

BRITISH UPPER SILURIAN CRINOIDS FROM THE LUDLOVIAN

by W. H. C. RAMSBOTTOM

ABSTRACT. A brief review of the crinoid fauna of the Ludlow formation is followed by the redescription of *Eutaxocrinus maccoyanus* (Salter) and *Meristocrinus orbigny* (M'Coy). The following new species are described: *Gissocrinus ludensis*, *Mastigocrinus bravoniensis*, and *Hapalocrinus quinquepennis*. *Pisocrinus* cf. *sphericus* (Rowley) and *Ciceroocrinus* spp. also occur in the fauna.

INTRODUCTION

'STARFISH BEDS' are a well-known feature of the Ludlovian in Britain. Associated with the starfish in these beds are crinoids, often numerous in individuals if not in species, and these have hitherto not received much attention. The crinoid faunas of the starfish bed at Church Hill, Leintwardine, Herefordshire, and of another such bed near Kendal, Westmorland, are here described, and the opportunity is taken to review briefly the whole crinoid fauna of the Ludlovian in Britain.

Crinoids occur at two principal horizons in the Lower Ludlow. In the *Monograptus nilssoni* Zone '*Actinocrinus pulcher* M'Coy, which is probably referable to the genus *Scyphocrinites*, is widespread in north and mid Wales and extends into the Lake District at what is possibly a similar horizon. In Ireland this species may be represented by *Actinocrinus wynnei* Baily (1860), but the type specimens of this latter species have not been available for examination. *Scyphocrinites* is also known in Cornwall (Bather 1907), but although possibly of Ludlovian age the precise horizon is uncertain. The species of *Scyphocrinites* found in Cornwall is more closely related to the species from Bohemia than to *S. pulcher* in the Anglo-Welsh area, and this fact has palaeogeographical significance. British examples of *Scyphocrinites* will form the subject of another paper.

At the higher horizon of the *Monograptus leintwardinensis* Zone lagoonal conditions at Leintwardine (Hawkins and Hampton 1927) allowed the preservation of a considerable number of specimens though only six species are represented. Two of these (*Eutaxocrinus maccoyanus* and *Hapalocrinus quinquepennis*) are also represented in Westmorland at a similar horizon, together with another species, *Meristocrinus orbigny*, unique to that district. Mr. E. V. Tucker has collected a fragmentary *Periechocrinus* (GSM ZI 7053) from 10 feet below the base of the equivalent of the Aymestry Limestone in a lane section south of Perton, Herefordshire.

In the Upper Ludlow the only known crinoids belong to *Ciceroocrinus*, also found in Sweden and the south Baltic area at a similar horizon, but the information available as to the occurrence of this genus is not altogether satisfactory.

When compared with the prolific crinoid life of the earlier Wenlock Limestone the evidence in Britain is of an impoverished fauna, probably due to the onset of unfavourable conditions. But the Ludlow crinoids seem to be in part transitional to the extensive Devonian faunas, for three of the seven genera (*Hapalocrinus*, *Eutaxocrinus*, and *Scyphocrinites*) are better represented in the Devonian than in the Silurian.

Most of the specimens described in this paper occur as external moulds and they have been studied by means of rubber latex casts prepared with Revultex supplied by Revertex Ltd., London.

Acknowledgements. I am indebted for the loan of specimens to the Directors of the British Museum (Natural History) [BM] and of the Geological Survey and Museum [GSM], to Mr. J. M. Edmonds of the University Museum, Oxford [OM], to Dr. F. Hodson of Reading University, and to Mr. A. G. Brighton of the Sedgwick Museum, Cambridge [SM]. The letters in brackets are those used to distinguish the registered numbers of specimens in the various institutions.

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SYSTEMATIC DESCRIPTIONS

Sub-class FLEXIBILIA Zittel

Genus MERISTOCRINUS Springer 1906

Type species by original designation: *Cyathocrinus interbrachiatus* Angelin, Silurian, Gotland.

Diagnosis. A genus of Sagenocrinitidae with the radial in the form of a radial beneath the right posterior radial. Interbrachials few or none, followed by perisome. Primibrachs three.

