

FOUR BRITISH ORDOVICIAN SPECIES OF DALMANELLOID BRACHIOPOD

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ABSTRACT. Lectotypes are chosen for certain Caradoc brachiopod species of zonal value, and their stratigraphical horizons and associated faunas are reviewed. *Paucicrura sowerbii* nom. nov. is proposed for the Ordovician syntype of *Orthis canalis* J. de C. Sowerby, 1839.

A NUMBER of brachiopods of Caradoc age have hitherto been described in detail, but with each species represented only by a collection of syntypes from differing localities. In view of the modern refinements of Caradoc stratigraphy, and the growing stratigraphical importance of many brachiopods, it is considered advisable that definition of some of these species should be more precise. The writers are indebted to Mr. R. G. Coope (University of Birmingham) and Mr. J. D. D. Smith (Geological Survey and Museum) for the loan of type material. W. T. Dean publishes this paper by permission of the Trustees, British Museum (Natural History).

Family DALMANELLIDAE Schuchert and Le Vene 1929
= Wattsellidae Schuchert and Cooper 1931

Genus DALMANELLA Hall and Clarke 1892

1928 *Wattsella* Bancroft, p. 55.

Type species. Orthis testudinaria Dalman 1828 by original designation of Hall and Clarke (1892, p. 205).

In 1928 Bancroft (p. 55) erected the genus *Wattsella*, selecting *Wattsella watsi* Bancroft as the type species. The following year four new species of the genus were introduced, namely *Wattsella sp. A*, *W. sp. B*, *W. sp. C*, and *W. sp. D* (Bancroft 1929a, pp. 36–38; 1929b, table facing p. 76), but although used in a zonal classification of Caradoc strata as characteristic forms within the Lower Longvillian substage, they were left undescribed. Later, in a private publication, Bancroft (1933, table 2) again mentioned these species, giving them the new names *Wattsella horderleyensis*, *W. leptota*, *W. indica*, and *Raymondella typa* respectively. The new generic name *Raymondella* was given only a brief diagnosis (Bancroft 1933, p. 3) and the undescribed *R. typa* was chosen as type species. Under Article 25 (3) of the International Rules of Nomenclature all these names were invalid, and remained so until 1938 when three of them, *W. horderleyensis*, *W. indica*, and *R. typa* were described and figured. The author of the descriptions, and thus of the species, was Whittington (1938a, pp. 50–51; 1938b, pp. 245–7), though he retained Bancroft's manuscript names. In a later paper Bancroft gave his first account of the same three species (1945, pp. 190–95, 198–201) and claimed them as new, apparently not recognizing Whittington's authorship and basing his descriptions solely on Shropshire specimens now in the British Museum (Natural History). Whittington's descriptions

Palaeontology, Vol. 1, Part 4, 1959, pp. 292–7, pl. 53.]

made in 1938 did not select holotypes, but were formulated on syntypes numbering up to four for each species. In every case, however, the figured syntypes included North Welsh specimens together with at least one specimen from those places in south Shropshire which were intended by Bancroft (*in litt.* to H. B. Whittington) to be the type-localities (Whittington 1938a, p. 51; 1938b, pp. 247, 250. See also Bancroft 1945, pp. 193, 195, 201). It now appears desirable to select lectotypes of the above species, and in every case we have thought fit to choose the syntype utilized by Whittington from the south Shropshire locality advocated by Bancroft, though there appears no doubt as to the specific identity of the Shropshire and Welsh specimens.

Dalmanella horderleyensis (Whittington *ex* Bancroft MS.)

Plate 53, fig. 1

- 1839 *Orthis testudinaria* Dalman, J. de C. Sowerby *in* Murchison, p. 640, pl. 20, figs. 9, 10.
 1854 *Orthis testudinaria* Dalman, J. de C. Sowerby *in* Murchison, pl. 6, figs. 1, 2.
 1859 *Orthis testudinaria* Dalman, J. de C. Sowerby *in* Murchison, pl. 5, figs. 1, 2.
 1929a *Wattsella* sp. A. Bancroft, pp. 36, 37.
 1929b *Wattsella* sp. A. Bancroft, table facing p. 76.
 1933 *Wattsella horderleyensis* Bancroft, table 3. MS. name only.
 1938a *Wattsella horderleyensis* Bancroft, Whittington, p. 50, pl. 6, figs. 2-7.
 1945 *Wattsella horderleyensis* n.sp., Bancroft, p. 190, pl. 22, figs. 1-3, pl. 23, figs. 1-3, pl. 24, fig. 1.
 1958 *Dalmanella horderleyensis* (Whittington), Dean, p. 206, pl. 24, figs. 12, 13.

