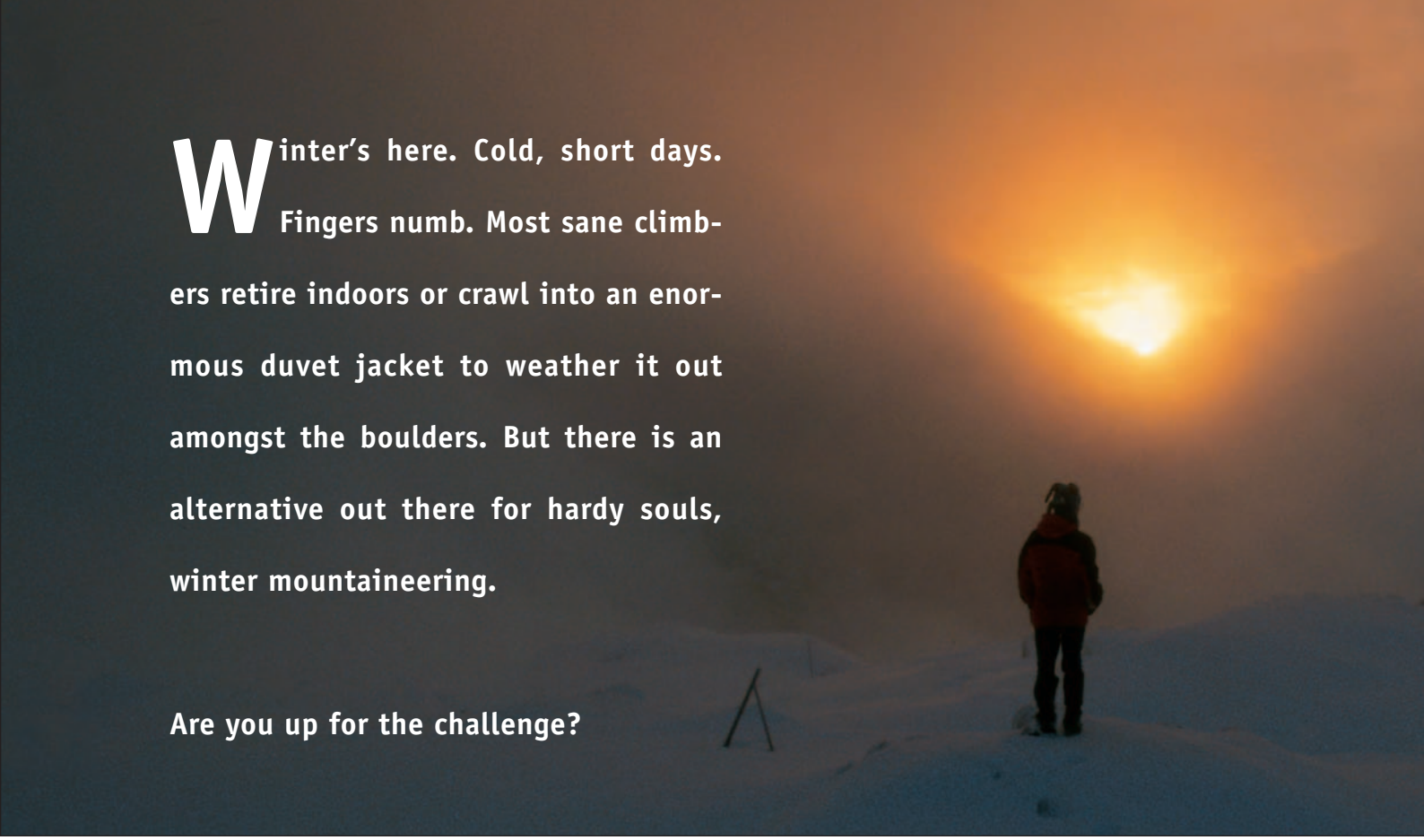

Winter's here. Cold, short days. Fingers numb. Most sane climbers retire indoors or crawl into an enormous duvet jacket to weather it out amongst the boulders. But there is an alternative out there for hardy souls, winter mountaineering.

Are you up for the challenge?

The real deal

Winter mountaineering can be one of the hardest aspects of climbing to pick up - you can't just pop down the wall to learn, and mother nature will do her best to stall you at every turn. It's short days and long nights, along with strong winds and changeable conditions. You'll need a fairly perverse mixture of masochism, patience and stubborn determination to really enjoy this sport. On the other hand you'll be rewarded by some unforgettable experiences and the occasional day of dream conditions.