Meristocrinus orbigny (M'Coy)

Plate 20, fig. 7

Taxocrinus? *Orbigny* M'Coy 1850, p. 289.

Taxocrinus? *Orbigny* M'Coy 1851, p. 53, pl. 1d, fig. 1.

Meristocrinus orbigny Springer 1906, p. 519.

Meristocrinus orbigny Springer 1920, p. 213, pl. 17, fig. 7.

Holotype. SM A 29599.

Occurrence. Lower Ludlow, Bannisdale Slates, *Monograptus leintwardinensis* Zone (*vide* Marr 1892, p. 538), 'Asterias Bed', High Thorns, Underbarrow, Kendal, Westmorland. The holotype is the only known specimen.

Diagnosis. A species of *Meristocrinus* with the stem not expanding towards the cup, and in which the brachials have a slight distal expansion.

Description. Cup bowl-shaped with subparallel sides, surface of cup plates smooth. Infrabasals low, appearing in side view like an enlarged columnal. Basals one-third the height of the radials, much wider than high, the facets occupying the whole width of the plates. Primibrachs three, wider than high; secundibrachs five. Arms dividing three times isotomously, though in the distal region the divisions are not at the same height in each branch. Proximally the brachials are wider than high, but distally they become as high or even higher than wide. Brachials have a slight distal expansion or cornice on their dorsal sides. Posterior side of cup not seen, but traces of the interbrachial perisome of tiny plates are seen in one interbrachial area. Tegmen not seen. Stem round, large, not expanding towards the cup, formed of uniform, ridged, short columnals with crenellate surfaces; preserved for a length of 33 mm.

Discussion. The unique holotype is preserved as an external mould in sandstone, and only the anterior side of the cup is seen. Some development of the specimen has been possible and a good Revultex impression has been made. The reference of the species to *Meristocrinus* is largely based on the presence of three primibrachs, a rare feature in Silurian Flexibilia, but also on the form of the crown.

The figure given by M'Coy (1851) and reproduced by Springer (1920) is very much restored and is inaccurate in several respects. The basals in that figure are too big, the infrabasals are not shown, no sign of the interbrachial perisome appears, and the arm branching is too artificial and regular. The species is well characterized by the distal expansions on the brachials and the non-expanding stem.

The horizon of this species was given, in error, as Upper Ludlow by M'Coy. The stratigraphical position of the Starfish Beds in the Bannisdale Slates has been commented on by Marr (1892, p. 539), but in which of several Starfish Beds the crinoids occur is not known.

Genus EUTAXOCRINUS Springer 1906

Type species by original designation: *Taxocrinus affinis* Müller, Middle Devonian, Germany.

Diagnosis. A genus of Taxocrinidae with the rays not abutting over the interbrachials; infrabasals low; posterior basal elongate; radial usually absent; few or no interbrachials; primibrachs two.

Eutaxocrinus maccoyanus (Salter)

Plate 20, figs. 4-6

Ichthyocrinus pyriformis M'Coy 1851, p. 54.

Ichthyocrinus McCoyanus Salter 1873, p. 163.

Taxocrinus La Touche 1884, pl. 17, fig. 551.

non *Ichthyocrinus pyriformis* (Phillips 1839).

Holotype. SM A 35407.

Occurrence. The holotype is from the Lower Ludlow, Bannisdale Slates, *Monograptus leintwardinensis* Zone (*fide* Marr 1892, p. 538), 'Asterias Bed', Light Beck, Underbarrow, Kendal, Westmorland. Two specimens are known from a similar horizon at Church Hill Quarry, Leintwardine, Herefordshire (BM E 26578, GSM 89989), and one specimen (GSM 89988) is labelled 'Underbarrow' and may be from the same locality as the holotype.

Diagnosis. A species of *Eutaxocrinus* without interbrachials, with three or four secundibrachs, arms branching isotomously, brachials smoothly rounded on their dorsal sides and smooth cup plates.

