WARWICK SCHOOL AND KINGS HIGH SCHOOL
ICELAND EXPEDITION
1989
REPORT
An account of the schools' first joint expedition to the
Snaefellsnes Peninsula western Iceland
EXPEDITION APPROVED BY
FOREWORD

Exploration and discovery are important aspects of education, as are opportunities for personal development. Combine these with the catalyst of enthusiasm and there exists some of the essential ingredients that went to make the Warwick and King's High Iceland expedition such a success.

These pages of print represent the report of the expedition and capture something of the experiences that all must have shared. There is no doubt that some of those involved experienced, for the first time, the exhilaration of Hillary ascending Everest when he took those "few very weary steps", and the determination of Scott "willing to undertake difficult enterprise". This enterprise would not have existed without the foresight, professionalism and sheer hard work of the team of staff led by Dr. B. Meatyard. The expedition was indeed lucky to have such an experienced leader.

It is a great pleasure and privilege to write a few introductory words to the report of the expedition. I welcome the opportunity to acknowledge its success and to pay tribute to all those involved.

Dr. Philip J. Cheshire
Headmaster of Warwick School and Expedition Patron
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PLATE 1a
The Members of the Expedition

The entrance to Vegamannahellir is in the right foreground and the summit of Snaefellsjokul is seen in the distance.

PLATE 1b
Climbing the summit ridge of Snaefellsjokull during the mass ascent.
The 1989 Warwick School Iceland Expedition comprised 6 Leaders and 21 student members. The expedition area was the Snaefellsnes peninsula on the west coast of Iceland, north of Reykjavik. Expedition dates were 11th July to 4th August.

Base camp was established about 4km south of Olafsvik near Geldingafell for the first week and subsequently on the south side of Snaefellsnes, 5km north of Arnarstapi.

Local vehicular support was obtained through the Hotel Nes in Olafsvik in order to move stores in and out of the base camps. Transport from Reykjavik was by bus, otherwise most personnel movement was on foot.

The expedition programme included three basic elements of training, fieldwork and adventure. Training for fieldwork had started in UK although techniques were revised in the expedition area to accommodate local conditions. This included various survey and map making techniques and botanical work. The main fieldwork investigation was a cave mapping exercise and photographic survey in the lava tubes known as Vegamannahellir, by the side of the track from Arnarstapi to Olafsvik, approximately 3km north of the ‘singing caves’, Songhellir. A botanical survey was carried out on Hroi, comparing the distribution of plants on north and south facing slopes with respect to altitude. A preliminary investigation to gather basic data on the size and fertility of the fern Polystichum lonchitis was also carried out. The occurrence and nature of stone patterned ground on moraines was also investigated.

Adventure activities included basic snow and ice training on the flanks of Geldingafell and Snaefellsnes icecap, crevasse techniques and ropework, and two ascents to the summit of the icecap. Mini-expeditions were organised to visit the sea cliffs between Hellsnar and Arnarstapi and the Londrangar Rocks, famous for their bird life, and to the ice-floored lava caves on the south coast, west of Londrangar rocks.

The expedition returned to Reykjavik and spent one day sightseeing on the ‘Golden Circle Tour’, including Gullfoss, Geysir, Thingvellir and Skalholt.

The weather throughout the expedition was very variable, including two sessions (36h and 24h) of continuous high wind and rain, but also several days of excellent clear sunny weather. Specially modified Vango tents coped admirably with the adverse weather.
INTRODUCTION AND AIMS

Most expeditions start life as a few ideas scribbled on the back of a beer mat, usually over a drink celebrating the end of the previous expedition. This one was no exception.

The idea of a Warwick School Expedition to Iceland was stimulated by Geoff Billington, of Woodlands School, Coventry, who had led an expedition to Snaefellsnes in 1987. Geoff and I had first met on a BSEES Expedition to Central Iceland in 1981 and had subsequently both worked on the 1986 BSEES Yukon Expedition as well as climbing together on local outcrops. Discussions with Geoff had indicated that the Snaefellsnes area was rich in possibilities for both fieldwork and adventure projects. Late in 1987 I discussed the outline proposal for a 1989 project with a few colleagues and it was clear that there was enthusiasm from both staff and students for an expedition. The then Headmaster of Warwick, John Strover, added his blessing and his enthusiasm was readily taken up by his successor, Philip Cheshire. Despite the paucity of Iceland experience on the Warwick staff there was much advice and great funds of information readily available through the Young Explorers’ Trust, The Iceland Travel Club and the Expedition Advisory Centre at the Royal Geographical Society. I was hoping for a group of about 24 students, but in the event 13 firm applicants came from Warwick School, thus the decision was made to open the project to our sister School, King’s High. This produced the enthusiastic support of Headmistress Jackie Anderson and 8 applicants.

No selection of members was carried out although several already had considerable relevant outdoor experience but all applicants were fully briefed as to the requirement for fitness and commitment to the aims of the expedition.

These were defined as follows:

1) To complete a fieldwork programme. This to be defined by the interests and experience of the leaders.

2) To train expedition members in safe techniques for travel on snow and ice and to make ascents of the icecap as part of an ‘adventure’ programme.

3) To see and experience something of Icelandic scenery, culture and way of life.

The over-riding aim was that through the above we should create the opportunity for experiential learning which would challenge the young members to acquire new skills and to assess themselves in a variety of situations which would be both novel and extensions of their previous experience.

In discussion with the Woodlands Expedition of 1987 it became clear that a most worthwhile fieldwork project would be to map a set of lava tubes which that expedition had visited. For this reason it was important that the leader team included competent surveyors with knowledge of cave survey techniques. In this we were greatly helped by a report of a cave survey carried out in Surtshellir by the 1st Claygate Selachii Venture Scout Unit in 1987. We also met their Leader, Alan Finch, at the 1989 Iceland Unit ‘Ping’ and were able to borrow several useful ideas. Our fieldwork would naturally include some biological work since two of the leaders were from the Biology Department at Warwick and it was decided that some basic aspect and altitude comparisons of plant species composition and diversity would be worthwhile. In the event we also found numbers of the fern Polystichum lonchitis, a national rarity in the UK and were able to gather some basic data on its growth form in the expedition area. I hoped that there would be sufficient flexibility among leaders and members alike to respond to other fieldwork opportunities as they presented themselves and in this I was not disappointed, the work on stone patterned ground being a good example of a project evolving in the field after the casual observation of features around base camp.

From little acorns....
PERSONNEL

LEADERS:

Barry Mettayrd - Chief Leader, Botanist and Mountaineer. Head of Biology at Warwick School. Previous expedition to Iceland in 1981, with BSE, other expedition experience in South America (Galapagos) and the Yukon. Many years of youth projects in Scotland, plus rock-climbing and mountaineering trips since student days (longer than he cares to remember). Mountain Leader Certificate.

John Cooper - Treasurer, Biologist and curator of tents. Biologist at Warwick School, many years of experience in fieldwork with A-level groups, experienced hill-walker and camper in UK, Canada and Europe.

Peter Johnson - Surveyor, Food quartermaster and Morris Dancer. Physicist at Warwick School. Previously worked with Scouts as Project Leader for Leadership Development, Queen’s Silver Jubilee Project for 3 years. Experienced hill-walker and caver.

Diane Stenton - Geographer graduate of Coventry Polytechnic. Duke of Edinburgh Silver Award.

Nicola Johnson - Geographer graduate of Coventry Polytechnic. Previous expedition experience in Norway, fieldwork experience as tutor at Kindrogan Field Studies Centre.

Richard (Pip) Piper - Mountaineer and rock-climber. Student Youth Worker at Westhill College. Work experience as instructor in outdoor centres and Duke of Edinburgh Award groups and youth work with Warwickshire Association of Youth Clubs.

MEMBERS:

Warwick School:

Keiron Alexander
Charlie Atkinson
Richard Cuthbert
Fraser Harban
Martin Howard
Alastair Kirk
Matthew Palmer
John Roberts
Jon Scott
Guy Sudbury
Julian Tombs
Mike Whelan
Hugo Wilson

King’s High School:

Catriona Lapsley
Abigail Sheridan
Abigail Stableforth
Rachel Willet
Louise Pratt
Shona Schofield
Christine Jackson
Helen Wood

Survey A:

Keiron Alexander
Fraser Harban
Mike Whelan
Alastair Kirk
Matthew Palmer

Survey B:

Julian Tombs
Jon Scott
Catriona Lapsley
Shona Schofield
Christine Jackson

Survey C:

Nicola
Diane
Pip

For reasons of organisation and logistics the expedition was divided into four fieldwork project groups which stayed together for most of the expedition activities.

Botany

Survey A

John Roberts
Hugo Wilson
Richard Cuthbert
Abigail Stableforth
Rachel Willet
Abigail Sheridan

Survey B

Barry / John

Nicola

Survey C

Charlie Atkinson
Guy Sudbury
Martin Howard
Helen Wood
Louise Pratt

Diane

Peter

Pip, as mountaineer leader, was responsible for the snow and ice training phases with Barry available to fill in as required on fieldwork or mountaineering. For hikes in the latter part of the expedition a less rigid framework evolved with groups forming depending on interest for climbing or hikes. Less supervision by leaders was applied for this where appropriate.
THE EXPEDITION AREA

Base Camp was established under 'Geldingajökull' about 4km south of Olafsvik on the Snaefellsnes peninsula. The camp was later moved to the south side of Snaefellsnes owing to poor weather experienced on the north and improved logistics for carrying out the expedition's aims. The Snaefellsnes peninsula extends some 80km westwards from the mainland of Iceland, approximately 100km due north of Reykjavik. As such it is at the mercy of any weather system crossing the north Atlantic. High winds seem to be a characteristic of the area and these are compounded by local effects of Snaefellsjokull, rising 1446m above see level and supporting a small permanent icecap of about 15 sq km.

Snaefellsjokull is believed to have magical powers and attracts pilgrims from a variety of mystical cults to sample its aura. Magical or not it certainly has powerful weather and confined us to our tents for three days in the first week with steady force 8 gales and gusts which lifted at least one of the leaders clean off his feet. The mountain inspired Jules Verne's classic story 'A Journey to the Centre of the Earth' and Professor Harwick's party entered the Earth through the Snaefellsjokull crater. A fanciful story perhaps, but the many lava tubes that permeate the southern flanks and which were the subject of part of the work of this expedition certainly give the impression that one is entering a world beyond the usual experience. It was certainly not difficult to appreciate the inspiration for Verne's story.

The first night's camp was on the official campground at Olafsvik, a fishing town of some 1,100 people, on the north side of the peninsula. With the help of local support base camp was then established further up the mountain, near the site of the Woodlands 1987 base. Snow conditions were not as expected and the snow line was much lower than anticipated. Local information suggested that the snow was some 7 weeks later than usual due to heavy falls in the winter and a cool spring. Base camp was thus established at the nearest convenient spot to the snow line.

Olafsvik is a busy town and we were able to obtain all necessary extra supplies such as paraffin (steinolja) with no problems. It also has a modern and efficient medical centre, a heated swimming pool, and a cafe that serves excellent coffee and local fish. It was here that the members of the expedition frequently impressed the owner with their sophistication as international gourmets by consuming vast quantities of chips.

Snaefellsjokull is a composite volcano and the northern flanks are dominated by complex moraines and the outlying eroded core of Hroí, consisting mostly of the agglomerate palagonite rock that characterises much of the area, with a cap of noticeably eroding basalt. Hroí overlooks the town of Olafsvik and formed the basis for one of the botanical projects.

There is a track, Jökulsárs, passable by four-wheel drive vehicles, running from Olafsvik immediately to the east of Snaefellsjökull to Arnarstapi on the south coast. Throughout the whole of the expedition period this track was impassable due to snow cover and it was necessary that any wheeled vehicle negotiated it fully in 1989. The track was well used up to the snow line by tourists, mountaineers and members of a skidoocub club. Movement of base camp to the south side of the peninsula thus required transport via Olafsvik on the well used road further east. This road is a bus route and is preferred by the locals to the probably equidistant coast road via Hellisandur and Dritvik. One trip was made around the coast road which affords magnificent views of wild open country and the south west flanks of Snaefellsjokull itself.

