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# Ashgill Quarry

[SD 269 954]

## Introduction

Ash Gill is known internationally because it gives its name to the uppermost of the British Series of the Ordovician System. Ashgill Quarry is the type locality for the Ashgill Formation, a unit recognized at the top of the Ordovician across the Lake District to the Cross Fell, Cautley and Dent inliers. The stratigraphical succession of middle to upper Ashgill age around Ashgill Quarry typifies this part of the Ordovician in the Lake District.

The term 'Ashgill Series' was introduced by Marr (1905) without mention of a type locality, but he subsequently (Marr, 1913, 1916) designated the Cautley district as the type area (Ingham and Wright, 1970). Ashgill Quarry is the type locality for the Ashgill Formation of the uppermost Rawtheyan and lower Hirnantian stages, as redefined by Kneller *et al.* (1994, p. 228). The Ashgill Formation comprises both the 'Ashgill Shales' (or 'Ashgill Shale Formation') of earlier usage, and a basal unit, the Troutbeck Member (= 'Troutbeck Formation' of McNamara, 1979a).

Salter (1873) first applied the term 'Ashgill Beds' to part of the upper Ordovician of the Lake District, and this was included by Aveline and Hughes (1872, 1888) as the top part of their 'Coniston Limestone Series'. The history of the 'Coniston Limestone' was summarized by Lawrence *et al.* (1986) and Kneller *et al.* (1994). The latter authors restricted the geographical qualifier 'Coniston', hitherto used both for an upper Ordovician and an upper Silurian division, to the Silurian Coniston Group. They termed the upper Ordovician division the 'Dent Group' and applied the term throughout the north of England. Most of the formation names introduced or formalized by McNamara (1979a) in his earlier revision of the 'Coniston Limestone' in the Lake District were retained in the Dent Group by Kneller *et al.* (1994) but at different (mostly member) levels in the litho-stratigraphical hierarchy.

Marr (1916, p. 190) described the succession in Ashgill Beck and Ashgill Quarry nearby and included a detailed geological map and cross-section. Aspects of the succession were described by McNamara (1979a), Scott and Kneller (1990) and Kneller *et al.* (1994). McNamara (1979a, b) listed and described trilobites from the site.

## Description

The site is spectacular both in its scenic setting and in the scale of the 'slate' workings in the Ashgill Formation and overlying Skelgill Formation in Ashgill Quarry (Figure 11.7) and (Figure 11.8). The succession dips at about 30° to the south-east, but, especially in the upper part, it is the cleavage that provides the most obvious structure. The quarry exposes the uppermost parts of the Dent Group, which, together with some of the underlying formations, also crop out in Ashgill Beck.

The oldest beds are poorly exposed calcareous siltstones, fine sandstones and nodular limestones of the High Pike Haw Member of the Kirkley Bank Formation (*Calymene* Beds of Marr, 1916). They are succeeded by the 3–4 m thick Torver Member (*Phillipsinella* Beds of Marr), which comprises cleaved homogeneous calcareous siltstones, exposed in the bank of Ashgill Beck some 15 m above the waterfall. They are overlain by nodular and micritic limestones of the Broughton Moor Formation, the 'White Limestone' of Marr (1916) and McNamara (1979a), which are less than 5 m thick; and this unit is succeeded just above the waterfall by sand-grade pyroclastic deposits, 5 m thick, termed the Appletreeworth Formation. The type section of the Troutbeck Member of the Ashgill Formation is at the waterfall (Figure 11.7), where 4 m of blue-grey calcareous mudstone with abundant scattered shelly fossil fragments crop out (*Mucronatus* Beds of Marr). The member is also exposed at the base of the north-west face of Ashgill Quarry, where it is overlain by almost 20 m of cleaved mudrocks of the Ashgill Formation, the Ashgill Shales of Marr (1916). This is the type locality and greatest recorded thickness in the Lake District; they are overlain conformably in the south-east face of the quarry by the uppermost Ordovician to lower Silurian Skelgill Formation (Figure 11.8). The shales of the Ashgill Formation also crop out in Ashgill Beck below the waterfall.

## Interpretation

Marr (1916) considered his 'Calymene Beds' (the High Pike Haw Member of the Kirkley Bank Formation) to belong in the Caradoc, but an Ashgill age was established by King and Williams (1948), and a mid-Cautleyan (Zone 2 to lowest Zone 3) age is now accepted (Ingham, 1966; McNamara, 1979a). The member is estimated to be about 40 m thick in the area around Ashgill Beck (Scott and Kneller, 1990, fig. 3) and lies in a region where it is transitional to the north-east into the slightly more calcareous and generally finer-grained Applethwaite Member. McNamara and Fordham (1981) demonstrated significant differences in the composition of the trilobite faunas, reflecting these lithological differences. They assigned those of the High Pike Haw Member to their Proetid Association and those of the Applethwaite Member to the Calymenid or, more rarely, Illaenid Association. Both members include storm deposits (Kneller *et al.*, 1994, p. 226). The Torver Member also contains an Illaenid Association and is Cautleyan Zone 3 in age (McNamara and Fordham, 1981).

