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NOTICES OF NEW WEST AMERICAN MARINE MOLLUSCA

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Any long continued regional study of a fauna is likely to result in the gradual accumulation of currently unidentifiable specimens, some of which eventually demand publication as new. It is in the effort to clear away a few such odds and ends and to make possible intelligible reference to some of them in other work now impending that the ensuing paper has evolved. The eleven molluscan species to be described include several which have long been known but have been quite as long rather thoroughly misunderstood, among them a most interesting new mussel (*Volsella*), a *Diplodonta,* and a fine new *Nassarius.* Of special interest among the remaining species, all of which are gastropods, are an exquisite off-shore *Ocenebra,* a beautiful olive-shell (*Agaronia*) from the tropical fauna, a splendid species of the striking turrid genus *Knefastia,* and two minute but hardly less remarkable tectibranchs, each of these last constituting the type of a new genus.

In addition to the various collectors mentioned in connection with the specimens so generously furnished me by them, my very appreciative thanks are likewise due to Dr. Harald A. Rehder and his associates of the Division of Mollusks, United States National Museum, to Dr. A. Myra Keen, Department of Paleontology, Stanford University, and to Col. Arthur F. Fischer and Dr. Joshua L. Baily, Jr. of the San Diego Museum of Natural History for affording me every possible facility in the study and in some instances the utilization of relevant comparative material to be found in the collections under their care. Further grateful expression of obligation is due to Dr. G. D. Hàrris and Dr. Katherine V. W. Palmer of the Paleontological Research Institution, Ithaca, and especially to my good friend Mr. Edgar R. Fisher of Redlands for making the photographs used in the accompanying plates.

1. **Volsella sacculifer** new species

Pl. 28, figs. 1, 2, Text-fig. 1.

Description: Shell of but moderate size for the genus, in outline broadly almond-shaped; highest at about the mid-point, thin, smooth, moderately inflated; hinge-line nearly straight to very slightly arcuate. Valves well rounded behind, more or less distinctly swollen ventrally in the byssal region and produced abruptly into a small obtuse lobe-like flare

or pocket just under the umbones, the rounded angle of this pocket forming the anterior end of the shell; postero-dorsal area subalate, its angle obtuse. Hinge toothless except for a short, sharply conical, posteriorly directed process set off by a notch at the anterior insertion of the ligament. Periostracum light to deep brown (near Buckthorn Brown to Mummy Brown), smooth, polished, under the more or less dehiscent traces of some fairly considerable posterior shagginess.

Measurements:	Max. long. mm.	Max. alt. mm.	Diam. mm.
Chace Coll. 1789	61.7	38.2	24.5
Paratype 20654	40.1	23.2	17.6
Paratype USNM	39.1	22.8	17.6
Holotype	38.0	20.0	15.8

Holotype: To be deposited in the collection of Stanford University, No. 7853.

Paratypes: Cat. No. 20654 Berry Collection, together with a small series in the Oldroyd Collection in the Department of Paleontology, Stanford University, besides one to be deposited in the collection of the United States National Museum.

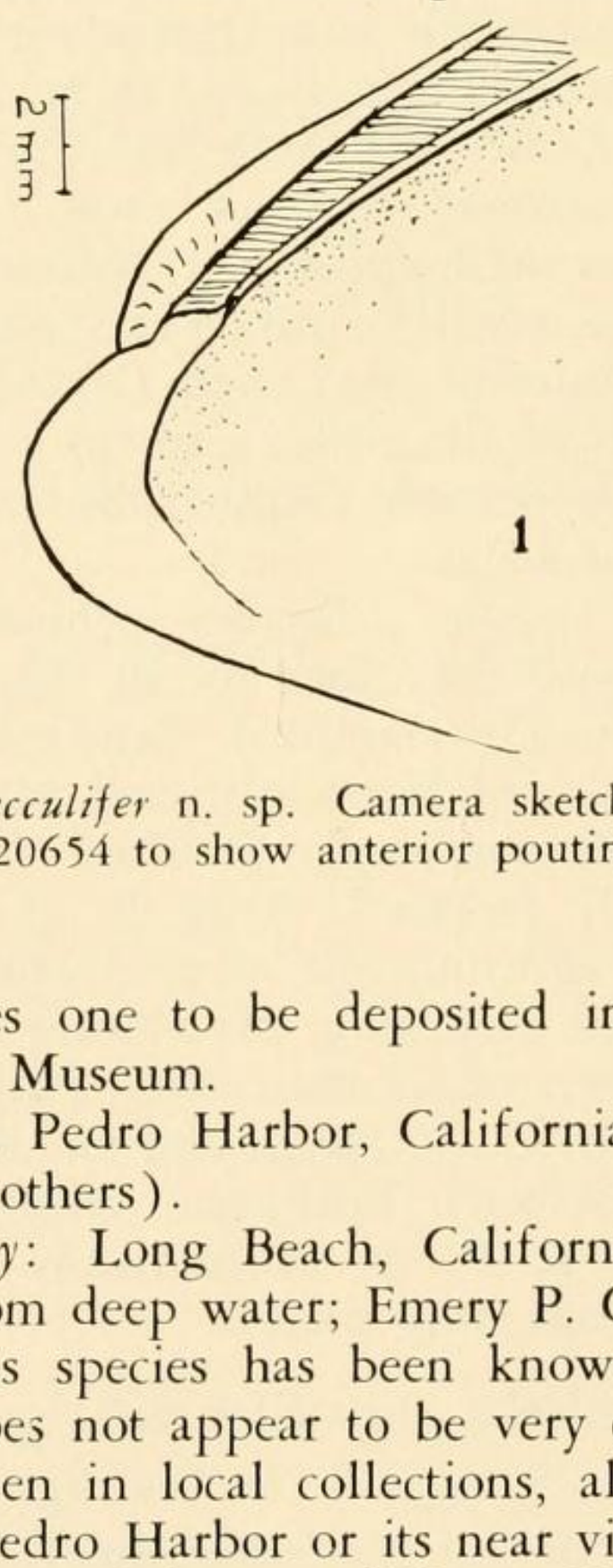

Fig. 1. *Volsella sacculifer* n. sp. Camera sketch of anterior portion of right valve of paratype 20654 to show anterior pouting and its relationship to umbo and hinge.

Type-Locality: San Pedro Harbor, California (Los Angeles County Museum collectors and others).

Additional Locality: Long Beach, California; one large complete specimen washed in from deep water; Emery P. Chace no. 1789.

Commentary: This species has been known and neglected for a number of years. It does not appear to be very common, but occasional specimens are to be seen in local collections, almost invariably having been collected in San Pedro Harbor or its near vicinity, and usually masquerading under the name of the very different *V. fornicata* (Carpenter). The byssal swelling varies greatly in strength in different individuals (it is rather weak in the shell which happened to be selected as the holotype), but the anterior pouting is both a constant and characteristic feature which

enables this species to be distinguished at a glance from any other presently known west American member of the genus. It is probably not an animal of littoral habit, but a dweller in somewhat moderate depths offshore, since almost all the specimens seen were taken at the time of the major dredging operations in San Pedro Bay and few if any of them appear to have been picked up alive. It is not probable that the species is anywhere either abundant enough or sufficiently available to be of importance as food, yet in its proper habitat it may occur more numerously than we at present know. The Long Beach example in the Chace Collection is far larger than any other examined and retains more of the pristine shagginess.[1]

The specific name is derived from the L. *sacculus,* pouch, + *-fer,* bearer, and has reference to the peculiar sub-umbonal pouting.

2. **Diplodonta impolita** new species

Pl. 28, figs. 3, 4. Text-fig. 2.

Description: Shell of medium size, thin, crude, dull and more or less chalky in texture, subrotund, a trifle longer than high, tumid, equivalve, distinctly oblique, the anterior end shorter but more narrowly rounded and projecting than the posterior. Surface pale brown, roughened by the coarse growth-striae which are lower and more distant on the earlier portion, but abruptly both more acute and more crowded during the subsequent half of development. Beaks narrow, bent strongly forward, quite angular and pointed for a *Diplodonta*, the area in front somewhat excavated. Hinge plate and teeth small; posterior right cardinal strongly divided by a sharp groove throughout its length, each segment strongly and rather acutely cusped on its inner side; anterior right car-

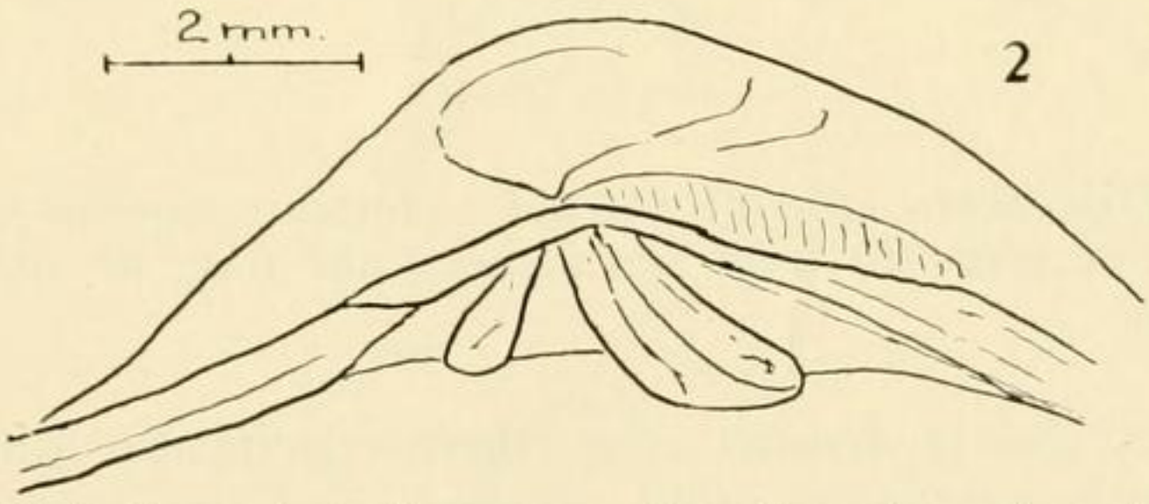

Fig. 2. *Diplodonta impolita* n. sp. Interior view of umbonal region of right valve; holotype; camera outline.

dinal smaller, simple, arising close under the valve margin and projecting but little below the supporting plate, its cusp either rounded or obtusely angular; anterior left cardinal simple, elongate, very oblique; posterior left cardinal duplex, little projecting ventrally, nearly vertical in align-

[1]During the printing of this paper and thus unfortunately too late to make it the type-series, a suite of three superb examples of this species were kindly sent to me by Dr. Howard R. Hill of the Los Angeles County Museum (Berry Coll. 18367). These were dredged alive in 25 fathoms, off Santa Catalina Id., California, in June 1927 by the late George Willett. The largest measures: long. 74.8, alt. 40.4, diam. 33.6 mm.

ment; hinge plate short, continuing, especially in front, as a low ridge running along the slopes of the valve close to the somewhat beveled and even slightly excavated margin; ligamental plate narrowly angled or ridged on its inner aspect, anterior adductor-scar subpyriform, concave or indented on the inner margin; posterior scar more ovate and without emargination. Periostracum thin, light brown, largely worn away in adult.

