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Studies in Laguna Amphipoda.

II.¹⁾

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With 3 figures in the text.

In the Standard Natural History, edited by JOHN STERLING KINGSLEY in 1884, in speaking of the Amphipoda and Isopoda, there are the following remarks: "These forms, which are mostly small, possess either but very slight popular interest, for but few of them are markedly injurious or beneficial, and their habits are not such as to attract much attention. From a scientific standpoint they also possess but few attractions, for their structure and their mode of development present but slight variations except in minute details." Since the time of Mr. KINGSLEY's observations it has come to be recognized that these forms, though minute, do nevertheless play a very important and indispensable part in the scheme of nature. The importance of these little crustaceans in maintaining the balance of nature, and even in aiding almost directly the comfort of man, should make them of interest to the casual observer as well as to the systematic scientist.

1) Part I of these studies appeared in 1912, First Annual Report Laguna Marine Laboratory.

Perhaps no other animal of macroscopic size along the temperate and arctic shores exists in such innumerable multitudes as do these little laterally compressed Amphipoda, or "sand-fleas", as they are commonly termed. Some of them are sand dwellers, and these serve as scavengers of the beach, as they eagerly devour all the decaying animal and vegetable forms that come their way, while they, in turn, furnish food for many birds. The sea dwellers, although acting as scavengers of the sea, yet serve man best by furnishing food for many fishes. In this relation Prof. VERRILL says: "These small crustaceans are of great importance in connection with our fisheries, for we have found that they, together with the shrimps, constitute a very large part of the food of our more edible fishes, both of fresh and salt waters. The amphipods, though mostly of small size, occur in such immense numbers in their favorite localities that they can always be easily obtained by the fishes that eat them, and no doubt they furnish excellent and nutritious food, for even the smallest of them are by no means overlooked even by large and powerful fishes that could easily capture larger game. Even the voracious blue-fish will feed upon these small Crustacea. They are also the favorite food of trout, lake white-fish, shad, flounders, scup," etc. These suggestions give but a hint of the importance of these tiny, multitudinous creatures to the scheme of nature, and indirectly to the welfare of man.

The amphipods are widely scattered over all the waters of the world, less so, perhaps in those of the tropics. In the ocean, they abound more especially in the littoral regions, but they live also in the greater depths. On the continents they live on the sandy shores, in fresh-water lakes, rivers, wells, caves and underground streams.

It is surmised that ARISTOTLE noted the existence of these small crustaceans. LINNAEUS knew little of them, as it appears from one of his descriptions that he mistook the head for the tail. Various men described individual species, some with considerable accuracy, but they were not brought together as a group until J. C. FABRICIUS in 1775 instituted the genus *Gammarus*. From this time on, a great deal of interest has been evidenced in them. They were first established as an order separate from the Isopoda by LATREILLE in 1816. Then there were various classifications for the subdivisions until 1852 when DANA subdivided the order into three groups, Caprellidea, Gammaridea, and Hyperidea, a classification still used to-day.

Classification
of the species described from Laguna Beach.

Phylum Arthropoda

Class Crustacea

Subclass Malacostraca

Series 2 Eumalacostraca

Division 2 Pericarida

Arthrostraca

B. Amphipoda

1. Legion Gammaridea

Fam. *Lyssianassidae*

Nannonyx dissimilis n. sp.

Fam. *Ampeliscidae*

Ampelisca articulata n. sp.

Fam. *Amphilochidae*

Amphilochus littoralis STOUT

Fam. *Gammaridae*

Caliniphargus sulcus n. g. n. sp.

Fimbriella robusta n. g. n. sp.

Maera simile? n. sp.

Neogammaropsis antennatus n. g. n. sp.

Fam. *Talitridae*

Orchestoidea corniculata n. sp.

Orchestoidea californiana (F. BRANDT)

Orchestia traskiana STIMPSON

Hyailella azteca (SAUSS.)

Allorchestes frequens n. sp.

Allorchestes oculatus n. sp.

Fam. *Podoceridae*

Dulichella spinosa STOUT

Fam. *Aoridae*

Lembos concavus n. sp.

Fam. *Photidae*

Neophotis inaequalis n. g. n. sp.

Photis californica n. sp.

Fam. *Amphithoidae*

Amphithoe corallina STOUT

Acanthogrubia uncinata STOUT

Grubia indentata n. sp.

Fam. *Jassidae*

Ischyrocerus parvus n. sp.

Jassa pulchella LEACH

Fam. *Corophiidae*

Erichthonius disjunctus n. sp.

Of the Amphipoda at Laguna Beach, the most conspicuous species which cannot fail to be noticed by even the casual observer is *Orchestoidea californiana*, with its female, which was originally described as a separate species under the name of *O. pugettensis*. This was present in countless numbers on the beach wherever seaweed had been cast up. South of the pier where great quantities of kelp were washed ashore these animals could be found in multitudes. In the day-time they burrow deep in the sand or hide under bunches of seaweed near the water line. This is probably for the purpose of escaping their various enemies. Birds feed on them, and when they are in a weakened condition, they fall a prey to swarms of Anthomyiid flies, *Fucellia costalis*. At noon on August 2nd, when an enormously high tide, accompanied by tremendous breakers, came in, we observed these and all the other creatures of the beach hurrying up the sands to escape the waves. This was the only time on which we observed their coming out in the day time. Soon after sunset in the evening, however, they always burrowed up from the sand, and hopped about all over the beach. They are very active, but their great numbers rendered a collection of them very easy to obtain. These animals are white with the front portion of the ridge of the back and the antennae colored a rather bright orange. None of the forms from the sands display the brilliant and beautiful colorings of those whose habitat is among the algae.

Orchestoidea corniculata n. sp. was occasionally seen among the larger and more numerous members of the genus, and was easily distinguished from them by its pink coloration. Many smaller amphipods were also very common on the sands, and were not nearly so hard to find in the day-time as the *O. californiana*. As they burrowed less deep in the sand, as well as nearer the water's edge, they were often compelled by the waves to change their hiding places.

In a little salt slough kept wet by occasional fillings from very high tides, and full of decaying seaweed, I found and collected quantities of the grayish brown and green *Orchestia traskiana*. These commonly slid around on their sides in the slime, but could also jump freely when out from underneath the algae.

The family *Talitridae* is by far the greatest in numbers of any family of amphipods around the littoral margins of the bay. Besides the three forms already mentioned from the beach, the little rose-tinged *Allorchestes frequens* n. sp. abounded in tufts of coralline algae

between tides, and was collected throughout the summer. It was also frequent among the long, bright green *Phyllospadix*. On July 13th a good quantity of them were brought in by Mr. HALL from the tangles which he had set below tides. On July 8th I collected a still different species of *Allorchestes*, *A. oculata* n. sp. from the coralline algae on the rocks at Aliso Point about two and one half miles south of Laguna Beach. The only freshwater amphipod, *Hyalella azteca* (SAUSS.) taken during the summer belonged to this family. It was caught in the nets by Mr. HALL in the freshwater lakes about five miles inland. These tiny little light green and bluish green forms were rather common among the reeds and other thick, hydrophytic vegetation near shore.

