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THREE NEW MEXICAN LAND SNAILS
OF THE GENUS *HUMBOLDTIANA*

BY JOHN B. BURCH AND FRED G. THOMPSON

Humboldtiana is an anatomically isolated genus belonging to the family Helminthoglyptidae, the American dart-bearing helices. It is confined to the mountains bordering the Mexican Plateau, the mountains of the Big Bend region of Texas, and southeastern New Mexico (Map 1). The genus is unique in the structure of the dart apparatus and the mucous glands, characters that mainly distinguish it from other helminthoglyptoids. The genotype of *Humboldtiana* was given by von Ihering (1892) as *Helix humboldtiana* Val. (= *Helix humboldtiana* Pfeiffer, 1841, cf. Pilsbry, 1927, 1948), although his knowledge of the anatomy was from Binney's (1879) account of the species now known as *Humboldtiana potosiana* Pilsbry. Pilsbry (*loc. cit.*) has further defined the genus and, as presently understood, it comprises the 24 species and two subspecies listed below (numbers refer to localities on Map 1).

1. *Humboldtiana buffoniana* (= *Helix buffoniana* Pfeiffer, 1845)
2. *H. cheatumi* Pilsbry, 1935
3. *H. chisosensis* Pilsbry, 1927
4. *H. chrysogona* Pilsbry, 1948
5. *H. durangoensis* Solem, 1954
6. *H. edithae* Perodiz, 1954
7. *H. fasciata* new species
8. *H. ferrissiana* Pilsbry, 1928
9. *H. fortis* Pilsbry, 1940
10. *H. globosa* new species
11. *H. högeana högeana* (= *Helix humboldtiana högeana* von Martens, 1890)
12. *H. högeana praesidii* Pilsbry, 1939
13. *H. humboldtiana* (= *Helix humboldtiana* Pfeiffer, 1845)
14. *H. montezuma montezuma* Pilsbry, 1940
15. *H. montezuma inferior* Pilsbry, 1948
16. *H. nuevoleonis* (= *H. humboldtiana nuevoleonis* Pilsbry, 1927)
17. *H. palmeri* Clench and Rehder, 1930
18. *H. pergranulosa* Solem, 1955
19. *H. pilsbryi* Solem, 1954
20. *H. potosiana* Pilsbry, 1927
21. *H. queretaroana* (= *Helix queretaroana* Dall, 1897)

22. *H. striata* new species
23. *H. taylori* Drake, 1951
24. *H. texana* Pilsbry, 1927
25. *H. torrei* Pilsbry, 1935
26. *H. ultima* Pilsbry, 1927

Humboldtiana tuckerae Mansfield, 1937, from the Lower Miocene Tampa limestone of Florida is not listed above. According to all characters given in the description it appears that this species should be placed in the genus *Cepolis*.

Nine of the presently recognized species have been previously investigated anatomically (Pilsbry, 1927, 1939, 1948). (This does not include the "*Helix humboldtiana*" dissected by Fischer (1899), the identity of which is uncertain.) The genus may be divided into two groups (which should perhaps be designated as subgenera) on the basis of the relationship of the mucous glands and the dart sacs. The mucous glands are situated closely above the summit of the dart sacs in *H. buffoniana*, *H. chrysogona*, *H. fortis*, *H. montezuma*, *H. potosiana*, and *H. ultima*, whereas they are separated in *H. chisosensis* and *H. texana* by a distance often equal to or greater than the length of the dart sacs. Of the three new species described in this paper *H. striata* belongs to the first group and *H. fasciata* and *H. globosa* to the second. These groups appear to be further characterized by the length of the verge and the presence or absence of a conspicuous upper chamber in the penial structure (Plate V, Figs. e and f). *H. chrysogona*, *H. fortis*, *H. nuevoleonis*, and *H. striata* have the chamber and a short verge, and a long verge and only a trace of the chamber is evidenced by *H. fasciata* and *H. globosa*.

