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SOME MOLLUSCA OF THE FAMILY EPITONIIDÆ
FROM THE GULF OF CALIFORNIA

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This report constitutes another record of the 1921 Expedition of the California Academy of Sciences to the Gulf of California.¹ In addition to the large number of stations at which collections were made during that year there have been included such members of this family as were obtained at Cape San Lucas, Lower California in 1925.²

The number of species credited to the family Epitondiidae (=Scalaridae) is very large, but they are all generally considered to belong to a single genus. This genus, Epitonium (=Scalaria), has been divided into a correspondingly large number of subgenera, some of which are very distinct while others are based on trivial differences. California is credited with about 35 species in the genus, and an additional 25 have been described from Lower California and the Gulf of Cali-

¹For a general account of the expedition of 1921, see Slevin, Proc. Calif. Acad. Sci., ser. 4, vol. 12, no. 6, pp. 55-72, June 2, 1923.
fornia. Many of these are known only from a single collecting; and sufficient material for a determination of the limits of specific variation is available only in a few cases. Many of the recorded ranges are based on old identifications and records which are badly in need of verification. The Academy's Gulf of California material in the genus is not sufficiently extensive to make any attempt at a general review of the entire fauna possible. The following key to the subgenera known from the west coast shows the arrangement used in this paper and indicates the closely related groups of species with which comparison should be made:

Key to Subgenera of West American Epitoniidæ

**Shell with a Basal Disk Bounded by a Keel**

- Surface with a spongy, punctate outer layer
  - Varices faint over whorls, pointed in the sutures........... Nodiscala
  - Varices strong over entire surface of whorls............... Cirsotrema

- Surface with a thin, chalky outer layer
  - Varices partly obsolete; sutures pitted.................... Dentiscala

- Surface without a distinct outer layer
  - Spiral sculpture distinct
    - Shell white
      - Varices terminating at basal keel................. Punctiscala
      - Varices extending to umbilical region........ Boreoscala
    - Shell yellow or brown
      - Sculpture evenly reticulated.................... Ferminoscala
      - Occasional ribs strongly varicose............... Pictoscala

- Spiral sculpture very fine or wanting
  - Axial ribs strong and thick.................. Opalia

**Shell Without a Basal Disk**

- Spiral sculpture distinct
  - Varices forming a ridged fold bounding the umbilicus... Crisposcala
  - Varices rounding into umbilical region........... Asperiscala

- Spiral sculpture very fine or wanting
  - Shell distinctly banded with brown............... Hirtoscala
  - Shell white
    - Shell slender, turrited.................. Nitidiscala
    - Shell short and broad
      - Varices thin and erect.................. Globoscala
      - Varices thick and reflexed............ Sthenorytis
We have used the term "varix" with full knowledge that the axial ribs in the members of the family are not equivalent to true rest stages in some other genera. However, the word has been so generally applied to these structures in conchological literature that we believe no good purpose would here be served in abandoning it.

Very few of the west American species have been adequately illustrated and this omission has added enormously to the labor of identification. In order to correct matters as best we can we have illustrated all of the species identified in the present collection. In many cases the only information the student has available is a very generalized description in which actual diagnostic characters are not mentioned or if mentioned are not emphasized. Naturally, working from such literature, errors may be made which cannot be corrected until type material is consulted, redescribed or illustrated. Of the 12 species treated in the following pages three are believed to be new; the other nine seem to fall into described species which have not heretofore been illustrated.

In using the obscure name Epitonium "Bolten" Röding for the genus we have followed current west American usage without, however, subscribing to the propriety or legality of the adoption of Boltenian names in general.

Genus Epitonium "Bolten" Röding, 1798

Epitonium "Bolten" Roding, Mus. Boltenianum, 1798, p. 91.

Subgenus Nodiscala de Boury, 1889

The species from the west coast which are placed in the subgenus Nodiscala form a distinct group, very different from the remainder of the Epitoniums. Dall9 described the subgenus as follows: "These are small, slender imperforate shells with ill-defined axial nodes or ribs but only one true varix, which is terminal and much thickened. The shells when in good condition have a soft calcareous outer coat which is punctate or minutely sculptured." To this it can be added that the more

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or less ill-defined ribs end in prominent points which coronate the sutures.

In addition to the species described below the subgenus contains the following from the west coast: *Epitonium spongiosum* (Carpenter),¹ described from Monterey with eight undulated ribs; *Epitonium mazatlaneum* (Dall),⁵ described from Mazatlan, with 20 faint ribs; and *Epitonium mexicanum* (Dall),⁶ from Acapulco, with nine wide ribs. All three are known only from the type localities.