The southern flanks of the mountain have less moraines but more prominent lava flows of different ages and this flank is almost certainly honeycombed with lava tubes. Near the coast, about 3km from Latangar Rocks are the caves, some of which are ice-floored and known locally as 'Ishellir' (Ice-cave). The roof of some of these is in excess of 4m high and in some places the caves are at least that in width. By the side of Haukafoss to the north of Arnarstapi are the 'Songhellir' (singing caves) which are of eroded palagonite and not lava tubes. Further north from these are the series of lava tubes 'Vegamannahellir' (the road-man's caves) which formed the basis of the cave survey project of this expedition.

The cave itself is not technically difficult and the crevassed areas are fairly obvious to the experienced eye. A few groups made the ascent while the expedition was in the field with some parties being pitifully under-equipped for what can be a demanding mountain in uncertain weather. Snow conditions were poor during July although two ascents were made, one from the north and one from the south. The route from the south was quicker and more straightforward given the snow line and snow conditions. The day before we arrived in Olafsvik a Dane had fallen into a deep crevasse, although fortunately he was not seriously injured. The British Embassy in Reykjavik was consulted by the mountaineering experience of the leaders and our equipment.

Snaefellsnes is a most interesting area for a youth expedition and offered everything that we were looking
PLATE 2a

Descending in the late afternoon to Vegamannahellir base camp. The orange tents are just visible in the middle distance on the left. Arnarstapi is visible on the coast behind the dark mass of Stapafell.

PLATE 2b

Getting to grips with every day life in the first base camp under Geldingafell. Abi, Schona, Keiron and Mike doing a few basic chores.
for in pursuit of our aims. The mountain has a genuine 'alpine' feel to it - unlike the rounded summits of some of the higher and larger icecaps, and there are a wealth of fieldwork prospects and opportunities. The people of Olafsvik were helpful, interested in what we were doing and most supportive of the project. They also thought that we were somewhat eccentric in choosing to camp on the mountain in such appalling weather. It is this latter factor that is so obviously the area's drawback. We were fortunate in having our basecamps well positioned so that we could make maximum use of the breaks in the weather and the few excellent days that we did experience.
EXPEDITION DIARY

a) Pre-Expedition

October 1987  Idea of Expedition Launched.  
November 1987  Planning a Small Expedition Seminar at RGS  
January 1988  Preliminary Approval given by Young Explorers' Trust  
March 1988  Application for Announcement from Icelandic Research Council.  
October 1988  Planning a Small Expedition Seminar at RGS.  
January 1989  Formal Approval given by YET  
March 1989  Training Day and Camp at the Roberts' Farm.  
April 1989  Approval given by Royal Geographical Society.  
June 18th  Packing day.  
June 27th  Final briefing meeting.  
June 30th  Kit dispatched to Ryders Freight for shipment from Immingham by MSF.  
July 11th  Expedition travels to Iceland.

b) On Expedition

July 11th  Expedition met at School. Travel to Heathrow
          Evening flight to Keflavik, transfer to Reykjavik
          Arrive Hvassaleitiskoli, Reykjavik at 11.30 pm.
          Customs clearance of equipment shipped in advance
          Bought Steinolla in Reykjavik
          Reported to British Embassy
          Day spent sightseeing and sampling the hot pools
          Met up with Malvern College Expedition at Hvassaleitiskoli.
          Bus to Olafsvik, arrived Olafsvik campsite 2 pm
          Reported expedition to Police and Mayor’s office
          Organised transport to base camp via Hotel Nes
          Met leaders of Sevenoaks Expedition
          Evening hike up Hroil.
          Transported equipment to base camp. Which was established under Geldingafell at edge of snow line. Recce for suitable snow and ice training area.
          Botany group started snow and ice training on Geldingafell
          Survey groups started preliminary fieldwork - patterned ground survey and map of base camp area.
          Botany group continued snow and ice training and made ascent of ice cap in deteriorating weather.
          Survey of base camp area, patterned ground survey, observations of river development in valley leading down to Rif. Weather worsening from midday on.

17th  Storm started during the night still raging.
18th  Confined to tents for much of the day.
19th  Weather cleared during morning
       Botany group recce Hroil in afternoon
       Base camp and river survey recommenced.
       Survey B started snow and ice training
       Barry and Nicola went via Olafsvik to Arnarstapi by bus to recce lava tubes. Returned late pm direct from south.
       Two sleeping bags dried out by Hotel Nes
       Weather deteriorated again in evening.
20th  Another day of rain and high winds - no chance of work
       Some members went to Olafsvik to seek solace in Cafe
       Arranged transport to take group to lava tubes.
       Weather improved
       Peter and Nicola + Survey C moved to lava tube area to establish satellite camp
       Survey A to Snow and Ice training.
       Botanists completed survey of south side of Hroil
       Pip took Survey A across the snow to lava tube camp and back.
       Diane continued base camp survey
       Decision taken in consultation with Pip to move Base Camp to south side of mountain to join lava tube satellite camp
       Cave survey started
       Weather worsened again in late evening
23rd  (Sunday) Atrocious weather during the night
       Church party thwarted in attempt to go to local service which was a wedding at which we were clearly not welcome.
       Arranged transport to move base-camp
       Botanical survey of north side of Hroil completed.
       Cave survey continued.
24th  Base Camp moved to Vegamannahellir
       Survey C hike to ice caves and Londrangar Rocks
       Satellite camp established near ice caves
       Midnight hike for some.
25th  Fine, clear morning - mass ascent of Snaefellsjokull.
26th  Photographic work in Vegamannahellir
       Hikes to Helinar, Arnarstapi and ice caves
       Rock climbers investigated possible climbs around Songhellir.
27th  Rock climbing
       Group to ice caves.
28th  Hikes to ice caves, Londrangar rocks
       Satellite camp near ice caves cleared.
29th  Snow and ice training and crevasse climbs
       Rock climbing Songhellir area.
30th Further botanical work - general survey W of Stafafell plus Polystichum lonchitis survey.
Advanced snow and ice training
Started packing kit for move back to Olafsvik.

31st Kit packed and ready to go by 1100
Main group hiked back to Olafsvik
Barry and Pip travelled with kit via coast road
via Driftvik (also trip to Hellisandur garbage tip
with our rubbish)
Camp established Olafsvik camp site
Camp fire on beach until the small hours.

August 1st Free day in Olafsvik with water polo marathon in
municipal pool and jacuzzi.

2nd Kit repacked for shipment to UK
Bus to Reykjavik and Hvassaleitiskoli

3rd Golden Circle Tour
Kit for shipment to UK dropped off at Eimskip
Tour to Thingvellir, Skalholt, Geysir, Gulfoss,
Eden and Kerid in excellent fine sunshine
Convivial evening in Hard Rock Cafe with members
of Malvern and Woodlands Expeditions.

4th Early start (0415) for transfer to Keflavik for
flight to Heathrow
Arrived back at School 1530.

Post Expedition

9th Kit arrives at MGH, Immingham
12th Preliminary Report produced
17th Kit arrives Warwick
19th Unpacking Day.

CHIEF LEADER'S REPORT

It has justifiably been argued that the greatest resource
that any generation possess is the potential of
character of its young people. Despite current
educational trends and attempts to 'profile' an
individual's achievements and personality this strength
is virtually impossible to quantify or define in absolute
terms. It is common practice in the Young Explorers' Trust
and other Youth Organisations offering outdoors
experience to young people to promote the notion that the
pursuit and achievement of realising and doing
Expedition Environment is an appropriate medium in which
to develop technical skills, self-reliance, self-
confidence and the personal skills needed to work as an
effective team member in hostile and demanding
situations. Such skills all serve as components of
caracter development and should be at least as valued as
academic excellence by prospective employers. The aims of
this expedition were thus no different to many others in
attempting to provide such opportunities through a
programme of fieldwork and adventure which would
hopefully prove interesting, as well as challenging the
members to acquire new skills and develop existing
experience. Philosophy aside it was also intended that it
should be fun.

The key element in achieving the aims of a youth
expedition is the leader team and with such a relatively
small group it was important that leaders should be as
far as possible 'dual-purpose'; being able to offer both
fieldwork and adventure skills. It is also important that
leaders should be in tune with the aspirations of young
people and be able to develop a structured yet flexible
programme to enable maximum use to be made of the
opportunities offered by the expedition location and
environment. Leadership style should be flexible enough
to allow 'hands off' supervision when the opportunity
arises to enable young members to think and plan for
themselves, whilst at the same time maintaining
sufficient safety cover when the need arises. Selection
of leaders took these criteria into account.

John Cooper had many years of A level Biology fieldwork
under his belt and was himself an experienced camper and
hillwalker, as well as having accompanied the School on
trips to Scotland. He had also been in the field for part
of the BSEF Yukon Expedition in 1986 and had been in on
the Iceland discussions from the outset. Also on the
Warwick Staff was physicist Peter Johnson, who declared
that he could learn to survey if that was wanted —
he is now a skilled cave surveyor. Peter had worked with
the Scouts on development training and leadership skills
during a few years spent out of teaching. He also had
caving as well as considerable camping and hillwalking
experience. Since the expedition area offered considerable mountaineering prospects it was important that at least one other leader with specialist technical experience was recruited and I was delighted when Richard (Pip) Piper agreed to join the project. I had met Pip through a Churchill Fellowship contact while he was working for Warwickshire Association of Youth Clubs and it was clear that he would have much to offer as well as to gain in his career as a Youth Worker. Since I had invited applications for the Expedition from King’s High, I had hoped to interest at least one female member of staff as a leader but in the event this was not possible having just graduated from Coventry Polytechnic. She had worked at Kindrogan Field Studies Centre and had also done geographical research on a student expedition to arctic Norway. She was joined by the last moment, by Diane Stenton, also of Coventry Poly. Despite her late recruitment, Diane survived an evening of rock-climbing and an Indian meal with Nicola, myself and the leaders of the 1989 Woodlands / Loughborough Expedition and was duly certified as being resilient enough to join the expedition.

Since no selection criteria were applied to the student members it was made clear that all expedition members would be expected to show commitment to the aims of the project. It was stressed that the Icelandic environment was far from predictable and could be a daunting one in which to camp for three weeks. In the event only one person who paid the initial deposit dropped out. Several of the early applicants were able to attend two YET Iceland Units ‘Pings’ and the 1989 one at Denbigh had provided the opportunity for some introductory snow and ice training on Moel Slabod as well as getting the feel of Icelandic expeditions. One of the members, John Roberts, was a keen climber and had been a member of the 1988 BSES Greenland Expedition and several of the others, notably Richard Cuthbert, had shown considerable rock climbing prowess on CCF Adventurous Training camps and School climbing trips to Derbyshire. It was hoped that we could use their experience to further the aims of this expedition (see Adventure Activities Report). An overnight camp and training day took place in February at the Roberts’ farm near Daventry. This was for all members to acquaint themselves with the modified tents, cold conditions and Primus stoves. We were most grateful for the use of the facilities on the farm for this important introduction to expedition life.

The administrative run up to the Expedition was greatly eased by the support and wealth of experience available from Tony Escritt of the Iceland Unit of the YET and the contact that we had with the leadership of the the 1987 Woodlands Expedition. We applied early for YET Approval and this was granted at first approach, giving the project a seal of approval. This Approval was ratified in January 1989 and the YET then conferred on us the honour of putting the project forward for Royal Geographical Society Approval which was subsequently granted. In the meantime an application for an Announcement had been made to the Icelandic Research Council. An Announcement is the appropriate documentation for youth expeditions and in the past has been a certificate relieving a bona fide expedition of import tax on food which is prohibitively expensive in Iceland. In the event we discovered that this is not necessarily the case but nevertheless the granting of the Announcement is an important public relations exercise.

The planning of the expedition had started back in the autumn of 1987 and in the intervening months we had planned, organised, raised funds and found out as much as possible about Iceland in general and the expedition area in particular. It was not deemed necessary to do a recce due to the excellent information available from Geoff Billington and the Woodlands 1987 Report. Two weeks before we departed we packed our food and equipment into a van loaned to us by Peugeot Talbot and this was driven by Peter Johnson to a freight agency in Birmingham for onward shipment to Innham and Reykjavik. For most however the Expedition started at the flurry of goodbyes and anxious parents outside the Glyn Nelson Hall as we departed for Heathrow and the evening flight to Reykjavik on the 11th July.

