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# Wernbongam

[SN 515 182]

## Introduction

This locality consists of a small quarry just south of Llanarthney in the Towy Valley, midway between Llandeilo and Carmarthen, south-central Wales. In terms of the regional geology it is located at the extreme western end of the outcrop of Llandovery to Ludlow age rocks which trends to the south-west from the Welsh Borderland and central Wales (Figure 4.46).

Murchison (1839) referred to the Silurian and Old Red Sandstone rocks of the Llandeilo–Llanarthney area, as did De la Beche (1846), Phillips (1848) and Symonds (1872). Phillips, for example, placed Llandovery ?, Wenlock and Ludlow strata in his Myddelton Series (see Squirrel and White, 1978), this series name being derived from Middleton Hall immediately east of Wernbongam. Cantrill and Thomas (in Strahan *et al.*, 1907) were the first to describe the geology of the area in detail and, with some additions (Price in Lawson *et al.*, 1956; Squirrel and White, 1978) the lithostratigraphical units they used for the Silurian are essentially those currently employed. Stamp (1923) and Straw (1930) discussed the nature of the base of the Old Red Sandstone in the area and the position, as then accepted, of the Siluro-Devonian boundary. Williams (1953) described the geology of the area around Llandeilo, including Wenlock rocks just to the east of Wernbongam. Bassett (1974a) subsequently commented on the Wenlock of the Llandeilo–Llanarthney district and the conclusions of Williams in his wide-ranging review of rocks of this age. Squirrel and White (1978), most recently, studied the geology of the Cennen Valley area, between Llandeilo and Llanarthney, this now being the standard work on this ground.

In the Llandeilo–Llanarthney area the Llandovery (?) to Ludlow age rocks form part of the vertical southern limb of the Towy Anticline, along which they are affected by numerous dextral and sinistral wrench faults, for example the (dextral) Wernbongam Fault immediately west of Wernbongam Quarry (Figure 4.47). The Wenlock rocks of this area are steeply dipping, have a narrow outcrop varying in width between 130 and 240 m, and range in thickness between 130 and 260 m, being about 150 m thick in the vicinity of the quarry.

Williams (1953) divided the Wenlock of the Llandeilo area into lower and upper units, the two being separated by an unconformity. Bassett (1974a) maintained these two broad lithological divisions throughout most of the tract covered by Williams — that is the area from just to the south-west of Llandeilo, north-east to Llangadog — but he supported the presence of a break between them only in the south-west, where the lower unit disappears beneath the upper one which overlaps it. Squirrel and White (1978), however, found no evidence in the Cennen Valley area for dividing the Wenlock as had Williams in the country a short distance to the east.

Fringing the Llandovery to Ludlow age strata to the south is the Old Red Sandstone, which about 1.5 km west of Wernbongam completes its south-westerly overstep onto progressively older Silurian strata, thereafter resting on the Ordovician (Figure 4.47). The rocks at the base of the Old Red Sandstone in the Llandeilo–Llanarthney area are of Pridoli age. They begin with the Tilestones followed by the Green Beds of the Raglan Marl Group, the succeeding Pridoli sediments passing conformably upwards into Ditton strata then beds of younger (Devonian) age. The boundary between the Tilestones and the Green Beds is conformable and transitional in the immediate vicinity of the Cennen Valley. Between this valley and Wernbongam to the west, the Tilestones, and rocks of the Ludlow Series, are cut out by overstep of the Green Beds (Figure 4.48).

Wernbongam Quarry, then, exposes Wenlock Series strata in the most western part of the main, Anglo-Welsh Silurian outcrop. Rocks belonging to this series do not reappear farther to the west until the Pembrokeshire (Dyfed) coast, some 50 km away. The quarry is generally thought, additionally, to contain Old Red Sandstone of Pridoli age, though the beds in question have been regarded by some authors as a continuation upwards of the Wenlock succession.

## Description

The lower beds comprise about 5 m of steeply dipping Wenlock siltstones and silty mudstones. Common faunal elements are *Homoeospirifer subinsignis*, *Marklandella giraldi*, *Meristina obtusa* and *Protochonetes* sp., whilst *Atrypa reticularis*, *Coolinia pecten*, *Leptaena* cf. *depressa*, *Pholidostrophia* (*Mesopholidostrophia*) sp., *Strophonella euglypha gentilis*, *Cornulites serpularius*, *Favosites* sp. and *Poleumita globosa* are also present.

Overlying the Wenlock strata are the near vertically dipping Green Beds, which comprise a basal conglomeratic sandstone and siltstones of Pŷdŷlí age. Squirrell and White (1978) have described the contact between these two units here as sharp and uneven, and they detected also the presence of a slightly angular unconformity.

