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#### IV

### SOME RISSOID MOLLUSCA FROM THE GULF OF CALIFORNIA

BY

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AND

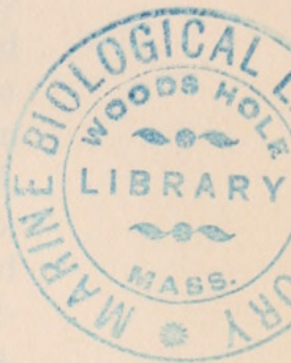
A. M. STRONG

This report has been prepared in the same manner as one on the Pyramidellidæ which we published in 1928.<sup>1</sup> The same collections there mentioned have furnished species of Rissoidæ; in addition, one fine large form was found in a small collection from Cape San Lucas, made by the naturalists of the U. S. S. *Albatross* about 1914. This collection was deposited in the California Academy of Sciences and contains a considerable number of species, mostly large forms.

The west American species which have generally been grouped together under Rissoidæ have been divided by Drs. Dall and Bartsch into several genera and three families. Of these the following appear in this paper: *Alvania* and *Amphithalamus* in the family Rissoidæ; *Rissoina* in the family Rissoinidæ; and *Barleeia* and *Rissoella*, not ascribed to any family.

The species are comparatively easy to identify because of the excellent monographic studies prepared by Dr. Paul Bartsch and published by the U. S. National Museum. An exception must be noted in the case of *Barleeia*. The simple

<sup>1</sup>Proc. Calif. Acad. Sci., ser. 4, vol. 17, no. 7, pp. 205-246, pls. 11, 12, June 29, 1928.





nature of the shells of the species of this genus, and the lack of information as to ecology and limits of variation, cause the determinations to be somewhat questionable. We have recognized and illustrated four species but we are not completely convinced that the collections do not contain a greater, or possibly a lesser, number.

1. *Alvania lucasana* Baker, Hanna & Strong, new species

Plate 1, figure 1

Shell rather small, everywhere marked by minute growth lines, cylindro-conic, dark straw-colored; nuclear whorls about two, smooth and slightly shining, depressed, forming a mammillate apex; post-nuclear whorls four, well rounded, narrowly, slopingly shouldered above, marked by rather indistinct, rounded, vertical or slightly retractive axial ribs, obsolescent on the base, about 22 appearing on the first whorl, 16 on the second, 18 on the third, and 24 on the last; interspaces and axial ribs crossed by nearly equal and equally spaced, narrow spiral cords, five appearing on the first and six on the succeeding turns, producing tubercles at their intersections with the axial ribs; these cords separated by very distinct, wavy incised spiral lines, the upper slightly more marked, giving the appearance of an appression of the summits of the whorls and bringing the upper row of tubercles into decided relief; sutures moderately impressed but rendered indistinct by the extensions of the axial ribs; periphery scarcely defined by the extension of the lowest suture; base rather long, well rounded, showing the feeble extensions of the axial ribs and about nine? nearly equal spiral cords; aperture entire, broadly subpyriform, the posterior angle being obtuse; outer lip not much thickened and the peritreme nowhere heavily calloused, probably because the holotype is not fully mature. Length 2.5 mm.; diameter 1 mm.

*Holotype*: No. 4597, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas, Lower California**. Three additional specimens were taken at the same place.



This species most nearly resembles *Alvania compacta* Carpenter, from the region north of Puget Sound, but is more slender and has fewer axial ribs. The great difference in distribution makes it improbable that it is even a subspecies.

## 2. *Alvania herrerae* Baker, Hanna & Strong, new species

Plate 1, figure 2

Shell small, ovate, slightly shining, light straw-colored; nuclear whorls about two, rather prominent, smooth, slightly opalescent, mammillate; postnuclear whorls four, rather straight above, rounded below, slightly overhanging, very narrowly tabulately shouldered at their summits, differentiated from the last nuclear whorl by a prominent tubercle, the first of a spiral series continuing on the periphery, most marked on the first two whorls and becoming obsolete on the body whorl, each tubercle forming the lower part of a narrow axial rib, about eight appearing on the first whorl, 14 on the second, and 16 on the third and fourth; intercostal spaces shallow, flattened at the bottom, about twice as wide as the axial ribs, crossed by subequal and subequally spaced, low, rounded spiral cords, sloping more abruptly above than below; those on the first two turns indistinctly marked; about 12 on the third and fourth whorls; these cross the axial ribs and render them tuberculate at their intersections, the upper two tend to become fused, thus producing a more prominent series of tubercles indistinctly coronating the whorls; a similar fusing appears at places on the lower two cords connecting the peripheral series of tubercles; upper sutures strongly impressed, the last only slightly so; base rather long, defined by a shallow sulcus, the continuation of the last suture, marked by feeble continuations of the axial ribs and by about 12 equal and equally spaced cords similar to those on the body whorl, beginning rather close together near the aperture and separating regularly as they advance; aperture broadly and quite regularly pyriform, rendered entire by a callus which is most marked on the outer lip; outer lip thickened on the edge, thin within, showing the external sculpture clearly. Length 3 mm.; diameter 1.5 mm.

