

### *The Blackdown Hills*

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The Blackdown Hills are a little known area. They were designated as an Area of Outstanding Natural Beauty (AONB) in 1991. They cover 360 km<sup>2</sup>, and straddle the Devon-Somerset county border south of Taunton Vale. The landscape is intimate and enclosed, as a direct result of low intensity livestock farming; furthermore, the area is essentially lowland, not exceeding about 310 m above sea level, and yet there is a sense of remoteness and tranquillity in a landscape punctuated by small villages, hamlets and isolated farmsteads. It is these factors together that give the Blackdowns their special character.

From the steep, north-facing scarp, the Blackdowns dip gently southward to the A35 road between Axminster and Honiton, as an extensive, flat-topped but dissected plateau consisting of an acidic Upper Greensand, mantled by a thin layer of clay-with-flints. In very few places there are remnants of the Chalk that once overlay the greensand. Greensand, laid down under a shallow sea that covered southern Britain between 65 and 135 million years ago during the Cretaceous, varies in colour from yellow to dark green, with beds of flint-like Chert much used in local building; it is rich in iron and is one of the main aquifers in the area. At the base of the greensand lies an unconformity, so that the sequence of geology normally beneath it is incomplete. In some areas, greensand is underlain by Blue Lias limestone of Jurassic age and, in parts of Bishopswood and Membury for instance, such outcrops give rise locally to calcareous soils. Elsewhere, the greensand is underlain by Keuper Marls or White Lias limestone each of Triassic age; the latter is again associated with calcareous soils, as occur in small outcrops on the northern scarp in Adcombe Wood, and near Thurlbear.

Three major rivers rise in the Blackdowns: the Yarty, the major tributary of the Axe, the Otter, which reaches the sea at Budleigh Salterton, and the Culm, which joins the Exe at Stoke Canon, cut through the hills as they flow south towards the sea.



View of the landscape from Hemyock looking north towards the Wellington Monument.

## History

After the last Ice Age about 12,000 BC, tree species that had migrated south during the Ice Age slowly spread north again, as indicated by pollen analysis. Birch, Aspen and Willow were followed by Pine and Hazel; then Alder and Oak; next came Lime, Elm, Holly, Ash and Maple. There followed a long period of relatively stable climate, to about 5,000 BC, during which natural processes of succession led to varying types of wildwood, in the Blackdowns dominated by Small-leaved Lime, before there was large-scale human activity (Rackham 2000).

Indications of human use of the area are scattered widely over the Blackdown Hills where hunter-gatherers set up seasonal camps both on high ground and on river banks: Palaeolithic flint and chert implements have been found both to the north of the area (Grove 2011) and further south in Stockland (Pearce 1996). Pre-historic finds in 1989 near Crandons Cross in the Yarty valley date from the Mesolithic (10,000-4,000 BC), a period that saw the transition between hunter-gatherers and early agriculture. By the Neolithic, Britain's vegetation was being altered dramatically.

Evidence of occupation during the Bronze Age, when the agricultural revolution was well underway, comes from barrows including Robin Hood's Butts on Brown Down (James 2011). Iron Age (750 BC–43 AD) hill forts such as Hembury and Castle Neroche, and iron working sites including Bywood Farm, Dunkeswell, are scattered widely across the Blackdowns; by this time wildwood had ceased to exist over much of England and mixed subsistence farming was established. Oak and hazel woodland remained significant, probably on steeper slopes. Apparently little environmental change took place during the Roman occupation (43 AD–410 AD), and arable cultivation continued within a mixed farming economy. This period saw the development of a network of roads, and at its end, the Blackdown Hills were probably under a civil administration from Ilchester. This governance changed to one of royal kingdoms, then to one of large estates belonging to the King, nobles and the church whose land grants were to lay the basis for Saxon parishes. For instance, the settlement of Stockland is first mentioned in 934 AD when the Manor was given by the Saxon King Athelstan to the church at Milton in Dorset, confirmed in 1086 in the Domesday Survey which also refers to the existence of three mills in the parish.

## Areas of outstanding botanical interest

The predominant pattern of small, irregular fields on valley slopes is typical of piecemeal enclosure using small Medieval implements. Evidence is sometimes found of ridge-and-furrow, indicating that an open-field system had existed (Exeter Archaeology 2003). In the Medieval period (1066–1540 AD), there were typically areas of woodland on the higher steeper slopes and expanses of open common pasture on the plateau. The Royal forest of Neroche and the many deer parks show that the Blackdown Hills were valued for both their timber and their livestock.

