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New species of tropical eastern Pacific Gastropoda.
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NEW SPECIES OF TROPICAL EASTERN PACIFIC GASTROPODA⁽¹⁾⁽²⁾ — In the course of assisting with the treatment of the Archaeogastropoda for the forthcoming revised edition of *Seashells of Tropical West America*, by Dr. Myra Keen, a number of new species have been recognized in the collections available to me. Descriptions of some of these have been published elsewhere (McLean, 1970a, 1970b, 1970c); in this paper descriptions of 17 additional archaeogastropods are given, along with 3 species of mesogastropods and 1 neogastropod.

Most notable of the new species is the 2nd tropical west American species of *Haliotis*. Two species of *Scissurella* (*Anatoma*) are included, a group previously unknown in the tropical eastern Pacific. New species of other generic taxa new to the region are in the subgenus *Clypidella* of *Fissurella* and the trochacean genus *Mirachelus* Woodring. Six species of *Tegula* (*Agathistoma*) are proposed as new. With these additions, this group of common intertidal species is represented by 16 tropical eastern Pacific species. Three species of *Arene* H. & A. Adams, and one *Macrarenne* Hertlein & Strong, are included.

Type materials for 11 of the species were collected by the Allan Hancock Pacific Expeditions (1931-41) and are part of the Allan Hancock Foundation Collection, now on loan to the Los Angeles County Museum of Natural History. Two of the species were received from André and Jacqueline DeRoy of Isla Santa Cruz, Galapagos Islands, Ecuador, one from Mr. Eugene Bergeron of Balboa, Canal Zone, one from Mr. Ray Maynard of Los Angeles, and one from Scripps Institution of Oceanography. The balance of the species were obtained by Los Angeles County Museum (LACM) field work. Three species were collected on separate expeditions to the Tres Marias Islands and to the Cape San Lucas area of Baja California on the R/V *Sea Quest*, in which Museum personnel were guests of Mr. and Mrs. Richard F. Dwyer of Corona del Mar, California.

Repositories for type materials described herein are as follows: AHF, Allan Hancock Foundation, University of Southern California (gastropod collection on loan to LACM); AMNH, American Museum of Natural History, New York; ANSP, Academy of Natural Sciences, Philadelphia; CAS, California Academy of Sciences, San Francisco; LACM, Los Angeles County Museum of Natural History; MCZ, Museum of Comparative Zoology, Harvard University; SBM, Santa Barbara Museum of Natural History; SDNHM, San Diego Natural History Museum; SU, Stanford University, Paleontological Museum; USNM, United States National Museum of Natural History. The type lots of 11 of the species are represented in sufficient quantity to enable distribution of paratypes to each of the above institutions.

1. *Haliotis* (*Padollus*) *roberti* new species (Figs. 1-2)

Description of Holotype: Shell small, thin sculptured postnuclear whorls 2.5; apex low, situated at about the posterior 1/4 of the shell, holes 25, with 5 remaining open. Nucleus of one rapidly enlarging, smooth and rounded whorl, tip small. Early postnuclear sculpture gradually emerging, consisting of fine, slightly undulating spiral threads. On the penultimate whorl directly above the edge of the lip there are approximately 12 spiral cords between the preceding suture and the row of holes, with a slightly stronger cord adjacent to the suture; below the row of holes there are 5 cords, becoming stronger and more broadly spaced near the succeeding suture. Along the edge of the lip, approximately 26 cords may be distinguished between the suture and the row of holes; cords are well elevated and rounded, with narrower interspaces; secondary cords emerge in the interspaces as the interspaces reach the width of the cords. The holes are weakly tubular, below are 5 minor cords and then 4 major cords with broad slopes in the direction of the columella. The area below the holes is only slightly concave. Axial sculpture consisting of undulating ridges radiating along the line of growth, 9 such ridges radiating out in the area of the shell that includes the last 7 holes. The radiating ridges are interrupted in a narrow band at about the mid-position on the whorl, although the spiral ribs remain strong through this area. Growth lines are minute and scarcely produce any sculptural effect, although some of the ribs may be cut into square beads. Pigmented outer edge of lip narrow, columella broad and smooth, extending internally for 2 whorls. External coloration pale orange with greenish-white flecking along the ribs; interior of similar hue with thin nacre reflecting pink and green. Length 18.6, width, 14.0, height, 6.8 mm.

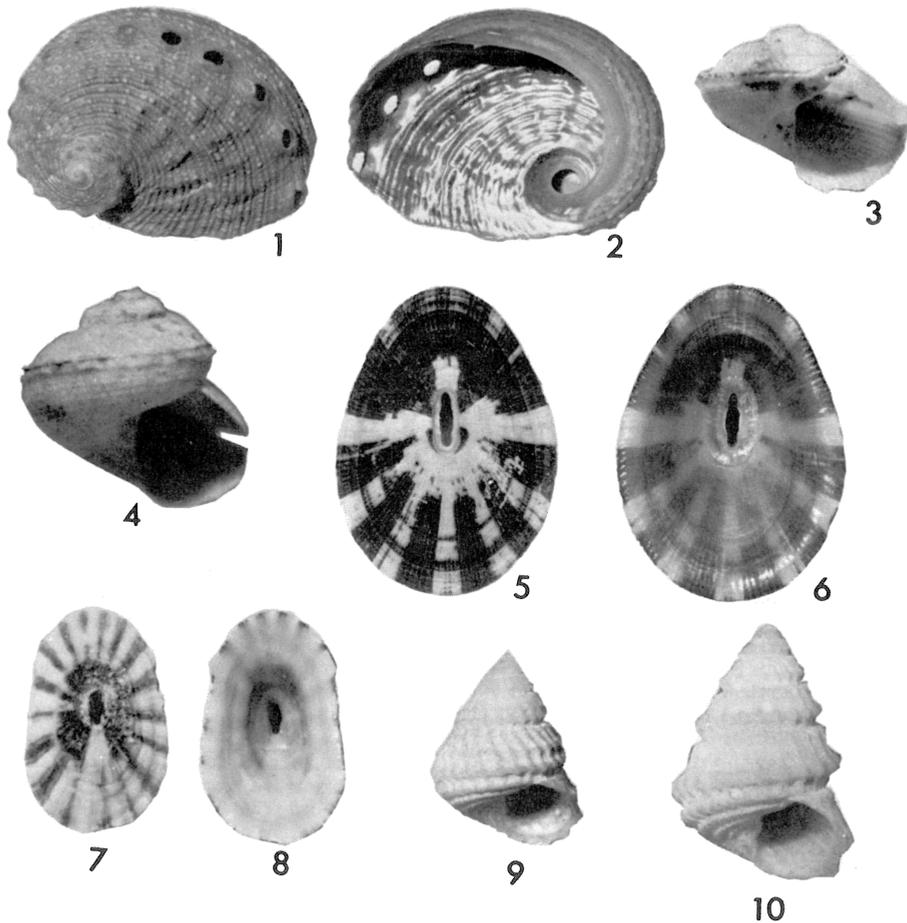
Type Locality: Chatham Bay, Cocos Island, Costa Rica, 5° 33' 50" N, 86° 58' 55" W, 40-47 fathoms, R/V *Velero* station 780-38, 14 January 1938, 11 specimens (9 live-collected).

Type Material: Holotype, LACM-AHF 1368, 7 paratypes, LACM-AHF 1369, single paratypes, AMNH, CAS, and USNM. Specimens in the type lot range from a minimum length of 9.6 mm to a maximum of 18.6 mm (holotype).

Discussion: *Haliotis roberti* belongs to a group of small, reddish shelled, offshore tropical American species represented by *H. pourtalesii* Dall, 1881, from off the Florida Keys (Foster, 1946) and Yucatan (Harry, 1966), *H. barbouri* Foster, 1946, from Brazil, and *H. dalli* Henderson, 1915,

previously known only from the Galapagos Islands, but reported here for the first time from Gorgona Island, Colombia (AHF 851-38, 10-20 fathoms, 2 specimens). Of these *H. roberti* resembles the 2 Caribbean species more so than *H. dalli*. *Haliotis dalli* has a distinct channel below the row of holes and also has an elevated spiral ridge at the mid-dorsal position on the shell, and has regular radial sculpture. *Haliotis roberti* has broader and thicker spiral ribbing than *H. pourtalesii*, in which the ribbing is narrow and broadly spaced, and it differs from *H. barbouri* chiefly in lacking the strong nodes of the latter species.

The addition of a 2nd tropical west American species of *Haliotis* is an unusual event and I am pleased to name it for Robert R. Talmadge of Eureka, California, an assiduous student of the Haliotidae.