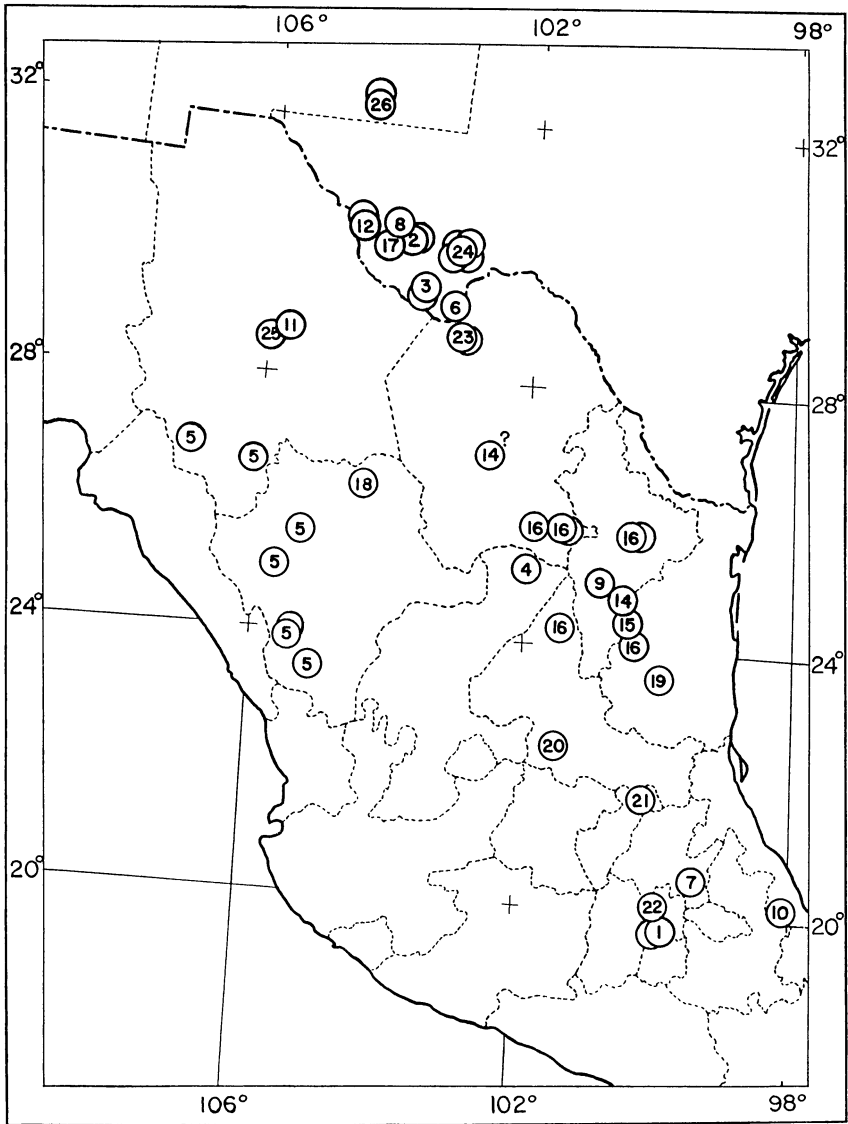
Humboldtiana fasciata, new species

(Pl. I, Figs. A, D; Pl. II; Pl. III, Figs. A, a, c, d, e; Pl. V, Figs. A, B, a, b, f)

HOLOTYPE.—UMMZ 191473; Hidalgo, Mineral del Monte, 9,300 feet altitude; collected by William E. Duellman, July 14, 1956.

PARATYPES.—UMMZ 191472 and 191474; same data as holotype.

DESCRIPTION OF THE HOLOTYPE.—Shell ovate-globose, moderately heavy; spire raised, obtuse, forming an angle of about 107°; whorls 4¼, strongly convex, heavily, irregularly, and closely wrinkled, sculptured with numerous fine, evenly distributed granules that run parallel to or on the growth wrinkles, disappearing near the umbilicus; embryonic whorls 1¼, raised, relatively small, slightly pitted; suture impressed, descending rather deeply to the aperture; aperture oblong-ovate, lying at an angle of about 45° to the axis of the shell, upper lip



MAP. 1. Distribution of species of *Humboldtiana*. For explanation of locality numbers, see list page 1. Locality for *H. humboldtiana* (No. 13) is unknown.

lying below lower band of shell; lip thin, sharp, slightly reflected; columellar margin reflected, half concealing the umbilicus; peristome slightly expanded, little thickened.

The shell is isabella-colored with three unevenly spaced black bands, which are frequently interrupted and stop short of the lip. The upper band is widest, but only slightly wider than the lower band. The middle band is about $\frac{4}{5}$ as wide as the upper band. The upper three whorls are slightly tinged with red. The inside of the aperture is pinkish white, with the bands of the shell distinctly showing through. The columella and lip are dull white.

Height of shell, 36.5 mm.; diameter, 40.4 mm.; height of aperture, 28.0 mm.; width of aperture, 26.0 mm.

The genitalia of the type are drawn in Fig. A, Pl. II. The somewhat cylindric penis contains a relatively long verge, which, when contracted, extends almost $\frac{2}{3}$ of the length of the penis. The end of the verge is divided into four fingerlike processes. Below the verge the penial wall has seven lengthwise ridges. These ridges are joined distally, almost separating the penis cavity into two compartments. The verge is marked with numerous transverse folds and contains only a trace of an upper cavity where the verge connects with the wall of the penis cavity. The flagellum is almost as long as the combined length of the penis and epiphallus. The long, narrow vagina bears four dart sacs of approximately equal size, which are separated from the mucous glands by a distance of 11 mm. The spermathecal duct, at about three-fourths of its length, bears a moderately long diverticulum. Measurements of the various structures are listed in Table I.

VARIATION.—The thickness and length of the vagina and the length ratios of the verge, penis and flagellum, and penis and epiphallus show slight variation. The only shell variation shown by the paratypes is in size and in the descent of the suture to the aperture. In both paratypes the upper lip originates on the lower band of the shell.

Shell measurements of the paratypes are as follow: height, 30.8 and 33.8 mm.; diameter, 39.2 and 39.8 mm.; height of aperture, 27.0 and 25.0 mm.; width of aperture, 24.2 and 24.6 mm.

RELATIONSHIPS.—This species belongs to the group characterized by the relatively great distance between the mucous glands and the dart sacs and appears to be most closely related to *H. texana*. It differs from *H. texana* in that all of the dart sacs are equal, or nearly so, in size, and in having a much larger penis, verge, and epiphallus.

The combination of the shell's color, size, shape, granulation, and raised spire with small nuclear whorls make it distinctive within the

genus. Conchologically, this snail is similar to *H. potosiana* but differs in being larger, decidedly wider than high, having a more obtuse spire with smaller, more protruding nuclear whorls, and having larger, unevenly spaced bands. The only other species with which *H. fasciata* may be confused is *H. nuevoleonis*. *H. nuevoleonis*, however, has more compressed whorls, a more obtuse spire with less protruding embryonic whorls, larger and stronger granulation, and a better developed middle band on the shell. It differs further from *H. fasciata* in that the angle the aperture makes with the main axis of the shell is about 15° greater.

