A contribution to the knowledge of the pectinacean Mollusca (Bivalvia: Propeamussiidae, Entoliidae, Pectinidae) from the Indonesian Archipelago

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Key words: Mollusca; Bivalvia; Propeamussiidae; Entoliidae; Pectinidae; taxonomy; Indonesia.

Abstract: During the Indonesian-Dutch SNELLIUS-II Expedition (1984-1985) to the Indonesian Archipelago 46 pectinacean species were collected from the Flores Sea and Banda Sea (5°52'-9°57'S, 118°12'-123°58'E) at littoral to bathyal depth (835 m). One new pectinid genus, viz. *Glorichlamys* gen. nov., six new propeamussiids, viz. *Parvamussium araneum* spec. nov., *Parvamussium carbaseum* spec. nov., *Parvamussium cassium* spec. nov., *Parvamussium undosum* spec. nov., *Parvamussium virgatum* spec. nov., *Cyclopecten cancellus* spec. nov., and one new entoliid, viz. *Pectinella aequoris* spec. nov. are described. Twelve new records of Pectinacea for this region are mentioned. For *Ostrea squamosa* Gmelin, 1791 a lectotype is designated. In addition Pectinidae of the SNELLIUS-Expedition (1929-1930) to the eastern region of Indonesia, and material collected by Dr B.W. Hoeksema near Sulawesi (1985, 1986) are reported upon.

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Contents

Introduction

For several centuries already Pectinidae are known from the Indonesian Archipelago. These were brought to Europe by explorers and commercial travellers. Rumphius (1705: 141) reported four Pectinidae species from the Moluccas, and afterwards several Pectinidae were described by Linnaeus (1758), Gmelin (1791), Lamarck (1819), Sowerby (1842), and Reeve (1852-53). As a consequense, 15 species were known at the end of the nineteenth century. At that time also deep-sea explorations were attempted, and many new Propeamussiidae were collected and described. From the SIBOGA-Expedition (1899-1900) to the Indonesian Archipelago 44 pectinacean species were recognized by Dautzenberg & Bavay (1912), eight of which were

new to science. Amongst the unidentified samples of this expedition the present author (1990) described 16 more pectinacean species, three of which are new to science. During the SNELLIUS-Expedition (1929-1930) to the same region, Pectinidae material was collected from the shores and shallow water by skin-diving. Only six Pectinidae species were live collected during this expedition; these are mentioned in this report. From a Belgium voyage to the Indonesian Archipelago, Adam & Leloup (1939: 55) described 11 Pectinidae species, and Van Regteren Altena (1945: 140) reported from off Java six species. During the Indonesian-Dutch SNELLIUS-II Expedition (1984-1985), again to the Indonesian Archipelago, 47 pectinacean species were collected at 58 stations in the Flores Sea and the Banda Sea (5°52'-9°57'S, 118°12'-123°58'E), at littoral to bathyal depth (intertidal to 835 m) by snorkeling, scuba-diving, using Van Veen-grabs, rectangular dredges, and Agassiz-trawls of 1.2 and 3.5 m. Based on this material, one genus and seven species are described as new to science. See table 1, in which the various species, collected by these expeditions, are listed.

Table 1. The various species collected by Snellius I-Expedition (SI), Snellius II-Expedition (SII) and the Siboga-Expedition (Si). It is indicated whether the specimens were found dead (x), alive (o) or both (+).

	SI	SII	Si
Propeamussiidae			
1. *Propeamussium caducum*	+		
2. *Parvamussium araneum* spec. nov	+		
3. *Parvamussium carbaseum* spec. nov	x		
4. *Parvamussium cassium* spec. nov.	o		
5. *Parvamussium cristatellum*	x		
6. *Parvamussium pauciliratum*	x		
7. *Parvamussium scitulum*	x		
8. *Parvamussium* cf. *texturatum*	+		
9. *Parvamussium undosum* spec. nov.	x		
10. *Parvamussium virgatum* spec. nov.	x		
11. *Cyclopecten cancellus* spec. nov.	x		
12. *Similipecten eous*	x		
Entoliidae			
13. *Pectinella aequoris* spec. nov.	x		
Pectinidae			
14. *Amusium balloti*	x		
15. *Delectopecten alcocki*	x		
16. *Delectopecten musorstomi*	x		
17. *Hyalopecten tydemani*	x		
18. *Chlamys allorenti*	x		
19. *Chlamys andamanica*	x		
20. *Chlamys cloacata*	+	x	
21. *Chlamys deliciosa*	+		
22. *Chlamys gladysiae*	x		
23. *Chlamys irregularis*			+
24. *Chlamys squamosa*	o	+	+
25. *Coralichlamys madreporarum*	o	o	
26. *Mimachlamys albolineata*	o		
27. *Mimachlamys lentiginosa*	o	x	+
28. *Mimachlamys senatoria*		+	+
29. *Scaeochlamys livida*		x	
30. *Cryptopecten bullatus*		+	
31. *Cryptopecten nux*		+	
32. *Complicachlamys wardiana*			x
33. *Semipallium dianae*		x	
34. *Semipallium fulvicostatum*		+	x
35. *Semipallium dringi*		x	
36. *Semipallium tigris*			+
37. *Pedum spondyloideum*		o	
38. *Decatopecten plica*		+	
39. *Anguipecten aurantiacus*		x	
40. *Annachlamys flabellata*		x	
41. *Annachlamys macassarensis*		+	x
42. *Annachlamys reevei*		x	
43. *Comptopallium radula*	o		+
44. *Excellichlamys spectabilis*		x	+
45. *Glorichlamys elegantissima*		x	
46. *Gloripallium pallium*	o	x	+
46a. *Gloripallium pallium* f. *speciosum*		x	
47. *Juxtamusium maldivense*		x	o
48. *Mirapecten mirificus*		x	
49. *Mirapecten rastellum*		x	
50. *Pecten (Oppenheimopecten) excavatus*		x	
51. *Serratovola gardineri*		x	
Live collected species	6	15	9
Dead collected species	-	44	12
Total collected species	6	47	13

During coral investigations in 1985 and 1986 Dr B.W. Hoeksema collected 14 Pectinidae species from Gugusan Spermonde (Sulawesi) by beach collecting, snorkeling and scuba-diving from intertidal to littoral depth. This material is also dealt with in the present report.

Actually about 90 pectinacean species are known from the Indonesian Archipelago, which is a high percentage (ca. 80%) of the known Indo-Pacific Pectinacea.

The Pectinacea of the SNELLIUS, and the SNELLIUS-II Expedition, and the material from Sulawesi are in the Nationaal Natuurhistorisch Museum (formerly RMNH) at Leiden.

Additional material from the Indonesian Archipelago was studied in several European museums.

Acknowledgements and abbreviations

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The following abbreviations are used for the type depositories: AMS— The Australian Museum, Sydney; BM(NH)— British Museum (Natural History); HHD— H.H. Dijkstra coll.; HPW— H.P. Wagner coll.; LSL— The Linnean Society of London; MCZ— Museum of Comparative Zoology, Harvard University; MHNG— Muséum d'Histoire naturelle, Genève; MNHN— Muséum National

d'Histoire Naturelle; NNW— National Museum of Wales, Cardiff; NNM— Nationaal Natuurhistorisch Museum (= RMNH, Leiden); PRC— P.R. Candall coll.; TM— Taiwan Museum, Taipei; UMZC— University Museum of Zoology, Cambridge; USNM— National Museum of Natural History, Washington D.C.; UUZM— Uppsala University Zoological Museum; ZMA— Zoölogisch Museum Amsterdam; ZSI— Zoological Survey of India, Calcutta.

Systematic part

Type material indicated with "o" was studied, whereas "." means that the present author did not study the specimen(s) himself. Some taxa are still under study, and indicated with "?".

Superfamily **Pectinacea** Rafinesque, 1815 (emend. Waller, 1978)
Family **Propeamussiidae** Abbott, 1954
Genus **Propeamussium** De Gregorio, 1884

Type species: *Pecten (Propeamussium) ceciliae* De Gregorio, 1884.

Propeamussium caducum (E.A. Smith, 1885)
(figs. 1-2)

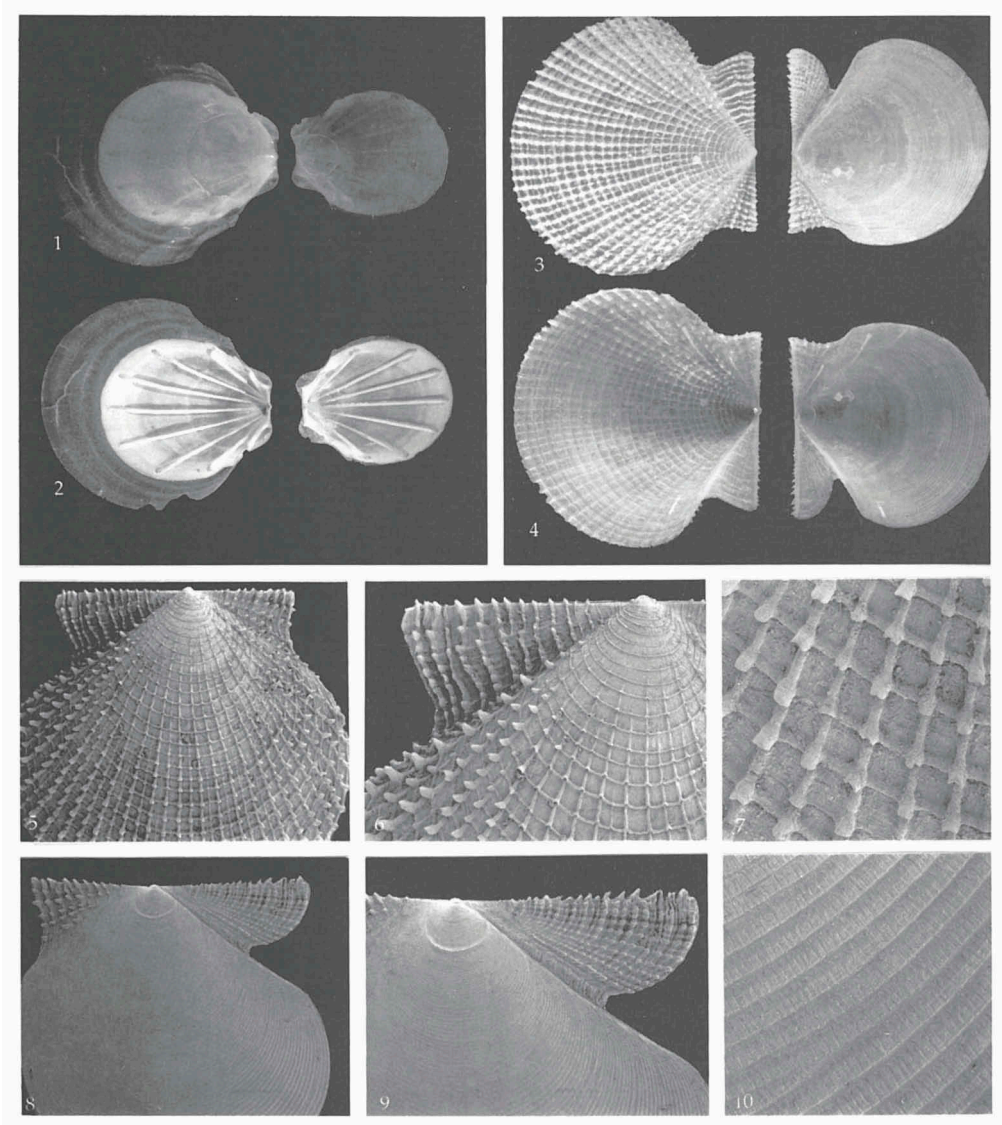
o *Amussium caducum* E.A. Smith, 1885: 309, pl. 23 figs. 1-1c.
o *Amussium weberi* Dautzenberg & Bavay, 1912: 32, pl. 28 figs. 9-13.
. *Propeamussium nakazawai* Kuroda, 1932: 87, figs. 101-102.
Parvamussium (Flavamussium) caducum; Oyama, 1951: 81, pl. 13 figs. 11-12.

Material.— Sta. 4.127 N. of Sumbawa, Bay of Sanggar, 8°18.7'S 118°18'E, 1.2 m Agassiz-trawl, depth 500-550 m, muddy bottom with many polychaetes, 22.ix.1984 (20 valves + 3 specimens, live and dead); sta. 4.128 N. of Sumbawa, Bay of Sanggar, 8°18'S 118°16'E, 1.2 m Agassiz-trawl, depth 700-835 m, muddy bottom with many polychaetes, 22.ix.1984 (7 valves); sta. 4.130 N. of Sumbawa, Bay of Sanggar, 8°17.9'S 118°17.8'E, 2.4 m Agassiz-trawl, depth 700-730 m, muddy bottom with worm tubes and plant debris, varied fauna, 23.ix.1984 (11 valves + 6 specimens, live and dead); sta. 4.131 N. of Sumbawa, Bay of Sanggar, 8°18'S 118°17.5'E, 2.4 m Agassiz-trawl, depth 680-800 m, muddy bottom with worm tubes and plant debris, dominating: Polychaeta, Pogonophora, Pennatularia, 23.ix.1984 (5 valves + 1 specimen, live and dead); sta. 4.267 N. of Sumbawa, Bay of Sanggar, 8°17.6'S 118°21.3'E, 3.5 m Agassiz-trawl, depth about 650 m, sandy volcanic mud with soft bottom fauna, 29.x.1984 (1 live specimen); sta. 4.276 N. of Sumbawa, off Tambora volcano, 8°12'S 118°12'E, 3.5 m Agassiz-trawl, depth 750 m, sandy volcanic mud with soft bottom fauna, 31.x.1984 (5 specimens, live).

Description.— Left valve fragile and transparent, smooth, with microscopic radiations, concentric growing-striations and sometimes a few minute radial waving lines near the posterior marginal area, as is observable in other *Propeamussium* species. Auricles small, equal and straight, and somewhat raised. All the present material bears seven internal lirae, with two smaller ones near the auricles, starting near the umbonal part and running to the submarginal area, and slightly nodulose near the end. In both valves, no interstitial rudimental lirae are observed. Coloration milky white to translucent between the lirae. External coloration brownish-yellow, right valve somewhat paler. External sculpture of right valve bears concentric costulae, that are more pronounced near the margin. Auricles equal and somewhat elevated. Description of the soft parts, food and reproduction are given by Knudsen (1967: 275).

Distribution and ecology.— Throughout the Indo-Pacific region, except for the central Pacific, and living on muddy bottoms. The present material is live collected from 500-800 m. Knudsen (1967: 276) mentioned a bathymetric range from 190-1500 m, with a temperature of about 5-12°C.

Remarks.— Examined specimens from the western Indo-Pacific slightly differ from the present material, mainly by coloration and internal lirae (usually one or two more). The present material is very similar to the type material of *Propeamussium*



Figs. 1-2, *Propeamussium caducum* (E.A. Smith); sta. 4.131. 1, left valve (large specimen), sta. 4.128, right valve, exterior (× 1.2); 2, left valve, interior (× 1.2). Figs. 3-10, *Parvamussium araneum* spec. nov.; sta. 4.060, holotype. 3, exterior (× 3.6); 4, interior (× 3.6); 5, left valve, exterior (× 4.8); 6, left valve, anterior auricle, exterior (× 9); 7, left valve, antero-marginal detail, exterior (× 43); 8, right valve, exterior (× 5.6); 9, right valve, anterior auricle, exterior (× 9); 10, right valve, antero-marginal detail, exterior × 85).

weberi, described by Dautzenberg & Bavay (1912: 32)(ZMA, holotype, paratypes; not registered). Knudsen (1967: 275) stated that *P. weberi* is only a junior synonym of *P. caducum*. Oyama (1951: 81), Kuroda & Habe (1981: 62) and Wang (1984: 600) synonymized also *Propeamussium nakazawai* Kuroda (1932: 87) from Japan. Type material of *P. nakazawai* has not been examined, but congeneric material from Japanese waters was studied, and proved to be very similar indeed to *P. caducum*, although there are nine instead of seven internal lirae.

Smith (1885: 309) placed *P. caducum* in the genus *Amussium*, actually proposed as a genus of Pectinidae. Oyama (1951: 81) described a new subgenus *Parvamussium (Flavamussium)* and mentioned *P. caducum* as its type species, but *Parvamussium* differs in many conchological characters from *Propeamussium*. Kuroda & Habe (1981: 62), however, mentioned *Flavamussium* as a subgenus of *Propeamussium*. Hertlein (1969: N350) treated *Flavamussium* and *Propeamussium* as synonyms. *P. caducum* is in all aspects a *Propeamussium* species (no external sculpture, no byssal notch developed, equal auricles and a lateral gape).

Genus **Parvamussium** Sacco, 1897

Type species: *Pecten (Pleuronectes) duodecimlamellatus* Bronn, 1832.

Parvamussium araneum spec. nov.
(figs. 3-10)

Material.— Holotype, sta. 4.060 NE coast of Sumba, E of Melolo, 9°51.8'S 120°46.4'E, rectangular dredge, depth 240 m, large calcareous stones, small stones, scarce epifauna, 14.ix.1984 (1 live specimen)(RMNH 56531). Paratypes: sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 300 m, calcareous sand, some shell gravel, 10.ix.1984 (1 specimen + 4 valves, live and dead)(RMNH 56532); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (1 valve)(RMNH 56533).

Description.— Shell small, approximately 9 mm in height and length, convex and circular. Anterior and posterior auricles unequal, umbonal angle about 105°. The external sculpture of the left valve is cancellated by about 25 regular radial costae, increasing in prominence near the ventral margin, and concentric lamellae, which are less conspicuous than the costae. Near the umbonal area only concentric lamellae are present, with microscopic interstitial irregular threads. The concentric squamous lamellae on the anterior auricle are strongly developed, and running over the weakly produced radial costae. The sculpture of the posterior auricle is nearly identical, but there are fewer radial costae.

The exterior surface of the right valve has concentric costae, which are more close set near the umbonal area, with interstitial scratches. The anterior auricle bears about seven tubercular radial costae, which are crossed by concentric costae near the dorsal margin, and scaly on the hinge line. The sculpture of the posterior auricle is more pronounced. Near the umbo the sculpture on the hinge line is smoothed.

The interior surface of both valves is provided with three rudimental lirae, and an additional one on the posterior auricle. The cancellated sculpture of the exterior surface of the left valve is easily visible, with small irregular scratches, also of the

right valve. The hinge line is straight and the resilial pit is triangular. The byssal notch is rather small and no ctenolium is developed on the suture.

The shell is milky-white and semi-translucent.

Dimensions: height 8.9 mm, length 9 mm, diameter 1.3 mm.

Etymology.— The surface of the left valve has an appearance of a spider's web.

