PRELIMINARY NOTE ON NEW SUBGENERA OF

PRODUCTUS AND STROPHALOSIA FROM THE
BRANXTON DISTRICT.*

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(With Plates I-III.)

(Read before the Royal Society of New South Wales, June 5, 1929.)

The Specimens herein described were collected in the Branxton district during 1928 by a field party working under the direction of Mr. M. Morrison, Geological Surveyor, of which the author was a member.

The specimens show so many new and remarkable characters that it was thought advisable to publish descriptions and figures immediately and to leave more detailed systematic work for a future paper.

I am greatly indebted to Mr. W. S. Dun, Palæontologist, Department of Mines, for his very valuable advice. I have also to thank Dr. C. Anderson, Director of the Australian Museum, and Mr. J. Kingsley for their valuable assistance.

Genus—STROPHALOSIA, King, 1844.
Subgenus—WYNDHAMIA, Subgen. nov.

Pl. I., figs. 1-5; Pl. II., figs. 1-5; Pl. III., figs. 4-7.

Shell large, plano-convex and regularly spinose, with a median sinus on the pedicle valve. Hinge line nearly as long as the greatest width of the shell. A well marked area is developed in both valves. The ears are well developed, flattened and usually without ornamentation. The

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Figs 1–5—Wyndhamia dalwoodensis, Sp. nov.
Figs. 6, 7—Strophalosia gerardi, King.
The brachial valve is flat and sometimes very thick, particularly at the anterior margin. The hinge teeth are strong and well developed, fitting into deep sockets in the brachial valve. A long septum is developed in the brachial valve and extends anteriorly nearly two-thirds of the length of the valve. The cardinal process is strong and inclined. It is bifid anteriorly and quadrified posteriorly. (See PI. II., figs. 5; PI. III., figs. 4 and 6.)

A specimen of Strophalosia geradi, King, from Jump-up Creek, where it crosses the boundary of Parishes of Belford and Ovingham, County of Northumberland, is figured for comparative purposes (PL I., figs. 6, 7), and shows the remarkable resemblance of its cardinal process to that of Wyndhamia. The adductor muscle scars of the brachial valve are flabellate and cannot be differentiated into anterior and posterior elements. They are triangular in shape, with one side parallel to the septum, the apex directed posteriorly and the base raised considerably above the general level of the valve forming the blunt prominence common to most species of strophalosia.

The brachial supports are directed postero-laterally from near the middle of the muscle scars and run sub-parallel to the shell margin to the antero-lateral margin, then curve sharply backwards, then inwards, but not meeting the median septum. (PI. I., figs. 3 and 4; PL II., fig. 4.)

Type, Wyndhamia dalwoodensis, Sp. nov.
Locality, Por. 147, Parish of Branxton, County of Northumberland.

Wyndhamia dalwoodensis, Sp. nov.
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*Wyndhamia dalwoodensis*, Sp. nov.

Pl. I., figs. 1-5; Pl. III., figs. 5, 7.

Shell moderately large and plano-convex, with beak incurved.
The pedicle valve is covered with spines which seem to be more or less regularly arranged in concentric rows. The ears apparently do not bear spines, but are well defined and sometimes ornamented with a few ribs. The brachial valve is flat or slightly concave and generally thin. The hinge line is long, but not equal to the full width of the shell. There is an area in both valves (Pl. I., fig. 5), and the teeth are strongly developed, fitting into deep sockets in the brachial valve. (Pl. I., fig. 2.) The cardinal process strongly resembles that of Strophalosia, being slightly inclined, bifid anteriorly and quadrified posteriorly. The adductor muscle scars in the brachial valve are flabellate and cannot be differentiated into anterior and posterior elements. The brachial supports are directed postero-laterally from near the middle of the adductor muscle scars and run sub-parallel to the shell margins to the antero-lateral margin, then curve sharply backwards and then inwards, but do not meet the median septum.

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**Wyndhamia valida**, Sp. nov.

Pl. II., figs. 1-5; Pl. III., figs. 4, 6.

Shell larger generally than *Wyndhamia dalwoodensis*, plano-convex and spinose. The spines are larger, coarser and more sparse than those of *Wyndhamia dalwoodensis*. The shell is ornamented with a few faint ribs, mainly on the marginal slopes.

