DESCRIPTION OF A NEW BRITTLE STAR FROM THE UPPER MIOCENE OF THE SANTA CRUZ MOUNTAINS, CALIFORNIA.

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INTRODUCTION.

While engaged in field work on the Santa Cruz quadrangle during the summer of 1901 two beautifully preserved though somewhat imperfect molds of a brittle star were found by Mr. W. J. Miller in the soft arenaceous shale immediately overlying the Santa Margarita sandstone south of Scott Valley, Santa Cruz County, California. The casts made from these molds exhibit so many diagnostic characters that it has been deemed expedient to prepare the following description. No other fossils were found with the stars but from such forms as

Astrodopsis antiselli Conrad and

Pecten crassicardo Conrad

which have been found in the clear white sandstone immediately underlying the shale, the age of the stars is known to be upper Miocene (upper Santa Margarita formation).

The form of description used by Lyman in his monograph on the *Ophiuroidea*[a] has been followed as closely as the state of preservation of the specimens would permit.

The writer wishes to acknowledge his indebtedness to Mr. Austin Hobart Clark, of the U. S. Bureau of Fisheries, for assistance rendered during the preparation of this paper.

[a] Theodore Lyman, Report on the Ophiuroidea dredged by H. M. S. Challenger during the years 1873–1876, Challenger Repts., Zoology, V, Pt. 1, pp. 1–386, pls. I–XLVIII. 4°. London, 1882.

Genus AMPHIURA Forbes.

AMPHIURA SANCTÆCRUCIS, new species.

Plate XL.

Description.—Disk attaining a diameter of 13 mm., delicate, covered with small naked, overlapping scales. Arms five, long, slender, even or tapering very slightly and more or less flattened. Arm spines moderately short and sharp pointed, approximately equal in length to the width of the dorsal median plates. Upper arm plates simple, breadth about 1½ length; lower arm plates deeply grooved in the median line.

Disk pentagonal in outline, the arms passing out from the sides rather than from the angles, this being due to the spreading of the disk upon compression by the containing fine clayey sediments; whole dorsal surface of disk covered with overlapping scales, which, in the cast serving as the type, are minutely shallowly punctuate corresponding to numerous microscopic protuberances in the original animal. Radial shields moderately large, of a short, pear-seed shape, pointed within, outer edge sharply rounded, inner edges nearly straight and separated by 5 prominently overlapping scales (the continuation of the upper arm scales, but shorter than the latter), which narrow rapidly toward the points of the shields. Between the radial shields of adjacent arms are about 7 rows of small overlapping plates, the middle row apparently much larger than the others. The specimen exhibiting the ventral side is so much crushed that its characteristics are unrecognizable. Upper arm plates simple, small, breadth about 1½ length, slightly narrowed within, broader without, straight front, back and sides. Side plates small, triangular, with sharp cornered, beveled edges. Under arm plates quite similar to upper, except deeply medially longitudinally grooved. Spines at least 4 to a segment; about 1½ times length of upper arm plates, rounded, sharp.

Dimensions.—Specimen exhibiting dorsal surface; diameter of disk 13 mm.; arms at least 25 mm. long, and probably several times this amount; width near disk 2 mm., upper arm plates 0.7 to 0.8 mm. long.

Specimen exhibiting ventral surface: diameter of disk 6.5 mm.; arm at least 20 mm. long and probably at least twice this length judging by taper.

Notes.—The two specimens upon which this species is founded are beautifully preserved molds, the larger one, which is taken as the type, showing the dorsal surface, the smaller one the ventral. As would be expected, the surfaces of the disks are considerably crushed and distorted, but enough characteristics are visible to admit

of the above specific description. The specimens have been compared with the recent alcoholics in the collection of the U. S. National Museum, but no forms agreeing even remotely with the fossils were found. Both A. H. Clarke and the writer are of the opinion that the fossils belong to the genus *Amphiura*, although, as might be expected in molds, some of the diagnostic characters are lacking. The species is named in honor of the Santa Cruz quadrangle near which the types were obtained.

Type.—Leland Stanford Junior University, Geological collection, No. 1078.

Paratype.—Cat. No. 165431, U.S.N.M.

