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Tournaisian Brachiopods from Baywulla,  
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by

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# Tournaisian Brachiopods from Baywulla, Queensland

W. G. H. Maxwell, B.Sc., Ph.D., D.I.C.

*ABSTRACT*:—The Tellebang fauna at Baywulla represents a deep water facies, equivalent to the Old Cannindah Tournaisian faunas. It is small, containing only four species, viz. *Dictyoclostus paradoxus* Campbell, *Spiriferellina baywullensis* sp.n., *Prospira typha* var. *tellebangensis* Maxwell and *Balanoconcha australis* sp.n.

## Introduction

This work was carried out at the same time as that on the Old Cannindah faunas (Maxwell, 1960 a, c). The author is indebted to Professor D. Hill and Dr. K. S. W. Campbell for comments and suggestions. A research grant from the University of Queensland financed the project.

## Stratigraphy

Baywulla is a pastoral property occupying the central and eastern part of the Yarrol Basin in the Yarrol-Monto district. In this area, the Lower Carboniferous Tellebang and Baywulla Formations outcrop around the Yarrol Syncline, and are separated from their western exposure at Old Cannindah by the Tellebang Anticline; the distance across the anticline between the eastern and western exposures is approximately 4½ miles.

The Tellebang Formation at Baywulla consists of shale and graywacke with little calcareous material and sparse faunas. Its thickness exceeds 3000 feet. The brachiopods described below occur in the upper 800 feet, in fine indurated siltstone and subgraywacke. Overlying these beds is the Baywulla Formation, consisting of crinoidal and oolitic limestones with interbedded calcareous subgraywacke. At Baywulla the formation lacks the rich coral faunas which are typical of its development in the west at Old Cannindah. Brachiopods, and bryozoa are more abundant. The thickness of the formation is approximately 1000 feet.

The localities from which the Tellebang fauna was obtained occur 1½ miles north of Baywulla Homestead. The fauna includes four species:—*Dictyoclostus paradoxus* Campbell, *Spiriferellina baywullensis* sp.n., *Prospira typha* var. *tellebangensis* Maxwell and *Balanoconcha australis* sp.n.,

## Systematic Descriptions

Superfamily PRODUCTACEA Maillieux 1941

Family DICTYOCLOSTIDAE Stehli 1954.

*Diagnosis*:— Shell ornament of costae or costellae; umbo reticulate or non-reticulate; body spines variable in number; strong, low, cardinal process.

*Remarks*:— Stehli (1954, pp. 316-321) erected three subfamilies in the Dictyoclostidae, namely Dictyoclostinae Stehli, Linoproductinae Stehli and Marginiferinae Stehli, their separation being based on the reticulate or non reticulate nature of the umbonal region, the posterior contour of the pedicle valve and the marginal ridge of the brachial valve.

Whether or not differences in these characters justify separation into subfamilies is doubtful, and the present author prefers to leave the family undivided.

#### Genus DICTYOCLOSTUS Muir Wood 1929

1929 *Dictyoclostus* Muir Wood, p. 103. 1938 *Dictyoclostus* Muir Wood: Sutton, pp. 562-564. 1954 *Spinifrons* Stehli, pp. 318-319. 1957 *Dictyoclostus* Muir Wood; Campbell pp. 56-57.

*Genotype*:—(by original designation) *Productus semireticulatus* Martin 1809 (p. 7, pl. 32, figs. 1-2), from Derbyshire, England; Lower Carboniferous (Z-D zones).

*Diagnosis*:—Large shell, maximum width at hinge line; pedicle valve even convex, slightly sinuate, non-geniculate; brachial valve weakly concave; ornament of uneven, rounded costae, and concentric ribs; spine bases numerous and irregularly scattered.

*Remarks*:—Campbell (1957, pp. 56-57) reviewed the present status of the genus, referring *Spinifrons* Stehli to its synonymy and retaining the following original species in *Dictyoclostus* — *D. pinguis* Muir Wood, *D. teres* Muir Wood, *D. multispiniferus* Muir Wood, *D. vaughani* Muir Wood, — as well as the North American species *D. fernglenensis* (Weller), *D. burlingtonensis* (Hall), and *D. crawfordsvillensis* (Weller). The present author is in full agreement with Campbell's interpretation.

*Range*:—Carboniferous and Permian.

#### *Dictyoclostus paradoxus* Campbell 1957

(Plate 1, Figs. 8-12)

1920 *Productus semireticulatus* Martin; Benson and Dun, p. 344.

1957 *Dictyoclostus paradoxus* Campbell, pp. 60-62.