1. **Epitonium (Nodiscala) golischi** Baker, Hanna & Strong, new species

Plate 2, figures 1, 2

Shell rather large, with the characteristic calcareous outer coat, dull cream-white; nuclear whorls very small, depressed helicoid, about one and a half, the first nearly smooth, the second showing the faint beginnings of varices, not sharply differentiated from the succeeding turn; postnuclear whorls about eight, high between the sutures, very moderately and evenly rounded, with ten broad, low-rounded, slightly retractive varices, obsolete on the lower whorls, more distinct on the upper turns, terminating posteriorly in broad, rounded points coronating the whorls, appressed to the preceding whorls and separated by rather deep depressions extending into the sutures; interspaces about as wide as the varices on the lower whorls, proportionally wider above; all postnuclear whorls marked by very indistinct, low rounded axial riblets, parallel to, and extending over the varices, crossed by equally indistinct spiral cords, both groups being further marked throughout by quite distinct, irregular and irregularly spaced, microscopic vertical riblets crossed by equally fine spiral cords separated by minute, incised, punctate spiral lines, the punctations unequal, generally circular, rather deep, and placed at the intersections of the interspaces of the vertical riblets; sutures rather deep, obscured by the coronating varices; base rounded above, concave below a basal disk

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defined by an extension of the last suture as a depressed line with a series of broad holes corresponding to those on the upper sutures and a second series of holes half way from the basal disk to the anterior extremity of the shell; aperture broadly subpyriform, distinctly effuse below; outer lip rather thin; basal lip and parietal wall heavily calloused. Length, 13 mm.; diameter, 5.8 mm.

*Holotype:* No. 4770, Mus. Calif. Acad. Sci., from San Francisco Island, Gulf of California, and a half-grown paratype (No. 4771), from Puerto Escondido, Lower California, both collected by Fred Baker in 1921. The holotype is probably not quite mature as it lacks the "much thickened" terminal varix noted by Dal17 as characteristic of the subgenus.

Besides other distinguishing criteria, this species differs from all others of the subgenus described from this coast in being much more obese.

It is named for the late W. H. Golisch, one of our most enthusiastic west coast conchologists.

2. *Epitonium (Nodiscala) retiporosum* (Carpenter)


One immature example was taken at Cape San Lucas.

A free translation of Carpenter’s description is as follows: "Shell similar in shape to *O. bullata*, but with entirely different sculpture; nuclear whorls ? (decollated); normal whorls seven, slightly rounded, sutures impressed; with about 14 subacute radiating ribs, rounded, not varicose, the continuation above the sutures flattened; last whorl with a riblike, irregularly arranged spiral row of tubercles on the periphery; entire surface reticulate, with the interstices deeply, irregularly punctate. punctures, minute, close; base angulated by a nodulous rib; aperture rounded, lip continuous, varicose, not sinuated; operculum (?) pauci-spiral. Length 7, length of spire 5, diameter 2.5 mm.” To this it can be added that the

ribs end in rounded knobs in the suture, and that the nucleus consists of four well rounded, glassy whorls of which only the last shows signs of sculpture. An adult specimen from Catalina Island has been chosen for illustration.

3. **Epitonium (Nodiscala) espiritum** Baker, Hanna & Strong, new species

Plate 2, figure 4

Shell of moderate size, elongate-conic, everywhere marked by heavy growth lines, milk-white; nuclear whorls decollated; remaining postnuclear whorls seven and a half, strongly exserted, the first three very convex, the rest strongly angulate in the middle, producing a broad, slightly concave, sloping shoulder on the upper half and a flattening of the lower part; all whorls marked by low, rounded, irregular, irregularly spaced, slightly retractive axial ribs, about fifteen appearing on all whorls, these ribs terminating superiorly on the lower whorls, and indistinctly on the upper, in rounded, appressed tubercles in the deeply impressed sutures, thus rendering the sutures strongly crenulate, and by from 10 to 20 narrow, rounded spiral cords crossing the axial ribs, separated by well defined sulci which are rendered markedly punctate by the heavy growth lines; base rather long, marked by the same sculpture as the preceding whorls; aperture broadly oval with some flattening on the peripheral side, rendered entire by a heavy continuous callus and showing the external sculpture within. Length, 6 mm.; diameter, 2.3 mm.


The species differs radically from any other described from this coast.
Subgenus *Dentiscala* de Boury, 1886

This subgenus contains those species with a spiral rib bounding the basal disk; the more or less obsolete ribs corotate the suture and have deep pits between them on the tabulated shoulder of the whorl.