Horizon.—Santa Margarita formation, upper Miocene.

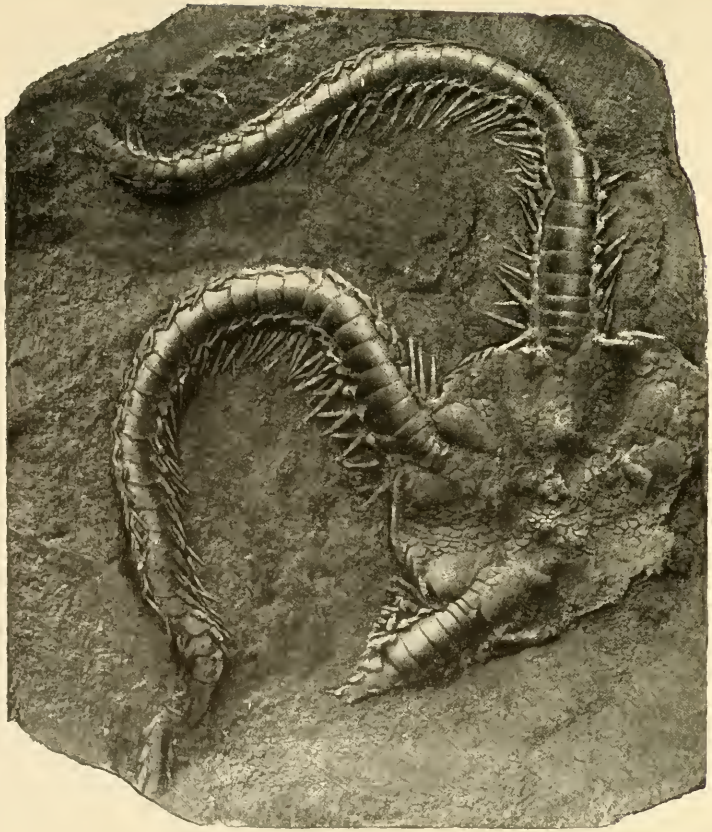
Locality.—Santa Cruz County, hills immediately southeast of Scott Valley, 6 miles north-northeast of Santa Cruz. (W. J. Miller.)

PLATE XL.

Amphiura sanctæcrucis Arnold, new species.

FIG. 1. View of cast of dorsal portion, enlarged 3 times. Type. Coll. Leland Stanford Junior University, No. 1078. Upper Miocene (Santa Margarita formation), Scott Valley, Santa Cruz County, California.

2. View of cast of ventral portion, enlarged 3 times. Paratype. Cat. No. 165431. U.S.N.M. Same locality as fig. 1.



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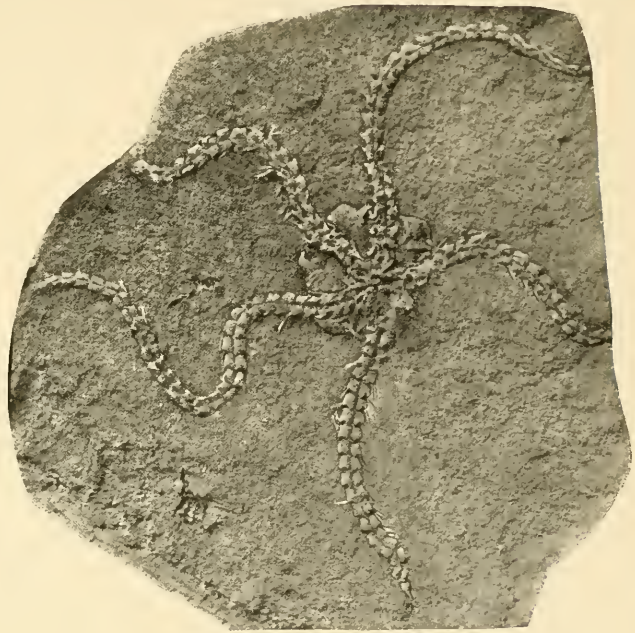

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A NEW CALIFORNIAN MIOCENE BRITTLE STAR.

FOR EXPLANATION OF PLATE SEE PAGE 420.