FIGS. 1-2, *Haliotis (Padollus) roberti* sp. nov., holotype, X2. FIG. 3, *Scissurella (Anatoma) epi-charis* sp. nov., holotype, X15. FIG. 4, *Scissurella (Anatoma) keenae* sp. nov., holotype, X15. FIGS. 5-6, *Fissurella (Clypidella) morrisoni* sp. nov., holotype, X3. FIGS. 7-8, *Fissurella (Cremides) deroyae* sp. nov., holotype, X2. FIG. 9, *Mirachelus galapagensis* sp. nov., holotype, X7. FIG. 10, *Mirachelus corbis* (Dall, 1889), holotype, USNM 95023, X7.

2. *Scissurella (Anatoma) epicharis* new species (Fig. 3)

Description of Holotype: Shell small for the genus (possibly immature), low spired, fragile, translucent white, 3 whorls. Selenizone at periphery, open about 1/5 the circumference, edges sharp, projecting, the open slit extremely narrow. Axial sculpture of fine, evenly spaced growth lines, curved protractively above the selenizone, straight or slightly retractive across the base; spiral sculpture of fine raised ridges of similar strength and spacing, producing a rhomboidal cancellate pattern on the upper part of the whorl, but with fine, even cancellate sculpture on the base. The suture is laid below the lower edge of the selenizone, creating a channel of the same width as the selenizone. Umbilicus narrow, deep, partially obscured by a slight reflection of the inner lip. Height, 1.3, diameter, 1.9 mm. The holotype has a growth scar on the penultimate whorl in advance of the aperture.

Type Locality: Cartago Bay, Isabela (Albemarle) Island, Galapagos Islands, Ecuador, 0° 35' S, 90° 57' W, 12 fathoms, R/V *Velero* III bottom sample station 481, 21 January 1938, 2 specimens.

Type Material: Holotype, LACM-AHF 1370, paratype, LACM-AHF 1371.

Discussion: This and the following species are the first known tropical eastern Pacific species of *Scissurella (Anatoma)*. Eastern Pacific species of Scissurellidae were reviewed by McLean (1967). Of the Californian species, *S. epicharis* most resembles *S. (Anatoma) lyra* Berry, 1947, which is more compressed and has axial ridges on the upper half of the whorl that are stronger than the spiral ridges. *Scissurella epicharis* has fine, even sculpture. The name is taken from the Greek, graceful.

3. *Scissurella (Anatoma) keenae* new species (Fig. 4)

Description of Holotype: Shell small for the genus, fragile, globose, whorls rounded, suture descending on the later whorls, color opaque yellowish-white. Nucleus of 1.5 smooth, glossy, unsculptured whorls with deeply impressed sutures. Postnuclear whorls 3.5, the selenizone arising about 1/3 of a whorl beyond the first appearance of axial sculpture. The fine, evenly spaced axial ridges on the upper half of the whorl are curved protractively and remain stronger than the fine spiral ribs that become apparent on the final 2 whorls. Selenizone at periphery, open about 1/5 the circumference, edges sharp, slightly raised. On the base the axial and spiral sculpture are nearly equal in strength, but the spiral cords are more broadly spaced, producing rectangular cancellations in a radiating pattern. Umbilicus narrow, deep, partially obscured by a slight reflection of the inner lip. Aperture circular, peritreme nearly complete. Height, 2.0, diameter, 2.0 mm.

Type Locality: Off northwest side, Angel de la Guarda [Guardia] Island, Gulf of California, Mexico, 29° 32' N, 113° 38' W, 46 fathoms, R/V *Velero* III bottom sample station 2033, 20 March 1937, 8 specimens, 2 of which are mature.

Type Material: Holotype, LACM-AHF 1372, 6 paratypes, LACM-AHF 1373; 1 paratype, USNM.

Referred Material: Additional specimens are represented in AHF bottom sample stations from the Gulf of California as follows: 275, off Raza Island, 40 fathoms, 6 specimens; 2005, San Jaime Bank, west of Cape San Lucas, Baja California, 75 fathoms, 1 specimen; 2010, Inner Gorda Bank, off Cape San Lucas, 80 fathoms, 3 specimens.

Discussion: In proportions *Scissurella keenae* resembles the wide ranging north boreal species *S. crispata* Fleming, 1832, but reaches only about 1/3 the size of that species. The latter species is known to range south to Cedros Island, outer coast of Baja California, at depths of 500-1000 fathoms. *Scissurella keenae* is evidently a fairly common species on mud bottoms in the Gulf of California at depths of 40-100 fathoms. It is a pleasure to dedicate this species to Dr. Myra Keen.

4. *Fissurella (Clypidella) morrisoni* new species (Figs. 5-6)

Description of Holotype: Shell small for the subgenus, thin, markedly depressed, ends of shell slightly elevated. Fissure forward of center, its posterior termination at about the midpoint of the shell, length of fissure about 4 times the width; fissure tripartite, constricted at both ends, walls of fissure sloping inward when viewed exteriorly; length of shell 5.5 times length of fissure. Surface of shell nearly smooth, sculptured with extremely fine radial grooves and fine concentric growth lines, appearing finely beaded under magnification. The termination of the grooves project slightly at the margins. Color purplish-brown with white rays; interior yellowish-green, glossy, transmitting the external color pattern. Length, 13.2, width, 9.5, height, 2.6 mm.

Type Locality: Bahia Honda, Panama, 7° 44' 25" N, 81° 32' 45" W, intertidal in rocky area, R/V *Velero* III station 861-38, 1 March 1938, 1 specimen.

Type Material: Holotype, LACM-AHF 1374.

Referred Material: Three lots, single beachworn specimens USNM 588191, USNM 588476, USNM 587950, all from San José Island, Perlas Islands, Panama, collected by Dr. J. P. E. Morrison, March, July and August, 1944. The largest of these, USNM 587950, measures: length, 16.2, width, 11.1, height, 2.6 mm.

Discussion: *Fissurella morrisoni* is referable to the subgenus *Clypidella* Swainson, 1840, distinguished by its extremely depressed shell, raised ends and elongate fissure, and on these characters differs widely from the tropical eastern Pacific fissurellas in the subgenus *Cremides* H. & A. Adams, 1854. *Fissurella morrisoni* differs from the 2 known Caribbean species of *Clypidella*, *F. fascicularis* Lamarck, 1822, and *F. punctata* Fischer, 1857 (see Farfante, 1943, p 12), in having extremely fine ribbing, rather than the coarse ribbing of the 2 Caribbean species. The species is dedicated to Dr. Joseph P. E. Morrison of the Division of Mollusks, U.S. National Museum, who has been most helpful during my visits to that institution, and whose industrious collecting in 1944 produced sufficient specimens of this remarkable species to warrant its description.

5. *Fissurella (Cremides) deroyae* new species (Figs. 7-8)

Description of Holotype: Shell small for the subgenus, sturdy but thin, moderately elevated. Fissure just forward of center, oblong, tripartite, particularly when viewed from the interior, approximately 1.10 the length of the shell. Radial sculpture of low, irregular, rounded ribs of varying width, separated by shallow grooves. The broader ribs project only slightly at the margin, forming a weakly crenulated edge. Color purplish-red, irregularly rayed with white. Interior glossy, pale greenish-white, showing concentric markings of darker green and transmitting the external pattern of white rays; callus area weakly bordered with pink. Length, 15.3, width, 9.5, height, 5.3 mm.

Type Locality: Academy Bay, Santa Cruz Island, Galapagos Islands, Ecuador, 0° 45' S, 90° 20' W, on surf exposed rocks at low tide. The type lot of 15 specimens was collected by Jacqueline DeRoy, of Santa Cruz Island, October, 1967.

Type Material: Holotype, LACM 1375; 6 paratypes, LACM 1376. Single paratypes, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: Numerous additional specimens from Isabela, San Cristobal, Santa Cruz, and Santa Maria Islands, Galapagos Islands, have been received from Mrs. DeRoy or are represented in the Hancock Collection. It evidently occurs only at the Galapagos Islands.

Discussion: *Fissurella deroyae* is the smallest of the tropical Eastern Pacific species of *Fissurella (Cremides)*. Its color pattern is consistently red-rayed and it is the only species in which the greenish interior transmits the external pattern. Another common species on the Galapagos Islands, *F. obscura* Sowerby, 1835, is larger, has prominent projecting ribs and an interior of dark, opaque green.

