A MIDDLE DEVONIAN INADUNATE CRINOID FROM WEST SOMERSET, ENGLAND

by B. D. WEBBY

ABSTRACT. *Decadocrinus oaktrovensis* sp. nov., is described from Middle Devonian (Givetian) strata near Timberscombe, west Somerset, in the lower half of the Ilfracombe Beds.

ALTHOUGH disarticulated crinoid ossicles are common in marine Devonian strata of north Devon and west Somerset, reasonably complete crinoids are exceedingly rare. Whidborne (1896–8) described a number of crinoids from the Pilton Beds, but none has previously been described from older Devonian rocks in north Devon and west Somerset.

A small outcrop at a sharp bend on the private road between the main highway (A396) and Oaktrow farmhouse (National Grid Reference SS941404), two miles south-west of Timberscombe, yielded a large number of good specimens, all belonging to a single crinoid species, *Decadocrinus oaktrovensis* sp. nov. The specimens occur as moulds in weathered, light-brown, originally calcareous siltstone. Nearby, in the disused Oaktrow quarries (SS939402) stratigraphically only a few tens of feet above or below the crinoidal horizon, a fauna of brachiopods, lamellibranchs, gastropods, Bryozoa, and crinoid ossicles has been collected. Two of the brachiopods have been identified as *Spinocyrtia ascendens* (Spriestersbach 1935), a Givetian species in Germany (Spriestersbach 1942), and *Thomassaria gibbosa* Vandercammen 1956, which occurs in upper Givetian and Frasnian strata in Belgium. A description of this fauna and the stratigraphy of the area will be published later.

SYSTEMATICS

The classification followed is that given by Moore and Laudon (1943). Numbers of specimens catalogued in the Bristol University Geology Department Collection are prefixed BU.

Subclass INADUNATA Wachsmuth and Springer
Order CLADOIDEA Moore and Laudon
Suborder DENDROCRINOIDEA Bather
Family SCYTALOCRINIDAE Moore and Laudon 1943
Genus DECADOCRINUS Wachsmuth and Springer 1879

EXPLANATION OF PLATE 67

All figures ×4; from latex (Revultex) casts of external moulds.

Figs. 1-7 *Decadocrinus oaktrovensis* sp. nov. 1, Holotype, BU 15358, posterior view, showing arrangement of plates in the posterior interradius and the proximal part of the anal sac. 2, Paratype, BU 15359, left lateral view, showing the arrangement of plates in the dorsal cup, small infrabasals, large basals and radials, and the isotomous branching of arms on the second primibrach. 3, Paratype, BU 15360, right posterolateral view, showing large recurved, plicated, anal sac. 4, Paratype, BU 15362, right posterolateral view, showing recurved, plicated, anal sac. 5, BU 15364, view of stem, showing alternate high nodals and low internodals with a few nodals bearing cirri. 6, Paratype, BU 15365, view of arm, showing single isotomous branching on the second primibrach, and pinnules on alternate secundibrachs. 7, Paratype, BU 15367, view of pinnules.

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Type species (by original designation, Wachsmuth and Springer 1879, pp. 332, 342–3). *Poteriocrinites* (*Scaphiocrinus* or *Graphiocrinus*) *scalaris* Meek and Worthen 1869, pp. 137, 139, 145–6.

Discussion. The genus *Decadocrinus* has a Devonian and Carboniferous time-range according to Moore (*in* Shimer and Shrock 1944). The North American Devonian species have been described by Goldring (1923; 1954), Laudon (1936), and Kier (1952). W. E. Schmidt (1941) considered that some of the species described by Goldring in 1923 should be assigned to a new genus, because they have laterally visible infrabasals. However, in the original diagnosis of *Decadocrinus*, Wachsmuth and Springer (1879, p. 342) stated that infrabasals are 'small, frequently hidden from view in the concave base'. Clearly, this statement implies that species with visible infrabasals can be included in the genus *Decadocrinus*. Schmidt, in his belief that the presence of laterally visible infrabasals was contrary to the original diagnosis of Wachsmuth and Springer, introduced *Denariocrinus* for those Devonian forms with laterally visible infrabasals, three to four anal plates in the cup, and each arm with a single forking on or above the second primibrach. The type species, *Denariocrinus ferula* W. E. Schmidt, is from the Eifelian of Germany. As the diagnosis of *Decadocrinus* includes the same characters, it seems better to regard *Denariocrinus* as a synonym of *Decadocrinus*, at least until further specimens are obtained from Europe, North America, and elsewhere for comparative study.