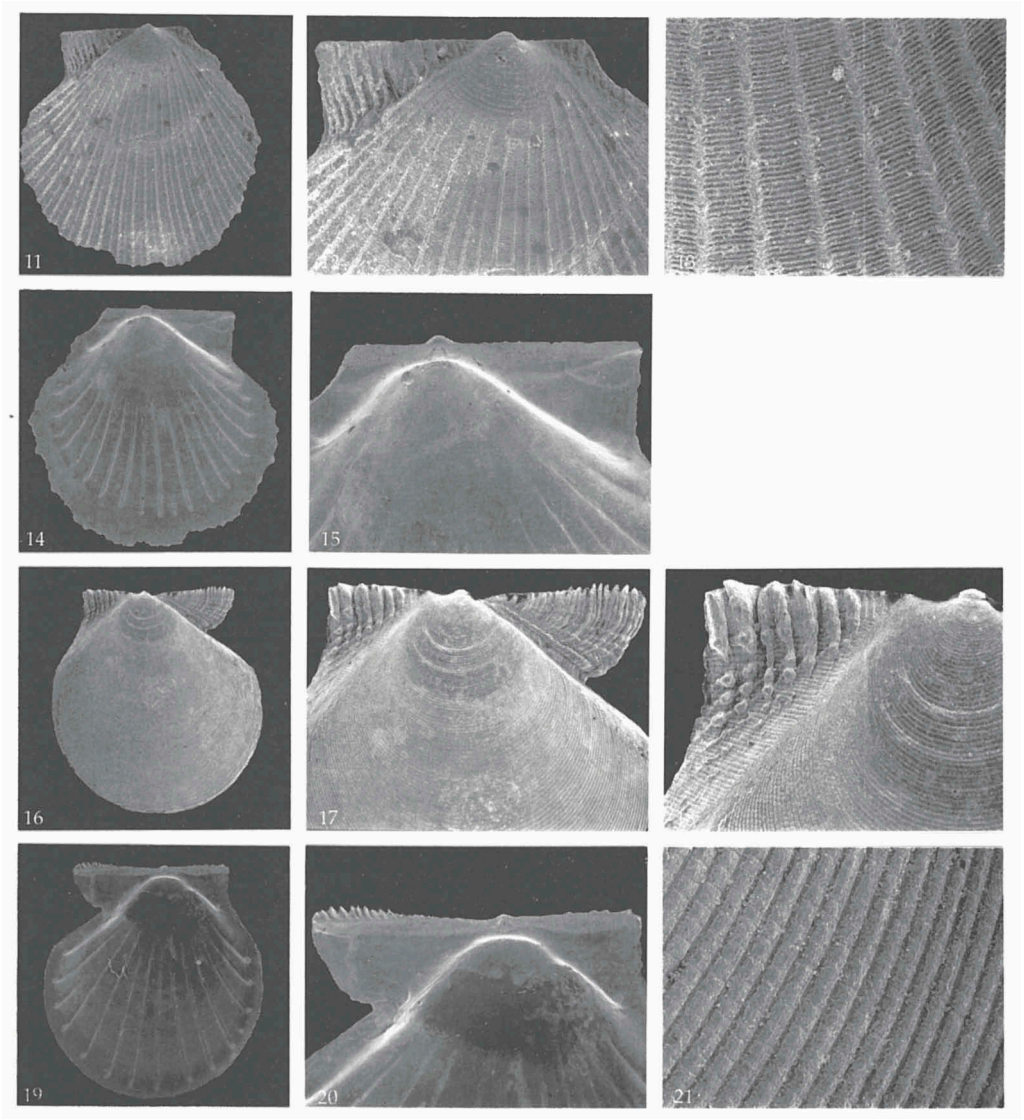
Differentiation.— The most similar congeneric species is *Parvamussium vidalense* (Barnard, 1964) from off Cape Vidal, Zululand (South Africa), which is different by the following conchological features: less pronounced radial costae on the exterior surface of the left valve, and overrunning concentric lamellae; auricles less sculptured; more internal rudimental lirae; coloration opaque.

Remarks.— Barnard (1964: 433) provisionally placed *P. vidalense* in *Cyclopecten*, but representatives of this genus have no internal lirae.

Parvamussium carbaseum spec. nov.
(figs. 11-21)

Material.— Holotype, sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (left valve)(RMNH 56534). Paratypes: sta. 4.031 (right valve, additional description)(RMNH 56535); sta. 4.031 (12 valves)(RMNH 56536); sta. 4.017 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.8'S 123°46.5'E, Van Veen-grab, depth 365 m, fine shell gravel, 9.ix.1984 (1 valve)(RMNH 56537); sta. 4.018 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab, depth 465 m, fine shell gravel with forams, 9.ix.1984 (2 valves)(RMNH 56538); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve)(RMNH 56539); sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, Van Veen-grab (2x), depth 255-275 m, coral sand, 9.ix.1984 (2 valves)(RMNH 56540); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (6 valves)(RMNH 56541); sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab,depth 280 m, coarse calcareous sand, 10.ix.1984 (14 valves)(RMNH 56542); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (6 valves)(RMNH 56543); sta. 4.135 NE Taka Bone Rate (Tiger Isl.), E of Tarupa Kecil, 6°28.5'S 121°09.3'E, Van Veen-grab, depth 495 m, muddy, yellow, calcareous sand with Polychaeta, 25.ix.1984 (2 valves)(RMNH 56544); sta. 4.136 NE Taka Bone Rate (Tiger Isl.), NE of Tarupa Kecil, 6°28.3'S 121°09'E, Van Veen-grab, depth 375 m, muddy calcareous sand with some coral stones, scarce macrofauna, 25.ix.1984 (2 valves)(RMNH 56545); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (15 valves)(RMNH 56546);sta. 4.154 off SW Salayer, 6°22.4'S 120°26.2'E, Van Veen-grab, depth 175 m, muddy calcareous sand, with some fine shell gravel, 28.ix.1984 (6 valves)(RMNH 56547); sta. 4.155 off SW Salayer, 6°22.3'S 120°26'E, Van Veen-grab (4x), depth 233-274m, muddy, fine, calcareous sand with sponges, ophiurids and polychaetes, 28.ix.1984 (1 valve)(RMNH 56548); sta. 4.166 SW Salayer, NE of Pulau Bahuluang, 6°26.2'S 120°26.5'E, VanVeen-grab, depth 300 m, calcareous sand with Foraminifera and some calcareous gravel, 30.ix.1984 (1 valve)(RMNH 56570).

Description.— Shell small, circular and convex, approximately 4 mm in height and length. Anterior and posterior auricles unequal, umbonal angle about 100°. After the dissoconch stage, about ten weak concentric lamellae are seen, with microscopic interstitial scratches. Irregular radial costae start 1 mm beneath the umbo, increasing to a number of about 25 at the ventral margin, with some intermediate small radial costae. The radial costae are provided with small tubercles. Many close set fine concentric



Figs. 11-21, *Parvamussium carbaseum* spec. nov.; sta. 4.031, figs.11-15, holotype; 11, left valve, exterior (× 7.1); 12, left valve, exterior dorsal region (× 15.3); 13, left valve, postero-central detail, exterior (× 85); 14, left valve, interior (× 7.1); 15, left valve, interior dorsal region (× 16.4); figs.16-21, paratype; 16, right valve, exterior (× 6.8); 17, right valve, exterior dorsal region (× 13.5); 18, right valve, posterior auricle, exterior (× 27); 19, right valve, interior (× 7.2); 20, right valve, interior dorsal region (× 13.6); 21, right valve, antero-marginal detail, exterior (× 85).

lines run over the entire shell-disc. The anterior auricle bears about 14 strongly developed concentric lamellae, which are also present on the posterior auricle.

The interior surface has 17 lirae, with some rudimental interstitial lirae, which nearly reach the periphery. The hinge line is straight and the cardinal crura is rather broad.

The shell is milky-white and semi-transparent.

Dimensions: height 4.4 mm, length 4.5 mm.

Exterior surface of right valve with many small concentric costae. Anterior auricle sculptured with a few weak radial costae. On the hinge line strongly concentric lamellae are present, which are most coarse near the anterior margin. The posterior auricle bears some nodose concentric lamellae.

The interior surface has about 13 lirae, with a few additional rudimental interstitial lines. The hinge line is straight and the cardinal crura is rather broad. Small spines are visible on the anterior hinge line; these are very weakly developed on the posterior one. The byssal notch is rather small and there is no ctenolium on the suture.

The shell is milky-white and semi-transparent.

Dimensions: height and length 4 mm.

Etymology.— The surface of the holotype has an appearance of old linen.

Differentiation.— *Parvamussium cristatellum* (Dautzenberg & Bavay) is larger, with more pronounced radial costae and fewer concentric lamellae. Internal lirae are also less in number. *P. araneum* is larger, with a cancellated structure and has also less internal lirae. *P. texturatum* has nearly the same number of internal lirae, but differs in external sculpture, which is more prominent with lamellose radiations, instead of the fine nodose radial costae that are typical for *P. carbaseum*.

Remarks.— The number of internal lirae varies between 11 and 17 (generally 11 to 13), with some rudimental interstitial lirae. Sometimes the small nodules on the radial costae of the left valves are absent, whereas the radial costae are not constant in number.

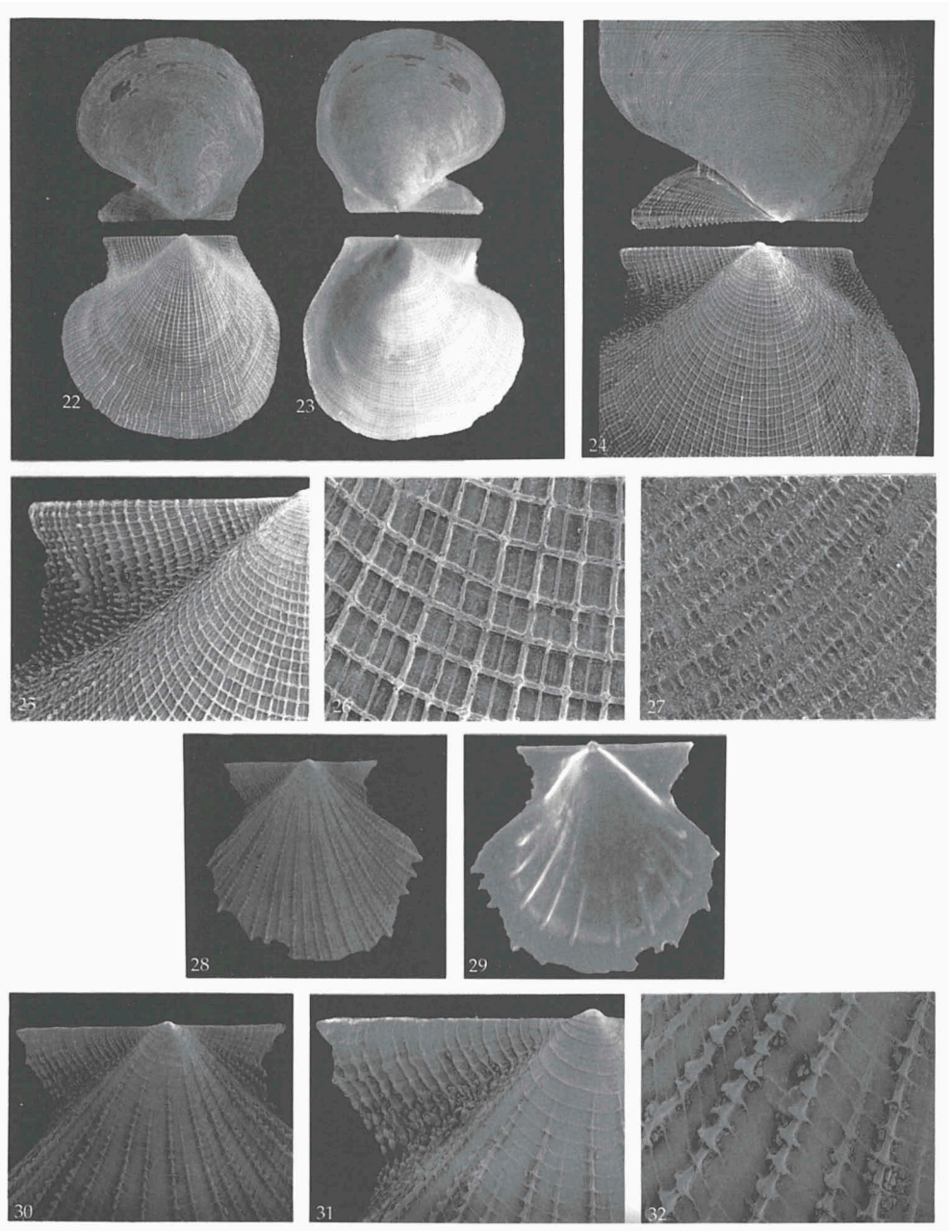
Parvamussium cassium spec. nov.
(figs. 22-27)

Material.— Holotype, sta. 4.142 NE Taka Bone Rate (Tiger Isl.), E of Tarupa Kecil, 6°29.7'S 121°10.8'E, rectangular dredge, depth 450-600 m, calcareous mud, partly hardened, Epizoa, 26.ix.1984 (1 live specimen) (RMNH 56549).

Description.— Shell small, subcircular, left valve slightly more convex than right one, approximately 10 mm in height. Anterior and posterior auricles very unequal (anterior 4 mm, posterior 2.5 mm); umbonal angle about 120°. Outline as in *Delectopecten*. Beneath the umbonal region of the external surface of the left valve, there is a cancellated sculpture with equally strongly developed fine radial and concentric costae, and microscopic scratches on the interstices. Many fine spines are set on the intersections of the cancellated sculpture, most strongly developed near the periphery. Both auricles bear also a cancellated sculpture. The sculpture on the anterior auricle is slightly more pronounced.

The exterior surface of the right valve has concentric lamellae, which are somewhat crenulated near the ventral margin, because of microscopic radial scratches on the lamellae. The anterior auricle has about eight radial costae, with several fine concentric lamellae, which are strongly developed on the dorsal margin, which has a serrated appearance. Only a few small radial costae are seen on the posterior auricle; more dominant are the concentric lamellae.

The exterior cancellated sculpture is visible on the interior glossy surface of the left valve. The interior surface is somewhat undulated near the ventral margin,



Figs. 22-27, *Parvamussium cassium* spec. nov.; sta. 4.142, holotype; 22, exterior (× 2.9); 23, interior (× 2.9); 24, exterior dorsal region (× 5.1); 25, left valve, anterior auricle, exterior (× 9.9); 26, left valve, antero-central detail, exterior (× 30); 27, right valve, antero-central detail, exterior (× 60). Figs. 28-32, *Parvamussium cristatellum* (Dautzenberg & Bavay); sta. 4.047; 28, left valve, exterior (× 4.7); 29, left valve, interior (× 5.3); 30, left valve, exterior dorsal region (× 8); 31, left valve, anterior auricle, exterior (× 14.3); 32, left valve, antero-central detail, exterior (× 22).

caused by disturbed development of growth. There are only two lirae on the border of the auricles. Both the anterior and the posterior margins of the auricles are somewhat spiniferous. The hinge line is straight. The resilial pit is oblong and ochreous coloured.

The interior surface of the right valve is also transparent and glossy. Only one small lira is seen on the posterior auricle. On the anterior dorsal hinge line many scales are visible; these are less clearly developed on the posterior region. The byssal notch is small and the byssal gape almost absent. There is no ctenolium on the suture.

The shell is white and semi-transparent.

Dimensions: (left valve) height 9.9 mm, length 10.5 mm; (right valve) height 8.9 mm, length 9.1 mm; diameter 2.1 mm.

Etymology.— The exterior surface of the left valve has an appearance of a fine net.

Differentiation.— A closely related species is *Parvamussium vidalense* (Barnard, 1964) from South Africa, which differs by more coarsely developed concentric lamellae and squamae on the radial costae of the left valve. The auricles are also more prominently sculptured. There are some lirae on the interior surface, which are absent in *P. cassium*, except for the two lirae on the border of the auricles. Another similar species is *Parvamussium araneum*, which is more coarsely sculptured with fewer radial and concentric costae on the left valve. The auricles are also more strongly sculptured, and the concentric lamellae are not crenulated near the ventral margin. Some rudimental lirae are seen on the interior surface; these are absent in *P. cassium*. Both similar species are somewhat smaller.

Parvamussium cristatellum (Dautzenberg & Bavay, 1912) (figs. 28-32)

o *Pecten (Amussium) cristatum* Bavay (non Bronn), 1905: 187, pl. 17 figs. 2a-c.
Amussium cristatellum Dautzenberg & Bavay, 1912: 36, pl. 28 figs. 5-8.
?. *Amussium siebenrocki* Sturany, 1901: 269-270, pl. 5 figs. 5-8.
?o*Amusium thetidis* Hedley, 1902: 304-305, fig. 49 (right valve); Hedley, 1906: 223, pl. 38 figs. 18-19.
?o*Ctenamusium salacon* Iredale, 1929: 164.
Amussium texturatum Dautzenberg & Bavay; Barnard, 1964: 432.

Material.— sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52,5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.046 NE coast of Sumba, E of Melolo, 9°53.5'S 120°42.7'E, Van Veen-grab, depth 74-83m, somewhat muddy fine sand with shell gravel, 13.ix.1984 (10 valves); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (17 valves); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (13 valves); sta. 4.155 off SW Salayer, 6°22.3'S 120°26'E, Van Veen grab (4x), depth 233-274m, muddy, fine, calcareous sand with sponges, ophiurids and polychaetes, 28.ix.1984 (2 valves).

Description.— The external sculpture of the left valve is rather variable, in contrast with that of the right valve, on which it is rather constant. Near the umbo sculptured with fine concentric lamellae; irregular radial costae start about 1 mm below the umbo. The concentric lamellae run over the radial costae, forming more or less pronounced squamae. Anterior auricle with some fine radiation of concentric lamellae; the posterior one is sculptured somewhat finer.

The external sculpture of the right valve bears only concentric lamellae, that are somewhat wider near the central part of the disc. Anterior auricle sculptured with some small radial costae near the byssal fasciole, and concentric lamellae, which are strongly developed near the dorsal edge. Posterior auricle with only concentric lamellae.

With seven to ten (usually nine) internal lirae. Sometimes there are a few rudimental interstitial lirae.

Left valve creamy, with milky-white dots; right valve more a uniform white.

The present material is up to 6 mm high, whereas the specimen of the 'Siboga' sta. 65 is about 10 mm high.

Distribution and ecology.— Throughout the southwestern Pacific. Unfortunately, only dead material is collected from 74-290 m depth on a muddy, or muddy sand bottom.

Remarks.— The present material is variable in sculpture (external ribbing and internal lirae), which suggest that *Parvamussium siebenrocki* from the northwestern Indian Ocean might be a senior synonym and *Parvamussium thetidis (=Parvamussium salacon)* from eastern Australia a junior synonym of *Parvamussium cristatellum*. More material from intermediate geographic areas should be collected for a better founded interpretation of the three taxa. Another similar species is *Parvamussium texturatum* (Dautzenberg & Bavay, 1912), which differs by a more prominent external sculpture of the left valve, especially with regard to the concentric lamellae; it has many more smaller internal lirae, at a lower level. *Parvamussium formosum* (Melvill in Melvill & Standen, 1907: 807) is also similar to *P. cristatellum*, but the left valve is less prominently sculptured externally and has more internal lirae with some rudimental lirae.

Hertlein (1969: N350) synonymized *Ctenamusium* with *Parvamussium*, whereas Hayami (1988: 79) mentioned both genera as synonyms of *Propeamussium*. However, *Parvamussium cristatellum* resembles conchologically *Pecten duodecimlamellatus* Bronn, type species of the genus *Parvamussium*. *Parvamussium* differs in many features from *Propeamussium* (external sculpture, auricles, byssal gape, and internal lirae).