## Interpretation

The Wenlock strata in the Llanarthney district that contain a *Salopina conservatrix* brachio pod community (of Calef and Hancock, 1974), as do those at Wernbongam Quarry, are from a level high in the local Wenlock, though the absence of identifiable graptolites from the whole of the Wenlock succession of the Cennen Valley area has prevented assignment of a more precise age for these rocks (Squirrell and White, 1978). One report (Hurst *et al.*, 1978), however, has the *Salopina* Community of this general area occurring at about the level of the *ellesae–lundgreni* boundary. Also, Bassett (1974a) claimed that Wenlock strata at least as young as the *linnarssoni* Biozone were present to the east in the Bethlehem Outlier, 3 km to the south-west of Llangadog.

During the Wenlock the Llandeilo–Llanarthney area was positioned a relatively short distance offshore, north of the Pretannia landmass (Bassett, 1974a; Hurst *et al.*, 1978; Holland, 1992). Moderately deep water was present here *at times*, a *Dicoelosia biloba* Community occurring, for example, towards the base of the local Wenlock, though shallower water is indicated later in the Wenlock by the *Salopina* Community (Squirrell and White, 1978; Hurst *et al.*, 1978).

It has been claimed (Hurst *et al.*, 1978) that the siltstones and conglomerates of Old Red Sandstone facies type at Wernbongam are possible lateral equivalents of the upper parts of the regressive, late Wenlock Ffinnant Sandstone Formation of the Sawdde Gorge, the latter being located some 25 km along strike to the east, 3 km to the SSE of Llangadog. The same authors, further, compared this apparently early, pre-Ludlow onset of non-marine conditions in the Wernbongam area with the coeval onset of such conditions in parts of Pembrokeshire (see Walmsley and Bassett, 1976; and the Marloes and Freshwater East (South) site reports herein). Such a timing of the beginning of Old Red Sandstone conditions in certain parts of Wales, and the notion that sediments of this type are transitional from underlying marine rocks of undoubted Wenlock age, has been argued against on a regional basis (Allen and Williams, 1978). Also, failure to recognize the presence of an unconformable Old Red Sandstone at Wernbongam is at odds with more than a century of geological mapping in the region.

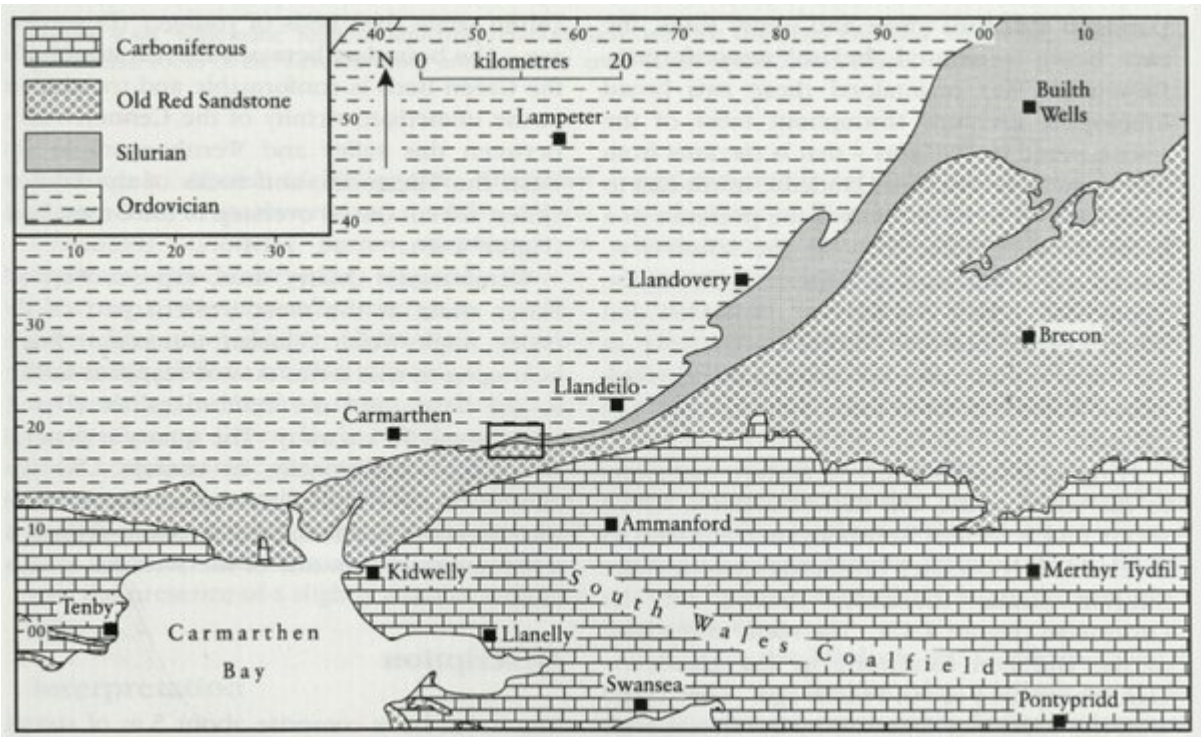
The present site is most closely networked to that of the River Sawdde, which, however, shows a much fuller succession, having a sequence of beds representing the whole of the Wenlock, and strata belonging to the Llandovery, Ludlow and Pŷdŷlí series too. Wernbongam is located about midway along strike between the Pembrokeshire sites of Wenlock age and those representing this series in the Builth area (Trecoed–Castle Crab, Pen-cerig, Coed-mawr, Dulas Brook, River Irfon). It has much more in common with the Pembrokeshire localities, which are characterized by medium to coarse elastic facies and shelly faunas. The Builth sites, as a whole, have mainly fine, offshore muds together with rarer carbonate rich horizons, and the fauna there is largely graptolitic with some shelly component. The Pembrokeshire localities also, like Wernbongam, take in the Old Red Sandstone, whereas Builth lies to the north of the regional outcrop of this major division.

