

PROCEEDINGS  
OF THE  
BIOLOGICAL SOCIETY OF WASHINGTON

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BIOLOGICAL INVESTIGATIONS OF THE DEEP SEA.  
50. THE VALIDITY AND GENERIC POSITION OF  
*PENTAGONASTER PARVUS* PERRIER (ECHINODERMATA, ASTEROIDEA)<sup>1</sup>

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When Perrier reported on the sea stars collected by the Blake (1881, 1884), one of the new species he described was *Pentagonaster parvus*. Verrill (1899: 151-156) examined the syntypes of *Pentagonaster parvus* and concluded that they were young specimens of *Goniaster americanus* Verrill (= *Asterias tessellatus* Lamarck). I have examined the syntypes of *P. parvus*, as well as many other specimens. I have also examined many young specimens of *Goniaster tessellatus* and have concluded that *Pentagonaster parvus* is a valid species belonging to the genus *Tosia*.

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*Tosia parva* (Perrier, 1881)

*Pentagonaster parvus* Perrier, 1881, p. 19; 1884, pp. 36, 37, 231, pl. 7, figs. 7-8.—Sladen, 1889, pp. 265, 267, 746-747.—?H. L. Clark, 1898, p. 5.

*Goniaster americanus* (pars) Verrill, 1899, pp. 154-156, pl. 26, fig. 6.  
*Plinthaster dentatus* (pars) Gray, et al., 1968, fig. 25.

*Material studied*: 22 specimens from the following localities: Lectotype: R = 10.5 mm, r = 7.5 mm, R/r = 1.4; Blake sta. 253, off Grenada,

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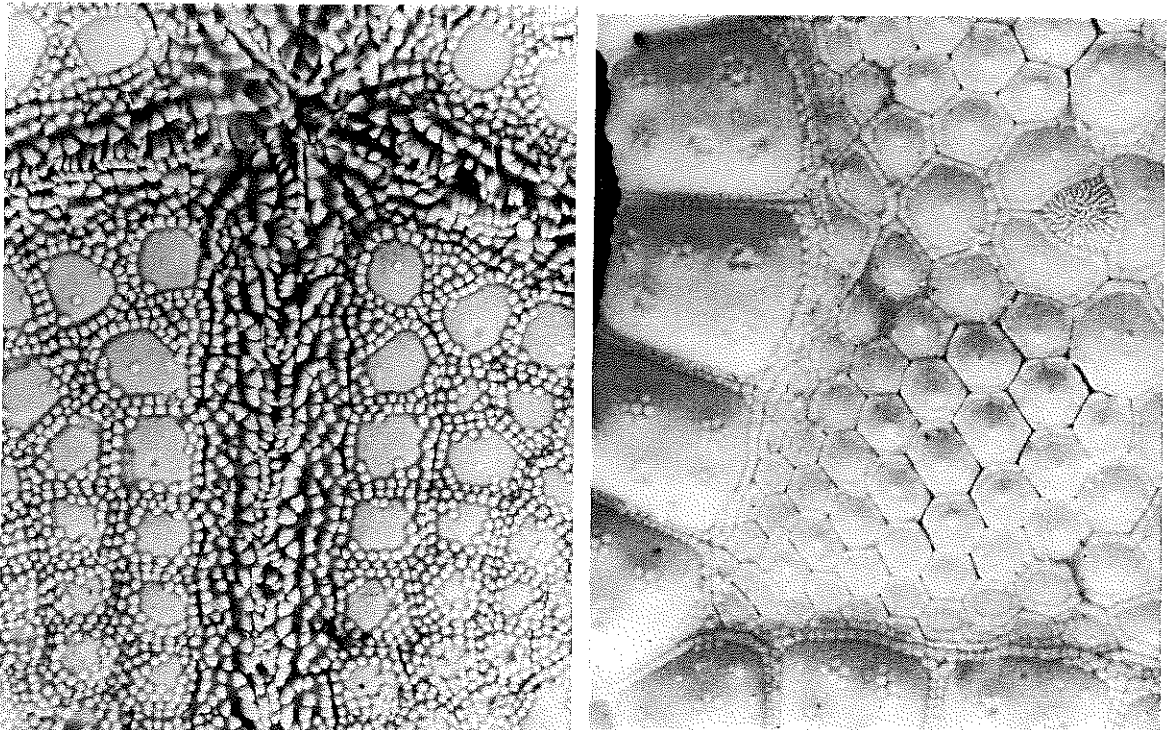


FIG. 1. *Tostia parva* (Perrier). Top, specimen from Pillsbury sta. 707, abactinal view, 6.1X.—Bottom, specimen from Silver Bay sta. 2263, actinal view, 7.8X.

168 m, 1878-79, MCZ 417.—Paralectotypes: *Blake*, West Indies, 172-229 m, 1877-79, MC 4283, (3 spec.)—1 spec., M/V *Silber Bay* sta. 2263, 33°04'N, 78°12'W, 30 m, 28 July 1960, UMML 40.149.—1 spec., R/V *Hernando Cortez* sta. E, 27°36'N, 84°13'W, 73 m, 4 January 1966, USNM E10851.—1 spec., M/V *Silber Bay* sta. 3496, 20°53'N, 73°42'W, 183, 4 November 1961, UMML 40.159.—1 spec., R/V *Pillsbury* sta. 478, 11°33'N, 62°09'W, 597 m, 2 August 1966, UMML 40.235.—2 spec., R/V *Pillsbury* sta. 707, 11°22'N, 62°22'W, 79 m, 19 July 1968, UMML 40.236.—13 spec., R/V *Pillsbury* sta. 734, 11°01'N, 63°35'W, 60-71 m, 22 July 1968.

