

Silurian crinoids from Dudley to Wenlock Edge

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DONOVAN, S.K. (2009). Silurian crinoids from Dudley to Wenlock Edge. *Proceedings of the Shropshire Geological Society*, **14**, 18–19. It is an unproven assumption that the crinoid debris found in the Much Wenlock Limestone Formation of Wenlock Edge represents similar, probably the same, species as are known from the Wren's Nest. This assumption is being tested by comparing the well preserved crinoids of Dudley with the disarticulated plates found on Wenlock Edge. Some congruence is found, demonstrated by reference to the cladid crinoid *Gissocrinus* spp.

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INTRODUCTION

The Much Wenlock Limestone Formation is internationally known for its superb biota of diverse fossils, but the style of preservation between its two principal outcrop areas shows distinct differences. These differences are particularly well demonstrated by the echinoderms, such as the crinoids (sea lilies). The crinoids of Wren's Nest and the surrounding area of Dudley include over 60 nominal species known from complete or near-complete specimens, yet less than ten have been identified from Wenlock Edge and not always from complete specimens (Donovan *et al.*, 2008a).

Obviously, the conditions controlling preservation must have been different between Dudley (complete crinoids) and Wenlock Edge (crinoid fragments) during the Wenlock. The author's interest is in the pattern that is preserved rather than the process that produced it. It is an unproven assumption that the crinoid debris found in the Much Wenlock Limestone Formation of Wenlock Edge represents similar, probably the same, species as are known from the Wren's Nest. This assumption is being tested by comparing the well preserved crinoids of Dudley with the disarticulated plates found on Wenlock Edge. Some congruence is found, although many of the latter are, as yet, still anonymous.

IDENTIFICATION OF CRINOIDS

Taxa such as gastropods with a 'one piece' skeleton can only show similar preservation at Dudley and Wenlock Edge; brachiopods may be recognised whether their paired valves are

articulated or not; and a trilobite, even if completely disarticulated, can generally be identified to genus or species from its cephalon and/or pygidium. But Silurian crinoids are not so easy to classify with confidence from their common fragments, apart from some notable exceptions. Their systematics are largely based on features of complete cups and crowns, not 'bits' such as columnals and brachials (plates of the column and arms, respectively).

So, how can the crinoids of Wenlock Edge be identified? The author suggests that it is possible, but it isn't quick. If there was one published reference to all the crinoids from Dudley, then it would be easier to identify distinctive plates from the cup, arms and column of any given species/genus/family of crinoid. If these separate plates were subsequently found on Wenlock Edge, then a positive identification could be made. This ideal situation is being approached by a project being pursued in collaboration with colleagues at the Natural History Museum in London, the University of London, and elsewhere.

Donovan *et al.* (2008a) published the first comprehensive survey of the British Silurian crinoids since early in the reign of Queen Victoria. Species-rich taxa were considered at the generic level, but this paper forms the framework upon which a comprehensive monograph of the British Silurian Crinoidea is currently being written by Donovan *et al.* (part 1 is in press; parts 2 and 3 are in preparation). This ongoing project, apart from its obvious relevance to systematics, faunistics and palaeogeography, is also educating the author regarding the identifiable fragments of all these crinoids.

EVALUATION OF THE THEORY

So much for theory. Does it work? The answer is at least sometimes and, indeed, more and more. This can be illustrated with one example that recently worked very well.

One of the best collecting sites for loose crinoid plates is the ‘old’ cutting on the west side of the A4169 at Farley, at about Grid [SJ 632 022]. It is overgrown, scruffy and with little exposure, but disarticulated plates are locally common in the ‘float’. These are much easier to work with than fragments cemented into pieces of limestone.

The author is slowly determining the names of various common columnals and brachials, and rarer cup plates, from this locality. One common brachial morphology is tetragonal in outline, has a broad, gently angled and unsculptured outer (aboral) surface, a shallow adoral (inner surface) groove and are unusually flattened (but not flat). These distinct brachials belong to the crinoid genus *Gissocrinus* Angelin (Donovan *et al.*, 2008b). There are six nominal species of *Gissocrinus* from the Wenlock of the British Isles, all but one known from Dudley. The brachial plates from Farley are only identifiable as *Gissocrinus*, but they do confirm the presence of this genus on Wenlock Edge. They compare exactly with the brachials of complete *Gissocrinus* specimens from Dudley (Figure 1).

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Figure 1. *Gissocrinus goniodactylus* (Phillips), the Natural History Museum, London, registration number E26888, from the Much Wenlock Limestone Formation, Dudley, Worcestershire (after Donovan *et al.*, 2008b, fig. 3b). This beautiful specimen preserves the proximal column, strongly ridged cup, arms showing multiple episodes of branching (missing only the tips) and, partly hidden by the arms, the elongate anal sac with a ladder-like sculpture. The plates of the arms are distinctive (see text). Identical disarticulated brachials are locally common on Wenlock Edge; plates of the cup also occur, albeit rarely.

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