On arrival at Keflavik we transferred by coach to Hvassaleitiskoll Reykjavik, a journey of some 35 min. which was met by Kristjan Sigmundsson who looks after visiting groups such as ours during the long Icelandic summer vacation. Hvassaleitiskoll means ‘school on the windy hill’ and this was an appropriateomen for what we were to experience in the next few days!

The next day for most was spent sightseeing in Reykjavik with the obligatory visits to the main swimming pool and its geothermally heated delights of jacuzzis and hot tubs - a really rugged start to the expedition. The important task of the day was to retrieve our kit from the Eimskip warehouse at Sundahofn and clear customs. Following the routine in Tony Escritt’s ‘Handbook for Expeditions’ we presented ourselves at the main customs office in Tryggvagata with our paperwork. Here we were told that the regulations had changed and that we would be liable for import duty on our food and that the most prudent course of action would be to put the whole matter in the hands of a broker. We had no option but to comply and duly
approached the offices of Flutningsmiðiðin, just over the road. At first they were rather unsure whether what we required could be done that day but suggested that we called back later. By three in the afternoon we were told that we could collect our kit from Eimskip. We were most grateful for this efficient and prompt service and suggested that future expeditions would do well to use the same method for clearing customs, particularly as it leaves stressed and harassed leaders free to adjourn to the pool for a while. Such procedures could be arranged by letter before the expedition arrives in Reykjavik. At the time of writing we have not been invoiced for any duty or handling charge, despite what we were told. However there was no mistaking Peter's relief and joy when we were reunited with our 35 kit bags and box that were then loaded on to a Sendibíl for transport to Hvassaleitiskóli. Other tasks completed in Reykjavik included the purchase of paraffin (Steinolla) and reporting to the British Embassy.

The following day we loaded our equipment into the cavernous bowels of the service bus and set off for Olafsvik. The journey along the western coast road via Borgarnes is truly spectacular and the mountainous interior of the Snaefellsnes peninsula looked inviting in the fine weather, culminating with a tantalising glimpse of the summit of Snaefellsjökull itself as we arrived at the Olafsvik campsite.

We arrived at Olafsvik at 2pm, established our camp and went up to town to announce ourselves at the Station and the Mayor's Office, where we were given permission for our camping and fieldwork proposals. The Hotel Nes seems to operate as the town's nerve-centre for organising excursions, buses, local transport and guides and drying sleeping bags. We are grateful to them for assistance in all of these. Through the Hotel Nes we met Saevar Ingsson with his Ford Custom van who became our transport officer and a very good friend. Saevar already had an interest in the lava tubes of the area and knew the mountain well, being a member of the local skidoos club. He arranged with Saevar to transport our equipment up to the snow line on Snaefellsjökull to establish our base camp. The snow line was much lower than we had anticipated and Saevar's estimate was that the melt of the winter snow was about seven weeks late. We therefore had to establish our camp lower than anticipated, although this did not hamper the expedition programme and possibly saved us from disaster in the subsequent storms.

The outline plan for the expedition was that during the first phase each of the four groups should go through a two day snow and ice training programme in turn, with fieldwork continuing for those not on the icecap. In the event this had to be modified, due mainly to the vagaries of the weather and partly to the movement of our base camp to the other side of the mountain. However by taking our chances as they presented themselves all members got the opportunity to learn safe techniques for movement on the glacier and to make an ascent of the mountain.

The botany group were able to make an ascent of the icecap on the second day of their snow and ice training, but the weather deteriorated and by the evening of 16th July a real storm was brewing. This ran unabated for 36 hours, confining all but the hardest (and desperate) to their tents. We estimated that for 24 hours this period it blew Force 8 continuously with gusts well in excess of Force 10. Clearly there was no option other than to sit it out. By luncheon time on the 18th there was a break in the weather which occasioned frantic activity, relanscaping the site and attempting to dry ourselves out. The scene could well have been the inspiration for the After the Storm 5th Movement of Beethoven's Pastoral Symphony. The activity led to a recommencement of fieldwork with high morale considering the frustrations of the storm.

On the 19th however the weather closed in again and rather than sit tight again several adjourned to the flesh pots of Olafsvik and baskets of chips. Nicola and I went down to Olafsvik to take a bus across the peninsula to the mouth of the lava tubes. It was decided that we do this rather than hike across from our base camp since the track was well covered with snow and the low cloud gave poor visibility. The bus dropped us at the end of the track near Arnarstapi and we started taking in Songhellir and much unnecessary searching we eventually found the caves by the side of the track, lucky just below the snow line. The entrance could so easily have been covered. We returned to the bus across the peninsula - a difficult trek with 30m visibility in virtual whiteout. We were certainly glad to pick up a vestige of the track as it crossed a moraine about 1km from our camp. The weather deteriorated yet again in the night and the decision was made to transport one survey group with Peter and Nicola across to camp by the cave, where at least they could work underground, relatively unhampered by the weather. On the 21st this was duly done in improved weather and another group were able to venture on to snow and ice training with Pip. Meanwhile we had to evacuate Christine to the medical centre in Olafsvik with an infected cut in her finger and to collect the two sleeping bags that the Hotel Nes had kindly dried out for us.

The 22nd was again a good day and Pip had managed to get across the peninsula to the cave camp with his training group, having marked the route with cairns. They returned with stories of green and pleasant lands, shelter and an
unwillingness of the cave survey group to return as planned since they were making good progress on the cave map. The decision was then taken to shift the whole group to the cave camp to give everyone the opportunity to experience the caves and to continue fieldwork on the other side. Access to the icecap was also easier from this side, as were the attractions of the coast—Londrangar Rocks, the bird cliffs and the ice-caves. This decision proved to be crucial and gave rise to a much wider range of opportunities. We arranged transport with Saever for the 23rd. The night of the 22nd confirmed our decision. I realised that rather than sleeping out on a cold February night in Daventry, we would have done better to spend our training day camped in a high powered car-wash.

We discovered at this time that north and east Iceland had been a heatwave with temperatures around 27°C and that there were even higher temperatures and drought back home. Some of us think that Life is a bit like that...

The new base-camp proved ideal but revealed some peculiarities of the weather on Snaefellsjökull. When the wind blows from the south the place not to be is on the north side of the icecap, and vice versa. A local funnelline effect seems to accelerate the wind down the lee side of the mountain where common sense tells one that there should be shelter. Snaefellsjökull is a magic mountain after all.

The lava caves, Vegamannaheilir, proved to be one of the highlights of the expedition. Certainly they are among the most fascinating of any of the natural features that I have been lucky enough to have experienced. Our map, which is almost certainly the only detailed one in existence, has created interest amongst cavers back in Britain. A full account of their structure and our survey work appears elsewhere in this report.

On the 25th July, the morning dawned fine and clear with the top of the icecap glistening in clear blue sky rather than its customary shroud of grey cloud. A mass ascent was ordered and all those willing and able to go made it to the top in what was a memorable mountain day. Despite the disruption to the programme caused by the weather we did seem to be achieving our concrete aims with reasonable success. The new base camp gave the opportunity for groups to hike down to the coast and a small satellite camp was established close to the ice caves near the crater Pukholar, west of Londrangar Rocks. It also gave the options of rock-climbing and more botanical work. From this camp it was also possible to gain access to good areas for snow and ice work for those who had been denied earlier on, with some groups going on to do more advanced work or to entertain themselves in a crevasse.

On the 31st we had arranged to return to Olafsvik with our now diminishing pile of kit as we ate our way through the food and again Saever and friend Kristjan were most helpful, using their skidoo trailers to augment the carrying capacity of the Custo van. The return was celebrated with a beach party with the locals and a marathon water-polo match in the municipal swimming pool.

Having said our goodbyes in Olafsvik and reporting to both the Police and Mayor's Office we returned with wet tents to Reykjavik by bus in suitably gloomy weather. Back at Hvassalettokir Kristjan suggested we dried our tents under the porch. This was quite effective but we had decided that it would be more sensible to take the tents and flysheets back on the plane and send the poles and pegs with the sea freight to save weight. This would enable us to dry the tents thoroughly back at School. On the morning of the 3rd August the bus arrived for our Golden Circle Tour with an initial stop off at Eismkip to drop our freight at the dock. Again the documentation was handled efficiently by both Eiskip and Flutningsmidur and we were able to relax and enjoy the splendours of Geysir, Gullfoss, Thingvellir and Skalholt in magnificent sunny weather. After a rather long but convivial evening spent in the company of both the Woodland Schools and Malvern College Expeditions at the Hard Rock Cafe we rose early for the transfer to Keflavik, the early morning flight, and the return to Heathrow where we said farewell to Pip and Diane before heading back to Warwick by 3.30pm on 4th August.

The sea freight arrived back on 10th August and was cleared by customs ready for road freight to Warwick under the auspices of MSG at Inmingham. All returned kit arrived safely at Warwick on 17th August. The main phase of the expedition was completed.

The success or otherwise of such a project is usually judged in retrospect. As a group we set out to achieve certain concrete aims and in this we were successful. We had climbed the mountain (twice), we had surveyed the lava caves, we had completed the fieldwork programme and provided the opportunity for increasing our knowledge of a very special country. However I would not wish the success of the project to be based on such tangible achievements. The aims of this expedition were vehicles for more far-reaching goals. The achievements involved in the completion of the various components are insignificant in the light of what each individual gained personally from their participation in the project. For the young members of the expedition to have come through such appalling weather conditions as a cohesive group who supported each other and shared their strengths and
weaknesses in pursuit of common goals was a magnificent achievement and I hope has been an experience from which they will draw much confidence in later walks of life, wherever they may be. I'm sure they would join with me in thanking the leader team for providing the many opportunities. However my thanks must ultimately go to the young members themselves for their enthusiasm and commitment, and for making the whole venture from conception to completion so worthwhile.

THE FIELDWORK PROGRAMME

The completion of a fieldwork programme was one of the major aims of the expedition. However it was realised that given the level of experience of the expedition members and the time available the fieldwork component should represent an educational exercise rather than to attempt to produce results which would stand up to intense scientific scrutiny. However it was also appreciated that a survey of the lava tubes would produce original results that might be of interest to the wider scientific and caving community.

The members of the expedition were organised into four groups, loosely based on their pre-expedition preferences, as listed in 'Personnel', although it was the intention that sufficient flexibility should be retained so that all members could experience all of the aspects of the fieldwork programme if they wished. The fact that all fieldwork was done from the same base camp rather than satellite camps (apart from the initial cave survey camp) greatly facilitated this. It was thus possible for example for all groups to experience and contribute towards the work carried out in the caves.

The fieldwork leaders were given an open brief to develop projects in association with the student members and this proved a fruitful approach. Indeed it could be argued that the one piece of 'true science' on the project was the study of patterned ground. This arose as a result of a casual observation of patterns in the stony ground and was then developed to see what effect the topography had on the degree of patterning and to see if the patterns fitted the generally accepted model for this geomorphological process.

Fieldwork was allocated about one week of the time that the expedition was in the field and this proved adequate to complete the projects.
Lava tubes are a frequent feature of the Icelandic volcanic landscape. Lava tubes are formed when a lava flow starts to cool and set on the surface, but continues to flow underneath. Since the lava itself is a good insulator, a high enough temperature may exist inside the flow for a considerable time in order to maintain a liquid core. The flow tends to be in distinct channels and when the source of the liquid lava is exhausted the channel drains and leaves a hollow tube or cave. These caves show a number of spectacular and unique features which make them worthy of study.

The lava tubes known as Vegamannahellir formed the subject of this the expedition's survey work. We had had enthusiastic reports about the caves from the 1987 Woodlands Expedition and had planned to visit and survey them if this proved feasible. The name means 'the roadman's cave' and we were told locally that they were discovered in 1964, presumably when work was being done on the track. As far as we know there has been no previous survey.

