

NOTES ON
PACIFIC COAST CRUSTACEA.

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Crangon nigricauda *Stimpson*.

The identity of this species with the *C. vulgaris* of the Atlantic is suspected. Owen, and after him Dana, mentions it as *C. vulgaris*, and Kingsley, in his "List of the North American Caridea" (Bull. Essex Inst., Vol. 10, Nos. 4, 5, 6, p. 54) says of *C. nigricauda*, *C. vulgaris*, and *C. alaskensis* Lock. (Proc. Cal. Acad. Sci., 1876, p. 34), "I am inclined to consider the three species above as the same, but need larger series to decide."

In an unpublished MSS., written previous to the publication of the above list, I find the following notes: "*C. alaskensis* does not appear, on further examination, to be distinct. Minute black spots, like those scattered over the body and hands in the specimens described under this name, are also abundant in fresh specimens of *C. nigricauda* from San Francisco Bay, and sometimes persist in alcohol."

This species, therefore, is known to range along the Pacific coast from Alaska to San Diego, from which last locality were obtained specimens which, from the persistence in a dried state of a single black spot on each side of the tail, were described by me as *C. nigromaculata* (Proc. Cal. Acad., loc. cit.).

Crangon munitus *Dana*, U. S. Ex. Exp. Crust., p. 536, pl. xxxiii, fig. 5.

A well-armed form obtained in Magdalena Bay, Lower Cal., by W. J. Fisher, and having, besides the infra-orbital, antennal, and hepatic spines, four spines upon the upper surface of the carapax, one on each side of the centre line, and two spines in the centre line, the posterior one placed far back, must, I believe, be referred to this species, which is thus proved to have a very considerable range, since Dana obtained it in Puget Sound. The rostrum is broader than usual in the genus, and the last abdominal segment is exceedingly compressed, the abdomen tapering rapidly at the fifth segment.

Hippolyte taylori *Stimpson*, Jour. Bost. Soc. Nat. Hist., vi, p. 500 ext. p. 60), 1857.

Three or four specimens from Magdalena Bay (Fisher) evidently belong to this species, having the peculiar rostrum with the second and third spines almost above the terminal one. The stout first pair of feet, and the second pair reaching to the tips of the maxillipeds, as described by Stimpson. Length of largest specimen $1\frac{1}{10}$ inches.

Hippolyte palpator *Owen*, Zoology of the Voyage of the Blossom (Capt. Beechey), Crustacea, p. 89, pl. xxviii, f. 3, 1839. *Stimpson*, Proc. Cal. Acad., I, p. 89 (1856). *Ibid*, Jour. Bost. Soc., VI, p. 499 (1857).

H. brevirostris of Dana (U. S. Expl. Ex. Crust., I, p. 566, pl. xxxvi, f. 5) is not improbably a variety of this species (vid. Stimpson, l. c., p. 500). A single specimen from the bay of San Francisco in the Museum of the California Academy has but one tooth on the under side of the rostrum near the extremity, which is bifid and furnished with six teeth above. The maxillipeds are very long, about half as long as the entire body, and are spinulose internally at their tips. The basal joint of antennulæ has a spine, longer than the rostrum, at its base. The next joint has a smaller lateral spine and there is a sharp spine on the last joint of the peduncle, immediately over the centre of the third flagellum. The telson has two rows of fine, short, sharp spines, and two larger spines on the posterior margin. The penultimate abdominal segment has two teeth on each side of the posterior margin and the epimera of the two preceding segments are prolonged backward into a spine.

The chief difference between this and Owen's description of *H. palpator* is in the number of rostral teeth, but as these are variable in this genus I hesitate to describe it as new, preferring to refer it to one of the above forms.

Several specimens from Magdalena Bay agree with *H. palpator* in the length of external maxillipeds, but have the rostrum with four teeth above. *H. palpator* was found at Monterey by Capt. Beechey, in the Straits of De Fuca by the Exploring Expedition, and in San Francisco Bay (Stimpson).