Description. Cup low, wider than high, surface of cup plates smooth. Infrabasals and basals of about equal height, very low and much wider than high. Radials form the height of the cup, slightly wider than high with the facets occupying the full width of the plates. Primibrachs two; secundibrachs three or four; arms dividing isotomously three times. All brachials wider than high, smooth and with rounded dorsal sides. Posterior side of cup not seen. Interbrachials absent. Stem widens slightly proximally and there is

formed of low columnals, the first twelve or thirteen being of uniform size. Distally there is an irregular alternation of longer and shorter columnals. Surface of columnals crenellate.

Discussion. No mention of this species is made by Springer (1920). Though the posterior side of the cup has not been seen, the species is referred to *Eutaxocrinus* with some confidence, for the form of the crown is characteristic. This species is the earliest, stratigraphically, so far known, of the more typical members of the genus, since *E. oblongatus* (Angelin) from the Silurian of Gotland is not at all typical in its arm branching. *E. maccoyanus* is mainly characterized by the low cup and smooth surface of the cup plates and brachials; *E. rhenanus* (C. F. Roemer) from the Devonian of Germany is perhaps the species which it most resembles.

Salter (1873) spelt the specific name '*McCoyanus*'. This has been altered to *maccoyanus*, an emendation in accordance with current recommendations (see *Bull. Zool. Nomencl.* **14**, 198).

Three of the four known specimens are figured on the plate. One of those (Pl. 20, fig. 6) from Leintwardine is apparently that figured by La Touche (1884, pl. 17, fig. 551), which was formerly in the Ludlow Museum but now housed in the British Museum (Natural History). Another (unfigured) Leintwardine specimen is notable in being the only specimen examined from that locality in which the actual plates are preserved in calcite (GSM 89989), though the sutures are somewhat obscure in places.

Sub-class INADUNATA Wachsmuth and Springer
Order CLADOIDEA Moore and Laudon
Genus GISSOCRINUS Angelin 1878

Type species by subsequent designation of Ramsbottom (1951): *Actinocrinites? arthriticus* Phillips, Wenlock Limestone, Dudley.

Diagnosis. A genus of Cyathocrinitidae with three infrabasals.

Gissocrinus ludensis (Sollas MS.) sp. nov.

Plate 21, figs. 8-9

Holotype. BM E 26573. *Paratype.* BM E 26577.

Occurrence. All the known specimens come from the Lower Ludlow Beds (*Monograptus leintwardinensis* Zone) at Leintwardine, Herefordshire. The British Museum specimens, including holotype and paratype, come from Church Hill Quarry, Leintwardine.

Diagnosis. A species of *Gissocrinus* in which the cup is cone-shaped with strong axial ridges. Infrabasals about the same height as the basals; brachials round backed; stem nodose, subpentagonal distally, round in the proximal few millimetres.

Description. Cup narrow, cone-shaped, higher than wide, with strong axial ridges. Infrabasals about as high as the basals, which are about as high as wide. Radials about as high as wide, the facet occupying about one-third of the width of the plate. Primibrachs three; arms branch about five times, the brachials being round backed and usually higher than wide and without distal expansion or ornament of any kind. Four covering plates per brachial. Anal tube formed of squarish plates with fine but deep transverse

folds; tube about the same length as the arms. Tegmen not seen. Stem, seen to a length of 60 mm., round in the proximal few millimetres, afterwards subpentagonal; formed of alternating nodals and internodals, with larger nodals situated at intervals.

Discussion. Among the species of *Gissocrinus* from the Wenlock Limestone of Dudley it is only with *G. scoparius* (Salter) that this species shows any close relationships. The features of the rachials, the shape of the cup, and the large size of the infrabasals distinguish this species. The subpentagonal stem is also characteristic. The specimen to which Sollas attached the manuscript name *ludensis* on a museum label (OM c 85) is a young specimen, the crown being only 12 mm. in height. In view of this a more adult example has been chosen as the holotype, and in this the crown has a height of 50 mm. All the specimens are preserved as external moulds, as is usual at Leintwardine.

Genus MASTIGOCRINUS Bather 1892

Type species by monotypy: *M. loreus* Bather, Wenlock Limestone, Dudley.

Diagnosis. A genus of Botryocrinidae in which the radianal is absent. Anal plate in line with radials. Arms long, isotomously branched, non-pinnulate. Anal tube long, flattened, and with strongly folded plates. Tegmen formed of many small plates. Stem divided longitudinally into pentameres.