REMARKS.—The type lot was collected on a cold, misty day in an oak-fir forest where the specimens were found crawling on moss- and lichen-covered tree trunks and stumps. The ground supported an undergrowth of small herbaceous plants and was covered with a thick mulch of oak leaves and fir needles.

Humboldtiana globosa, new species

(Pl. I, Figs. C, F; Pl. III, Figs. B, b, f; Pl. V, Figs. C, c, f)

HOLOTYPE.—UMMZ 191476; Veracruz, 3 miles east of Perote, La Molina, 8,000 feet altitude; collected July 30, 1955, on a lone fir tree by a mill by Emmet T. Hooper. It was found associated with *Helix aspersa* Muller.

DESCRIPTION OF THE HOLOTYPE.—Shell globose, moderately light, wider than high; spire raised, obtuse, forming an angle of about 118° ; whorls $4\frac{1}{4}$, strongly shouldered, globose, irregularly and moderately wrinkled, with many fine, oblong granules arranged diagonally to the wrinkles, disappearing at the edge of the umbilicus; embryonic whorls $1\frac{1}{2}$, raised, moderate in size, smooth; suture deeply impressed, descending to the aperture; aperture subovate, lying at an angle of about 38° to the axis of the shell; upper lip originating on lower band, approaching the columella; lip thin, sharp, slightly reflected; columella slightly reflected, partly covering the umbilicus; peristome distinct, thin, hardly concealing the granules of the preceding whorl.

The ground color of the shell is horn yellow, with three chocolate-brown to black bands stopping short of the lip. The bands are unequally spaced, the middle one lying slightly closer to the upper than to the lower band. The upper band is the widest, the lower band the narrowest, being about half as wide as the upper band. The middle band is about $\frac{4}{5}$ as wide as the upper band. The embryonic whorls are pinkish buff (may be partly due to peeling of the periostracum). The

inside of the aperture is glossy white, with slight indications of color bands showing through. The aperture, peristome, and columella are also glossy white.

Height of shell, 28.0 mm.; diameter, 33.0 mm.; height of aperture, 20.5 mm.; width of aperture, 20.7 mm.

The genitalia of the type are shown in Pl. III, Fig. B. The bulbous penis contains a quadripartite-ending verge which, when contracted, extends about $\frac{1}{2}$ the length of the penis. The four processes at the end of the verge are strikingly dissimilar in appearance, two being shorter and thinner. The verge is marked with numerous transverse folds and contains a very small upper cavity. The lower half of the penial wall has seven heavy, longitudinal ridges. The flagellum is nearly as long as the length of the penis and epiphallus. The vagina bears four long, thin dart sacs, three of approximately equal size, the other much smaller. The outer wall of the upper half of the spermathecal duct contains a conspicuous flange. Measurements are listed in Table I.

RELATIONSHIPS.—*H. globosa* belongs to the group characterized by a relatively great distance between the mucous glands and dart sacs. Although the distance is less in this species than in others of the group, the close similarity in structure to *H. fasciata* may readily be seen. *H. globosa* is distinguished from other species of the genus by its flattened dart sacs and spermathecal duct.

The shell may be distinguished from that of other species by the combination of the following characters: the globose, shouldered whorls, raised spire, moderate nuclear whorls, pattern of granulation, and moderate growth wrinkles. The glossy white aperture is a further aid in identifying the shell.

***Humboldtiana striata*, new species**

(Pl. I, Figs. B, E; Pl. IV; Pl. V, Figs. D, d, e)

HOLOTYPE.—UMMZ 192247; Distrito Federal, Paso Cortez, 10,500 feet altitude; collected by Emmet T. Hooper, August 26, 1955.

PARATYPES.—UMMZ 191475 (six specimens); same data as the holotype.

DESCRIPTION OF THE HOLOTYPE.—Shell subglobose, heavy, wider than high; spire raised, obtuse, forming an angle of about 114° ; whorls $4\frac{1}{4}$, strongly convex, irregularly and heavily wrinkled, periostracum mostly worn off, sculptured with few small granules that are confined mostly to zones between growth wrinkles; embryonic whorls $1\frac{3}{4}$, raised, relatively

large, lightly but regularly wrinkled; shell sculptured with numerous fine, incised striae which are heaviest and most distinct near the suture; where granules occur they are separated by the striae; suture deeply impressed, descending deeply to the aperture; aperture oblong-ovate, lying at an angle of about 40° to the axis of the shell; upper lip somewhat thickened, blunt, not reflected, slightly approaching the columella; columellar margin reflected, nearly closing the umbilicus; peristome little thickened, slightly expanded.

The body whorl is pinkish cinnamon; the remaining whorls are a little darker. There is a faint indication of two dark color bands on the spire. These fade out on the body whorl. The interior of the aperture is pale lavender-violet. The peristome is white along its outer border and horn yellow farther in the shell. The columella and the lip are also white. The color abruptly fades into the pale lavender-violet of the interior of the aperture. When the shell is placed in front of a light the bands may be discerned from the inside, but over an opaque surface there is an indication of them only deep within the aperture.

