Rumney Quarry

[ST 215 788]

Introduction

Rumney Quarry is situated in the Silurian inlier of the Cardiff district, the general geology and stratigraphy of which are depicted in (Figure 4.19), (Figure 4.20) and (Figure 4.21) and brief comment on which is included under the description of the Penylan Quarry site.

In some of the literature, especially the older papers, Rumney Quarry is referred to as Ty-mawr Quarry. Most relevant references for the site are the same as those for Penylan Quarry: Sollas (1879), which was the most comprehensive work on the Cardiff Silurian until recently; Strahan and Cantrill (1902, 1912), in which the Silurian succession of this area was detailed and which leaned to a large extent on the results of Sollas; Bassett (1969), wherein it was proved that rocks in the inlier were no older than Wenlock, and Bassett (1974a), which contained a summary stratigraphy for this series in the area; lastly, but most importantly, Waters and Lawrence (1987), in which the lithostratigraphy, biostratigraphy and facies interpretations of the Cardiff Silurian were revised in modern terms.

All the above works include specific description of the strata in Rumney Quarry, which exposes mainly the Rhymney Grit of the Cae Castell Formation, a distinctive, laterally persistent member within the upper Wenlock strata of the inlier.

Description

In the Cardiff area, the Cae Castell Formation as a whole consists of 70–80 m of sandstones and siltstones, with subordinate mudstones, thin sandy and conglomeratic limestones, a thin ironstone and a bentonite (Waters and Lawrence, 1987). The Rhymney Grit varies in thickness in the inlier between 6 m in the Rumney Borehole (Waters and White, 1980) and probably almost 20 m in the west of the area at Roath Park Lake (Storrie, 1908). The strata comprising this grit are, overall, grey, buff-weathering, variably calcareous, cross-bedded and variably laminated medium-, sometimes fine- or coarse-grained to pebbly sandstones; it also contains scattered mudstone partings.

Rumney Quarry itself (Figure 4.22) was developed in the 19th century for extraction of road-stone. The Rhymney Grit and slightly younger beds of the Cae Castell Formation made available by the quarry dip north-east at about 30° and represent part of the northern limb of an anticline, the approximately E–W trending axis of which runs just to the south (see site report for Penylan Quarry). The following is a recent log (Waters and Lawrence, 1987) of the section.

Beds/lithology/fauna	Thickness (m)
Sandstone; green-grey, fine-grained, in wave-rippled units up to 0.5 m thick, and as thin beds and laminae with scattered thin mudstone beds and partings; scattered *Orbiculoidea* sp. and cf. *Microsphaeridiorhynchus nucula;* moderately burrowed.	5.5
Mudstone; grey, silty with scattered streaks and very thin beds of sandstone; at the base is a 10 mm coarse sandstone with scattered quartz granules, mudflakes and phosphate nodules; scattered burrows; fauna includes *Lingula* sp., *Orbiculoidea* sp., cf. *M. nucula,* gastropod and bivalve fragments, *Pachytheca* sp. and other probable algal fragments.	0.5

Sandstone; yellow, fine-grained, homogenized by burrowing; top 0.14 m is the 'Ctenodonta Bed' of Sollas (1879) and contains '*Ctenodonta subaequalis*', cf. *M. nucula,* horny brachiopod fragments, a bellerophontid, *?Loxonema gracile,* *?L. hydropica* and *?Murchisonia elegans,* with homalonotid and probable algal fragments; wave-rippled and flaser-bedded packet in the middle.	1.67
Sandstone; buff, fine-grained, forming thin beds in subordinate silt-and sand-streaked mudstones; burrowed.	1.6
Mudstone; grey, scattered very thin sandstone beds and streaks.	0.3
Sandstone; buff, fine-grained, wave-rippled in part, a few mudstone partings; *Orbiculoidea* sp., *?Modiolopsis,* *?Nuculites* and algal fragments.	0.52
Rhymney Grit; sandstone; grey to buff, fine to medium-grained, trough cross-bedded, scattered lenticular units of wavy- to flaser-bedded sandstone with mudstone partings.	4.33

Sollas (1879) noted some further 7 m of Rhymney Grit below this section, describing it as massive sandstone, locally flaggy and rippled, in places a fine-grained conglomerate (Waters and Lawrence, 1987). The only complete section of the Rhymney Grit is that of the core from the Rumney Borehole (Waters and White, 1980; Waters and Lawrence, 1987; (Figure 4.21)). Excavations in February, 2000 in the quarry have exposed strata below the faces previously displayed (J. Davies, pers. comm.) but the precise nature of these and how they relate to the Rhymney Grit have yet to be determined.

