
River Calder, Latter Barrow

[NY 0687 1178]

Introduction

Exposures in the River Calder yield a distinctive late Tremadoc acritarch flora and the only essentially trilobitic fauna known from the Skiddaw Group. The source rock may be an olistolith of Tremadoc strata derived into the Buttermere Formation.

Having described the graptolite fauna of the Skiddaw Group, Elles (1898) considered that part of it was of Tremadoc age, but subsequent revision did not uphold her conclusions, and for some years the Skiddaw Group was believed to be no older than Arenig (Jackson, 1962). In 1985, however, Molyneux and Rushton reported late Tremadoc acritarchs and trilobites from the Calder River north-west of Latter Barrow hill and also from other areas of the Skiddaw Group outcrop. Allen and Cooper (1986) reviewed the geological investigations in the area of Latter Barrow and produced a geological map. In 1988, Webb and Cooper described an olistostrome deposit in the Buttermere area; subsequently Cooper *et al.* (1995) formalized this as the Buttermere Formation and extended its outcrop to include the area of the Calder River, so the Tremadoc rocks there may represent an olistolith within the Buttermere Formation.

Description

The Skiddaw Group is exposed in the River Calder to the west of Latter Barrow hill, 6 km east of Egremont (see (Figure 11.1)). The exposures are mainly in the east bank of the river, 70–200 m upstream of the place where the base of the unconformably overlying Latterbarrow Sandstone Formation crosses the river (Allen and Cooper, 1986). The Skiddaw Group consists mainly of grey, silty mudstones with sandstone laminae and thin turbiditic beds of fine- to medium-grained sandstone, generally dipping at 20–30° to the west or north-west. A flat-lying slump-fold of the Skiddaw Group is exposed at the northern end of the outcrop.

Acritarchs were detected in six samples collected from these exposures, and detailed analysis showed that their age lies between the base of the *Shumardia (Conophrys) salopiensis (= pusilla)* Zone and the top of the *Tetragraptus approximatus* Zone and is probably late-Tremadoc (Molyneux and Rushton, 1985). Ten species of trilobites, together with a few other shelly fossils, were collected from three places on the east bank, and one trilobite is recorded from the right bank (Rushton, 1988). The trilobites include *Niobina davidis* (Lake) and *Peltocare olenoides* (Salter), both known from Y Garth in the Porthmadog area of North Wales (see site report for Y Garth); they also indicate a late Tremadoc age and were correlated with the *Angelina sedgwickii* Zone of the Welsh Tremadoc succession (Rushton, 1988). The fauna also includes *Parabolinella triarthroides* Harrington, described from the upper Tremadoc of Argentina, and at least two new endemic species.

Interpretation

The Tremadoc age of the exposures in the River Calder contrasts with Arenig faunas (*Isograptus gibberulus* Zone?) from Ya Gill, 1 km to the north-east, and Beck Grains, 1 km to the southeast, and its discovery contributed to the identification of an unconformity at the base of the overlying Latterbarrow Formation (Allen and Cooper, 1986). However, identification of the Buttermere Formation as an olistostrome suggests that all the Tremadoc localities are within a large olistolith of a pre-existing Tremadoc formation and derived into the Buttermere formation by major slumping, inferred by Cooper *et al.* (1995, p. 202) to have occurred during late Arenig times.

