ing exopods.) Second pereiopods asymmetrical, right stronger. Right second pereiopod with 21–22 meral and 45–46 carpal articles, left second pereiopod with 5 meral and 18–21 carpal articles. (Fifth pereiopods incomplete.) Fifth abdominal somite unarmed posterolaterally. Abdominal sternites unarmed.

DESCRIPTION.—Rostrum (Figure 13*a*) almost straight, apex slightly deflexed, bifid, lower tooth longer, apex (Figure 13*b*) obscured by numerous long setae; lower margin of rostrum sinuous, convex proximally, slightly concave distally. Lower orbital angle broadly rounded. Antennal spine well developed. Lower anterior angle of carapace broadly rounded.

Abdomen (Figure 13*c*) smooth, bare, ventral margins of pleura lined with fine setae. Fifth abdominal somite rounded posterolaterally. Sixth abdominal somite only slightly longer than fifth, with posterolateral spine; lobe above articulation of uropod produced into small, sharp spine. Telson (Figure 14*a*) slightly more than 1½ times as long as sixth abdominal somite, length about 3½ times greatest width, with 2 pairs of dorsal and 2 pairs of distal spines; anterior pair of dorsal spines of telson set at end of proximal fourth, distal pair beyond midlength; distance between anterior margin and anterior pair of spines more than ½ the distance between pairs of spines; distal spines of telson (Figure 14*b*) as in *P. bermudensis*; apex of telson produced into small, sharp point.

Eyes (Figure 13*a*) moderately large, cornea width subequal to length of stalk and cornea combined, twice greatest width of antennal scale.

Antennular peduncle (Figure 13*d*) extending by 2 distal segments and about ½ of proximal segment beyond rostrum; basal segment of peduncle subequal in length to distal segments, ultimate segment ⅗ the length of penultimate; proximal segment of peduncle with ventral spine set slightly beyond midlength. Stylocerite (Figure 13*e*) with strong, acute lateral projection, anterior margin sloping proximally mesially, concave. Dorsolateral flagellum of antennule at least as long as carapace, thickened setigerous portion consisting of 20–27 articles, distal portion incomplete. Ventromesial flagellum of antennule broken, probably at least twice as long as carapace.

Antennal scale (Figure 13*f*) scarcely overreaching antennular peduncle, length of scale 6½ times greatest width; distal spine of scale slightly overreaching rounded anterior margin of blade. Proximal segment of antenna with slender outer spine. Antennal peduncle extending about to midlength of second segment of antennular peduncle. Antennal flagellum more than 4 times carapace length.

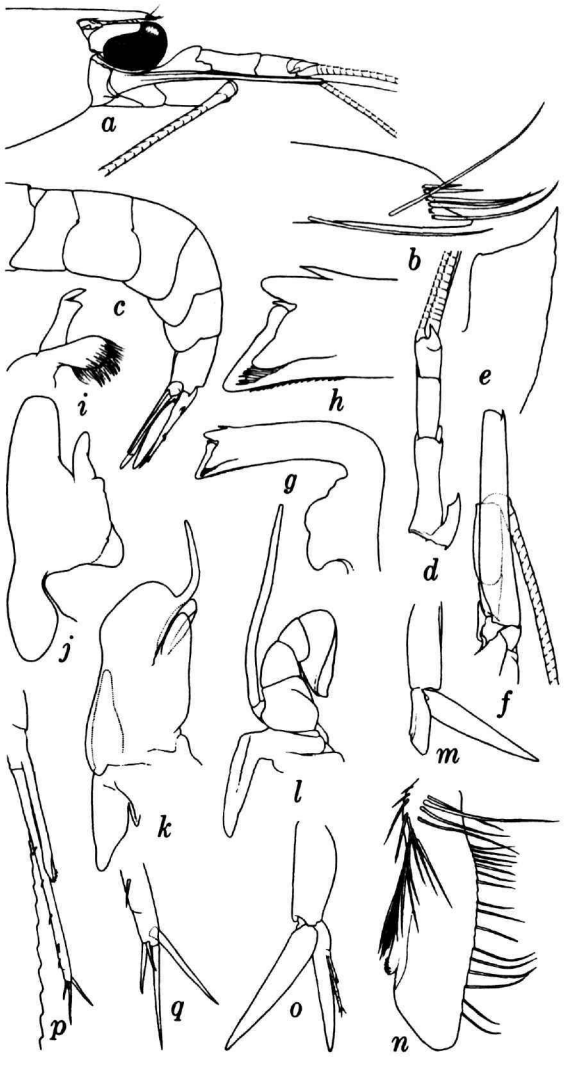

FIGURE 13.—*Processa profunda*, new species, holotype, male, carapace length 7.2 mm: *a*, anterior region; *b*, distal end of rostrum; *c*, abdomen; *d*, right antennule; *e*, same, stylocerite; *f*, right antenna; *g*, right mandible; *h*, same, distal end; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right first pleopod; *n*, same, endopod; *o*, right second pleopod; *p*, same, appendix masculina and appendix interna; *q*, end of appendix masculina. Magnifications: *c*, ×3; *a*, *d*, *f*, *m*, *o*, ×6; *i–l*, ×12.5; *e*, *g*, *n*, *p*, ×25; *b*, *h*, *q*, ×63.

Third maxilliped (Figure 14*c*) overreaching antennal scale by distal and ½ of penultimate segments; ultimate segment ornamented with few spines, apex sharp, shorter than penultimate segment, and about ⅓ as long as basal segment. Mandible (Figures 13*g*, *h*) with row of about 18 spines on posterior margin of molar process. Remainder of mouthparts (Figures 13*i–l*) as in *P. bermudensis*.

Right pereiopod of first pair (Figure 14*d*) chelate, overreaching antennal scale by most of length of fingers of chela; fingers about ¾ the length of palm; carpus slightly longer than palm; merus about as long as carpus and chela combined. Left pereiopod of first pair (Figure 14*e*) with simple dactyl, overreaching antennal scale by dactyl and ⅓ of propodus; dactyl about ⅓ the length of propodus; carpus slightly shorter than propodus; merus shorter than remainder of distal segments combined. Arthrobranch present at base of first pereiopods. Second pereiopods asymmetrical, right (Figure 14*f*) longer, overreaching antennal scale by chela, carpus, and 3 distal articles of merus; merocarpal articulation of right pereiopod extending beyond eye; ischium with 3, merus with 21–22, and carpus with 45–56 articles; fingers subequal to or slightly longer than palm; carpus almost 11 times as long as chela; merus 6 times as long as chela; ischium shorter than merus. Left pereiopod of second pair (Figure 14*g*) overreaching antennal scale by chela and about ⅓ of carpus; ischium not divided, merus with 5 and carpus with 18–21 articles; fingers slightly longer than palm; carpus almost 7 times as long as chela; merus almost 4 times as long as chela; ischium slightly longer than merus. Third pereiopod (Figure 15*a*) overreaching antennal scale by dactyl, propodus, and about ⅓ of carpus; dactyl (Figure 15*b*) slender, simple, with subapical setae; propodus almost 4 times as long as dactyl, unarmed, with tufts of setae beyond midlength, and denser distal tufts of setae; carpus about 2⅓ times as long as propodus, unarmed, not markedly setose; merus less than twice as long as propodus, with 5 movable spines on lateral surface; ischium shorter than merus, with 1 movable spine on lateral surface; combined lengths of propodus and carpus of third pereiopod subequal to that of ischium and merus. Fourth pereiopod (Figure 15*c*) overreaching antennal scale by dactyl, propodus, and about ½ of carpus; dactyl (Figure 15*d*) slender, simple, with dense subapical tuft of setae; propodus slightly more than 3 times as long as dactyl, unarmed, with tufts of setae proximal and distal to midlength, as well as denser distal tufts; carpus slightly more than twice as long as propodus, unarmed, not markedly setose; merus less than 1½ times as long as propodus, shorter

