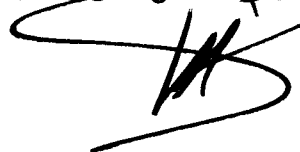


Stevens, B.
1924

with the writer's regards


Orthopagurus, a New Genus of Paguridae From the Pacific Coast

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The description of *Pylopagurus schmitti* Stevens, a new species as recorded in Publications Puget Sound Biological Station (3: 297-299, figs. 19-22, 1925), is based on male specimens only; the female was not found up to that time.

During the summer of 1925, a biological survey under the direction of Dr. John E. Guberlet of the University of Washington was undertaken in the vicinity of the Puget Sound Biological Station, Friday Harbor, Washington. Rather extensive dredging was done. While assisting with the survey, numerous specimens of *Pylopagurus schmitti*, both male and female, were collected by the writer. Examination of the material thus obtained and further investigation revealed characteristics such as to exclude this form from the genus *Pylopagurus* Milne-Edwards and Bouvier, and to prevent its reversion to the genus *Pagurus* Fabricius, as at present known.

Dr. Waldo L. Schmitt has called the writer's attention to the fact that *Pylopagurus minimus* (Holmes), which as yet has not been found in the Friday Harbor region, exhibits generic characteristics similar to those of *Pylopagurus schmitti* Stevens. *Orthopagurus* is now proposed as a new genus to include these two forms. The key to the genera of the hermit crabs of Friday Harbor, Washington, as given in the above mentioned reference, is accordingly revised. The distinguishing character used by certain authors, based on the fingers of the chelipeds opening and closing horizontally or obliquely is disregarded in the present paper for it has been found very indefinite, particularly as a means of separating the juvenile specimens.

The marine worms whose tubes are inhabited by *Orthopagurus schmitti* were identified by Dr. A. L. Treadwell of Vassar College.

In addition to the literature listed in the brief synonymy under each species the paper which has been most helpful in the preparation of this article is:

Alcock, Catalogue of Indian Decapod Crustacea; Pagurides; Part 2, fasc. 1, pp. 11-197, pls. 1-16, Indian Museum, Calcutta, 1905.

Acknowledgements are due to Professor Trevor Kincaid, Dr. T. C. Frye and Dr. John E. Guberlet of the University of Washington and to Dr. Waldo L. Schmitt of Smithsonian Institution for valuable advice and the loan of various specimens.

KEY TO THE GENERA OF THE PAGURIDAE OF THE
FRIDAY HARBOR REGION

- A. Chelipeds similar and equal, subequal or one (usually the left) larger than the other; external maxillipeds approximated at base; abdomen with paired appendages on first two segments of male, and on first segment of female; gills 13 on either side. PAGURISTES, p. 247.
- AA. Chelipeds dissimilar and unequal, the right much the larger; external maxillipeds widely separated at base; abdomen with no paired appendages on first or second segments of either sex: gills 11 on either side.
- B. Abdomen spirally coiled; telson and uropods not symmetrical, usually better developed on the left side than on the right. PAGURUS, p. 247.
- BB. Abdomen not spirally coiled but flexed; telson and uropods symmetrical. ORTHOPAGURUS, p. 247.

Comparison of the Genera	Paguristes	Pagurus	Orthopagurus
Chelipeds similar.....	+	—	—
Chelipeds equal or subequal.....	+	—	—
Right cheliped usually much the larger when the two are unequal.....	—	+	+
Fourth pair of legs simple.....	+	—	—
Fourth pair of legs subchelate.....	—	+	+
External maxillipeds approximated at base.....	+	—	—
External maxillipeds widely separated at base.....	—	+	+
Abdomen with paired appendages other than the uropods.....	+	—	—
Number of gills on either side.....	13	11	11
Abdomen spirally coiled.....	+	+	—
Abdomen merely flexed.....	—	—	+
Telson and uropods symmetrical.....	—	—	+
Telson and uropods asymmetrical, usually better developed on the left side.....	+	+	—

Genus PAGURISTES Dana

Chelipeds similar and equal, subequal or one (usually the left) larger than the other. Fourth pair of legs simple. External maxillipeds approximated at base; exopodites of all three pairs of maxillipeds flagellate. Abdomen spirally coiled, with paired appendages other than the uropods; paired appendages on the first two segments of the male and on the first segment of the female. Telson and uropods better developed on the left side than on the right. Gills phyllobranchiae, 13 on either side.