The family *Gammaridae*, while not furnishing such a great number of specimens as the *Talitridae*, also showed considerable variety in habitat. In the tide-pools north of the pier we collected a good many specimens of *Caliniphargus sulcus* n. sp. from under rocks between tides. *Fimbriella robusta* n. g. n. sp. was quite common, and *Maera simile* n. sp. occasional in a large kelp holdfast which floated in to the breaker line from deep water, while *Neogammaropsis antennatus* n. g. n. sp. occurred in considerable numbers in tufts of coralline algae between tides.

Of the families most abundant among the *Phyllospadix* were the *Amphiloichidae* and the *Jassidae*. Of the *Amphiloichidae*, I worked out but one species, the very minute, rose colored *Amphiloichus littoralis* n. sp. Others similar in general appearance, but greatly different in color, some ivory white, others solid black, and still others transversely striped, were quite numerous. These have not yet been examined carefully for differences in other details but are apparently only extreme color forms of one species. Two genera of the *Jassidae* were represented, *Jassa pulchella*, found in many parts of the world, and the white *Ischyrocerus parvus* n. sp.

More conspicuous among the corallines but not so numerous as *Allorchestes frequens* was the large, beautiful green and white *Amphithoe corallina* STOUT. Besides these and *Neogammaropsis antennatus*, already mentioned, also occurred the Amphithoid, *Grubia indentata* n. sp., small in size and inconspicuous in coloring.

Twice during the summer we were able to bring in from the breaker line large kelp holdfasts which had just been washed loose and carried in from deep water still loaded with their usual inhabitants. The largest amphipod, though not at all common, found on

them, was the tube dweller, *Ancanthogrubia uncinata* STOUT. Perhaps most common of the dwellers in the kelp from deep water was the species, *Nannonyx dissimilis* n. sp. of which there were hundreds in one holdfast. Besides the fact of their numbers, these forms were rather conspicuous in the bright orange eggs of the females. Of nearly the same size and also with rather thick bodies was the much less common *Ampelisca articulata* n. sp., distinguished by the bright red and black marks on its head. Of the deep water amphipods, besides these and the two Gammarids previously mentioned, *Fimbriella robusta* and *Maera simile*, there were five other species. The beautiful *Dulichkiella spinosa* STOUT, of a delicate green color with red spots, was quite common. Less frequently found was *Lembos concavus* n. sp. The little *Neophotis inaequalis* n. sp. with its slender arched body, delicate pink coloring, and bright eyes, was occasionally found, as was also *Photis californica* n. sp., and the brown, orange-eyed *Erichthonius disjunctus* n. sp.

None of the Legion Hyperiidea were recognized. Of the Legion Caprellidea several species were taken from the kelp holdfasts, and a few from Phyllospadix, though they were nowhere common.

Nannonyx dissimilis n. sp.

Body stout, curved, smooth. Head not rostrate; side-lobes large and triangular. Eyes large, black, irregular, sometimes dorsally confluent. Side-plates deep, not serrate, the 5th about one half the depth of the 4th and bi-lobed, both lobes of about equal depth.

Antenna 1 with peduncle stout, first joint elongate, second and third short, the second slightly the longer; flagellum 13-jointed, accessory flagellum 8—9-jointed. Antenna 2 about equal in length to Antenna 1, slender, peduncle longer than the 14-jointed flagellum, penultimate joint of peduncle longest, antepenultimate slightly shorter than ultimate. Gnathopod 1 long, slender, and non-chelate. Gnathopod 2 long, slender, third joint elongate, fifth much longer than sixth, fifth and sixth densely covered with short setae, sixth small, palm and finger minute. Pereiopods 1—2 slender, second joint not produced, fourth joint produced distally behind with seta at apex. Pereiopods 3—5 successively increasing in length, second joint produced distally behind. Pleopods well developed, biramous, with retinacula. Uropods 1—2 rami subequal, shorter than peduncle. Uropod 3, rami shorter than peduncle, outer ramus two-jointed, slightly longer than inner, the peduncle with a number of plumose

spinules on inner margin. Telson, short, entire, longer than wide, rectangular, the apex very slightly incurved, with a small spine on each distal corner.

Mandible, palp 3-jointed, the second longest, and third curved; cutting plates not dentate; molar obsolescent; brush on spine-row near usual position of molar. Maxilla 1, inner plate very small, tipped with two setae; outer plate with eight notched teeth; palp large, two-jointed, the second joint long, but unarmed, with the apical edge crenulate. Maxilla 2, outer plate the longer, both but very slightly fringed on inner margin. Maxillipeds, palp not elongate, 4-jointed, the fourth small with minute nail; outer plates large, minutely crenulate; inner plates small, slender, apex irregular, sparsely armed.

This species differs from all others in the same genus in having the inner plate of the maxilliped narrow, yet not elongate, and in having the flagella of the antennae longer.

Color, white. The females carrying bright orange eggs.

L. 4—6 mm.

Very numerous in kelp holdfast from deep water. Laguna Beach, Calif.

Ampelisca articulata n. sp.

Body very plump, smooth. Head not rostrate. Four corneal lenses, the lower pair occupying the lower corners of the head. Side-plates deep, the fourth very large, excavate behind, the fifth bilobed, very much shorter than the fourth. All the side-plates setose on the lower edge. Pleon segment 3 quadrate at lower, hind corner, postero-lateral angles not bisinuate. Pleon segment 4 minutely produced. Antenna 1, peduncle shorter than the 24—30-jointed flagellum, ultimate joint short, penultimate and antepenultimate subequal in length; without an accessory flagellum. Antenna 2 longer, the flagellum longer than the peduncle, ultimate and penultimate long, nearly equal, with the penultimate possibly slightly longer; flagellum slender, 23—34-jointed. Upper lip rounded, slightly concave at apex. Mandible with palp long, second joint longer than the third; cutting plates dentate; spines in spine-row numerous; molar small. Maxilla 1, inner plate small, triangular, and armed with about six setae; outer plate with ten spines; palp two-jointed, the second joint long, broad, and spinose. Maxilla 2, inner plate fringed apically and on inner margin; outer plate a little longer

and armed only on apex. Maxillipeds with inner plate small, slender; outer broad, as long as the first two joints of the four jointed palp.

Gnathopod 1, very slender, very setose; the fifth joint as long and wide as sixth; sixth joint without palm; finger long, spinose. Gnathopod 2, similar to 1, but, in proportion, longer and more slender; sixth joint, especially, densely setose. Pereiopods 1 and 2, small and slender; second and fourth joints long; seventh joint as long as the sixth; 2 somewhat longer than 1, and both armed with long, plumose setae. Of pereiopods 3, 4 and 5, pereiopod 3 the longest; second joint expanded, finger very small. Pereiopod 4, second joint almost square, and wider than in any of the other pereiopods, the rest of the leg smaller than in 3. Pereiopod 5 smallest, the second joint about as long as all the rest of the leg, the greatest breadth near the lowest part, and produced down to the fourth joint behind; lower edge of second and back of fourth with long, plumose setae; the third joint very slightly shorter than the fourth; fourth and fifth joints nearly equal in length; sixth joint curiously oval; seventh joint broadly lanceolate, at least half as long as the sixth, much longer than in 3 and 4. Pleopods normal, biramous. Uropod 1, rami and peduncle subequal in length; rami lanceolate, subequal. Uropod 2 shorter; rami unequal, lanceolate. Uropod 3 produced beyond the others; rami longer than peduncle; inner ramus longer and broader than outer, serrate and toothed on inner margin. Telson reaching about to the distal end of uropod 3, cleft nearly to the base with a short spine in each of the emarginate apices.