Parvamussium pauciliratum (E.A. Smith, 1903) (figs. 33-34)

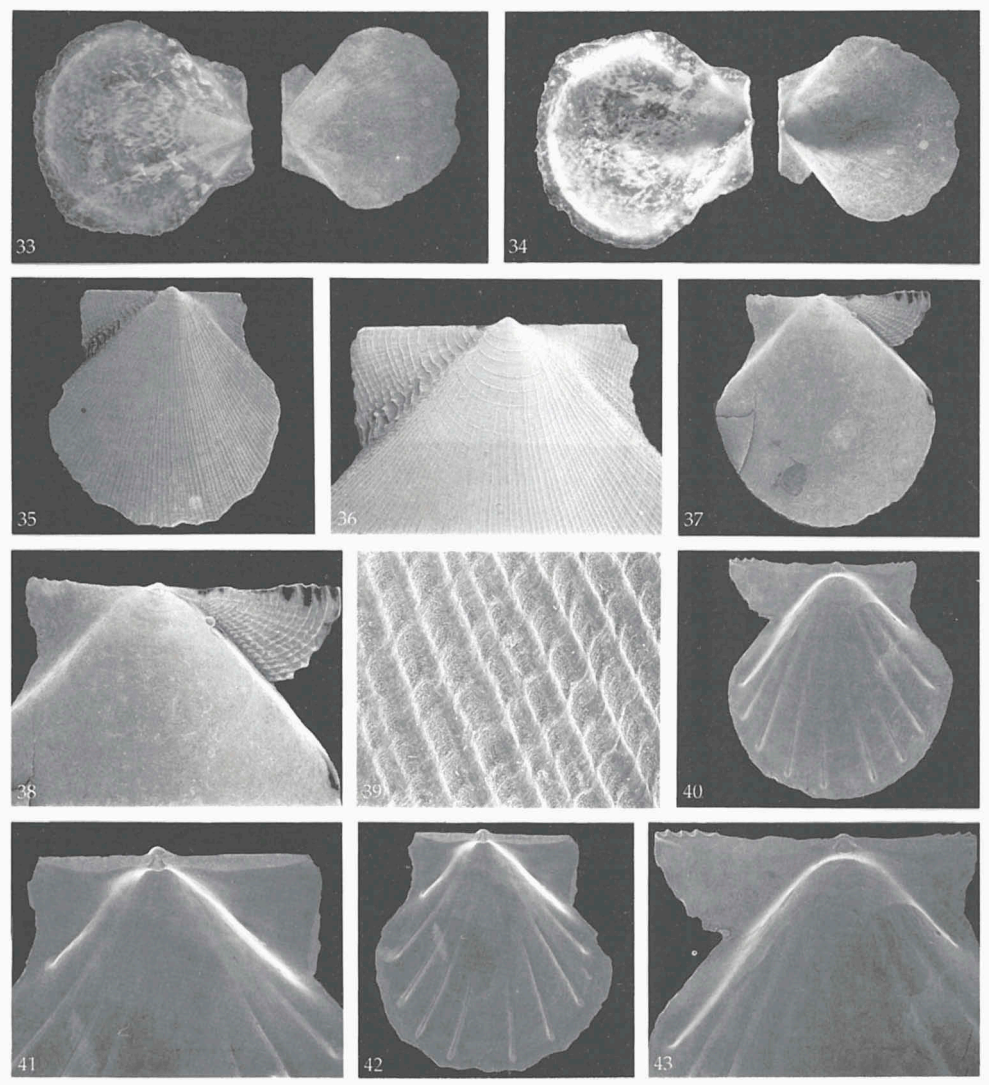
o *Amussium paucilirata* E.A. Smith, 1903: 622, pl. 36 figs. 23-24.

Material.— sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, Van Veen-grab (2x), depth 255-275 m, coral sand, 9.ix.1984 (1 valve); sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (2 valves); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.045 NE coast of Sumba, E of Melolo, 9°54.2'S 120°43'E, Van Veen-grab, depth 48-57m, coarse sand with shell gravel, some calcareous stones with epifauna, 13.ix.1984 (7 valves); sta. 4.074 E of Komodo Island, Slawi Bay, 8°35.7'S 119°30.3'E, Van Veen-grab, depth 50 m, muddy volcanic sand with few shells, 17.ix.1984 (17 valves); sta. 4.134 NE Taka Bone Rate (Tiger Isl.), SE of Tarupa Kecil, 6°31'S 121°08.2'E, lagoon entrance, Van Veen-grab (8x), depth 53-59m, foraminifera sand and calcareous gravel, scarce macrofauna, rich microfauna, 25.ix.1984 (4 valves); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large foraminifera, some calcareous stones with epizoa, 29.ix.1984 (12 valves); sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, VanVeen-grab (5x), depth 34m, rather fine coral rubble, 8.x.1984 (1 valve).

Description.— Left valve nearly flat; right valve more convex. The external surface of both translucent valves is smooth and glossy, with sometimes very fine concentric striae on the anterior auricle of the left valve. One or two rudimental internal lirae may be present at most, sometimes with very small lirae near the bases of the auricles.

Left valve mottled; with a white streak running from the umbo to the anterior margin; sometimes a uniform white. Right valve milky-white.

Distribution and ecology.— Throughout the southwestern Pacific and the north-



Figs. 33-34, *Parvamussium paucilinatum* (E.A. Smith); sta. 4.045, 33, left valve (large specimen) & right valve, exterior; 34, interior. Figs. 35-43, *Parvamussium scitulum* (E.A. Smith); sta. 4.075, 35, left valve, exterior (× 7.8); 36, left valve, exterior dorsal region (× 13.4); 37, right valve, exterior (× 7.8); 38, right valve, exterior dorsal region (× 13.4); 39, left valve, postero-marginal detail, exterior (× 85); 40, right valve, interior (× 7.8); 41, left valve, interior dorsal region (× 13.4); 42, left valve, interior (× 7.8); 43, right valve, interior dorsal region (× 13.4).

ern Indian Ocean. The present material is collected from a bathymetric range of 34-390 m (mainly from 48-70 m) depth on a sandy or muddy sand bottom with gravel or coral rubble.

Remarks.— So far only two Propeamussiidae species, viz. *Parvamussium pauciliratum* and *P. scitulum*, are collected from littoral and sublittoral depth. Most representatives of the Propeamussiidae are living much deeper. This species is a new record for the Indonesian Archipelago.

Parvamussium scitulum (E.A. Smith, 1885) (figs. 35-43)

o *Amussium scitulum* E.A. Smith, 1885: 312, pl. 23 figs. 4-4b.
?o*Amussium torresi* E.A. Smith, 1885: 311-312, pl. 23 figs. 3-3b.
. *Amusium (Propeamusium) scitulum* var.? *cmadoritinctum* Kuroda, 1931: 77, figs. 81-82.
Ctenamusium (Ctenamusium) cmadoritinctum; Oyama, 1951: 80, pl. 13 figs. 3-4.
?. *Propeamussium (Parvamussium) gracilis* Wang, 1984: 601, 603-604, pl. 1 figs. 5-1figs. 5-10, fig. 4.

Material.— sta. 4.032 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth ca. 385 m, calcareous sand, 10.ix.1984 (2 valves); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.046 NE coast of Sumba, E of Melolo, 9°53.5'S 120°42.7'E, Van Veen-grab, depth 74-83 m, somewhat muddy fine sand with shell gravel, 13.ix.1984 (many valves); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (many valves); sta. 4.074 E of Komodo Island, Slawi Bay, 8°35.7'S 119°30.3'E, Van Veen-grab, depth 50 m, muddy volcanic sand with few shells, 17.ix.1984 (2 valves); sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (many valves); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (9 valves); sta. 4.112 N of Sumbawa, Bay of Sanggar, 8°18.8'S 118°16'E, Van Veen-grab, depth 365 m, clay with some very fine shell gravel, some molluscs, 21.ix.1984 (1 valve);sta. 4.134 NE Taka Bone Rate (Tiger Isl.), SE of Tarupa Kecil, 6°31'S 121°08.2'E, lagoon entrance, Van Veen-grab (8x), depth 53-59 m, foraminifera sand and calcareous gravel, scarce macrofauna, rich microfauna, 25.ix.1984 (many valves); sta. 4.135 NE Taka Bone Rate (Tiger Isl.), E of Tarupa Kecil, 6°28.5'S 121°09.3'E, Van Veen-grab, depth 495 m, muddy, yellow, calcareous sand with Polychaeta, 25.ix.1984 (1 valve); sta. 4.153 off SWSalayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (13 valves); sta. 4.154 off SW Salayer, 6°22.4'S 120°26.2'E, Van Veen-grab, depth 175 m, muddy calcareous sand, with some fine shell gravel, 28.ix.1984 (15 valves); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large foraminifera, some calcareous stones with epizoa, 29.ix.1984 (1 valve).

Description.— Externally, the left valve bears sometimes very fine concentric striations near the umbo. Further on irregular radial striations start, which are developed to the marginal area; this sculpture may be very weak. Anterior auricle of the left valve with concentric lamellae near the disc, decreasing in prominence near the dorsal margin; posterior auricle with fine radial striations.

The external sculpture of the right valve consists of very fine, more or less obsolete concentric lamellae, which may be lacking completely.

With seven to eleven (usually nine or ten) internal lirae, sometimes with rudimental interstitial lira(e).

Left valve milky-white, with white and yellow-brown maculations; right valve

more uniformly whitish. Both valves semi-transparent. Dimension of present material up to 6 mm height.

Distribution and ecology.— Throughout the Indo-Pacific region. Present material only dead collected from a bathymetric range of 50-385 m on a muddy sand or sandy bottom with calcareous gravel or shell gravel.

Remarks.— The sculpture of *P. scitulum* is very variable and not clearly different from that of *P. torresi*, therefore, the latter taxon might be only a senior synonym. *P. cmadoritinctum* and *P. gracilis* are somewhat larger and slightly more prominently sculptured. Smith (1885: 312) already suggested, that syntypes of *P. scitulum* could be juveniles. *Parvamussium sinense*, described by Wang (1980: 259-262) is larger, especialy broader, with more pronounced scaly radial costae. *Parvamussium dautzenbergi* Dijkstra (1990: 2-3) has a more prominently cancellated sculpture on the left valve, throughout the entire surface of the disc. Perhaps *Parvamussium andamanense* (Bavay, 1904: 186-187) is also close related to *P. scitulum*, but actually type material could not be examined. Oyama (1951: 80) introduced the genus *Ctenamusium* for this species, but its conchological features are almost those of *Parvamusium*.

Parvamussium cf. **texturatum** (Dautzenberg & Bavay, 1912) (figs. 44-52)

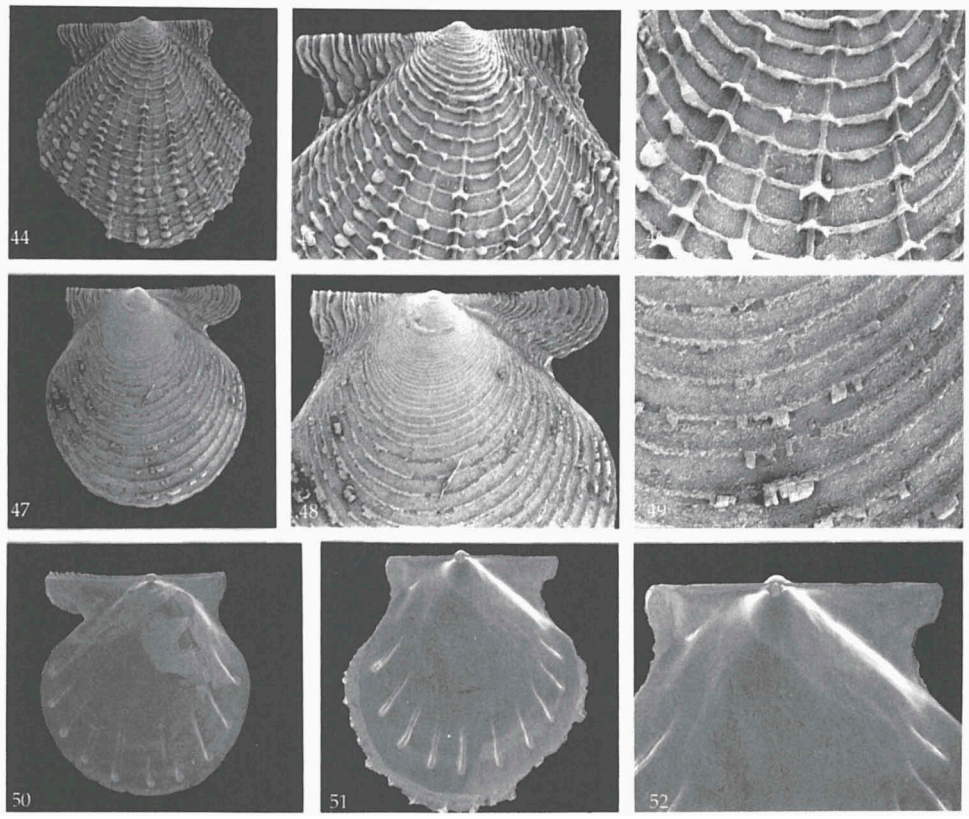
o *Amussium texturatum* Dautzenberg & Bavay, 1912: 37-38, pl. 27 figs. 19-22.

Material.— sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 live specimen); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (1 valve).

Description.— The left valve is ornamented with concentric lamellae near the umbo. Further on irregular radial costae start, which run to the margin. The concentric lamellae cross the radial ribs; they are squamiform on the costae. The concentric lamellae are somewhat close set on the anterior auricle, also fine concentric lamellae are produced on the posterior auricle. The external concentric lamellae of the right valve are coarse and widely arranged. The present material has ten internal lirae. Coloration creamy with white maculations, most clearly so on the inside of the left valve. Umbonal area somewhat more ochreous. Up to 5 mm high.

Distribution and ecology.— The present material is so far only collected from Indonesia. The bathymetric range is 100-290 m. Living on muddy sand or sandy bottom with corals or calcareous gravel.

Remarks.— The present material, described above, is very similar to the type specimen of *P. texturatum* (ZMA, holotype; not registered), although there are fewer internal lirae. The external sculpture of the type specimen is somewhat finer. Barnard (1964: 432) described *P. texturatum* from South Africa, although the conchological features of that material are more similar to *P. siebenrocki* and *P. cristatellum*. It is possible that *P. texturatum* is only a roughly sculptured variation of *P. cristatellum*, because intermediate variations are observed in material from the Indo-Pacific.



Figs. 44-52, *Parvamussium* cf. *texturatum* (Dautzenberg & Bavay); sta. 4.033, 44, left valve, exterior (× 9.5); 45, left valve, exterior dorsal region (× 17.5); 46, left valve, central detail, exterior (× 27.5); 47, right valve, exterior (× 8.7); 48, right valve, exterior dorsal region × 17.5); 49, right valve, antero-central detail, exterior (× 27.5); 50, right valve, interior (× 8.7); 51, left valve, interior (× 18.7); 52, left valve, interior dorsal region (× 9.6).

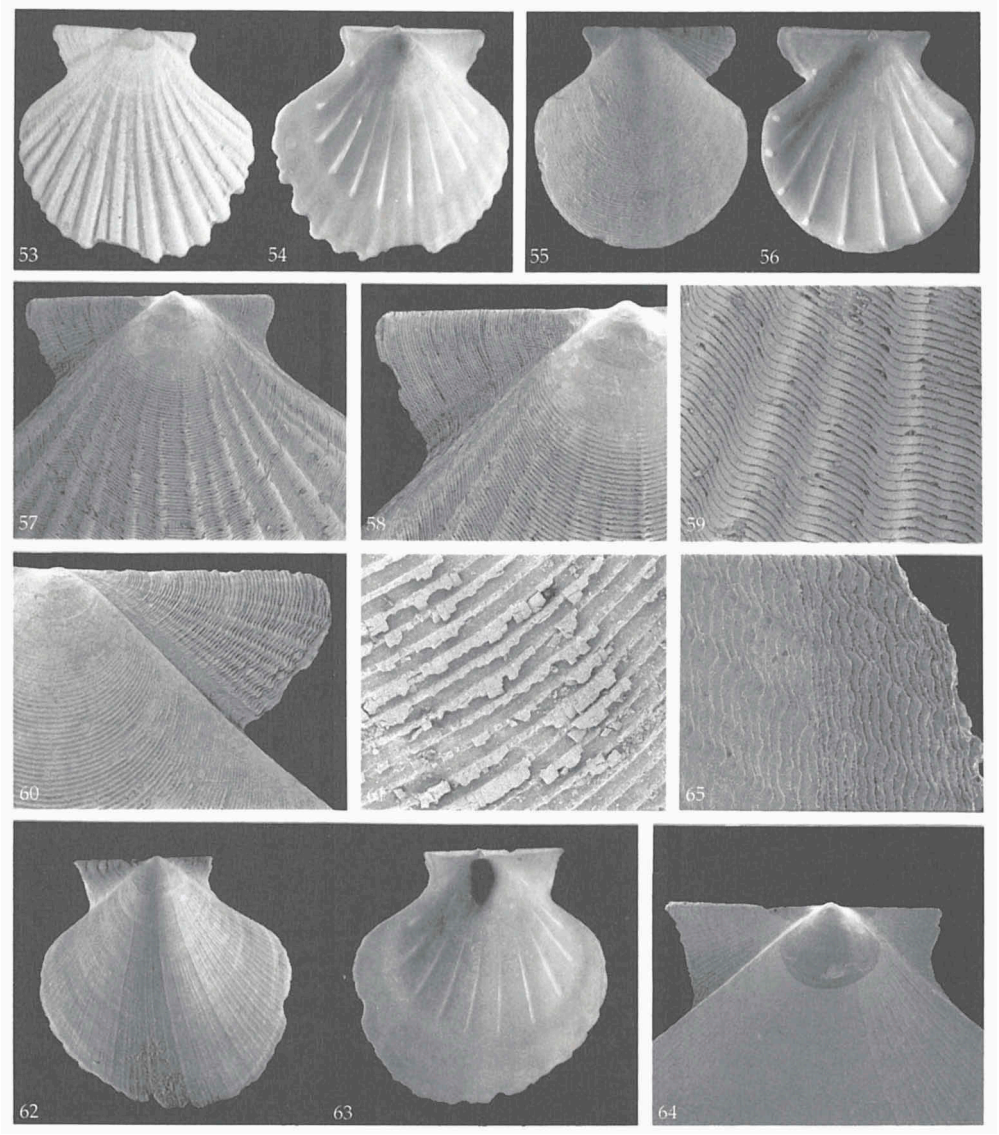
Parvamussium undosum spec. nov.
(figs. 53-61)

Material.— Holotype, sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123° 58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (left valve)(RMNH 56550);Paratypes, sta. 4.033 (right valve, additional description)(RMNH 56551); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve)(RMNH 56552); sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (1 valve)(RMNH 56553); sta. 4.032 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth ca. 385 m, calcareous sand, 10.ix.1984 (1 valve)(RMNH 56554); sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E,Van Veen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (1 valve)(RMNH 56555).

Description.— Shell small, subcircular and convex, approximately 8 mm both in height and length. Anterior and posterior auricles unequal, umbonal angle about 100°.

The external surface, to about 1 mm beneath the umbonal top, is smooth and

glossy with some microscopic scratches. Further on very fine concentric lamellae start, increasing in prominence towards the ventral margin. From about 2 mm beneath the umbo, radial costae begin as well, also increasing in number towards the ventral margin, where about 15 rounded costae are counted. The fine concentric lamellae are developed on the entire exterior shell disc. Both auricles bear also very



Figs. 53-61, *Parvamussium undosum* spec. nov.; sta. 4.033, 53, holotype, left valve, exterior (× 3.7); 54, interior (× 3.7); 55, paratype, right valve, exterior (× 3.7); 56, right valve, interior (× 3.7); 57, left valve, exterior dorsal region (× 6.3); 58, left valve, anterior auricle, exterior (× 10.7); 59, left valve, antero-central detail, exterior (× 17.5); 60, right valve, anterior auricle, exterior (× 10.7); 61, right valve, antero-marginal detail, exterior. (× 35) Figs. 62-65, *Parvamussium virgatum* spec. nov.; sta. 4.033, 62, holotype, left valve, exterior (× 3.2); 63, interior (× 3.2); 64, left valve, exterior dorsal region (× 35); 65, left valve, postero-marginal region, detail (× 6.3).

fine concentric lamellae. The ventral margin is somewhat crenulated, because of the undulated exterior radiation.

The interior surface has ten lirae, which are developed to the ventral margin of a distance of 2 mm. The lirae are regularly developed and somewhat pronounced to the end, without any rudimental interstitial lirae. Only two small lirae are visible on the marginal auricles. The hinge line is straight. The cardinal crura is rather broad and the resilial pit is triangular. A line runs parallel along the periphery of the anterior auricle and ventral margin.

The holotype is milky-white, on the inside glossy and semi-transparent.