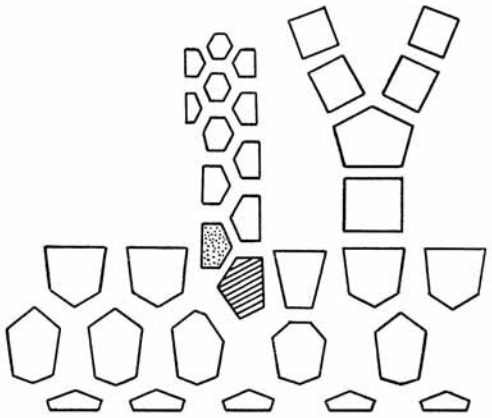
Decadocrinus oaktrovensis sp. nov.

Plate 67; text-fig. 1

Diagnosis. A small species of *Decadocrinus* with the dorsal cup a little wider than high; basals convex and depressed at sutures, higher than wide; brachials smooth, usually slightly higher than wide.

Description. Dorsal cup small, conical, sutures depressed especially between the basals. Infrabasals small, pentagonal, twice as wide as high. Basals hexagonal, except for heptagonal posterior basal and right posterior basal; convex, slightly higher than wide. Radials convex, similar in size to basals, pentagonal, except right posterior radial which is trapezoidal in outline and slightly smaller than the other four; radials as wide as high; facets curved and occupying full width of radials. Primibrachs two, the first quadrangular, as wide as high; the second (axillary) pentagonal, slightly wider than high; a single isotomous branching of each arm; arms long, slender, tapering gradually towards the distal end, observed to a length of 24 mm. above axillary; thirty-seven secundibrachs observed in one paratype (BU 15365); brachials uniserial, smooth, rounded, pinnulate, usually slightly higher than wide. Pinnules borne on every second secundibrach; pinnule segments higher than wide, oval in section. Posterior interradius with pentagonal radianal at the level of the radials and adjacent to right posterior radial, a little smaller than basals; anal X pentagonal, slightly smaller than radianal. Anal X and radianal support large, recurved, anal sac; a row of anal tube plates rests on both anal X and radianal, and gradually decreases in size distally; a further row of plates is seen above the second tube plates; in the distal recurved part of the sac three to four rows of small plates are observed; each row of plates bears a strong central ridge with horizontal

flutings giving the upper part of the anal sac a plicated appearance; anal opening not seen. Stem observed to a length of 45 mm.; pentagonal to slightly stellate in the proximal 10 mm., distally round; columnals near cup low, slightly stellate with swollen corners, but distally columnals are round and alternate between high nodals and low internodals;



TEXT-FIG. 1. Diagram showing the arrangement of plates in the dorsal cup, the proximal part of the anal sac, and the proximal part of an arm of *Decadocrinus oaktrovensis* sp. nov. Five infrabasals, five basals, five radials, a radianal (shown ruled), and anal X (shown stippled) in the dorsal cup. Arm with a single isotomous branching on the second primibrach. Proximal part of anal sac with two rows of tube plates resting on radianal and anal X respectively; above the second tube plates a third row of plates visible.

nodal columnals bear long, slender, tapering cirri; cirri composed of numerous thin, disk-like segments.

Dimensions (in mm.)

	Holotype	*Paratypes*				
	BU 15358	BU 15359	BU 15360	BU 15361	BU 15362	BU 15363
Hc	3·0	2·8	3·1	2·7	4·0	2·7
Had	6·4	..	6·1	..	6·2	..
Hah	13·0	..	16·5	..	11·2	..
Wcr	4·8	4·1	4·2	3·6	3·5	4·7
Wcb	2·1	2·0	2·2	2·0	1·9	1·8

Hc, height of dorsal cup; Had, height of anal sac from base of radianal to distal recurved tip of anal sac; Hah, height of anal sac from base of radianal to greatest height of sac; Wcr, width of dorsal cup at the level of the radial facets; Wcb, width of dorsal cup at the base of the dorsal cup.

Holotype. BU 15358, Pl. 67, fig. 1. *Paratypes*. BU 15359–67.

Remarks. *Decadocrinus oaktrovensis* resembles both the Middle Devonian North American forms *D. stewartae* Kier (1952, pp. 73–74) from the Silica Formation of Ohio,

and *D. wrightae* Goldring (1954, pp. 32–34) from the Hamilton (Arkona) Shale of Ontario, but differs from both species in a somewhat narrower dorsal cup, slightly longer brachials, and trapezoidal outline of right posterior radial. It is also distinguished from *D. crassidactylus* Laudon (1936, p. 64) from the Cedar Valley Formation of Iowa in being smaller, and in a narrower dorsal cup and longer brachials; from *D. rugistriatus* Goldring (1923, pp. 432–4) from the Portage (Ithaca) Beds of New York in lacking striations on the arms and in shorter brachials; from *D. nereus* (Hall) (Goldring 1923, pp. 419–20) from the Hamilton (Moscow) Shales of New York in having shorter primaxils, and shorter secundibrachs. From Germany, *Denariocrinus ferula* W. E. Schmidt 1941 differs in being larger, in having four anal plates in the cup, and in bearing pinnules on each secundibrach. *Rhadinocrinus minae* (W. E. Schmidt 1905) (listed as *Denariocrinus minae* by Spriestersbach 1942), from the upper Middle Devonian in Germany, is similar in size and shape, but differs fundamentally in having three primibrachs in each arm, and a radianal that is smaller than anal X, a feature of the Botryocrinidae.