*Holotype*:—F1972. University of New England Collection; from Watts, Babbinsboon, New South Wales; Upper Tournaisian, Lower Carboniferous.

*Diagnosis*:—Small shell, maximum width anterior to hinge; pedicle valve evenly convex, slightly sinuate; brachial valve geniculate to rounded; ornament of ribs, costae and scattered spines; cardinal ridges diverge obliquely from the base of cardinal process, and curve anteriorly along the lateral margins; median ridge broad, low, merging anteriorly into septum; adductor scars sometimes differentiated into antero-central and posterolateral elements.

*Remarks*:—Campbell (1957, p. 60) regarded the variable nature of the marginal ridge and the differentiation of the adductor scars as significant in the genus *Dictyoclostus*, but failed to indicate the diagnostic features of *D. paradoxus*. The present author believes that the species is distinguishable largely on its size and external proportions, as these are the characters which separate it from *D. simplex* Campbell, the second species in the Watts, Babbinsboon fauna.

Campbell compared *D. paradoxus* with *D. bergicus* Paeckelmann from the Visean of Ratingen, with *D. teres* Muir Wood from the Tournaisian (C zone) of England and with *D. mesialis* (Hall) from the Keokuk limestone of late Tournaisian age in North America. Further comparisons may be drawn with *D. altonensis* (Norwood and Pratten) from the Salem

Limestone of early Visean age in Indiana, U.S.A., and the species figured by Sarycheva and Sokolskaya 1952 (pl. 42, figs. 210) as *Pugulis? annae* Sarytcheva from the Gtsch subzone of the Tournaisian of the Moscovian Basin.

*D. paradoxus* occurs in the Tellebang formation, on Baywulla Station, locality L1920, eight hundred feet below the limestones of the Baywulla Formation which is of Visean age. It has not been found on the western margin of the Yarrol Basin, in the Old Cannindah region.

Superfamily TEREBRATULACEA Waagen 1883.

Family DIELASMATIDAE Schuchert 1929.

*Diagnosis*:—Smooth or costate punctate shell; cardinal plate divided into two plates joining socket plates to valve floor; crural plates small or absent; dental plates present or absent.

*Remarks*:—The Dielasmatidae as defined by Schuchert 1929 and interpreted by Stehli 1954 (p. 352-353) is a long ranging group stratigraphically, and it is also a widely varying group morphologically. The inclusion of *Balanoconcha* Campbell 1957, and perhaps other genera without dental plates, may be a matter of convenience, but until further morphological studies have been made on Palaeozoic Terebratulacea, it would seem unwise to erect a new family for genera of this kind.

#### Genus BALANOCONCHA

1957 *Balanoconcha* Campbell, pp. 86-88.

*Genotype*:—(by original designation) *Balanoconcha elliptica* Campbell 1957 (pp. 86-88, pl. 15, figs. 13-15, text figs. 25-27); from Watts, Babbinsboon, New South Wales; Upper Tournaisian, Lower Carboniferous.

*Diagnosis*:—Medium sized, terebratuliform shape, commissure rectimarginate or slightly sinuate; surface smooth; deltidial plates small, conjunct; no dental plates; hinge plate with central trough, free anteriorly, attached posteriorly to crural plates; shell structure punctate.

*Remarks*:—Campbell (1957, p. 86) separated *Balanoconcha* from *Dielasma* King on the basis of ventral internal structure — *Balanoconcha* including forms without dental plates. So far he had identified only one species in the genus, *Balanoconcha elliptica* Campbell. This species has only been found in Upper Tournaisian faunas.

*Balanoconcha australis* sp.nov.

(Plate 1, Figs. 4-7)

*Holotype*:—F28580. University of Queensland Collection; from L1922, Baywulla Station, Parish Baywulla, County Yarrol, Queensland; Tellebang Formation, Upper Tournaisian.

*Diagnosis*:—Small, compressed shell; elongate outline; rectimarginate commissure; internal characters as for genus; faint median ridge in dorsal valve.

*Description*:—This is a very small, elongate, terebratuliform shell of small thickness, with a suberect ventral umbo, pierced by a large foramen. Deltidial plates are small and conjunct. The cardinal region is terebratuloid, with beak ridges bordering a minute, reflexed cardinal area. The commissure is rectimarginate. The ventral interior is characterised by the absence of dental plates, and the development of a low

median ridge, extending for half the valve's length. The dorsal valve contains more complex internal structure. A hinge plate with a central trough extends anteriorly from the dorsal umbo, and is attached postero-laterally by crural plates, which reach to the valve floor.