*Diagnosis:* R not greater than 30 mm; R/r = 1.3-1.8. Abactinal and marginal plates bearing scattered granules in centers. Peripheral granules of abactinals in radial areas fused. Actinals surrounded by more than single row of granules. Five compressed adambulacral furrow spines; nine to ten mouth furrow spines.

*Description:* Five arms. R = 22 mm, r = 46 mm, R/r = 1.5. General form pentagonal to arcuate pentagonal.

Five primary plates conspicuously larger than other abactinals. Abactinal plates slightly convex; each surrounded by single row of large, flattened, rectangular granules. Granules surrounding plates in radial areas fused so that each plate surrounded by flattened, calcareous ring. Center of each abactinal plate bearing one to six round granules embedded in deep pits. Papulae confined to large radial areas.

Inferomarginals and superomarginals corresponding throughout wide interbrachial arc. Eight massive superomarginal plates; each surrounded by single row of small, rounded granules. Clusters of one to twelve round granules, similar to those of abactinals, scattered about each plate. Double row of large, flattened granules, similar to those surrounding abactinals along suture between superomarginals and inferomarginals. Granules twice as large at angle formed by two adjacent superomarginals and corresponding inferomarginals. Each enlarged granule bearing single, very small, rounded granule. Terminal plate small, naked. Ten massive inferomarginal plates; granulation similar to superomarginals.

Actinal intermediate area large; plates arranged in five chevrons. Actinal plates large, flat, rhombic; each plate surrounded by two to three irregular rows of coarse, rounded granules. Most plates having large naked central area; some plates bearing one to four scattered granules in central area.

Adambulacral plates square with straight furrow margin bearing five subequal, compressed furrow spines with blunt, rounded tips. Subambulacral spines in three to four irregular rows of three to five short, blunt spinules slightly taller than granules of actinal plates.

Each mouth plate bearing nine to ten furrow spines, similar to adambulacral furrow spines, but more strongly compressed, median spine being most compressed; median spine only slightly enlarged. Rest of plate covered by ten to twelve pyramidal spinules, slightly taller than subambulacral spines of adambulacral.

Anus prominent, subcentral. Madreporite roundly triangular, about two-thirds as large as adjacent abactinal plates; located approximately one-third the distance from center of disk to middle of interbranchial arc. No pedicellariae.

*Type*: Museum of Comparative Zoology, cat. no. 417 (lectotype).

*Type-locality*: off Grenada, 168 m, *Blake* sta. 253.

*Distribution*: This species is found throughout the Antillean province, extending from 50 miles south of Cape Fear, North Carolina to Trinidad. Its bathymetric range is 30–597 m.

*Discussion*: The smallest specimen examined measures  $R = 6$  mm. All its characters are the same as in an adult, except the peripheral granules of the abactinals of the radial areas are not yet fused.

The smallest specimen of *Conaster tessellatus* I examined ( $R = 9$  mm) is distinguished from *Tosia parva* by having naked supernomarginals and the abactinal and actinal plates completely covered by granules. Specimens as small as  $R = 11$  mm already have abactinal spines forming.

*Pentagonaster parvus* Perrier belongs in *Tosia* because of its pentagonal form, actinal granulation and lack of pedicellariae. It is distinguished from all other species of *Tosia* by its central abactinal and marginal granules. It is the only species of *Tosia* not from Australian waters and is a Tethyan relict.

The specimen collected at *Blake* station 253 is designated the lectotype and the type locality is restricted to off Grenada, 168 m. The specimens collected by the *Blake* at stations 32, 276 and 296 have been placed together and it is impossible to determine which specimen is from which station. These three specimens are designated the paralectotypes.

#### LITERATURE CITED

- CLARK, H. L. 1898. The echinoids and asteroids of Jamaica. Johns Hopkins Univ. Circ., 18 (137): 4–6.
- GRAY, I. E., M. E. DOWNEY, AND M. J. CERAME-VIVAS. 1968. Sea-stars of North Carolina. Fish. Bull., 67 (1): 127–163, figs. 1–40.
- PERRIER, E. 1881. Reports on the results dredging . . . in the Gulf of Mexico, and in the Caribbean Sea, 1877–79, by the U. S. Coastal Survey steamer "Blake". . . 14. Description sommaire des espèces nouvelles d'Astéries. Bull. Mus. comp. Zool. Harvard, 9 (1): 1–31.
- . 1884. Mémoire sur les étoiles de mer recueillies dans la Mer des Antilles et la Golfe du Mexique durant les expéditions de dragage faites sous la direction de M. Alexandre Agassiz. Nouv. Arch. Mus. Hist. nat. Paris, (2) 6: 127–276, pls. 1–9.
- SLADEN, W. P. 1889. Report on the Asteroidea collected by H. M. S. CHALLENGER during the years 1873–1876. Reports Challenger Zool., 30: 1–893, pls. 1–117.
- VERRILLI, A. E. 1899. Revision of certain genera and species of starfishes. Trans. Conn. Acad. Arts, Sci., 10: 145–234, pls. 24–30.