

A NEW BARNACLE FROM THE LOWER JURASSIC OF SOUTH WALES

by P. HODGES

ABSTRACT. A previously unknown cirriped from the *semicostatum* Biozone of the Lower Lias of Bridgend, South Wales is described. The fused scutum and tergum, and the lack of any indication of a peduncle, indicates some loose affinities with the Verrucomorpha. However, the tooth-like nature of scutum and tergum are unlike the plate in any other known cirriped. A new taxon *Bassettina cambriensis* is assigned to a new family, the Bassettinidae.

DURING the excavation in 1982 of foundations for a new factory for the Ford Motor Company, in Bridgend, South Glamorgan, beds of Lower Jurassic limestones, mudstones and clays were exposed containing a rich fauna of silicified invertebrates. These beds were deposited in a shallow marine environment near several Early Jurassic 'islands' (Trueman 1922).

Ammonites identified from these beds indicate the *resupinatum* Sub-biozone. A large collection of silicified invertebrates was made including bivalves, gastropods, brachiopods, ammonites, belemnites and a few arthropods. Amongst the specimens collected were a number of problematica. The material described herein, housed in the Department of Geology at the National Museum of Wales (NMW), was collected from a yellow clay band (Hodges 1986) and has, until recently, remained unidentified. However, following a suggestion by Dr J. C. W. Cope, they are identified as barnacles.

SYSTEMATIC PALAEOLOGY

Superorder THORACICA Darwin, 1854
Order SESSILIA Lamarck, 1818
Suborder VERRUCOMORPHA? Pilsbury, 1916
Family BASSETTINIDAE fam. nov.

Diagnosis. Thoracica with hollow tooth-like plates, paired scutum, tergum and latus carinal plates fused together at base, scalloped basal margin, pit-like depression towards apex of tergum and scutum indicating possible site of muscle attachment, peduncle very short or absent.

Genera included. *Bassettina* gen. nov.

Discussion. The systematics of Thoracica currently recorded from the Mesozoic is as follows (Schram 1986; Newman 1987).

Superorder THORACICA Darwin, 1854
Order PEDUNCULATA Lamarck, 1818
Suborder IBLOMORPHA Leach, 1825
Family IBLIDAE Leach, 1825
Suborder SCALPELLOMORPHA Pilsbury, 1916
Family SCALPELLIDAE Pilsbury, 1916
Family STRAMENTIDAE Withers, 1920

- Order SESSILIA Lamarck, 1818
 - Suborder BRACHYLEPADOMORPHA Withers, 1923
 - Family BRACHYLEPADIDAE Woodward, 1991
 - Suborder VERRUCOMORPHA Pilsbury, 1916
 - Family PROVERRUCIDAE Newman and Hessler, 1989
 - Family VERRUCIDAE Darwin, 1854
 - Suborder BALANOMORPHA Pilsbury, 1916
 - Superfamily CHTHAMALOIDEA Darwin, 1854
 - Family CATOPHRAGMIDAE Utinomi, 1968

The Iblomorpha includes cirripeds with a capitulum supporting two pairs of weakly calcified plates, and with scuta and terga having apical umbones. The peduncle is not separated from the capitulum, and is clothed with blunt chitinous spines. The Scalpellomorpha includes all cirripeds with a plated capitulum and plated peduncle. The Verrucomorpha consists of barnacles with an asymmetrical arrangement of plates, fixed and moving scuta and terga, and which lack a peduncle. The Brachylepadomorpha have a bilaterally symmetrical shell comprising rostrum and carina with a fixed base of imbricating scales, an operculum of paired scuta and terga, and which lacks a peduncle. The Balanomorpha have a bilaterally symmetrical shell comprising carina, rostrum and up to three pairs of plates variously fused, paired opercular valves, and which lacks a peduncle.

The phylogeny of the Thoracica has been discussed in detail in Newman *et al.* (1969) and partly revised by Newman (1987). The evolution of the sessile barnacles has also been discussed in Newman and Hessler (1989). The scarcity of sessile barnacles in the Jurassic fossil record causes some difficulty in the interpretation of phylogenetic relationships between the three suborders. The point in the fossil record at which the sessile barnacles evolved from the pedunculate barnacles is also unresolved.