*Holotype*: No. 4598, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas**,



**Lower California.** About 20 additional specimens were taken at the same place.

This species can be differentiated from *Alvania lirata* (Carpenter)<sup>2</sup> by its less defined sutures and narrower axial ribs, especially just above the sutures where *A. lirata* shows greatly enlarged tubercles, and by the subcoronation of the whorls. It is perhaps more like *Alvania lucasana* of this paper but it is more obese, has fewer axial ribs and has differently shaped whorls.

The species is named for Prof. A. Herrera, Director of Biological Studies in Mexico.

3. *Alvania gallegosi* Baker, Hanna & Strong, new species

Plate 1, figure 11

Shell rather small, elongate-conic, everywhere marked by minute growth lines, covered by a thin, fugaceous, light straw-colored epidermis, showing white where denuded; nuclear whorls nearly two, smooth, well rounded, forming a mammillated apex; postnuclear whorls  $5\frac{1}{3}$ , subangulated at the periphery, cancellated by narrow, rounded, slightly protractive axial ribs terminating at the suture of the last whorl, and nearly equal spiral cords, generally tuberculated at their intersections and enclosing shallow, squarish pits; from 20 to 22 axial ribs appear on all whorls except the first; four spiral cords appear on the lower whorls, the first three placed on a long, sloping shoulder occupying about  $\frac{3}{5}$  of each whorl, the fourth cord forming the narrow carina of the subangulation; spiral cords subequal and subequally spaced, the upper two being slightly closer than the others, the posterior at the summit, just outside the suture, the anterior almost equally near the lower suture, the last whorl and base showing fine, intercalating, spiral cords; sutures deeply impressed; base rather short, slightly inflated at the periphery, marked by nine low, rounded roughened, but scarcely tuberculate spiral cords, the upper originating in the last suture, the others on the parietal wall and spreading and diminishing rather evenly towards the um-

<sup>2</sup> *Rissoa lirata* Carpenter, Cat. Maz. Shells, 1856, p. 358; *Alvania lirata* Bartsch, Proc. U. S. Nat. Mus., vol. 41, p. 338, pl. 29, fig. 3, 1911.



bilical region; aperture very broadly and rather evenly pyriform; outer and basal lips very thin, crenulated by the external sculpture which shows plainly within; columella and parietal wall scarcely calloused. Length 2.3 mm.; diameter 1.1 mm.

*Holotype*: No. 4599, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas, Lower California**. Two additional specimens were taken at the same place.

This species differs from other west American *Alvanias* by its subangulated periphery; this character is noticed in *A. lara*<sup>3</sup> from the Galapagos Islands, but in that species the spiral cords are sublaminate and differently arranged.

The species is named for Professor José Maria Gallegos of the Mexican Biological Survey who lost his life in Yucatan in the prosecution of his work and who is much honored in California for his untiring efforts to bring about a coordination of the biological work of the Federal Government of Mexico with similar work being carried on in the State of California.

#### 4. *Alvania monserratensis* Baker, Hanna & Strong, new species

Plate 1, figure 9

Shell very small, subperforate, oblong-ovate, white or more or less clouded with straw-color or brown; nuclear whorls small, immersed and scarcely showing; postnuclear whorls four, decidedly exserted, with a broad, sloping shoulder above, convex below, cancellated by subequal and subequally-spaced, rather prominent, narrow, slightly retractive axial ribs terminating on the last whorl, and lower, subequal spiral cords, forming rather deep, squarish pits, generally longer in a spiral direction with the tubercles at their intersections; about 20 axial ribs appearing on the second turn, 22 on the third and 26 on the last, with four spiral cords on the last three whorls, the first in the middle of the shoulder, the second at the angle, the other two about equally spaced between this and the suture; sutures deeply impressed, crossed by the axial ribs; base slightly concave at the umbilical region, well rounded behind, marked by four subequal and subequally spaced spiral cords separated from the last cord by a continuation of the

<sup>3</sup>*Alvania lara* Bartsch, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 357, pl. 32, fig. 6.



suture, the posterior two being distinctly tuberculate; aperture entire, subcircular, calloused throughout; outer lip indistinctly dentate within, showing the external sculpture behind the thickened edge. Length 1.35 mm.; diameter 0.75 mm.

