
Melmerby Road

[NY 623 383]–[NY 623 385]

Introduction

This is the most northerly outcrop of the Dufton Shale Formation and is significant because it includes Longvillian strata with a distinctly different fauna from that elsewhere in the Cross Fell Inlier. The Woolstonian strata are the lowest known representatives of that substage in the inlier.

About 1.2 km north-east of Melmerby, the A686 road cuts through the lower parts of the Dufton Shale Formation at the northernmost end of the Cross Fell Inlier. These beds constitute the 'Melmerby Beds' of Dean (1959a), a faunally-based concept now subsumed within the Dufton Shale Formation (Arthurton and Wadge, 1981), which lie within a small faulted inlier of Longvillian, Woolstonian and Ashgill rocks (Figure 11.12). Dean (1959a, p. 210) discussed earlier work, especially that of Bancroft (1933, in Lamont, 1948), described the road section and its faunas and provided a sketch-map of the area indicating fossil localities in the Caradoc rocks. The British Geological Survey discovered additional outcrops of these beds to the east of the road and the existence of fault-bounded areas of Ashgill rocks immediately to the south-west and north-east (Burgess and Wadge, 1974; Arthurton and Wadge, 1981, p. 18).

The site is the type locality for the ostracod *Sigmoopsis* (*S.*) *duftonensis* (Reed) (Jones, 1986) and for several trilobite species described or revised by Dean (1962), including '*Conolichas*' *melmerbiensis* (Reed), which was subsequently made the type species of *Otorozoum* by Thomas and Holloway (1988). The Longvillian trilobite fauna differs significantly from that elsewhere in the Cross Fell Inlier, and this is the only locality within which the lowest part of the Woolstonian is exposed.

Description

At the time of writing, the road cutting is overgrown and covered by shale debris. Beneath this cover, the Dufton Shale Formation dips steeply (70–80°) to the SSE and comprises jointed purple to brown mudstones and shales, with some limestones. Faulting includes two WSW–ENE strike faults that throw down to the north and thus repeat parts of the formation (Figure 11.12); these faults are recognized on faunal grounds, there being no major lithological difference between the Longvillian and Woolstonian strata. At the northern end of the section, Silurian rocks are faulted against the Dufton Shales and younger Ordovician rocks (Arthurton and Wadge, 1981). The most northerly faunas obtained from the road section by Dean (1959a) may be Woolstonian in age (=Upper Longvillian of Dean), but about 60 m to the south and for some 80 m the shales yield Longvillian faunas (=Lower Longvillian of Dean). These were listed by Dean (1959a, p. 212) and augmented by Rushton and Wadge (in Arthurton and Wadge, 1981). The southernmost outcrop of shales is early Woolstonian in age and includes at least one nodular limestone that weathers to a rottenstone revealing a prolific Shelly fauna (Dean, 1959a, p. 212). The boundary between the Longvillian and Woolstonian is not exposed. Importantly though, the Woolstonian faunas are the lowest ones known from the entire Cross Fell Inlier (Dean, 1962, p. 71). Immediately south of the road section, outcrops of Dufton Shales show the southward extent of the Woolstonian Substage and a further repeat of the Longvillian strata.

Trenching to the south-west and north-east of the Dufton Shales of the road section revealed limestones and mudstones containing an Ashgill fauna (Rushton and Wadge, in Arthurton and Wadge, 1981). These were assigned to the 'Swindale Shales', a term rejected by Bassett *et al.* (1992, p. 121) in favour of the older name 'Swindale Limestone' (see Swindale Beck site report).

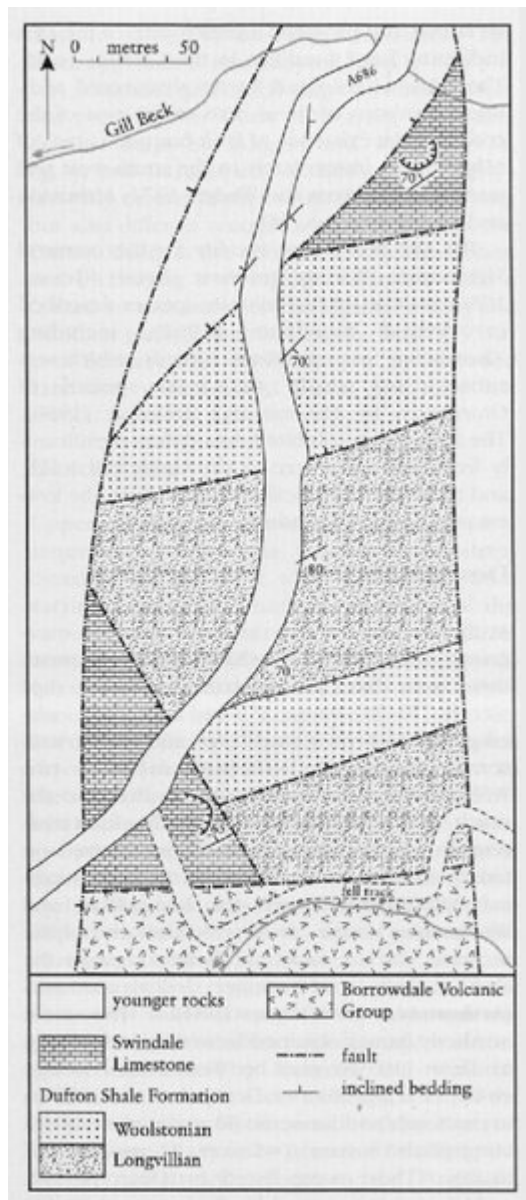
Interpretation

Dean (1959a) termed the Ordovician strata in the Melmerby cutting the 'Melmerby Beds' on account of the marked differences in fauna from equivalent strata elsewhere in the Cross Fell Inlier. Whilst this usage has not been followed, the lateral faunal differences in the lower part of the Dufton Shales are evident, though their palaeoenvironmental significance has yet to be interpreted. In addition to various trilobite species known only from here, the abundance of *Kloucekia apiculata* (M'Coy) and *Broeggerolithus nicholsoni* (Reed) suggests greater affinities to Longvillian faunas of North Wales (Whittington, 1968, p. 114) and the Lake District than those of the rest of the Cross Fell Inlier.

Conclusions

This is the most northerly outcrop of the Dufton Shale Formation in the Cross Fell Inlier. Fossil faunas indicate that the palaeoenvironment here during the Longvillian was different from that farther south in the inlier, and that the earliest part of the Woolstonian Substage is present here but unknown from the rest of the inlier.

References



(Figure 11.12) Geological map showing the Dufton Shale Formation and Swindale Limestone in and adjacent to the Melmerby Road section, based on Burgess and Wadge (1974, fig. 7) and Arthurton and Wadge (1981, fig. 9).