



A WALK TO FOLLY DOLLY FALLS, MELTHAM, TO LOOK AT THE ROCKS AND LANDSCAPES Grid Reference SE 107 113

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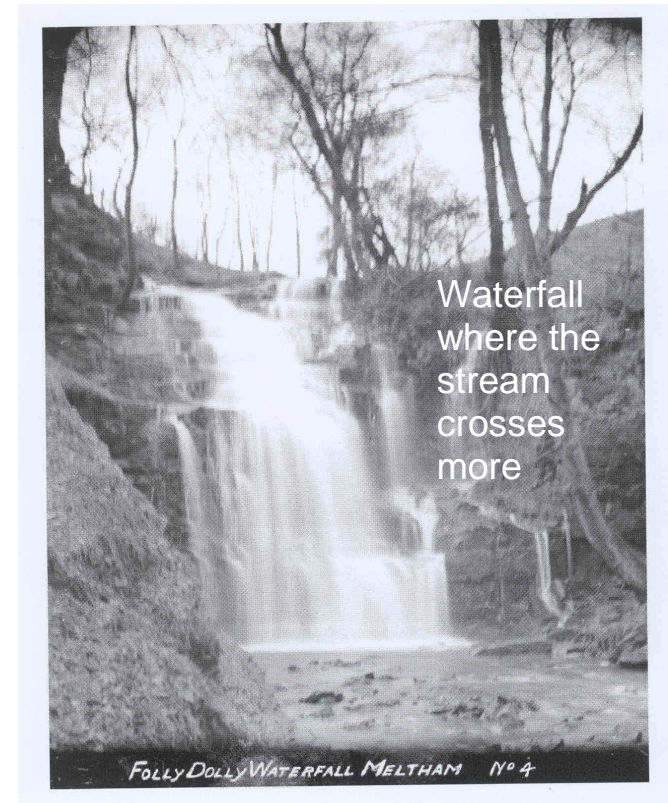


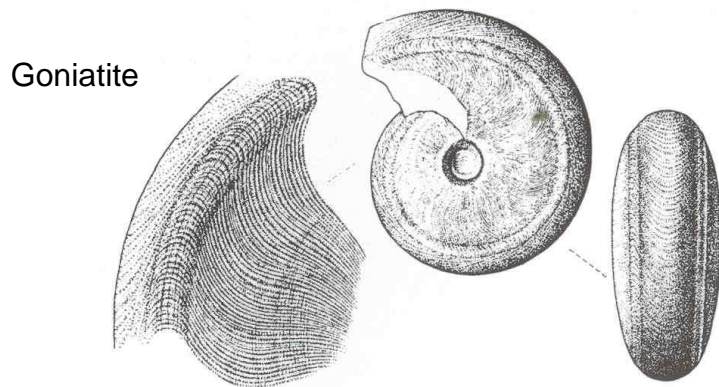
Photo 1922 from Kirklees Photo Archive

The rocks of the Meltham area are **Upper Carboniferous** (Marsdenian) in age, so they are about 310 million years old.

These rocks were laid down in **deltas** on the edge of a shallow sea, with mountains to the north and south. Sands and muds were deposited by rivers in shallow water. Because the continent was close to the equator, the climate was warm and wet so that tropical rain forest flourished. Dead plant material became trapped in stagnant swamps between river channels. Over geological time it was buried by muds and sands as the rivers in the delta changed position and built up more **deposits**. The water, oxygen and hydrogen were driven out of the plant remains, leaving only the carbon in **coal seams**, such as the Upper Meltham Coal.

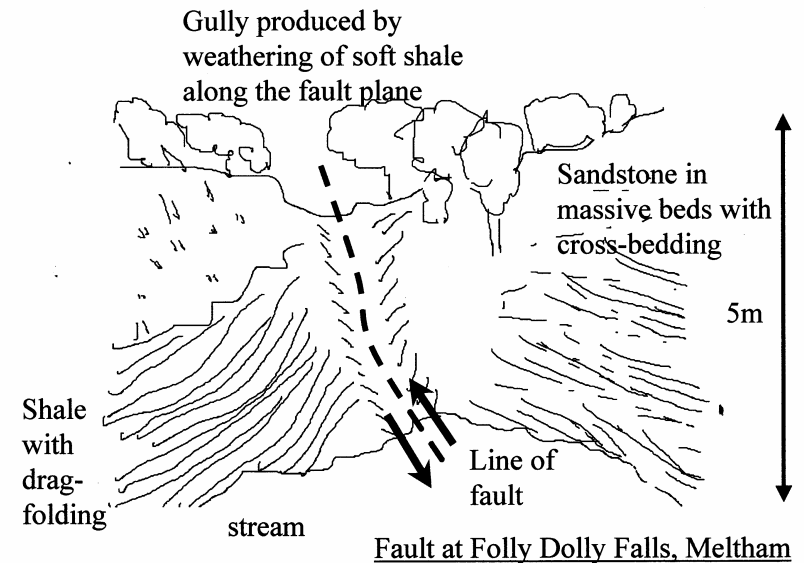
After the sediments were formed close to sea-level, they were buried by hundreds of metres of sediment and **compressed**. As the sea water moved upwards it carried minerals which **cemented** the sand and mud grains together to make a rock.

These rocks, particularly the mudstones, contain **fossils**, such as shells and microfossils, of which the most important are **goniatites**. However, fossils are not easy to find here and the site is best left undisturbed. Goniatices are the ancestors of ammonites and like the present-day *Nautilus*, floated in warm oceans.



Goniatite - *Reticuloceras bilingue* x 1 1/2

Folly Dolly Falls gives an excellent view, in three dimensions, of a **fault**. The change of rock type from less resistant shale to the stronger beds of sandstone has been exploited by the stream to form the **waterfall**, which cascades across the sandstone fault plane, down joints and along bedding places. There is some reddening of the sandstone by iron-rich minerals, which have been able to follow the line of weakness along the **fault plane**.



The position of the fault is marked by a gully which runs across the front of the waterfall. The soft shale was fragmented and shattered, as the sandstone moved violently against it during fault movements, to form soft clay called **gouge**, which has been weathered more than the resistant sandstone.

There are very few places in West Yorkshire where beds dip at steep angles and they are nearly always associated with fault movements, as in this case. As the shale moved down relative to the sandstone, it was affected by friction with the sandstone and dragged downwards, forming the **drag folding** shown above.