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A PRELIMINARY SURVEY OF THE NOMENCLATURAL UNITS OF THE TERTIARY PECTINIDAE,

by H. I. TUCKER ROWLAND, C. R. B. Fellow, 1937-38.

A molluscan family which has not been revised during a period of more than thirty years is probably in need of critical study. Such a revision involves a survey of the morphology of the group, the distribution of the species in the group, as well as a critical evaluation of the nomenclatural units which have been proposed for it.

In this paper, as a preliminary step in the revision of the Tertiary Pectinidae, is presented a tabulation of pertinent data relative to the sixty-nine units which have been detected in the literature. It is hoped that any omissions may be called to the attention of the writer.

This study has been made possible by Dr. Victor Van Straelen, Director of the Musée royal d'Histoire naturelle de Belgique, who has most generously made available to the writer all the facilities necessary to such research. The writer has benefited much from the excellent advice of Dr. Maxime Glibert, Curator of Cenozoic and Mesozoic collections.

UNIT.	REFERENCE.
ADAMUSSIIUM Thiele, 1934.	Hand. Syst. Weichtierkunde, Teil 3: 807.
AEQUIPECTEN Fischer, 1886.	Man. Conchyl.: 944.
AMUSIUM Bolten, 1798.	Mus. Bolt.: 165.
AMUSSIOPECTEN Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 53.
ANATIPOPECTEN Hertlein, 1936.	Nautilus, 50 (1): 26.
ANTIPECTEN Cossmann, 1914.	Actes Soc. Linn. Bordeaux, 68: 113-114.
ARCTINULA Thiele, 1934.	Hand. Syst. Weichtierkunde, Teil 3: 806.
ATHLOPECTEN Marwick, 1928.	N. Z. Inst., Trans., 58: (4); 447, 454.
BELCHLAMYS Iredale, 1929.	Records Austral. Mus., 17: (4): 164.
CAMPTONECTES Meek, 1864.	Smith. Misc. Coll., 7: (177): 39.
CHLAMYDELLA Iredale, 1929.	Records Austral. Mus., 17: (4): 164.
CHLAMYS Bolten, 1798.	Mus. Bolt.: 161.
CTENAMUSSIIUM Iredale, 1929.	Records Austral. Mus., 17: (4): 164.
CYCLOCHLAMYS Finlay, 1927.	N. Z. Inst., Trans. & Proc., 57: 478.
CYCLOPECTEN Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: 70.
DELECTOPECTEN Stewart, 1930.	Acad. Nat. Sci. Phila., Spec. Publ., 3: 118.
DENDOPECTEN Hertlein, 1936.	Nautilus, 50: (1): 26.
DUPLIPECTEN Marwick, 1928.	N. Z. Inst., Trans. & Proc., 58: (4): 451, 458.
EBURNEOPECTEN Conrad, 1865.	Am. Jour. Conch., 1: 140, pl. 10, fig. 4.
EQUICHLAMYS Iredale, 1929.	Records Austral. Mus., 17: (4): 163.
EUVOLA Dall, 1898.	Wagner Free Inst. Sci., Trans., 4: (3): 694.
FELIPES (Locard) Carus, Dec., 1889 (1).	Annal. Soc. Linn. Lyon, nouv. sér., 34: 154.
FLABELLIPECTEN Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 55.
FLEXOPECTEN Sacco, 1897.	Op. cit., 39.

