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## Spengill (Backside Beck)

[SD 699 998]

### Introduction

The Howgill Fells lie to the east of the town of Kendal in the south-east of the English Lake District (Figure 3.49). Llandovery strata are exposed in the eastern part of the Fells, and as elsewhere in the Lake District are accommodated in the Skelgill and Browgill formations of the Stockdale Group (Kneller *et al*, 1994). At the base of the Skelgill Formation, the Spengill Member is differentiated, and the 'Grey Beds' of Rickards (1970a) at the top of the Browgill Formation have been formalized as the Far House Member (Scott and Kneller, 1990).

By far the most complete section through the Stockdale Group in this area is exhibited in the stream of Backside Beck, which Marr and Nicholson preferred to refer to as 'spengill' (Figure 3.58). The succession in Spengill was described by Marr and Nicholson (1888), with some observations added by Marr (1913); more recently, the section was logged in detail by Rickards (1970a; (Figure 3.59)), who also documented the graptolite faunas. The site provides the type section of the Spengill Member. There are numerous graptolitic horizons in the Skelgill Formation and in the lower part of the Browgill Formation, and the graptolite faunas are rich and extremely diverse. Spengill is the type locality for the graptolite species *Climacograptus simplex* Rickards, 1970a, *Glyptograptus packhami* Rickards, 1970a, *Petalolithus kurcki* (Rickards, 1970a), *Dimorphograptus epilongissimus* Rickards, 1970a, *Pribylograptus angustus* (Rickards, 1970a), *Pristiograptus fragilis fragilis* Rickards, 1970a and *Rastrites spengillensis* Rickards, 1970a.

### Description

The lowest beds in the succession are exposed near the confluence with Stockless Gill, and the strata young upstream as Backside Beck is followed eastwards. Cleaved mudstones of the Ashgill Formation occur at the base, followed by the Spengill Member (Figure 3.60), which here comprises 1.0 m of hard, pale, pyritous limestone containing trilobites (including *Mucronaspis mucronata brevispina*), brachiopods and, possibly, crinoids (Marr and Nicholson, 1888; Marr, 1913). The *acuminatus* Biozone is represented in the next few centimetres, with the zonal fossil and other characteristic graptolites reported (Rickards, 1970a), so the base of the Silurian probably lies within or at the top of the Spengill Member.

Above the *acuminatus* Biozone, some 11 m of graptolitic mudstone span the *atavus* to *triangulatus* biozones. Graptolites are diverse through this interval, and Rickards (1970a, text-fig. 10) illustrated the ranges of 38 species and subspecies. The immediately succeeding strata are heavily tectonically disturbed and only a sparse fauna of small brachiopods and trilobites has been recorded. Upstream from the disturbed zone, however, 60 m of fine-grained mudstone is well exposed and contains numerous black graptolitic bands (Figure 3.59); these demonstrate the presence of the *sedgwickii*, *turriculatus*, *crispus* and *griestoniensis* biozones. Rickards (1970a, text-fig. 11) recorded the distributions of 52 graptolite species and subspecies in the *sedgwickii* and *turriculatus* biozones, and the faunas of the *crispus* and *griestoniensis* biozones have been recorded in the unpublished thesis of Wilson (1954). The base of the Browgill Formation (Figure 3.61) is taken as coincident with the base of the *turriculatus* Biozone. High in the Skelgill Formation, within the *sedgwickii* Biozone, a calcareous horizon occurs, from which Marr and Nicholson (1888) reported trilobites, brachiopods and corals. Near the top of the *turriculatus* Biozone, and marking the boundary with the *crispus* Biozone, is a prominent felsite sill (Rickards, 1970a).

Above the footpath, green non-graptolitic mudstones pass up into a thick unit of red shales and occasional sandstones, becoming greenish-grey towards the summit. Marr and Nicholson (1888) estimated a thickness of about 50 m for this unit. Rickards (1973, 1978) found *crenulata* Biozone graptolites within the red mudstones at Spengill and in nearby Watley Gill [SD 692 989]. The red beds are succeeded by 8 m of unfossiliferous grey siltstones, representing the Far House Member.

