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The Bernardinidae of the Eastern Pacific (Mollusca: Bivalvia)

by

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Abstract. The Bernardinidae is a family of minute, shallow-water marine bivalves as yet known only from the eastern Pacific. They combine an internal ligament with three cardinal teeth in the left valve, two or three in the right, and at least one lateral tooth. The four known species brood their young. The family is here assigned to the Cyamiacea instead of where it has been placed in the Arcticacea.

In *Bernardina,* the anterior end is longer than the posterior; there is heavy concentric sculpture; and there is a large anterior lateral tooth, but no posterior lateral. *Bernardina bakeri* Dall, the type species, occurs from Pacific Grove, California, to Isla Natividad, Baja California Sur. *Bernardina margarita* (Carpenter) occurs from Isla Guadalupe, Baja California Norte, to Bahía Banderas, Jalisco, Mexico.

In *Halodakra,* the posterior end is longer than the anterior; the sculpture consists of fine concentric threads; and there is a posterior lateral tooth. *Halodakra, s.s.,* lacks an anterior lateral tooth. *Halodakra* (*H.*) *subtrigona* (Carpenter), the type species, occurs from Tomales Bay, California, to Mancora, Peru. A new subgenus, ***Stohleria,*** is proposed for *H.* (*S.*) *salmonea* (Carpenter), which has an anterior lateral tooth. This species occurs from Brookings, Oregon, to Punta San Hipolito, Baja California Sur; *Crassatella marginata* Keep and *Psephidia brunnea* Dall are synonyms.

INTRODUCTION

I BECAME curious about the Bernardinidae when, during my review of the Crassatellinae of the eastern Pacific (COAN, 1984), I attempted to find a proper home for *Crassatella marginata* Keep, 1887. I concluded then and confirm now that it is a synonym of *Halodakra salmonea* (Carpenter, 1864). In arriving at this conclusion, however, I discovered that the two previously described species of *Halodakra* Olsson, 1961, are sympatric along much of the coast of southern California and Baja California Norte. Here I explain how they can be separated. I also provide characters differentiating the two species of *Bernardina* Dall, 1910. The distributions of all four species are documented, a neotype and four lectotypes are designated, and all four species are illustrated. The placement of the family within bivalves is also discussed.

CONVENTIONS AND ABBREVIATIONS

In the following treatment, each valid taxon is followed by a synonymy, information on type specimens and localities, notes on distribution and habitat, and additional discussion.

The synonymies include all major accounts of the species, but generally not minor mentions in the literature. The entires are arranged in chronological order under each species-name, with changes in generic allocation from the previous entry, if any, and other notes provided in brackets after each entry.

The following are the abbreviations of institutions used in the text:

AHF—Allan Hancock Foundation, Los Angeles
BM(NH)—British Museum (Natural History), London
CASIZ—California Academy of Sciences, Department of Invertebrate Zoology, San Francisco
LACM—Los Angeles County Museum of Natural History
USNM—United States National Museum of Natural History Washington, D.C.

The thicknesses are of entire specimens with valves articulated unless stated otherwise. The proportions are based

on measurement of at least 10 specimens. A "pair" means the two valves of a single specimen.

Superfamily Cyamiacea

Family Bernardinidae Keen, 1963

Bernardinidae Keen, 1963:91

The family Bernardinidae was proposed by Keen (1963) for the eastern Pacific genera *Bernardina* and *Halodakra*. Later (Keen, 1969:N650), she supplied a definition of the family.[1]

The shells of species in this family are small to minute, attaining only about 4.5 mm in length. Sculpture consists of concentric threads or prominent concentric ribs. The hinge has an oblique resilium, well below the dorsal margin, in combination with two or three cardinal teeth in each valve and at least one lateral tooth. The pallial line is broad and entire. There is no evident lunule or escutcheon.

All four known species of the Bernardinidae occur in the eastern Pacific among rubble in rocky areas, from the intertidal area to subtidal depths; none has been recorded deeper than 60 m. All brood their young; I have observed broods in dried specimens of each of the four species.