Lectotype (here selected). Geol. Dept. Mus., University of Birmingham, T. 218, internal mould of a dorsal valve from Long Lane Quarry, two-thirds of a mile south-west of Cheney Longville, Shropshire.

Paratypes. T. 217, internal mould of a ventral valve, locality as for lectotype. T. 219 and T. 222, internal moulds of ventral and dorsal valves respectively, from Lluest Quarry, Allt-y-Gader, Llanfyllin, Montgomeryshire. T. 220 and T. 221, internal moulds of ventral and dorsal valves respectively, from trench-like quarry 200 yards east of Bwlch-y-Cibau Church, Montgomeryshire. All specimens are in the Geol. Dept. Mus., University of Birmingham.

Dalmanella indica Whittington *ex* Bancroft MS.

Plate 53, figs. 2-4

- 1929a *Wattsella* sp. C. Bancroft, p. 37.
 1929b *Wattsella* sp. C. Bancroft, table facing p. 76.
 1933 *Wattsella indica*, Bancroft, table 2. MS. name only.
 1938b *Dalmanella* (*Wattsella*) *indica* (Bancroft), Whittington, p. 245, pl. 10, figs. 4-7.
 1945 *Wattsella indica* n.sp., Bancroft, p. 194, pl. 22, figs. 8-12; pl. 23, figs. 5, 6.
 1958 *Dalmanella indica* Whittington, Dean, p. 206, pl. 24, fig. 14.

Lectotype (here selected). No. 234 (= 299), Geol. Dept. Mus., University of Birmingham, internal mould of dorsal valve from quarry by west side of track near north-east side of Longville Plantation, 2 miles west-north-west of Cheney Longville, Shropshire. In a personal communication Professor H. B. Whittington has confirmed that in his

original description (1938*b*, explanation of pl. 10) 'north-east side' was misprinted as 'north-west side'.

Paratypes. No. 233 (= 298), internal mould of dorsal valve from the old quarry 1 mile east of point 822 in Ancient Camp, Bryngwyn Hill, 3 miles east-south-east of Llanfyllin, Montgomeryshire. Nos. 235 (= 300) and 236 (= 301), internal moulds of dorsal and ventral valves respectively, from mudstones between ash and conglomerate, quarry at Bryn Farm, 1 mile south-east of Glyn Ceiriog, Denbighshire. All specimens in the Geol. Dept. Mus., University of Birmingham.

Discussion. Considerable variation is noted in the shape and size of the cardinal process in individuals from the same horizon and locality (see Pl. 53, figs. 3, 4).

Genus BANCROFTINA Sinclair 1946

- 1933 *Raymondella*, Bancroft, p. 3. MS. name only.
 1938*b* *Raymondella*, Whittington, p. 249. Non *Raymondella* Reed 1935.
 1945 *Raymondella*, Bancroft, p. 197.

Type species. *Raymondella tya* Whittington 1938 by original designation of Sinclair (1946, p. 295).

Bancroftina tya (Whittington ex Bancroft MS.)

Plate 53, figs. 5, 6

- 1929*a* *Wattsella sp. D.*, Bancroft, p. 38.
 1929*b* *Wattsella sp. D.*, Bancroft, table facing p. 76.
 1933 *Raymondella tya*, Bancroft, table 2. MS. name only.
 1938*b* *Raymondella tya* Bancroft, Whittington, p. 249, pl. 10, figs. 12-14.
 1946 *Bancroftina tya* (Bancroft), Sinclair, p. 295.
 1949 *Bancroftina tya* (Whittington), Sinclair, p. 438.
 1958 *Bancroftina tya* (Whittington), Dean, p. 206, pl. 24, figs. 17, 18.