*Remarks:* So far this species has been recorded from the Tellebang Formation only. It is similar to *B. elliptica*, but can be readily distinguished by its smaller size, more compressed shell and slightly greater elongation. A similar species occurs in beds of Upper Carboniferous age in the Yarrol district. *B. elliptica* has been found in the Lower Carboniferous faunas 10 miles further north.

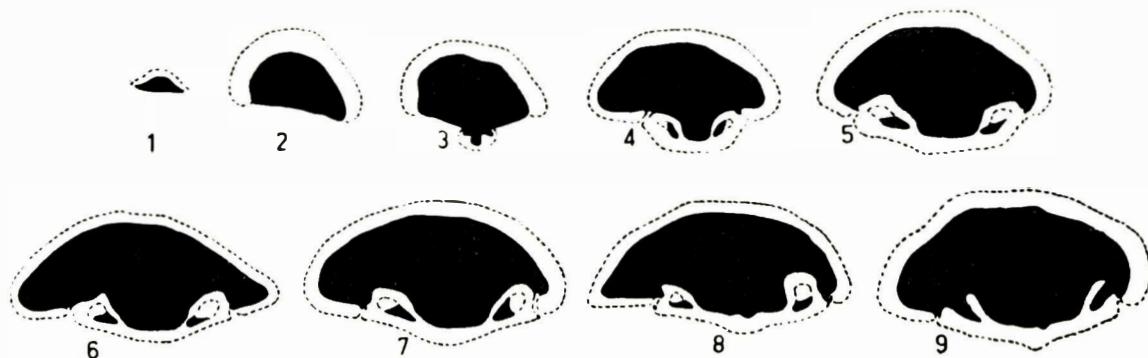


Figure 1: Serial sections through umbo of *B. australis* sp.n. x 5. Sections at intervals of .5 mm.

Superfamily PUNCTOSPIRACEA Cooper 1944.

Family SPIRIFERINIDAE Davidson 1884.

Genus SPIRIFERELLINA Fredericks 1924.

1847 *Spiriferina* d'Orbigny (partim) p. 268. 1850 *Spiriferina* d'Orbigny (partim) p. 334. 1924 *Spiriferellina* Fredericks, p. 299. 1926 *Spiriferellina* Fredericks, p. 407. 1931 *Spiriferellina* Fredericks; Paeckelmann, p. 50. 1951 *Spiriferellina* Fredericks; Maxwell, pp. 17-19. 1959 *Spiriferellina* Fredericks; Campbell pp. 358-362.

*Generotype:*—(by original designation) *Terebratulites cristatus* Schlotheim 1816, 6, p. 28, pl. 1, figs. 3a, b, c (re figured Campbell 1959, 1 (4), pl. 59, figs. 7a-b); from Zechstein of Blucksbrunnen, Thuringen, Germany; Permian.

*Diagnosis:*—Small, punctate shell; prominent sinus and fold; three to six angular lateral plications on each slope; cardinal area curved, triangular, moderately high; dental plates small, subparallel; ventral median septum high; dorsal median ridge low.

*Remarks:*—The status of the genus has been discussed by Muir Wood and Oakley (1941, p. 8), Muir Wood (1948, pp. 63-64), Maxwell (1951, pp. 17-19), and more recently Campbell (1959) has redescribed and refigured the type species of *Spiriferellina* and of the related genera *Punctospirifer* North and *Reticulariina* Fredericks. Campbell's valuable contribution has established the validity of all three genera, and cleared away the increasing confusion that had been developing since the time of their erection. Although he made detailed examinations of the internal

structures, Campbell has shown that these are less diagnostic than characters such as micro ornament, the degree of plication, and size and attitude of the cardinal area — characters which Muir Wood (1948, pp. 63-64) had suggested could be used in the distinction of *Punctospirifer* from *Spiriferellina*.

*Spiriferellina* ranges from the Lower Carboniferous into the Permian, and is world wide in its distribution.

*Spiriferellina baywullensis* sp.n.

(Plate 1, Figs. 1-3)

*Holotype*:—F28577a,b. University of Queensland Collection; from L1920, Baywulla Station, County Yarrol, Queensland; Lower Carboniferous (late Tournaisian).

*Diagnosis*:—Evenly biconvex, punctate, plicate shell; 4-5 angular plications on each lateral slope; fold and sinus steep; concentric growth lamellae abundant; dental plates of moderate length, weakly divergent; median septum twice length of dental plates, thickened anteriorly; crural plates short, strong; median ridge not developed.

