
Afon Hepste, Powys

[SN 931 133]–[SN 924 098]–[SN 942 109]

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Highlights

Unusually well-developed waterfalls and dry river courses are related here to the outcrop of limestone and adjacent rock types. Detailed relationships between lithology and structure and landforms are evident along this short river reach.

Introduction

The Afon Hepste downstream of Hepste Bridge provides an excellent example of the geological controls on river development. It is characterized in its upper reaches by a dry stream course over areas of Carboniferous limestone and in the lower part by waterfalls.

The Hepste drains southwards from the Brecon Beacons. It rises on the Old Red Sandstone and crosses outcrops of the Carboniferous Limestone and the Millstone Grit. On the limestone, water enters well-developed joints and bedding planes such that during times of low flow, the river upstream of the Penderyn-Ystradfellte road bridge is dry-bedded. The area to the east of the Hepste is characterized by swallow or sink holes caused by the collapse of the roofs. North (1962) presented aerial photographs illustrating the relationships of such features to the underground passages of the area. The river re-emerges 0.5 km downstream of the bridge through joints in the Millstone Grit. This re-emergence, after the stream had previously entered fissures in the limestone at the base of a small waterfall subsequent to flowing over rocks of the Millstone Grit Series, is illustrated in (Figure 3.14).

Immediately downstream of this point, the river flows over Upper Carboniferous rocks of the Millstone Grit and Coal Measures. It is the influence of three factors, namely the alternation of soft and hard rock beds, the influence of faults, and the increasing erosive power of the captured (and thus rejuvenated) Hepste, that accounts for the features of this section of the river, notably those of waterfalls and cascades. Such features have been described as 'more numerous and varied than in any other area of similar size in the whole of the country' (North, 1962). (Figure 3.13) A diagrammatic geological map of the neighbourhood of Ystradfellte. The 'solid' rock outcrops are shown. They are largely and irregularly covered by superficial deposits.

Description

The course of the Afon Hepste flows over limestone for approximately 5 km. The bed seldom carries water, so that grass and other vegetation has become established amongst the pebbles. Below the bridge [SN 945 113] the Hepste Valley is flooded by the conglomerates and sandstones of the Millstone Grit that overlies the Carboniferous Limestone (Figure 3.13). The rejuvenated and downcutting Hepste has penetrated the sandstones to reveal a small exposure of Carboniferous limestone [SN 938 097]. The river at this point, 1 km upstream of Scwd-yr-Eira, flows underground beneath a vegetation-covered dry river bed for approximately 50 m. It re-appears through joints in the Millstone Grit (Figure 3.14).

The first description of the features of the lower Hepste was made by Malkin (1807), who suggested that the most important fall was at Scwd-yr-Eira (Malkin's Upper Hepste Fall), in contrast to the series of cascades further downstream. Scwd-yr-Eira was initiated by a fault which caused the stream to flow from hard sandstones to soft shales (Figure 3.15). A band of more resistant shale below the sandstone is exposed at the base of the cliff. Downstream of the fall, the river enters an 80 m gorge caused by the upstream retreat of Scwd-yr-Eira and another fault. Between these falls and the junction of the Hepste and Mellte is a series of smaller falls first described in detail by Young (1835) and known as the Lower Hepste falls. Here two plunge pools are separated by a series of rapids, followed by a 10 m fall in a gorge section

of approximately 100 m in length.