Only the Iblomorpha, Scalpellomorpha and Brachylepadomorpha are recorded in the Jurassic, with the Verrucomorpha and Balanomorpha first appearing in the Cretaceous. In the Lower Jurassic, the Iblomorpha are represented by *Eolepas* (Whyte in Briggs *et al.* 1993) and the Scalpellomorpha by *Archaeolepas* (Zittel 1885); the former is also recorded from the Triassic. Buckeridge and Grant-Mackie (1985) have also recorded a scalpellid barnacle from the Lower Jurassic of New Caledonia which they assigned to ?*Neolepas* (Newman 1979) a genus previously known only from the Holocene. The Brachylepadomorpha is represented in the Upper Jurassic only, by *Pycnolepas* (Withers 1914).

The diagnostic characteristics of *Bassettina* are the fixed scutum and tergum and the absence of a peduncle, and these indicate close affinities with the Verrucomorpha, as represented by *Eoverruca* (Withers 1935) and *Proverruca* (Withers 1914) from the Upper Cretaceous. However, the hollow tooth-like scutum and tergum are clearly very different from the plate-shaped scutum and tergum of genera of the Verrucidae. For this reason a new family, the Bassettinidae, is proposed to include genera with hollow tooth-like plates,

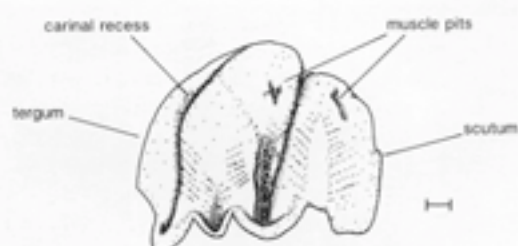
Genus BASSETTINA gen. nov.

Derivation of name. After Dr M. G. Bassett as a gesture for the help and encouragement given to me over many years.

Type species. *Bassettina cambriensis* gen. et sp. nov.

Diagnosis. Plates tooth-like, hollow, comprising paired scutum, tergum, latus carinal plates fused at base and a carina plate, peduncle very short or absent.

TEXT-FIG. 1. *Bassettina cambriensis* gen. et sp. nov.
Descriptive features of inner surface of holotype,
NMW 83.22G.856; drawing based on Text-figure 2E;
scale bar = 1 mm.



Bassettina cambriensis sp. nov.

Text-figures 1-2

Derivation of name. From *Cambria*, the Latin name for Wales.

Holotype. NMW.83.22G.856 from the *resupinatum* Sub-biozone, *semicostatum* Biozone, Ford Motor Company Site, Bridgend, South Glamorgan, South Wales (locality SS 936782).

Paratype. NMW.83.22G.857 horizon and locality as for holotype.

Diagnosis. As for genus.

Measurements. (mm.)

Holotype, NMW.83.22G.856.

	Height	Length	Width
Tergum	11.3	8.0	5.5
Scutum	9.0	5.0	3.0

Paratype, NMW.83.22G.857.