This family has been placed in the Arcticacea, members of which attain 50 to 100 mm in size, have an external ligament, and are not known to brood their young. I think a better placement would be in the Cyamiacea, which was most recently studied by Ponder (1971). Many members of this superfamily are small, have an internal ligament, and brood their young within their ctenidia. Among other known differences between these two superfamilies are the morphologies of the ctenidia. The Arcticacea have plicate ctenidia with interlamellar septa (Boss, 1982:1146); those of the Cyamiacea lack interlamellar septa and are not plicate (Boss, 1982:1133).

Although most bernardinids are evidently not uncommon in shallow water, no preserved material is yet available for study. Observations on living or preserved specimens would considerably increase our knowledge about this family, including its taxonomic placement.

The two bernardinid genera are reminiscent of some species of the Veneridae in which the ligament may be somewhat sunken below the hinge margin and which brood their young. Frank Bernard (1982:147) has recently proposed the genus *Nutricola* for one such venerid. Bernardinids can be distinguished from these small venerids by their lack of a pallial sinus, their proportionately less conspicuous beaks, and their internal ligament. *Bernardina* with its long anterior end is unlikely to be confused with other genera. *Halodakra* is most likely to be confused with small specimens of the eastern Pacific venerid genera *Transennella, Nutricola, Pitar,* or *Psephidia*. In addition to the features given above, *Halodakra* has a posterior lateral tooth in its left valve and a slot for it in the right, features not present in these venerids.

The following is a key to the four species of the Bernardinidae:

A. Anterior end longer than posterior; concentric sculpture of heavy ribs; posterior lateral tooth absent; 3 cardinals present in each valve ..... *Bernardina*
  (1) Prodissoconch set off by a prominent, raised ring; concentric ribs wide; proportionately higher (l/h = 1.1); attains 3 mm in length ..... *B. bakeri*
  (2) Prodissoconch set off by a low, raised ridge; concentric ribs narrow; lower (l/h = 1.2); minute, attains only 2.4 mm ..... *B. margarita*

B. Posterior end longer than anterior; concentric sculpture of fine threads; posterior lateral present; 3 cardinals in left valve, 2 in right ..... *Halodakra*
  (1) Left valve without an anterior lateral tooth; oval and elongate (l/h = 1.3); white, generally with a radial row of brown chevrons; attains 4.5 mm in length ..... *H. (Halodakra) subtrigona*
  (2) Left valve with an anterior lateral tooth, right valve with a slot for it; generally higher, trigonal (l/h = 1.2); entire shell white, salmon, or brown, without a radial row of brown chevrons; attains 4.3 mm in length ..... *H. (**Stohleria**) salmonea*

Bernardina Dall, 1910

Bernardina Dall, 1910:171–172; type species (original designation): *B. bakeri* Dall, 1910.

Anterior end longer than posterior; sculpture of heavy concentric ribs; three cardinal teeth present in each valve; large anterior lateral present in left valve, well spaced from cardinals; no posterior lateral present.

Bernardina bakeri Dall, 1910

(Figures 1, 2)

Bernardina bakeri Dall, 1910
Dall, 1910:171–172
Dall, 1916a:24
Dall, 1921:30
Oldroyd, 1925:108–109; pl. 15, figs. 7, 8
Emerson, in Burch, 1944a:19; Burch, 1944a:19
Burch 1944b:7, 1 fig.; Burch, 1945:11
Bernard, 1983:49

Type material and locality

USNM 220099, **lectotype** (herein), a right valve; length, 2.5 mm; height, 2.2 mm; thickness, 0.7 mm (pair would have been 1.4 mm thick) (Figure 1). USNM 792413, **paralectotypes,** 7 pairs, 40 valves. The lectotype is the only specimen in the lot that comes close to the originally stated length of 2.8 mm.

[1] The family name is based on *Bernardina,* which Dall (1910) had dedicated to Felix Bérnard, a pioneer worker on the development of the bivalve hinge.

Isla Coronado del Sur, Baja California Norte, Mexico (32°24′N, 117°15′W); 5.5 m; F. Baker.

