With the Regards of the Authors

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NEW NERITIDAE FROM SOUTHWESTERN NORTH AMERICA

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ABSTRACT-In southwestern Baja California Norte a new species of Early Tertiary Tethyan gastropod, Velates, V. vizcainoensis n. sp., occurs with a previously unknown intertidal molluscan fauna suggestive of an unprotected coastline of probable Paleocene age. Comparison of Velates vizcainoensis n. sp. to other forms previously assigned to Velates from southwestern North America suggests that "Nerita" cuneata Gabb of Late Cretaceous age probably belongs in Neritina (Dostia), as do N. (D.) aff. N. (D.) cuneata and N. (D.) escondita n. sp.

Velates is probably derived from typical Otostoma and is an early Tertiary genus. Velates californicus Vokes, although originally described as being from the Llajas Formation of middle Eocene age, is from the upper Santa Susana Formation and probably is of late Paleocene age at its type locality.

Two other neritid gastropods are present in the fauna with *Velates vizcainoensis*; namely, *Corsania (Januncia) Janus* n. subgen., n. sp. and *Nerita (Theliostyla)* n. sp.(?). *Corsania* Vidal, 1917, is a genus distinct from *Otostoma* and ranges from Early Cretaceous to Paleocene. *Januncia* n. subgen. has a Tethyan distribution and ranges from Maastrichtian through Paleocene.

INTRODUCTION

ALAN WOODS collected fossils from deposits near Punta Rosarito, southwest Baja California Norte, Mexico, to help distinguish Quaternary marine-terrace deposits from older marine sediments of very shallow seaward dip (Woods, 1978, 1980). At one of these fossil localities (UCLA 7083; see Figures 1 and 2), a small collection of very shallow-water mollusks includes new forms of Neritidae-Velates vizcainoensis n. sp., Corsania (Januncia) janus n. subgen., n. sp., and Nerita (Theliostvla) n. sp.(?). Except for ovsters, which occur stratigraphically below the beds with Velates, the fossils are predominantly gastropod shells and are wave-worn. Gastropod apertures are filled with coarse angular sand grains, but adspirally the whorls are commonly not filled by matrix and are lined or nearly filled with sparry calcite. Abraded shell fragments are abundant and a rotaliid foraminifer is common. The abraded or broken condition of most of the shells hinders identification. Recognizable in the collection, in addition to the three genera of Neritidae-Corsania (Januncia), Nerita (Theliostyla), and Velates-are Littorina sp. (Figure 3.1), ?Batillaria sp., Beniostia cf. B. brevicula (Deshayes) (Figure 3.3), Planaxis n.

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sp.(?) (Figure 3.2), *Cepatia*(?) sp. (Figures 3.4–3.5), a probable thaidid (Figure 3.6), and ?*Mi*-*trella* sp.

The neritids from UCLA 7083 are represented by better preserved and more abundant material than are the other gastropods; therefore, this paper discusses the neritids. Comparison of these neritids to previously described similar forms and to those which might be presumed to be similar, from their generic assignment, suggests that the genus *Velates* evolved from *Otostoma* in the latest Cretaceous or earliest Paleocene and can be used as an indicator of Paleocene through Eocene age.

UCLA LOCALITY 7083, SW BAJA CALIFORNIA NORTE

UCLA locality 7083 is on a northwest-facing hillslope 7.1 km east southeast of Punta Rosarito and 0.9 km east of Bahía Sebastian Vizcaino, southwestern Baja California Norte, Mexico ($28^{33'}$ 00"N, 114°05'30"W) (Figure 2). The outcrop was mapped as Sepultura Formation by Fife (1968, 1974) (Figure 1). Wave-worn molluscan fossils—mainly gastropods—were collected from a thin lens of coarse-grained sandstone in a pebble conglomerate 8 m below the surface of Aeropuerto marine terrace and at an elevation of 52 m (Woods, 1980).

