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Crinoidea from the Reefton Group (Lower Devonian),  
New Zealand

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*Abstract*

CRINOID remains from Yorkey Creek, Reefton, New Zealand, are determined and described: *Megistocrinus reeftonensis* n.sp. is proposed. The stratigraphical significance of the Reefton crinoids is discussed.

INTRODUCTION

IN 1961 Professor H. W. Wellman of Victoria University of Wellington, New Zealand, collected a number of crinoid fossils from a boulder of calcareous argillite (S38/641, grid reference 372223) in Yorkey Creek, near Reefton, in the south-west part of Nelson province, South Island, New Zealand. The collection of fossils comprised a single external mould including some calical plates and arms with pinnules, as well as other moulds of fragments of stems. Specimens other than isolated columnals and calical plates are unusual for New Zealand, and Professors H. B. Fell\* and P. Vella (Departments of Zoology and Geology, Victoria University of Wellington) sent latex casts of the material to me for taxonomic determination.

The specimens illustrated are in the type collections of the Geology Department, Victoria University of Wellington; numbers given below refer to the above collections.

SYSTEMATIC DESCRIPTIONS

Subclass CAMERATA Wachsmuth and Springer, 1885

Order MONOBATHRIDA Moore and Laudon, 1943

Superfamily PEREICHOCHRINIDAE Austin and Austin, 1843

GENUS MEGISTOCRINUS Owen and Shumard, 1852

*Megistocrinus reeftonensis* n.sp. (Pl. 1, Pl. 2, Figs. 1-3)

DESCRIPTION: The calyx is large, greater in width than in height, composed of thick, large plates which become gradually smaller in a ventral direction. The plates are gently arched, ornamented at the surface by rather densely distributed, rounded, radial ribs, which are apparent especially in the plates of higher circles. The round stalk facet is slightly exposed

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with BB above the surface in the basal part of the calyx. Only two (of the three) BB are preserved; they are narrow and long. RR are typically hexagonal in shape. RR and, to a lesser extent, the solid BrBr and IBrBr are often deformed, or broken by pressure; this indicates that neither number nor mutual position of plates can be inferred with certainty.

The tegmen is partly visible on the holotype, and consists of numerous small polygonal plates.

Arms are long, slender and arched, showing rather sparse dichotomous branching; they are markedly biserial. In the proximal part of the arm, brachials are relatively broad and low, narrowing gradually towards the distal part. In this direction their height also slowly increases. Axillares are lacking; the arms of higher orders branch so that brachials of their inner rows are inserted wedge-like between brachials of lower-order arms. Food grooves are broad, covered by two rows of small hexagonal plates. Well-preserved are the long, thin, articulated pinullae, which start by a small triangular facet.

**MATERIAL:** Holotype VE1; this is a mould of a specimen compressed almost flat, with the posterior part of the calyx, arms, and tegmen visible as well as fragments of arms; original shape uncertain.

Paratype VE2; mould of parts of arms of another specimen.

**REMARKS:** *Megistocrinus reeptonensis* n.sp. is closely related to the younger species *Megistocrinus depressus* Hall, 1862, from the Hamilton Group, U.S.A. The two species are similar in the size of the calyx and the position of its plates, in the composition of the basal part of the calyx with projecting BB and stalk facet, and in composition and shape of the free arms. The two differ in size of the calyx plates; *Megistocrinus reeptonensis* n.sp. has conspicuously large IBrBr and the anal plate X is much larger than RR. The latter characteristic distinguishes the New Zealand species from all other known species of *Megistocrinus*. *M. reeptonensis* also differs from *M. depressus* Hall by having different ornamentation of calyx plates, i.e., by distinctly rounded radial ribs all over the surface of the plates. Most frequently the American species has on the surface of the plates fine grains, sometimes in lines or coalescent in places, forming a sort of shagreen ornamentation; if the ribs are developed, the grains are very fine and concentrated only at the margin of the plates.

#### Superfamily HEXACRINITICEAE Ubaghs, 1953

#### Family HEXACRINITIDAE Wachsmuth and Springer, 1881

#### Genus HEXACRINITES Austin and Austin, 1843

#### *Hexacrinites* sp. (Pl. 3, Figs. 1-4)

**DESCRIPTION:** Columnals low, disc-like or slightly oval, thickness about one half of radius. A minute circular axial canal is present, its edge being raised slightly above surrounding parts of the columnal. Peripheral part of columnal also raised. Upper and lower surfaces covered with fine radial striae (crenelae) which show as fine indentations at the periphery.

All coherent stem fragments consist of regular alternations of three internodal columnals and one nodal columnal. Internodals low, with smooth columnar walls. Nodals higher and broader, with walls rounded or tapered to periphedral edge; more mature nodals show densely-packed fine spinose bases of cirri.

**MATERIAL:** VE3, 4, 5. More common than *Megistocrinus reeptonensis* n.sp., represented by stems and columnals.

#### CRINOIDEA GEN. ET SP. INDET. (Pl. 4, Figs. 1, 2)

Two fragments are too incomplete to be determined generically.

A fragment of a small column (Pl. 4, Fig. 1, VE6) has regularly alternating nodals and internodals with rounded walls, nodals thicker than internodals, small slightly protruding bases of cirri sparsely scattered on nodals.

The second fragment (Pl. 4, Fig. 2, VE7) is the basal part of the column of a large crinoid with fastening appendices preserved. Stem poorly preserved, showing only a few smooth, very low columnals. Appendices long, unbranched, touching each



*Megistocrinus reeftonensis* n.sp. Latex cast of holotype (VE1) ( $\times 1$ ).