Individual sets of cross-bedding within the Rhymney Grit are often graded, their bases having intraformational lags and locally showing irregular load casts, passing up into micaceous 'plant'-rich shaly partings; the lenticular units are up to 0.17 m thick. The top of the grit is somewhat gradational (as it is in the Rumney Borehole, with the base of the member in the borehole being sharply defined). Plant-like debris is common in the grit here and scattered crinoid columnals, bryozoans and indeterminate shell fragments are also present.

The fauna of the sandstones, siltstones and mudstones above the Rhymney Grit in the quarry is a low diversity one of inarticulate and articulate brachiopods (the latter represented more or less exclusively by the rhynchonellid cf. *M. nucula*), bivalves and gastropods. Four species of gastropod (*Holopella hydropica, H. gracilis, H. minuta* and *Murchisonia elegans*), together with one species of bivalve (*Modiolopsis acutipora*) were established by Sollas (1879) on the basis of material from the Ctenodonta Bed here, from which he listed 19 species of invertebrates and plants/algae.

Specific descriptions of the plant/algal material from Rumney Quarry, for example of *Prototaxites storriei* and specimens of *Pachytheca,* have been made, by Harris (1884), Barber (1891, 1892) and Storrie (1892). The sporomorphs from here have recently been described by Burgess and Richardson (1995).

Interpretation

In terms of the Cardiff Silurian succession, the Cae Castell Formation in Rumney Quarry succeeds the Pen-y-Lan Mudstone. A Wenlock age can be assigned to the Rhymney Grit and younger beds of the Cae Castell Formation on the basis of acritarchs from the Rumney Borehole (Waters and White, 1980; Waters and Lawrence, 1987); in particular, the upper part of the formation is of late Wenlock age. The formation is constrained in age also by the mid- to late Wenlock age of the Pen-y-Lan Mudstone below, together with the early Gorstian, Ludlow age of the overlying Hill Gardens Formation, the latter assignment being based on acritarch and graptolite evidence from the borehole (Waters and Lawrence, 1987). The Cae Castell Formation can thus be regarded as a late Wenlock equivalent of the Much Wenlock Limestone Formation of the Welsh Borderland (Waters and Lawrence, 1987), the latter formation ranging from the *lundgreni to ludensis* biozones (see Dudley and Easthope–Harley Hill site reports). One report (Cocks *et al.,* 1992) has the Cae Castell formation spanning this time, with the Rhymney Grit being approximately of *lundgreni* Biozone age.

Another age assessment of the Rhymney Grit (Burgess and Richardson, 1995), based on sporomorphs, gives it as being no older than the *nassa* Biozone.

The Rhymney Grit is interpreted as a major subtidal sand bar, with the trough cross-bedding and other sedimentary structures indicating a high-energy environment (Waters and Lawrence, 1987). It represents a rapid shallowing event after the slightly more offshore, deeper conditions under which the Pen-y-Lan Mudstone was deposited. The presence of plant/algal remains and sporomorphs, and the rather fragmentary, low diversity nature of its fauna, accords with this nearshore, high-energy interpretation. The Cae Castell Formation sediments above the Rhymney Grit in Rumney Quarry formed in a shallow water, inner shelf situation.