*Holotype*: No. 4600, Mus. Calif. Acad. Sci., collected by Fred Baker in 1921 at **Monserate Island, Gulf of California**. Three specimens were taken at Amortajada Bay, San Jose Island, Gulf of California; one at Coyote Bay, Concepcion Bay, Lower California; several others were taken at Cape San Lucas. Some of the Cape San Lucas specimens are light brown throughout while others show a broad yellowish blotch behind the external labial varix.

The species more closely resembles *Alvania oldroydæ* Bartsch<sup>4</sup> than any other described from the west coast but it is thinner, smaller, more slender, has a much broader shoulder, flatter whorls and a different arrangement of the spiral cords on the postnuclear whorls and base; it also lacks the wide umbilicus of *A. oldroydæ*.

##### 5. *Alvania albolirata* (Carpenter)

*Rissoa albolirata* CARPENTER, Ann. Mag. Nat. Hist., ser. 3, vol. 13, 1864, p. 76.  
*Alvania albolirata* (CARPENTER), BARTSCH, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 338, pl. 29, fig. 6.

A single shell taken at Sal si Puedes Island, Gulf of California, agrees well with Bartsch's description and figure of this species. It is slightly broader and the aperture varies somewhat, probably due to immaturity.

##### 6. *Alvania lirata* (Carpenter)

? *Rissoa lirata* CARPENTER, Cat. Maz. Shells, 1856, p. 358.  
*Alvania lirata* (CARPENTER), BARTSCH, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 338, pl. 29, fig. 3.  
*Rissoa porteri* DALL, ms., 1909.

Specimens of this species were taken in five fathoms off the Salt Works, San Jose Island; at Ballandra Bay, Carmen Island; at Isthmus Bay, Espiritu Santo Island; on Monserate Island, and at Isla Partida in the Gulf of California. It was

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<sup>4</sup>Bartsch, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 360, pl. 32, fig. 3.



also taken at Cape San Lucas, Agua Verde Bay, Puerto Escondido, and San Francisquito Bay, Lower California. Besides these there is in the Baker collection a large number of specimens taken by George D. Porter in the "Gulf of California," and these constitute the type lot of *Rissoa porteri* Dall, ms.; these shells are identical with *Alvania lirata* (Carpenter). So far as we are able to learn, Dr. Dall never validated this name, but unfortunately, the species has been rather widely distributed as *Rissoa porteri*.

### 7. *Alvania electrina* (Carpenter)

? *Diala electrina* CARPENTER, Ann. Mag. Nat. Hist., ser. 3, vol. 3, 1864, p. 478.  
*Alvania electrina* (CARPENTER), BARTSCH, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 346, pl. 30, fig. 4.

About 50 specimens of this species were taken at Cape San Lucas. Some are almost typical while others vary widely in the number of spiral cords on the various whorls and the base, generally with an increase in the numbers. As high as 12 were counted on the penultimate turn and nine on the base. There is also considerable variation in the strength of the axial ribs but no great variation in their number. The intergradations are fully represented.

### 8. *Alvania æquisculpta* Keep

*Alvania æquisculpta* KEEP, West Coast Shells, ed. 1, 1887, p. 65.  
*Rissoa* (*Alvania*) *grippiana* DALL, Nautilus, vol. 21, 1908, p. 136.

Two mature specimens taken at Cape San Lucas, Lower California, undoubtedly are this species. The southern limit of the range previously reported was San Martin Island, Lower California.

### 9. *Alvania tumida* Carpenter

*Alvania tumida* CARPENTER, Cat. Maz. Shells, 1856, p. 360.—BARTSCH, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 361, pl. 32, fig. 2.

Several dozen specimens of this species were taken at Cape San Lucas, Lower California. They show only slight variation in the number of spiral cords and axial ribs.



