

# Pectinoidea (Mollusca, Bivalvia, Propeamussiidae, Entoliidae and Pectinidae) from the Austral Islands (French Polynesia)

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## ABSTRACT

**KEY WORDS**  
Mollusca,  
Bivalvia,  
Pectinoidea,  
Propeamussiidae,  
Entoliidae,  
Pectinidae,  
Austral Islands,  
littoral,  
bathyal,  
new genus,  
new species.

Twenty-nine species of Pectinoidea (12 Propeamussiidae, 1 Entoliidae, 16 Pectinidae) are recorded from the Austral Islands, the southernmost archipelago of French Polynesia. One genus (Pectinidae: *Lamellipecten* n. gen.) and five species (Propeamussiidae: *Parvamussium australanum* n. sp., *Cyclochlamys australensis* n. sp., *Cyclopecten ambiguus* n. sp.; Pectinidae: *Lamellipecten aduncus* n. gen., n. sp., *Mimachlamys erycina* n. sp.) are new to science, and most others are new records for the archipelago. The near-shore fauna of Rapa has 12 species of Pectinidae, and half of these have narrow-range distributions. Such a remarkably high level of marine endemism is shared by other mollusc taxa on Rapa.

## RÉSUMÉ

**MOTS CLÉS**  
Mollusca,  
Bivalvia,  
Pectinoidea,  
Propeamussiidae,  
Entoliidae,  
Pectinidae,  
Archipel des Australes,  
littoral,  
bathyal,  
genre nouveau,  
espèces nouvelles.

*Pectinoidea* (Mollusca, Bivalvia, Propeamussiidae, Entoliidae et Pectinidae) des Îles Australes (Polynésie Française).

Vingt-neuf espèces de Pectinoidea (12 Propeamussiidae, 1 Entoliidae, 16 Pectinidae) ont été récoltées dans les Îles Australes, l'archipel le plus au sud de la Polynésie française. Un genre (Pectinidae: *Lamellipecten* n. gen.) et cinq espèces (Propeamussiidae: *Parvamussium australanum* n. sp., *Cyclochlamys australensis* n. sp., *Cyclopecten ambiguus* n. sp.; Pectinidae: *Lamellipecten aduncus* n. gen., n. sp., *Mimachlamys erycina* n. sp.) sont nouveaux pour la science, et la quasi totalité des autres sont des signalements nouveaux pour l'archipel. La faune côtière de Rapa comprend 12 espèces de Pectinidae, dont la moitié ont des distributions très restreintes. Un tel niveau d'endémisme marin est remarquable et est également présent chez les autres groupes de mollusques étudiés à Rapa.

## INTRODUCTION

The Austral Islands – which include the inhabited islands of Rapa, Raivavae, Tubuai, Rurutu, Rimatara and the uninhabited outliers of Marotiri and Maria – extend to the south of Tahiti, roughly between 22 and 28°S (Fig. 1). Currently, 448 marine mollusc species have been recorded from this island group (Tröndlé & Boutet 2009), reflecting both an absolute lower richness and a comparatively less intensive sampling effort compared to the rest of French Polynesia. Two combined marine biodiversity expeditions were conducted to the Austral Islands in 2002: the shore-based Atelier RAPA sampled the island of Rapa from the intertidal to about 60 m deep, while the BENTHAUS cruise on board RV *Alis* sampled the whole chain by dredging and trawling to about 1200 m deep (Bouchet *et al.* 2008). Taxonomic work on the mollusc samples is in progress, and a significant number of new records and new species have already been published (Schwabe & Lozouet 2006; Vidal & Kirkendale 2007; Geiger 2008; Houart & Tröndlé 2008; Alf & Kreipl 2009). The present paper deals with the pectinoid bivalves collected during these expeditions.

Prior to the Atelier RAPA and BENTHAUS expeditions, only two pectinid species were recorded from the Australs (Richard 1986: 201, as *Semipallium rapanense* (Bavay, 1905) and *Chlamys coruscans* (Hinds, 1845)); Tröndlé & Boutet (2009) added four new records (including one erroneous identification corrected herein) based on the same material that is reported in the present paper. Recently, a total of 41 pectinoid species were known from French Polynesia (Tröndlé & Boutet 2009): 14 from the Marquesas, 11 from the Society Is, 10 from the Tuamotus, and just 6 from the Australs. This inventory is now spectacularly boosted to 29 species herein recorded from the Austral Islands alone: 12 propeamussiids, 1 entoliid and 16 pectinids. Of these, one genus (Pectinidae: *Lamellipecten* n. gen.), three species of Propeamussiidae (*Parvamussium australanum* n. sp., *Cyclochlamys australense* n. sp. and *Cyclopecten biformatus* n. sp.) and two of Pectinidae (*Lamellipecten aduncus* n. gen., n. sp., *Mimachlamys erycina* n. sp.) are new to science. One new species (*Cryptopecten* sp. A) is left unnamed

for lack of adequate material. Twenty-four species are new records for the Austral Islands.

Species treated in full in earlier publications (Dijkstra 1989a, 1995a, 2002) are here only recorded and the material listed, but are not illustrated again. All material is deposited in the MNHN.

## ABBREVIATIONS AND TEXT CONVENTIONS

*Repositories*

- BMNH The Natural History Museum, London;  
coll. HD H. H. Dijkstra collection;  
MHNB Muséum d'Histoire naturelle de Bordeaux;  
MNHN Muséum national d'Histoire naturelle, Paris;  
RMNH Naturalis, Nationaal Natuurhistorisch Museum, Leiden;  
USNM National Museum of Natural History, Washington, DC;  
ZMA Zoologisch Museum, Amsterdam;  
ZSI Zoological Survey of India, New Alipur, Calcutta.

*Station data*

- CAS casier (lobster trap);  
CP chalut à perche (beam trawl);  
DW drague Warén (Warén dredge).

*Other abbreviations*

- lv left valve(s);  
rv right valve(s);  
spm(s) live-taken specimen(s);  
IRD Institut de Recherche pour le Développement.

## SYSTEMATICS

- Superfamily PECTINOIDEA Rafinesque, 1815  
Family PROPEAMUSSIIDAE Abbott, 1954  
Genus *Propeamussium* de Gregorio, 1884

*Propeamussium watsoni* (Smith, 1885)

*Amussium watsoni* Smith, 1885: 309, pl. 22, figs 8-8c.

*Propeamussium watsoni* – Dijkstra 1995a: 24, figs 27-30, 123, 124 (synonymy, references, type data, distribution, description).

MATERIAL EXAMINED. — **New Guinea**. NE, 1957 m, lectotype spm (BMNH 1887.2.9.3307, designated by Dijkstra [1995a: 24]).

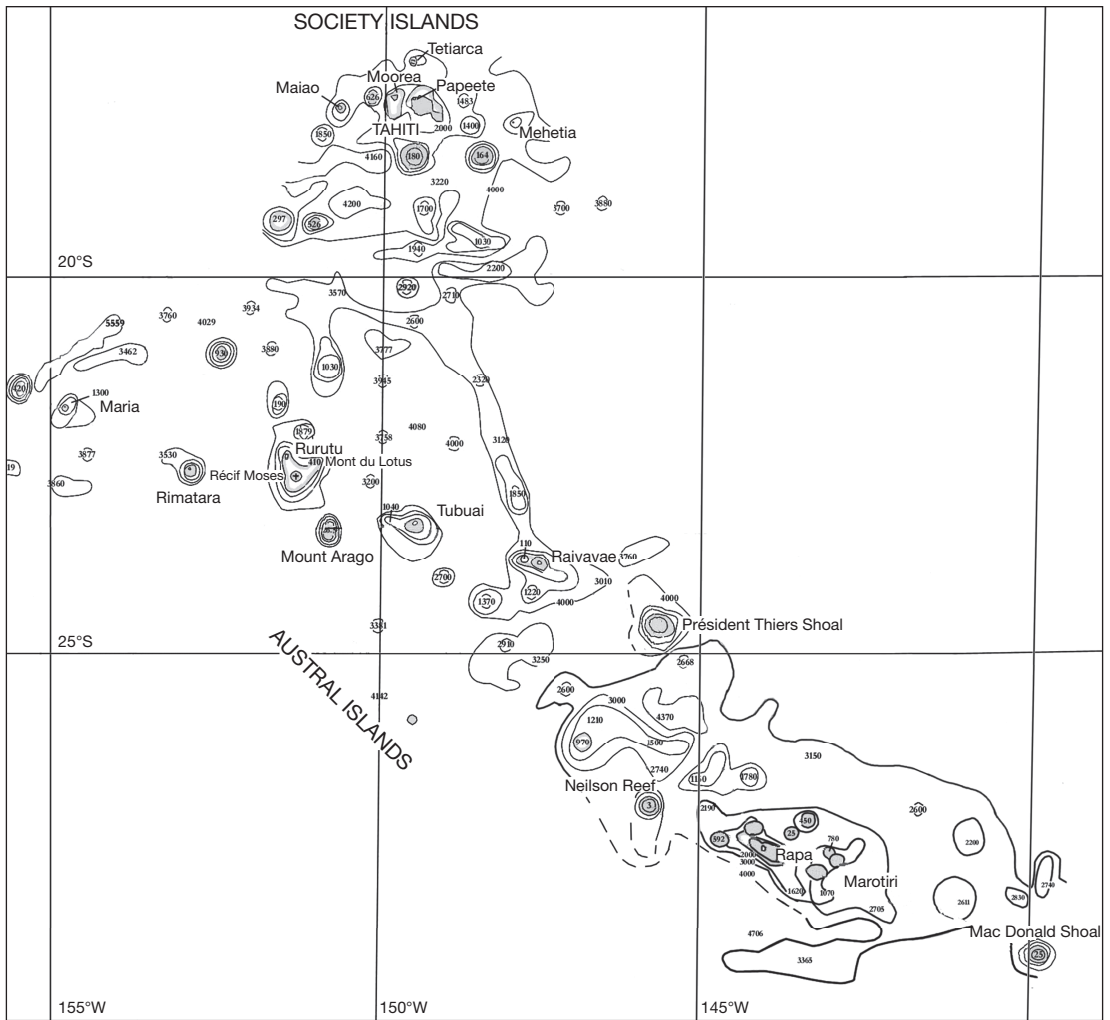


FIG. 1. — Study area: the BENTHAUS expedition (RV *Aliis*, November 2002) covered the chain of the Austral Islands from Mac Donald to Rimatara; “Atelier RAPA” was entirely carried out on Rapa I.

**Rapa.** BENTHAUS, stn CP 1911, 27°38'S, 144°15'W, 900-1300 m, 1 lv, 1 rv.

**DISTRIBUTION.** — Northern Indian Ocean, southern Japan, Papua New Guinea, New Caledonia, and Vanuatu (Dijkstra 2001: 82). Depth range 650-1300 m (alive). Now also Austral Islands (new record), only single valves at 900 m depth.

**REMARKS**

The left and right valves are similar to the type material, although the commarginal lamellae on

the left valve are somewhat more closely arranged (intermediate lamellar space is variable). Other shell characters are identical to the type material.

Genus *Parvamussium* Sacco, 1897

*Parvamussium australanum* n. sp.

(Fig. 2A-E)

**TYPE MATERIAL.** — **Rapa.** BENTHAUS, stn CP 1891, 27°37'S, 144°15'W, 800-850 m, holotype spm (MNHN

21377). — Same data, paratypes, 14 spms, 31 lv, 6 rv (46 MNHN 21378, 3 ZMA Moll. 4.09.010, 2 NMNZ M.287777).

TYPE LOCALITY. — Austral Islands, east of Rapa Island, 27°37'S, 144°15'W, 800-850 m (BENTHAUS, stn CP 1891).

ETYMOLOGY. — After the Austral Islands.

OTHER MATERIAL EXAMINED. — **Rapa**. BENTHAUS, stn CP 1892, 27°39'S, 144°16'W, 742-1000 m, 11 spms, 6 lv. — Stn CP 1909, 27°39'S, 144°16'W, 783-1000 m, 1 spm.

**Banc Nord-Est Rapa**. BENTHAUS, stn DW 1904, 27°27'S, 144°03'W, 600-900 m, 1 lv.

**Banc Président Thiers**. BENTHAUS, stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 rv.

**Tubuai**. BENTHAUS, stn CP 1965, 23°21'S, 149°34'W, 500-1200 m, 1 spm.

**Banc Arago**. BENTHAUS, stn DW 1969, 23°22'S, 150°43'W, 200-640 m, 1 lv. — Stn DW 1972, 23°22'S, 150°43'W, 500-1020 m, 1 spm, 5 lv, 1 rv. — Stn DW 1975, 23°24'S, 150°44.3'W, 600-691 m, 1 rv.

**Rurutu, Mont du Lotus**. BENTHAUS, stn DW 1991, 22°36'S, 151°00'W, 470-780 m, 4 lv, 4 rv. — Stn DW 1992, 22°34'S, 151°00'W, 442-444 m, 1 lv.

**Rurutu**. BENTHAUS, stn DW 2004, 22°28'S, 151°19'W, 430-850 m, 2 lv. — Stn DW 2010, 22°32'S, 151°21'W, 520-950 m, 1 spm, 5 lv, 1 rv.

DISTRIBUTION. — Austral Islands, 200-800 m, alive at 500-800 m depth.