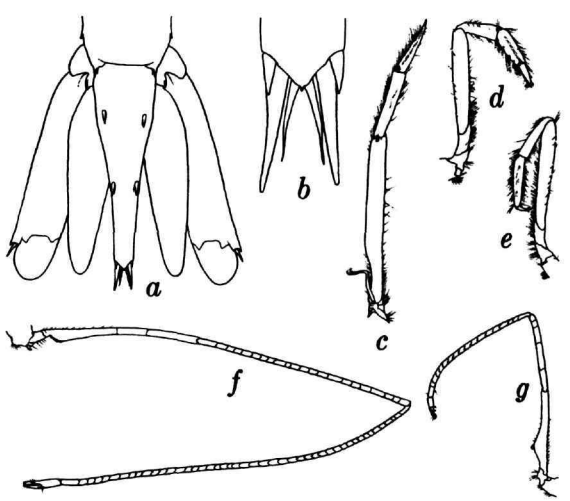

FIGURE 14.—*Processa profunda*, new species, paratype, ovigerous female from south of Cape San Blas, Florida (*Albatross* Station 2402), carapace length 9.3 mm: *a*, telson and uropods; *b*, end of telson; *c*, right third maxilliped; *d*, right first pereiopod; *e*, left first pereiopod; *f*, right second pereiopod; *g*, left second pereiopod. Magnifications: *c–g*, ×3; *a*, ×6; *b*, ×25.

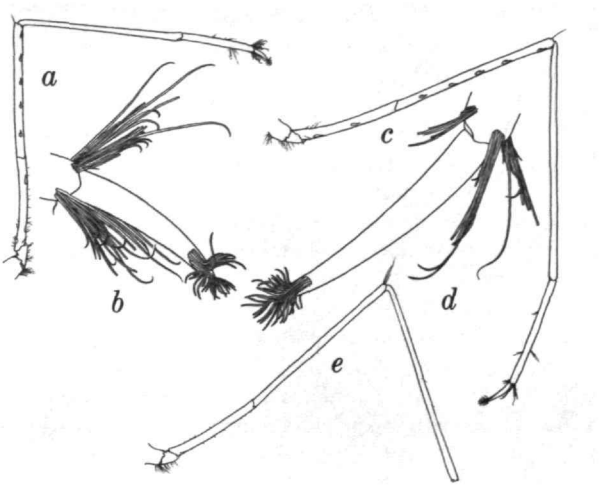

FIGURE 15.—*Processa profunda*, new species, paratype, ovigerous female from southwest of Dry Tortugas (*Oregon* Station 1005), carapace length 10.8 mm: *a*, right third pereiopod; *b*, same, dactyl; *c*, right fourth pereiopod; *d*, same, dactyl; *e*, right fifth pereiopod (propodus and dactyl missing). Magnifications: *a*, *c*, *e*, ×3; *b*, *d*, ×25.

than carpus, with 5 movable spines on lateral surface; ischium shorter than merus, about as along as propodus, with 2 movable spines on lateral surface; combined lengths of propodus and carpus of fourth pereiopod greater than that of ischium and merus. Fifth pereiopod (Figure 15*e*) damaged or missing in all specimens, but extending beyond antennal scale by dactyl, propodus, and ½ of carpus; carpus longer than merus, unarmed; ischium shorter than merus, unarmed.

Endopod of first male pleopod (Figures 13*m*, *n*) about ½ as long as exopod, apex obliquely truncate, smooth, without setae or spines; inner margin more setose than outer; retinacular lobe distinct distally, fused proximally. Appendix masculina on endopod of first male pleopod (Figures 13*o–q*) with 5 short lateral spinules and 4 distal spinules, 3 elongate. Abdominal sternites unarmed. Uropods (Figure 14*a*) as in *P. bermudensis*. Eggs small and numerous, 0.4–0.6 mm in diameter.

SIZE.—Carapace lengths of males, 6.5–7.2 mm; of females, 7.0–10.8 mm; of ovigerous females, 9.3–10.8 mm.

COLOR.—Not recorded.

DISCUSSION.—*Processa profunda* resembles both *P. guyanae* and *P. tenuipes* in having large eyes, an antennal spine, a basal spine on the antenna, numerous (more than forty) articles in the carpus of the second pereiopods, and a rounded pleuron on the fifth abdominal somite. It differs from those two species in having the stylocerite produced into a strong outer spine and in having an arthrobranch at the base of the first pereiopods; no other Atlantic species has the stylocerite shaped as in *P. profunda*.

The specimens taken by the *Albatross* were reported by Rathbun (1901) as *P. canaliculata*.

NAME.—The specific name is from the Latin, *profundus*, deep, alluding to the depths at which the type-series was collected.

TYPE-LOCALITY.—Gulf of Mexico, off the west coast of Florida, in 202 m.

DISTRIBUTION.—Gulf of Mexico, in depths between 202 and 346 m.

Processa riveroi, new species

FIGURE 16

HOLOTYPE.—Ovigerous ♀, 5.65 mm; Puerto Rico; Lajas, La Parguera, east side of Maguey Island, evening, after dark, with push net on shallow *Thalassia* flats; R. B. Manning, col., station PR 6–61; 24 June 1961; USNM 134122.

PARATYPES.—2 ♀ (1 ovigerous); data as for holotype; USNM.

DIAGNOSIS.—Antennal spine present. Stylocerite with spine at inner and outer angles. (Right leg of first pereiopod chelate, left with simple dactyl; first periopods lacking exopods.) Second pereiopods asymmetrical, right stronger. Right second pereiopod with 17 meral and 39–43 carpal articles, left second pereiopod with 5–6 meral and 16–20 carpal articles. Carpus of fifth pereiopod shorter than propodus. Fifth abdominal somite with posterolateral spine. Abdominal sternites 1–5 with median ventral spine.

DESCRIPTION.—Rostrum (Figure 16*b*) slightly deflexed, not extending to anterior margin of eye; apex (Figure 16*c*) bifid, lower tooth longer, apex obscured by long setae; ventral margin of rostrum ornamented with setae, evenly convex. Lower orbital angle inconspicuous, broadly rounded. Antennal spine well developed. Lower anterior angle of carapace rounded (Figure 16*a*).

Abdomen (Figure 16*d*) smooth, surface ornamented with numerous short setae, ventral margins of pleura lined with fine setae; fifth abdominal somite with posterolateral spine (Figure 16*e*). Sixth abdominal somite less than twice as long as fifth, with blunt posterolateral spine; lobe above articulation of uropod produced into posterior spine. Telson (Figure 16*f*) more than 1½ times as long as fifth abdominal somite, length about 2½ times greatest width, with 2 pairs of dorsal and 2 pairs of distal spines; anterior pair of dorsal spines of telson set at end of proximal fourth, posterior pair beyond midlength; distance between anterior margin and anterior pair of spines more than ½ the distance between pairs of spines; distal spines (Figures 16*g*) as in *P. bermudensis*; apex of telson produced into small, sharp point.

Eyes (Figure 16*a*) small, cornea width less than length of stalk and cornea combined, only slightly greater than greatest width of antennal scale.

