Ecker Secker Beck

[SD 696 945]–[SD 709 952]

Introduction

This site has the best development of the middle Cautleyan Stage (Zone 3) and is an important supplement to the sites at Backside Beck and Sally Beck. Like them, it is the origin of a large number of species of shelly fossils, especially trilobites (Ingham, 1970–1977) and conodonts (Orchard, 1980; Bergström and Orchard, 1985).

The Ecker Secker Beck site comprises virtually all of the Ordovician exposures in the northern part of the Taythes Inlier, the southernmost of the Cautley inliers. The uppermost Ordovician unit was termed the 'Fairy Gill Shales' by Hughes (1905, p. 369), but subsequent authors have followed Marr (1913) in applying the name Ashgill Shales', that of its equivalent in the Lake District (see the Ashgill Quarry site report); this name is now replaced by the Ashgill Formation', following Kneller *et al.* (1994), who included the Cystoid Limestone as a local basal member. A calcareous grit within this formation was noted by Dakyns *et al.* (1891) in Ecker Secker Beck and was further commented on by Turner (1961) and Rickards (1970). Ingham (1966, pl. 27; 1970, fig. 6) gave a detailed geological map of the northern part of the Taythes Inlier (Figure 11.19).

Description

The site extends along Taythes Gill, the lower parts of which are named Ecker Secker Beck, and also includes some of its tributaries, notably Fairy Gill, which rises on Bluecaster to the north. A fault striking ENE–WSW divides the geology of the site in two (Figure 11.19). Along Taythes Gill, south-east of Taythes Farm, there is an extensive outcrop of east-dipping calcareous mudstones of Zone 3, and although their total thickness is unclear, almost 100 m of strata are exposed in the longest unfaulted section (Ingham, 1966, p. 469). The upper parts of the underlying Zone 2 are brought up by faults in two areas around [SD 7065 9550] and [SD 7075 9540] and a thin (< 75 cm) calcareous sandstone is developed in the mudstones very close to the top of this zone. The intensity of faulting increases to the south-east, where parts of Zones 4 and 5, and the overlying Ashgill Formation, with the Cystoid Limestone at its base, are exposed in an inverted succession, which abuts a narrow strip of Silurian rocks against the Dent Fault (Figure 11.19). The base of the Rawtheyan Stage was originally defined at the base of Zone 5 in Taythes Gill, where there is a marked change in the composition of the trilobite and brachiopod faunas and a diminution in the diversity of the latter (Ingham and Wright, 1970, p. 238). However, a level within the Swindale Limestone in Swindale Beck (see site report) in the Cross Fell Inlier may prove to be a better basal stratotype for the stage.

The northern part of the site, along Ecker Secker Beck to the area around Taythes Farm and Fairy Gill, is composed largely of NW-dipping calcareous mudstones of Zone 5, within which a thick felsite sill has been intruded. The Cystoid Limestone is seen to rest with very slight angular unconformity on mudstones of this zone 500 m to the west of Taythes Farm [SD 6995 9585], but, being unweathered, its does not yield the late Rawtheyan macrofossils known from elsewhere. It is succeeded in both localities by fossiliferous shales of the Ashgill Formation (cf. (Figure 11.17)b, c); these are best seen in an extensive but isolated outcrop in Fairy Gill (Figure 11.19). The bedding there is obscure and is only revealed by occasional layers of shelly fossils (Ingham, 1966 p. 479); in contrast, the steep cleavage gave earlier workers a false impression of a very thick succession, whereas Ingham estimated that only about 45 m of shales are present. Boulders of conglomerate in the stream here suggest that a coarse member near the top of the Ashgill Formation is present beneath the drift somewhere to the north. It is well exposed at the western end of the site, where some 10 m of coarse calcareous sandstone and conglomerate crop out in partly overgrown cliff sections near the northern edge of Foxhole Rigg Wood.