Genus PAGURUS Fabricius

Chelipeds usually dissimilar and unequal, the right much the larger; very rarely subequal (not so in Friday Harbor species). Fourth pair of legs subchelate. External maxillipeds widely separated at base; exopodites of all three pairs of maxillipeds flagellate. Abdomen spirally coiled, with no paired appendages except the uropods in either sex. Telson and uropods usually better developed on the left side than on the right. Gills phyllobranchiae, 11 on either side.

Genus ORTHOPAGURUS, new genus

Chelipeds dissimilar and unequal, the right much the larger. Fourth pair of legs subchelate. External maxillipeds widely separated at base; exopodites of all three pairs of maxillipeds flagellate. Abdomen not spirally coiled but flexed, with no paired appendages except the uropods in either sex. Telson and uropods very nearly symmetrical. Gills phyllobranchiae, 11 on either side.

Key to the Species of Orthopagurus

- A. Large hand distally widened, base narrow and convex, distal portion declivate with edges upturned; lateral teeth of front rounded. *O. minimus*, p. 247.
 AA. Large hand nearly uniform in width, flattened or slightly convex; lateral teeth practically obsolete. *O. schmitti*, p. 249.

ORTHOPAGURUS MINIMUS (Holmes)

Pagurus minimus Holmes, Occas. Papers Calif. Acad. Sci. 7: 145, 1900; Rathbun, Harriman Alaska Exped. 10: 160, 1904.
Pylopagurus minimus Schmitt, Univ. of Calif. Pub. in Zool. 23: 144, Pl. 16, figs. 1a, 1b, and 1c, 1921.

Characters.—Somewhat pubescent. Anterior portion of cara-

pace about as wide as long; median tooth of front triangular, acute; lateral teeth rounded. Eye stalks stout, cylindrical, a little flattened distally, about two-thirds the length of the anterior portion of the carapace. Antennal acicle not reaching the tip of the eye. Large cheliped with merus compressed; carpus distally widened, upper surface rounded and armed with short spines which incine forwards; hand oblong, widening distally to a short distance beyond the base of the movable finger; base convex, armed with anteriorly inclined spines; distal portion declivate and practically spineless except along the outer margin of the fingers; fixed finger broad; outer edge evenly rounded, sharp, upturned, armed with anteriorly inclined spines; the upper surface smooth and concave; movable finger broad, widest a little beyond its articulation; outer margin sharp, spiny, evenly curved; upper surface nearly smooth and concave; inner margin of both fingers with large, white, tubercular teeth. Smaller cheliped narrow, much shorter than the larger; hand rounded, the upper surface oblique; fingers longer than the palm. Ambulatory legs

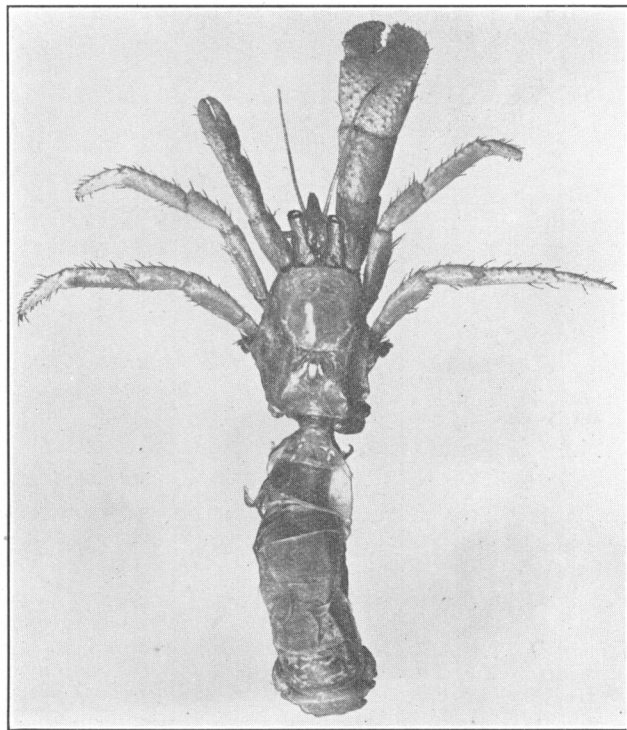


Fig. 1. *Orthopagurus minimus* (Holmes), female, $\times 3.3$.

rather slender, laterally compressed, pubescent; dactyls slender, curved, tapering from the base, spiny below and slightly longer than the propodi.