Antennular peduncle (Figure 16*h*) extending by distal 2 segments and ⅔ of proximal segment beyond rostrum; basal segment longer than distal segments combined, ultimate segment about ¾ the length of penultimate; proximal segment with ventral spine set slightly beyond midlength. Stylocerite (Figure 16*i*) truncated anteriorly, with small spine at inner and outer angles. Dorsolateral flagellum of antennule

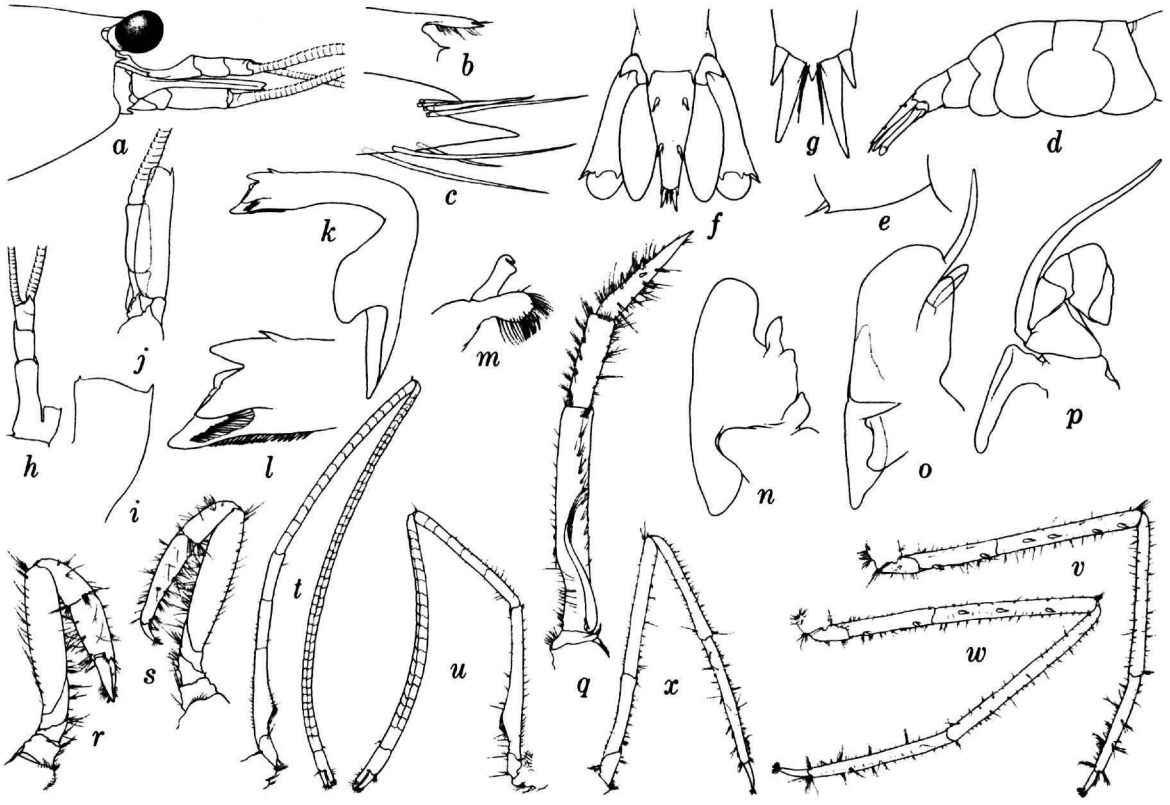

FIGURE 16.—*Processa riveroi*, new species, holotype, ovigerous female, carapace length 5.65 mm: *a*, anterior region; *b*, rostrum; *c*, same, distal end; *d*, abdomen; *e*, margin of fifth abdominal pleuron; *f*, telson and uropods; *g*, end of telson; *h*, right antennule; *i*, same, stylocerite; *j*, right antenna; *k*, right mandible; *l*, same, distal end; *m*, right first maxilla; *n*, right second maxilla; *o*, right first maxilliped; *p*, right second maxilliped; *q*, right third maxilliped; *r*, right first pereiopod; *s*, left first pereiopod; *t*, right second pereiopod; *u*, left second pereiopod; *v*, right third pereiopod; *w*, right fourth pereiopod; *x*, right fifth pereiopod. Magnifications: *d*, ×3; *a*, *b*, *f*, *h*, *j*, *q*–*x*, ×6; *e*, *m*–*p*, ×12; *g*, *i*, *k*, ×25; *c*, *l*, ×63.

nearly 1/5 longer than carapace, thickened setigerous portion consisting of 17–19 articles and amounting to 2/5 of total length, slender distal portion consisting of 26–29 articles. Ventromesial flagellum at least 2 3/4 times as long as carapace.

Antennal scale (Figure 16*j*) slightly overreaching antennular peduncle, length of scale almost 4 times the greatest breadth; distal spine of scale extending slightly beyond lamella. Basal segment of antenna with ventral spine. Antennal peduncle extending to end of second segment of antennular peduncle. Antennal flagellum at least as long as body.

Third maxilliped (Figure 16*g*) overreaching antennal scale by slightly more than combined lengths of two distal segments; ultimate segment ornamented with short spines, apex sharp; ultimate segment longer than penultimate, slightly more than half as long as proximal segment. Exopod well developed. Mandible (Figures 16*k*, *l*) with row of 21 spines on posterior margin of molar process. Remainder of mouthparts (Figures 16*m*–*p*) as in *P. bermudensis*.

Right pereiopod of first pair (Figure 16*r*) chelate, overreaching antennal scale by fingers and over 1/2 of palm of chela; fingers about 3/4 the length of palm; carpus slightly shorter than palm; merus slightly shorter than carpus and chela combined. Left pereiopod of first pair (Figure 16*s*) with simple dactyl, overreaching antennal scale by dactyl and 2/3 of pro-

podus; dactyl 1/3 the length of propodus; carpus slightly more than 1/2 as long as propodus; merus about as long as carpus and propodus combined. No arthrobranch visible at base of first pereiopods. Second pereiopods asymmetrical, right (Figure 16*t*) stronger, overreaching antennal scale by chela, carpus, and 2/3 of merus; merocarpal articulation extending beyond eye; ischium with 3, merus with 17, and carpus with 39–43 articles; fingers slightly shorter than palm; carpus 10 times as long as chela; merus about 5 2/3 times as long as chela; ischium slightly shorter than merus. Left pereiopod of second pair (Figure 16*u*) overreaching antennal scale by chela, carpus, and 2 distal articles of merus; ischium undivided, merus with 5–6 and carpus with 16–20 articles; fingers shorter than palm; carpus about 4 1/2 times as long as chela; merus about 2 2/3 times as long as chela. Third pereiopod (Figure 16*v*) overreaching antennal scale by dactyl, propodus, and about 7/10 of carpus; dactyl slender, simple, with apical setae; propodus about 4 times as long as dactyl, unarmed, ornamented with tufts of setae along surface and at apex; carpus slightly more than 1 1/3 times as long as propodus, unarmed; merus less than 1 1/2 times as long as propodus, with 4 movable spines on lateral face; ischium shorter than merus, with 2 movable spines on lateral face; combined lengths of propodus and carpus of third pereiopod greater than those of ischium and merus. Fourth pereiopod (Figure 16*w*) overreaching antennal scale by dactyl, propodus, and 4/5 of carpus; dactyl slender, simple, with apical tuft of setae; propodus 3 3/4 times as long as dactyl, unarmed, with tufts of setae along surface and at apex; carpus less than 1 1/2 times as long as propodus, unarmed; merus slightly longer than propodus, with 3 movable spines on lateral surface; ischium shorter than merus, with 2 movable spines on lateral surface; combined length of propodus and carpus of fourth pereiopod greater than that of ischium and merus. Fifth pereiopod (Figure 16*x*) overreaching antennal scale by dactyl and 9/10 of propodus; dactyl slender, simple, with short apical tuft of setae; propodus almost 4 times as long as dactyl, surface with scattered setae, with 4–5 spines on flexor margin; carpus slightly shorter than propodus, unarmed; merus slightly longer than propodus, unarmed; ischium shorter than merus, unarmed; combined length of propodus and carpus of fifth pereiopod greater than that of ischium and merus.

Abdominal sternites 1–5 with median spine in females. Uropods (Figure 16*f*) as in *P. bermudensis*. Eggs small and numerous, 0.3–0.4 mm in diameter.

SIZE.—Carapace lengths of females, 2.7–5.65 mm; of ovigerous females, 5.3–5.65 mm.

COLOR.—Background white, with minute red chromatophores scattered over body; third maxillipeds and first pereiopods tinged with orange distally; eggs light green.

