

A Walk on The Clouds

In Fell End, Ravenstonedale, Cumbria

An introduction to their geology, natural history, land use, and value for nature conservation.

Advisory note:

Parts of the route followed by the walk are on rough or rocky ground; elsewhere there are steep, grassy slopes, which, when wet, can be slippery. Accordingly, stout footwear with a good tread on the soles is essential.

Dogs should be kept on leads to avoid frightening grazing sheep and ponies.

The distance covered by the **main walk** is about **3.5km**, with the **Stennerskeugh Loop** covering an additional **2.0km**.

The route is shown on the map.

N.B. The location of patches of limestone pavement shown on the map is not strictly accurate

Acknowledgements:

I am most grateful to Dr Nigel Woodcock for much geological information, and to Mrs Margaret Albon and Sir Martin Holdgate for valuable comments on the draft text, and Mr Trevor Clarke (Principal of the Bendrigg Trust) for valuable comments on the draft text and for supplying the photographs.

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A Walk On The Clouds

An introduction to its Geology, Natural History, Land Use, and Value for Nature Conservation

I. Introduction

At the foot of Wildboar Fell, in the Parish of Ravenstonedale, Cumbria, there is a prominent, rocky outcrop known as **The Clouds** (grid ref. NY 742002). It is a striking feature with its white limestone crags and limestone pavements overlooking the valley between Wildboar to the east and Harter Fell to the West.

The name 'Clouds' is generally thought to be derived from an Anglo-Saxon root meaning 'clods' which could describe the knobbly appearance of the ground. However, it is also possible that 'Clouds' may originate in a Celtic root related to mining activity since there are many, small mineral workings on the site, some of which may be very ancient.

Throughout the walk we shall be on Common Land, part of Ravenstonedale Common. The route described in these notes aims to give an idea of the geology, land formation, natural history and land use of the area.

As we go, keep a look out for birds and mammals. There may be buzzards (*Buteo buteo*) sailing overhead on broad wings. Their mewing calls are in sharp contrast to the deep-throated, harsh

croaking of ravens (*Corvus corax*) as they tumble and play across the sky, often in pairs. Small mammals are much less easy to spot, but there will be field voles (*Microtus agrestis*) scurrying through their hidden pathways in longer grass. Rabbits (*Oryctolagus cuniculus*) dash for the safety of their burrows, their white 'scuts' conspicuous, at the first hint of disturbance. Hares (*Lepus europaeus*), on the other hand, sit tight, unobserved in their grassy 'forms' (their only shelter), leaping away with long-striding bounds only at the last moment, no white showing on their tails. Mole hills indicate the presence of moles (*Talpa europaea*). These small mounds comprise the excavated soil pushed up from the subterranean tunnels, which are patrolled by the mole (*Talpa europaea*), ready to seize any invertebrate which falls into a tunnel.