What is it?

What is winter mountaineering? Not a trick question - is it hill walking in the snow, or climbing overhanging frozen waterfalls, since there's quite a difference. Winter mountaineering in the UK can be defined as any time or place when the ground is covered with sufficient snow or ice that an ice axe and crampons are more of a help than a hindrance. This could be stepping up a grade I gully, balancing along an icy ridge, or wading through a deep bowl. The boundaries between walking and climbing tend to blur when the snow falls. Especially when you consider that a good knowledge of navigation and hazard awareness are essential, regardless of technical plans.

In this article we're assuming that you're already a climber and are looking to try some winter climbing on graded routes. Hill walkers will need to beef up on the technical skills before tying on (maybe on a suitable course) but don't be put off since experience of long mountain days and misty navigation is actually a very solid grounding for winter climbing.

What do I need?

Gleaming and spiky, winter gear bears more than a passing resemblance to torture instruments. But don't rush out and buy state of the art toys just yet. As ever, try it first, - you may not even like it!

Good fit

Probably the most important pre-requisite is a good pair of mountaineering boots. These need to be proper four season boots; waterproof and warm, with good ankle support and a fully stiffened sole capable of taking crampons. Once you've got these, it's time to beg, borrow, or buy some crampons. General-purpose crampons with 12 points are perfectly adequate for anything up to the very highest grades, and are more versatile for walking than the rigid, clip-on or monopoint models available. There are various attachment methods, but I prefer a compromise strap system, with a cradle for the toes and a clip for the heel. These fit a wider range of boots and are less prone to popping off when kicked awkwardly.

When you buy crampons, take your boots along and try to get the shop to fit them - it's important that they fit securely. Make sure that the strap buckles are on the outside edge of the boot and trim off any ends if they are over 15cms too long. Sooner or later you'll trip over anything that dangles.

Axes

For Grade I routes, a single general purpose ice axe is perfectly adequate. To select the right length, hold the axe with your fingers cupping the pick and adze, and with a straight arm the spike should just reach the top of your boots. Any longer and it's too unwieldy for safe self-arrest. The pick should be curved in a similar arc to the direction of movement when hacking the ice.

On ice climbs, using two tools feels more secure, and for steep ice it's essential unless you want to spend all day cutting steps. Reversed curve picks are used for these tools, one of which will normally have a hammerhead for hammering pitons, and the other an adze for hacking steps.

The ice tools should be fitted with wrist loops (leashes). The leash should fit snugly around the wrist and give support when the axe is held properly, just above the spike. Holding the middle of the shaft (known as

(TOP) Summit of Meall Glass, near Bridge of Orchy. Credit: John James. **(INSET)** The joys of winter. Credit: Steve Long.
(LEFT) Using tools to good effect in Scabbard Chimney, Stob Coire nan Lochain, Glencoe. Credit: Cubby Images. See www.cubbyimages.co.uk for more.

The best way to start your winter mountaineering career is to second a more experienced climber. Credit: Steve Long

"choking") is inefficient and results in weak and wobbly swings. Futuristic leashless axes are now on the market designed for competitions and the hardest routes - but avoid them, they are very easy to drop, with disastrous consequences.

Rack it up

A normal climbing rack is generally a starting point for most climbs, and this needs to be supplemented with ice screws and pitons.

Ice screws

Most modern ice screws are like a giant hollow wood screw with a handle. These are very strong when threaded into good ice so buy the best you can afford. Choose ones with at least four teeth, made from a tough metal that's not easily worn down. The best models have chunky handles for one-handed placement, and eyes that allow at least two krabs to be clipped in at belays.

Drive-in screws are also available. These have very fine teeth and are designed to be hammered straight into the ice, then screwed out for removal. They don't have such good holding power, but can be useful if you get scared (never!) and need to pound something in quickly. The final type of screw is a warthog, resembling as it does a sharp, gnarled tusk. These tend to shatter ice but can be useful for sticking into turf on mixed routes.