Dimensions: height 8.2 mm, length 8.4 mm.

Additional description.— Exterior surface of the entire shell disc with fine concentric lamellae, which are somewhat wider arranged near the ventral margin than elsewhere. The anterior auricle bears about nine small radial costae, and overrunning fine concentric lamellae. Only fine concentric lamellae are present on the posterior auricle.

On the interior surface there are ten lirae which nearly reach to the ventral margin, and are somewhat tubercle-like at the end. Two small lirae are visible near the marginal auricles. The byssal notch is small and no ctenolium is present on the suture.

The right valve is dirty white, and opaque.

Dimensions: height and length 7.9 mm.

Etymology.— The exterior surface of the holotype has an undulated appearance.

Differentiation.— The most similar species is *Parvamussium carbaseum*, which is also found at the type locality. *P. carbaseum* has more radial costae and internal lirae. On the radial costae of *P. carbaseum* there are small tubercles, which are absent in *P. undosum*. The sculpture on the auricles of *P. carbaseum* is more pronounced.

Parvamussium virgatum spec. nov.
(figs. 62-65)

Material.— Holotype, sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (left valve)(RMNH 56556); Paratypes, sta. 4.033 (2 valves)(RMNH 56557); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve)(RMNH 56558);sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (1 valve)(RMNH 56559).

Description.— Shell small, convex and subcircular, approximately 10 mm both in height and length. Anterior and posterior auricles unequal, umbonal angle about 110°.

The white exterior surface, down to 2 mm beneath the umbo, is smooth and glossy, with microscopic scratches and growth-lines. The central part of the shell-disc is dull dirty white and provided with some irregular very fine radial lines, which are more coarse near the posterior margin. Near the ventral margin microscopic concentric lamellae are present. The anterior and posterior auricles also bear very fine concentric lamellae, which are most prominent near the dorsal margin.

The white, opaque and glossy interior surface has ten lirae, which are developed to nearly 3 mm from the ventral margin. A small lira is visible on each border of the auricles. The hinge line is straight. The cardinal crura is rather broad and the resilial pit triangular.

Dimensions: height and length 10.5 mm.

Etymology.— The exterior surface of the holotype is irregularly fine radially striped.

Differentiation.— The most closely related species is *Parvamussium formosum* (Melvill in Melvill & Standen, 1907) from the Gulf of Oman. *P. formosum* differs from *P. virgatum* by (1) the more prominent irregular radial lines near the anterior and posterior margins, (2) the auricles, that are more clearly radiated with very small costae, (3) microscopic lamellae near the ventral margin, (4) the presence of some rudimental lirae, (5) the absence of the smaller cardinal crura and (6) the semitransparent shell.

Remarks.— Unfortunately no live material is found and right valves could not be traced with certainty. Juveniles cannot be distinguished with certainty from *P. scitulum*.

Genus **Cyclopecten** Verrill, 1897

Type species: *Pecten pustulosus* Verrill, 1873.

Cyclopecten cancellus spec. nov.
(figs. 66-70)

Material.— Holotype, sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (left valve) (RMNH 56560); Paratypes, sta. 4.153 (8 valves) (RMNH 56561); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve) (RMNH 56562); sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, Van Veen-grab (2x), depth 255-275 m, coral sand, 9.ix.1984 (1 valve) (RMNH 56563); sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (1 valve) (RMNH 56564); sta. 4.136 NE Taka Bone Rate (Tiger Isl.), NE of Tarupa Kecil, 6°28.3'S 121°09'E, Van Veen-grab, depth 375 m, muddy calcareous sand with some coral stones, scarce macrofauna, 25.ix.1984 (1 valve) (RMNH 56565); sta. 4.154 off SW Salayer, 6°22.4'S 120°26.2'E, Van Veen-grab, depth 175 m, muddy calcareous sand, with some fine shell gravel, 28.ix.1984 (2 valves) (RMNH 56566).

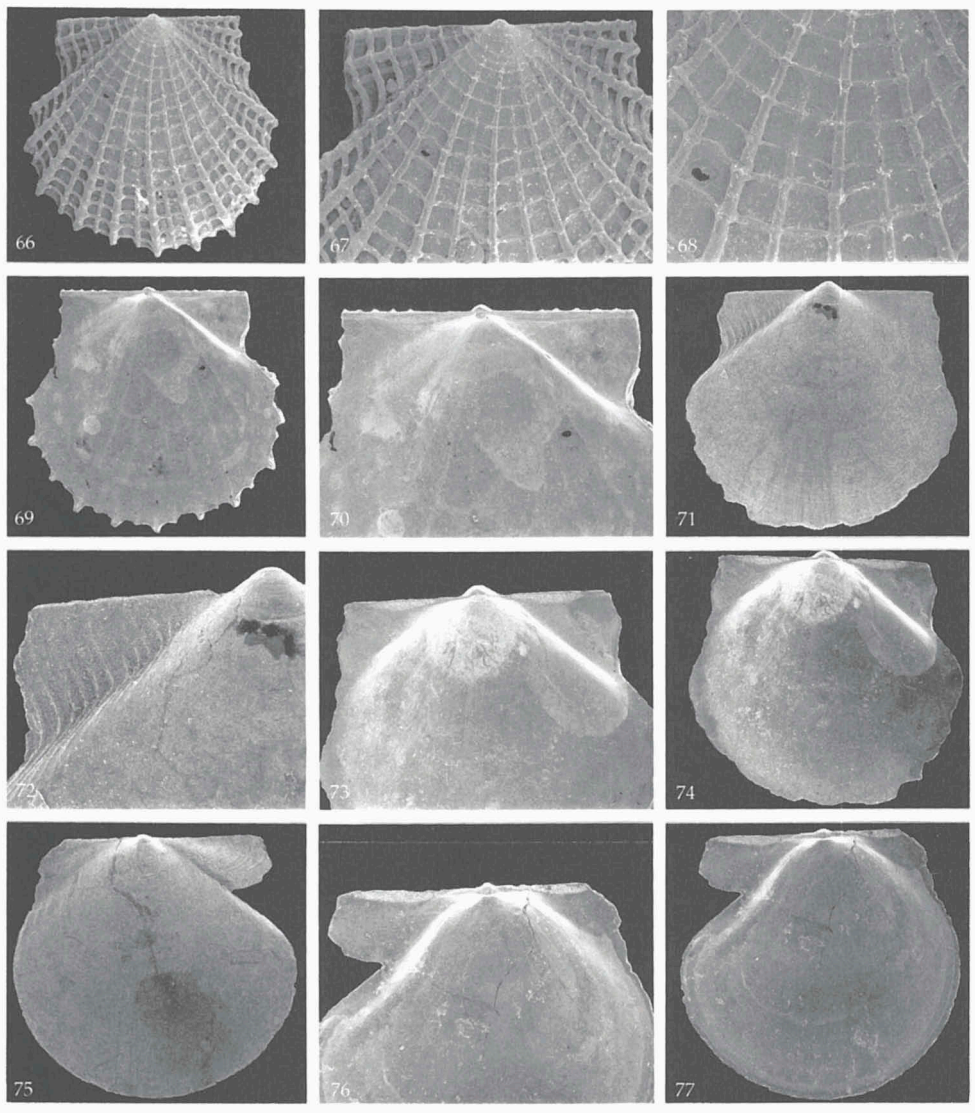
Description.— Shell very small, nearly equilateral, convex, opaque, strongly cancellated; approximately 3 mm in height and length. Anterior and posterior auricles subequal, umbonal angle about 100°.

The umbonal region, till 0.5 mm from the umbo, is smooth and ornamented with a few concentric striae and microscopic radial scratches. After that, about ten primary radial costae and concentric costae start, which are strongly developed towards the ventral margin. Nine secondary radial riblets are present between the primary ones near the ventral marginal region. The concentric costae are slightly weaker than the radial riblets. The entire shell-disc has a cancellated sculpture with scaly intersections. The anterior auricle bears two radial costae with strongly developed crossing concentric costae. The posterior auricle gradually passes into the shell disc and has about the same sculpture as the anterior one.

The exterior sculpture is visible on the inside. The hinge line is straight and the cardinal crura is rather broad. The resilial pit is triangular. No lirae are seen on the interior surface. The ventral margin is somewhat denticulated.

The shell is dirty white to creamy, with some white spots on the inside.

Dimensions: height 3.5 mm, length 3.9 mm.



Figs. 66-70, *Cyclopecten cancellus* spec. nov.; sta. 4.153, 66, holotype, left valve, exterior (× 9.4); 67, left valve, exterior dorsal region (× 15); 68, left valve, dorso-central detail, exterior (× 30); 69, left valve, interior (× 9.4); 70, left valve, interior dorsal region (× 10). Figs. 71-77, *Similipecten eous* (Melvill in Melvill & Standen); sta. 4.046, 71, left valve, exterior (× 16.6); 72, left valve, anterior auricle, exterior (× 39); 73, left valve, interior dorsal region (× 21.1); 74, left valve, interior (× 16.6); 75, right valve, exterior (× 19.2); 76, right valve, interior dorsal region (× 24.5); 77, right valve, interior (× 19.2).

Etymology.— The exterior surface of the holotype is strongly cancellated.

Differentiation.— The most closely related species is *Cyclopecten secundus* (Finlay, 1926) from off North Cape (New Zealand), which differs by the presence of more primary and secondary radial costae and rudimental radial riblets; it has tubercles on the intersections. This species has the same outline and dimensions as *C. cancellus*.

Finlay (1926: 453) placed *C. secundus* in a new genus *Cyclochlamys*. *Cyclochlamys* is considered a junior synonym of *Cyclopecten* here.

Genus **Similipecten** Winckworth, 1932

Type species: *Pecten similis* Laskey, 1811.

Similipecten eous (Melvill in Melvill & Standen, 1907) (figs. 71-77)

o *Pecten eous* Melvill in Melvill & Standen, 1907: 808, pl. 55 fig. 9.

Material.— sta. 4.046 NE coast of Sumba, E of Melolo, 9°53.5'S 120°42.7'E, Van Veen-grab, depth 74-83m, somewhat muddy fine sand with shell gravel, 13.ix.1984 (3 valves); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (3 valves); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large foraminifera, some calcareous stones with epizoa, 29.ix 1984 (1 valve).

Description.— Shell small and semi-circular. Right valve more convex than left one. The external surface of the left valve is very smooth, with at most microscopic concentric lirae near the ventral margin. The anterior auricle bears several fine concentric lamellae; the posterior one has no sculpture.

The external surface of the right valve is smooth with only a microscopic granular structure. The anterior auricle bears fine concentric lamellae; the posterior one is smooth.

No internal lirae are present and no ctenolium is visible on the suture of the right valve. The byssal notch is small.

The shells are milky-white with some white spots and/or streaks, and semi-transparent. They are up to 3 mm high.

Distribution and ecology.— So far only known from the northwestern Indian Ocean and Indonesia. Collected material from a bathymetric range of 70-155 m, on a calcareous or muddy sand bottom with gravel.

Remarks.— This is a new record for Indonesia. The specimens are very similar to the type material from the Gulf of Oman (BM(NH) 1907.5.3.18-20, syntypes; NMW 1955.158.673, syntypes). *Similipecten eous* is most closely related to the E.Atlantic *Similipecten similis* (Laskey, 1811).

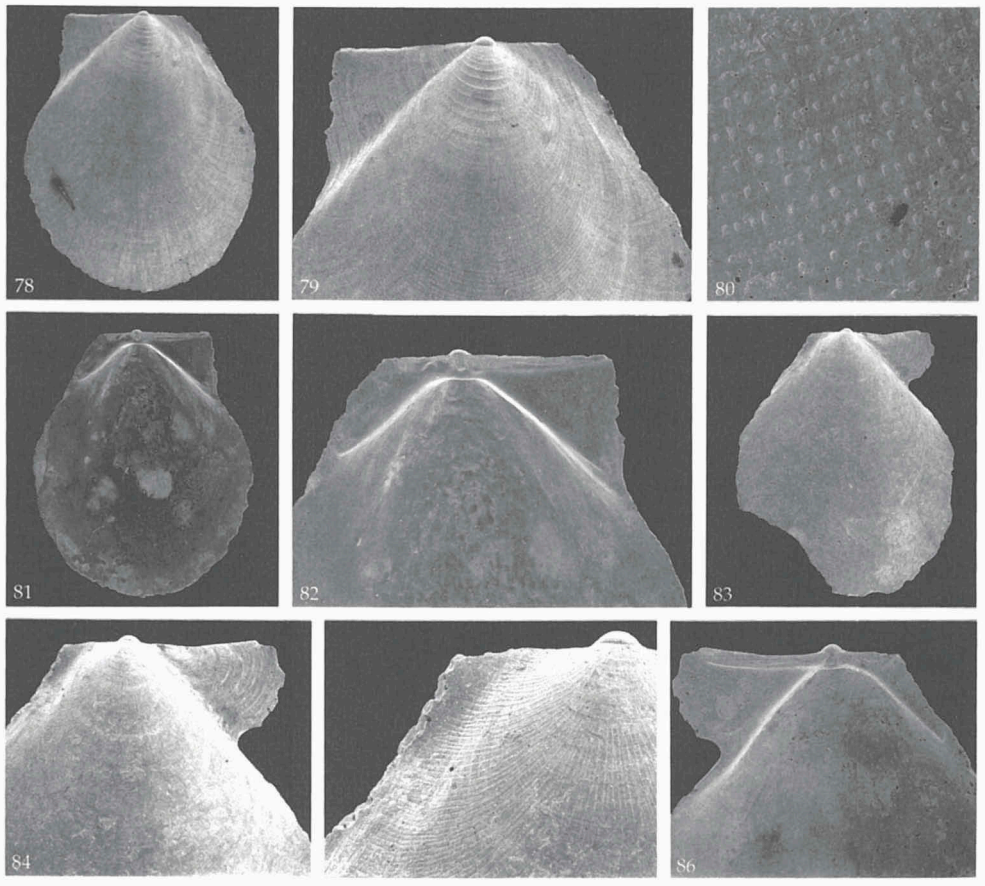
Hertlein (1969: N354) placed *Similipecten* in the *Eburneopecten* group of Pectinidae, as a synonym of *Palliolum* (*Delectopecten*) Stewart, 1930, whereas Waller (1984: 213) treated *S. similis* as a representative of Propeamussiidae.

Family **Entoliidae** Von Teppner, 1922 = **Syncyclonemidae** Waller, 1978
Genus **Pectinella** Verrill, 1897

Type species: *Pecten* (*Pseudamusium*) *sigsbeei* Dall, 1886.

Pectinella aequoris spec. nov. (figs. 78-86)

Material.— Holotype, sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals,



Figs. 78-86, *Pectinella aequoris* spec. nov. holotype, sta. 4.111; 78, left valve, exterior (× 9.1); 79, left valve, exterior dorsal region (× 17.4); 80, left valve, postero-central detail, exterior (× 90); 81, left valve, interior (× 8.7); 82, left valve, interior dorsal region (× 17.4); 83, paratype, right valve, exterior (× 8.4); 84, right valve, exterior dorsal region (× 14.9); 85, right valve, postero-dorsal region, exterior (× 38); 86, right valve, interior dorsal region (× 15).

21.ix.1984 (left valve) (RMNH 56567); Paratypes, sta. 4.111 (right valve, additional description, figured) (RMNH 56568); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (3 valves) (RMNH 56569).
Other material studied.— Hawaiian Islands, Oahu, off Pokai Bay, dredged, 240-300 m, sandy bottom, xi.1985 (1 specimen, live, coll. Jazwinski) (Dijkstra coll.); Hawaiian Islands, Oahu, off Pokai Bay, dredged, 210 m, in silt and pebbles, vii.1986 (left valve, coll. Jazwinski) (Dijkstra coll.); Fiji Islands, Viti Levu, off Yanuca Island, dredged, 33 m, at base of ledge in sediment, 20.i.1986 (2 right valves, coll. Jazwinski) (Dijkstra coll.).

Description.— Shell small, convex, elongate, nearly smooth, opaque; approximately 4 mm in height. Anterior and posterior auricles very unequal, umbonal angle about 90°.

Near the umbonal top the prodissoconch stage and borderline is clearly visible at a magnification of 60 × . Very fine concentric striae increase in prominence towards the ventral margin, with microscopic, radially diverging scratches on the entire shell-disc. The anterior auricle bears several concentric lirae; the posterior one gradually

passes into the shell-disc and has very small concentric striae.

The internal surface is glossy, and microscopically granulated. Near the border of each auricle one liral tooth (auricular crura) is developed. The hinge line is nearly straight, and the resilial pit elongated-triangular. The cardinal crura is rather broad near the pit on the anterodorsal region; a narrow groove runs from the pit to the anterior margin. There is a prominent tooth near the pit on the posterodorsal region; here the groove is smaller and broader than on the anterodorsal part.

Shells creamy-white, with a few white and creamy spots.

Dimensions: height 4.1 mm, length 3.5 mm.

Additional description of right valve (sta. 4.111).— The external surface of the shell-disc has nearly the same microscopic structural features as the holotype; it is also very convex, elongated and smooth. A liral tooth on each border of the auricles is seen on the internal side of the shell. The anterodorsal region of the auricle bears also a straight narrow groove and the hinge line is rised. On the posterodorsal side there is a small basin; the hinge line is straight. The byssal notch is well developed, and neither a ctenolium, nor a pseudo-ctenolium is present.

Etymology.— The external surface of the holotype is smooth and glossy.

Distribution.— So far only known from Indonesia, the Fiji Islands, and the Hawaiian Islands.

Differentiation.— The most similar species is *Pectinella sigsbeei* (Dall, 1886) from off Havana, Cuba. The microsculpture of *P. sigsbeei* is somewhat more prominent and Waller (1984: 212) observed 'a weak fasciolar pseudoctenolium' on *P. sigsbeei*, which is absent in *P. aequoris*. Shells from the Hawaii Islands and the Fiji Islands are larger and more colourful on the left valve, but otherwise similar. It is possible, that the type material is semi-adult (MCZ 7817, holotype).

Remarks.— Waller (1978: 353) described a new family Syncyclonemidae, and determined that *Pectinella* Verrill, 1897 (type species: *Pecten* (*Pseudamusium*) *sigsbeei* Dall) is only a junior synonym of *Syncyclonema* Meek, 1864. However, in an additional note in the same publication the Syncyclonemidae are considered Entoliidae and *Pectinella* becomes an extant genus in this family, instead of a synonym of *Syncyclonema*.

Family **Pectinidae** Rafinesque, 1815 (emend. Waller, 1978)
Genus **Amusium** Röding, 1798

Type species: *Amusium pleuronectes* Röding, 1798; = *Ostrea pleuronectes* Linnaeus, 1758.

Amusium balloti (Bernardi, 1861)

o *Pecten balloti* Bernardi, 1861: 46-48, pl. 1 fig. 1.
Amusium japonicum balloti; Habe, 1964: 4-5, pl. 1 fig. 5; pl. 2 fig. 6.
Amusium balloti; Dijkstra, 1988: 3-4, illustr.

Material.— sta. 4.063 NE coast of Sumba, E of Melolo, 9°54'S 120°45'E, rectangular dredge, depth 145-155 m, shells, scarce epifauna, 15.ix.1984 (1 left valve).

Distribution and ecology.— This is a new record for the Indonesian Archipelago. The species is also known from the Australian and New Caledonian region, mostly living in shallow waters on sandy or muddy bottoms with seaweeds.

Remarks.— The present single specimen is somewhat paler than Australian and New Caledonian material and has about 34 internal lirae, which are seperated by equal intervals. The internal lirae on the anterior and posterior margins are very weak.

Habe (1964: 4-5) treated *A. balloti* as a subspecies of *A. japonicum*, but specimens representing the latter taxon, are more uniformly dark-red, instead of pale-brown or red-brown, concentric coloured on the left valve, and have more internal lirae (about 40). Intermediate specimens are unknown.

