Burrington Combe

[ST 47 58]

Highlights

Burrington Combe is a fine example of a fluvial karst gorge, which was cut largely under periglacial conditions across the narrow steeply dipping limestone outcrop on the northern side of the Mendips. Relict and active caves exposed in the limestone flanks provide evidence of a long history of solutional erosion predating the formation of the valley. The lower part of the gorge has exposed part of an haled Triassic gorge or wadi. An almost complete succession through the Carboniferous limestone sequence of the Mendips is exposed in the Combe.

Introduction

The Combe is a dry karst gorge immediately south of Burrington village, which cuts thorough the northern flank of the Mendip Hills (Figure 5.2). The gorge is in many ways very similar to Cheddar Gorge; however, its walls contain smaller cliff sections, it intersects two fossil Triassic valleys, and it has a large alluvial fan at its mouth. Burrington Combe is entrenched through limestones which dip at about 60° north, on the northern side of the Black Down pericline. Being a less spectacular feature than the nearby Cheddar Gorge, little has been written specifically on the Combe, although the arguments about the formation of Cheddar Gorge equally apply.

A description of the general geomorphology and hydrology of the area was published by Tratman (1963), while the gravels associated with the alluvial fan at the foot of the gorge were the subject of work by Clayden and Findlay (1960). The geological succession exposed in the Combe is described in detail by Green and Welch (1965). Many caves occur in the side of the Combe, documented by Barrington and Stanton (1977) and by Irwin and Jarratt (1992). Although most are very small, they provide evidence of former stages in the evolution of the gorge.

Description

The upper part of the gorge is developed along the strike of the Black Rock Limestone, before turning sharply north and cutting through the rest of the Carboniferous limestone sequence. Burrington Combe partially intersects two infilled fossil Triassic valleys, which can be recognized by the outcrops of Triassic Dolomitic Conglomerate which infill them. One is located near the head of the combe at Lower Ellick Farm, while the second is exposed where the combe beaches its eastern flank near its lower end (Figure 5.2).

The combe is a steeply graded feature, descending from 200 m at Lower Ellick Farm to debouch at around 80 m onto the lowland excavated in Mercia Mudstone to the north. A well developed alluvial fan (marked as head on most geological maps) is developed at the foot of the gorge and spreads out into the Vale of Wrington to the north. Two tributary valleys, the East and West Twin valleys, descend steeply off Blackdown's northern slopes to join the main combe about halfway down. The upper parts of these tributary valleys are developed on the Old Red Sandstone and have surface streams which disappear underground at the contact with the Carboniferous limestone, with some small sinks in the East Twin into the Lower Limestone Shales. Solutional voids in the Shale group are also revealed in a drainage adit driven through them from the floor of the West Twin valley. The combe is dry, except in extreme floods, including that of 1968 which cut a trench through the clastic fill in the East Twin valley (Hanwell and Newson, 1970); normal drainage is now underground, and resurges at the Rickford and Langford Risings (Newson, 1972; Crabtree, 1979), east and west of the mouth of the combe (Figure 5.2).

Many caves have been exposed by the down-cutting of the combe, of which the most extensive are the inclined mazes of Goatchurch Cavern and Lionel's Hole (Figure 5.2). These are mainly abandoned phreatic systems, and thus predate valley incision; they represent fragments of earlier generations of swallet caves and the complex phreatic networks which

they fed (Bull and Carpenter, 1978). A newer generation of small sinks has developed in the valley floor. Aveline's Hole, located near the foot of the combe is the remains of a major phreatic tube, which was once part of a resurgence cave, but now acts as a sink for road drainage. Another set of abandoned and active stream sinks is located on the hillslope west of the combe. From east to west these are Bath Swallet, Rod's Pot, Drunkards Hole, Bos Swallet and Read's Cavern, forming a series of steeply descending caves developed downdip; they are almost certainly linked, although no connections have been found yet (Williams and Farrant, 1992). Their descending, dip-orientated passages contrast with the level strike-oriented rifts in Lionel's Hole, Goatchurch Cavern and the other caves at lower levels in the combe.

Interpretation

Burrington combe clearly shows the features associated with fluvial erosion during periglacial periods, and as such is very similar to Cheddar Gorge. However, the smaller catchment and the more limited relief has created a less dramatic gorge than that at Cheddar. This has meant that cavern collapse has not so commonly been invoked to explain its development. Both Reynolds (1927) and Tratman (1963) recognized the fluvial origin of the combe. Tratman went further and suggested the valley was eroded during periods of periglacial spring snowmelt, when the ground was frozen and underground drainage impeded. The large alluvial fan below the mouth of the gorge consists largely of gravel, produced by intense frost action and transported by periodic torrents of water flowing down the combe (Clayden and Findlay, 1960; Findlay, 1965; Stanton, 1977). The relationship between the Combe and the alluvial fan is clearer here than at any other site on Mendip. Deposition of the fan may also have been responsible for diverting karstic drainage to the two modern Risings on either side of it (Figure 5.2), in a style reflecting the diversion of surface streams off the crest of an aggrading fan. Although much of the combe was excavated under periglacial conditions, its early stages may have pre-dated significant karstification, and could have been cut by normal surface drainage.