EXPLANATION OF PLATE 53

- Fig. 1. *Dalmanella horderleyensis* (Whittington). Lower Longvillian substage, Long Lane Quarry, $\frac{2}{3}$ mile south-west of Cheney Longville, Shropshire. Lectotype, Birmingham University T. 218, internal mould of dorsal valve, $\times 2.8$.
- Figs. 2-4. *Dalmanella indica* Whittington. Lower Longvillian substage, old quarry by west side of track near north-east side of Longville Plantation, $\frac{1}{2}$ mile north-west of Cheney Longville, Shropshire. 2, B.M. BB. 24889, latex impression of dorsal valve, $\times 3$. 3, lectotype, Birmingham University 234, internal mould of dorsal valve, $\times 2.5$. 4, B.M. BB. 24888, internal mould of dorsal valve showing another form of cardinal process, $\times 2.7$.
- Figs. 5, 6. *Bancroftina tya* (Whittington). Lower Longvillian substage, old quarry by west side of New House, Horderley, Shropshire. 5, lectotype, Birmingham University 242, internal mould of dorsal valve, $\times 2.5$. 6, B.M. BB. 24892, latex impression of dorsal valve, $\times 2.8$.
- Figs. 7-11. *Paucicrura sowerbii* nom. nov. Lower Longvillian substage, all specimens figured here are from the *Dalmanella horderleyensis* zone. 7, holotype, G.S.M. Geol. Soc. Coll. 6852, internal mould of dorsal valve, $\times 3.1$. 8, paratype, B.M. BB. 24885, internal mould of dorsal valve, $\times 3.1$. 9, 11, paratype, B.M. BB. 24886, internal mould of ventral valve showing pallial sinuses, $\times 3.1$. 10, B.M. BB. 24891, internal moulds of two ventral valves showing different development of pallial sinuses, $\times 3.1$. Fig. 7 is localized merely as 'Myfod'. 8, 9, and 11 are from the large exposure on Gallt-yr-Ancr, 440 yards west-north-west of Dyffryn, $\frac{1}{2}$ mile south-west of Meifod, Montgomeryshire. 10 is from Long Lane Quarry, $\frac{2}{3}$ mile south-west of Cheney Longville, Shropshire.

Photographs by W. T. Dean.

Lectotype (here selected). No. 242 (= 307), Geol. Dept. Mus., University of Birmingham, internal mould of dorsal valve from quarry at New House, $\frac{3}{8}$ mile north-west of Cheney Longville, Shropshire.

Paratypes. No. 241 (= 306), internal mould of ventral valve from crag 330 feet south-east of Pen-y-Graig Farm, 1 mile south of Glyn Ceiriog, Denbighshire. No. 243 (= 308), internal mould of dorsal valve, loose block from outcrop 400 feet north-west of Bryn Farm, 1 mile south-east of Glyn Ceiriog. Both specimens in the Geol. Dept. Mus., University of Birmingham.

Genus PAUCICRURA Cooper 1956.

Type species. *Orthis rogata* Sardeson 1892 by original designation.

When Bancroft erected the genus *Resserella* (1928, p. 54) he cited as type species *Orthis canalis* J. de C. Sowerby. The latter was described by Sowerby (*in* Murchison 1839, p. 630, pl. 13, fig. 12a, p. 640, pl. 20, fig. 8) using syntypes from two different horizons. One of these syntypes, G.S.M. Geol. Soc. Coll. 51550 (Murchison 1839, pl. 13, fig. 12a) was obtained from the Wenlock Shales, and figured together with numerous other Wenlock Shale fossils, though the species was said to occur also in the Caradoc Sandstone. Localities given were 'Delves Green; Croft; Tame Bridge; Woolhope (Falfield, near Tortworth)'. The rest of Sowerby's figured syntypes, G.S.M. Geol. Soc. Coll. 6852 (*in* Murchison 1839, pl. 20, fig. 8), originated at Meifod, though the species was described as occurring 'in Caradoc Sandstone at Horderley and Whittingslow, near the Caradoc; Moel-y-garth and Gaerfawr, near Welchpool', and 'in Llandeilo Flags at Clog-y-frain; Golden Grove, Caermarthenshire; at Llampeter-felfrey, Pembrokeshire'. Sowerby claimed that the interiors of the species were figured 'to show how they differ from the allied species in the higher beds of the Upper Silurian rocks. The specimens are larger than those in the Wenlock Shale.'

