ADDITIONS TO THE ROSTROCONCH FAUNA OF AUSTRALIA AND CHINA

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Eight taxa of rostroconch are described from stratigraphically and geographically dispersed localities in Australia; *Euchasma caseyi* and *Euchasma colliveri* sp. nov from the Ordovician (Caradoc) of Tasmania; *Kandosoconcha pembertoni* gen. et sp. nov. from the Lochkovian-Pragian Yellowmans Creek Beds near Kandos, NSW; and *Hippocardia* sp. from the Lochkovian-Pragian Martins Well Limestone, NQ. *Conocardium sowerbyi* de Koninck. is decribed from the Emsian Brogans Creek Lst of the Capertee Valley, and a neotype for the species is designated. A single rostroconch is described from the Middle Devonian of Guangxi, China. Rostroconchs are described for the first time from the Carboniferous of Australia. ❐ *Rostroconchs, new taxa, Ordovician, Devonian, Carboniferous, Australia, China.*

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Ordovician rostroconchs are known from central Australia (Pojeta, et al., 1977) and Tasmania (Etheridge,1883; Pojeta, 1979). *Euchasma caseyi* Pojeta et al.,1977 and *E. colliveri* sp. nov. are described from the Gordon Group near Zeehan Tasmania, in shales from near the Zeehan Smelters Quarry which Banks & Burrett (1989) correlated with their OT17 or OT18 faunal assemblage (Caradoc).

Known Australian Devonian rostroconchs come mainly from the Lower Devonian of SE Australia (de Konninck, 1876; Creswell, 1893); Etheridge, 1881; Chapman, 1908; Fletcher, 1943; Talent, 1956; Talent & Philip,1956; Tassell, 1982) with only *C. gogoense* Fletcher (1943), known from Upper Devonian of the Canning Basin WA

Early Devonian material described herein comes from: 1)Yellowmans Creek Beds, near Kandos NSW; 2) Brogans Creek Lst in the upper Capertee Valley NSW, and 3) the Martins Well Limestone Member of the Shield Creek Fmn, Broken River Province, north Queensland.

The Yellowmans Creek Beds are a thick sequence of shales with minor limestone and calcareous shales near the base (Pemberton et al 1994, Colquhoun 1996). *Kandosoconcha pembertoni* gen. et sp. nov. is derived from the lowermost 10m of the formation above the Kandos #1 limestone quarries. The locality has yielded *Ozarkadina remschiedensis remschiedensis*, *Amydrotaxis sexidentata* (Mawson in Cook, 1988) and is regarded as late Lochkovian to earliest Pragian.

The Brogans Creek Limestone has been regarded as lateral equivalent of the Carwell Creek Group (Pemberton et al, 1994). Colquhoun (1995) suggested an early Emsian age for the limestone based on conodonts. Shelly faunas currently under investigation show strong species-level similarity with the '*Receptaculites*' Limestone of Taemas, and thus for the single horizon containing *Conocardium sowerbyi* de Koninck, a late Emsian age is probable.

The Martins Well Limestone Member of the Shield Creek Formation is regarded as spanning the Lochkovian-Pragian boundary (Jell et al., 1993). *Hippocardia* sp. were collected in the uppermost part and are here regarded as Pragian.

Conocardium gogoense Fletcher 1943 has been recovered from a silicified fauna in the Pillara Limestone (Frasnian) in the Hull Range, Canning Basin WA. (cf. Playford & Lowry, 1966). A paucity of biostratigraphically-useful fossils from the Pillara Limestone in the Hull Range make exact placement of the occurrence within the Frasnian impossible at present.

Fletcher (1943) concluded there was only one vague reference to Australian Carboniferous rostroconchs. The specimens described herein are from the Utting Calcarenite, Utting Gap identified by Roberts (1971) as Viséan in age.

Terminology follows Pojeta & Runnegar (1976) and Pojeta (in Boardmann et al., 1987).