Height of shell, 34.5 mm.; diameter, 38.0 mm.; height of aperture, 26.3 mm.; width of aperture, 25.5 mm.

The genitalia of two paratypes are shown in Pl. IV. The short, bulbous penis contains a short, contracted verge extending about $\frac{1}{3}$ its length. The verge ends in three large flaplike and two small narrower processes. Projecting from the wall of the penis cavity are four massive, more or less transverse folds almost completely filling the cavity and crowding the verge to one side. The flagellum is longer than the combined length of the penis and epiphallus. The vagina bears four almost equal dart sacs, closely appressed to the mucous gland ring. The spermathecal duct, at about $\frac{3}{4}$ of its length, bears a diverticulum which may be either rather short or long. Measurements of paratypes are listed in Table I.

VARIATION.—In half of the paratypes the spire is raised a little higher than in the holotype, so that the spire has a slightly concave outline. The angle of the spire varies from 102° to 118° , averaging 104° . The number of whorls varies from $3\frac{3}{4}$ to $4\frac{1}{4}$, the latter extreme appearing to be usual for mature shells. The embryonic whorls of all of the paratypes agree with the holotype in number and texture. In juvenile shells the periostracum is moderately granulated, the granules small and lying parallel to the growth wrinkles. All of the shells have the fine incised striae that are peculiar to this species. In younger specimens the striae are confined to the upper third of the whorls, parallel to the suture, but in older ones the striations extend over the entire whorl to the

umbilicus. The angle of the aperture to the axis of the shell varies from 39° to 47°, averaging 44°.

In juvenile shells the periostracum is burnt umber, the color bands dark maroon. In mature shells the periostracum peels off, leaving the shell bare and colored like the holotype.

Measurements of the shells of the paratypes are as follow: height, 27.6–33.2 mm. (av. 30.2 mm.); diameter, 28.1–36.8 mm. (av. 33.5 mm.); height of aperture, 21.0–25.0 mm. (av. 22.7 mm.); width of aperture, 18.7–23.8 mm. (av. 21.1 mm.).

There appears to be considerable variation in the length of the diverticulum of the spermathecal duct (9–28 mm. in the two specimens measured) and also in the height from the spermatheca. Other structures of the genitalia appear constant.

RELATIONSHIPS.—This species belongs to the group in which the mucous glands are situated closely above the summit of the dart sacs. The arrangement and structure of the female genitalia are very similar to *H. montezuma*; the penis and verge approach that of *H. nuevoleonis*.

The shell of this species is unique within the genus *Humboldtiana* in having fine, incised striae running parallel to the suture of the whorls.

REMARKS.—These specimens were found at the base of a limestone cliff in a fir forest. Live snails were crawling on debris on the forest floor. Dead shells were found in caves where they had apparently been dragged by pack rats.

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REFERENCES

- ANACONA, H. I.
1947 Moluscos del Distrito Federal. An. Inst. Biol. Mexico, 18 (1): 151–58.
- BINNEY, AMOS
1851 The Terrestrial Air-Breathing Mollusks of the United States, and the Adjacent Territories of North America. Charles C. Little and James Brown, Boston, 2: 115–16; Bull. Mus. Comp. Zool., Harvard, 5: Pl. 43.
- BINNEY, W. G.
1857 Notes on American Land Shells, No. 2. Proc. Acad. Nat. Sci. Phila., p. 110; No. 6 (1860), *ibid.*, p. 151.
1879 On the Jaw and Lingual Dentition of Certain Terrestrial Mollusks. Bull. Mus. Comp. Zool., Harvard, 5 (16): 336, Pl. 2, Figs. J, K.

TABLE I

Measurements (in Millimeters) and Ratios of Genitalia of Species of *Humboldtiana* and Subspecies *H. montezuma*

Character	montezuma ¹	inferior ¹	striata (paratypes)		ultima ²	buffoniana ²		fortis ¹				chrysogona ¹	nuevoleonis ¹		globosa	chisosensis ²	texana ²	fasciata ³		
Length:																				
flagellum	40	25	32	30	96	43	40	120	122	134	13.5	24	50	42	32	47	42	64	50	71
epiphallus	32	15	16	17	11	27	30	14	11	11.5	10	23	14	27	25	11	11	45	33	40
penis	11	8	7	8	7	10	12	8	12	11.5	10	9	8	9	12	7	7	17	21	19
verge	3			2.9								2	3.5		5.7			11.3	11.4	
vas deferens				33											35			41	37	
penial retractor muscle	25	20																27	18	27
spermatheca to diverticulum	33		30	13	10	33	30								24		ca. 11	29	26	33
diverticulum	23	11	28	9	6	16	13		20			1	12	7	8	3	9	13	13	20
spermathecal duct from diverticulum to mucous gland	38		39	42	52	54	43								77		ca. 44	93	70	93
spermatheca and duct	71	52	69	55	62	87	73		109			40	35	87	101	50	55	122	96	126
vagina and atrium	18		15	15	16	15	15	20					19	20	15.5			25	27	20
dart sacs to mucous gland ring			0	0		1	0.5								1.5		7	4	7	4
top of dart sacs to top of mucous gland ring			2	2											5			9	11	8
Length Ratios:																				
verge penis	0.27			0.36								0.22	0.43		0.48			0.66	0.54	
flagellum penis and epiphallus	0.93	1.09	1.39	1.20	5.33	1.16	0.95	5.45	5.30	5.83		0.75	2.27	1.17	0.86	2.61	2.33	1.03	0.93	1.20
diverticulum to mucous gland spermatheca and duct	0.53		0.56	0.76	0.84	0.62	0.59								0.76		0.80	0.76	0.73	0.74

¹From Pilsbry, 1948.²From Pilsbry, 1927.³First column based on UMMZ 191472; second on 191473 (Holotype); and third on 191474

CHEATUM, ELMER P.