6. *Mirachelus galapagensis* new species (Figs. 9, 11)

Description of Holotype: Shell small, nacreous within, conical, imperforate, suture deeply impressed. Tip of nucleus small, immersed, smooth, glassy, of one whorl. First of the 5 post-nuclear whorls with fine axial ridges. On the penultimate whorl there are 3 spiral cords, beaded on crossing the retractorily slanted axial ribs and producing square cancellations. The uppermost cord is directly below the suture, the lowermost cord is the strongest and is close to a spiral cord defining the base and upon which the suture is laid. On the penultimate whorl the middle of the 3 cords is closer to the lowermost cord. In addition to the main basal cord, there are 4 other basal cords, thinner and more closely spaced toward the columella. Columella slightly inflated toward the base. Lip edge sharp, about 10 lirate denticles within. Height, 3.6, diameter, 2.9 mm.

Type Locality: Off Canal Bolivar, near Tagus Cove, Isabela Island, Galapagos Islands, Ecuador, 0° 16' S, 91° 22' W, 40-55 fathoms. The type lot, consisting of 12 specimens was dredged by Andre and Jacqueline DeRoy, 23 January 1968.

Type Material: Holotype, LACM 1377, 3 paratypes, LACM 1378. Single paratypes, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: Approximately 90 specimens, 50-100 fathoms, from the type locality, Tagus Cove, are in the Hancock Collection, from station 155-34 and from bottom sample stations 432 and 461. In addition there is one specimen from station 143-34, 100-150 fathoms, Wenman Island, Galapagos Islands, and 15 specimens from bottom sample station 329, Cocos Island, Costa Rica, 40-46 fathoms.

Discussion: This is the first Eastern Pacific record of the genus *Mirachelus* Woodring, 1928 (p 438) (type species, *Calliostoma corbis* Dall, 1889, off Havana, Cuba). Dall's species is larger, reaching a length of 4.8 mm, has a more strongly pronounced columellar fold and has a much more strongly projecting peripheral cord than does *M. galapagensis*. The holotype of *M. corbis* is illustrated for comparison in Fig. 10.

The radula of a paratype specimen of *M. galapagensis* is illustrated in Fig. 11. The rachidian tooth is broadly flanged and has a pointed central cusp and 3 lateral cusps, as is illustrated for the genus *Euchelus* Philippi, 1847 (see Theile, 1924, fig. 1), indicating that the genus is closely related to *Euchelus*, as has been supposed. As in *Euchelus* the lateral teeth number 3 and the marginals are numerous.

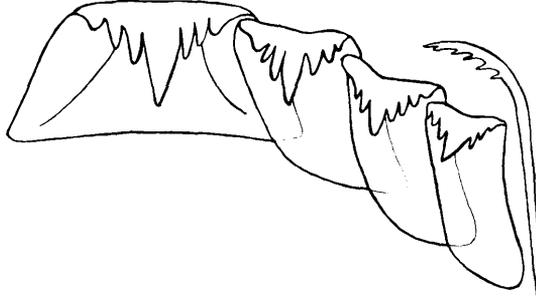


FIG. 11. *Mirachelus galapagensis* sp. nov., radula of paratype. Shown, left to right, the rachidian tooth, 3 lateral teeth, and the 1st marginal tooth. Greatly enlarged.

7. *Tegula (Agathistoma) bergeroni* new species (Figs. 12-13)

Description of Holotype: Shell of medium size for the subgenus, sculptured postnuclear whorls 5.5, suture moderately impressed, periphery and base angulate, base weakly convex, broadly umbilicate, columella with 3 denticles at base, aperture oblique, circular within. The suture is laid just below the cord defining the base; on the penultimate whorl the shoulder area is nodular below the preceding suture; midway across the whorl there is a strong nodular peripheral cord, between the subsutural cord and the peripheral cord are 3 weakly defined cords with broader interspaces; between the peripheral cord and the basal cord are 3 more cords. Fine spiral striae may be observed under magnification throughout. Base with about 7 broadly spaced, low cords. Early whorls mottled with grayish-brown, later whorls predominately yellowish-tan with brown stripes radiating from the suture, terminating on the outer lip and on the basal lip nearly perpendicular to the lip edge. Columella and a broad area adjacent to the umbilicus white; umbilical wall and the callus tongue weakly tinted with green. Height, 13.4, diameter, 14.4 mm.

Type Locality: Cabita Bay, near Cabo Corrientes, Colombia, 5° 29' 20" N, 77° 29' 35" W, intertidal, R/V *Velero* III station 229-34, 13 February 1934, 3 specimens.

Type Material: Holotype, LACM-AHF 1379; 1 paratype, LACM-AHF 1380; 1 paratype, USNM.

Referred Material: LACM 65-25, Taboga Island, Panama, 5-15 fathoms, 3 specimens; LACM B.368, Isla Senora, Perlas Islands, Panama, 8 specimens; AHF 239-34 and 859-38, Port Utria, Colombia, single specimens.

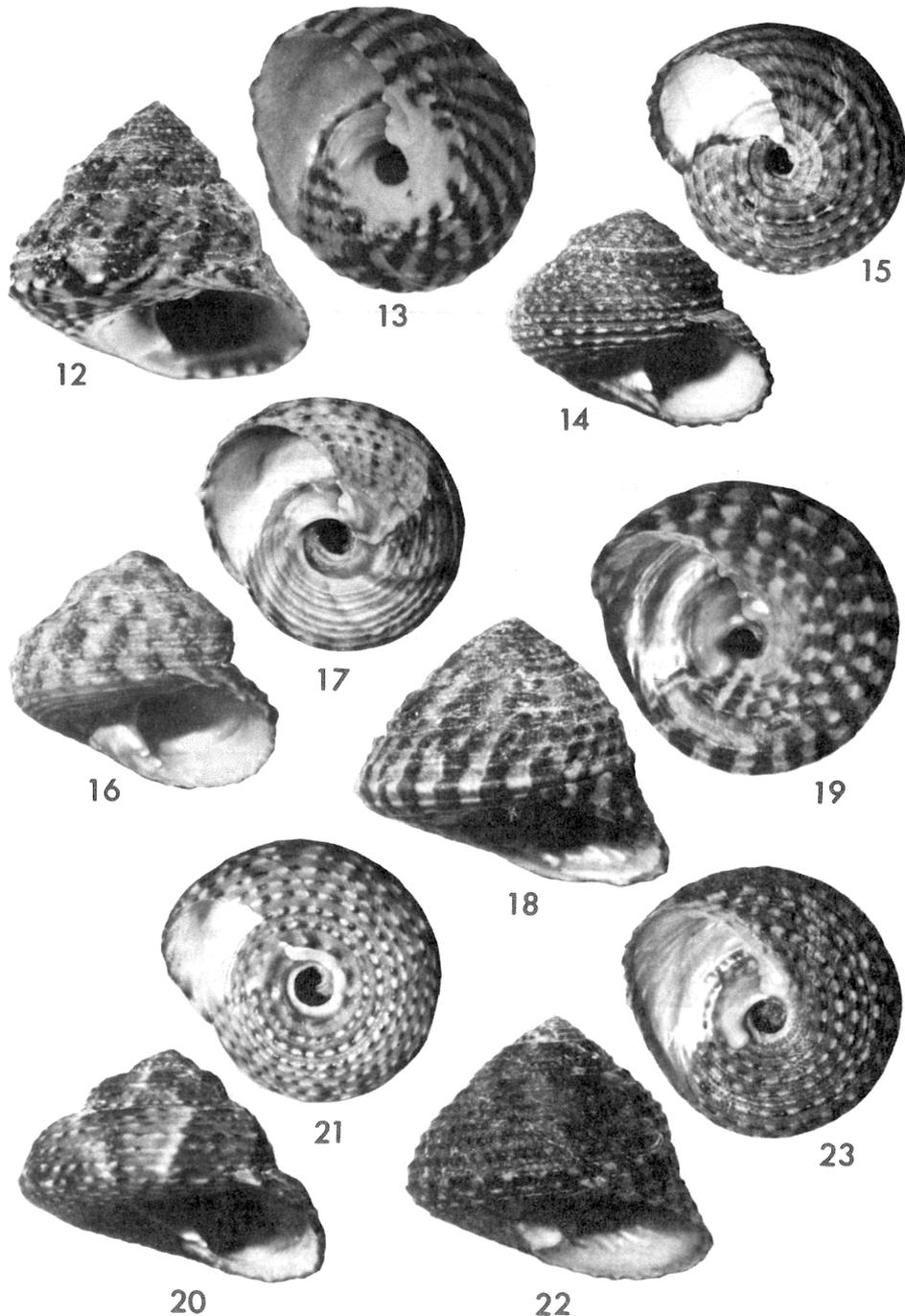
Discussion: *Tegula bergeroni* has the proportions only of *T. ligulata mariamadre* Pilsbry & Lowe, 1932, which is not known south of Manzanillo, Mexico. It differs from the latter species in its smaller size and different color pattern. *Tegula ligulata mariamadre* never has green in the umbilical area. Most species of *Tegula (Agathistoma)* exhibiting the green callus tongue invariably show it, but some specimens of *T. bergeroni* do not, in others a trace of green may be discerned deep within the umbilical cavity. The species is named for Eugene Bergeron of Balboa, Canal Zone, Panama, collector of numerous examples of this species and donor to the Museum's collections.