Measurements: Largest paratype, long. 26.0, alt. 25.0, diam. (depth) 8.8 mm.; holotype, long. 23.0, alt. 21.2, diam. 8.6 mm.

Holotype: To be deposited in the type collection of the Department of Paleontology, Stanford University, No. 7854.

Paratypes: Cat. No. 3658 Berry Collection; others to be deposited in the collections of the San Diego Society of Natural History, the United States National Museum, and the Museum of Comparative Zoology of Harvard College.

Type-Locality: 15 fathoms, off Forrester Id., Alaska; dredged by George Willett, July-Aug., 1916.

Commentary: This is the species which Willett (1918: 68) reported from Forrester Island as *D. orbella* (Gould). He noted that it is "much less globose than California specimens," and indeed upon closer

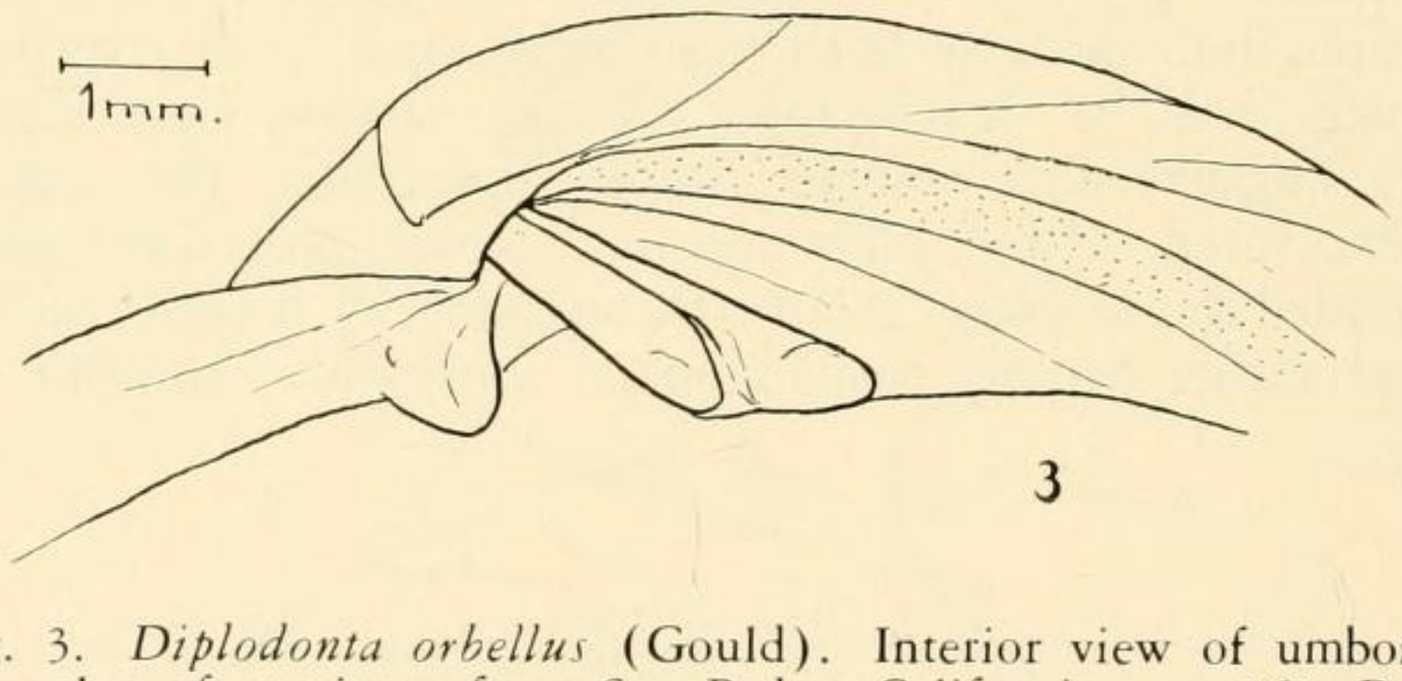

Fig. 3. *Diplodonta orbellus* (Gould). Interior view of umbonal region of right valve of specimen from San Pedro, California; no. 160, Berry Coll.; camera outline.

study it appears clearly distinct from them specifically, differing not only in the very much narrower, more pointed, and less projecting umbones, but also in the earthy texture, the heavier incremental striae, the relatively minute hinge-plate, the smaller, more obtuse, and less projecting cardinals, and other more minor features. It may bear some relationship to *D. aleutica* Dall (1901: 820), but this I have not seen. It would seem a distinctly less globose and more elongate species than either *D. impolita* or *D. orbellus*.[2] I suspect that nearly or quite all of the more northern published records under Gould's name will prove referable to the present species.

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[2]As the Latin *orbis* is masculine in gender, its diminutive should logically be spelled *orbellus*, for which Gould's use of *orbella* might be regarded as a *lapsus calami*. We could do with either a sharper or a more inclusive definition of what properly constitutes *lapsus calami* within the purview of the International Code.

Unfortunately all of the mature shells are incomplete and represent the same valve, the right.

The specific name is the L. *impolitus,* unpolished, and refers to the crude, inelegant appearance of the outer surface of the shell.

3. **Lacuna succinea** new species

Text-fig. 4.

Description: Shell small, thin, narrowly acutely conic, umbilicate; spire attenuate, produced. Whorls about 6.3, rapidly descending and enlarging, moderately convex above the strongly corded peripheral carina which nearly always remains visible just above the rather deep suture almost from its inception; nepionic whorls at first whitish, smooth, polished, eventually becoming slightly roughened by the increasingly strong incremental lines and the faint beginnings of spiral sculpture; later whorls corneous, translucent, strongly and copiously spirally striate; base concavely flattened. Aperture large, sub-pyriform or semi-lunar, acute posteriorly, broadly rounded in front; lip thin, very sharp, effuse anteriorly, very slightly everted near its junction with the parietal wall just below the carina, whilst in front continuing smoothly past the columella into the threaded keel which bounds the very open, crescentic, trimly reamed umbilical groove; columella narrow, solid, calloused, whitish, for the most part nearly straight, its attenuate lower third curving into the aperture.

Color of shell usually a nearly uniform Deep Olive-Buff to Wood Brown without definite markings or mottlings, the umbilical keel a little

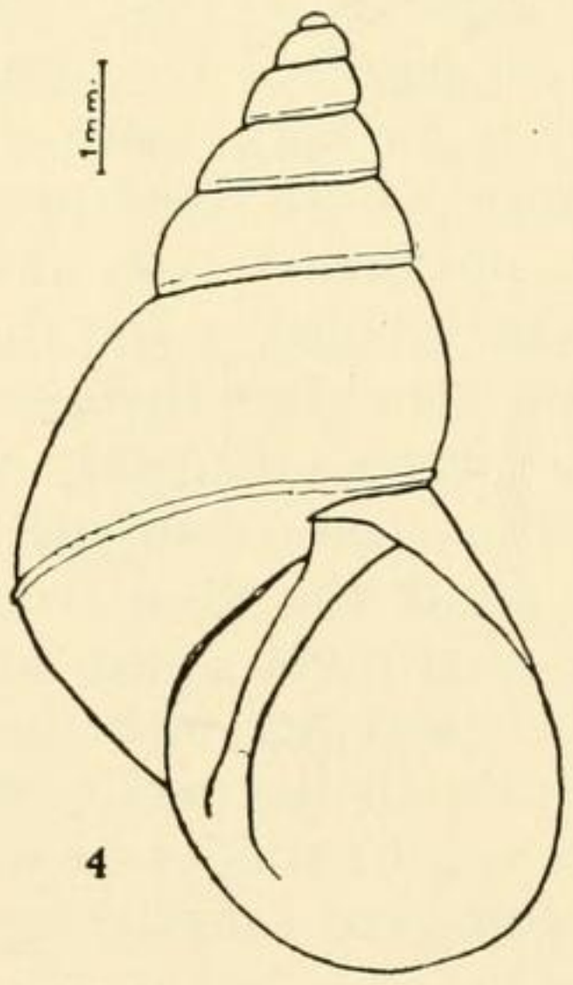

Fig. 4. *Lacuna succinea* n. sp. Camera outline of holotype.

darker, but the larger shells occasionally showing on the body-whorl a few dim brownish oblique lines, especially visible near the carina as it approaches the lip.

Measurements: Holotype, alt. 8.9, max. diam. 5.5, alt. aperture 4.7, diam. aperture 2.6, max. diam. umbilical chink from carina to inner face of columella 0.8, max. inner diam. of chink 0.4 mm.

Holotype: Cat. No. 11983 Berry Collection.

Paratypes: Cat. No. 12886 Berry Collection; others to be deposited in the collections of the San Diego Museum of Natural History, Stanford University, and the United States National Museum.

Type-Locality: San Pedro, California; Emery P. and Elsie M. Chace.