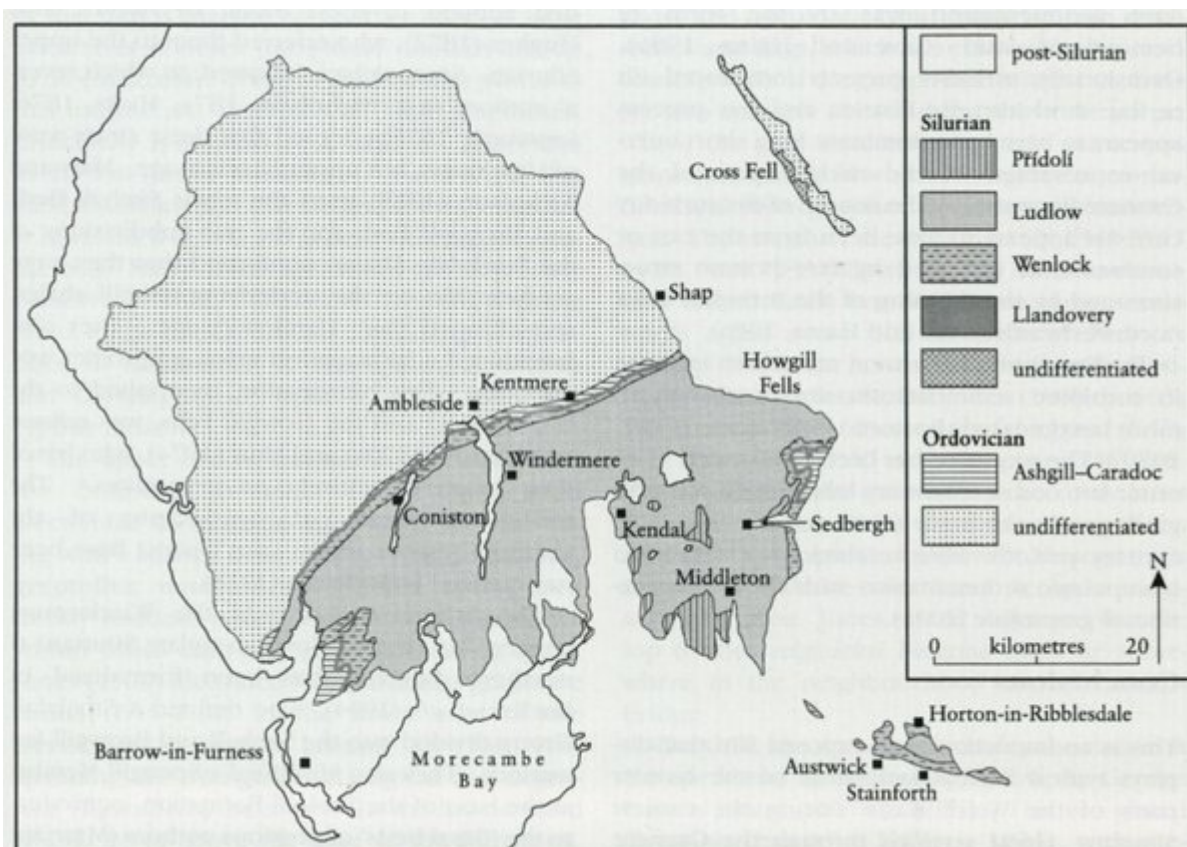
## Interpretation

The Silurian rocks of the Howgill Fells were deposited in the Lake District Basin, which developed on a subsiding volcanic arc terrane on the northern part of Avalonia (see Chapter 1). The interpretative cross-sections of the basin published by Rickards (1978; (Figure 3.52)) show the development of thin limestones in the Howgill Fells during latest Ordovician (*persculptus* Biozone) times, perhaps generated in part through slumping from horsts or uplifted extensional faults to the west. This was followed by the development of graptolitic shales in the earliest Silurian. Tectonic features in the *atavus* Biozone and above attest to the possible development of some horsts in this area, too. Although the lowest Silurian *acuminatus* Biozone is very thinly developed in the Howgill Fells, the thickness of the Stockdale Group is overall greater than in sections to the west (Yewdale Beck, Skelghyll Beck and Brow Gill Beck) and it may be that the sequence is more complete here than elsewhere. This may account for the greater number of graptolitic hands identified in the Browgill Formation in this region (Rickards, 1978). The thick, haematitic, red beds in the upper part of the Browgill Formation are attributed to sediment input from an eroding desert landscape (Ziegler and McKerrow, 1975), with the deposits accumulating in hollows between submarine ridges (Rickards, 1978). These beds thin and disappear westwards across the Lake District, presumably reflecting the greater distance from the shoreline to the south-east.