SYSTEMATIC PALAEONTOLOGY

Phylum MOLLUSCA
Class ROSTROCONCHIA Pojeta, Runnegar, Morris & Newell, 1972
Order CONOCARDIOIDA Neumayr, 1891
Superfamily EOPTERIOIDEA Miller, 1889
Family EOPTERIIDAE Miller, 1889

Euchasma Billings, 1865

Euchasma caseyi Pojeta, Gilbert-Tomlinson & Shergold, 1976
(Fig. 1A-E)

Euchasma caseyi Pojeta, Gilbert-Tomlinson & Shergold 1976: 27, pl. 20, figs 8-15, pl. 21, figs 1-9, pl. 23, figs 1-10, pl. 24, figs 1-5.

MATERIAL. QMF37321-37323, two conjoined valves and a fragmentary right valve, from QML901, Zeehan Smelters Quarry, Zeehan Tasmania.

DESCRIPTION. Shell medium sized, up to 10.8 mm long, 11.4mm high, 8.2mm wide; laterally expanded, posterior outline circular, oblique straight anterior face, very weakly concave. Rostrum prominent, extending at least two thirds along the dorsal margin. Anterior faces reclined 60° from horizontal, with modest ribs stronger towards the gape. Gape a characteristic 'key hole' shape, oval with invagination above and slit like with interlocking denticles below. Posterior shell dominated by evenly spaced ribs.

REMARKS. The only slight difference between this and the Georgina Basin material Pojeta et al. (1976) is its coarser denticulation in the anterior gape. This species differs from *E. colliveri* by the architecture of the gape, weaker ribs and lack of the prominent carina.

Euchasma colliveri sp. nov.
(Fig 1F-H)

ETYMOLOGY. For F.S.Colliver.

MATERIAL. Holotype: QMF37324 from QML901, Zeehan Smelters Quarry, Zeehan Tasmania.

DIAGNOSIS. Concave upper anterior face convex lower anterior face, strong carina and subtriangular outline.

DESCRIPTION. Shell medium sized, oblique, sub-triangular in outline, moderately inflated, 11.6mm long, 9.8mm high, 8.4mm wide. Rostrum elongate, extending nearly to posterior margin. Dorsal margin slightly arcuate. Anterior face reclined at approximately 60° from the horizontal, bordered from posterior shell by prominent raised carina. Anterior face concave near the dorsum, lacking ornament dorsally, convex towards the venter where it is adorned by strong but thin ribs and finer comarginal growth