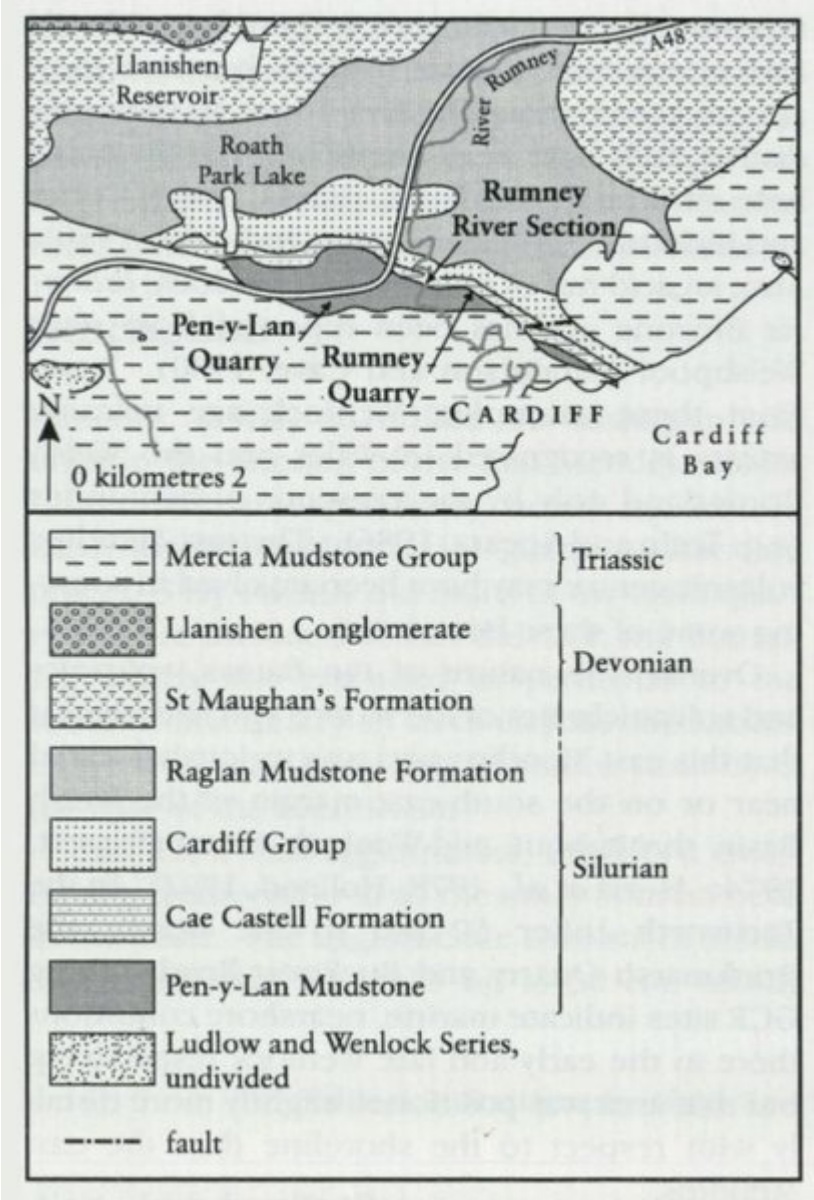
Palaeogeographically, during this late Wenlock time the inshore facies of the Rhymney Grit marks the southern boundary of the Welsh Basin, that is the northern margin of Pretannia, the shoreline running roughly east to west through the Cardiff district (Bassett, 1974a; Hurst *et al.,* 1978; Siveter *et al.,* 1989; Holland, 1992). Other Wenlock age sites in the Bristol Channel area that reflect the proximity of Pretannia include those of Brinkmarsh Quarry and the Buckover Road Cutting to the east, in the Tortworth area.

Rumney Quarry has Wenlock strata intermediate in age between those at the Penylan and the Rumney River sites, the latter exposing higher beds of the Cae Castell Formation.