A sinus can be seen on internal casts of the pedicle valve, but is largely obscured by the shell growth. The species may therefore be considered to be in a katagenetic condition. The hinge line is long, straight and nearly the full width of the shell, there is a well marked area in both valves, and the ears are well marked but without spines.
Figs. 1—5—*Wyndhamia valida*, Sp. nov.
The brachial valve is flat or slightly concave, and in this species is very thick in adult specimens. The teeth are exceptionally well developed and fit into deep sockets in the brachial valve. The septum of the brachial valve extends anteriorly for nearly two-thirds the length of the valve. The cardinal process is very large and strong, somewhat inclined, bifid anteriorly and markedly quadrified posteriorly. (PL II., fig. 5; PL III., figs. 4, 6.) The flabellate adductor muscle scars in the brachial valve are compact and cannot be differentiated into anterior and posterior elements. They are triangular in shape and practically identical with those of Wyndhamia dalwoodensis. The brachial supports are also identical with those of the type Wyndhamia dalwoodensis.

Locality, Por. 152, Parish of Branxton, County of Northumberland.

The subgenus Wyndhamia has been erected for the reception of shells resembling Strophalosia clarkei in outward appearance, but which have a well developed sinus in the pedicle valve, and which differ markedly from S. clarkei and from Strophalosia generally in the internal characters of the brachial valve.

For the purpose of a preliminary paper it will be sufficient to compare the new subgenus with Strophalosia, King, 1844, Aulosteges, von Helmerson, 1847, and Productus (Tceniotherus) suhquadratus, Morris, 1845.

Wyndhamia is perhaps most nearly related to Strophalosia clarkei, Eth. Fil., particularly in size and general contour of the shell. The ornamentation of Wyndhamia, however, is decidedly coarser than that of S. clarkei, while Etheridge, R., Junr., Proc. Roy. Phys. Soc. Edinburgh, Vol. 5, Pl. 9, fig. 21, 1880.

Specimen No. F2412, Mining-Museum, Sydney.
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Specimen No. F2412, Mining Museum, Sydney.
internally the adductor muscle scars of the brachial valve of *St. clarkei* are distinctly differentiated into anterior and posterior elements, whereas those of *Wyndhamia* are undifferentiated. A deep sinus extending right to the umbo is characteristic of *Wyndhamia*, but *Strophalosia* generally is without a sinus, though *St. excavata*, Geinitz² has a sinus in the anterior part of the pedicle valve, and one of the specimens of *St. clarkei* examined (F2412, Mining Museum, Sydney) also had a slight sinus in the anterior part of the pedicle valve.

Etheridge³ figures one specimen as *Strophalosia clarkei* which will almost certainly need to be referred to *Wyndhamia*.

The form of the brachial supports of *Wyndhamia* is similar to that of *Strophalosia jukesii*⁴, but the distortion of *St. jukesii* is such that one is never likely to have difficulty in separating the two.

There is absolutely no sign of distortion of the pedicle valve of either species of *Wyndhamia* due to its having at some stage of its existence been attached to some foreign body. This last character is used by Clarke⁵ as a generic distinction between *Strophalosia* and *Productella*, Hall, 1847. The species under discussion, however, have little affinity with *Productella*, differing markedly from it in the characters of the cardinal process, teeth and muscular impressions. The brachial supports of *Wyndhamia* are

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strongly developed and very characteristic of the subgenus, while in *Productella* they are rarely retained even if present.

*Aulosteges*, von Helmerson, is characterised by a convex, spike-like deltidium covered with tubercules or spinules, and by the teeth being either rudimentary or absent. *Wyndhamia*, on the other hand, has strongly developed teeth and sockets. The deltidium was only observed in one specimen which it was impossible to figure, but it seemed to be small and triangular, not spike-like as in *Aulosteges*, and it showed no signs of spines or tubercules. King\(^6\) was not disposed to regard the spinose condition of the deltidium as of generic value, but the differences in the teeth and deltidium are sufficient to definitely separate *Wyndhamia* from *Aulosteges*.

*Productus (Taeniotherus)* sub*quadратus*, Morris, was described and figured by Etheridge in 1880\(^7\) and 1892.\(^8\) In 1909 the species was redescribed and refigured by Etheridge and Dun.\(^9\) They directed attention to the many characters which this species had in common with *Aulosteges*, but did not consider it to differ sufficiently from *Productus* to erect a new sub-genus or genus for its reception.