Hippolyte hemphillii, described by myself (Proc. Cal. Acad., vii, p. 35 (1876)) from an imperfect dried specimen, is probably only a variety of the above species with an extremely short rostrum. This variety has been found at Magdalena Bay and San Diego. The rostrum is equal in length to the eyes; the terminal tooth is simple, the next smaller and considerably behind the terminal one.

Hippolyte layi Owen, l. c., p. 90, p. xxvii, f. 3.

Owen's description of this species is very brief and the rostrum only is figured. Two examples in the collection of the California Academy from the west coast of Alaska, north of Behring's Straits, agree so nearly with *H. layi* in the form of rostrum that I believe them identical. According to Owen the rostrum has ten spines above and four below, besides the terminal tooth. The specimens above referred to have, as in Owen's figure, a long lamellate ensiform rostrum, below well in front of the eyes are five nearly equal teeth, directed forwards, rostral tip long and sharp; above with seven unequally spaced teeth, the three posterior ones near together and on the carapax. Rostrum as long as or longer than the carapax, and has a thickened midrib from which the spines project as lamellæ of varying width. Antennal spine prominent. One specimen has a prominent spine upon the abdomen at the bend of its central segment. External maxillipeds comparatively short, and hidden entirely beneath the antennal scales. Basal joint of antennulæ spinose. Total length $1\frac{3}{4}$ inches.

Palæmon longipes. Nov. sp.

Rostrum longer than antennal scale, reflexed towards extremity, armed with eight teeth above, and six below, without including the slender bifid terminal tooth. First teeth on upper margin, small, situated on the carapax, and separated from the following six, which are close together, eighth tooth nearer the tip than to the seventh tooth. Six lower teeth nearly equidistant, the first (beginning at the rear) immediately beneath the sixth of the upper series, the sixth beneath the eighth upper tooth. A spine on each side of the carapax, immediately above the antennal scale, and a second spine farther back and slightly below the first. Peduncle of antennulæ shorter than the antennal scale, basal joint armed with a strong spine externally, two external flagella united for some distance, the inner of the two very short, the outer very long, exceeding in length the internal flagella.

Antennal scale longer than peduncle of antennulæ, flagellum as long as the body from tip of rostrum to tail.

External maxillipeds, when extended, reaching somewhat beyond the antennal peduncle, slender, setose, especially on the terminal joint.

First pair of limbs slender, cylindrical, meros half as long again as ischium, carpus longer than meros, and three times as long as the manus; fingers blue, closely fitting, nearly as long as palmer portion of manus.

Second pair of legs exceedingly long and slender (in the male), ischium comparatively short and very slender; meros more than twice as long as ischium, and stouter; carpus exceeding the meros by two

thirds; propodus slightly longer than carpus; fingers parallel, slightly deflected from the line of the palm, without teeth, their inner and outer surfaces densely pubescent.

Manus of the second pair minutely spinulose to the base, of the fingers; carpus and meros spinulose, the spinules larger on the under surface, where they form distinct longitudinal rows.

Posterior legs smooth, cylindrical, sparsely pubescent.

Terminal segment of abdomen with seven spinules, three at the tip the central one fixed, the lateral ones articulated, and two pairs situated farther forward, the anterior pair at about the middle of the length of the segment.

Three or four specimens were taken in Mulege River, on the West coast of the Gulf of California, by W. I. Fisher.

This species closely resembles *P. dasydactylus* Streets (Proc. Phil. Acad., 1871, 225) which is quoted by Kingsley, in his List of North American Caridea (Bull. Essex Inst., Vol. X, Nos. 4, 5, 6) as a synonym of *P. forceps* M. Edward. The principal differences traceable are in the proportions of the joints of the first pair of legs, the manus in the present species being shorter than in *P. dasydactylus*, in the greater length of the articulations of the second pair in this species, as compared with their thickness; and in the spines of the terminal abdominal segment, which are only five in Dr. Streets' species.