Genus **Delectopecten** Stewart, 1930

Type species: *Pecten (Pseudamusium) vancouverensis* Whiteaves, 1893.

Delectopecten alcocki (E.A. Smith, 1904)
(fig. 87)

o *Pecten alcocki* E.A. Smith, 1904: 13; Alcock, Annandale & McGilchrist, 1907: pl. 18 figs. 4,4a-b.; Knudsen, 1967: 282-284, fig. 19, pl. 2 figs. 3-4.
Delectopecten alcocki; Poutiers, 1981: 331, pl. 1 fig. 1.

Material.— sta. 4.039 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°57.7'E, rectangular dredge, depth ca. 525 m, small number of sponges, 10.ix.1984 (1 specimen, dead).

Distribution and ecology.— Throughout the (south)western Pacific and the Indian Ocean. Living on muddy or sandy sand bottoms and often byssally attached to silicious sponges. Bathymetric range from sublittoral to bathyal depth.

Remarks.— The present specimen corresponds very well with the type material of *D. alcocki* from off South India, although no radial scratches are observed on the external surface of the valves (mentioned by Smith, 1904) (ZSI M669/1, holotype; M667-668, 670-698/1, paratypes).

Delectopecten musorstomi Poutiers, 1981

o *Delectopecten musorstomi* Poutiers, 1981: 331-332, pl. 1 figs. 2-3.

Material.— sta. 4.017 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.8'S 123°46.5'E, Van Veen-grab, depth 365 m, fine shell gravel, 9.ix.1984 (1 valve); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2×), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve); sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, Van Veen-grab (2x),depth 255-275 m, coral sand, 9.ix.1984 (1 valve); sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (1 valve); sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab,depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (1 valve); sta. 4.135 NE Taka Bone Rate (Tiger Isl.), E of Tarupa Kecil, 6°28.5'S 121°09.3'E, Van Veen-grab, depth 495 m, muddy, yellow, calcareous sand with Polychaeta, 25.ix.1984 (2 valves); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (7 valves); sta. 4.154 off SW Salayer, 6°22.4'S 120°26.2'E, Van Veen-grab, depth 175 m, muddy calcareous sand, with some fine shell gravel, 28.ix.1984 (4 valves).

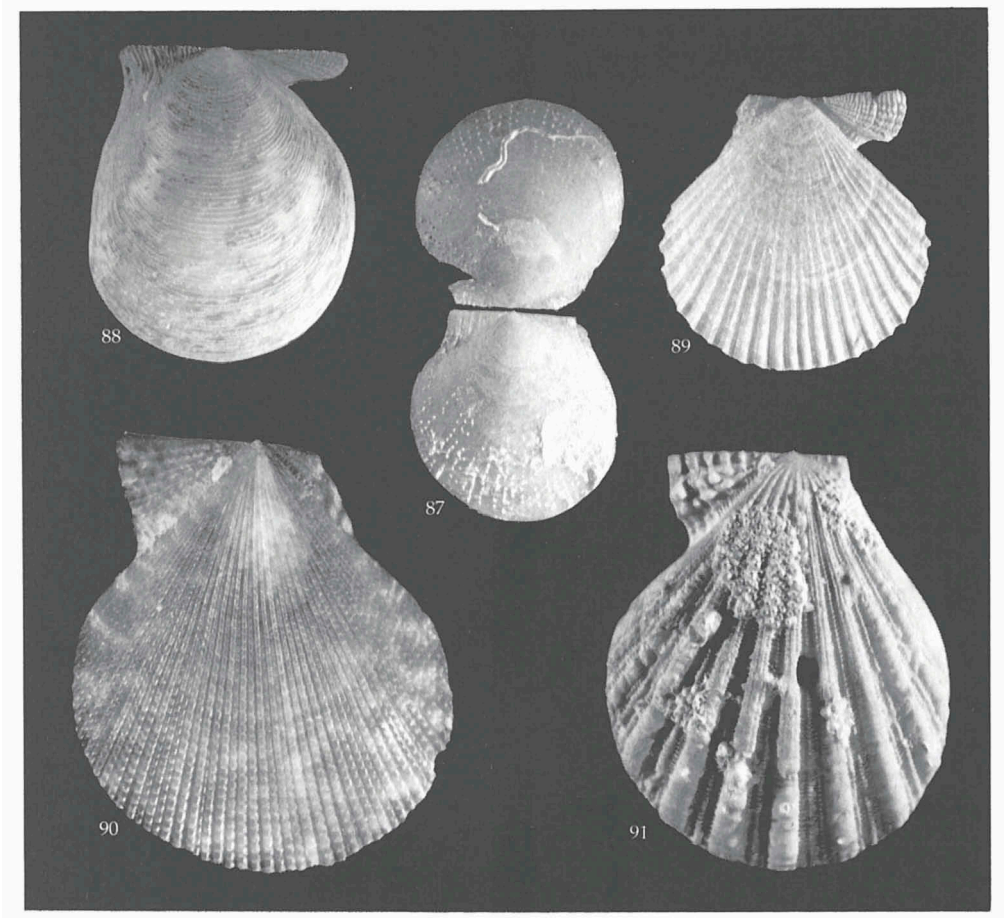


Fig. 87, *Delectopecten alcocki* (E.A. Smith); sta. 4.039, complete specimen, exterior (× 1.7). Fig. 88, *Hyalopecten tydemani* Dijkstra; sta. 4.164, right valve, exterior (× 4.2). Fig. 89, *Chlamys allorenti* Dijkstra; sta. 4.033, right valve, exterior (× 5.1). Fig. 90, *Chlamys andamanica* Preston; sta. 4.181, left valve, exterior (× 3.7). Fig. 91, *Glorichlamys elegantissima* (Deshayes); sta. 4.153, left valve, exterior (× 3.7).

Distribution and ecology.— So far only known from the Philippines and Indonesia, living on muddy sand or sandy bottoms, with gravel or sediments, from sublittoral to bathyal depth.

Remarks.— The present specimens are somewhat smaller than the type specimen, but otherwise very similar (MNHN, holotype; not registered). The diverging scratches ('*Camptonectes*' structure) are present on both valves; these are absent in *D. alcocki*. The latter species is also larger.

Genus **Hyalopecten** Verrill, 1897

Type species: *Hyalopecten undatus* Verrill, 1897; = *Pecten undatus* Verrill & S. Smith in Verrill, 1885 (non *Pecten undatus* Defrance, 1825).

Hyalopecten tydemani Dijkstra, 1990
(fig. 88)

o *Hyalopecten tydemani* Dijkstra, 1990: 7, pl. 2 fig. 13.

Material.— sta. 4.164 off SW Salayer, 6°24'S 120°20.5'E, 3.5 m Agassiz-trawl, depth 800-950 m, muddy bottom with tunicates, sponges, echinoderms and crustaceans, 29.ix.1984 (1 right valve).

Distribution and ecology.— So far only known from Indonesia, where it has been collected dead from muddy bottoms at a bathymetric range of 800-950 m .

Additional description.— Shell small, approximately 10 mm in height, strongly convex and elongate. Anterior and posterior auricles subequal, umbonal angle about 90°.

The external surface of the valve is provided with strongly developed concentric lamellae. The anterior auricle also bears an obsolete radial striation. The hinge line is straight, and finely spinous. The byssal notch is rather deep; a few teeth (ctenolium) are developed on the suture, visible only on the inside of the shell. The suture overlaps the ctenolium.

The shell is dirty white and opaque.

Remarks.— The present specimen is the first collected right valve of *H. tydemani*, which is similar to the holotype in proportion and sculpture (ZMA 3.89.009, holotype).

A closely related species is *H. strigillatus* (Dall, 1889), known from the western Atlantic, which is somewhat more prominently sculptured with concentric lamellae, and less elongated.

Genus **Chlamys** Röding, 1798

Type species: *Pecten islandicus* Müller, 1776.

Chlamys allorenti Dijkstra, 1988
(fig. 89)

o *Chlamys allorenti* Dijkstra, 1988: 19-21, illustr.

Material.— sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (2 valves).

Distribution and ecology.— This concerns a new record for Indonesia. The species is also known from off Reunion (type locality). Material collected on a sandy bottom with gravel, coral rubble or sediments; at littoral to sublittoral depth.

Remarks.— The present material corresponds in all features including colouration with the type material from off Reunion (MNHN, holotype and paratypes; not registered). A closely related species is *Chlamys kauaiensis* Dall, Bartsch & Rehder, 1938, from the Hawaiian Islands; its sculpture is more obsolete.

Chlamys andamanica Preston, 1908
(fig. 90)

o *Chlamys andamanicus* Preston, 1908: 204, pl. 14 fig. 19.
o *Pecten perfectus* Melvill, 1909: 127, pl. 5 fig. 15.
Chlamys perfecta; Dijkstra, 1986: 9, illustr.

Material.— sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34 m, rather fine coral rubble, 8.x.1984 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific, as well as from the northern and western Indian Ocean, including the Red Sea. The species has not been reported from Indonesia before. Shell collected on a sandy bottom with coral rubble or sediments, at littoral depth.

Remarks.— The present specimen corresponds very well with the type specimens of both *C. andamanica* (ZSI, M4042/1, holotype) and *C. perfecta* (BM(NH), 1910.3.17.22, holotype). The radial costae vary in number, but are always regularly narrowly spaced. In the closely related species *Chlamys irregularis* (Sowerby II, 1842), the radiation is more irregular, with less costae. Another similar species is *Chlamys deliciosa* (Iredale, 1939), which is more elongated, with a smaller umbonal angle and some more regularly close set costae. *Chlamys aliae* Dijkstra, 1988, from the Philippines is similar, but larger, more convex, and with many finer, narrowly spaced costae on both valves. Juveniles of *Chlamys mollita* (Reeve, 1853) could be confused with *C. andamanica*, but the former species has a sculpture of microscopic radial costae and is somewhat more roundish in shape.

Chlamys cloacata (Reeve, 1853)

o *Pecten rugosus* Sowerby II (non Lamarck, 1819), 1842: 66, pl. 19 fig. 226.
o *Pecten cloacatus* Reeve, 1853: spec.166, pl. 34 fig. 166.
o *Pecten valdecostatus* Melvill, 1888: 281, pl. 2 fig. 10. **Syn.nov.**
Pecten (*Chlamys*) *pelseneeri* Dautzenberg & Bavay, 1912: 8. Nomen novum for *P. rugosus* Sowerby II, 1842, not Lamarck, 1819.
?o*Mimachlamys curtisiana* Iredale, 1939: 351, pl. 5 figs. 19-19a.
Chlamys asperulata pelseneeri Dautzenberg & Bavay; Kira, 1962: 137, pl. 49 fig. 11.
Chlamys asperulata; Abbott & Dance, 1982: 313, illustr.
Chlamys (*Mimachlamys*) *valdecostatus*; Wang, 1983: 50-51, pl. 1 fig. 7.
Chlamys (*Mimachlamys*) *asperulata*; Wang, 1983: 51, pl. 1 fig. 3.

Material.— sta. 4.222 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°31.5'S 121°08'E, rectangular dredge, depth 58 m, sandy bottom with gorgonians, antipatharians, sponges, 14.x.1984 (1 live specimen); sta. 4.231 NE Taka Bone Rate (Tiger Isl.), SW of Pulau Tarupa Kecil, 6°31.3'S 121°06.5'E, 1.2 m Agassiz-trawl, sandy bottom with spatangoid echinoderms, 16.x.1984 (1 live specimen); sta. 21 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, beach collected, 15.xi.1985 (1 valve); sta. 30 Sulawesi, Gugusan Spermonde, Pulau Bone Tambung, S-side, 17.vi.1986 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific, on sandy bottoms at littoral depth.

Remarks.— The present material corresponds very well with the type specimens of *Pecten cloacatus* (BM(NH) holotype and paratype; not registered). *Pecten rugosus* is

a senior synonym, but this name was preoccupied. Dautzenberg & Bavay (1912: 8), while introducing the nomen novum *P. pelseneeri*, overlooked *P. valdecostatus* and its senior synonym *C. cloacata*. Abbott & Dance (1982: 313) synonymized *C. asperulata* with *C. pelseneeri*, but the type specimen is not identical with those of *C. cloacata*. The specimen figured by Reeve (1853: pl. 26 fig. 109) is not similar to *P. asperulatus* and resembles in sculpture more *Chlamys dieffenbachi* (Reeve, 1853), a species from New Zealand. Perhaps *Pecten jickelii* Dunker, 1882 (nom. nov. for *Pecten trifidus* Dunker, 1877) is a junior synonym of *C. asperulata*, but unfortunately syntypes could not be traced in the Loebbecke collection, in the Loebbecke Museum & Aquarium at Düsseldorf; the description is not sufficient for recognition. A closely related species, *C. curtisiana* (Iredale, 1939) from eastern Australia developes secondary radial riblets in fully adult shells, but small specimens correspond very well with equally sized *C. cloacata*. Perhaps these taxa are not separate species.

Chlamys deliciosa (Iredale, 1939)

o *Mimachlamys deliciosa* Iredale, 1939: 350-351, pl. 5 figs. 22-22a.
. *Chlamys* (*Chlamys*) *princessae* Kuroda & Habe in Kuroda, Habe & Oyama, 1971: 364, pl. 79 figs. 16-17.

Material.— sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (5 valves); sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (2 valves);sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, VanVeen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (3 valves); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (1 specimen & 7 valves); sta. 4.080 E of Komodo Island, Selat Linta, 8°34.1'S 119°36.3'E, Van Veen-grab, depth 135 m, coarse sand, shell gravel, few living animals, 18.ix.1984 (1 valve); sta. 4.100 E of Komodo Island, 8°28.6'S 119°37.3'E, rectangular dredge, depth 91 m, calcareous stones and nodules, with sponges and soft corals, 19.ix.1984 (1 live specimen); sta. 4.106 NE of Komodo Island, 8°26.9'S 119°37.9'E, rectangular dredge, depth 80 m, calcareous stones and nodules with Porifera, Bryozoa, etc., 20.iv.1984 (1 live specimen); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (1 valve); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (1 valve); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large Foraminifera, some calcareous stones with Epizoa, 29.x.1984 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific, on sandy or muddy sand bottoms with calcareous stones, gravel or sediments at littoral to sublittoral depth. The present material is collected from a bathymetric range of 70-390 m.

Remarks.— The specimens correspond very well with the type specimens of *M. deliciosa*. Kuroda, Habe & Oyama (1971) overlooked this species, while describing *C. princessae*, which is very similar conchologically, although the figured type specimens are somewhat more circular; however, intermediate forms are also observed. A closely allied species is *C. andamanica* Preston, 1908, which is less convex, with a larger umbonal angle, and more regular, radial small costae on both valves; this species occurs in shallower waters. Maybe *C. deliciosa* is only a bathymetric form of *C. andamanica*.

Iredale (1939: 350) placed *C. deliciosa* in *Mimachlamys*, but the morphological characters correspond better with those of *Chlamys*.

Chlamys gladysiae Melvill, 1888

o *Pecten gladysiae* Melvill, 1888: 279, pl. 2 fig. 5.
o *Chlamys elsae* Wagner, 1988: 37-39, 6 figs. **Syn. nov.**

Material.— sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, Van Veen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (1 valve).

Distribution and ecology.— The species is a new record for Indonesia. So far known from the Philippines and Indonesia, living on sand bottoms with coral rubble, gravel or sediments at sublittoral depth.

Remarks.— The present specimen corresponds in all conchological aspects with the type material of *P. gladysiae* (NMW 1955.158.10, holotype) and *C. elsae* (ZMA 3.88.030, holotype; HPW 1313, paratypes).

Wagner (1988: 39) provisionally placed the species in *Coralichlamys* Iredale, 1939.

Chlamys irregularis (Sowerby II, 1842)

o *Pecten irregularis* Sowerby II, 1842: 69-70, pl. 13 figs. 51-52; Reeve, 1852: spec. 19, pl. 4 figs. 19a-b.
o *Pecten cuneatus* Reeve, 1853: spec. 94, pl. 24 figs. 94a, 95.
Pecten (Chlamys) irregularis; Dautzenberg & Bavay, 1912: 13.
. *Chlamys cookei* Dall, Bartsch & Rehder, 1938: 90-92, pl. 24 figs. 1-4.
Chlamys irregularis; Masuda, 1962: 171, pl. 24 figs. 2-3; Kay, 1979: 525, figs. 168B-C.
. *Chlamys midwayensis* Habe & Okutani, 1968: 50-51, pl. 3 figs. 2-3.
Chlamys spec. cf. *irregularis*; Waller, 1972: 238,239, pl. 2 figs. 34-35, fig. 3.

Material.— sta. 14 Sulawesi, Gugusan Spermonde, Pulau Lanyukang, S-side, 28.vii.1985 (1 valve); sta. 24 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, 24.iii.1986 (1 live specimen).

Distribution and ecology.— Throughout the western, southwestern and central Pacific; living in shallow waters, byssally attached to corals, on sandy bottoms.

Remarks.— The present material from Sulawesi is similar to the type specimen of *P. irregularis* Sowerby (BM(NH) 1950.11.14.39, holotype), although it is somewhat more variable in the number of the radial costae.

Wagner (1982: 86) synonymized *Chlamys limatula* (Reeve, 1853) with *C. irregularis*, but the former species is finer in radiation, and more similar to *Chlamys marshallensis* Waller, 1972.

Chlamys squamosa (Gmelin, 1791)

Pectinibus inequaliter Lister, 1687: tab.184 spec.21. Invalid publication.
o *Ostrea squamosa* Gmelin, 1791: 3319, no.17.
o *Ostrea anonyma* Gmelin, 1791: 3329, no.73.
o *Pecten hybridus* Lamarck (non Gmelin), 1819: 177-178, no.56.
o *Pecten serratus* Sowerby II (non Nilsson); Reeve, 1852: spec. 46, pl. 12 figs. 46a-b.
Pecten dissimilis Montrouzier in Fischer (non Fleming), 1858: 341 (pro parte).
o *Mimachlamys grossiana* Iredale, 1939: 352-353, pl. 5 figs. 23-23a.
Pecten (Chlamys) squamosa; Wilkins, 1953: 14-15, pl. 5 figs. 16-18.
Chlamys squamosa; Waller, 1972: 237-239, fig. 3, pl. 3 figs. 38-41; Dijkstra, 1984: 16-17, illustr.

Material.— sta. 4.071 E of Komodo Island, Slawi Bay, 8°34.5'S 119°31.3'E, sublittoral near eastern shore, 17.ix.1984 (1 specimen, dead); sta. 4.079 E of Komodo Island, Selat Linta, 8°35'S 119°34.2'E, snorkeling, scuba-diving, edge of coastal reefflat, very gently sloping to -16m, botanical survey, 18.ix.1984 (1 live specimen); Timor, Koepang Bay, dredge, depth 6-15 m, 11/13.xi.1929 (1 live specimen); Timor, Koepang Bay, off-shore near Koepang, 5.xii.1929 (1 live specimen); Ternate, 1.iv.1930 (1 live specimen); sta. 1 SW Sulawesi, 1985 (1 specimen, live; 2 valves); sta. 12 Sulawesi, Gugusan Spermonde, Pulau Lankai, E-side, 27.vii.1985 (1 valve); sta. 15 Sulawesi, Gugusan Spermonde, Pulau Lanyukang, E-side, 28.vii.1985 (1 valve); sta. 24 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, 24.iii.1986 (1 live specimen); sta. 29 Sulawesi, Gugusan Spermonde, Pulau Bone Tambung, N-side, 12.vi.1986 (2 specimens, live).

Distribution and ecology.— Throughout the western, southwestern and southern central Pacific, living on sandy or muddy sand bottoms in shallow water, byssally attached to rocks, coral or sediments.