- 1935 Gastropods of the Davis Mountains Vicinity in West Texas. *Nautilus*, 48 (4): 112-16.

CLENCH, W. J., AND H. A. REHDER

- 1930 A New *Humboldtiana* from Texas. *Nautilus*, 44 (1): 10-13.

DALL, W. H.

- 1897 New Species of Mexican Land Shells. *Nautilus*, 11 (7): 73-74.

DRAKE, ROBERT J.

- 1951 *Humboldtiana taylori*, New Species, from Northern Coahuila. *Revista de la Sociedad Malacologica*, 8 (2): 93-96.

FERUSSAC, D. DE, AND G. -P. DESHAYES

- 1851 Histoire naturelle générale et particulière des Mollusques terrestres et fluviatiles. J. -B. Baillière, Paris, Vols. 1 and 3: 273-74, Pl. 17A, Figs. 17, 18.

FISCHER, H.

- 1899 Note sur l'*Helix humboldtiana*, Valenciennes, avec quelques remarques sur le sous-genre *Lysinoe* et sur la section *Odontura*. *Journ. de Conchyliologie*, 47 (3): 297-304, Figs. 1-3.

FISCHER, P., AND H. CROSSE

- 1870 Études sur les Mollusques terrestres et fluviatiles du Mexique et du Guatemala. Mission scientifique au Mexique et dans l'Amérique Centrale, publié par l'ordre de S. M. l'Empereur. *Recherches Zoologiques*, Paris 240-42, Pl. 11, Figs. 1, 1a, 2.

KOESTNER, E. J., AND RICHARD A. SCHNEIDER

- 1940 Notes on the Snail *Humboldtiana fortis* Pilsbry. *Nautilus*, 54 (2): 47-49.

MANSFIELD, W. C.

1937. Mollusks of the Tampa and Sewanee Limestones of Florida. *Geol. Dept. Conservation, Fla.*, 15: 66, Pl. 1, Figs. 9, 12.

PARODIZ, JUAN JOSÉ

- 1954 A New Species of *Humboldtiana* from Texas. *Nautilus*, 67 (4): 107-8.

PFEIFFER, LOUIS

- 1845 Diagnosen einiger neuer Heliceen. *Zeitschrift für Malakozoologie*, 2: 152.
1846 Die Schnirkelschnecken (Gattung *Helix*). In: Martini and Chemnitz, *Systematisches Conchylien-Cabinet*. Bauer und Raspe, Nürnberg, 151-53, Pl. 92, Figs. 11-13, 18, 19.

PFEIFFER, LUDOVICO

- 1841 *Symbolae ad Historiam Heliceorum*. I. Cassel, p. 37.
1848-59 *Monographia Heliceorum Viventium*. F. A. Brockhaus, Lipsiae, 1: 196; 3: 182; 4: 167.

PHILIPPI, R. A.

- 1845 *Abbildungen und Beschreibungen neuer oder wenig gekannter Conchylien, unter Mithilfe mehrerer deutscher Conchyliologen*. Theodor Fischer, Cassel, 2: 183-84, Pl. 9, Figs. 2, 7.

P[ILSBRY], H. A.

- 1891 [Review of "List of North American Land and Fresh-Water Shells Received from the U.S. Department of Agriculture, with Notes and Comments Thereon" by Robert E. C. Stearns, 1891 (*Proc. U.S. Nat. Mus.*, 14 (844): 95-106).] *Nautilus*, 5 (4): 48.

PILSBRY, HENRY A.

- 1892 Preliminary Outline of a New Classification of the Helices. Proc. Acad. Nat. Sci. Phila., p. 394.
- 1894 Tryon's Manual of Conchology, Structural and Systematic. Conchological Section, Acad. Nat. Sci. Phila., 9: 191-92, Pl. 58, Fig. 75; Pl. 60, Fig. 5.
- 1897 A Classified Catalogue of American Land Shells, with Localities. Nautilus, 11 (4): 45-48.
- 1903 Mexican Land and Freshwater Mollusks. Proc. Acad. Nat. Sci. Phila., 55 (3):762.
- 1927 The Structure and Affinities of *Humboldtiana* and Related Helicid Genera of Mexico and Texas; *ibid.*, 79: 165-92.
- 1928 Helices from California and Texas and a Zonitid from Virginia. Nautilus, 41 (3): 81-83.
- 1935a Descriptions of Middle American Land and Freshwater Mollusca. Proc. Acad. Nat. Sci. Phila., 87: 1-6.
- 1935b Western and Southwestern Amnicolidae and a New *Humboldtiana*. Nautilus, 48 (3): 91-94.
- 1939 Land Mollusca of North America (North of Mexico). Monograph 3, Acad. Nat. Sci. Phila., 1 (1): 395-410.
- 1940 Two New Mexican Species of *Humboldtiana*. Nautilus, 53 (4): 140-41.
- 1948 Inland Mollusks of Northern Mexico. I. The Genera *Humboldtiana*, *Sonorella*, *Oreohelix*, and *Ashmunella*. Proc. Acad. Nat. Sci. Phila., 100: 185-203.

