

Sollas (1879)	Strahan and Cantrill (1902)	Present		Series	
Lower Old Red Sandstone (<i>pars</i>)	Red Marls (<i>pars</i>)	Raglan Mudstone Formation (<i>pars</i>)		PRIDOLI	
Alternating mudstones, sandstones and shales	Ludlow Beds	Roath Park Lake Member	Llandeyrn Formation	LUDLOW	
		Chapel Wood Member			
		Eastern Avenue Member			
			Hill Gardens Formation		
Wenlock Limestone	Wenlock Limestone	Ty Mawr Ironstone			
Alternating mudstones and sandstones		Wenlock Beds	Newport Road Member	Cae Castell Formation	WENLOCK
Rumney Grit	Rumney Grit		Rumney Grit		
Mudstones and sandstones			Penylan Mudstone		

Table 1 (above); Silurian nomenclature.

The Silurian System in Cardiff

Simon Smith

Penylan Mudstone

The Penylan Mudstone is a new term for the richly fossiliferous mudstones with scattered thin beds of sandstone that occur beneath the Rumney Grit. The base of the formation has not been proved. The designated type locality is a cutting (ST1906 7875 – 1923 7876) on the northern side of the Eastern Avenue at Penylan. The outcrop is visible from the Ty Gwyn road bridge crossing the Eastern Avenue. The thickness is assumed to be 225m at maximum.

Mudstones account for 80 – 90% of the formation. They are grey when fresh, but weather grey - green, olive green and buff and are locally affected by Triassic staining. They are variably calcareous and silty, in parts grading into siltstone. The mica content is variable.

Two mudstones types can be differentiated but there are gradations between. The first and most prevalent occurs in massive, but poorly defined blocky beds 10 – 45cm thick. It is characterised by burrowing, mainly dominated by *Chondrites*; bedding

within the mudstones is locally preserved as thin wisps and streaks of siltstone, whilst shelly fossils commonly broken are scattered randomly. The second occurs in thinner blocky beds 2 – 7 cm thick. The fauna is sparser and there is little bioturbation.

The sandstones within the formation occur as distinct, laterally persistent, parallel sided beds 2 – 20cm thick, and exceptionally upto 60cm. They are variably calcareous, grey to greenish grey when fresh, but weathering buff and subject to Triassic staining. They are fine to very fine grained, some grading to siltstones.

Scattered within to bioturbated mudstones are irregular ball like masses of argillaceous bioclastic limestone, on average 10cm in diameter, developed along the bedding. The masses have diffuse margins and contain variable amounts of bioclastic material, predominantly crinoid and broken shelly debris. They appear to be the result of both mechanical and biological soft sediment disruption of original thin, parallel sided, silty limestone beds.

Bentonites were recorded during the excavations for the Eastern Avenue; they consist of pale blue green clay beds upto 85cm thick.

The junction with the Rumney Grit is abrupt. The Rumney borehole (ST2108 7925) showed fine to medium grained sandstones of the latter resting on interbedded thin sandstones and siltstones of the Penylan Mudstone.

This formation contains a rich high diversity fauna, predominantly of Brachiopods and Trilobites, but also corals, gastropods, bivalves cephalopods and bryozoa, graptolites are represented by only one species. The richest faunas have come from Penylan Quarry (ST1981 7873). Within the uppermost part of the formation this diverse fauna is replaced by a restricted assemblage of cf. *Microsphaeridorhyncus nucula*, *Atrypa reticularis*, crinoid columnals and the alga *Pathythea* sp.

Shelly fossils are characteristic of the late Wenlock. They are best correlated with the upper part of the Wenlock Shale or Wenlock Limestone. *M. flemingii* elsewhere ranges from the *Cyrtograptus rigidus* Zone to the *C. lundgreni* Zone. In this basis it appears that that the formation correlates with the upper part of the Coalbrookdale Formation (Homerian Stage) of the type area for the Wenlock Series, Much Wenlock, Shropshire.

The fauna of silty mudstones indicates accumulation in a shallow marine, mid – shelf. Low stress environment below normal wave base. The sand stones exhibit many of the features of the sub-littoral sheet – sandstones. Each sandstone represents a distinct ‘event’, probably due to storm wave activity accompanied by tidal or storm ebb when sand was brought onto the shelf from nearshore environments. The limestone beds are also ‘event deposits’ and are carbonate analogs of sub – littoral sheet-sandstones. They may represent storm events when there was insufficient energy to transport sand but sufficient to rework autochthonous bioclastic debris into carbonate sheet – sands.

The transition into the restricted, predominantly shallow water shelf facies of the overlying Cae Castell formation is manifested by less diverse fauna and increased sandstone content in the uppermost part of the formation.