Color, white, with bright red and black spots about head.

L. 4—6 mm.

Frequent in kelp holdfast from deep water. Laguna Beach, Calif.

Genus *Caliniphargus* n. g.

Head not rostrate. Eyes well developed. Side-plates 1—4 much deeper than the following. Some of the pleon segments with dorsal teeth. Antenna 1 the longer, with two-jointed accessory flagellum. Upper lip rounded. Lower lip without inner plates. Maxilla 1, inner plate with seven plumose spinules; outer plate with seven toothed spines. Maxilla 2, inner plate fringed on inner margin. Maxillipeds, outer plates large, palp not greatly elongate. Gnathopods 1 and 2 unlike each other and differing in male and female. Uropod 3 elongate, outer ramus long, one-jointed, inner minute. Telson cleft to base.

In Mr. STEBBING's key to the *Gammaridae* given in Das Tierreich, this runs to *Neoniphargus*, but differs very markedly from it, especially in the characteristics of the gnathopods, uropods, and telson.

Caliniphargus sulcus n. sp.

Eyes of good size, black. Side-plates of moderate depth, 1—4 much deeper than the following, the fourth the deepest and widest, the fifth shallow and bilobed. Pleon segments 4 and 5 toothed dorsally. Antenna 1 the longer; accessory flagellum two-jointed, peduncle not as long as flagellum, second joint of peduncle slightly longer than the first, much longer than the third; flagellum, 25—30-jointed. Antenna 2 with peduncle longer than the 10—15-jointed flagellum, ultimate and penultimate joints nearly subequal. Mandible with molar well developed, 5 spines in spine-row, cutting plates dentate, palp 3-jointed. Maxilla 1, inner plate with fringe of eight long, plumose spinules; outer plate with seven toothed spines; palp 2-jointed, longer than either plate, second joint expanded and apically fringed with blunt spines and a few setae. Maxilla 2, outer plate the longer and larger; inner fringed apically and on inner margin. Maxillipeds, inner plates rather short, well fringed along apex and inner margin with plumose setae and a few short spines; outer plates large, thickly armed with blunt spines; palp 4-jointed, the third joint broad, the fourth slender, apparently with nail.

Gnathopod 1 of the female, second joint long, with slender setae; fourth joint with stiff, short, brush-like spines behind; fifth joint both wider and longer than the sixth; sixth joint with convex, setose palm, finger small, fitting closely over the palm. Gnathopod 1 of the male similar to the female, but with the second joint more expanded; fifth joint much longer than sixth; the sixth much expanded apically in front, hand much excavate about palm, palm transverse, spinose, very small; finger very minute. Gnathopod 2 of the female somewhat larger than 1; fifth joint as wide but not as long as sixth; fifth and sixth joints, especially, thickly armed with slender spines, some of them compound; finger strong, fitting into groove along the finely serrate, slightly convex, oblique palm. Gnathopod 2 of the male much larger than in the female; second joint slightly produced; third joint long; fourth joint produced into small tooth at distal hind end; fifth joint about half as long as sixth, cup shaped; sixth joint large, closely covered with compound spinules, palm oblique, not clearly defined; finger strong, fitting tightly into

the very deep groove. Pereiopod 1, long and very slender, the second joint but very slightly produced; fourth joint somewhat produced. Pereiopod 2 similar, slightly shorter. Pereiopods 3—5 successively longer; the second joint produced into a plate and produced down behind over the third joint. Pleopods well developed. Uropod 1, peduncle longer than the slender, subequal rami. Uropod 2 shorter than 1; peduncle subequal to the subequal rami. Uropod 3, rami elongate, strongly spinose, inner very small. Telson short, cleft to the base, each apex with two small setae.

Color, violet gray, mottled; some of the specimens with the margins of the segments marked with black.

L. 5—8 mm.

Under rocks between tides. Laguna Beach, Calif.

Genus *Fimbriella* n. g.

Body rather thick. Head not rostrate. Side-plates 1—4 of moderate depth, the fifth about one-half the depth of the fourth. Pleon segments 4 and 5 subdorsally toothed. Antennae 1 and 2 nearly equal in length; antenna 1 with peduncle elongate, the second joint the longest, assessor flagellum well developed. Upper lip rounded symmetrically. Lower lip with inner plates. Mandible with palp large, second joint slightly longer than the third. Maxilla 1, inner plate with numerous small setae, outer plate with ten spines. Maxilla 2, inner plate fringed on inner margin. Maxillipeds, inner plates without the usual three spine teeth. Gnathopods 1 and 2 subchelate, differing in male and female. Pereiopods slender; 1 and 2 with second joint not produced; 3—5 successively longer, the second joint produced into a plate. Uropod 3 extending beyond the rest, rami subequal. Telson partly cleft.

This genus differs from *Maera* in having a rather thick body, pleon segments 4 and 5 subdorsally toothed, antennae 1 and 2 of nearly equal length, the inner plate of maxilla 1 with numerous small setae, and the inner plate of maxilla 2 fringed on the inner margin.

Fimbriella robusta n. sp.

Side lobes of head produced to small, acute processes. Eyes large, black, long. Antenna 1, peduncle elongate, the second joint the longest and the first and the third nearly equal in length;

flagellum 18-jointed; accessory flagellum 9—11-jointed. Antenna 2 set far back below; first three joints of peduncle distinct, ultimate and penultimate subequal; flagellum 15—20-jointed. Upper lip rounded, without emargination. Lower lip developed, mandibular processes small. Mandible with molar well developed, several spines in spine-row; cutting plates small and dentate; palp large, 3-jointed, the second joint slightly longer than the third, the third with long, slender setae. Maxilla 1, inner plate small with numerous small setae on inner margin; outer plate with ten spines; palp two-jointed, produced beyond the outer plate, expanded apically and armed with spines. Maxilla 2, inner plate fringed on inner margin and apex; outer plate the larger, apically fringed. Maxillipeds, inner plates quadrate, with plumose spinules; outer plates rather large, with blunt spines and setae; palp long, 4-jointed, the fourth joint long, tapering, curved.

