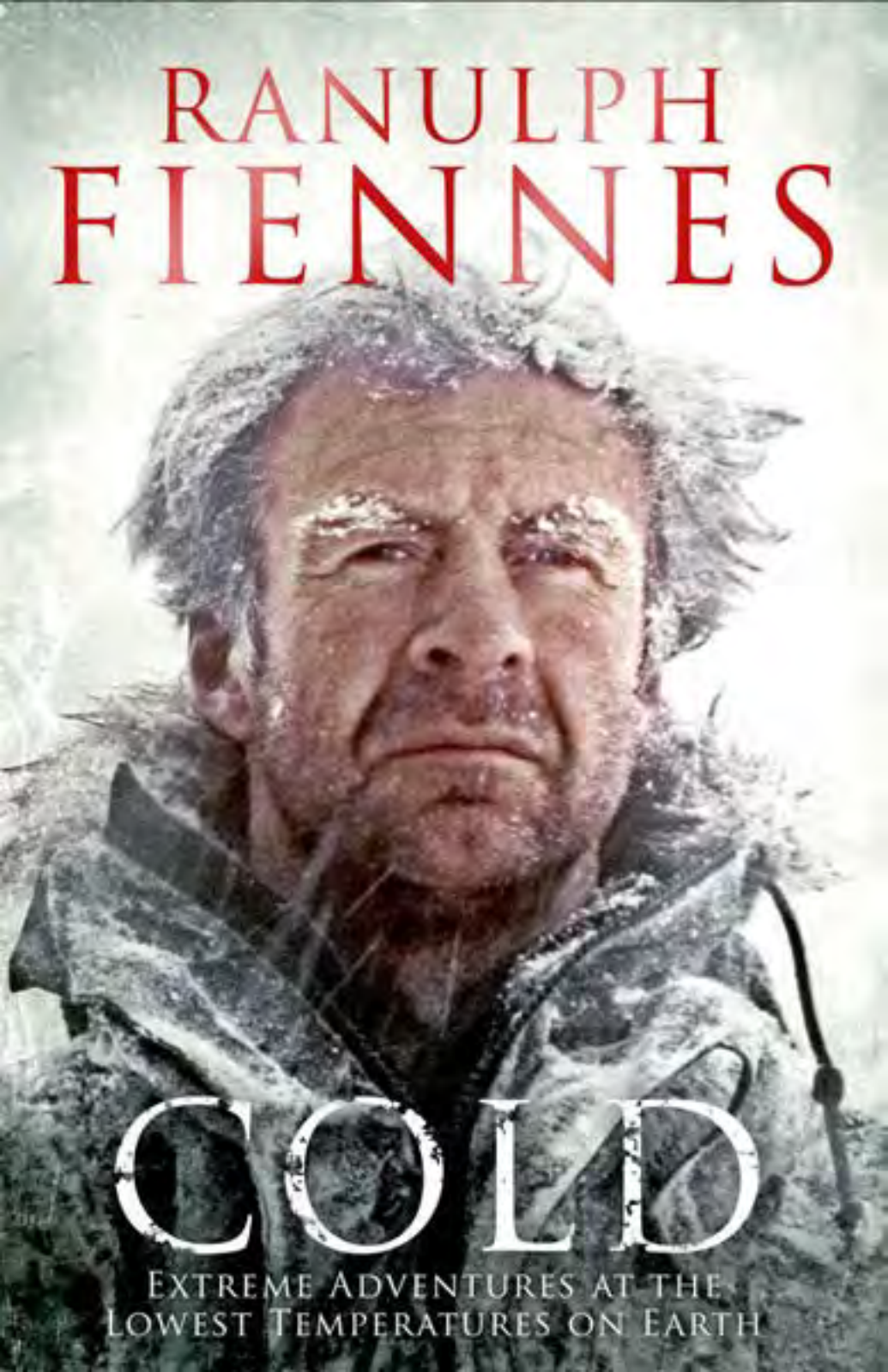
RANULPH FIENNES



COLD

EXTREME ADVENTURES AT THE LOWEST TEMPERATURES ON EARTH

COLD

Also by Ranulph Fiennes

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Ice Fall In Norway
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Killer Elite
My Heroes

COLD

Extreme Adventures at the Lowest Temperatures on Earth

RANULPH FIENNES

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For my daughter Elizabeth ('Mouser')
With much Love.

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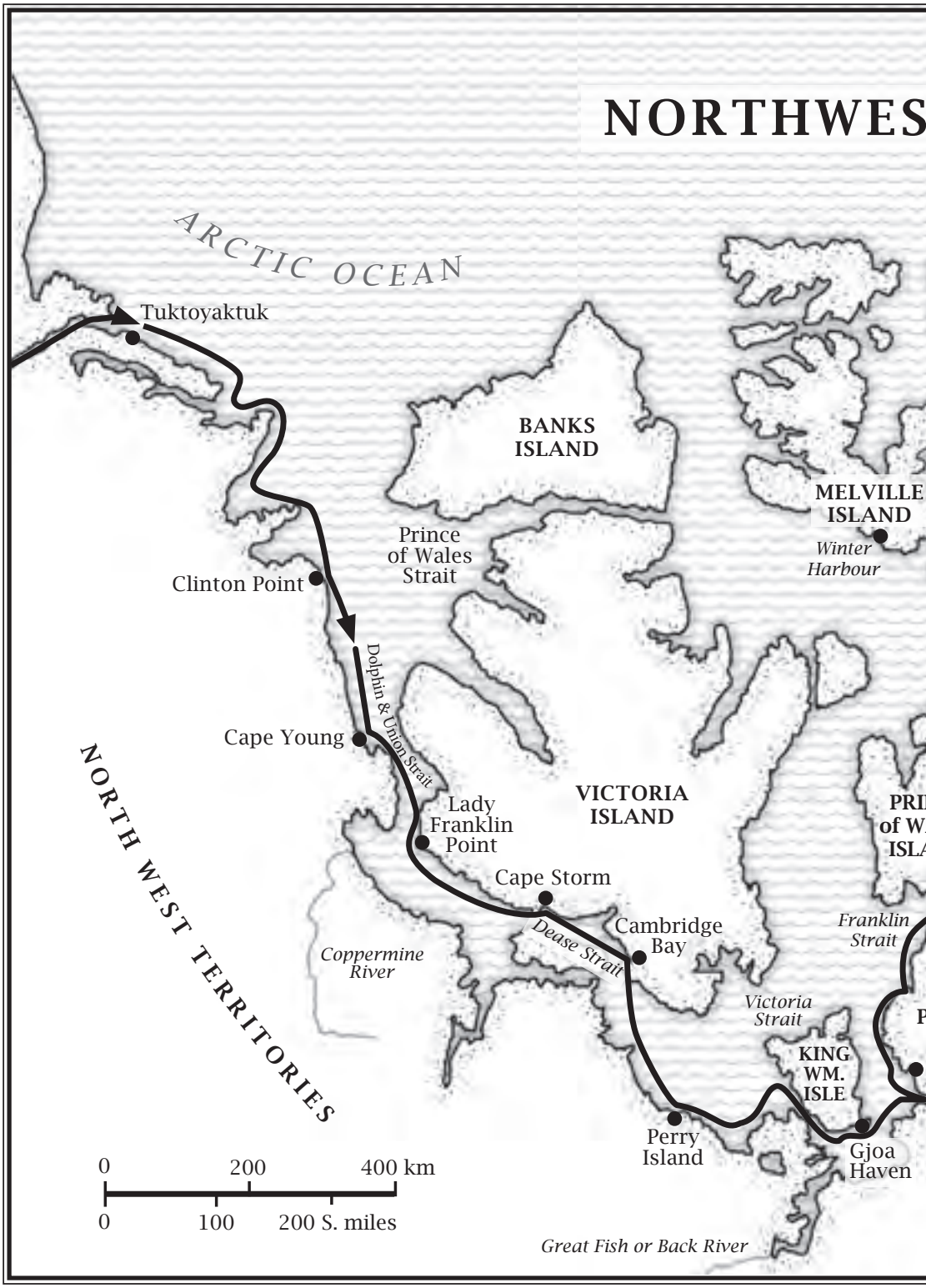
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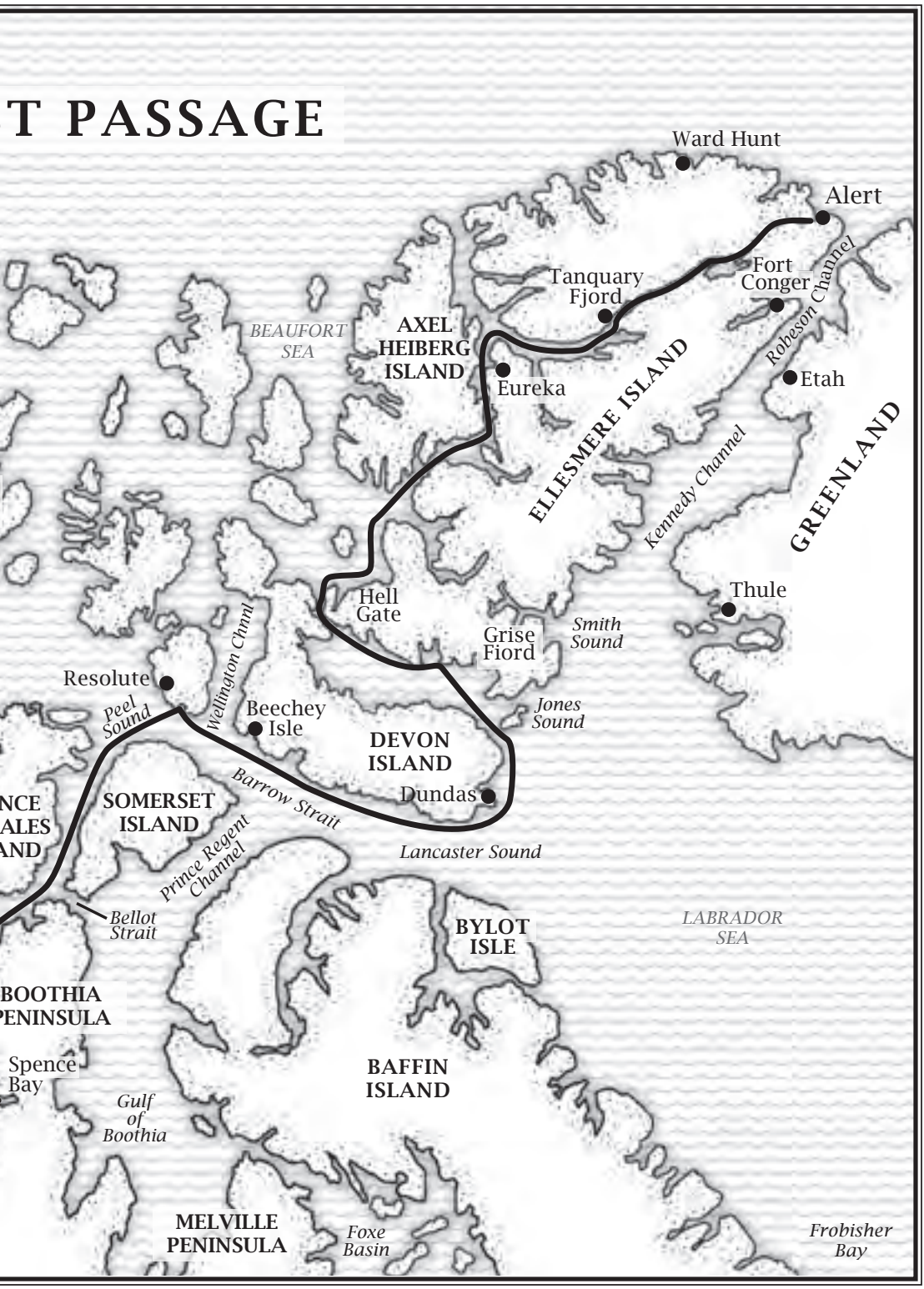
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Foreword