The Sepultura Formation is said to be of



FIGURE 1—Geologic map of a portion of southwestern Baja California Norte east of Bahía Sebastian Vizcaino (see Figure 2 for location). UCLA loc. 7083 and other pertinent fossil sites shown. Locality numbers preceded by "UCLA" were collected by Woods, and those preceded by "B5" were collected by Fife. Geology is from Fife (1968), Gastil et al. (1973, 1975), and Woods (1978, 1980).

Paleocene and early Eocene age (Gastil et al., 1975). However, Eocene deposits have not been recognized in the immediate vicinity of UCLA 7083, the nearest being a greenish mudstone breccia, exposed at the base of an active sea cliff 21 km northwest of UCLA 7083 that yielded "planktonic foraminifers characteristic of the lowest Eocene" (E. C. Allison, 1965, personal commun. to D. L. Fife *in* Fife, 1968, p. 29).

The fauna from UCLA 7083 has not been previously recorded and, to date, it does not

provide an unequivocal indication of age. Velates is more common in Eocene than in Paleocene deposits, and is, according to Palmer (1967, p. 189), "the guide to the Eocene." However, the Velates from UCLA 7083, V. vizcainoensis, is more similar to V. californicus, which apparently ranges from late Paleocene into early Eocene, than to V. perversus (Gmelin) of the Eocene. There are several other indications that V. vizcainoensis is of Paleocene rather than Eocene age. First, Corsania (Januncia) janus is the most abun-



FIGURE 2—Topographic map of a portion of southwestern Baja California Norte east of Bahía Sebastian Vizcaino with route information and the location of UCLA loc. 7083. Route information field checked by Alan Woods, 1981. Base from Comisión de Estudios de Territorio Nacional, Estados Unidos Mexicanos quadrangles H11D69 and H11D79 (scale: 1:50,000).

dant fossil in the assemblage and species assignable to Corsania (Januncia) have only been recognized in rocks of Maastrichtian through Paleocene ages. Second, a typical "Martinez Stage" fauna is well represented in the Sepultura Formation (Fife, 1968; Gastil et al., 1975; Woods, 1980). Turritellas present-T. peninsularis or T. infragranulata pachecoensis-suggest late early to early late Paleocene age (Saul, 1983, p. 22; Saul, 1983a, p. 72, fig. 1). T. pachecoensis s.l. was recognized at Fife's (1968) localities B5D-30, B5K-166, B5K-167, B5K-168 (Figure 1), but the specimens were not available at the time of writing this paper. Third, T. i. pachecoensis Stanton specimens from UCLA 7084 (Figure 2) indicate P4 Zone, early late Paleocene age (Saul, 1983, p. 97; Saul, 1983a, p. 72, fig. 1). Fourth, no megafossils indicating a younger



FIGURE 3-Non-neritacean gastropods from UCLA loc. 7083. All figures ×2. 1, Littorina sp., UCLA 59432; 2, Planaxis? sp., UCLA 59433; 3, Benoistia cf. B. brevicula (Deshayes), UCLA 59434; 4, 5, Cepatia? sp., UCLA 59435; 6, probable thaidid, UCLA 59436.



FIGURE 4—Diagrams based on young Velates perversus (Gmelin). 1, Apertural view showing apertural surface; 2, abapertural view showing spiral surface; 3, spiral view of whorl profile; 4, ablabral view of whorl profile. Terms are listed alphabetically: 1, ablabral margin; 2, anterior is used for the abspiral end of aperture and shell margin; 3, callus; 4, deck; 5, height is parallel to axis of coiling; 6, inner lip edge; 7, labral margin; 8, outer lip; 9, posterior is used for the adspiral end of aperture and shell margin; 10, shell layer with color markings and growth lines that is deposited over callus; 11, shoulder; 12, spire; 13, teeth; 14, thickness is perpendicular to the plane of the labral-ablabral margins; 15, width is perpendicular to axis of coiling.

age have been recorded from the Sepultura Formation.