Description

Small (to 3.0 mm in length; LACM 63-41, Middle Isla Coronado, Baja California Norte); triangular, length 1.1 times height; anterior end longer, rounded; posterior end slightly angled; inflated, thickness 0.5 times height. Surface with large, rounded concentric ribs that become broader ventrally; prodissoconch set off by a raised ring. Color white.

Right valve with a narrow anterior cardinal, a broad central cardinal, and a narrower posterior cardinal. Anterior end with a broad slot for lateral of left valve, distant from cardinals; both sides of slot swollen into teeth. Left valve with a narrow anterior cardinal, a broad central cardinal, and a very narrow posterior cardinal, the ligament just posterior to it. Anterior end with a large lateral, well spaced from cardinals (Figure 2).

Geographic distribution and habitat

Pacific Grove, Monterey Co., California (36°37′42″N, 121°54′48″W) (LACM 72-88), to Isla Natividad, Baja California Sur (27°52′N, 115°11′W) (LACM 72-116); intertidal area to 24 m, with a mean depth of 10 m; among rubble in rocky areas. Not uncommon; I have examined 47 lots. I have not located any specimens to confirm Burch's (1944a:19) record from Bahía Magdalena, Baja California Sur, but the following species does occur there. Example of a lot with a brood: LACM 63-41.

This species has been reported from the Pleistocene of three of the Channel Islands of southern California: Anacapa (Valentine & Lipps, 1963:1294, 1297) and San Nicolas (Vedder & Norris, 1963:46–47, 50), both Ventura Co.; and Santa Barbara, Los Angeles Co. (Lipps *et al.*, 1968:297, 299).

Bernardina margarita (Carpenter, 1857)

(Figures 3, 4)

Circe margarita Carpenter, 1857
Carpenter, 1857a:247, 306 [*nomen nudum*]
Carpenter, 1857b:81, 82
Dall, 1902b:408 [indeterminate juveniles]
Keen, in Burch, 1944b:17 [juvenile venerids]
Haas, 1945:4–5 [indeterminate juveniles]
Palmer, 1951:20 [*Circe*]
Keen, 1958:140 [juveniles, possibly venerids]; 622 [*Lasaea*]
Brann, 1966:34, pl. 9, fig. 114 [*Circe*]
Keen, 1968:394, 395, fig. 4 [*Bernardina*]
Keen, 1971:118, 117, fig. 264
Bernard, 1983:49

Type material and locality

BM(NH) 1857.6.4.412, lectotype (Keen, 1968), pair; length, 1.15 mm; height, 0.95 mm; thickness, 0.8 mm (Figure 3). Other specimens now in lot, paralectotypes, one minute pair, 1 left valve. USNM 715784, paralectotypes, 3 valves.

Mazatlán, Sinaloa, Mexico (23°12′N, 106°25′W); F. Reigen, 1848–1850.

Description

Minute, smaller than *Bernardina bakeri* (to 2.4 mm in length; LACM 72-121, Isla Guadalupe, Baja California Norte); trigonal, but slightly more elongate than *B. bakeri*, length 1.2 times height; anterior end longer, sharply rounded; posterior end quadrate; inflated, thickness 0.5 times height. Surface with conspicuous concentric ribs, finer than those in *B. bakeri*; prodissoconch set off by a ridge less prominent than that in *B. bakeri*. Color white, tan, pink, or brown, sometimes with lighter blotches; more colorful than *B. bakeri*.

Hinge very similar to that of *B. bakeri*[2] (Figure 4).

Distribution and habitat

Northwest side of Isla Guadalupe, Baja California Norte (29°11′18″N, 118°15′12″W) (LACM 72-121), in the Gulf of California as far north as Guaymas, Sonora (27°58′N, 111°11′W) (LACM 68-13), and southward to Bahía Banderas, Jalisco (20°32′N, 105°19′W) (LACM 69-18 & 71-83), all in Mexico; intertidal area to 21 m, with a mean depth of 16 m; in rubble in rocky areas. Not common; I have examined only 21 lots. Example of a lot with a brood: LACM 72-121.