DISCUSSION.—*Processa riveroi* closely resembles *P. fimbriata*, the only other western Atlantic species with a spine on the stylocerite, a posterolateral spine on the pleuron of the fifth abdominal somite, and spines on the abdominal sternites. It can, however, be distinguished from that species by several features. *Processa riveroi* is a slenderer species, with noticeably smaller eyes; the cornea width is only slightly greater than the greatest width of the antennal scale, whereas in *P. fimbriata* it is usually twice as broad as the antennal scale. The distal portion of the dorsolateral antennal flagellum is longer than the proximal in *P. riveroi*, whereas the reverse is true in *P. fimbriata*. The stylocerite of *P. riveroi* is armed at both internal and external angles, rather than the external angle only, and there are more spines (21 rather than 6–7) on the posterior margin of the mandible. The pereiopods of *P. riveroi* are longer than those of *P. fimbriata*: the right second pereiopod in *P. riveroi* extends beyond the antennal scale by two thirds of the merus, rather than by most of the carpus; the third pereiopod of *P. riveroi* overreaches the antennal scale by most of the carpus, whereas in *P. fimbriata* it extends beyond the scale by the two distal segments only. The numbers of articles in the second pereiopods are slightly different in the two species: in *P. riveroi* there are 17 meral and 39–43 carpal articles in the right pereiopod, 5–6 meral and 16–20 carpal articles in the left; in *P. fimbriata* there are 13–16 meral and 31–40 carpal articles in the right pereiopod, 4–6 meral and 15–18 carpal articles in the left.

There may also be a habitat difference in the two species, for *P. riveroi* was found free-living on shallow grass flats, whereas many of the specimens of *P. fimbriata* were found to be associated with sponges.

Two other species, *Ambidexter symmetricus* and *Processa bermudensis*, were collected along with *P. riveroi* at Maguey Island; all three apparently live in the same habitat, *Thalassia* flats in shallow water, (water depth 1 meter or less) on a sandy substratum.

NAME.—We are pleased to dedicate this species to

Juan A. Rivero, University of Puerto Rico, who supported the trip to Puerto Rico by one of us (RBM) to study the decapods in the collection of the Institute of Marine Biology at Mayaguez; during that trip the types of *P. riveroi* were collected.

TYPE-LOCALITY.—Maguey Island, La Parguera, Puerto Rico.

DISTRIBUTION.—Known only from the type-locality, Maguey Island, La Parguera, Puerto Rico, in shallow water.

Processa tenuipes, new species

FIGURES 17, 18

HOLOTYPE.—Ovigerous ♀, 9.65 mm; Gulf of Mexico, off west coast of Florida; 29°12′N, 84°22′W; 31 m; *Oregon* station 898; 8 March 1954; USNM 97415.

PARATYPES.—5♂, 6 ovigerous ♀; off North Carolina; 35°08′30″N, 75°10′W; 90 m; grey sand; *Albatross* station 2596; 17 October 1885; USNM.—1 ovigerous ♀; off northern coast of Cuba; 23°11′45″N, 82°17′54″W; 331 m; fine brown sand; *Albatross* station 2327; 17 January 1885; USNM.—7 ♀ (5 ovigerous); Gulf of Mexico; off west coast of Florida; 28°44′N, 85°06′W; 92 m; fine clay ooze; L. Abele col., LGA 70–5; 10 April 1970; USNM.

DIAGNOSIS.—Antennal spine present. Stylocerite with at most lateral tubercle. (Right pereiopod of first pair chelate, left with simple dactyl; first pereiopods lacking exopods.) Second pereiopod asymmetrical, right stronger. Right second pereiopods with 18–28 meral and 28–69 carpal articles, left second pereiopod with 5–9 meral and 17–26 carpal articles. Carpus of fifth pereiopod longer than propodus. Fifth abdominal somite unarmed posterolaterally. Abdominal sternites unarmed.

DESCRIPTION.—Rostrum (Figure 17*b*) slender, convex dorsally, not extending to anterior margin of eye; apex deflexed, bifid, lower tooth longer, apex obscured by long setae. Lower orbital angle inconspicuous, broadly rounded. Antennal spine small but distinct. Lower anterior angle of carapace broadly rounded (Figure 17*a*).

Abdomen (Figure 17*c*) smooth, surface ornamented with few short setae, ventral margins of pleura lined with fine setae. Fifth abdominal somite bluntly angled posterolaterally. Sixth abdominal somite less than twice as long as fifth, angled posterolaterally; lobe above articulation of telson unarmed. Telson (Figure 17*d*) slightly more than 1½ times as long as sixth abdominal somite, length slightly more than 3 times greatest width, with 2 pairs of dorsal and 3 pairs of distal spines; anterior pair of dorsal spines of telson set near end of proximal fourth, posterior pair beyond midlength; distance between anterior margin and anterior pair of spines more than ½ distance between pairs of spines; distal spines (Figure 17*e*) as in *P. bermudensis*; apex of telson produced into slender median spine.

Eye (Figure 17*a*) of moderate size, cornea width subequal to length of stalk and cornea combined, more than double greatest width of antennal scale.

Antennular peduncle (Figure 17*f*) extending beyond rostrum by 2 distal segments and distalmost third of proximal segment; basal segment as long as combined lengths of distal segments, penultimate segment more than twice the length of ultimate segment. Proximal segment of antennular peduncle with small ventral spine near midlength. Stylocerite (Figure 17*g*) subtruncate anteriorly, anterior margin sinuous, with lateral tubercle or bluntly angled prominence. Dorsolateral flagellum of antennule ¾ as long as carapace, thickened setigerous portion consisting of 17–26 articles in females and 26–30 articles in males and amounting to ⅗ of length, slender distal portion consisting of 17–19 articles. Ventromesial flagellum of antennule at least 4 times as long as carapace.

Antennal scale (Figure 17*h*) extending about to end of antennular peduncle, length of scale about 6½ times greatest width; distal spine of scale small, not overreaching blade. Basal segment of antennal peduncle with small but distinct outer spine. Antennal peduncle extending about to midlength of second segment of antennular peduncle. Antennal flagellum about 4½ times as long as carapace.

Third maxilliped (Figure 17*n*) overreaching antennal scale by 2 distal segments; ultimate segment ornamented with spines, apex sharp, shorter than penultimate segment and less than ⅓ as long as proximal segment; exopod well developed. Posterior margin of molar process of mandible (Figure 17*i*) with row of 21 small spines. Remainder of mouthparts (Figures 17*j–m*) as in *P. bermudensis*.

Right pereiopod of first pair (Figure 17*o*) chelate, overreaching antennal scale by length of fingers; fingers slightly more than ½ the length of palm;