10. *Rissoina porteri* Baker, Hanna & Strong, new species

Plate 1, figure 15

Shell very small, slender, elongate-conic, distinctly curved, shining translucent, white; nuclear whorls four, the first mammillate, the others only slightly convex, forming a very regular cone and showing a very minute and irregular thimble-pitting in places; change to post-nuclear whorls not well-defined, the last nuclear whorl appearing to be slightly imbedded in the first postnuclear turn; postnuclear whorls  $4\frac{1}{2}$ , the upper ones broadly, not quite tabulately shouldered above, the last two more slopingly; rather strongly curved below and somewhat appressed at the sutures, marked by narrow, sublamellate, sinuous, irregular and irregularly placed, strongly protractive axial ribs extending without diminution to the columellar and basal fasciole; about 10 appear on the first whorl, 12 on the remaining turns; intercostal spaces wider than the axial ribs, rather deep and rounded below, showing no definite sculpture; sutures deep but not well defined; base rather long, marked by a fasciole which is an extension of the very heavy columellar callus and which shows on its edge a minute tubercle at the lower extremity of each axial rib scarcely discernible at the magnification of the figure; aperture broadly sublunate; outer and basal lips much thickened, the outer showing a few broad lirations on the inner, upper portion; columella and adjacent portion of the inner lip very heavily calloused and reflected adnatly to form the basal fasciole; parietal wall heavily, but more narrowly calloused. Length 2.35 mm.; diameter 0.85 mm.

*Holotype*: No. 4601, Mus. Calif. Acad. Sci., collected in the "Gulf of California" by George D. Porter, for whom the species is named. Five additional specimens from the same lot are in the Baker collection.

The species has very marked resemblances to, and differences from, *Rissoina signæ* Bartsch.<sup>5</sup> Its nucleus is very large and prominent instead of depressed; it lacks the spiral striations on the intercostal spaces, is more narrowly and less tabulately shouldered, and is more slender, but the arrangement of the axial ribs and intercostal spaces is very similar.

<sup>5</sup>Proc. U. S. Nat. Mus., vol. 49, 1915, p. 61, pl. 31, figs. 1, 4.



11. *Rissoina melanelloides* Baker, Hanna and Strong,  
new species

Plate 1, figure 5

Shell rather small, quite evenly elongate-conic, everywhere marked by minute, protractive growth lines which are enlarged at irregular intervals giving the appearance of obscure axial ribbing, also by many microscopic spiral lines; shining, milk-white; nuclear whorls about  $1\frac{1}{2}$ , smooth, the first portion depressed and evenly rounded, the latter portion very convex; postnuclear whorls  $6\frac{1}{2}$ , nearly straight above, more rounded on the anterior third, the first differentiated from the last nuclear whorl only by the beginning of a narrow, shallow, impressed spiral line anteriorly towards the suture, a second appearing a little later on the turn, these increasing by rather evenly placed additions until about five appear on the third whorl, seven on the fourth and fifth, and 12 on the last; these incised spiral lines indistinctly define very low, nearly equal, rounded spiral cords which continue quite regularly over the whole shell, becoming obsolescent on the base; sutures shallow, not much more clearly defined than the impressed spiral lines; base rather long, evenly rounded, marked by the obsolescent extensions of the spiral cords; aperture entire, very oblique, quite regularly pyriform but slightly flattened on the columellar side; outer and basal lips slightly thickened, straight above, curving to form almost an exact segment of a circle below, joining the columella without marked change; columella scarcely thickened or reflected, defining a distinct umbilical depression; parietal wall with a very narrow, thin callus. Length 3.30 mm.; diameter 1.40 mm.

*Holotype*: No. 4602, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas, Lower California**. Five additional specimens were taken at the same place.

The shape of the species suggests a *Melanella*. It is perhaps more like *Rissoina dalli* Bartsch<sup>6</sup> from the California coast than any other west American species, but it is larger, has less convex whorls, less distinct sutures, and is sharply differentiated by the spiral sculpture.

<sup>6</sup>Bartsch, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 59, pl. 33, fig. 2.



12. *Rissoina gisna basilirata* Baker, Hanna & Strong,  
new subspecies

Plate 1, figure 12

The form closely resembles *Rissoina gisna* Bartsch.<sup>7</sup> It seems to be immature, showing one less whorl than the type and a thin outer lip, but has the aperture and base of the columella as noted by Bartsch, about the same number and arrangement of axial ribs, but lacks the spiral sculpture everywhere except on the base where there are about 25 basal cords instead of 11. Bartsch's figure shows decided weakening of the spiral sculpture above the periphery, but it is everywhere present except on the nuclear whorls. The variation is sufficiently marked to indicate a probable distinct race.

*Holotype*: No. 4606, Mus. Calif. Acad. Sci., collected by Fred Baker in 1921 at the **West Anchorage, San Jose Island, Gulf of California.**

13. *Rissoina firmata* (C. B. Adams)

*Rissoa firmata* C. B. ADAMS, Ann. Lyc. Nat. Hist. N. Y., vol. 5, 1852, p. 401.