Much of my life has been governed by the cold. After leaving the army, I looked around for a civilian job to put bread on the family table. Cold places, cold survival skills and breaking cold world records would, I hoped, do the job.

I spent the early years of my childhood in sunny South Africa, followed by a family move back to England when I was eleven, and the first time I can remember feeling cold was at Eton College, when climbing the great dome of School Hall on a dark, wet and windy November night. This was an activity which, if discovered, risked expulsion. My climbing friend and I had left his old black tailcoat flying from the lightning conductor after a difficult ascent, but on returning to ground level not long before dawn, he owned up to a shocking oversight.

'You will not believe this, Ran, but I think I forgot to remove my name tag. They will know it was me.'

'You mean . . .' I gasped.

'Yes.' He shook his head in disbelief at his own stupidity, and, looking at his watch, hissed, 'We could just about get up there again, remove the tag and be back safe before the breakfast gong.'

'We?' I was incredulous. 'You don't think I'm going back up to get your coat and risk getting chucked out of school, do you? You must be joking.'

But we both made it in time and retrieved his coat. I crept back through a rear window of my school house soon after dawn had

broken, with hands numb and bleeding and shivering with cold. My teeth were still chattering in the breakfast queue an hour later.

After school and on leave from the army I dug my first snowhole and spent the night in it as part of a double wager with friends. The bet was that I would not ski up the main busy Aviemore ski run wearing only Y-fronts and ski boots, followed by a night with my girlfriend of that time in the shovelled-out snowscrape on the same piste run. That also proved a cold experience, though now just a hazy memory among a thousand and one other colder nights.

In the early 1960s I joined my late father's regiment, the Royal Scots Greys. We were stationed on the German front line during the Cold War face-off, and I began to spend my annual leaves in Norway, usually with a friend and a canoe. By our fourth visit we had come to know the rivers and fjords of central Norway fairly well. The part of Norway which interested us most was the Jostedalsbreen, which contains the largest snowfield in Europe. Many valley glaciers, forever shifting, moaning and grinding in tortured response to the stresses of gravity, descend from this great reservoir of ice and snow. From the lakes at the base of these glaciers issue raging torrents which race down the valleys to the calmer levels of the fjords and so to the sea.

In 1965 a friend and I planned to canoe from the western mountains to Oslo, starting our voyage immediately below the Jostedalsbreen (or Jostedal Glacier). This river journey proved to be a wild dash through magnificent country, but we had completed less than a third of our intended route when our canoe was dashed to pieces in a cataract and lost.

Despite this failure, Norway still lured me back. Standing at the foot of the Jostedal Glacier before the canoe journey, I had peered up at the great ice cliffs soaring above and wondered what the plateau which caused such glacial outpourings might be like. I had been told that there were routes up to the plateau if you were fit and knew where to look, and that trails existed that led right over the ice fields from the side of the sea fjords to inland eastern Jotunheimen. Once herds of cattle and the famous fjord ponies of

Jotunheimen were driven over these 'drift' trails, for they had formed vital trade links between the coast and inland Norway. I learnt that the last drift of animals was taken across the ice in 1857, but then the gently sloping edges of the glaciers leading up to the plateau began to melt and recede, so that their slopes became too steep and dangerous for the animals.

In 1967, six of us decided to explore this area by following one of the old trails right across the plateau and then canoeing down one of the rivers running east from the Jostedal Glacier. The trip was a disaster, due both to bad equipment and to the poor skiing skills of two of the team. Nonetheless it was my first real taste of ice travel, and I was determined to try other ice travels.

So I did, many times, and in 2013 I was part of a six-man team about to attempt what would be, quite literally, the coldest journey on Earth: a winter crossing of Antarctica. I had spent the previous five years organizing this endeavour. Then my left hand, already sporting five shortened fingers due to amputations a dozen years before, was further damaged by frostbite. The temperature at the time of the injury was –30°C, with a steady breeze lifting the snow around my skis. I had travelled in far colder conditions over many years without any problem, so the frostbite came as a shock, inexplicable at the time.

The journey would now prove out of the question for me, for I knew well that fingers which could not put up with –30°C would prove a major handicap on a six-month journey with temperatures likely to plummet well into the –80°Cs. Forced to return prematurely from Antarctica, I decided instead to share my fascination with the wonderful world of all things cold, and this book is the result.

Chapter One

Three years after the previous Norwegian trip, I had left the army and was planning a new Jotunheimen expedition. My personal fascination was for the hidden trails, the giant ice cliffs and the rushing rivers that issue from the Jostedal's glacial gorges, but this was not in itself enough to obtain sponsorship for a journey there. The days of sponsored exploring to discover new terrain or to achieve a purely physical goal were, by the 1960s, already numbered: most deserts had been crossed, seas navigated and mountains climbed. Even then, few expeditions could hope to get off the ground without sponsorship for finance and equipment, and this support can be hard to get without a sound scientific programme.

What did I already know about glaciers? Not very much. Glacier is a French word but has been the English term for slowly moving rivers of ice since 1744. These rivers of solid ice flow down from high mountain origins in simple response to gravity.

Glaciers are made up of densely packed snow. Beautifully constructed snowflakes, with many different shapes and exotic names, land on the surface of ice sheets as hexagonal crystals. The largest crystals, often the most delicate, fall in less windy conditions with the air only just freezing. On colder, windier days, the crystals often collide and, losing their six delicate 'arms', become mere granules. These soon become weathered, rounded and lie as layers of grains with air pockets initially trapped between them. As more snow falls, the air is expelled from these layers and the grains pack down to the

point where they are impermeable and can be described as true glacier ice.

The biggest glaciated area in the world, far larger than anywhere in Norway or even Greenland, is 15 million years old and covers the continent of Antarctica. The largest glaciers are in Antarctica, and 90 per cent of the world's ice and 70 per cent of our freshwater is locked up down there. In many places glacial ice covers, and even squashes, 10,000-foot-high mountain ranges.

Whereas people who live in areas prone to tsunamis, earthquakes and floods are well aware of their vulnerability, the inhabitants of great cities in areas once covered by glaciers feel secure, even when the occasional warning of glacial advances hits the news. And yet, only 10,000 years ago all northern Europe was covered by ice, as was Canada and most of the USA, and this ice has historically advanced and retreated on a regular basis.

For three hundred years, and well into the nineteenth century, Norwegian farmers suffered from the severe conditions of the Little Ice Age. Harvest failures led to death, disease and emigration. The great-grandparents of Norwegians alive today told of mountain chalets and farms destroyed by ice surges. The resulting cold also caused the deaths of 130,000 Finns and the emigration to the New World of 2 million Swedes, one quarter of that country's population. At the same time that the British were sending ships north in 1845, under Sir John Franklin, to find an ice-free trade route from the Atlantic to the Pacific, winter sea ice extended well south of Iceland and enabled Eskimos with kayak 'sleds' to turn up in Scotland.

The slow pace of glacial advances is, of course, reassuring, but the power of glaciers to destroy natural features rivals that of great rivers, or even volcanoes. There are valleys in Greenland, tunnelled by the excavating power of moving ice, which are 8 miles wide, 50 miles long and over 2 miles deep. Although glacial advances are usually imperceptible to the eye of the visiting tourist, there are many with a creep rate of several miles a year, both in the Alps and the Rockies. Sudden spectacular surges have been measured at 300 yards per day, and they can be audible from more than a mile away.

For my surprise fiftieth birthday present, my wife, Ginny, booked a week's holiday touring Iceland in a rented car. This coincided with the periodic surge of a glacier which spilt meltwater on to farmland on either side of the road that we were following. Cattle were stranded on outcrops of higher land and the outwash plains were submerged. Such floods, we were told at the local B&B, were wont to damage bridges and barns. A surge on a grander scale, should global warming continue, could easily upset one or more of the Antarctic ice sheets, resulting in low-lying countries, such as Bangladesh and Holland, disappearing under the sea.