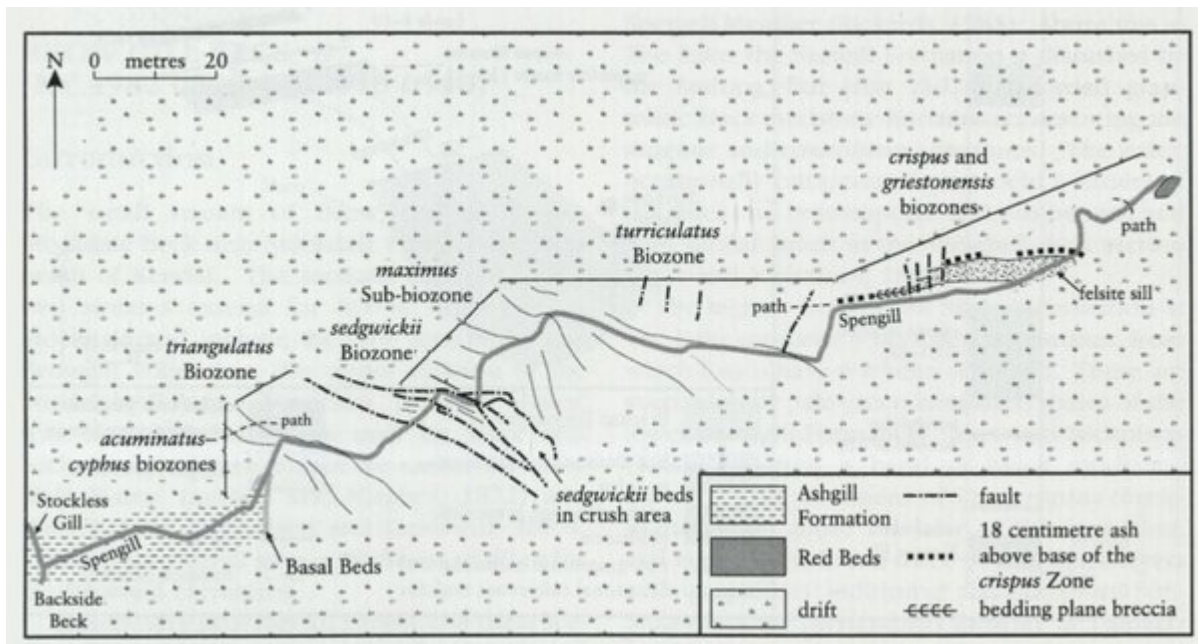
## Conclusions

The section in Spengill (Backside Beck) provides the most complete section through the Stockdale Group of the Howgill Fells. The succession is thicker, and possibly more complete, here than in areas of the Lake District to the west. At the base of the Stockdale Group is the thin Spengill Member, of *persculptus* Biozone age, for which this is the type locality. The lower and uppermost parts of the Skelgill Formation and the entire Browgill Formation are well exposed in the stream and in the cliffs, and there are numerous graptolite horizons from which very diverse faunas have been reported. Towards the top of the Browgill Formation, a thick unit of red beds is interpreted as the product of deposition of desert-derived sediments in hollows on the sea floor; similar red beds are widespread globally at this level. Spengill is an important representative site for the lithostratigraphy of the south-eastern part of the Lake District Basin, and is of international interest for its graptolite biostratigraphy.