	Height	Length	Width
Tergum	12.0 (est.)	8.0	6.0

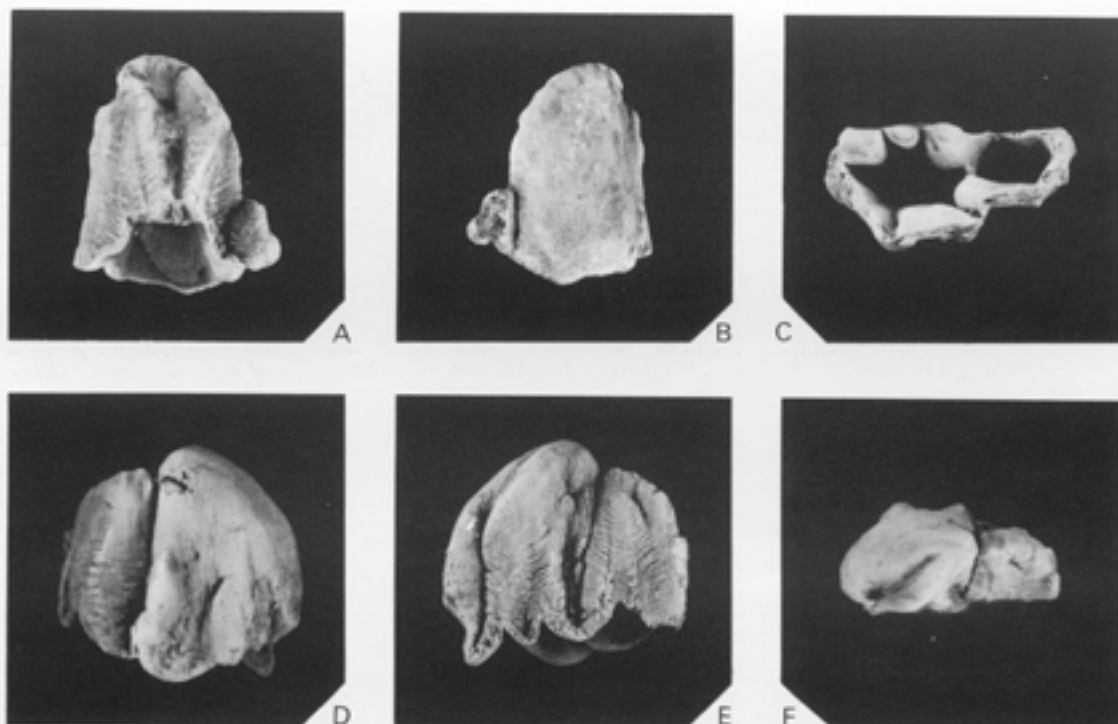
Description. The scutum and tergum are hollow, tooth-like and porcelaneous in appearance. They are fused at the base and have a scalloped basal margin. The tergum is blade-like in profile and the outer wall is rounded and relatively smooth. The carinal and scutal sides of the tergum are flattened at the interface with adjacent plates and ornamented with slightly sinuous parallel growth halts sloping at a few degrees downwards and towards the centre of the flattened carinal interface. The central portion of the carinal interface surface is elongated and triangular, and is smooth and devoid of growth halts where contact has been made with the adjacent plate. The remaining part of the tergum inner surface is either smooth or marked by irregular growth halts and is slightly concavely elongated towards the base. The carinal side of the tergum is marked by a deep groove running from apex to base which probably served as a recess for the carina. Towards the apex of the tergum on the inner side, is a pit-like depression, possibly the site of a muscle attachment. The opposite paired tergum is a mirror image in profile. There is evidence of a small fused tooth-like *latus carinal* plate at the base of the tergum on the carinal side.

The scutum is also blade-like in profile, smaller, and a mirror image of the tergum. The outer wall is rounded and generally smooth but growth halts are visible in parts. The interface with adjacent plates is ornamented as in the tergum. A short narrow pit is present just below the apex running parallel to the margin. This probably served as a position of muscle attachment. Carinal plate not seen, only evidence of its presence as exhibited by the carinal recess in the tergum.

DISCUSSION

The diagnostic characteristics of *Bassettina* are unlike those of any other genus in the Thoracica but, until further material has been collected from the Jurassic to clarify the early phylogeny of the sessile barnacles, it has provisionally been placed in the Verrucomorpha.

The scalloped base of the tergum and scutum does not lend itself to fixation to a flat surface, indicating the possible presence of a very short peduncle. This feature places the Bassettinidae



TEXT-FIG. 2. *Bassettina cambriensis* gen. et sp. nov. A-B, paratype, NMW 83.22G.857; A, inner surface of tergum; B, outer surface view of tergum. C-F, holotype, 83.22G.856; C, scutum and tergum viewed from below; D, outer surface view; E, inner surface view; F, scutum and tergum viewed from above. All specimens coated with ammonium chloride and magnified $\times 3$.

somewhere intermediate in characteristics between the Brachylepadidae and the Verrucidae and the possibility exists that they all share a common ancestor. The absence of any other genera with hollow tooth-like plates at higher stratigraphical levels, indicates that the Bassettinidae may be an extinct family and, as such, was an evolutionary 'dead end'.

Acknowledgements. I thank the Ford Motor Company for access to their factory site during excavations for their new factory; also to Dr J. C. W. Cope for suggesting that these enigmatic fossils could possibly be barnacles.