Present-day nerites are tropical and subtropical in distribution. Neritids having thick shells are marine and live between low tide and the splash zone of less protected coasts, and those with thinner shells are marine to fresh water in bays, estuaries, and rivers; a few are found in trees.

The abraded and broken shells at UCLA 7083 suggest very shallow water, as do the identifiable gastropods. All Neritidae of UCLA 7083 are relatively thick-shelled; even the *Velates* has a thickened outer lip rather than the thin outer lip of *V. perversus* and *V. californicus*. The fauna suggests a littoral zone of an exposed, tropical coast.

TERMS

Gastropods with the shape of *Velates* cannot be clearly described by using the terms

for limpets or for more conventionally coiled forms. We use the terms diagrammed in Figure 4. By analogy with Recent neritids the head of Velates may have extended from under the outer lip more or less normal to the inner lip; the basal half of the outer lip would therefore be anterior and the ablabral callus deposit would be posterior. However, when a Velates shell rests aperture down, there are gaps between substrate and shell at the abspiral and adspiral ends of the aperture that could have been areas of inhalent and exhalent flow. With this excuse, we refer to the adspiral end of the aperture as posterior and the abspiral as anterior. Rather than change terminal directions in mid-paper, the same usage is applied to the other neritids herein described.

Letter abbreviations needed for the catalog and locality numbers are: ANSP, Academy of Natural Sciences of Philadelphia; CAS, California Academy of Sciences; CIT, California Institute of Technology; UCB, University of California, Berkeley; UCBMP, University of California, Berkeley, Museum of Paleontology; UCLA, University of California, Los Angeles.

SYSTEMATIC PALEONTOLOGY

Phylum Mollusca Linnaeus, 1758 Class Gastropoda Cuvier, 1797 Order Archaeogastropoda Thiele, 1925 Family Neritidae Rafinesque, 1815 Genus Corsania Vidal, 1917

Type species.—Corsania douvillei Vidal, 1917, by original designation.

Diagnosis. — Subglobose, with low spire, high wide shoulder, and rapidly enlarging whorls; ornament of very strong to moderate spiral ridges with vaulted rasp-like tubercles crossed by collabral ridges on the adapical third of the whorl and in some species on the abapical third of the whorl; inner lip convexly rounded by callus, bearing denticulations on its slightly convex edge; outer lip prosocline, thickened internally with a beveled edge but without denticulations.

Discussion. - Cossmann (1925, p. 199) and Keen and Cox (1960, p. 1282) considered Corsania a subjective junior synonym of Otostoma, but Otostoma spp. have a more roundly globose shape and sculpture that is predominantly collabral. Bataller (1949, p. 7) recognized the genus and included it in the Stomatiidae, but the callused and denticulated inner lip of Corsania is characteristic of Neritidae. Corsania differs from Lissochilus Zittel, 1882, in having stronger spiral sculpture, lacking collabral sculpture on the middle third of the whorl, and having denticulations on the inner lip. Species that appear assignable to Corsania occur at least as early as Aptian and as late as Paleocene. Desmieria japonica Nagao (1934, p. 237, Pl. 34, figs. 19-23) from the Aptian Hiraiga Sandstone of Japan and Otostoma (Lysoma) japonica (Nagao) of Allison (1955, p. 414, Pl. 40, figs. 11, 12; see Figure 5.7) from the Albian, Upper Member of the Alisitos Formation at Punta China, Baja California Norte are Corsania. Illustrations of Nerita rinctus White (1887, p. 195, Pl. 15, figs. 10–12) from the Paleocene of Maria Farinha, Pernambuco, Brazil, shows features typical of Corsania. Maastrichtian and Paleocene forms such as *C. persica* (Douvillé, 1904) and *C. limata* (White, 1887) differ from typical *Cor*sania in having a less angulate whorl that is sculptured by many granulate spiral ribs. The inner lip of this group has an outer, strong, round rim, which circles the deck and joins the outer lip with only slight angulation. The deck is depressed and bears a few strong teeth. For these forms we provide a new subgeneric name.