## Conclusions

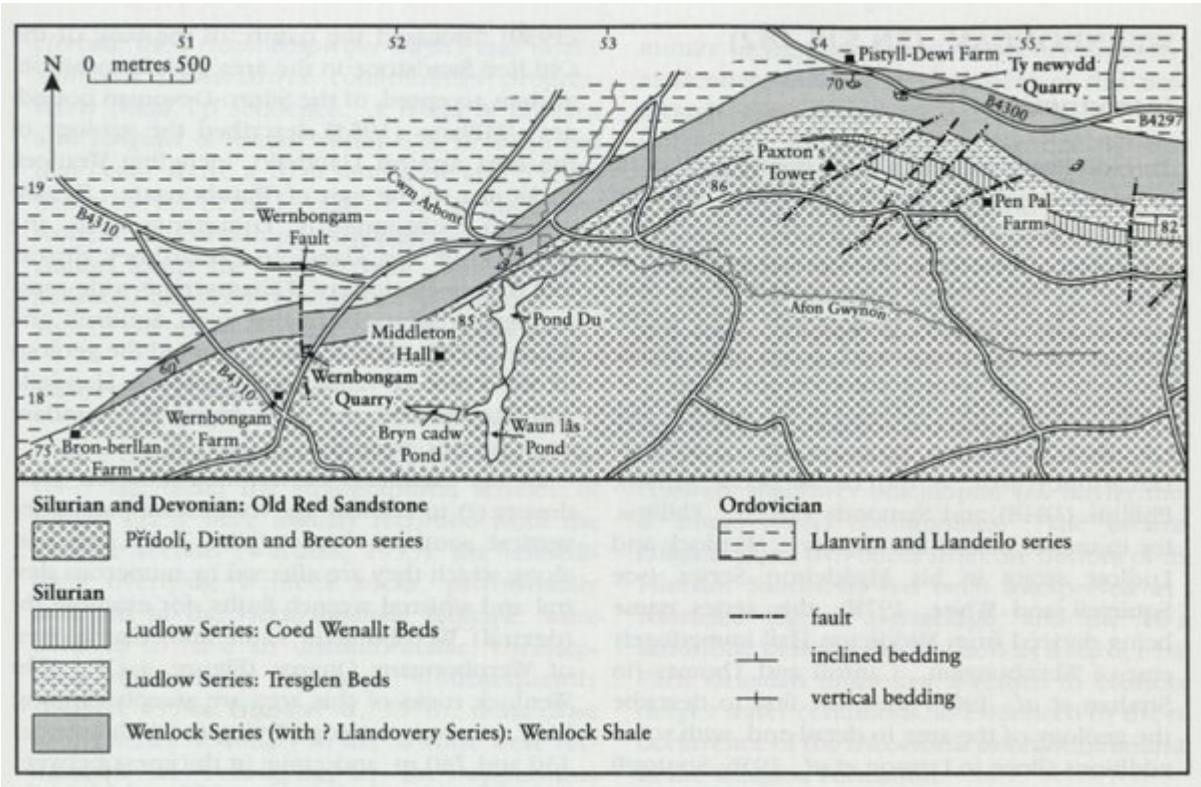
Wernbongam Quarry is generally considered to expose both Wenlock and Old Red Sandstone, Pŷdŷlí age, strata, with slight angular unconformity between the two. It is located at the most westerly end of the main, Welsh Borderland to south-central Wales outcrop of Wenlock rocks, before these are hidden immediately to the west by the Old Red

Sandstone that oversteps them. A different interpretation has the Old Red Sandstone facies strata of the upper part of the succession at Wernbongam as also being of Wenlock age, and transitional from the marine, incontrovertibly Wenlock rocks beneath them. The quarry thus has import for this time period concerning interpretation of the regional stratigraphy and geological history of this part of the Welsh Basin.