4. *Epitonium* (*Dentiscala*) *crenatoïdes* (Carpenter)

Plate 2, figure 5


One immature specimen was taken at the West Anchorage, San Jose Island, Gulf of California and one at Cape San Lucas, Lower California.

A free translation of Carpenter's description of this species is as follows: "Shell white, margin of spire straight, nuclear whorls?, normal whorls six, compact, in close contact; axial ribs 10, nearly obsolete on the spire, strong on the last whorl, broad, not elevated, ascending the spire in close, almost straight lines; suture deeply punctured between the ribs, suture continued as a broad basal keel; spaces between the ribs deep, particularly in the sutures, showing subobsolete, subnodose spiral threads; not umbilicated; base smooth. Length 13.5, length of spire 9.5, diameter 5.75 mm."

5. *Epitonium* (*Dentiscala*) *crenimarginatum* (Dall)

Plate 2, figure 6


Thirty-three specimens were taken at Smith Island, two at Balandra Bay, Carmen Island, three at the West Anchorage, San Jose Island, one at San Marcos Island, three at Georges Island, fourteen at Sal si Puedes Island, three at Isla Partida, all in the Gulf of California; one at Las Animas Bay and three at San Antonio Point, Lower California.

In the original description of *Epitonium crenimarginatum* it was stated that the species had been confused with *Epitonium crenatoïdes* (Carpenter). The latter is a rare and little known
Gulf shell but the name has been commonly applied to the
former species which ranges as far north as Monterey, Cali-
nesia, as shown by the various published lists. *Epitonium
crenimarginatum* (Dall) is characterised by having about 12
axial ribs, strong on the spire, obsolete on the last two whorls,
the whorls finely spirally striated, the base smooth.

Carpenter described under the name of "Opalia (?crena-
toides, var.) insculpta," a Pleistocene fossil from Santa Bar-
bara with 13 or 14 ribs, strong on the spire, obsolete on the
last whorl, spiral sculpture none. Dall stated of this that it is
somewhat intermediate between the two above noted but with-
out the fine spiral surface sculpture. As the spiral striations
on the living shells is on a surface coating which is easily
eroded, leaving a smooth underlayer, this character is not of
specific value. It is not improbable that a study of well pre-
served material from the Pleistocene will show that *insculptum*
(Carpenter) and *crenimarginatum* (Dall) are identical. One
other species, *Epitonium nesioticum* (Dall), from Catalina
Island, California, is placed in the subgenus. It is smaller,
with 12 ribs and sharp spiral sculpture.

Subgenus *Asperiscalac* de Boury, 1909

This subgenus contains those species without a basal disk in
which the surface between the varicose ribs is marked with
spiral sculpture. To the single species described by Carpenter,
Dall added 13 more from the west coast. Three of these were
found in the Academy’s material and a single specimen of
another seems to represent a new species.

6. *Epitonium (Asperiscalac) kelseyi* Baker, Hanna & Strong,
    new species
    Plate 2, figure 7

Shell of medium size, rather obese, with straight sides,
shining white; nuclear whorls about two, high and prominent,
the first somewhat eroded, the second showing a minute thim-

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ble-pitting in spots; transition to postnuclear sculpture not well defined; postnuclear whorls nearly eight and a half, slopingly shouldered above, strongly and evenly rounded below the shoulder, marked by eighteen thin, slightly reflected, irregular and irregularly placed, varices, which are depressed at the sutures, but raised at the shoulder to rounded tubercles which occasionally become spinose; varices not continuous up the spire which they encircle about $\frac{3}{4}$; interspaces wider than the varices, everywhere marked by irregular and irregularly spaced, incised spiral lines quite generally showing faintly on the varices; postnuclear whorls marked throughout by minute growth lines reaching the anterior surfaces of the varices; sutures deep and well defined between the varices; base well rounded, without a basal disk; aperture ovate, slightly effuse below; outer lip somewhat fractured but thin, indicating probable immaturity; basal lip and parietal wall with a broad callus reflected above, and free from the ends of the varices in such a manner as scarcely to hide the umbilicus. Length, 11.9 mm.; diameter, 5.5 mm.

**Holotype:** No. 4766, Mus. Calif. Acad. Sci., collected by Fred Baker at **San Francisco Island, Gulf of California,** 1921.

