

Mountains: SCOTLAND'S LIVING LANDSCAPES

Two-thirds of Scotland is covered by mountains and wild uplands, which straddle geological and climatic boundaries to give us several distinct mountain areas. From the shattered gabbro of the Skye Cuillin to statuesque sentinels such as Suilven and Ben Loyal in Sutherland, the steep narrow ridges of Lochaber to the vast boulder plateaux of the Cairngorms, our mountain ranges are unique and spectacular.

These special landscapes and their wildlife are vulnerable to insensitive use and demand the highest standards of stewardship.

"I love the series title 'Scotland's Living Landscapes' because for me, mountains are intensely living and intensely alive; and not only alive, but life-giving, too. Mountains harbour vivid life and growth in unexpected, rugged and hidden places; mountains revive the ailing soul with the power and purity of their beauty, while hugging to themselves some of the deepest secrets of the evolution of our planet. This book captures so much of the essential spirit of Scotland's mountains, and highlights the importance of their nature – in every sense."

Magnus Magnusson KBE, Founder-chairman, Scottish Natural Heritage.

About the author:

Mark Wrightham is an upland ecologist and mountaineer, and has been climbing in Scotland for over 20 years. He now works as a National Strategy Officer with Scottish Natural Heritage, dealing with various upland policy issues.



MOUNTAINS

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1. Golden eagle
2. Loch Einich in the western Cairngorms
3. Mountain hare
4. Creeping azalea on an exposed ridge

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by

Mark Wrightham

Contents

Introduction	1
The ancient foundations	2
A collision of continents	2
The volcanoes of Scotland	7
Ice sculptures	8
The Ice Age	8
Snow and glaciers	10
The mountains today	13
Trees and woodland	14
Heaths and bogs	15
Plant life on the high tops	16
Upland mammals	23
Upland birds	24
Invertebrate life	24
Mountains and people	26
Sheep walks and deer forests	29
Hillwalking and mountaineering	30
Human impacts	33
Looking ahead	34
References	37





Ben More and Stob Binnean

Foreword

Finally, in the year 2002, those steep sided, conspicuous landforms we call 'mountains' are being honoured as we celebrate the International Year of Mountains. Hopefully this year will help us all gain a greater appreciation of the need for more care of their spiritual qualities, their beauty and vulnerability.

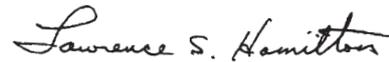
Though not high mountain cloud-piercers like the European or Southern Alps of New Zealand or the Central Andes, the Scottish Highlands are high on the list of beloved mountains of the world. The pressures of development, however, are great, for these, like mountains worldwide, are economically marginalized areas. The pathway of sustainable development and conservation is difficult, but Scotland is now taking a leadership role in this approach.

A major component of sustainable development is giving areas of special value some kind of protected area status. This year, Scotland has just established its first National Park, centred on Loch Lomond and the Trossachs, and the Cairngorms National Park is in the final stages of establishment. These are splendid contributions to the International Year of Mountains.

But after the tumult of International Year of Mountains, after the conferences, workshops, and other mountain-based events of

2002 are over and done, the drive for more tender loving care for our mountains must not falter. Scotland has other significant mountain areas in need of improved conservation status. As indicated by the author of this publication: "Scotland's mountains are the most extensive near-natural areas in Britain, with many habitats, plants and animals which are rare or absent elsewhere in the world."

Scotland's literature, painting and photography bespeak the importance of its mountains as symbols of national identity. This publication will hopefully increase the knowledge of local residents and visitors from elsewhere about the Highlands of Scotland, and promote greater stewardship of these precious landscapes. The World Commission on Protected Areas congratulates you in your move to create two mountain National Parks. Why stop at two?



Professor Lawrence S. Hamilton

Vice-Chair for Mountains

World Commission on Protected Areas

World Conservation Union (IUCN)

Between 1883 and 1904, the Scottish Meteorological Society maintained an observatory on Ben Nevis. W.T. Kilgour's account of life in the observatory was published in 1905, and well illustrates the nature of the mountain environment: "The sublimity of prospect, the variety of phenomena, the rolling mists, and the raging tempests have their own peculiar interest, and none the less enthralling is the study of gales and cloud effects, the torrential rains, the accumulation of snow, and the remarkable range and fluctuation of temperature; but the feature which probably most impresses the uninitiated is the stillness - the awful solitude - which at times prevails amid these fastnesses".



Introduction

Mountains and wild uplands cover two thirds of Scotland. This relatively small country straddles geological and climatic boundaries and contains several distinct mountain areas. On Skye, the Cuillin encircles Loch Coruisk with a dark wall of shattered gabbro. In Lochaber, narrow ridges of glistening quartzite plunge to deep glens with scattered birchwoods. In Sutherland, statuesque sentinels such as Suilven and Ben Loyall overlook mile after mile of gnarled wet heathland, which turns to a rich golden-brown in the autumn light. In the Cairngorms, vast boulder plateaux with granite tors rise from lower slopes of heather and pine. Winter transforms all of these mountains, bringing, by turns, the crystalline beauty of sunlit snow and ice, or arctic blizzards with driving spindrift.

Scotland's mountains may appear small alongside the Alps or Himalaya, but this comparison is deceptive. Our highest peaks



Beinn Eighe and Liathach

extend more than 600m above the limit of tree growth and their natural environment and wildlife have much in common with summits in the Pyrenees or Norway. Long-lived snowbeds linger in the shadowy recesses of Ben Nevis and the Cairngorms.

Our mountains record the immense geological forces that shaped Scotland over millions of years. They are the most extensive near-natural areas in Britain, with many habitats, plants and animals that are rare or absent elsewhere in the world. They are well-known landmarks and symbols of national identity, enriching the lives of local residents and those who visit for recreation. But these unique mountain landscapes and their wildlife are also vulnerable to insensitive use and demand the highest standards of stewardship.

The ancient foundations

Today's mountain scene is a snapshot in a continuing process of change, and the origin of Scotland's mountains can be traced almost to the beginnings of measurable geological time.

A collision of continents

1500 million years ago, north-west Scotland was part of an ancient continent known as Laurentia. This continent included much of present-day North America and was separated from northern Europe, and the rest of Britain, by an ocean known as Iapetus.

But all this was to change, and a period of extraordinary upheaval 400-500 million years ago laid the foundations for much of the Highlands. The movement of vast plates that comprise the earth's crust forced these continents together, crushing, folding and uplifting the sedimentary rocks of the ocean floor. These rocks were drastically altered during this process, creating hard schists and slates, which formed a great mountain range known as the Caledonides. The collision of the continents also forced these rocks westwards in north-west Scotland, overriding the ancient crust for over 70km, and the resulting 'front' is marked by the line of an internationally renowned geological feature - the Moine Thrust.