Periodic volcanic activity under Iceland's Vatna Glacier is another cause of flooding: it melts the subglacial ice and raises the level of the high meltwater lakes which overflow every dozen years or so, to flood hundreds of square miles for a few hours. Huge blocks of ice are often shifted well away from their origin. Sensible Icelanders, unlike many British property constructors, know not to build on flood plains. They know glaciers in the vicinity are not to be ignored.

I made enquiries of Norway's glacier expert, Doctor Gunnar Østrem in Oslo, as to what scientific research, glaciological or otherwise, was possible in the Jotunheimen area, what was already known about its glaciers and ice caps, and what icy facts remained as yet undiscovered or unproven. He replied that he would very much like to have an accurate survey made of the Fåbergstølsbre, one of the valley glaciers 'flowing' from the Jostedalsbreen and at the eastern end of its plateau. Information as to the exact position of the Fåbergstølsbre's tip or 'snout' was urgently required in order to compare its location with that shown on a map made in 1955. Was the glacier receding, growing or moving its course?

The 1955 chart had been made from aerial photographs taken by the Norwegian authorities, who then flew a second series of photogrammetric flights in 1966. By comparing the two maps, they had hoped to obtain an accurate idea of the rate of movement of each ice arm, which would provide knowledge of considerable importance to those living in the area. Unfortunately, however, as Gunnar

Østrem explained, there were certain important gaps in the photogrammetric charts. The map construction had been based on two flying lines over the ice cap and, due to wind conditions, one of these lines did not catch the longest outlet glaciers to the east. The Fåbergstølsbre was the most serious omission, and Dr Østrem stressed that a survey of it would be of extreme topical interest to his Hydrological and Glaciological Department.

He warned us that this would be no simple task, for we would have to tie in our section of map with the trigonometrical points used by the Norwegians for their maps. These points were on high areas of the main glacier, towering above the Fåbergstølsbre arm, and they would have to be visited before any survey of the ice arm could be done. Moreover, they were extremely difficult to reach, being over six thousand feet above sea level and rimmed by crevasse fields. All the necessary survey equipment, delicate theodolites, radios for communication between the various points, bulky poles and tripods, and a hundred other items, would have to be transported somehow on to the plateau top and then moved over the fissured ice fields to a position above the Fåbergstølsbre. Sledges and skis would be necessary, as well as tents and food. The only safe track up to the plateau near the Fåbergstølsbre was a difficult route up steep glacial moraines and broken rock for five thousand feet; difficult enough with a small rucksack, let alone 8-foot sledges and 15-foot marker poles.

The Norwegian authorities didn't have the time, staff or money to operate a ground survey of this area, or to commission another aerial survey solely for the eastern edge of the vast glacier. With the notorious local mists and blizzards of the Jostedalsbreen to confound theodolite sightings and the difficulty of transporting kit, it seemed that the survey would take several weeks to complete.

The answer was clear. We must hire an aircraft with floats, take off from one of the many lakes, and drop everyone and everything by parachute on to the ice field as near as possible to the survey area. After the science work was done, we could then sledge over the drift trail and descend by way of a glacial valley to our vehicles on the nearest roadhead.

The Jostedal Glacier consists of a high central bowl of ice, with some two dozen outlet glaciers which flow like frozen rivers down to the valleys below, where, once warm enough, the ice becomes water and heads on by way of often turbulent streams to picturesque lakes. Though huge by European standards, the Jostedal is tiny when compared with the world's largest glacier, the Lambert-Fisher in Antarctica, a body of ice nine times the size of Iceland, measuring over 1 million square kilometres. This glacier is 65 kilometres wide and 510 kilometres long, and constantly ferries a vast load of inland ice from the high Antarctic plateau towards, and eventually into, the sea. The power of the moving ice is such that rocks are often sheared off mountain sides and can end up floating out to sea embedded in icebergs.

The Jostedalsbreen, I learnt from our team's glaciologist, Norris Riley, was a small remnant of a vast block of ice that had suffocated most of Scandinavia and literally crushed the land below. Norris, who had previously worked with the British Antarctic Survey in Antarctica, told me of one ice shelf so heavy that it depressed the land underneath it to 2,500 metres below sea level.

One aim of our survey was to measure the exact outline of a valley glacier, which would enable the Norwegian authorities to compare our figures with those of previous surveys and so confirm the ongoing rate of advance or retreat of the ice front. The neighbouring glacier to the one we were to work on, the Nigardsbreen, had earlier in the century advanced into the valley below and crushed farms that were in its way, and in 1953 the Kutiah Glacier in the Himalayas surged forward at the record rate of 112 metres a day, flattening villages and forests. One cause of such events is that periodic climate warming allows the belly ice of a glacier to melt and so travel faster down its valley bedrock. Overall, however, the world's glaciers are retreating, Norris said, with their ice melting faster than new ice is forming, and this has been happening for the last thousand years.

Wanting individuals who could complete the survey and had basic parachute skills, I began to put a team together. Choosing individuals

for a polar expedition (or even a simple 'cold' outing to survey a picturesque European glacier) involves a different level of selection from that needed for non-ice journeys. This is a generalization but one based on the principle that a single stupid mistake made below freezing can easily cost a life or lives. So I chose the Jotunheimen team with great care. Geoff Holder, Roger Chapman, Patrick Brook and Bob Powell were all ex-army. Peter Booth was a geologist and Henrik Forss, a Swede, was our doctor.

I made sure that additional parachute training was arranged for anyone who needed it, and top SAS parachuting instructor, Don Hughes, checked on our skills. At his final debriefing he did little to boost our confidence with the summary, 'Thank God I'm not responsible for you lot in Norway. Never in twelve years of instruction have I seen such a collective abortion as your last effort.'

With everything, including parachutes, survey gear and sledges, we drove in three Land Rovers to Newcastle to catch the ferry to Bergen on Norway's west coast.

The day before we left I had received a letter from Ginny, who was at that point my ex-fiancée, saying that she might be coming down from the north-west of Scotland to see us off. I had known her for fourteen years on and off, and we had been engaged for two years before circumstances – mainly my unfortunate addiction to wandering – had made us break things off. Now she was working for the National Trust for Scotland in faraway Torridon and aqualung diving for scallops in the sea lochs in her spare time. She arrived in Newcastle just before we caught the boat and, on seeing her after so long, I knew that there could be no other – as the saying goes – and asked her to marry me as soon as we returned from the expedition.

We drove to a lake below the Jostedalsbreen's northern flank where we unpacked all the gear and made up parachutable bundles. Don Hughes had decided to supervise the drop, which was a great relief to us all. Waiting for the plane to arrive, he summarized his policy of the day:

> You know I'll stretch a point if I can – otherwise I wouldn't be here – but it would be sheer lunacy to attempt the jump if the winds get up. If anyone gets into trouble, pulls too early, and gets blown just a few hundred yards too far, I wouldn't like to answer for the consequences. There's sheer black rock dropping away for four thousand feet, with thermal wind currents scouring the gullies. Get caught in one of those and you'll be dashed against the rock. There are downdraughts too which would deflate a canopy and you'd find yourself free-falling again. I'm not being pessimistic, you know, just realistic. If you were all experts, we might chance the conditions slightly, but you're not much better than beginners. So I'm afraid that it's a question of good weather and not much wind, or we don't jump.

The ice field where we hoped to land was at 6,000 feet above sea level. We would free-fall from 10,000 feet. ITN filmed the jump, which the *Sunday Times* subsequently described as 'The World's Toughest Jump'.

I hit the fuselage with one hand a split second after jumping off one of the Cessna's floats and, temporarily panicked, I spun away in an unstable position, cartwheeling through the air. But by the time I had counted to fifteen (to ensure that I did not activate the chute too high where the wind might whisk me well away from the only safe landing zone), I had achieved the correct spreadeagle position and pulled the red handle. Only two of the team missed the 'safe' ice field, and they narrowly escaped the dizzy drop down the cliffside abyss. Geoff hurt his ribs, bashed his eyes and lacerated his nose. All the equipment was retrieved undamaged, and we camped the night in rare good weather.

In the morning, under threatening skies, we set a compass bearing for the upper reaches of the Fåbergstølsbre, but very nearly identified the wrong glacier. Only through good luck at the last minute did we establish our actual position, and so had to make a long extra journey to the north, flanking several vicious-looking crevasse fields en route. Henrik was the only person with previous experience of ice navigation in crevassed areas.

Our camp, on a rare flat patch of ice on the high shoulder of the Fåbergstølsbre, was sheltered by a prominent group of black rocks. From that point on the next day three groups of 'surveyors' set out to three different commanding mountain tops which surrounded and overlooked our glacier. Each group took a high frequency (HF) radio, theodolite and fluorescent flags on long poles. Once all local mists lifted, the three high points would be established as inter-visible control points around the Fåbergstølsbre ice tongue, which we could then relate to the existing Norwegian charts. One control point lay on the far side of a serrated crevasse field, another atop a rocky precipice and the third on the far side of a deep valley. I went with this last party to help carry their gear, and did not return to the ice field camp for two days.

The climb from the valley back to the camp took me eight hours, and although it felt cold, the rain in the valley did not change to snow higher up. Twice in the blinding rain I took a wrong route up the final rocky buttress below our campsite. The weight of water pouring over the buttress made it difficult to see a reasonable route, and my heavy rucksack did not help matters. Being no glaciologist, I could not understand why, when it was so cold, the sleet and rain did not turn to snow, nor why it did not freeze solid on contact with the ice. True, it was August and the hottest period of the year, but the temperature appeared to me to be below freezing. I could only presume, as I watched the torrents of water gushing from the ice plateau, that the air above the ice was affected by warmer currents from the valley below and that there was just too great a volume of water racing down too quickly for it to freeze.

Worried, for exposure can set in unexpectedly in such conditions, I climbed across to the southern edge of the buttress where it met the ice tongue (though separated from it by a formidable gap) and ascended a steep but firm ramp, hauling the rucksack up after me with a 100-foot length of nylon rope. The thought of a warm tent and dry sleeping bag kept my legs moving, but cautiously, for visibility was low and I was lost.