Mastigocrinus bravoniensis sp. nov.

Plate 21, figs. 6-7

Holotype. GSM 89994. *Paratype.* OM c 84.

Occurrence. All known specimens are from the Lower Ludlow Beds (*Monograptus leintwardinensis* Zone), Church Hill Quarry, Leintwardine, Herefordshire.

Diagnosis. A small species of *Mastigocrinus* in which the brachials are higher than wide. Primibrachs usually four, sometimes five.

Description. A small species; cup conical, about as wide as high, surface of cup plates smooth or slightly granular. Infrabasals occupy a quarter of the height of the cup; basals occupy half the height of the cup and are as wide as high; posterior basal truncate and considerably wider than the others. Radials a little wider than high, occupying one-third of the height of the cup; radial facets occupying the whole width of the radials. Primibrachs usually four, sometimes five, slightly higher than wide. Arms branch three or

EXPLANATION OF PLATE 20

All photographs are of rubber latex (Revultex) casts coated with ammonium chloride.

Figs. 1-3. *Hapalocrinus quinquepennis* sp. nov. Lower Ludlow, Leintwardine, Herefordshire; figs. 2 and 3 from Church Hill Quarry. $\times 1\frac{1}{2}$. 1, holotype, BM E 26576a. 2, paratype, GSM 89897. 3, paratype, BM E 14900.

Figs. 4-6. *Eutaxocrinus maccoyanus* (Salter). Lower Ludlow. 4, holotype, SM A 35407, $\times 3$, Bannisdale Slates, Light Beck, Underbarrow, Westmorland. 5, GSM 89988, $\times 3$, Bannisdale Slates, Underbarrow. 6, BM E 26578, $\times 2$, Church Hill Quarry, Leintwardine, Herefordshire.

Fig. 7. *Meristocrinus orbigny* (M'Coy). Lower Ludlow, Bannisdale Slates, High Thorns, Underbarrow, Westmorland. Holotype, SM A 29599, $\times 2$.

possibly four times isotomously; brachials with evenly rounded dorsal sides; axial canal and food groove confluent. Anal plate relatively large, considerably wider than high; anal tube formed of rectangular plates which are folded longitudinally, and there are in addition transverse folds of the same type as in *M. loreus* (Bather 1892). Stem slightly subpentagonal, smooth, formed of alternating thin and thick columnals.

Discussion. It was at first thought that this small species, represented by a number of external moulds from Leintwardine, belonged to *Cyathocrinites* and Sollas had so labelled the paratype in the University Museum, Oxford. The posterior side and anal tube are exposed in the holotype, however, and they show that it should be referred to *Mastigocrinus*. It is easily distinguished from *M. loreus*, the only other described species of the genus, by the length of the brachials and the small size. The specific name is derived from the Roman name for Leintwardine.

Order DISPARATA Moore and Laudon
Genus CICEROCRINUS Sollas 1900

Type species by monotypy: *C. elegans* Sollas, unlocalized, probably Upper Ludlow.

Diagnosis. A genus of Pisocrinidae with an elongate cup which is confluent with the stem, branched pinnulate arms, and radials without pronounced lateral processes.

Ciceroocrinus elegans Sollas

Plate 21, figs. 2-5

Ciceroocrinus elegans Sollas 1900, p. 267, pl. 16, figs. 3-4.
Lagarocrinus tenuis Jaekel 1900, p. 487.

Holotype. OM c 80.

Occurrence. The holotype is unlocalized. Sollas suggested that it was Wenlock in age, but its mode of preservation is unlike that of any other Wenlock crinoid examined. It is here suggested that its age is more probably Upper Ludlow on account of the matrix and mode of preservation, which accords well with that of other Upper Ludlow crinoids, and because all other examples of the same species are of Upper Ludlow age.

Specimens have been examined from the Upper Ludlow, Whitcliffe, Ludlow, Shropshire (BM E 26071a); quarry near old bridge, Ludlow (BM E 5726—holotype of *C. tenuis*—here figured plate 21, fig. 3); small roadside quarry, 150 yards north of Stapleton Castle, Stapleton, near Presteigne, Radnorshire (GSM 85405); old quarry 150 yards east-north-east of Warren House Farm, c. 2 miles from Knighton on the Knighton to Penybont road (GSM 85406).

