5.5 Newton St Cyres

Highlights
- Extensive exposures in Mid-Late Permian red beds.
- Rhyolite debris related to unroofing of the Dartmoor Granite.

Geographical Coordinates 50°47'13.4"N, 3°35'09.8"W **OS Grid Reference** SX 8829 9981
Access An active golf course with easy walking access to the two sites of interest. Some wet ground in the lower part of the site. This is a private site and access must be negotiated with the owners.
Distance to walk: 0.37 miles (0.6 km) **Elevation changes:** 40 m (130 ft) **Time:** 1 hour
Conservation status None

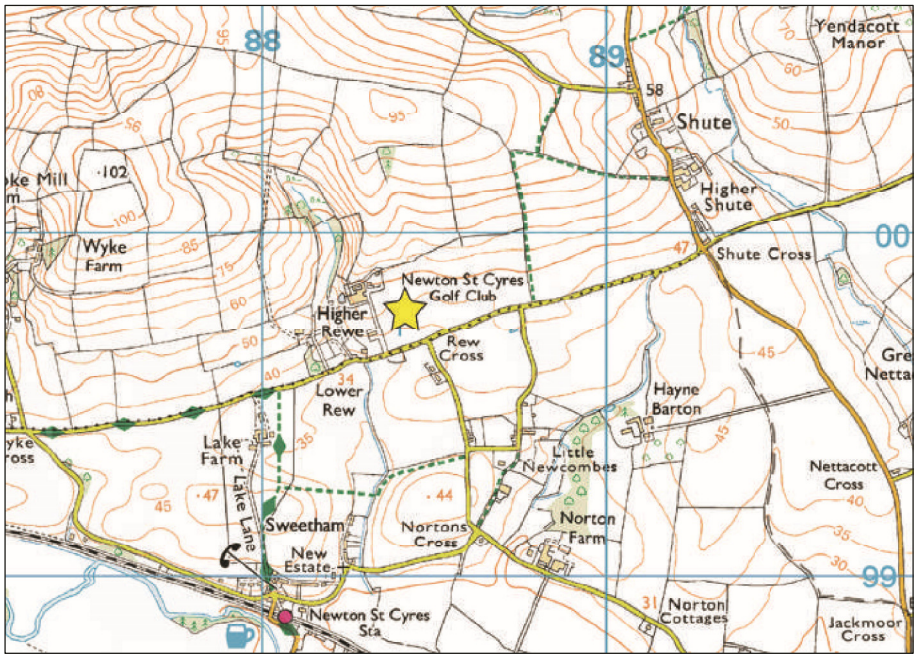

Figure. 5.10 Location map for Newton St. Cyres. © Crown Copyright/database right 2014. An Ordnance Survey / EDINA supplied service.

Directions

Leave the A377 Exeter to Crediton Road in Newton St. Cyres village and drive north towards Sweetham and the railway station. Turn right at the Beer Engine public house and at 0.37 miles (0.6 km) bear left to Rew Cross. The turn left and take the right hand turn into the golf course after 0.12 miles (200m). Park as directed by signs – not room for coaches.

Geology

The northern part of the golf course has been developed on the outcrop of the lower part of the Crediton Breccia Formation of mid- to late- Permian age. This formation includes some 240m (785 ft) of sedimentary breccia with a matrix of red silt, fine sand and clay with clasts dominated by rhyolite, quartz-porphyry, culm sandstone, vein quartz and slate. The lower part of the breccia, of which some 30m (100 ft) are exposed to the north of the 10th Tee (Figure 5.11a), shows abundant sub-rounded to sub-angular pale grey rhyolite clasts, with much culm sandstone and shale debris of local origin, with subordinate vein quartz, in a poorly sorted matrix of red-brown silt, sand and clay. The rhyolite is present in clasts up to small boulder size (Figure 5.11b), some showing flow banding and, more rarely, spherulitic textures (Figure 5.11c). The strata here are bedded in units up to 2m thick, commonly with coarse channel lags at the base.

The results of geochemical studies published in Edwards and Scrivener (1999) suggest that the rhyolite fragments found in the Crediton Breccia represent the erosion and transport of suprabatholithic volcanic rocks above the Dartmoor pluton. The evidence for this is based on Ar/Ar geochronology, which indicates an age of 279.7 +/- 1.4 for biotite from a clast from the Crediton Breccia. Also on the range of €Nd values for a number of clasts from the Crediton Breccia -4.4 to -5.2, which compares well with the Dartmoor granite value of -4.7.

The Crediton Breccia is probably the proximal part of an alluvial fan and the distal parts are represented by the Yellowford Formation which crops out to the east and is suggested to be its lateral equivalent. The Crediton Breccia was dominated by low and high viscosity debris flows in the west and tractional sheetfloods in the east. With increased organized fluvial sedimentation recognized through the formation it can be assumed that the fan became more distal.

The Crediton Breccia outcrop at Newton St. Cyres Golf Course is terminated by an E-W trending fault: to the south of this fault are outcrops of the overlying Newton St. Cyres Breccia and its down-fan lateral equivalent, the Shute Sandstone. Lithologies representative of these formations can

be seen in the embankment immediately to the west of the Golf Course reception office and café (Figure 5.11d).

The Shute Sandstone consists of unconfined sheetflood deposits and is indicative of a distal alluvial fan setting. Its coarser equivalent, the Newton St. Cyres Breccia was part of a fan system overlying the Crediton Breccia. The Newton St. Cyres Breccia is distinctive in that it contains much granitic debris: clasts include shale, slate, pelitic hornfels, chert, potassium feldspar, vein quartz, quartz-porphyry, acid lava and tuff, microgranite and tourmalinised igneous rocks. Of particular note is the presence of 'Murchisonite' pink cleavage fragments of potassium feldspar (perthite) (Figure 5.11e). The Newton St. Cyres is interpreted to represent the earliest evidence of unroofing of the Dartmoor which, on palynological evidence (Edwards and Scrivener, 1999) took place in the mid-to late- Permian (G. Warrington, personal communication).

The Shute Sandstone is a reddish-brown silty sandstone and sandy siltstone. The sandstones contain red-stained quartz grains with flakes of mica. Generally the sandstones are moderately to well sorted and cross-bedding is sometimes present, therefore deposition from unconfined tractional sheetfloods is suggested with a possible source from the west.

Literature

EDWARDS, R. A. and SCRIVENER, R. C. 1999. The geology of the country around Exeter. *Memoir of the British Geological Survey*, Sheet 325 (England and Wales).

USSHER, W A E. 1902. The geology of the country around Exeter. *Memoir of the Geological Survey of Great Britain*, Sheet 325 (England and Wales).

Figure 5.11 (a) Exposure of the lower part of the breccia near the 10th tee. **(b)** Large clast of rhyolite (right hand side) seen within the breccia. Clasts range in size but can reach up to small boulder sizes. **(c)** Flow banding and spherulitic textures within a rhyolite clast. Penny for scale. **(d)** Newton St. Cyres breccia and the Shute Sandstone exposed towards the café. **(e)** Fragment of perthitic alkali feldspar within the Newton St. Cyres Breccia.

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