GENOTYPE.	DESIGNATION.
<i>Pecten colbecki</i> E. A. Smith, 1902.	Original.
<i>Ostrea opercularis</i> Linné, 1758.	Monotypy.
<i>Ostrea pleuronectes</i> Linné, 1758.	Herrmannsen, Ind. Gen. Mal., 1: 47, 1846.
<i>Pecten burdigalensis</i> Lamarck, 1806.	Original.
<i>Pecten anatis</i> Morton, 1833.	Original.
<i>C. (Antipekten) sacyi</i> Cossmann et Peyrot, 1914.	Original.
<i>Pecten greenlandicus</i> Sowerby, 1842.	Original.
<i>Pecten athleta</i> Zittel, 1864.	Original.
<i>Pecten aktinas</i> Petterd, 1885.	Original.
<i>Pecten lens</i> Sowerby, 1821.	Stoliczka, Geol. Surv. India, Mem., Pal. Ind., ser. 6, 3: 425, 1871.
<i>Cyclopecten favus</i> Hedley, 1902.	Original.
<i>Ostrea islandica</i> Linné, 1791.	Herrmannsen, Ind. Gen. Mal., 1: 231, 1846.
<i>Amusium thetidis</i> Hedley, 1902.	Original.
<i>Pecten transenna</i> Suter, 1913.	Original.
<i>Pecten pustulosus</i> Verrill 1873 + <i>Pecten imbrifer</i> Lovén, 1846.	Original.
<i>P. (Pseudamusium) vancouverensis</i> Whiteaves, 1893.	Original.
<i>Pecten dendyi</i> Hutton, 1902.	Original.
<i>Pecten waihaoensis</i> Suter, 1917.	Original.
<i>Pecten scintillatus</i> Conrad, 1865.	Monotypy.
<i>Pecten bifrons</i> Lamarck, 1819.	Original.
<i>Ostrea ziczac</i> Linné, 1758.	Original.
<i>Ostrea pes-felis</i> Linné, 1758.	Monotypy.
<i>Ostrea flabelliformis</i> Brocchi, 1814.	Original.
<i>Ostrea flexuosa</i> Poli, 1795.	Original.

UNIT.	REFERENCE.
GIGANTOPECTEN Roverto, 1899 (2).	Rev. Crit. de Paléozoöl., ann. 3: (2): 90.
GRANDIPECTEN Cossmann and Peyrot, 1914 (2).	Actes. Soc. Linn. Bordeaux, 68: 73.
HEMIPECTEN Adams & Reeve, 1848.	Zool. Soc. London, Proc., (16): 133-134.
HINNITES Defrance, 1821 (3).	Dict. Sci. Nat., 21: 169-170.
HYALOPECTEN Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 71, pl. 18, fig. 5.
INEQUIPECTEN Ugolini, 1906.	Pal. Italica, 12: 192.
JANIRA Schumacher, 1817 (3).	Essai Nouv. Syst.: 118.
JANUPECTEN Marwick, 1928.	N. Z. Inst., Trans. & Proc., 58: (4): 450, 455.
LENTIPECTEN Marwick, 1928.	Op. cit.: 455.
LEPTOPECTEN Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 69.
LISSOCHLAMYS Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 46.
LISSOPECTEN Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 68.
LYROPECTEN Conrad, 1862.	Acad. Nat. Sci. Phila., Proc., 14: 291.
MACROCHLAMYS Sacco, 1897 (2).	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 32.
MANUPECTEN Monterosato, May, 1889 (1).	Jour. de Conchyl., 3 ^e sér., t. 29, vol. 37: 21.
MESOPEPLUM Iredale, 1929.	Records Austral. Mus., 17: (4): 162, 164.
MIMACHLAMYS Iredale, 1929.	Op. cit.: 163.
MIXTOPECTEN Marwick, 1928.	N. Z. Inst., Trans. & Proc., 58: (4): 447, 456.
NODIPECTEN Dall, 1898 (6).	Wagner Free Inst. Sci., Trans., 3: (4): 695.
NOTOCHLAMYS Cotton, 1930.	South Austral. Mus., 4: (2): 233.
NOTOVOLA Finlay, 1926.	N. Z. Inst., Trans. & Proc., 57: 451-452.
OOPECTEN Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 54, pl. 15, figs. 14-15.
PALLIUM Schumacher, 1817.	Essai Nouv. Syst.: 120, pl. 4, fig. 4.