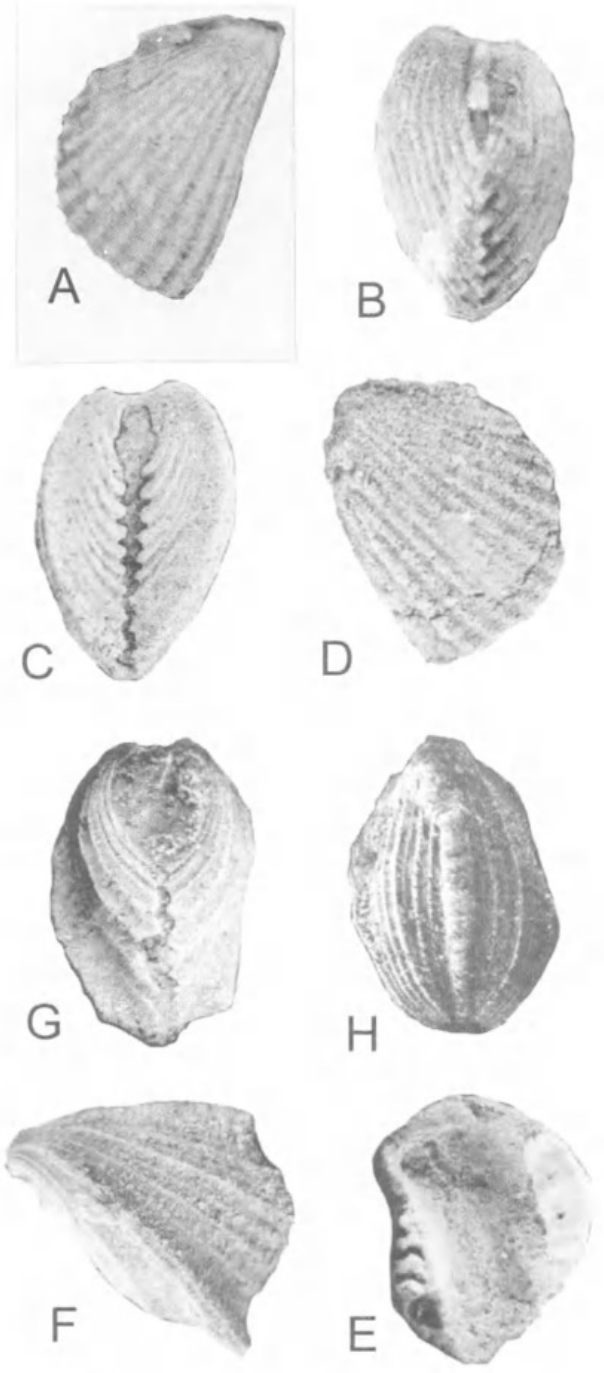

FIG. 1. A-E, *Euchasma caseyi* Pojeta, Gilbert-Tomlinson & Shergold, 1976. A-C, QMF37322, right lateral, anteroventral and posterior views, ×2.4. D, QMF37323, left lateral view, ×2.4. E, QMF37324, internal view, ×2.4. F-H. *Euchasma colliveri* sp. nov. Holotype QMF37321 ×2.4, right lateral, posterior and dorsal views.

lines. Posterior shell bears 6 ribs of subequal strength and numerous fine lines continuing the rib-dominant reticulation on the shell anterioir to the main carina. Rostral clefts obscured.

REMARKS. Reticulation and the carina suggest affinities with *E. skwarkoi* Pojeta et al., 1976, but that taxon bears finer more numerous ribs, more robust ribs on the anterior face, and a less pronounced carina. The specimen differs from the type *E. blumenbachii* (Billings) (Pojeta & Runnegar, 1976, pl. 27) by having coarser ornament and a prominent carina.

Superfamily CONOCARDIOIDEA Miller, 1889
Family HIPPOCARDIIDAE Pojeta & Runnegar, 1976

Hippocardia Brown, 1843

TYPE SPECIES. *Cardium hibernicum* Sowerby 1815 from the lower Carboniferous of Ireland.

Hippocardia sp.
(Fig. 2)

MATERIAL. QMF33798-33801 from QML541, Martins Well Limestone Member of the Shield Creek Formation, Broken River Province, north Queensland.

DESCRIPTION. Medium to large, up to 25.2mm long, 13.4mm high and approximately as wide as high. Dorsal margin straight with umbo mid-shell projecting slightly above hinge line. Prominent short rostrum situated just below dorsal margin. Snout long with wide anterior gape. A strong ridge and a smaller ridge posterior to it form a week hood separating the posterior and anterior parts of the shell. Posterior face at approximately 60< to vertical with a concavity to rostrum. Ornament reticulate, evenly so on anterior shell, ribs stronger on posterior.

REMARKS. This poorly preserved material is generically assigned on the basis of the elongate snout and weak hood.

? Family HIPPOCARDIIDAE Pojeta & Runnegar, 1976

Kandosoconcha gen. nov.

TYPE SPECIES. *Kandosoconcha pembertoni* sp. nov.

ETYMOLOGY. For the Kandos district, NSW.

DIAGNOSIS. Minute, trapezoidal, with prominent mid-shell carinae and intercalated ridges.

