

STUDIES ON THE FAUNA OF SURINAME
AND OTHER GUYANAS: No. 10.

STOMATOPOD CRUSTACEA OF SURINAME

by

L. B. HOLTHUIS

(Rijksmuseum van Natuurlijke Historie, Leiden)

The present report is based in the first place on material collected by the trawler "Coquette", which, from April to August 1957, explored the offshore waters of Suriname and French Guiana from the mouth of the Nickerie River in the west to the Iles de Salut in the east. Most of the hauls were made at a distance of 20 to 30 miles from the coast. The paper also considers the Stomatopoda collected off the Suriname coast by the Suriname Fisheries Service.

To date, only one species of stomatopod has been reported from Suriname, viz. "*Gonodactylus chiragra* Fabr.", so named by NEUMANN (1878, p. 39), who reported on a specimen which is preserved in the collection of the Heidelberg Museum and was said to have originated from Suriname. As has been shown by HOLTHUIS (1959, p. 14) NEUMANN's so-called Suriname material is very likely incorrectly labelled, and was more probably collected in the West Indian Islands. Accordingly, this record had better be ignored.

Little is known of the Stomatopoda of the Guianas and neighbouring regions. The only nearby country whose Stomatopoda have been given more than superficial attention is Brazil. In 1955 LEMOS DE CASTRO published an account of the Brazilian Stomatopoda known at that time. It is surprising to note that not a single of the Suriname species was included in his report. More intensive exploration of the continental shelf of Central and northern South America will probably reveal the presence of a far richer stomatopod fauna than has hitherto been surmised.

Part of the "Coquette" material reported upon here belongs to the United States National Museum, Washington, D.C., the rest is preserved in the Rijksmuseum van Natuurlijke Historie, Leiden; a set of duplicates has been deposited in the Surinaams Museum, Paramaribo. The letters W. and L. in the list of material indicate whether a sample is to be found in the Washington or in the Leiden Museum.

I wish to express my gratitude to Dr. D. C. GEIJSKES, Director of the Surinaams Museum; Mr. H. W. LIJDING, head of the Suriname Fisheries Service; and Dr. FENNER A. CHACE, JR., Curator of the Division of Marine Invertebrates, U.S. National Museum, for making the material available to me.

***Squilla rugosa* Bigelow, 1893**

[Plate VIII 1-2]

"Coquette" Sta. 4, off the mouth of the Suriname River, 6°25' N 55°05' W; depth 29 m; 11 May 1957.- 1 male. (L.)

"Coquette" Sta. 6, off the mouth of the Suriname River, 6°24.5' N 55°03' W; bottom gray mud and shells; depth 27 m; 11 May 1957.- 1 female. (L.)

"Coquette" Sta. 8, off the mouth of the Suriname River, 6°24' N 55°02.5' W; bottom gray mud and shells; depth 27 m; 11 May 1957.- 1 male. (L.)

"Coquette" Sta. 280, between the mouths of the Coppename and Suriname Rivers, 6°45' N 55°35' W; bottom mud and fine shells; depth 48 m; 26 June 1957.- 1 female. (W.)

"Coquette" Sta. 290, N.E. of the mouth of the Coppename River, 6°53' N 55°55' W; bottom mud, shells, and coral; depth 49 m; 27 June 1957.- 1 female. (L.)

"Coquette" Sta. 298, off the mouth of the Suriname River, 6°45' N 55°17' W; bottom mud and fine shells; depth 44 m; 28 June 1957.- 1 male. (L.)

The specimens agree quite well with the published descriptions and figures of this characteristic species. The males are 82 to 87 mm long, the females 87 to 106 mm.

The rostrum is tongue-shaped with the anterior margin rounded. The lateral carinae are distinct, but no median carina is visible. The antero-lateral spines of the carapace reach almost to the level of the base of the rostrum. The dorsal surface of the carapace shows five distinct longitudinal carinae. The anterior bifurcation of the median

carina is so vague as to be practically non-existent: before the dorsal pit the median carina is first visible as a sharp single ridge, which stops slightly behind the middle of the distance between the dorsal pit and the base of the rostrum. The posterior part of the lateral margin of the carapace is rounded and shows no angle.