Color.—General color reddish, with spots of darker red, larger cheliped a darker red than the rest of the body, especially at the distal end; ocular peduncles with a median, transverse, light colored band (Holmes).

General Distribution.—Skidegate, Queen Charlotte Sound, British Columbia; San Francisco, Monterey Bay, Laguna Beach and San Diego, California, 27.4 to 64 meters (Schmitt).

Local Distribution.—Not found in the Friday Harbor region.

Remarks.—A specimen of *Orthopagurus minimus* from Monterey Bay, California, and also one from Skidegate, Queen Charlotte Sound, British Columbia, loaned by the Division of Invertebrates of the Smithsonian Institution, were examined. It has been found in worm tubes (Benedict) and in Dentalium ("tooth") shells between the Farallones and the Golden Gate (Schmitt).

ORTHOPAGURUS SCHMITTI (Stevens)

Pylopagurus schmitti Stevens, Publ. Puget Sound Biol. Sta. 3: 297-299, figs. 19, 20, 21 and 22, 1925.

Characters.—Somewhat pubescent, particularly on the chelipeds. Anterior portion of carapace little longer than wide; median tooth of front triangular, acute, prominent; lateral teeth practically obsolete. Eye stalks stout at base but rather tapering, about two-thirds the length of the anterior portion of the carapace. Antennal acicle not reaching the tip of the eye. Large cheliped with merus compressed; carpus distally widened, upper surface rounded and armed particularly along inner surface with spines which incline forward; hand oblong, of nearly uniform width; inner margin of palm armed with spines similar to those of the carpus, upper surface slightly convex but appearing quite flattened; fixed finger broad, its outer edge with small anteriorly inclined spines; movable finger more nearly uniform in width. Smaller cheliped rather stout, nearly as long as the larger; hand somewhat flattened; fingers about same length as the palm. Ambulatory legs rather slender, laterally compressed, pubescent; dactyls slender, curved, decidedly tapering from the base, spiny below, about the same length as the propodi.

Color.—Pale pinkish buff to white with irregular spots and

bands of orange cinnamon; the fingers being tipped with apricot orange; the fingers of the large hand are armed on the inner margins with large white, tubercular teeth; antennae orange vinaceous.

Local Distribution.—Common west off Reed Rock at 70 meters. Rather numerous northwest off Brown Island at 6 to 10 meters and between Brown Island and Reed Rock at 50 to 100 meters; off Point Caution, San Juan Island at 22 to 37 meters; off Minnesota Reef at 80 meters; northeast of Turn Rock at 160 meters; both north and south of Flat Point, Lopez Island at 20 to 60 meters and in Griffin Bay near Cattle Point, San Juan Island at 77 meters. Collected also north of Orcas Island at 12 to 14 meters; south of Johnson Point, Sucia Island, at 14 to 40 meters; between Mattia Island and Puffin Island at 24 to 26 meters; northwest of Jones Island at 220 meters.

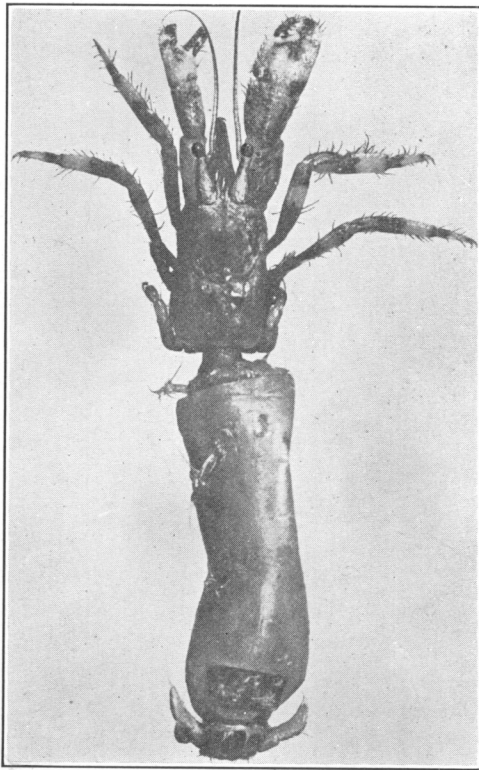


Fig. 2. *Orthopagurus schmitti* (Stevens), female, $\times 3.5$.

Remarks.—The type, a male, taken at about 37 meters off Point Caution, measures 34 mm. in length and is deposited with the Division of Marine Invertebrates of the Smithsonian Institution.