8. *Tegula (Agathistoma) corteziana* new species (Figs. 14-15)

Description of Holotype: Shell small for the subgenus, sculptured postnuclear whorls 4.5, suture impressed, periphery rounded, base convex, narrowly umbilicate, columella with one denticle at base, aperture oblique, circular within. Early whorls have 3 even spiral cords with broad interspaces; secondary cords arise in the interspaces, resulting in 5 developed cords on the penultimate whorl; along the outer lip a total of 16 developed cords between the suture and umbilicus; the interspaces are microscopically striate throughout. Color gray-brown, the cords mottled with lighter gray. Callus tongue bright green, the umbilical wall white, but bordered below with green; the green extending across the base of the columellar denticle and along the outer lip in a line marking the junction with the outer pigmented layer of the shell. Height, 10.5, diameter, 12.4 mm.

Type Locality: South side of Cabo Tepoca, Sonora, Mexico, 30° 16' N, 112° 30' W, mid intertidal. The type lot, consisting of 86 mature and 10 juvenile specimens, was collected by James H. McLean, LACM station 67-19, 26 March 1967.

Type Material: Holotype, LACM 1381; 71 paratypes, LACM 1382. Three paratypes each, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.



FIGS. 12-13, *Tegula (Agathistoma) bergeroni* sp. nov., holotype, X3. FIGS. 14-15, *Tegula (Agathistoma) corteziana* sp. nov., holotype, X3. FIGS. 16-17, *Tegula (Agathistoma) felipensis* sp. nov., holotype, X2. FIGS. 18-19, *Tegula (Agathistoma) picta* sp. nov., holotype, X2. FIGS. 20-21, *Tegula (Agathistoma) verdispira* sp. nov., holotype, X3. FIGS. 22-23, *Tegula (Agathistoma) verrucosa* sp. nov., holotype, X2.

Referred Material: Numerous lots of this species are in museum collections, including 35 lots in the LACM collection. The species is found at every rocky intertidal locality from the head of the Gulf of California, south to at least Guaymas, Sonora, on the east and to Cerralvo Island on the western side of the Gulf. It is not known from the vicinity of Cape San Lucas.

Discussion: This abundant Gulf of California species has been confused chiefly with *Tegula globulus* (Carpenter, 1857). A specimen of *T. corteziana* was illustrated as *T. globulus* by Keen, 1958 (p 258, fig. 52). The lectotype of *T. globulus* was illustrated by Keen, 1968 (p 403, pl. 57, figs. 52a-b). *Tegula globulus* is a smaller species with more numerous spiral cords on the early whorls, has a more glossy surface and a broader range of color patterns. It occurs from Mazatlan to Acapulco. Distributions of the 2 species are not known to overlap, although the occurrence of either species between Guaymas and Mazatlan is unknown for lack of collections from this area. *Tegula corteziana* is a characteristic Gulf of California species, and the name is derived from another name for the Gulf, the Sea of Cortez.

9. *Tegula (Agathistoma) felipensis* new species (Figs. 16-17)

Description of Holotype: Shell of medium size for the subgenus, whorls 5 (excluding nucleus), suture moderately impressed; midway on the whorl there is an angulation, but the base is rounded; base slightly convex, broadly umbilicate, columella with 3 denticles at base, aperture oblique, circular within. On the penultimate whorl the shoulder area below the preceding suture is flat and bears 4 major spiral cords of irregular strength and spacing; the peripheral cord is thick and projecting, between it and the suture below are 4 irregular major cords, with irregular fine spiral striae throughout. Base with about 11 spiral cords of irregular strength and spacing; the cords are rounded and have narrower interspaces; directly in advance of the aperture the basal cords are worn smooth. Ground color yellowish-green with axial markings of brown that tend to run parallel to the advancing lip. Base of columella and callus tongue bright green. Height, 15.4, diameter, 17.2 mm.

Type Locality: Punta San Felipe, Baja California del Norte, 31° 02' N, 114° 49' W, among small rocks, low tide. The type lot, consisting of 19 mature and 14 juvenile specimens, was collected by James H. McLean, April, 1961, and December, 1962.

Type Material: Holotype, LACM 1383; 16 paratypes, LACM 1384. One mature and one juvenile paratype each, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: Abundant material of this species is represented in collections from San Felipe. It is uncommon at Puertecitos [Puertocitos], Baja California (SBM 06939); and at Punta Peñasco, Sonora (SBM 15905).

Discussion: *Tegula felipensis* has generally been identified as *T. mariana* Dall, 1919, but differs from that species in having stronger spiral cording and a dull, rather than shiny surface. The basal cords of *T. mariana* are low, narrow, and broadly spaced, while those of *T. felipensis* are coarse and rounded, with narrower interspaces. Large specimens of *T. mariana* may show a concavity in the subsutural area and coarse nodulations on the peripheral cord, features not shown in *T. felipensis*. San Felipe is the center of abundance of this species; it is rare at Punta Peñasco to the west and at Puertecitos [Puertocitos] to the south. *Tegula mariana* is unknown from San Felipe but is abundant both at Punta Peñasco and Puertocitos. At San Felipe the substrate is fine silt or clay and the water is seldom clear, giving rise to peculiar ecological conditions and no doubt favoring the localized distribution of some species, while excluding others.

10. *Tegula (Agathistoma) picta* new species (Figs. 18-19)

Description of Holotype: Shell large for the subgenus, 6 whorls, weakly convex, suture not impressed, base angulate, nearly flat, narrowly umbilicate, 3 denticles at base of columella, aperture oblique, lirate within. Spiral sculpture of nodular cords, with slightly broader interspaces, 4 cords on 3rd whorl, 6 on penultimate whorl, counting the broad, weakly defined subsutural cord, but not the strongly projecting cord defining the base. Base nearly flat, surface glossy, with 7 narrow, low cords, broadly spaced but more closely spaced toward the umbilicus. Body whorl with fine spiral striae, but on the base the striae are broadly spaced and faint. Axial sculpture of fine growth lines. Color greenish-white with broad axial stripes of pinkish-tan, on the base the stripes are brown in the interspaces and bright pink on crossing the basal cords; base of columella and callus tongue bright green. Height 18.5, diameter, 20.2 mm.

Type Locality: West of Manta, Ecuador, 0° 56' 43" S, 80° 44' 43" W, on exposed reef at low tide, R/V *Velero* III station 403-35, 20 January 1935, 23 specimens.

Type Material: Holotype, LACM-AHF 1385; 14 paratypes, LACM-AHF 1386. Single paratypes, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: Eleven lots from Ecuador and Peru are in the LACM collection, the northern extreme at Cape San Francisco, Ecuador (AHF 848-38), the southern, Talara, Peru (A.7408).

Discussion: *Tegula picta* has no doubt been regarded as the same as *T. verrucosa* sp. nov. (*T. byroniana* of authors), but differs in having 1/3 to 1/2 as many pustules on the spiral cords, in having a glossy base with low, narrow cords rather than the coarse cords of *T. verrucosa*, and in having pinkish-tan rather than purplish-brown coloration. The 2 species are evidently closely related, but no intergradation has been observed. *Tegula picta* has a more restricted, more southern distribution. The name is taken from the Latin, "painted," and describes the bright pattern of coloration, the name taken from a manuscript label of W. H. Dall in the U.S. National Museum.

11. *Tegula (Agathistoma) verdispira* new species (Figs. 20-21)

Description of Holotype: Shell small for the subgenus, sculptured postnuclear whorls 5, suture impressed, periphery rounded, base weakly angulate, broadly umbilicate, columella with 1 prominent denticle at the termination of the bright green, flat cord bordering the umbilicus, another sharp denticle just below; aperture oblique, circular within, lip lirate within. Penultimate whorl with 7 narrow, sharp spiral cords, interspaces broader than the cords, not spirally striate. Base with 8 narrow cords, with broader interspaces, cords more broadly spaced toward the umbilicus. Spiral sculpture of fine growth lines, produced into fine microscopic lamellae just below the suture and on the interspaces between basal cords, particularly those close to the umbilicus. Color, mottled brown, tan and white, with alternating light and dark areas on the spiral cords of the body whorl and base. The broad spiral platform descending into the umbilicus is bright green, the umbilical wall smooth and white, the callus tongue is unusually narrow and is bright green. Height, 9.0, diameter, 11.8 mm.