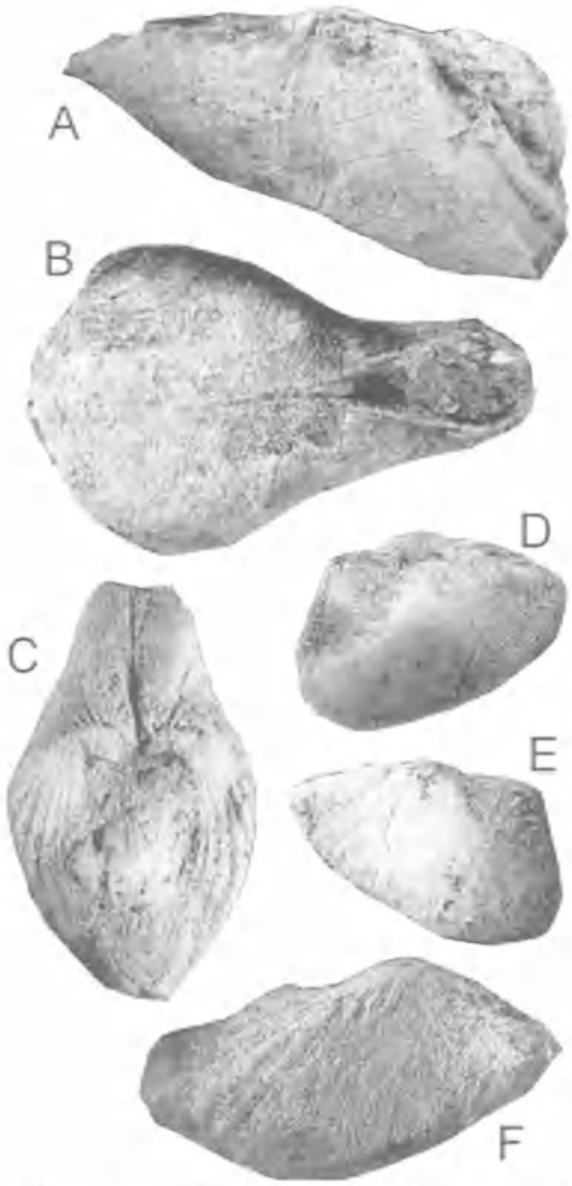

FIG. 2. *Hippocardia* sp. A-C, QMF33798, × 2, left lateral, ventral and dorsal views. D,E, QMF33800, × 2, right and left lateral views. F, QMF33801, × 2.4, right lateral view.

REMARKS. Gross anatomy, prominent carinae and reticulation suggests affinities with *Mulceodens* Pojeta & Runnegar or *Bigalea* Pojeta & Runnegar. *Mulceodens* was established for taxa with a constriction in the ventral part of the snout, but the restriction is lacking in the Kandos species. *Bigalea* has 2 rostral hoods, and a slit-like aperture. The Kandos species is closest to and shares the reticulation and trapezoidal shape of *B. visbeyensis* Pojeta & Runnegar from the Silurian of Gotland differing by intercalation of ridges, no development of hoods, rather having carina.