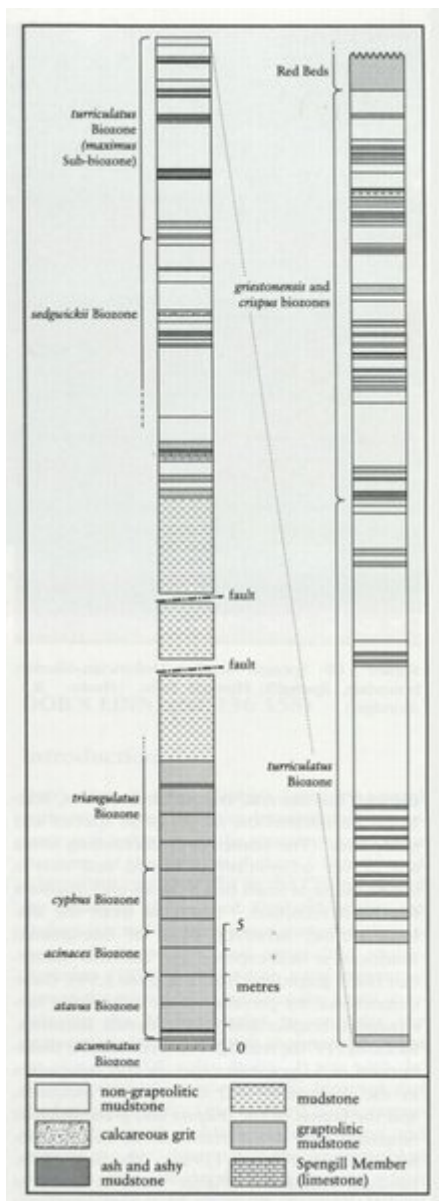
## References



(Figure 3.49) Outline geological map of the Lake District and Howgill Fells (modified after Rickards, 1989a).



(Figure 3.58) Plan of the Spengill section, showing the outcrops of the graptolite biozones represented in the Skelgill and Browgill formations (after Rickards, 1970a).



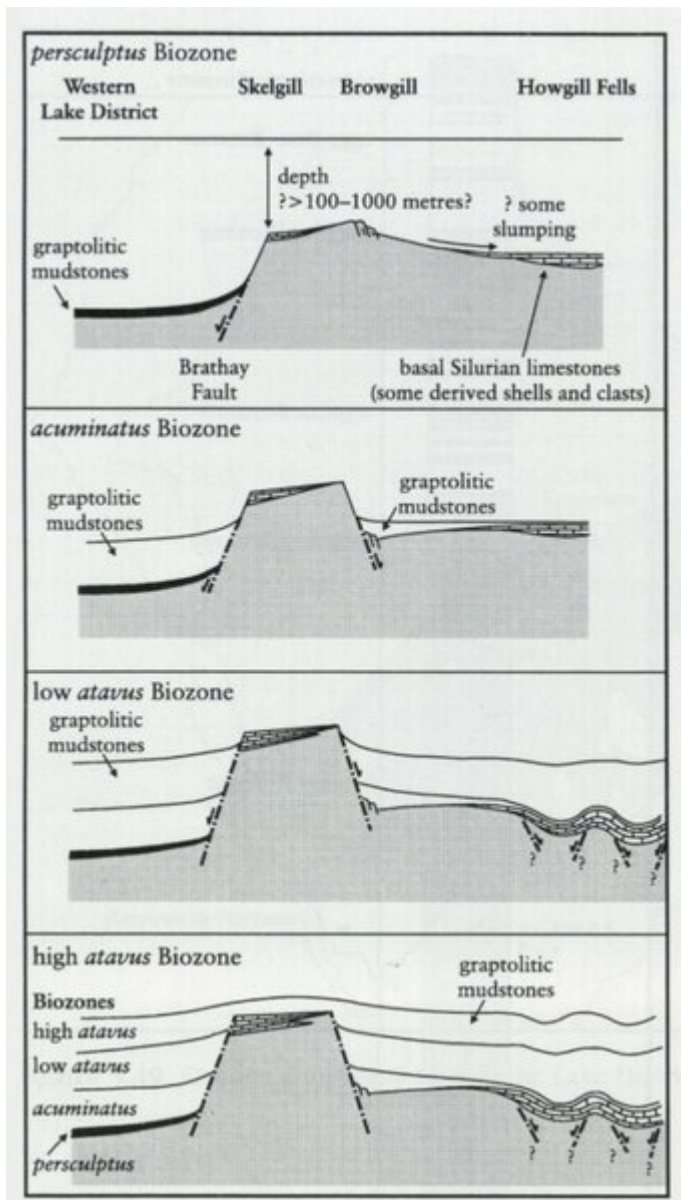
*(Figure 3.59) Measured section through the Skelgill and Browgill formations in the Spengill section, showing the graptolite biozonation (modified after Rickards, 1970a).*



*(Figure 3.60) Spengill Member, Ordovician–Silurian boundary, Spengill, Howgill Fells. (Photo: R.J. Aldridge.)*



(Figure 3.61) Exposure of the Browgill Formation in Spengill, Howgill Fells, showing strata of the *turriculatus* Biozone.  
(Photo: R.J. Aldridge.)



(Figure 3.52) Reconstructed west-east sections across the Lake District, showing the development of the depositional environment during the early Llandovery (after Rickards, 1978).