Type Locality: South anchorage, Maria Magdalena Island, Tres Marias Islands, Mexico, 21° 35' N, 106° 35' W, in rocky area at low tide. The type lot, consisting of one mature and one juvenile specimen, was collected by James H. McLean, LACM station 65-11, 15 March 1965, from the R/V *Sec Quest*.

Type Material: Holotype, LACM 1387; paratype, LACM 1388.

Referred Material: CAS 24108, Maria Magdalena Island, 4 specimens; CAS 23779, Maria Magdalena Island, 5-10 fathoms, 1 specimen; SDNHM 40044, Tres Marias Islands, 2 specimens; ANSP 142731, Maria Magdalena Island, 3 specimens; LACM A.3991, Los Frailes, Baja California, 1 specimen.

Discussion: *Tegula verdispira* is the only Eastern Pacific species having the spiral platform descending into the umbilicus. The same structure is found in the Caribbean species *T. lividomaculata* (C. B. Adams, 1845), but that is a much larger species lacking the green coloration in the umbilical area. Most of the known specimens of *T. verdispira* were mixed with lots of *T. globulus*, a smaller, more elevated species with weaker spiral cording. The single specimen from Los Frailes, Baja California, was mixed with specimens of *T. corteziiana* sp. nov., from which *T. verdispira* is readily distinguished in lacking the pronounced spiral striae in the interspaces of the spiral cords. My own collecting at Los Frailes and nearby Pulmo Reef has yielded neither of the 2 new species, however. Another related species is the Caribbean *T. maculostrata* (C. B. Adams, 1845), which is known in the eastern Pacific only at Cocos Island, Costa Rica, where it was first reported by Pilsbry & Vanatta (1902, p 559). Although broadly umbilicate, it does not have an umbilical platform or groove, and has smoother spiral cords than *T. verdispira*. The name, meaning green spiral, directs attention to the most characteristic feature of this species.

12. *Tegula (Agathistoma) verrucosa* new species (Figs. 22-23)

Description of Holotype: Shell large for the subgenus, 6 whorls, weakly convex, suture not impressed, base angulate, nearly flat, narrowly umbilicate, 3 denticles at base of columella, aperture oblique, lirate within. Spiral sculpture of nodular cords, with equal interspaces, the nodes closely spaced, 4 cords on 3rd whorl, 6 on penultimate whorl, counting the broad weakly defined subsutural cord, but not the strongly projecting cord defining the base. Interspaces with about 5 sharply cut spiral striae between cords; base nearly flat, with 8 strong, rounded cords with nearly equal interspaces, interspaces with about 3 sharply raised spiral striations between cords. Axial sculpture of fine growth lines. Color predominantly dark reddish-brown, with axial markings of dark yellow-green; base brownish with interrupted lighter markings along the spiral cords. Base of columella and callus tongue green. Height, 19.6, diameter, 21.7 mm.

Type Locality: Palo Seco, Canal Zone, Panama, 8° 55' N, 79° 34' W, rocky intertidal. The type lot, consisting of 14 specimens, was collected by Eugene Bergeron in 1963.

Type Material: Holotype, LACM 1389, 5 paratypes, LACM 1390. Single paratypes, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: Seventeen lots of this species are represented in the LACM and AHF collections, ranging from La Libertad, El Salvador, to Panama. The only lot examined from south of Panama is CAS 36663, from Sechura Bay, Peru.

Discussion: This is *Trochus reticulatus* Wood, 1828 (not Sowerby, 1821); *Tegula byroniana* of authors, not Wood, 1828. Type material of *Trochus byronianus* Wood, 1828, originally said to be from the "Sandwich Islands" [Hawaii], has been examined and photographed in the British Museum by Dr. Myra Keen. I concur with Dr. E. Alison Kay (1966, p 2), that *T. byroniana* represents the south Caribbean species *T. viridula* (Gmelin, 1791), which differs from both *T. verrucosa* and *T. picta* sp. nov. in having a more impressed suture and a rounded rather than angulate base. This familiar Panama species is consequently without a name, and *T. verrucosa*, from the Latin, "full of warts," with reference to the nodulose sculpture on the spiral ribs, is proposed.

13. *Arene adusta* new species (Figs. 24-25)

Description of Holotype: Shell of medium size for the genus, solid, umbilicate, nacreous within, suture deeply channeled, whorls rounded, base angulate, nearly flat. Nucleus of 1.5 flattened, singly carinate whorls; postnuclear whorls 3.5. Spiral sculpture on early whorls of 4 beaded cords that gradually take shape on emerging from the nucleus. On the body whorl are 4 beaded cords of nearly equal size, interspaces equal. The suture is laid upon a broader and more projecting basal cord until the final half whorl, when this cord is exposed by the descending suture. Base with 6 prominent beaded cords, one bordering the umbilicus and another descending within. Axial sculpture of fine lamellae over entire surface, beading on the spiral cords produced by the thickening and overlapping of 5-8 layers of lamellae in the direction of growth. Lip greatly thickened, spiral cords of base reflected outward and then inward, when seen in basal view. Color tan, with darker and lighter areas upon the spiral cords in a radial pattern, area adjacent to umbilicus lighter colored. Height, 4.8, diameter, 6.1 mm.

Type Locality: Cove adjoining the west sides of Isla Partida and Espiritu Santo Islands, Baja California, Mexico, 24° 25' N, 110° 25' W, LACM station 66-28, 10 April 1966. The type lot, consisting of 29 hermit crab specimens was collected by James H. McLean and Peter M. Oringer by skin diving at approximately the low water line, from the R/V *Sea Quest*.

Type Material: Holotype, LACM 1391; 20 paratypes, LACM 1392. Single paratypes, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: USNM 558435, Isla Partida, Baja California, one specimen with operculum in place, collected by Hawkins.

Discussion: *Arene adusta* is closely related to *A. lurida* Dall, 1913, but differs chiefly in having an angulate base rather than the evenly rounded base of *A. lurida*. Differences between immature shells of the 2 species are even more pronounced, the juvenile shells of *A. adusta* are discoidal in shape, while those of *A. lurida* are rounded. Approximately 50 specimens of *A. lurida* were collected with the type lot of *A. adusta*. Nearly all were living; they are somewhat smaller and colored gray or brick red, rather than tan as in *A. adusta*. *Arene lurida* has been collected at many of the islands along the southwestern shore of the Gulf of California, while *A. adusta* is known only from the vicinity of Espiritu Santo Island. The name is a Latin adjective, "brown" or "tanned."

14. *Arene ferruginosa* new species (Figs. 26-29)

Description of Holotype: Shell of medium to large size for the genus, sturdy but not massive, umbilicate, nacreous within, suture deeply channeled, whorls and base rounded. Nucleus of 1.5 flattened whorls with a single carination, 4 postnuclear whorls. Spiral sculpture on early whorls of 3 cords, the uppermost consisting of a row of projecting, rounded beads, the other 2 unbeaded until reaching the final whorl and a half. Weak, beaded interstitial cords emerge next to the upper 2 of the original 3 cords on the final whorl. The suture is laid on a strong cord that delimits the base, but does not strongly project. The basal cord is exposed by a slightly descending suture on the final whorl. Base sculptured with 6 major and 1 minor cord, 1 bordering the umbilicus and 2 descending deep within. Axial sculpture of fine growth lamellae over entire surface, apparent chiefly in the interspaces between cords but not directly on the beaded surfaces. Lip not thickened, growing edge sharp. Color brick red, with scattered white flecking along the spiral cords. Height, 6.0, diameter, 6.9 mm.

Type Locality: South of White Friars, Mexico, 17° 30' 50" N, 101° 29' 55" W, 25 fathoms on rocky bottom, R/V *Velero III* station 264-34, 2 March 1934, 1 specimen.

Type Material: Holotype: LACM-AHF 1393.

