

The type Ludlow Series: Pitch Coppice Quarry

Pitch Coppice Quarry [SO 4723 7298], a disused quarry about 4.5 km WSW of Ludlow, is the boundary stratotype for the bases of the Ludlow Series, the Gorstian Stage and the Lower Elton Formation. Select '[Pitch Coppice Quarry - vertical section](#)' to display the section, and '[Ludlow Anticline](#)' to display the location of Pitch Coppice Quarry.

Beds exposed in the quarry have yielded shelly faunas, graptolites, chitinozoa and conodonts. A prominent bentonite is present, forming bed F2, and samples from the Wenlock and Ludlow strata of the quarry have been analysed for their carbon isotope composition.

Pitch Coppice Quarry is a Site of Special Scientific Interest. See Siveter *et al.* (1989) for details.

Siveter, D.J., Owens, R.M. & Thomas, A.T. 1989. *Silurian field excursions: a geotraverse across Wales and the Welsh Borderland*. National Museum of Wales, Geological Series No. **10**, Cardiff, 133pp.

See: [Boundary stratotype for the base of the Ludlow Series and Gorstian Stage, Lower Elton Formation, Ludlow Anticline, Pitch Coppice Quarry - bentonites, carbon isotopes, chitinozoa, conodonts, graptolites, lithostratigraphy, shelly fauna, vertical section.](#)

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Pitch Coppice Quarry - lithostratigraphy

The section in Pitch Coppice Quarry comprises the highest 3.35 m of the Much Wenlock Limestone Formation, overlain by the lowest 1.76 m of the Lower Elton Formation. In detail, the succession is as follows (Lawson & White 1989; after Holland *et al.* 1963).

Bed	Lithology	Thickness	
F4	soft, olive, calcareous shaly siltstones; with limestone lenses; shell fragments	1.00 m (seen)	
F3	silty shales and nodular limestones; numerous shells and corals	0.50 m	Lower Elton Formation
F2	bentonite	0.01 m	
F1	shales with nodular limestones; numerous shells and corals	0.25 m	
E	hard crystalline limestone; poorly fossiliferous	0.15 m	
D3	nodular limestones with occasional thin shale partings; sparsely fossiliferous	0.45 m	
D2	as for D3	0.75 m	
D1	as for D3; 3 cm shelly limestone at base	0.70 m	
C	soft light olive-grey, calcareous shaly siltstones (eroded to form conspicuous recess in quarry face)	0.20 m	Much Wenlock Limestone Formation
B	limestone; poorly fossiliferous, with scattered shells	0.25 m	
A	massive grey nodular limestone; poorly fossiliferous, with scattered shells	0.85 m (seen)	

Holland, C.H., Lawson, J.D & Walmsley, V.G. 1963. The Silurian rocks of the Ludlow district, Shropshire. *Bulletin of the British Museum (Natural History)*, Geology, **8**, 95-171, pls 1-7.

Lawson, J.D. & White, D.E. 1989. The Ludlow Series in the Ludlow area. *In* Holland, C.H. & Bassett, M.G. (eds) *A global standard for the Silurian System*. National Museum of Wales, Geological Series No. **9**, Cardiff, 73-90.

See: [Lower Elton Formation, Pitch Coppice Quarry - vertical section](#).

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Pitch Coppice Quarry - shelly faunas

Although there is a faunal change from coral and large brachiopod-dominated faunas in the upper Wenlock to small brachiopod-dominated faunas in the lower Ludlow (*Glassia obovata* Association), the change is not readily apparent at Pitch Coppice Quarry (Lawson & White 1989). *Aegiria grayi* (Davidson), for example, a small, probably epiplanktonic brachiopod which is characteristic of Lower Elton faunas, only occurs in the Much Wenlock Limestone Formation, whereas corals and large strophomenid brachiopods such as *Leptaena depressa* (J. de C. Sowerby) and *Strophonella euglypha* (Hisinger) are present in the Lower Elton Formation. Select '[Faunal distribution across the Wenlock-Ludlow boundary](#)' for a table of shelly fossil occurrences.