The project was started by Survey C with Peter and Nicola, working from a satellite camp by the cave entrance. Subsequently this camp was moved to this site to allow further work. The entrance to the cave is 2m from the west side of the track and is marked by a cairn approximately 2 km north of Songhellir at an altitude of about 1420m.

The entrance is complex and is formed by a collapsed section of the roof. This is about halfway along the main part of the system which extends for some 350m in a NW/SE direction with a fairly constant slope of about 15% which is the same as the surface above. The main part of the cave was surveyed with some accuracy, and a preliminary survey was made of the muddy, branching network which leads from the entrance and runs south to the east of the main cave. Measurements were also made of two caverns, one just beneath the entrance (John's Hole) and one halfway along the upper tube (The Big Hole).

The entrance is a crawl with a roof height of about 60cm and probably deters the casual visitor. The main cave has an average height of 1.7m and width of 2.0m. Movement in the cave was relatively easy, though helmets were essential as the walls and ceiling were very rough. When the weather was bad on the surface the cave became very wet as water dripped from the roof and disappeared through the floor. Only at the lower end was there any evidence of water flow through the cave. Fumarole gravel had been carried down and formed a blockage which
Magnetic compasses were of no use in the cave. In experimenting with these it was found that the magnetic field followed the line of the lava flow so that the needle pointed along the tube itself, although even this was not constant.

The survey was carried out using a home-made cave theodolite, mounted on a camera tripod. Control points were marked with tape at intervals along the tubes and measurements of distance, relative bearing and elevation were made between each point. Having fixed the tripod at each point and set a horizontal protractor from the previous bearing, the next bearing could be taken. The angle of elevation between points was measured using a second protractor mounted vertically above the first. The theodolite was kept at a fixed height from the floor except where the headroom did not permit, when readings were taken from floor level, with a little more difficulty. Bearings were checked by back-bearings and are probably accurate to within plus or minus one degree, although since the method used is subject to accumulative error the directions of the more remote parts of the tubes are the least reliable. The map of the caves is shown in Fig. 1.

The team of six worked well. Two moved on to fix the next point, taking the end of the tape-measure with them. One remained at the previous point for backsighting, two operated the theodolite and one kept the records. At each point a profile of the tube was drawn and a description made of any significant features. Conditions in the caves meant that about two hours of surveying could comfortably be completed at a time and the exercise was completed in five such sessions after a preliminary exploration. Other groups then subsequently explored the caves and one completed a preliminary survey of the muddy, branching tubes to the south east of the entrance. Finally a series of photographs were taken along the length of the tubes.

The cave cross sections (Fig. 1) are approximately circular, though the floor is usually fairly flat. The floor was typically loose and angular blocks of varying sizes where the residue of the lava flow had cooled and set. This can best be described as looking like the clinker at the bottom of a coal fired boiler, although in some places it showed typical 'pahoehoe' features of smooth coils and ridges. The lower part of the walls is typically smooth, with the upper part and roof showing an abundance of lava beards, small stalactites and a white crystalline deposit. There were occasional rock falls, but the most significant feature is the prevalence of a rock shelf about 30 cm above the floor, some 40 cm wide but only a few centimetres thick. In places this is scoured
PLATE 3a

Inside Vegamannahellir near cross-section G (see Fig.1). The general features of the tube can be seen including the clinker like appearance of the floor, the white crystalline deposits on the roof and a prominent section of the 'tide-mark' shelf.

PLATE 3b

A more detailed view of the flow marks along the length of the tube. Lava 'stalactites' can be seen under the tide mark and the pahoehoe nature of the lava is shown.
out underneath so that the widest part of the cave in these regions is under the shelf. The shelf runs for the majority of the length of the cave and presumably represents a ‘tide mark’ of the liquid lava flow. The general features of the caves are shown in the photographs (Plates 3 and 4). We were not able to date the caves, although the whole area shows evidence of a series of successive lava flows.

The caves are in magnificent condition and it was easy to imagine the flow of liquid rock which caused their formation. There were a few visitors to the caves during the expedition, including one group of experienced potholers, but it appears that visitor pressure is generally low and there is little sign of erosion and damage. We removed our survey markers together with a small amount of litter and it is to be hoped that the remoteness of the caves and the difficulty of the entrance will ensure that they remain in the pristine condition in which they have remained for the past few thousand years.
A general view of Vegamannahellir near section P (see Fig.1).
The various features described in the text are clearly visible and this area exhibits particularly clearly the smooth laminar flows just above floor level which contrast with the block lava of the floor itself. This view of the cave is typical in exhibiting the virtually undamaged original condition of Vegamannahellir.
The Snaefellsnes peninsula provides a wide variety of habitats supporting a varied flora. Although a detailed species list was not compiled it is apparent that given the diversity of habitats, from sandy beaches through agricultural land to mountain tops, there are over 100 species of vascular plants to be found in the expedition area. Some of these such as Polygonum viviparum, Polygala lutea, Botrychium lunaria, Pyrola minor, and the orchids Corallorhiza trifida, Coeloglossum viride, Listera cordata and Habenaria hyperborea are national rarities in the UK or confined to very specialized habitats.

For various reasons it was decided to keep the botanical work simple so that all members of the Botany group could contribute without having to learn great numbers of species. A preliminary day was spent simply looking at plants and learning the names of the more common and obvious vascular plant species. An investigation which relied on this basic knowledge could then be attempted.

1) THE BOTANY OF HROI

We set out to make observations on the flora of Hroi, the eroded volcanic plug that overlooks Olafsvik. In making this survey we set up three hypotheses:

1) That species diversity would be expected to increase with decreasing altitude.

2) There would be expected to be variations in species composition with respect to altitude.

3) The differences in aspect on the north and south facing slopes would influence 1) and 2) above.

Methods:

Transect lines were set up on the south and north facing slopes. At 50m intervals down the slope, starting at the summit, the number of species present and relative abundance of each species was recorded for each of 10 stations. Six one metre square quadrats were randomly placed at each sampling site and the abundance of each species was recorded on a simplified percentage cover basis. This 'cover' value was essentially the Braun-Blanquet scheme as follows:
The total number of species recorded in the six quadrats at each station are shown in the following table:

<table>
<thead>
<tr>
<th>Percentage Cover</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>75-100</td>
<td>5</td>
</tr>
<tr>
<td>50-75</td>
<td>4</td>
</tr>
<tr>
<td>25-50</td>
<td>3</td>
</tr>
<tr>
<td>5-25</td>
<td>2</td>
</tr>
<tr>
<td>1-5</td>
<td>1</td>
</tr>
<tr>
<td>Isolated</td>
<td>X</td>
</tr>
</tbody>
</table>

An average cover value for each species at each of the stations was calculated by totalling the values of each of the quadrats and dividing by the number of quadrats. Species which were awarded a 'X' or had a cover value of 1 in less than half the quadrats were recorded as additional species, and no numerical value assigned to them other than 'X' (see Table 2). In practice a 'X' in Table 2 always represents a cover value of \(< 0.5\), but this designation also includes some species which occurred only once in six quadrats.

The results of this survey are shown in Table 2.

**Table 1**

<table>
<thead>
<tr>
<th>Station</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
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<td>North</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>South</td>
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<td>9</td>
<td>10</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>18</td>
<td>17</td>
<td>18</td>
<td>21</td>
</tr>
</tbody>
</table>

**Discussion:**

a) **Species Diversity**

On both north and south facing slopes there is an increase in the number of species present in the sampled areas with decreasing altitude. This is particularly marked on the south slope, but less so on the north slope where the total number of species is generally lower.

The north face of Hroi is altogether a less stable environment than the south slope. Hroi is an eroding volcanic plug of palagonite and basalt and the north face is particularly unstable with active scree formation very obvious. Scree formation is also occurring on the south side, but it was a more consolidated slope and certainly easier (and safer) to move around on than the north side.
PLATE 5a

The first base camp under Geldingafell looking north. The river in the foreground was the subject of the stream study (see text). The photograph was taken just before the first big storm.

PLATE 5b

The botanists at work on Hroi. To save both weight and bulk simple string quadrats were used. The site is about half way down the flank of the south slope.
Microclimatic factors also presumably play a part in determining the observed differences in species distribution, although no environmental monitoring was done as part of this study. The north slope receives less light than the south slope although given the proximity of the area to the Arctic Circle, the amount of sunlight is probably a critical factor only in the spring. Of more importance are likely to be the temperature effects of solar radiation and the south slope is on average likely to be warmer than the north slope.

The effect of aspect and shelter is more difficult to determine. It is tempting to think of the north side as being a harsh and exposed place, yet the predominant wind direction during the expedition was from the south, making the north flank of Hroi relatively sheltered. An additional factor is that Snæfellssjökull itself probably also exerts an influence on Hroi. As recorded elsewhere in this report when the wind blew from the south, the north side of the peninsula seemed the most affected and vice versa. Clearly the position of Hroi on the Snæfellssnes Peninsula and its proximity to Snæfellssjökull provide a complex variety of microclimatic factors that warrant further investigation.

b) Species Composition

Table 2 shows the structure of the vegetation on the slopes of Hroi together with aspects of zonation of individual species. The overall pattern is of a typical arctic alpine heath dominated by Empetrum nigrum and Salix herbacea. The grass Poa alpina is also a dominant species, particularly on the north slope. Some species show a distinct pattern of zonation. Rhodiola rosea (Roseroott) and Oxystria digyna (Mountain sorrel) are frequent near the summit of Hroi, but absent at lower altitude. On the north facing slope there is little other sign of altitude zonation within the area covered by this study. However on the south slope the greater species diversity is accompanied by a more distinct pattern of zonation reflecting the gradual development at lower altitude of a relatively species rich alpine meadow. This includes the grasses Anthoxanum odoratum and Nardus stricta and P. annua and at sites 9 and 10 represents the only area where 100% plant cover in any quadrat was recorded. The meadow community contains an assemblage of typical species such as Bartsia alpina, Dryas octopetala and Polygonum viviparum.

The results support the three hypotheses stated above and also indicate that the area has an interesting and varied flora that provides ample scope for further study.
2) A STUDY OF THE HULLY FERN (POLYSTICHUM LONCHITIS)

In the steep sided river bed that runs south from Songhellir to the south-west of Stapafell a number of plants of the fern Polystichum lonchitis were found. P. lonchitis is a national rarity in Britain and this was a useful opportunity to gather some basic data on an infrequently encountered plant.

A simple survey of all the plants recorded in the valley was carried out. Two people searched the length of the valley from a point just above Songhellir to the point where the valley flattens out before crossing the road and continuing to the coast near Arnarstapi. It was in this upper section of the valley that the fern was exclusively found. 35 plants or clumps of plants that could not be resolved into individual plants were observed. For each plant the following data was recorded:

1) nature of the ground,
2) aspect of the site,
3) diameter of whole plant
4) total number of fronds (including unopened 'fiddleheads'),
5) number of fertile fronds,
6) length of largest fertile frond,
7) length of fertile section of this frond

This data is presented in Table 3

The data was collected on July 30th and many of the plants had clearly only recently been uncovered by the retreating snow. The turf community typically contained such species as Euphorbia nigra, V. myrtillus, V. uliginosus and P. minor

P. lonchitis typically grows on southwest facing aspects in this valley. No plants were found on north or east facing sites and this presumably represents a climatic preference, since other features of these sites seemed similar to those in which the plant was found growing.

The results show that a wide range of plant sizes was observed and most of the plants exhibited some fertile fronds. As recorded for plants found in the UK the sorus are found in the distal half of the frond and it would appear that the larger and presumably more vigorous plants are the most fertile.

Table 3 - Data obtained from Polystichum lonchitis near Stapafell

<table>
<thead>
<tr>
<th>Plant of ground</th>
<th>1) nature</th>
<th>2) aspect</th>
<th>3) plant diam (cm)</th>
<th>4) No. of fronds</th>
<th>5) No. of fertile fronds</th>
<th>6) length of fert. frond</th>
<th>7) length of fert. section</th>
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</thead>
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<tr>
<td>1 rock SW</td>
<td>SW</td>
<td>16</td>
<td>6</td>
<td>0</td>
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<td>2 rock SW</td>
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<td>9</td>
<td>7</td>
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<td>10.5</td>
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</tr>
</tbody>
</table>

Plants 32, 33 and 34 marked * are clumps rather than individual plants.