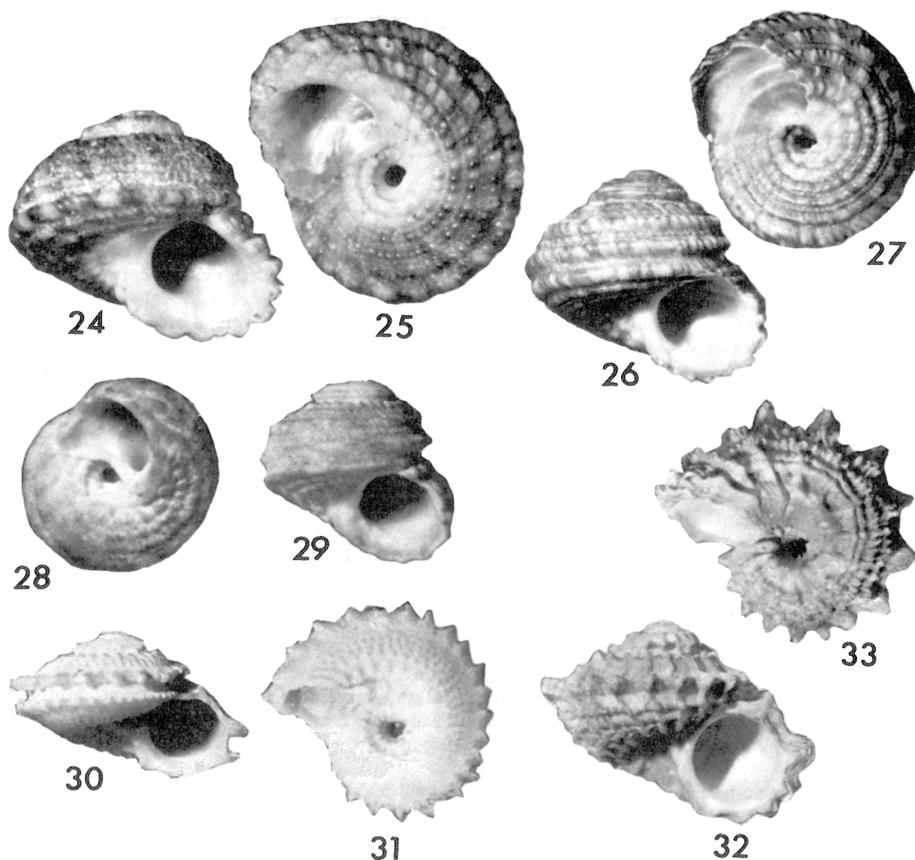
Referred Material: Specimens are represented from the following AHF bottom sample stations: 332, Bahía Honda, Panama, 30-50 fathoms, 34 specimens, mostly fragmentary and in subfossil condition; 330, Chatham Bay, Cocos Island, Costa Rica, 47 fathoms, 2 specimens; 430, Wenman Island, Galapagos Islands, Ecuador, 150 fathoms, 3 specimens.

Discussion: *Arene ferruginosa* differs from all Eastern Pacific and Western Atlantic species known to me in having only the uppermost cord beaded on the early whorls. Of the 11 eastern Pacific species

it is the only one characteristically found in moderately deep water: the other species occur at depths of 20 fathoms or less. It is one of the few species of *Arene* not having a greatly thickened mature lip. In this feature it is similar to *A. bairdii* (Dall, 1889), a brick red Caribbean species occurring at similar depths. The latter species does not show the peculiar beading feature of the early ribs of *A. ferruginosa*. The specimens from Wenman Island, Galapagos Islands (Figs. 28-29), and Cocos Island, Costa Rica, reach only 3 mm in height but are evidently mature because the suture descends on the final whorl. Dwarf populations apparently occur at these localities. The name means rust-colored, with reference to the brick red coloration.

15. *Arene stellata* new species (Figs. 30-31)

Description of Holotype: Shell small to medium sized for the genus, solid, low spired, broadly umbilicate, nacreous within, suture deeply channeled; periphery with 2 strongly projecting spinose carinations. Nucleus of 1.5 flattened, singly carinate whorls; postnuclear whorls 3.5. Spiral sculpture on early postnuclear whorls consisting of a row of beads close to the suture and a projecting peripheral cord bearing fluted scales; on the final whorl below the suture there is first a broad horizontal shelf, followed by a prominent row of beads, then a slightly convex area sloping down and bearing 3 weak rows of beads, then a smooth concave area leading to the projecting peripheral keel, which



FIGS. 24-25, *Arene adusta*, sp. nov., holotype, X6. FIGS. 26-27, *Arene ferruginosa*, sp. nov., holotype, X5. FIGS. 28-29, *Arene ferruginosa*, AHF 430, Wenman Island, Galapagos Islands, X8. FIGS. 30-31, *Arene stellata* sp. nov., holotype, X7. FIGS. 32-33, *Macrarenalepidotera* sp. nov., holotype, X4.

bears regularly spaced fluted scales. Area between the 2 projecting carinations deeply cut, with a smooth vertical wall; the basal carination projects less strongly than the upper carination and bears more numerous fluted scales (3 in the same space for 2 on the upper carination). Base weakly convex, bearing 3 rows of fine beads away from the edge. Umbilicus broad, and bearing 3 coarsely beaded cords separated by nearly equal interspaces. Axial sculpture over the entire surface of fine raised lamellae. Peritreme complete (umbilical wall broken in holotype). Height, 2.9, diameter, 4.8 mm.

A paratype specimen 4.8 mm in diameter lacks the upper 1/2 of the shell but has a mature lip, showing that the suture descends on the last 1/5 turn, that the mature lip is slightly thickened, and that 4.8 mm in diameter is approximately the mature size.

Type Locality: Cove adjoining the west sides of Isla Partida and Espiritu Santo Islands, Baja California, Mexico, 24° 25' N, 110° 25' W, LACM station 67-27, 10 April 1966. The type lot, consisting of 5 fragmentary or immature dead specimens was collected by diving on rocky bottom at 20-30 feet by James H. McLean, from the R/V *Sea Quest*.

Type Material: Holotype, LACM 1394; 4 paratypes, LACM 1395.

Referred Material: SU 50999, 3 nepionic specimens, 14-25 fathoms, Espiritu Santo Island, Belvedere Expedition, 1960.

Discussion: *Arene stellata* is the only low spired species with a stellate periphery known in the eastern Pacific. It is related to a group of similar Caribbean species, the best known of which is *A. cruentata* (Mühlfeld, 1829), the type species of *Arene* Adams & Adams, 1854. *Arene stellata* is smaller, lacks the red markings and has 2, rather than the 3 peripheral carinations of *A. cruentata*. Subgeneric separation of this group from those related to the other 2 species described above does not seem to be warranted, because there are Caribbean species not definitely assignable to either group.

16. *Macrarenne lepidotera* new species (Figs. 32-33)

Description of Holotype: Shell of medium size for the genus, sturdy, yellowish-white, low spired, broadly umbilicate, nacreous within, suture deeply channeled, peritreme complete. Nucleus of 2 smooth, rounded nuclear whorls in a plane coil, postnuclear whorls 3.5, the suture descending slightly on the final whorl. Early postnuclear whorls with thin axial ridges running suture to suture; after one whorl 3 spiral carinations emerge, one on the shoulder, a more prominent one at the periphery and one barely left exposed by the following suture. Axial sculpture of fine overlapping lamellae throughout and of narrow raised axial ridges, 16 on the final and penultimate whorls, elevated on crossing the shoulder cord and forming strong fluted scales on crossing the main peripheral cord. Spiral sculpture on base consisting of a strong cord bordering the umbilicus, another less pronounced cord midway on the umbilical wall, and, between the main basal cord and the major peripheral carination, 4 separate cords, the 2 closest to the umbilicus more closely spaced, the outer 2 bearing fluted scales, these scales numbering 4-6 between major axial ribs. Aperture entire, lip not greatly thickened, but the 3 preceding axial ribs are thicker and more closely spaced than earlier ribs. Height, 7.1, diameter, 10.0 mm.

Type Locality: Off Braithwaite Bay, Socorro Island, Revillagigedo Islands, Mexico, 18° 40' 42" N, 110° 55' 58" W, 70-75 fathoms on rocky bottom, R/V *Velevo* III station 925-39, 18 March 1939, 1 specimen.

Type Material: Holotype, LACM-AHF 1396.

Referred Material: All Revillagigedo Islands, Mexico: LACM A.375, Clarion Island, 40 fathoms, 1 specimen, George Willett; AHF 137-34, Clarion Island, 57 fathoms, 1 immature specimen; USGS (Geological Survey, Menlo Park, Calif.) sta. SU-91-67, San Benedicto Island, 128-130 fathoms, 10 specimens (9 immature), in subfossil condition.