#### DESCRIPTION

Shell up to *c.* 12 mm in height, fragile, opaque white to semi-transparent, glossy near umbonal area, left valve slightly more convex than right valve, nearly circular, somewhat higher than wide, inequivalve, nearly equilateral, auricles unequal in shape and size (anterior larger than posterior).

Left valve sculptured with ventrally curled, distinct narrow commarginal lamellae (sometimes to hollow bands), commencing at *c.* 4 mm from umbonal margin, widely spaced (*c.* 1 mm apart on central part of disc), extending and more closely spaced to the ventral area, transforming to very closely spaced commarginal lamellae near the periphery. Interstitial, closely spaced, weak radial threads commence on the central part of the disc, more prominent laterally. Anterior auricle with rather coarse commarginal lamellae, posterior auricle nearly smooth, weak closely spaced, delicate commarginal lamellae near the margin.

Right valve with closely spaced, regularly arranged weak commarginal lirae. Marginal apron (*c.* 1 mm high) pressed to left valve, broken off many specimens. Anterior auricle with coarse closely spaced commarginal lamellae, posterior more delicate. Hinge line straight. Byssal notch shallow, byssal fasciole narrow, ctenolium lacking. Internally 10 or 11 radial ribs (sometimes lacking on the central part and only rudimentary laterally), commencing *c.* 3-5 mm from umbonal margin, extending nearly to ventral margin.

Dimensions of holotype: H 11.5 mm, W 11.2 mm, D 2.4 mm.

#### REMARKS

The commarginal sculpture of the left valve of the present species strongly resembles the sculpture of *Cyclopecten cincinnatus* Dijkstra & Gofas, 2004, from the northeastern Atlantic (Dijkstra & Gofas 2004: 48, fig. 11A, B, D), however the commarginal sculpture of *C. cincinnatus* already starts in early growth stage (*c.* 0.1 mm, 4 mm of *P. australanum*). Moreover, *C. cincinnatus* lacks close-set commarginal lamellae near the ventral margin and also lacks internal ribs.

The commarginal sculpture of *P. australanum* also somewhat resembles two other bathyal Pacific species, *P. multiliratum* Dijkstra, 1995 (see above) and *Parvamussium retiaculum* Dijkstra, 1995, but both species have more closely spaced delicate lamellae. Moreover, *P. multiliratum* lacks radial sculpture and has more interior ribs (*c.* 14 and rudimentary). *P. retiaculum* has more widely spaced radial riblets, a larger anterior auricle of the right valve and coarser interior ribs than *P. australanum*.

#### *Parvamussium cristatellum* (Dautzenberg & Bavay, 1912)

*Amussium cristatellum* Dautzenberg & Bavay, 1912: 36, pl. 28, figs 5-8 (nomen novum for *Pecten (Amussium) cristatum* [sic] Bavay, 1905: 187, pl. 17, fig. 2a-c, non *Pecten cristatus* Bronn, 1828).

*Parvamussium cristatellum* – Dijkstra 1991: 13, figs 28-32. — Dijkstra & Marshall 1997: 80, pl. 3, figs 4-8,

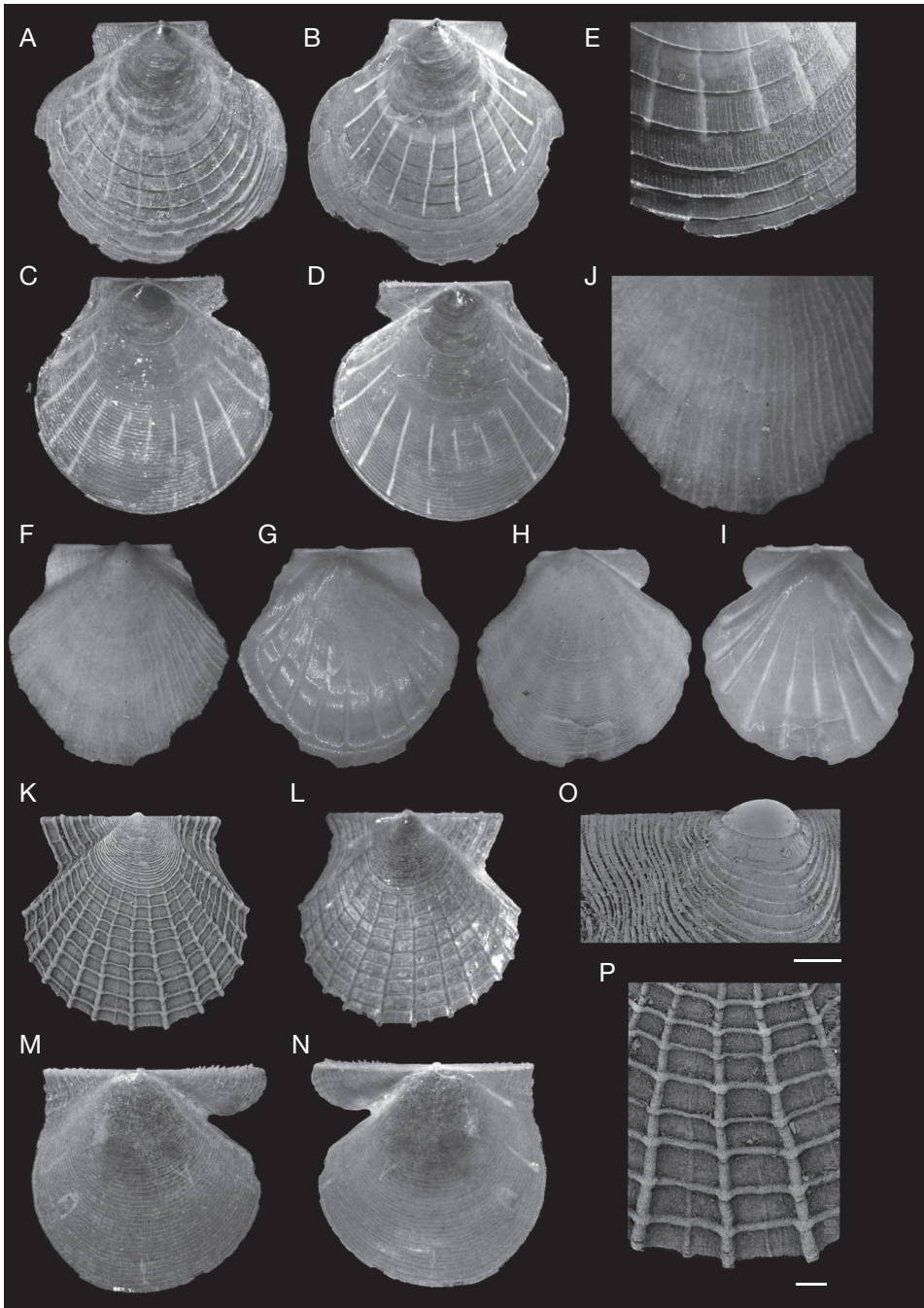


FIG. 2. — **A-E**, *Parvamussium australanum* n. sp.; **A, B**, holotype, external and internal views of the left valve; **C, D**, holotype, external and internal views of the right valve; **E**, details of the left valve; **F-J**, *Parvamussium dautzenbergi* (Dijkstra, 1990); **F, G**, external and internal views of the left valve; **H, I**, external and internal views of the right valve; **J**, details of the left valve; **K-P**, *Cyclopecten ambiguus* n. sp.; **K, L**, holotype, external (SEM) and internal views of the left valve; **M, N**, external and internal views of the right valve; **O**, prodissococonch and early stage of the left valve (SEM); **P**, details of the left valve (SEM). Scale bars: O, 100  $\mu$ m, P, 200  $\mu$ m.

pl. 4, figs 1, 2; 2008: 7, figs 5, 6A-D [references, type data, supplementary description, distribution]. — Dijkstra & Maestrati 2008: 86 [distribution].

**MATERIAL EXAMINED.** — **Andaman Islands.** Lectotype lv (ZSI M3360/1, designated by Dijkstra & Kastoro [1997: 261]).

**Marotiri.** BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 3 lv, 4 rv. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 lv. — Stn DW 1887, 27°52'S, 143°33'W, 750-1000 m, 1 lv.

**Banc Nord-Est Rapa.** BENTHAUS, stn DW 1903, 27°27'S, 144°04'W, 400-800 m, 1 rv.

**Récif Neilson.** BENTHAUS, stn DW 1919, 27°04'S, 146°04'W, 140-390 m, 1 rv. — Stn DW 1923, 27°01'S, 146°05'W, 360-840 m, 3 lv, 5 rv. — Stn DW 1924, 27°01'S, 146°05'W, 340-800 m, 2 lv, 14 rv. — Stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 6 rv.

**Tubuai.** BENTHAUS, stn DW 1957, 23°19'S, 149°29'W, 558-1000 m, 2 rv. — Stn DW 1961, 23°21'S, 149°34'W, 470-800 m, 1 rv.

**Rurutu, Mont Lotus.** BENTHAUS, stn CP 1989, 22°36.2'S, 151°00.0'W, 456 m, 1 lv.

**Rurutu.** BENTHAUS, stn DW 1998, 22°25'S, 151°22'W, 250-302 m, 2 lv. — Stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv. — Stn DW 2000, 22°25'S, 151°22'W, 270-480 m, 8 lv, 3 rv. — Stn DW 2001, 22°27'S, 151°20'W, 200-550 m, 1 rv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 2 lv, 2 rv.

**DISTRIBUTION.** — Southeastern Africa, Andaman Islands, Indonesian Archipelago, Solomon Islands (Dijkstra 2001: 83; Dijkstra & Maestrati 2008: 87); Lord Howe Ridge (Dijkstra & Marshall 2008: 7), Kermadec Islands, New Caledonia, Vanuatu, Fiji Islands, Wallis and Futuna. Depth range 330-510 m (alive). Now also Austral Islands (new record), only single valves at 140-750 m depth.

**REMARKS.** — The present material is rather variable in sculpture of the left valve. The radial ribs are weak to prominent and closely to widely spaced. The commarginal lamellae are more widely spaced in the central part of the disc to more closely arranged near the periphery. Internal ribs also vary in number (10 to 12, usually 10, with one or two interstitial rudimentary ones). This variation is also observed in other studied material (MNHN) from the tropical Indo-Pacific. All shell characters are similar to the type material.

*Parvamussium dautzenbergi* (Dijkstra, 1990)  
(Fig. 2F-J)

*Propeamussium* (*Parvamussium*) *dautzenbergi* Dijkstra, 1990: 2, figs 5-8.

*Parvamussium dautzenbergi* – Dijkstra & Maestrati 2008: 87 [distribution]. — Tröndlé & Boutet 2009: 7 [listed from Austral Is].

**MATERIAL EXAMINED.** — **Indonesia.** Makassar Strait, 281 m, holotype lv (ZMA Moll. 3.89.005).

**Marotiri.** BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 4 lv. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 2 lv, 5 rv. — Stn DW 1887, 27°52'S, 143°33'W, 750-1000 m, 1 lv.

**Banc Président Thiers.** BENTHAUS, stn DW 1934, 24°41'S, 145°57'W, 560-1150 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1979, 23°22'S, 150°44'W, 176-340 m, 2 lv.

**Rurutu.** BENTHAUS, stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv.

**DISTRIBUTION.** — Indonesian Archipelago and Solomon Islands (Dijkstra & Maestrati 2008: 87). Depth range 281-655 m (dead). Austral Islands, only loose valves at 176-750 m depth.

**REMARKS**

The present specimens are similar to the type material. The radial riblets of the left valve are unevenly, widely spaced and more pronounced than the commarginal lamellae, which are microscopically closely spaced. External and internal sculpture is rather constant.

*Parvamussium lozoueti*  
Dijkstra & Maestrati, 2008

*Parvamussium lozoueti* Dijkstra & Maestrati, 2008: 87-89, figs 11-17.

**MATERIAL EXAMINED.** — **Fiji.** 670-682 m, holotype spm (MNHN 20449).

**Marotiri.** BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 1 spm. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 rv.

**Rapa.** BENTHAUS, stn DW 1889, 27°37'S, 144°16'W, 600-620 m, 3 spms, 3 lv, 2 rv.

**Récif Neilson.** BENTHAUS, stn DW 1923, 27°01'S, 146°05'W, 360-840 m, 1 spm, 1 rv.

**Banc Arago.** BENTHAUS, stn DW 1969, 23°22'S, 150°43'W, 200-640 m, 1 spm.

**DISTRIBUTION.** — Fiji Islands and Tonga (Dijkstra & Maestrati 2008: 87). Depth range 660-777 m (alive). Now also Austral Islands (new record), alive at 200-600 m.

**REMARKS**

The present specimens are similar to the type material. The internal ribs only differ in development (2 or 3

TABLE 1. — Morphological comparisons between three species of *Parvamussium* Sacco, 1897.

|               | <i>P. australanum</i> n. sp.     | <i>P. multiliratum</i> Dijkstra, 1995 | <i>P. retiaculum</i> Dijkstra, 1995 |
|---------------|----------------------------------|---------------------------------------|-------------------------------------|
| Height        | up to c. 12 mm                   | up to c. 9 mm                         | up to c. 7 mm                       |
| Shape         | circular                         | circular                              | higher than wide                    |
| Sculpture lv  | wide-set lamellae radial threads | very close-set lamellae absent        | close-set lamellae radial riblets   |
| Internal ribs | 10 or 11 or rudim.               | 14 + rudimentary                      | 12                                  |

rudimentary laterally in the present material; full-grown in the type material). Other shell characters are identical.