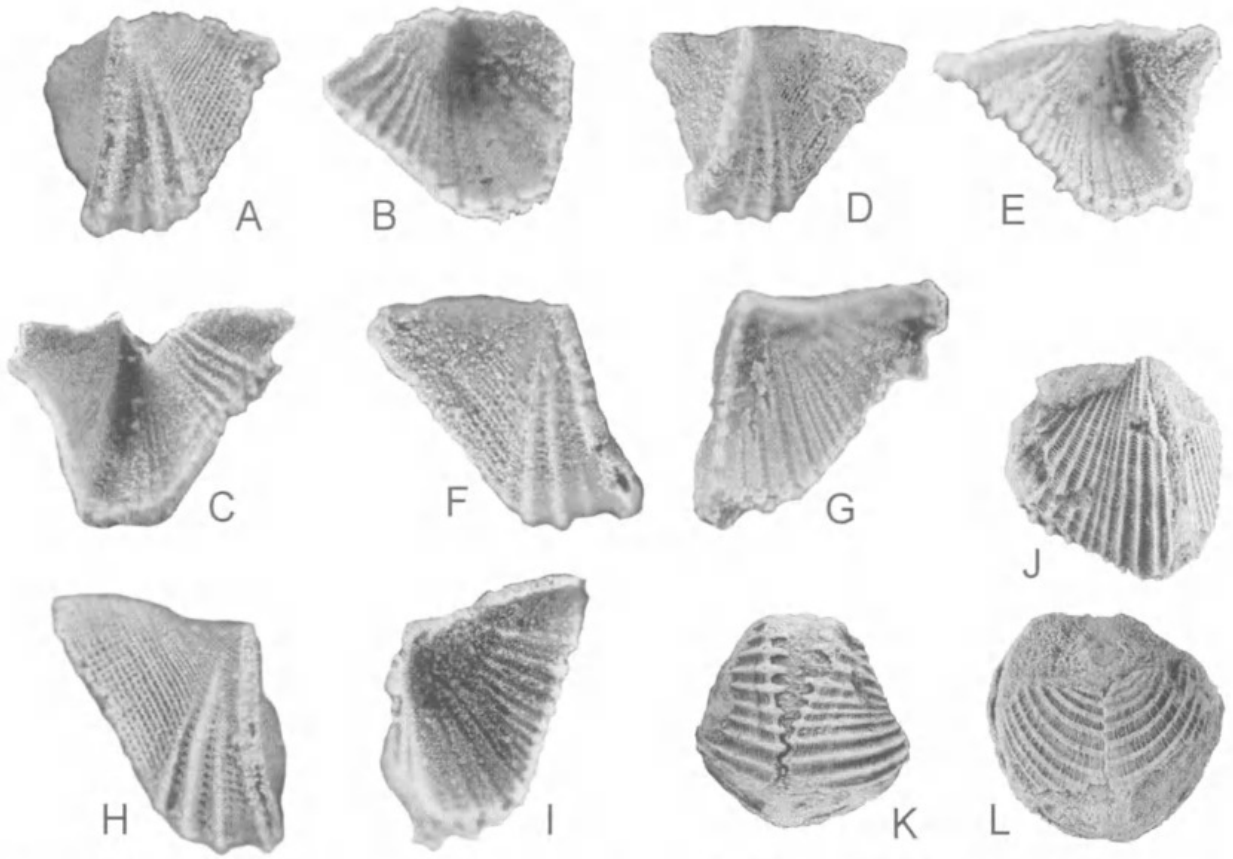

FIG. 3. A-I, *Kandosoconcha pembertoni* gen. et sp. nov. A,B, Holotype QMF37325, × 20. C, Paratype QMF37326, ×16, left valve internal view. D, E, Paratype QMF37328, ×16, right valve. F,G, Paratype QMF37327, ×10, left valve. H,I, Paratype QMF37329, ×10, left valve. J-L, *Conocardium* sp. 1. QMF41130, ×3.2, left lateral, ventral and anterior views.

Kandosoconcha pembertoni sp.nov.
(Fig. 3A-I)

ETYMOLOGY. For John Pemberton.

MATERIAL. Holotype: QMF37325 (right valve), paratypes QMF37326-37330 from QML1026, top bench of Kandos #1 Quarry, W of Kandos NSW, Yellowmans Creek Beds, Early Devonian.

DIAGNOSIS. As for genus.

DESCRIPTION. Shell minute, up to 2.8mm long, 2.7mm high, trapezoidal,with 2 intermediate strength ribs between 2 major mid shell carinae. Dorsal margin nearly straight, umbones above dorsal margin. Anterior part of shell equantly triangular, with equally reticulate ornament, or on some specimens slightly dominant comarginal fine lines. Posterior portion smaller than anterior, with weak fine comarginal lines. Mid-shell with 3 or 4 strong ribs on the posterior ridge, the strongest forming a carina with next most robust ridge penultimate anterior also forming a carina. Minor ridges intercalated some originating from mid shell, not from umbones. Reticulation continuing on mid-shell. Gape narrow with some denticulation. Rostrum unknown.

Family CONOCARDIIDAE Miller, 1889

Conocardium Bronn, 1835

TYPE SPECIES. *Cardium elongatum* Sowerby 1815.

Conocardium sowerbyi de Koninck 1876
(Fig. 4)

Conocardium sowerbyi de Koninck 1876:109; de Koninck 1898 (transl.): XX.
Conocardium sp. Tassell 1982: 2 pl. 1 fig.1.