A prominent feature of the Blackdowns landscape in post-Medieval times was the construction of beacons, often on sites of Iron Age hill forts and sometimes as a domed stone structure such as Culmstock Beacon; each was part of a network to warn of the approach of an enemy. Support among Blackdowns men for Monmouth's rebellion in 1685 was strong. The ghastly revenge taken by Judge Jeffries is probably reflected in the number of forches and gallows in place names throughout the Hills.

Reference to tithe maps of the Blackdown Hills reveals the existence of numerous pits for the extraction of sand, gravel and marl. Whereas chert, from the greensand, has provided the vernacular stone in buildings, marl has been used in a mixture with straw and stone in buildings of cob. Marl, which is a calcareous clay, has also been quarried for use locally as a fertilizer applied to acid sandy soils that prevail on the plateau. Liassic limestones that outcrop in the north and east of the Blackdowns were also used for the same purpose by burning in lime kilns. In the 18<sup>th</sup> and 19<sup>th</sup> centuries, a whetstone mining industry centred on Blackborough was at its height.

The iconic obelisk on the northern scarp celebrates the Duke of Wellington's defeat of Napoleon at the Battle of Waterloo in 1815. High food prices that followed in the wake of the Napoleonic wars led to a series of Enclosure Acts that privatised the remaining expanses of plateau heathland and divided them up into rectangular fields. A few unenclosed areas, often on slopes at the spring-line, remained accessible to the poor to cut peat turf for fuel; these are the turbaries, mostly now owned by parish councils who manage the areas for wildlife (Allen 2004). Ashculm Turbary, in Hemyock where peat was dug until about 1900, is now a Site of Special Scientific Interest (SSSI).

This long history of land use, combined with the area's underlying geology and climate, have together moulded the character of the landscape and vegetation of the Blackdown Hills.

## Vegetation

Biological knowledge of the Blackdown Hills is sketchy, though their conservation interest has been recognised in part through the designation of some 16 SSSIs, one Special Area of Conservation and numerous County Wildlife Sites. Species records from surveys are held centrally by the Devon Biodiversity Records Centre (and the Somerset Environmental Records Centre) and a few parishes have been the subject of recent biodiversity audits.

An annual rainfall of about 1,000 mm percolates through the porous greensand until it reaches the impervious band of Keuper Marl beneath. Springs emerge at this junction, and a spring-line forms a 'Plimsoll line' of ill-drained mires at about 210 m altitude on the slope of the hills that dip, finger-like, southward. The relatively high rainfall, temperatures lower than the surrounding lowland, and nutrient-poor soils derived from the greensand combine in making conditions harsh for agriculture, so that grassland, and small farms with small fields enclosed within high hedges, are typical. Copses of broad-leaved woodland are widely scattered throughout the landscape, except on the northern scarp where there is an extensive area of semi-natural woodland.

The plateau of the Blackdown Hills was, until some 50-60 years ago, dominated by heathland but now only a few blocks remain. The most extensive is on Blackdown and Sampford Commons SSSI. In the wake of the Second World War, some of this hill-top heathland was converted into coniferous plantations as for instance still exist on Bewley Down in Chardstock and around Blackborough and Sheldon.

Very little of the grassland is 'unimproved'. The old hay meadows, cut in July, have largely been replaced by temporary Rye-grass leys which are often first cut for silage in May. Remaining unimproved mesotrophic grassland typically include various combinations of Common Knapweed *Centaurea nigra*, Cat's-ear *Hypochaeris radicata*, Sweet Vernal-grass *Anthoxanthum odoratum*, Crested Dog's-tail *Cynosurus cristatus*, Ribwort Plantain *Plantago lanceolata*, Yellow Rattle *Rhinanthus minor* and the southwestern species Corky-fruited Water-dropwort *Oenanthe pimpinelloides*, among numerous others. Long Lye Meadow SSSI is typical. Some meadows, including Goren Farm in Stockland, have spectacular displays in June of Southern Marsh-orchid *Dactylorhiza praetermissa*. Very few now support large populations of the nationally declining Green-winged Orchid *Anacamptis morio* or the Daffodil *Narcissus pseudonarcissus*, each of which were locally abundant grassland species in the 1960s. One study (Silvertown *et al.* 1994) attributed the decline of *A. morio* to agricultural improvement by fertilizing old hay meadows, leading to increased plant competition and apparently a direct toxicity from added phosphorus. Other rarities of neutral grassland include Common Lady's-mantle *Alchemilla filicaulis* ssp. *vestita*, Dyer's Greenweed *Genista tinctoria* and Adder's-tongue *Ophioglossum vulgatum*. Unimproved, species-rich mesotrophic meadows may support 16 species per m<sup>2</sup> whereas improved grassland usually has no more than four species per m<sup>2</sup>.