Discussion

This species was proposed in the genus *Circe* Schumacher, 1817 (pp. 50, 152), which is now placed in the Veneridae. However, Carpenter (1857b) realized that his new species had an internal ligament, and he placed *Circe* in the Astartidae.

Halodakra Olsson, 1961

Halodakra Olsson, 1961:319, 472; type species (original designation): ?*Circe subtrigona* Carpenter, 1857.

Posterior end longer than anterior; sculpture of fine concentric threads; three cardinal teeth present in the left valve, two in the right; posterior lateral present in the left valve, a socket for it in the right. The name means "sea tear."

(*Halodakra*)

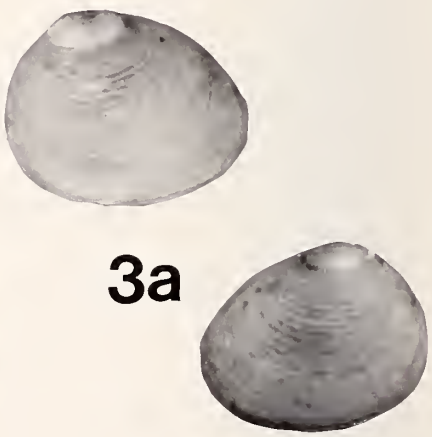
Without an anterior lateral tooth.

[2] Keen (1971:118) described this species as having two cardinal teeth in the right valve, but like *B. bakeri*, it has three cardinal teeth in each valve.

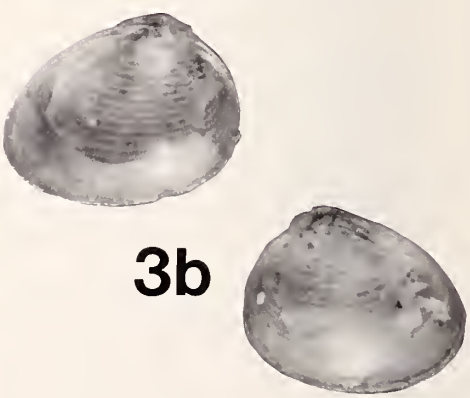

2a


1


2b


3a


4a


3b

Halodakra (*Halodakra*) *subtrigona* (Carpenter, 1857)

(Figures 5–7)

Circe subtrigona Carpenter, 1857
CARPENTER, 1857a:247, 306 [*nomen nudum*]
CARPENTER, 1857b:82 ["?*Circe*"]
DALL, 1902b:408 [indeterminate juveniles]
KEEN, in BURCH, 1944b:18 [possibly juvenile *Petricola*]
HAAS, 1945:4–5 [*Semele*]
PALMER, 1951:20 ["?*Circe*"]
KEEN, 1958:140 [*Circe,* but indeterminate juveniles], 622 [*Psephidia*]
OLSSON, 1961:319, 500 (pl. expl.), pl. 27, figs. 1–1c [*Halodakra*]
BRANN, 1966:34, pl. 9, fig. 115 ["?*Circe*"]
KEEN, 1968:394, 396 [*Halodakra*]
KEEN, 1971:118, 117, fig. 265
BERNARD, 1983:49

Type material and locality

BM(NH) 1857.6.4.413, **lectotype** (herein), pair; length, 2.4 mm; height, 1.9 mm; thickness, 1.4 mm (Figure 5). Other specimens in this lot, **paralectotypes,** 2 pairs, one right valve. Field Museum of Natural History, Chicago, 6698, **paralectotype,** right valve (HAAS, 1945: 5). USNM 715785, **paralectotypes,** 1 pair, 10 valves. Mazatlń, Sinaloa, Mexico (23°12′N, 106°25′W); F. Reigen, 1848–1850.

