

PROCEEDINGS  
OF THE  
BIOLOGICAL SOCIETY OF WASHINGTON

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TWO NEW ASTRORADIATE ECHINODERMS FROM THE  
PACIFIC COAST OF COLOMBIA, AND ECUADOR.

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On her voyage from the Atlantic to the north Pacific in 1887-1888 the *Albatross* dredged off northwestern South America a magnificent new starfish of the genus *Luidia*, and a very interesting new species of the ophiuran genus *Ophiosteira*, which are described below.

***Luidia superba*, new species.**

Six arms;  $R=205$  mm.;  $r=30$  mm.;  $R:r=6.8:1$ ; width of arms at base, 30 mm.; superomarginal paxillæ, 100.

Arms relatively stout, very gradually tapering to a blunt extremity; interbrachial arcs very acute; general form depressed; no pedicellariæ.

The paxillæ, though massive, are in rather open order, especially along the sides of the rays.

The superomarginal paxillæ correspond to the inferomarginals and are closely crowded against them; in shape they are approximately square; they bear centrally seven or eight prominent high rounded tubercles, surrounded by about twice as many similar but more slender tubercles, beyond which are very numerous slender spinelets.

Within this superomarginal row is another regular row of similar, but smaller, paxillæ, five of which correspond to four superomarginals; these are mostly transversely oblong, becoming squarish toward the end of the ray; each of these paxillæ is entirely independent of those on either side, and the series is separated from the superomarginal series by a conspicuous channel.

Within these again is a third regular series of similar spaced paxillæ, corresponding exactly to those in the second row, from which they are separated by a somewhat broader channel than that separating the second row from the superomarginals; every third or fourth of these paxillæ (on

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the average) is much enlarged and bears a stout conical central spine about 3 mm. long.

The next row is not so regular as those preceding, and is composed of slightly smaller paxillæ, which are more rounded; many of them bear spines like those in the preceding row.

Within this fourth row the paxillæ decrease rapidly in size and in regularity, so that the central third of the arm is occupied by small, irregular, closely placed, though not crowded, rounded paxillæ, many of which are enlarged and bear a conical spine, especially in the outer part of the arm.

On the disk the paxillæ in the center, continuing thence along the midradial region of the arms, are small and rounded; toward the inter-brachial arcs and the margins of the arms they rapidly become larger, more oblong or quadrate, more spaced, and more regular in arrangement. Only one or two of the paxillæ on the disk bear spines, and these spines are small; on the arms the spines appear first along the sides, and it is only in the outer half that they become as abundant in the median as in the lateral areas.

The inferomarginal plates bear three long stout spines, of which the lowest, situated just below the ambitus, is the longest, 9 mm. in length; the second, situated at the ambitus, is similar, but slightly shorter; the third, situated on the abactinal surface, is the shortest, usually about 4 mm. long; on the actinal surface below the first spine in the preceding series the inferomarginals bear from three to five spines of considerable length, though much shorter than those in the upper series, which decrease in size toward the ambulacral groove; the sides of the inferomarginals are bordered with very numerous capillary spinelets.

The actinal intermediate plates have usually a single prominent median spine; their proximal and distal borders bear numerous capillary spinelets.

The adambulacral plates are slightly narrower than the actinal intermediate plates, which in turn are slightly narrower than the inferomarginals; they bear a sabre-shaped spine in the furrow, followed by a similar, but longer, stouter and less curved spine, beyond which are two slightly shorter straight spines, the distal the smaller; the inner half of the plate is bare; the proximal and distal borders are fringed with numerous capillary spines.

The mouth plates are narrow, with eleven gradually decreasing spines situated along the median suture, and four similar spines situated along the furrow margin; the mouth spines proper may be said to consist of the first spines in these two series (the inner being the larger) and a third, more or less widely spaced from these and making a considerable angle with them, situated deep in the groove on the aboral edge of the plate; the border adjoining the first adambulacral is fringed with capillary spinelets.

The color in alcohol is a very dark brown above, the crowns of the paxillæ white except for the bordering spinelets, which are dark brown; the enlarged spine-bearing paxillæ and the abactinal surface of the inferomarginals are deep brown; the spines are white, except for those included



in the two upper rows on the inferomarginals, which have brown bases; beneath, straw yellow.

*Type*.—Cat. No. 36,948, U. S. N. M., from "Albatross" Station 2797, off the coast of Colombia, in 33 fathoms.