Gnathopod 1 of the female, the whole gnathopod somewhat setose; the second joint long, scarcely produced; fifth joint longer and nearly as wide as sixth; sixth joint oval, palm oblique, slightly convex, defined by small spines; finger, long, serrate. Gnathopod 1 of the male similar to the female, except that the second joint is more expanded and thickly armed with long setae. Gnathopod 2 of the female larger than 1; the fourth joint quadrate; the fifth cup shaped, shorter but nearly as wide as sixth; the sixth longer and much stronger than in 1, palm oblique, four serrations on the half nearer the finger hinge, tooth and spine at apex; finger long, serrate. Gnathopod 2 of the male larger and stronger than in the female; second joint densely setose; fifth joint not as long but subequal in with to the sixth; palm oblique, deeply incurved on either side of the middle, serrate process between the two excavations; finger strong, longer than the palm. Pereiopods 1 and 2 slender, not expanded. Pereiopod 3 longer, second joint with spines in front; and produced into a serrate plate extending over the third joint behind; the fourth joint rather large and wide; fifth short; sixth long; finger blade shaped. Pereiopods 4 and 5 successively longer than 3. Pleopods well developed, with two rami. Uropod 1 with the peduncle slightly longer than the rami; the inner ramus slightly the longer; both rami and peduncle armed with spines. Uropod 2 with the peduncle shorter than the rami; inner ramus the longer. Uropod 3, peduncle subequal to the subequal rami; extending further

back than the other two uropods. Telson short, partly cleft, apices each armed with one spine and three setules.

Color, sordid white, speckled with black.

L. 4—7 mm.

Frequent in kelp holdfast from deep water. Laguna Beach, Calif.

Maera simile n. sp.

Head with very minute rostrum; side-lobes rounded, but little produced. Side-plate 1 produced forward; side-plate 4 neither excavate nor serrate behind; side-plates 5 and 6 with backward turning projections near lower hind corners. Pleon segment 3 with the postero-lateral corners acutely produced, and faintly serrate above. Antenna 1, first and second joints of the peduncle long and subequal, the third shorter; flagellum 23—24-jointed; accessory flagellum 10-jointed. Antenna II shorter than I, peduncle elongate, the penultimate joint the longest; flagellum short, 10—11-jointed. Upper lip symmetrically rounded. Lower lip with the inner lobes not developed. Mandible with molar small; about six small spines in spine-row; cutting plates small, weakly dentate; palp three-jointed, the second joint slightly the longer and wider. Maxilla 1, inner plate with four apical setae; outer plate with nine toothed spines; second joint of palp tipped with setae. Maxilla 2, outer plate both broader and longer than inner, both apically fringed, the inner slightly fringed on the inner margin. Maxillipeds, inner plate rectangular; broadly curved; palp 4-jointed.

Gnathopod 1 slender, the fifth joint produced, incurved on the front margin, longer than the sixth; the sixth similar to gnathopod 2, but much smaller; the palm convex, with small spines. Gnathopod 2 of the female with the fourth joint produced into an acute process behind; the fifth joint rather broad; the hand broad, palm oblique, serrate and spinose, with the usual two spines at the apex, finger strong with slender setules on the outer side. Gnathopod 2 of the male very large, second joint broadly expanded; palm long, oblique, spinose, serrate, one excavation between hinge and middle of tooth, and one wide excavation between the middle and the apex. with one to three small teeth in the middle of the excavation. Pereiopods 1 and 2 slender, the second joint curved, and the finger narrowed and toothed. Pereiopods 3—5 slender, the second joint somewhat produced, serrate behind, and produced half way down the third

joint. Uropod 1 long, the peduncle longer than the rami; the outer ramus slightly the longer and broader. Uropod 2 slightly longer than 1. Uropod 3 prominent, though easily broken off; the peduncle shorter than the rami; the outer ramus with clusters of spinules on the outer edge; the inner ramus but sparsely spinose; both with numerous spinules at apex, extending somewhat beyond uropod 1. Telson cleft, longer than broad, the apices tridentate with a seta in each indentation.

Color, dull, bluish green, with violet antennae. The females carrying green eggs.

L. 5–8 mm.

Kelp holdfast from deep water. Laguna Beach, Calif.

Genus *Neogammaropsis* n. g.

Body slender, strongly arched. Head without rostrum; side-lobes produced roundly between the first and second antennae. Eyes well developed. Side-plates 1–4 of about equal depth; the fifth shallow, bilobed. Antenna 1 the longer, accessory flagellum one-jointed. Upper lip rounded. Lower lip with inner plates. Mandible normal, second and third joints of the palp subequal. Maxilla 1, inner plate with few setae; outer plate with seven spines. Maxilla 2, inner plate fringed a short distance from apex down inner margin. Maxillipeds with elongate palp. Gnathopod 2 the larger, differing in shape in male and female, large in the male. Pereiopods slender, the second joint somewhat expanded in pereiopods 3–5. Uropod 3 well developed, but not elongate, the outer ramus larger and somewhat longer than inner. Telson small, partly cleft.

Neogammaropsis antennatus n. sp.

Eyes of good size, black, lateral. Side-plate 4 excavate behind; side-plate 5 with the front lobe the deeper. Antenna 1 stout, peduncle and flagellum subequal; the first and second joints of the flagellum subequal in length, the third much shorter; flagellum with 17–18 joints; accessory flagellum 1-jointed, about half as long as the first joint of the primary flagellum. Antenna 2 shorter, stout; peduncle longer than flagellum, the last two joints longest and subequal in length; flagellum stout, 9–10-jointed. Mandible, molar large, three or four spines in spine-row; cutting plates dentate; palp large, the second and third joints about equal in length, the third

curved and spinulose along edge with three long setae at apex. Maxilla 1, inner plate small with two setae at apex, outer plate with seven toothed spines; palp large. Maxilla 2, both plates apically fringed, the fringe of the inner bordered by two plumose setae. Maxillipeds, inner plate small, the outer longer and broader, fringed with long setae; palp long, 4-jointed, the fourth with claw.

Gnathopod 1 of the male very small, slender; fifth joint very setose, as wide and almost as long as the sixth; sixth with oblique, spinose palm; finger small, moderately long. Gnathopod 1 of the female similar to the male but smaller. Gnathopod 2 of the male longer than 1; fourth joint rather long, slightly produced behind with seta at apex; fifth joint setose behind, shorter behind than in front, as wide but much shorter than the sixth; sixth joint long and powerful, palm long, not clearly defined, exceedingly oblique, with short transverse process near finger hinge, and small, thumb-like process a little lower; hand setose below the palm; finger powerful, curved. Gnathopod 2 of the female similar to the male, though much smaller, except for the sixth and seventh joints; palm oblique, slightly setose; finger not very strong. Pereiopod 1 slender, second joint not produced, the dactyl large with claw and seta at claw's base. Pereiopod 2 similar to 1 but smaller. Pereiopod 3 rather small, stout, the second joint broadly expanded down behind to distal end of third, the dactyl smaller than in 1 and 2. Pereiopod 4 longer, the second joint longer in proportion, the fourth joint produced proximally behind and distally in front. Pereiopod 5 a little longer than 4, the second joint slightly wider, dactyl with abrupt narrowing. Uropod 1 with the subequal rami shorter than peduncle. Uropod 2 short, the rami and peduncle nearly equal in length, the outer ramus much longer than the inner. Uropod 3, outer ramus as long as peduncle, broad, thick, and very spinose; inner ramus narrower and shorter with two or three spines at apex. Telson small, partly cleft, with several spines in each incurved apex.

