

THE WEST AMERICAN MOLLUSKS OF THE FAMILIES
RISSEOELLIDAE AND SYNCERATIDAE, AND THE RIS-
SOID GENUS BARLEEIA.

By PAUL BARTSCH,

Curator, Division of Marine Invertebrates.

The present paper discusses several groups of minute West American mollusks which were sadly in need of revision. They are the family Rissoellidae, formerly known as Jeffreysidae. The change of name is required because *Jeffreysia* had to give way to the prior name of *Rissoella*. The family Synceratidae, a new designation for the family Assimineidae, which change is also made necessary because the generic name *Assimineia* has to be replaced by the earlier name *Syncera*. Lastly, the Rissoid genus *Barleeia* has been subjected to a careful examination, which has yielded rather interesting results, as may be seen by an examination of the following pages.

Genus RISSEOELLA Gray.¹

1847. *Rissoella* GRAY, Proceedings Zoological Society of London, p. 159.

1850. *Jeffreysia* ALDER, in Forbes & Hanley's British Mollusca, vol. 3, p. 151.

Gray, at the above citation, makes the following statement: "*Rissoella*, *Rissoa* sp. BROWN. *Rissoa* ? *glaber*, Alder." *Rissoa glaber* Alder, therefore, is the hologenotype of *Rissoella*. *Rissoa glaber* Alder, as cited by Gray, was Alder's concept of *Rissoa glabra* Brown at that time, a concept which Alder changed later when he renamed his shell *Rissoa diaphana*, recognizing that it was not the *Rissoa glabra* of Brown. The genotype of *Rissoella*, therefore, is *Rissoa diaphana* Alder, which is also the genotype of the synonym *Jeffreysia*.

Forbes and Hanley publish² a description of *Jeffreysia*, which they say was entirely furnished them by Alder. This is of sufficient interest to merit reprinting at the present time:

Shell spiral, conical or subglobose, thin, transparent; aperture ovate, rounded below, with the peristome thin and entire. Operculum horny, thin, imperfectly ovate, nearly straight on one side; not spiral, but showing faint concentric lines of growth from a lateral nucleus. It is strengthened internally, on the side next the columella of the shell, by a rib with a branch toward the center of the operculum; from this rib rises a strong, projecting plate, set at right angles to the opercular disk.

Animal with four flattish tentacles; the upper pair moderately long, the lower pair rather shorter, and spreading out broad at the base so as to unite with the outline of the head. Eyes placed on the back of the animal, a considerable distance behind the tentacles. They are large and prominent. Oper-

¹ Trans. Tyneside Nat. Field Club, vol. 1, p. 149, 1847.

² British Mollusca, vol. 3, p. 151.

culigerous lobe small and rounded, without filaments or prolonged appendages. Foot oblong, notched and bilobed in front, with a groove down the center, and slightly rounded behind. The armature of the tongue consists of a broad crenulated central tooth, flanked by two lateral ones on each side—the first broad and crenulated, the exterior one small and hooked.

There is no character in the shell of this curious genus by which it can be distinguished from *Rissoa*. In the only two species yet known, both minute, the shell is transparent, and from the remarkable position of the eyes of the animal, so far behind the usual place, and constantly within the shell, its transparency is probably a constant character of the genus, being necessary for the exercise of vision. The lower tentacles may be considered to represent the lobes of the muzzle in *Rissoa*, here elongated into tentacles and covered with vibratile cilia in the same manner with the upper pair. These latter are more flattened and broader than in *Rissoa*.

The operculum is very peculiar. The projecting internal plate I do not recollect to have observed in any other genus, though the spine in *Nerita* approaches to it. It appears from the ridges on its inner surface to afford attachment to a muscle.

Jeffreysia is a littoral genus, found in company with *Rissoa* on small seaweeds in pools between tide marks. Its alliance is evidently with that genus, which in the shell it so strongly resembles; and the lingual armature bears out the affinity, differing but little from that of *Rissoa interrupta* and some of the commoner species. Some others of the small transparent shells usually included under *Rissoa* may probably, when they are obtained alive or with the operculum, be found to belong to this genus.

Four West American species are now referred to this genus. Of two of these the operculum is known so their status may be considered without question. These are *Jeffreysia bifasciata* Carpenter and *Jeffreysia tumens* Carpenter, both of which were described in the Mazatlan Catalogue in 1856. The third species, *Rissoa anguliferens* de Folin, described in Fonds de la Mer in 1870 (vol. 1, p. 134), is placed here provisionally. It seems to belong here, but we have seen no specimens, and de Folin does not describe the operculum; its status, therefore, requires confirmation. Of the fourth species, here described as new, the operculum is also unknown. Its general shape and peculiar umbilicus would place it near *Rissoella tumens* Carpenter.

KEY TO THE WEST AMERICAN RISSOELLAS.

Shell umbilicated.

Shell smooth *tumens*.

Shell not smooth but axially threaded..... *excolpa*.

Shell not umbilicated.

Periphery angulated..... *anguliferens*.

Periphery not angulated..... *bifasciata*.

RISSOELLA TUMENS (Carpenter).

Plate 12, fig. 1.

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

1857. *Jeffreysia tumens* CARPENTER, Rept. Brit. Ass. Adv. Sci. for 1856, pp. 257, 327.