### *Parvamussium multiliratum* Dijkstra, 1995

*Parvamussium multiliratum* Dijkstra, 1995a: 26, figs 31-34, 91, 92.

MATERIAL EXAMINED. — Southern New Caledonia. 2100-2110 m, holotype spm (MNHN 21173).

**Marotiri.** BENTHAUS, stn DW 1886, 27°51'S, 143°32'W, 620-1000 m, 2 rv.

**Rapa.** BENTHAUS, stn DW 1889, 27°37'S, 144°16'W, 600-620 m, 1 spm, 1 lv. — Stn DW 1890, 27°39'S, 144°16'W, 800-822 m, 3 rv. — Stn CP 1891, 27°37'S, 144°15'W, 800-850 m, 1 lv. — Stn DW 1894, 27°40'S, 144°22'W, 100 m, 1 lv.

**Récif Neilson.** BENTHAUS, stn DW 1923, 27°01'S, 146°05'W, 360-840 m, 1 lv, 1 rv. — Stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 4 lv, 5 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1975, 23°24'S, 150°44'W, 600-691 m, 1 lv.

**Rurutu.** BENTHAUS, stn DW 1998, 22°25'S, 151°22'W, 250-302 m, 1 lv.

DISTRIBUTION. — New Caledonia, Wallis and Futuna, Vanuatu, Fiji Islands and Tonga (Dijkstra 2001: 83; Dijkstra & Maestrati 2008: 91). Depth range 640-2110 m (alive). Now also Austral Islands (new record), alive at 600 m depth.

#### REMARKS

The present material is similar to the type material, although the commarginal sculpture is somewhat more close-set and the radial sculpture more prominent than in the type material. However, in other material examined (MNHN), this sculpture is rather variable in spacing and development.

### *Parvamussium scitulum* (E. A. Smith, 1885)

*Amussium scitulum* E. A. Smith, 1885: 312, pl. 23, figs 4-4b.

*Parvamussium scitulum* – Dijkstra 1995a: 31, figs 43-46, 153-154 [synonymy, references, type data, distribution, description].

MATERIAL EXAMINED. — New Guinea. South, 51 m, lectotype lv (BMNH 1887.2.9.3319/1, designated by Dijkstra [1995a: 31]).

**Marotiri.** BENTHAUS, stn DW 1886, 27°51'S, 143°32'W, 620-1000 m, 1 lv.

**Banc Lotus.** BENTHAUS, stn DW 1952, 23°49'S, 147°53'W, 300-372 m, 1 rv.

**Tubuai.** BENTHAUS, stn DW 1957, 23°19'S, 149°29'W, 558-1000 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1973, 23°24'S, 150°44'W, 200-350 m, 1 lv, 1 rv.

**Rurutu.** BENTHAUS, stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv, 2 rv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 1 lv, 1 rv.

DISTRIBUTION. — Western and southwestern Pacific from southern Japan to New Caledonia, Loyalty Islands, Tonga and Wallis and Futuna (Dijkstra 2001: 86; Dijkstra & Maestrati 2008: 94). Depth range 50-300 m (alive). Now also Austral Islands (new record), only single valves at 200-620 m depth.

#### REMARKS

The present specimens are similar to the type material, although larger in size (up to 10 mm high), but Smith (1885) already reported that the type material could be juveniles (Dijkstra 1995a: 32); they also have more numerous internal ribs (up to 16 and 2 or 3 rudimentary, vs 9 or 10 in the type material). Other characters are identical.

### *Parvamussium squalidulum* Dijkstra, 1995

*Parvamussium squalidulum* Dijkstra, 1995a: 32, figs 47-50. — Dijkstra & Marshall 2008: 12, figs 10A-E,

11 [references, type data, supplementary description, distribution].

**MATERIAL EXAMINED.** — **Lord Howe Rise.** Kelso Bank, 270 m, holotype spm (MNHN 21169).

**Marotiri.** BENTHAUS, stn DW 1881, 27°55'S, 143°29'W, 112-121 m, 1 spm, 1 lv, 5 rv. — Stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 1 lv, 2 rv.

**Récif Neilson.** BENTHAUS, stn DW 27°02'S, 146°00'W, 120 m, 1 lv, 2 rv. — Stn DW 1914, 27°04'S, 146°04'W, 150 m, 1 lv. — Stn DW 1915, 27°03'S, 146°04'W, 120-200 m, 6 rv. — Stn CP 1918, 27°03'S, 146°04'W, 130-140 m, 1 rv. — Stn DW 1923, 27°01'S, 146°05'W, 360-840 m, 1 lv, 1 rv. — Stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 1 lv, 1 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 lv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv, 1 rv.

**Banc Arago.** BENTHAUS, stn DW 1979, 23°22'S, 150°44'W, 176-340 m, 1 lv, 4 rv.

**DISTRIBUTION.** — Coral Sea, Loyalty Islands, Vanuatu, Kermadec Islands, Wallis and Futuna, Fiji Islands and Tonga (Dijkstra & Marshall 1997: 81; Dijkstra 2001: 86; Dijkstra & Maestrati 2008: 94). Depth range 260-523 m (alive). Now also Austral Islands (new record), alive at 112 m depth.

#### REMARKS

The present specimens are similar to the type material, although the sculpture of the left valve is somewhat weaker and more delicate. Other characters are identical.

### *Parvamussium undisonum* Dijkstra, 1995

*Parvamussium undisonum* Dijkstra, 1995a: 37, figs 55-58.

**MATERIAL EXAMINED.** — **Loyalty Islands.** 700 m, holotype spm (MNHN 21421).

**Rurutu.** BENTHAUS, stn DW 2004, 22°28'S, 151°19'W, 430-850 m, 1 spm.

**DISTRIBUTION.** — Solomon Islands, New Caledonia, Loyalty Islands, New Hebrides Arc, Wallis and Futuna, Fiji Islands and Tonga (Dijkstra 1995a: 37; 2001: 87; Dijkstra & Maestrati 2008: 95, 96). Now also Austral Islands (new record), alive at 430-850 m depth.

#### REMARKS

The present specimen is similar to the type material from the Loyalty Islands. The radial sculpture on the left valve is somewhat weaker and the internal

ribs are almost lacking. Both features are rather variable in other material examined (MNHN) and this specimen falls within the range of variability. Other characters are identical.

### *Parvamussium undosum* Dijkstra, 1991

*Parvamussium undosum* Dijkstra, 1991: 18, figs 53-61.

**MATERIAL EXAMINED.** — **Indonesia.** Banda Sea, 250-290 m, holotype lv (RMNH 56550).

**Marotiri.** BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 1 lv. — Stn DW 1887, 27°52'S, 143°33'W, 750-1000 m, 1 lv.

**Rapa Est.** BENTHAUS, stn DW 1889, 27°37'S, 144°16'W, 600-620 m, 1 lv.

**Récif Neilson.** BENTHAUS, stn DW 1924, 27°01'S, 146°05'W, 340-800 m, 4 lv. — Stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 2 lv.

**Banc Lotus.** BENTHAUS, stn DW 1951, 23°49'S, 147°53'W, 206-450 m, 4 lv, 4 rv.

**Banc Arago.** BENTHAUS, stn DW 1979, 23°22'S, 150°44'W, 176-340 m, 1 rv.

**Rurutu, Mont du Lotus.** BENTHAUS, stn DW 1988, 22°36'S, 150°59'W, 451-456 m, 1 lv, 1 rv. — Stn DW 1992, 22°34'S, 151°00'W, 442-444 m, 1 spm.

**Rurutu.** BENTHAUS, stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 5 lv, 2 rv. — Stn DW 2000, 22°25'S, 151°22'W, 270-480 m, 3 spms. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 1 lv.

**DISTRIBUTION.** — Indonesia, Solomon Islands, Norfolk Ridge, Wallis and Futuna (Dijkstra 2001: 87; Dijkstra & Maestrati 2008: 96). Depth range 250-600 m (dead). Now also Austral Islands (new record), alive at 270-442 m depth.

#### REMARKS

The radial lirae and commarginal lamellae of the present specimens are somewhat weaker than in the type material from Indonesia. Other characters are identical.

### Genus *Cyclopecten* Verrill, 1897

#### *Cyclopecten ambiguus* n. sp. (Fig. 2K-P)

*Cyclopecten cancellus* – Tröndlé & Boutet 2009: 6 [listed from Austral Is as *C. cancellus*].



TYPE MATERIAL. — **Rapa.** Atelier RAPA stn 43, 27°36.8'S, 144°18.3'W, 45 m, holotype lv (MNHN 21385). — Same data, paratypes, 3 lv, 4 rv (4 MNHN 21386, 2 ZMA Moll. 4.09.011, 1 NMNZ M.287778).

TYPE LOCALITY. — Austral Islands, Rapa Island, Baie de Haurei, 27°36.8'S, 144°18.3'W, 45 m (Atelier RAPA, stn 43).

ETYMOLOGY. — From the transforming sculpture (commarginal in juvenile stage, reticular in adult stage) on the left valve (Latin *ambiguus*, adjective meaning changeable, variable or inconstant).

OTHER MATERIAL EXAMINED. — **Rapa.** Atelier RAPA, stn 30, 27°38.2'S, 144°18.2'W, 16–20 m, 7 lv, 2 rv. — Stn 44, 27°36.3'S, 144°18.2'W, 30 m, 4 lv. — Stn 47, 27°36.7'S, 144°19.1'W, 33 m, 1 rv. — Stn 48, 27°34.1'S, 144°22.1'W, 36 m, 5 lv, 3 rv (1 ZMA).

**Banc Arago.** BENTHAUS, stn DW 1979, 23°22'S, 150°44'W, 176–340 m, 1 lv.

DISTRIBUTION. — Austral Islands, only single valves at 16–176 m depth.

#### DESCRIPTION

Shell up to *c.* 4 mm high, circular, inequivalve, equilateral, left valve slightly more inflated than right valve (nearly flat), auricles nearly equal in size, unequal in shape, opaque whitish (lv), translucent (rv).

Left valve disc sculpture commencing immediately by very closely spaced commarginal lirae (*c.* 20 per mm) to 1 mm from the top margin, followed by a reticulate sculpture of widely spaced radial lirae (12 or 13) and overrunning commarginal lirae (*c.* 5 per mm), forming weak nodules on the intersections. Secondary intercalated radial lirae commence on the central part of the disc. Anterior and posterior auricle with 4 or 5 strongly developed commarginal lirae and one weak radial lira.

Right valve disc with very closely spaced commarginal lirae in early growth stage, gradually slightly wider to the ventral margin. Auricles with strong commarginal lirae (numerous on anterior, 9 or 10 on posterior). Hinge line straight. Byssal notch relatively deep, byssal fasciole rather broad. Internal rudimentary riblets near ventral area in adult stage.

Dimensions of holotype: H 3.0 mm, W 3.0 mm.

#### REMARKS

The present species is morphologically closest (similar size, shape and reticulated sculpture) to *Cyclopecten*

*cancellus* Dijkstra, 1991, from the southwestern Pacific (and was indeed listed from the Australs by Tröndlé & Boutet as *C. cancellus*), but differs in having very closely spaced lirae in early growth stage (*c.* 20 per mm in *C. ambiguus*, vs *c.* 6 or 7 in *C. cancellus*), a weaker sculpture of radial lirae, lacking radial sculpture on the auricles (*C. cancellus* 2 or 3), and rudimentary inner riblets (usually lacking in typical *C. cancellus*).

*Cyclopecten thyrideus* (Melville, 1907), from the northwestern Indian Ocean is also close to *C. ambiguus* (somewhat similar in size, shape, sculpture and internal rudimentary riblets), but differs in having a fine microscopic radial sculpture in early growth stage immediately below the dissoconch stage (a commarginal sculpture in *C. ambiguus*), weaker commarginal lirae on the left valve and fewer commarginal lirae on the anterior auricle of the right valve).

*Cyclopecten ryukyuensis* Hayami & Kase, 1993, from southern Japan and the Philippines is similar in size, shape and sculpture, but differs in having widely spaced commarginal lirae and irregular anti-marginal intercalated scratches (see Hayami & Kase 1993: figs 195, 197) in early growth stage on the left valve (only closely spaced commarginal lirae in *C. ambiguus*), fewer intermediate secondary radial lirae, and in lacking internal rudimentary riblets.

Finally, *Cyclopecten secundus* (Finlay, 1926), from New Zealand, also has a somewhat similar sculpture in early growth stage as *C. ryukyuensis*, although with more closely spaced (but much wider and stronger than in *C. ambiguus*), more prominent commarginal lirae with strong lamellae on the intersections (almost lacking in *C. ambiguus*) and sometimes 1 or 2 internal rudimentary riblets near the periphery (usually and more numerous in *C. ambiguus*).

#### Genus *Cyclochlamys* Finlay, 1926

#### *Cyclochlamys australensis* n. sp. (Fig. 3A–E)

TYPE MATERIAL. — **Rapa.** Atelier RAPA stn 32, Vavai, 27°35'S, 144°23'W, 15–20 m, holotype spm (MNHN 21379). — Same data, paratypes, 17 spm (MNHN 21380), 4 spm (ZMA Moll. 4.09.013), 2 spm (NMNZ M.287779).

TYPE LOCALITY. — Austral Islands, Rapa Island, Vavai, 27°35'S, 144°23'W, 15–20 m (Atelier RAPA stn 32).