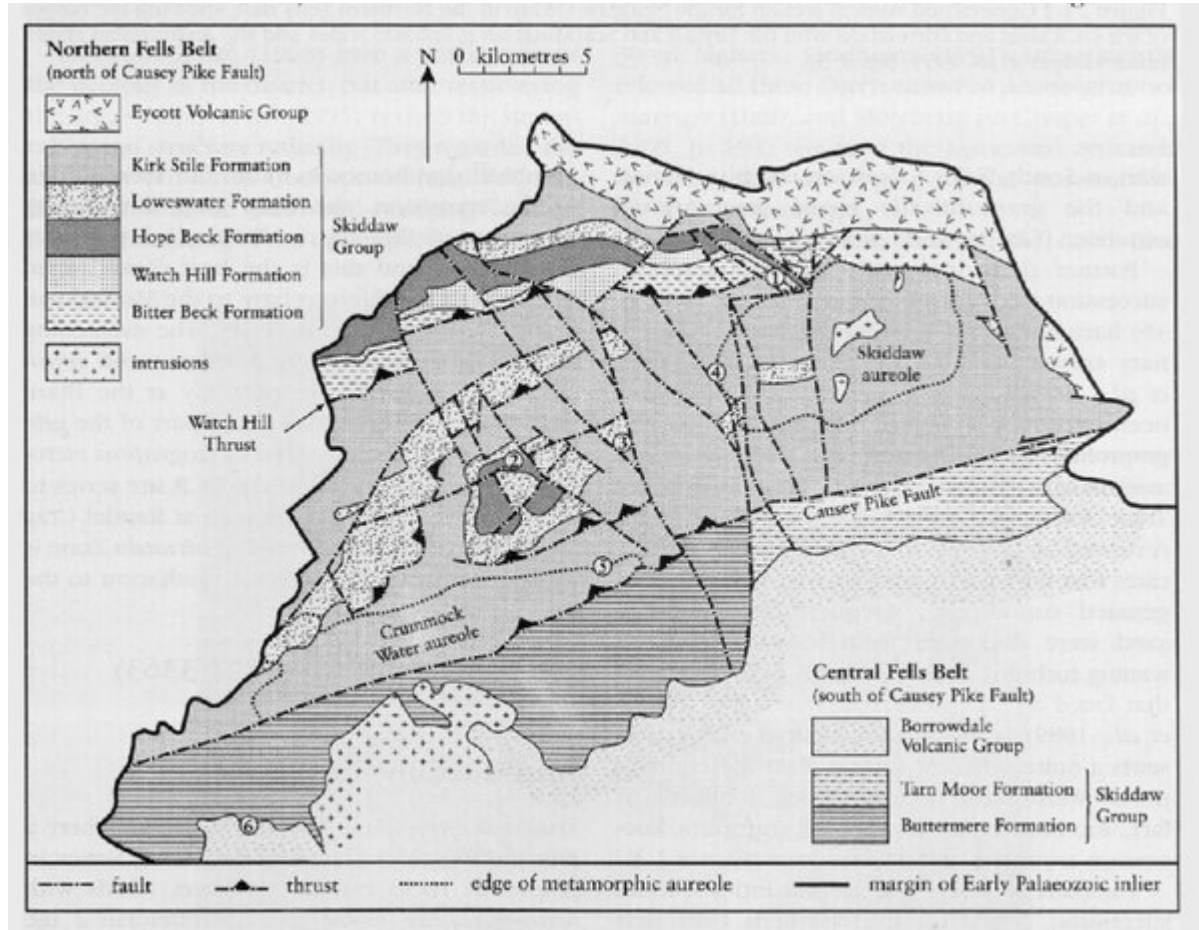
Although acritarch floras are very widely distributed throughout the Skiddaw Group, the present locality has the only essentially trilobitic fauna in the group; indeed, it has yielded more trilobites than all the rest of the Skiddaw Group below the Llanvirn. Late-Tremadoc trilobite faunas are uncommon, presumably partly on account of the end-Tremadoc eustatic

regression, and elsewhere in Britain they are restricted to North Wales and the Shelve area of Shropshire (Fortey and Owens, 1992). The Calder fauna appears to be an outer-shelf benthic association that inhabited cool water (Rushton, 1988).

Conclusions

This site is unique in the Lake District in exposing a rarely found benthic trilobite fauna of late-Tremadoc age. It is probable that the fossiliferous strata slipped into their present place in a giant chaotic submarine mud-slide.

References



(Figure 11.1) Geological sketch-map of the Skiddaw Group in the main outcrop of the English Lake District, after Cooper et al. (1995, fig. 2). GCR localities: 1, Trusmadoor; 2, Blaze Bridge and Scawgill Quarry; 3, Barf; 4, Randel Crag; 5, Outside; 6, River Calder (Tremadoc, Chapter 7).