Shell small, subglobular, openly umbilicated, with a slender thread bordering the umbilicus; thin, white, diaphanous, smooth. Nuclear

whorls depressed. Whorls four, convex, slightly shouldered at the summit. Aperture suboval. Operculum thin, translucent. To the above description, which is based upon Carpenter's diagnosis and camera lucida figure, Carpenter's remarks, which are as follows, may be added:

Differs from the least elevated form of *Jeffreysia bifasciata* in its very swelling and somewhat irregular whorls, transparent white texture, and large angulated umbilicus. The operculum, which was found in 5 out of the 13 specimens, is perfectly transparent, appearing black from the remains of the animal, which seems to have been differently colored from that of *J. bifasciata*. Long. .048 (1.2 mm.), long. spir. .026, lat. .038 (95 mm.).

Hab., Mazatlan; very rare, off Chama and Spondylus; Liverpool Col. [British Museum].

Tablet 1719 contains 2 sp.; one young and glossy, with the operculum so situated as to show the medial process; the other adult.

RISSOELLA EXCOLPA, new species.

Plate 12, fig. 3.

Shell small, flesh colored, inflated ovoid. Whorls strongly rounded, appressed at the summit, marked by numerous closely spaced, decidedly retractively slanting axial threads which pass over the inflated and well-rounded periphery as well as the well-rounded base. Base narrowly umbilicated, the posterior edge of the umbilicus slightly angulated. Aperture very broadly oval; posterior angle obtuse; outer lip thin, showing the external sculpture within; inner lip strongly curved and but very slightly reflected; parietal wall covered by a thick callus, which renders the peritreme complete.

The type and two specimens, Cat. No. 267502, U.S.N.M., were collected by the author at head of Concepcion Bay, Lower California. The type has four whorls and measures—length, 2.5 mm.; diameter, 1.8 mm.

Our specimens do not have an operculum, but we are led to believe that they belong to this genus. In general form of outline and also in the matter of umbilicus it suggests *Rissoella tumens* Carpenter. Carpenter's description, however, does not mention the axial thread sculpture and his figure gives a much wider umbilicus than our specimens possess.

RISSOELLA ANGULIFERENS (de Folin).

Plate 12, fig. 9.

1870. *Rissoa anguliferens* DE FOLIN, Fonds de la Mer, vol. 1, p. 134, pl. 20, fig. 6.

Shell small, conic, polished, yellowish brown with a broad whitish band which gradually shades into the darker coloration. Nuclear

whorls decidedly depressed, the first almost completely immersed in the second. Postnuclear whorls flattened axially and spirally, minutely striated. Suture very deep, owing to the shoulder of the whorls and the peripheral angle. Periphery decidedly angulated. Base short, moderately rounded with a broad spiral color band on its middle. Aperture subcircular; outer lip thin; inner lip well rounded; parietal wall covered by a thick callus.

The type was described as from Panama Bay. The measurements given for it are: Altitude, 2.5 mm.; diameter, 1.4 mm.

RISSOELLA BIFASCIATA (Carpenter).

Plate 12, fig. 2.

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

1857. *Jeffreysia bifasciata* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1856, pp. 257, 327, 366.

1864. *Jeffreysia bifasciata* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, p. 623.

Shell minute, ovate, very thin, semitranslucent. Nuclear whorl apparently not differentiated from the succeeding turns by sculptural characters or resting mark. Postnuclear whorls inflated, strongly rounded and roundly shouldered at the summit, marked by fine re-tractively slanting lines of growth only. Suture strongly marked. Periphery inflated, strongly rounded. Base short, strongly rounded. Aperture large, oval, posterior angle nearly obtuse; outer lip decidedly curved, thin; inner lip curved and appressed to the base excepting the anterior third, which is free; parietal wall covered by a thick callus that renders the peristome complete. The shell may be plain white or have a color band or two between summit and suture and one on the base. The bands, when present, are usually only faintly exhibited.

Cat. No. 56354, U.S.N.M., contains a specimen determined by Carpenter, from Mazatlan, which has five whorls and measures—altitude, 1.2 mm.; diameter, 0.8 mm. Cat. No. 16218, U. S. N. M., contains another species from Cape St. Lucas, Lower California, whose operculum shows the typical thin, pale yellow, horny consistency, with the thick ridge on the internal columellar border and the transverse median ridge connecting with this.

Carpenter writes:

Of this species, beautifully lustrous when viewed under the microscope with a good light, about 90 specimens were obtained, probably from the Algae on the Uvanillae. They are most likely of somewhat sedentary habits, as even in a living state they are not unfrequently incrustated with Coralline. The dried animals have a rich brown color. Several retained their opercula, which are perfectly normal, and of a reddish brown. Long., 1.375 mm.; lat. 0.75 mm.

Hab. Mazatlan; rare, on ? Algae; Liverpool Collection [British Museum].

Tablet 1716 contains three sp. richly colored, of which two retain their opercula.—1717, 3 sp. pale nonbanded variety, one with beautiful incrustation of Coralline.

I fear that the specimens with the red opercula to which he refers are *Barleeias*, probably *Barleeia alderi* Carpenter, which he describes as *Jeffreysia alderi* on the same page on which the present form is diagnosed, for that form resembles the present species quite a bit, but has a thimble-pitted nucleus and a different operculum.

Genus SYNCERA Gray.

1821. *Syncera* GRAY, Med. Repos. London, vol. 15, p. 239.

1830. *Assimineca* JEFFREYS, Trans. Linn. Soc., vol. 16, p. 378.

Shell conic, usually strong. Nuclear whorl smooth, the rest of the shell marked by lines of growth and fine spiral striations only. Outer lip simple; inner lip continuing over the base as a thick parietal callus. Operculum subspiral, thin, horny. Animal with the muzzle deeply notched in front; tentacles two, short, cylindric or club shaped, contractile, bearing the eyes at their tip; respiratory orifice on the right side.