This species probably resembles *E. imperforatum* Dall\(^{10}\) more closely than any other from this coast, but it is larger, has fewer varices, a thimble-pitted nucleus and, apparently, a greater tendency to become spinose at the shoulder, besides being perforate. It appears to us that this last criterion is not of great taxonomic importance in *Epitonium* because the usual broad callus of the columellar region may easily obscure a quite large umbilicus. However, the very free reflection of the callus in this species makes obscuration very improbable at any stage of growth. We are inclined to agree with Dall\(^{11}\) rather than with de Boury\(^{12}\) that the number of varies, at least in the

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\(^{11}\)"The number of varices is, on the whole, very constant in most of the groups, following the rule that the greatest variation will be found where the normal number of varices is greatest."


\(^{12}\)"Bien que le nombre des côtes axiales soit une indication relativement très utile dans nombre de cas, il est souvent si variable, même chez les espèces à côtes peu nombreuses, qu'il faud n'en tenir compte qu'avec une extrême prudence et ne pas y attacher la même importance que notre savant collègue, qui attribue à ce caractère une constance en réalité très relative."

Jour. de Conch., vol. 64, 1918, p. 34.
majority of our west coast species, is generally a dependable criterion.

The species is named for Mr. F. W. Kelsey of San Diego, California.

7. **Epitonium (Asperiscala) acapulcanum** Dall

*Plate 2, figure 8*


A single specimen was taken at Isthmus Bay, Espiritu Santo Island, Gulf of California.

This species is characterized by Dall as having 11 varices, without spinosity at the shoulder, the whorls covered with closely adjacent flattish threads; the three nuclear and five subsequent whorls measuring 5 mm. in length by 2.5 mm. in diameter. Our specimen has six whorls and is slightly larger than the type in all dimensions. It seems to agree in most particulars but the varices are slightly less retractive. The number of threads in the intercostal spaces of the penultimate whorl is about twenty.

8. **Epitonium (Asperiscala) xantusi** Dall

*Plate 3, figures 1, 2*


A single specimen taken at Isthmus Bay, Espiritu Santo Island, Gulf of California, and about two dozen specimens at Cape San Lucas, Lower California, seem to fall here.

The species is characterized by Dall as having 12 low, continuous varices, not spinose or expanded over the suture, the interspaces on the whorls with flattish adjacent threads; the seven decollated whorls measuring 5.5 mm. in length by 3 mm. in diameter. None of our specimens reach quite the seven whorls of the type and the measurements are proportionally smaller. The nuclear whorls are nearly three, axially retrac-
tively, very minutely striated, the direction agreeing with that of the varices. The intercostal spiral cords number from eight to twelve, nearly equal, equally spaced and very distinctly marked.

9. **Epitonium (Asperiscala) cookeanum Dall**

Plate 3, figure 3


A single beachworn specimen from Isthmus Cove, Espiritu Santo Island, Gulf of California, agrees with Dall’s description and with a specimen from Ocean Beach, near San Diego, in Dr. Baker’s collection. No type locality was designated in the original description but the range was stated to be from San Diego to Gulf of California. Dr. Baker’s specimen is marked “co-type” and is believed to have been received from Miss Cooke; it is very probably part of the type lot and has been chosen for figuring here.

Subgenus **Nitidoscala**, de Boury, 1909

This subgenus contains those species without a basal disk in which the surface of the whorls between the varices is without spiral sculpture. The majority of the species from the west coast belong in this subgenus, the total number being nearly 50. Many of these are only known from type specimens and there has been much confusion in the application of the older names. Only four species falling in the subgenus were found in the Academy’s Gulf material.

10. **Epitonium (Nitidoscala) apiculatum Dall**

Plate 3, figures 4, 5, 6


Two specimens were taken at the Salt Works, Carmen Island, two at Amortajada Bay, San Jose Island, one at Isthmus Bay, Espiritu Santo Island, all in the Gulf of California;
three at La Paz, one at San Evaristo Bay and two at Coyote Bay, Conception Bay, Lower California.

This species is characterized by Dall as having eight sharp varices, acutely angled at the shoulder and becoming spinose on the last whorl; the $2\frac{1}{2}$ nuclear and five subsequent whorls measuring 4 mm. in length by 2 mm. in diameter. The species was evidently described from an immature individual. We figure an immature specimen which agrees very closely with the type-description and another with seven and a half post-nuclear whorls; this last is 9.2 mm. in length and 3.3 mm. in diameter; the varices are continuous and make nearly a whole turn of the spire.

11. **Epitonium** (Nitidoscala) *propehexagonum* Dall

Plate 3, figure 7


One specimen from Puerto Escondido, Lower California, one from Sal si Puedes Island and one from San Luis Island, Gulf of California, seem to fall here.

Dall separated this species from the wider ranging *Epitonium hexagonum* (Sowerby), the only other species from the west coast with six varices, by the larger size, broader proportions and greater tendency to spinosity on the varices at the shoulder of the whorls. Judging from the description alone our specimens possess these characters.