Subgenus JANUNCIA n. subgen.

Type species.—Corsania (Januncia) janus n. sp.

Diagnosis. —Globose, with depressed spire and rapidly enlarging whorls; ornament of very strong to moderate spiral ridges granulate to tuberculate, granules or tubercles usually vaulted and rasp-like, some species with collabral ribs on the abapical third of the whorl; inner lip in two parts, an outer rim which with the outer lip creates a nearly round aperture, and the nearly straight inner margin of the depressed semicircular deck which bears a few strong teeth; outer lip strongly prosocline, smooth internally.

Discussion. – Januncia differs from Corsania sensu stricto in having the inner portion of the inner lip strongly depressed. The edge of the depressed inner inner lip has a nearly straight trend behind the embellishment of the strong teeth. This double inner lip structure is similar to that of Chingua Clark and Durham (1946, p. 20) from the Eocene of Columbia, but Chingua does not have teeth on the inner inner lip and the outer lip is plicate. As with Velates, the distribution of the spirally nodose, janus-decked species assigned to Januncia is Tethyan. No species of this group has previously been reported from the West Coast of North America.

Derivation of subgeneric name. – Diminutive of Janus, the Roman god of doors and gates.

CORSANIA (JANUNCIA) JANUS n. sp. Figures 5.1–5.6

Description.—Shell medium sized (Table 1), thick walled, nearly flat spired; whorls roundly inflated with slight angulation at shoulder, enlarging rapidly, ornamented by subequal nodose spiral ribs that increase in

number by intercalation, interspaces nearly same width as the ribs; aperture large, roughly circular, constricted by semicircular deck to semicircular opening; outer lip thickened but not dentate; outer inner lip semicircular, thick, smooth; inner inner lip straight with six strong teeth extending across the deck not quite to its ablabral edge; deck deeply depressed; teeth largest medially.

Type specimens.—Holotype, UCLA 59426; paratypes, UCLA 59427–59430.

Type locality.-UCLA loc. 7083, east of Bahía Sebastian Vizcaino, Baja California, Mexico.

Age.—Late Paleocene?

Remarks.—This is the most abundant form from UCLA loc. 7083. Most of the specimens are, however, broken and wave-worn. Fragments are also abundant and recognizable by their distinctive sculpture or the remarkable teeth on the deck. The deck is so deeply depressed and the teeth so strongly embossed upon it that the teeth give the impression of facing two ways—both toward the apertural opening and toward the well-marked ablabral margin of the deck. A fragment consisting of the deck and its distinctive teeth implies a specimen 25 percent larger than the holotype, which is the largest of the relatively complete specimens.

The type species of Corsania, C. douvillei Vidal, from the Aptian of Corsá, Lérida, Spain, differs from C. (J.) janus in having its whorl strongly angled by two prominent spirals and an obvious collabral element to its sculpture.

C. (J.) janus differs from C. (J.) persica (Douvillé, 1904) (p. 347, Pl. 49, figs. 1-12; Cossmann, 1925, p. 200, Pl. 7, figs. 15-18; Pl. 10, fig. 34) from the Maastrichtian (Cossmann, 1925) or Danian (Eames in Davies, 1975, p. 84) of Luristan, western Iran, in having spiral ribs of more nearly equal size and in lacking the collabral element to the sculpture on the basal third of the whorl. Our largest specimen (UCLA 59426) is similar in size to the smaller specimens illustrated by Douvillé (Pl. 49, figs. 1, 3-5, 12). The noded ribs of this specimen (UCLA 59426) are less unequal than are those on the smaller specimens from UCLA 7083. The most complete specimen of C. (J.) janus is UCLA 59428. This small specimen has about nine unequal spiral ribs of which two produce a bicoronate effect reminiscent of Nerita bicoronata Deshayes, 1864 (Cossmann and Pissarro, 1910–1913, Pl. 5, fig. 38-2). All of the small specimens are similarly bicoronate. Whereas in C. (J.)janus the ribbing appears to become more equal with growth, in C. (J.) persica specimens larger than any C. (J.) janus develop very large nodes on three of the spiral ribs.