*Rissoa scalariformis* C. B. ADAMS, op. cit., p. 402.

*Rissoina firmata* (C. B. ADAMS), BARTSCH, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 38, pl. 32, figs. 4, 6.

Specimens of this species were taken at Cape San Lucas, Puerto Escondido and Coyote Bay, Concepcion Bay, Lower California, and at the West Anchorage, San Jose Island, Gulf of California.

14. *Rissoina stricta* Menke

*Rissoina stricta* MENKE, Zeitschr. f. Malak., 1850, p. 177, no. 37.—BARTSCH, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 39, pl. 28, fig. 6.

Specimens of this well-marked species were taken at Tepoca Bay, Sonora, Puerto Escondido, Lower California, and on Sal si Puedes, San Esteban, Georges, Isla Partida, Isla Raza, and Santa Cruz islands, Gulf of California.

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<sup>7</sup>Bartsch, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 41, pl. 28, fig. 1.



15. *Rissoina nereina* Bartsch

*Rissoina nereina* BARTSCH, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 53, pl. 32, fig. 1.

Specimens of this species were taken at Cape San Lucas, La Paz, Coyote Bay, Concepcion Bay and San Francisquito Bay, Lower California; and at the Salt Work, Carmen Island, Isthmus Bay, Espiritu Santo Island, Amortajada Bay, San Jose Island, and at Monserrate Island, Gulf of California.

16. *Rissoina bakeri* Bartsch

*Rissoina bakeri* BARTSCH, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 56, fig. 4.

A single shell, not quite mature, taken at Cape San Lucas, Lower California, seems to agree with Bartsch's figure and description. Dr. Bartsch has reported the species from Monterey, California, to South Coronado Island off the northern coast of Lower California. Specimens identified by him were taken by Baker on San Martin Island, 200 miles farther south, so that an extension to Cape San Lucas seems very probable. However, as our shell is immature, this extension of range may be taken with some doubt.

17. *Rissoina stephensæ* Baker, Hanna & Strong, new species

Plate 1, figure 14

Shell small, everywhere marked by rather distinct, slightly retractive growth lines, elongate-conic, dark chestnut brown irregularly flamed with whitish near the sutures; nuclear whorls nearly two, depressed, mammillated, smooth, lighter than the rest of the shell, indistinctly differentiated from the succeeding turns; post-nuclear whorls nearly seven, very moderately and evenly rounded, everywhere marked by rather prominent, nearly equal and equally spaced spiral cords separated by narrow, distinct impressed spiral sulci, of which four appear on the first three whorls and eight on the penultimate; also by very low, indistinct axial undulations of which about six appear on the earlier whorls and about 10 on the last; these are too low to be classed as axial ribs and failed to



appear in our photograph; subsutural spiral cord slightly wider and flatter than the succeeding ones, marked by irregularly spaced brown spots not uniform in size, separated by irregularly triangular whitish flames extending downward over two or three spiral cords; this subsutural cord becomes the peripheral cord on the last turn; periphery subangulate near the aperture; base rather short, marked below the peripheral cord by six spiral cords, the upper ones about equal to those preceding them, but gradually diminishing towards the umbilical region; aperture quite regularly oval, with a rounded posterior canal, only slightly effuse near the base of the columella; outer and basal lips thin, scarcely thickened within, the basal lip very slightly reflected; columella very concave, narrowly reflected, free below, closely appressed above, narrowly calloused, the callus disappearing within the aperture; parietal wall free from callus. Length 4 mm.; diameter 1.5 mm.

*Holotype*: No. 4607, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas, Lower California**. Seven additional specimens were taken at the same place.

This species falls into a very distinct group represented on this coast by four species characterized by color markings, thin outer lip, and the spiral sculpture predominating over the ill-defined or obsolete axial undulations. The opercula of the three gulf species, *Rissoina lapazana* Bartsch,<sup>8</sup> *R. berryi*, and *R. stephensæ*, are unknown. However, that of the fourth species, *R. kelseyi* Dall & Bartsch,<sup>9</sup> from southern California, is found to be typical of the genus as is shown by the accompanying figures 6 and 7. *R. stephensæ* differs from the other species in the group in color, in being much smaller for an equal number of whorls, in having slightly fewer axial undulations and spiral cords, especially on the base, and in other details. There is some variation in the number of spiral cords on the postnuclear whorls of the topotypes but within very narrow limits.

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<sup>8</sup>Bartsch, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 50, pl. 30, fig. 6.

<sup>9</sup>Dall & Bartsch, Nautilus, vol. 16, 1902, p. 94; Proc. U. S. Nat. Mus., vol. 49, 1915, p. 49 pl. 30, fig. 4.