Type, *Syncera hepatica* Gray [= *Assimineca grayana* Leach] *Synceras* are littoral forms, frequently inhabiting the brackish reaches of our coast.

Four species of the genus *Syncera* are known from the West Coast of America at the present time. Two of these, *Syncera translucens* Carpenter and *Syncera compacta* Carpenter, were named by Dr. Philip P. Carpenter in his supplementary report on the present state of our knowledge with regard to the mollusks of the West Coast of North America, published in the Report of the British Association for the Advancement of Science for 1863. In the same paper he also published *Assimineca subrotundata* Carpenter and ? *Paludinea castanea* Carpenter. Of the latter he states that it "may be an aberrant *Assimineca*." These two have since been transferred to the section of *Algamorda* of the genus *Littorina* by Dr. W. H. Dall.

In 1865 Tryon bestowed the name *Hydrobia californica* Tryon upon the shell previously designated as *Jeffreysia translucens* by Carpenter. It is not strange that Tryon did not recognize this fact, for Carpenter's diagnosis was so terse that it is scarcely recognizable.

The present paper adds two new members to the genus from the West Coast, one from Lower California and the other from Panama.

KEY TO THE WEST AMERICAN SYNCERAS.

Altitude of adult shell more than 6 mm.....	<i>panamensis</i> .
Altitude of adult shell less than 3 mm.	
Shell elongate-ovate.....	<i>magdalenensis</i> .
Shell not elongate-ovate	
Shell broadly ovate.....	<i>translucens</i> .
Shell not broadly ovate	
Shell globular.....	<i>compacta</i> .

SYNCERA PANAMENSIS, new species.

Plate 12, fig. 8.

Shell large, elongate conic, bluish-white, the tip pale horn colored. Nuclear whorls smooth, not differentiated from the succeeding turns. Postnuclear whorls moderately rounded, appressed at the summit, marked by rather strong, irregularly spaced, retractively slanting incremental lines and exceedingly fine microscopic spiral striations. Suture feebly impressed. Periphery of the last whorl rather inflated, obscurely angulated. Base rather long, with a feeble umbilical chink, marked like the spire. Aperture large, oval; posterior angle almost acute; outer lip thick within, thin at the edge; inner lip strongly curved and very strongly reflected, continuing at the insertion into a strong parietal callus, which renders the peritreme complete. Operculum typical.

The type and another specimen, Cat. No. 150870, U.S.N.M., come from Panama. The type has seven and one-half whorls and measures—length, 6.2 mm.; diameter, 3 mm.

SYNCERA MAGDALENENSIS, new species.

Plate 12, fig. 5.

Shell very small, elongate ovate, chestnut brown. Nuclear whorls not differentiated from the postnuclear turns, well rounded. Postnuclear whorls strongly rounded, very narrowly shouldered at the summit, marked by decidedly retractively curved axial lines of growth and apparently without spiral markings. Suture strongly marked. Periphery of the last whorl somewhat inflated, well rounded. Base short, well rounded, with a very narrow umbilical chink. Aperture very broadly oval; posterior angle obtuse; outer lip thin; inner lip strongly curved, passing into the strong parietal callus, which renders the peritreme complete. Operculum typical.

The type, Cat. No. 218323, U.S.N.M., comes from Magdalena Bay. It has 5.1 whorls and measures—altitude, 2.2 mm.; diameter, 1.4 mm. Two additional lots have been examined, as follows: Cat. No. 218325, U.S.N.M. seven specimens, from Magdalena Bay, Lower California, and Cat. No. 218324, U.S.N.M., four specimens from the same locality.

SYNCERA TRANSLUCENS (Carpenter).

Plate 12, fig. 7.

1864. *Jeffreysia translucens* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, pp. 613, 657.

1865. *Hydrobia californica* TRYON, Amer. Journ. Conch., vol. 1, p. 221, pl. 22, fig. 11.

1866. *Jeffreysia translucens* CARPENTER, Proc. California Acad. Sci., vol. 3, p. 219.

Shell broadly ovate, light brown. Nuclear whorls not differentiated from the remaining turns, well rounded. Postnuclear whorls

strongly rounded, very narrowly shouldered at the summit, marked by decidedly retractorily curved axial lines of growth, and exceedingly fine microscopic spiral striations. Suture strongly impressed. Periphery of the last whorl well rounded. Base inflated, well rounded. Aperture subcircular; posterior angle obtuse; outer lip thin; inner lip very strongly curved, thick, reflected over and appressed to the base; parietal wall covered with a thick callus which fuses with the reflected inner lip and forms a decided callosity over the umbilical region. Operculum typical.

The specimen described and figured, Cat. No. 271483, U.S.N.M., is one of a large series collected at San Diego, California. It has five and one-half whorls and measures—altitude, 3 mm.; diameter, 1.9 mm.

The following additional specimens have been examined:

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
126645	U.S.N.M.	21	Vancouver Island, British America.	
150953	.....do.....	4	do.....	
152188	.....do.....	10	Whidby Island, Puget Sound	
56442	.....do.....	1	Eureka, California.....	
56398	.....do.....	15	Oakland, California.....	
23727	.....do.....	5	do.....	
32380	.....do.....	2	do.....	
32381	.....do.....	6	do.....	
32382	.....do.....	2	do.....	
152191	.....do.....	1	San Pedro, California.....	
185364	.....do.....	2	do.....	
56453	.....do.....	15	San Diego, California.....	
105431	.....do.....	4	do.....	Mossy rocks, near low tide.
198579	.....do.....	15	do.....	
99294	.....do.....	3	do.....	
152313	.....do.....	6	do.....	Ocean beach.
32372	.....do.....	87	do.....	
195336	.....do.....	25	do.....	
271493	.....do.....	13	do.....	
273714	.....do.....	4	do.....	Dritt.
¹ 271483	.....do.....	427	do.....	
130319	.....do.....	2	San Diego Bay, California.....	Do.
191580	.....do.....	1	Terminal Island, California.....	
199181	.....do.....	2	Alamitos Bay, California.....	
32378	.....do.....	26	Catalina Island, California.....	
148264	.....do.....	8	California.....	
32367	.....do.....	2	do.....	
56442	.....do.....	10	do.....	
271508	.....do.....	27	Santo Domingo, Lower California.	
32369	.....do.....	16	Todos Santos Bay, Lower California.	
198963	.....do.....	4	do.....	
198961	.....do.....	1	do.....	
105542	.....do.....	8	Manuel Lagoon, Lower California.	Among grass, near high tide.
269166	.....do.....	8	Santa Maria Bay, Lower California.	Boat dredge.

¹Type.

SYNCERA COMPACTA (Carpenter).

Plate 12, fig. 4.

1864. ? *Hydrobia compacta*, CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, p. 618.
1864. ? *Hydrobia compacta*, CARPENTER, Ann. Mag. Nat. Hist., ser. 3. vol. 13, p. 478.

Shell very minute, globular (probably chestnut brown). Nuclear whorls not differentiated from the remaining turns. Postnuclear whorls feebly shouldered at the summit, inflated, and strongly rounded, marked by decidedly retractively slanting axial lines of growth. Suture strongly impressed. Periphery of the last whorl inflated, well rounded. Base short, strongly rounded. Aperture large, subcircular; outer lip thin; inner lip strongly curved, passing into the strong parietal callus, which is reflected over the base.

The type, Cat. No. 16209, U.S.N.M., was collected at Cape St. Lucas, Lower California. It has four whorls and measures—altitude, 1 mm.; diameter, 0.75 mm. Doctor Carpenter's type, the only specimen at hand, is a dead, worn shell, which I strongly suspect of being a young specimen. It is undoubtedly closely related to *Syncera translucens*.

Genus BARLEEIA Clark.

The genus *Barleeia* was described by William Clark in 1855¹, who gives an interesting account of the animal of *Barleeia rubra* Montagu, the holo-genotype of the proposed genus, which, considering the scarcity of anatomic data, bears repeating here:

Shell.—The color is plain red-brown, smooth or slightly wrinkled, of $4\frac{1}{2}$ to $5\frac{1}{2}$ tumid volutions, which form a rapidly increasing cone. Aperture oval, entire, contracted above, rounded basally; outer margin sharp, without the callous pad of the *Rissoa*. Axis one-tenth, diameter one-seventeenth of an inch.

Animal.—The mantle is plain, even with the margin of the shell, and without the filament seen at the upper angle of the aperture in many of the *Rissoa*. Rostrum very short, not corrugated nor capable of much extension, brindled above with dark smoke-colored, fine, irregular, close-set lines, below pale yellow; buccal disk of the same color, of small area, crossially and vertically cloven, containing the usual masticatory processes of the Littorinidae; neck dark, but not so much so as the rostrum, quite plain and without appendages. Tentacula very short, strong, broad, not in the least setaceous, with perfectly rounded, somewhat spatulate extremities; they are not vibrated on the march; color very pale yellowish-white, with a line of sulphur-colored beads or minute flakes running centrally from base to point; eyes very large, black, fixed on bright sulphur inflations at the external bases. Foot an elongated, rather narrow oval, anteaally arcuated, labiated, with scarcely perceptible auricular points, posteaally rounded, emarginate in the centre of its termination; color, in the middle of the upper part, confused flake-white, margined with a belt of pale smoke hue; sole pale yellow with a decided depressed longitudinal line on the center of the posterior half, not constricted under the slight auricles

¹ British Marine Testaceous Mollusca, pp. 392-395.

as in *Rissoa*, and not so slender. The operculigerous lobe is small, very little alated anteriorly, but expands below into a dark, flat, arcuated membrane; no cirrus is visible, and I believe none exists; it carries a strong, red-brown, suboval, testaceous operculum, sharp above, rounded below and at the outer edge, and straighter on the columellar side. The structure of the fine stria on the upper surface is of subannular figure, with a longitudinal furrow about the middle, which forms a raised rib on the under part, the whole of that area being thick, coarse, and irregular, with, at the nucleus (which is nearer the base than the center) a testaceous apophysis, more prominent than in *Jeffreysia* and stronger and longer; indeed, as much as in some of the *Chemnitzia*.

These animals inhabit the lower littoral levels at Penzance; their locomotion is deliberate, and they evince considerable shyness. There are many fasciated varieties and a white one.

An examination under high magnification of the genotype and the West American material permits me to add that the nepionic whorls are finely thimble pitted.

Only four species and a variety, the latter without real status, have prior to this been reported from the West Coast of America. The first two of these were described by Philip P. Carpenter in 1856, on pages 361 and 362 of the Catalogue of Mazatlan Shells, under the names of *Hydrobia ulva* ? Pennant and *Jeffreysia alderi*, while the rest: *Barleeia subtenuis*, *Barleeia* (? *subtenuis*, var.) *rimata* and *Barleeia haliotiphila*, were christened by the same author in 1864 in the 1863 Report of the British Association for the Advancement of Science, the first name replacing *Hydrobia ulva* ? of the Mazatlan Catalogue. In 1870 de Folin added a fourth species, *Rissoa polychroma*, in volume 1 of his *Fonds de la Mer* (p. 133, pl. 20, fig. 5).