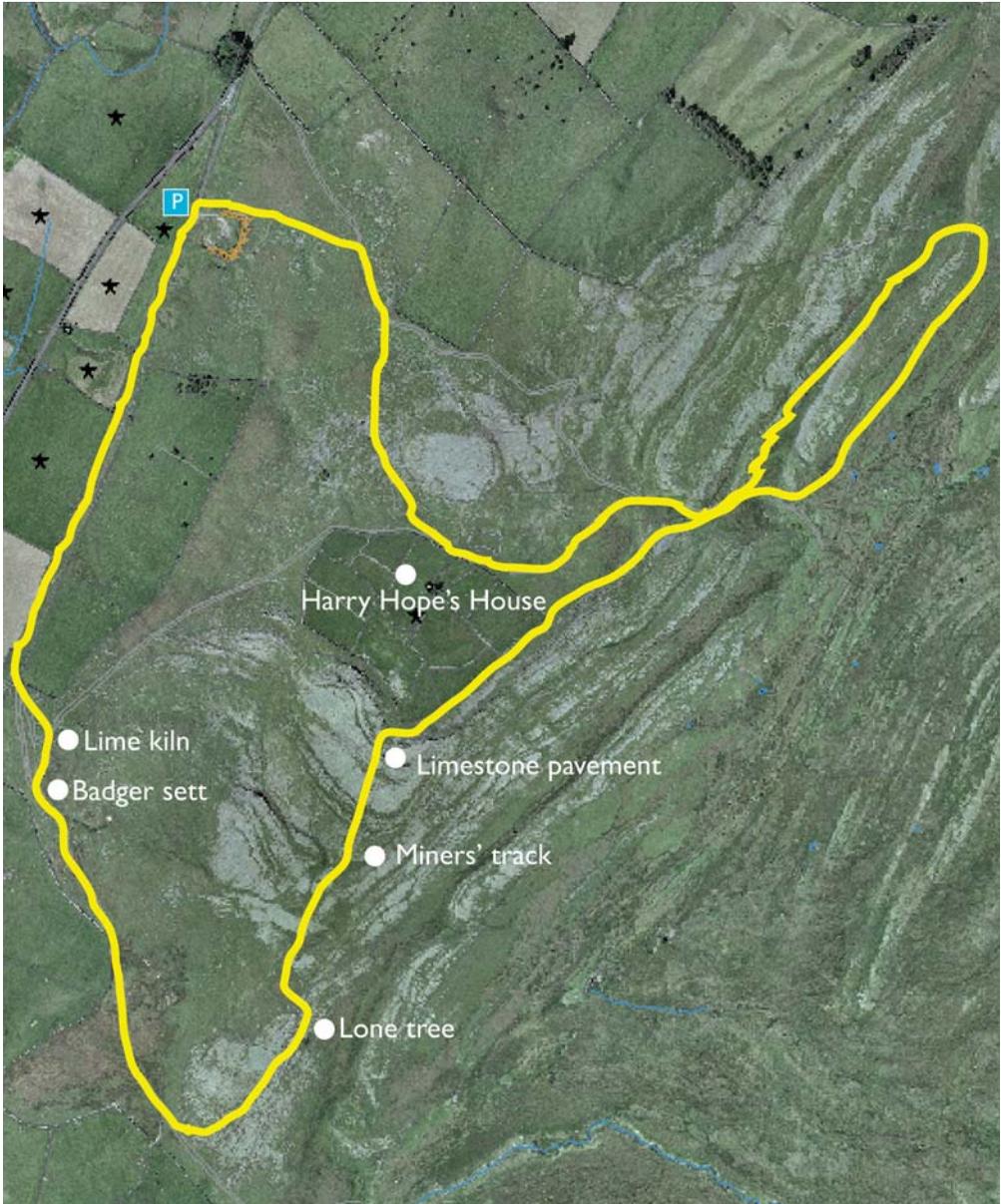
2. The Start: Fell End Quarry (grid ref. NY 734006)

The A683 road (once a turnpike road) is joined close to **Fell End Quarry** by The Street (The name indicating its origin as a Roman road.) close to the Quarry. Cars can be parked on the

road side and approach to the Quarry.
This is where the walk starts.

The rock exposed in the quarry face, and everywhere else on The Clouds, is carboniferous limestone (Calcium carbonate). The depth of solid limestone underlying The Clouds can be

estimated by the height of the quarry face. However, allowance has to be made for the old quarry floor having been raised considerably when tons of surplus soil from the construction of the Appleby by-pass were dumped there. Carboniferous limestone is



composed of the calcareous shells of minute marine animals which sank to the bottom of what was, some 350 million years ago, a tropical sea.

3. Bale Hill and the Dent Fault

Walk up the left-hand (north) side of the quarry on to **Bale Hill** (grid ref. NY 736005). From the top of this rounded bank, there is a good view to north and south. The name, 'Bale Hill' means 'beacon or fire hill', which suggests that it may have been used as a place to light signal fires. A chain of such fires could transmit messages over long distances.