ETYMOLOGY. — From the Austral Islands.

OTHER MATERIAL EXAMINED. — **Rapa.** Atelier RAPA, stn 4, 27°34.3'S, 144°22.1'W, 18 m, 1 spm, 3 lv, 1 rv. — Stn 5, 27°05.6'S, 144°18.5'W, 8 m, 13 spms, 3 lv. — Stn 6, 27°36.8'S, 144°16.7'W, 42 m, 4 spms, 1 lv, 1 rv. — Stn 8, 27°36.5'S, 144°17.7'W, 52–57 m, 3 spms, 80 lv, 1 rv. — Stn 9, 27°37.3'S, 144°22.2'W, 3–24 m, 8 spms, 13 lv, 1 rv. — Stn 11, 27°37.2'S, 144°18.2'W, 2 m, 10 spms, 8 lv, 10 rv. — Stn 21, 27°34.2'S, 144°20.6'W, 5 m, 2 spms. — Stn 22, 27°33.9'S, 144°21.7'W, 18–22 m, 3 spms. — Stn 25, 27°38.4'S, 144°18.9'W, 3 m, 23 spms, 7 lv, 3 rv. — Stn 28, 27°38.4'S, 144°20.6'W, 30 m, 9 spms, 2 lv. — Stn 30, 27°38.2'S, 144°18.2'W, 16–20 m, 1 spm, 4 lv. — Stn 31, 27°38.2'S, 144°18.2'W, 6 m, 13 spms, 1 lv. — Stn 33, 27°34.8'S, 144°18.6'W, 30 m, 4 spms, 4 lv. — Stn 36, 27°33.5'S, 144°20.8'W, 27 m, 1 spm, 1 lv. — Stn 41, 27°36.3'S, 144°22.7'W, 5 m, 3 spms, 15 lv, 6 rv. — Stn 43, 27°36.8'S, 144°18.3'W, 45 m, 42 lv, 5 rv. — Stn 44, 27°36.3'S, 144°18.2'W, 30 m, 2 spms, 22 lv, 4 rv. — Stn 47, 27°36.7'S, 144°19.1'W, 33 m, 18 lv. — Stn 48, 27°34.1'S, 144°22.1'W, 36 m, > 100 valves. — Stn 61, 27°37'S, 144°18.6'W, 10–15 m, 2 lv. — Stn 98, 27°34.8'S, 144°22.8'W, 16–18 m, 6 lv, 2 rv.

DISTRIBUTION. — Austral Islands, alive at 3–52 m depth.

#### DESCRIPTION

Shell up to *c.* 1.80 mm high, nearly circular to strongly oblique, inequivalve, inequilateral (valves sometimes strongly deformed), left valve more inflated than right valve, higher than wide, translucent or opaque whitish.

Left valve disc and auricle sculpture commencing immediately by irregularly spaced very weak antimarginal threads, multiply on disc by intercalation. Prominent commarginal lirae (sometimes nearly lacking) with irregularly arranged nodules (also lacking) commence at *c.* 0.8 from the umbonal margin, more widely spaced on the central part (*c.* 0.2 mm) of the disc than near the ventral margin (*c.* 0.1 mm). Auricles gradually modulated into disc.

Right valve disc and ventral half of posterior auricle with outer layer of commarginally elongate, hexagonal prisms that form broad, flexible ventral apron. Anterior auricle with 1–3 weak nodulifer radial threads. Byssal notch moderately deep.

Dimensions of holotype: H 1.7 mm, W 1.5 mm, D 0.8 mm.

#### REMARKS

Many specimens are strongly deformed, perhaps due to their life in microcavities, made possible by their very small adult size.

*Cycloclamys australensis* n. sp. differs from *Cycloclamys favus* (Hedley, 1902), from the South-West Pacific (Dijkstra 1995a: 40), by having a smaller size (*C. australensis* n. sp. 1.8 mm, *C. favus* 4.0 mm in height), a more prominent commarginal sculpture on the left valve (commarginal lirae with nodules in *C. australensis* n. sp., smooth or a few commarginal growth lines in *C. favus*).

*Cycloclamys australensis* n. sp. also differs from *Cycloclamys obliqua* (Hedley, 1902), from the same geographical range as *C. favus* (Dijkstra 1995a: 40), by having a smaller size (*C. obliqua* is 4.6 mm in height), a more widely spaced commarginal sculpture and a weaker and more closely spaced irregular intercalated radial sculpture.

*Cycloclamys incubata* (Hayami & Kase, 1993), from southern Japan, also has nodules on the commarginal lirae of the left valve, but these are only placed on the intersections of the commarginal and radial sculpture (irregularly arranged in *C. australensis* n. sp.). Moreover, this radial sculpture is much more prominent than in *C. australensis* n. sp.

Recently Dijkstra & Marshall (2008) named several new *Cycloclamys* species from the New Zealand region. A few species have a similar size and shape, but all differ from *C. australensis* n. sp. by the sculpture of the left valve.

Family ENTOLIIDAE Teppner, 1922

Genus *Pectinella* Verrill, 1897

*Pectinella aequoris* Dijkstra, 1991

*Pectinella aequoris* Dijkstra, 1991: 23, figs 78–86; 1995a: 44, figs 71–74.

MATERIAL EXAMINED. — **Indonesia.** N of Sumbawa, 175–185 m, holotype lv (RMNH 56567).

**Banc Président Thiers.** BENTHAUS, stn DW 1932, 24°41'S, 146°02'W, 500–800 m, 2 lv. — Stn DW 1937, 24°40'S, 145°56'W, 469–500 m, 1 lv.

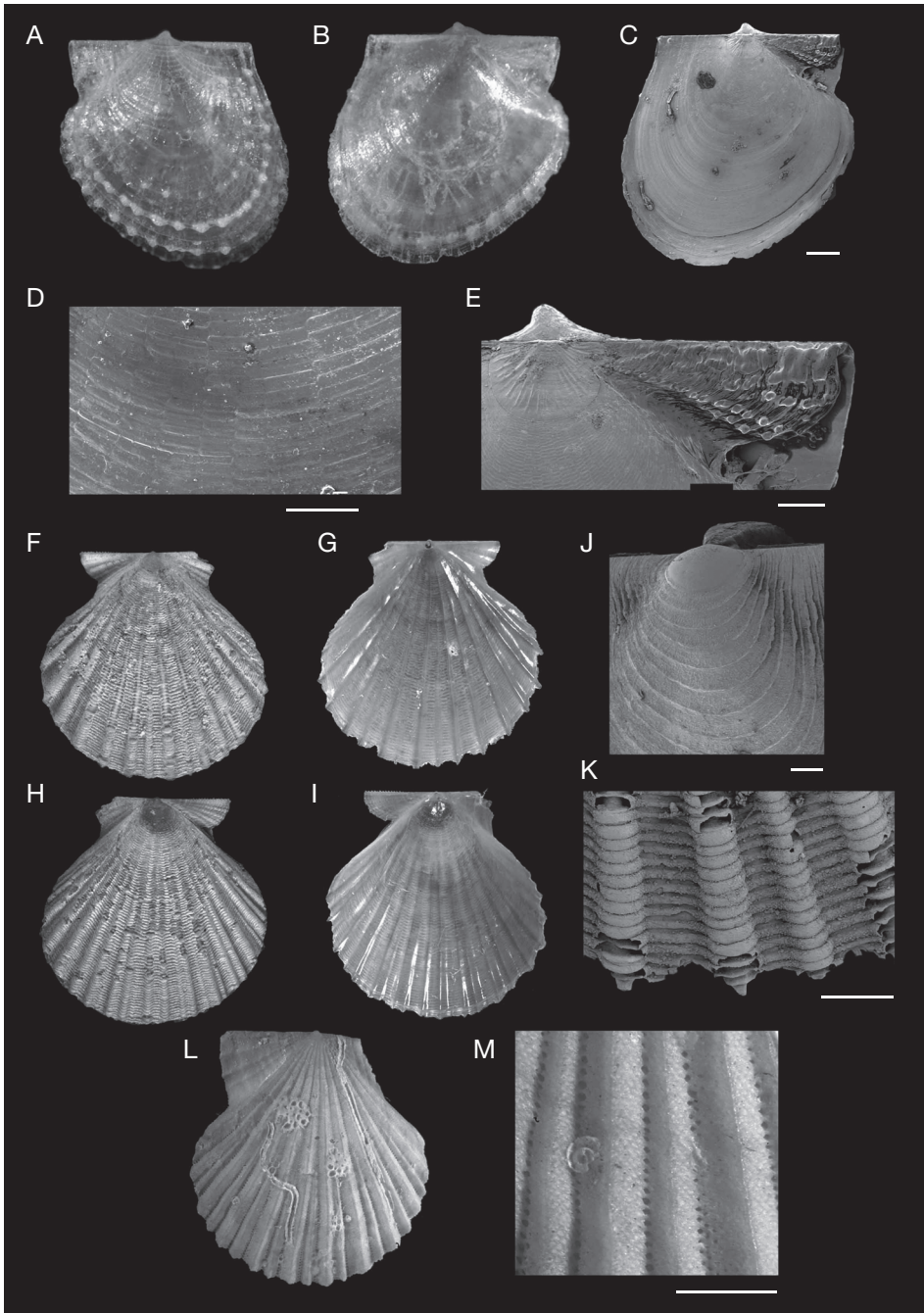


FIG. 3. — **A-D**, *Cyclochlams australense* n. sp.: **A**, holotype, external view of the left valve; **B**, holotype, external view of the right valve; **C**, *idem* (SEM); **D**, details of the right valve; **E**, prodissoconch and auricle (SEM); **F-K**, *Lamellipecten aduncus* n. sp.: **F**, **G**, holotype, external and internal views of the left valve; **H**, **I**, holotype, external and internal views of the right valve; **J**, prodissoconch and early stage of the left valve (SEM); **K**, details of the left valve (SEM); **L**, **M**, *Pascahinnites pasca* (Dall, 1908); **L**, external view of the left valve; **M**, details of the left valve. Scale bars: **C**, 200  $\mu$ m; **D**, 50  $\mu$ m; **E**, **J**, 100  $\mu$ m; **K**, **M**, 1 mm.

**Banc Lotus.** BENTHAUS, stn DW 1951, 23°49'S, 147°53'W, 206-450 m, 1 rv.

**Rurutu.** BENTHAUS, stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 rv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 1 rv.

**Rimatara.** BENTHAUS, stn DW 2015, 22°38'S, 152°50'W, 250-280 m, 1 lv.

**DISTRIBUTION.** — Indonesia, New Caledonia, Fiji Islands (Dijkstra 2001: 90; Dijkstra & Maestrati 2008: 102) and Hawaii Islands. Depth range 260 m (alive). Now also Austral Islands (new record), only single valves in 206-500 m.

#### REMARKS

The present specimens are indistinguishable from the type material from Indonesia, although they are much larger in size (up to 22 mm in height, holotype 4.1 mm). Other characters are identical. Judging from SW Pacific specimens (MNHN, coll. HD) the type material is immature.

Family PECTINIDAE Rafinesque, 1815

Genus *Delectopecten* Stewart, 1930

#### *Delectopecten musorstomi* Poutiers, 1981

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

**MATERIAL EXAMINED.** — **Philippines.** N of Lubang, 150-159 m, holotype spm (MNHN 21162).

**Banc Arago.** BENTHAUS, stn DW 1979, 23°22'S, 150°44'W, 176-340 m, 1 rv.

**DISTRIBUTION.** — Philippines, Indonesia, Solomon Islands, New Caledonia and Norfolk Island (Dijkstra & Marshall 1997: 88; Dijkstra & Maestrati 2008: 105). Depth range 150-250 m (alive). Now also Austral Islands (new record), only single valves at 176 m depth.

#### REMARKS

The present specimen differs from the type material from the Philippines only in almost lacking the radial rows of lamellate sculpture.

Genus *Pseudohinnites* Dijkstra, 1989

*Pseudohinnites levii* Dijkstra, 1989

*Pseudohinnites levii* Dijkstra, 1989b: 29, figs 1-3.

**MATERIAL EXAMINED.** — **New Caledonia.** South-east, 965 m, holotype lv (MNHN 21417).

**Rapa.** BENTHAUS, stn CP 1910, 27°38'S, 144°15'W, 840-1200 m, 1 lv.

**Tubuai.** BENTHAUS, stn DW 1956, 23°18'S, 149°27'W, 600-990 m, 1 spm. — Stn CP 1967, 23°21'S, 149°34'W, 600-1200 m, 1 lv.

**DISTRIBUTION.** — Philippines, Indonesia, New Caledonia, Vanuatu, Wallis and Futuna, Fiji Islands, Tonga and Marquesas Islands (Dijkstra 1995a: 47; 2001: 90; Dijkstra & Maestrati 2008: 103-105). Depth range 581-2000 m (alive). Now also Austral Islands (new record), alive at 600 m depth.

#### REMARKS

The present specimens of *P. levii* from the Austral Islands are similar to the type material from New Caledonia, although the radial and commarginal sculpture of a specimen from Tubuai (stn CP 1967) is somewhat more delicate. However, these characters somewhat vary in observed material (MNHN) and the present specimen falls within this range of variation.

Genus *Lamellipecten* n. gen.