12. **Epitonium** (Nitidoscala) *hexagonum* (Sowerby)

Plate 3, figure 8


A single specimen from Isla Danzante, Gulf of California, seems to fall in Sowerby's species as restricted by Dall.
13. **Epitonium (Nitidoscala) colpoicum Dall**

Plate 3, figure 9


A single specimen from Ballandra Bay, Carmen Island, Gulf of California, has one more whorl than the original description calls for and it is accordingly larger. The lack of any indication of coronation to the varices and the “pit-like cavities” in the suture between the varices make this species quite distinct from any other described form.
PLATE 2

Fig. 1. Epitonium gollischii B. H. & S., n. sp. Holotype No. 4770 (C. A. S.); San Francisco Island, Gulf of California; length 13.0 mm.; diameter 5.8 mm.; p. 44.

Fig. 2. Epitonium gollischii B. H. & S., n. sp. Paratype No. 4771 (C. A. S.); Puerto Escondido, Gulf of California; length 7.6 mm.; diameter 3.5 mm.; p. 44.

Fig. 3. Epitonium reiporosum (Carpenter). Plesiotype No. 4777 (C. A. S.); White's Landing, Catalina Island, California, 30 fms.; length 9.5 mm.; diameter 3.3 mm.; p. 45.

Fig. 4. Epitonium espiritum B. H. & S., n. sp. Holotype No. 4778 (C. A. S.); Isthmus Bay, Espiritu Santo Island, Gulf of California; length 6.0 mm.; diameter 2.1 mm.; p. 46.

Fig. 5. Epitonium crenatoïdes (Carpenter). Plesiotype No. 4768 (C. A. S.); west side San Jose Island, Gulf of California; length 9.8 mm.; diameter 4.2 mm.; p. 47.

Fig. 6. Epitonium crenimarginatum (Dall). Plesiotype No. 4774 (C. A. S.); San Marcos Island, Gulf of California; length 18.8 mm.; diameter 7.3 mm.; p. 47.

Fig. 7. Epitonium kelseyi B. H. & S., n. sp. Holotype No. 4766 (C. A. S.); San Francisco Island, Gulf of California; length 11.9 mm.; diameter 5.5 mm.; p. 48.

Fig. 8. Epitonium acapulcanum Dall. Plesiotype No. 4769 (C. A. S.); Isthmus Bay, Espiritu Santo Island, Gulf of California; length 6.2 mm.; diameter 2.9 mm.; p. 50.
PLATE 3

Fig. 1. Epitonium xantusi Dall. Plesiotype No. 4775 (C. A. S.); Isthmus Bay, Espiritu Santo Island, Gulf of California; length 4 mm.; diameter 1.9 mm.; p. 50.

Fig. 2. Epitonium xantusi Dall. Plesiotype No. 4776 (C. A. S.); Cape San Lucas, Lower California; length 5.5 mm.; diameter 2.8 mm.; p. 50.

Fig. 3. Epitonium cookeanum Dall. Plesiotype in the collection of Dr. Fred Baker; Ocean Beach, San Diego, California; length 7.1 mm.; diameter 3.2 mm.; p. 51. This specimen is probably from the type lot returned by Dr. Dall; it is more important than an ordinary plesiotype.

Fig. 4. Epitonium apiculatum Dall. Plesiotype No. 4763 (C. A. S.); Salt Works, Carmen Island, Gulf of California; length 9.2 mm.; diameter 3.3 mm.; p. 51.

Fig. 5. Epitonium apiculatum Dall. Plesiotype No. 4764 (C. A. S.); La Paz, Lower California; length 3.8 mm.; diameter 1.7 mm.; p. 51.

Fig. 6. Epitonium apiculatum Dall. Plesiotype No. 4765 (C. A. S.); Isthmus Bay, Espiritu Santo Island, Gulf of California; length 4 mm.; diameter 1.7 mm.; p. 51.

Fig. 7. Epitonium propehexagonum Dall. Plesiotype No. 4772 (C. A. S.); Inner Lagoon, San Luis Island, Gulf of California; length 18.7 mm.; diameter 7.7 mm.; p. 52.

Fig. 8. Epitonium hexagonum (Sowerby). Plesiotype No. 4767 (C. A. S.); Isla Danzante, Gulf of California; length 14.1 mm.; diameter 5.7 mm.; p. 52.

Fig. 9. Epitonium colpoicum Dall. Plesiotype No. 4773 (C. A. S.); Ballandra Bay, Carmen Island, Gulf of California; length 13.2 mm.; diameter 6.9 mm.; p. 53.