Material Examined:

Number Specimens	*Locality*	*Collector*	*Date*	*Where Deposited*
2	Avalon, Santa Catalina Id., Calif.	S. S. Berry	1903	Berry Coll. 1424
2	Arch Beach, Orange Co.,Calif.	H. Grace Eaton	——	" " 9181
6	San Diego, Calif.	F. W. Kelsey	——	" " 1484
1	San Pedro, Calif.	E. P. & E. M. Chace	——	" " 11983 Holotype
10	" "	"	——	" Paratypes
10	" "	"	——	Chace Coll. Paratypes
2	" "	"	——	San Diego Mus. Paratypes
1	" "	"	——	Stanford Coll. Paratypes
2	" "	"	——	U.S.N.M. Paratypes

Remarks: The determination of this pretty and altogether distinct little species has bothered me for some time. It clearly has nothing to do with the boreal group of *L. solidula* Lovén and its allies, although I have several times seen it under the name *solidula* in collections. I have also seen it labeled *aurantiaca* Carpenter (1864: 656) despite that having been succinctly described as "keel obsolete, resembling the chinked *Phasianellae*" and hence evidently something quite different from the present species. A third name which I have seen applied to it is *carinata* Gould (1848: 75), but that is a northern species and has a much more robust shell (Gould called it "ovato-globosa") and the extensive material I have seen does not lead me to the conviction that the two are in any way closely related. To my reading Carpenter's diagnosis of his *L. compacta* (1864a: 429) is more suggestive of *succinea* than any of the three species aforementioned. However, his use of the word "compact," his failure to mention the characteristically drawn-out spire, and his description of the columella as "vix lacunata," together with the fact that *compacta* was a segregate from his variable Neah Bay series, whence he described a total of no less than five species and varieties of this genus, afford good evidence that he could not have been considering this southern species.

The color matching I have given is from a shell taken with the animal. Empty beach shells are often quite a clean bright amber in hue, hence the specific name, which is the *L. succineus*,—of amber.

4. **Turritella orthosymmetra** new species

Plate 28, fig. 5.

Diagnosis: Shell of moderate size, rather thin; spire compactly coiled, elongate-conic, with straight smooth slopes; apical angle narrowly

acute, showing no marked change with advancing growth; suture distinct, very narrowly channeled. Sculpture of early post-embryonic whorls comprising a strong peripheral keel slightly below the middle, a weaker one a little below the upper suture, and very soon a third immediately above the lower suture, which last increases in strength until on the final whorl it forms a sharp carina which bounds the concavely flattened base; a smaller secondary rib also develops between the uppermost major rib and the suture, while on all the later whorls a fine somewhat wavy spiral threading covers all the surface between the major spirals and also extends over the base, the number of threads on the base varying from about 12 to 20 in addition to a few weak intercalaries. Aperture asymmetrically quadrate, slightly widest anteriorly, strongly angled and somewhat pinched where intersected by the basal keel; outer lip thin, sharp, usually more or less broken away; columella narrow, arcuate, slightly twisted, the basal lip very weakly everted where it adjoins it, sometimes appearing to form the bare rudiment of a canal; columellar callus rounding out over the base somewhat in advance of the lip.

Color of shells always considerably obscured and dulled by a grayish deposit or bloom, but apparently fairly near Clay Color, more or less clouded with Army Brown and related tones.

Measurements: Holotype, alt. 30.0+, max. basal diam. 8.5, alt. aperture 5.0, diam. aperture 5.0 mm.

Holotype: Cat. No. 11,979 Berry Collection.

Paratypes: Cat. No. 502 Berry Collection, others to be deposited in the collections of Stanford University, United States National Museum, and San Diego Museum of Natural History.

Type-Locality: Off Pebbly Beach, Santa Catalina Id., California; dredged in 50 fathoms by J. H. Paine and S. S. Berry, 31 Aug.-1 Sept. 1903.

Remarks: This beautiful *Turritella* has been known to collectors for a long time, but I can not find that any valid name has ever been applied to it. It has probably most frequently been labeled *T. jewettii* Carpenter (1866: 276), but the description of that enigmatic and perhaps indeterminable fossil species is no very close fit for the shells of this living race, especially the description of the base as "parum angulata," and I believe we are well advised to follow Merriam (1941: 123) in regarding *jewettii* either as a variant of *cooperi* Carpenter, or still better as a mere *species inquirenda* until its true identity is one day definitely established. Although apparently, from its plan of sculpture, allied to *cooperi* (Carpenter 1864: 612, 655), the present species is sharply distinguished by its less attenuate, evenly geometric, flat-sided, tightly coiled spire, acute basal keel, quadrate angled aperture, and definite spiral sculpture on the base. In form it is much more like *T. pedroensis* "Applin" Merriam (1941: 121, pl. 35, figs. 1-9), but is smaller and the shell is much less heavily sculptured. The species was a common one at the type-locality and Paine at one time had quite a number of the shells. I have seen few of them from other dredgings.

The specific name is derived from the Gr. *orthos,* correctly, and *symmetros,* symmetrical, and is descriptive of the trimly aligned spire.

5. **Ocenebra crispatissima** new species

Pl. 28, fig. 6.

Description: Shell rather small, thin, somewhat broadly fusiform, with a large, rounded body-whorl; spire short, turreted, acutely conical. Whorls (counting suturally) about seven (apex missing in holotype); larval shell small, high, straight-sided, sharply carinately tabulate and inward sloping above, nearly smooth, with about one and a quarter whorls; succeeding whorls more narrowly and flatly tabulate, abruptly bearing a small spiral cord on the shoulder, a slightly weaker one a little below it, and soon with traces of a third still weaker one appearing now and then in the suture, these cords at first smooth but soon becoming roughened by the appearance of fine incremental lirations, following which additional spiral cords gradually appear, the original two cords nevertheless maintaining their primacy throughout, until back of the aperture there may be as many as 14 or 15 cords of varying strength separated by considerably narrower, deeply squarish interspaces, beyond which anteriorly a few more similar spirals gradually fade away on the canal; simultaneously the incremental threads have likewise been rapidly increasing both in strength and number until on the last whorl they form a close, erect, crispate, laminate imbrication over-riding both the axial ridges, on the summit of which, most especially on the shoulder spiral, it attains its greatest and almost spinose emphasis. Aperture about three-tenths as long as the shell, ovate-pyriform, acute posteriorly; axial threads corresponding to the outer laminations continuous and closely crowded around the inner lip to separate it from the columellar wall and render the peritreme complete, eventually terminating on the roof of the canal; outer wall of aperture dentate with about five teeth, including one small tubercle situated a little above the middle, a second one so weak as to be hardly more than a trace, then two somewhat stronger ones, and finally a very heavy tubercle at the entrance of the canal. Canal a little longer than the aperture, narrow, nearly straight, gently recurved, and covered for all but the anterior third of its length.

Color cream-white outwardly, the interior polished and warmly flesh-tinted.

Operculum shortly pyriform, the columellar border weakly concave; striae low, rounded, rather heavy, not very crowded.

Measurements of holotype: Alt. 20.9, max. diam. 11.1, alt. aperture 6.1, length canal 7.8 mm.

Holotype: To be deposited in the type-collection of the Department of Paleontology, Stanford University, No. 7855.

Paratype: An immature shell with perfect apex, Cat. No. 18972 Berry Collection.

Type-Locality: 33 fathoms, off Isthmus Cove, Santa Catalina Id.,

California; "Zaca" Sta. 23, Stanford-Crocker Expedition (Dr. George S. Myers), 16 Sept. 1938.

Additional Material: A single adult shell from 15 fathoms, Avalon Harbor, Santa Catalina Id., California (Berry Coll. 8945).

Commentary: For an *Ocenebra* this is a shell of unusual refinement and beauty, quite as lovely as some of the northern "trophons" and indeed recalling them in nearly every way except the more robust body-whorl. In its own genus nothing appears to demand particular comparison with it. It probably belongs in the group with *O. barbarensis* (Gabb) and *O. squamulifera* Carpenter, from both of which it differs in the smaller size, thin shell, relatively low spire, long and very narrow canal, very sharp sculpturing, and complete lack of any brown coloring.

The specific name is the superlative of the L. *crispatus*, curled or crimped, and has reference to the incremental lamination.

6. **Nassarius (Schizopyga) rhinetes** new species

Plate 28, fig. 7.

Diagnosis: Shell quite large, thin, high-conic, with an acute apex, the slope of the spire distinctly arcuate; whorls about 8, the later ones quite inflated, with rounded profile and only the weakest suggestion of a very narrow shouldering; suture distinctly impressed and deep. Sculpture, subsequent to the abraded apical whorls, developed first as about 14 rather strong, nearly straight axial ridges, soon becoming somewhat retractively slanting, relatively finer and more crowded, and on the last whorl weakly arcuate or hypo-sigmoid, here increasing in number to about 30; spiral sculpture appearing soon after the axial; on the spire about 6, on the fully exposed last whorl about 12 cords, not all of them of equal strength, the first cord anterior to the suture being distinctly more slender and the second cord more emphasized than succeeding ones, while the 10th and 11th cords just posterior to the columellar fossa are again somewhat emphasized, while the 12th cord, which runs along the posterior wall of the fossa itself, is little more than a strong thread; cords 1 to 10 form distinctly squarish interspaces with the axial ribs, with the intersections rather sharply tuberculate; tubercles slightly emphasized at the shoulder along cord 2, and reduced along cord 11, while cord 12 and the 5 crowded ribs of the wall of the canal anterior to the fossa are non-tuberculate. Aperture ample, about 51% of the total altitude, ovate-pyriform, truncate in front; outer lip thin, its inner surface marked by slender shallow spiral grooves corresponding in position to the cords of the exterior; inner lip strongly concave in profile, covered by a thin, smooth, whitish callus which extends well in front of the aperture, but barely passes the sutural line and is not very sharply bounded; columella strongly twisted and incurved, weakly biplicate near its termination; canal open, deep, its outer margin reflexed against the rather narrow sharply excavated fossa. Color of shell whitish, unbanded, but with traces of a thin, axially laminated, semi-dehiscent, pale yellowish brown periostracum between the costae.

