Church Hill Quarry

[SO 412 738]

Highlights

This famous quarry was the source of one of the earliest fossil fish from Herefordshire in the Welsh Borders, *Archaegonaspis ludensis* (Salter) (Figure 3.8). It was discovered in the middle of the 19th century, and was notable at the time because it proved that fishes occur below the Ludlow Bone Bed. The site is also important because it is in marine sediments.

Many fine fossils were recovered from the Lower Leintwardine Shales (Ludfordian Stage, upper Ludlow Series) at the Church Hill quarries in the 19th century. Several different species of fossil starfish were found here, as well as several almost complete eurypterids and other invertebrates, recorded as 'a glorious list of fossils, all found in one quarry' by Marston (1882b). In the 1850s the site yielded what was then the earliest known fish (*Archaegonaspis;* Salter, 1859), which at that time was regarded as important because it showed that fishes occur in beds older than the Ludlow Bone Bed.

The site was visited by the Geologists' Association in 1904 (Dixon, 1904) when starfish were collected, and by Watson *et al.* (1948), but only the original few specimens found at the site are known. Recent collecting (in 1984) has concentrated at the upper levels because of current lack of exposure and has failed to produce fish material.

The geology of the site has been described by, amongst others, Woodward (1891a), Marston (1882b), la Touche (1894), Alexander (1936), Whitaker (1962), Goldring and Stevenson (1972) and Siveter *et al.* (1989). The small het-erostracan *Archaegonaspis ludensis* was described and discussed by Salter (1859), Lankester (1868), Woodward (1891a), Kiaer (1932b), Watson *et al.* (1948) Denison (1956, 1964), and White (1958a).

Description

Alfred Marston, who discovered the 'Starfish Beds', described the site as consisting of several Lower Ludlow quarries close together near the summit of Church Hill, facing Leintwardine, the most prolific one being 'the uppermost, and nearest to the hedge from which 'starfish were first produced and also where they occur in the greatest abundance… the starfish and other fossils lying in bands, very seldom with any intermixture of the species' (Marston,1882b). From the lower Leintwardine Shales (Ludfordian) of Church Hill quarry, Lightbody and Lee discovered the earliest known 'pteraspid' in the Welsh Borders, *Archaegonaspis ludensis,* together 'with shells, starfish and a large species of '*Pterygotus*' (Salter, 1859), and therefore presumably roughly in the same horizon as the starfish. Marston (1882b) mentioned small graptolites in the upper beds of the quarry, possibly at the horizon that is exposed today as some 2–3 m of bluish green microlaminated siltstones in small, scattered exposures. The starfish beds are some way beneath this; although Marston (1882b) did not produce a section, Woodward (1891a, p. 94) gave a sketch of the 'Starfish Quarry'.

Hawkins (Hawkins and Hampton, 1927) re-excavated 'the southerly' of two remaining quarries, which he identified as the Starfish Quarry, and cut a new section 12 ft 6 in (3.7 m) deep through calcareous shales that contained *Monograptus leintwardinensis* throughout. There were frequent shell bands, and two starfish beds were traced, the higher 5 ft 3 in (1.6 m) below the surface, the lower 10 ft 6 in (3.0 m) below. The specimens of starfish, crinoids, etc. in these beds were nearly all perfect and fragments were extremely rare. They do not lie on bedding planes but are often oblique within the siltstone. No vertebrates were found. The Ludlow strata in the Leintwardine area are similar to those at Ludlow, but show evidence of slumps and submarine erosion. Six parallel channels trending NE–SW off the shelf over an area of 12 km^2 were postulated by Whitaker (1962). Of these, the Church Hill Channel had first been recognized by Alexander (1936). Some 580 ft (174 m) of strata below the higher Lower Leintwardine Beds are cut out by a channel with steep sides. The many fossil specimens do not lie parallel to the bedding planes but obliquely and specimens are often complete, although fragile.

Fauna

AGNATHA

Heterostraci: Cyathaspidiformes:

Cyathaspididae

Archaegonaspis ludensis (Salter, 1859)

Archaegonaspis ludensis (Salter, 1859) was described initially as *Pteraspis ludensis,* and as *Scaphaspis* by Lankester (1868). Woodward (1891a) redescribed it, and it is mentioned by Kiaer (1932b). Denison (1964) redescribed the species within his Family Cyathaspididae but concluded that its referral to the genus could not be firmly established. Its occurrence at Church Hill is mentioned by Woodward (1891a), Denison (1956) and White (1958a).