Description

Small (to 4.5 mm in length; LACM 71-83, Los Arcos, Bahía Banderas, Jalisco, Mexico); ovate, length 1.3 times height; anterior end sharply rounded; posterior end longer, broadly rounded; anterior end more expanded dorsally than that in *Halodakra salmonea*; inflated, thickness 0.7 times height. Surface with fine concentric striae. White to light brown, with dark brown flecks or chevrons in a radial row from beaks toward ventral margin posterior to midline, often interspersed with white material; light brown zig-zag lines also present on external surface in many specimens. Dark brown color present on hinge anterior and posterior to umbones.

Right valve with a broad, elongate anterior cardinal and a thin posterior cardinal, the resilifer posterior to it; elongate slot present for anterior cardinal of left valve; slot for posterior lateral of left valve still more elongate, its ventral edge swollen to form a tooth. Left valve with an elongate anterior cardinal, a short central cardinal, and a very thin posterior cardinal; ligament just posterior to the latter; posterior end with a lateral tooth[3] (Figure 7).

Geographic distribution and habitat

Tomales Bay, Marin Co. (38°15′N, 123°W) (AHF 1628-48), and Southeast Farallon Id., San Francisco Co. (37°41′N, 123°W) (LACM 62-9), California, to and throughout the Gulf of California, to El Rubio and Punta Mero, Tumbez Prov., Peru (3°54′S, 80°53′W) (LACM 72-85); Mancora, Tumbez Prov., Peru (4°6′S, 81°4′W) (OLSSON, 1961); intertidal area to 24 m, with a mean depth of 9 m; among rubble in rocky areas. Not uncommon; I have examined 102 lots. Example of a lot with a brood: LACM 63-11.

Discussion

This species has not previously been reported from California, specimens having been confused with *H. salmonea.*

Specimens from central California are elongate and oval. They lack the characteristic radial row of dark brown flecks, but similar specimens occur in southern California and northern Baja California Norte along with more typical specimens. Material from central California is rare in museums (only three lots), with no material in collections from between Carmel and Corona del Mar. It is possible that when more material is available for study, two taxa of *Halodakra, s.s.,* will come into focus. I have illustrated here (Figure 6) an elongate, oval specimen from central California.

Stohleria Coan, subgen. nov.

Type species: *Psephis salmonea* Carpenter, 1864.

Differing from *Halodakra, s.s.,* in the presence of an anterior lateral tooth in the left valve and a slot for it in the right valve.

The name of this subgenus honors Dr. Rudolf Stohler, the founding editor of the journal *The Veliger.*

[3] OLSSON (1961) terms the broad anterior cardinal of the right bivalve as "bifid." His figure of the left valve seems to show a cardinal tooth posterior to the ligament, but I see none there in the material I have examined. He judges the combination of what I consider the central and the posterior cardinals of the left valve to be a single, bifid tooth.

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Explanation of Figures 1 to 4

Figures 1 and 2. *Bernardina bakeri* Dall.

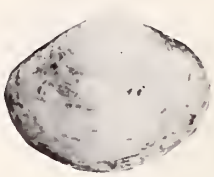
Figure 1. **Lectotype** (herein). USNM 220099, length, 2.5 mm, outside and inside views.

Figure 2. LACM 67-1, Puerto Santo Tomás, Baja California Norte, 3–8 m, length, 2.8 mm. 2a, right valve. 2b, left valve.

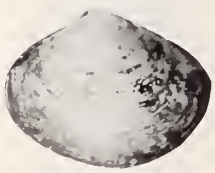
Figures 3 and 4. *Bernardina margarita* (Carpenter).

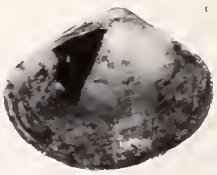
Figure 3. **Lectotype** of *Circe margarita* Carpenter, BM(NH) 1857.6.4.412, length, 1.15 mm. 3a, outside views. 3b, inside views.

Figure 4. LACM 71-14, Punta Entrada, Bahía Magdalena, Baja California Sur, 3–15 m, length, 2.0 mm. 4a, right valve. 4b, left valve.