***Ophiosteira kœhleri*, new species.**

The disk is 5 mm. in diameter; the arms are very slender, evenly tapering, 40 mm. long.

The plates of the disk are few, large, greatly swollen; the radial areas are strongly elevated, the narrowly triangular interradial areas strongly depressed.

The dorsal surface of the disk is overlaid by a thin semi-transparent membrane with an approximately plane surface which conceals the underlying plates. In drying this membrane may cling tightly to the surface of the plates, or it may stretch, drum-head like, between the more elevated plates more or less concealing the others from view.

The radial shields are large, rather narrow, greatly swollen, extending from the base of the arms half way to the center of the disk, in apposition for the distal half.

An oval, greatly swollen, plate occupies the area between the inner halves of adjacent radial shields; just within this are two or three similar, but much smaller, oval plates, radially elongated, beyond which is the nearly circular primary radial plate, which is of about the same area as the plate between the inner halves of the radial shields of each pair, and also as the rounded-pentagonal central plate. The radial primary plates are separated from this last by a ring of small transversely oval plates, and from each other, in their basal halves, by similar, but slightly larger, plates.

The triangular interradial areas, embracing on the border of the disk the region between the radial shields as a base, and extending inward to an apex between the primary radial plates, are occupied by a large kidney-shaped, much swollen, plate situated on the border of the disk between the radial shields, in area about equal to the plate between the distal halves of the radial shields of each pair; beyond this on either side is a small hemispherical plate attached immediately below the radial shields, just within which is a transversely oval, much smaller, though similar, plate, bridging the gap between the inner ends of the radial shields, and within this one or two smaller plates.

In lateral view the interradial areas of the disk are seen to be occupied by about six irregularly rounded swollen plates. Along the genital slit there are about ten prominent well separated conical papillæ, distal to which are two or three larger, more robust, papillæ, forming the rudimentary arm comb which is entirely hidden from dorsal view by the extension over it of the produced distal border of the radial shields.

The oral shields have a broadly heart-shaped inner portion, occupying about two-thirds of their radial length, and a smaller transversely oval outer portion, the two portions separated by deep lateral notches.



The side mouth shields are about four times as long as broad, with parallel sides, in apposition inwardly.

The mouth frames are similar to, and not much larger than, the side mouth shields.

The mouth papillæ are five in number, the first two relatively long, and conical, the third of about the same basal length, but lower with a rounded outer border, the fourth of the same height as the third but twice as long with a straight outer margin, the fifth similar but nearly three times as long as the fourth, with a straight outer margin.

The first arm tentacle lies in a tube consisting of four rounded tentacle scales inwardly, and three outwardly, the two tentacle slits in each inter-radial area being parallel and not connected with the mouth slits.

The first upper arm plate is small, transversely oval, from two to three times as broad as long; the second is much larger, reaching almost entirely across the arm as viewed dorsally, twice as broad as long, the proximal and distal borders strongly curved and parallel, the lateral edges converging slightly; the following upper arm plates become rapidly narrower, the fifth being an elongate triangle, twice as long as the distal width, the apex resting on the distal border of the preceding; beyond the fifth the upper arm plates, becoming progressively smaller, are more and more widely separated from each other by the apposition of the side arm plates, on the outer portion of the arm being small and inconspicuous quadrilateral plates with the proximal angle more produced than the distal, inserted between the distal inner borders of the apposed side arm plates.

The arm spines are three, extremely short, well spaced, the uppermost slightly further from the middle than the latter is from the lowest.

The first under arm plate is triangular with very broadly rounded angles and a somewhat abrupt rounded extension occupying the central quarter of the distal edge; the second is slightly broader than long, fan-shaped, with a truncated proximal angle, with a strongly and evenly convex distal border and strongly concave sides forming the inner borders of two broad diverging slits which accommodate the tentacles, protected by three tentacle scales; the third is more broadly fan-shaped than the preceding, and is excluded from contact with it by the apposition of the side arm plates for a distance of half its length; the following under arm plates rapidly become smaller and relatively broader.

*Type*.—Cat. No. 38,670 U. S. N. M., from "Albatross" Station 2792, off the coast of Ecuador, in 401 fathoms.



Clark, Austin Hobart. 1917. "Two new astroradiate echinoderms from the Pacific coast of Colombia, and Ecuador." *Proceedings of the Biological Society of Washington* 30, 171–174.

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