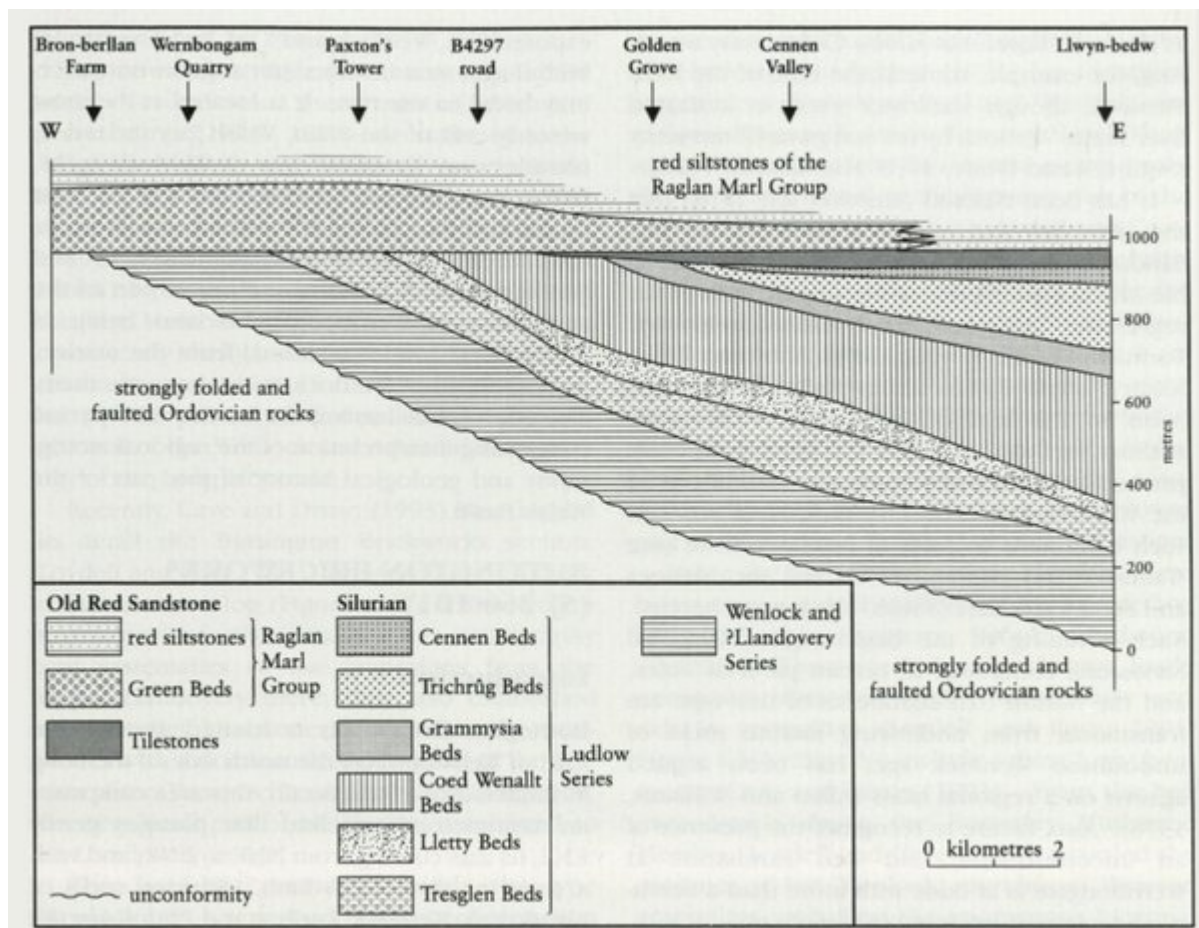
References



(Figure 4.46) Geology of south-central Wales and location (rectangle, see (Figure 4.47) of Wernbongam (after Squirrell and White, 1978).



(Figure 4.47) Geology of the area in the vicinity of Wernbongam Quarry, Llandeilo area (after Squirrel and White, 1978).



(Figure 4.48) Schematic section depicting relationships between the basal Old Red Sandstone, Silurian and Ordovician rocks of the Cennen valley and adjacent areas (after Squirrell and White, 1978).