The species is named for Mrs. Kate Stephens, Curator of Mollusks in the San Diego Society of Natural History.

18. *Rissoina berryi* Baker, Hanna & Strong, new species

Plate 1, figure 3

Shell large, broadly elongate-conic, everywhere marked by distinct and strongly protractive growth lines, shining white; nuclear whorls about two, smooth, the first depressed, the second prominent, not distinctly differentiated from the post-nuclear turns; postnuclear whorls  $6\frac{1}{2}$ , rather convex, narrowly shouldered above, the first two nearly smooth but showing the beginning of faint opaque, slightly colored axial markings which become stronger below and are discernible in the umbilical region, numbering about 20 in the lower whorls; these appear under certain lighting as faint ribs but are not raised above the general surface; spiral sculpture consisting of low rounded spiral cords uneven in size, separated by narrower impressed spiral sulci beginning on the third postnuclear turn, increasing in number on each succeeding turn and extending over the base, of which about four appear on the fourth, 10 on the penultimate turn, and 10 on the base; periphery not distinctly marked; base rather short, evenly rounded behind, slightly concave in the umbilical region; aperture subovate, slightly effuse near the columellar base, roundly angulate above; outer and basal lips somewhat worn, but apparently thickened within; columella very concave, narrow above, rather broad and flattened below, backed by a very narrow fasciole; parietal wall marked by the beginnings of the basal spiral cords, scarcely calloused. Length 9 mm.; diameter 3.75. A more worn but larger specimen measures: length 9.5 mm.; diameter 4.25 mm.

*Holotype*: No. 4608, Mus. Calif. Acad. Sci., collected by E. C. Johnson of the U. S. S. *Albatross* about 1914, **Cape San Lucas, Lower California**. Three additional specimens were taken at the same place.

The species falls into the group mentioned under *R. stephensæ* of this paper. It is much the largest of the group and much more obese; it also has more axial ribs than any of



the other species of the group. The species is named for Dr. S. Stillman Berry, one of the outstanding malacologists of this coast.

19. **Rissoina woodwardii** Carpenter

Plate 1, figure 8

*Rissoina woodwardii* CARPENTER, Cat. Maz. Shells, 1856, p. 357.—BARTSCH, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 57.

One specimen was taken in San Luis Gonzaga Bay and two in Isthmus Cove, Espiritu Santo Island, Gulf of California.

20. **Rissoella tumens** (Carpenter)

Plate 1, figure 13

*Jeffreysia tumens* CARPENTER, Cat. Maz. Shells, 1856, p. 363.

*Rissoella tumens* (CARPENTER), BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), pp. 160, 161, pl. 12, fig. 1.

About a dozen specimens were taken at Cape San Lucas, Lower California. A few of the younger shells contain the operculum and agree with Carpenter's description and dimensions. An adult example has six whorls and measures: length 4.3 mm., diameter 2.9 mm.

21. **Rissoella excolpa** Bartsch

Plate 1, figure 10

*Rissoella excolpa* BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), p. 161, pl. 12, fig. 3.

About 100 specimens were taken at Cape San Lucas, Lower California, many of which show faint color banding.

22. **Rissoella johnstoni** Baker, Hanna & Strong, new species

Plate 1, figure 16

Shell small, thin, translucent, shining, white, everywhere marked by indistinct, slightly retractive growth lines; nuclear whorls nearly two, the first rather flatly mammilate, the second roundly shouldered above, rather straight below, smooth;



postnuclear whorls  $2\frac{1}{2}$ , roundly shouldered above, well rounded below, everywhere marked by unequal and unequally spaced, low narrow spiral cords extending to the edge of the open umbilicus, about 9 appearing on the first, 12 on the second and not less than 25 on the base and final turn; periphery well rounded; base rather long and well rounded; umbilicus elongate-lunate, rather large and open; sutures distinctly impressed; aperture oval; outer and basal lips thin, the latter effuse near the columellar junction; columella convex, heavily calloused but scarcely reflected over the umbilicus; parietal wall showing the continuation of the callus flatly adanate above the umbilicus, rendering the aperture entire. Length 1.6 mm.; diameter 1.0 mm. A weathered specimen measures: length 1.7 mm., diameter 1.1 mm.

*Holotype*: No. 4612, Mus. Calif. Acad. Sci., collected by G. D. Hanna and E. K. Jordan in 1925 at **Cape San Lucas, Lower California**. Two additional specimens were taken at the same place.