Measurements: Holotype—alt. 32.5, max. diam. 18.9, alt. aperture 16.6, diam. aperture (opening only) 8.8, diam. aperture to edge of callus, 11.2 mm.

Holotype: Cat. No. 1182 Berry Collection.

Paratypes: Cat. No. 1163 Berry Collection.

Type-Locality: Dredged in 40 fathoms, off Moss Landing, Monterey Bay, California; mud bottom; S. S. Berry, June 1906.

Remarks: This beautiful species has been held in MS. for some time. It has long been known to Californian students as one of the strange congeries of forms which has passed under the name *Nassa californiana* (Conrad), the present type-material having been reported under this name by myself (1907: 40) shortly after its collection. And to avoid misunderstanding, it should be admitted at once that if Conrad's name can properly be associated with any living species, the subject in hand is the likeliest candidate for selection. Unfortunately the original description of *californiana* is at once so brief and so generalized as to be nearly worthless, while the almost equally inadequate figure shows only two whorls, the spire represented by a restoration in outline. While the figure is about the same size as adult Recent shells and the reconstituted spire is rather startlingly close to the contours they exhibit, there exist otherwise what appear to me as quite troublesome discrepancies. There is shown no trace whatever of any parietal callus, no internal lirations, the sculpture is indicated as quite closely cancellate rather than ribbed, and while its delineation makes it appear nearly as much like an injury as a normal structure, the fossa is in profile both considerably more open and more "profound." Fortunately at least one fossil form has been reported and figured, which, in spite of the indefinite status of Conrad's type-horizon, is probably fairly near it in the time-scale, and is likewise more or less in accord with it in the characters just noted. This is the *Nassa californiana* recorded by Arnold (1908: pl. 36, fig. 6) from the Pliocene south-west of Capitola in Santa Cruz County, which I am accordingly inclined to accept as reasonably identified, enabling us to fix, far better than any other published evidence, Conrad's enigmatic name. Arnold gives no description, but the clean-cut photographic figure represents the shell of a species obviously of the same intimate group as the living one, but differing in its decidedly wider outline, more finely cancellate sculpture, the wide *smooth* fossa, and at least the appearance of a rather remarkable excavation of the columella, the importance of which is difficult to estimate without examination of actual specimens.

Of other living species *N. perpinguis* (Hinds) seems about the closest but is much smaller, spiral cords are appreciably more numerous on the later whorls, and there are so many other differences of detail that only through the utmost carelessness could the two species readily be confused.

The specific name chosen is from the Gr. *rhinetes*, one who rasps or files, and refers to the rasp-like sculpturing of the shell.

7. **Agaronia murrha** new species

Pl. 29, fig. 1. Text-fig. 5.

Description: Shell of moderate size, rather heavy at maturity, ovate-fusiform, widest near middle, the spire tapering rapidly and on the lip side somewhat convexly to the minutely mammillate apex; anterior extremity truncate. Whorls 5 or a trifle more, rapidly increasing, the body-whorl convex and including about 90% of the total length of the shell. Suture sharp and strongly but not very deeply channeled. Aperture ample, sharply angled posteriorly, about three-fourths as high as the shell; outer lip sharp until maturity when it becomes reinforced inwardly by a whitish callus which becomes quite heavy approaching the suture; outer anterior lobe subangular, slightly surpassing the columella; canal open, moderately wide; parietal wall covered by a sharply delimited white callus which is thickened above the suture posteriorly and thence extends in most specimens completely across the whorls to the suture above so that the spire is completely calloused; anteriorly the callus passes over the columella to the canal. Columella with a single strong fold at the canal which is bounded by a rather sharp and deep channel; behind this appears a rather complex system of low folds,—first, two or three outer ones parallel to the callus-margin, second, entering against these at a low angle and supplanting them toward the aperture are three or four more slender costae, and third, an apertural series of low less sharply ascending folds which are of rather irregular development and strength; fasciole hardly elevated. Surface smooth except for extremely weak traces of a microscopic spiral striation and the growth lines, the latter becoming stronger in nearing the aperture; parietal callus and fasciole microscopically wrinkly-punctate.

Color of exterior of adolescent or mature shells everywhere a slightly grayish porcelain-white, the outer wall of the interior deep brownish except for the calloused margin of the lip which is white; very young shells light brownish gray with an indistinct yellowish zone below the suture, a rather sharp white band on the anterior part of the body-whorl, and a brown-bordered white zone marking the fasciole.

Measurements of largest paratype, alt. 38.5 mm., max. diam. 16.6, alt. aperture 31.8 mm., no. whorls 5; of holotype, alt. 36.3, max. diam. 15.4, alt. aperture 29.3 mm., no. whorls 5+.

Holotype: San Diego Museum of Natural History.

Paratypes: Cat. No. 16431 Berry Collection; others to be deposited in the collections of the United States National Museum, the Department of Paleontology of Stanford University, the Museum of Comparative Zoology of Harvard College, and the private collection of Dr. Joshua L. Baily, Jr.

Type-Locality: Corinto, Nicaragua (Herbert N. Lowe, 1931).

Commentary: In critically reviewing the available West American specimens of *Agaronia* with a view to correlating their distribution, it shortly became apparent that two quite different forms are involved

whereas only a single species, the widespread *A. testacea* (Lamarck), has been hitherto recognized from the region. Since an exhaustive search of available literature has revealed no lost name which can be revived for the rarer form, a name is here supplied for it and tentatively given specific

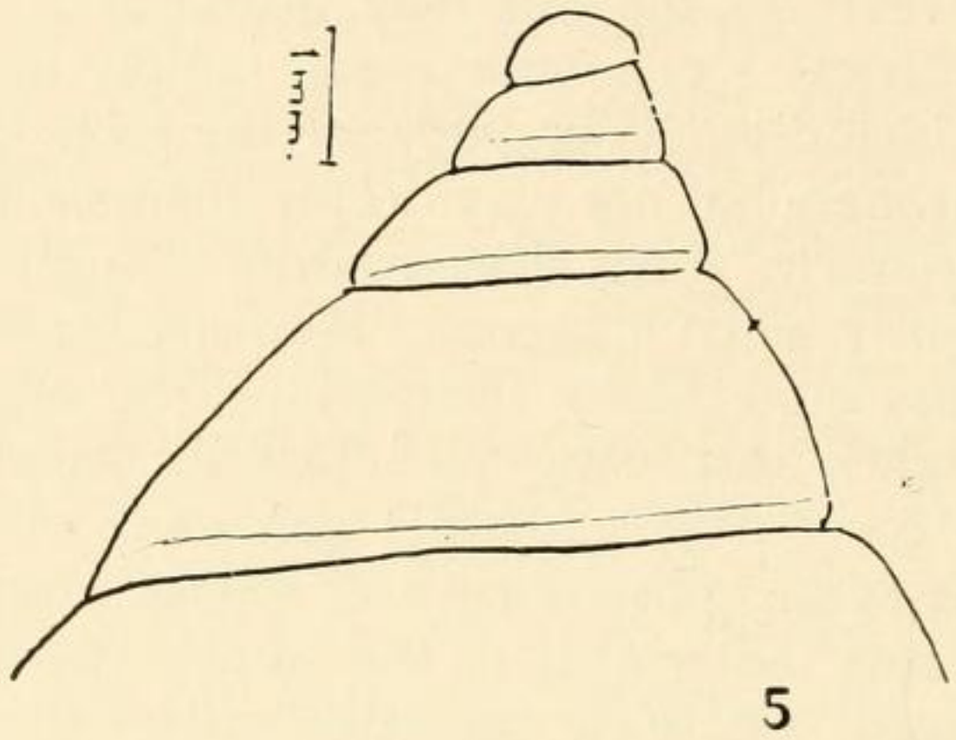

Fig. 5. *Agaronia murrha* n. sp. Camera outline of apex of paratype 16431a.

rank. It differs from *A. testacea* in detail at almost all points, but adults may perhaps be most easily separated by 1) the low spire, slightly convex on the apertural side; 2) the long aperture; 3) the constricted and relatively shallow sutural channel; 4) the more evenly ovate outline; 5) the extension of the parietal callus across the whorl to the suture with a consequent smoothly calloused spire; 6) the relatively large and more mam-

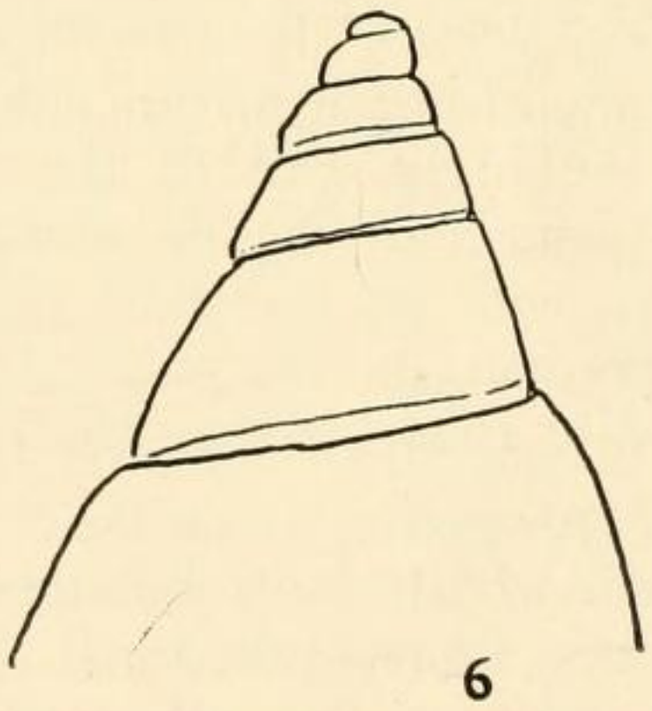

Fig. 6. *Agaronia testacea* (Lamarck). Camera outline of apex of shell from Cholla Cove, Sonora; no. 15122a, Berry Coll.; same scale as Fig. 5.

millate nepionic shell; 7) the closely wrinkled inner lip, with its folds oblique to the thin major plaits; and 8) the barely raised fasciole. To these might be added the opaque whitish-porcelain coloring of the exterior and the inside margin of the outer lip, besides the warm deep brown of the interior without any trace of the usual bluish-gray of *A. testacea*, except that it must be borne in mind that the *Olividae* are a family in which extreme colored variants are of the commonest occurrence and these differences, conspicuous though they are, may turn out to be more

characteristic of the particular colony whence the type-series was taken than of the species as a whole, although some describable difference in the respective color ranges of the two species is quite certainly to be anticipated. Until then such characters as those provided by the calloused spire and the nepionic shell should provide more certain criteria for separation than mere color, but this can be better told when larger series become available for comparison. Although the present species apparently lacks the lively coloring exhibited by *A. testacea* in its best forms and is not known to approach it in size, it is nevertheless attractive in a modest way.[3]

The specific name chosen is the L. *murrha,* porcelain.