The Moine Thrust near Elphin



Intensely folded schist

The Moine Thrust still forms a highly visible boundary today. The mountains of Wester Ross and Sutherland lie to the north-west, consisting of Torridonian sandstone on a base of contorted Lewisian gneiss. This is one of the most ancient rocks in the world, almost three billion years old, and is the last Scottish remnant of Laurentia. These mountains are typified by the lone sculpted sandstone peaks of Suilven and Stac Pollaidh, which rise from open, rugged moorland. South-east of the Moine Thrust, the Northern and Central Highlands are dominated by more massive schist ranges such as Beinn Dearg and the Fannichs. These mountains are the worn-down roots of

the Caledonides, exposed by weathering and erosion over the intervening millennia.

This collision of continents was also an important phase in the development of the Southern Uplands. As the plates carrying North America and northern Europe converged, sedimentary rocks forming part of the Iapetus ocean floor were lifted and bulldozed to form the foundations of these hills. These rocks are relatively susceptible to weathering and eroded more easily, producing rounded, rolling hills such as Broad Law and Hart Fell, near Moffat.



Beinn Dearg, south-east of the Moine Thrust



"Northwest Scotland is one of the classic areas in the annals of British geology, and its Geological Survey memoir is often claimed to be the most important ever produced".

John Whittow 1992



"The magnitude of the scale of nature and the utter loneliness of the vast mountain-world powerfully affect us. But deep beneath the feelings thus evoked lies a more or less consciously felt mental unrest in presence of the mystery of the cause of such stupendous features. The stern broken features of the mountains arrest our attention and excite our imagination as we try to picture to ourselves how they came into existence".

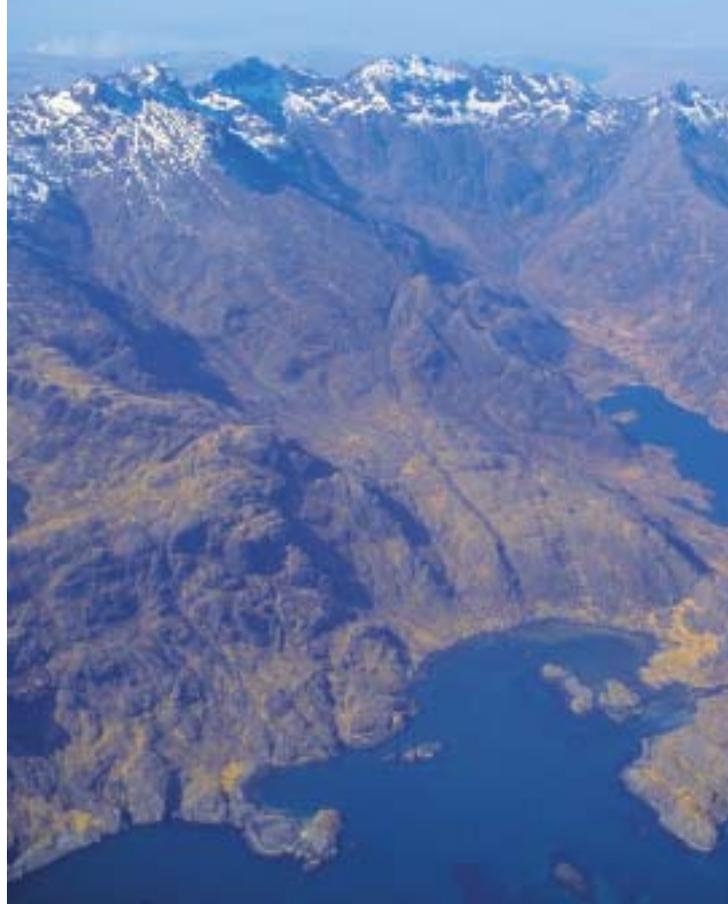
Archibald Geikie 1901

The volcanoes of Scotland

The cataclysmic events 400-500 million years ago were accompanied by volcanic activity, as molten magma forced its way upwards from deep in the earth's crust. In some places this cooled slowly underground to form huge masses of granite. These rock masses, exposed by erosion, now form many of Scotland's best-known mountains, including Ben Cruachan and the Cairngorms. Elsewhere, lava flows erupted onto the earth's surface from active volcanoes and cooled rapidly to form rhyolite and andesite - now the most characteristic rocks of Glencoe and Ben Nevis. These mountains still reveal the structure of those ancient volcanoes, providing world-famous examples of a process known as 'cauldron subsidence', in which gigantic plugs of lava have partially collapsed into magma below.

The next major phase in the history of Scotland's mountains began some 60 million years ago. The land masses which now form Europe and North America were torn apart by further continental movement, triggering renewed volcanic activity. Huge fractures opened along western Scotland, spilling lava to form a great basalt plateau 4km thick. Volcanoes developed in several locations, underlain by enormous subterranean masses of gabbro and granite. Subsequent erosion has exposed these rocks, which now form the Arran Hills and the Skye and Rum Cuillin.

The raw materials were in place, but the landscape still bore little resemblance to the mountains of the present day. A further powerful influence would be crucial to the development of Scotland's trademark skylines, from the Cobbler to An Teallach.



The Cuillin, Skye

Granite



Ice sculptures



The role of ice in the shaping of mountains is relatively obvious in Nepal or Alaska, where there are still large glaciers. Similar forces also carved Scotland's mountain landscapes, but this was not appreciated until 1840, when a Swiss geologist, Louis Agassiz, published some astute detective work. Agassiz was well-acquainted with the effects of glaciation in his native land and recognised similar features, including ice-transported boulders and ice-scoured rocks, in many parts of Scotland.

The Ice Age

The last 2.5 million years have seen a succession of glaciations, in which large parts of Scotland were periodically covered by ice sheets that reached over 1000m in thickness. At other times, smaller mountain glaciers existed for long periods in the Highlands. The erosive power of these glaciers radically reshaped the underlying terrain and moulded the mountains into their present forms. Drastic changes occurred throughout the Scottish hills, but were most pronounced in the Western Highlands where snowfall was greatest and the glaciers were most active. The mountains of this area are therefore much more deeply hewn, with narrow ridges and deep glens, in contrast to the rolling plateaux of the Cairngorms and Monadhliath.



Glacially-dissected mountains above Strath Fillan, in the south-west Highlands

Snow and glaciers

Then as now, snow preferentially accumulated on shady north or east-facing lee slopes. Small glaciers developed in these areas, gouging out existing hollows to form much deeper carries with very steep headwalls. These glaciers merged to form great rivers of ice in lower valleys, in a scene which must have resembled the famous Mer de Glace in the French Alps. At other times, the glaciers coalesced to form vast sheets of ice, as seen in Greenland today, that buried entire mountain ranges or left only a few protruding summits. Powerful 'streams' of ice within the ice sheets also deepened the glens and, in some instances, carved new ones. In the far north-west, including Assynt, the ice sheets scoured the bedrock to create distinctive cnoc and lochan landscapes.