Interpretation

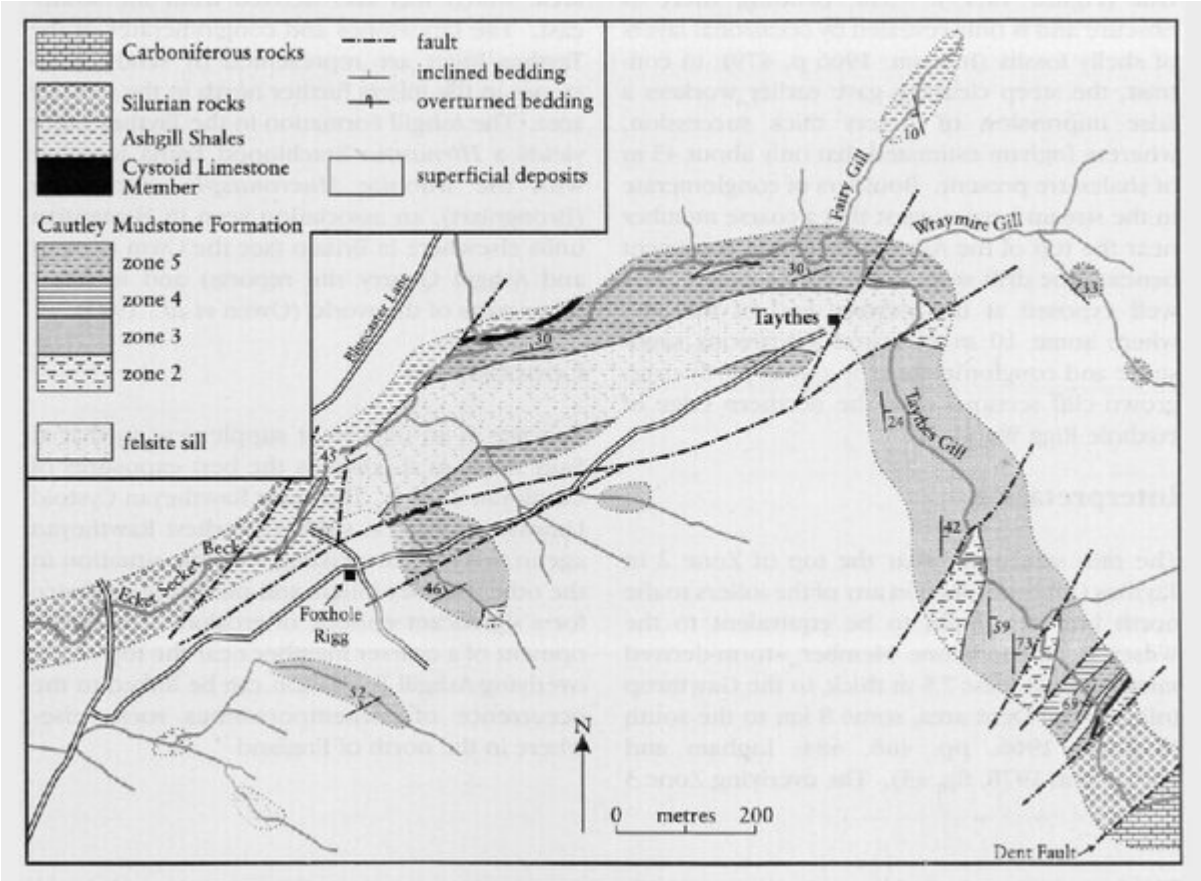
The thin sandstone near the top of Zone 2 in Taythes Gill is not seen in any of the inliers to the north but is thought to be equivalent to the Wilsey Beck Sandstone Member, storm-derived sandstones at least 7.5 m thick, in the Gawthrop Inlier in the Dent area, some 8 km to the south (Ingham, 1966, pp. 468, 484; Ingham and McNamara, 1978, fig. 43). The overlying Zone 3 strata in Taythes Gill are the best exposures of that zone in the Cautley area.