Due to the relatively small number of plants found and the fact that the population is almost certainly subject to variations in season it would be speculative to attempt to read anything more than these generalisations into the data. However P. lonchitis is an interesting fern and the population studied comprises more plants than the leader has seen in the UK during the last 25 years!
Although it was not originally intended to do any formal work on birds the keen birdwatchers on the expedition nevertheless made an informal list of their observations. It is accepted that this record is by no means a full survey and the coastal species were observed on only two or three days that groups spent in the Arnarstapi - Londrangar area. The observations were as follows:

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Fulmar</td>
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<td>Coast</td>
</tr>
<tr>
<td>Gannet</td>
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<td>Coast</td>
</tr>
<tr>
<td>Cormorant</td>
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<td>Arnarstapi</td>
</tr>
<tr>
<td>Eider</td>
<td>Frequent</td>
<td>Arnarstapi</td>
</tr>
<tr>
<td>Merlin</td>
<td>Single</td>
<td>Hrói</td>
</tr>
<tr>
<td>Ptarmigan</td>
<td>Frequent</td>
<td>Around Lava Caves</td>
</tr>
<tr>
<td>Oyster Catcher</td>
<td>Frequent</td>
<td>Coast</td>
</tr>
<tr>
<td>Ringed Plover</td>
<td>Frequent</td>
<td>Moorland areas</td>
</tr>
<tr>
<td>Golden Plover</td>
<td>Common</td>
<td>Moorland areas</td>
</tr>
<tr>
<td>Purple Sandpiper</td>
<td>Occasional</td>
<td>Near Lava Caves</td>
</tr>
<tr>
<td>Dunlin</td>
<td>Occasional</td>
<td>Hrói</td>
</tr>
<tr>
<td>Redshank</td>
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<td>Olafsvik</td>
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<td>Whimbrel</td>
<td>Common</td>
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<td>Grey Phalarope</td>
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<td>Olafsvik</td>
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<tr>
<td>Arctic Skua</td>
<td>Common</td>
<td>Hrói area</td>
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<td>Black-headed Gull</td>
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<td>Lesser B.B Gull</td>
<td>Frequent</td>
<td>Coast</td>
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<td>Herring Gull</td>
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<tr>
<td>Common Gull</td>
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<td>Coast</td>
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<td>Kittiwake</td>
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<td>Arctic Tern</td>
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<tr>
<td>Guillemot</td>
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<tr>
<td>Black Guillemot</td>
<td>Common</td>
<td>Londrangar</td>
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<td>Puffin</td>
<td>Frequent</td>
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<tr>
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<td>Wheatear</td>
<td>Frequent</td>
<td>Base camps</td>
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<tr>
<td>Raven</td>
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Aim:

In the preliminary exploration of the first base camp area casual observation of periglacial features revealed several areas of stone patterned ground. It was then decided to further investigate these and to attempt to relate them to slope angle. In addition the exercise had a social function in that it was the first opportunity for the group to work together and the techniques used provided ample opportunity for team work and problem solving within the group.

Introduction:

The Icelandic landscape is rich in glacial and periglacial environments. Periglacial areas are characterised by the predominance of frost action processes and determined by two main criteria. The first of these is the presence of permafrost (permanently frozen ground) and secondly the periodic freezing and thawing of the ground surface. For an area to be periglacial either or both of these criteria must apply. In many periglacial locations, including parts of Iceland, the permafrost closest to the surface melts during the warmer seasons and is known as the active layer. It is in the active layer that patterned ground forms.

Patterned ground is basically the term used to describe arrangement of sediment on gentle slopes in periglacial areas. The processes which are involved in its formation all relate to freezing and thawing causing the movement and collection of sediment. This results in shapes being formed as different sized particles are moved around at different rates. There are five basic pattern forms that can be recognised. These are circles, nets, polygons, steps and stripes and classically each pattern is related to the angle of the slope. Circles typically form on the gentlest slopes (1-2°) and stripes on the steeper slopes (7-10°). Beyond 10° regular patterns can rarely be identified. The aim of this project was to identify the types of pattern in the study area and to relate these to slope angle to see if they fitted the classical model.

Methods:

A 10m x 5m area was marked out to include most of a particular location where patterned ground had been observed. This was approximately 500m south of, and some 75m in altitude above, the first base camp. The area was then mapped using 50 m x 1m quadrats. Each quadrat was recorded onto squared paper with the distribution of sediment, general sediment size and direction of any obvious lines of sediment being noted.
impression of the main features had been obtained, the slope angle was measured using an Abney level.

Observations of slope angle at a number of other periglacial sites were then recorded for comparison and to test the generally held 'textbook model'.

Results:
Figure 1 shows the results of the area mapped using the above method. A number of prominent stripes were found to traverse the area running down slope and these stripes commonly formed parts of polygons and circles on the gentler slopes.

The other areas examined were in the same locality and all between the first site and base camp. In all locations stripes were commonly composed of larger particles with finer material forming the sides of polygons and circles, especially where the sides ran across rather than down slope.

Conclusions:
The observations and results supported the accepted model for patterned ground and the hypothesis that the type of pattern is determined by slope angle was confirmed. Although this was expected to be the case the exercise was valuable in giving first hand experience of periglacial processes to the group and enabling them to work together as an effective team to execute the project. It also illustrates the fact that effective fieldwork projects need not be complicated by sophisticated and expensive equipment.

Fig 1 - Opposite
A field sketch of the patterned ground studied as described in the text. Obvious stone lines can be seen and these fit the accepted model for patterned ground formation on slopes of this angle.
A STUDY OF THE STREAM CHANNELS AT GELDINGAFELL BASE

Nicola Johnson and Catriona Lapsley

(This study was submitted as part of an A level Geography project)

This survey was carried out by Survey A (group 1) and Survey C (group 2). Group 1 aimed to examine the nature of the stream channels and to identify and explain any changes in flow over a 24 hour period.

The survey involved measuring depth and cross sections of channels. Inventive ways of measuring depth included precarious balancing acts by Fraser and Mike and saw Keiron standing in a survival bag in the middle of the channel. As these attempts were largely unsuccessful at keeping feet dry Catriona didn’t even try - boots and socks off and straight into the freezing water - brave girl!

The velocity of the stream was measured using a float made from an empty Raven pate pot, sealed in a poly bag. The time taken for it to travel along a 10m stretch was recorded. After a frantic dash downstream to retrieve it the process was repeated so that an average could be calculated. The final task was to measure the wetted perimeter across the stream floor from one bank to the other.

The study was repeated on a smaller channel in the camp, although the depth was not sufficient to measure velocity with a float. The cross sections of both channels are shown in Figures 1 and 2.

Unfortunately the second part of the study was abandoned as the 24h period coincided with the storm.

Group 2 studied the same channel after the storm, when the river was at its highest level (bankful conditions). Further measurements were taken throughout the day and the following morning. This enabled the time taken for the river level to return to base flow to be measured.

Figure 3 shows the river at bankful conditions, figure 4 shows the falling levels.

Although the groups could not measure diurnal changes in the stream flow, it was found that these upland channels respond very quickly to heavy rains in their catchment area. The calculation of hydraulic radius revealed that the river was more efficient after the storm. Its velocity was higher and the frictional drag of its bed was lower. This allowed transportation of material in the channels.
Figure 1
Cross-section of the main stream channel at Geldingafell base.
Before the heavy rains: Saturday 13th July

Width of river channel in meters.

The depth of the river has a scale double that of the river's width.

Figure 2
Cross-section of the small stream at Geldingafell base.
Before the heavy rains: Saturday 15th July

Width of river channel in meters.

Figure 3
Cross-section of the main stream channel at Geldingafell base.
After heavy rains Tuesday 18th July

Figure 4
Changes in cross-section of main stream channel at Geldingafell base.
Tuesday 18th July - Wednesday 19th July

Depth (cm)

Width of river channel in meters.
ADVENTURE REPORT - by Richard (Pip) Piper

1) Aim of Adventurous Training

The overall aim of including an adventure element in the expedition was to provide another avenue for learning through participation. The very nature of some aspects of the expedition programme, for example the work in the caves, was in itself an 'adventure', but the intention was that this should be further extended. Since the expedition was to be based so close to the edge of Snaefellsjokull this would provide an excellent opportunity to teach basic snow and ice techniques, leading to an ascent of the icecap itself. Through this adventure element it was hoped that both social and group work skills would be enhanced and that the members would obtain satisfaction in completing a course of training that extended beyond their previous experience. It was also hoped that the abundance of skills so acquired would lead to further involvement in these activities in the future.

2) The Dynamics of the Groups

There was one all male group and three mixed groups of the members. The group size was five or six and ages ranged from 16-19 years. Fitness and previous mountaineering knowledge and experience differed widely in all members of the expedition, including leaders, but all training was pitched at basics and those with more experience were used to enhance the learning of others. The size of groups proved to be ideal for the type of training undertaken.

3) Basic Training Programme

On First Day

a) Familiarisation with equipment. Harnesses, ropes, helmets, ice axes, snow and ice anchor devices, belay devices, karabiners and abseil and junior equipment.

b) Ice axe arrest techniques

c) Moving on a rope over crevassed areas

d) Placing off, and use of, both in situ and artificial snow and ice anchor points.

On Second Day - an ascent of the icecap.

All training was undertaken on suitable steep snow slopes surrounding the icecap and was supervised by experienced instructors.

4) First Ascent of Snaefellsjokull

The first group to enter the adventure training phase were the Botanists under Barry's leadership. The first day was successfully completed by all and when the second day dawned fine with a clear view of the summit we all set off with our hearts set on a good day on the mountain. It took six and a half hours to gain the summit with the weather showing continuous signs of deteriorating. Large cloud formations billowed below us, heading resolutely for Greenland. At times we were totally engulfed by cold, damp mist and at others blinded by bright sun. Good goggles and glacier cream were essentials. We roped up about 1,000 feet below the top with the snow the consistency of wet sugar. We gained and followed the obvious north ridge keeping an eye out for the ever-presents danger of crevasses. With the cloud rolling in from all around and enclosing us with cold icy fingers it was clear that we were not going to have the views that we had hoped for. Visibility was about 100m as we approached the final summit cone whose steep slopes provided a fine mountaineering experience despite the cloud. Part wading and part swimming through the sugary snow we stood atop the famous jokull with that mixture of joy and disappointment that is so much part of the illogical sport of mountaineering. The descent took just two and a half hours, testimony to the hard going on the ascent, in ever deteriorating weather and that night was the start of the 36 hour storm that shattered our tiny camp below Glingafell. The Magic Mountain was exerting some sort of retribution for our unholy deed of standing on its summit.

5) Other Adventure Activities

The other fieldwork groups completed their snow and ice training as the weather allowed and whilst we were encamped by the lava tubes a clear day saw a mass ascent so ensuring that all had an opportunity to reach the summit.

Besides the basic training and subsequent ascents of the ice cap the members were able to take part in midnight rambles (in broad daylight!), overnight bivies and hikes to the Londrangar Rocks and the Ice Caves. Approximately 2km below our Lava Tube Camp, near Soghnellir, we found some interesting crags on which to teach rock-climbing and abseiling techniques. Most of the members participated in this over a two and a half day period, some having to overcome fear of heights to do so. Amongst the members were two keen climbers, John Roberts and Richard Cuthbert; both proved to be very able as assistant instructors, passing on their skills with much enthusiasm. All in all we managed four climbs of about 30 feet ranging in difficulty from V0 to V4, an 80 foot
abseil and a 25 foot prussik.