Periods of extensive glaciation were interspersed with phases of cold climate when glaciers were less widespread or absent. During these phases, soils were subjected to intense freezing



Boulder lobes, Lurchers Gully, Cairngorms



Glen Rosa, Arran; a valley carved by ice

and thawing. These 'periglacial' conditions are recorded on mountain slopes and summits, where some features betray the downhill creep of saturated rock debris over frozen ground below. Terraces and 'lobes' made up of soil, rock debris and coarse boulders cascade down hillsides, locked in position by the arrival of warmer weather. On some summits, piano-sized boulders have slid downhill, ploughing trenches which trail behind like meteorite tails. On the Cairngorm plateau, the heaving action of expanding ice has created delicate patterns in the fine granite gravel.

The arrival of warmer conditions loosened the grip of the last glaciers about 11,500 years ago. It is sobering to remember, however, that warm intervals like that of the present day also occurred between previous glaciations, and the Ice Age could yet return to Scotland.



Coire an Lochain in the northern Cairngorms





The mountains today

The last 11,500 years have seen a relatively congenial climate, but the rocks and screes of the mountains remain in a constant state of gradual change. The West Ridge of Sgurr nan Gillean, on Skye, used to be adorned by the 'gendarme', a famous pinnacle which featured in the sepia-toned photographs of Victorian climbers. This landmark was prised off the ridge by the spring thaw of 1987 and now lies shattered on the slopes below. On a calm afternoon on the summit of Foinaven, in Sutherland, one can hear the murmurings of shifting scree.

The most dramatic change during the last 11,500 years, however, has been the return of life to a landscape stripped bare by glaciers. The vegetation of the mountains bears the strong imprint of our wild 'oceanic' climate, with mild winters, cool summers and abundant wind and rain. These conditions are uncommon around the world and Scottish mountain vegetation is a distinctive blend with few international parallels.

Trees and woodland

As the temperature rose after the last glaciation, plant life gradually crept northwards into the Scottish mountains, culminating in the development of woodland on lower slopes. This primeval forest reached its peak 6000 years ago without ever forming a continuous blanket, in marked contrast to some romantic images of a 'Great Wood of Caledon'. The tree canopy has retreated greatly since then, at first because of a deteriorating climate and more recently because of felling, grazing and burning. Many Scottish hillslopes are scattered with downy birch and rowan, whose elegant fronds are lit by blazing red berries in autumn. Native pinewoods are relatively common in

the colder and drier central and eastern Highlands, and sometimes harbour crested tit or capercaillie in their resin-scented depths.

On many mountains elsewhere in the world, woodland extends to a natural upper limit before fading into low-growing 'alpine' vegetation. Natural treelines now occur on only a handful of Scottish mountains because of the extent of past woodland clearance. At about 600m on Creag Fhiaclach above Glen Feshie, native woodland gives way to a remarkable belt of twisted and contorted 'bonsai pinewood' - a relic of a habitat which was once much more widespread.



Scots pine



Rowan

Heaths and bogs

Lower slopes in the north-west are now carpeted by wet heath in which coarse grasses tangle with heather, pink bells of cross-leaved heath and yellow spikes of bog asphodel. This rough vegetation dominates the expansive landscapes of Wester Ross and Sutherland, flowing over and around terraces of Torridonian sandstone. Some wet heath results from woodland clearance, but much could be almost natural, and these wild landscapes may come as close to a primal state as anywhere in Britain. Sheltered slopes and hollows on these mountains can harbour delicate and colourful mixtures of liverworts, which form intricate gold and purple mats beneath the heather canopy.

Poorly-drained hollows in the north-west develop blanket bog with cotton grasses and *Sphagnum* mosses. These living sponges have a remarkable hollow-celled structure which retains water, helping to maintain waterlogged conditions. The resulting microscopic labyrinth contains a complete ecosystem within an ecosystem, with up to 220,000 protozoa per gram of moss. All of these plant communities are characteristically 'oceanic' and Scotland contains 10% of the world's blanket bog.

The lower flanks of the central and eastern Highlands are coloured by the darker hue of vigorous heather and splashed with the lush green of blaeberry. Heaths and bogs hereabouts are also dotted with dwarf shrubs of cold climes such as cow-berry, bearberry and cloudberry - whose solitary berries make excellent gin!



Cross-leaved heath



Bog asphodel

Not surprisingly, the widespread occurrence of heather in the Scottish mountains has resulted in a host of practical uses. These have included roofing, bedding, flooring, ropes, brooms, harrows, baskets, pot scrubbers, beer, wine, tea, dyes and tanning agents. The plant has also been used for medicinal purposes, including the treatment of coughs, colds, insomnia, rheumatism and bladder or kidney complaints.

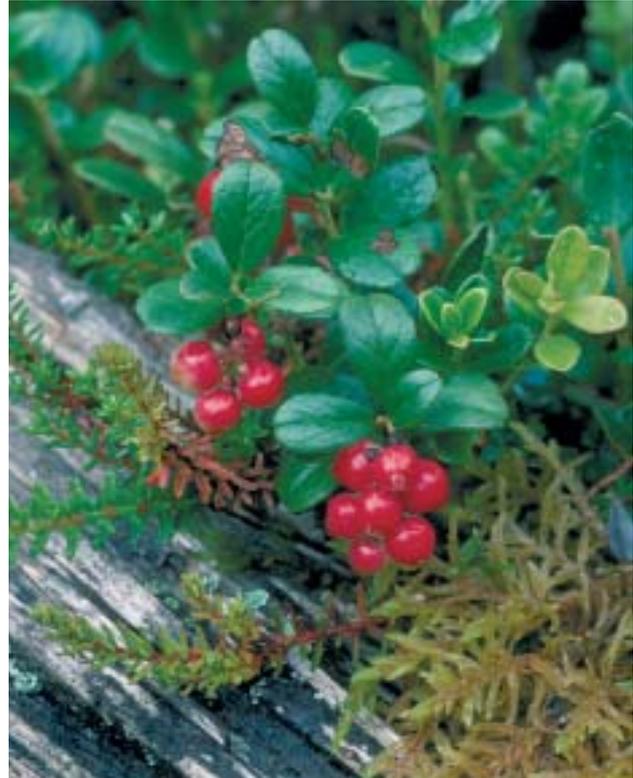
Flora Celtica - Scotland 2000 database

Plant life on the high tops

Heather is the most talismanic plant of the lower parts of our mountains, but its existence becomes ever more tenuous with increasing altitude. Stunted stems cling to the ground on windswept brows between 600 and 900m, but above this level, exposed slopes and summits are carpeted by *Racomitrium lanuginosum*, or woolly fringe moss. This moss is extremely well adapted to the tops, deriving water and nutrients exclusively from rain and mist. The occasional dry spell does not pose any problem, however, for the plant can also survive total drought for up to a year.

This remarkable moss is also found in other oceanic mountains and tundras, for example in North America, where its soft mats were traditionally used by the Inuit to line funeral biers. Even this plant, however, loses its grip in the extreme environment of the Cairngorm summits. Here, moss heaths are replaced by great expanses of three-leaved rush, anchored in the wind-blown gravel by its tough root system. This distinctive habitat rolls on for mile after mile over the bleak Cairngorm plateau, the rush tussocks quivering in the wind.