The differences are so small, and the resemblances so great, as to suggest the possibility of actual near relationship; and it is not improbable that in this form we meet with the descendants of such of the Atlantic *P. forceps* as penetrated into the Pacific when the oceans were connected at what is now the Isthmus of Panama.

The female resembles the male, except in the second pair of limbs, which are much smaller, smooth, shorter, and more slender, and have the proportions of the joints reversed, the manus shorter than the carpus, and the latter shorter than the meros.

The specimens were obtained in August, and the females were loaded with ova.

The teeth on the upper side of the rostrum vary somewhat, the tip, which is blunt in one specimen, is bifid in another, and one of the males has only eight teeth on the upper edge.

Following are the dimensions of a male and female:—

| | ♂ | ♀ |
|---|--------------|-------------|
| Total length, | 105 millims. | 82 millims. |
| Length of carapax, including rostrum, . | 51 " | 37 " |
| " " flagellum of antennæ, | 110 " | 95 " |
| " " outer flagellum of antennulæ, . | 90 " | — " |
| " " first pair of legs, | 39 " | 25 " |

| | ♂ | ♀ |
|--------------------------------------|--------------|-------------|
| Length of second pair of legs, . . . | 167 millims. | 39 millims. |
| “ “ third pair of legs, . . . | 55 “ | — “ |
| “ “ manus of first pair, . . . | 60 “ | 10 “ |
| “ “ carpus “ . . . | 55 “ | 13 “ |
| “ “ meros “ . . . | 35 “ | 16 “ |

Notwithstanding the great difference in the proportions of the joints of the second pair of limbs in the males and females, I think there is no doubt they belong to the same species, since they were taken on the same occasion, and in other respects resemble each other closely.

In every point except those mentioned above, my specimens agree with Streets' description and figure, yet they are from the western shore of the Gulf of California, while his specimens were from Coatzoalios River, Isthmus of Tehuantepec, and the species has always been known as an Atlantic one. Yet the differences are so small as to be, in my opinion, only varietal, and a parallel case occurs in the genus *Alpheus*, where *A. heterochelis* and *A. minus* are common to both the Atlantic and Pacific shores.

Pontonia margarita *S. I. Smith*, Am. Naturalist, 1869, vol. III, p. 245, foot note.

This species, originally described from individuals collected at Panama, was taken in considerable numbers at Port Escendido, Mulege Bay and Gulf of California, by W. I. Fisher, in August, 1876, at which date the females were with spawn.

The color after a month in spirits, was a light rose tint, with occasionally some dark markings upon the hands.

The specimens agree in every respect with Smith's description, and inhabited the same shell, viz., *Margaritophora fimbriata*.

Pontonia pinnæ nov. sp.

Body slightly depressed; carapax smooth, rostrum elongate-triangular, deflected, the tip lying between the base of the antennulæ; antennal spine prominent.

Peduncles of eyes short, broad ovate, cornea much narrower than the peduncle.

Peduncle of antennulæ exceeding the rostrum by the length of its distal joint, flagella not longer than the two last joints of the peduncle subequal, the outer stouter than the inner.

Antennal scale broad, as long as antennular peduncle, antennal flagellum extending backwards to about the middle of the carapax.

First pair of limbs slender, carpus and meros sub-equal, propodus about two thirds the length of carpus, dactyli about equal to palmar portion.

Second pair greatly developed, equal to the body in the female, and exceeding it in the male; propodus stout, dactyli one half as long as the palmar portion, pollex with two large obtuse teeth on its inner border, and a slightly hooked point, dactylus slender, with a large sharp-pointed, triangular, compressed tooth in the middle of its length, closely fitting between the teeth of the pollex.

Dactyli of hinder four pairs bi-unguiculate.

Three last segments of pleon compressed, a spine on each side of the posterior border of the penultimate segment.