Color, pale grayish lavender with the appendages a little darker, and the flagella of the antennae with two rings of white and dark violet.

L. 3—4 mm.

From tufts of coralline algae between tides. Laguna Beach, Calif.

Orchestoidea corniculata n. sp.

(Compare Figs. A—C.)

Body smooth. Side-plates of good size, the fifth neither so wide nor deep as the fourth. Eyes of moderate size, black, reniform, rather wide apart. Antenna 1 reaching about to the middle of the penultimate joint of antenna 2; flagellum 4-jointed, shorter than peduncle. Antenna 2 in the male frequently approaching half the length of the body; in the female usually about one fourth the length of the body; the peduncle much longer than the 14—18-jointed flagellum. Mouth parts normal. Gnathopod 1 of the male, spinose;

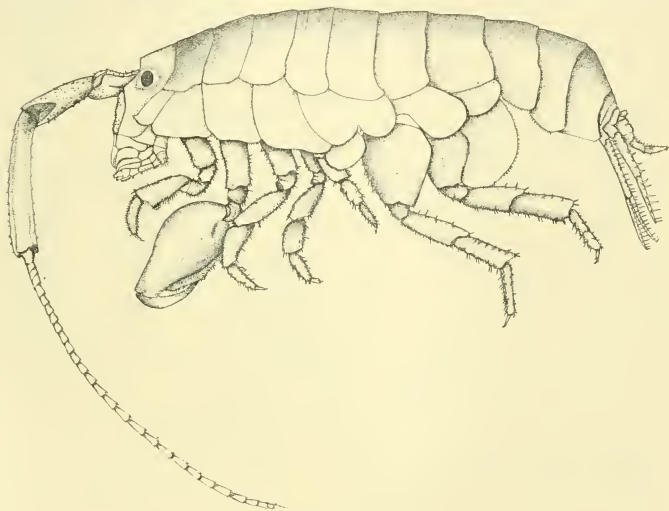


Fig. A. *Orchestoidea californiana* (F. BRANDT).

fifth joint with small, triangular, apical process on hind margin; sixth joint shorter, narrow and without palm. Gnathopod 1 of the female similar but without the apical process on the hind margin of the fifth joint. Gnathopod 2 of the male with small fifth joint; large sixth, palm oblique, spinose, with prominent transverse process extending about one third of the distance from the finger to the apex; finger large, strongly curved, with apex touching groove in

hand. Gnathopod 2 in female, second joint very large, long, and broadly oval, the membranous expansion fringed with spinules, fourth joint having at apex of hind margin a long, slender, triangular process; fifth joint somewhat swelled, little longer than sixth; sixth joint slender, the rounded apex produced considerably beyond the

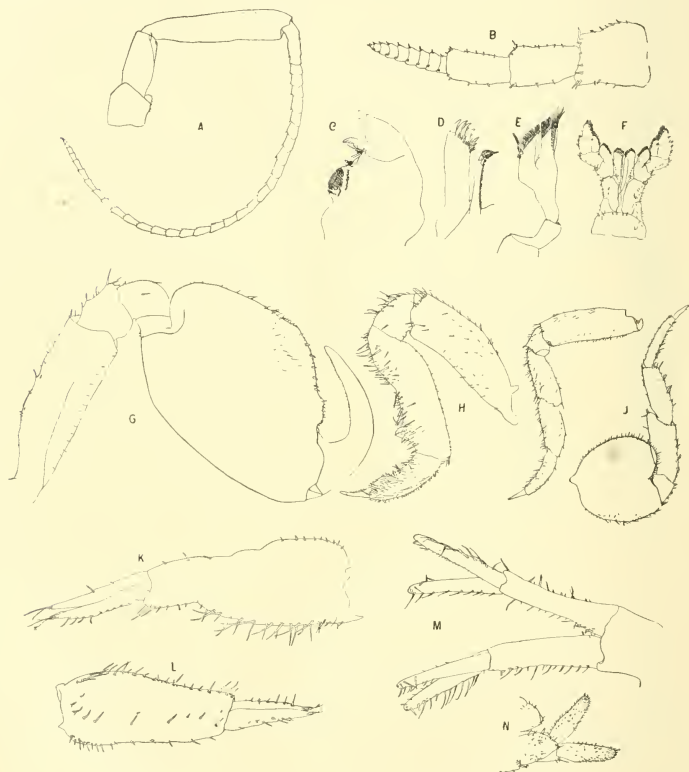
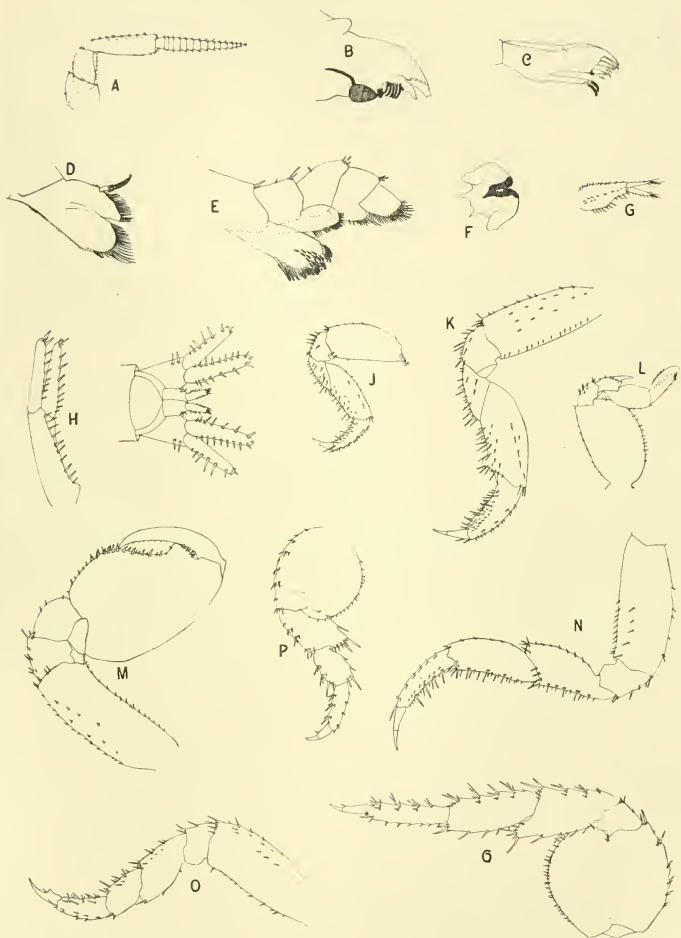


Fig. B. Details of *Orchestoidea californiana* (F. BRANDT).

A second antenna. B first antenna. C mandible. D first maxilla. E second maxilla. F maxillipeds. G second right gnathopod. H first right gnathopod. I first pereopod. J fifth pereopod. K first pleopod. L third pleopod. M first uropods. N telson and third uropod.

Fig. C. Details of *Orchestoidea corniculata* n. sp.