**TYPE SPECIES.** — *Lamellipecten aduncus* n. sp.

**ETYMOLOGY.** — A Pectinidae with strongly developed commarginal lamellae.

**DIAGNOSIS.** — Thin Pectinidae with a fasciolar pseudo-ctenolium (Waller 1984: 213) throughout ontogeny, functional ctenolium lacking, narrow byssal fasciole, byssal notch shallow, strong resilial teeth and very weak dorsal teeth on right valve, intermediate teeth lacking (Waller 1991: 8), strong radial and commarginal macrosculpture exteriorly, irregularly radially undulated interiorly, short auricles, internal ribs lacking.

#### REMARKS

A fasciolar pseudo-ctenolium had been described by Waller (1984: 213) in species of the families Propeamussiidae (*Parvamussium sayanum* (Dall, 1886) and *Cyclopecten culebrensis* (Smith, 1885), from the [sub] tropical western Atlantic), and Entoliidae (*Syncyclonema sigsbeeii* (Dall, 1886), also from the tropical western Atlantic, and an undescribed species from the Pacific, subsequently described as *Pectinella aequoris* Dijkstra,

TABLE 2. — Morphological comparisons between *Lamellipecten* n. gen. and *Pseudohinnites* Dijkstra, 1989.

|                     | <i>Lamellipecten</i> n. gen. | <i>Pseudohinnites</i> |
|---------------------|------------------------------|-----------------------|
| Size                | up to 28 mm high             | up to 50 mm high      |
| Shape               | rv convex                    | rv flat               |
| Sculpture           | present                      | lacking on rv         |
| Ctenolium           | pseudo-ctenolium             | true ctenolium        |
| Interior surface rv | strongly undulose            | weakly undulose       |

1991). This character was also reported by Dijkstra (1995a: 37) in *Parvamussium undisonum* Dijkstra, 1995, and is now found for the first time in a species of Pectinidae, *Lamellipecten aduncus* n. sp.

The external sculpture of the left valve of *Lamellipecten* n. gen. somewhat resembles that of the deepwater *Pseudohinnites* from the Atlantic and Pacific. However, all other shell characters are different (Table 2):

The propeamussiids *P. sayanum* and *P. undisonum* also resemble *Lamellipecten* n. gen. in sculpture of the left valve, but by all other characters (interior ribs, dissimilar sculpture of both valves, lack of a true ctenolium) they are typical species of Propeamussiidae, whereas *Lamellipecten* n. gen. lacks interior ribs and has a similar sculpture on both valves. It is remarkable that this pectinid genus lacks a true ctenolium and only has a fasciolar pseudo-ctenolium. Some pectinid genera that also lack a functional ctenolium like *Anguipecten*, *Pecten* Müller, 1776 and *Hyalopecten* Verrill, 1897, do not have a pseudo-ctenolium. Although *Lamellipecten* n. gen. has a similar pseudo-ctenolium as in two genera of Propeamussiidae (*Parvamussium* and *Cyclopecten*), other characters (strongly developed resilial teeth, similar macrosculpture on both valves, undulating inner surface) are typical of Pectinidae.

*Lamellipecten aduncus* n. sp.  
(Fig. 3F-K)

TYPE MATERIAL. — **Rurutu**. BENTHAUS, stn DW 1999, 22°25.1'S, 151°22.1'W, 270-500 m, holotype spm (MNHN 21381). — Same data, paratypes, 3 (MNHN 21382), 1 (MNHN 21401), 2 (ZMA Moll. 4.09.014).

TYPE LOCALITY. — Austral Islands, north of Rurutu, 22°25.1'S, 151°22.1'W, 270-500 m (BENTHAUS, stn DW 1999).

ETYMOLOGY. — From numerous commarginal curved lamellae on both valves (Latin *aduncus*, adjective meaning curved).

OTHER MATERIAL EXAMINED. — **Marotiri**. BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 2 lv, 1 rv. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 rv.

**Banc Lotus**. BENTHAUS, stn DW 1945, 23°49'S, 147°42'W, 120-500 m, 1 lv, 1 rv.

**Banc Arago**. BENTHAUS, stn DW 1974, 23°24'S, 150°44'W, 450-618 m, 3 lv, 2 rv (paratypes: 3 MNHN 21382, 2 ZMA Moll. 4.09.014).

DISTRIBUTION. — Austral Islands, live taken at 270-500 m depth.

DESCRIPTION

Shell up to *c.* 28 mm in height, fragile, compressed, right valve slightly more inflated than left valve, nearly circular, somewhat higher than wide, inequivalve, equilateral, auricles unequal in shape, nearly equal in size, umbonal angle *c.* 105°, inner surface somewhat irregularly, radially undulated, opaque whitish.

Left valve sculptured with widely spaced radial lirae, commencing at *c.* 2 mm from the umbonal margin with *c.* 10 in number, increasing with interstitial lirae to *c.* 20 on the central part of the disc and to *c.* 45 to the ventral margin. Closely spaced commarginal lamellae commence in early ontogeny at *c.* 0.5 mm from the umbonal margin and extend to the ventral margin, increasing to ventrally curled prominent lamellae, forming almost hollow sections on the lirae. Anterior auricle with two prominent radial lirae and closely spaced commarginal lamellae, posterior somewhat weaker sculptured with *c.* 6 radial lirae and commarginal lamellae.

Right valve similarly sculptured as left valve, although weaker with more irregularly, closer spaced radial lirae. Commarginal lamellae widely spaced on anterior auricle with *c.* 6 radial riblets, posterior

TABLE 3. — Morphological comparisons between three species of Pectinoidea Rafinesque, 1815.

|               | <i>Lamellipecten aduncus</i><br>n. gen., n. sp. | <i>Parvimussinum undisonum</i><br>Dijkstra, 1995 | <i>Parvimussinum undosum</i><br>Dijkstra, 1991 |
|---------------|---|--|--|
| Height        | up to c. 28 mm                                  | up to c. 14 mm                                   | up to c. 8 mm                                  |
| Sculpture rv  | radial & commarginal                            | commarginal                                      | commarginal                                    |
| Inner surface | undulate  | smooth   | lv weak undulated                              |
| Internal ribs | lacking   | 10 + rudimentary                                 | 10   |

auricle with very closely spaced commarginal lamellae and 2 or 3 radial lirae. Hinge line straight. Byssal notch shallow, byssal fasciole narrow, ctenolium and interior ribs lacking.

Dimensions of holotype: H 13 mm, W 13.1 mm, D 3.2 mm.

#### REMARKS

The commarginal lamellae on the left valve resemble the sculpture of *Parvamussinum undisonum*, but other characters strongly differ (Table 3). *Parvamussinum undosum* also has a prominent commarginal sculpture on the left valve, which is more closely spaced than in *L. lamellosus*, and the inner ventral apron of the left valve is very weakly undulated (*L. lamellosus* has a strongly undulated inner surface on both valves). Moreover, radial sculpture is lacking on the anterior auricle of the left valves (*L. lamellosus* has two prominent radial lirae).

Genus *Pascabinnites* Dijkstra & Raines, 1999

#### *Pascabinnites coruscans coruscans* (Hinds, 1845)

*Pecten coruscans* Hinds, 1845: 61, pl. 17, fig. 3.

*Chlamys coruscans coruscans* – Waller 1972: 231, pl. 1, figs 1-19 [synonymy, description, distribution, functional morphology, ecology].

*Semipallium coruscans coruscans* – Dijkstra & Kilburn 2001: 294, figs 31, 32 [references, type data, description, distribution].

*Pascabinnites coruscans coruscans* – Paulay 2003: appendix 1, note 39. — Dijkstra & Marshall 2008: 51, figs 35, 48A, D.

*Pascabinnites coruscans* – Tröndlé & Boutet 2009: 6 [listed from Austral Is].

MATERIAL EXAMINED. — **Marquesas Islands.** Nuku Hiva, 13 m, lectotype spm (BMNH 19709, designated by Waller [1972: 231]).

**Rapa.** Atelier RAPA, stn 1, 27°22.9'S, 144°20.1'W, 24 m, 1 lv, 2 rv. — Stn 4, 27°34.3'S, 144°22.1'W, 18 m, 1 rv. — Stn 5, 27°05.6'S, 144°18.5'W, 8 m, 1 lv. — Stn 8, 27°36.5'S, 144°17.7'W, 52-57 m, 1 spm, 1 lv. — Stn 11, 27°37.2'S, 144°18.2'W, 2 m, 1 rv. — Stn 15, 27°38.1'S, 144°21.1'W, 20 m, 2 lv. — Stn 18, 27°33.3'S, 144°20.4'W, 1-6 m, 1 rv. — Stn 22, 27°33.9'S, 144°21.7'W, 18-22 m, 1 lv. — Stn 31, 27°38.2'S, 144°18.2'W, 6 m, 7 spms, 2 lv, 1 rv. — Stn 36, 27°33.5'S, 144°20.8'W, 27 m, 1 lv, 1 rv. — Stn 38, 27°37.4'S, 144°18.4'W, 2 m, 1 lv. — Stn 42, 27°37.2'S, 144°18.3'W, 2 m, 1 spm. — Stn 43, 27°36.8'S, 144°18.3'W, 45 m, 1 lv. — Stn 44, 27°36.3'S, 144°18.2'W, 30 m, 1 lv. — Stn 48, 27°34.1'S, 144°22.1'W, 36 m, 3 rv. — Stn 58, 27°35.8'S, 144°18.5'W, 2-3 m, 1 lv. — Stn 61, 27°37.0'S, 144°18.6'W, 10-15 m, 1 lv. — Stn 98, 27°34.8'S, 144°22.8'W, 16-18 m, 2 spms, 1 lv.

**Récif Neilson.** BENTHAUS, stn DW 1913, 27°02'S, 146°00'W, 120 m, 1 lv. — Stn DW 1915, 27°03'S, 146°04'W, 120-200 m, 1 lv.

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 1 spm, 1 lv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 4 lv, 2 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv, 2 rv. — Stn DW 1936, 24°40'S, 145°57'W, 80-100 m, 1 rv. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 1 lv.

**Tubuai.** BENTHAUS, stn DW 1953, 23°19'S, 149°25'W, 280-390 m, 1 rv.

**Banc Arago.** BENTHAUS, stn DW 1984, 23°26'S, 150°44'W, 40 m, 1 spm.

**Rurutu.** BENTHAUS, stn DW 2004, 22°28'S, 151°19'W, 430-850 m, 1 lv.

DISTRIBUTION. — Western Indian Ocean, Maldives, southern Japan, south China Sea to eastern Australia, Melanesia, Kermadec Islands, Micronesia, Polynesia to Pitcairn Island (Waller 1972: 234; Dijkstra & Marshall 1997: 101; 2008: 51). Depth range 0-60 m (Dijkstra unpubl. data). Austral Islands (Richard 1986, and present records), alive at 2-52 m depth.

#### REMARKS

The present specimens are indistinguishable from the type material from the Marquesas Islands. The

subspecies *P. coruscans hawaiiensis* (Dall, Bartsch & Rehder, 1938) occurs around the Hawaiian Islands (Waller 1972: 232).

This species was formerly placed in *Chlamys* or *Semipallium*, but actually assigned to *Pascabinnites*, based on the lack of an external prismatic layer in the early right dissoconch stage (Paulay 2003).

*Pascabinnites pasca* (Dall, 1908)

(Fig. 3L, M)

*Pecten* (*Chalmys*) [*sic*] *pasca* Dall, 1908: 401.

*Pascabinnites pasca* — Dijkstra & Raines 1999: 200, figs 1, 2 [references, type data, description, habitat, comparison]. — Tröndlé & Boutet 2009: 6 [listed from Austral Is].

MATERIAL EXAMINED. — **Easter Island**. Holotype lv (USNM 110765).

**Marotiri**. BENTHAUS, stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 2 lv. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 lv.

DISTRIBUTION. — Formerly only known from Easter Island and considered as endemic. Austral Islands, only loose valves at 620-700 m depth.

REMARKS

The present specimens (free living stage) from Marotiri Islands are indistinguishable in all characters from the (non-cemented) type material from Easter Island. On Easter Island, the species lives sublittorally (Dijkstra & Raines 1999) and the somewhat eroded valves from Marotiri were obviously displaced to bathyal depths.

Genus *Semipallium* Jousseaume, 1928

*Semipallium rapanense* (Bavay, 1905)

(Fig. 4A-F)

*Pecten rapanensis* Bavay, 1905: 25, pl. 2, figs 10-13.

*Semipallium rapanense* — Dijkstra 1989a: 16, 17, fig. — Tröndlé & Boutet 2009: 7.

MATERIAL EXAMINED. — **Austral Islands**. Rapa, holotype spm (BMNH 8606.9.889).

**Marotiri**. BENTHAUS, stn DW 1879, 27°55'S, 143°30'W, 52 m, 2 spms. — Stn DW 1880, 27°55'S, 143°29'W, 90-94 m, 1 spm, 1 lv, 1 rv. — Stn DW 1881, 27°55'S, 143°29'W, 112-121 m, 2 rv. — Stn DW 1884, 27°54'S, 143°33'W, 570-620 m, 1 rv. — Stn DW 1886, 27°51'S, 143°32'W, 620-1000 m, 4 fragments.