Interpretation

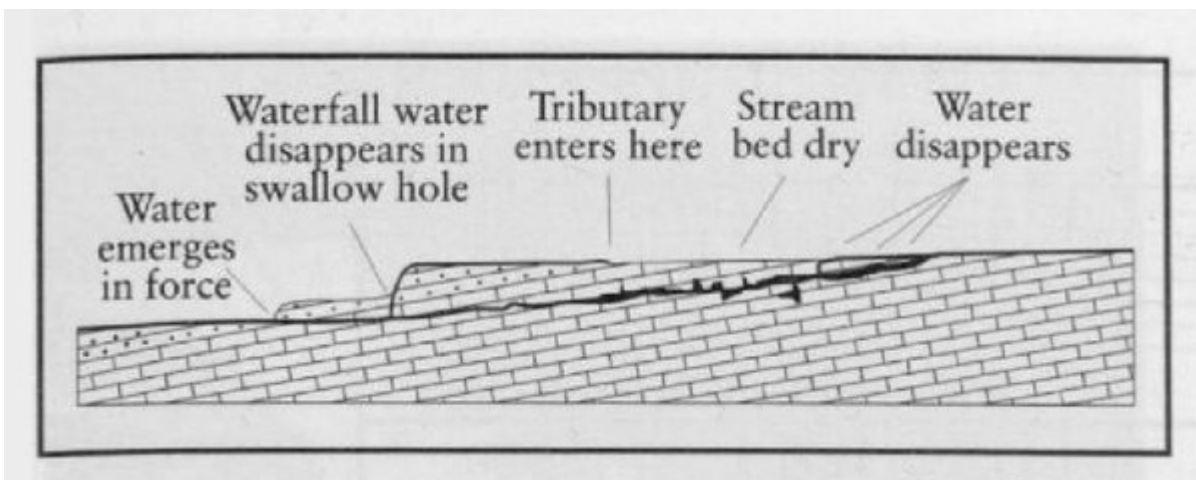
The Hepste, like the nearby Mellte and Nedd Fechan, illustrates features of river evolution unique to karstic environments. Early works concentrated on a basic description of the area (e.g. Atkinson 1890; Thomas, 1902; Malkin, 1907). The first major attempt at the interpretation of such features was made by North (1930) in a National Museum of Wales publication, which was subsequently updated in 1938, 1949 and 1962. Mention was also made of such features in a National Museum of Wales publication (1979) describing aspects of the Brecon Beacons National Park scenery. Thomas (1974) has described some of the features of the South Wales interstratal karst, namely beneath the Millstone Grit fringing the South Wales Coalfield including dry river valleys, which, it was suggested, extend to a maximum individual length of 3 km. Many of the features of the upper Neath were attributed to the active downward erosion of the tributaries as a result of the capture by the River Neath of streams that previously entered the Taff. The results of this rejuvenation, however, are not consistent because of the nature of the rocks over which the streams flow.

The Scwd-yr-Eira Fall [SN 928 099] was initiated where a fault caused the stream to flow from hard sandstones on to soft shales. The backwash of the water has brought about the disintegration and removal of the shale near the base of the fall, so that the sandstone tends to be overhanging. Sandstone blocks periodically fall away, so that the waterfall is receding away from the original fault zone. There is a deep plunge pool at the base of the falls, which has formed because of the erosional influence of entrained pebbles. This, it has also been suggested, has led to the deepening of the gorge immediately downstream of the falls (North, 1962). Below Scwd-yr-Eira the bed of the Afon Hepste falls rapidly, and for the last 0.5 km down to the junction with the Mellte at the base of a 75 m gorge, the river descends in a succession of waterfalls. This is partly due to another fault and also because the relation of the Hepste to that of the Mellte is that of a 'hanging valley'.