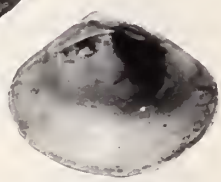


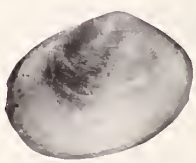
5a



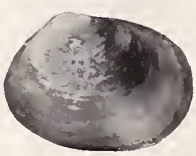


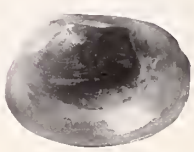
5b



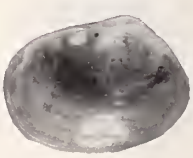


6a





6b



Halodakra (***Stohleria***) *salmonea* (Carpenter, 1864)

(Figures 8–10)

Psephis salmonea Carpenter, 1864
- Carpenter, 1864:539, 611, 641 [1872:25, 97, 127]
- Carpenter, 1866:209
- Arnold, 1903:18, 21, 37, 52, 75, 152
- Dall, 1902b:408 [juvenile *Tivela*]
- Dall, 1916a:34 ["?*Psephidia*"]
- Dall, 1921:44 ["?*Psephidia*"]
- Oldroyd, 1925:162 [*Psephidia*; incorrectly cites a figure of *Tellina salmonea*]
- Grant & Gale, 1931:338 [*Psephidia*]
- Burch, 1944c:16; Burch, 1945:16
- Palmer, 1958:16, 20, 22, 37, 99, 336 (pl. expl.), pl. 11, figs. 6–12 [*Psephidia*]
- Bernard, 1983:49 [*Halodakra*]

Crassatella marginata Keep, 1887
- Keep, 1887:179 [as "Carpenter"] [Keep, 1888, 1892, 1893:179]
- Paetel, 1890:139
- Keep, 1904:50, 281
- Kelsey, 1907:38 [*Crassatella*]
- Keep, 1911:61–62
- Orcutt, 1915:13 (1st sect.), 60 (2nd sect.)
- Lamy, 1917:204
- Keep & Bailey, 1935:73 [*Crassatellites*]
- Burch, 1944b:9 [*Crassatellites*]; Smith, in Burch, 1944b:9 [unidentifiable]; Keen, in Burch, 1944b: 17 [*Crassatella*; probably synonym of *Psephidia brunnea*]
- Palmer, 1958:81
- Bernard, 1983:36 [synonym of *Eucrassatella fluctuata* (Carpenter, 1864)]
- Coan, 1984:164 [*Halodakra*; possibly synonym of *H. salmonea*]

"*Crassatellites margarita* Carpenter," *auctt., non Circe margarita* Carpenter, 1857b
- Jordan, 1924:153

?"*Tivela marginata* Carpenter," *auctt.*
- Dall, 1902b:386
- Berry, 1907:20
- Lamy, 1917:204
- Palmer, 1958:96

Psephidia brunnea Dall, 1916
- Dall, 1916a:34 [*nomen nudum*]
- Dall, 1916b:413
- Dall, 1921:44
- Oldroyd, 1925:162
- Keen, in Burch, 1944b:17
- Burch, 1944c:16; Burch, 1945:16
- Keen, 1971:118 [*Halodakra*]
- Bernard, 1983:49 [synonym of *Halodakra salmonea*]

Type material and localities

Psephis salmonea—USNM 15578, **lectotype** (herein), pair; length, 3.0 mm; height, 2.7 mm; thickness, 2.0 mm (Figure 8). From Calif. State Geol. Surv. Coll. no. 1068. San Diego, San Diego Co., California (about 32°33′N, 117°14′W; J. G. Cooper, probably Nov. or Dec. 1861. **Paralectotypes:** Redpath Museum, McGill University 115, 5 specimens; Santa Catalina Id., Los Angeles Co., California (about 33°26′N, 118°29′W); 55 m; J. G. Cooper, June 20–26, 1863.

Crassatella marginata—The original type material has not been located in the parts of the Keep collection now housed at the University of California at Berkeley (D. Lindberg, verbal communication, Jan. 1983), the California Academy of Sciences (B. Roth, verbal communication, Jan. 1983), or the Institute of Geology & Paleontology of Tohoku Univ. in Sendai, Japan (Ogasawara, *in litt.*, 5 Sept. 1983). **Neotype:** USNM 15578, the lectotype of *Psephis salmonea*, which gives it the same type locality.