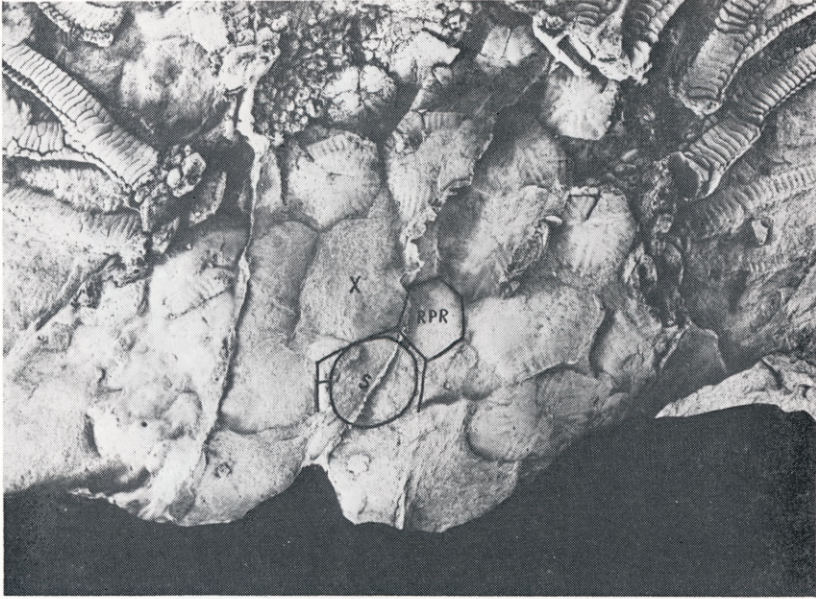


FIG 1



FIG 2



FIG 3

FIGS. 1-3.—*Megistocrinus reeptonensis* n.sp. Fig. 1.—Detail of the cup of holotype. A part of tegmen is preserved; RPR, right posterior radiale; X, anal plate; S, stem facet. ( $\times 1.5$ ). Fig. 2.—Detail of the arms with pinullae (VE1) ( $\times 1$ ). Fig. 3.—Remains of the arms of another specimen (VE2). Food grooves and triangular facets are visible ( $\times 1$ ).



FIG. 1



FIG. 2



FIG. 3

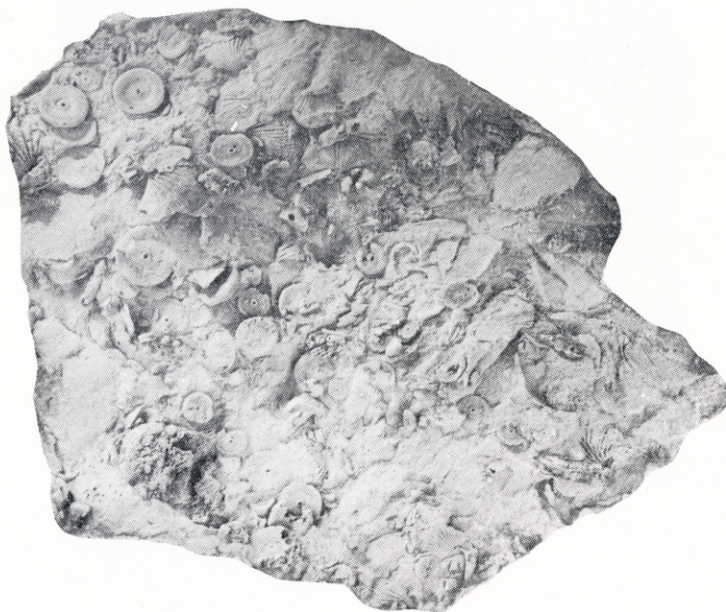


FIG. 4

FIGS. 1-4.—*Hexacrinites* sp. Figs. 1, 2.—Fragments of the stems (VE3). Fig. 3.—Stem with the bases of cirri (VE4). Fig. 4.—Isolated columnals (VE5). Latex casts ( $\times 1$ ).



FIG. 1



FIG. 2

FIGS. 1, 2.—Crinoidea gen. et sp. indet. Fig. 1.—Isolated stem (VE6). Fig. 2.—Stem base with root appendices (VE7). Latex casts ( $\times 1$ ).

other at their proximal ends, diverging fan-wise, gradually tapering distally, composed of cylindrical segments which are low near the stem and increase in height distally. Each segment has regularly arranged minute grains on the peripheral surface. The form of the appendices suggests attachment to a soft bottom which is in agreement with the type of sediment forming the matrix.

#### DISCUSSION

Previous works on the geology and paleontology of the Reefton Group were reviewed by Wright (1967). Brachiopods from the Lower Reefton Quartzite and the Reefton Mudstone of Suggate (1957) have been correlated with the upper Siegenian or lower Emsian (Lower Devonian) of the Rhine region, in western Europe (Allan, 1935; Gill *et al.*, 1966).

In spite of wide stratigraphic ranges, the association of the two crinoid genera found in the Reefton Group is indicative of the Devonian period. *Hexacrinites* ranges from the Upper Silurian to the Upper Devonian; it is found especially in the Middle and Lower Devonian, where its distribution is cosmopolitan. *Megistocrinus* occurs quite abundantly from the Lower Devonian to the Lower Carboniferous; it is found most abundantly in the Middle Devonian of the U.S.A., with several species represented in beds which correspond to the Givetian of Europe. The record of the genus *Megistocrinus* in the Reefton Group of Lower Devonian age in New Zealand is important and is in agreement with present ideas based on other fossil groups (Gill *et al.*, 1966) on the age of the Group.

#### ACKNOWLEDGMENTS

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The photographs are by L. Frantova and H. Vrstalova, Geological Survey of Czechoslovakia, Prague. All photographs are taken after whitening the specimens with ammonium chloride. Not retouched.

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