Barry, Peter and Nicola took one group to amuse themselves in a crevasse, abseiling in and climbing with crampons and axes a 25 foot grade 3 ice wall to get out. This proved highly entertaining and Shona’s novel technique of inverted abseiling will be long remembered. It was also the first real opportunity to see ice screws in action – three being used at the belay point while we abseiled off a conveniently placed natural bollard of deep blue glacier ice. Unfortunately time and weather dictated that only one group were able to obtain this experience. However a group of 10 opted to spend one day on advanced snow and ice techniques with Pip. This included abseiling past a knot in the rope, jumaring, multiple belays, escaping from the system, assisted and unassisted hoists and the tying and use of French prussik and Clewheist knots. All proved eager to learn and very able. My thanks to John Roberts, Richard Cuthbert, Guy Sudaby and Alistair Kirk who were most helpful in assisting during the day.

6) Conclusions

Without a doubt all of our aims and objectives were met and we were lucky enough to be able to include more than we expected in the adventure programme. The members all grasped the opportunities on offer and all excelled themselves. Many spoke of conquered fears and many found new areas in which to express and enjoy themselves. My hope is that all will have a continued awareness of the beauty of wild areas and that as they build upon the skills they have learned all will have a growing respect for the environment in its widest context and their fellows.

My thanks to all the young members and leaders whose efforts ensured my own personal enjoyment of the adventure phase of the expedition.

THE MASS ASCENT – by Barry Meatyard

A fundamental principle of any mountaineering trip is that any attempt to climb a mountain relies for its success on a combination of factors. Some of these are personal experience, fitness, equipment and so forth and some are governed by the mountain itself and weather systems. I had made it clear during the briefing meetings that the intention was to reach the top but that this would depend on making the best of our opportunities. We were all sufficiently fit, had sufficient experience and had enough equipment to tackle a peak far more technically demanding than Snæfellsjökull. However it was clear that the weather would be the determining factor in our success. The early ascent by the Botanists from the north side of the mountain was a bonus but fell short of the intention to get everyone on the top. Since the weather had interfered with the pattern of training outlined in the Adventure Report it required flexibility in the programme to allow an ascent to be made. The relatively high placings of both of our base camps was a major factor in this. On 25th July base camp was at the lava tubes and the day dawned fine and clear. An early decision was made to go for the top and fieldwork and other activities were shelved for the day. Five leaders and eleven members prepared themselves for the day on the mountain. We decided at base camp that we would climb as four ropes, with Barry, Pip and Peter leading three and giving the opportunity to Mike Whelan to be on the front of the fourth rope. Since we would be climbing as a group this was perfectly safe but gave worthwhile experience to Mike. From Base Camp we had thought our way up the mountain by the most obvious route, skirting to the left of a line of moraines running down the south east flank. We climbed past these unroped, there being no crevasse danger. However at the top of the moraines the gradient eased into a sweeping snout to a snowfield leading to the summit ridge. The snowfield showed distinct pressure zones and fracture lines and some very obvious deep crevasses and so we roped up at its edge. Snow conditions had improved marginally since the Botany ascent – the texture was now of soft brown rather than caster sugar, and there had been fresh snowfall during the days of bad weather making the danger of slab avalanche on the steeper slopes something to be aware of.

The views were spectacular and contrary to popular opinion my rest stops at the front were more to take these in rather than to get my breath back in the tiring conditions. We negotiated several deep crevasses, cautiously picking our way across the snow bridges, despite John Scott’s attempts to find new ways to the Centre of the Earth. There were two other groups on the mountain – both without ropes and one without ice axes.
The idea of taking a youth group so ill prepared didn’t bear thinking of.

As if to remind us of the potential dangers the French party just ahead of us created a classic slab avalanche (it is a French word after all) as they kicked up the final ridge. Fortunately the gradient was such that it didn’t gather momentum and soon we too were making the final effort and sitting on the summit. Snaefellssjokull is the highest point on the Snaefellssnes peninsula and the views from the summit on such a clear day defy description. We could see south to Reykjavik and north across the islands of Breidafjordur to the north west peninsula with a suspicion of Orangajokull in the background, a distance of over 100 miles. Below us to the east a blanket of cloud hugged the lower mountains like a feather duvet, tumbling down to the coastal plain to the south. It takes a long time on such a summit to take everything in and a leisurely lunch gave time for reflection and wonderment and the inevitable summit photos.

Snaefellssjokull has two summits, the western one being some few metres short of the 1446m of the main summit. Two ropes decided to go on for this while the rest (many of whom had been on a midnight hike the previous night) returned to base. A superb airy ridge led down to a heavily crevassed area and then swept up again for the second summit with its north face plunging vertically down an ice wall into huge crevasses 500 feet below. This summit gives the real feel of the extinct volcano’s caldera and affords the most dramatic views of the east summit. It is certainly worth the diversion from the direct route back. More photos and then time for the descent. In order to make this more entertaining I thought that it would be fun to put into practice some of the crevasse techniques that had been learned in the training programme. However despite the direct route across most of the pressure ridges the snow bridges held and cheated us out of some real crevasse rescue practice. This did however allow us to recce a suitable area to do some ice climbing on a future day. The return to base in lengthening shadows and high spirits was the fitting climax to an excellent mountain experience. It is not too difficult to see how Snaefellssjokull generates its mystical power. The day had demanded physical exertion and considerable team effort and mutual trust and support. As such it embodied all the reasons and excuses that those who venture into the mountains make for their sport. If I had a wish to be granted it would be that I could experience such a day on a regular basis – the world would seem a better place for it!

MIXED FEELINGS - Catriona Lapsley

Julian’s head appeared over the edge of the crevasse. It was now my turn. After being attached to numerous ropes and with two ice axes dangling from my belt I was ready to abseil down. I stood poised on the edge. “Lean back”.

No problem, I said to myself, yet I could not move. “Lean further”, I was told. Further? They must be joking I thought.

It had seemed so easy when I had seen it done on television, so why couldn’t I do it? With shaking legs I began to lower myself down yet the temptation was too great to keep moving my feet down instead of my whole body and keeping the correct angle with the side of the crevasse. Gradually I began to get the right idea. “Smile for the camera”, I heard someone say. I had more important things to be doing than posing for a picture and smiling was quite out of the question. The relief on reaching the bottom was overwhelming until I realised that I was hemmed in on all sides by great walls of ice and that the only way out was to climb up. Barry was already waiting at the bottom of the crevasse to make sure that I knew what to do next. It was far from quiet. Somewhere down in the bowels of the glacier beneath our feet there was the sound of running water. We were deep in the glacier but obviously only standing on a small platform above what knows - it was an eerie place.

“Climb when you’re ready”, came the shout from above and reminded me that the only way out was up. With an ice axe in each hand and the ridiculously small points of my crampons scratching at the ice wall I made the first move. Don’t panic, I told myself as I remembered to shout “Climbing!” — despite the safety rope my legs were shaking. Gradually I got into the swing of it with encouraging grunts coming from below and above - this is fun!

The last problem was how to get over the edge at the top. The answer was inelegantly as I scrabbled ungraciously on hands and knees back into the sunlight. I had made it and had to confess that I had really enjoyed it - I was now ready for the next one!
PLATE 6a

Roping up on Snaefellsjökull during the first ascent by the Botany group. The summit ridge is in the background and, shortly after this photograph was taken, disappeared from view for several days.

PLATE 6b

The second base camp at Vegamannshellir with the summit of Snaefellsjökull behind. The entrance to the cave is just behind the left hand tent. The route to the summit on the 'mass ascent' followed the line of moraines right of centre to the rock outcrop on the sky line and thence to the summit cone direct. The crevasses and more advanced snow and ice training were carried out on the lower slopes left of centre.
DAYS 5 to 8 - EXTRACTS FROM MY DIARY - Richard Cuthbert

Day 5 - Weather colder but good today. Had snow and ice training yesterday and today we’re trying for the top. Walked past the snow slope we practised on yesterday - it seems closer to the camp now. Hugo carried the rope. Trudging up one snow slope, completely quiet, views barren of life, when four Icelanders on snow-mobiles roar past below us. Feelings of exploring virgin territory are dampened somewhat. Quite close to the top we have to cross some crevasses, spectacular views. Then suddenly the clouds rolled in and obscured everything. So much for the summit photos! Eventually reached the top - it was further than we had thought - celebrated with a Mars Bar. It’s really misty - could be north Wales! Walk / slide back, got boots wet crossing last stream before camp - not amusing. John, Abi and I eat huge meal followed by popcorn.

Day 6 - Pouring with rain, stuck in tent all day. John sticks his head out in the afternoon to discover we have our own scenic lake plus a small river under the tent. We end up digging a canal network around the tent with Julian. Feel better after doing something active.

Day 7 - Still raining. Quotes of “I’m going outside, I may be sometime” are wearing a bit thin! 2.30 pm rain stops. Hugo, the two Abi’s, John, Rachel and I, who are all in the Botany group, go up Hroi on a mas) plant spotting trip with Barry and John. Everything of interest was under about a foot of water. Cooked spicy goulash and vegetable strogonov + brown sauce for evening meal. For some unaccountable reason I was the only one who felt like eating it.

Day 8 - Raining again. Everyone sick of being in their tents so we decided to go down to Olafsvik. Warm dry toilets, showers, swimming pool, jacuzzi, chips, beefburgers, cakes, coffee - JOY! Get back to camp by John’s dubious short cut through a peat bog. High spirits all round - except those who stayed behind. Seven people in tent tonight, all eating fried sardine and Marmite sandwiches, followed by curry and then hot chocolate. We really hit the high life today!
REFLECTIONS - Martin Howard

Saturday 19th July was a pretty peculiar day as far as my experiences in Iceland went. The sun was shining brightly and I didn’t have to wear my fibregale. Amazingly the weather seemed set fair as we set off for an afternoon of rockclimbing.

Some way off the track down to Arnarstapi we found a crag which Pip deemed suitable for beginners, though it looked fairly impossible to me. Guy and Alistair went up first and I grabbed my first and last chance for a spot of sun-bathing, and for the first time in almost three weeks Iceland seemed totally idyllic.

But soon my turn came, so I clipped into the rope and set off - ‘Climb when ready’; ‘Climbing’s OK’; a well practised safety routine. However I hadn’t bargained for the razor-sharp lava - every time I reached for a hold it felt as if the lava impaling my finger tips was about to burst through. Because of this speed was of the essence and I was soon clambering inelegantly over the top and onto a ledge to choruses of ‘Well done Martin, you’re a natural!’ This begged the question, ‘A natural what?’ I had the feeling that they weren’t being that sincere!

The next ‘highlight’ of the day was across a narrow valley to the site of my first abseil. Helen had gone first with her face a mixture of bewilderment (that’s usual Ed.), excitement and terror - you could tell this because she had stopped talking for a moment. A few minutes later and I too was dangling horizontally over the ridge with nothing under my feet and probably the same mixed expression on my face. After a few feet I realised I was actually enjoying it - and yet all logic told me this was a totally illogical thing to do.

With some regrets we started back for camp, but were stopped by the natural vista that was unfolding itself. The clouds were rolling down off the mountains further along the peninsula, with the sunlight glinting on the protruding peaks; behind us Stapafell was silhouetted fiercely against the darkening sky, like a fairy castle that would have not been out of place on a film set for Lord of the Rings; and above us Snæfellsjökull itself was now tinged with pink. After an indulgent spree of photography, which I knew could never capture all of that magic moment we returned to base for a pancake party and yet more dehydrated food. Evening merged into the twilight of an Icelandic night as the blues faded into blacks, the pinks receded past the horizon and the sky settled into a monochrome of grey.

THINGVELLIR - Alistair Kirk

The first stop on our ‘Golden Circle’ tour was the area of Thingvellir, which offers interest to the historian as well as the geographer. It was here in 930 AD that the Althing or Parliament was set up. This continued for eight centuries, and is thus arguably the oldest known parliament. The site of the Althing is on the northwestern edge of Thingvallavatn, the largest lake in Iceland, and sittings were held in one of the many volcanic fissures in the area. The members would sit along one of the basalt walls while the speaker would stand in front of them using the excellent natural acoustics of the fissure. Since Iceland had no written laws this was an occasion of great national significance.