REFERENCES

- BRIGGS, D. E. G., WEEDON, M. J. and WHYTE, M. A. 1993. Arthropoda (Crustacea excluding Ostracoda). 321-342. In BENTON, M. J. (ed.). *The fossil record 2*. Chapman and Hall, London, xvii + 845 pp.
- BUCKERIDGE, J. S. and GRANT-MACKIE, J. A. 1985. A new scalpellid barnacle (Cirripedia: Thoracica) from the Lower Jurassic of New Caledonia. *Géologie de la France*, **1**, 15-18.
- DARWIN, C. 1854. A monograph on the fossil Balanidae and Verrucidae of Great Britain. *Palaeontographical Society Monograph*, **44** pp., 2 pls.
- HODGES, P. 1986. The Lower Lias (Lower Jurassic) of the Bridgend area, South Wales. *Proceedings of the Geologists' Association*, **97**, 237-242.
- LAMARCK, J. B. DE. 1818. *Histoire naturelle des Animaux sans vertèbres*, 5. Verdiere, Paris, 612 pp.
- LEACH, W. E. 1825. A tabular view of the genera composing the class Cirripedia, with descriptions of the species of *Otion*, *Cineras*, and *Clyptra*. *Zoological Journal*, **2**, 208-215.
- NEWMAN, W. A. 1979. A new scalpellid (Cirripedia); a Mesozoic relic living near an abyssal hydrothermal spring. *Transactions of the San Diego Society of Natural History*, **19**, 153-167.

- 1987. Evolution of Cirripedes and their major groups. 3–42. In SOUTHWARD, A. J. (ed.). *Barnacle biology, crustacean issues 5*. A. A. Balkema, Rotterdam, 365 pp.
- ZULLO, V. A. and WITHERS, T. H. 1969. Cirripedia R206–R295. In MOORE, R. C. (ed.). *Treatise on invertebrate paleontology. Part R. Arthropoda 4(I)*. Geological Society of America and the University of Kansas Press, Boulder, Colorado and Lawrence, Kansas, 426 pp.
- and HESSLER, R. R. 1989. A new abyssal hydrothermal verrucomorphan (Cirripedia; Sessilia); The most primitive living sessile barnacle. *Transactions of the San Diego Society of Natural History*, **21**, 259–273.
- PILSBURY, H. A. 1916. The sessile barnacles (Cirripedia) contained in the collections of the U.S. National Museum; including a monograph of the American species. *Bulletin of the U.S. National Museum*, **93**, 1–366, pl. 1–76.
- SCHRAM, F. R. 1986. *Crustacea*. Oxford University Press, Oxford, 606 pp.
- TRUEMAN, A. E. 1922. The Liassic rocks of Glamorgan. *Proceedings of the Geologists' Association*, **33**, 245–284.
- UTINOMI, H. 1968. A revision of the deep sea barnacles *Pachylasma* and *Hexelasma* from Japan, with a proposal of new classification of the Chthamalidae (Cirripedia, Thoracica). *Publications of the Seto marine biology laboratory*, **16**, 21–39.
- WITHERS, T. H. 1914. A remarkable new cirripede from the chalk of Surrey and Hertfordshire. *Proceedings of the Zoological Society of London*, **64**, 945–953.
- 1928. *Catalogue of fossil Cirripedia in the Department of Geology, Vol. 1. Triassic and Jurassic*. British Museum (Natural History), Oxford University Press, London. xii + 131 pp., 12 pls.
- 1935. *Catalogue of fossil Cirripedia in the Department of Geology, Vol. 2. Cretaceous*. British Museum (Natural History), Oxford University Press, London. xiii + 433 pp., 50 pls.
- ZITTEL, K. A. VON. 1885. *Handbuch der Palaeontologie, Abteilung 1, Palaeozoologie, Band 2, Mollusca und Arthropoda*. R. Oldenbourg, München und Leipzig, 893 pp.

P. HODGES

Department of Geology
National Museum of Wales
Cathays Park
Cardiff CF1 3NP, UK

Typescript received 18 August 1993

Revised typescript received 6 January 1994