From Bale Hill, looking across the valley below, it is obvious that the general appearance of The Clouds is very different from Harter Fell opposite. The latter is rounded in shape and the only rock showing is shaley scree here and there. This formation was laid down in muddy seas during the Silurian Era long before the Carboniferous Era. How is

it, then that we see the two formations side by side and level with one another? The answer lies in the north-south running valley bottom below us; it is the line of the **Dent Fault**. A 'fault' is a crack in the Earth's crust. In this case, the fracture has allowed the Silurian sheet of rock (which extends **under** the Carboniferous formation to the east) to rise up, relative to the Carboniferous formation, along the fault line. Uplift of this part of the Earth's crust over millions of years following their sub-marine deposition left these ancient rocks far above sea level and they have since been ground down and eroded by the glaciers of successive Ice Ages, producing the topography we see today.

The main grass species on the slopes of Bale Hill is mat grass (*Nardus stricta*). Other plants you will see among the grass include mosses and sedges and more conspicuous, a little yellow flower, tormentil (*Potentilla erecta*). Also, although almost grazed down out of existence, there are a few tiny sprigs of

The quarry at the start of the walk



heather or ling (*Calluna vulgaris*). All these plants are characteristic of wettish, acid conditions. In spite of the underlying limestone, the overlying soil is 'glacial drift', i.e. relatively acid soil swept along from elsewhere by a glacier and stranded as the glacier melted at the end of the last Ice Age.

4. Limestone Grassland and Limestone Pavement

Continue over undulating ground among scattered rocks, with walled enclosures on the left (north), one of which juts out southward from the others. (Significantly, it is known as 'Hungerlands'!) About halfway along its southern wall, **turn south** over increasingly rocky ground, soon going uphill, with low, broken crags on the left (east). There is a faintly discernable track, made by horses grazing on the Common, along which **pick your way** with care. At the top of the slope, on more or less open grassland, **you will see ahead** a walled enclosure with a ruined building in it. At this point, **on your left**, there is steeply inclined limestone pavement. This consists of 'clints' (tabular blocks of rock) interspersed with numerous 'grikes' (deep clefts of varying width between the clints – more fully described later). Typical limestone pavement rests horizontally, such as, for example, the huge expanses of it on Ingleborough in the Craven District of Yorkshire. The tilt of the pavement on this, west-facing, side of The Clouds is to do with the Dent Fault. In association with the

fractures of the Earth's Crust that formed the fault, the rock of The Clouds was pushed into a ridge parallel with the fault in a land formation known as an anticline.

As you **walk towards the walled enclosure**, notice that the turf immediately round each rock is greener and more closely grazed than the more tussocky vegetation further away from rocks. This difference is due to lime slowly being dissolved out of the calcareous rock by rain which is slightly acid (water plus carbon dioxide equals carbonic acid), and this 'sweetening' of the ground encourages the growth of plants particularly attractive to grazing animals. These lime-loving plants include fescue grass (*Festuca species*) and bent grasses (*Agrostis species*), mountain pansies (*Viola tricolour* and, possibly *V. lutea*), daisies (*Bellis perennis*), and thyme (*Thymus politrachus*). Patches of deeper glacial drift show a greater frequency of acid-loving plants and those preferring wetter ground, similar to the vegetation on Bale Hill.

5. Harry Hope's Land and Dale Slack

You now enter Dale Slack, a small valley rising eastward between crags and scattered rocks on its northern side and the walled enclosure on its southern side. **Turn left and follow** the Dale Slack track, leaving the walled area on your right.

As you **walk up the track look back** at the walled enclosure (grid ref. NY

738001). It is called **Harry Hope's Land**, named after the last occupant of the rudimentary, and now ruined, house. (Please view it from the gate only). He is said to have lived there and farmed the land until 1820. This particular area would have been chosen for enclosure for its sheltered position, deep soil, and relative freedom from rock outcrops. The walls of the patchwork of little fields within the external boundary, now reduced to their foundations, would have been built largely from stone lying about, thus combining clearance of stone from the ground with dividing the land into separate fields as meadows (which would have been mown for hay with a scythe) and pastures. The marked difference between species composition and luxuriance of the vegetation within the enclosed land and the surrounding Common is, of course, due to regulated, lighter grazing on Harry Hope's Land as compared with the unregulated, heavier grazing outside. The coarse, tussocky grass, now dominating much of the level ground is tufted hair grass (*Deschampsia caespitosa*). The steep ground, which