Pegs

Pitons (pegs) need to be hammered into cracks on some climbs for the belay. They should be used sparingly since repeated use damages the rock, but sometimes there is no other choice, so it's worth carrying a selection. The lightest and most useful type is the aptly named Knifeblade, a thin blade peg for otherwise unusable hairline cracks (1-3mm). Next up the scale are Lost Arrows (aka King Pins). These are fatter, heavier blades for wider cracks (4-7mm) and are available in various lengths. Then come Angles (aka Channels) for wide cracks (15-25mm), which have a channel shape designed to cam when placed correctly. Close relatives of Angles are Leepers, and these have a double channel Z profile.

When placing a peg you should be able to push it in to about halfway before needing to start hammering, although that will depend on your adrenaline level. The best cracks are generally horizontal, vertical cracks can be used but avoid those which open out just below the peg placement, inviting it to rotate and ping out. After placing a peg, test it by letting the hammerhead bounce off it. If the hammer doesn't bounce cleanly, the peg is absorbing the energy by moving and is not to be trusted.

Other equipment

You'll be showered with lumps of ice and rock, so a helmet is essential. Choose one that feels comfortable even over a hat, and replace it if it's taken a heavy blow or aged beyond the manufacturer's instructions. You only get one head in life. For those epics when night arrives before the summit, you'll need a head torch, so make sure the helmet can take one. As for head torches, in emergency situations a cheap LED may be adequate but you really need one that's up to the job of navigating off the hill in the dark. Always slip in spare batteries and bulb.

It gets cold and wet out there, especially when you're belaying. Carry an additional warm layer that you can put on at the foot of the climb, and consider an extra fleece or duvet for belaying on hard leads. Most important are a decent hat and gloves. Gloves need to be warm but dextrous enough to cope with placing gear and tying knots. Many climbers wear thin inner gloves for these jobs, and attach the outers to their wrists so that they can't be dropped accidentally.

Waterproof trousers and jacket are essential for most British conditions; it's very rare for no surface water to be running. The trousers need to be worn under your harness, so they're on for the duration of the climb. They'll need to fit on over the top of your boots, and a full-length zip is handy so that you can carefully put them on or off while wearing crampons. It's difficult to avoid the occasional tear from crampons, so check them over for damage, and patch them up if necessary; I use a combination of duct tape and shoe repair glue.

First routes

The learning curve is steep, so enlist the services of an experienced winter climber to lead you up your first climbs. Everything feels very different in winter, so set aside some time for general practice in a safe setting first. Experiment with different foot and axe placements, and practice the all-important self-arrest. As far as grades go, it's possible to second middle-grade ice climbs quite early in your winter career, but if you're taking several goes to get each placement then try something easier rather than damage the climb. Take it easy on mixed climbs too, it takes a while to get used to climbing with picks, and unlike ice the damage to the rocks from clumsy footwork is permanent.

Technique

On frozen ground the more spikes you can get in, the better. Try to keep your feet spaced with a wide stance, otherwise the crampons will catch on your other leg. On easier angled slopes, flex your ankles to allow all the spikes to bite; stomp firmly. If only the outside edge of a crampon touches ice it will usually skate off - edging is definitely out in ice climbing! This takes quite a bit of practice; it's a good idea to practice by scrambling up a frozen stream, flexing and rotating your ankles to maximise the crampons' bite.

As the ice steepens, you'll need to change from flat footing to front pointing. This basically entails kicking the toes straight at the ice. There is an art to it, though. Keep your heels slightly lower than your toes; raised heels allow the rounded toe of your boot to lever the front points out. A relatively low heel allows two sets of spikes to bite – both the outward facing front points, and the first pair of vertical spikes.

walk this way

The snow doesn't care if you're a walker or a climber. Either way you need mountain sense in winter - **Mal Creasey** from MLTE has got some tips for walking the white way:

1. Keep your thumb on the map to mark your last known location. This saves scouring the map every time you check your position. And if you're involved in critical route finding you're then free to use the greatest aid to navigation ever - your eyes. The number of times I've seen ML candidates walk straight past an objective simply because they've had their eyes glued to the map...

2. Thumbs are no use if the map has disappeared into the mist. But I've never got on with map cases so in winter I take a cut down map. It folds smaller and you're likely to keep it in your pocket instead of the sac. Punch a hole in the corner and tie it on to a zip toggle too. I remember being out one night with an old Irish friend of mine whose map disappeared into the depths of a dark Scottish blizzard. Amazingly an hour later, on the other side of the hill, the map reappeared and lodged neatly into his hand. The moral? Hang on to your map, tie it on, or take an Irishman for luck.