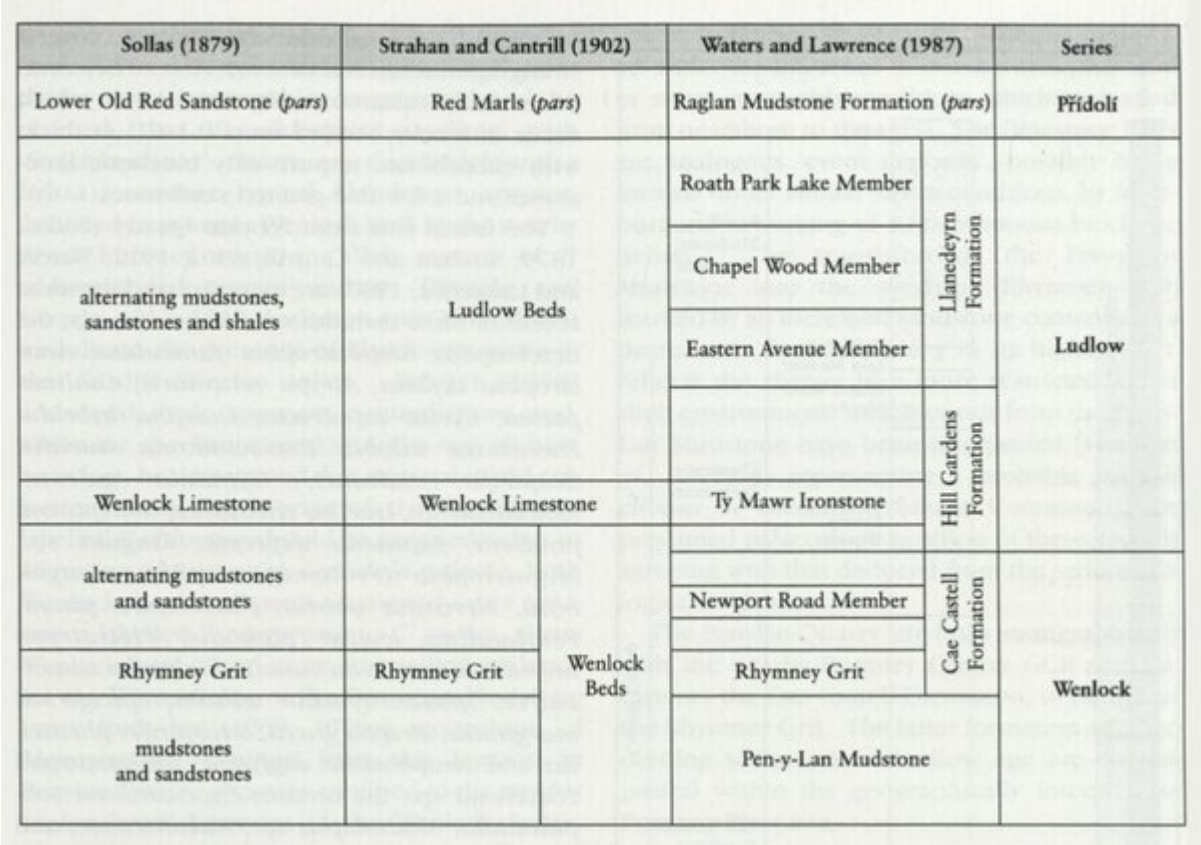
Conclusions

The Rhymney Grit, an important, distinctive late Wenlock elastic fades found in the Cardiff area, has its only surface exposure in Rumney Quarry. This lithostratigraphical unit, combined with its restricted fauna and the occurrence of plant/algal remains and sporomorphs, is of prime importance in palaeoenvironmental and palaeogeographical interpretations for this time concerning the position of the southern margin of the Welsh Basin and the bordering landmass of Pretannia. Additionally, the Cae Castell Formation strata exposed in the quarry complement those Wenlock sediments of the Penylan Quarry and River Rumney sites to give full stratigraphical and lithological coverage of Wenlock age rocks for the southern Wales region. Rumney Quarry is also the type locality for certain mollusc species and the presence of early plant/algal remains together with sporomorphs is noteworthy in a palaeobotanical context.

References

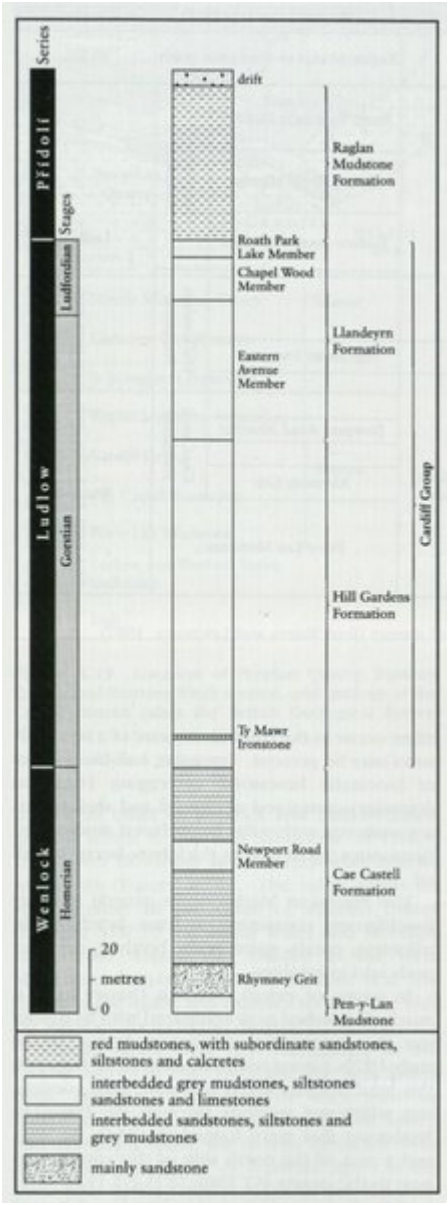


(Figure 4.19) Location of Penylan Quarry, Rumney Quarry and Rumney River section, and geology of the Cardiff district (after the British Geological Survey, 1986).



Sollas (1879)	Strahan and Cantrill (1902)		Waters and Lawrence (1987)		Series
Lower Old Red Sandstone (*pars*)	Red Marls (*pars*)		Raglan Mudstone Formation (*pars*)		Přídolí
alternating mudstones, sandstones and shales	Ludlow Beds		Roath Park Lake Member	Llanedeyrn Formation	Ludlow
			Chapel Wood Member		
			Eastern Avenue Member		
				Hill Gardens Formation	
Wenlock Limestone	Wenlock Limestone		Ty Mawr Ironstone		
alternating mudstones and sandstones		Wenlock Beds		Cae Castell Formation	Wenlock
			Newport Road Member		
Rhymney Grit	Rhymney Grit		Rhymney Grit		
mudstones and sandstones			Pen-y-Lan Mudstone		

(Figure 4.20) Silurian stratigraphy of the Cardiff district (fom Waters and Lawrence, 1987).



(Figure 4.21) Silurian stratigraphy of the Rumney Borehole, Cardiff District (after Waters and Lawrence, 1987).

(Figure 4.22) Rumney Quarry, Cardiff district. Showing the Rhymney Grit and overlying strata. (Photo: Derek J. Siveter.)