Schuchert and Cooper (1932, p. 126) designated Sowerby's specimen from the Wenlock Shales as lectotype, with unfortunate consequences. Stubblefield has pointed out (*in* Cooper 1956, p. 956) that the specimen involved is a typical *Parmorthis* Schuchert and Cooper (1931, p. 246), so making this genus a subjective synonym of *Resserella* Bancroft 1928. In the meantime the name *Resserella canalis* had been frequently applied to Caradoc brachiopods which constitute a well-known and stratigraphically useful species in the Lower Longvillian substage of south Shropshire and North Wales. As Sowerby's syntypes are generically dissimilar, and as *Resserella* must be used for Silurian shells hitherto known as *Parmorthis*, Cooper has erected a new name *Paucicrura* to include the Ordovician brachiopods previously called *Resserella*, using as type species *Orthis rogata* Sardeson 1892, a form which has been referred also to *Onniella* Bancroft 1928 (Whittington 1938b, p. 245). The outcome of this situation is that one of Sowerby's syntypes is now called *Resserella canalis*, whilst the other syntype, representing what many Ordovician stratigraphers have in the past called *R. canalis*, is generically referable to *Paucicrura* but is in need of a new specific name, for which *P. sowerbii* is now proposed.

Paucicrura sowerbii nom. nov.

Plate 53, figs. 7-11

1839 *Orthis canalis* J. C. de Sowerby *in* Murchison, p. 640, pl. 20, fig. 8.

- 1854 *Orthis elegantula (canalis)* Dalman, J. de C. Sowerby *in* Murchison, pl. 6, fig. 5.
 1859 *Orthis elegantula* Dalman, J. de C. Sowerby *in* Murchison, pl. 5, fig. 5.
 1928 *Resserella canalis* (Sow.), Bancroft, p. 54.
 1929 *Resserella canalis* Sowerby, Bancroft, pp. 36–38.
 1932 *Resserella canalis* (Sowerby), Schuchert and Cooper, p. 126, pl. 17, figs. 14–16.
 1938a *Resserella canalis* (J. de C. Sowerby), Whittington, p. 51, pl. 6, figs. 8–12.
 1945 *Resserella canalis* Sowerby, Bancroft, pp. 193, 195, 203.
 1958 *Resserella canalis* (J. de C. Sowerby), Dean, p. 221.

Diagnosis. The species has already been described in detail by Whittington (1938a, p. 51) and little further need be added. It is noted, however, that the ridge bounding the dorsal muscle impressions is subject to variation and is very strongly developed in some specimens (Pl. 53, fig. 8). In addition the vascular impressions of the ventral valve show variable development according to the size of the individual; the larger the specimen the more prominent the feature is likely to be.

Holotype. G.S.M. Geol. Soc. Coll. 6852 (Pl. 53, fig. 7). *Paratypes.* Brit. Mus. (Nat. Hist.) BB. 24885 (Pl. 53, fig. 8), BB. 24886 (Pl. 53, figs. 9, 11).

Locality and horizon. The holotype is the dorsal valve figured by Sowerby (*in* Murchison, 1839, pl. 20, fig. 8), and forms part of a block of weathered sandy limestone filled with the remains of brachiopods. The ventral valve figured by Sowerby (*loc. cit.*) and shown by him as being on the same block has not been traced with certainty, and his drawing is obviously composite. The specimen is labelled 'Myfod' only, and the associated fauna includes *Dalmanella horderleyensis* with occasional *Broeggerolithus* and *Phacopidina*. In view of the lack of adequately-preserved material on the original hand-specimen, paratypes have been chosen from well-localized Meifod specimens in the British Museum (Natural History), and these derive from the large exposure on Gallt-yr-Ancr, 440 yards just north of west from Dyffryn, $\frac{1}{2}$ mile south-west of Meifod Church. At this locality *Paucicrura sowerbii* occurs with *Dalmanella horderleyensis* and *Broeggerolithus*, and the rocks belong to the Lower Longvillian substage. The other specimens figured (Pl. 53, fig. 10) come from the Lower Longvillian (Middle Horderley Sandstone *pars*) of Long Lane Quarry, two-thirds of a mile south-west of Cheney Longville, Shropshire, where the associated fauna is for the most part similar to that at Meifod.