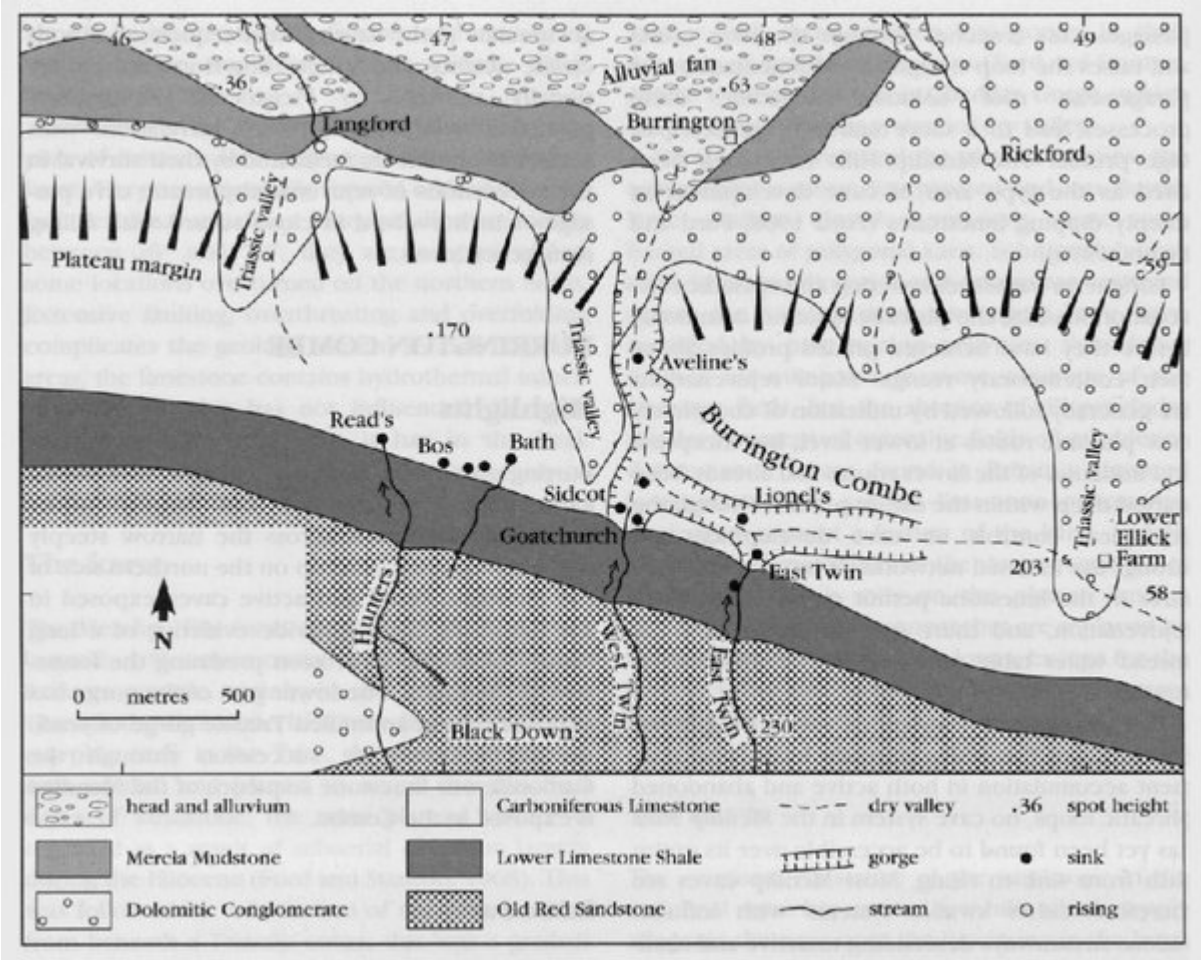
The caves exposed in the side of the gorge provide evidence of underground solutional erosion which pre-dates the surface excavation of much of the gorge. The modern active cave system appears to be fairly immature. This is shown by the bifurcation of the drainage to two separate springs and the small nature of the active streamways. As yet no dating studies have been completed, but an absolute chronology for the caves would provide a time-scale for the geomorphological evolution of the combe.

It has been suggested that many of the modern valleys on Mendip follow earlier infilled Triassic valleys (Ford and Stanton, 1968). This is not the case in Burrington. The combe truncates the head of one such valley at Lower Ellick farm (Figure 5.2), but does not follow it. Similarly, the combe intersects another Triassic valley near the foot of the modern gorge, but, instead of following it, runs parallel to its eastern flank, cutting partly into the Carboniferous limestone. The Pleistocene erosion of the combe is independent of earlier Triassic development, and the Dolomitic Conglomerate does not appear to have offered a line of least resistance.

Conclusions

Burrington Combe is an excellent example of a fluvially eroded valley cutting through steeply dipping limestone, and has a long history of development through the Pleistocene. It partially intersects two earlier infilled Triassic valleys, but unlike many other valleys on Mendip, is not directly influenced by them. Ancient caves which have been truncated by downcutting of the combe provide evidence of a long history of solutional development. The combe also provides an excellent exposure of virtually the entire Carboniferous limestone sequence.

References



(Figure 5.2) Geological map of Burrington Combe and the infilled Triassic valleys cut into the northern slope of the Mendip Hills (after Williams and Farrant, 1992).