The large amount of material that has accumulated in the collection of the United States National Museum not only enables one to more clearly define the range of distribution of the known forms, but also makes it necessary to describe a number of additional species.

KEY TO THE WEST AMERICAN BARLEEBIAS.

Periphery of the last whorl acutely carinated:

Altitude about 4 mm.-----*dalli*.

Altitude about 2 mm-----*bentleyi*.

Periphery of the last whorl not acutely carinated:

Periphery of the last whorl obsolete carinated:

Shell unicolor:

Shell broadly conic

Whorls coarsely spirally striate-----*subtenuis*.

Whorls finely spirally striate-----*sanjuanensis*.

Shell narrowly conic:

Altitude about 3.2 mm-----*oldroydi*.

Altitude about 2.5 mm-----*haliotiphila*.

Shell banded:

Whorls strongly inflated-----*polychroma*.

Whorls not strongly inflated-----*californica*.

Periphery of the last whorl not acutely carinated—Continued.

Periphery of the last whorl not obsoletely carinated:

Periphery of the last whorl rounded:

Shell umbilicated ----- *orcutti*.

Shell not umbilicated:

Shell unicolor:

Shell chestnut brown ----- *subtenuis*.

Whorls strongly inflated ----- *coronadoensis*.

Whorls not strongly inflated ----- *carpenteri*.

Shell banded ----- *alderi*.

BARLEEIA DALLI, new species.

Plate 13, fig. 10.

Shell rather large, broadly conic, yellowish white. Nuclear whorls two, well rounded, marked by sinuous axial rows of closely spaced pits, which are separated by spaces about four times as wide as the pits. Postnuclear whorls almost appressed at the summit, moderately rounded, marked by slender, slightly retractively slanting incremental lines and numerous closely spaced spiral striations. Suture but slightly constricted. Periphery of the last whorl marked by a cord, which renders it decidedly angulated. Base moderately long and moderately rounded, marked like the spire. Aperture subcircular, posterior angle obtuse; outer lip thin at the edge; inner lip slender, evenly curved, appressed to the base, except at the extreme anterior portion, where it is free; parietal wall covered by a thick callus, which joins the columella with the outer lip at the posterior angle and renders the peritreme complete. The summit of the last turn bends slightly down below the peripheral cord near the aperture.

The type and 49 additional specimens, Cat. No. 209013, U.S.N.M., were dredged at the Bureau of Fisheries Station 4310 in 71 to 75 fathoms on sand and mud bottom, off Point Loma, California. The type has six and one-quarter whorls and measures—altitude, 4.4 mm.; diameter, 2.4 mm.

BARLEEIA BENTLEYI, new species.

Plate 13, fig. 2.

Shell small, conic, flesh colored, excepting the two nuclear turns, which are light brown. Nuclear whorls well rounded, marked by curved axial rows of closely spaced pits, which are separated by spaces about one and a half times the diameter of the pits. Postnuclear whorls moderately well rounded. The appressed summit of these whorls falls slightly below the peripheral keel, and allows this to appear in the suture as a slender thread. The surface of the postnuclear turns is marked by curved incremental lines and numerous fine, rather closely spaced, spiral striations. A strong cord marks the periphery and renders it decidedly angulated. Base moderately

long, well rounded, marked like the spire. Aperture large, posterior angle obtuse, slightly effuse at the junction of the inner and basal lip; outer lip thin; inner lip slender, oblique, and appressed for the greater part, to the base, the anterior portion only being free; parietal wall covered by a thick callus, which renders the peritreme complete; operculum typical.

The type, Cat. No. 332121, U.S.N.M., and 350 additional specimens, were collected on Bryozoa at the breakwater at Venice, California. The type has five and one-third whorls and measures—altitude, 2.2 mm.; diameter, 1.2 mm.

BARLEEIA SUBTENUIS Carpenter.

Plate 13, fig. 11.

1856. *Hydrobia ulvac* CARPENTER, Cat. Maz. Shells, p. 361.

1864. *Barleeia subtenuis* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, pp. 546, 623, 656, 669.

1864. *Barleeia subtenuis* ? var. *rimata* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, p. 656.

1865. *Barleeia subtenuis* CARPENTER, Journ. de Conchyl., vol. 12, pp. 143-144.

1865. *Barleeia* (? *subtenuis*, var.) *rimata* CARPENTER, Journ. de Conchyl., vol. 12, p. 144.

1865. *Rissoa cooperi* TRYON, Amer. Journ. Conch., vol. 1, p. 222, pl. 22, fig. 13.

Shell oval, pale brown. Nuclear turns two, well rounded, marked by numerous fine pits, which are arranged in axial and spiral series. Postnuclear whorls well rounded, almost appressed at the summit, marked by slender, retractively slanting incremental lines, and numerous fine, closely spaced spiral striations. Suture moderately constricted. Periphery of the last whorl usually obsoletely angulated but at times rounded. Base short, well rounded, usually with a narrow umbilical chink at the columella. Aperture large, rather flaring; posterior angle acute; outer lip thin; inner lip rather strongly curved forming an acute angle at its junction with the basal lip, appressed to the body whorl for about half its length, the anterior half being free; parietal wall covered by a thick callus which renders the peritreme complete; operculum typical.

The specimen figured is one of 147 bearing the catalogue number 56446, U.S.N.M., and comes from San Diego, California. It is a typical specimen, having five and one-half whorls and measures—altitude, 3 mm.; diameter, 2.7 mm.