Oblong-leaved Sundew *Drosera intermedia* on Blackdown Common.

## Areas of outstanding botanical interest

Calcareous grassland is confined to a few sites to the east and northern scarp of the AONB (Saunders & Butcher 1987). Steep grassy valley sides, locally called sidelings, are too steep to be ploughed so remain permanent grassland in some places. Typical plant species here include Common Spotted-orchid *Dactylorhiza fuchsii*, Bee Orchid *Ophrys apifera*, Pyramidal Orchid *Anacamptis pyramidalis*, Common Rock-rose *Helianthemum nummularium*, Quaking-grass *Briza media*, Hoary Ragwort *Senecio erucifolius*, Hawkweed Oxtongue *Picris hieracioides*, Dwarf Thistle *Cirsium acaule*, Fairy Flax *Linum catharticum*, Yellow-wort *Blackstonia perfoliata* and Autumn Gentian *Gentianella amarella*. It is doubtful whether Early Gentian *G. anglica* survives at inland sites in the Blackdowns.

One of the most striking features of the Blackdown Hills is the mosaic of small fields bounded by a network of hedgebanks, some of which are irregular, species-rich and ancient. Their purposes were to enclose livestock and to demarcate boundaries; boundary trees, often pollards, remain conspicuous.

The most frequent woody components of ancient hedges here are generally some combination of Field Maple *Acer campestre*, Hazel *Corylus avellana*, Dog Rose *Rosa canina*, Blackthorn *Prunus spinosa*, Hawthorn *Crataegus monogyna*, Ash *Fraxinus excelsior* and Elder *Sambucus nigra*, often with occasional Elm *Ulmus* spp., Pedunculate Oak *Quercus robur*, Holly *Ilex aquifolium*, Spindle *Euonymus europaeus*, Dogwood *Cornus sanguinea*, Grey Sallow *Salix cinerea*, Guelder-rose *Viburnum opulus* and Wayfaring tree *V. lantana* (Allen 2010, Saunders 2011). Beech *Fagus sylvatica* is the signature species on the plateau where, in the wake of the Enclosure Acts, hedgerows are straight, regular in shape and species-poor, reflecting a recent origin and generally acidic soils. Rowan *Sorbus aucuparia*, Alder Buckthorn *Frangula alnus*, Gorse *Ulex europaeus* and Bilberry *Vaccinium myrtillus* are occasional components of these hill-top hedgebanks, as remnants of former heathland.

Hedges remain stock-proof only if they are managed, preferably by laying, called 'steeping' in Devon. Coppice crafts, including making hurdles and thatching spars, owe their existence in part to hedge-laying that provided fuel wood, timber, shelter, fruit and herbs. The first wild flowers to appear in Blackdown hedgebanks are those species common everywhere: Primrose *Primula vulgaris* is a particular local favourite. Most are essentially woodland species, for hedges are corridors of woodland. Among the rarer herbs of hedgerows in the Blackdowns are some that are persistent but strictly not native; these include Green Hellebore *Helleborus viridis*, Orpine *Sedum telephium* and Lesser Periwinkle *Vinca minor* which have become naturalized from earlier cultivation as medicinal herbs or their use in folklore. Other uncommon species include a population of the hybrid *Geum* × *intermedium* on a hedgebank near Hemyock and a patch of Pencilled Cranesbill *Geranium versicolor* in Broadhembury parish.

The most extensive and richest areas of ancient semi-natural broadleaf woodland are found on the north-facing scarp of the Blackdowns, over the Somerset county border. Prior's Park and Adcombe Woods, together a SSSI, are prime examples where rarities include Wild Service-tree *Sorbus torminalis* and Small-leaved Lime *Tilia cordata*. Further south, there are remnants of semi-natural woodland on the valley sides of the Otter and Yarty catchments. On neutral to slightly acid soils, woodland is dominated by *Q. robur* in a community with affinity to an Oak-Bracken-Bramble association, with Wood Anemone *Anemone nemorosa*, Wood Sorrel *Oxalis acetosella*, Bluebell *Hyacinthoides non-scripta*, Pignut *Conopodium majus*, Greater Stitchwort *Stellaria holostea* and Early-purple Orchid *Orchis mascula*. *Corylus avellana* is abundant, *I. aquifolium*, *S. aucuparia* and locally, Wild Cherry *Prunus avium* are frequent, and *V. opulus* occasional. Uncommon species here include Broad-leaved Helleborine *Epipactis helleborine* and Wood Small-reed *Calamagrostis epigejos*. These "bluebell woods" include Wood Copse, Cotleigh, Yarty Copse, Membury and Woodmoor Copse, Stockland.