The species somewhat resembles *R. tumens* (Carpenter), but differs from this species by its small size and from all west coast species in the well-marked spiral cords.

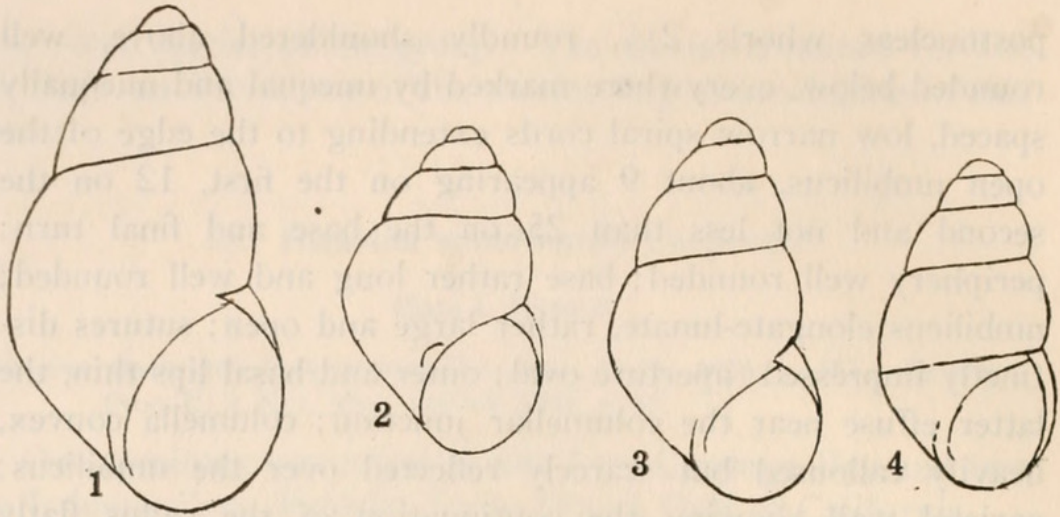
It is named for Mr. Edward C. Johnston, Naturalist of the U. S. S. *Albatross* at the time a Cape San Lucas collection of shells was made.

### 23. *Amphithalamus inclusus* Carpenter

*Amphithalamus inclusus* CARPENTER, Ann. Mag. Nat. Hist., ser. 3, vol. 15, 1865, p. 181.—BARTSCH, Proc. U. S. Nat. Mus., vol. 41, 1911 (1912), p. 264, text fig. 2.

A single specimen was taken at Monserrate Island, Gulf of California, and several at Cape San Lucas, Lower California. The species has not previously been reported below San Diego, California.





Outline, camera lucida figures (X25) of *Barleeia* from  
Cape San Lucas, Lower California

Fig. 1. *Barleeia subtenuis* Carpenter. Plesiotype, No. 4613 (C. A. S.). Length 2.4 mm.

Fig. 2. *Barleeia orcutti* Bartsch. Plesiotype, No. 4614 (C. A. S.).

Fig. 3. *Barleeia alderi* Carpenter. Plesiotype, No. 4615 (C. A. S.).

Fig. 4. *Barleeia bentleyi* Bartsch. Plesiotype, No. 4616 (C. A. S.).

#### 24. *Barleeia alderi* (Carpenter)

Text figure 3

*Jeffreysia alderi* CARPENTER, Cat. Maz. Shells, 1856, p. 362.

*Barleeia alderi* (CARPENTER), BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), p. 175, pl. 12, fig. 6.

Five specimens were taken at the Northeast Anchorage, Monserrate Island, Gulf of California, and a large series at Cape San Lucas, Lower California. Many of the latter show little or no sign of color banding.

#### 25. *Barleeia subtenuis* Carpenter

Text figure 1

*Hydrobia ulva* (PENNANT) CARPENTER, Cat. Maz. Shells, 1856, p. 361, an error in diagnosis.

*Barleeia subtenuis* CARPENTER, Suppl. Rep. Brit. Assoc. Adv. Sci., 1864, pp. 546, 625, 656, 669.—CARPENTER, Jour. de Conch., vol. 13, 1865, pp. 143, 144.—BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), pp. 169, 170, pl. 13, fig. 11.

One specimen was taken at Sal si Puedes Island, several at Monserrate Island, Gulf of California, one at San Luis Gon-



zaga Bay, about a dozen at Cape San Luca, and several hundred on "sea lettuce" in San Francisquito Bay, Lower California. Five specimens in the Baker collection were taken in the "Gulf of California" by George D. Porter, three of them being much larger than those noted above. The largest measures: length 3.6 mm., this being larger than any we have seen reported.