The particularly oceanic climate of the far north-west is reflected by exceptionally cool, cloudy summers and frequent strong winds, even by Scottish standards. This combination of influences causes mountain plant communities to develop at unusually low altitudes, and carpets of *Racomitrium* occur on some hills as low as 500m in the Western Isles.



Cowberry

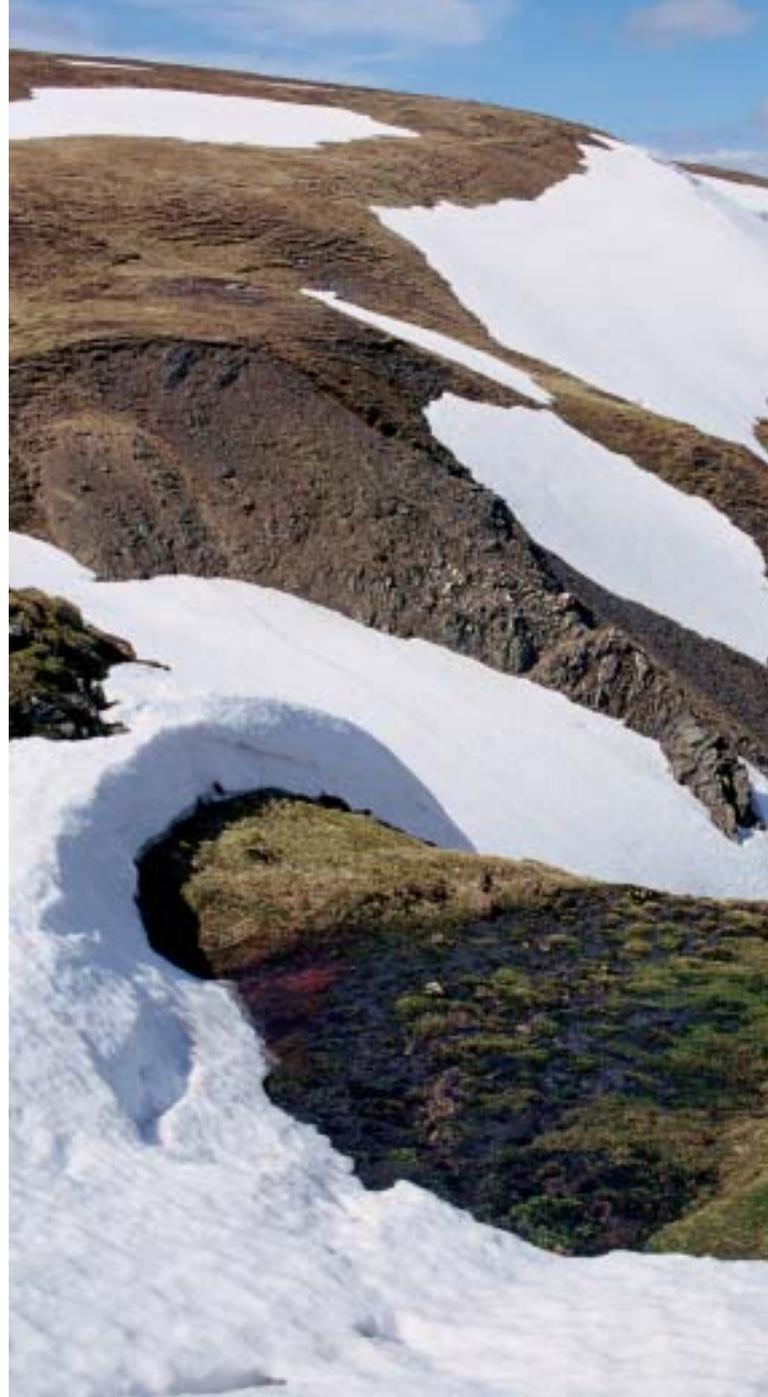


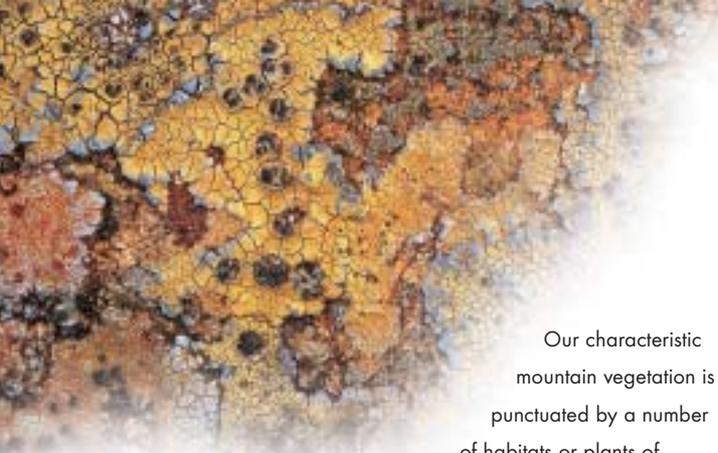


Snow is integral to the mountain environment and presents plants with both a crisis and an opportunity. A snow blanket provides shelter from the ferocity of winter, with extreme temperatures and lacerating spindrift, but also limits the growing season. Progressively longer snow cover therefore supports distinct communities of plants which are adapted to these conditions. 'Early' snowbeds are marked by grasses and sedges, while more long-lived snows conceal specialised mosses and liverworts, sometimes forming a precarious crust over ground which slumps downhill, laden with meltwater. The warmth of fine August days fails to penetrate the near-permanent snowbeds of Ben Nevis and the Cairngorms, which conceal a dark and silent underworld. Even these snows, however, are an indirect source of life, and their frigid meltwater forms sparkling springs with cushions of mosses and liverworts.