Throughout the Taythes Inlier, the uppermost Rawtheyan Cystoid Limestone lies on Rawtheyan Zone 5 strata, in contrast to the situation in other Cautley inliers, where it succeeds Zone 7 (see the Backside Beck and Sally Beck site reports). Ingham (1966, p. 478) calculated that some 110 m of strata had been overstepped in the 2.5 km between the Westerdale and Taythes inliers — evidence of a substantial episode of late (but not latest) Rawtheyan erosion. Kneller *et al.* (1994, p. 229) considered the Cystoid Limestone to be an equivalent of the Troutbeck Member of the Ashgill Formation in the Lake District (see the Ashgill Quarry site report). They concurred with Ingham and Rickards (1974) in equating the sandstone and conglomerate within the Ashgill Formation in the Taythes Inlier with the Wharfe Conglomerate in the Craven inliers to the south and used the term Wharfe Member in the Cautley area. They also considered it to be comparable to the Rebecca Member of the Ashgill Formation in the Furness area, which was also derived from the southeast. The sandstones and conglomerates of the Taythes Inlier are represented by sandy mudstones in the inliers further north in the Cautley area. The Ashgill Formation in the Taythes Inlier yields a *Hirnantia* brachiopod fauna together with the trilobite *Mucronaspis mucronata* (Brongniart), an association seen in Hirnantian units elsewhere in Britain (see the Cwm Hirnant and Ashgill Quarry site reports) and in many other parts of the world (Owen *et al.,* 1991).

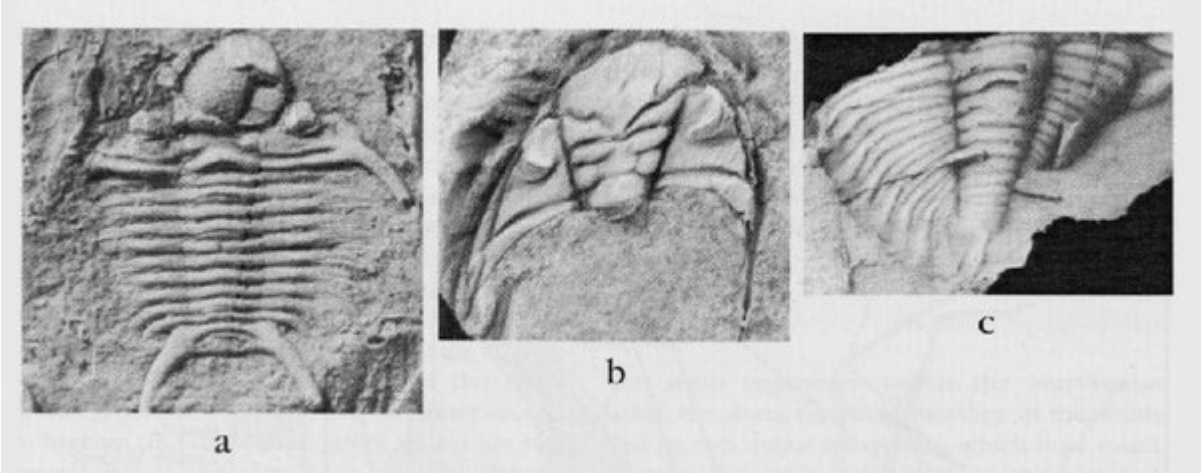
Conclusions

This site is an important supplement to that at Sally Beck, as it contains the best exposures of Cautleyan Zone 3. The latest Rawtheyan Cystoid Limestone rests on strata of earliest Rawtheyan age in this site, contrasting with the situation in the other Cautley inliers and providing evidence for a significant episode of erosion. The development of a coarser member near the top of the overlying Ashgill Formation can be linked to the occurrence of contemporaneous rocks elsewhere in the north of England.

References



(Figure 11.19) Geological map of Ecker Secker Beck, Taythes Gill and Fairy Gill in the northern part of the Taythes Inlier, Cautley district, based on Ingham (1966, pl. 27) and Ingham (1970–1977, fig. 6).



(Figure 11.17) (a) Sphaerocoryphe kingi Ingham, x 5, Zone 6, Wandale Beck, Murthwaite Inlier (Figure 11.16). (b, c) Mucronaspis mucronata (Brongniart), x2, Ashgill Shale Formation, Fairy Gill, Taythes Inlier (Figure 11.19).