## 26. *Barleeia bentleyi* Bartsch

Text figure 4

*Barleeia bentleyi* BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), pp. 168, 169, pl. 13, fig. 2.

Of several dozen specimens taken at Cape San Lucas, Lower California, a few agree in every way with the description and figure, though the majority are of a darker shade of brown; none being quite fully mature. This extends the range from the type locality, Venice, California, to the southern end of Lower California.

## 27. *Barleeia orcutti* Bartsch

Text figure 2

*Barleeia orcutti* BARTSCH, Proc. U. S. Nat. Mus., vol. 58, 1920 (1921), p. 174, pl. 13, fig. 8.

Three specimens taken at Northeast Anchorage, Monserrate Island, Gulf of California, agree with the description and figure of this species the type locality of which is Magdalena Bay on the opposite side of Lower California.



## PLATE 1

- Fig. 1. *Alvania lucasana* Baker, Hanna & Strong, n. sp. Holotype, No. 4597 (C. A. S.), from Cape San Lucas, Lower Calif.; length 2.5 mm.; p. 24.
- Fig. 2. *Alvania herrerae* Baker, Hanna & Strong, n. sp. Holotype, No. 4598 (C. A. S.), from Cape San Lucas, Lower Calif.; length 3.0 mm.; p. 25.
- Fig. 3. *Rissoina berryi* Baker, Hanna & Strong, n. sp. Holotype, No. 4608 (C. A. S.), from Cape San Lucas, Lower Calif.; length 9 mm.; p. 35.
- Fig. 4. *Rissoina kelseyi* Dall & Bartsch. Plesiotype, No. 4603 (C. A. S.), from Coronado Islands, Lower Calif.; length 5.8 mm.; p. 34.
- Fig. 5. *Rissoina mellanelloides* Baker, Hanna & Strong, n. sp. Holotype, No. 4602 (C. A. S.), from Cape San Lucas, Lower Calif.; length 3.30 mm.; p. 31.
- Fig. 6. *Rissoina kelseyi* Dall & Bartsch. Plesiotype, No. 4604 (C. A. S.), from Coronado Islands, Lower Calif.; length of operculum about 1.0 mm.; p. 34.
- Fig. 7. *Rissoina kelseyi* Dall & Bartsch. Plesiotype, No. 4605 (C. A. S.), from Coronado Islands, Lower Calif.; length of operculum about 1.0 mm.; p. 34.
- Fig. 8. *Rissoina woodwardii* Carpenter. Plesiotype No. 4609 (C. A. S.), from San Luis Gonzaga Bay, Lower Calif.; length 3.0 mm.; p. 36.
- Fig. 9. *Alvania monserratensis* Baker, Hanna & Strong, n. sp. Holotype, No. 4600 (C. A. S.), from Monserrate Island, Gulf of Calif.; length 1.35 mm.; p. 27.
- Fig. 10. *Rissoella excolpa* Bartsch. Plesiotype, No. 4611 (C. A. S.), from Cape San Lucas, Lower Calif.; length 1.4 mm.; p. 36.
- Fig. 11. *Alvania gallegosi* Baker, Hanna & Strong, n. sp. Holotype, No. 4599 (C. A. S.), from Cape San Lucas, Lower Calif.; length 2.3 mm.; p. 26.
- Fig. 12. *Rissoina gisna basilirata* Baker, Hanna & Strong, n. sp. Holotype, No. 4606 (C. A. S.), from West Anchorage, San Jose Island, Gulf of Calif.; length 3.8 mm.; p. 32.
- Fig. 13. *Rissoella tumens* (Carpenter). Plesiotype, No. 4610 (C. A. S.), from Cape San Lucas, Lower Calif.; length 4.0 mm.; p. 36.
- Fig. 14. *Rissoina stephensæ* Baker, Hanna & Strong, n. sp. Holotype, No. 4607 (C. A. S.), from Cape San Lucas, Lower Calif.; length 4 mm.; p. 33.
- Fig. 15. *Rissoina porteri* Baker, Hanna & Strong, n. sp. Holotype, No. 4601 (C. A. S.), from Gulf of Calif.; length 2.35 mm.; p. 30.
- Fig. 16. *Rissoella johnstoni* Baker, Hanna & Strong, n. sp. Holotype, No. 4612 (C. A. S.), from Cape San Lucas, Lower Calif.; length 1.6 mm.; p. 36.





Baker, Fred and Strong, A M. 1930. "Some rissoid mollusca from the Gulf of California." *Proceedings of the California Academy of Sciences, 4th series* 19, 23-40.

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