Remarks.— The present material agrees with the description of *O. squamosa*, in which Gmelin (1791: 3319) referred only to Lister (1687: spec. 21). Wilkins (1953: 14) traced a specimen of Lister's species in the Sloane collection (BM(NH)). For the stability in nomenclature I here designate this specimen as the lectotype of *O. squamosa* Gmelin.

In the literature this species is often confused with other species, viz. *Chlamys irregularis*, *Chlamys lemniscata* (Reeve, 1853), and *Scaeochlamys livida* (Lamarck, 1819). A closely related species from the Red Sea is *Scaeochlamys superficialis* (Forsskål, 1775). This species has been overlooked in the literature. It differs from *C. squamosa* by a shagreen microsculpture, which is also present in *S. livida*, but the former species is flatter and less coarsely sculptured. *C. squamosa* always lacks this microsculpture.

Genus **Coralichlamys** Iredale, 1939

Type species: *Coralichlamys acroporicola* Iredale, 1939; = *Pecten madreporarum* Sowerby II, 1842.

Coralichlamys madreporarum (Sowerby II, 1842)

o *Pecten madreporarum* Sowerby II, 1842: 68; Reeve, 1853: spec. 117, pl. 28 fig. 117.
o *Coralichlamys acroporicola* Iredale, 1939: 355-356, pl. 5 figs. 26, 26a.
Chlamys madreporarum; Waller, 1972: 238, pl. 3 fig. 42.
Chlamys (*Coralichlamys*) *madreporarum*; Wang, 1983: 47-48, pl. 1 fig. 11; Dijkstra, 1986: 7-8, illustr.

Material.— sta. 4.108 NE of Komodo Island, coral reef on westside of Gili Lawat Laut, 8°27.4'S 119°33.8'E, scuba-diving, 20.ix.1984 (1 specimen in *Acropora granulosa)*; Obi Latoe, NW of Obi Major, 1°47.5'S 126°59.5'E, on reef, 23/27.iv.1930 (1 live specimen); Spermonde, Bone Tamboeng, 5°2'S 119°16'E, near Macassar reef, 2.iii.1939 (specimens in *Acropora* spec.).

Distribution and ecology.— Throughout the Indo-Pacific region; living between branches of *Acropora* in shallow waters.

Remarks.— The material is mostly somewhat distorted, which is caused by the habitat. Young specimens are byssally attached, often in the axils of the branches of *Acropora*. *Acropora* is a fast growing coral, increasing about 10 cm a year in size, which encloses *C. madreporarum* like a pocket. Sometimes one of the valves is fixed to the coral.

Sowerby II (1842: 68) mentioned the name of Petit in his description of C. *madreporarum* without any references. Petit de la Saussaye (1792-1870) never published about *P. madreporarum,* but perhaps he first used this name in a letter or on a label sent to Sowerby.

Genus **Mimachlamys** Iredale, 1929

Type species: *Pecten asperrimus* Lamarck, 1819.

Mimachlamys albolineata (Sowerby II, 1842)

o *Pecten albolineatus* Sowerby II, 1842: 73, pl. 14 figs. 69-70; Reeve, 1853: spec. 95, pl. 24 fig. 94b.
Pecten (Chlamys) albolineatus; Dautzenberg & Bavay, 1912: 10.
Chlamys (Mimachlamys) albolineata; Wang, 1983: 51, pl. 1 fig. 4.

Material.— North coast of Celebes (Sulawesi), Paleleh, on reef, 21.viii.1929 (1 live specimen); North coast of Celebes (Sulawesi), Paleleh, on reef, 22.viii.1929 (3 specimens, live); Talau Islands, Karakelong Island, near Beo, on reef, 14/21.vi.1930 (1 live specimen); Amboina, Bay of Amboina, 11/17.ix.1930 (6 specimens, live); Amboina, Bay of Amboina, Batoe Merah, 15.x.1930 (1 live specimen).

Distribution and ecology.— Throughout the western and southwestern Pacific, living byssally attached to coral boulders on sandy bottoms of shallow waters.

Remarks.— The material of the SNELLIUS-I Expedition corresponds very well to the type specimens of *P. albolineatus* (BM(NH), syntypes; not registered).

Mimachlamys lentiginosa (Reeve, 1853)

o *Pecten lentiginosus* Reeve, 1853: spec. 76, pl. 20 fig. 76.
o *Pecten sanguinolentus* Reeve (non Gmelin), 1853: spec. 159, pl. 34 fig. 159 (= *Pecten saniosus* Reeve, misidentification).
Pecten (Chlamys) cruentatus var. *lentiginosa;* Dautzenberg & Bavay, 1912: 9-10.
o *Mimachlamys gavena* Iredale, 1939: 351-352, pl. 5 fig. 28.

Material.— sta. 4.171 SW Salayer, N point of Pulau Bahuluang, 6°28'S 120°26.5'E, snorkeling, seagrass bed, 30.ix/1.x.1984 (1 valve); Tenimber Islands, Wotab Island, reef off SW-coast, 20/24.x.1929 (7 specimens, live); Koepang Bay, near Koepang, 5.xii.1929 (1 live specimen); Bone Tamboeng (ca. 20 km NW of Ujung Pandang), off shore, 2.iii.1939 (1 live specimen); Morotai, off Wayabula, 3.vi.1930 (1 live specimen); Bay of Amboina, Hitoe,reef, 11/17.ix.1930 (1 live specimen); sta. 1 SW Sulawesi, 1985 (1 valve); sta. 4 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, E-side, sandy slope, 5.vi.1985 (2 valves); sta. 6 Sulawesi, Gugusan Spermonde, Pulau Samalona, N-side, 12.vi.1985 (1 valve); sta. 8 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, SE-side, 13.vii.1985 (1 valve); sta. 10 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, N-side, 20.vii.1985 (1 valve); sta. 12 Sulawesi, Gugusan Spermonde, Pulau Lankai, E-side, 27.vii.1985 (1 specimen, live; 1 valve); sta. 19 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, N-side reef, 7.xi.1985 (1 valve); sta. 20 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, beach, 12.xi.1985 (1 specimen, dead; 2 valves); sta. 22 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, S-side reef, 15.xi.1985 (1 valve); sta. 28 Sulawesi, Gugusan Spermonde, Pulau KudingarengKeke, SW-side, 28.v.1986 (1 live specimen); sta. 29 Sulawesi, Gugusan Spermonde, Pulau Bone Tambung, N-side, 12.vi.1986 (1 valve).

Distribution and ecology.— This species is known from the western and southwestern Pacific, living byssally attached to rocks, stones, coral, etc. on muddy sand, or sandy bottoms, from intertidal to littoral depth.

Remarks.— The present material corresponds very well with the type specimens of *P. lentiginosus* (BM(NH)1950.11.14.40, holotype; 1950.11.14.41-42, paratypes). Some authors treated this species as a variation of *P. cruentatus* Reeve, 1853, but the latter species differs in many aspects; it belongs to the *'senatoria*-complex', which is still under study. Iredale (1939: 351) described *M. gavena* from Queensland (AMS C89666, holotype), but this nominal taxon is similar to and only a junior synonym of *M. lentiginosa*.

A closely allied species from the northwestern coast of Australia is *Mimachlamys funebris* (Reeve, 1853), which differs from *M. lentiginosa* by a few more radial costae, finer lamellae on the radial costae, and a more uniformly brown or red colour.

Mimachlamys senatoria (Gmelin, 1791)

o *Pallium senatoris* Chemnitz, 1784: 320, pl. 65 fig. 617. Invalid publication.
o *Pallium porphyreum* Chemnitz, 1784: 330, pl. 66 fig. 632. Invalid publication.
Ostrea senatoria Gmelin, 1791: 3327.
Ostrea porphyrea; Gmelin, 1791: 3328.
o *Pecten aurantius* Lamarck, 1819: 175.
o *Pecten florens* Lamarck, 1819: 175.
o *Pecten raffrayi* Jousseaume, 1886: 221-222, illustr.
Pecten (Chlamys) senatorius; Dautzenberg & Bavay, 1912: 4-8.

Material.— sta. 4.057 NE coast of Sumba, E of Melolo, 9°52.8'S 120°44.7'E, rectangular dredge, depth 154 m, many dead shells, 14.ix.1984 (1 valve); sta. 4.063 NE coast of Sumba, E of Melolo, 9°54'S 120°45'E, rectangular dredge, depth 145-155 m, shells, scarce epifauna, 15.ix.1984 (2 valves); sta. 4.068 NE coast of Sumba, 9°57'S 120°48'E, Agassiz-trawl, depth 50 m, sandy bottom with sponges and gorgonians, 16.ix.1984 (1 live specimen);sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (2 valves); sta. 4.098 E of Komodo Island, 8°29.9'S 119°38.1'E, rectangular dredge, depth 75 m, small calcareous nodules, echinoderms, 19.ix.1984 (1 valve); sta. 4.231 NE Taka Bone Rate (Tiger Isl.), SW of Pulau Tarupa Kecil, 6°31.3'S 121°06.5'E, 1.2 m Agassiz-trawl, depth 48m, sandy bottom with spatangoid echinoderms, 16.x.1984 (1 valve); sta. 4.235 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.7'S 121°8.7'E, 3.5 m Agassiz-trawl, depth 53-57 m, sandy bottom with spatangoid echinoderms, 18.x.1984 (1 specimen, dead); sta. 3 Sulawesi, Gugusan Spermonde, Pulau Samalona, E-side, sandy slope, 28.v.1985 (1 live specimen); sta. 18 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi, E-side reef, sandy slope, 31.x.1985 (1valve); sta. 22 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, S-side reef, 15.xi.1985 (1 valve).

Distribution and ecology.— Throughout the Indo-Pacific region; living on muddy sand, or sandy bottoms with rocks, coral rubble or sediments at littoral depth. Material of *M. senatoria* from Indonesia is mostly encrusted with sponges, viz. *Mycale* spec. (identified by Van Soest, ZMA).

Remarks.— The present material is variable in radiation and sculpture; it corresponds very well with the original description and accompanying references of *O. senatoria*. In the literature (Dautzenberg & Bavay, 1912: 4; Iredale, 1939: 348) many names are used for *M. senatoria*. The *'senatoria*-complex' is still under study.

Iredale (1929: 162) introduced the genus *Mimachlamys*, with the type species *P.*

asperrimus Lamarck, 1819, but Hertlein (1969: N355) synonymized this genus with *Chlamys*. This view is not followed because representatives of both genera are very different in structure of the sculpture.

Genus **Scaeochlamys** Iredale, 1929

Type species: *Pecten lividus* Lamarck, 1819.

Scaeochlamys livida (Lamarck, 1819)

o *Pecten lividus* Lamarck, 1819: 178.
. *Ostrea tegula* Wood, 1828: 7, pl. 2 fig. 3.
o *Pecten foliaceus* Quoy & Gaimard, 1835: 445-446, pl. 76 figs. 4-6.
Pecten tegula; Reeve, 1853: spec. 136, pl. 30 fig. 136.
o *Scaeochlamys livida peroniana* Iredale, 1939: 355; Dijkstra, 1983: 19-22, illustr.

Material.— sta. 4.069 E of Komodo Island, Slawi Bay, N cape of entrance, 8°36'S 119°31.2'E, snorkeling, scuba-diving, -16m, gently sloping reef -8m, coral heads, sand, 17.ix.1984 (1 live specimen); sta. 4.071 E of Komodo Island, Slawi Bay, 8°34.5'S 119°31.3'E, sublittoral near eastern shore, 17.ix.1984 (1 live specimen); sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (18 valves, juveniles); sta. 4.098 E of Komodo Island, 8°29.9'S 119°38.1'E, rectangular dredge, depth 75 m, small calcareous nodules, echinoderms, 19.ix.1984 (1 live specimen).

Distribution and ecology.— Throughout the western and southwestern Pacific; living in shallow waters on mud, muddy sand, or sandy bottoms, byssally attached to rocks, stones, coral boulders, wrecks, etc.

Remarks.— The present immature specimens are somewhat smoother than the type specimens of *P. lividus* from Australia(MNHN holotype, not registered). A shagreen microsculpture is present on the anterior auricles and the umbonal region of the left valves. However, this microsculpture is variable and absent on the ventral marginal region. The closely related species *Scaeochlamys lemniscata* (Reeve) from the western Indo-Pacific region lacks this microsculpture on the entire disc. In the literature many names are used for this and closely related species, which are still under study.

Genus **Cryptopecten** Dall, Bartsch & Rehder, 1938

Type species: *Cryptopecten alli* Dall, Bartsch & Rehder, 1938; = *Pecten bullatus* Dautzenberg & Bavay, 1912.

Cryptopecten bullatus (Dautzenberg & Bavay, 1912)

o *Pecten* (*Chlamys*) *bullatus* Dautzenberg & Bavay, 1912: 17-18, pl. 27 figs. 1-2.
Chlamys (*Aequipecten*) *tissotii*; Kuroda, 1932: app.95.
. *Cryptopecten alli* Dall, Bartsch & Rehder, 1938: 93-94, pl. 23 figs. 1-4,7.

Cryptopecten complanus Wang, 1983: 402-403,405-406, figs. 1.1-7.
Cryptopecten bullatus; Hayami, 1984: 96-99, pl. 1 figs. 1-6, pl. 2 figs. 1-3, pl. 9 fig. 1, pl. 10 fig. 3, pl. 11 fig. 3; Wagner, 1989: 60-61, figs. 14-16.

Material.— sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.037 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54.2'S 123°57.9'E, rectangular dredge, depth 350-500 m, mainly sponges, 10.ix.1984 (1 valve); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (4 valves); sta. 4.199 SW Salayer, off Tanjung Batu Kerapo, 6°19.1'S 120°24.5'E, rectangular dredge, depth 265 m, soft bottom fauna, 9.x.1984 (1 live specimen).

Distribution and ecology.— Throughout the western, southwestern and central Pacific, also known from the western Indian Ocean. Living on muddy sand or sandy bottoms with coral rubble or sediments, at sublittoral to bathyal depth.

Remarks.— The present material corresponds in all aspects with the type specimens of *P. bullatus* (ZMA, holotype, paratypes; not registered). The convexity and sculpture vary with the bathymetric range and geographical distribution.

In the literature many Japanese malacologists have used the name *P. tissotii* Bernardi, 1858, for *C. bullatus*, but the former species is a juvenile *Aequipecten flabellum* (Gmelin, 1791) from off western Africa. Dall, Bartsch & Rehder (1938: 93) introduced *C. alli* as a separate species from the Hawaiian Islands, but its morphological features strongly remind those of *C. bullatus*. Wang (1983: 402) described *C. complanus* from the eastern China Sea; the characters of this species are also very similar to those of *C. bullatus*.

Cryptopecten nux (Reeve, 1853)

o *Pecten coruscans*; Reeve, 1853: spec. 143, pl. 32 fig. 143 (non *P. coruscans* Hinds, 1845).
o *Pecten nux* Reeve, 1853: errata.
o *Pecten hastingsii* Melvill, 1888: 279, pl. 2 fig. 7.
o *Pecten guendolenae* Melvill, 1888: 279, pl. 2 fig. 6.
o *Pecten smithi* Sowerby III, 1908: 18, pl. 1 figs. 6-7.
o *Pecten corymbiatus* Hedley, 1909: 423, pl. 36 figs. 1-4.
Pecten (Aequipecten) vesiculosus; Dautzenberg & Bavay, 1912: 148 (non *P. vesiculosus* Dunker, 1877).
Pecten (Aequipecten) kikaiensis Nomura & Zinbo, 1934: 153, pl. 5 figs. 9a-b.
Corymbichlamys corymbiatus; Iredale, 1939: 368.
Cryptopecten nux; Wang, 1983: 403, figs. 1.8-13; Wagner, 1989: 56-58, figs. 6-9,17-18.
Cryptopecten nux nux; Hayami, 1984: 100-103, pl. 2 fig. 4, pl. 3 figs. 1-2, pl. 9 figs. 2-5, pl. 12 figs. 1-2.
Cryptopecten bernardi corymbiatus; Dijkstra, 1988: 7-8, illustr.

Material.— sta. 4.018 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab, depth 465 m, fine shell gravel with forams, 9.ix.1984 (1 valve); sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (8 valves); sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, VanVeen-grab (2x), depth 255-275 m, coral sand, 9.ix.1984 (1 valve); sta. 4.031 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°54'S 123°58.4'E, Van Veen-grab, depth 390 m, calcareous sand, some shell gravel, 10.ix.1984 (2 valves); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (2 valves); sta. 4.034 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab, depth 280 m, coarse calcareous sand, 10.ix.1984 (2 valves); sta.

4.045 NE coast of Sumba, E of Melolo, 9°54.2'S 120°43'E, Van Veen-grab, depth 48-57m, coarse sand with shell gravel, some calcareous stones with epifauna, 13.ix.1984 (11 valves); sta. 4.046 NE coast of Sumba, E of Melolo, 9°53.5'S 120°42.7'E, Van Veen-grab, depth 74-83m, somewhat muddy fine sand with shell gravel, 13.ix.1984 (many valves); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (many valves); sta. 4.073 E of Komodo Island, Slawi Bay, 8°34.9'S 119°30.4'E, Van Veen-grab, depth 37m, muddy volcanic sand, with many shells (mainly *Turritella*), 17.ix.1984 (1 valve); sta. 4.074 E of Komodo Island, Slawi Bay, 8°35.7'S 119°30.3'E, Van Veen-grab, depth 50 m, muddy volcanic sand-with few shells, 17.ix.1984 (3 valves); sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (many valves); sta. 4.106 NE of Komodo Island, 8°26.9'S 119°37.9'E, rectangular dredge, depth 80 m, calcareous stones and nodules with Porifera, Bryozoa, etc., 20.ix.1984 (1 live specimen); sta. 4.111 N of Sumbawa, Bay of Sanggar, 8°19.3'S 118°15.6'E, VanVeen-grab, depth 175-185 m, volcanic sand and gravel with many species of small shells, few living animals, 21.ix.1984 (2 valves); sta. 4.134 NE Taka Bone Rate (Tiger Isl.), SE of Tarupa Kecil, 6°31'S 121°8.2'E, lagoon entrance, Van Veen-grab (8x), depth 53-59m, foraminifera sand and calcareous gravel, scarce macrofauna, rich microfauna, 25.ix.1984 (19 valves); sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (3 valves); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large Foraminifera, some calcareous stones with epizoa, 29.ix.1984 (17 valves); sta. 4.232 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.1'S 121°9'E, rectangular dredge, depth 59m, calcareous nodules, sponges, 16.x.1984 (1 specimen, live; 4 valves); sta. 4.234 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°31.6'S 121°7.5'E, 3.5 m Agassiz-trawl, depth 58m, sandy bottom with calcareous nodules, sponges, 17.x.1984 (1 specimen, live; 13 valves); sta. 4.235 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.7'S 121°8.7'E, 3.5 m Agassiz-trawl, depth 53-57m, sandy bottom with spatangoid echinoderms, 18.x.1984 (1 valve).

Distribution and ecology.— Throughout the Indo-Pacific region; living on sandy bottoms with coral rubble or sediments, at littoral to bathyal depth.

Remarks.— The present material is very variable in outline, convexity and sculpture, but is still clearly conspecific with the type specimens of *C. nux* (BM(NH) 1950.11.14.52, lectotype; 1950.11.14.50-51, paralectotypes). Wagner (1989: 58) indicated *C. guendolenae* as a valid species from Mauritius and the southern Philippines, but many intermediate forms are reported from throughout the Indo-Pacific by Hayami (1984: 102) and have been observed by the author.

A closely related species is *C. bernardi* (Philippi, 1851), so far only known from French Polynesia. It is larger (up to 25 mm), with a more triangular outline, and a larger convexity, and has a finer sculpture than *C. nux*.

Genus **Complicachlamys** Iredale, 1939

Type species: *Complicachlamys wardiana* Iredale, 1939.