*Description*:—The shell is transverse, being three quarters as long as it is wide, with maximum width near the hinge line. The cardinal extremities are well rounded, and the cardinal area is fairly high, triangular and curved. A deep, median sinus with a flat floor is developed, while four to five angular plications occur on either slope. A corresponding fold exists on the dorsal valve. Internally, the shell is characterised by two blade-like dental plates which extend for a third of the length of the valve, and diverge at an angle of 15°. A high median septum extends for twice this length, becoming slightly thicker anteriorly. In the dorsal valve two short, well defined crural plates reach to the valve floor, but do not extend anteriorly. No median ridge is developed.

*Dimensions*:—

	Ventral	Dorsal
Length .....	7 8	9
Width .....	10 14	15
Length Dental Plates .....	3	
Length Median Septum .....	6	

*Remarks*:—*S. baywullensis* is distinguished from *S. neerkolensis* Maxwell, the Middle Carboniferous species, by its smaller size and longer dental plates and septum. That the two species are closely related is clearly evident, and if sufficient material were available for detailed variation study, it is quite probable that continuous gradation would be found. However, their separation is justifiable on the present material, and is useful stratigraphically.

*S. baywullensis* is readily distinguished from *Punctospirifer amblys* Cvancara (1958, pp. 879-881, pl. 113, figs. 6-16) from late Tournaisian faunas of Gloucester, New South Wales. *P. amblys* is more plicate, and the plicae are somewhat rounded.

The species also occurs in the Tournaisian fauna of Fairy Bower, 3½ miles west of Rockhampton District, Queensland.

*Range*:—Tournaisian.

Family SPIRIFERIDAE King 1846.

Genus PROSPIRA Maxwell 1954.

*Prospira* Maxwell, 1954, pp. 35-37, 1960 (in press).

*Generotype*:—(by original designation) *Prospira typa* Maxwell 1954, pp. 35-36, pl. 4, figs. 6-8; from L1291, Stony Creek, Mt. Morgan District, Queensland; Lower Carboniferous.

*Diagnosis*:—Shell transverse, biconvex; sinus and fold small, smooth or weakly costate; lateral costae rounded; microscopic radial lirae over entire surface; dental plates short, thickened; dorsal median septum small or absent.

*Remarks*:—The taxonomic status and the generic affinities of *Prospira* have been discussed in detail in earlier works (Maxwell 1954, 1960c). It occurs in the Lower Carboniferous faunas of Australia and species probably belonging to it have been found in equivalent faunas in Japan, Europe and North America.

*Range*:—Upper Tournaisian and early Viséan.

*Prospira typa* var. *tellebangensis* Maxwell 1960.

(Plate 1, Figs. 13-14).

*Type Specimen*:—F28593. University of Queensland Collection; from L1970, Portion 9, Parish Cannindah, County Yarrol, Queensland. Late Tournaisian — early Viséan.

*Diagnosis*:—Shell transverse, weakly biconvex; sinus and fold broad; sinal costae weakly defined; dental plates very thickened.

*Remarks*:—This variety was separated from the species *s.s.* on the basis of its weaker convexity, wider sinus and more clearly defined sinal costae, the sinal formula being 1 + I + 1 + I + 1. It occurs in the late Tournaisian faunas of the Old Cannindah area on the western margin of the Yarrol Basin, and in the highest fauna of the Tellebang formation further east at Baywulla.

*Range*:—Late Tournaisian.



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## EXPLANATION OF PLATE

(All figures  $\times 1.5$ )

- Figures 1-3: Spiriferellina baywullensis* sp.n.  
 1a — Internal mould ventral showing median septum and dental plates. Holotype F28577a.  
 1b — Latex impression of external of ventral valve F28577b. 2 — Latex impression of external of part of ventral valve F28579.  
 3 — Internal mould of part of ventral valve F28578.
- Figures 4-7: Balanoconcha australis* sp.n. 4 — Internal mould of shell, dorsal view. Holotype F28580.  
 5 — Latex impression of external, dorsal view. F28583.  
 6 — Internal mould of shell, dorsal view. F28582.  
 7 — Internal mould of shell, dorsal view. F28581.
- Figures 8-12: Dictyoclostus paradoxus* Campbell.  
 8a — Latex impression of external of ventral valve, ventral view. F28572b.  
 8b — Same specimen, lateral view.  
 8c — Internal mould, ventral valve, ventral view. F28572a.  
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 9 — Latex impression of external of ventral valve, antero-ventral seen showing geniculation. F28573.  
 10 — External mould, dorsal valve. F28575.  
 11 — Latex impression internal, dorsal valve. F28574.  
 12 — Internal mould, ventral valve. F28576.
- Figures 13-14: Prospira typha* var. *tellebangensis* Maxwell.  
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 13b — Latex impression, same specimen.  
 14a — Dorsal view of half of shell. F28664.  
 14b — Ventral view of same specimen.