Both C. (J.) janus and Corsania bicoronata (Deshayes) from the Thanetian of the Paris Basin have similar bicoronate sculpture, but the spiral ribs of C. (J.) janus are larger and have coarser nodes. C. bicoronata (Deshayes, 1866, Pl. 66, fig. 11) apparently has an aperture more typical of Corsania s.s. than of Januncia.

Corsania (J.) limata (White, 1887, p. 196, Pl. 15, figs. 6, 7) from the Paleocene of Brazil has uniform and closely spaced spirals. In the illustrations, the spirals appear more finely granulate than those of C. (J.) janus. White (1887) described this sculpture as being of "vaulted projections" which produce a rasplike appearance. UCLA 59429, which may be the least worn specimen, has some nodes preserving the forward-facing vaults, and the unwave-worn sculptural appearance of C. (J.) janus probably was similarly rasp-like, but of more uneven tooth than C. (J.) limata.

Etymology.—The name is from the Roman god of gates and doors. *Janus*, who is depicted with two faces looking in opposite directions, was chosen because the teeth on the deck appear to face both the apertural opening and the ablabral deck margin.

Genus VELATES de Montfort, 1810

Type species. -V. conoideus de Montfort, 1810, by original designation = Nerita perversa Gmelin, 1791.

Discussion. — Typically Velates has a large shell, resembling Crepidula in that the coiling can be discerned but with a more limpet-like profile (Figure 4.3). A thick callus upon the deck and on the ablabral side of the spire results in an unlimpet-like convex apertural surface. Internally some of this callus is resorbed, thus enlarging the living chamber (Woodward, 1892), but the shell is nonetheless left very thick in the areas of callus deposition (Figure 5.24) especially around the ablabral margin. The inner lip is moderately thick at its edge and thickens rapidly toward the most bulbous area of the deck. ALAN J. CUSHING WOODS AND L. R. SAUL



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| Specimens | Height | Width | Thickness | Inner lip length | Deck width |
|------------|----------|----------|-----------|------------------|------------|
| UCLA 59426 | 12.7 mm* | 18.2 mm* | 14.8 mm | * | 6.7 mm |
| UCLA 59427 | 10.8 mm | 11.2 mm* | 9.8 mm | 7.7 mm | 4.9 mm |
| UCLA 59428 | 7.7 mm | 9.5 mm | 6.6 mm | 4.8 mm | 3.0 mm |
| UCLA 59429 | 8.4 mm | 8.9 mm* | 5.9 mm | 4.8 mm | 3.5 mm |

| TABLE 1—Dimensions of (| Corsania (| (Januncia) | <i>janus</i> n. | sp. |
|-------------------------|------------|------------|-----------------|-----|
|-------------------------|------------|------------|-----------------|-----|

* Incomplete.

In the adult, dentition is expressed only as projections of the inner lip edge (Figures 5.25, 6.8); but in juveniles, teeth are relatively stronger, apparently because there is less callus infill between them. Adult teeth are separated by unequal interspaces wider than the teeth into an anterior group of three teeth, a submedian tooth with the widest interspaces on either side, and a posterior group of four teeth. In V. perversus, juveniles have fewer teeth, and both the anterior-most and posterior-most teeth bifurcate to achieve adult tooth count. The outer lip is not dentate but is thickened in some (V. perversus n. subsp.(?) Woodring, 1957) and thin in others (V. perversus (Gmelin)). Whether the thickening of the outer lip is a specific, subspecific, or ecophenotypic characteristic has not been determined.

Velates shells were reshaped from a lowspired naticiform early youth toward a patelliform adulthood, in large part by the addition of callus. Although within fairly broad limits, amount of callus deposited is undoubtedly a specific characteristic, there is enough individual variation in amount and, to a degree, placement of the callus that there is considerable variation of height, width, and length ratios, and position of the spire with respect to the ablabral margin within any species (Vokes, 1935, p. 383). The inner lip dentition and profile, presence or absence of shoulder on the uncallused area of the shell, and probably a thick or thin outer lip are among the less individually variable morphologic features.