In 1926 Whitehouse\(^10\) proposed the name *Taeniotherus sub-quadратus* for the species, but did not describe or

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\(^6\) King, W., The Permian Fossils of England, printed for the Palaeontographical Society, 1850, p. 94.


\(^8\) ———, Geology, Palaeontology, etc., of Queensland, p. 252, Pl. 38, figs. 7-10; Pl. 40, fig. 5.


figure his types. It will be noted that *P. (Taeniotherus)* subquadratus is much the larger of the two. An area in both valves and compact dendritic adductor muscle scars in the brachial valve are features common to both. They differ considerably, however, in the form of the brachial supports, and the cardinal process of *Wyndhamia* is typically strophalosoid, while that of *P. (Taeniotherus)* subquadratus closely resembles *Productus* proper.

*Wyndhamia* must therefore be classed as one of the intermediate forms between *Productus* and *Strophalosia* and nearer to *Strophalosia* than *Productus*.

Genus—*Productus*, Sowerby, 1812.
Subgenus—*Branxtonia*, Subgen. nov.

*Branxtonia typica*, Sp. nov.

Pl. III., figs. 1-3.

Shell plano-convex and productoid in form. A well developed sinus is present in the pedicle valve. The hinge line is short and curved, and no ears are developed. The brachial valve is flat or slightly concave and no area is developed in either valve. Teeth are present, but are more or less rudimentary. The septum is very long and strongly developed and reaches nearly to the anterior margin of the shell. The cardinal process is somewhat inclined and bilobed posteriorly. The adductor muscle scars of the brachial valve are flabellate, compact, and not differentiated into anterior and posterior elements. They are triangular in shape, with one side parallel to the median septum, the apex directed posteriorly and the base raised considerably above the general level of the valve, forming a boss resembling that developed in the genus *Strophalosia*. The brachial ridges have their origin near the middle of the adductor scars and run sub-parallel to the margins of the shell to the antero-lateral edge, where they definitely terminate. (Pl. III., fig. 1.)
Figs. 1 - 3—Branxtonia typica, Sp. nov.
Figs. 4, 6,—Wyndhamia valida, Sp. nov.
Figs. 5, 7,—Wyndhamia Dalwoodensis, Sp. nov.
PRODUCTUS AND STROPHALOSIA.

Type, Branxtonia typica, Sp. nov.

Locality, Portion 147, Parish of Branxton, County of Northumberland.

This species is represented only by three internal casts, but the characters are so marked that one has no hesitation in erecting, tentatively at least, a new subgenus for its reception. The species is most nearly related to Productus, but differs from that genus in having dental-callosities developed, while the adductor scars of the brachial valve are remarkably like those of Wyndhamia. The affinities of the species cannot be further discussed without material showing the external appearance of the shell; an attempt will, however, be made to obtain such material for description in a future paper.

The two new subgenera described occur on the same horizon about 2,250 feet below the Muree Beds, in the Branxton Stage of the Upper Marine Series in the Hunter River District. The Branxton Beds and Muree Beds abound in productid types, a close examination of which may make it possible to divide these strata into zones of considerable stratigraphic value.
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LIST OF PLATES.

PLATE I.

Fig. 1.—*Wyndhamia dalwoodensis*. A damaged internal cast showing one ear, and spines penetrating the matrix.

Fig. 2.—. . . An internal cast showing the deep impressions of the teeth.

Figs. 3 and 4.—. . . An internal cast of the brachial valve, and a mould made from it to show the disposition of the brachial supports, septum etc.

Fig. 5.—. . . A mould of the brachial valve and part of the pedicle valve showing the area of both valves.

Figs. 6 and 7.—*Strophalosia gerardi*. A brachial valve showing the cardinal process, area and internal structures.

PLATE II.

Figs. 1-3.—*Wyndhamia valida*. A large specimen showing the shell structure and ornamentation.

Fig. 4.—. . . Half of a brachial valve showing the brachial supports and muscle scar.

Fig. 5.—. . . An enlarged view of the cardinal process and area, $\times 2$.

PLATE III.

Figs. 1-3.—*Branxtonia typica*. Three views of an internal cast.

Figs. 4, 6.—*Wyndhamia valida*. Two views of a brachial valve showing the cardinal process and brachial support.

Fig. 5.—*Wyndhamia dalwoodensis*. An internal cast of a young specimen showing the sinus and ears.

Fig. 7.—. . . Mould of a brachial valve showing ornamentation.
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