After visiting numerous possible outcrops leading on to the ice,

desperation was in the offing – as no doubt was pneumonia – when I stumbled on our Union Jack lying in a pool. I picked it up and climbed into the wind over a jumble of metamorphic rock. Suddenly the ice rim and the tents were before me, but my relief was tempered by anxiety for the others. I did not call out, for it was painfully obvious that they were absent.

Everywhere lay sodden equipment. The tents were on their sides in pools of meltwater, and sleeping bags, radios, skis and ration packs were strewn about as though abandoned in a hurry. Clothes and ski boots lay quite far from the tents, perhaps blown there by the gale before they became waterlogged. The level snow patch was now just a sloping grey layer of mush.

The faraway group, led by the injured Geoff, would be all right, for there was little or no ice where I had left them that morning and they could easily find their way back down to the gully. But what of Roger and Peter, some six kilometres over the ice on the Fåbergstølsnøse? And Henrik's group on the far side of the ice tongue and crevasse field? For some unfathomable reason they had taken none of the tents, nor any sleeping bags or rations. Even a day-tourist visiting these parts is well advised to carry gear giving full protection from the elements. Both Henrik and Roger were experienced enough to know better than to venture into the ice fields carrying no survival kit. The temperature was now well below freezing point and, together with the strong wind, made for ideal hypothermic conditions.

There was a single strip of damp snow at the uppermost lip of the ice field, and I moved the tents there one by one, cursing as they persistently blew away from my numbed grasp. Grabbing sleeping bags and clothes, I passed them through the entrance holes, knowing this to be of little use, for they were thoroughly drenched. I could see perhaps five yards into the gloom and shouted hoarsely, but my voice was carried away like a jinking feather in the gale. I found the emergency flares and fired some into the mist. There was no reply as I listened intently. I could hear nothing save the chattering of my own teeth, the hiss of moving meltwater and the wind. I called the

groups on the walkie-talkie, but again there was no reply. The blizzard intensified outside the soaking wet tent.

We were by no means the first expedition to make such a basic error. On his first Antarctic trip, Captain Scott's diary recorded on 12 October 1903 that there was a need to be less 'careless in leaving our things outside the tent ... Our sleeping bags, with socks ... and other garments, lay scattered about on the ice whilst we were having breakfast when suddenly the wind swept down on us: before we could move, everything was skidding away over the surface.' But in spite of this warning, caution still appeared to be in short supply, for a few days later another series of strong gusts robbed them of a critical item.

The events of that night in Norway might well have proved tragic, due to wet-cold-induced hypothermia. As it was, the six men experienced a night they would never forget and the blind fear which comes from being lost in a dark, frozen world of roaring, yet unseen, water chutes and yawning fissures. Roger's and Peter's diaries later recorded:

> As we dismantled our theodolite at dusk, the mists closed in along with sleet and driving rain. Only then did the stupid mistake we had made begin to dawn on us. The golden rule in such mountains when a mist descends is to stay where you are, erect a tent, and crawl into your sleeping bag until the mist lifts. As the weather had been glorious when we left ice camp that morning and the weight of the survey kit, theodolite and radio had been back-breaking, we had dispensed with both tent and sleeping bags. How stupid we were! There was naught for it but to attempt to reach the safety and warmth of ice camp, but there was one large snag. Between us and the camp, on the direct route we had come by, lay a 600-foot-deep gorge. There was, however, an 8-kilometre ice traverse which flanked this gorge. It was worth a go, for even if we huddled together under a rock for warmth, we would only have a small chance of survival in this bitter howling wind.

The surface of the glacier itself was melting at an unbelievable rate. Where the ice was level, we walked through slush and rotten ice with water well above our ankles. Where there was a slope, black streams had formed which rushed past at torrential speeds. One such temporary hazard was especially impressive, not for its size, but for the velocity of the water hurtling down it. Although only a yard across and about two feet deep, it moved so fast that to have slipped and fallen in would have meant being shot down into the unseen valley below.

We slithered and fell on the ice, sometimes disappearing up to our thighs in glacial streams which flowed across the ice field. No, it was far from pleasant. Peter noticed a couple of drowned lemmings in the centre of an ice field which he felt was significant. I tried not to share his view.

According to my calculations, we should have reached ice camp by about 2015 hours, but as this hour came up, all we could see through stinging eyes was mist and ice. We could hardly tell whether we were climbing or losing height. My heart beat a little faster. Oh my God, have I made a mistake in my calculations? If so, then we are in deep trouble.

At 2030 hours we hit rock which appeared to be running in the right direction, so we left the compass-bearing and edged our way carefully down the rim of the rock. The clouds cleared and we glimpsed for a moment a breathtaking and intense blue sky. Then the mists closed in and it was gone as though but a mirage.

Without crampons, walking on the sloping, moving ice in rubber-soled boots was not easy. We did not dare to rope ourselves together for – if one of us fell – the other would not have held him and both of us would have slid over the edge together. We could not tell where the terminal rim of the ice lay, though it must have been close for the wet crunch of our boots was drowned by the background roar of water pouring off the glacier.

I felt we might be walking around the wrong outcrop – perhaps we had gone too far north and were in the middle of the main glacier; having seen the force of the water melting off the

> ice, I wondered whether the camp had not been completely washed away. Even if it hadn't, we might miss it in the mist, for the successive outcrops of rock were most confusing. Each new bay in the rock-piles looked like the one with the camp. By now finding the camp was the be-all and end-all of our lives. To sleep in a tent with a sleeping bag, no matter how wet, seemed the ultimate luxury. We wanted nothing more than that, and did not think further.
>
> Suddenly Peter pointed to the front and I quickened my pace. 'That's it, I'm sure that's it!' he shouted against the wind. I could not see anything in the swirling gloom. 'Are you sure?' I asked with my heart pounding. 'Yes, I can see the tents.' We ran the last few yards into the camp in our relief. We were numb with cold and awkwardly stripped off one another's clothes, climbed into the tent where Ran was, and crawled into one sleeping bag so that the meagre warmth from our huddled bodies could warm each other's frozen limbs. Both of us had uncontrollable shivers and Ran produced a flask of brandy. It tasted good as it burnt its way down my throat then swelled up with heat in my stomach.

Relieved as I was at the arrival of Peter and Roger, I noticed their poor state, which did not bode well for the other groups. They had crossed over no crevassed ground, however slippery and sheer their route, whereas Henrik's team must pass right across the rotten snow of the moving ice tongue, dangerous enough in daylight. Both Roger and Peter were having difficulty in speaking and, though obviously exhausted, they were shivering convulsively and unable to sleep. Their skin was a mottled green in the torchlight, their lips cracked, and icy particles of sleet clung to their hair. They lay together shuddering and sucking numb fingers. Bob's diary recorded the nightmare experience of his benighted group:

> Reflecting on our plight, I realised we had fallen into a common trap; the day had earlier seemed bright and clear so we had left without protection kit or adequate rations. Now, in a blizzard, we

faced the prospect of huddling together under our three groundsheets or the equally unpleasant alternative of a blind traverse of the Fåbergstølsbre crevasse field.

What followed was not exactly an argument; we were far too cold and worried to waste time arguing, but – whereas I favoured finding some form of shelter – Patrick was adamant that, with no tent in the freezing wind, we must attempt the crossing. Henrik was undecided but, swayed by our lack of food or dry clothes, agreed with Patrick and the decision was made.

The next four hours were an unforgettable hell. The earlier sledge crossing of the area had been a picnic by comparison, since we had then been able to see the dangers: now they were obscured and increased, for the driving rain had melted all but a few of the remaining snow bridges and those that still existed were rotten and difficult to find in the gloom.

I followed only the black line of the rope as Henrik, leading with his compass, was hidden in the misty gloom. God knows how he managed to sort out any useful bearing from his compass – we were spending more time detouring the black lips of crevasses than heading in any particular direction. I had long since lost any sense of orientation.

This group was also lucky, and finally found the campsite lit by our torch. Bob's diary ended: 'Peter, Ran and Roger were in one tent. We climbed exhausted into another. Everything was wet but at least the wind could no longer cut into us. We polished off a half-bottle of whisky between us, and Henrik climbed into a sleeping bag with me. I shivered uncontrollably for the five hours before dawn; decidedly the most miserable night of my life.'

Having established hundreds of sightings from their control points over the next week, our seven 'surveyors' moved down on to the ice tongue itself. Using crevasse ladders, survey poles and metal stakes, they threaded their way up and down the broken ice like so many flies on a fractured wedding cake.

I sat one night with two others in a tent. Munching an oatcake,

Roger reflected how very transitory and puny man was when seen against so massive, so eternal an element as the glacier. The blue-white mass below us had contemplated the heavens for aeons of time and doubtless would continue to do so for countless years to come. The spirit of the ice must laugh to itself to see our clumsy efforts at recording its movement, its shape and its nature. In a while it would change absolutely and our records would soon be outdated. The ice will continue to alter when we are long since dead, like the lemmings frozen for centuries in its icy veneer.

The Ice Age known as the Pleistocene began 2½ million years ago, and is still with us today. Within its overall existence there are fluctuations of the average temperature on Earth and, in response, glaciers advance or retreat. Advances are called glacial periods; retreats are interglacials.

The last glacial period lasted from the fourteenth century to about 1850. So, whether or not man-made global warming is currently having a big effect on ice the world over, we would anyway be experiencing an interglacial interlude during our lifetime and that of our children. Greenhouse gases do undeniably affect the behaviour of our ice-covered zones, but so too do natural phenomena like volcanoes that cool the Earth down.

In the three years between 1812 and 1815 three volcanoes blew their tops in a major way: Soufrière in the Caribbean, Mount Mayon in the Philippines and Tambora in Indonesia. Over three thousand feet of Tambora literally disappeared, sheared off by unimaginable forces. Twelve thousand of the local islands' inhabitants were killed, many thousands starved when their crops were buried under ash, and dense volcanic dust clouds blocked out the sun's warmth far more effectively than did the subsequent and more famous Krakatoa explosion. Tambora altered global weather patterns and lowered normal summer temperatures by as much as 8°C – enough to ruin crops and cause mass starvation.