SOLEM, ALAN

- 1954 Notes on Mexican Mollusks. I. Durango, Coahuila and Tamaulipas, with Description of Two New *Humboldtiana*. Nautilus, 68 (1): 3-10.
- 1955 New and Little-Known Mexican Helicidae (Mollusca, Pulmonata); *ibid.*, 69 (2): 40-44.

STEARNS, ROBERT E. C.

- 1891 List of North American Land and Fresh-Water Shells Received from the U.S. Department of Agriculture, with Notes and Comments Thereon. Proc. U.S. Nat. Mus., 14 (844): 95-106.

STREBEL, HERMANN, AND GEORG PFEFFER

- 1880 Beitrag zur Kenntnis der Fauna mexikanischer Land- und Süßwasser-Conchylien. G. J. Herbst, Hamburg, Pt. 4: 35-36.

TAYLOR, WALTER W.

- 1948 A Study of Archeology. Amer. Anthropol. Assoc. Memoirs, 69: 174-75.

TRYON, GEORGE W., JR.

- 1866 Monograph of the Terrestrial Mollusca of the United States. Amer. Jour. Conch., 2 (4): 318, 327, Pl. 6, Fig. 17.
- 1888 Manual of Conchology, Structural and Systematic. Phila., 4: 260, Pl. 69, Figs. 34-37.

VON IHERING, HERMANN

- 1892 Morphologie und Systematik des Genitalapparates von *Helix*. Zeitschrift für wissenschaftl. Zoologie, Bd. 54: 472.

VON MARTENS, EDUARD

- 1865 Über die mexikanischen Binnen-Conchylien aus den Sammlungen von Deppe und Uhde im Berliner Museum. *Malakozoologische Blätter*, 12: 16-17.
- 1901 Land and Freshwater Mollusca. *In: Biologia Centrali-Americana*, Taylor and Francis, London, pp. 146-49, 624-25, 660, Pl. 7, Figs. 20-22a.

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PLATE I

Shells of *Humboldtiana fasciata*, new species, *H. globosa*, new species, and *H. striata*, new species.

A,D. *H. fasciata*, Holotype UMMZ 191473.

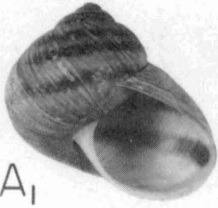
B,E. *H. striata*, B1-4, E, Holotype UMMZ 192247; B5-8, young paratype UMMZ 191475.

C,F. *H. globosa*, Holotype UMMZ 191476.

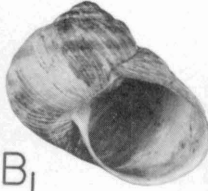
Figs. A,B,C reduced *ca.* $\frac{1}{3}$.

Figs. D,E,F show minute sculpture. Slightly enlarged.

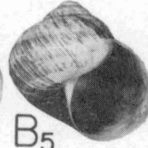
PLATE I



A₁



B₁



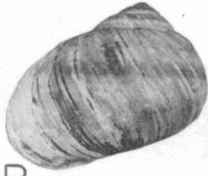
B₅



C₁



A₂



B₂



B₆



C₂



A₃



B₃



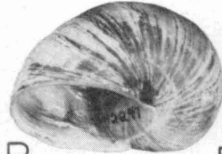
B₇



C₃



A₄



B₄



B₈



C₄



D



E



F

PLATE II

Reproductive system of *Humboldtiana fasciata*, new species.

A. Holotype UMMZ 191473. $\times 1\frac{1}{3}$. Arrow indicates position of cross section of vagina figured in Plate III, Fig. c.

B. Paratype UMMZ 191472. $\times 1\frac{1}{4}$. Arrow indicates position of cross section of vagina figured in Plate III, Fig. d.

a,b,c,d,e,f,g are cross sections of the epiphallus and penis at corresponding letters in Fig. A. $\times 5$.