Iceland is situated on the Mid-Atlantic ridge - a formative zone of the earth’s crust on the boundary of two major tectonic plates. The area is probably one of the best in the world to observe diverging tectonic plates, with the east of the area moving towards Europe and the west towards America. The crust in this region is very thin and two effects are noticeable. Firstly the presence of many volcanoes shows that there is much upwelling of material from under the crust. This upwelling also causes subsidence of parts of the crust and the valley at Thingvellir has dropped some 40m since its formation. Such crust movement cause deep parallel fissures and produces a ‘grain’ in the landscape clearly visible in the region. Thingvallavatn has only one small river feeding it whose flow rate could not account for the size (94 sq km) of the lake. The main feeders for the lake are underground springs with a constant temperature of 3.3°C which prevents the lake freezing in winter. Thingvellir is subsiding at the rate of about 1mm per year. Having studied plate tectonics and continental drift from the text books, to see at first hand some of the evidence and processes was an exciting experience.
Appendix 1

TRAVEL, PACKING AND FREIGHTING AND INSURANCE

Group travel was booked through Arctic Experience and we are grateful to Catherine Harlow and Clive Stacey for their efficient arrangements. Flights with Icelandair and bus transport to and from Olafsvik were included in the package along with our guided Golden Circle Tour, as were transfers to and from Keflavik to the school, Hvassaleistiskoli, used for accommodation in Reykjavik. This was also booked through Arctic Experience and the Iceland Travel Club.

All transport arrived on time except the bus for the Golden Circle which was an hour late. In fairness BSI admitted that they had made an error and sent a messenger personally to the school to inform us. This did not detract from the enjoyment of the day.

All food and equipment other than personal kit was shipped out ahead of the expedition. Equipment was packed using a team of expedition members one Sunday morning at School. All packing was done into large heavy duty canvas kitbags obtained from Williamson's of Oldham. These would take approximately 20 packs of two-person Raven rations each or the equivalent in tentage etc. They proved excellent for the task and virtually waterproof. Identical bags had been used for the BSER 1986 Yukon Expedition. Some items such as trolley lamps, books, and delicate instruments were packed in either wooden boxes or '10 Man Compo' boxes for added protection. No damage was done to kit in transit. Several copies of the inventory were taken into the field and a detailed inventory was prepared for the return of kit to UK. This is a straightforward task and merely requires the recording of contents against the kitbag number as it is being packed.

Using a van kindly lent to us by Peugeot-Talbot we moved all of the kit (35 units) to Ryder's Express Services in Birmingham for onward movement to McGregor, Gow and Holland at Immingham. MSH then handled all of the documentation and we next saw our equipment in the Eimskip warehouse in Reykjavik. We intended to follow the routine given in Tony Escritt's book for clearing customs but on reporting to the Customs House in Reykjavik we were told that the regulations had changed (see Chief Leader's Report for details of customs clearance). Future expeditions would be well advised to check the procedures with the Iceland Travel Club or Young Explorers' Trust contacts.

Johanna Johansdottir at Flutningsmidlunin handled the paperwork for our return trip and all we had to do was to
deposit our now reduced to 18 units) kit at Emskrop on the morning before we left. Back in England MSG picked up the admin and communicated direct by phone and letter when the shipment was cleared for collection. We are also grateful to Tony Russell and Tracey Papanasius at MSF for coping so efficiently with our amateur approach to international shipping. One of the major queries seemed to stem from the VAT situation, but since as an Independent School we had paid VAT on all goods purchased and shipped for the expedition, and were not registered for VAT, there seemed to be no problem. We were however pleased and relieved to have all of the kit safely back in Warwick.

The group insurance offered by West Mercia through the Iceland Travel Club was taken out. Including mountain rescue insurance. Only one claim was made relating to the loss of a passport and various personal effects belonging to Rachel Willett. In the throes of moving base camp a plastic bag containing the items was consigned accidentally to the bonfire at the Olafsvik municipal tip along with the cogs' heads and various other unmentionables. Initially the claims agency refused any liability but after a telephone discussion the claim was met in full. The debate centered on whether we were claiming for damage, which we were insured for, or loss, which apparently we were not. Terminal damage by fire resulting in loss clearly represented a grey area. We did not attempt to claim for the repairs to damage to tents which seemed to us to represent fair wear and tear. The insurance situation is a minefield of small print and expediions should take professional advice. Individual members should also be made aware that the all risks section of their family household polcicy should cover items such as cameras, which are usually excluded from group policies. The medical expenses incurred in Olafsvik as a result of Christina's infected finger did not exceed our excess, but it is of course essential that medical and repatriation expenses, particularly if helicopter evacuation is likely to be involved, are adequately covered.

Appendix 2

FOOD

Whatever other memories are discussed after an expedition the one common topic of conversation in any reminiscences is the food. Food is a vital element in expedition morale and performance. It is vital that expedición food fulfills five criteria.

1. It must provide sufficient fuel for the body's needs.
2. It must be palatable, varied and interesting.
3. It must be lightweight for both shipment and back-packing.
4. It must be easy to dispense under field conditions.
5. It must be easy to prepare and cook under expedition conditions.

The first four of these are obvious but the fifth is often overlooked. Basically what it means is that under bad weather conditions it is unrealistic to think that food which requires long cooking times or extended soaking to rehydrate it will be properly prepared. This results in low morale and poor performance in other expedition activities.

Because of the high cost of food in Iceland and the lack of availability of a wide range of dehydrated rations it was decided from the outset to use UK bought dehydrated food as the staple diet. From previous experience the obvious choice was the Raven range and Andrew Howell and Petra Bowden of BCB International were most helpful in providing a good range of menus, including vegetarian, and a trade discount price. The one person / day packs came in pairs, packed in heavy gauge polythene tubes. These proved most robust and only a minority in water resulting in spoilage of the more delicate contents such as biscuits. 600 person / days of such packs were taken to allow a small surplus as spares. The packs were supplemented with extra drink rations such as drinking chocolate, coffee and tea, together with dried milk. It is perhaps worth noting that these items were in higher demand than the basic packs provided. However the orange drink powder supplied in the packs was in great excess. Had the weather been different it is certain that there would have been different demands made on liquid refreshments.

We were donated extra chocolate bars and a variety of sundries such as nuts and raisins, which always went down well as extra ration issues. We also took certain bulk items such as pancake mix, oats, margarine and bread mixes in varying quantity, together with a range of herbs and spices. Such items are useful for 'parties', communal get-togethers and those of more creative culinary
persuasions. Unfortunately we had very few evenings when the elements allowed 'picnic' atmospheres. There were very few complaints about food even though trips to Olafsvik were usually accompanied by the unnecessary consumption of baskets of chips. Most members of the expedition cannot have failed to have gained weight.

It is worth recording the following with respect to the Raven food:

- Issue of food was simplicity itself.
- Hot Cereal Start was preferred to Hot Bran Muesli.
- The Breakfast Egg Mix was disliked by virtually everyone.
- The Shepherds Pie had a remarkable and extremely rapid effect on the alimentary canal and is certainly not 'ozone friendly'.
- Vegetarians complained of lack of suitable lunch items (e.g. cheese). (We took some 'Compo' tinned cheese to off-set this).

Otherwise virtually all main meals proved popular with Savoury Couscous, and the various chills and curries attracting the greatest 'trade in' value in the usual bartering of food.

It is testimony to the ease of cooking that overall we used only approximately 60 lts of fuel, including that used in heating water for cleaning utensils and the occasional hot wash. There was also very little wastage of food due to culinary ineptitude. A few of the more adventurous produced some excellent breads, flapjack and various 'melanges' including a memorable (and very large) communal chilli.

The major food disaster was when the leader decanted the contents of a boiling billy into his entire private store of Earl Grey tea instead of into his mug.

We are most grateful to Mr. Derek Reid and Judy Prichard of Premier Brands Ltd, Lyons Tetley Ltd, General Foods Ltd, Cadbury's, Kernel Nut Ltd, Nestle Health Care, the Beecham Group, Homepride and Asda Stores for the donation of foodstuffs.
Appendix 3

EQUIPMENT

1) TENTAGE

Having taken advice from the Woodlands 1987 Snaefellsnes Expedition it was realised that one of the requirements of tentage would be its resistance to high winds. Since the School did not possess any suitable expedition tentage before this project the opportunity to equip from scratch was available. We were most fortunate to have a generous grant from the Friends of Warwick School and a further contribution from King’s High Parents specifically for tentage. A number of alternative tents were considered, including various ‘geodesic’ models. However after long considerations and much discussion with John Hare at the Outdoor Shop in Stoney Stratford it was decided to opt for a specially modified Vango Mk4 with cotton flysheet. The modifications involved a strengthening of the ridge pole by the addition of an extra ‘A’ frame in the centre. The A piece was fitted through a hole drilled through the central joint of the ridge and its sleeve. The flysheet was fitted with an extra eyelet to accommodate the spike. The only other modification was the addition of an all-round snow valance on the flysheet. Ten such tents were used on the expedition and they coped admirably with the gales (well in excess of Force 8) and rain of the first week. Although some members did get wet sleeping bags, somehow all of the leaders managed to stay dry - experience tells in these matters! The Vango was chosen for its basic simplicity and the fact that straight poles are much easier to effect temporary repairs on than curved or flexible hoops. In the event no pole, ridge-pole or A piece damage was incurred. Damage to tents was caused by ‘operator error’ rather than the weather and included small holes caused by rocks placed on valances chaffing against the fly, zip breakages due to incorrect pegging of the front or carelessness in use of zips and small burn holes where the fly had been allowed to touch hot stoves (the weather meant that most cooking had to be done in the shelter of the flysheet). Two tents suffered holes in groundsheets due to carelessness in the use of stoves.

All in all we were most impressed by the performance of these tents. None of the leaders had experienced such adverse weather conditions for so long on any previous expedition and the fact that the tents remained intact is great credit to them. The only modification we would consider in using them again is to add extra guy lines to the two central seams (one on each side) at the rear of the fly. It was in this area that most of the problems of the fly caving in against the inner were experienced.

Other expedition tents included a privately owned Vango Mk3 CN (with fitted valance) and a North Face Westwind hooped model. The guy lines pulled out of this latter tent but the Vango performed well although became rather claustrophobic during the gales since it was used as a one man leader tent.

One unmodified Vango Mk4 CN was used as a store tent. This also suffered no damage, but it was agreed that it would have been an uncomfortable tent to have lived in during the worst of the weather.

Two Ultimate Hobos and one Saunders Backpacker 2 (veteran of 6 months use in South America in 1982) were used as bivvi tents for lightweight expeditions down to the coast. No problems were encountered with these although they were not really tested by the weather.

2) STOVES

Paraffin (Steinolia) stoves were used throughout. Twelve stoves of four types were used. These were the type 9600L Camper, an unknown model similar to this with a larger tank and the Hiker. After a few initial problems, mainly due to pump getting dry and wet white tin stoves had been emptied and vented prior to shipping, these stoves all performed well and approximately 60 litres of Steinolia was consumed during the whole expedition. Steinolia is available in Olafsvik. A tool kit for stoves including jet spanners, a small mole wrench and pliers, jet cleaners and a range of spares was carried. Solid Metafuel was used for priming.

It is perhaps inevitable that with our high tech kitchens at home it is tempting for young people to think that you simply turn on a stove and it lights. All members had been trained in the use of the stoves but some had had greater opportunities for practice than others. The proper use of a paraffin stove is an acquired art which comes with patience and experience. However relatively few ‘flare-ups’ occurred and with the difficulties posed by the weather it is pleasing to note that most of the expedition’s members coped excellently with the routine of camp cookery. Even Christine Jackson had managed to light a stove by the end of the expedition.