8. **Antiplanes (Rectiplanes) willetti** new species

Pl. 29, fig. 2.

Description: Shell elongate fusiform, with tall, sharply conic spire; whorls 8, convex, each appressed closely against the whorl above, the suture distinct; nepionic whorls two, mammillate, their inflation insufficient to alter appreciably the symmetrical outline of the apex, polished, the first smooth, the second developing a few weak traces of spiral sculpture on its concluding portion, which develops into a system of about 10 fine spiral threads on the next succeeding whorl, and increases to about 20 gradually stronger but still very weak threads on the penultimate whorl and many more on the body-whorl, where they continue to the canal, those in the fasciolar area being excessively fine, crowded, and numerous; axial sculpture absent except for the numerous growth lines of rather uneven strength. Aperture elongate-pyriform, about 40% of the height of the shell; outer lip thin, sharp, strongly arcuately produced; inner lip and columella smooth, arcuate; canal open, short, slightly recurved; anal sulcus wide and deep, passing smoothly into the produced segment of the lip; fasciole not sharply delimited, marked mainly by the fineness of the sculpture.

Measurements: Holotype—alt. 18.4, maj. diam. 6.6, alt. aperture 7.0, diam. aperture 2.2 mm. Paratype—alt. 17.8, maj. diam. 6.7, alt. aperture 6.3, diam. aperture 2.0 mm.

Holotype: Cat. No. 11,977 Berry Collection.

Paratypes: Cat. No. 3843 Berry Collection, and the collection of the San Diego Museum of Natural History, No. 22856.

Type-Locality: 50 fathoms, off Forrester Island, S.W. Alaska; dredged by George Willett, July 1917.

Remarks: This very attractive little species has been previously recognized under the name *Crassispira rotula* (Willett 1919: 21). The latter species was originally described from fossil material under the name

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[3]Too late for consideration except in a footnote, there was called to my attention a large series of a small dark *Agaronia* in the San Diego Museum taken in 1931 by H. N. Lowe at San Juan del Sur, Nicaragua. These shells are mostly of purplish-gray coloring with a deep brown (rarely light yellowish-brown) apex and fasciole, and appear to represent a dark phase of the species here described.

Pleurotoma (*Spirotropsis*[4]) *smithi* Arnold (1903: 216, pl. 6. fig. 13), but the specific name having been preoccupied in *Pleurotoma* more than once, it was later renamed *rotula* by Dall (1921: 71). To this the northern living species is admittedly quite close, but differs from it according to the material seen 1) in being much smaller, with fewer whorls and a shorter canal; 2) in the distinct spiral sculpture, which in the fossil is either entirely absent as described by Arnold, or represented by some nearly obsolete traces on the anterior part of the body-whorl as shown in one of my Hilltop Quarry specimens; and, perhaps most importantly of all, 3) by the very much smaller and less bulbous nepionic shell. I have found *A. rotula,* or what I at present interpret as that species, only twice at Hilltop Quarry, so it would seem of relatively infrequent occurrence there, although the specimens are beautifully preserved. The holotype of *rotula* came from Arnold's supposed "Pliocene" of Dead Man's Island, now generally considered as the equivalent of the lower Pleistocene at Timm's Point. The nepionic shell in the fossils I have seen is similar in general form and structure to that of *willetti,* but is greatly larger and somewhat more inflated, rendering the apex distinctly obtuse. *A. rotula* is one of the extraordinary melange of species placed by Grant and Gale (1931: 553-4) in the synonymy of *perversa* (Gabb), but I am wholly at a loss to comprehend how anyone with both this and *perversa* in hand could possibly confound them, their characterization being sufficiently ample quite aside from the mere direction of coil, a prejudice against which as a taxonomic anchor appears to have blinded these authors to everything else.

The species is dedicated to its discoverer, the late George Willett, of the Los Angeles Museum.

9. **Knefastia princeps** new species

Pl. 29, fig. 3. Text-fig. 7.

Description: Shell moderately large, elongate, fusiform; larval shell decollated in holotype but persisting whorls 8½, turreted, strongly convex, sloping above to a high, subangulate shoulder; a flattened fold-like ridge strongly appressed against the suture is subtended by a shallow spiral furrow in the rather wide anal fasciole, the latter sculptured otherwise mainly by the very strong and coarse incremental striae and a few weak traces of low spirals; body of whorl marked by from 7 to 8 massive axial ribs (there are 7 on the last whorl) which are slightly knobbed on the shoulder, and 4 low but strong spiral ridges which over-ride both the axial ribs and their interspaces, the two central ridges being a trifle more widely separated than either is from its outer neighbor; base with about 13 or 14 gradually weakening spirals; the axial ribs pass onto the base but become obsolescent in the region of the canal. Aperture unarmored, about 45% the length of the shell, elongate-pyriform, acute posteriorly; outer lip sharp-edged, hardly crenulated by the spiral ridges, its margin convex in front of the strong open anal notch which nearly subtends the

[4]Apparently an inadvertence for *Spirotropis* Sars 1878.

end of the suture. Canal open and fairly long. Columellar wall somewhat erose parietally, covered with a moderate wash of shining enamel.

Periostracum shining, the spire and main portion of body-whorl lustrous Antique Brown, paling anteriorly and on the nodes to Raw

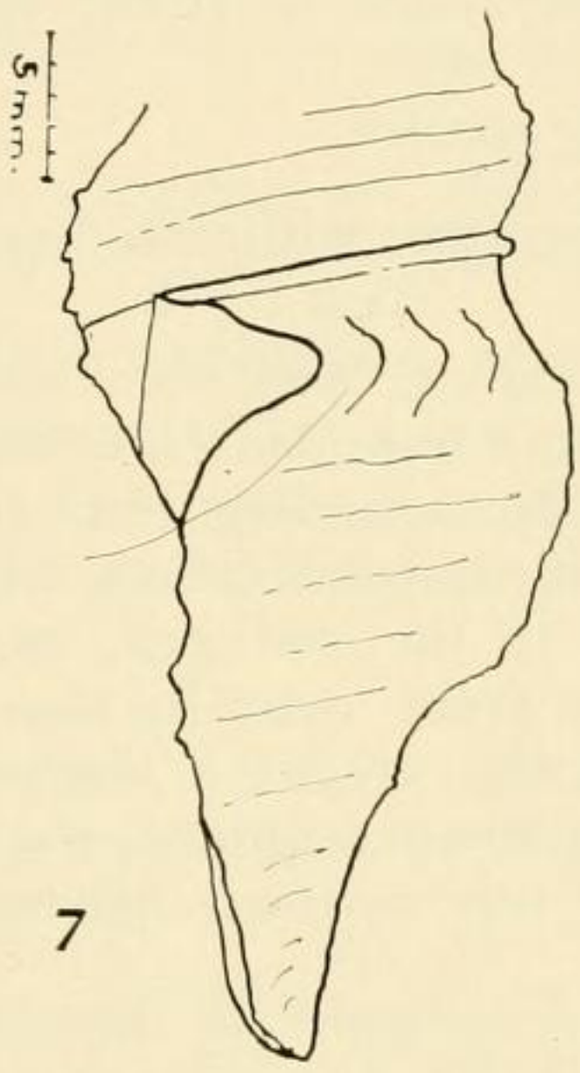

Fig. 7. *Knefastia princeps* n. sp. Camera sketch to show profile outline of lip.

Umber, the spiral ridges sharply paler and the anterior portion of the shell as well, even to Chamois at the extreme portion and on the spirals, with one or two darker bands under the periphery. Interior polished and bright, near Cinnamon to Pinkish Cinnamon.

Operculum a little smaller than the aperture, acute in front, more blunt posteriorly, with a shallow furrow running parallel to the inner margin.

Measurements of holotype: Alt. 60.3+, max. diam. 19.9, alt. aperture 28.0, max. diam. aperture ca. 9.2 mm.

Holotype: Cat. No. 13949 Berry Collection.

Type-Locality: 20 fathoms; pebble, mud and shell bottom; 2 miles N. of Cedros Village, Cedros Id., Baja California; Kenyon-Williams Mexican Expedition, Sta. 17B, 14 May 1946.

Commentary: This magnificent species, one of the finest in a generally striking genus, appears nearest to *K. dalli* Bartsch (1944: 28) among described forms, differing in its larger size, more slender form, the relatively longer and attenuate canal, the slender and well-spaced spiral cords, the very much fewer and less nodulous axial ribs, the more open sinus, and the warmer and brighter coloring, especially of the interior. The single example taken was dredged up alive.

The specific name is the L. *princeps,* the first in rank or most distinguished.

10. **WOODBRIDGEA** new genus

Diagnosis: Shell minute, thin, transclucent, inflated, obliquely bulliform; whorls nearly embracing, rather narrowly planate above, rapidly expanding to the greatly inflated body-whorl; aperture wide, ear-shaped, strongly and obliquely expanded in front; columella unarmed; surface strongly spirally striate.

Type: the following species.