3. Anticipate the difficult navigational sections and work out bearings beforehand so that once you arrive at that point, it's simply a matter of setting the compass. I note any critical bearings in the back of guidebooks, but you could use the margins of the map.

4. With so many variables to deal with in winter like short days, extra kit, snow, ice and strong winds, it's worth keeping track of your progress. From lunchtime onwards you need to be asking at least two questions; What time does it get dark? Can I at least get to a decent path by then? It's no use plodding on then panicking at teatime. Have a contingency plan, or at least a cut off time to start heading back down.

5. Don't ignore raised footprints. These formations are the result of someone walking on fairly deep snow and settling it under their boots. Since then the wind has picked up, removed the surrounding snow and re-deposited it elsewhere. This means that even if it hasn't snowed for several days leeward slopes could have a serious avalanche danger. Their snow cover could consist of wind-damaged crystals that squeak under the boots and have little bondage with each other. This windslab is a dull white opaque colour, and is definitely to be avoided.

6. Experienced mountaineers should really be alert to what the ground is doing. But some years ago a friend and I were coming down off Ben Nevis and were chatting away in reasonable weather when we both suddenly realised that "it didn't feel right". We'd intended to drop down from the summit towards the abseil posts (no longer in place) but without noticing had drifted way too far right. In this case it only cost us about ten minutes and some unwanted toil but it was a hasty reminder that a combined experience of 40 odd years on the Scottish hills in winter is no reason for complacency.

7. When winter hill walking (mountaineering?) most problems occur in descent. Steep corrie headwalls or ridges may not be a problem in summer but when covered in snow they are a different proposition, and trying to find the actual edge can be difficult. But even if there are only two of you, with about ten metres of rope you can create a good deal of security. If one goes over the edge, they're unlikely to pull the second over, and with more people it becomes very solid.

8. Rationalise what you intend to get out of the day. I've seen less experienced groups or individuals subject to peer pressure and 'sucked in' so they finish up on routes or in areas at the limit of their abilities. It would only take one more thing to delay or push the day technically beyond them and they'd be in trouble. That doesn't mean you should only go and have super safe and possibly uninteresting days out, but simply think about the weather, underfoot conditions, and skill levels within the team before heading out.

9. Coming off a big snowy mountain with a storm bearing down can do funny things to people. However one of the least funny was when a client put his gloves down on the ground and the other his goretex salopettes, and all my best goalkeeping skills were to no avail. Diving around in that spot did little to improve my nerves and the situation got worse as the day wore on. Eventually, after several hours we all got down but it could have been much worse. It's strange how many epics are born out of silly little mistakes. Get into the habit of stashing gloves inside your jacket and never expect things to stay where you put them!

10. If it runs on a battery, it's more likely to go belly up because it's got wet, cold, or misted up. GPS and mobile phones are all fine as additional aids, but they're no replacement for a map, compass, and solid navigational skills.

(ABOVE) Where are we? Answer: near the summit of Meall na Ceapraichean, Ullapool. Credit: John James.

Credit: Steve Long.

Grades

Just when you thought you had grades mastered, here's another system. Winter routes are graded for difficulty and commitment in a similar way to rock. The overall grade, comparable to the adjectival rock grade is given in a roman numeral, currently from I to X.

I - The easiest climbs. Straightforward snow slopes upto 50 degrees, or simple scrambles on snowed up rock.

II - Steeper sections with ice but still normally less than vertical.

III + Increasingly long sections of steep climbing and commitment.

Above III, individual crux pitches are also graded. For example, Point Five Gully at V,5 is a benchmark V, while a well protected hard mixed climb might be graded V,7. Zero Gully is less technical but serious so gets V,4.

Mix it up

Mixed climbs are predominantly rock with varying degrees of ice coating. To qualify as a mixed route plenty of snow and ice should be covering any ledges, otherwise you'll be "dry tooling". This style of climbing is inappropriate at most UK venues as it causes damage. Controversially, some mixed climbs look black when viewed from below and fresh arguments rage each winter.

Winter ethics

Ethics are obtuse for winter, but the underlying theme is the same as for rock. The tools are regarded as free climbing assistance. Hooking into protection is not allowed, just like pulling on runners is regarded as cheating in summer. The use of wrist loops is generally accepted, however clipping a leash into your harness and hanging from that is regarded as a rest point and therefore an impure ascent. These distinctions may seem a bit contrived, but they seem to fit reasonably within the free climbing philosophy and evolve as equipment and standards develop.

