



### **Valley bulge in the Peak District, UK**

Camber folding is developed where weak clays or shales are squeezed out from beneath an upland that has a thick and heavy cap of roughly horizontal stronger rocks. Most of the displacement takes place under the edges of the upland, where the cap-rock therefore sags to produce a plateau profile like that of a road camber. The underlying rock is displaced towards the adjacent valleys, where it rises unconstrained to form the valley bulge component of a camber structure. However this is normally lost to river erosion while it is developing, so is rarely seen in natural exposures. The most conspicuous camber folding occurs where limestones sag over soft Jurassic clays in the English Midlands, and similar structures occur on a smaller scale in Carboniferous shales that are rather less mobile. So there is some rarity value in this exposure on the outside of a river bend in the Ashop Valley, in the heart of the Dark Peak Pennines. The bulge appears as crumpling of the thinly bedded sandstones and shales of the Mam Tor Beds that have been squeezed out from the right by 300 metres of Shale Grit and Kinderscout Grit that forms the adjacent high moorland. Similar structures were encountered in the nearby Derwent Valley when the Howden and Derwent dams were being built during the early 1900s. At both sites, excavations had to be deepened to 20 metres beneath valley floor to reach undisturbed rock beneath the bulge structures in order to provide stable footings for the masonry dams. This change with depth within the valley bulge can also be seen in the Ashop exposure where the intensity of the anticline increases upwards. The Ashop Valley site lies a short way upstream of Rowlee Bridge and is not easily accessible; in dry weather it can best be reached by those prepared to paddle across the river in order to save obscure detours around undercut river cliffs. © *Photograph and text by Tony Waltham Geophotos*