Vokes (1935) argued that the oldest Velates is V. cuneatus (Gabb) of Campanian age, but we consider cuneatus to be more similar to Neritina (Dostia) than to Velates. Keen and Cox (1960, p. I285) give the range of Velates as Cenomanian through Eocene, which is the same range as that given by Cossmann (1925, p. 230), who listed species upon which he based the range.

Both Nerita umzambiensis Woods, 1906, and N. kaffraria Woods, 1906, have the outer lip denticulate and the deck depressed; and, as noted by Vokes (1935, p. 381), they have no features characteristic of Velates. Nor are these species of Cenomanian age as indicated by Cossmann (1925, p. 230); the Umzamba

FIGURE 5-1-6, Corsania (Januncia) janus n. subsp., $\times 2$, from UCLA loc. 7083. 1, 2, UCLA 59426, holotype; 1, abapertural view; 2, abapertural view showing spiral surface. 3, UCLA 59427, paratype, apertural view of worn specimen. 4, UCLA 59429, paratype, abapertural view. 5, 6, UCLA 59428, paratype; 5, spiral view; 6, apertural view. 7, Corsania japonica (Nagao) of Allison, ×2, UCBMP 33406, hypotype, from UCB loc. A-8317. 8–14, Velates vizcainoensis n. sp., ×1, from UCLA loc. 7083; 8, UCLA 59424, paratype, interior of broken specimen showing septum. 9, 11, 13, UCLA 59421, holotype, 9, abapertural view; 11, apertural view; 13, whorl profile. 10, 14, UCLA 59423, paratype; 10, spiral view; 14, abapertural view. 12, UCLA 59422, paratype, apertural view. 15, 16, 18, 19, 21, Velates californicus Vokes, ×1, hypotypes, from UCLA loc. 3173; 15, 16, 18, 19, UCLA 58275, 15, abapertural view showing spiral surface; 16, apertural view, photo by T. Susuki; 18, ablabral view of whorl profile; 19, spiral view of whorl profile, photo by T. Susuki. 21, UCLA 58274, apertural view, photo by T. Susuki. 17, 20, 22-25, Velates perversus (Gmelin), hypotypes; 17, 20, UCLA 29054, ×1, from Cuise-la-Motte, France, photos by T. Susuki; 17, apertural view; 20, spiral view of whorl profile. 22, UCLA 59578, ×1, from UCLA loc. 7069, ablabral view of whorl profile. 23, UCLA 59438, ×1.5, from Cuise-la-Motte, France, ablabral view of whorl profile, 24, UCLA 59579, \times 1, from UCLA loc. 4244, polished section showing thin shell in apertural area of last whorl, layers deposited internally in spiral area, thick callus on apertural face and very thick callus around ablabral margin, 25, UCLA 29892, ×1, from Orgeval, France, apertural view, photo by T. Susuki.

Formation of Pondoland is considered to be of middle Santonian through early Campanian age (Klinger and Kennedy, 1980).

Neritina (Velates) decipiens Stoliczka (1868, p. 340) from the "Arrialoor" Group of India is probably not of Turonian age, as indicated by Cossmann (1925, p. 230), but is of Campanian or Maastrichtian age (Sastry et al., 1968). Stoliczka's (1868) illustrations indicate that this small form has a convex apertural face suggestive of Velates. The callus does not, however, extend to the ablabral margin. The dentition, although not clearly shown, appears to resemble that of V. californicus but with the more convexly rounded lip profile of Otostoma.

Typical *Velates*, then, with an expanded, thick, inner lip callus covering the apertural face and inner lip teeth reduced to coarse serrations, is known only from the Eocene.