Woodbridgea williamsi new species

Text-fig. 8.

Description: Shell minute, very thin, subvitreous, whitish, translucent; somewhat suggesting a lop-sided *Haminoea* in form; whorls closely embracing and very rapidly expanding from the minute, planate, barely exposed apex to the greatly expanded body-whorl. Aperture ample, ear-shaped, strongly oblique to the shell-axis, narrow and sub-acute posteriorly, widely produced in front; outer lip thin, sharp, forming a shallow but distinct sinus posteriorly, whence it descends slantingly to its insertion; inner lip weakly calloused, sigmoid, the columellar portion nearly straight, slender, in front very narrowly flattened or possibly even sulcate

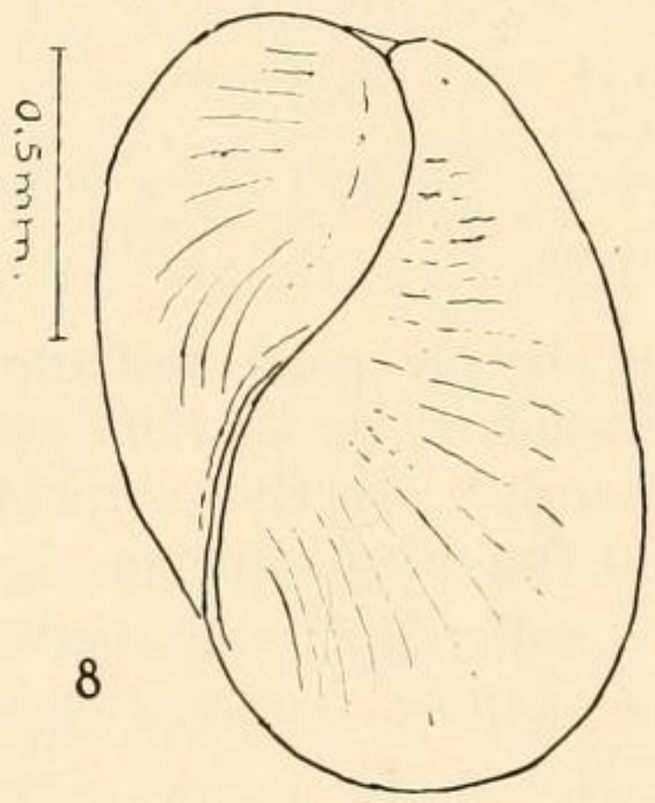

Fig. 8. *Woodbridgea williamsi* n.g. & sp. Camera sketch of holotype; spiral sculpture merely indicated.

between the rather solid appearing pillar and the thin margin of the lip, the precise formation being difficult to see and interpret clearly in so tiny and transparent a shell. Surface covered with numerous conspicuous sharp spiral striations fanning out from the aperture in two series, those above the periphery trending parallel to the suture and those below the periphery descending very much more rapidly, especially just in front of the columella.

Measurements of the unique holotype: Alt. 1.33, max. diam. 0.96, alt. aperture 1.22, max. diam. aperture 0.71 mm.

Holotype: Cat. No. 13907 Berry Collection.

Type-Locality: 25 fathoms, fine brown sand and mud, ¾ mile off Cedros Village, Cedros Id., Baja California; one example, Kenyon-Williams Mexican Expedition, Sta. 17A, 14 May 1946.

Commentary: I know nothing sufficiently similar to this minute but very beautiful little sea-snail to render fruitful any precise comparisons. Until something can become known of the animal its nearer affinities can be hardly more than surmised, but from the form and texture of the shell one can scarcely doubt that its general relationships are tectibranch. In some respects the *Scaphandridae* are suggested, in others the *Diaphanidae* or the *Philinidae*.

Both the species and its genus are dedicated to its assiduous collector, Mr. M. Woodbridge Williams of Inverness, California.

11. **MICRAENIGMA** new genus

Diagnosis: Shell minute, white, translucent, almost exactly like a very minute *Bulla* in form, but imperforate both apically and basally, and unique in that the columella is provided with a strong downward-slanting tooth-like plate.

Type: the following species.

The name is derived from the Gr. *mikros,* small, + *ainigma,* difficulty or riddle, and refers to the development of the large columellar tooth, anomalous in the group.

Micraenigma oxystoma new species

Text figs. 9, 10.

Description: Shell minute, milky white, moderately translucent, evenly ovoid, bulliform, widest near middle, about 63% as wide as long; whorls embracing, but merely flattened at summit without the formation of an apical pit, imperforate basally; aperture elongate-ear-shaped, widest in front, narrowing posteriorly where it appreciably exceeds the spire; outer lip simple, sharp, thin, evenly curved; parietal wall less strongly

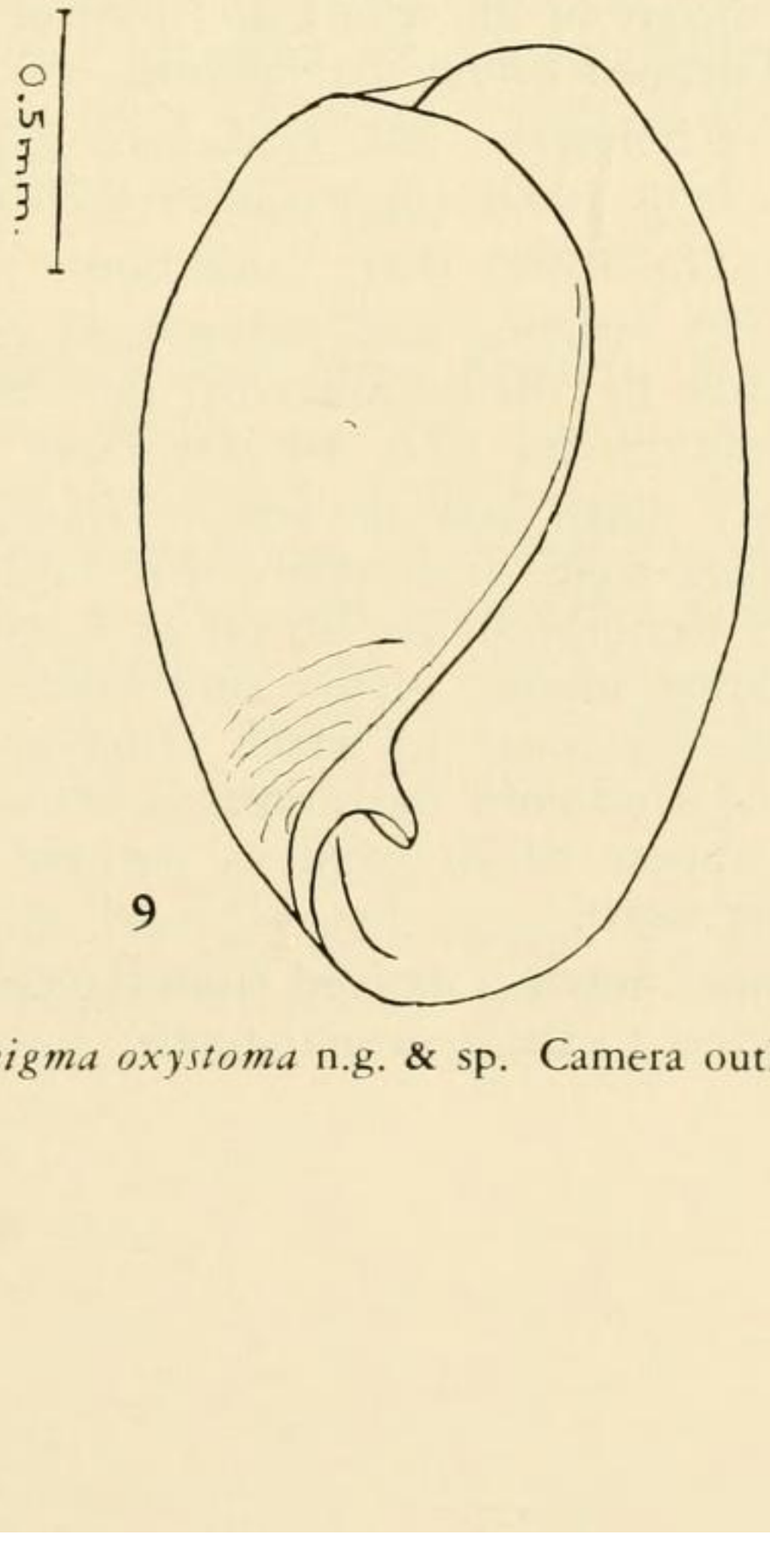

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Fig. 9. *Micraenigma oxystoma* n.g. & sp. Camera outline of holotype.

convex than the outer, covered with a restricted light callus, and curving back rather sharply into the short straight pillar-like columella, which bears a heavy and very long, downward and slightly backward slanting, triangular, plate-like, somewhat penetrating and ascending tooth, which is narrow and sharply conic in front view with a slight twist. Surface smooth except for the very fine microscopic incremental striation, some traces of a very delicate axial striation (perhaps only an emphasis of the