Purple saxifrage





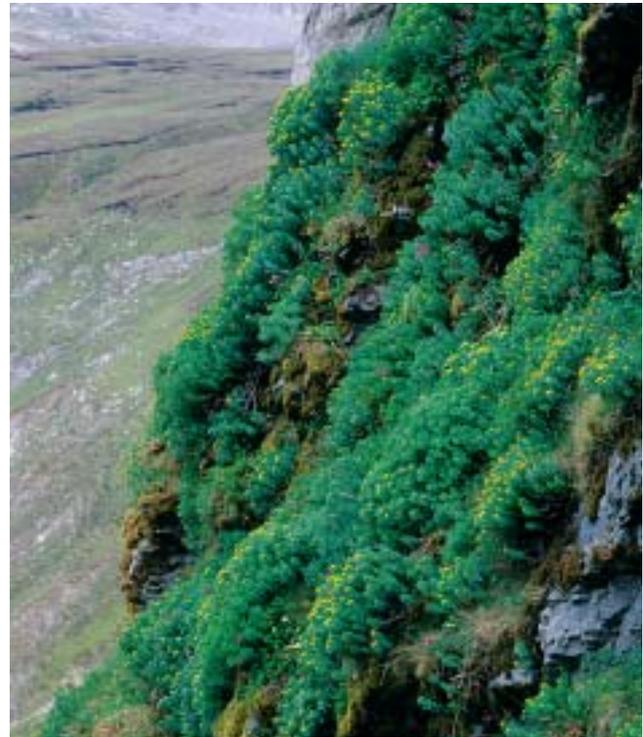
Our characteristic mountain vegetation is punctuated by a number of habitats or plants of particular rarity. Ben Lawers and neighbouring summits are composed of particularly calcium-rich schist, creating an unusual high altitude niche for alpine plants which are uncommon, or absent, elsewhere in Scotland. On these mountains, lush tangles of colourful tall herbs cascade over crags, while smaller plants form intricate patchworks over unstable gravel scoured by drainage and churned by frost heave. Scattered rocky ledges harbour patches of low-growing downy or woolly willows, their leaves matted with delicate silvery hairs. This is perhaps the rarest habitat in the Scottish mountains, with no more than 0.1km² in the whole country. Regeneration of these willows is extremely tenuous, as male and female reproductive structures occur on separate plants which may be up to 50km apart.

Some extreme rarities are confined to just one or two individual mountains within the UK. The conspicuous golden moss *Herbertus borealis* occurs only on Beinn Eighe, while alpine rock-cress is found only on rock ledges high on the Black Cuillin. The tenacious diapensia clings to a single exposed ridge in the western Highlands, pushing up small white flowers in May, and remained entirely undetected until 1951. Other surprises undoubtedly await those who explore the most wild and remote sanctuaries.

Mountain lichens

"The haunts of these alpine plants are wild and inspiring. The black corries, where precipices rise sheer for a thousand feet, where broken chimneys and vast heaps of scree encumber the climber and where the snows lie late, it is here that many a rare alpine has its home".

A.E. Holden 1952



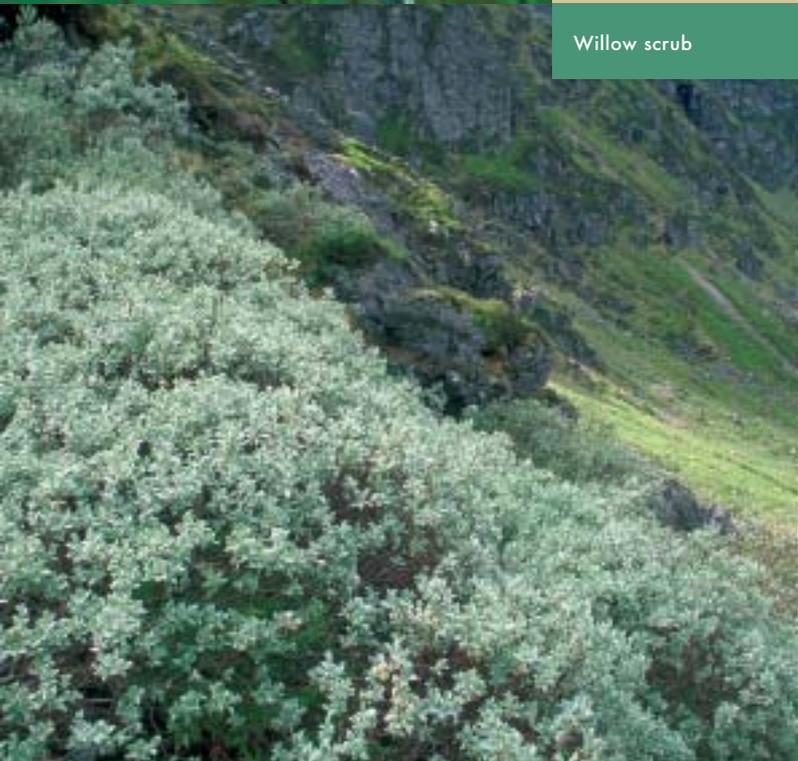
Roseroot growing on a cliff ledge which is inaccessible to sheep or deer



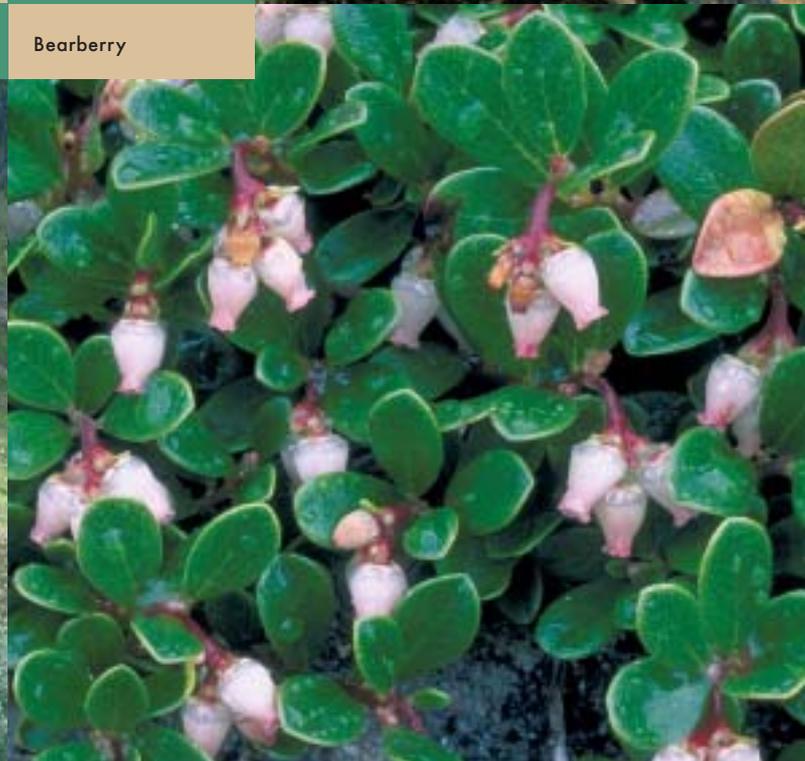
Globeflower



Alpine lady's mantle



Willow scrub



Bearberry



Red fox



Bellowing stag

Upland mammals

Our upland landscapes are home to a number of larger animals, some of which are icons of Scotland. Perhaps foremost among these are red deer, which are as important for tourism as for the stalking and venison they provide. In the damp half-light of dusk in October, the groans of rutting stags echo round cloud-wreathed corries with primeval energy.

Mountain hares thrive on the heathery grouse moors and hillslopes of the eastern Highlands, sometimes bursting from underfoot as their resting places or forms are disturbed. Foxes also venture onto the higher tops, and their footprints are sometimes the only sign of life on bleak snow-crueted ridges in the depths of winter. On many slopes, however, the most frequently seen creature is actually an amphibian. The humble frog is abundant on most Scottish hills and high, lonely lochans emit a chorus of hoarse croaks on warm spring days.