GENOTYPE. —	DESIGNATION. —
<i>Ostrea latissima</i> Brocchi, 1814.	Original.
<i>Ostrea latissima</i> Brocchi, 1814.	Original.
<i>Hemipecten forbesianus</i> Adams & Reeve, 1848.	Monotypy.
<i>Hinnites cortesii</i> DeFrance, 1821.	Stoliczka, Geol. Surv. India, Mem., Paleont. Ind., ser. 6, 3: 427, 1871.
<i>Pecten undatus</i> Verrill, 1882-85.	Original.
<i>Pecten tournali</i> Serres, 1829.	Original.
<i>Janira intermedia</i> Schumacher, 1817.	Original.
<i>Pecten uttlei</i> Marwick, 1924.	Original.
<i>Pecten hochstetteri</i> Zittel, 1864.	Original.
<i>Pecten monotimeris</i> Conrad, 1834.	Original.
<i>Pecten excisus</i> Bronn, 1831.	Original.
<i>Ostrea hyalina</i> Poli, 1795.	Original.
<i>Pallium estrellanum</i> Conrad, 1855.	Dall, Wagner Free Inst. Sci., Trans., 3: (4): 695, 1898.
<i>Ostrea latissima</i> Brocchi, 1814.	Original.
<i>Ostrea pes-felis</i> Linné, 1758.	Original.
<i>Mesopeplum caroli</i> Iredale, 1929.	Original.
<i>Pecten asperrimus</i> Lamarck, 1819.	Original.
<i>Pecten (Aequipecten) amuriensis</i> Woods, 1917.	Original.
<i>Ostrea nodosa</i> Linné, 1758.	Original.
<i>Chlamys anguineus</i> Finlay = <i>Pecten undulatus</i> Sowerby, 1842.	Original.
<i>Pecten novaezelandiae</i> Reeve, 1852.	Original.
<i>Pecten rotundatus</i> Lamarck, 1819.	Original.
<i>Ostrea plica</i> Linné, 1758.	Monotypy.

UNIT.	REFERENCE.
PALLIOLUM Monterosato, 1884.	Nom. Gen. Conch. Medit.: 5-6.
PARAMUSIUM Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 72.
PARVAMUSSIUM Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 48.
PATINOPECTEN Dall, 1898.	Wagner Free Inst. Sci., Trans., 3: (4): 695.
PLACOPECTEN Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 69-70.
PLAGIOCTENIUM Dall, 1898.	Wagner Free Inst. Sci., Trans., 3: (4): 696.
PECTEN Müller, 1776 (3).	Zool. Dan. Prodr.: 248.
PECTINELLA Verrill, 1897.	Conn. Acad. Arts & Sci., Trans., 10: (1): 68.
PEPLUM Bucquoy, Dautzenberg & Dollfus, 1889.	Les Mollusques Marins du Roussillon, 2: fasc. 16: 67.
PHIALOPECTEN Marwick, 1928.	N. Z. Inst., Trans. & Proc., 58: (4): 454.
PROPEAMUSSIUM de Gregorio, 1884.	Il Nat. Sicil., Ann. 3: (4): 119.
PSEUDAMUSSIUM Mörch, 1853.	Cat. Conchyl. Yoldi, fasc. 2: 59.
SCAEOCHALMYS Iredale, 1929.	Records Austral. Mus., 17: (4): 163.
SECTIPECTEN Marwick, 1928.	N. Z. Inst., Trans. & Proc., 58: (4): 454.
SERRIPECTEN Marwick, 1928.	Op. cit.: 455.
SIMILIPECTEN Winckworth, 1932.	Jour. Conch., 19: (7): 241.
SWIFTOPECTEN Hertlein, 1935.	Calif. Acad. Sci., Proc., ser. 4, 21: (25): 319.
TALOCHLAMYS Iredale, 1929.	Records Austral. Mus., 17: (4): 164.
VARIAMUSSIUM Sacco, 1897.	I Moll. Terr. Terz. d. Piemonte e. d. Liguria, (24): 49.
VEPRICHLAMYS Iredale, 1929.	Records Austral. Mus., 17: (4): 164.
VERTIPECTEN Grant & Gale, 1931.	San Diego Soc. Nat. Hist., Mem., 1: 188-189.
VOLA Klein, 1753 (3).	Tent. Meth. Ostrac.: 135.