would have been pasture, has much less depth of soil. This means that grasses cannot stifle the lower growing small flowers which include daises, pansies, and possibly mountain pansies and thyme. Between the gate and the house, there is a well, optimistically driven into the limestone, where water used to be hauled up in a bucket from only a few feet below ground level. At the house itself, a small lean-to, two-stall cow byre doubles as a porch to a single room, over which there would have been a wooden-floored loft for the storage of hay. The hay would have been forked in on to the loft through a large 'fork hole' still to be seen in the east wall of the house. Like the byre, the hay loft would serve two purposes – to store hay and to insulate the ceiling of the room below. Just outside the gate, there are the ruined remains of a small, rectangular enclosure. This was probably used as a fold to hold stock otherwise grazing on the surrounding Common, perhaps overnight or while some routine farming operation was being carried out.

Harry Hope's house looking across Dale Slack



6. The Dale Slack Fault

Leaving Harry Hope's Land behind, the track emerges on to a patch of level ground (Grid ref. NY 740002). From here, there is a good view of the higher Pennines to the north and down into Ravenstonedale to the north west. Turn right (east). Ahead of you Dale Slack narrows between rocks and then widens somewhat. This point gives the first good view of the long, north-south orientated, craggy crests of the **Stennerskeugh Clouds** to the left (north) and slightly setback eastward, of the **Fell End Clouds** to the right (south). This displacement is the key to the origin of Dale Slack; it is a minor fault at a right angle to the line of the Dent Fault. However, unlike the Dent Fault with its **vertical** displacement of the cracked Earth's crust, the **Dale Slack Fault** presents a **horizontal** displacement along the crack. Hence, the crests of Stennerskeugh and Fell End Clouds respectively have been shifted horizontally out of alignment.

7. The Stennerskeugh Clouds Loop

At this point in Dale Slack (grid ref. NY 742002) **you have a choice. For a rather longer walk do as suggested in this section, or, if you prefer, go straight to Section 8.**

The **Stennerskeugh Clouds Loop** takes you round the crest of the Stennerskeugh Clouds. **Turn left** (northward) up a slight bank **out of**

Dale Slack and follow a grassy 'ride' between two limestone 'scars' (craggy ground with broken limestone pavement). Between these scars, glacial drift has been left behind by the melting glacier and so, once again, we find the ground is more acid and there is some coarse grassland with Mat Grass.

At the northern end of the Stennerskeugh Clouds, the land suddenly plunges downward towards the enclosed land and farmstead of High Stennerskeugh (Grid ref. NY 748014). Beyond the green pattern of small meadows and pastures, there are larger enclosures, almost black with dense heather – also called ling. These larger enclosures are 'allotments', mostly dating from the 18th to 19th Century when much common land was awarded – or 'allotted' to individuals (who became the freeholders) by Parliamentary Act. Thus, on allotments, grazing can be regulated by the individual farmer concerned. Ling is a very valuable winter feed for sheep and is the staple diet of red grouse (*Lagopus scoticus*). Accordingly, fell sheep farming and moor management for grouse shooting are compatible, provided there is give and take on both sides. Heather moor is also an important habitat for many forms of wildlife, from birds to butterflies. At one time much of the Common Land would have had a similar good cover of this dwarf shrub. However, in the last half century or so, excessively heavy grazing, dictated by short term economic advantage, has all but eliminated ling from many northern Commons, including Wildboar Fell, at the foot of which lie The Clouds. Since ling

Skennerskeugh Clouds - the start of the loop



favours acid ground, it will never have been prevalent on The Clouds themselves. This lack of ling on Wildboar will be apparent as you **continue the walk** along the back (eastern side) of the Stennerskeugh Clouds and return to Dale Slack Head (Grid ref. NY 743002). **Now go down into Dale Slack** and **return to the point** where the Stennerskeugh Clouds Loop started. On your left at the top of Dale Slack, there is a shallow trough down which water seeps from an indeterminate source. It is one of the very few places on The Clouds where ground water comes to the surface; one may even disturb a snipe (*Gallinago gallinago*) hunting for small snails and other prey in the soggy ground.