TYPE. This taxon was not illustrated by de Koninck, 1876 and destruction of the material by fire rendered the name dubious in Tassell's (1982) opinion. Complicating this, the type locality was nebulously given by de Koninck as Yass district, with the host lithology as a black limestone. Thus the name is based on a non-existant type from an unclear locality. I here designate a neotype, ANU 36845 from the *Receptaculites* Limestone

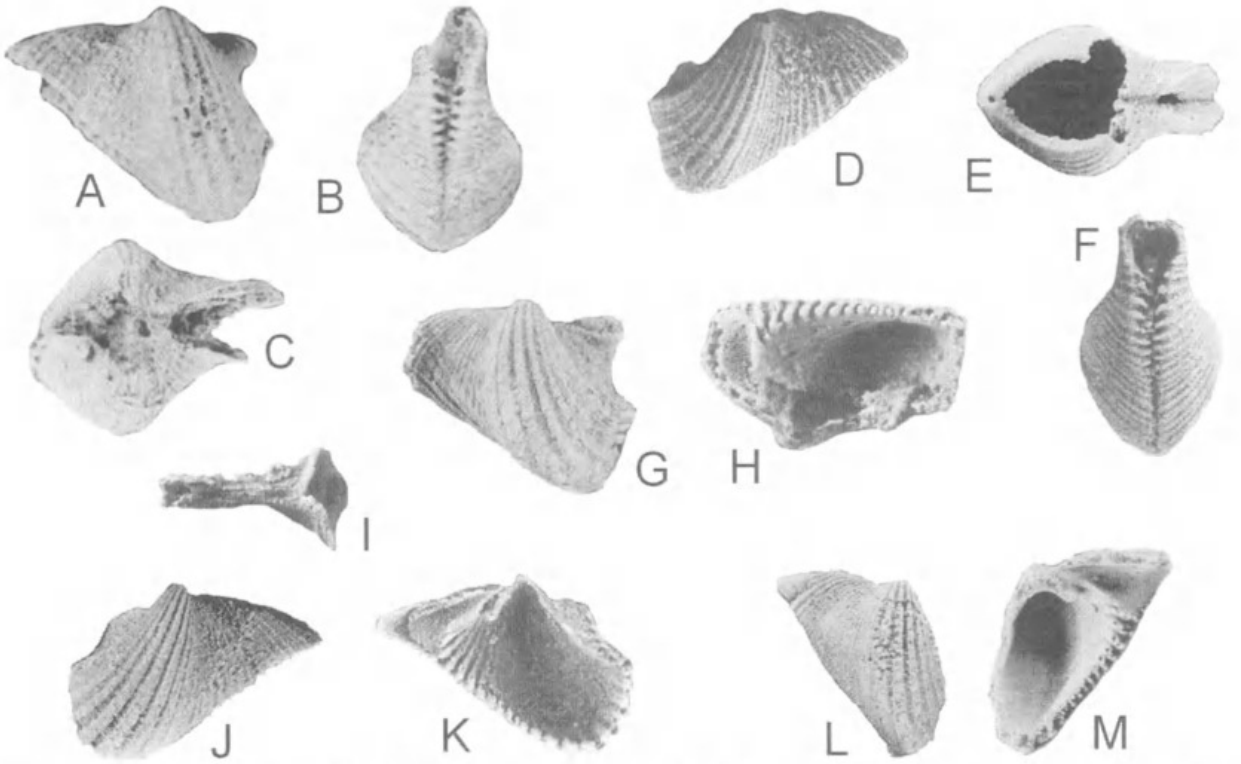

FIG. 4. *Conocardium sowerbyi* de Konnick, 1876. A-C, QMF37306, ×3.5, left lateral, posterior and dorsal views. D-F, QMF37307, ×3.5, right lateral, dorsal and anterior views. G,H, QMF37209, × 2.7, left lateral and internal views. I, QMF37312, × 2.7, dorsal view of snout. J,K, QMF37310, × 2.7, right lateral and internal views. L,M, QMF37308, × 2.7, left lateral and internal views.

described and figured as *Conocardium* sp. (Tassell, 1982). Given other taxa described by de Koninck, and Tassell (1982a), such as *Murchisonia turris* and *Mitchellia striatula*, are also abundant in the *Receptaculites* Limestone the most likely source of the conocardiid was this unit. Whilst the species was not illustrated by de Koninck and the name unused, there are reasonable grounds to conclude Tassell's material is topotypic and conspecific.

