Exploring the Geology of the Sychryd Gorge A Brief Tour

1. The scramble down from the road to the mouth of the Sychryd ***('the Confluence'***) is over steeply tilted beds of the **Upper Limestone Shales** – alternating beds of limestone and mudstone/ shale.

Fig A: Upper Limestone Shales at the confluence

2. In the bed of the Mellte, if the water flow is low, the contact between the **Upper Limestone Shales** and the **Basal Grit** can be seen. The Basal Grit here forms the bed of the river and is clearly conglomeratic ie contains pebbles, almost all are quartz.

Fig B: Basal Grit in the bed of the Mellte:

3. Heading up the narrow gorge of the Sychryd you almost immediately enter the main body of the **Carboniferous Limestone** – a very hard rock but one which is soluble in even mildly acidic water. The Sychryd has cut a passage through this band of limestone; its flow has moulded the shapes of the gorge sides with potholes and scallop markings. The thick beds of limestone dip northwards ie towards the Mellte at around 30degrees.

4. Upstream of the high arch of the road bridge, the gorge quickly widens out. This is because it crosses the **Dinas Fault** beyond which are the easily eroded mudstones and thin sandstones of the **Middle Shales/Bishopston Mudstone**. The river sides fall back and the ground is formed by an assortment of loose boulders and shingle banks.

5. On the northeast side of the river (true right bank), near the access track, a white-grey deposit can be seen in a vegetated bank. This is a man-made deposit; waste **lime** dating from the days when a limekiln was in operation at the top of the bank.

Fig C: Lime waste

6. At the river bend, near the tree with exposed roots (*the **'Roots Traverse'***), a thin outcrop of sandstone stretches across the river. These sandstones are typical of the **Bishopston Mudstone Formation**; the larger part is formed from mudstones but occasional sandstones appear. They resist erosion rather better than the mudstones. Note that, in contrast to the earlier limestone, this sandstone is dipping southwards.

Fig D: erosion resistant sandstone within mudstones

7. Black coloured mudstone can be seen in places in the banks of the river; the blacker the colour, the higher its carbon content. Those with highest carbon content might be considered dirty coals. The carbon is all that is left of vegetation which died and was compacted and which, over millions of years, turned to stone. There is some iron- staining (rust-colour) and a yellow coloration on some rock surfaces which is **limonite** (fig E).

Fig E: Iron within mudstones

8. A rocky section of bank on the north/true right side of the river (*the **1st** or **'Lower Bridge Traverse'** or **'Cornflake Corner'***) displays a geological fault. This is one of a swarm of NNW-SSE aligned faults which run through the coalfield and through Waterfall Country. Solid sandstone appears on one side of the fault (west) whilst bands of mudstone and layered siltstone appear on the other (east). A band of black clayey material fills the fault itself.

Fig F: Fault with infill

9. Immediately upstream of the old tram bridge abutment is an exposure in the north/true right bank of channel sand- stones, one stacked above another and separated by carbon-rich mudstones, almost coals.

Fig G: Stacked channel sandstones

10. An abandoned adit (*'**Blue Stal Mine'***) into the **Basal Grit** on the south/true left bank is flooded.

Fig H: Blue Stal Mine

11. The next section of the river is aligned with what is a faulted boundary between limestone to the north and **Basal Grit** to the south. Beds of rock seen in the river sides are contorted. A further fault can be made out on the downstream side of the next bridge abutment.

Fig I: Fault with infill

12. Beyond the bridge abutment is a pool at a sharp bend in the river. The Sychryd plunges 1.5m down a band of limestone (fig J - '***Timotei', Armpit Shower', 'Jacuzzi', 'Washing Machine*** *or* ***1st Waterfall'***). In the far (ie east/true left) bank, beyond an overhanging tree, a fault can be seen, marked by a zone of shattered rock. This may be the same fault seen at 11.

FigJ: First waterfall

13. The impressive rock buttress of **Bwa Maen** (fig K) rises sheer above the river. It is a huge and very tightly folded anticline in the limestone. Several different beds are recognised including the Penwyllt Limestone, Penderyn Oolite and Cil-yr-ychen Limestone. Caves (***eg 'the Wormhole'***) have formed within this buttress particularly along the boundaries where different beds are in contact with one another and which probably slipped over each other when these strata were folded.

Fig K: Bwa Maen

14. Patterning (fig L) reveals sinuous water solution channels (incipient cave systems) and, on close inspection, an intricate tracery revealing that the rock has been re-crystallised adjacent to this fault.

Fig L: Limestone texture

15. A steep wall of limestone rises directly behind the concrete platform beneath the Sychryd cascade. The wall is a fault plane – one side of the fault zone whose width probably corresponds to the width of the narrow slot between Dinas Rock and Bwa Maen through which the Sychryd pours (*the* ***'Main Waterfall'***).

Fig M: Sychryd within Dinas Fault zone

16. The overhanging cliff is composed of massive beds of Carboniferous Limestone, tilting at a moderate angle to the NNW. The angle increases as you head east along the path beside the river.

Fig N: Dinas Rock

17. The **Basal Grit** overlies the Carboniferous Limestone and can be seen to do so both on the path ascending the NE side of the gorge at the next bend and also in the river bed and sides. The 'inner gorge' narrows again (as it did near the confluence with the Mellte) as the river is forced to cut through the limestone (***'Ivy Pool'*** *or* ***'Bellyflop Pool'***).

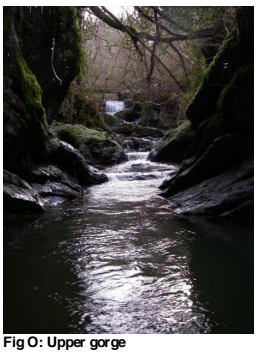

Fig O: Upper gorge

18. Upstream are a series of falls cut into successive beds of the **Basal Grit**. Each bed is seen to dip to the SE (in contrast to the NW dipping limestone beds of Dinas Rock). The photo shows ***Pool 2*** or ***Middle Pool***.

Fig P: Middle Pool

19. Either side of the footbridge are tunnels driven into the **Basal Grit** where the same dip can be seen. Photo 1 is '***Black Hole Mine'*** within which is a shaft known as '***the Black Hole'***.

20. Further upstream, a vegetated quarry can be seen to the left/east of the path shortly before an abandoned brick building. Beyond this the Basal Grit runs out and the river runs through a wider valley characterised by the Bishopston Mudstone/ Middle Shales. The next waterfall beyond is formed by the river's passage over the Twelve Foot Sandstone – the same bed of rock as occurs at Sgwd Gwladus on the Afon Pyrddin.

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Beyond the tour . . . Where to find further sources of information: **WEB:** Take a look at www.fforestfawrgeopark.org.uk **EXHIBITION:** drop into the Waterfall Centre, Pontneddfechan **PUBLICATIONS:** Books and leaflets available from this and other centres. **EVENTS:** Watch out for the annual Fforest Fawr Geopark Festival (late May/early June) **GROUPS:** Look up the South Wales group of the Geologists' Association (www.swga.org.uk)