PLATE II

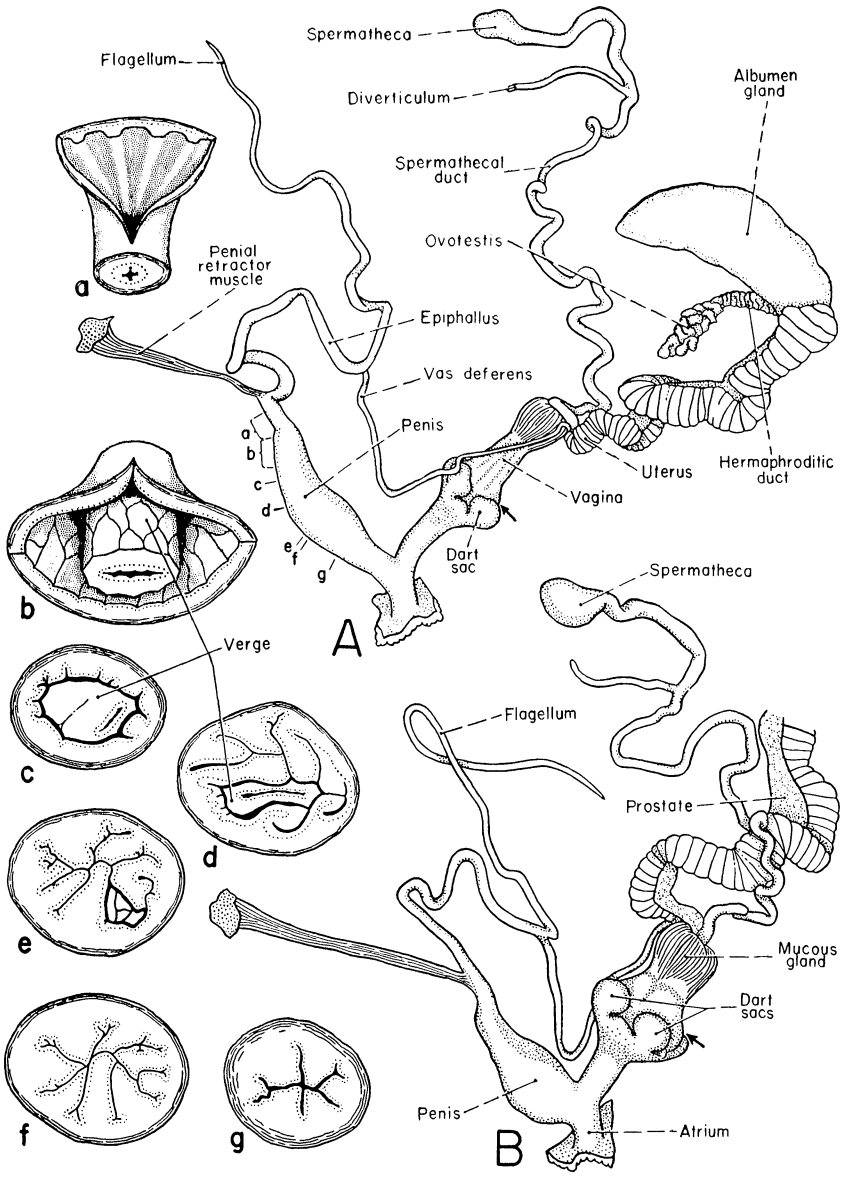


PLATE III

Reproductive system of *Humboldtiana fasciata*, new species, and *H. globosa*, new species.

A. *Humboldtiana fasciata*, Paratype UMMZ 191474. $\times 1\frac{1}{2}$.

B. *H. globosa*, Holotype UMMZ 191476. $\times 1\frac{3}{4}$.

a,e. Cross sections of the spermathecal duct and the vagina at the positions indicated in Fig. A. $\times 5$.

b,f. Cross sections of the spermathecal duct and the vagina at the positions indicated in Fig. B. $\times 5$.

c. Cross section of the vagina of *H. fasciata* (Holotype UMMZ 191473) at the position indicated by the arrow in Plate II, Fig. A. $\times 5$.

d. Cross section of the vagina of *H. fasciata* (Paratype UMMZ 191472) at the position indicated by the arrow in Plate II, Fig. B. $\times 2\frac{1}{2}$.

PLATE III

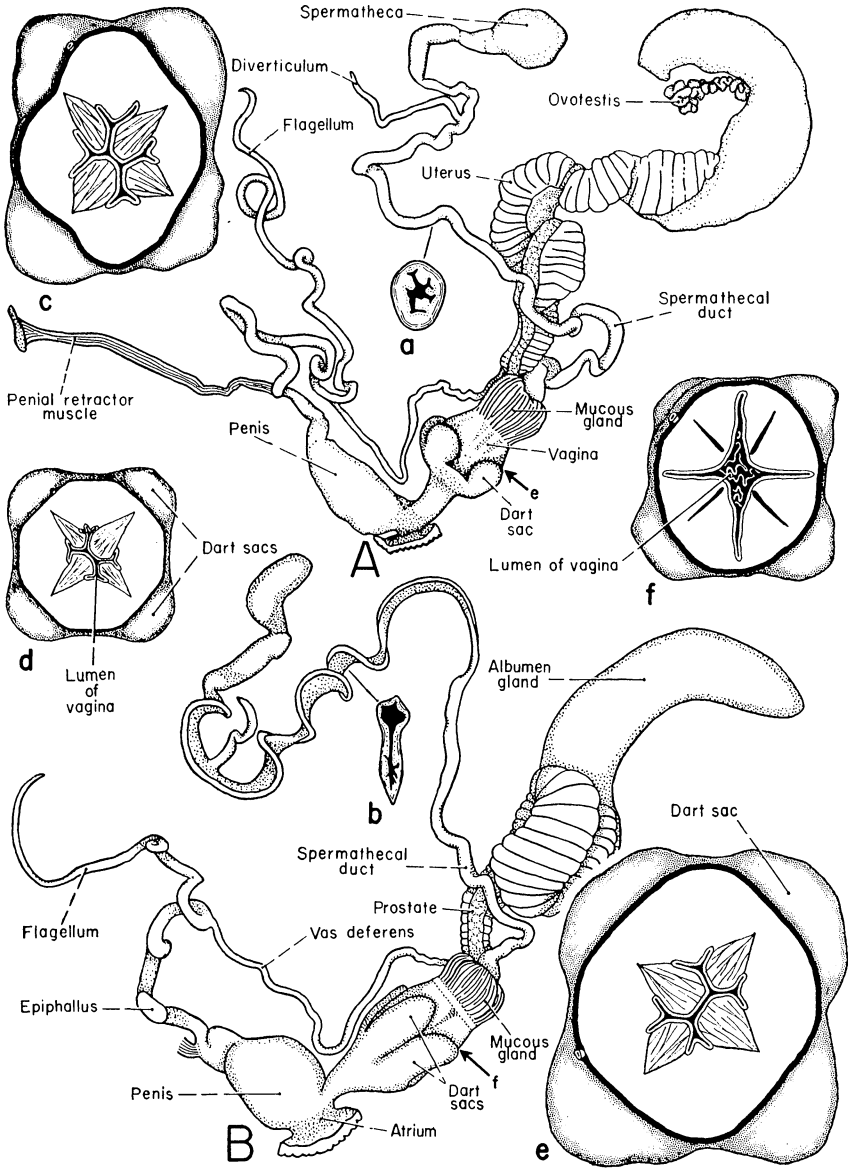


PLATE IV

Reproductive system of *Humboldtiana striata*, new species.