MATERIAL. QMF37306-QMF37312 from QML1027, Brogans Creek Limestone, Brogans Creek, Upper Capertee Valley, NSW. Devonian (Emsian).

DESCRIPTION. Small to medium sized, up to 11mm long, 8mm wide and 7mm high. Long rostrum just below and at slight angle to hinge. Umbo subcentral, well above hinge line. Valves moderately inflated. Anterior gape slit-like widening close to dorsum to form the oval snout, with elongate denticles. Short apertural shelves. Pegma at 45° to hinge. Broad flattened ribs on mid and posterior shell, widest and most pronounced on mid shell, ribs without intercalation. Anterior ribs finer. Fine growth lines present. Posterior-most shell and rostrum lacks ornament.

REMARKS. The narrow slit, broad ribs, and aperture confined to the end of the shell demonstrate that this material is conspecific with that described by Tassell (1982) and de Koninck's (1876).

Conocardium gogoensis Fletcher, 1943.
(Fig. 5A,B)

MATERIAL. QMF36085, QMF42233 from QML1033, Pillara Limestone, Hull Range, Canning Basin, WA; Devonian (Frasnian).

DESCRIPTION. Moderately inflated, up 7mm long, and 6.5mm high, umbones well above dorsal margin. Antero-dorsum straight, rostrum not preserved. Posterior face at 30° from horizontal. Anterior surface with wide numerous flattened ribs. Posterior at least partially ornamented by finer ribs. Fine detail lacking due to coarse silicification.

REMARKS. Of the many hundreds of kilograms of limestone dissolved only these two specimens of rostroconch were recovered. Fletcher's (1943) specimens are similarly coarse ribbed, and equally long as high.