Complicachlamys wardiana Iredale, 1939

o *Pecten dringi* Reeve, 1853: spec. 152, pl. 33 fig. 152a. (pro parte; see *S. dringi*, p. 40)

o *Complicachlamys wardiana* Iredale, 1939: 362-363, pl. 5 figs. 25, 25a.

Semipallium wardiana; Abbott & Dance, 1982: 308, illustr.

Semipallium (Semipallium) fulvicostatum; Wang, 1985: 502-503, fig. 2 (non *P. fulvicostatus* Adams & Reeve).

Chlamys wardiana; Wagner, 1989: 111-116, figs. 6-8.

Material.— sta. 1 SW Sulawesi, off Udjang Pandang, 1985 (1 valve).

Distribution and ecology.— So far only known from the Philippines, Indonesia and northwestern to northeastern Australia. Living at intertidal to littoral depth, byssally attached to rocks or coral boulders on sandy or muddy sand bottoms.

Remarks.— The present specimen from Sulawesi is a new record for Indonesia. It is similar to the type specimens of *C. wardiana* (AMS C90373, holotype) from Queensland (Australia), although the radial costae are somewhat more prominent. However variations are also observed from other geographic regions. Some authors placed *C. wardiana* in *Semipallium*, but representatives of that genus have a shagreen microsculpture throughout, which is always absent in *Complicachlamys*. Both taxa are still under study.

Genus **Semipallium** (Jousseaume) Lamy, 1928

Type species: *Pecten tigris* Lamarck, 1819.

Semipallium dianae (Crandall, 1979)

. *Chlamys dianae* Crandall, 1979: 114-115, figs. 3-8.

Material.— sta. 4.044 Tukang Besi Islands, Banda Sea, reef SW of Taipabu, Binongko, 5°56'S 123°58.5'E, scuba-diving, steeply sloping reef, down to 25 m, 11.ix.1984 (1 valve); sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34 m, rather fine coral rubble, 8.x.1984 (1 valve).

Distribution and ecology.— So far only known from southern Japan, the Philippines, Indonesia, and the Solomon Islands, living attached or free swimming between coral rubble on sandy bottoms at littoral depth. This concerns a new record for Indonesia.

Remarks.— The present material corresponds very well with the type specimens of *Chlamys dianae* Crandall from the Ryukyu Islands, southern Japan (TM, holotype; PRC, paratypes).

The closely related *S. crouchi* (E.A. Smith, 1892) from the western Indo-Pacific, differs by somewhat smaller and more prominent costae and a brownish colour.

Semipallium fulvicostatum (Adams & Reeve, 1850)

o *Pecten fulvicostatus* Adams & Reeve, 1850: 74, pl. 21 fig. 11; Reeve, 1853: spec. 123, pl. 28 fig. 123.
o *Pecten luculenta* Reeve, 1853: spec. 59, pl. 16 fig. 59.
Pecten (Chlamys) fulvicostatus; Dautzenberg & Bavay, 1912: 16-17 (pro parte).
Chlamys dringi; Dautzenberg & Bouge, 1933: 426.
Complicachlamys fulvicostata; Iredale, 1939: 363.
Complicachlamys luculenta; Iredale, 1939: 363.
Semipallium fulvicostatum; Dijkstra, 1989: 16, illustr.

Material.— sta. 4.045 NE coast of Sumba, E of Melolo, 9°54.2'S 120°43'E, Van Veen-grab, depth 48-57 m, coarse sand with shell gravel, some calcareous stones with epifauna, 13.ix.1984 (1 valve); sta. 4.047 NE coast of Sumba, E of Melolo, 9°53.2'S 120°43.2'E, Van Veen-grab, depth 100 m, muddy sand with calcareous nodules, 13.ix.1984 (1 valve); sta. 4.051 NE coast of Sumba, E of Melolo, 9°53.5'S 120°42.7'E, rectangular dredge, depth 75-90 m, calcareous stones, rich epifauna dominating by soft corals, 13.ix.1984 (1 live specimen); sta. 4.106 NE of Komodo Island, 8°26.9'S 119°37.9'E, rectangular dredge, depth 80 m, calcareous stones and nodules with Porifera, Bryozoa, etc., 20.ix.1984 (2 specimens, live); sta. 17 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi (= Barang Keke), S-side, 28.x.1985 (1 valve); sta. 19 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, N-side reef, 7.xi.1985 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific to French Polynesia. Living on sandy bottoms with coral rubble, gravel or sediments, at littoral depth.

Remarks.— The present material corresponds very well with the type specimens of *P. fulvicostatus* (BM(NH) 1950.11.14.31, holotype). In the literature this species is sometimes confused with *Semipallium tigris* or *Complicachlamys wardiana*.

A closely related species, *Semipallium dringi* differs from *S. fulvicostatum* by being more convex, with a subcircular shape, and microsculpture. Wagner (1989: 111) synonymized *Semipallium barnetti* Dijkstra, 1988, with *S. fulvicostatum*, but the former species is smaller, has a more irregular radiation, and a brownish instead of a bright yellow or orange colour. The bathymetric range of *S. barnetti* is also deeper to sublittoral depth.

Semipallium dringi (Reeve, 1853)

o *Pecten dringi* Reeve, 1853: spec. 152, pl. 33 fig. 152b); Wagner, 1989: 114 (lectotype designation; incorrectly identified as *S. fulvicostatum*).

o *Semipallium kengaluorum* Dijkstra, 1986: 24-26, illustr. **Syn. nov.**

Material.— sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34m, rather fine coral rubble, 8.x.1984 (1 valve).

Distribution and ecology.— Only known from Indonesia, the Solomon Islands, the Fiji Islands, and the Marshall Islands; living on sandy bottoms with coral rubble, byssally attached to corals in shallow waters. This species is a new record for Indonesia.

Remarks.— The present immature specimen corresponds very well with the type specimens of *S. kengaluorum* (ZMA 3.86.024, holotype; NNM, NMNH, BM(NH), USNM, HHD, paratypes) from the Solomon Islands; only the fine spinous sculpture on the radial costae is somewhat coarser, also on the anterior auricular suture.

A close allied species is *S. fulvicostatum*, which differs by a more elongate shape, and coloration. *S. barnetti* Dijkstra, 1988 is another similar species, and differs by a more circular outline and irregular radiation.

After examination of syntype material of *P. dringi* I consider the lectotype designated by Wagner (1989) to belong to *S. kengaluorum*. The lectotype is the specimen figured by Reeve (1853) as fig. 152b, the other figured specimen (fig. 152a) belongs to *C. wardiana*.

Semipallium tigris (Lamarck, 1819)

o *Pecten tigris* Lamarck, 1819: 171; Sowerby II, 1842: 68, pl. 14 figs. 95-96; Reeve, 1853: spec. 77, pl. 20 fig. 77.
Pecten (Pallium) tigris; Adam & Leloup, 1939: 60.
Complicachlamys tigris; Habe, 1964: 174, pl. 53 fig. 14.
Semipallium (Semipallium) tigris; Hertlein, 1969: N365-N366, figs. C87:3a-b; Wang, 1985: 502, fig. 1.
Semipallium tigris; Abbott & Dance, 1982: 308, illustr.

Material.— sta. 2 Sulawesi, Gugusan Spermonde, Pulau Lae-Lae Keke (= Gusung), E-side, depth 1-6m, 30.iv.1985 (1 valve); sta. 6 Sulawesi, Gugusan Spermonde, Pulau Samalona, N-side, 12.vi.1985 (1 valve); sta. 25 Sulawesi, Gugusan Spermonde, Pulau Bone Tambung, W-side, 2.v.1986 (1 live specimen).

Distribution and ecology.— Throughout the Indo-Pacific region; living byssally attached under coral boulders or between coral rubble on sandy bottoms at littoral depth.

Remarks.— The recent material from Sulawesi corresponds very well with the type specimens of *P. tigris* (MNHN, syntypes; not registered), although the undulated costae are somewhat more acute in the former specimens.

Subfamily **Peduminae** Habe, 1977

Genus **Pedum** Bruguière, 1791

Type species: *Ostrea spondyloidea* Gmelin, 1791.

Pedum spondyloideum (Gmelin, 1791)

o *Ostrea spondyloidea* Gmelin, 1791: 3335, no.109.
. *Ostrea pedum* Röding, 1798: 170.
Pedum spondyloideum; Lamarck, 1799: 88; Nielsen, 1986: 8, figs. 3A-B; Dijkstra, 1987: 9-10, illustr.
Pedum spondiloideum; Quoy & Gaimard, 1834: 447-449, pl. 76 figs. 15-21.
Pedum spondyloideum var.; Fischer, 1858: 340.
o *Pedum pedum intensum* Iredale, 1939: 341.

Material.— This species was observed and photographed alive in situ at several stations (pers. comm. Van der Land, RMNH). No dead material is collected.

Distribution and ecology.— Throughout the Indo-Pacific region; living in cavities of massive heads of coral, *Porites* spec., in shallow waters.

Remarks.— For further information on morphology, ecology, and distribution see also Yonge (1967: 311-323) and Waller (1972: 254-258).

Genus **Decatopecten** Sowerby, 1839

Type species: *Ostrea plica* Linnaeus, 1758.

Decatopecten plica (Linnaeus, 1758)

o *Ostrea plica* Linnaeus, 1758: 696, no.162.
Pecten plica; Lamarck, 1819: 167-168; Reeve, 1852: spec. 16, pl. 3 fig. 16.
Decatopecten (Decatopecten) plica; Hertlein, 1969: N365, figs. C87: 4a-b.

Material.— sta. 4.045 NE coast of Sumba, E of Melolo, 9°54.2'S 120°43'E, Van Veen-grab, depth 48-57 m, coarse sand with shell gravel, some calcareous stones with epifauna, 13.ix.1984 (1 valve); sta. 18 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi (= Barang Keke), E-side reef, sandy slope, 31.x.1985 (1 live specimen).

Distribution and ecology.— Throughout the western and southwestern Pacific, and the Indian Ocean; living on muddy, muddy sand or sandy bottoms with sediments at littoral depth.

Remarks.— This widely distributed species varies strongly in outline, convexity and sculpture, and therefore many names are used for it in the literature. The representatives of *Decatopecten* from the Indo-Pacific region are still insufficiently known and a full synonymy cannot be presented.

Waller (1986: 40) placed *Decatopecten* in a tribe Decatopectinini and synonymized *Comptopallium* Iredale, 1939.

Genus **Anguipecten** Dall, Bartsch & Rehder, 1938

Type species: *Anguipecten gregoryi* Dall, Bartsch & Rehder, 1938; = *Pecten lamberti* Souverbie in Souverbie & Montrouzier, 1874.

Anguipecten aurantiacus (Adams & Reeve, 1850)

o *Pecten aurantiacus* Adams & Reeve, 1850: 74, pl. 21 fig. 12 (non *aurantiaca* Röding, 1798).
Anguipecten lamberti; Abbott & Dance, 1982: 312, illustr. (non *lamberti* Souverbie, 1874).
Anguipecten aurantiacus; Dijkstra, 1984: 9, illustr.

Material.— sta. 4.020 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.4'S 123°45.8'E, Van Veen-grab (2x), depth 255-275 m, coral sand, 9.ix.1984 (1 valve); sta. 4.057 NE coast of Sumba, E of Melolo, 9°52.8'S 120°44.7'E, rectangular dredge, depth 154 m, many dead shells, 14.ix.1984 (1 valve); sta. 4.232 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.1'S 121°09'E, rectangular dredge, depth 59m, calcareous nodules,sponges, 16.x.1984 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific and in the western Indian Ocean; living on sandy bottoms with corals and/or coral rubble at littoral depth. This species is a new record for Indonesia.

Remarks.— The present material has one radial costa more than the type specimen from the China Sea (BM(NH), holotype; not registered).

Hertlein (1969: N365) treated *Anguipecten* as a subgenus of *Decatopecten*, whereas Waller (1986: 40) considered *Anguipecten* an extant genus of Decatopectinini. In the literature the species is often confused with *A. lamberti* (Souverbie, 1874), actually only known from New Caledonia and the Hawaiian Islands.

Genus **Annachlamys** Iredale, 1939

Type species: *Pecten leopardus* Reeve, 1853; = *Pecten flabellatus* Lamarck, 1819.

Annachlamys flabellata (Lamarck, 1819)

o *Pecten flabellatus* Lamarck, 1819: 172.
o *Pecten leopardus* Reeve, 1853: spec. 145, pl. 32 fig. 145.
Pecten flabellatus f. *leopardus*; Bavay, 1904: 364.
Annachlamys leopardus; Iredale, 1939: 358-359.
o *Annachlamys melica* Iredale, 1939: 359.

Material.— sta. 4.057 NE coast of Sumba, E of Melolo, 9°52.8'S 120°44.7'E, rectangular dredge, depth 154 m, many dead shells, 14.ix.1984 (1 valve).

Distribution and ecology.— *A. flabellata* is a new record for Indonesia. This species is also known from western, northern and eastern Australia, living on sandy or muddy sand bottoms at littoral depth.

Remarks.— The present specimen is very similar to the type specimens of *P. flabellatus* (MNHN, syntypes; not registered) except for the colouration on the inside of the shell, which is more uniformly white with a reddish spot beneath the resilial insertion, whereas *A. flabellata* is more completely red. However, intermediate colourforms are observed (AMS).

Iredale (1939: 358) mentioned *A. leopardus* and *A. melica* as two distinct species from eastern and western Australia, respectively, but forms that are intermediate in shape and colour exist; the shells cannot be distinguished from *A. flabellata*. Iredale (1939: 358) introduced *Annachlamys* as a genus, whereas Hertlein (1969: N355) treated this taxon as a subgenus of *Chlamys*. Waller (1986:40) mentioned the synonymy of *A. flabellata* and *A. leopardus* and gave *Annachlamys* generic status again and considered it an extant genus in the Decatopectinini.

Annachlamys macassarensis (Chenu, 1845)

. *Pecten macassarensis* Chenu, 1845: pl. 39 figs. 4-4d.
o *Pecten solaris* Sowerby (non Born), 1842: 55, pl. 12 figs. 7-8,22.
Pecten leopardus f. *solaris*; E.A. Smith, 1884: 114-115.
Pecten (*Aequipecten*) *macassarensis*; Dautzenberg & Bavay, 1912: 21-22.
Annachlamys macassarensis; Iredale, 1939: 358.

Material.— sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (3 valves); sta. 4.235 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.7'S 121°8.7'E, 3.5 m Agassiz-trawl, depth 53-57m, sandy bottom with spatangoid echinoderms, 18.ix.1984 (1 specimen, live; 1 valve); sta. 18 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi (= Barang Keke),E-side reef, sandy slope, 31.x.1985 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific and in the eastern Indian Ocean; living on muddy, muddy sand, or sandy bottoms at littoral depth.

Remarks.— The present material is similar to the type specimens of *P. solaris* So-

werby, 1842 (BM(NH), syntypes; not registered), but somewhat paler in colour. Unfortunately, the syntypes of *P. macassarensis* that should be in the Delessert collection, in the Museum d'Histoire naturelle at Geneva, have not yet been traced. However, the figures correspond very well with the present material. A specimen labelled as "*Pecten insignis* Dunker" was found in the Zoological Museum (Humboldt-University) of Berlin. This concerns a manuscript name.

Annachlamys reevei (Adams in Adams & Reeve, 1850)

o *Pecten reevei* Adams in Adams & Reeve, 1850: 73-74, pl. 21 figs. 10a-b.
Pecten (Aequipecten) reevei; Dautzenberg & Bavay, 1912: 18-19, pl. 27 figs. 3-4.
Annachlamys reevei; Kira, 1962: 211, pl. 72 fig. 7.

Material.— sta. 4.075 E of Komodo Island, Slawi Bay, 8°36.8'S 119°30.7'E, Van Veen-grab, depth 65 m, coarse yellow sand, with shell gravel, 17.ix.1984 (1 valve, juvenile); sta. 4.098 off Komodo Island, 8°29.9'S 119°38.1'E, rectangular dredge, depth 75 m, calcareous nodules, echinoderms, 19.ix.1984 (3 valves).

Distribution and ecology.— Only known from southern Japan to the Indonesian Archipelago; living on sandy bottoms with sediments at littoral depth.

Remarks.— The present material corresponds very well with the type specimens from the China Sea (BM(NH) 74.12.11.375, syntype; BM(NH) 1950.11.14.58, syntypes), apart from being less red coloured, which is caused by encrustment of the dead specimens, however.

A rather similar species is *Annachlamys iredalei* (Powell, 1958), only known from the Kermadec Islands, New Caledonia, and the Coral Sea.

Genus **Comptopallium** Iredale, 1939

Type species: *Comptopallium pauciplicatum* Iredale, 1939; = *Ostrea radula* Linnaeus, 1758.

Comptopallium radula Linnaeus, 1758

o *Ostrea radula* Linnaeus, 1758: 697.
Pecten radula; Lamarck, 1819: 166; Sowerby II, 1842: 63, pl. 17 figs. 154-155; Reeve, 1853: spec. 83, pl. 21 fig. 83.
Pecten (Pallium) radula; Dautzenberg & Bavay, 1912: 24-26.
. *Comptopallium pauciplicatum* Iredale, 1939: 359-360.
. *Pecten (Comptopallium) radula* f. *griggi* Webb, 1957: 53-54, pl. 4 figs. 1-3.
Comptopallium radula; Dijkstra, 1984: 11-12, illustr.

Material.— NE coast Halmaheira, Morotai Island, off Wayabula, shore and reefs, 3/10.vi.1930 (1 live specimen); Lembeh Strait, near islet between Lembeh Island and the main land Celebes (Sulawesi), off Bitung, on reef, 25.ix.1939 (2 specimens, live); sta. 2 Sulawesi, Gugusan Spermonde, Pulau Lae-Lae Keke (= Gusung), E-side, 1-6m depth, 30.iv.1985 (1 live specimen); sta. 6 Sulawesi, Gugusan Spermonde, Pulau Samalona, N-side, 12.vi.1985 (3 valves); sta. 11 Sulawesi, Gugusan Spermonde, Pulau Lankai, N-side, 24.vii.1985 (1 live specimen); sta. 13 Sulawesi, Gugusan Spermonde, Pulau

Lanyukang, N-side, 28.vii.1985 (1 valve); sta. 14 Sulawesi, Gugusan Spermonde, Pulau Lanyukang, S-side, 28.vii.1985 (2 specimens, live); sta. 23 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, W-side, 23.xi.1985 (1 live specimen); sta. 24 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, 24.iii.1986 (1 live specimen).

Distribution and ecology.— Throughout the Indo-Pacific region; living on sandy or muddy sand bottoms in masses of seaweeds, under stones, dead corals or fixed to wrecks, at intertidal to littoral depth.

Remarks.— The material of the SNELLIUS-I expedition and Sulawesi corresponds very well with the type specimens of *O. radula* Linnaeus (UUZM, syntypes; LSL, syntype; not registered). *C. radula* varies in radiation and sculpture.

Dautzenberg & Bavay (1912: 25) synonymized *P. argenteus* Reeve, 1853 with *C. radula*, but the former species from the China Sea is more similar to *Bractechlamys vexillum* (Reeve, 1853). Waller (1986: 40) treated *Comptopallium* as a junior synonym of *Decatopecten*. However, *Comptopallium* is more similar to *Bractechlamys*, whereas *Decatopecten* is more similar to *Anguipecten*.

Genus **Excellichlamys** Iredale, 1939

Type species: *Pecten spectabilis* Reeve, 1853.

Excellichlamys spectabilis (Reeve, 1853)

Pecten histrionicus Gmelin var. Petit, 1853: 150-152, pl. 5 fig. 2.
o *Pecten spectabilis* Reeve, 1853: spec. 128, pl. 29 fig. 128.
Pecten (Aequipecten) histrionicus var. *spectabilis*; Dautzenberg &Bavay, 1912: 22-23.
Chlamys (histrionica var.?) *spectabilis*; Kuroda, 1932: 95-96.
Aequipecten histrionicus var. *spectabilis*; Lamy, 1935: 314-315.
Excellichlamys spectabilis; Iredale, 1939: 366; Kuroda, Habe & Oyama, 1971: 366-367, pl. 79 figs. 12-13.; Waller, 1972: 224, 225F, 227, 246-250, 247F, 248T, 258, 259, pl. 5 figs. 87-92, pl. 6 figs. 93-102; Dijkstra, 1987: 9-10, illustr.