The lateral process of the fifth thoracic somite is single, sharply pointed, and directed straight outwards or even slightly posteriorly. The lateral processes of the sixth and seventh thoracic somites are also pointed, but the tips are curved strongly backwards. The process of the sixth segment bears an inconspicuous blunt lobe at the base of the anterior margin; no such lobe is present in the process of the seventh somite. The longitudinal carinae are distinct on the last three thoracic somites and on all the abdominal somites. The spine formula of these carinae is: submedian 5 + 6, intermediate (2) 3-6, lateral 1-6.¹⁾ The posterior margins of the fifth and sixth somites bear one to three spinules between the submedian and intermediate spines; sometimes up to three additional minute spinules are visible, in one specimen there are no spinules at all on one side of the body. The telson shows numerous more or less longitudinally arranged carinae at each side of the median carina; the pattern formed has been well figured by BIGELOW (1894, p. 541, fig. 23). The margins of the telson are not thickened in the males, they resemble those of the females. The tips of the submedian teeth are not movable. The pre-lateral lobes are absent. The denticular formula is: submedian 4-6, intermediate (8), 9-11, lateral 1²⁾. The submedian and intermediate denticles are usually all sharply pointed, with the exception of the outermost.

The eyes are large. The cornea is placed obliquely on the stalk. The latter broadens distally.

¹⁾ This spine formula indicates which carinae end in spines; hence, "intermediate (2) 3-6" means that the intermediate carinae of the third to sixth abdominal somites end in a spine, while in some specimens those of the second somite also show a posterior spine.

²⁾ This denticular formula indicates the number of denticles on the margin of the telson. The number of submedian denticles given here is that between the postero-median incision of the telson and the submedian teeth, the intermediate denticles are those between the submedian and intermediate teeth, the lateral that between the intermediate and lateral teeth. "(8), 9-11" means "between 9 and 11, seldom 8."

The raptorial claw possesses 6 slender teeth (the tip of the dactylus included). The lower margin of the dactylus is evenly convex and not sinuate. The upper margin of the carpus shows a carina, which ends rather abruptly anteriorly.

There are five epipods on the thoracic legs of each half of the body.

The inner margin of the bifurcate process of the protopodite of the uropods shows a row of 8 to 13 slender spines. The outer margin of the penultimate segment of the uropodal exopod bears 8 spines.

Colour. A dark line is present along the submedian region of the posterior margin of the first five abdominal somites. The most striking coloration, however, is formed by a number of large, sharply delineated, deep-black spots. One such spot is present on the median part of the second and fifth abdominal somites. Furthermore, there is a black spot on the lateral part of the first and fifth somites; the spot on the latter extends on to the sixth somite. The posterior half of the telson is distinctly darker than the anterior; this difference is especially distinct in the median region. A black line is visible on the top of the scaphocerite, and another on the distal part of the merus of the raptorial claw. The last segment of the uropodal exopod, and the distal half of the endopod, are entirely black.

The present species differs from all other West Atlantic species of *Squilla* in the presence of many ridges on the dorsal surface of the telson, and in the long spines on the inner margin of the bifurcate process of the uropod.

Type locality. Gulf of Mexico off Charlotte Harbor, W. Florida; 26°18'30" N 83°8'45" W; depth 27 fathoms.

Distribution. West coast of Florida, U.S.A. (off Charlotte Harbor, and off Cedar Key), Alabama (Mississippi Sound), Mexico (Gulf of Campeche), Jamaica, Isle of Pines. The present Suriname records greatly extend the known range of the species. It is doubtful whether the specimen from the Isle of Pines, which LUNZ (1937, p. 12) made the type of a separate variety *pinensis*, actually represents a distinct form. The main distinguishing feature of this variety is the fact that no spinules are present on the hind margin

of the fifth and sixth abdominal somites. As shown by the present Suriname material the number of these spinules on each side of the abdomen may vary between 0 and 3, and hence not too much importance should be attached to this character.

Squilla empusa Say, 1818

[Plate VIII 3-4, Fig. 76a]

20 miles N.N.W. of the mouth of the Coppename River; depth 31 m; 1-5 April 1957; first voyage of the "Coquette".- 3 males, 5 females. (L.)

N.N.W. of the mouth of the Marowijne River; about 20 miles offshore; depth 35 m; 8-12 April 1957; second voyage of the "Coquette".- 1 male, 2 females. (L.)

20 miles N. of the Suriname coast between the mouths of the Nickerie and Coppename Rivers; depth 27 m; 15-20 April 1957; third voyage of the "Coquette".- 2 females. (L.)

20 miles N. of the mouth of the Suriname River; depth 9 m; 6-9 May 1957; sixth voyage of the "Coquette".- 1 male. (L.)

"Coquette" Sta. 140, N.E. of the mouth of the Suriname River, 6°24'-6°22' N 54°55'-54°59' W; bottom mud; depth 26 m; 30 May 1957.- 1 male. (W.)