Sitting outside the tent in warm sunshine with the others, I pictured the entire Jostedalsbreen as a giant bath and tried to imagine the

amount of water, should the Earth warm up a bit, that would result from the melting of an equivalent-sized ice chunk of 600 square kilometres with a height of 300–600 metres.

I was distracted from my thoughts by the sudden appearance of a group of shirtless climbers wending their way up the ice. Three were tough-looking men with ropes and ice axes and the fourth was a young woman, blonde hair tucked up under a peaked cap. All conversation stopped outside our tents. Our group was mesmerized. The girl was very pretty, well tanned like the men she was following, except for her breasts, which swung free as she walked. They were as white as ice. The vision passed on up the glacier and we heaved a communal sigh.

Back at work on the ice tongue, we planted survey poles at 200-metre intervals all the way down the 2-kilometre-long frozen river. Half the team then worked from the top of the tongue downwards with a subtense bar, whilst the others started down at the glacial snout and moved upwards with a theodolite and 16-foot-long measured staves to complete a tachymetric traverse which would give us accurate readings of the complex contour lines of the whole glacier.

Darkness sent everyone back to their tents, and next morning Geoff, with his nose hugely swollen from his parachute jump, gave out bad news. The heavy rainstorm and the resulting ablation had messed up all the previous day's sightings due to tiny movements of the poles. Twenty-four hours later Geoff announced over the radio, 'The ice movement is negligible now, but would you believe this? During the night, all the survey poles have popped out of the holes we drilled.'

So we went back to work with hammers and stakes, replacing poles and substituting new ones where originals had fallen into deep crevasses. I glanced into one such hole. There was no visible bottom, just a faint gurgle from water flowing far below. 'In a hole on a nearby glacier,' Geoff told me, 'village children recently spotted a corpse, and police fetched up the perfectly preserved body of an old man dressed in the style of clothes worn by local shepherds four hundred years ago.'

The work finally complete, two of our group departed down the ice to our valley base with the precious notebooks containing our survey results. We would have followed them, but the tricky terrain would have meant hiring porters to get the heavy and more bulky gear down the precipitous route to the valley five thousand feet below. And we would have needed many hours of good weather as well. So I had hired glacier guides to take us down the Briksdalsbreen, which was the steepest of the glaciers and would, in theory, allow us to use gravity and our ropes to lower the gear on sledges to the base of the Briksdal, where we would have easy road access to our Land Rovers. No porters, no sweat and an added bonus that the 40-kilometre route from Fåbergstølsbre to Briksdalsbreen would follow an original, much-used drift trail.

Our two guides arrived on time but were apprehensive about our plans. Henrik spoke to them in Norwegian and told us that they were prepared to guide us for some thirty kilometres but then we would be on our own. Henrik's diary recorded the guides' worries: 'They advised us not to go down the Briksdal because of the weather conditions. They emphasized the danger from deep crevasses. I agree with them for three reasons. Firstly, it is the maximum melting period with danger of avalanches; secondly, we have no proper ice ladders, no ice nails – only ropes; and thirdly, we have no experience on ice!'

I tried to persuade the guides to make the journey. Henrik translated. One explained:

> Many times I have led people over the Jostedal. I have even skied by myself over its entire length in one journey. But not in such weather as this. You do not know the crevasse fields to be crossed, nor do you know the zigzag route we must follow if the dangerous areas are to be avoided. As to your hopes to descend the Briksdal, there are areas above it which will be perilous to transit, and the ice tongue itself I have never descended: indeed I know no one who has, for the old cattle route has long since fallen into disuse.

The other added: 'I know the weather in these parts – a mist like this may lie over the plateau for days on end and with it you will get the rain. Many of the snow bridges will fall away and, as for the Briksdal, all day and every day it will move with tons of falling ice. If you have any sense, you will abandon what equipment you cannot carry and descend to Fåberg.'

Further discussion ended in compromise, with the guides agreeing that after the thirty kilometres they would advise us on a specific compass bearing, mist or no mist, which would take us to the upper reaches of the Briksdal.

For five hours we sweated, strained and cursed up the endless slopes. Each time we came to the top of a gradient, another expanse of grey mush ice climbed to a misty horizon above us. Yet, when a gap in the mists allowed us good vision ahead, the shimmering white plateau rolled away to the west seemingly flat as a pancake. If there were gradients, they were undetectable. Of the guides, who had gone on ahead, there was no sign; to our front we could see their spoor running on for little more than fifty yards before it faded into the overall glare. I began to wish that I had snow goggles, but they had been lost earlier that week.

A wind howled about us, lashing the sleet viciously into our eyes and lips. We needed more grip with the skis to gain leverage for tugging our burdens but, as time passed and the crust grew wetter, our skis increasingly slid backwards. Just as we tried to pull hard to tug the pulk over a hummock, one of our langlauf skis would slip away backwards, lashing into the sledge and causing the others to curse.

Langlaufing is a type of cross-country skiing that is popular in Scandinavia but practised by very few Britons. Pioneers have tried to enthuse the British with its simplicity and economy, but the countryside and weather conditions in Britain do not favour langlaufing as they do in Scandinavia or Bavaria. Nor, it seems, do we take kindly to a sport demanding a fair amount of exertion and strength when the expanding potentials of downhill skiing are effortlessly available all over Europe and even in Scotland.

One can langlauf in any clothes, so long as there is freedom of

limb movement. Specially made boots must be bought with thick rubber soles that protrude beyond the toecaps so that the overlaps can be fitted into metal brackets on each ski. A spring retaining clip holds the toe of each boot in position and the skier can virtually run on flat snow or, with the aid of his ski sticks, up 40° inclines.

The skis are prevented from slipping backwards when climbing by the application of specially prepared waxes and klisters. For every conceivable type of snow there is a different colour of wax, and for each degree of changing temperature a further change of wax is required. But Henrik was an expert at gauging the temperature and texture of the coarse snow by rubbing some in his palms. He selected green and blue waxes and applied them with aggression to the base of our skis, finishing by massaging the now shiny wood with a cork. If too smooth a wax is applied, the skier will slide fast on a downhill stretch but will find climbing difficult, for his skis will gain little or no grip and will slide away backwards, giving a treadmill effect to his efforts. On the other hand, an over-glutinous wax such as a klister resin, which is for wet or slushy snow, might be ideal for climbing but will cause clogging, allowing no free slide at all. When the correct wax is applied, fast movement up and downhill is possible, and once the rhythmic glide of the professional is learnt, distances of over fifty miles in a day can be attained without undue exertion.

Even Henrik did not always get it right. After some seven hours of skiing, he bade us stop: he would re-wax our skis with a klister wax. Thankful for any excuse to rest our aching shoulders and thighs, we crouched down in the poor shelter of the sledge. The others were not visible behind, but our own trail was plain to see, since the whole floor area of our sledge flattened the slush as we passed. Henrik shook his head, running a gloved hand up one of his skis. Then he swore in some other tongue.

'Look at this. The abrasive texture of the surface crust has ruined my skis. It will be no use at all trying to re-wax them, and yours will be the same. New wax must always be applied on to a base wax, not direct to the wood, or it will rub off in minutes. But look – all

the base wax has gone and much of the wood has been filed off too.'

He was right. No wonder we were slipping about. The others caught up with us. They too were slipping on the spot, 'tread-milling', as Roger described it, and they had stopped to repair their manhaul harness, which had come apart.

A gradually descending slope helped us for two hours as we slid smoothly, silently, through the yellowish gloom, the driving sleet coming from behind us now, the cadence of its hiss on our anoraks rising and falling with the wind squalls. We changed over our harnessed positions every half-hour, the lead-hauler making sure to look only before him, some five yards in front of his skis, to pick out the blurred marks of the faint piste.

Henrik prodded me with his ski stick and pointed to the left. We stemmed our skis and came to a grinding halt, for there, like some long-sought signpost to Mecca, stood our ice axe where the guides had left it. Scrawled in thin snow beside it were words and an arrow. The letters were almost obliterated, but Henrik peering at them shouted, 'To Briksdalsbreen! To Briksdalsbreen!'

Henrik decided that he would leave us at that point and follow the ski tracks of the guides back down to the valleys. He was the only one of our group with previous glacier experience and his reaction to the guides' advice was that to attempt a descent of the Briksdalsbreen in the prevailing conditions was less than sensible. As a family man, he made his decision accordingly and we all respected it.

Bob moved out ahead of us with his compass. Following him, we moved carefully, finding that the gale was forcing the sledges to the left. Particles of icy sleet stung our cheeks and foreheads, and the murky ether hissed with white pellets seemingly bent on our discomfort. Without goggles, I kept my eyes half-open and my head down, letting Geoff do the steering. I looked behind briefly from time to time: Patrick was there, swathed in mist and often stumbling as he checked Bob's direction on his own compass and called out some new correction from time to time. Of the other sledge there

was no sign, but they had our tracks to follow so long as they kept going. None of us wished to stop, even briefly, now: it was far too cold, with the icy blast blowing straight up at us from the crevasse fields down to our right, from where came alarming noises of falling ice, sometimes quite close. I expected at any moment to find the sloping shoulder which we were traversing falling away sheer beneath us.

Bob must have had similar thoughts, for he was moving more slowly now, peering myopically into the gloom and stemming his skis carefully. I did not envy him his guiding role, for a crevasse can remain invisible in the mist until a skier is on top of it. It is difficult to stop quickly on langlauf skis when the surface is hard and icy.

We had been moving for two hours after leaving Henrik when Bob came to a sudden halt. 'Crevasses,' he shouted. 'All over the place. We must have been moving with our eyes shut, for they're on every side.'

The snow bridges in this part of the glacier were firmer than those of the Fåbergstølsbre, but they spanned wicked-looking gaps which ran on for hundreds of yards before tapering to some six feet in width. Only then did snow bridges seal their lips and we could attempt to cross them, our hearts thumping as the whole length of our sledges weighed down on the teetering spans. We knew we should be roped but were too cold, too exhausted, to do aught but stumble on with heads down and shoulders bunched. Slithering skis catching in the crust, we shouted and swore at each succeeding chasm that forced us from our compass bearing.