Discussion: *Macrarenne lepidotera* is closely related to *M. farallonensis* (A. G. Smith, 1952), a species described from off the Farallon Islands, California, but represented in the AHF collections from as far south as Cape San Lucas, Baja California. *Macrarenne lepidotera* differs from *M. farallonensis* in having 4 scaly cords rather than a single smooth spiral cord between the stellate periphery and the main basal cord. Specimens also tend to be smaller and to have more numerous axial ribs. The name is a Greek adjective, derived from the noun *lepidion*, "little scale," with reference to the characteristic scaly sculpture of the basal cords.

17. *Tricolia diantha* new species (Figs. 34-35)

Description of Holotype: Shell small for the genus, postnuclear whorls 3.5. Nucleus of one flattened whorl, 1st postnuclear whorl developing a single angular carination that lasts only 2/3 of one turn. Later whorls rounded, suture descending on final whorl, the immediate subsutural area on the final whorl flat or slightly concave. Later whorls sculptured with fine, even spiral striae, approximately 15 striations exposed on the penultimate whorl above the termination of the lip, 6 on the whorl directly

above. Aperture proportionately large, nearly circular, outer lip thin, inner lip bordering a narrow umbilical chink; in basal view, the extremely narrow umbilicus is partially obscured by the inner lip. Color whitish-pink, with wavy and sometimes interrupted axial striping of darker pink, a slight whitish blotching on the back side of the last whorl. Height, 2.1, diameter, 1.7 mm.

Type Locality: East of south end, Albemarle (Isabela) Island, Galapagos Islands, Ecuador, $0^{\circ} 55' S$, $90^{\circ} 30' W$, 60 fathoms, R/V *Velero* III bottom sample station 450, 26 January 1934, 54 specimens, none live-collected.

Type Material: Holotype, LACM-AHF 1397; 37 paratypes, LACM-AHF 1398. Two paratypes each, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: AHF 193-34, Post Office Bay, Charles Island (Santa Maria), 8-10 fathoms, 2 specimens with operculum in place. Additional specimens are represented from AHF bottom sample stations 401, 402, 429, 430, 435 and 464, including San Cristobal, Santa Maria, and Wenman Islands, at depths ranging from 9 to 150 fathoms.

Discussion: *Tricolia diantha*, the only species of *Tricolia* known to occur at the Galapagos Islands, differs from all other eastern Pacific species in its color pattern of dark pink markings on a lighter pink ground, emphasized by the name, pink. The operculum (AHF 193-34) is calcarous, white, with microscopic striae running perpendicular to the outer edge. Although most of the type lot is consistently colored like the holotype, some of the lots show a predominance of pink spotting or broad white banding or mottling.

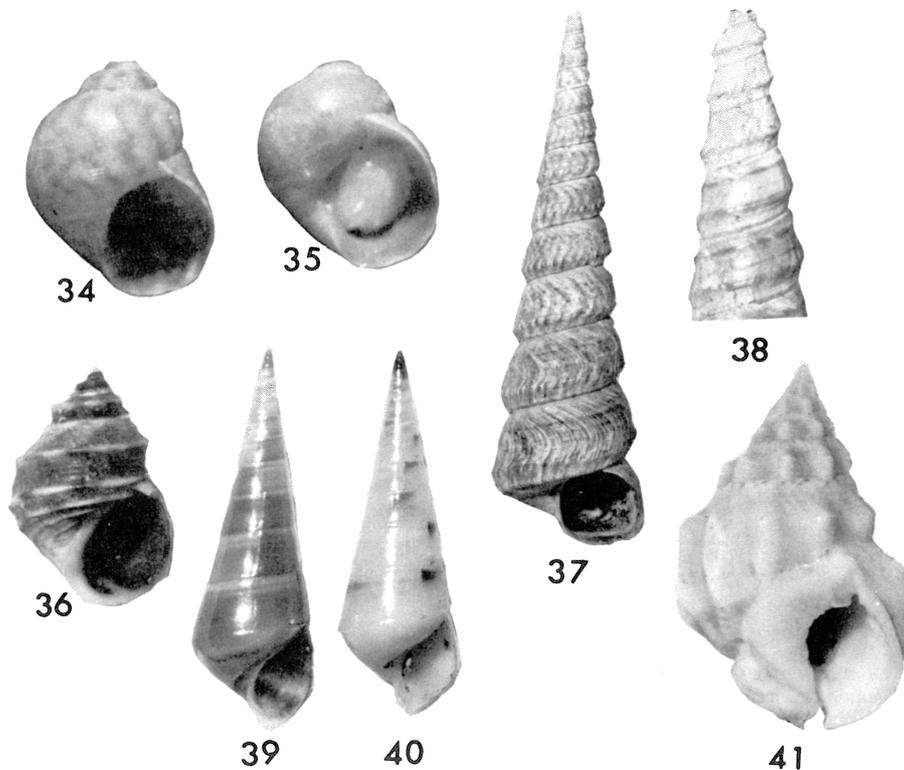


FIG. 34, *Tricolia diantha* sp. nov., holotype, X15. FIG. 35, *Tricolia diantha*, AHF 193-34, Post Office Bay, Galapagos Islands, X15. FIG. 36, *Littorina albicarinata* sp. nov., holotype, X6. FIG. 37, *Turritella parkeri* sp. nov., holotype, X1.5. FIG. 38, *Turritella parkeri*, detail of early whorls (AHF 237). FIG. 39, *Niso emersoni* sp. nov., holotype, X4. FIG. 40, *Niso emersoni*, paratype, X4. FIG. 41, *Nassarius shaskyi* sp. nov., holotype, X2.

18. *Littorina albicarinata* new species (Fig. 36)

Description of Holotype: Shell small for the genus, turbinate, spire elevated, nuclear whorls eroded; sculptured postnuclear whorls five. Spiral sculpture on penultimate and early whorls consisting of 2 thin, strongly projecting, rounded carinations. Above the upper carination the surface of the whorl slopes evenly toward the suture and bears 6 evenly spaced incised spiral lines; the face of the whorl between the 2 main carinations is nearly vertical and also has about 6 incised spiral lines. Base with 1 major and 3 minor cords and spirally incised lines. Axial sculpture wanting. Columellar area narrow, continuous with the basal lip, the callus on the parietal wall meeting the upper extremity of the lip; a weak umbilical groove outside the callus. Spiral carinations whitish, early whorls dark brown, body whorls grayish with brown maculations crossing the carinations, columella white, aperture dark brown. Height, 4.7, diameter, 3.2 mm.

Type Locality: El Requeson, Concepcion Bay, Baja California, 26°38' N, 111°50' W. The type lot, consisting of approximately 200 specimens, was collected in August 1963 by Ray Maynard. Specimens were picked from gravel collected by shallow diving. None of these specimens were live-collected, but this lot is selected because it includes a number of exceptionally large specimens.

Type Material: Holotype, LACM 1399, 50 paratypes, LACM 1400. Four paratypes each, AMNH, ANSP, CAS, MCZ, SBM, SU and USNM.

Referred Material: Numerous specimens of this species are represented in museum collections from stations ranging from the head of the Gulf of California, to at least as far south as Guaymas on the east, and to Rancho el Tule, near Cape San Lucas, Baja California, on the western side of the Gulf. Living specimens occur in crevices near barnacles in the mid-intertidal zone.

Discussion: Collectors in the Gulf of California have long been aware of this species. *Littorina albicarinata* is the smallest of the eastern Pacific littorines and is the only strongly carinate species. Variation is extensive. In some specimens the carinae are weakly developed or dark colored. The number and strength of the basal cords is also variable. Often occurring with the new species is a species of *Fossarus*, cf. *F. atratus* (C. B. Adams, 1852), of similar size and markings, which differs in having a lower spire, broader umbilical chink, and less pronounced carinations.

A more detailed examination of the relationships among the eastern Pacific littorines and *Fossarus* is desirable. The new species is tentatively referred to *Littorina* in the broad sense until such work is done. The name means white-keeled, referring to the characteristic feature of this species.

19. *Turritella parkeri* new species (Figs. 37-38)

Description of Holotype: Shell of medium size, nucleus lost, remaining whorls 14, surface chalky and eroded near apex, near the aperture there are thin periostracal remnants. Earliest whorls with a single projecting carination at 1/3 the distance from the anterior suture, persisting on later whorls as the single strong carination at 1/4 the distance above the suture, the area below beveled in toward the suture. On the penultimate whorl there are in addition 4 weakly defined spiral cords and fine irregular spiral striae throughout. The base is defined by an angularity, just below which the suture is laid, producing a deeply indented suture. Base nearly flat, with fine, scarcely perceptible spiral striae. Growth line trace producing a broad sinus, in nearly central position on the whorl. Aperture rounded quadrate, lip and columella thin, parietal area glossy. Color tan, with irregular dark markings along the growth line trace. Height, 48.4, diameter, 13.4 mm.