A second antenna of female. B mandible. C first maxilla. D second maxilla. E maxilliped. F lower lip. G third pleopod. H first uropod. I second and third uropods and telson. J first gnathopod of female. K first gnathopod of male. L second gnathopod of female. M second gnathopod of male. N second pereopod. O second pereopod. P third pereopod. Q fifth pereopod.

very short, spinose palm; finger very small. Pereiopod 2 shorter than pereiopod 1, with finger abruptly narrowed near the middle. Pereiopods 3—5, second joint roundly expanded. Pereiopods 4 and 5 long. Pleopods small; rami one-jointed, tipped with a few compound setules. Uropod 1 long, peduncle and both rami spinose. Uropod 3, ramus subequal in length with the peduncle. Telson simple, much broader than long, just reaching base of peduncle of third uropod.

Body variously mottled with red and brown. Appendages white. L. 10—15 mm.

This species closely resembles *O. californiana*, with its female *O. pugettensis*, which were exceedingly numerous in the same locality, but differs from it especially in size, color, and length of the second antenna.

Occasional in sand along high-tide mark. Laguna Beach, Calif.

Allorchestes frequens n. sp.

Body smooth. Head without rostrum; side-lobes not produced forward. Eyes small, black, lateral. Side-plates fairly deep. Antenna 1 with joints of peduncle successively narrower, antepenultimate longest, ultimate but slightly shorter than penultimate, peduncle much shorter than the 12—13-jointed flagellum. Antenna 2 much longer than 1; peduncle short, with joints successively longer; flagellum 31—34-jointed. Mandible, molar large; cutting plates dentate; several spines in spine-row; without palp. Maxilla 1, inner plate slender with two plumose setae at apex; outer plate longer with nine toothed spines; palp slender, one-jointed with spine on apex. Maxilla 2, outer and inner plates apically fringed with setae, the inner edged with single plumose seta on inner margin. Maxillipeds, outer and inner plates small and slender, inner almost as long as the outer, with three spines at apex; palp 4-jointed, long and setose. Lower lip without inner lobes. Upper lip broadly rounded.

Gnathopod 1 of the female small and slender; the second joint produced somewhat at distal end; fifth joint produced behind, setose; sixth joint longer, slender, palm obliquely convex; finger strong, longer than palm and closing between spines. Gnathopod 1 of the male similar to the female, though a little stouter. Gnathopod 2 of the female with the second, fourth, and fifth joints wider than in 1; sixth more narrow in proportion, palm more oblique; the fourth joint produced as far behind as the fifth. Gnathopod 2 of the male,

second joint produced distally behind; third joint with process, fourth produced; sixth joint broad and thick; eight or nine spines on either side of the deep groove in the oblique palm, into which the strong finger closes. Pereiopod 1, second joint but moderately expanded; fourth longer than fifth, but shorter than sixth; dactyl long, curved. Pereiopod 2 similar, a little smaller. Pereiopod 3, second joint produced into plate, notched in middle behind; fourth and fifth joints subequal; sixth long; dactyl similar to 1 and 2. Pereiopods 4 and 5 similar, but longer. All three pair of pleopods well developed, biramous, with finely compound spinules. Uropod 1 longest, the subequal rami shorter than the peduncle. Uropod 2 with the inner ramus longer and broader, armed on the inner margin. Uropod 3 with but one ramus.

Specimens from the coralline algae between tides were of a soft pinkish violet color with some variations. Those from the tangles set below tides were of a rather dull orange green color.

L. 3–5 mm.

From tufts of coralline algae and from *Phyllospadix* between tides; also from tangles set below tides. Laguna Beach, Calif.

Allorchestes oculatus n. sp.

Differs from *A. frequens* in the following characteristics: Antenna with ten-jointed flagellum. Antenna 2 with peduncle nearly as long as the 8-jointed flagellum. Gnathopod 2 of the male with the sixth joint produced proximally in front, palm more oblique and very long. Eyes very large, black, and almost contiguous behind.

Head and front of body mottled with bright orange; the rest of the body mottled with dark shades of brown, green and violet; antennae, sage green; the other appendages either transparent or tipped with green.

Occasional in tufts of coralline algae between tides at Aliso Point, two miles south of Laguna Beach, Calif.

Lembos concavus n. sp.

Body slender, smooth. Head without rostrum; sidelobes produced between antennae. Eyes small, lateral. Sideplate 1 produced slightly forward; the fourth not excavate behind; the bilobed fifth with the front lobe as deep as the fourth. Antenna 1 longer than 2; peduncle with first joint longer than the third, second longer than the first;

the 20—32-jointed flagellum longer than the peduncle; accessory flagellum of 10 joints. Antenna 2, peduncle elongate, ultimate and penultimate joints subequal, longer than the antepenultimate; peduncle longer than the 10-jointed flagellum. Upper lip broad, apically rounded. Lower lip with both inner and outer plates well developed, mandibular processes prominent. Mandible, molar prominent, with usual seta; cutting plates dentate; nine spines in spine-row; palp very large, the second and third joints elongate, third longest and armed with numerous compound setae. Maxilla 1, inner plate short, broad, triangular, tipped with one long plumose seta reaching to the apex of the outer plate, outer plate with ten spines; palp large, two-jointed, longer than outer plate, tipped with setae and eight spines. Maxilla 2, outer plate the longer, apically fringed; inner plate fringed apically and along inner margin. Maxillipeds with inner plates fringed apically and on inner edge with plumose setae; outer plate not quite reaching distal end of second joint of palp, and armed with numerous short spines; palp not elongate, the fourth joint small.

Gnathopod 1 of the female, fifth joint large; sixth with palm setose, oblique, with spine at apex; finger strong, curved, serrate. Gnathopod 1 large, strong, the second joint thick; the fourth produced to a point; the fifth large, broad, cup-shaped; the sixth longer and broader, palm transverse with setae and small spines, abrupt, deep notch between middle and hinder margin of palm, bounded by a tooth not as long as the rest of the palm; finger long. Gnathopod 2 of the female smaller than 1, but in proportion longer and more slender, more setose. Gnathopod 2 of the male small, slender, very setose; fourth joint produced to a point in front; fifth joint as wide but not as long as sixth, palm slightly convex, slightly oblique; finger serrate. Pereiopods slender, no joints expanded, finger long. Pereiopods 1 and 2 with the fourth joint strongly setose in the male. Pereiopod 5 greatly elongate. Uropods 1—3 extended about equally far back. Uropod 1 with nearly equal rami. Uropod 2 with the inner ramus the longer and thicker. Uropod 3 biramous, rami subequal, slender, longer than the peduncle. Telson simple, short, the broad apex slightly concave with a tiny tooth and setae on either side.

Body ringed with dark brown and white; antennae ringed with reddish violet and white; the females carrying bright blue eggs.

L. 5—7 mm.

This species differs from *L. hirsutipes* in having pereopod 5 greatly elongate; antenna 1 and 2 with more joints in flagella; telson with concave apex. Occasional in kelp holdfasts from deep water. Laguna Beach, Calif.

Genus *Neophotis* n. g.