Diagnosis. A species of *Ciceroocrinus* in which the cup is about twice as high as wide; pinnules are borne usually on every fourth brachial.

Description. Cup conical, about twice as wide as high, surface of cup plates smooth. Basals half the height of the radials. Radials without marked lateral processes, facet occupying the whole width of the plate. Primibrachs two, the first being about twice as wide as high, the second usually higher than wide. Secundibrachs up to twenty observed; tertibrachs up to twenty-eight observed. In adult (i.e. large) specimens the arms branch

twice, but in small specimens only once; all brachials variable in height, being up to twice as wide as high or twice as high as wide. Pinnules are borne on secundibrachs and tertibrachs usually occurring on every fourth brachial, but sometimes three and sometimes five brachials occur between divisions. Sutures of the pinnule-bearing brachials are at an angle with the sides of the arm. Pinnulars longer than wide, tapering sharply, and with a relatively wide proximal end. Small anal plate, but no tube has been seen in the available material. Tegmen not seen. Stem round, smooth, expanding proximally and confluent with the base of the cup.

Discussion. The specimen described by Sollas is unique in being so well preserved, and all the other specimens are more or less fragmentary. It is thought, however, that all the English Upper Ludlow *Cicerocrinus* specimens are conspecific with this fine specimen. *C. anglicus* (Jaekel) may be an exception (see below). In the case of *C. tenuis* (Jaekel), the holotype is a young specimen in which the arms divide only once, but it otherwise shows no differences which would suggest that it would not have grown up into a typical *C. elegans*. The suggestion of an Upper Ludlow age for the holotype of *C. elegans* seems unavoidable.

Cicerocrinus anglicus (Jaekel)

Lagarocrinus anglicus Jaekel 1900, p. 486.

Original description. 'Oberes Obersilur (Low. Ludlow beds). Gomey Quarry, Presteigh, Radnorshire in Süd Wales, England. Hohe des Kelches etwa 20 mm., Länge der Arme etwa 34 mm. Arme zunächst in 10 gleichwertige Hauptäste geteilt, diese mit zahlreichen (etwa 24), aber anscheinend ziemlich kurzen Ramulis versehen. Stiel oben beträchtlich erweitert, namentlich in die Dicke des Kelches übergehend. 1 Orig.-Ex. Museum f. Naturkunde, Berlin.'

Discussion. I am informed by Professor W. Gross that the holotype of this species has disappeared from the Museum für Naturkunde in Berlin. Since no topotype material has been available it has not been possible to make a proper study of this species, for there is no figure. The description would suggest a distinct species characterized by many pinnules.

The horizon and locality of the holotype are in doubt. There is no place in Radnorshire with the name 'Presteigh' as given by Jaekel, and it is probable that Presteigne was intended. Modern maps do not mark any place called 'Gomey', and the nearest to this is

EXPLANATION OF PLATE 21

Fig. 1. *Pisocrinus* cf. *sphericus* Rowley. Lower Ludlow, Church Hill Quarry, Leintwardine, Herefordshire. Reading University collection, E 299, Revultex cast $\times 2\frac{1}{2}$.

Figs. 2-5. *Cicerocrinus elegans* Sollas. Upper Ludlow. 2, BM E 26071a, $\times 2$, Whitcliffe, Ludlow, Shropshire. 3, BM E 5726, $\times 4$, wax squeeze of the holotype of *C. tenuis* (Jaekel); quarry by old bridge, Ludlow. Photo supplied by British Museum (Natural History). 4-5, holotype, OM c 80, fig. 4 $\times 1$, fig. 5 $\times 2$; unlocalized.

Figs. 6-7. *Mastigocrinus bravoniensis* sp. nov. Lower Ludlow, Leintwardine, Herefordshire. 6, paratype, OM c 84, Revultex cast, $\times 4$. 7, holotype, GSM 89994, Revultex cast, $\times 6$, posterior side of crown showing anal tube.