The Broughton Moor Formation is 4–5 m thick in this area, and whilst it has yielded only a few fossils (e.g. *Diacanthaspis*) in Ashgill Beck, the trilobite fauna elsewhere indicates a Rawtheyan Zone 6 age (McNamara, 1979a). Kneller *et al.* (1994, p. 226) also noted local evidence for continuous deposition from the underlying Torver Member of the Kirkley Bank Formation and for faunas in the eastern Lake District, similar to those of the latest Rawtheyan Troutbeck Member of the Ashgill Formation, in facies assigned to the Broughton Moor Formation. The overlying Appletreeworth Formation is presumed to be Rawtheyan Zone 6 in age and represents pyroclastic material transported and resedimented by gravity flow (Kneller *et al.*, 1994, p. 228). It is thought to represent the same volcanic activity as that which gave rise to the Cautley Volcanic Member of the Cautley Mudstone Formation in the Cautley district (see the Backside Beck site report).

The Troutbeck Member of the Ashgill Formation in Ashgill Beck is latest Rawtheyan in age and contains a diverse shelly fauna, including seven species of trilobite (McNamara, 1979a, b), only one of which, *Mucronaspis mucronata* (Brongniart), is known from the overlying shales elsewhere. The shales in the quarry yield a sparse *Hirnantia* brachiopod fauna (Wright, 1968, p. 360; Scott and Kneller, 1990, p. 18), indicating a Hirnantian age. The lowest parts of the overlying Skelgill Formation contain graptolites of the *Glyptograptus persculptus* Zone (Hutt, 1974, p. 6) and are thus latest Hirnantian in age.

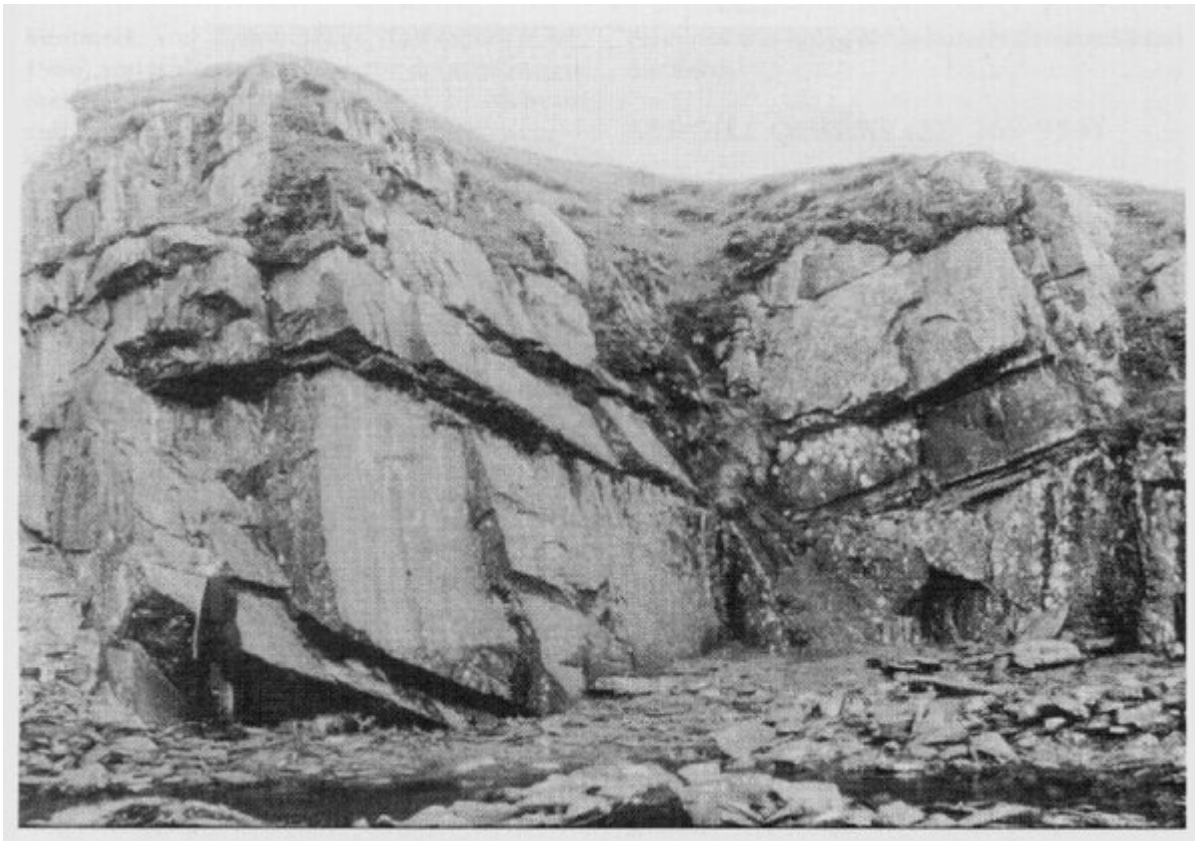
## Conclusions

This is a historically important site internationally and gives its name to the uppermost series of the Ordovician, the Ashgill. It is the type locality for the Ashgill Formation, a distinctive rock unit deposited near the end of the Ashgill epoch over much of northern England.

## [References](#)



*(Figure 11.7) Ashgill Beck, showing the type development of the Troutbeck Member of the Ashgill Formation, with the Old Man of Coniston (Borrowdale Volcanic Group) in the background. (Photo: A.W. Owen.)*



*(Figure 11.8) The southern face of Ashgill Quarry showing the Skelgill Formation in the topmost part of the quarry conformably overlying shales of the uppermost Ordovician Ashgill Formation. (Photo: A.W. Owen.)*