Upland birds

The birds of the Scottish mountains are particularly evocative. The mournful call of golden plover accentuates the vastness of the tops, while at closer quarters, the croak of ptarmigan can be heard on many rocky summits. The golden eagle is perhaps the perfect epitome of these wild places, soaring and spiralling around such peaks as the jagged Cuillin of Skye. Our mountain birds also include jewels such as dotterel, which nest on the bleak alpine heaths, and sparrow-like snow bunting, which frequent the high, craggy corries. Only a few score of these buntings breed in Scotland, their black and white plumage merging with mosaics of rock and lingering snow. The lower slopes are home to the unmistakable red grouse, and startled birds erupt from the heather with a rattling machine gun-like alarm call.

Invertebrate life

Birds and mammals are relatively conspicuous, but numerous beetles, spiders, flies, butterflies and moths also frequent the slopes and summits. Lowly invertebrates often form essential links in mountain ecosystems, and the cranefly *Tipula montana*, for example, provides vital food for dotterel. Many of these creatures, such as the red-flecked Mountain Burnett moth, or the dragonflies which patrol dark bog pools, also add extra colour and richness to the mountain scene. Many rarities are confined to a few hills, including the spider *Hilaira nubigena*, whose four Scottish sites include the northern outpost of Ben Hope in Sutherland. These are among the most mysterious aspects of our mountain wildlife and much undoubtedly remains to be discovered.

"With the red deer itself, the golden eagle is the grandest of the wild creatures which fittingly belong to this most extensive and challenging of our mountain regions".

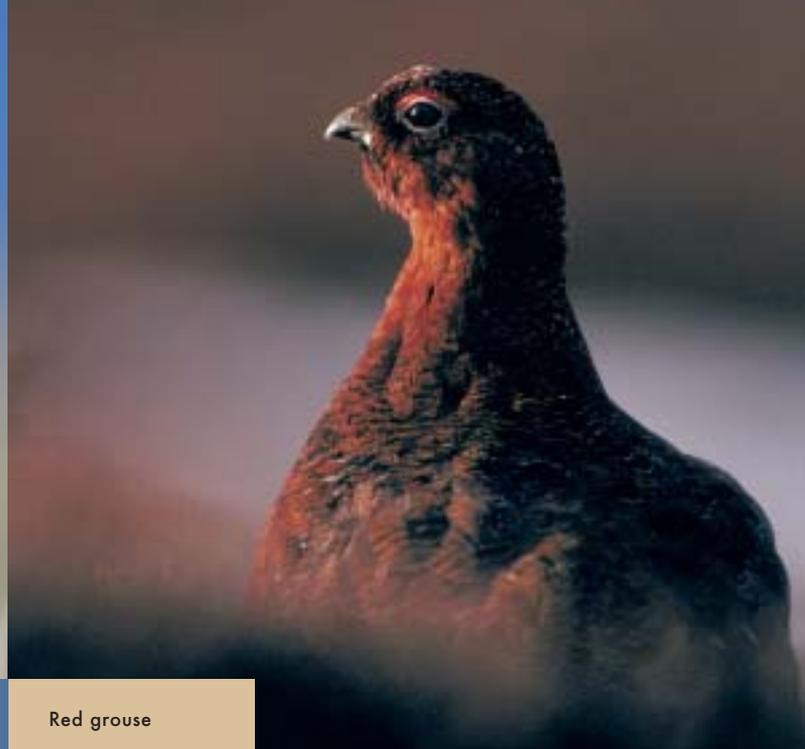
*Derek Ratcliffe,
1990, referring
to the Highlands*

Wildlife often features in the Gaelic names of Scottish hills. Common elements include fraoch (eg. Fraoch Bheinn; heathery mountain), and choinnich (eg. Sgurr Choinnich Mor; big mossy peak). The dark, majestic golden eagle well suits its Gaelic name of iolaire dubh (black eagle), and this name is sometimes applied to crags as, for example, Creag na h-Iolaire.

