Robeston Wathen

[SN 084 161]

Introduction

Robeston Wathen is an important locality for showing the stratigraphical and age relationships of the Robeston Wathen Limestone (one of the few coral-rich units in the Anglo-Welsh Ordovician) to other divisions in the Ashgill of Wales.

This is the type locality for the Robeston Wathen Limestone. The formation had been noted by Murchison (1839, p. 397), who described it as 'beds of black limestone two, three and five feet thick alternating with dark grey shale, passing upwards into sandy flags', and attributed it to the Llandeilo Flags. Lonsdale (in Murchison, 1839, p. 687, pl. *16bis,* fig. 12) described and figured the coral '*Porites*' (now *Heliolites*) *inordinatus* from this locality, later redescribed in Milne Edwards and Haime's monograph (1855, p. 253, pl. 57, figs 7 and 7a). *Halysites catenularius* (Linnaeus) was also noted from here (Milne Edwards and Haime, 1855, p. 270). Phillips (1848, p. 220), like Murchison, mentioned black limestone with corals and fossiliferous shales at Robeston Wathen.

The first detailed description and section of the site was by Marr and Roberts (1885, p. 479, pl. 15, fig. 3), who proposed the name 'Robeston Wathen Limestone'; they considered it to be a calcareous development at the top of the *Dicranograptus* (now Mydrim) Shales, directly overlain by the Sholeshook Limestone. A fuller description was given by Jones (in Strahan *et al.,* 1914, p. 57), who evidently believed it to succeed the *Dicranograptus* Shales. A modern reassessment by Price (1973a, p. 232) described the succession and gave vertical sections through the Robeston Wathen Limestone and succeeding Sholeshook Limestone (Figure 8.24). He showed that the latter formation, following Marr and Roberts (1885), directly overlies the Robeston Wathen Formation in a calcareous mudstone facies. On the basis of the trilobite faunas, Price (1973a, fig. 6) correlated the Robeston Wathen and Sholeshook limestones at this locality with the Cautleyan Stage. This assessment was supported by Orchard (1980, p. 13) and by Savage and Bassett (1985, p. 680) on the basis of conodont faunas from the Robeston Wathen Limestone. Having re-examined the trilobite fauna (Price, 1974, 1977, 1980b), Price (1980a) revised the age of the top of the Sholeshook Limestone at Robeston Wathen as Rawtheyan Zone 5.

Description

A succession extending from the Robeston Wathen Limestone Formation through the Sholeshook Limestone Formation and the Slade and Redhill Mudstone Formation is exposed in old quarries and the adjacent dingle north of Robeston Wathen church (Figure 8.24). The strata dip SSW at 35–40°. The junction between the base of the Robeston Wathen Limestone and the underlying Mydrim Shales is not exposed, but a small outcrop of the latter [SN 0844 1622] was noted by Jones (in Strahan *et al.,* 1914, p. 45, Geological Survey locality 29NWλ2) 46 m north of the quarry. Smooth, flaggy black shales here yielded graptolites, including *Diplograptus multidens* Elles and Wood, *Climacograptus* and *Dicranograptus.* It is not known whether the succession below the Robeston Wathen Limestone is complete or if there is a break (for discussion of this interval at Pengawse Hill, Whitland, see Zalasiewicz *et at.,* 1995).

The Robeston Wathen Limestone Formation is exposed in two disused quarries [SN 0837 1618] and [SN 0847 1615] on either side of the dingle about 400 m north of Robeston Wathen; that on the east side is the one referred to by Marr and Roberts (1885, p. 479) when they proposed the name. The sequence comprises some 8 m of alternations of thick beds of tough, dark-coloured, medium- to coarse-grained limestone with generally much thinner beds of dark-coloured calcareous shale (Price, 1973a, p. 232). The limestone beds are particularly rich in halysitid corals, with subordinate numbers of other tabulate corals and brachiopods. Conodonts include *Amorphognathus ordovicicus* Branson and Mehl (Savage and Bassett, 1985) and species of *Plectodina, Birksfeldia* and *Walliserodus* (Orchard, 1980).