As an alternative to dropping down into Dale Slack (described in Section 8), you can maintain your height and **walk south along the crest of the Fell End Clouds** from where you have magnificent views across the Lake District fells and down to the Morecambe Bay area. **You can rejoin**

the main route by making your way westward down between rocks to the southern top corner of Harry Hope's Land. As you do so, you will have an almost aerial view of the limestone pavement amphitheatre below you.

8. Dale Slack to The Miners' Track

The main walk now turns right (south) out of Dale Slack over a slight rise leading to the northern top corner of Harry Hope's Land. On this rise, evidence of a deposit of glacial drift is again shown by the dominance of mat grass in the turf. **Walk along outside the top wall of Harry Hope's Land and examine the boulders** that have fallen from the crags of the Fell End Clouds above you on your left. Much of what looks like a bare rock surface is in fact covered by encrusting growths of lichen. (Most of the rocks on The Clouds are similarly clad, but this is a

9. The Limestone Pavement

At the southern top corner of Harry Hope's Land, **bear somewhat left** steeply uphill on an unpromising looking, boulder-strewn track. Note the amount of moss of several different species growing on any shaded, and therefore moist, rocks. This track becomes better defined as you continue southward; it is **The Miners' Track**.

Following this track, soon on the left, we have the first convenient opportunity to examine **limestone pavement**, the best known and most characteristic feature of Carboniferous Limestone exposures. Huge expanses of this formation occur on, for example, Ingleborough, and there are substantial areas, more locally, above Orton. The pavement consists of more or less level-topped blocks of bare rock intersected by fissures of varying width and depth. The blocks are called 'clints' and the fissures are known as 'grikes'. The smoothing of the rock surfaces is due to slow solution over long periods of the rock surfaces by slightly acid rain, initially under a cover of soil, and once erosion had removed the soil, by direct action of rain on the rock. The sale of this 'waterworn limestone' for making rock gardens was devastating large areas of pavement, but now, thankfully, it is illegal to remove it from the best sites. **Turn left off the Miners' Track and walk along the grassy track** between the pavement and a low wall of crag on your right. From here, you can get a good view along some of the grikes and plants in them. More is to be seen if you

The limestone pavement



convenient place to examine them.) These remarkable organisms comprise two entirely different life forms – fungi and algae – living permanently in close alliance in what appear to be extremely inhospitable conditions. Some are 'foliose' – frilly growths, but many do not project at all from the rock surface. They grow very slowly from a central point and thus are more or less circular in shape. Lichens are abundant on gravestones, which is convenient for lichenologists because the dates on the gravestones document the length of time from the earliest possible colonisation date and, hence, how long a patch of lichen has had to reach its present size.

venture onto the pavement itself, **but if you do, be very careful; it is easy to lose one's balance.**

It is immediately apparent that the grike flora is totally different from what we have seen so far. Mosses and ferns are common. The larger ferns include male fern (*Dryopteris felix-mas*), and hartstongue (*Phyllitis scolopendrium*). The smaller ones include brittle bladder fern (*Cystopteris fragilis*) and green spleenwort (*Asplenium viride*). Among flowering plants are wood anemone (*Anemone nemorosa*), dog's mercury (*Mercurialis perenne*), wood sorrel (*Oxalis acetosella*), barren strawberry (*Potentilla sterilis*) and harebell (*Campanula rotundifolia*). There is little grass, but blue moor grass (*Sesleria caerulea*) - a species confined to limestone - grows on the upper edges of the grikes. Surely this flora suggests woodland, or at least hedge bottoms, rather than open ground? Sure enough, there is a gnarled and closely sheep-browsed hawthorn 'bush' (*Crataegus monogyna*) in one of the grikes. Indeed, before sheep grazing dominated the Common, The Clouds would have been lightly wooded with ash (*Fraxinus excelsior*) and an understorey of hawthorn, etc. This supposition is supported by the Westmorland dialect-based 'Stennerskeugh' - 'Staener' (stony ground) and skogr (wood). This woodland type flora has been able to persist after the demise of the tree canopy because of the moisture-retaining shade and shelter of the grikes where sheep cannot graze. As always, evidence of animal life is less easy to