Psephidia brunnea—USNM 109469, **lectotype** (herein), pair; length, 3.3 mm; height, 2.8 mm; thickness, 2.0 mm (Figure 9). **Paralectotypes,** USNM 792512, 1 broken and 4 entire pairs. Santa Catalina Island, Los Angeles Co., California (about 33°26′N, 118°29′W); 29 m.

Description

Small (to 4.3 mm; LACM 67-61; Isla San Jeronimo, Baja California Norte); ovate to almost triangular, length 1.2 times height; posterior end longer; anterior and posterior ends rounded to sharply rounded; inflated, thickness 0.7 times height; beaks produced, more so than in *Halodakra* (*H.*) *subtrigona*. Shell surface with fine concentric striae. Color white, salmon, to brown, with darker brown dorsally on either side of beaks, often with light brown patches or wavy lines, which may also be visible on internal surface.

Right valve with a broad anterior cardinal and a narrower posterior cardinal, the ligament well posterior to it. Anterior end with an elongate slot for anterior cardinal and anterior lateral of left valve, with distinct pits for each of these teeth; ventral edge of this slot swollen to form a lateral tooth; posterior end with an elongate slot for posterior lateral of left valve, its ventral margin swollen into

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Explanation of Figures 5 to 7

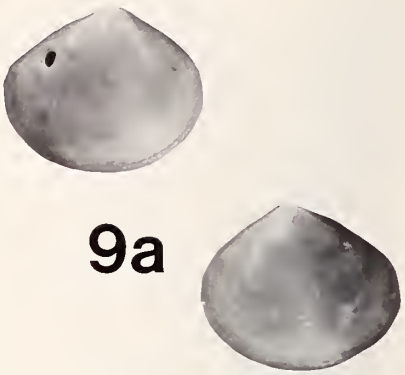
Figures 5 to 7. *Halodakra* (*Halodakra*) *subtrigona* (Carpenter).

Figure 5. **Lectotype** (herein) of *Circe subtrigona* Carpenter, BM(NH) 1857.6.4.413, length 2.4 mm. 5a, outside views 5b, inside views.

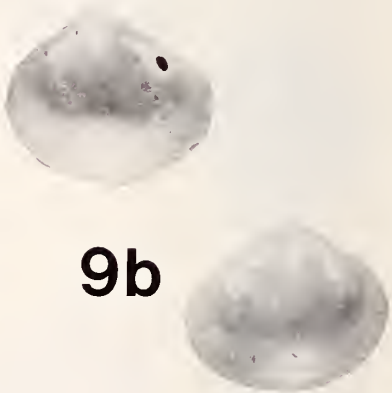
Figure 6. LACM 66-57, Carmel, California, intertidal area, length, 2.5 mm. 6a, outside views. 6b, inside views.

Figure 7. LACM 71-151, northeastern end of Isla Cedros, Baja California Norte, 6–12 m, length, 2.2 mm. 7a, right valve. 7b, left valve.

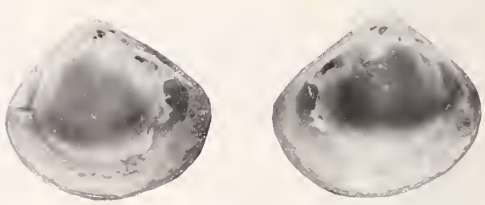

10a


9a


10b


9b


8a


8b

a lateral tooth. Left valve with a medium-sized anterior cardinal, a medium-sized central cardinal, and a very thin posterior cardinal bordering resilium. Anterior end with a conspicuous lateral tooth, generally in line with anterior cardinal. Posterior end with an elongate lateral (Figure 10).

Geographic distribution and habitat

Brookings, Curry Co., Oregon (42°2′42″N, 124°17′12″W) (LACM 63-35), to Punta San Hipolito, Baja California Sur (26°58′N, 114°W) (USNM 127538; CASIZ 039005); intertidal area to 60 m, with a mean depth of 16 m; in gravel and rubble in rocky areas. Not uncommon; I have studied 74 lots. Example of a lot with a brood: LACM 63-50.