**Rapa**. Atelier RAPA, stn 8, 27°36.5'S, 144°17.7'W, 52-57 m, 1 spm, 22 lv, 32 rv. — Stn 11, 27°37.2'S, 144°18.2'W, 2 m, 1 spm. — Stn 15, 27°38.1'S, 144°21.1'W, 20 m, 1 lv. — Stn 26, 27°33.0'S, 144°19.1'W, 53 m, 1 spm. — Stn 31, 27°38.2'S, 144°18.2'W, 6 m, 2 spms, 1 lv, 1 rv. — Stn 38, 27°37.4'S, 144°18.4'W, 2 m, 1 lv. — Stn 43, 27°36.8'S, 18.3'W, 45 m, 1 spm, 29 lv, 18 rv. — Stn 44, 27°36.3'S, 144°18.2'W, 30 m, 1 spm, 1 lv, 4 rv. — Stn 45, 27°36.7'S, 144°18.9'W, 35 m, 17 lv, 14 rv. — Stn 46, 27°36.8'S, 144°19.2'W, 10-42 m, 8 spms. — Stn 47, 27°36.7'S, 144°19.1'W, 33 m, 16 lv, 10 rv, 2 fragments. — Stn 48, 27°34.1'S, 144°22.1'W, 36 m, 3 spms, 5 lv, 1 rv. — Stn 52, 27°36.8'S, 144°19.9'W, 23-25 m, 2 lv, 4 rv. — Stn 54, 27°36.6'S, 144°19.3'W, 12-20 m, 1 spm, 1 rv. — Stn 56, 27°36.7'S, 144°18.1'W, 25-30 m, 4 lv. — Stn 57, 27°36.8'S, 144°19.5'W, 20-30 m, 2 lv. — Stn 62, 27°36.6'S, 144°20.5'W, 20 m, 2 lv, 1 rv. — Stn 71, 27°37.0'S, 144°19.9'W, 20-25 m, 1 spm.

BENTHAUS, stn DW 1890, 27°39'S, 144°16'W, 800-822 m, 1 fragment. — Stn DW 1894, 27°40'S, 144°22'W, 100 m, 6 spms. — Stn DW 1903, 27°27'S, 144°04'W, 400-800 m, 1 lv, 1 rv. — Stn CP 1910, 27°38'S, 144°15'W, 840-1200 m, 1 lv. — Stn CP 1911, 27°38'S, 144°15'W, 900-1300 m, 1 rv.

**Récif Neilson**. BENTHAUS, stn DW 1913, 27°02'S, 146°00'W, 120 m, 1 lv. — Stn DW 1917, 27°03'S, 146°04'W, 50-60 m, 5 spms. — Stn CP 1920, 27°04'S, 146°04'W, 120-203 m, 2 lv. — Stn DW 1923, 27°01'S, 146°05'W, 360-840 m, 1 spm. — Stn DW 1924, 27°01'S, 146°05'W, 340-800 m, 1 rv. — Stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 1 lv.

**Banc Président Thiers**. BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 2 spms. — Stn DW 1927, 24°39'S, 146°02'W, 95-105 m, 1 spm, 1 lv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 4 lv, 3 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 rv. — Stn DW 1936, 24°40'S, 145°57'W, 80-100 m, 2 spms. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 1 lv, 1 rv.

**Tubuai**. BENTHAUS, stn DW 1958, 23°20'S, 149°30'W, 80-150 m, 2 spms, 6 lv, 4 rv, 2 fragments. — Stn DW 1959, 23°20'S, 149°30'W, 95-380 m, 1 rv. — Stn DW 1960, 23°20'S, 149°31'W, 230-262 m, 1 lv. — Stn DW 1961, 23°21'S, 149°34'W, 470-800 m, 1 lv.

**Banc Arago**. BENTHAUS, stn DW 1985, 23°26'S, 150°44'W, 100-107 m, 1 spm, 1 lv.

**Rurutu**. BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 1 rv, 1 fragment. — Stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv. — Stn DW 2003, 22°28'S,

151°19'W, 250-330 m, 1 lv, 2 rv.

**Rimatara.** BENTHAUS, stn DW 2013, 22°39'S, 152°50'W, 80-93 m, 3 spms.

**DISTRIBUTION.** — Known from Rapa Island, now also extended to the neighbouring region. Present material taken alive at 2-360 m depth.

#### DESCRIPTION

Shell up to *c.* 25 mm high, weakly inflated, left valve slightly more convex than right valve, higher than wide, somewhat inequivalve, equilateral, auricles strongly unequal in size and shape, umbonal angle *c.* 90°, colour yellowish, purplish or orange-reddish.

Left valve sculptured with 9 shallow primary radial lirae, commencing 1 mm of the umbonal top, dividing by 2 longitudinal grooves (tripartite lirae) in late growth stage, with very weak nodules (also lacking) on the central part of the lirae. Interstitial secondary lirae (2-4) in late growth stage to the ventral margin. Shagreen microsculpture throughout, less developed on posterior auricle. Anterior auricles with 5 or 6 prominent radial lirae, posterior auricle with 3 scaled riblets.

Right valve with similar sculpture, although the primary radial lirae are more flattened, broader and more divided into quadri- to hexapartite radial lirae and 2 interstitial secondary lirae with more prominent scales. Interstices narrower than those of left valve. Anterior auricle with 7 squamous radial riblets, posterior with 2 scaled riblets. Byssal notch deep, byssal fasciole rather broad. Functional tcnolium with about 7 teeth.

#### REMARKS

The largest specimen (BENTHAUS, stn DW 1925, lv) is 43 mm in height, which is remarkably larger than the holotype (18 mm).

*Semipallium rapanense* is morphologically close to *Semipallium fulvicostatum* (A. Adams & Reeve, 1850), from the tropical south-western Pacific to French Polynesia, but differs in having a more circular shape (more elongate in *S. fulvicostatum*) and is somewhat more compressed. Moreover, the anterior auricle of the right valve is smaller than in *S. fulvicostatum* and the latter is more brightly coloured.

Genus *Mimachlamys* Iredale, 1929

#### *Mimachlamys erycina* n. sp. (Fig. 4G-L)

**TYPE MATERIAL.** — **Rapa.** BENTHAUS, stn DW 1894, 27°40'S, 144°22'W, 100 m, holotype spm (MNHN 21383). — Same data, paratypes, 2 spm (MNHN 21384).

**TYPE LOCALITY.** — Austral Islands, E of Rapa Island, 27°40'S, 144°22'W, 100 m (BENTHAUS, stn DW 1894).

**ETYMOLOGY.** — Latin *erycinus*, adjective meaning shell of Venus.

**OTHER MATERIAL EXAMINED.** — **Marotiri.** BENTHAUS, stn DW 1879, 27°55'S, 143°30'W, 52 m, 1 spm.

**Récif Neilson.** BENTHAUS, stn DW 1917, 27°03'S, 146°04'W, 50-60 m, 8 spms, 1 lv, 2 rv. — Stn CP 1922, 27°04'S, 146°04'W, 150-163 m, 1 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 4 spms, 3 lv. — Stn DW 1929, 24°39'S, 146°02'W, 350-370 m, 1 rv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv.

**Banc Lotus.** BENTHAUS, stn DW 1947, 23°49'S, 147°54'W, 120-150 m, 1 spm.

**Tubuai.** BENTHAUS, stn DW 1958, 23°20'S, 149°30'W, 80-150 m, 2 lv. — Stn DW 1961, 23°21'S, 149°34'W, 470-800 m, 1 rv.

**Banc Arago.** BENTHAUS, stn DW 1968, 23°23'S, 150°44'W, 100-120 m, 2 spms. — Stn DW 1977, 23°22'S, 150°44'W, 90-95 m, 2 spms. — Stn DW 1979, 23°22'S, 150°44'W, 176-340 m, 1 lv. — Stn DW 1985, 23°26'S, 150°44'W, 100-107 m, 2 spms.

**Rurutu.** BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 1 lv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 4 lv, 4 rv.

**Rimatara.** BENTHAUS, stn DW 2013, 22°39'S, 152°50'W, 80-93 m, 1 spm.

**DISTRIBUTION.** — Austral Islands, alive at 50-120 m depth.

#### DESCRIPTION

Shell small, up to *c.* 11 mm high, fragile, semitransparent, weakly inflated, circular, nearly equivalve, equilateral, left and right valve equally convex, auricles strongly unequal in size and shape, umbonal angle *c.* 95-100°, brightly coloured with creamy, yellow or orange, usually with some whitish small spots.

Prodissoconch *c.* 200 µm in height.

Left valve sculptured with 20-24 regularly spaced, radial riblets, commencing 1.5 mm from the



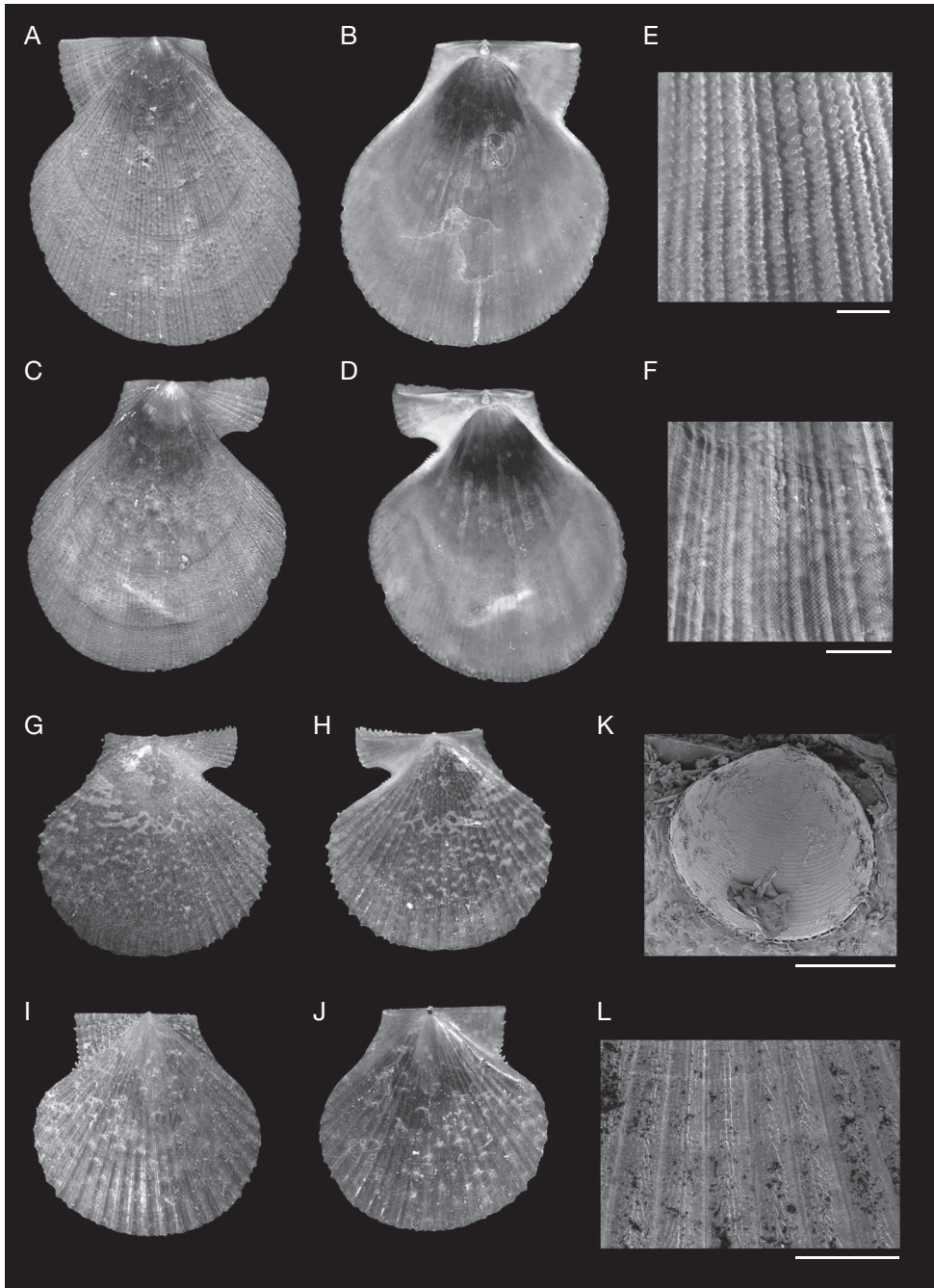


FIG. 4. — **A-F**, *Semipallium rapanense* (Bavay, 1905); **A, B**, external and internal views of the left valve; **C, D**, external and internal views of the right valve; **E**, details of the left valve; **F**, details of the right valve; **G-L**, *Mimachlamys erycina* n. sp.; **G, H**, holotype, external and internal views of the left valve; **I, J**, holotype, external and internal views of the right valve; **K**, prodissoconch of the left valve (SEM); **L**, details of the left valve (SEM). Scale bars: E, F, L, 1 mm; K, 100  $\mu$ m.

umbonal top, and delicate, widely arranged scales (often eroded) on the riblets, and secondary radial rows of hollow sections on both sides of the riblets antero-laterally of disc. Intercalated antimarginal microsculpture prominent postero-laterally, nearly lacking antero-laterally. Interstices wider than riblets. Auricles with 3 or 4 scaly axial riblets, slightly more prominent on anterior. Hinge line straight.

Right valve similarly sculptured as left valve, although lacking the secondary radial sculpture of delicate vesicles. Anterior auricle with 5 or 6 scaly radial riblets. Antero-dorsal margin strongly denticulate. Posterior auricle narrow, with 3 or 4 spinous riblets. Byssal fasciole and notch well developed. Functional ctenolium with 4-7 teeth. Resilifer triangular. Internal plicae extending from central sector to ventral margin.