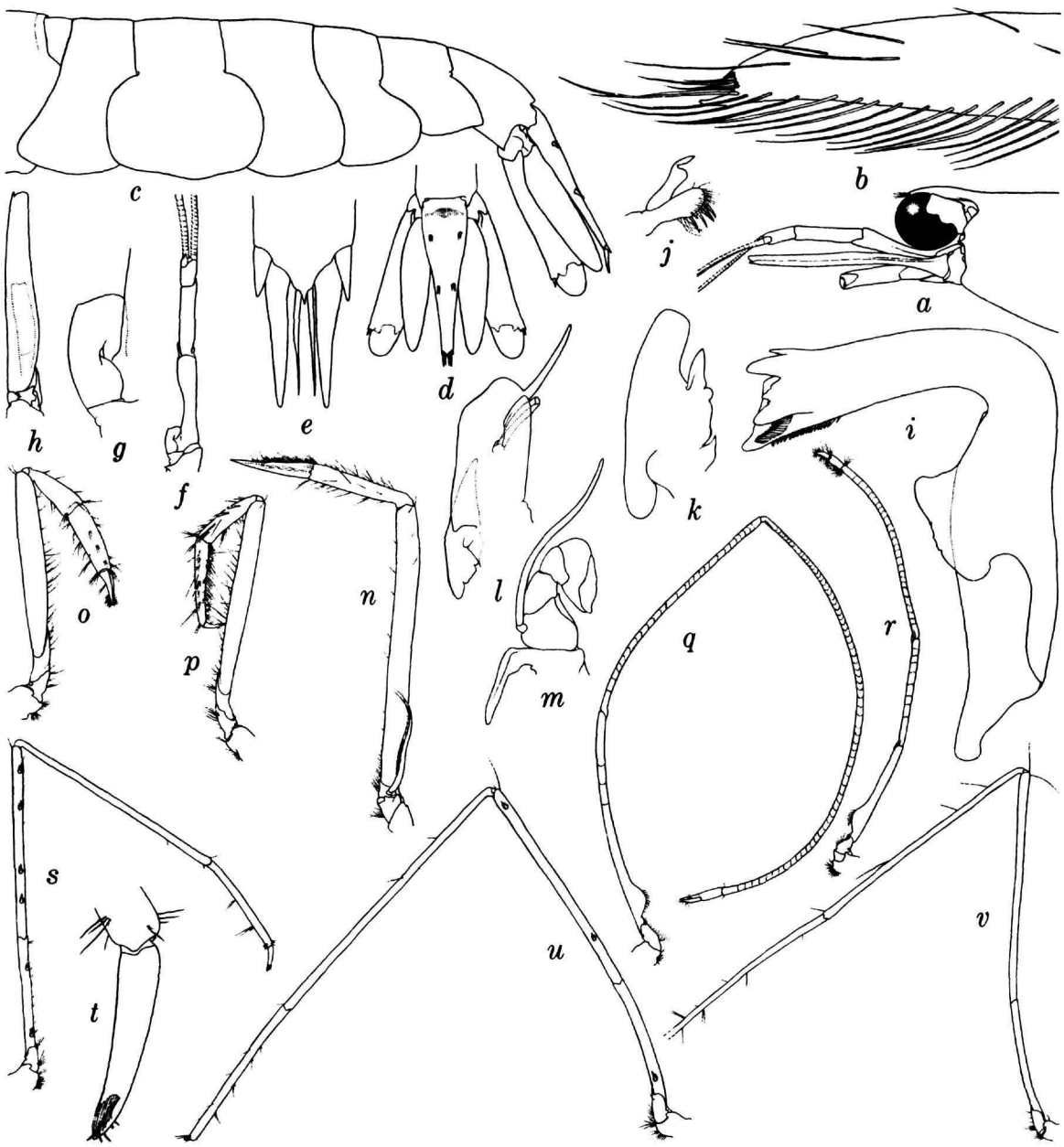

FIGURE 17.—*Processa tenuipes*, new species, holotype, ovigerous female, carapace length 9.65 mm: *a*, anterior region; *b*, distal portion of rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, left antennule; *g*, same, stylocerite; *h*, left antenna; *i*, right mandible; *j*, right first maxilla; *k*, right second maxilla; *l*, right first maxilliped; *m*, right second maxilliped; *n*, left third maxilliped; *o*, right first pereiopod; *p*, left first pereiopod; *q*, right second pereiopod; *r*, left second pereiopod; *s*, right third pereiopod; *t*, same, dactyl; *u*, left fourth pereiopod (dactyl missing); *v*, left fifth pereiopod (dactyl and distal end of propodus missing). Magnifications: *a*, *c*, *d*, *f*, *h*, *n–s*, *u*, *v*, ×4.2; *j–m*, ×8.4; *g*, ×17.5; *b*, *e*, *i*, *t*, ×35.

carpus subequal to palm; merus longer than carpus and chela combined. Left pereiopod of first pair (Figure 17*p*) with simple dactyl, overreaching antennal scale by dactyl and fully ⅓ of propodus; dactyl about ¼ the length of propodus; carpus slightly shorter than propodus; merus longer than carpus, propodus, and dactyl combined. No arthrobranch visible at base of first pereiopods. Second pereiopods strongly asymmetrical, right longer. Right pereiopod of second pair (Figure 17*g*) overreaching antennal scale by chela, carpus, and slightly less than ½ of merus; merocarpal articulation of right pereiopod extending well beyond eye; ischium divided into 4 (sometimes indistinct), merus into 18–28, and carpus into 48–69 articles; fingers subequal to palm; carpus about 11½ times as long as chela; merus about 6 times as long as chela; ischium slightly shorter than merus. Left pereiopod of second pair (Figure 17*r*) overreaching antennal scale by chela and 4 distalmost articles of carpus; ischium not noticeably segmented, merus with 5–9 and carpus with 17–26 articles; fingers subequal to palm; carpus 6 times as long as chela; merus less than 4 times as long as chela; ischium subequal to merus. Third pereiopod (Figure 17*s*) overreaching antennal scale by dactyl, propodus, and ⅗ of carpus; dactyl (Figure 17*t*) slender, simple, with subapical tuft of setae; propodus 4 times as long as dactyl, unarmed; carpus slightly more than twice as long as propodus, unarmed; merus slightly less than twice as long as propodus, with 4–6 movable spines on lateral surface; ischium shorter than merus, with 2 spines on lateral surface, combined length of propodus and carpus of third pereiopod greater than that of ischium and merus. Fourth pereiopod (Figures 17*u*, 18*a*, *b*) overreaching antennal scale by dactyl, propodus, and ⅘ of carpus; dactyl (Figure 18*a*) slender, simple, with subapical tuft of setae; propodus 4 times as long as dactyl, unarmed; carpus about twice or slightly less than twice the length of propodus, unarmed; merus about 1⅓–1½ times as long as propodus, with 2–7 movable spines on lateral face; ischium shorter than merus, with 1–2 movable spines on lateral face; combined length of propodus and carpus of fourth pereiopod greater than that of ischium and merus. Fifth pereiopod (Figures 17*v*, 18*c*, *d*) overreaching antennal scale by dactyl, propodus, and about ⅔ of carpus; dactyl (Figure 18*d*) slender, simple, with subapical tufts of setae; propodus about 6–7 times as long as dactyl, with 3–4 spines on flexor margin, distalmost sometimes paired; carpus slightly longer than propodus, unarmed; merus slightly shorter than carpus, unarmed; ischium shorter than merus, unarmed; combined length of propodus and carpus of fifth pereiopod greater than that of ischium and merus.

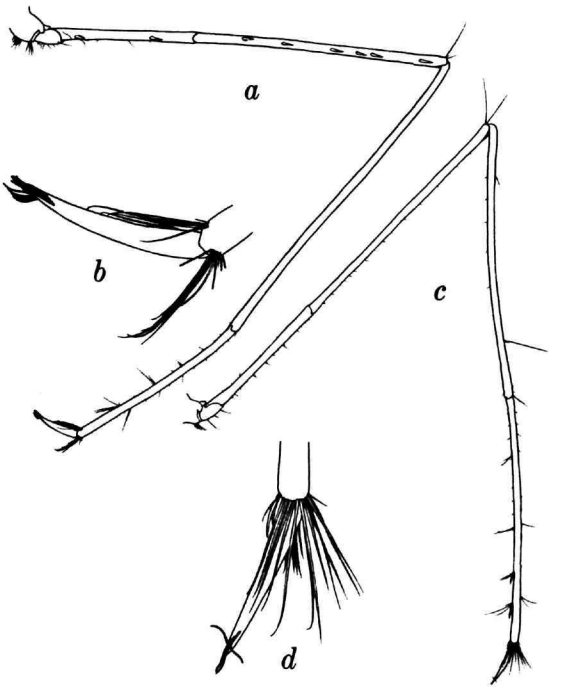

FIGURE 18.—*Processa tenuipes*, new species, paratype, ovigerous female, from Gulf of Mexico, 92 meters, carapace length 6.4 mm: *a*, right fourth pereiopod; *b*, same, dactyl; *c*, right fifth pereiopod; *d*, same, dactyl. Magnifications: *a*, *c*, ×6; *b*, *d*, ×25.