Figs. 8-9. *Gissocrinus ludensis* sp. nov. Lower Ludlow, Church Hill Quarry, Leintwardine, Herefordshire. 8, holotype, BM E 26573, Revultex cast, $\times 1\frac{1}{2}$. 9, paratype, BM E 26577, external mould, $\times 1\frac{1}{2}$.

a farm called 'Gumma', $1\frac{1}{2}$ miles west of Presteigne. The old Geological Survey map, dated 1850, however, calls this farm 'Gomey'. There is doubt, moreover, as to which is 'Gomey Quarry', for locally no quarry is known by this name. There is an old, but still sporadically worked, quarry near the road $\frac{1}{4}$ mile north-east of Gumma Farm, now called Rock Bridge Quarry and this seems to be the most likely place from which the holotype of *C. anglicus* came. Collecting in this quarry by the writer yielded no specimens of *Cicerocrinus*, but this is not surprising when the rarity of this genus is considered.

With regard to the horizon, Dr. C. H. Holland, who is studying the stratigraphy of the Presteigne area, tells me that the whole of the rocks surrounding Gumma Farm for some distance, and including Rock Bridge Quarry, belong to the upper part of the Upper Ludlow, and not to the Lower Ludlow as was stated by Jaekel.

Genus PISOCRINUS de Koninck 1858

Type species by subsequent designation of S. A. Miller 1889: *Pisocrinus pilula* de Koninck, Wenlock Limestone, Dudley.

Diagnosis. A genus of Pisocrinidae in which the cup is well marked off from the stem, with unbranched non-pinnulate arms and with the radials bearing lateral processes. Basals five.

Pisocrinus cf. sphericus Rowley

Plate 21, fig. 1

A single almost complete specimen is figured here (Reading University collection E 299) from the Lower Ludlow (*Monograptus leintwardinensis* Zone) at Church Hill Quarry, Leintwardine. It was collected by Professor H. L. Hawkins during excavations in the quarry in 1926 (Hawkins and Hampton 1927). It has a small globular cup, a stem formed of columnals of equal length, and very short arms composed of only four brachials, the first of which is very short. The arms are possibly incomplete. The basals appear to be hidden by the stem, so that this specimen cannot belong to *P. pilula* de Koninck. It recalls *P. sphericus* Rowley from the Brownsport Formation of Tennessee, but in the absence of comparative material the determination must remain indefinite.

Sub-class CAMERATA Wachsmuth and Springer

Genus HAPALOCRINUS Jaekel 1895

Type species by monotypy: *H. elegans* Jaekel, Lower Devonian, Germany.

Diagnosis. A genus of Hapalocrinidae with two to four unbranched arms in each ray; brachials cuneate uniserial, each brachial bearing one pinnule, these coming off on each side alternately; interbrachials 1-2.

Hapalocrinus quinquepennis (Salter MS.) sp. nov.

Plate 20, figs. 1-3

Platycrinus quinquepennis Salter 1878, p. 116 (*nom. nud.*).
Crinoid sp.—La Touche 1884, pl. 17, fig. 550.

Holotype. BM E 26576a. *Paratypes.* BM E 14900, GSM 89897.

Occurrence. The specimens come from the Lower Ludlow Beds (*Monograptus leintwardinensis* Zone) at Leintwardine, Herefordshire. The British Museum specimens are from Church Hill Quarry, Leintwardine. Also known from the Lower Ludlow Beds at Ludlow (GSM 89905).

Diagnosis. A large species of *Hapalocrinus* with the surface of the cup plates smooth, the radial facets occupying about two-thirds of the width of the radials. Arms branch once only. Stem without cirri.

Description. A large species, a typical crown measuring about 60 mm. in height. Cup obpyriform, tubular above, about as wide as high. Basals about half the height of the radials, which are higher than wide, the radial facets occupying about two-thirds of the total width of the radials. The surface of the cup plates is smooth. Primibrachs two, with conspicuous brachial facets. Three or four secundibrachs without pinnules, followed by uniserial or slightly cuneate brachials. Arms branch once only, giving ten rami. Each brachial bears a pinnule, these being given off on each side alternately from the thicker ends of the brachials. Brachials short, nearly twice as wide as high. Interbrachial areas with one plate, followed by two smaller ones in the second row; none of these plates reaches far down into the cup. One interbrachial plate is sometimes a little larger than the others, and this is interpreted as being the posterior one. Tegmen not seen. Stem formed of alternating nodals and internodals, the nodals becoming less prominent and less numerous distally, and the length of the columnals increases distally. No trace of cirri are seen.