The Robeston Wathen Limestone passes upwards gradationally into about 4 m of deeply-weathered calcareous mudstones and silty rottenstones that are richly fossiliferous and are considered to be a development of the Sholeshook

Limestone (Figure 8.24), this conclusion being based on stratigraphical, lithological and faunal grounds (Price, 1973a, p. 233). The trilobite fauna includes the trinucleid *Tretaspis hadelandica brachystichus* Ingham, which is diagnostic of the Rawtheyan Stage in northern England, and its presence is taken as evidence for that stage at this locality (Price, 1980a). These beds are well exposed in the steep bank between the western of the two quarries and the stream.

The junction with the overlying Slade and Redhill Mudstone Formation is a sharp plane of contact, seen in the section about 10 m southeast of the western quarry. Immediately above is a very thin and inconstant conglomeratic horizon, and Price (1973a, p. 233) suggested that together these features indicate the possibility of at least a slight stratigraphical break. However, the presence of *Flexicalymene cavei* Price in the basal mudstone above the contact suggests that the break, if present, is of no great magnitude, for that species ranges no higher than Rawtheyan Zone 5 (Price, 1980a, p. 486), the age of the top of the underlying Sholeshook Limestone here. There are further outcrops of the Slade and Redhill Mudstone Formation in the sides of the dingle to the south e.g. [SN 0843 1605], [SN 0843 1601] and [SN 0845 1588], and Jones (in Strahan *et al.,* 1914, p. 69) estimated a thickness of 137 m of strata between the top of the Robeston Wathen Limestone and the base of the Llandovery. Little work has subsequently been done on the Slade and Redhill strata. The sequence is essentially blue-grey mudstones with thin micaceous bands in the lower part, and hard bands of predominantly grey and brown sandstones in the upper (Jones, in Strahan *et al.,* 1914, p. 70), in which fossils are more abundant and include trinucleid and calymenid trilobites. These have not been studied, although all of this succession is probably of Rawtheyan age, including, according to Cocks and Price (1975, p. 709), the highest beds of the formation.