A,B. Paratypes UMMZ 191475. \times ca.1½.

a,b,c,d,e,f. Cross sections of the epiphallus and penis at corresponding letters in Fig A. \times 5. Figs. c,d,f show complementary proximal and distal sections.

g. Cross section of the spermathecal duct. \times 5.

h,i. Cross sections of the vagina at arrows h and i in Figs. A and B. \times 5.

PLATE IV

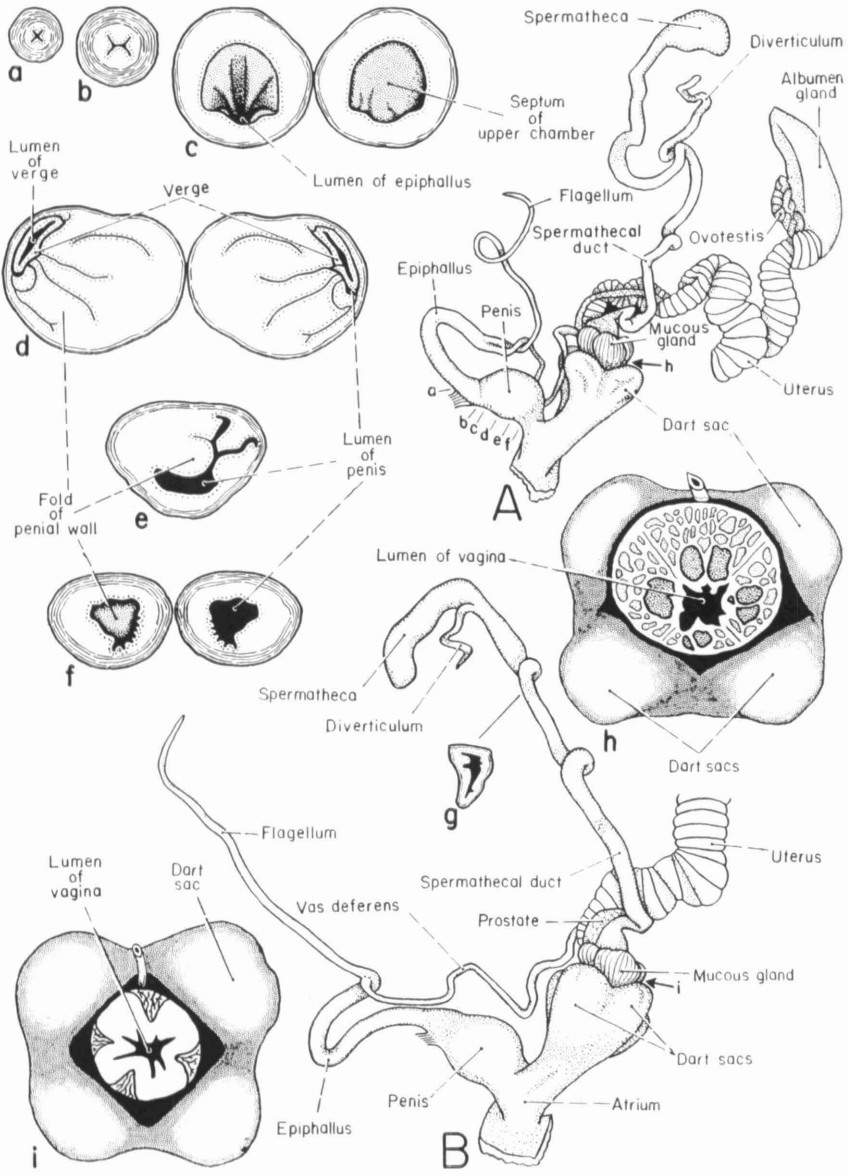


PLATE V

Structure of the penis and verge of *Humboldtiana fasciata*, new species, *H. globosa*, new species, and *H. striata*, new species.

A. Penis and verge of *Humboldtiana fasciata*, Paratype UMMZ 191472. The penis has been cut longitudinally and the walls pinned back to expose the penial cavity and the verge.

B. Penis and verge of *H. fasciata*, Paratype UMMZ 191474.

C. Penis and verge of *H. globosa*, Holotype UMMZ 191476.

D. Penis and verge of *H. striata*, Paratype UMMZ 191475.

a. Extended verge of *H. fasciata*, Paratype UMMZ 191472.

b. Extended verge of *H. fasciata*, Paratype UMMZ 191474.

c. Extended verge of *H. globosa*, Holotype UMMZ 191476.

d. Extended verge of *H. striata*, Paratype UMMZ 191475.

e. Diagrammatic longitudinal section of the penis and verge of *H. striata*.

f. Diagrammatic longitudinal section of the penis and verge of *H. fasciata* and *H. globosa*.

All figures except e and f $\times 4$.

PLATE V