Meanwhile, you'll be swinging the axes into the ice. Again the technique is best varied according to the angle. On low angled soft ice, it's often preferable to cup your hand over the head of the axe and push it into the ice at waist level, using it mainly for support. On harder and steeper ice, the tools need to be swung above the head to gain purchase. Hold the shaft just above the spike, and swing the pick into the ice. For a general-purpose curved pick, this entails a simple swing. With a technical "reverse-curved" pick you will need to flick the wrist downward just before impact to get the best bite. This takes a bit of practice, so get back on to that frozen stream, or find an icy wall with a safe landing zone below it.

When using two tools, it's normal to place both picks at a comfortable reach, shoulder width apart. It's possible to rest for a moment with straight arms, letting the wrist loops take much of your weight. Then the feet are stepped up - try to use small intermediate steps, and don't forget to keep those heels low. Once the elbows are bent to about right angles, it's possible to carefully remove one pick by levering the shaft towards the ice and away again. The thigh muscles are used to straighten the legs and the pick is swung into the ice again at a comfortable reach. Once securely placed, the other tool can be removed from the ice and then placed level with the other. This is a steady and secure way to climb. It's also possible on very good or easy ice to simply alternate pick placements one above the other, like thugging up a ladder. This is harder to recover from if an axe rips out, and as British ice tends to be relatively brittle, this style of climbing is generally more appropriate overseas.

Of course, real ice has bulges, pillars and flutings, so you can't just hack away anywhere that suits you. However this basic idea will stand you in good stead as you experiment. For mixed climbs, anything goes, really. The style of movement is more akin to rock climbing, with the significant difference that vegetation can provide handy additional holds.

Good placements

Whilst the technique of moving on ice is actually quite straightforward, the tricky bit is judging where to place a pick to economise effort, and knowing when to trust a placement. On good ice you'll see experienced climbers achieving a good placement with the first blow. This requires plenty of experience, which is why it's best to follow plenty of climbs before venturing onto your first leads. The ice gives clues to its consistency through shape and colour. For example it's often easier to get a good placement in the groin between two flutings. Grey ice is more aerated than blue ice so less prone to shattering. On the other hand, granulated grey ice is generally fragile. The easiest first time placements are generally in white (snow) ice. This is formed over time as snow metamorphoses into ice through a process called firnification. This can provide really easy placements, which is rather fortunate, as it doesn't hold ice screws very well.

Mixed climbing takes a lot of learning too. Tools can be jammed in tapering cracks, torqued in wider ones, or dug into frozen turf. Sometimes it's easier to let them dangle on their leashes and grab the rock with your hands, but only for the odd move if you want to call it a winter ascent.

Hazards

Part of the challenge of winter climbing is learning to manage the hazards. The consequence of an unexpected slide on snow or ice can be very serious, so learn to kick and cut steps, and practice ice axe braking in a safe hollow with a gentle, snowy run out. Snow is notoriously prone to avalanche, so learn as much as you can to spot the warning signs, and pay close attention to safety bulletins. Avalanche safety is a complex art, and attending a course could be a valuable investment.

Coping with winter

Winter conditions are notoriously fickle, so it's a good plan to maintain a reasonable level of fitness to grab those routes as and when they freeze. For climbing in Britain, you'll have to walk for at least an hour unless conditions are exceptionally good, so regular hill walking is a good start. Regular sessions at a wall will help keep your body tuned into climbing movement, and a few pull-ups certainly won't do any harm. If you're lucky enough to live near an indoor ice wall, or dry tooling facilities, then make use of them. Follow weather forecasts carefully and be ready to make good use of the high pressure when it arrives. Phone around, check the web and do the research. And finally, don't be stubborn, be prepared to change your plans - a day spent in the café is more fun than being buried under sliding snow.

That completes our brief insight into winter climbing. It's just fingers crossed for good conditions now, and look out for the final part of this series on learning to climb - self rescue. ||

Steve Long works for Plas y Brenin, the National Mountain Centre. PyB run a range of winter courses, from walking to ice climbing. See www.pyb.co.uk.

OTHER RESOURCES

www.sais.gov.uk
Sport Scotland Avalanche Information
www.scotmountain.co.uk
Mountain Innovations email updates
www.westcoast-mountainguides.co.uk
Conditions updates from Alan Kimber