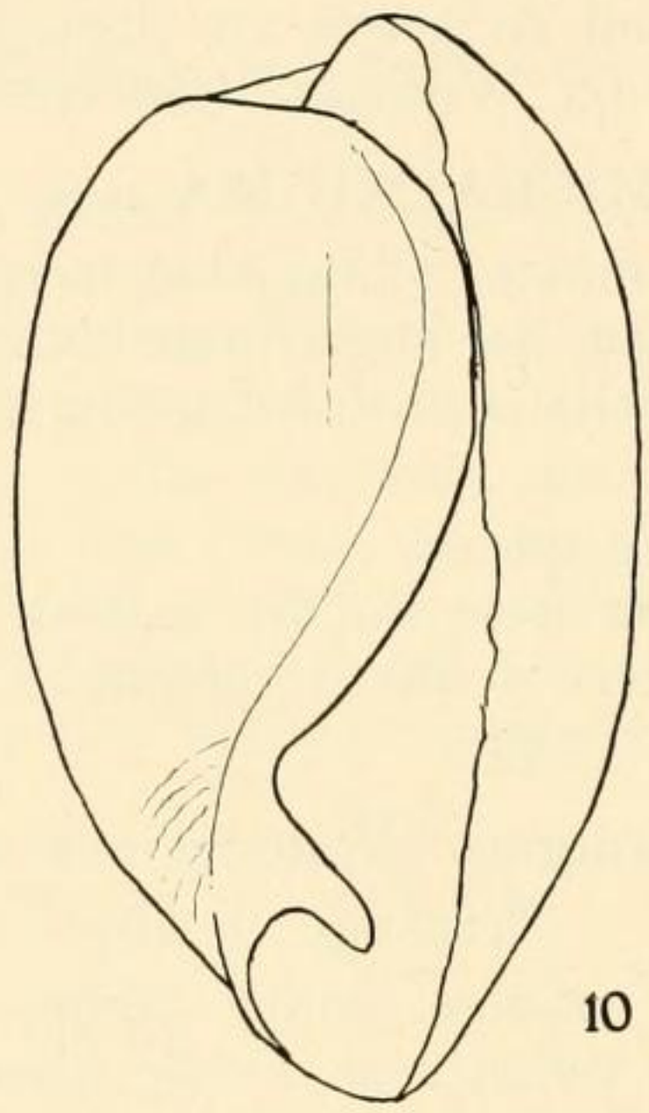

Fig. 10. *Micraenigma oxystoma* n.g. & sp. Camera outline of holotype, looking obliquely into the aperture to show the full length of the columellar tooth; same scale as Fig. 9.

first) on the upper moiety of the whorl, and four or five fine spiral striae on the otherwise ill-defined columellar fasciole.

Measurements of holotype: Alt. 1.78, max. diam. 1.13, max. diam. aperture 0.51, max. long. tooth (upper side) 0.28 mm.

Holotype: Cat. No. 13907 Berry Collection.

Type-Locality: 25 fathoms, fine brown sand and mud, ¾ mile off Cedros Village, Cedros Id., Baja California; one example, Kenyon-Williams Mexican Expedition, Sta. 17A, 14 May 1946.

Commentary: To judge from the texture, form, and general appearance of the shell there seems little doubt that we have in this pleasant little species another tectibranch, yet, so far as I can discover, the heavy basal tooth is a feature unique in the entire order, although in some groups (such as the *Retusidae,* to which family perhaps *Micraenigma* may be tentatively referred until the animal is known) a low columellar fold may at times appear which from its position would seem clearly homologous with the tooth.

The specific name chosen is derived from the Gr. *oxystomos,* fanged, and appropriately refers to the apertural tooth.

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EXPLANATION OF PLATES

PLATE 28

Fig. 1. *Volsella sacculifer* n. sp. Exterior view of right valve of holotype, San Pedro Harbor, California; x ca. 1 2/3.

Fig. 2. *Volsella sacculifer* n. sp. Interior view of left valve of holotype; same scale.

Fig. 3. *Diplodonta impolita* n. sp. Exterior view of right valve, the holotype, from 15 fms., off Forrester Id., Alaska; x ca. 1¾.

Fig. 4. *Diplodonta impolita* n. sp. Interior view of same valve; same scale.

Fig. 5. *Turritella orthosymmetra* n. sp. Holotype, from 50 fms., off Pebbly Beach, Santa Catalina Id., California; x 2.1.

Fig. 6. *Ocenebra crispatissima* n. sp. Holotype, from 33 fms., off Isthmus Cove, Santa Catalina Id., California; x 2.9.

Fig. 7. *Nassarius rhinetes* n. sp. Holotype, from 40 fms., off Moss Landing, Monterey Bay, California; x ca. 1 2/3.

PLATE 29

Fig. 1. *Agaronia murrha* n. sp. Holotype, Corinto, Nicaragua; x ca. 1.6.

Fig. 2. *Antiplanes* (*Rectiplanes*) *willetti* n. sp. Holotype, from 50 fms., off Forrester Id., Alaska; x 2¾.

Fig. 3. *Knefastia princeps* n. sp. Holotype, from 20 fms., off Cedros Id., Baja California; x ca. 1.1.

Fig. 4. *Ensis californicus* Dall. Exterior view of left valve, Miramar, Sonora; x 1.

Fig. 5. *Ensis myrae* n. sp. Exterior view of left valve of holotype, San Pedro, California; same scale as preceding.

Fig. 6. *Ensis myrae* n. sp. Interior of right valve of same; same scale.

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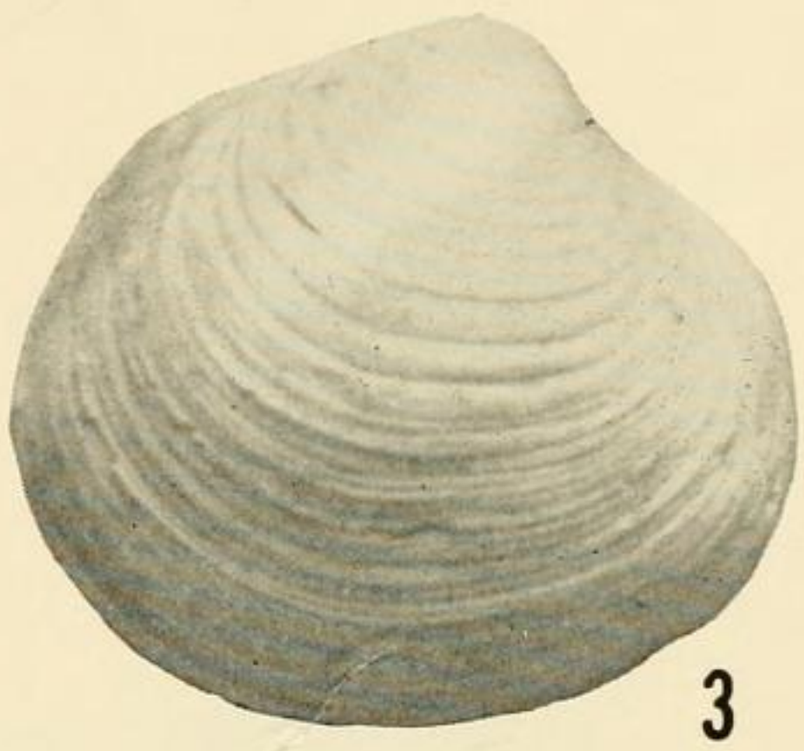

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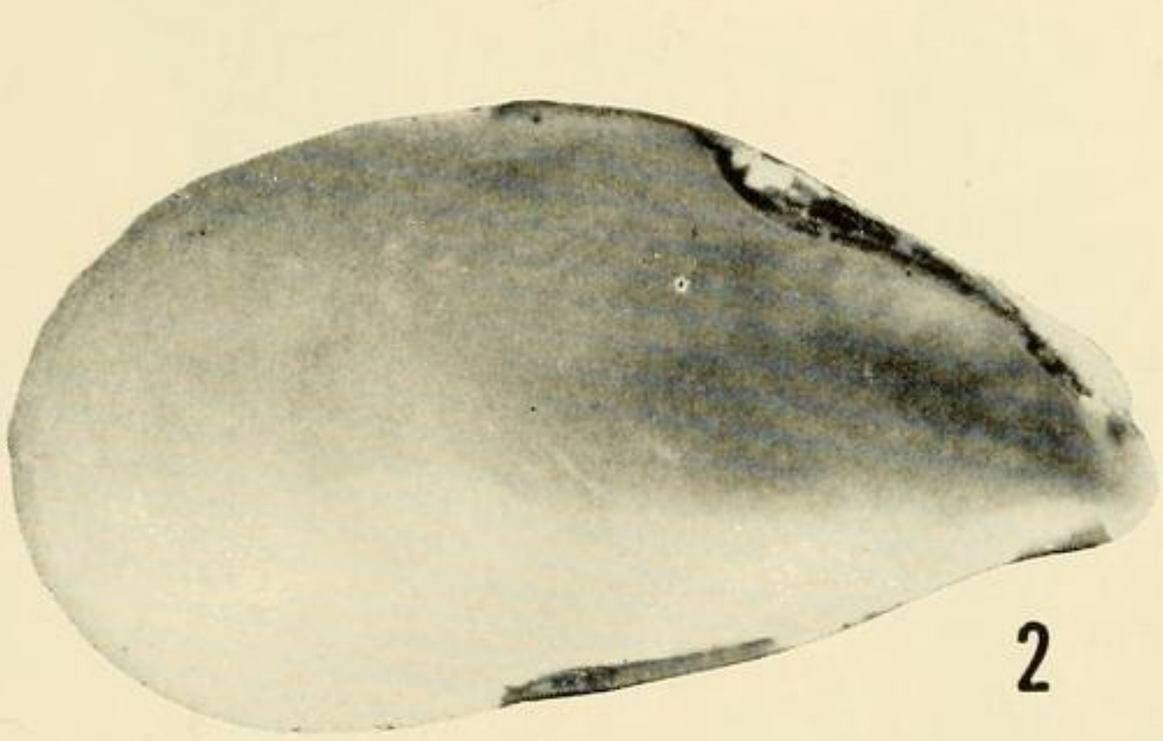