Several taxa (e.g., V. noetlingi Cossmann and Pissarro, 1909; V. balkanicus Bontscheff, 1897; V. vizcainoensis Woods and Saul) are more similar to V. californicus than they are to V. perversus. They differ from V. perversus in lacking the subangulate shoulder and in having better developed teeth on the inner lip. This adult inner lip dentition resembles that of juvenile V. perversus, but the teeth are somewhat stronger, in that they encroach slightly more onto the inner lip. Pinard's (1936, p. 101) illustration of Velates cf. V. perversus from the Danian of Vigny, France, suggests teeth too broad for V. perversus that extend as swellings beyond the lip edge onto the deck. Chavan considered this form a typical Otostoma and named it O. pinardi Chavan, 1949 (p. 244, fig. 4). Its shape is more typical of Velates than of Otostoma, but Chavan's figure suggests that the inner lip callus does not cover the apertural face. Except for N. (V.) decipiens Stoliczka, which should perhaps be considered an Otostoma because the inner lip callus does not cover the apertural face, these "strong-toothed" Velates are all of Paleocene and Eocene age.

Vokes (1935, p. 382) placed V. equinus (Bezançon, 1870) (Cossmann and Pissarro, 1910, Pl. 6, fig. 40-2) of the Paris Basin Eocene and V. noorpoorensis (d'Archiac and Haime, 1854) (Cossmann and Pissarro, 1909, p. 77, Pl. 6, figs. 13–15) of the Indian Eocene in an "unnamed group" of Velates. Only its collabral ribbing separates V. equinus from equivalent sized V. perversus, and Cossmann (1925, p. 230) considered the possibility that V. equinus consisted of juvenile V. perversus that had not been glossed over with callus, but he could find no V. perversus that showed ribbing on the early whorls. At the size of adult V. equinus, the inner lip callus of both species forms a convex pad that does not reach to the ablabral margin. Smaller juveniles, both ribbed and smooth, are found. The sculpture of V. equinus is very similar to that of typical Otostoma, as are the inner lip callus and denticulations. We thus agree with Douvillé (1904) that *Velates* is most closely related to Otostoma and consider that equinus and probably *noorpoorensis* should be placed in Otostoma. Velates spp. are smooth Otostoma that have callus extending over the apertural face.

UCLA collections have five specimens of O. subrugosum (d'Orbigny) from Haute Garonne, France, but in all of these the inner lip is lacking. In Velates the microstructure of the callus forming the inner lip differs from that of the shell (Figure 5.24). The inner lip of Otostoma may also have been of a different

FIGURE 6-1-3, 8, Velates perversus (Gmelin), ×1, hypotypes. 1, 8, UCLA 58376, from UCLA loc. 4244, photos by T. Susuki, 1, spiral view of whorl profile, 8, apertural view. 2, 3, UCLA 29892, from Orgeval (Aisne), France, collection of A. Chavan; 2, abapertural view showing spiral surface; 3, spiral view of whorl profile, photo by T. Susuki. 4-5, 11, Neritina (Dostia) cuneata (Gabb), UCLA 58273, ×1, hypotype, from UCLA loc. 4082, 4, spiral view of whorl profile; 5, abapertural view; 11, apertural view, photo by T. Susuki. 6, 7, 12, Neritina (Dostia) aff. N. (D.) cuneata (Gabb), UCLA 59417, ×3, hypotype, from CIT loc. 1551; 6, spiral view of whorl profile; 7, abapertural view; 12, apertural view, photo by T. Susuki. 9, 10, 14, 15, Neritina (Dostia) escondita n. sp., ×1.5, from CAS loc. 1023; 9, 10, 15, CAS Geol. 61393, holotype; 9, spiral view of whorl profile; 10, abapertural view; 10, apertural view. 14, CAS Geol. 61394, paratype, apertural view. 13, 16, 17, Nerita (Theliostyla) n. sp., UCLA 57431, ×3, hypotype, from UCLA loc. 7083; 13, apertural view; 16, ablabral view of whorl profile; 17, abapertural view.