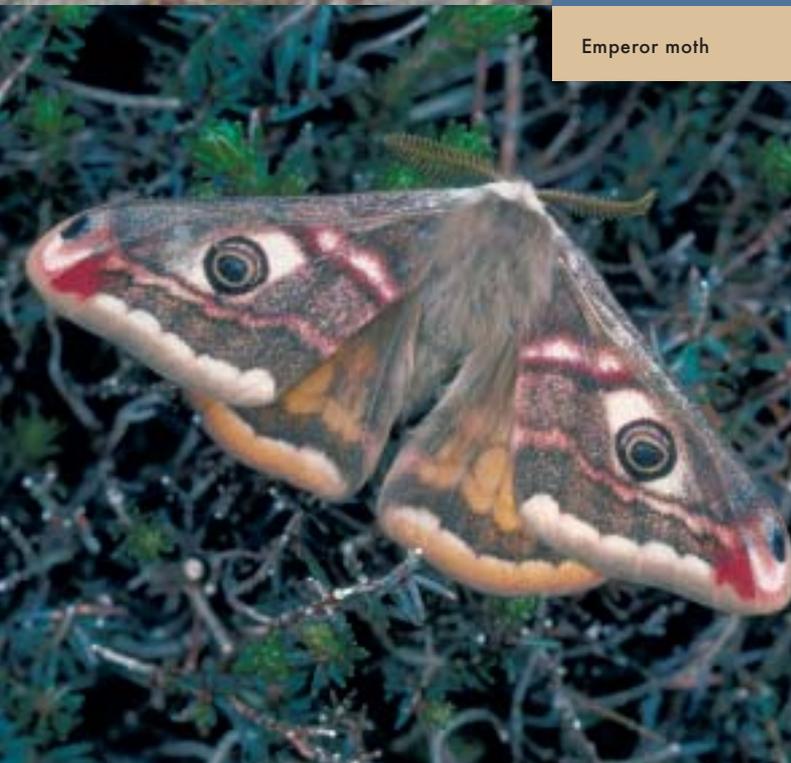




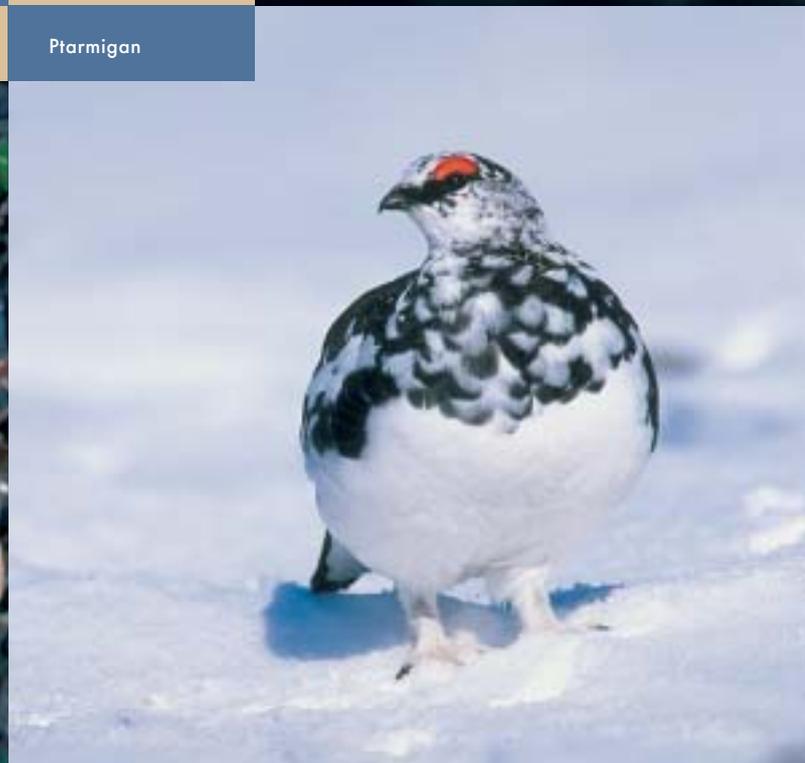
Dotterel



Red grouse



Emperor moth



Ptarmigan

Mountains and people

People have exerted ever-greater influence on the mountains in recent millennia. The high places were once seen as grim and forbidding, striking terror into early travellers such as Thomas Pennant. In Victorian times, a more romantic view was promoted by artists and writers such as J.M.W. Turner and Sir Walter Scott. This period also saw an awakening of scientific interest,

including early botanical exploration and construction of the Ben Nevis observatory. Nowadays, mountains form a common cultural thread extending from 'Monarch of the Glen' to the poetry of Sorley Maclean. For many people, mountains define Scotland itself.

The travel writer Thomas Pennant was struck by An Teallach, which overlooks Dundonnell. In his 'Tour in Scotland' of 1769, he described the mountain as "horrible and awful with summits broken, sharp and serrated and springing into all terrific forms!"



An Teallach, Wester Ross



Extract from Loch Coruisk (JMW Turner, ca 1831)

"To shoot one of these well-proportioned, delicate, beautifully camouflaged and adapted animals is a serious business which gives rise in the rifle to thoughts of his own impermanence and tenuous adherence to life. Set against some of the most beautiful scenery anywhere, in one of the world's oldest and most weathered mountain ranges,...these intimations of mortality can reach a pitch of almost painful acuteness. The hills are eternal, and man is fiery and fit for a brief time".

Michael Wigan 1992



Sheep walks and deer forests

During the last 300 years, human imprints have gradually extended onto the most rugged and remote summits. The lower slopes and straths have long been used for marginal agriculture, although most hill land is of naturally low productivity, and ruined sheilings are a common sight. Many formerly inhabited straths were depopulated during the infamous Clearances of the 18th and 19th centuries, to make way for vast upland sheep-walks. In most parts of the Highlands, this phase was succeeded by the development of sporting estates during the 19th and early 20th centuries, and many imposing shooting lodges date from this period.

Deer stalking is now widespread and is accompanied by grouse shooting on the lower heather moors of the relatively dry central and eastern Highlands, which provide prime grouse habitat. These moors are managed by rotational burning to maintain vigorous heather of varying heights, creating unmistakable 'patchwork quilt' markings. These activities provide livelihoods for farmers, stalkers, gamekeepers and other land managers, and support jobs further downstream in, for example, the venison industry.





Hillwalker above Loch Coruisk, Skye

Hillwalking and mountaineering

The growth of these activities has been paralleled by an expansion of other types of recreation, notably mountaineering. The Cairngorm and Scottish Mountaineering Clubs were founded in 1887 and 1889 respectively, and Sir Hugh Munro's famous Tables were first published shortly afterwards in 1891. This mighty feat of surveying gave birth to a national cult activity and over 2700 pilgrims have since completed all of the 3000ft 'Munro' summits. Some estimates suggest that hillwalkers may number 10% of the Scottish population.

Climbing has also grown in popularity and sophistication, starting from early ventures equipped with perilously thin ropes which, it was said, 'served only to maintain the illusion that man is a gregarious animal'. The spectacular crags of Skye, Glencoe, Ben Nevis and the Cairngorms have attracted all of the leading lights in British mountaineering and now provide a wealth of established climbs. The high ridges and plateaux, particularly in the central and eastern Highlands, are also popular for ski-touring when snow permits.

Scotland's upland landscapes are a mainstay of our tourism industry. Mountain recreation is probably the largest source of income and employment in Scotland's hill regions, and many visitors also savour dramatic mountain scenery from low level walks and viewpoints.



Rock climbing on Ben Nevis



Bidean nam Bian from Buachaille Etive Beag

"On a bad day, if it was cold, late or otherwise ill-starred, the feeling might well begin to niggle: 'This is no place to be'. But the buttress is so handsome, the vistas of the Torridon mountains so tremendously sculpted, and I am so ready to lose my bothered self in physical grapple with the wilderness that nothing can baffle our momentum".

David Craig on Mainreachan Buttress, Fuar Tholl 1987



Human impacts

Although mountains provide great benefits to the people of Scotland, human activity can also have detrimental effects on this environment. Excessive numbers of grazing sheep restrict the development of native woodland and suppress the growth of heather, which is gradually replaced by coarse grassland. In the absence of predators such as wolves, deer populations can also become very large, and more rigorous culling is needed in many areas to achieve a balance with woodland and moorland habitats. Burning is often used in the management of sheep walks and grouse moors, and poorly controlled fires can exacerbate these detrimental effects.

Vehicle tracks, telecommunication masts and hydro-electricity schemes have introduced development, not always appropriately, within our mountain landscapes. Lower hill slopes often carry extensive conifer plantations, which are particularly extensive in the Southern Uplands, but new approaches to forestry are beginning to address these problems and nurture native woodland. A few mountains have even suffered because of their own popularity and are scarred by path erosion.

Some of the most pervasive effects on Scotland's mountains arise from activities elsewhere and are very hard to tackle. Global warming could reduce the extent of alpine habitats, but renewable energy developments, if sited in our wilder mountain areas, could also erode their quality. Air pollution has contributed to a decline of *Racomitrium* heaths in some parts of southern Scotland, although such pollution may now be decreasing.

Action to tackle all of these problems will be a measure of our commitment to protect this mountain heritage.