Abdominal sternites unarmed. Uropods (Figure 17*d*) as in *P. bermudensis*. Eggs small and numerous, 0.3–0.5 mm in diameter.

SIZE.—Carapace lengths of males, 5.4—6.7 mm; of females, 4.3–9.65 mm; of ovigerous females, 5.9–9.65 mm.

COLOR.—Not recorded.

DISCUSSION.—*Processa tenuipes* may be the northern counterpart of *P. guyanae*, a species not known from localities north of Surinam. The new species resembles *P. guyanae* in general facies; both species have large eyes, an anteriorly truncated stylocerite, slender pereiopods and numerous articles (44 or more) on the carpus of the second right pereiopod. *Processa tenuipes* differs from *P. guyanae* in having the rostrum convex dorsally, with the apex deflexed, more articles on the carpus of the

second pereiopods, 48–69 rather than 44–47, slenderer third, fourth, and fifth pereiopods, and with different proportions in the segments, especially those of the fifth pereiopods. The propodus of the fifth pereiopod in *P. tenuipes* is 6–7 times as long as the dactyl and the merus is shorter than the carpus, whereas in *P. guyanae* the propodus is 4 times as long as the dactyl and the merus is slightly longer than the carpus. Of the known processids from the western Atlantic, only *Nikoides schmitti* resembles *P. tenuipes* in overall slenderness of the posterior three pairs of pereiopods.

NAME.—The name is from the Latin, *tenuis*, thin, and *pes*, foot, in reference to the slender pereiopods.

TYPE-LOCALITY.—Gulf of Mexico, off the west coast of Florida, in 31 m.

DISTRIBUTION.—Northwestern Atlantic, from scattered localities between North Carolina and the Gulf of Mexico in depths between 31 and 331 m.

Processa vicina, new species

FIGURES 19, 20

Processa canaliculata.—Rathbun, 1901: 104 [listed, specimens from *Albatross* stations 2605, 2606, 2370, 2373 only; part].—Schmitt, 1935: 169 [part; North Carolina record only].

HOLOTYPE.—♂, 4.0 mm; off North Carolina; 34°35′30″N, 75°45′30″W; 59 m; white sand, black specks; *Albatross* station 2605; 18 October 1885; USNM 23383.

PARATYPES.—2 ♂, 4 ♀ (2 ovigerous); 1 carapace; data as for holotype; USNM.—1 ovigerous ♀; off North Carolina; 34°35′15″N, 75°52′W; 46 m; white sand, black specks; *Albatross* station 2606; 18 October 1885; USNM.—1 ♀; Gulf of Mexico, off northwestern Florida; 29°14′N, 85°29′15″W; 46 m; coral; *Albatross* station 2373; 7 February 1885; USNM.—2 ♀ (1 ovigerous); Gulf of Mexico, off northwestern Florida; 29°18′15″N, 85°32′W; 46 m; coarse, gray sand, broken shell; *Albatross* station 2370; 7 February 1885; USNM.—1 ♂; Venezuela, off Isla de Margarita; 11°03′N, 64°37.5′W; 95 m; LS 6805, station III; L. Abele; 25 November 1968; USNM.

DIAGNOSIS.—Antennal spine absent. Stylocerite rounded laterally. (Right pereiopod of first pair chelate, left with simple dactyl; first legs lacking exopods.) Second pereiopods symmetrical, with 5 meral and 10–14 carpal articles. Carpus of fifth pereiopod longer than propodus. Fifth abdominal somite unarmed posterolaterally. Abdominal sternites unarmed.

DESCRIPTION.—Rostrum (Figures 19*b*, 20*a*) sinuous or convex dorsally, apex (Figure 19*c*) noticeably deflexed, bifid, lower tooth longer, bifurcation obscured by long setae; lower margin of rostrum convex proximally, concave distally. Lower orbital angle an inconspicuous, rounded lobe. Antennal spine absent. Lower anterior angle of carapace broadly rounded (Figures 19*a*, 20*a*).

Abdomen (Figure 19*d*) smooth, bare, lower margins of pleura lined with fine setae. Fifth abdominal somite rectangular posterolaterally, posterolateral apex of pleuron rounded, unarmed. Sixth abdominal somite less than 1½ times as long as fifth, bluntly angled posterolaterally; lobe above articulation of uropod irregular in outline, unarmed. Telson (Figures 19*e*, 20*b*) about 1½ times as long as sixth abdominal somite, length slightly more than 3 times greatest width, with 2 pairs of dorsal and 2 pairs of distal spines; anterior pair of dorsal spines of telson set in proximal fourth, posterior spines beyond midlength; distance between anterior margin and anterior pair of dorsal spines less than ⅓ distance between pairs of spines; distal spines (Figures 19*f*, 20*c*) as in *P. bermudensis*.

Eye (Figures 19*a*, 20*a*) moderately large, cornea width subequal to or slightly greater than length of stalk and cornea combined, 2½ times greatest width of antennal scale.

Antennular peduncle (Figure 19*w*) extending by 2 distal segments and ½–⅓ of proximal segment beyond rostrum, proximal segment longer than distal segments combined; ultimate segment slightly more than ½ the length of penultimate; proximal segment of antennular peduncle with ventral spine, set slightly beyond midlength. Stylocerite (Figures 19*g*, 20*d*) obtusely rounded laterally, inner margin projecting farther than outer, inner armed with minute tubercle in some specimens. Dorsolateral flagellum of antennule incomplete, thickened setigerous portion consisting of 9–12 articles.

Antennal scale (Figure 19*x*) extending to or slightly beyond end of antennular peduncle, length of scale about 6½ times greatest breadth; distal spine of scale overreaching blade. Antennal peduncle extending about to midlength of second segment of antennular peduncle, basal segment of antenna unarmed. Antennal flagellum about 4–5 times carapace length.