GENOTYPE.

DESIGNATION.

<i>Pecten incomparabilis</i> Risso, 1826.	Crosse, Jour. Conchyl., 3 ^e sér., t. 24: vol. 33: 140, May, 1889.
<i>Amusium dalli</i> Smith, 1885.	Original.
<i>Pecten duo-decimlamellatus</i> Bronn, 1831.	Original.
<i>Pecten caurinus</i> Gould, 1851.	Original.
<i>Pecten clintonius</i> Say, 1824.	Original.
<i>Pecten ventricosus</i> Sowerby, 1842.	Original.
<i>Ostrea maxima</i> Linné, 1758.	Schmidt, Versuch. Conch. Samml.: 67, 1818.
<i>Pecten sigsbei</i> Dall, 1886.	Original.
<i>Ostrea clavata</i> Poli, 1795.	Original.
<i>Pecten triphooki</i> Zittel, 1864.	Original.
<i>Pecten ceciliae</i> de Gregorio, 1884.	Monotypy.
<i>Pecten septemradiatum</i> Müller, 1776.	Absolute tautonomy.
<i>Pecten lividus</i> Lamarck, 1819.	Original.
<i>Pecten wallastoni</i> Finlay = <i>Pecten sectus</i> Hutton, 1873.	Original.
<i>Pecten hutchinsoni</i> Hutton, 1873.	Original.
<i>Pecten simile</i> Laskey, 1809.	Original.
<i>Pecten swiftii</i> Bernardi, 1858.	Original.
<i>Chlamys famigerator</i> Iredale, 1925.	Original.
<i>Amusium cancellatum</i> Smith, 1885.	Original.
<i>Chlamys perillustris</i> Iredale, 1925.	Original.
<i>Pecten nevadus</i> Conrad, 1855 + <i>Pecten (Lyropecten) bowersi</i> Arnold, 1906.	Original. Stoliczka, Geol. Surv. India, Mem. Paleont. Ind., ser. 6: 3: 426, 1871.
<i>Ostrea jacobaea</i> Linné.	

FOOTNOTES.

(1) In a personal communication, June, 1938, Mr. A. C. Townsend, General Librarian of the British Museum of Natural History, states that : « I have examined our copy of *Journal de Conchyliologie*, sér. III, tome 29, n° 1, 1899, containing pp. 1-100. According to a stamp on the wrapper this part of it was received on 6th May, 1889.

» Now as to Carus: « *Prodromus* » &c., Vol. 2, pt. 1. This is noticed in *Naturae Novitates* published by R. Friedländer & Sohn, in No. 25 of this periodical, December 1889 (p. 404). This well-known bibliography of Friedländer was published every fortnight, and No. 25, 1889, was the part issued for the second fortnight in December. According to this evidence, therefore, Vol. 2, pt. 1, pp. 1-272, of Carus's work must have been published sometime towards the middle or end of the month.

» Moreover, Vol. 2, pt. 1 of Carus's work is noticed in the *Zoologischer Anzeiger: Inseraten-Beilage*, No. 324, for the 30th December, 1889. Furthermore, our copy was received here on the 19th December, 1889, not 1880 as quoted by *Nautilus* (Vol. 50: (1): 25, July, 1936). It seems therefore quite evident that the above mentioned part of the *Journal de Conchyliologie* was published well in advance of Vol. 2 of Carus's work. Indeed, the back of the wrapper of no. 1 of the *Journal* bears the date 1888, and in my opinion it must have been issued sometime during the first four months of 1889. »

This information establishes clearly the priority of *Manupecten* Monterosato by at least six months.