YOCUM & EDGE (1929:50) reported "*Psephidia brunnea* Dall" from Coos Bay, Oregon, farther north than Brookings. However, it is more likely that they had either *Nutricola tantilla* (Gould, 1853) or *Psephidia lordi* (Baird, 1863), small venerids that occur there but are not present on their faunal list. Their specimens have not been located at the University of Oregon (P. Frank, *in litt.*, 5 Jan. 1984).

VEDDER (1960:326) reported "*Psephidia* cf. *P. salmonea*" from a Pliocene sandstone in Orange Co., California. ARNOLD (1903: see synonymy) reported this species from what is now regarded as the Lower Pleistocene of Santa Barbara and of San Pedro, California. DELONG (1941: facing p. 244) also recorded it from the latter.

Discussion

This species was first proposed in the venerid genus *Psephis* Carpenter, 1864, which proved to be a homonym (*non Psephis* GUÉNÉE, 1854:257) and was renamed *Psephidia* by DALL (1902a:243). It is unclear why Dall failed to compare his new species, *Psephidia brunnea,* to *P. salmonea,* having placed them side by side in the same genus.

As discussed elsewhere (COAN, 1984), *Crassatella marginata* Keep, 1887, was most probably based on specimens of *Halodakra* from southern California.[4] Keep credited this species to Carpenter, but Carpenter never proposed it. The name probably originated from the miscopying of a label by Carpenter with some southern Californian specimens of *Halodakra salmonea* that had been misidentified by him as "*Crassatella margarita* (Carpenter, 1857)" (CASIZ 036681). The latter species is a Panamic *Bernardina* discussed herein.

BERNARD (1983:36) recently associated Keep's taxon with the rare, deep water Californian *Eucrassatella fluctuata* (Carpenter, 1864). This is unlikely because Keep had several specimens, and the *Eucrassatella* is still known from only a few specimens, none resembling the "pinhead"-sized material that Keep said he had. Moreover, Keep's description demonstrates that he had good, probably live-collected material showing a color pattern.

I now recognize two species of *Halodakra* in southern California, and it is difficult to be certain which of the two Keep had. However, it is probable that he had *H. salmonea,* the more common of the two forms there. The neotype designation herein therefore serves to eliminate future doubt and speculation.

It is uncertain what GARDNER (1917:113, pl. 4, fig. 12) reported and illustrated from Laguna Beach, California, as "*Crassatella marginata.*" It could have been either species of *Halodakra,* and efforts to trace the specimens have been unsuccessful (Oglesby, *in litt.*, 25 Jan. 1984).

[4] This is sometimes misdated as 1888, but there was an 1887 printing of "West Coast Shells" that is less common in libraries (see Literature Cited).

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All works cited in the text, including sources of taxonomic units are listed. Volume, bulletin, monograph, memoir, and professional paper numbers are in bold face; series

←

Explanation of Figures 8 to 10

Figures 8 to 10. *Halodakra* (***Stohleria***) *salmonea* (Carpenter).

Figure 8. **Lectotype** (herein) of *Psephis salmonea* Carpenter, and **neotype** (herein) of *Crassatella marginata* Keep, USNM 15578, length, 3.0 mm. 8a, outside views. 8b, inside views.

Figure 9. **Lectotype** (herein) of *Psephidia brunnea* Dall, USNM 109469, length 3.3 mm. 9a, outside views. 9b, inside views.

Figure 10. LACM 71–151, northeastern end of Isla Cedros, Baja California Norte, 6–12 m, length, 2.8 mm. 10a, right valve. 10b, left valve.

numbers, in parentheses, precede volume numbers; issue numbers, in parentheses, follow volume numbers; supplementary information, such as second methods of listing volumes, part numbers, and parenthetical statements, are given in brackets. Plates and portraits are listed, but not text figures, maps, charts, and tables. Exact publication dates are given when possible.

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