A well worn track



Walker above Loch Linnhe, Lochaber

Looking ahead

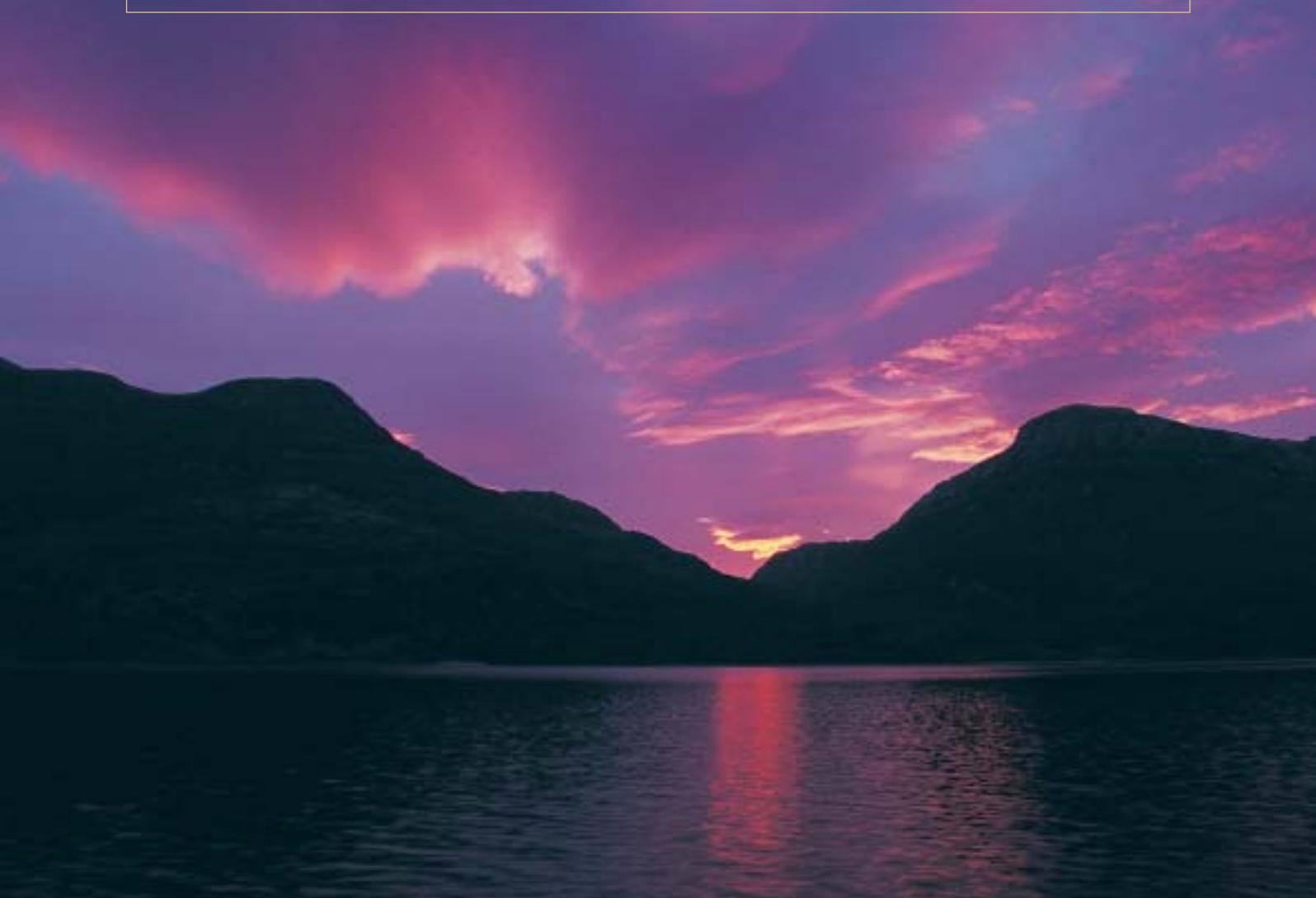
The stewardship of Scotland's mountains presents a formidable challenge, but there is also cause for optimism. Our understanding of the mountain environment, and its value to society, is greater now than ever before. Wild mountain landscapes are increasingly recognised as economic assets, as well as places for nature and spiritual refreshment. The UN International Year of Mountains, in 2002, symbolises the importance which is now accorded to these areas.

Scotland's new National Parks in Loch Lomond & the Trossachs and the Cairngorms should be well placed to develop new approaches to conservation and land management, and to

demonstrate how the enhancement of mountain areas can benefit local communities and the nation as a whole. The planning system has an important role in preventing inappropriate development across all of the Scottish uplands. But responsibility for the mountains is shared to varying degrees by all who have an interest in these magnificent areas, including land managers, public bodies, Non-Government Organisations and those who use the hills for recreation. The challenge ahead will be for these bodies and individuals to work together, with a shared commitment to safeguard and enhance our mountain resource.

"By taking care of the world's mountains, we help to ensure the long-term security and survival of all that is connected to them, including ourselves."

FAO/UN IYM website, 2002





References

- Craig, D. (1987). *Native Stones*. Flamingo.
- Geikie, A. (1901). *The Scenery of Scotland*. Macmillan.
- Holden, A.E. (1952). *Plant life in the Scottish Highlands*. Oliver and Boyd.
- Kilgour, W.T. (1905). *Twenty Years on Ben Nevis*. Ernest Press.
- Ratcliffe, D. (1990). *Bird life of Mountain and Upland*. Cambridge University Press.
- Pennant, T. (1769). *Tour in Scotland*. Birlinn Publishers.
- United Nations (1992). *Agenda 21; UN Conference on Environment and Development, Rio*.
- Whittow, J. (1992). *Geology and Scenery in Britain*. Chapman and Hall.
- Wigan, M. (1992) in: *The Highland Game: Life on Scottish Sporting Estates*. Glyn Satterley. Swan Hill Press.

Addresses

Please contact SNH at the address below, or your local Area office, for further information about the natural heritage, or sustainable management, of Scotland's mountains. Practical demonstrations of upland management for landscape and biodiversity benefits are provided by a number of National Nature Reserves (NNR) owned by SNH.

Scottish Natural Heritage
2 Anderson Place
EDINBURGH
EH6 5NP
Tel: 0131 447 4784
www.snh.org.uk

Some other organisations which are closely involved in the positive management of mountain areas:

The National Trust for Scotland
Wemyss House
28 Charlotte Square
EDINBURGH
EH2 4ET
Tel: 0131 243 9300
E-mail: information@nts.org

The Scottish Wildlife Trust
Cramond House
Kirk Cramond
Cramond Glebe Road
EDINBURGH
EH4 6NS
Tel: 0131 312 7765
E-mail: enquiries@swt.org.uk

The John Muir Trust
41 Commercial Street
EDINBURGH
EH6 6JD
Tel: 0131 554 0114
E-mail: admin@jmt.org

The Mountaineering Council of Scotland
The Old Granary
West Mill Street
PERTH
PH1 5QP
Tel: 01738 638227
E-mail:
info@mountaineering.scotland.org.uk

RSPB (Scotland)
Dunedin House
25 Ravelston Terrace
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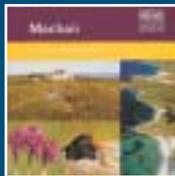


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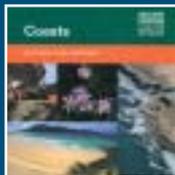


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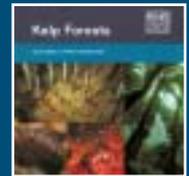


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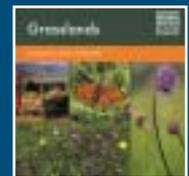


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