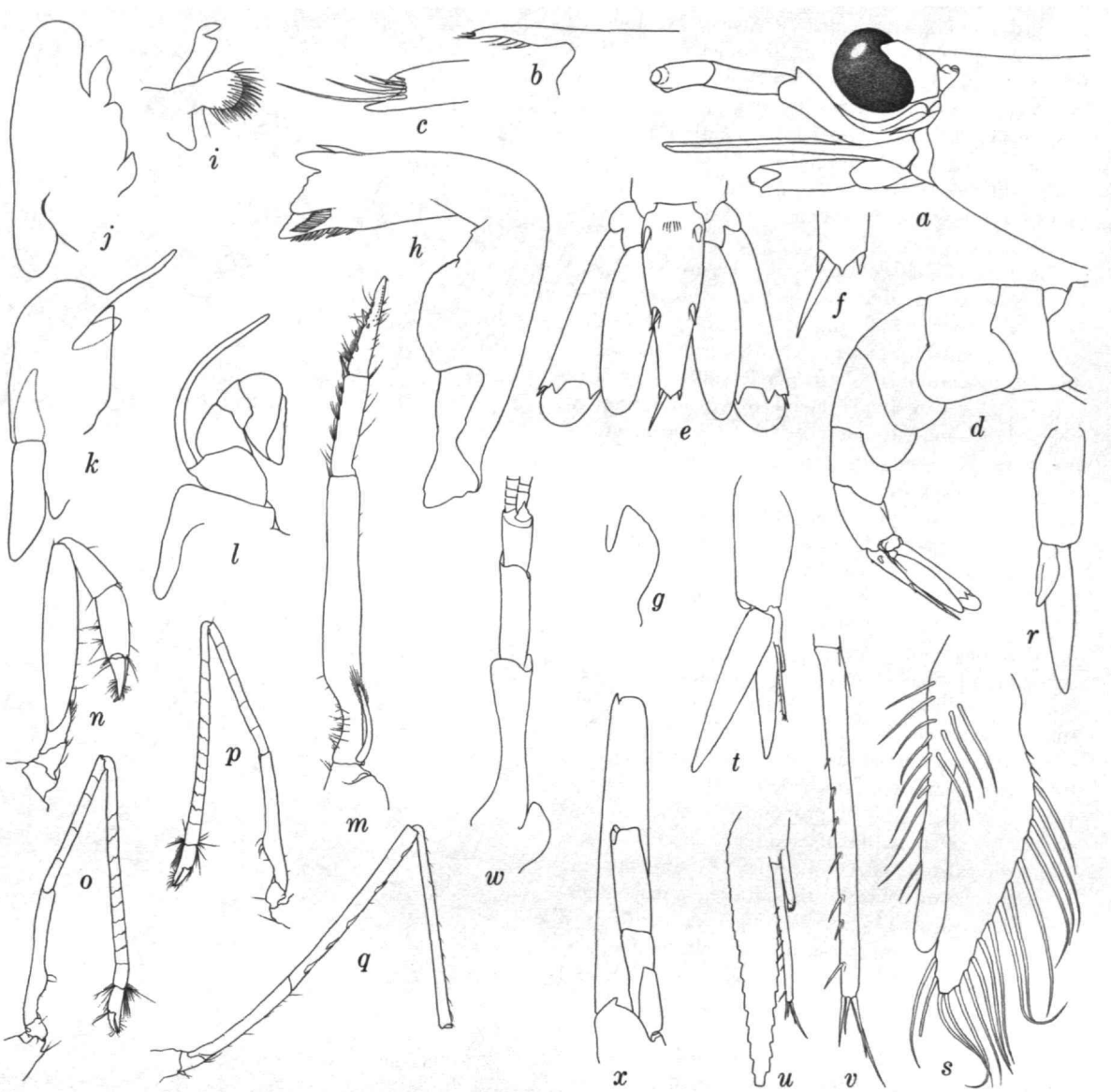

FIGURE 19.—*Processa vicina*, new species, holotype, male, carapace length 4.0 mm: *a*, anterior region; *b*, rostrum; *c*, same, distal end; *d*, abdomen; *e*, telson and uropods; *f*, end of telson; *g*, stylocerite of right antennule; *h*, right mandible; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, left second pereiopod; *q*, right third pereiopod (propodus and dactyl missing); *r*, right first pleopod; *s*, same, endopod; *t*, right second pleopod; *u*, same, endopod; *v*, same, appendix masculina. Paratype, ovigerous female, from type-locality, carapace length 5.3 mm: *w*, right antennule; *x*, right antenna. Magnifications: *d*, ×6; *a*, *b*, *e*, *m–r*, *t*, *w*, *x*, ×12.5; *f*, *g*, *i–l*, *u*, ×25; *c*, *h*, *s*, *v*, ×63.

Third maxilliped (Figure 19*m*) overreaching antennal scale by slightly more than length of distal segment; ultimate segment with short spines on surface, apex acute; ultimate segment subequal to penultimate, slightly more than ⅓ the length of proximal segment; exopod well developed. Mandible (Figure 19*h*) with row of 11 spines on posterior margin of molar process; other mouthparts (Figures 19*i–l*) as in *P. bermudensis*.

Right pereiopods of first pair (Figures 19*n*, 20*e*) chelate, reaching about to end of or barely overreaching antennal scale; fingers ⅗–⅘ length of palm; carpus subequal to palm; merus longer than carpus and chela combined. Left pereiopod of first pair (Figure 20*f*) with simple dactyl, overreaching antennal scale by most of dactyl; dactyl ⅓ the length of propodus; carpus ¾ the length of propodus; merus longer than carpus, propodus, and dactyl combined. Arthrobranch not visible at base of first pereiopods. Second pereiopods (Figures 19*o*, *p*, 20*g*, *h*) symmetrical, overreaching antennal scale by chela and distal 3 articles of carpus; merocarpal articulation of second legs not extending beyond eye; ischium undivided, merus with 5 and carpus with 10–14 articles; fingers subequal to palm; carpus 4½–5 times as long as chela; merus about 3 times as long as chela; ischium subequal to merus. Third pereiopod (Figures 19*q*, 20*i*) overreaching antennal scale by dactyl, propodus, and fully half of carpus; dactyl (Figure 20*j*) slender, simple, with subapical setae; propodus 4 times as long as dactyl, unarmed, with scattered setae on surface, and longer apical tufts of setae; carpus 1⅔ times as long as propodus, unarmed, with scattered setae on surface; merus about 1½ times as long as propodus, with 5 movable spines on lateral surface; ischium about ⅔ as long as merus, with 0–2 movable spines on lateral surface; combined length of propodus and carpus of third pereiopod slightly greater than that of ischium and merus. Fourth pereiopod (Figure 20*k*) overreaching antennal scale by dactyl, propodus, and about ¾ of carpus; dactyl slender, simple, with subapical tufts of setae; propodus 5 times as long as dactyl, unarmed, ornamented with few short setae on surface and longer distal tufts of setae; outer margin of propodus not markedly more setose in males than in females; carpus slightly more than 1½ times as long as propodus, unarmed, with few short setae on surface; merus about 1⅕ times as long as propodus, with 5 movable spines on lateral surface; ischium shorter than merus, with

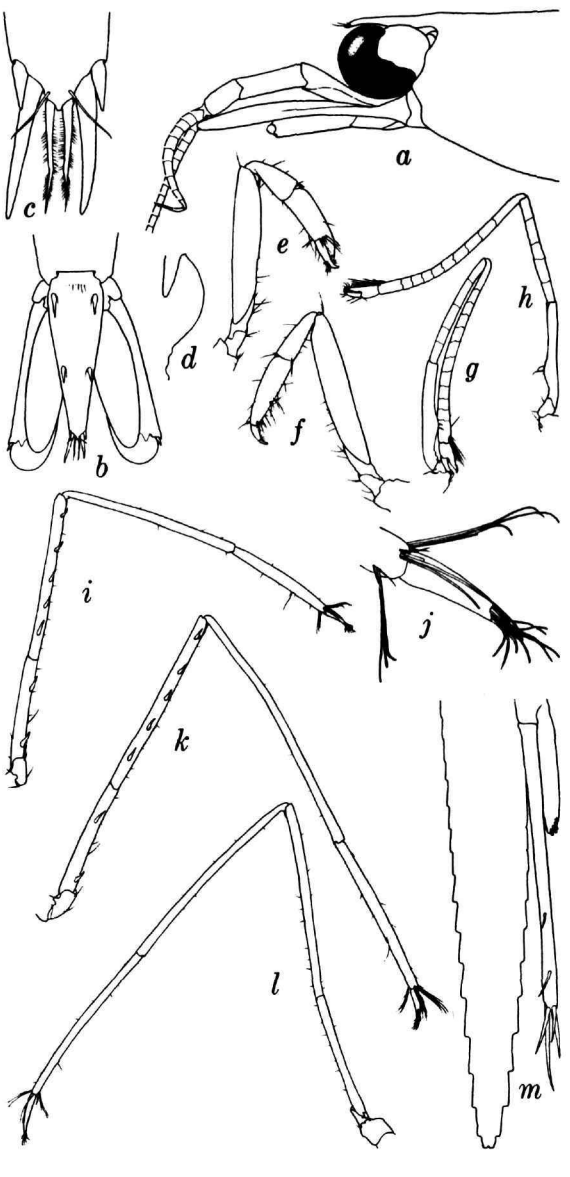

FIGURE 20.—*Processa vicina*, new species, paratype, male, from off Venezuela, carapace length 3.0 mm: *a*, anterior region; *b*, telson and uropods; *c*, end of telson; *d*, stylocerite of right antennule; *e*, right first pereiopod; *f*, left first pereiopod; *g*, right second pereiopod; *h*, left second pereiopod; *i*, right third pereiopod; *j*, same, dactyl; *k*, right fourth pereiopod; *l*, left fifth pereiopod; *m*, endopod of right second pleopod. Magnifications: *a*, *b*, *e–i*, *k*, *l*, ×12.5; *d*, ×25; *c*, *j*, *m*, ×63.