(2) Sacco, December, 1897, being unaware that *Macrochlamys* was preoccupied by Benson, *Asiat. Soc., Jour.*, 1: 76, 1832, used it for a group of pectens and designated as type *Ostrea latissima* Brocchi. Rovertto having discovered that *Macrochlamys* was not available, proposed *Gigantopecten* for the group of *Ostrea latissima* Brocchi. Later Cossmann and Peyrot proposed *Grandipecten*, type *O. latissima*, in 1914.

(3) It is probable that *Hinnites* is polyphyletic. It is possible that only the genotype may properly be included here.

(4) *Vola* Klein, 1753, is clearly unavailable, and hence must depend for its availability upon its introduction into the literature in accordance with Opinion 5, International Rules of Nomenclature.

Klein, p. 130, 1753, gives the diagnosis of *Pecten*, which he follows with a brief description of « St. Jacobs Schulpfen », obviously *Pecten jacobaea*. His first species following this is *Pecten maximus*, for which he cites « Listri de Cochl., p. 184 ». On p. 135 he gives a diagnosis of *Vola*, and cites as the first and only example « Spec. I. Indica », which he figures, Tab. IX, n. 35.

Paleontologists generally seem to be of the opinion that Klein intended *maximus* to be taken as the example of his genus *Pecten*, and probably *jacobaea* as the example of *Vola*. Stoliczka, p. 426, 1871, is of the opinion that Klein's figure is of the shell known at present as *sinensis* Sowerby. However, it is clear that he was referring *jacobaea*

to *Pecten*, since it was popularly called the St. Jacobs shell, and that he followed this with *maximus*. In the latter case, he at least used the form of binomial nomenclature. The shell which he illustrates as an example of *Vola* is clearly generically a *Pecten*. One may, therefore, consider that even Klein had made his two genera synonyms!

H. and A. Adams, Gen. Rec. Moll., 2: 554, 1858, definitely bring *Vola* into the literature. Their diagnosis would make it the exact equivalent of *Pecten*. *Pandora* Mühlf., non Solander, and *Janira* Schumacher are placed in synonymy, and *V. jacobaea* is cited as an example. Their list of species to be included under *Vola* contains examples of species which are now considered to belong to independent genera, as well as *P. maximus* L.

Stoliczka, p. 426, 1871, designated *Ostrea jacobaeae* Linné as the genotype of *Vola* Klein, thereby making it a synonym of *Pecten* Müller, 1776.

Schumacher, pp. 117-118, 1817, gave a diagnosis of *Janira*, to which genus he assigned the group of species which now are considered to belong to *Pecten* Müller. He restricted *Pecten* to the group which Bolten, 1798, had called *Chlamys*, and for the true *Pecten* group he proposed *Janira*, type *Janira intermedia*, which certainly has a definitely *Pecten*-like hinge. There seems little question that it properly may be considered a true *Pecten*. Schumacher also places *Janira maxima* in the new genus as his first species, and places *Ostrea maxima* Linné and *Pecten maximus* Chemn. 7. pag. 268, Tab. 60, fig. 585 in synonymy, thereby making it clear that *Janira* is only another synonym of *Pecten*.

Müller, Prodr. Zool. Dan.: 248, 1776, was the first binomial writer to introduce *Pecten*. He listed first *Pecten maximus* Linné, although he also included *P. islandicus* Linné, etc. This usage was followed by Da Costa, 1778, Cuvier, 1798, and Lamarck, 1799. Schmidt, 1818, made the first designation of type. Later Children, Quart. Jour. Sci., 15: 66, 1823, and Gray, Zool. Soc. London, (15): 200, 1847, also designated *Ostrea maxima* Linné as the type of *Pecten*. The problem of *Pecten* Osbeck v. *Pecten* Müller is discussed at length by Tucker, American Midland Naturalist, 17: (2): 471-475, March, 1936.

Philippi, Zeitschr. Deutsch. geol. Ges., Bd. 52: 93, 1900, has proposed *Eupecten* for *Pecten*, s. s.

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