Total length of a well-grown specimen from tip of rostrum to end of abdomen, about 34 millims; length of manus of adult male, 17 millims; ditto of a well-grown female 13 millims.

The females are similar to the males, but the manus of the second pair is somewhat shorter.

Several specimens were taken from the interior of the shell of the common *Pinna*, of the Gulf of California; localities: Angelas Bay, Mulege Bay, San José Island. They were collected in the months of July and August, at which date the females were loaded with eggs.

From *P. margarita* S. I. Smith, this species may readily be distinguished by the much greater development of the manus of the second pair. From M. Edwards' description of *P. tyrrhena* (Hist. Nat. des Crust., Vol. II, p. 361), which inhabits the *Pinna* of the Mediterranean, this species differs in lacking the tooth upon the rostrum.

Sicyonia penicillata n. s.

Rostrum deep, shorter than peduncles of eyes, with four spines above, one forming the tip, the next immediately above and slightly posterior to it, the third midway between the second and fourth, which is upon the carapax. Carina of rostrum extending backwards the whole length of the carapax; developing a strong spine, directed forwards, just anterior to the centre of the carapax, and a stronger similar spine near its posterior border.

Central carina higher behind the former of these spines, curving upwards to the posterior spine, then downwards till it disappears on the posterior border of the carapax.

Spines of rostrum preceded by a few hairs, the central spine of carapax by quite a mane of hairs, and the posterior spine with a similar mane.

A spine on the exterior orbital margin, and a second posterior to it, on the hepatic region.

First segment of pleon with a triangular spine, behind which a low central carina is continued to the extremity of the sixth segment of the pleon, rising into a spine on the posterior margin of the fifth and sixth segments.

Ophthalmic peduncle shorter than the basal joint of antennulæ, cornea large, broader than the peduncle, its width about equal to the length of the visible portion of the latter.

Basal joint of antennular peduncle broad, armed with two sharp lateral spines, one behind the other, in a line with the lateral spines of the carapax; flagella of antennulæ scarcely as long as the two distal joints of the peduncle, the joints much shorter than broad.

Spine of antennal scale extending slightly beyond the antennular peduncle, the squamose portion broad, not longer than the spinose portion.

Peduncle of antennæ slightly shorter than that of antennulæ, its terminal joint setose on its internal margin, flagellum much shorter than the body, its articulations broader than long, especially the proximal portion, where they are depressed and margined with seta internally and externally.

Outer maxillipeds extending beyond antennal peduncle, the propodus margined internally with long setæ.

Meros, carpus and propodus of first pair of legs equal in length, all the joints of second pair longer, but the carpus longer than the meros; in the third pair, which extends beyond the outer maxillipeds when straightened, all the joints are longer than in the second pair, and the slender carpus almost twice the length of the propodus.

Propodi of three first pairs similar, that of the third pair somewhat longest, fingers parallel, equal to the palmer portion in the first and second pairs, but shorter in the third.

Fifth pair longer than the fourth, dactyli laminate.

A spine at the tip of the outer caudal appendage externally.

| | | |
|-----------------------------|-----------|-------------------|
| Length of a large specimen, | | 3 $\frac{1}{8}$ " |
| Length of carapax, | | 0.35" |
| Length of outer antennæ, | | 1.85" |

Dredged from a depth of 14 fathoms, in Bolinas Bay, Lower California; also obtained in Angeles Bay, Gulf of California. (W. J. Fisher.)

Color after two weeks exposure to alcohol, bright red; with a dark red-brown ocellated spot on each side of the carapax. Antennæ bluish.

A longer exposure to alcohol has bleached the body, but the antennæ still show traces of blue, and the spots on the carapax, though obsolete in one specimen, remain dark and conspicuous in another.

This form resembles *S. carinata* Dana (U. S. Ex. Exp. Crust., I, p. 602), but the rostrum is more prominent.