I called to Bob to stop. We had no idea what lay ahead. We were dog-tired, so we needed to camp before dark and while there was still a flat spot. We were traversing between two great splits, moving on an apparently solid platform as wide as a Roman Catholic altar is long. It offered no protection from the gale, but on the Jostedal plateau it is useless to look for shelter. There was just enough room for our two small tents. Unleashing the taut straps of the sledges with numb fingers was a slow business. With four of us gripping the

corners of a tent, the fifth secured it, not with ice pegs, which were immediately whipped out by the wind, but with ice axes pushed deep into the crust. Inside, each of those tents was a pocket paradise.

Towards five o'clock next morning the mists cleared suddenly from below, leaving us as though on the edge of a monsoon cloud. Immediately above us the mists still lay thick, but elsewhere the world was a sun-dappled place beneath a clear friendly sky. The events which followed were best witnessed by Bob Powell, as he was behind the rest of us. His diary records the start of the descent:

> 0545 hours. To our relief the clouds of mist rolled away and revealed a cold clear morning. We crawled from our tents and the whole of the top of the Briksdalsbreen was visible. By backbearings, we established that we were in the position we had hoped for, so we stowed the kit on the pulks, fitted skis and set off on our descent to the Briksdalsbreen's upper ice field. Almost immediately disaster struck, for one of the pulks ran headlong out of control. Roger and Patrick fell sideways, releasing their grasps on the handles as the sledge plummeted into a deep fissure, along with its valuable load. We counted the cost of this loss – one boat, tents and parachutes, six hundred feet of rope, and an assortment of personal and scientific gear, camp beds, lilos, etc.
>
> We continued on down since, despite the loss, we still had all the necessities for the ice descent. We did take the precaution of transferring loose items of personal kit, such as crampons, and all the ropes we had from the remaining sledge to our backpacks. Helmets were donned, and we found a relatively simple route down the next steep gradient. Already, though, the crevasses were more formidable than those at the centre of the Fåbergstølsbre – some indication of what was to come.
>
> No sooner had we congratulated ourselves on the speed with which we had navigated this first pitch – perhaps relaxing at the relative ease of the descent – when the second pulk went out of

control. So heavily laden were the two sledges that traversing crabwise across the slope and having to turn through 180° was sufficient to throw them off balance, and the second one rolled a bare three metres before plunging into a crevasse running parallel with our course. This time Patrick was on the downward side of the pulk and narrowly escaped being caught by the load as it rolled over. Roger was in the traces and was flicked bodily over. Ran and Geoff, navigating some two hundred metres ahead, turned but were in no position to help. We grouped around the crevasse, staring into the depths.

We had by now switched from skis to crampons, and one of the losses in this second incident was six pairs of skis and sticks strapped on the top of the pulk – indeed it was probably their bulk which had unbalanced the load and made it so ungainly. We examined our kit, laying it out on the snow to reassess whether we had the bare minimum for the ice descent. Although much rope had been lost, we decided that we should have sufficient lengths of 300 foot, 200 foot and 100 foot line, if single fixed ropes were used for abseils. Each team member had crampons and an ice axe, and there was adequate food for twenty-four hours.

I winced as I thought of the amount of equipment lost. Perhaps it would have been better to have abandoned it above the Fåbergstølsbre and saved much sweat. On the other hand there had been a sporting chance of successfully lowering the sledges and a chance is always one up on a negative certainty. However, there was little good to be had in worrying about that argument now. At least we still had sufficient gear, it appeared, to descend three thousand feet of ice, however sheer.

Beneath us lay a vast field of jagged ice blocks; a nightmare in blue and white. This was the first icefall. The glaciological definition of an icefall is a heavily crevassed area in a glacier at a zone of steep descent. There would be four more, but only this one could safely be skirted by descending the black cliffs enclosing either edge, for

here the rock was broken in many places and the route beside the icefall would be an uncomplicated rock descent, saving valuable hours of light. Time was all-important for, with our remaining rations and all but a single two-man tent lost in the crevasse field, we could ill afford to spend another night on the ice.

A waterfall precluded further movement between ice and rock; a thunderous deluge issuing from the heavens, so it seemed, for the water's source was invisible to us huddled down below. Flashing cascades poured forth from the black granite many hundreds of feet above us, thundering past ice and rock into some bottomless canyon.

Looking carefully around, we saw that instead of the usual giddy divide between rock and glacier, we were faced, through some anomaly of nature's forces, with a temporary bridge of ice spanning the abyss. It looked as if a great chunk of ice had lodged itself in the bergschrund when the last avalanche had descended from the ice face above. Other smaller bits of ice had then become wedged upon the original chunk so that, although the giant block had melted down and might at any moment drop away into the gorge, a complex of crazily balanced smaller blocks led the way before our doubtful gaze out on to the main ice arm. Roger was with me and viewed the teetering bridge leading from rock to ice with equal distaste.

I contemplated the ice bridge as we clung to the rock. I was annoyed by the slow progress of the others. I knew why I felt irritated: I was frightened. I glanced at Roger, but he seemed unaffected by his surroundings. Did he feel that he should be leading us? After all, I had never climbed on ice before, any more than had the others. Our week's clambering about the Fåbergstølsbre was the only experience any of us could boast. A few days ago we had strapped on crampons – probably incorrectly, since no one knew how the experts wore them – and, grasping the alien weight of short ice axes, taken our first steps on the treacherous medium of glacial ice. The Fåbergstølsbre was a gentle slope compared with this monster, both in length and degree of incline.

This was no time for lack of self-confidence. Ice is not so very dissimilar to rock when it comes to methods of descent, and I had spent much of my life in various mountain ranges. The others had not; so I was, I tried to persuade myself, the best qualified to pioneer a route down the Briksdalsbreen.

As the others readjusted their packs and tightened their crampons, Roger tuned the radio and tried to contact the camp far below us. Johnnie, the boss of our vehicle group, answered him. He had bad news; news which he had learnt from some locals earlier that morning and which he had been trying to tell us about ever since. Now, hearing us at last, Johnnie was voluble. He couldn't understand why we had not been told before – since it was common knowledge amongst the local Norwegians – that the glacier we were descending was notoriously dangerous throughout the year owing to its unusually steep declivity, but during mid-August, the period of maximum annual melting activity, it was especially hazardous. Some forty local farmers and guides had walked up to the lake and sat with Johnnie discussing our plight – for such they unanimously considered it to be.

Fifty years ago, they said, a Briton called William Slingsby, a climber of much repute, had managed to scale the glacier; but his attempts at descending it had been frustrated by the falling ice and the impossibility of working out a plausible return route. He had planned his upward route carefully in advance but he could not retrace it once up, for such is the nature of the ice that crevasses may be jumped across in one direction, but often not the other. Going up he could see to avoid the more perilous pitches. Not so descending, for the ground below was dead ground visually.

For half a century the great face had remained inviolate, and then, only five days before our own arrival at its summit, a team of Norway's ace glacier climbers had set out at dawn and, after forty gruelling hours – and an accident when the leader had badly sprained his ankle – had been forced to give up only a thousand feet from the top. Later they were to describe the ascent as their most difficult climb ever. Their achievement was the culmination of

months of training and numerous ascents of other tamer glaciers. They acknowledged the Briksdalsbreen to be the Everest of Norway's glaciers They had been equipped with the latest in ice-climbing gear: specially stressed screws and pitons, and periscopic ice ladders for traversing the many wide crevasses which more often than not split the entire width of the glacier.

Johnnie ended with the words, 'All the folk here say you should go back up while you can.' I replied, 'We cannot go back, Johnnie. Both sledges and most of the survival kit were lost this morning. We're virtually out of food, with no spare radio batteries, and only one two-man tent between the five of us. Getting this far has meant traversing a maze of crevasse fields and a long descent. It's unlikely that we would ever find a way back even if the weather remains fine.'

Johnnie, as tape-recorded for ITN film, then said:

> There are already two helicopters on standby within an hour's journey, but Jan Mickelbust here says that they could never do it. For one thing the thermal wind currents up the glacial valley would make it impossible to hover above you and between the narrowly separated cliffs. For another, the helicopter's engine noise and the downward blast from its blades would set off many avalanches and bury the lot of you.
>
> You don't seem to understand that you've chosen the very worst time of year for this. Everything's melting. From down here it's like listening to Tchaikovsky's *1812*. Each new explosion is followed by a minute spume of white spray. Looking at these through binoculars we can see whole areas of the face break off and fall away; chunks of ice bounding down the glacier below.
>
> If you really can't go back, for heaven's sake be careful and take your time. I'll keep the radio open, so let me know if you get into difficulties. We can't actually see you as yet, so I can't tell you much about the conditions immediately below you.

I trod warily on two of the balanced blocks that provided the only visible way down, but both pivoted wildly and I withdrew my

questing boot rapidly as from a too-hot bath. There seemed no way over this crumbling ledge. Geoff whistled with low cadence and indicated the far side of the ice pillar. Slithering around it, I found a narrow, but firm block wedged at its base, and I eased round the pillar with caution, for the weight of my pack tended to pull my body outwards. I noticed the pillar was red where I had clutched it. My woollen army gloves must have succumbed to the abrasion of sharp rock and ice and now my skin was also being torn by the file-like surface of the eroded blocks. Ten minutes of intricate movement and I was across the bridge and, cutting holds up the face of the solid ice, climbed on to a narrow ridge where it was possible to belay to a home-made ice bollard.

Bob recorded our arrival below the first icefall in his diary:

> The icefall negotiated, we traversed across to what looks to be the quicker central route. Ran has, by the time I reach the centre, already fixed a double 200-foot abseil rope, and one by one we lower ourselves to the plateau above the final 2,000-foot pitch. The plateau itself is some 400 yards wide, and crossing this is no mean feat in itself. It is difficult to recapture the sheer hard work and time it takes to perform even a simple manoeuvre. The negotiation of the icefall, for example – all carried out with whispered commands, for even a whistle can bring a ton of ice crashing down – took about one and a half hours.