DISTRIBUTION

In the type-area of the Caradoc Series in south Shropshire the appearance of *Dalmanella horderleyensis* in large numbers marks the base of the Lower Longvillian substage, and, so far as is known, this line of demarcation holds good for the whole of North Wales. In Denbighshire and Montgomeryshire the species is accompanied by the more typically Soudleyan brachiopod *Rafinesquina expansa* (J. de C. Sowerby), and such an overlap may be characteristic in all parts of North Wales, though these two species have not yet been found co-existing in south Shropshire. In the Meifod and Welshpool districts of Montgomeryshire *D. horderleyensis* appears with large numbers of *Paucicrura sowerbii*, a species which continues beyond the range of *D. horderleyensis* to the end of the succeeding *Dalmanella indica* and *D. leptota* zone, where the specimens are fewer but slightly larger. Bancroft distinguished separate zones characterized by

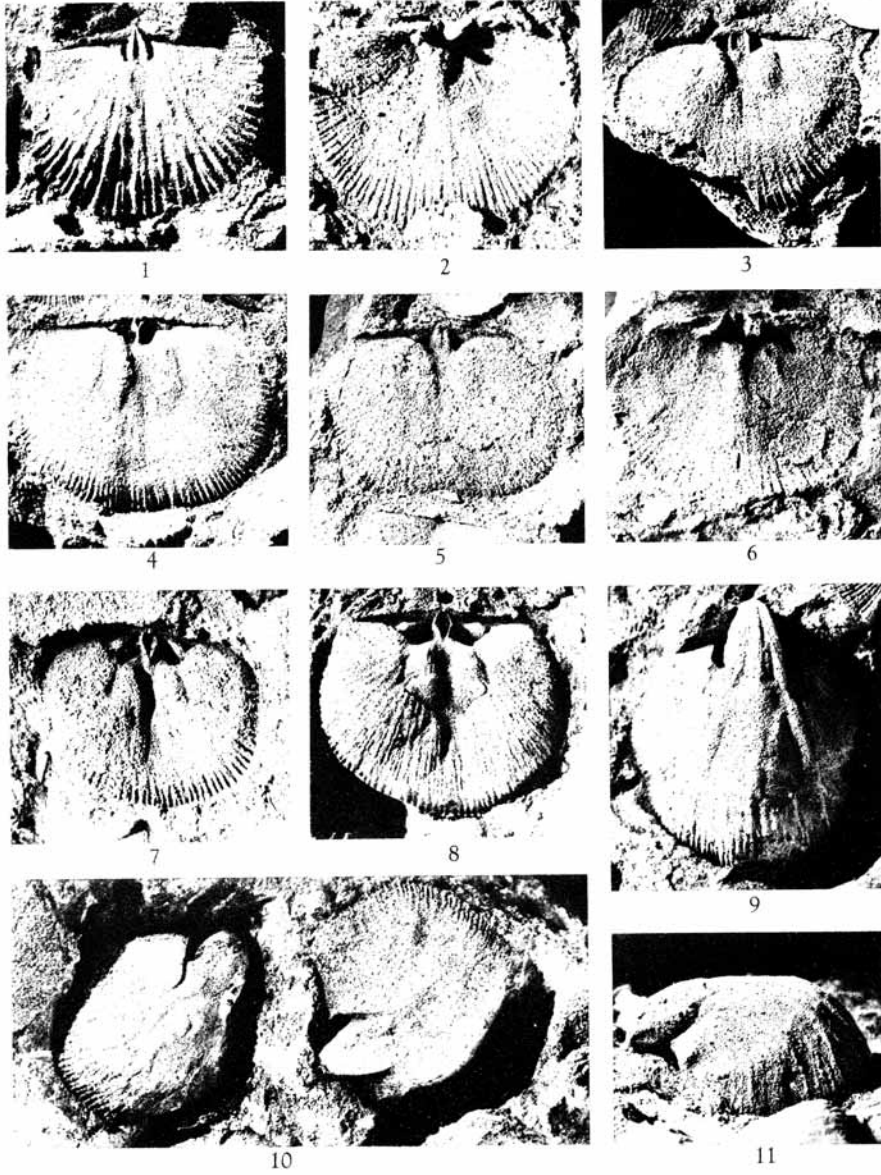
D. indica and *D. lepta* (Bancroft), but it has been found preferable, both in south Shropshire and at Welshpool, to combine the two as a single zone within the Lower Longvillian, although *D. lepta* has not yet been found in the Welshpool district. At Welshpool *Nicolella actoniae* (J. de C. Sowerby), *Platylichas* and *Chasmops* appear below the top of the zone of *Dalmanella indica* and *D. lepta*, and the first two continue into the succeeding *Bancroftina typha* zone. In south Shropshire *Chasmops* has not been found earlier than the Upper Longvillian, and a single record of *Platylichas* from the *B. typha* zone of the Onny Valley has not yet been substantiated.

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