Discussion. All the available material of this species is represented by impressions, as is usual at Leintwardine, and the species has been studied with the aid of Revultex impressions. The large size of this species is the main distinguishing feature, since it is nearly twice as large as any of the other described species of *Hapalocrinus*. Salter (1878) labelled several specimens in the Geological Survey Museum as *Platycrinus quinquepennis*, but only the names appear in the published catalogue of 1878. La Touche figured a specimen which was formerly in the Ludlow Museum, but the figure is so generalized that the specimen has not been recognized among the specimens transferred from the Ludlow Museum to the British Museum (Natural History).

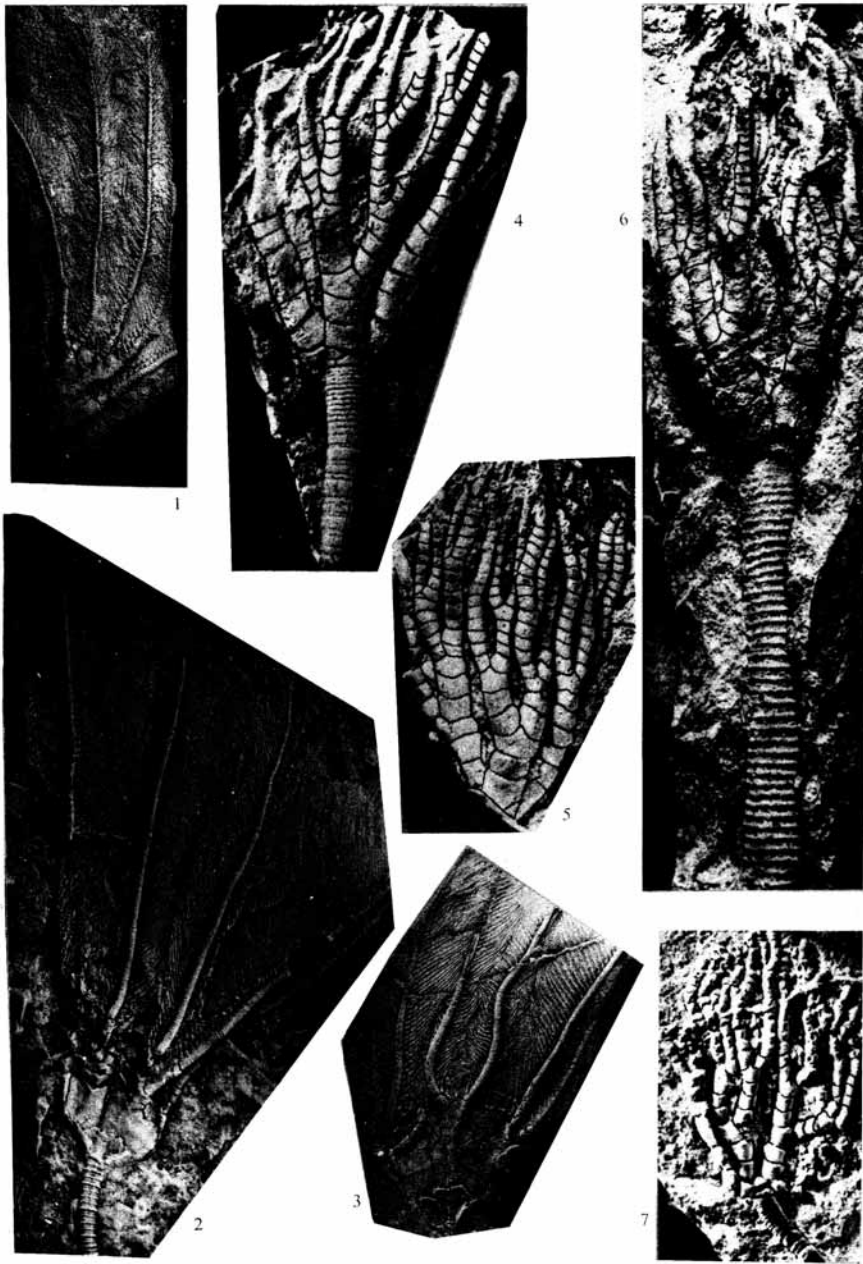
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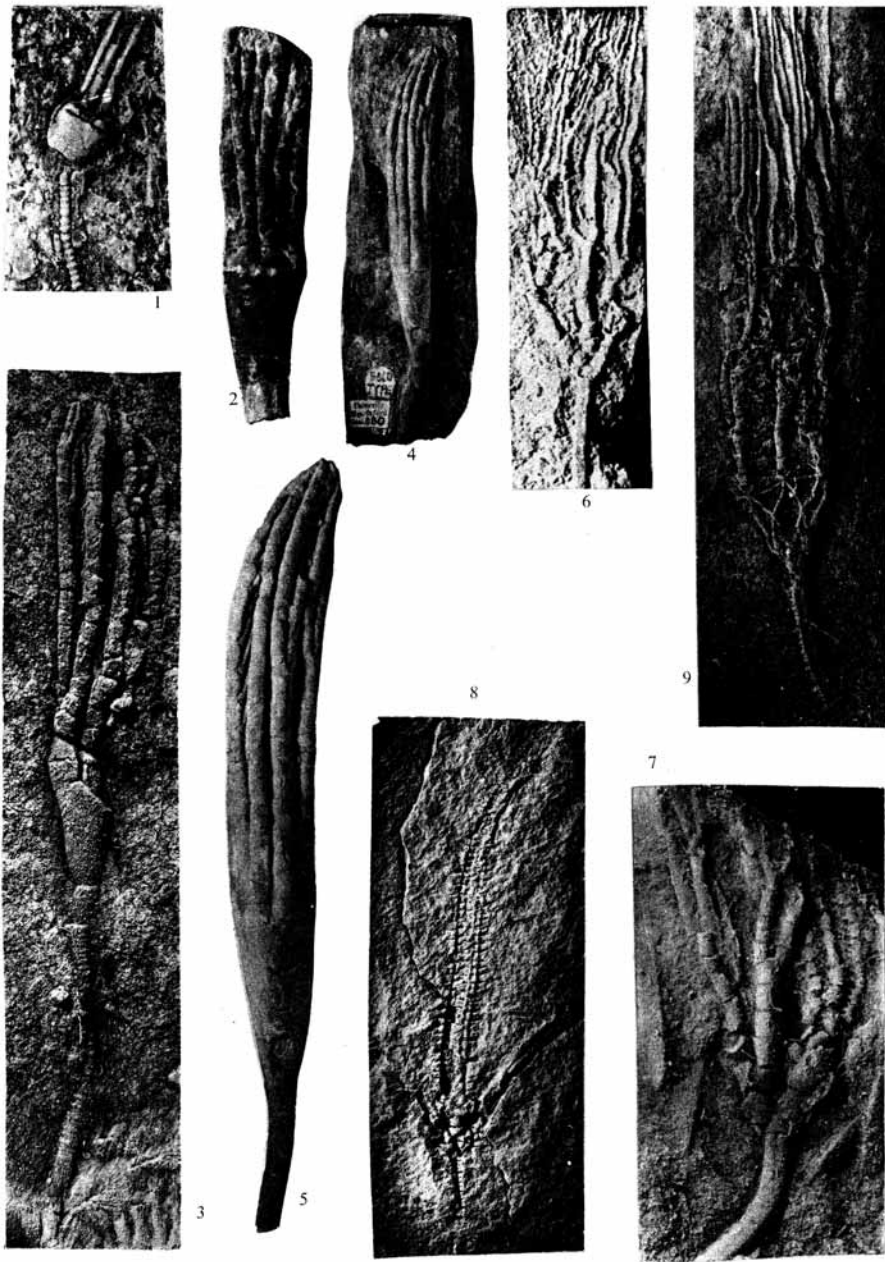
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Manuscript received 17 October 1957



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