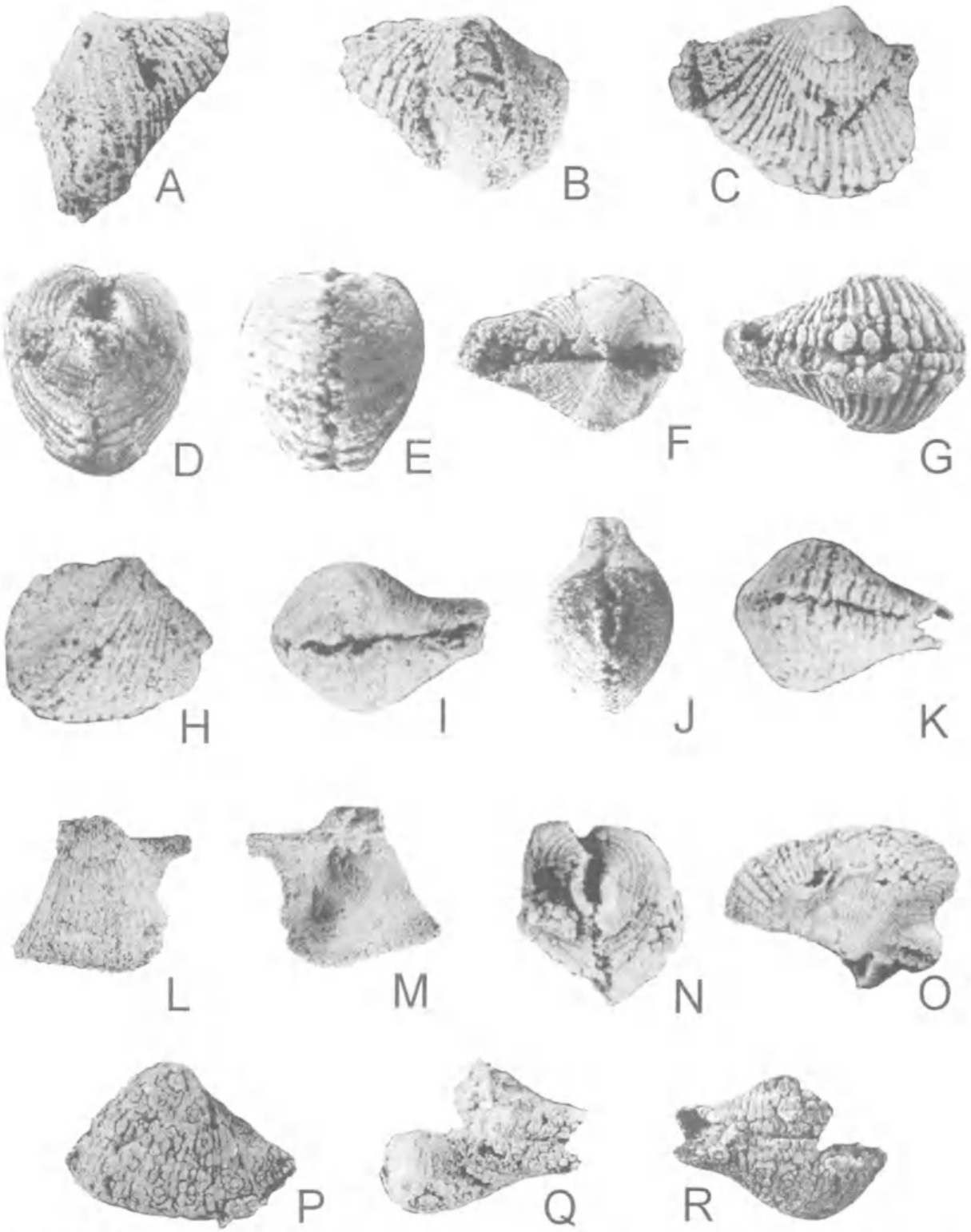

FIG. 5. A,B, *Conocardium gogoense* Fletcher, 1945. A, QMF36085 right valve, × 4; B, QMF42233 left valve, × 4. C-R, *Conocardium* sp. 2. C-G, QMF37317, × 3.2, right lateral, posterior, anterior, dorsal and ventral views; H-K, QMF37314, × 4 right lateral, dorsal, inclined posterior and ventral views; L, M, QMF37316, × 1.6 left lateral and internal views; N,O, QMF37317 × 3, posterior and right lateral inclined views;was not illustrated P-R, QMF37320, × 2.5, left lateral, dorsal and ventral views.

Conocardium sp. 1
(Fig. 3J-L)

MATERIAL. QMF41330 from the Dongangling Formation, 7km NW of Ertang, Wuxian County, Guangxi Province China; Middle Devonian (Givetian).

DESCRIPTION. Medium sized, tumid, quadrate in outline, 7.3mm high, 7.1mm long, 7.2mm maximum width. Rostrum well below dorsum, projecting from short steep convex posterior face. Gape widening strongly dorsally, with long denticules. Shell reticulate with subequal ribs dominant on anterior face, comarginal lines fine, very numerous. Posterior face with coarse ribs and much finer radial lines. Rostral clefts unknown.

REMARKS. This stout taxon differs from the type species *C. elongatum* (Sowerby) by the shortness of the shell. From *Conocardium sowerbyi*, from the Devonian of Tasmas, it differs in its more tumid shell form. I can find no other records of Middle Devonian rostroconchs from Guangxi.

Conocardium sp. 2
(Fig. 5C-R)

MATERIAL. QMF37313-37320 from QMI 1095, Utting Calcarenite, Utting Gap Bonaparte Gulf Basin, WA; Carboniferous, Visean.

DESCRIPTION. Shell, medium sized, up to 19mm long 13mm high and 9mm wide, moderately inflated, rostrum prominent, slightly below the hinge axis, gently inclined upwards from the shell margin. Rostral clefts unknown. Anterior gape with weak denticles. Ornament of flattened wide ribs, with comarginal rugae confined to posterior surface.

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