The following additional specimens are in the collection of the United States National Museum:

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
564	U.S.N.M.	2	San Pedro, California.....	
23739	do	3	do.....	
¹ 56446	do	147	do.....	
32375	do	878	do.....	
198588	do	130	do.....	
56447	do	78	do.....	
32366	do	4	do.....	
273710	do	362	San Diego, California.....	Drift.
271487	do	5	do.....	
252946	do	2	do.....	
332007	do	1	do.....	
274045	do	51	do.....	Dredged foot of Broadway. Do.
274031	do	1	do.....	
252943	do	4	do.....	
32358	do	378	do.....	
159329	do	281	do.....	
23734	do	2	do.....	
32359	do	3	do.....	
334448	do	17	San Diego Bay, California.....	1½ fathoms.
211129	do	118	do.....	3 fathoms, 58.°
308792	do	1	do.....	Drift.
207239	do	2	do.....	7 fathoms, sand and mud bottom.
32363	do	3	California.....	
32364	do	3	do.....	
32365	do	3	do.....	
206632	do	4	Southern California.....	
105541	do	10	Manuel Lagoon, Lower California.	
105561	do	8	San Ignacio Lagoon, Lower California.	On stones; mud flats between tides.
105562	do	7	do.....	Shell washings.
198968	do	3	Todos Santos Bay, Lower California.	

¹ One type.

BARLEEIA SANJUANENSIS, new species.

Plate 13, fig. 3.

Shell broadly conic, chestnut brown, except the nuclear whorls, which are pale brown. Nuclear turns two, well rounded, marked by numerous rather strong pits, which are arranged in axial and spiral series. Postnuclear whorls very slightly shouldered at the summit, well rounded, marked by numerous, rather coarse incised spiral lines. Periphery obscurely angulated. Suture well marked. Base well rounded, marked like the spire. The summit of the last turn bends decidedly downward behind the aperture. Aperture subcircular; posterior angle decidedly obtuse; outer lip rather thick; inner lip

strongly curved, appressed to the base; parietal wall covered by a thick callus, which renders the peritreme complete.

The type and another specimen, Cat. No. 334488, U.S.N.M., were collected by Dr. C. C. Engberg in the Gulf of Georgia. The type has five and one-half whorls and measures—altitude, 2.6 mm.; diameter, 1.5 mm.

The present species, while ranging nearest to *Barleeia subtenuis* Carpenter in our key, is readily distinguished from that form by its much larger nuclear whorls and the stronger pittings thereof, resembling in these characters *Barleeia dalli* and *Barleeia bentleyi*. It is much more strongly spirally sculptured than *Barleeia subtenuis* and has the aperture much smaller. Three additional specimens from the same lot are in Doctor Engberg's collection.

BARLEEIA OLDROYDI, new species.

Plate 13, fig. 9.

Shell narrowly conic, light chestnut brown. Nuclear whorls one and three-fourths, well rounded, marked by slightly retractively slanting rows of exceedingly minute pits, which appear to be arranged also in spiral series. Postnuclear whorls almost flat, appressed at the summit, marked by fine incremental lines and exceedingly fine, closely spaced spiral striations. Suture only slightly constricted. Periphery of the last whorl obsoletely angulated. Base moderately long, moderately well rounded. Aperture moderately large, oval; posterior angle obtuse; outer lip thin; the curved inner lip joins the basal lip in a curve; inner lip appressed to the base for a little more than half its length, the extreme anterior portion only being free; parietal wall covered by a thick callus, which renders the peritreme complete. The summit of the last turn falls slightly below the peripheral angle at the aperture; operculum typical.

The type, Cat. 32376, U.S.N.M., comes from Monterey Bay, California. It has 6.1 whorls and measures — altitude, 3.3 mm.; diameter, 1.5 mm.

The following additional specimens have been examined:

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
211608	U.S.N.M..	2	Barkley Sound, Vancouver Island.	
126651	...do.	4	Mink Bay, Vancouver Island.	
334449	...do.	1	Trinidad, California.....	
271413	...do.	6	Little River, Mendocino County, California.	
¹ 32376	...do.	12	Monterey, California.....	
32362	...do.	3	.....do.....	

¹ One type.

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
74002	U.S.N.M..	2	Monterey, California.....	
199170	...do.....	4	...do.....	
334450	...do.....	1	...do.....	
56448	...do.....	74	...do.....	
56355	...do.....	11	...do.....	
56370	...do.....	15	San Diego, California.....	
32360	...do.....	29	...do.....	
194398	...do.....	4	...do.....	
99292	...do.....	15	...do.....	
130242	...do.....	9	...do.....	
274025	...do.....	1	...do.....	On grass between tides. Dredged foot of Broadway.
211938	...do.....	1	Off San Diego, California....	20 fathoms, 58°, sand.
334451	...do.....	4	Los Coronados Islands, off N.W. Lower California.	20 fathoms, 58°, gray sand, broken shells.

BARLEEIA HALIOTIPHILA Carpenter.

Plate 13, fig. 1.

1864. *Barleeia haliotiphila* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, p. 656.

1865. *Barleeia haliotiphila* CARPENTER, Journ. de Conchyl., vol. 12, pp. 144-145.

Shell elongate conic, pale chestnut brown. Nuclear whorls almost two, well rounded, marked by curved, axial rows of pits which are also arranged in spiral series. Postnuclear whorls moderately well rounded, almost flat at the summit, marked by fine incremental lines and exceedingly fine closely spaced spiral striations. Suture moderately constricted. Periphery of the last whorl obscurely angulated. Base moderately long and moderately rounded, marked like the spire. Aperture rather small, oval; posterior angle obtuse; outer lip thin; the basal and inner lip meet in a well-rounded curve; inner lip appressed to the base, except at the anterior third, which is free; parietal wall covered by a thick callus which renders the peritreme complete; operculum typical.

