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Book Review

H.A. JONKERS. 2003. **Late Cenozoic–Recent Pectinidae (Mollusca: Bivalvia) of the Southern Ocean and neighbouring regions**. *Monographs of Marine Mollusca* No. 5: 1–125, 17 pls, 46 figs. Backhuys Publishers BV, Leiden, The Netherlands. ISSN 0162-8321, ISBN 90-5782-120-6. Price 46.50 GBP / 59 USD.

The Pectinidae are certainly among the most extensively studied and best known groups of molluscs. The representatives of this family have shells composed primarily of foliated calcite, with aragonite occurring in the form of crossed lamellar structure but not as nacre, and their preservation in various deposits is excellent. The family Pectinidae may prove extremely useful as correlation tools for shallow-water sediments in which planktonic organisms are extremely poorly represented. It has a strong position in the stratigraphic subdivision of Neogene European deposits laid down in epicontinental basins of the Paratethys and in the littoral strata of the Mediterranean.

As emended by Waller (1991), since the publication of Linnaeus' *Systema Naturae* in 1758, approximately 7 000 species and subspecies names have been introduced for fossil and living representatives of the Pectinacea. About 80% of these names were placed originally in one of only five genera: *Pecten*, *Chlamys*, *Hinnites*, *Amusium* and *Aequipecten*. Only that such placement was inspired by gross morphology rather than phylogenetic consideration. Consequently, up to present day the Pectinidae classification has not reflected the true relationships within this family. So, each aspect addressed to phylogenetic relationships within this family is a next step forward in our understanding of the evolutionary history and biogeography of scallops. In the opinion of the reviewer the recently published monograph by H.A. Jonkers is certainly the important study which offers to the pectinid students opportunity to learn about Late Cenozoic Southern Ocean pectinid diversity, evolutionary history and biogeography as well.

The monograph presents the results of taxonomic studies of the Late Eocene to Recent scallops from Antarctica, the Southern Ocean and adjacent areas, which have been previously attributed to three genera, viz. "*Chlamys*", *Zygochlamys* and *Adamussium*. The author revised most of the available worldwide museum collections (a detailed list is given in the Appendix) and made also additional collecting himself in West Antarctica (King George Island, South Shetland Islands; and both Cockburn and James Ross Islands, northern Antarctic Peninsula). Examination of this material has revealed the presence of the representatives of 6 genera, the species previously assigned to *Zygochlamys* belonging to four genera: *Austrochlamys* gen. nov., *Psychrochlamys* gen. nov., *Talochlamys* and *Zygochlamys*. Totally, twenty-six Eocene to Recent scallop species and subspecies have been recognised, out of which four new species and two subspecies have been established, viz. *Adamussium alanbeui*, *A. colbecki cockburnensis*, *Austrochlamys gazdzickii*, *A. marisrossensis*, *A. natans walosseki* and *Psychrochlamys whenuataruensis*. One new tribe – Austrochlamydini – is defined. It contains only *Austrochlamys* which is a chiefly fossil genus, with one species *A. natans* surviving in southernmost South America.

The main part of Jonkers' paper forms the chapter "Taxonomy", where descriptions of all taxa are presented. The clarity of morphological descriptions is improved by morphological and biometrical terms which are explained in the "Methods" chapter of this work. The descriptions are preceded by fairly complete synonymies and notes on examined material, and followed by comparative remarks and notes on stratigraphic and geographic distribution. All described species are also excellently illustrated. This general part of the paper is preceded by chapter "Materials", which brings not only information on provenance of studied material but above all details of nature and geological setting for fossil Antarctic and sub-Antarctic scallops as well as oceanographic conditions for the living genus *Adamussium* in the Southern Ocean. It contains useful maps of pectinid localities in Antarctica and sub-Antarctica and the table shows both Antarctic and South American lithostratigraphic units which have yielded bivalve fauna.

Much emphasis is made by Jonkers on morphological details of scallop shell as indication of their lifestyle. Analysis of shell morphology suggests that all genera contained both byssate and free-living forms. Narrow umbonal angles, highly asymmetrical auricles, combined with a deep byssal notch and a high number of functional teeth in the ctenolium of adults suggest byssally attached mode of life during whole life. In contrast, the species identified as free-living usually have relatively convex upper valve improving the hydrofoil function, relatively shallow byssal notch and the functional ctenolium with a low number of byssal teeth.

Probably the most interesting parts of this paper are that concerning the evolutionary history of southern scallops and their biogeography. The evolutionary history can only be sketchy due to the incompleteness of the fossil record. Common origin of South American (Patagonian) *Zygochlamys* and the group related to *Chlamys s.s.* is suggested. The origin of the South American genus *Zygochlamys* is unclear. The oldest species *Z. geminata* known only from the Upper Eocene–Lower Oligocene San Julian Formation in Patagonia seems to have appeared suddenly. Also the late Miocene? to Recent genus *Psychrochlamys* almost certainly originated in South America. It evolved from *Zygochlamys* during the Late Miocene, when cold-water habitat became more widespread in South America. Instead, the spatial and stratigraphical distribution of genera *Austrochlamys* and *Adamussium* suggests that they largely evolved in Antarctica. Since latest Eocene speciation and distribution of Southern Ocean scallops has been strongly determined by climatic evolution of Antarctica. On the one hand, the opening of Drake Passage, enabling initiation of the Antarctic Circumpolar Current and the onset of widespread Antarctic glaciation, created an effective thermal barrier around Antarctica, which has prevented the spreading of scallops. On the other hand, significant expansion of the Antarctic ice sheet during the Late Miocene enabled migration of *Austrochlamys* to South America and of *Psychrochlamys* to the New Zealand region. Finally, Late Pliocene cooling accounted for the extinction of *Austrochlamys* in Antarctica, and substantial northward migration of *Psychrochlamys* in New Zealand.

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