Body slender. Side-plates irregular and not contiguous; the fifth not as deep as the third and fourth. Antenna 1 with the first joint of the peduncle longer than the third; accessory flagellum 1-jointed. Both antennae long and not differing greatly in length. Upper lip rounded, slightly insinuate. Lower lip with both plates well developed. Maxilla 1, inner plate armed with several very fine setae; outer plate with ten spines. Maxilla 2, inner plate fringed along inner margin. Maxillipeds with elongate slender palp. Gnathopod 1 small and slender, the fifth joint longer than the sixth. Gnathopod 2 similar in both sexes; much larger than 1; sixth joint larger than the fifth. Pereiopods 1 and 2 with the second and fourth joints swelled. Pereiopods 3—5 successively larger, the third very small. Uropod 3 the shortest; rami slightly unequal, setose. Telson rectangular, slightly emarginate.

This genus appears to be nearest the genus *Eurystheus*, but differs from it in the irregular side-plates; the fifth side-plate without deep front lobe; the third joint of antenna 1 not elongate; the accessory flagellum of but one joint.

Neophotis inaequalis n. sp.

Body slender, strongly flexed. Head not rostrate; side-lobes rounded and produced between the antennae. Eyes lateral, of moderate size, and irregular in shape, located back and slightly above the side-lobes. Side-plates shallow, irregular, and not contiguous; side-plate 1 produced forward and rounded below; side-plate 2 deeper than the following, produced to a point at the distal, front margin with a single seta at the apex; side-plates 3 and 4 much shallower, triangular in shape; side-plate 5 still shallower but not narrowed distally. Antenna 1 somewhat longer than 2; the peduncle longer than the 9—10-jointed flagellum; the second joint of the peduncle slightly longer than the first, the first longer than the third; accessory flagellum 1-jointed. Antenna 2 with the ultimate and penultimate joints of the peduncle nearly equal; the peduncle longer than

the seven-jointed flagellum. Lower lip large. Mandible with very large palp, 3-jointed, the third with very long plumose setae; cutting plates dentate; spines in spine-row; molar well developed. Maxilla 1, inner plates small, armed with several very fine setae; outer plate with ten toothed spines; palp two-jointed, the second joint longer than the outer plate, tipped with spines. Maxilla 2, inner plate fringed at apex and on inner margin with long spinules; outer plate apically fringed. Maxillipeds, inner plate tipped with three tiny spines and four thick, short, plumose setae, and four somewhat longer setae on the inner edge; outer plate armed, though not thickly, with spines and setae; palp slender, elongate, four-jointed, with compound setae.

Gnathopod 1 of the female small, very slender; fifth joint longer than sixth; palm not well defined; finger long. Gnathopod 2, fifth joint large, but not so long nor quite so wide as sixth; palm serrate, slightly oblique, spine-like defining process at apex; finger strong, curved. Pereiopods 1 and 2 long, second and fourth joints tumid, the second incurved behind, the fifth and sixth joints small and short, the seventh very small. Pereiopod 3 very small, joints quite round, finger curved and notched towards tip. Pereiopod 4 somewhat larger and longer than 3, though not nearly so large as 5. Pereiopod 5, second joint large and long, the fourth joint not so large in proportion as in 1 and 2; finger small but similar in shape to that of 3. Pleopods well developed. Uropod 1, inner ramus the longer, serrate on the outer edge; outer ramus broader with several short spines at apex. Uropod 2, rami unequal, the inner the longer, narrower, unarmed; the outer with spines at tip. Uropod 3, rami as long as peduncle; the inner ramus slightly the longer; both rami broad, edged around apex and part way down the outer edges with compound setae. Telson short, simple, nearly rectangular, though slightly emarginate, armed with setae.

Body suffused with delicate pink. Eyes bright pink.

L. 4—7 mm.

Frequent in a kelp hold fast from deep water. Laguna Beach, Calif.

Photis californica n. sp.

Body plump. Head not rostrate; side-lobes acute, not produced far forward. Eyes small, lateral, not entering the side-lobes. Side-plates deep, setose below; the fifth scarcely less deep than the

fourth. Pleon segments not coalesced. Antennae nearly equal in length, the upper the stouter. Antenna 1 with the first joint of the peduncle thick, subequal in length to the third, the second joint longer; flagellum 9—11-jointed; no accessory flagellum. Antenna 2, peduncle with the antepenultimate joint short, ultimate and penultimate subequal; flagellum 8—9-jointed. Upper lip slightly emarginate. Lower lip, outer lobes large, not notched; inner lobes present. Mandible with molar large; cutting plates dentate; several spines in spine-row; palp large, second joint longer than the third, third very setose. Maxilla 1, inner plate small, apparently unarmed; outer plate with nine spines; palp large, apically spinose, longer than outer plate. Maxilla 2 with both plates fringed apically, the inner fringed on the inner margin. Maxillipeds, inner plates small, rectangular, three spines on apex and a few plumose spinules on apex and part way down the inner margin; outer plate edged with spines, serrate at apex; fourth joint of palp small.

Gnathopod 1 of the male, second joint produced; fifth as wide and long as sixth, irregularly produced behind; sixth with concave, oblique, setose palm; finger serrate. Gnathopod 1 of the female similar to the male, but with the palm not much concave. Gnathopod 2 of the male, second joint produced, especially on the distal front end; fifth joint much shorter than the sixth, produced very narrowly between the fourth and sixth; sixth large and broad, palm cruiously excavate with a small, forward-turning projection near the hinge, and then a deep, rounded excavation bounded behind by a long, sharp process, making the end of the palm. Gnathopod 2 of the female somewhat longer than 1, not so large as the male; fifth joint neither as wide nor as long as the sixth; sixth joint broad, not so irregular as in the male, with two rather shallow excavations; finger serrate, somewhat sinuose. Pereiopod 1 armed with plumose setae; second joint very moderately expanded; fourth joint large; fifth small. Pereiopod 2 similar, but somewhat smaller. Pereiopod 3 small, second joint greatly expanded; finger small, with denticle behind. Pereiopods 4 and 5 longer, more slender, the second joint not greatly expanded; the dactyl about the same size as in the third, both with a denticle behind. Uropod 1, peduncle longer than the subequal rami. Uropod 2, peduncle somewhat longer than the rami; the inner ramus the broader and longer, lanceolate. Uropod 3, peduncle longer than rami; the inner ramus very small with one spine at apex; the outer ramus somewhat setose, two-jointed.

Telson small, triangular, entire, with a single seta on either side.

Color, sordid medium and light brown.

L. 3—4 mm.

Rather frequent in kelp holdfast from deep water. Laguna Beach, Calif.

Grubia indentata n. sp.

Body rather slender, curved. Eyes of medium size, placed laterally between the antennae. Side-plates of moderate depth; the fifth as deep as the fourth; the fourth not excavate behind; the first broad; the sixth and seventh shallow. Pleon segments not coalesced. Antenna 1, the first joint of the peduncle broadest and longest, the third short; peduncle shorter than the flagellum; flagellum 20—22-jointed; accessory flagellum very small, 1-jointed, and triangular in shape. Antenna 2, peduncle elongate, the ultimate and penultimate joints subequal, the latter slightly longer; flagellum 17—22-jointed. Upper lip, distally rounded, median line evident. Lower lip with inner plates well developed, mandibular processes prominent. Mandible cutting plates dentate; four spines in spine-row; molar large; palp 3-jointed, slender, the second joint with one seta, the third joint with six long setae on apex. Inner plate small and but slightly armed; outer plate with toothed spines at apex; palp longer than the outer plate, the second joint broad, elongate, with apical spines. Maxilla 2, both plates fringed apically, the inner thickly and the outer somewhat fringed on the inner margin. Maxillipeds, inner plates very small, with plumose setae on apex and inner margin; outer plates rather large, armed with spines; palp short, stout, the fourth joint small.