Woodland overlying Liassic limestone is usually dominated by *F. excelsior*, typically in association with *A. campestre* underlain by a dense carpet of Dog's Mercury *Mercurialis perennis*. Here, Ramsons *Allium ursinum* is often abundant, with Stinking Iris *Iris foetidissima*, Moschatel *Adoxa moschatellina*, Pendulous Sedge *Carex pendula*, Lords-and-Ladies *Arum maculatum*, Hart's-tongue Fern *Asplenium scolopendrium* and Soft Shield-fern *Polystichum setiferum*. Rarities include Herb-Paris *Paris quadrifolia*, Greater Butterfly-orchid *Platanthera chlorantha*, Toothwort *Lathraea squamaria*, Spurge-laurel *Daphne laureola* and Goldilocks Buttercup *Ranunculus auricomus*. An example of woodland of this type is found near Chapplecroft in Membury parish.

At the spring-line throughout the Blackdowns, there are patches of wet woodland usually with Downy Birch *Betula pubescens* and *S. cinerea* as co-dominants. In places, Alder *Alnus glutinosa* may be dominant. Opposite-leaved Golden-saxifrage *Chrysosplenium oppositifolium*, Marsh Violet *Viola palustris*, Water Mint *Mentha aquatica* and Lesser Spearwort *Ranunculus flammula* are common associates in the herb layer, among tussocks of Purple Moor-grass *Molinia caerulea*, Greater Tussock-sedge *Carex paniculata* and various Rushes *Juncus* spp. Shrubs include *F. alnus* and locally also Bog Myrtle *Myrica gale*. Uncommon species include Marsh Valerian *Valeriana dioica*, Wood Horsetail *Equisetum sylvaticum* and Royal Fern *Osmunda regalis*.

The vast majority of the dry heathland on the plateau has been lost, either to agricultural improvement or to conifer plantation. Among the few blocks that remain within the Blackdowns AONB, Blackdown and Sampford Commons are the best. Typical components of dry heath in our area include Heather *Calluna vulgaris*, Bell Heather *Erica cinerea*, Western Gorse *Ulex gallii* and Bristle Bent *Agrostis curtisii*, which also has a western distribution in Britain. Rarities here are two parasites, Dodder *Cuscuta epithimum* and Greater Broomrape *Orobanche rapum-genistae*, 35 flowering spikes of which were counted on Hense Moor, Luppitt in 2006.

Perhaps among the most precious and species-rich of the habitats in the Blackdown Hills are the wet heaths and mires that develop at the spring-line, at the junction of the porous Upper Greensand and the more impervious Keuper Marl below. Wet heaths are typified by the presence of Cross-leaved Heath *Erica tetralix*, with *C. vulgaris*, *U. gallii* and *M. caerulea*. On Southey Moor, Smeatharpe there is an apparently native population of Dorset Heath *E. ciliaris* which hybridises here with *E. tetralix* (Edgington 1999). Mire vegetation is found where peat accumulates under waterlogged conditions under which *M. caerulea* tends to predominate. These are our turbaries, mostly now owned by parish councils, where local people had the right to cut turf and dig peat for fuel. Examples include the turbaries at Ashculm in Hemyock, Culmstock and Stockland parishes (Allen 2004, Saunders 2011). Vegetation of spring-line mires is rich, often with between 20 and 34 species per m<sup>2</sup> (Pulteney 1988); typical associates of *Molinia* include Common Cotton-grass *Eriophorum angustifolium*, Carnation Sedge *Carex panicea*, Bog Asphodel *Narthecium ossifragum*, Devil's-bit Scabious *Succisa pratensis*, Heath Spotted-orchid *Dactylorhiza maculata* and Meadow Thistle *Cirsium dissectum* in a community with affinities to Culm grassland and fen-meadow elsewhere (Rodwell 1991).

The wettest parts of these spring-line mires are characterised by the presence of Bog-mosses *Sphagnum* spp. amongst which the insectivorous Round-leaved Sundew *Drosera rotundifolia* and Pale Butterwort *Pinguicula lusitanica* are commonly found, often with Bog Pimpernel *Anagallis tenella*. In seepages and runnels where there is more bare ground, Bog Pondweed *Potamogeton polygonifolius*, Marsh St John's-wort *Hypericum elodes*, Marsh Lousewort *Pedicularis palustris* and Bogbean *Menyanthes trifoliata* are typical of a soakway community, as found on Hense and Yarty Moors.