spot than plant life. However, if you look along the wider grikes, you may well see a spider's web strung across the grike from side to side. Clearly, it is well placed to catch any insect blown into the web by the draught funnelling along the grike. You may also see strikingly banded snail shells, if not snails themselves. Snail shells are composed of calcium carbonate which accounts for the preference for lime-rich habitats shown by shelled molluscs.

10. The Miners' Track and Mineral Workings

Return to the point at which you made the diversion to see the limestone pavement and **follow southward the increasingly well-defined Miners' Track.** Coming over a crest on the track, ahead there are several narrow, north-south orientated trenches, some several feet deep. These trenches are evidence of past mineral working. These surface mines follow veins of various mineral ores, which have been forced up in a hot liquid state through cracks in the Earth's crust and then cooled into a solid state. You will see that the rubble round the workings includes broken samples of various minerals, quite different from the prevailing limestone. Some are much heavier than you would expect from their size; these heavy stones are barytes (a barium ore). Others, blue in colour, are malachite (a copper ore). The commonest mineral present is galena (a lead ore) and this would have been the main product of the workings. A

The spectacular view at the start of the Miners' Track



mineralogist would probably spot other, less common, ores in this area. Lead is toxic to most plants, but here there grows a notable exception; spring sandwort (*Minuartia verna*) flourishes without competition from common and more vigorous plants which cannot tolerate the lead. The sandwort grows on lead ore debris in little cushions with white flowers in spring.

Follow the mineral workings down to where the exposed Limestone rock begins to be covered thinly by highly calcareous soil – conditions favouring blue moor grass (*Sesleria caerulea*) and also carline thistle (*Carlina vulgaris*). Unlike other thistles, this one has no stem, the flower resting directly on the ground, its strap-like golden-brown petals radiating from the centre. An impressive lone sycamore tree has thrust its way

through some tumbled rocks, which would have protected it until it was tall enough to be out of reach of browsing sheep.

11. The Clouds Anticline and Clouds Gill

Ahead (to the south), there is a steep-sided gill carrying a small beck flowing from left to right (east to west). This is **Clouds Gill** and it marks the southern end of the Limestone outcrop which forms The Clouds. On the south side of this gill, there begins an expanse of rough vegetation sweeping up eastwards to the long, level top of Wildboar Fell. Clearly this abrupt change from limestone and dry, short, turf to peaty, rough grazing across the gill must

indicate some dramatic happening in the distant past. What first springs to mind is another geological fault disengaging the Carboniferous Limestone from a different formation beyond. However, this is not the explanation. Along its north to south axis, the originally level limestone deposit has been compressed against the line of the Dent Fault so that it has buckled upwards to form the long, north-south orientated crest of The Clouds. This type of ridge is known, as already mentioned, as an **anticline** (as opposed to downward buckling, known as a syncline). Support for this view is seen in the tilt of the exposed rocks on the west-facing side of The Clouds. At the southern end of The Clouds, the 'snout' of the Anticline plunges under younger rocks on the other side of Clouds Gill, hence the sudden landscape change. These younger (but still within the Carboniferous Era) rocks were laid down as sediments by alternating rising and falling of sea level. This left coarse sand (sandstone) where there were strong currents, muddy silts (shales) in sluggish conditions, and limestone in clear, still waters, as in the case of the main limestone of the Carboniferous Era (already described in Section 2.) These repeated layers of rock are known as the **Yoredale Series**. They account for the stepped sides and long, level, tops of most of the Pennine Fells, Wildboar being but one example. The original topography has, of course, been much eroded and ground down by subsequent glacial action.