The type, Cat. No. 15558, U.S.N.M., was collected on the back of a *Haliotis* by Rowell in Lower California. It has almost six whorls and measures: altitude, 2.5 mm.; diameter, 1.3 mm. This species closely resembles *Barleeia oldroydi*. It is, however, uniformly smaller, with a decidedly smaller aperture.

The following additional specimens have been examined:

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
271414	U.S.N.M..	2	Little River, Mendocino County, California.	
173804	...do.....	1	La Jolla, California.....	
32371	...do.....	34	San Miguel Island, California.	
32373	...do.....	8	...do.....	
171914	...do.....	4	Catalina Island, California...	Between tides.
195135	...do.....	4	...do.....	
334452	...do.....	41	...do.....	
210497	...do.....	11	...do.....	
¹ 15558	...do.....	1	Lower California.....	
32370	...do.....	9	Todos Santos Bay, Lower California.	
105471	...do.....	4	Point Abreojos, Lower California.	

¹ Type.

BARLEEIA POLYCHROMA (de Folin).

Plate 13, fig. 6.

1870. *Rissoa polychroma* DE FOLIN, Fonds de la Mer, vol. 1, pp. 133-134, pl. 20, fig. 5.

Shell small, ovate, varying in color from violaceous through reddish, brownish, to horn white, ornamented with indistinct color bands, which at times are almost lost in the ground color. Nepionic whorls two, decidedly depressed, marked by pits which are arranged in axial and spiral series. Postnuclear turns three, inflated, marked by oblique lines of growth and fine spiral striations. Suture simple. Periphery obscurely angulated. Base short, inflated, well rounded. Aperture subcircular; outer lip thin; inner lip separated from the body whorl.

The type has five whorls and measures—altitude, 1.7 mm.; diameter, 1.1 mm. De Folin states that he had 20 specimens from the Bay of Panama. We have not seen this species.

BARLEEIA CALIFORNICA, new species.

Plate 13, fig. 7.

Shell very small, broadly conic, pale brown, sometimes with a lighter zone at the periphery and a darker band on the middle of the base. Nuclear whorls one and three-fourths, well rounded, marked by numerous, rather large, rounded pits, which are arranged in re-tractively slanting axial as well as a spiral series, the spaces between the pits being about equal to the diameter of the pits. Postnuclear whorls moderately well rounded, almost appressed at the summit, marked by somewhat re-tractively slanting incremental lines, and very fine incised spiral striations. Suture moderately impressed. Periphery of the last whorl obsoletely angulated. Base very short, well rounded. Aperture very large, oval; outer lip rather effused at

the junction of the outer and basal lip, and forming almost an angle at the junction of the basal and inner lip; inner lip slightly curved, appressed to the base for three-fourths of its length, the anterior portion only being free; parietal wall covered by a thick callus, which renders the peritreme complete.

The type, Cat. No. 152192, U.S.N.M., was collected at Crocker's wharf, San Pedro, California. It has five whorls and measures—altitude, 1.8 mm.; diameter, 1.1 mm. The small size and the color banding, as well as the very large aperture, will distinguish this from the other obscurely angulated *Barleecius* of the West Coast.

The following additional specimens have been examined:

Cat. No.	Collection of—	Number of specimens.	Locality.	Remarks.
173090	U.S.N.M.	1	Terminal Island, California.	
¹ 152192	...do....	41	Crocker's wharf, San Pedro, California.	
3566b	...do....	1	San Diego, California.....	
189145	...do....	4	Catalina Island, California...	Deep water.
171914a	...do....	6	...do.....	Between tides.
334453	...do....	5	...do.....	
105588	...do....	5	Point Abrejos, Lower California.	

¹ Type.

BARLEEIA ORCUTTI, new species.

Plate 13, fig. 8.

Shell very small, elongate oval; the early whorls white, the last with the posterior half diffused with pale brown, the anterior white, and a broad light brown band on the middle of the base. Nuclear whorls almost two, well rounded, marked by numerous small pits which are arranged in more or less sinuous axial lines, as well as in spiral series. Postnuclear whorls rather inflated, well rounded, very narrowly shouldered at the summit, marked by fine retractively slanting incremental lines and exceedingly fine spiral striations. Suture well marked. Periphery of the last whorl well rounded. Base short, well rounded, marked like the spire. Aperture subcircular; posterior angle obtuse; outer lip thin; the basal and inner lip join in an even curve; inner lip free, curved, continuing posteriorly into a parietal callus, which is also partly free from the body wall and joined to the posterior angle of the aperture, rendering the peritreme complete. The summit of the last whorl sinks slightly below the periphery at the aperture; operculum typical.

The type, and five additional specimens, of this species, Cat. No. 218360, U.S.N.M., were collected by Mr. Orcutt in Magdalena Bay, Lower California. The type has five and one-half whorls and measures—altitude, 2.2 mm.; diameter, 1.3 mm. Two additional specimens, Cat. No. 105482, U.S.N.M., come from Point Abrejos, Lower California.

BARLEEIA CORONADOENSIS, new species.

Plate 13, fig. 5.

Shell ovate, white. Nuclear whorls two and a fifth, well rounded, marked by numerous pits, which are arranged in curved axial lines as well as in spiral series. Postnuclear whorls strongly rounded, appressed at the summit, marked by feeble incremental lines and exceedingly fine spiral striations. Suture rather constricted. Periphery of the last whorl strongly rounded. Base moderately long and well rounded. Aperture large, broadly ovate, rather effuse at the junction of the base and outer lip; posterior angle obtuse; junction of the inner and basal lip well rounded; outer lip thin; inner lip well rounded, reflected over and appressed to the base except at the extreme anterior portion where it is free; parietal wall covered by a thick callus, which renders the peritreme complete; operculum typical.