Rarities of the spring-line mires of the Blackdown Hills include White Beak-sedge *Rhynchospora alba*, Dioecious Sedge *Carex dioica*, Oblong-leaved Sundew *Drosera intermedia*, Lesser Butterfly Orchid *Platanthera bifolia* and Petty Whin *Genista anglica*; survival of the latter two species is probably threatened. Great Sundew *D. anglica* has one of its two county stations on Hense Moor where Fir Clubmoss *Huperzia selago* persists at one of its two remaining lowland sites in the Blackdowns. Early Marsh-orchid *Dactylorhiza incarnata* subsp. *pulchella* has its county stronghold here, with a large population on Blackdown and Sampford Commons; Broad-leaved Cotton-grass *Eriophorum latifolium* can still be found on at least one site, at Clayhidon Turbary.

The Blackdown Hills are dissected by numerous streams, the majority of which are tributaries of one of the three major rivers, the Yarty, Otter and Culm each of which has its source in the North of the AONB. To the southeast is the River Kit. On its shady, wooded banks in spring can be found two county rarities (Margetts 2007), Alternate-leaved Golden-saxifrage *Chrysosplenium alternifolium* and Thin-spiked Wood-sedge *Carex strigosa*. The county stronghold of the Small Teasel *Dipsacus pilosus* is near Beckford on the banks of the River Yarty where both Trifid Bur-marigold *Bidens tripartita* and Water Chickweed *Myosoton aquaticum* occur, the latter sometimes on shingle banks. Aquatic plants include Stream Water-crowfoot *Ranunculus penicillatus* subsp. *pseudofluitans*, in both Yarty and Otter rivers, while a wooded bank on the Umborne Brook is an apparently native site for the rare Monkshood *Aconitum napellus* where it has been known at least since 1948.



The River Yarty at Beckford Bridge.

The abundance and spread of the invasive alien Himalayan Balsam *Impatiens glandulifera* is a cause for concern in the conservation of riverside flora.

### The Future

The Blackdown Hills are an agricultural landscape, formed over millennia. Since the Second World War, the number of farms has decreased and farm size has increased. Hedge removal, estimated at 6 per cent, is comparatively low. Dairying has given way in part to beef and to sheep. Hay-making is rare whereas silage-making is the rule; permanent grass leys have declined in favour of ploughing and seeding, either with Rye-grass *Lolium* spp. or with forage Maize *Zea mays* for silaging. Such intensification of farming has led to increased productivity, decreased food prices, sometimes to the detriment of wildlife, whether through fragmentation and loss of habitat, pesticide usage, nutrient enrichment or merely the timing of operations including the cutting of grass or hedge-trimming.

The Blackdown Hills are also a protected landscape, principally as an AONB whose purpose is “to conserve and enhance natural beauty of the area”, supplemented by SSSIs, Local Nature Reserves and County Wildlife Sites, not all of which are in ‘favourable condition’ whether in the eyes of Natural England or of the Devon Wildlife Trust. Nevertheless, within the AONB there are habitats deemed to be of international importance (such as lowland heathland and rivers and streams), national importance (spring-line mires) and regional importance (lowland meadows and species-rich hedgerows); together these are among priorities of Biodiversity Action Plans (East Devon District Council 2005). Countryside stewardship schemes, particularly Higher Level Stewardship (HLS), recognise that precious habitats require management by providing financial incentives to work the land in an environmentally friendly manner.

The Heritage Lottery Fund has in recent years also supported conservation initiatives including the Tomorrow’s Heathland Heritage programme and the Neroche Landscape Partnership Scheme. There is room for cautious optimism, particularly in heathland habitats, but it may be too soon to tell how effective the HLS scheme has been in conserving precious habitats and vulnerable species within them. Biological processes take time, but there seems a need to improve the monitoring of the effects of conservation management on plant (and animal) populations. There is also a need to up-date species records from ecological surveys of protected sites many of which are old and possibly now inaccurate. Declining plants that now seem locally vulnerable include the ‘northern’ species *Huperzia selago* and *Drosera anglica*, and probably also *Genista anglica* and *Platanthera bifolia*. In the face also of climate change, their individual survival may rest in part on an improved understanding of their ecological requirements before we lose them.

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