12. The Return to the Start via a Badger Sett and a Limekiln

At the foot of the exposed Limestone, a faint track runs to the right (north-west), slanting across the face of the Fell End Clouds. **Follow this track down towards, then parallel with, the wall on your left. Turn right (north) away from the wall along a stretch of level ground overlooking the road below you.** Soon you will see a patch of ground with soil scratched out from the entrances to large burrows. This is a **badger sett** ('sett' is a badger's burrow) (grid ref. NY 732998). **Look carefully** and you may see recently disturbed soil in the entrances and, possibly the imprint of a badger's paw (*Meles meles*). If all five toes point **forward**, you can be certain it was made by a badger. Badgers have increased in numbers considerably since legislation protecting them was introduced, which is welcome, but there are disadvantages. They prey on hedgehogs (*Erinaceus europaeus*), which seem to be decreasing, and they do take poultry and perhaps some lambs, although foxes (*Vulpes vulpes*) are responsible for most of these losses. The most contentious issue, so far unresolved, is the part played by badgers in the spread of bovine tuberculosis, especially in cattle in S.W. England.

Ahead, beyond the badger sett, there is a disused **lime kiln**, a tower-like stone construction set into the hillside. On the low side there is a substantial archway leading into a vaulted space,

The badger sett



now, sadly, collapsing, with the ruined remains of a chimney-like funnel at the back. On the high side, the square top of the tower is level with the ground. Within is a circular 'pot', in which the remnants of a brick lining can be seen. Originally, the bottom of the pot would have had a hole connecting with the arched vault, but debris obscures any sign of it.

Lime is 'burnt' - literally - by mixing up broken limestone with layers of some combustible material, usually wood, in the pot of the kiln, a through-draught being ensured by the hole connecting the bottom of the pot to the archway below. These raw materials are fed in from the level ground above and behind the kiln. After the slow process of burning, the limestone (calcium carbonate) is converted to quick lime (calcium oxide). This powdery white product falls into the back of the archway and is raked out on the low

side of the kiln. The two main uses of lime are, firstly, to spread on acid land to reduce its acidity, and, secondly, as mortar for building work.

Now walk down to The Street and follow it north, back to the Quarry where the walk started.

13. Nature Conservation

We have seen during this walk that The Clouds has a wealth of interest for the geologist and the naturalist, but how about its **value for nature conservation**? The geological value rests on its pavements, representative of the Carboniferous Era Main Limestone, its proximity to the Dent Fault, and the repercussions of this association. Biological importance is more complex. There **are** rare plants, which diligent search, especially in grikes, would reveal, but the whole, post-woodland habitat,

The lime kiln where limestone was converted to quick lime



with its mosaic of lime-loving and acid-loving plant and associated animal communities, is more important, since it is scarce in the country as a whole and is representative of its type.

Accordingly, it is up to us to ensure its protection from damaging exploitation and so far as possible, to manage the land so that its wildlife (in the broadest sense) flourishes. To this end, The Clouds has been notified as a statutory **Site of Special Scientific Interest**.

This means that development requiring planning permission cannot be undertaken without consultation of the official, nature conservation body (originally The Nature Conservancy, now Natural England). Voluntary bodies, especially Cumbria Wildlife Trust, can also comment. If objections are strong, the matter may be referred to a public inquiry. Indeed, years ago, after a public inquiry, an application to 'win' limestone on The Clouds was rejected. Limestone, has, of course, been 'won' on The Clouds over the ages - for walling stone and lime-burning. This historic use did damage the pavement and its associated flora, but not on the scale that commercial extraction for rockery stone does.

14. Conclusion

During this walk we have considered the geology of the area, its natural history and ecology, conditioned as they are by its land-holding status, past and present land uses, its value for nature conservation, and how all these factors are inter-dependent.

I hope that what we have seen will have enhanced your enjoyment of this particular walk and will enable you to get the most out of any walk by approaching each one with an enquiring spirit and careful observation.

Helga Frankland, 2008

On behalf of Cumbria Wildlife Trust

Note: Scientific names of plants follows usage in M. Blamey, R. Fitter, A. Fitter, *Wildflowers of Britain & Ireland* (London, A.C. Black, 2003)

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