Gnathopod 1 of the male small, long; the second joint somewhat produced, curved, distal process in front; the fifth joint as wide and nearly as long as the sixth; palm oblique, setose, with defining spine; finger large. Gnathopod 1 of the female similar to the male, though with the sixth joint longer. Gnathopod 2 of the male much larger than 1; second joint long, not produced; the fifth joint much shorter and not so wide as sixth; sixth broad, thick, palm somewhat setose, with longitudinal slit varying from less than to more than one-half the length of the hand; finger strong. Gnathopod 2 of the female but slightly larger than 1; the second joint produced somewhat more, in proportion, than the male; fifth joint as wide but not as long as the sixth with a triangular setose process behind; sixth joint

with the palm and finger like 1. Pereiopod 1, second joint widened. Pereiopod 2 similar, but a little smaller. Pereiopods 3—5 successively longer. Pleopods developed, not large, biramous. Uropod 1, rami shorter than peduncle; outer ramus broader and slightly shorter than inner; peduncle and outer ramus spinose on outer edges. Uropod 2, rami and peduncle about subequal in length; the inner a little longer and somewhat narrower. Uropod 3, the subequal rami shorter than the peduncle; the outer ramus shorter, with two hooks; the inner ramus with several short spines and longer setae. Telson small, entire, longer than broad, apex rounded and with a few setae on either side.

Color, varying from olive green to tan.

L. 4—7 mm.

From coralline algae between tides. Laguna Beach, Calif.

Ischyrocerus parvus n. sp.

Body slender. Head not rostrate. Eyes small, on side-lobes between the antennae. Side-plates not as deep as their segments; third and fourth broadest and deepest; the fifth almost as deep as the fourth; the sixth much shallower. Antennae 1 and 2 stout. Antenna 1, peduncle with first joint short and thick; second and third much longer, subequal; peduncle longer than the five-jointed flagellum; accessory flagellum two-jointed. Antenna 2, somewhat longer than I; antepenultimate, penultimate, and ultimate joints of peduncle successively longer; peduncle longer than the 4—5-jointed flagellum. Lower lip well developed with prominent mandibular processes. Mandible with palp large, the second joint longer than the third, the third broadly rounded and setose; cutting plates dentate; plumose spines in spine-row; molar normal. Maxilla 1, inner plate small with two or three setae on the inner margin; outer plate with nine or ten spines; palp long, spinose on the broad apex. Maxilla 2, both plates apically fringed, the inner fringed on the inner margin. Maxillipeds, inner plates small, setae and the usual three spines on the apex; outer plates longer, with spines; fourth joint of the palp short.

Gnathopod 1 of the male with the second joint expanded distally; fifth nearly as wide, but much shorter than the sixth; palm long, oblique, setose, with two terminal spines; finger long and serrate. Gnathopod 1 of the female similar to the male, palm serrate.

Gnathopod 2 of the male larger than 1; second joint long, both the second and third with apical projections in front; 3, 4, and 5 each with plumose setae behind; sixth not more than twice as long as broad; palm long with transverse projection near hinge, the rest of the palm very oblique and not well defined, numerous plumose setae all along the hind margin of the hand; finger long, curved, sinuous, especially on the inner margin. Gnathopod 2 of the female similar to 1 but even more simple. Both gnathopods of the female small. Pereiopod 1, second joint produced, the other joints short and thick. Pereiopod 2 similar to 1, but slightly longer. Pereiopods 3—5 successively longer. Pleopods all developed, with two rami. Uropod 3, peduncle long, rami short, less than half as long as the peduncle; outer ramus with toothed claws; inner ramus simpler and more slender.

Color. white; the females carrying green eggs.

L. 2.5—3 mm.

Occasional in Phyllospadix. Laguna Beach, Calif.

Erichthonius disjunctus n. sp.

Body slender. Head with side-lobes acute, produced far forward between the antennae. Antenna 2 arising very far back below the eye. Side-plates 1 and 2 in the male arising from the front end of their segments, and neither touching the one behind it; side-plate 3 produced somewhat forward; side-plate 5 bilobed, the front lobe a trifle deeper than the fourth; side-plates of the females lying closer together, all shallow. Pleon strongly flexed. Antenna 1 usually broken off at the end of the stout first joint of the peduncle, the second joint longer than the third, the third than the first; peduncle elongate, longer than the 13-jointed flagellum. Antenna 2 subequal in length to antenna 1; peduncle longer than the 10—13-jointed flagellum, ultimate and penultimate joints subequal. Mandible with molar large, spines in spine-row numerous, cutting plates very small and dentate, 3-jointed, setose palp with the second joint longest and the third joint widened distally. Maxilla 1, inner plate small, edged with about five setae; outer plate with ten spines; palp longer than the outer plate, two-jointed, tipped with spines and setae. Maxilla 2, outer plate apically, and inner plate edged both apically and on inner margin with spines. Maxillipeds normal.

Gnathopod 1 of the female very small, abundantly setose; fifth

joint longer and slightly wider than the sixth; palm not well defined; finger long and serrate. Gnathopod 1 of the male small; second joint with narrow neck beyond which it is greatly and irregularly widened: fifth joint very long and wider than sixth; sixth triangular with setose palm not clearly defined; finger long and serrate. Gnathopod 2 of the female with the second joint rather swelled behind; fifth joint much shorter than the sixth and produced behind into narrow lobe in line with the oblique sixth, with six spines on the hind margin: sixth with palm long and extremely oblique, setose, with defining spines at the apex; finger large and strong. Gnathopod 2 of the male, second joint very long, proximally narrowed; fourth joint long and slender; fifth joint enormously produced, swelled in front and produced behind into a long, uni-notched, triangular process, the notch forming two teeth of which the inner is the smaller; sixth joint narrow, much shorter than the basal part of the fifth; palm oblique setose; finger long, setose, with bunch of long setae near tip. Pereiopods 1 and 2 with the second joint produced. Pereiopods 3—5 successively longer. Pleopods well developed, with two rami. Uropod 1 long, both rami and inner edge of peduncle fringed with small, sharp teeth. Uropod 2, inner ramus slightly the longer, toothed on both edges, the outer ramus toothed on the inner edge. Uropod 3, peduncle long, curved, with one out-curved ramus tipped with two spinules. Telson twice as long as broad, slightly cleft between the two rounded lobes which are thickly covered with very minute spines.

Body ringed and mottled with brown; antennae ringed with orange; bright orange eyes.

L. 3—5 mm.

From kelp holdfasts from deep water. Laguna Bench, Calif.

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