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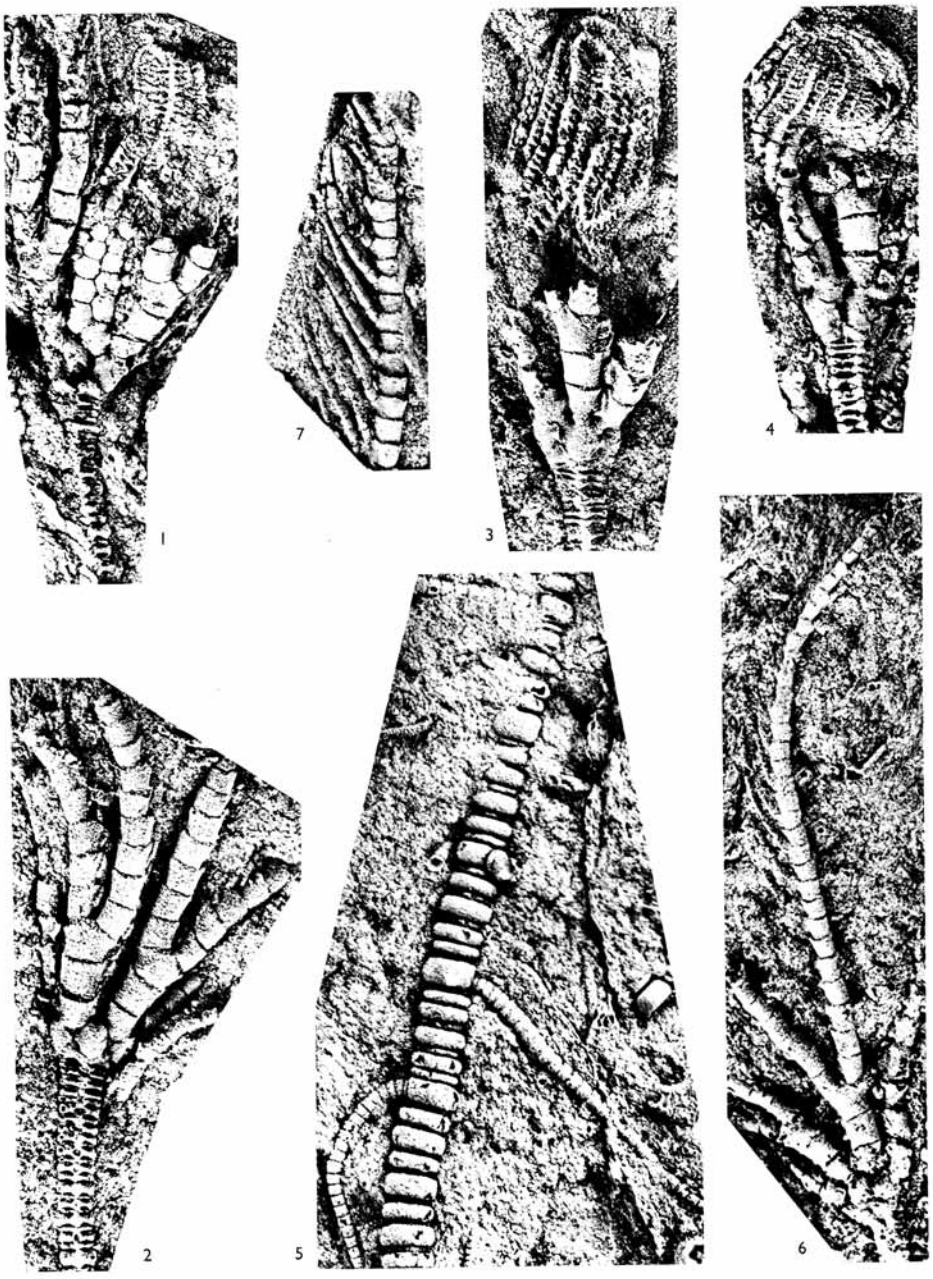

WEBBY, Devonian crinoid