Interpretation

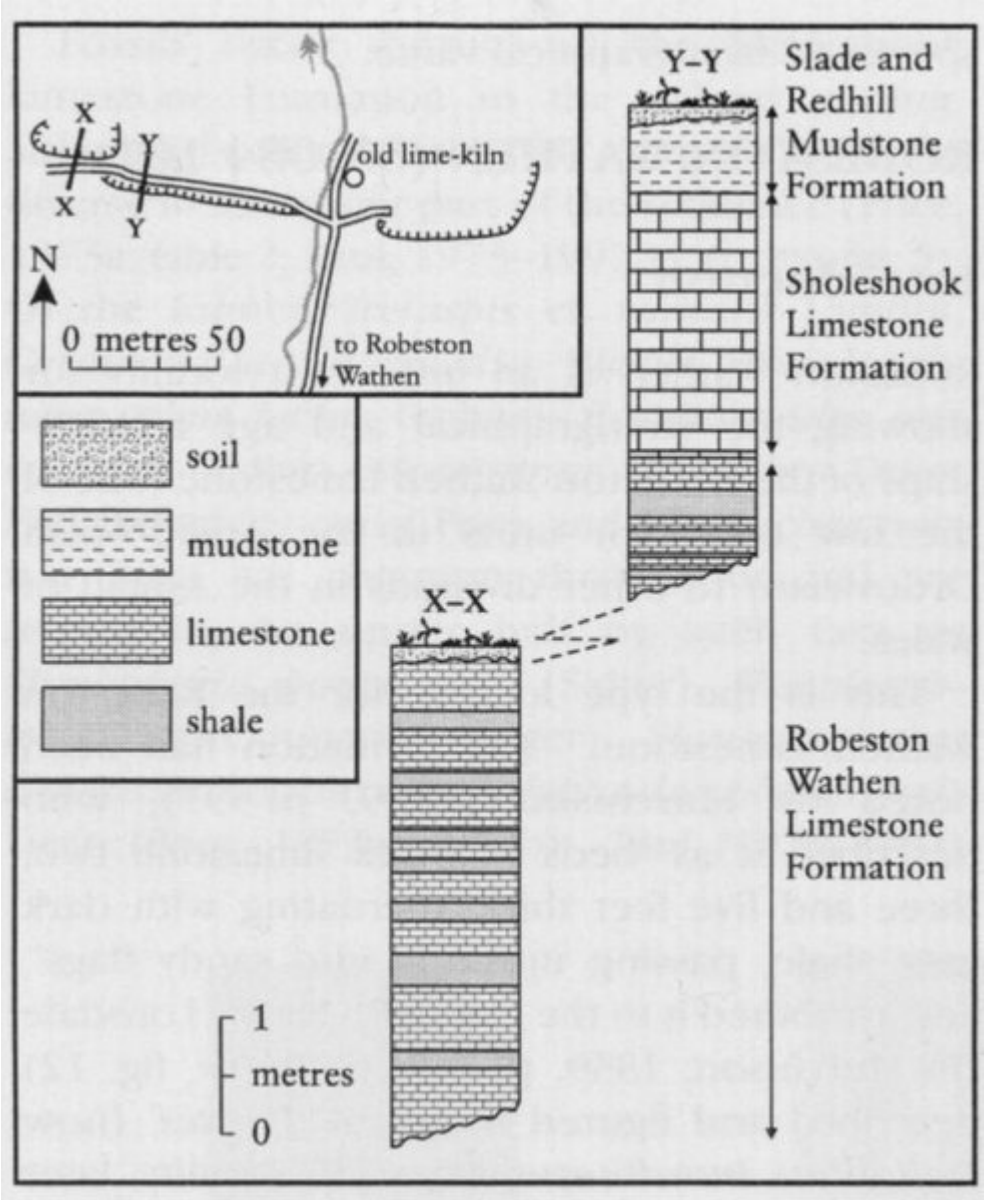
The transition from the black graptolitic Mydrim Shales into the carbonates and calcareous mudstones of the Robeston Wathen and Sholeshook limestone formations probably relates to a general shallowing and perhaps a cooling event (see Mylet Road site report; Zalasiewicz *et al.,* 1995, p. 616); whether there is a break in succession is not known. The Robeston Wathen Limestone is a locally developed carbonate facies, rich in corals, that is particularly well developed and well known at this locality but is reported to crop out elsewhere (Strahan *et al.,* 1909, 1914). It appears that locally, as here, conditions favourable to corals prevailed, although nowhere do they form reefs. Several taxa are common to coeval horizons elsewhere, such as the Portrane Limestone in eastern Ireland (Somerville, in Harper and Owen, 1996, pp. 40, 46). The Sholeshook Limestone equivalents and the overlying Slade and Redhill Mudstone are all generally shallow-water platform deposits with rich shelly faunas.

The special significance of this section lies in the abundance of corals in the Robeston Wathen Limestone (an unusual feature in the British Ordovician), the demonstration of the stratigraphical relationship between the Robeston Wathen and Sholeshook limestones, and the presence at the top of the latter of trilobites indicative of a Rawtheyan age, demonstrable at only a few other localities. Potentially it may be possible to show here whether the succession below the Robeston Wathen Limestone is conformable with the underlying Mydrim Shales, as is apparently the case below the Sholeshook Limestone at Pengawse Hill (Zalasiewicz *et al.,* 1995, p. 616).

Conclusions

Robeston Wathen is, stratigraphically and palaeontologically, an important locality It is the type locality for the Robeston Wathen Limestone, an unusual coral-rich facies of the Ordovician in Britain, and is one of the few localities where the stratigraphical relationships and age of the Upper Ordovician limestones of South Wales can be discerned.

References



(Figure 8.24) The geological succession north of Robeston Wathen, after Price (1973a).