Dimensions of the holotype: H 8.9 mm, W 8.9 mm, D 2.1 mm.

#### REMARKS

*Mimachlamys erycina* n. sp. is morphologically closest to *M. kauaiensis* (Dall, Bartsch & Rehder, 1938), from Hawaii and the southwestern Pacific. It differs in size (up to 11 mm in height, vs 6.5 mm in *M. kauaiensis*), in having fewer radial riblets (20-24, vs 24-27 in *M. kauaiensis*), in lacking commarginal sculpture on the left valve (prominent antero-laterally in *M. kauaiensis*), in having a delicate row of hollow sections on each side of the radial riblets of the left valve (lacking in *M. kauaiensis*). *Mimachlamys kauaiensis* was formerly often placed in *Chlamys* or *Laevichlamys* (Dijkstra 1995a: 57), but is actually more appropriately classified in *Mimachlamys* (Paulay 2003).

#### Genus *Cryptopecten*

Dall, Bartsch & Rehder, 1938

#### *Cryptopecten bullatus*

(Dautzenberg & Bavay, 1912)

*Pecten (Chlamys) bullatus* Dautzenberg & Bavay, 1912: 17, pl. 27, figs 1, 2.

*Cryptopecten bullatus* – Dijkstra 1995a: 60, figs 115-118 [synonymy, references, type data, distribution, description].

MATERIAL EXAMINED. — **Philippines.** Sulu Archipelago, 275 m, holotype spm (ZMA Moll. 3.12.006).

**Marotiri.** BENTHAUS, stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 rv.

**Rapa.** BENTHAUS, stn DW 1889, 27°37'S, 144°16'W, 600-620 m, 1 lv, 1 rv. — Stn DW 1890, 27°39'S, 144°16'W, 800-822 m, 1 lv. — Stn CP 1891, 27°37'S, 144°15'W, 800-850 m, 2 rv. — Stn CP 1909, 27°39'S, 144°16'W, 783-1000 m, 1 rv.

**Récif Neilson.** BENTHAUS, stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 1 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 4 lv, 1 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 2 rv.

**Banc Lotus.** BENTHAUS, stn DW 1949, 23°49'S, 147°54'W, 250-500 m, 1 lv. — Stn DW 1951, 23°49'S, 147°53'W, 206-450 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1973, 23°24'S, 150°44'W, 200-350 m, 1 rv. — Stn DW 1986, 23°26'S, 150°44'W, 150 m, 1 spm.

**Rurutu.** BENTHAUS, stn DW 1998, 22°25'S, 151°22'W, 250-302 m, 1 lv. — Stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 rv. — Stn DW 2000, 22°25'S, 151°22'W, 270-480 m, 1 rv. — Stn DW 2002, 22°27'S, 151°20'W, 247-250 m, 1 rv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 7 lv, 3 rv.

**Rimatara.** BENTHAUS, stn DW 2015, 22°38'S, 152°50'W, 250-280 m, 1 lv.

DISTRIBUTION. — Eastern South Africa, southern Japan, to eastern Australia, Melanesia, Kermadec Islands, Marquesas Islands and Hawaiian Islands (Dijkstra & Marshall 1997: 106; Dijkstra 2001: 92; Dijkstra & Maestrati 2008: 109). Depth range 82-500 m (alive). Now also Austral Islands (new record), alive at 150 m depth.

#### *Cryptopecten nux* (Reeve, 1853)

*Pecten coruscans* – Reeve 1853: sp. 143, pl. 32, fig. 143 (not *Pecten coruscans* Hinds, 1845).

*Pecten nux* Reeve, 1853: named in unnumbered page in “errata”.

*Cryptopecten nux* – Dijkstra & Marshall 1997: 107 [synonymy, references, type data, distribution]. — Dijkstra & Kilburn 2001: 310, figs 50, 51 [description].

MATERIAL EXAMINED. — **Marquesas Islands.** Nukuhiva, 13 m, lectotype spm (BMNH 1950.11.14.52, designated by Wagner [1989: 56]).

**Mac Donald.** BENTHAUS, stn DW 1876, 28°59'S, 140°15'W, 150-160 m, 1 lv. — Stn DW 1877, 28°59'S, 140°15'W, 59-150 m, 1 rv.

**Marotiri.** BENTHAUS, stn DW 1880, 27°55'S,

143°29'W, 90-94 m, 6 lv, 5 rv. — Stn DW 1881, 27°55'S, 143°29'W, 112-121 m, 5 spms, 2 lv, 4 rv. — Stn DW 1885, 27°52'S, 143°33'W, 700-800 m, 1 rv. — Stn DW 1888, 27°51'S, 143°31'W, 100-120 m, 2 rv.

**Banc Nord-Est Rapa.** BENTHAUS, stn DW 1901, 27°25'S, 144°02'W, 115-120 m, 4 spms, 5 lv, 1 rv. — Stn DW 1905, 27°25'S, 144°03'W, 120-140 m, 2 spms, 3 lv, 11 rv. — Stn CP 1906, 27°25'S, 144°02'W, 110-127 m, 2 spms, 1 lv, 1 rv.

**Rapa.** BENTHAUS, stn CP 1909, 27°39'S, 144°16'W, 783-1000 m, 1 spm.

**Récif Neilson.** BENTHAUS, stn DW 1913, 27°02'S, 146°00'W, 120 m, 4 spms, 6 lv, 5 rv. — Stn DW 1914, 27°04'S, 146°04'W, 150 m, 14 spms, 2 lv, 4 rv. — Stn DW 1915, 27°03'S, 146°04'W, 120-200 m, 1 lv. — Stn CAS 1916, 27°00'S, 146°04'W, 180 m, 1 rv. — Stn CP 1918, 27°03'S, 146°04'W, 130-140 m, 20 spms, 56 lv, 64 rv. — Stn DW 1919, 27°04'S, 146°04'W, 140-390 m, 1 spm. — Stn CP 1920, 27°04'S, 146°04'W, 120-203 m, 6 spms, 18 lv, 23 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 6 lv, 8 rv. — Stn DW 1927, 24°39'S, 146°02'W, 95-105 m, 1 lv. — Stn DW 1929, 24°39'S, 146°02'W, 350-370 m, 2 lv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 13 lv, 9 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv, 2 rv. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 4 lv.

**Tubuai.** BENTHAUS, stn DW 1957, 23°19'S, 149°29'W, 558-1000 m, 2 rv. — Stn DW 1958, 23°20'S, 149°30'W, 80-150 m, 1 lv. — Stn DW 1959, 23°20'S, 149°30'W, 95-380 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1986, 23°26'S, 150°44'W, 150 m, 1 rv.

**Rurutu.** BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 1 lv, 1 rv. — Stn DW 2000, 22°25.1'S, 151°21.8'W, 270-480 m, 1 lv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 3 lv, 1 rv. — Stn DW 2004, 22°28'S, 151°19'W, 430-850 m, 1 rv.

**Rimatara.** BENTHAUS, stn DW 2012, 22°28'S, 152°50'W, 270-320 m, 1 lv.

**DISTRIBUTION.** — Red Sea, Oman, Kenya, Seychelles, Mozambique, Madagascar, Mauritius, eastern South Africa, Andaman Islands, southern Japan, Taiwan, Philippines, Indonesia, eastern and northern Australia, Solomon Islands, New Caledonia, Lord Howe Island, Vanuatu, Wallis and Futuna, Fiji, Tonga and Marquesas Islands (Dijkstra & Marshall 1997: 108; Dijkstra 2001: 93; Dijkstra & Maestrati, 2008: 109-110). Depth range 97-120 m. Now also Austral Islands (new record), alive at 110-783 m depth.

#### REMARKS

The present specimens are indistinguishable from the type material from the Marquesas Islands.

### *Cryptopecten* sp. A

(Fig. 5A)

**MATERIAL EXAMINED.** — **Récif Neilson.** BENTHAUS, stn DW 1925, 27°00'S, 146°05'W, 560-790 m, 1 rv.

**DISTRIBUTION.** — Austral Islands, only a single valve at 560 m depth.

#### REMARKS

The present specimen somewhat resembles *Cryptopecten phrygium* (Dall, 1886), from the tropical western Atlantic, in having an identical sculpture of longitudinal hollow sections on both sides of the primary radial ribs and intercostal commarginal lamellae. A similar sculpture also exists in *Cryptopecten vesiculosus* (Dunker, 1877), from southern Japan, and in *C. bullatus* and *C. nux* (Hayami 1984). A delicate shell layer covers these hollow sections (Hayami 1984: pl. 13, fig. 1c), but in eroded specimens this shell layer is often lacking and a longitudinal groove appears on each side of the main ribs. The present specimen is considerably larger in size than the other *Cryptopecten* species (*Cryptopecten* sp. A 57 mm, *C. phrygium* 43 mm, *C. vesiculosus* 34 mm, *C. bullatus* 25 mm, and *C. nux* 20 mm in height) (Hayami 1984), and strongly posteriorly oblique (other *Cryptopecten* species are more circular). Because a single valve is available, this new species is not named here.

### Genus *Anguipecten*

Dall, Bartsch & Rehder, 1938

### *Anguipecten lamberti* (Souverbie, 1874)

(Fig. 5B)

*Pecten lamberti* Souverbie in Souverbie & Montrouzier, 1874: 200, pl. 7, fig. 9.

*Anguipecten lamberti* — Dijkstra 2002: 140, figs 5-7.

**MATERIAL EXAMINED.** — **Loyalty Islands.** Holotype spm (MHNB 2004.TY.150).

**Banc Président Thiers.** BENTHAUS, stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 lv.

**Rimatara.** BENTHAUS, stn DW 2018, 22°37'S, 152°49'W, 770-771 m, 1 lv.

DISTRIBUTION. — Known from New Caledonia (Dijkstra 1985) and the Hawaiian Islands (form *gregoryi* Dall, Bartsch & Rehder, 1938). Depth range 50-70 m (alive) (unpubl. data, coll. HD). Now also Austral Islands (new record), only loose valves at 500-770 m depth.

## REMARKS

The present specimens are in all characters indistinguishable from the holotype from the Loyalty Islands. The morph of the Hawaiian Islands has somewhat larger auricles and more emphasized radial lirae in proportion to typical specimens.

*Anguipecten pacificus* Dijkstra, 2002

*Anguipecten pacificus* Dijkstra, 2002: 139, figs 1-4.

MATERIAL EXAMINED. — **Marquesas Islands.** 450-455 m, holotype lv (MNHN 21413).

**Rapa.** BENTHAUS, stn DW 1889, 27°37'S, 144°16'W, 600-620 m, 2 rv. — Stn DW 1890, 27°39'S, 144°16'W, 800-822 m, 1 lv.

**Banc Président Thiers.** BENTHAUS, stn DW 1929, 24°39'S, 146°02'W, 350-370 m, 1 lv, 1 rv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 1 lv.

**Rimatara.** BENTHAUS, stn DW 2015, 22°38'S, 152°50'W, 250-280 m, 3 fragments. — Stn DW 2020, 22°37'S, 152°49'W, 920-930 m, 1 rv.

DISTRIBUTION. — Eastern Indonesia (Kai Islands) and French Polynesia (Marquesas Islands) (Dijkstra 2002: 140). Depth range 163-245 m (dead). Now also Austral Islands (new record), only single valves at 250-920 m depth.

## REMARKS

The present specimens are similar to the type material from the Marquesas Islands, but differ in having one more radial lira and the secondary radial riblets are slightly more pronounced. Other characters do not differ.

*Anguipecten picturatus* Dijkstra, 1995  
(Fig. 5C)

*Anguipecten picturatus* Dijkstra, 1995b: 17 (nomen novum for *Pecten aurantiacus* Adams & Reeve, 1850, non *Pecten aurantiacus* J. de C. Sowerby, 1820, nec DeFrance, 1825).

MATERIAL EXAMINED. — **China Sea.** Holotype (spm) (BMNH 1950.11.14.8).

**Tubuai.** BENTHAUS, stn DW 1957, 23°19'S, 149°29'W, 558-1000 m, 1 lv.

DISTRIBUTION. — Réunion Island, Thailand, southern Japan, Philippines, Papua New Guinea, Solomon Islands, Coral Sea, Fiji (MNHN, coll. HD, unpubl. data). Depth range 20-130 m (alive) (unpubl. data, coll. HD). Now also Austral Islands (new record), only a single valve at 558 m depth.

## REMARKS

The present specimen is nearly similar to the type material from the China Sea, although the com-marginal microsculpture is somewhat more delicate and more closely spaced.

*Anguipecten superbus* (G. B. Sowerby II, 1842)  
(Fig. 5D)

*Pecten superbus* G. B. Sowerby II, 1842: 62, pl. 12, fig. 11.

*Anguipecten superbus* — Dijkstra 2002: 140, fig. 9. — Tröndlé & Boutet 2009: 6 [listed from Austral Is].

MATERIAL EXAMINED. — Unknown locality, 2 syntypes spms (BMNH 1950.11.14.78-79).

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 1 lv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 1 rv.