Rushing rivulets flowed down every cranny in the ice and, thirsty with apprehension and fatigue, we lay on the ice to lap up the nectar-like water and bathe bloody hands. It had not been apparent from above, but the plateau was split by a series of parallel fissures. It resembled a ploughed field, with each furrow being many feet deep and from three to six feet wide at the lips. We began to zigzag through this crevasse field wishing that we had but a single ice ladder – or even a sledge – to span these alarming gaps. To begin with the fissures would narrow towards either flank and, by side-tracking to left or right, we could find places where it was possible

to jump across the gaps, cramponed feet scrabbling for a hold on landing. But, not halfway across the plateau, we came to a great crack that stretched across the whole breadth of the glacier. No one would volunteer to jump across with a rope: all were apparently still sane.

Looking back to the plateau, I saw one orange figure lying crumpled on the ice, well behind us. 'It's Patrick,' said Roger. 'He's whacked and resting.' Evening was nigh, with the five of us in the middle of an ice wall which at any moment might prove impossible to descend. Already a cold wind was blowing up the gully, and even a five-minute halt had us shivering uncontrollably. We needed sustenance and warm shelter, but had neither. This was no time to rest and my temper flared.

I swore at Patrick, yelling at him to join us at once. This had no immediate effect on him, but the echoes of my voice melded with the booms of responsive ice falls above and below, adding weight to my urgency. He got up, teetering as the pack settled on his shoulders, and plodded on in a daze to join us. Roger, Bob and Geoff descended into the gloom and I lowered their packs to a narrow rock ledge on a separate rope.

The ledge was scarily narrow and water from the cliffs above dripped down the backs of our necks, but at least it went in the right direction. We followed it for three hundred yards and assumed that we must have circumvented the great fissure which had blocked our way on the surface above. The rock ledge kept its level of incline, but the glacier ice began to descend rapidly and was soon well below our little ledge. Dusk arrived with scant warning, and a freezing wind blew steadily up the Briksdalsbreen. Even if we could get back down to the ice, it would be unwise to do so in the poor light. We agreed to spend the night on the ledge, there being no reasonable alternative.

We had a single tent designed to sleep two average-sized soldiers in comfort, so long as they had lilos or soft ground beneath them. We brushed the wet gravel from our minuscule camping ground, erected the tent and crawled inside through the small entrance flap.

What a squeeze. It was too cold outside to do aught but take spare clothes from our rucksacks and leave them wedged against the rock, together with vital ropes and axes, in the hope they would not be blown away.

The maddening business of removing boots from swollen feet with numb and bloody fingers was conducted inside the tent, one man at a time, whilst the others laughed at his ineptitude. Blood began to return to our toes and fingers with a painful throb. There was nothing to clean them with, for no one was willing to leave the shelter of the tent for water, but Patrick produced some evil-looking yellow cream from his anorak and this we applied to the raw areas of our fingers. The tin's instructions were in Norwegian, so it could have been ski wax. Whatever the cream's true purpose, its effects were agonising and my fingers kept me awake much of the night. Patrick, Bob and Geoff had tough civilian gloves, and their fingers were but slightly cut. Roger, like me, had army woollen mitts, so his hands were also raw and swollen.

'Good heavens!' said Patrick, with unusual animation. 'It's my birthday today!' He was allowed an extra dessertspoonful of the mashed curry gruel which Roger prepared in the centre of the tent: this meant two spoonfuls instead of one, and three sips of weak tea instead of two, for we were each rationed to a fifth of one man's 'dehydrated meal'. We knew that tomorrow we must find a way down the steepest section, the last two thousand feet of the icefall: the famous 'avalanche icefall', which tourists from all over the world come to see, recording the drama and beauty of the tumbling ice for their home movies.

We decided that we would sleep like sardines – one up, one down and head to toe. This made for more room, true enough, but our hips were jammed solid in the middle of the tent. Furthermore, with due respect to Patrick and Geoff between whom I was wedged, so overpowering was the aroma from their four feet that I was soon nodding off, despite the nearby crunch and rumble of the ice.

After two hours in this 'black hole of Calcutta' I awoke with someone's bony hip jabbing my ribcage, to find I could hardly

breathe. I knew I might vomit. Even the freezing wind outside might be an improvement, but how to extricate myself from the tightly packed bodies without waking them? Being a captive in my sleeping bag, it was impossible, and foul mutterings from unidentifiable mouths followed me as I retreated through the tiny entrance hole.

Much was my embarrassment when I found that the ledge on the Briksdalsbreen was so cold that even the evil atmosphere back inside could only be an improvement. During my brief absence from the tent, the other four had fallen asleep again and seemed to have swollen. I tried to drive a foot between two of the bodies as a thin end of the wedge, but there was no room at the inn and I spent the night outside, regretting my lack of staying power.

Dawn came cold and clammy, creeping up the deep blue surface of the icefall. Breakfast was three-quarters of a biscuit: exactly three-quarters, for I checked carefully lest there had been a mistake and I was due the whole. A tin mug full of steaming water well boiled with used tea bags was passed around under Bob's stern eye. Should a drinker's Adam's apple jerk more than once, or the tilt of the mug be too acute, Bob's large hand would strike and the mug passed to the next man. I had visions of scrambled egg and fruit juice.

Hands ached and refused to operate efficiently with bootlaces, zips and rope coils. Blisters squelched and complained bitterly at the first pressure of boot leather. Geoff's ribs were as tender as ever, but he was up first and, lying along the ledge to peer downwards, he pondered our next step. He decided on a long abseil down the sheer wet rock to another ledge nearly three hundred feet below which protruded from the cliff so that it lay over and above the ice, bridging the bergschrund neatly though precariously.

There was a 300-foot length of rope coiled around Bob's rucksack which Geoff used, securing it by a sling and carabiner to a hefty boulder on our ledge. The descent was unnerving and served to jolt us wide awake, stretching stiff limbs and bringing unwelcome feeling to our hands. To prevent rope-burn, my tattered gloves being worse than useless, I wrapped socks around my hands. These were

soaked in blood on my breathless arrival at the guttering below but, for the first time since the previous morning, my hands felt warm and the throbbing had ceased.

Patrick was unusually quiet, although his progress was as noisy as ever, loose rocks and gravel particles showering down on those of us below as he jerkily descended the rope. He must be a brave man, I thought, for he had a strong dislike of heights, and that first abseil was of a decidedly exposed nature. Our rope reached the ledge with some fifteen feet to spare. Geoff's estimation had been precise, but the view from above proved misleading, for although our narrow platform effectively bridged the bergschrund, it was higher above the ice than we had thought. To jump from rock to ice would be suicidal, even with crampons, since the surface was hopelessly fractured, being the jagged spoil of many previous ice falls lying poised in unstable confusion over a criss-cross network of fissures.

The sun was not yet over the mountains, and the narrow ledge where we clung to the wet granite was a dank, chilly place. The ice below looked, to my inexperienced eyes, totally impossible. It was a hostile area of innumerable death traps, where one step on an ill-balanced ice block would cause a whole delicately poised platform to collapse into the void below. A noise, too, might be enough to set in motion the tumbled fragments from above and bring them bounding through the air to sweep the face and fall to the unseen lake a thousand feet below. I shuddered involuntarily and looked upwards over my shoulder. The rope swayed gently, running out of sight up the slimy cliff. We could not get it down – a fact which delighted Bob whose load was that much lighter. We would not get back that way, I mused, so we had no choice but to descend, having thoroughly burnt our boats.

It was getting cold standing tight against the rock and staring at the frozen waterfall of ice so near to us, yet so unattainable. Again Geoff's keen and practical eyes found us a way out. There was, he said, a series of sharp runnels in the rock running diagonally across the cliff to our left as we faced the ice. If we could

make our way down by way of them, we would reach a point where a large tumble of ice had jammed over the bergschrund. This, Geoff felt sure, was our only way out, up or down. Patrick, following behind in his usual unsteady fashion, lurched up to the obstacle and verbally indicated his reluctance to follow such a precarious route. 'You must be joking,' he muttered, inspecting the route indicated by Geoff. 'A monkey with sticky fingers would look twice at that.'

I must have somehow annoyed Patrick at that point, for I sparked off a violent soliloquy which indicated very clearly what he thought of the whole proceedings. I was accused of being totally unaware of the perils of the situation, of abusing his friendship by deceitfully luring him on to the expedition with false promises of trout fishing in Norwegian lakes and little physical discomfort, apart from the odd night in a tent. Once this indignant tirade had abated, Patrick obviously felt better and crabbed his way past us to inspect the rock face.

Only the sharply eroded runnels in the granite provided holds. Some were too smooth to grip, but with a fist clenched within them, good chock-holds served to keep us from falling away from the bluffs. We clung like limpets to each little hold, cursing the outward pull of the rucksacks and sweating at the thought of what lay below. But we made it and reached a hollow in the rock on a level with the giant blocks of the icefall. Here we strapped on crampons and loosed the ice axes from our packs. And so began the most hair-raising morning of my life.

The upper cliffs of the Briksdalsbreen are at no stage predictable, but at least their dangers can be minimized with care and common sense. That is no longer true when one comes to the bottleneck region which crests the final majestic sweep to the lake, a sheer thousand feet of brittle ice swept by avalanches throughout the summer months. From the first few testing steps over the icefall, it was obvious that only luck would see us safely down the next unstable gradient.

I halted abruptly as a grinding rush of smaller fragments slid

away below me, to disappear as though through a trapdoor. Where they had been, a deep blue cavern lay revealed, and the rectangular block on which I crouched lurched sickeningly, slipping towards the newly opened hole with other bigger blocks moving beside it. I wanted to scream or shout or something, but stopped instinctively. Another block, sliding down before mine, moved across the gap and plugged it.

For minutes we surveyed the chaotic scene below. Layer upon layer of fallen blocks were scattered crazily between tall chiselled pillars. The blue sheen of newly fractured ice was covered by a coating of moist black gravel, for the alluvial muck of the bergschrund higher up had spewed some of this mud through diagonally inclined fissures and down to the ice cliffs below.