Material.— sta. 4.045 NE coast of Sumba, E of Melolo, 9°54.2'S 120°43'E, Van Veen-grab, depth 48-57m, coarse sand with shell gravel, some calcareous stones with epifauna, 13.ix.1984 (1 valve); sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34 m, rather fine coral rubble, 8.x.1984 (2 valves); sta. 5 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, depth 6-15 m, 11.vi.1985 (1 valve); sta. 24 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, 24.iii.1986 (1 live specimen).

Distribution and ecology.— Throughout the Indo-Pacific region; living on sandy bottoms with coral rubble or sediments, from shallow water to sublittoral depth.

Remarks.— The present material corresponds very well with the type specimen of *P. spectabilis* (UMZC 1461, holotype). Wang (1985: 504) described *Semipallium (Excellichlamys) xishaensis* from Jinqing Island (China), which is similar to the French Polynesian subspecies *E. spectabilis parva* (Sowerby I, 1835) (non Da Costa, 1778). Therefore, a new name for *parvus* (see Waller, 1972: 248; Dijkstra, 1989: 14-15) is not necessary. This subspecies differs from *E. s. spectabilis* by strongly unequal auricles and fewer primary radial costae.

Waller (1986: 40) placed *Excellichlamys* in the tribus Decatopectinini.

Glorichlamys gen. nov.

Type species: *Pecten elegantissimus* Deshayes, 1863.

Diagnosis.— A genus belonging to the tribus Decatopectinini. Shells relatively small (not over 15 mm), plicate, inequivalve, both valves convex, auricles unequal, umbonal angle about 85°. Left valve sculptured with primary and secondary radial costae, provided with concentric lamellae. Interstices sculptured with fine concentric lamellae. Right valve sculptured with divided radial costae, and provided with fine lamellae. Sometimes interstitial radial riblets in late growth-stages. Interstices also sculptured with fine concentric lamellae. Auricles with radial costae and concentric lamellae, which are most and strongly developed on the anterior auricle, sometimes with tubercles. Byssal notch rather deep, ctenolium present, and cardinal crura strongly developed.

Comparison.— *Gloripallium* Iredale, 1939 is less convex and larger, the radiation is more regular and both valves are sculptured with strongly developed lamellae in early growth-stages. The auricles are less unequal.

In *Excellichlamys* Iredale, 1939, the shells are also less convex, the left valve being nearly flat and sculptured with a regular primary and secondary radiation. Right valve regularly plicated. In late growth-stages there may be divided costae on both valves. Sculpture of auricles strongly developed, with nodules.

Shells of *Bractechlamys* Iredale, 1939 are less convex and larger, whereas the radiation of both valves is more regular, with radial riblets on and between the costae. Sculpture weakly developed on the auricles, which are nearly equal in size.

Glorichlamys elegantissima (Deshayes, 1863)
(fig. 91)

. *Pecten elegantissimus* Deshayes, 1863: 32-33, pl. 4 figs. 11-12.
Pecten (Chlamys) elegantissimus; Bavay, 1903: 403-404, pl. 8 figs. 5-7
o *Pecten cooperi* E.A. Smith, 1903: 621-622, pl. 36 figs. 15-18.
"Chlamys" elegantissima; Dijkstra, 1989: 12-15, illustr.

Material.— sta. 4.153 off SW Salayer, 6°22.4'S 120°26.3'E, Van Veen-grab, depth 130-155 m, calcareous sand with some shells and polychaetes, 28.ix.1984 (1 valve).

Distribution and ecology.— Throughout the western, southwestern and central Pacific and the western Indian Ocean. The habitat and behaviour of this species are poorly known, although most of the material was collected from littoral to sublittoral depth on sandy bottoms with coral rubble or sediments. This species is a new record for Indonesia.

Remarks.— E.A. Smith (1903: 403) overlooked the description of the right valve of *G. elegantissima* by Deshayes, and the subsequent description by Bavay, some time before his description of *P. cooperi*. A closely related species is *Glorichlamys quadrilira-*

ta (Lischke, 1870), known from the same geographic region, which differs by quadri- or tripartited radial costae and a finer sculpturing of the concentric lamellae. Another closely related species is *Glorichlamys elegans* (Wang, 1983) from China, recently also known from the Philippines (HHD). Wang (1983: 532) placed this species in *Bractechlamys*, but the outline and tripartite costae are more similar to *Glorichlamys*.

Genus **Gloripallium** Iredale, 1939

Type species: *Ostrea pallium* Linnaeus, 1758.

Gloripallium pallium f. **pallium** (Linnaeus, 1758) & f. **speciosum** (Reeve, 1853)

o *Ostrea pallium* Linnaeus, 1758: 697, no.163.
Pecten pallium; Lamarck, 1819: 170; Reeve, 1853: spec. 63, pl. 17 figs. 63a-c; Küster, 1843-1859: 39-40,103, pl. 11 figs. 1,5, pl. 28 figs. 7-8, pl. 29 fig. 1.
o *Pecten novaeguinae* Tenison-Woods, 1878: 267.
Pecten (Aequipecten) pallium; Dautzenberg & Bavay, 1912: 19-20.
Gloripallium pallium; Iredale, 1939: 357.
Chlamys (Cryptopecten) pallium; Hertlein, 1969: N357, fig. C79:1c.
Gloripallium pallium; Waller, 1972: 224, 225F, 226, 228F, 239-243, 240T, 248, 249, pl. 3 figs. 45-47, figs. 4,9, table 6; Dijkstra, 1984: 17-18, illustr.
o *Pecten speciosus* Reeve, 1853: spec. 112, pl. 27 fig. 112.
Pecten (Aequipecten) pallium var. *speciosa*; Dautzenberg & Bavay,1912: 20-21.
Gloripallium pallium f. *speciosum*; Dijkstra, 1988: 19-20, illustr.

Material *Gloripallium pallium* f. *pallium*.— sta. 4.024 Tukang Besi Islands, Banda Sea, SE of Kaledupa reef, 5°57'S 123°49'E, rectangular dredge, depth 350-500 m, calcareous stones, dead corals, sponges, 9.ix.1984 (1 valve); sta. 4.033 Tukang Besi Islands, Banda Sea, NW of Binongko, 5°52.5'S 123°58.5'E, Van Veen-grab (2x), depth 250-290 m, coarse calcareous sand, 10.ix.1984 (1 valve); sta. 4.171 SW Salayer, N point of Pulau Bahuluang, 6°28'S 120°26.5'E, snorkeling, seagrass bed, 30.ix/1.x.1984 (1 specimen, dead); sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34 m, rather fine coral rubble, 8.x.1984 (1 valve); sta. 4.232 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.1'S 121°09'E, rectangular dredge, depth 59 m, calcareous nodules, sponges, 16.x.1984 (1 valve); Moluccas, Ambon, Batu Merah, 15.x.1930 (1 live specimen); sta. 5 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, depth 6-15 m, 11.vi.1985 (1 specimen, live; 4 valves); sta. 6 Sulawesi, Gugusan Spermonde, Pulau Samalona, N-side, 12.vi.1985 (1 specimen, live; 3 valves); sta. 7 Sulawesi, Gugusan Spermonde, Pulau Samalona, E-side, depth, 25.vi.1985 (1 live specimen); sta. 8 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, SE-side, 13.vii.1985 (1 live specimen); sta. 9 Sulawesi, Gugusan Spermonde,Pulau Kudingareng Keke, S-side, 16.vii.1985 (1 valve); sta. 10 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, N-side, 20.vii.1985 (4 valves); sta. 11 Sulawesi, Gugusan Spermonde, Pulau Lankai, N-side, 24.vii.1985 (2 valves); sta. 12 Sulawesi, Gugusan Spermonde, Pulau Lankai, E-side, 27.vii.1985 (1 live specimen); sta. 16 Sulawesi, Gugusan Spermonde, Kapodasang, W-side, 12.viii.1985 (1 live specimen); sta. 17 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi (=Barang Keke), S-side, 28.x.1985 (1 valve); sta. 19 Sulawesi, Gugusan Spermonde, Pulau Bone Batang, N-side reef, 7.xi.1985 (3 valves); sta. 24 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, W-side, 24.iii.1986 (2 specimens, live; 4 valves); sta. 25 Sulawesi, Gugusan Spermonde, Pulau Bone Tambung, W-side, 2.v.1986 (1 live specimen); sta. 26 Sulawesi, Gugusan Spermonde, Pulau Lanyukang, W-side, depth 24m, 21.v.1986 (1 valve); sta. 27 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, NW-side, 27.v.1986 (1 live specimen); sta. 28 Sulawesi, Gugusan Spermonde, Pulau Kudingareng Keke, SW-side, 28.v.1986 (1 live specimen).
Material *Gloripallium pallium* f. *speciosum*.— sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve); sta. 4.136 NE Taka Bone Rate (Tiger Isl.), NE of Tarupa Kecil, 6°28.3'S 121°09'E, Van Veen-grab, depth 375 m, muddy calcareous sand with some coral stones, scarce macrofauna,

25.ix.1984 (1 valve); sta. 4.232 NE Taka BoneRate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°32.1'S 121°09'E, rectangular dredge, depth 59m, calcareous nodules, sponges, 16.x.1984 (1 valve).

Distribution and ecology.— Throughout the Indo-Pacific region; living on sandy or muddy sand bottoms and byssally attached to rocks, stones, corals or coral rubble and sediments, at intertidal to sublittoral depth. *G. pallium* f. *speciosum* has also been observed in deeper water.

Remarks.— The present material corresponds very well with the type specimens of *O. pallium* (LSL, syntypes; UUZM, syntypes (?); not registered) and *P. speciosum* (BM(NH) 1950.11.14.67, holotype), between which intermediate forms are observed. *G. pallium* f. *speciosum* is only an intrapopulation and bathymetric variant.

Hertlein (1969: N357) synonymized *Gloripallium* with *Cryptopecten*, but Waller (1972: 241) clearly determined the morphological differences. Waller (1986: 40) recently placed *Gloripallium* in the tribus Decatopectinini.

Genus **Juxtamusium** Iredale, 1939

Type species: *Juxtamusium oblectatum* Iredale, 1939; = *Pecten (Chlamys) coudeini* Bavay, 1903.

Juxtamusium maldivense (E.A. Smith, 1903)

o *Pecten maldivense* E.A. Smith, 1903: 622, pl. 36 figs. 19-20.
Juxtamusium maldivense; Iredale, 1939: 368; Waller, 1972: 250-254, pl. 7 figs. 111-127, pl. 8 fig. 134, figs. 7,19,20, table 12; Dijkstra, 1984: 8-9, illustr.

Material.— sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), shell gravel and foraminifera sand, depth 285-305 m, 9.ix.1984 (1 valve); sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large Foraminifera, some calcareous stones with Epizoa, 29.ix.1984 (1 valve); sta. 4.181 SW Salayer, W of Pulau Guang, Van Veen-grab (5x), 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34m, rather fine coral rubble, 8.x.1984 (2 valves); sta. 18 Sulawesi, Gugusan Spermonde, Pulau Barang Caddi (=Barang Keke), E-side reef, sandy slope, 31.x.1985 (1 live specimen).

Distribution and ecology.— Western and southwestern Pacific and the western and northwestern region of the Indian Ocean; living on sandy bottoms between corals, coral rubble or gravel, at littoral to sublittoral depth.

Remarks.— The present material is similar to the type specimens from the Maldive Islands (BM(NH) 1903.9.17.49-53, syntypes). For further information, see Waller (1972: 250), who overlooked *J. coudeini* (Bavay, 1903), however, which is a senior synonym of *J. oblectatum* Iredale, 1939. Material of both taxa indicates that the sculpture is variable. More material from different areas is needed for comparative investigations.

Genus **Mirapecten** Dall, Bartsch & Rehder, 1938

Type species: *Mirapecten thaanumi* Dall, Bartsch & Rehder, 1938 = *Pecten mirificus* Reeve, 1853.

Mirapecten mirificus (Reeve, 1853)

o *Pecten mirificus* Reeve, 1853: spec. 104, pl. 26 fig. 104.
. *Mirapecten thaanumi* Dall, Bartsch & Rehder, 1939: 84, pl. 21 figs. 7-8.
Mirapecten mirificus; Kay, 1979: 526, figs. 158B,169A-B; Dijkstra, 1988: 14.

Material.— sta. 4.162 off SW Salayer, 6°21.3'S 120°26.1'E, Van Veen-grab, depth 70 m, calcareous sand, shell gravel, large Foraminifera, some calcareous stones with Epizoa, 29.ix.1984 (2 valves).

Distribution and ecology.— Throughout the Indo-Pacific region; living on sandy bottoms with coral rubble, gravel or sediments, at littoral to sublittoral depth.

Remarks.— The present material corresponds very well with the type specimen of *P. mirificus* from the Moluccas (BM(NH) 1950.11.14.46, holotype); only the sculpture of the left valve is somewhat more obsolete and the radiation of the right valve is more acute and spinous. However, the material is very variable in size, sculpture and colouration.

Kay (1979: 526) and Waller (1986: 40) synonymized *M. thaanumi* from the Hawaiian Islands with *M. mirificus*. *Mirapecten* is placed in the tribus Decatopectinini by Waller (1986: 40).

Mirapecten rastellum (Lamarck, 1819)

o *Pecten rastellum* Lamarck, 1819: 166-167; Delessert, 1841: pl. 16 figs. 1a-b; Chenu, 1843: 5, pl. 15 figs. 2,2a-b,4,4a.
o *Pecten amaliae* Kobelt, 1887: 84, 198-200, pl. 53 figs. 5-6.
Pecten (Chlamys) squamatus; Dautzenberg & Bavay, 1912: 9 (non *Ostrea squamata* Gmelin).
Mirapecten rastellum; Dijkstra, 1988: 14, illustr.

Material.— sta. 4.019 Tukang Besi Islands, Banda Sea, S of Kaledupa reef, 5°57.5'S 123°46.5'E, Van Veen-grab (2x), depth 285-305 m, shell gravel and foraminifera sand, 9.ix.1984 (1 valve); sta. 4.181 SW Salayer, W of Pulau Guang, 6°21'S 120°26.2'E, Van Veen-grab (5x), depth 34 m, rather fine coral rubble, 8.x.1984 (1 valve).

Distribution and ecology.— From throughout the western and southwestern to the central Pacific; living on sandy bottoms with corals, coral rubble, gravel or sediments, at littoral to sublittoral depth.

Remarks.— The present material is very similar to the type specimen of *P. rastellum* (MHNG 1088/24, syntype). Some authors considered *M. rastellum* a junior synonym of *O. squamata* Gmelin, 1719, but Gmelin only refers to Lister (1770: pl. 183 fig. 20), a figure which most probably applies to *Chlamys imbricata* (Gmelin, 1791), known from the western Atlantic, and certainly not to Lamarck's *rastellum*.

After having studied the holotype of *P. amaliae* in the Loebbecke collection, in the Loebbecke Museum & Aquarium at Düsseldorf, this nominal taxon prooved to be a junior synonym of *M. rastellum*. Rehder (1944: 52) described *Comptopallium spiceri* from the Line Islands (central Pacific), which is very similar to *M. rastellum*, and should be placed in *Mirapecten*. Perhaps it is only a geographic variant of *M. rastellum*.

Genus **Pecten** Müller, 1776
Subgenus **Oppenheimopecten** Von Teppner, 1922

Type species: *Pecten subbenedictus* Fontannes, 1878.

Pecten (Oppenheimopecten) excavatus Anton, 1839

. *Pecten excavatus* Anton, 1839: 19; Philippi, 1845: 201, pl. 2 fig. 1.
o *Pecten sinensis* Sowerby II, 1842: 48, pl. 16 figs. 120-121, 134.; Reeve, 1852: spec. 33, pl. 8 fig. 33.
o *Pecten puncticulatus* Dunker, 1877: 71.
Vola puncticulata; Dunker, 1882: 244, pl. 11 figs. 10-11.
Pecten benedictus excavatus; Fleming, 1957: 9, 16, 17, 18, 22, 23, 33, 35, pl. 1 figs. 3-4, 6-7.
Pecten (Notovola) sinensis; Kira, 1962: 134, pl. 48 fig. 1-2.
Pecten (Oppenheimopecten) excavatus; Wang, 1989: 177-179, pl. 1 figs. 5-6.

Material.— sta. 4.057 NE coast of Sumba, E of Melolo, 9°52.8'S 120°44.7'E, rectangular dredge, depth 154 m, many dead shells, 14.ix.1984 (3 valves).

Distribution and ecology.— From throughout the western and southwestern Pacific to northern Australia; living on muddy sand or sandy bottoms in shallow waters. This species is a new record for Indonesia.

Remarks.— The present material is similar to *P. excavatus* Anton, as it has been described and figured by Philippi (1845: 201, pl. 2 fig. 2), although the shells are less concave, and the radiation somewhat weaker. However, these differences are considered within the range of normal variation.

Fleming (1957: 16) placed *P. excavatus* in the *'benedictus*-group'. The morphological features of *P. excavatus* correspond very well with those of *Oppenheimopecten*, which is treated as a subgenus of *Pecten* by Hertlein (1969: N369).

Nomenclature, taxonomy and zoogeography of related species from the Indo-Pacific region are still under study.

Genus **Serratovola** Habe, 1951

Type species: *Pecten tricarinatus* Anton, 1839 (non Defrance).

Serratovola gardineri (E.A. Smith, 1903)

. *Pecten tricarinatus* Anton (non Defrance), 1939: 19; Küster, 1858: 80-81, pl. 20 fig. 4; Dautzenberg & Bavay,1912: 3.
o *Janira gardineri* E.A. Smith, 1903: 622, pl. 36 figs. 21-22.
Serratovola tricarnatus; Wang, 1989: 181-182, pl. 1 figs. 3-4.

Material.— sta. 4.134 NE Taka Bone Rate (Tiger Isl.), SE of Tarupa Kecil, 6°31'S 121°08.2'E, Van Veen-grab (8x), depth 53-59 m, lagoon entrance, foraminifera sand and calcareous gravel, scarce macrofauna, rich microfauna, 25.ix.1984 (8 valves); sta. 4.234 NE Taka Bone Rate (Tiger Isl.), S of Pulau Tarupa Kecil, 6°31.6'S 121°07.5'E, 3.5 m Agassiz-trawl, depth 58 m, sandy bottom with calcareous nodules, sponges, 17.x.1984 (1 valve).

Distribution and ecology.— Throughout the western and southwestern Pacific and in the northern region of the Indian Ocean; living on muddy sand or sandy bottoms with sediments, at littoral depth.

Remarks.— The present material corresponds very well with the description of *J. gardineri*; only the colouration (somewhat paler) and radiation (angular) are somewhat different, but intermediate forms have also been observed. In early growth-stages the radial costae of the right valves have a tripartite appearance by detrition. Near the ventral marginal region the radiation is more clearly undulated with fine concentric lamellae, which may be absent as well, however, *S. passerina* (Hinds, 1845), and *S. rubicunda* (Chenu, 1845), both nom. nov. for *Pecten asper* Sowerby II, 1842 (non Lamarck, 1819), concern a closely related species, which differs by more rounded costae of the right valve, and a red spotted colour on the left valve.

Habe (1951: 81) introduced *Serratovola*, which Hertlein (1969: N367) synonymized with *Pecten*. However, *Serratovola* differs from *Pecten* by its subcircular shape, subequal auricles, hollow sections in the radial costae and slightly convex to flat left valves.

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