2 movable spines on lateral surface; combined length of propodus and carpus of fourth periopod much greater than that of ischium and merus. Fifth pereiopod (Figure 20*l*) overreaching antennal scale by dactyl, propodus, and fully half of carpus; dactyl slender, simple, with subapical tufts of setae; propodus almost 4 times as long as dactyl, with scattered short setae on surface, longer apical setae, and 1 distal spine on flexor margin; outer margin of propodus not markedly more setose in males than in females; carpus ¼ longer than propodus, unarmed; merus about 1⅙ times as long as propodus, unarmed; ischium shorter than merus, unarmed; combined length of propodus and carpus of fifth pereiopod greater than that of ischium and merus.

Endopod of first male pleopod (Figures 19*r*, *s*) about ½ as long as exopod, tapering distally, apex acute, setose, retinacular lobe well developed, separated for most of its length; coupling hooks not seen. Appendix masculina of second male pleopod (Figures 19*t–v*, 20*m*) with row of spinules on outer margin, apex with 4 distal spinules. Abdominal sternites unarmed. Uropods (Figures 19*e*, 20*b*) as in *P. bermudensis*. Eggs small and numerous, 0.5–0.6 mm in diameter.

SIZE.—Carapace lengths of males, 2.8–4.0 mm; of females, 2.9–5.3 mm; of ovigerous females, 4.3–5.3 mm.

COLOR.—Not recorded.

DISCUSSION.—*Processa vicina* resembles *P. bermudensis* and differs from all other Atlantic species of *Processa* in lacking the antennal spine of the carapace. It differs from *P. bermudensis* in having symmetrical second pereiopods, with 5 meral and 10–14 carpal articles on both; it further differs from *P. bermudensis* in having the rostrum deflexed anteriorly and in having broader eyes.

Only three other species of *Processa* are known to have symmetrical second pereiopods: *P. aequimana* (Paulson), from the Red Sea; *P. parva* Holthuis, from the eastern Atlantic; and *P. hemphilli*, described herein from west Florida. These three species also have an antennal spine on the carapace.

NAME.—The name is from the Latin, *vicina*, near, alluding to its presumed relationship with *P. bermudensis*.

TYPE-LOCALITY.—Off North Carolina, in 59 m.

DISTRIBUTION.—Western Atlantic, where it has been taken off North Carolina, in the Gulf of Mexico, and off Venezuela, in depths between 46 and 95 m.

Processa wheeleri Lebour, 1941

Processa wheeleri Lebour, 1941: 403, figs. 1–9, 11–27.—Holthuis, 1959: 120 [discussion].—A. B. Williams, 1965: 87.

DIAGNOSIS.—Antennal spine present. Stylocerite with lateral spine. (Right pereiopod of first pair chelate, left with simple dactyl; first pereiopods lacking exopods.) Second pereiopods asymmetrical, right stronger. Right second pereiopod with 7 meral and 23 carpal articles, left second pereiopod with 5 meral and 15 carpal articles. Carpus of fifth leg subequal in length to propodus. Fifth abdominal somite unarmed posterolaterally. (Abdominal sternites not described).

DISCUSSION.—This species was not represented in the material available to us, and we were unable to locate the male holotype; it may prove to be at The Marine Laboratory, Plymouth.

P. guyanae, *P. profunda*, and *P. tenuipes* (the other western Atlantic species with a spine on the stylocerite, an antennal spine, unarmed pleura on the fifth abdominal somite, and asymmetrical second chelae) all have longer pereiopods and have more than forty articles on the carpus of the right second pereiopod.

Williams (1965) suggested that a few immature specimens of *Processa* collected in Bogue Sound, North Carolina, might prove to be *P. wheeleri*, but his specimens were too young to be identified with certainty.

TYPE-LOCALITY.—Off Bermuda.

DISTRIBUTION.—Western Atlantic, where it is known from Bermuda and possibly from off North Carolina.

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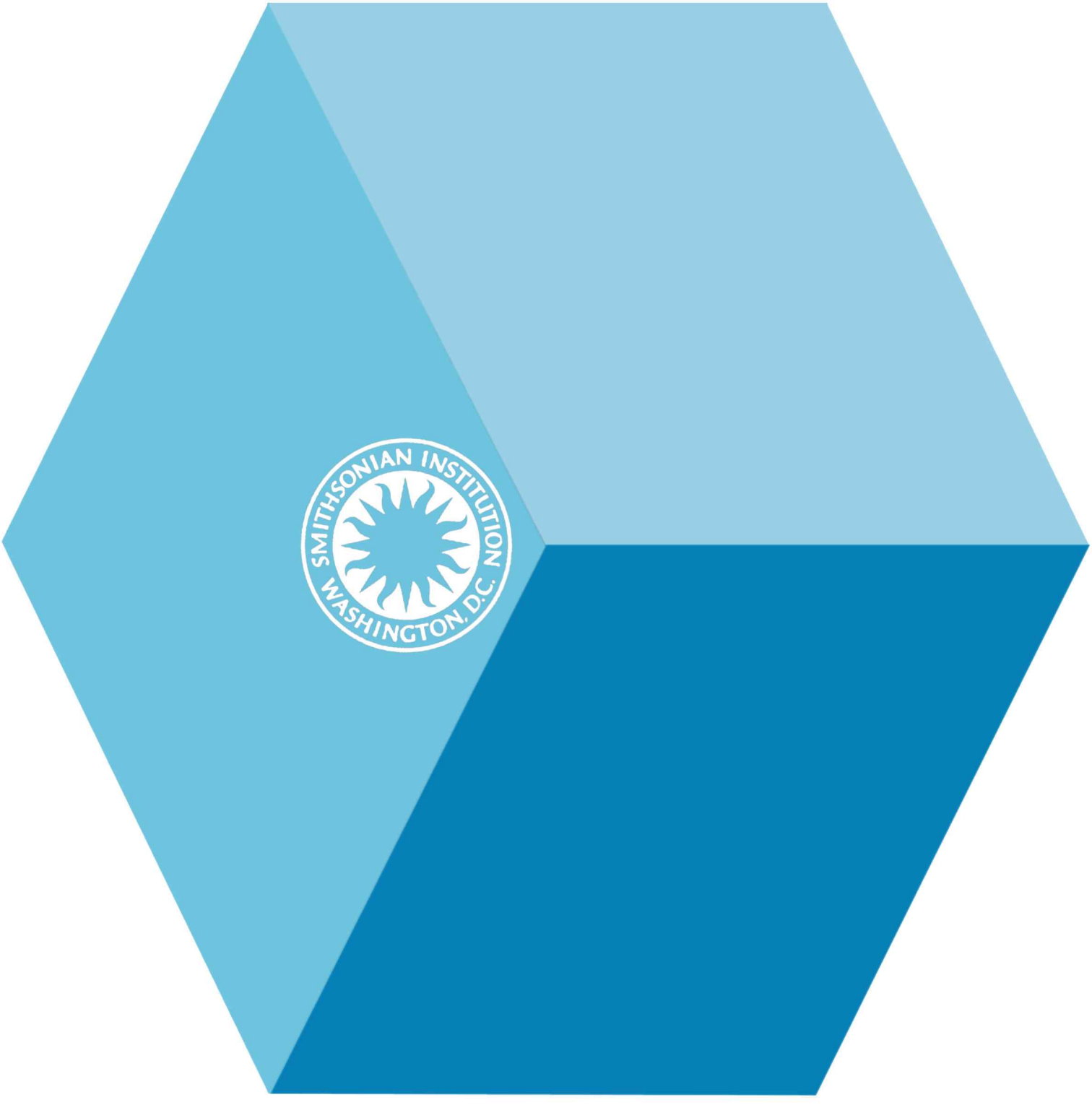
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