**Banc Lotus.** BENTHAUS, stn DW 1947, 23°49'S, 147°54'W, 120-150 m, 2 spms.

**Tubuai.** BENTHAUS, stn DW 1958, 23°20'S, 149°30'W, 80-150 m, 1 lv, 2 rv. — Stn DW 1959, 23°20'S, 149°30'W, 95-380 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1968, 23°23'S, 150°44'W, 100-120 m, 1 spm, 1 lv. — Stn DW 1977, 23°22'S, 150°44'W, 90-95 m, 1 spm. — Stn DW 1985, 23°26'S, 150°44'W, 100-107 m, 1 spm, 1 lv, 1 rv.

**Rurutu.** BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 2 lv, 2 rv. — Stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 3 lv, 3 rv.

DISTRIBUTION. — Southern Japan, Philippines, Malaysia, Indonesia, Papua New Guinea, Solomon Islands, Marshall Islands (MNHN, coll. HD, unpubl. data). Depth range 20-165 m (alive) (coll. HD, unpubl. data). Austral Islands, alive at 90-120 m depth.

## REMARKS

The present specimens are juveniles, up to 17 mm

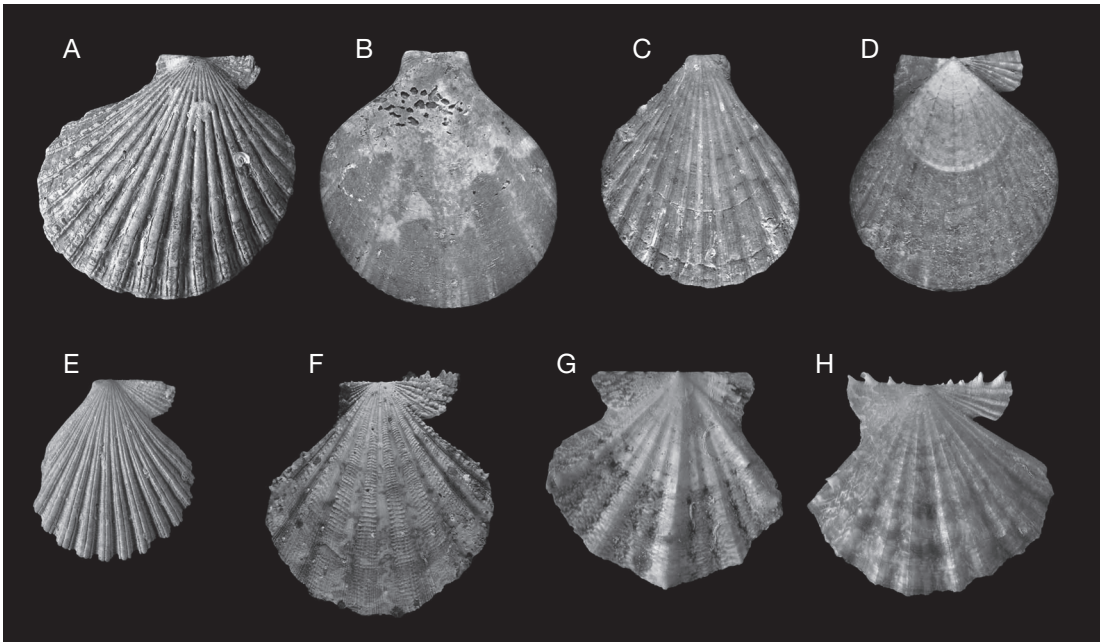


FIG. 5. — **A**, *Cryptopecten* sp. A, external view of the right valve; **B**, *Anguipecten lamberti* (Souverbie, 1874), external view of the left valve; **C**, *Anguipecten picturatus* Dijkstra, 1995, external view of the left valve; **D**, *Anguipecten superbus* (Sowerby II, 1842), external view of the right valve; **E**, *Glorichlamys elegantissima* (Deshayes, 1863), external view of the right valve; **F**, *Gloripallium spiniferum*, (Sowerby I, 1835), external view of the right valve; **G**, **H**, *Mirapecten mirificus* (Reeve, 1853), external views of the left and right valves.

in height (the adult reaches up to 70 mm) are similar to the type material, although the colour is somewhat paler and more yellowish.

Genus *Glorichlamys* Dijkstra, 1991

*Glorichlamys elegantissima* (Deshayes, 1863)  
(Fig. 5E)

*Pecten elegantissimus* Deshayes in Maillard, 1863: 32, pl. 4, figs 11, 12.

*Glorichlamys elegantissima* – Dijkstra & Kilburn 2001: 279 [synonymy, references, description, distribution].

MATERIAL EXAMINED. — **Tubuai**. BENTHAUS, stn DW 1961, 23°21'S, 149°34'W, 470-800 m, 1 rv.

**Rurutu**. BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 1 fragment.

DISTRIBUTION. — Eastern South Africa, Mozambique, Madagascar, Réunion, Thailand, southern Japan, China, Philippines, Indonesia, northwestern Australia, Papua New Guinea, New Caledonia, Fiji, Line Islands, Society Islands and Tuamotu (Dijkstra 1991: 45; 1998: 21; Dijkstra & Kilburn 2001: 280; MNHN, coll. HD, unpubl. data). Depth range 18-120 m (alive) (unpubl. data, coll. HD). Now also Austral Islands (new record), only single valves at 212-470 m depth.

#### REMARKS

The type locality is Réunion Island, and the type material appears to be lost; it is not in MNHN, where most Deshayes types of Recent molluscs – formerly in École des Mines – are currently lodged. The present specimens from the Austral Islands are morphologically indistinguishable from modern material from Réunion in MNHN.

Genus *Gloripallium* Iredale, 1939*Gloripallium spiniferum*

(G. B. Sowerby I, 1835)

(Fig. 5F)

*Pecten spiniferus* G. B. Sowerby I, 1835: 110. — G. B. Sowerby II 1842: 74, pl. 20, figs 229, 230. — Reeve 1853: sp. 118, pl. 28, fig. 118 (text unpaginated).

*Pecten pulcherrimus* Gray in Gray & G.B. Sowerby I, 1839: 150, pl. 41, figs 1-2.

*Gloripallium spiniferum* — Waller 1972: 240, pl. 4, figs 58-63 (holotype). — Dijkstra 1989a: 15, figs. — Dijkstra & Kilburn 2001: 281.

MATERIAL EXAMINED. — **Tuamotu Archipelago.**, Marutea, holotype spm (BMNH 1950.11.14.69).

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 1 lv, 2 rv. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 2 lv, 1 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv, 2 fragments. — Stn DW 1936, 24°40'S, 145°57'W, 80-100 m, 1 lv. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 1 lv.

**Tubuai.** BENTHAUS, stn DW 1959, 23°20'S, 149°30'W, 95-380 m, 1 lv. — Stn DW 1961, 23°21'S, 149°34'W, 470-800 m, 1 lv.

**Banc Arago.** BENTHAUS, stn DW 1984, 23°26'S, 150°44'W, 40 m, 1 lv.

**Rurutu.** BENTHAUS, stn DW 1995, 22°29'S, 151°22'W, 212-450 m, 2 lv, 3 rv. — Stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 rv. — Stn DW 2003, 22°28'S, 151°19'W, 250-330 m, 2 lv, 4 rv. — Stn DW 2005, 22°28'S, 151°18'W, 680-1800 m, 1 lv.

DISTRIBUTION. — Society Islands, Tuamotu Archipelago and Marquesas Islands (Dijkstra 1989a: 15; MNHN, unpubl. data). Living sublittorally under coral slabs or amongst coral rubble on sandy bottoms (MNHN, coll. HD). Depth range 18-32 m (alive) (unpubl. data, coll. HD). Now also Austral Islands (new record), only single valves at 40-680 m depth.

## DESCRIPTION

Shell up to *c.* 43 mm high, weakly inflated, nearly equiconvex, subcircular, inequivalve, nearly equilateral, auricles unequal, umbonal angle *c.* 85-90°, colour variable, milky white with white, orange, red or brown maculations, right valve paler and plain orange.

Both valves sculptured with 7 rounded radial lirae covered with curled lamellae on the left valve and more closely spaced on the right. Interspaced finely

ridged. Byssal notch moderately deep. Functional ctenolium with *c.* 6 teeth.

## REMARKS

The present specimens are indistinguishable from the holotype. The largest valve from the Austral Islands (stn DW 1926) is 40 mm in height, which is remarkably larger than the 23 mm holotype.

Genus *Mirapecten* Dall, Bartsch & Rehder, 1938*Mirapecten mirificus* (Reeve, 1853)

(Fig. 5G, H)

*Pecten mirificus* Reeve, 1853: sp. 104, pl. 26, fig. 104.

*Mirapecten mirificus* — Kay 1979: 526, figs 158B, 169A, B [description] — Dijkstra 1991: 48 [synonymy, references, distribution]; 1998: 23, pl. 3, figs 4-6 [type data, distribution].

MATERIAL EXAMINED. — **Indonesia.** Ambon, holotype spm (BMNH 1950.11.14.46).

**Récif Neilson.** BENTHAUS, stn CP 1918, 27°03'S, 146°04'W, 130-140 m, 1 spm, 1 rv.

**Banc Président Thiers.** BENTHAUS, stn DW 1926, 24°38'S, 146°01'W, 50-90 m, 1 spm. — Stn DW 1932, 24°41'S, 146°02'W, 500-800 m, 2 lv, 3 rv. — Stn DW 1933, 24°41'S, 146°01'W, 500-850 m, 1 lv. — Stn DW 1936, 24°40'S, 145°57'W, 80-100 m, 1 rv. — Stn DW 1937, 24°40'S, 145°56'W, 469-500 m, 2 fragments, 1 lv.

**Banc Lotus.** BENTHAUS, stn DW 1947, 23°49'S, 147°54'W, 120-150 m, 1 spm.

**Tubuai.** BENTHAUS, stn DW 1958, 23°20'S, 149°30'W, 80-150 m, 5 spms, 5 lv, 7 rv. — Stn DW 1959, 23°20'S, 149°30'W, 95-380 m, 1 rv. — Stn DW 1960, 23°20'S, 149°31'W, 230-262 m, 1 spm, 1 lv, 1 rv.

**Banc Arago.** BENTHAUS, stn DW 1968, 23°23'S, 150°44'W, 100-120 m, 1 spm.

**Rurutu.** BENTHAUS, stn DW 1999, 22°25'S, 151°22'W, 270-500 m, 1 lv.

DISTRIBUTION. — Southern Japan, China, Philippines, Malaysia, Indonesia, Papua New Guinea, Solomon Islands, Coral Sea, New Caledonia, Fiji and Hawaiian Islands (MNHN, coll. HD, unpubl. data). Depth range 37-183 m (alive) (coll. HD, unpubl. data). Now also Austral Islands (new record), alive at 50-230 m depth.

## REMARKS

The present specimens are similar to the holotype from the Moluccas, although the radial lirae are

TABLE 4. — Pectinid species of the near-shore fauna of Rapa and their geographical distribution. Abbreviations: **ll**, live; **dd**, dead.

| Species                                 | ll/dd | Depth (m) | Remarks                       |
|---|-------|-----------|-------------------------------|
| <i>Cyclopecten ambiguus</i> n. sp.      | dd    | 16-176    | endemic to Rapa               |
| <i>Cyclochlamys australensis</i> n. sp. | ll    | 3-52      | endemic to Rapa               |
| <i>Paschahinnites coruscans</i>         | ll    | 2-52      | broadly distributed           |
| <i>Paschahinnites pasca</i>             | dd    | 570-700   | endemic to Easter I. and Rapa |
| <i>Semipallium rapanense</i>            | ll    | 2-360     | endemic to the Australs       |
| <i>Mimachlamys ericina</i> n. sp.       | ll    | 50-120    | endemic to Rapa               |
| <i>Anguipecten lamberti</i>             | dd    | 500-770   | broad Pacific distribution    |
| <i>Anguipecten picturatus</i>           | dd    | 558       | broadly distributed           |
| <i>Anguipecten superbus</i>             | ll    | 90-120    | broadly distributed           |
| <i>Glorichlamys elegantissima</i>       | dd    | 212-470   | broadly distributed           |
| <i>Gloripallium spiniferum</i>          | dd    | 40-680    | endemic to French Polynesia   |
| <i>Mirapecten mirificus</i>             | ll    | 50-230    | broadly distributed           |

slightly weaker and the colour more creamy. However, examined material from the southwestern Pacific is rather variable in sculpture and colour and the specimens from the Austral Islands fall within this variation range.

## DISCUSSION

Twenty-nine species of littoral and bathyal species of Pectinoidea are now known from the Austral Islands vs 24 for the rest of French Polynesia. Given the steepness of the slopes of the banks and islands, many records from dredging are based on loose valves carried downslope, and it is difficult to ascertain the exact bathymetric range of many species in the Austral Islands. However, 15 species were taken alive at 3-600 m (two littoral, three littoral to offshore, 10 bathyal) and fourteen were represented by shells only at 16-900 m, of which at least seven are clearly near-shore/sublittoral species transported downslope.

The near-shore fauna of Rapa, which has been the most intensively sampled, has 12 species of Pectinidae (Table 4). Of these, half have broad Pacific or Indo-Pacific distributions, and half have distributions restricted to French Polynesia (one), to the Austral Islands (four), or to Rapa and Easter Island (one). This high level of marine endemism on Rapa appears to be recurrent in other molluscan groups as well (Schwabe & Lozouet 2006; Vidal & Kirkendale 2007; Geiger 2008; Houart & Tröndlé 2008; Alf & Kreipl 2009).

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