O. schmitti is best distinguished from *O. minimus* by the characteristics of the large hand, which in *O. schmitti* is nearly uniform in width and appears flattened above, while in *O. minimus* it is distally widened and has the distal portion declivate with the edges upturned. The upper surface of the large hand of *O. schmitti* varies greatly both in length and in degree of convexity; in juvenile specimens it is shorter in proportion to the width than in older individuals, and appears nearly flat, while in the latter it is in most cases easily seen to be convex.

O. schmitti has been found in the tubes of the marine worms, *Sabellaria cementarium* Moore and *Serpula* sp. but more commonly in the former. The fact that the tubes are usually attached may account for the comparatively small number of specimens which have come up in the dredge even tho the local range is large. This idea is further substantiated by the fact that they have been rather com-

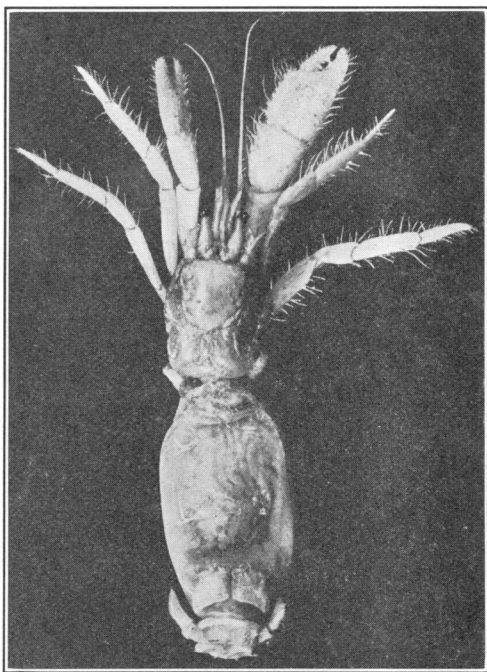


Fig. 3. *Orthopagurus schmitti* (Stevens), male, $\times 3.5$.

monly found inhabiting worm tubes attached to the rocks which have been pulled up with kelp holdfasts off the northwest shore of Brown Island, near the town of Friday Harbor, Washington.

As this paper goes to press a manuscript by M. W. de Laubenfels is received to appear in Publ. Puget Sound Biol. Sta. Vol. 5. In this is described a species of sponge with which the worm tubes inhabited by *O. schmitti* are often associated.

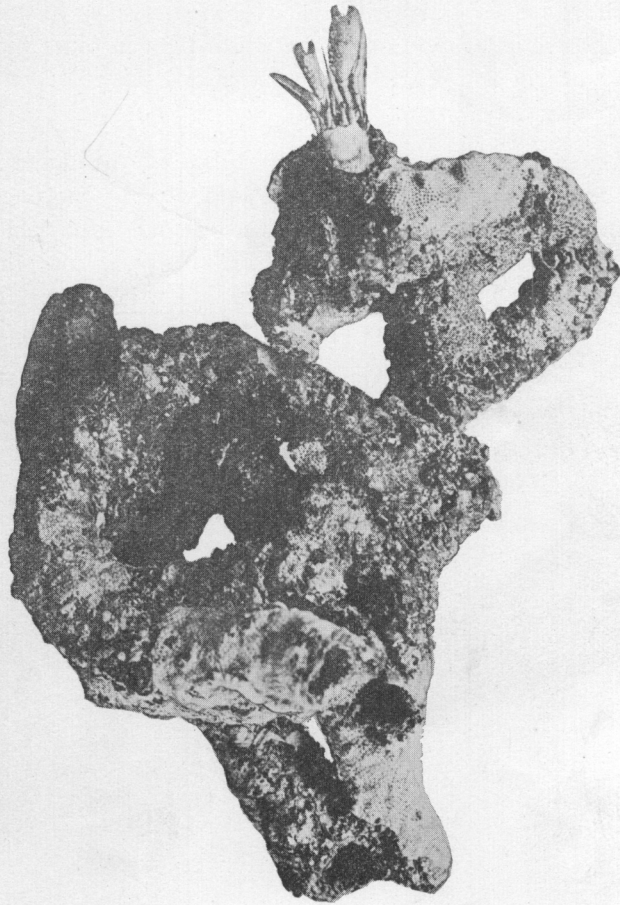


Fig. 4. *Orthopagurus schmitti* (Stevens) in tube of *Sabellaria cementarium* Moore, $\times 1.5$.