Archaegonaspis is a cyathaspid with a moderately broad shield, no median process, and an ornament of longitudinal ridges. The post-rostral field has a fanned or irregular pattern with the ridges occurring as short lengths or denticks. On the ventral shield the pattern is longitudinal, with an anterior area of fanned ridges (Denison, 1964). *Archaegonaspis ludensis* is also present in the younger rocks at Whitcliffe Quarry and Woodcock Covert Quarry, near Ludlow. The genus has recently been recorded from the Gorstian of Cwar Glas Quarry (q.v.), which is the oldest record of heterostracans in Britain. Four species of *Archaegonaspis* are known from the late Silurian of the eastern Baltic, Poland, Gotland, Sweden, the Welsh Borders and Wales.

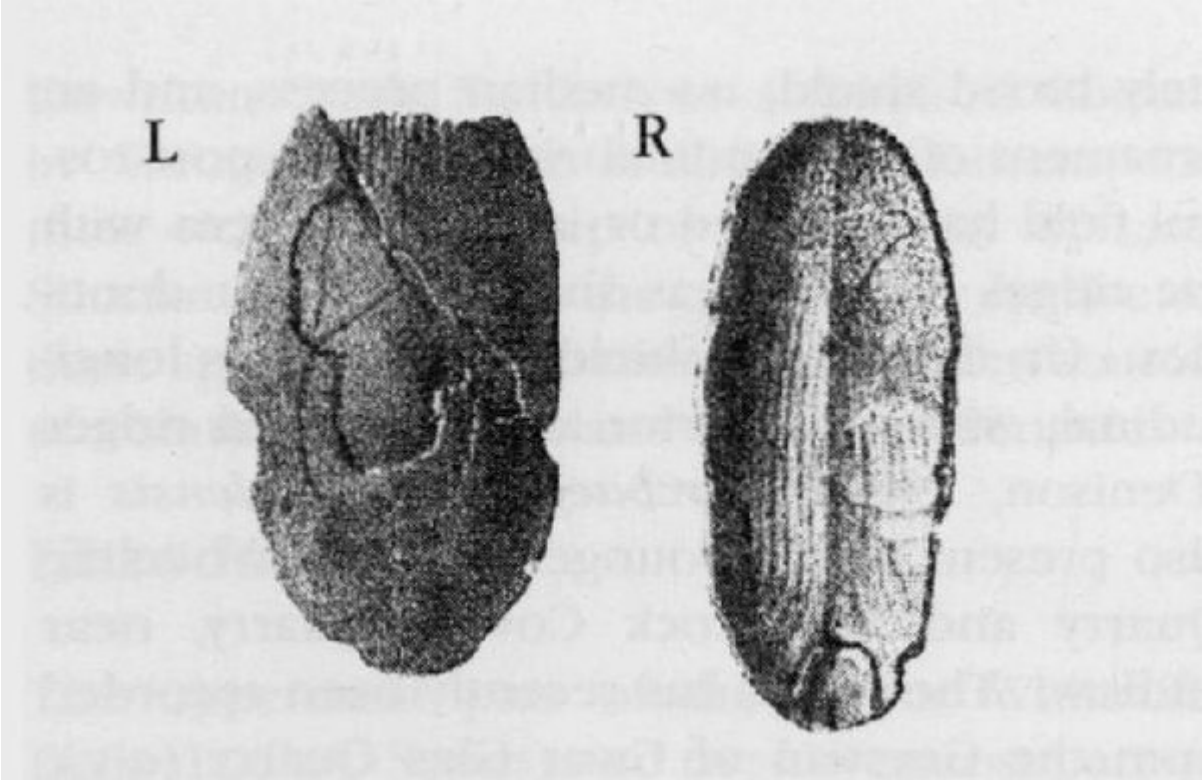
Interpretation

The evidence of slumps and submarine erosion within the Ludlovian around Church Hill mark its position close to the palaeogeographical shelf edge. The parallel channels are interpreted as Ludlow-age submarine canyon heads that were infilled later in lower Leintwardine times. Whitaker (1962) thought that the fossil fauna was indigenous to the canyon heads, because it was not found outside them. However, Goldring and Stevenson (1972) showed that the specimens were suspended within the sediments, and they argued that the fauna had been introduced within fine-grained turbidite flows in the channels.

Conclusion

The main conservation value of the Church Hill quarries is important as the source of the oldest identifiable fish specimens in the Silurian of the Welsh Borders. *Archaegonaspis* is found also in other Welsh Borders localities, and farther afield, providing useful evidence for dating. Today there is little left of the quarries on Church Hill. All that can be seen is a large, irregular pitted area with few exposures of bluish green graptolitic siltstones, but the site could be re-excavated for further study.

References



(Figure 3.8) (L) Dorsal and (R) ventral discs of the cyathaspidid Archaegonaspis ludensis from the Ludlovian, x 0.8 (from Lankester, 1864).