A thunderous roar sounded above us, coming immediately after a report much like a pistol crack. I ducked instinctively, wondering if the entire face would be covered by what was to come. The shoulder on which we kneeled seemed to shudder and vibrate as the whole ravine reverberated with sound. A squadron of Concordes passing directly above might have produced a similar volume of sound, but I doubt it. All around us the smaller ice fragments slid away as the first great chunk bounded past, well to our front. Then the main body of pounding, gyrating white boulders passed with alarming speed, sending slivers of glinting ice all about us. As the initial pulsating roar passed away, echoes and re-echoes pursued the mother sound down the enclosing cliffs of the gorge till silence came and we looked at one another, saying nothing.

It was already ten o'clock, and the sun would soon climb over the mountains. Then we would be in trouble, for the melting process would accelerate ice falls. Already the little mountain track far below was moving with pinpricks of colour: the first tourists from Loen trekking up from the roadhead to watch and photograph the fabulous icefalls of the Briksdalsbreen. The thought was ironic. Here we were, dreading the next fall, praying that the sun delay its climb, whilst down below, on the far side of the lake, the tourists gaped up, impatient for an avalanche, the bigger the better,

and wishing the sun was up. They could not know that five fellow humans were moving snail-like down this wall of death.

Patrick, in the middle of the rope, had disappeared through a heap of loose ice shale. Now he dangled somewhere below the surface. As Geoff reached the area of the slide, he slipped and further fragments fell in on top of Patrick, one large block closing over the hole to form a tomb. Geoff began to haul on the rope with Bob's aid. Patrick surfaced a few minutes later, numb with cold but unhurt.

Using two short ropes joined together, we descended a cliff below the tumbled section and found, to our dismay, evidence of fresh falls across the entire width of the glacier. Only immediately beneath our cliff was there a narrow couloir of smooth unlittered ice, and here we rested briefly, flinching as each successive crack and rumble shook our perch. Now at last we could see the lake, or rather that half of it farthest away from the glacial snout, and watch the slowly gyrating ice floes sailing towards the outlet torrent where they jammed its mouth, fighting for release into the fast current.

Johnnie's diary describes his reflections whilst observing our descent:

> There were many local guides and farmers in groups round our Land Rovers, watching the little dark figures on the ice face. I also met the four Norwegian climbers who had tried to scale the glacier three days before. It had taken them twenty-four hours, they had had a slight accident and had been forced to abandon the attempt before reaching the final 1,000-foot pitch. They had then descended by a rock trail – possibly the route Henrik had taken.
>
> I read a translated local newspaper describing their feat: 'The four climbers had wanted to climb the Briksdalsbreen for a long time, but only this year, they say, have they pulled enough guts together to see it through. They have been climbing a lot around Norway, both mountains and glaciers. Among glacier experts the Briksdalsbreen is said to be the most dangerous one in Norway, and this is no doubt the reason that it has been left so much in

peace by climbers. The four soon discovered that the least dangerous area was the centre where there were less avalanches. The glacier was full of cracks, the biggest ninety feet deep and thirty feet wide. They had to descend deep inside some in order to pass. In places the ice was so solid that they could not use regular nails, but they were well equipped . . .'

On meeting these four climbers, I asked them what they thought of our team's chances. It was dangerous, they said, there were too many avalanches. Did our party have all the right equipment? I said that they had many feet of rope, but no ice screws. This was not wise, they said. If they were to make the descent, they would try to climb up first to mark the best route, and then come down. But to descend it unseen, that was most unwise. Overall, the locals gave our team little chance of getting down alive. Either the avalanches would get them, or lack of the right equipment would. This was not very cheering, but I was not unduly perturbed at this stage.

Watching the painful progress of the small figures down the glacier was an exciting experience. There was the feeling that at any moment an avalanche would obliterate them. They were at the glacier's mercy, no matter what route they selected, and by the lake the crowd of Norwegians and tourists watched in silence: the tension had communicated itself to them. Someone with binoculars had noticed a rope hanging near the top of the glacier, presumably abandoned the day before. I wondered how much rope they had left; perhaps they would not have enough to complete the descent: then what?

The sun was moving on to the very face of the ice as we watched. By using binoculars, I could almost identify the individuals. It was like a cine film. Suddenly there was a tremendous cracking noise, followed by a rumble: huge lumps of ice could be seen bouncing down the glacier, shattering as they went and triggering off further falls. At the sides, avalanches rolled down with regularity. It was the speed that was terrifying to watch: within seconds of the first crack and boom, tons of ice swept

down the almost vertical slopes. Anyone in the path of these falls would have stood little chance. During the morning no one in our team was hit, though on occasions I saw ice blocks pass uncomfortably close to them, blotting them from view.

On our ledge the sun was making itself felt through the weight of our sweaters and anoraks. We rolled our sleeves up and drank our fill from the dripping ice. There was a feeling of unreality about that morning. Glancing at the others, I thought Bob showed signs of actually enjoying himself, unlike the rest of us. Reading through his notes on the expedition later, I noticed that he had given considerable thought as to the varied motives that drove each one of us. He felt that personal background had little effect on a man's reasons for proving himself: illegitimacy might help to trigger off the ambition of a Lawrence, but he did not think the vagaries of our respective parents had impelled any of us on to the ice; three of us came from military families, one had a mining father, and another a steelworker. This, Bob mused, had influenced us little. Rather it was our individual outlooks on life that had prompted our presence on the glacier. During a lifespan there are highlights in everyone's memories which they try to recapture: some get their kicks from drugs, perversions, or financial gain; others from conquering the elements for the thrill of it. And the more hostile those elements, the more treasured will be the memory of dangers narrowly avoided.

Falling away beneath us for some seven hundred feet, an ice wall of great frozen chunks reached down to the lake. Geoff felt that we would only manage this region in relative safety by firm speedy action. He had a 400-foot length of thin red Marlow Terylene and, while he checked and uncoiled it, we hacked away at the base of our ledge with axes, making narrow grooves to anchor the rope as firmly as possible. In the absence of ice screws, home-made bollards were a relatively safe alternative.

The rope made ready, we hurled it into the abyss. For fifty feet it was visible, snaking straight beneath us, then it disappeared over a bulging shoulder. Henrik's voice came over the radio then, advising

us that the rope had snagged in a deep crevasse: anyone descending it would be trapped. Geoff tried again, this time throwing the coils well to the right of the ledge. Henrik confirmed that the rope now hung free, its end hidden from his view but in the area of a small ice platform only three hundred feet above the lake.

That abseil was possibly the most perilous passage of the descent, spanning as it did some four hundred feet of broken ice, which might or might not hold firm at each descending bound of our roped bodies. We went down wearing our rucksacks, for these could not be lowered separately in safety. Bob and I reached the platform without mishap and descended another 50 metres clear of the rope end for safety's sake. The others were invisible for a while, then Patrick appeared sliding down the rope at speed. Geoff came next, and Roger appeared over the lip as Geoff reached the central marked tag. They were sliding easily, smoothly down, when – without warning – a wide area of the ice face between them teetered briefly, as though in slow motion, and then, as a numbing roar marked its fracturing, came rushing down the gully towards us. I glimpsed Patrick flinging himself flat as the great mass of ice rolled over his ledge, cascading down the couloir to our immediate right.

Geoff's language was imaginative when he reached us. He was lucky to be alive, but we were all badly unnerved. The lake was close now and the very proximity of success seemed to amplify the dangers. Some way past the platform, I was belaying Bob down a gully chimney when I heard a scream of pain. Scrambling back up to the platform, I found the other three bunched together in a huddle. Patrick was pressing ice against Geoff's leg, and Roger was unravelling a dirty bandage. It transpired that Patrick had been swung off balance by his rucksack as he edged down the face of the bluff. He had fallen on to the ledge below where Geoff was waiting, and one wildly flailing crampon had dug a metal spike into Geoff's skin, scraping down along the bone.

Calling for advice from below, we were counselled by Henrik to move to the left flank of the snout and descend on to the steep slipway which runs between the bergschrund and the crevasse field.

Henrik warned us of its character: 'It is a steep shoot of loose ice and muddy slime lying over a smooth surface. All day we have watched successive avalanches channelled from above crash down it into the lake. But if you wait for a calm spell and go across fast, one by one, you will reach the ledge of rock which flanks it.'

'What happens when we get on the ledge?' asked the ever-practical Bob. 'It looks like a dead end to me.' But Henrik had also thought that out. 'Its far end is directly above the lake, perhaps two hundred feet above it. If you have rope left, abseil down and we will collect you by boat.'

Two ice falls sounded high above, and we watched anxiously as the avalanche spoil hurtled by, bounding down the dark chute as though it were a skittle alley. One by one we moved over that treacherous slope, as fast as we dared and the loose surface allowed. As Bob joined us at the far edge of the chute, God had the last word, a sort of Amen to a day of pent-up tension. The rumble of distant thunder grew ever louder from out of the gathering gloom of dusk. Then the whole grey slipway shuddered under a deluge of rushing ice spoil, as a railway vibrates beneath a passing express.

Our very last rope took us down to the waiting rubber boat with a grinning Johnnie at the helm. 'I never thought you'd make it,' he said.

Reaction began to set in as we landed on the far side of the lake amongst a small crowd of reporters, television men and locals, all interested to see the faces of the little orange figures they had been so keenly observing. Soon we would be back in England and would return to the daily grind of nine till five. None of us would forget the Jostedal, the special noise of falling ice, the roar of pounding water or the rush of freezing air on leaving the aircraft as you plummet from 10,000 feet.

Two weeks later I married Ginny. We had loved each other for ten years, and certainly since well before the age of consent. Neither of us had money in the bank nor a job, but she was lent a bothy in Wester Ross for a minimal rent and we lived there whilst I wrote a couple of books. We agreed to make our living through expeditions.

After Norway I found myself addicted to ice and was determined to learn all I could about extreme cold, about the great polar explorers, indeed about all aspects of the wonderful world below zero, for which the Jostedal experience had served as the first stage of a long apprenticeship.