The type and six additional specimens, Cat. No. 226453, U.S.N.M., were collected in 7-10 fathoms off Coronados Islands, northwest coast of Lower California. The type has four and one-fifth whorls and measures—altitude, 1.3 mm.; diameter, 9 mm.

BARLEEIA CARPENTERI, new species.

Plate 13, fig. 4.

Shell elongate ovate, white. Nuclear whorls two, well rounded, marked by numerous pits, which are arranged in axial and spiral series. Posterior whorls narrowly, tabulately shouldered at the summit, more so on the early whorls than on the last, well rounded, marked by slender, curved incremental lines and fine spiral striations. Suture well marked. Periphery of the last whorl strongly rounded. Base moderately long, well rounded. Aperture ovate; posterior angle obtuse; outer lip thin at the edge; inner lip strongly curved, appressed to the base, free only at the anterior fourth; parietal wall covered by a thick callus, which renders the peritreme complete; the summit of the last whorl falls slightly below the periphery at the aperture.

The type, Cat. No. 16215, U.S.N.M., comes from St. Lucas, Lower California. It has 4.8 whorls and measures—altitude, 1.6 mm.; diameter, 1.1 mm.

BARLEEIA ALDERI (Carpenter).

Plate 12, fig. 6.

1856. *Jeffreysia alderi* CARPENTER, Cat. Maz. Shells, p. 362.1857. *Jeffreysia alderi* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1856, pp. 257, 327.1864. *Jeffreysia alderi* CARPENTER, Rept. Brit. Ass. Adv. Sci., 1863, pp. 109, 143.

Shell small, elongate ovate, wax yellow, with a pale narrow brown band about one-sixth of the distance between the summit and the

suture anterior to the summit, and a second one of about the same width an equal distance posterior to the suture; a third brown band, a little wider than these encircles the base almost at its middle. Nuclear whorls two, well rounded, marked by minute pits, which are arranged in axial and spiral series. Postnuclear whorls only moderately rounded, almost appressed at the summit, marked by slender incremental lines and fine incised spiral striations. Suture feebly impressed. Periphery of the last whorl strongly rounded. Base moderately long, well rounded. Aperture almost subcircular; outer lip thin at the edge, decidedly curved; inner lip strongly curved, appressed to the base for its greater length, the extreme anterior portion only being free; parietal wall covered by a moderately thick callus, which renders the peritreme complete; the summit of the last whorl falls considerably below the periphery at the aperture.

The specimen described and figured is Cat. No. 15423, U.S.N.M., and comes from Guacomayo, Mexico. It has 5.1 whorls and measures—altitude, 2.1 mm.; diameter, 1.2 mm.

Cat. No. 264996, U.S.N.M.; 2 from Agua Verde Bay, Gulf of California.

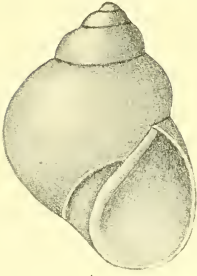
EXPLANATION OF PLATES.

PLATE 12.

- FIG. 1. *Rissoella tumens* (Carpenter), type.
2. *Rissoella bifasciata* (Carpenter), type.
3. *Rissoella excolpa*, new species, type.
4. *Syncera compacta* (Carpenter), type.
5. *Syncera magdalenensis*, new species, type.
6. *Barlecia alderi* (Carpenter), type.
7. *Syncera translucens* (Carpenter), type.
8. *Syncera panamensis*, new species, type.
9. *Rissoella anguliferens* (deFolin), type.

PLATE 13.

- FIG. 1. *Barlecia haliotiphila* Carpenter, type.
2. *Barlecia bentleyi*, new species, type.
3. *Barlecia sanjuanensis*, new species, type.
4. *Barlecia carpenteri*, new species, type.
5. *Barlecia coronadoensis*, new species, type.
6. *Barlecia polychroma* (deFolin), type.
7. *Barlecia californica*, new species, type.
8. *Barlecia oreutti*, new species, type.
9. *Barlecia oldroydi*, new species, type.
10. *Barlecia dalli*, new species, type.
11. *Barlecia subtenuis* Carpenter, type.



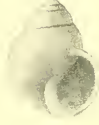
1



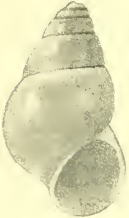
2



3



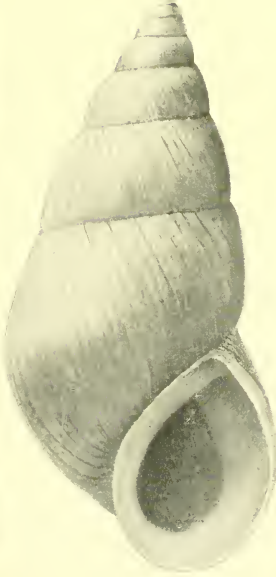
4



5



6



8



7



9

WEST AMERICAN MOLLUSKS.
FOR EXPLANATION OF PLATE SEE PAGE 176.



1



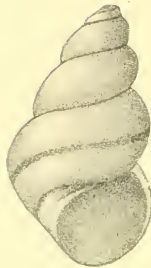
2



3



4



6



5



7



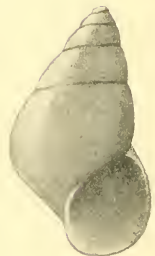
8



9



10



11

WEST AMERICAN MOLLUSKS.

FOR EXPLANATION OF PLATE SEE PAGE 176.