3) HARDWARE STORES

Spare tent poles and A pieces (2 sets)
Spare tent pegs
Billies (Sufficient for a pair per tent group)
Cleaning materials (scourers, J-cloths, detergent, Swarfega)
Shovels (2)
Trenching tools (2)
Spare toilet roll (Raven daily supply adequate however)
Plastic washing up bowls (4)
Quantity light nylon line (spare guys etc)
2 polypropylene clothes lines plus pegs
Tent brush
Tilley lamps (2) and spare mantles
Spare 'Sigg' fuel bottles (6)
Packframe (1) - Screwdriver and hammer

4) MOUNTAINEERING EQUIPMENT
4 x 12mm Kernmantel rope
6 x harnesses (Whillans and Pat Littlejohn)
12 x belts
8 x helmets
22 x screwgate karabiners
8 x eight foot slings
3 x 4 foot slings
12 x ice axes
8 sets crampons
4 x sticht plates
3 x figure of eight descendeurs
1 x Petzl Jammer
3 x deadmen
1 deadboy
2 snow stakes
4 drive in - screw out ice screws (long)
2 screw in ice screws
2 Ice hammers
Prussik loops
4 x 7mm 'walker's' ropes

5) PERSONAL KIT (List as circulated to members)

1) Clothing
Underwear: 3-4 pairs pants
thermal long-johns
T-shirts (long to avoid gaps at waist) 3-4
Socks - three sets of what ever is comfortable in your boots - loopstitch are warm and comfortable. Socks should be long.

Warmwear: Fibrepile jacket or similar (or woollen sweater - 2 light better than 1 heavy)
Lightweight sweater or bodywarmer.
Balaclava or similar warm hat.
Mitts - 'Dachstein' the best
Change of clothes for sleeping (suit of thermal-wear)

Outer: Waterproof jacket - 'Cag-Jac' type -
Goretex such as Berghaus 'Lightning'

expensive. Neoprene is more rugged and cheaper.
Waterproof over-trousers. Lightweight proofed nylon would be adequate but make sure they have long zips to go on over boots.
Gaiters - proofed nylon.
Trousers - one moderately decent pair for use in civilisation when sight-seeing.
Breeches for walking / climbing (Stretch Helenium best)
Shorts (let's be optimistic).
Swimming trunks for hot springs.

Boots:
1 pair of old CCF type workboots for kicking around in base camp and for fieldwork.
1 pair good walking boots.
1 pair trainers for general use

2) Sleeping Bag
Three season Hollofil (Quallofil).
Insulating sleeping mat - Karrimat or similar

3) First Aid Kit
A small portable kit for your own use which will pack into a small sandwich box.
Glacier cream (red) to protect against glare from snow.

4) Hardware
Torch - Head-torch a luxury, small hand torch with spare batteries suitable.
Mess tins - 1 pair
Knife fork spoon
Mug - unbreakable plastic
2 or 3 plastic sandwich or icecream boxes - useful for packing small items, storing water etc.
Water bottle - Blue 'Sigg' bottle the best. Plastic are OK but may leak.
Fuel bottle - Grey 'Sigg' the best.
Emergency sewing kit containing needle, thread, spare buttons, length of velcro etc. Pack into film canister.
Poly bags - stacks of various shapes and sizes. One at least big enough to take sleeping bag.
Stuff-sacks (make them yourself) for easy location of clothes etc packed in
rucksack.
Washing kit - toothbrush, paste, soap, towel etc. Footpowder.
Soft toilet paper in poly bag.
Emergency rations in plastic box.
Whistle, notepaper and pencil (packed with above).
Polythene survival (bivy) bag.
Spare boot laces.
Sunglasses or goggles for use on the glacier. Ski goggles are good but you
should choose a pair that is well screened against UV - snowblindness is temporary
but very painful.
Paperback book for relaxation (swap these around).

5) Rucksack

You will need a large pack - 65lt minimum.
I recommend the Karimor Jaguar range.
Small daysack - use for hand luggage.

6) Camera and Film

A matter of personal choice.

7) Optional items

Ice axe - a 'mountaineering' axe rather
than a technical ice climbing model. Camp
interalp or similar.
Crampons - unless you have fully stiffened
boots you will need articulated ones.
Harness - Pat Littlejohn or Whillans.

In general all equipment and clothing functioned well. We
bought (in error) the wrong mantles for the Tilley lamps
and it is worth noting that mantles designed for gas
burners do not function well on paraffin lamps. The old
adage that there is no substitute for quality can be well
applied to expedition equipment, especially when your
comfort (and life) depend on it. We are most grateful to
John Hare and the staff at the Outdoor Shop in Stoney
Stratford, all of whom are active in climbing and
expedition projects, whose experience and advice was both
freely given and relevant.

Appendix 4

PHOTOGRAPHY

As to be expected there was a wide range of photographic
equipment and expertise on the expedition. The leaders
plan from the start was to cover the expedition fully to
provide material for a lecture set and a static display
and to illustrate the report. The major problems for the
photographers were the damp weather conditions and the
wide range of lighting conditions from bright sun on the
icecap to the pitch black of the caves.

We were most fortunate in being able to obtain
substantial discounts on film from Kodak with Kodachrome
64 being the most popular slide film and Kodakcolor Gold
100 the most used print film. In addition we were given a
quantity of XRG100 by Agfa which was used extensively in
the cave survey.

Polarising filters were useful additions on the icecap
and for general landscape work.

It is perhaps worth noting special mention of the cave
survey since this was the most 'technical' aspect of the
expedition's photography. For this work an Olympus OM1
and an OM2SP were used in conjunction with a Tamron 24mm
and a Tamron 35-70mm zoom. Flashlight was provided by a
small Sunpack unit and a Cobra D500 Twin, the latter
dedicated to the OM2SP. Wide angle lenses were the most
versatile and the two focal lengths most commonly used
were 24mm and 35mm. Two approaches to lighting were used.
The most straightforward used the dedicated flash by
simply using the auto facility and the OM2SP's ability to
meter flashlight 'off the film'. The advantage of the
Cobra gun is that it can be adjusted to give a variety of
both beam angles and widths and it was more than capable
of coping with even illumination over the field of view
of the 24mm lens, particularly when bounced off the
crystalline deposits on the roof of the caves. This
technique has the advantage that it does not require a
tripod and is relatively fast, the only requirement being
sufficient supplementary light (headlamp and candle) to
compose and focus the shot. The only disadvantage of this
technique is the harsh shadow and 'red eye' produced with
unbounced flash. The first of these is inherent in this
technique, the second can be avoided by careful
composition. The second approach was used with both
cameras and was the more traditional cave photography
technique of open flash. For this the camera was mounted
on a sturdy Velbon tripod. The picture was then composed
and the shutter opened on the 'B' setting while the walls
of the cave were 'painted' with flashlight. Each shot was
repeated at two apertures (f9 and f4) to allow for
exposure latitude. Typically 2 or 3 full power flashes
were used for each shot, care being taken so that the flash was always directed away from the lens, or where more remote branches of the cave were being back-lit aimed so that the lens was shielded from direct view of the flash. Care must be taken in this type of photography not to walk back to the camera to close the shutter with a headlamp shining towards it – an obvious point perhaps but one which in practice takes some planning! This type of photography requires some time and patience and it may take some 15 minutes to set up and expose each shot. Any ‘models’ must therefore be in tune with the aims of the photographer and be prepared to sit around in the cold and damp for a considerable time. In Vegaannnahellir the roof and width are seldom more than 2m and the amount of light required is thus relatively small compared to large caves such as the Ice Caves near the coast. The percentage of shots rejected on exposure grounds for colour print film and black and white was negligible, whereas that for transparencies was much greater, reflecting the smaller exposure tolerance of slide film. The negatives of group prints were subsequently rephotographed as ‘Transprints’ to make slides for lecture purposes. The quality of these, produced by John Wright’s in Warwick, is impressive.

It is also worth mentioning the performance of the fully automatic Minolta 38-90 zoom Compact which gave excellent results in the caves despite its deceptively small flashgun, particularly when used with Kodak 100 ISO film. All cameras performed well although the undoubted accuracy and versatility of flash metering by the OM2SP is offset by its voracious appetite for batteries.

Operating conditions in the caves were harsh and a CCS Workbench was used to protect equipment when moving from one location to another and care was taken to set up shots where there were no water drips from the roof. Several sets of spare batteries for the flashguns were taken but the batteries performed well and recycling time was not a limiting factor.

Several of the members found that their prints, and particularly slides, taken of general landscape subjects were slightly under-exposed. The reason for this is the tendency of light meters to read the brightest areas of the field of view and the failure of operators not to take this into account either by opening up by half a stop or so or by resetting automatic cameras to a slower film speed. There is an unfortunate tendency to believe that everything a light meter says is correct and that automatic cameras always take the thinking out of photography.
Appendix 6

FINANCE

The original budget for the expedition was arrived at more than 18 months before we travelled to Iceland. It was based on 18 members paying £800 each. We intended to use tentage owned by the school, suitably augmented. In the event generous support from the Friends of Warwick School and the King’s High School Parent Teachers Association enabled us to equip ourselves with brand new strengthened tents. Inevitably as the expedition membership and programme of activity firms up the finances of the project altered. In the end we settled on a members contribution of £700, which due to various generous sponsorships, proved more than adequate and allowed for a comfortable but essential contingency. The members organised various fund-raising events on their own behalf but it was policy not to organise centralised expedition fund raisers. However we were lucky to be given the balance of the proceeds from a very successful ball organised by Bill and Betty Jackson on behalf of Christine.

Members paid by installments over a period of about a year prior to departure. Projecting a cash flow is difficult when early on some deadlines are unknown. However we got it right though there was one tight squeeze! In addition there were various unknowns even after the expedition; this is what a contingency is for.

We took cash and US dollar travellers cheques to Iceland (an unnecessary lack of confidence in the £71) The travellers cheques were split between two leaders. Changing money (both sterling and dollars) and cheques was absolutely no problem. There are good banking facilities in Olafsvik and most shops and cafes accepted Visa and Mastercard.

The balance sheet shows a summary of the expedition finances at the time of going to press. There are still a few items as yet unaccounted for to be paid out of the balance. These include some aspects of the production costs of the report and postage involved in the distribution of the report. It is estimated that the full cost of production and distribution of the report (print run of 300) will not exceed £1600.

Balance Sheet

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John Cooper (Expedition Treasurer)
Appendix 7

ACKNOWLEDGEMENTS

A large number of individuals and organisations contributed financially, with food and equipment and with advice and support to make the Expedition possible. To all of those listed below we extend our most grateful thanks.

Tony Escritt
Young Explorers' Trust
Shane and Nigel Winser – Expedition Advisory Centre and the Royal Geographical Society
Geoff Billington
John Hare, The Outdoor Shop, Stoney Stratford
Catherine Harlow, Arctic Experience
Nigel Brainger, Lockwoods, Leamington
Tony Russell and Tracey Papathanasiou, MSG, Immingham
Mr. and Mrs. Bill Jackson
Mr. Bob Scott, Peugeot Talbot
Needle Industries, Studley
Studley Parish Charity
The Kathleen Elliot Scholarship Trust
The Gino Watkins Memorial Fund
The Explorers' Club, New York
The Friends of Warwick School
The Parents of Kings' High School
Dr. Philip Cheshire
Mrs. Jackie Anderson
Arges Distributors Ltd
Derek Reid and Judy Prichard, Premier Brands Ltd.
Dr. Theo Weston
Dr. Dewi Roberts
Agfa-Bevaert UK Ltd
Kodak UK Ltd.
Peter Ball, The Pharmacy, Moreton in the Marsh
Mr. Trevor Pritchard
Taylor Gardner Associates Ltd
Danny Lynch Construction
Gordon Hall Contractors Ltd
Integrated Hydraulics Ltd
Wincott Galliford Ltd
Avana Meat Products Ltd
Allan and Hanburys Ltd
Stuart Pharmaceuticals Ltd
Mr. Charles Lobban, Lloyds Bank, Shipston
Mr. D. W. Clark
Mr. and Mrs. P. S. Benton
Keith Felton, Martonair Ltd
Lyons Tetley Ltd
General Foods Ltd
Cadbury Ltd
Kernel Nut Ltd
Nestle Health Care

Beecham Group plc
Homepride
Asda Stores
Potterton International Ltd
Midland Design Partnership
Turriff Construction Ltd
A. C. Lloyd Ltd
Automotive Products, Leamington
Bovis Ltd
Equity and Law
Lord Caldecote
Kenilworth Round Table
Bainbridge and Co.
Price Waterhouse
B. Ashman
John Earle and Son
Bordon H. Cain
Mr. J. H. Heaton, Deanox Ltd
Colin Maynell
Warwick School Reprographics Dept.

In Iceland

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