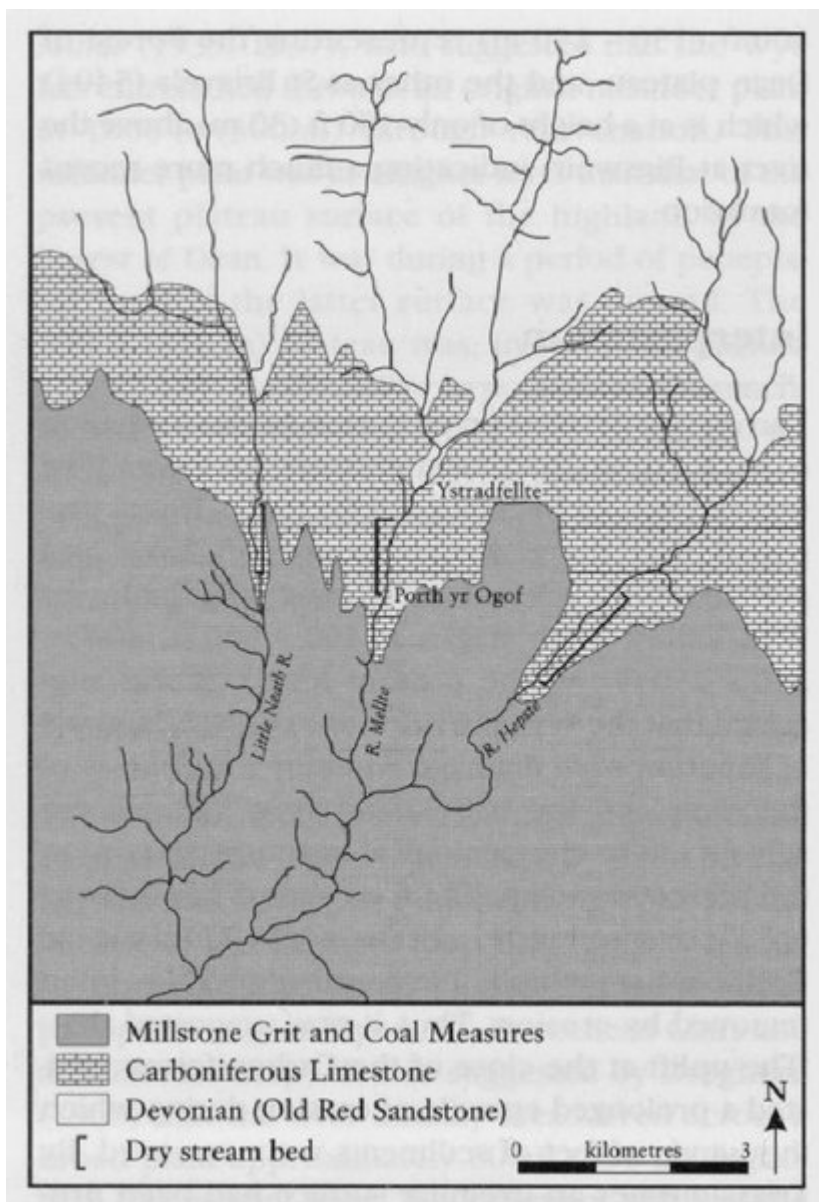
Conclusion

The Afon Hepste GCR site includes features that are peculiar to karstic scenery, including dry river beds and underground passages. These features provide excellent examples of the response of a river to geological control coupled with the results of rejuvenation following river capture. The river is exceptional in having a range of such features within a small area.

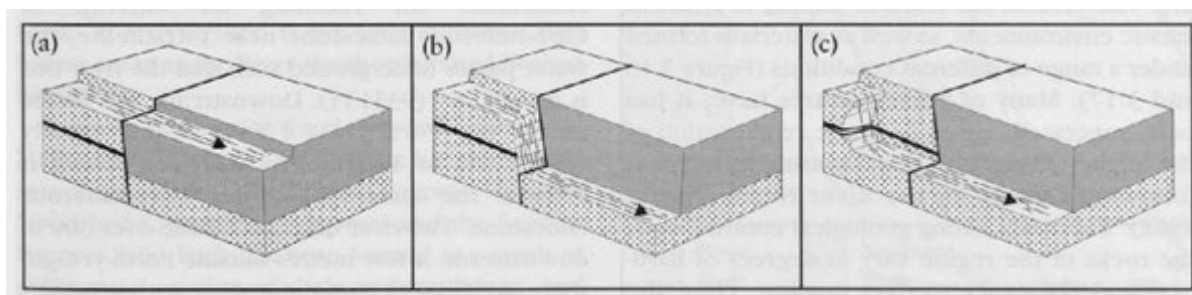
References



(Figure 3.14) The disappearance and reappearance of the Afon Hepste near Penderyn.



(Figure 3.13) A diagrammatic geological map of the neighbourhood of Ystradfellte. The 'solid' rock outcrops are shown. They are largely and irregularly covered by superficial deposits.



(Figure 3.15) Sequential diagrams illustrating stages in the formation of Scwd-yr-Eira. This fall owes its origin to a fault, which has retreated upstream as a result of the erosion of some beds of shale that occur near its base. (After North, 1962.)