Type Locality: West of Espiritu Santo Island in Bahia de La Paz, Baja California, 24°24.3' to 24°25.6' N, 110°23.7' to 110°25.5' W, 45-65 fathoms, R/V *Thomas Washington* (Scripps Institution of Oceanography) station MV 68-1-29, 12 January 1968, 74 specimens, 15 in fresh condition.

Type Material: Holotype, LACM 1401, 27 paratypes, LACM 1402; 30 paratypes, Scripps Collection. Two paratypes each, AMNH, ANSP, CAS, MCZ, SBM, SDNHM, SU and USNM.

Referred Material: AHF bottom sample station 247, 3 miles off San Gabriel Bay, Espiritu Santo Island, 80 fathoms, 3 specimens (Fig. 38); Shasky Collection (Redlands, California), off east side, Espiritu Santo Island, 40-90 fathoms, Ariel Expedition, 1960, 4 specimens.

Discussion: *Turritella parkeri* was illustrated by Parker (1964, pl. 7, fig. 1, "*Turritella* sp.") as a species characteristic of deep northern basins and troughs in the Gulf of California, 230-1400 meters in depth, but I am unable to determine the station of his specimen. It is, however, a species found at greater depths than other eastern Pacific *Turritella*. It is evidently related to *T. cooperi* Carpenter, 1864, and *T. mariana* Dall, 1908, 2 eastern Pacific species in which the single prominent carination near the base of the early whorls persists in the same position on the adult whorls. *Turritella parkeri* is broader than both of these species and bears a single prominent carination on mature whorls, while both *T. cooperi* and *T. mariana* develop 2 or more strong carinations per whorl. The early sculpture of *T. parkeri* is illustrated in Fig. 38. The largest of the LACM paratypes measures 57 mm in length (nuclear whorls lost), 16 mm in diameter. *Turritella parkeri* is named for Robert H. Parker, whose 1964 paper is an important source of ecological data for many Eastern Pacific species.

20. *Niso emersoni* new species (Figs. 39-40)

Description of Holotype: Shell of medium size for the genus, surface highly polished, narrowly but distinctly umbilicate. Nuclear whorls 3.5, slightly convex, nuclear whorls and 1st postnuclear whorl dark reddish-brown, followed by 3 whitish, flat-sided whorls. Postnuclear whorls 12, body whorls colored reddish-brown, color increasing in intensity in direction of growth for 1/8 to 1/3 of a whorl, color then abruptly dropping to a lower intensity and increasing in the direction of growth. On the final whorl a fine raised but rounded ridge defines the periphery, ridge of slightly darker intensity of the color above: below the peripheral ridge the basal area has a broad white band of 1/3 the basal width: the remaining 2/3 of the basal area, including the umbilical ridge, is dark brown; umbilical wall and inner lip opaque white. The subperipheral band of white is reflected on the inner side of the outer lip. Early whorls nearly flat-sided, suture not impressed: penultimate and final whorl slightly convex, suture slightly channeled. Outer lip thin, inner lip curved and revolute. Height, 12.2, diameter, 4.1 mm.

Type Locality: Off San José Point, Guatemala, 13° 52' 30" N, 91° 10' 30" W, 7-11 fathoms on black sand, R/V *Velero* III station 770-38, 11 January 1938, 4 specimens.

Type Material: Holotype, LACM-AHF 1403, 1 paratype, LACM-AHF 1404, 1 paratype, USNM, 1 paratype, AMNH. Each of the 3 paratypes have 1 or 2 holes bored by naticids, but all have complete apertures and complete nuclear whorls. The largest paratype measures 15.5 mm in height. One of the specimens is predominantly white (Fig. 40), but the nuclear whorls are the same reddish color in all the specimens.

Referred Material: Shasky Collection (Redlands, California), one specimen from Chiapas, Mexico, 30 miles north of Guatemala border, by shrimp trawler, March, 1961.

Discussion: *Niso emersoni* is the only eastern Pacific species having dark early whorls; the body whorls are also more intensely colored than in other species. Its color pattern is similar to that of *N. interrupta* (Sowerby, 1834), but *N. emersoni* has a whitish subsutural band and lacks the dark color of the inner lip and umbilicus of *N. interrupta*. *Niso portoricencis* Dall & Simpson, 1901, is a Caribbean species with dark nuclear whorls, but the shell of that species is broader, with a whitish band just above the suture. The species is dedicated to Dr. William K. Emerson of the American Museum of Natural History, who recently reviewed the eastern Pacific species of *Niso* (Emerson, 1965).

21. *Nassarius shaskyi* new species (Fig. 41)

Description of Holotype: Shell relatively large, massive, nucleus of three smooth, polished, rounded whorls, tip immersed: postnuclear whorls seven, sutures distinct but not deeply impressed. Axial sculpture of ten ribs, rounded and extending from suture to suture, with broad interspaces on the first three whorls, nearly obsolete in the shoulder area and cresting at the midpoint on later whorls. On the final whorl the ribs crest even more strongly at the basal angularity, the rib surfaces slightly concave between the upper and lower crests, ribs extending across the base but becoming obsolete at the edge of the fossa. Spiral sculpture on the first sculptured whorl of six raised threads with nearly equal interspaces, overriding the axial ribs; on the fifth sculptured whorl the ribs have increased to about 13 and the interspaces or grooves are narrower; on the penultimate whorl the spiral ribs become weak and broadly spaced: on the final whorl the ribs are obsolete particularly in the area between the upper and lower axial crests, which are nearly smooth. Outer lip with a strong varix, lip edge rounded, lirate internally; inner lip producing a broad columellar shield, completely obscuring the body whorl, shield with irregular, undulating ridges and a strong ridge defining the anal notch; canal narrow, deeply notched and recurved; siphonal fasciole thick, sloping toward the right, delimited above by the deep fossa. Color yellowish white, with a faint white band connecting the basal crests, a slightly darker band just below and weak brown flecking in the shoulder area of the final whorl. Operculum with latero-basal nucleus and jagged outer edge. Height, 22.5 mm, diameter, 14.0 mm.

Type Locality: Off Gorgona Island, Colombia, 3° 01' 25" N, 78° 10' W, 20 fathoms, R/V *Velero* III station 221-34, 12 February 1934, 4 specimens.

Type Material: Holotype, LACM-AHF 1405, 2 paratypes, LACM-AHF 1406, 1 paratype, USNM.

Referred Material: 21 fully mature lots of this species are represented in the AHF and LACM collections from depths of 10-40 fathoms: 11 stations in the Gulf of California, the northernmost station at Isla Partida (28° 53' N); one station on the outer coast of Baja California at Santa Maria Bay; three stations at Banderas and Tenacatita Bays, Mexico; one station, Costa Rica; two stations, Panama; three stations, Colombia, the southernmost station is the type locality. The species is therefore of fairly broad distribution throughout its range, although it may not be considered abundant, the largest lot represented by but five specimens.

Discussion: *Nassarius shaskyi* is related to *N. corpulentus* (C. B. Adams, 1852), and *N. pagodus* (Reeve, 1844), differing from both in having obsolete spiral sculpture on the final whorl, and in having the rib surface concave rather than rounded between the two crests on the body whorl. In *N. pagodus* the siphonal fasciole projects straight down, while in *N. shaskyi* and *N. corpulentus* it tapers toward the right, following the general outline of the base. The species is named for Dr. Donald R. Shasky of Redlands, California, astute collector and student of Panamic mollusks, who first brought the species to my attention.

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MALACOLOGISTS INTERESTED IN AFRICA. --- During the last week in November 1969, a meeting was held at the Musée Royal de l'Afrique Centrale, Tervuren, Belgium, which was attended by various people interested in the study of land and freshwater mollusks of Africa, south of the Tropic of Cancer, including Madagascar (Malagasy), the adjacent islands and part of Arabia. This group decided to issue a newsletter once a year, beginning in the spring of 1970, giving names and addresses of researchers interested in this region, as well as lists of their papers and current researches, notes on the location of African type specimens in museums, proposed expeditions to Africa, specialized bibliographies and addresses for inquiries. This newsletter will be called *ACHATINA*. Copies of it will be available at no cost to *bona fide* workers who cooperate in this scheme. The terms of reference will be restricted to taxonomy and zoogeography; medical aspects will be outside the area of interest. A long term project is to compile an annotated bibliography of all the papers dealing with non-marine molluscs of this area.

Those interested should contact Dr. J.-J. VAN MOL, c/o Section des Invertébrés non Insectes, Musée Royal de l'Afrique Centrale, Tervuren, Belgium.

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