Lawson, J.D. & White, D.E. 1989. The Ludlow Series in the Ludlow area. In Holland, C.H. & Bassett, M.G. (eds) *A global standard for the Silurian System*. National Museum of Wales, Geological Series No. 9, Cardiff, 73-90.

See: [Faunal distribution across the Wenlock-Ludlow boundary, *Glassia obovata* Association, Pitch Coppice Quarry - vertical section.](#)

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Pitch Coppice Quarry - graptolites

?*Saetograptus* (*Colonograptus*) *varians* (Wood) and ?*Neodiversograptus nilssoni* (Barrande) have been found respectively 0.03 m and within 0.23 m above the base of the Ludlow Series in Pitch Coppice Quarry, i.e. within bed F1, representing the lowest 0.25 m of the Lower Elton Formation. Their presence has been taken as a strong indication of the ***Neodiversograptus nilssoni* Biozone** (Lawson & White 1989, pp. 81-82).

Lawson, J.D. & White, D.E. 1989. The Ludlow Series in the Ludlow area. *In* Holland, C.H. & Bassett, M.G. (eds) *A global standard for the Silurian System*. National Museum of Wales, Geological Series No. **9**, Cardiff. 73-90.

See: [Lower Elton Formation, *Neodiversograptus nilssoni* Biozone, Pitch Coppice Quarry - vertical section.](#)

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Pitch Coppice Quarry - conodonts

Conodonts are rare in both the Much Wenlock Limestone Formation and the Lower Elton Formation at Pitch Coppice Quarry. Faunas comprise *Ozarkodina excavata* (Branson & Mehl) and *Panderodus equicostatus* (Rhodes) (Aldridge & Smith 1985; Siveter *et al.* 1989, loc. 3.3c), but information regarding their precise level of occurrence has not been published.

Aldridge, R.J. & Smith, M.P. 1985. Lower Palaeozoic succession of the Welsh Borderland. Fourth European Conodont Symposium (ECOS IV) Field Excursion B Guidebook, 39 pp.

Siveter, D.J., Owens, R.M. & Thomas, A.T. 1989. *Silurian field excursions: a geotraverse across Wales and the Welsh Borderland*. National Museum of Wales, Geological Series No. **10**, Cardiff. 133pp.

See: [Gorstian conodont faunas, Lower Elton Formation](#).

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Pitch Coppice Quarry - chitinozoa

All the strata exposed in Pitch Coppice Quarry lie within Chitinozoan Biozone 1 of Sutherland (1994). The lowest productive sample (PC13 of Sutherland 1994) is estimated to be from bed A of the Much Wenlock Limestone Formation, but the base of the biozone has not been located. The top of the biozone lies above the level of strata exposed in the quarry.

Sutherland, S.J.E. 1994. Ludlow chitinozoans from the type area and adjacent regions. *Palaeontographical Society Monograph*, London, 1-104, pls 1-18 (publ. No. 594, part of vol. 148 for 1994).

See: [Chitinozoan Biozone 1, Pitch Coppice Quarry - vertical section.](#)

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Pitch Coppice Quarry - bentonites

One prominent bentonite, bed F2, is located within the Pitch Coppice Quarry section.

See: [Bentonites, Pitch Coppice Quarry - lithostratigraphy, vertical section](#).

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Pitch Coppice Quarry - carbon isotopes

Corfield *et al.* (1992) investigated carbon and oxygen isotope ratios ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) in sections straddling the Wenlock-Ludlow boundary at various localities in England and Wales, including Pitch Coppice Quarry, to determine whether any systematic changes occurred across the boundary. They concluded that there was a steady decline in $\delta^{13}\text{C}$ from positive to negative values across the boundary in all sections examined. At Pitch Coppice Quarry, the boundary also appears to correlate approximately with a marked negative excursion in $\delta^{13}\text{C}$ (Corfield *et al.* 1992, fig. 2).

Corfield, R.M., Siveter, Derek J., Cartledge, J.E. & McKerrow, W.S. 1992. Carbon isotope excursion near the Wenlock-Ludlow (Silurian) boundary in the Anglo-Welsh area. *Geology*, **20**, 371-374.

See: [Carbon isotopes.](#)

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