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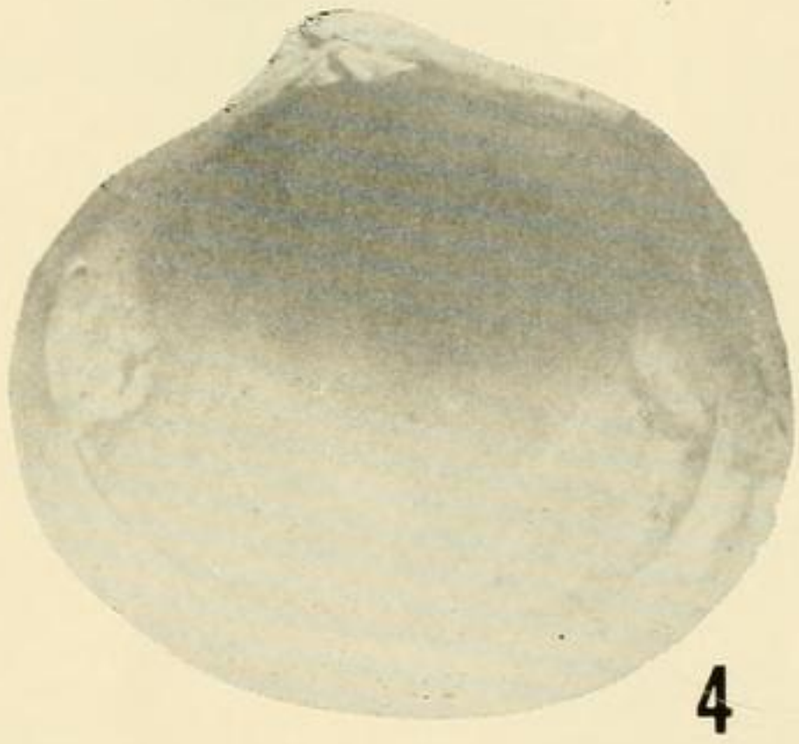

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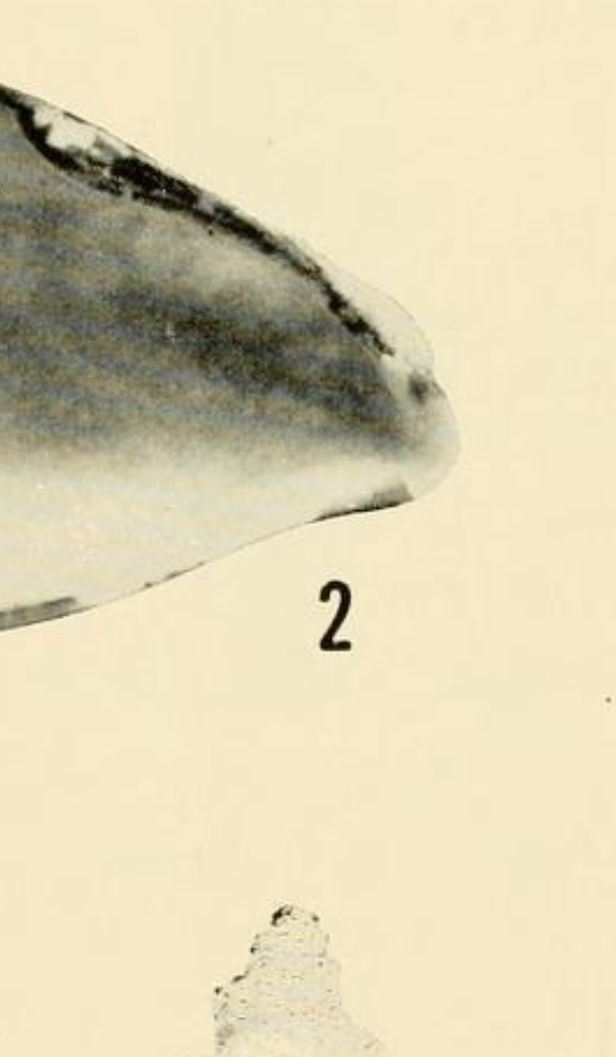

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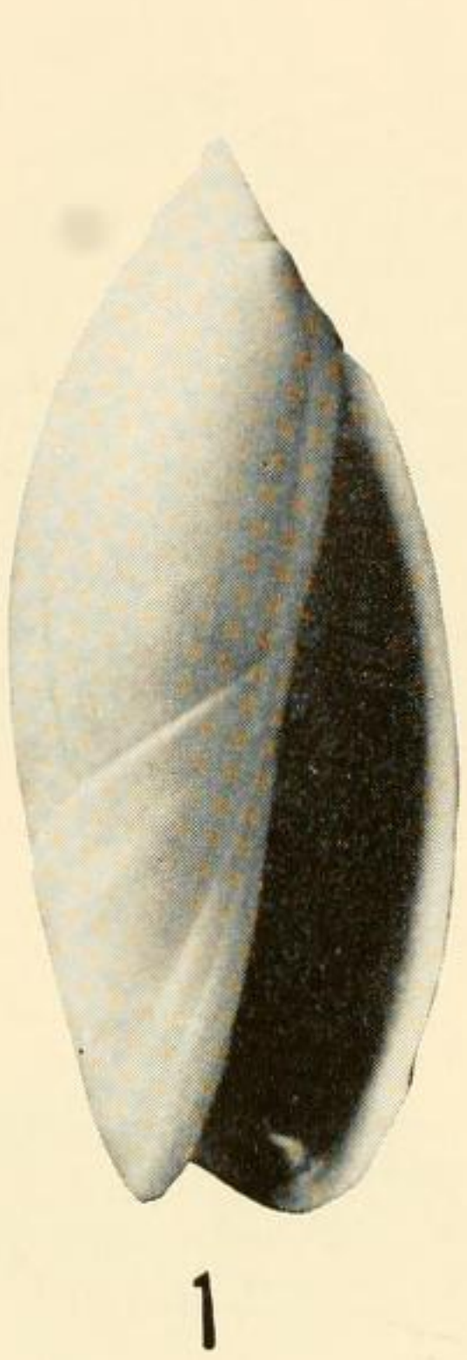

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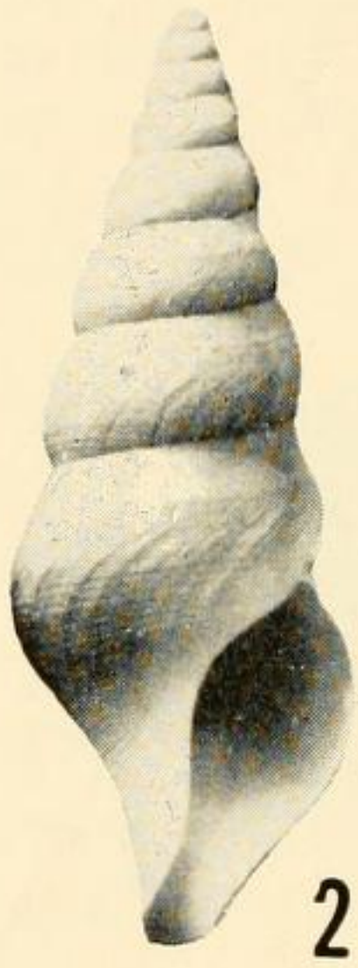

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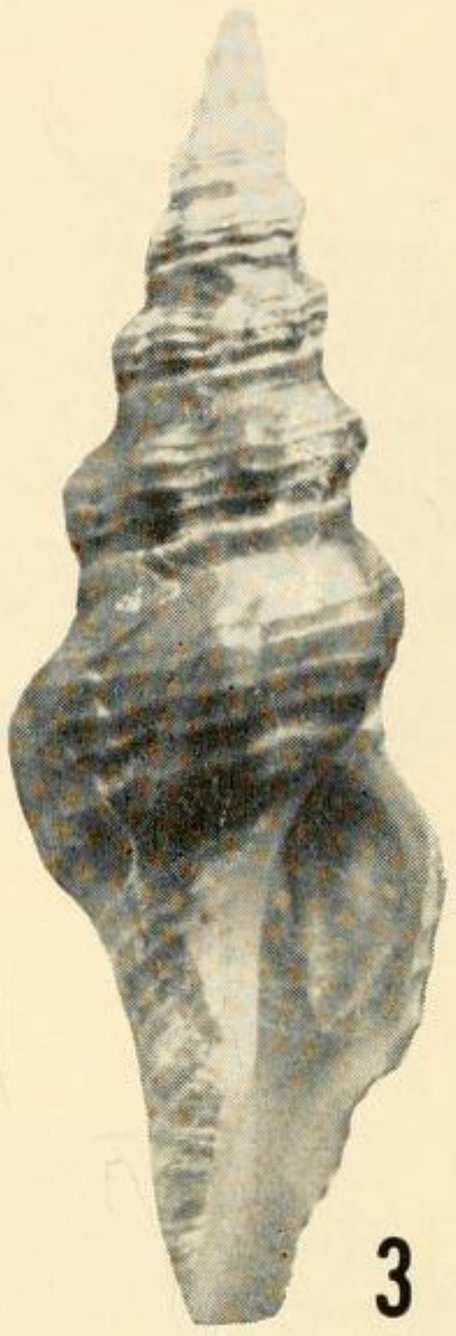

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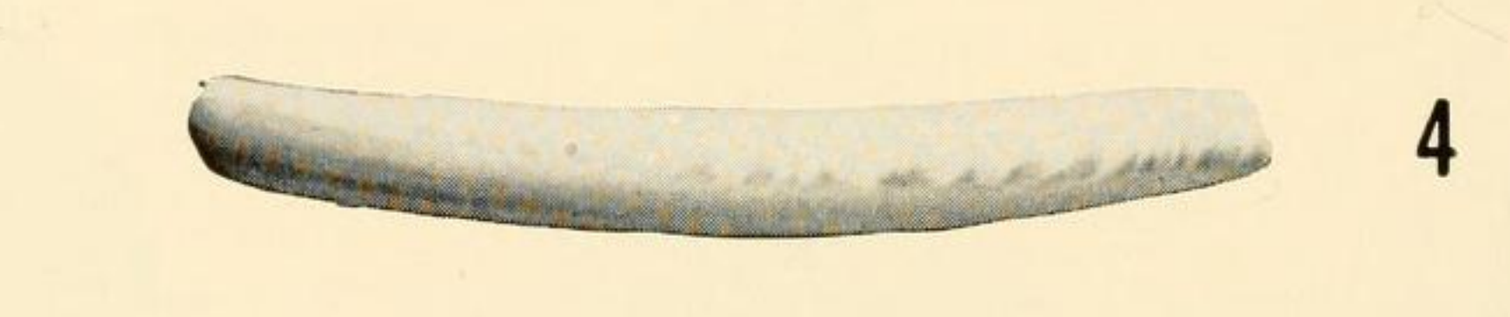

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