"Coquette" Sta. 281-282, between the mouths of the Coppename and Suriname Rivers, 6°46'-6°46.5' N 55°36.5'-55°38' W; bottom mud and fine shells; depth 46 m; 26 June 1957.- 1 female. (W.)

"Coquette" Sta. 297, off the mouth of the Suriname River, 6°45'-6°50.5' N 55°17'-55°27' W; bottom mud and fine shells; depth 44 m; 28 June 1957.- 3 females. (W.)

Near "Suriname Rivier" light vessel; 1953; H. W. Lijding.- 1 male. (L.)

The above specimens agree perfectly with the descriptions and figures which have been published of this species. Furthermore, they could be compared with material of the species from near Chincoteague Island, Accomack Co., Virginia, U.S.A. (8 January 1952, F. W. Sieling) and from Long Beach, E. of St. Leonard, Calvert Co., Maryland, U.S.A. (6 December 1953, E. Walker), present in the collection of the Leiden Museum.

In the Suriname material the males are 70 to 133 mm long, the females 77 to 156 mm.

The rostrum is trapezoid, being about as long as broad, with the anterior angles rounded. The median and lateral carinae of the rostrum are distinct. The antero-lateral spines of the carapace reach to or slightly beyond the level of the base of the rostrum. The dorsal surface of the carapace bears five distinct longitudinal carinae. The anterior bifurcation of the median carina is distinct and

starts just before the dorsal pit. The posterior part of the lateral margin of the carapace shows a distinct angle.

The lateral process of the fifth thoracic somite is single, sharply pointed, and curved somewhat forwards. The lateral processes of the sixth and seventh somites are broad and sharply pointed, showing only a very small blunt tooth on the anterior margin; in the seventh somite, in particular, this tooth is practically non-existent. The longitudinal carinae are distinct on the last three thoracic and on all abdominal somites. The spine formula of the abdominal carinae is: submedian (4), 5 + 6, intermediate (2), 3-6, lateral 1-6. No additional spinules are present on the posterior margins of the fifth and sixth somites. The telson has a single median carina, which ends in a sharp point. The margin of the telson is not thickened in the males, being there of practically the same shape as in the females. The tips of the submedian teeth are immovable. The denticular formula is as follows: submedian 3-4, intermediate 6-8 (9), lateral 1. The submedian denticles are of equal size or become smaller outwards.

The eyes are large, and the cornea is placed obliquely on the stalk. The stalk is not much broader at the top than at the base.

The raptorial claw possesses six slender teeth (the tip of the dactylus included). The lower margin of the dactylus is distinctly sinuate. The upper margin of the carpus shows two distinct teeth. Five epipods are present.

The inner margin of the bifurcate process of the protopodite of the uropods is serrate or crenulate. There are 8 or 9, seldom 7, spines on the outer margin of the penultimate segment of the uropodal exopod.

Colour. The last three thoracic and first five abdominal somites show a dark line along the posterior margin. A broad dark spot is visible in the median region of the second abdominal somite. Similar, but far less distinct spots may be seen in the third to fifth somites. The distal part of the penultimate, and the inner part of the ultimate segment of the uropodal exopods is black, as is also the distal half of the endopod. No dark spots are visible near the base of the median carina of the telson.

The present species may be immediately distinguished from the other Suriname species of this genus by the median carina of the carapace, which is bifurcated immediately before the dorsal pit.

Type localities. Rhode Island and E. Florida, U.S.A.

Distribution. *Squilla empusa* is known from the coast of the U.S.A. from Massachusetts to Texas, and has also been collected in the Gulf of Campeche. Furthermore, the species has been reported from Jamaica (MIERS, 1880; RATHBUN, 1899) and Cuba (BOONE, 1930, as *Squilla mantis*). As shown by LEMOS DE CASTRO (1955, p. 21), MOREIRA'S (1905) record of the species from Brazil is actually based on material of *Squilla brasiliensis* Calman. It is therefore surprising that the species has proved to be far from rare off the coast of Suriname. The Rijksmuseum van Natuurlijke Historie possesses a full-grown male specimen of this species (length 132 mm) collected from a sandbank N. of Margarita Island, Venezuela (20-40 fms, February 1957, T. Blok).

The records of *Squilla empusa* from West Africa do not relate to the present species, but are based on material of what is best known as *Squilla africana* Calman. The specific name *africana*, however, cannot be used for this species, as *Squilla africana* CALMAN (1916, Ann. Mag. nat. Hist., ser. 8 vol. 18, p. 373) is preoccupied by *Squilla raphidea africana* BALSS (1910, Abh. Bayer. Akad. Wiss., suppl. vol. 2 pt. 2, p. 8). As no other name is available for CALMAN'S species, I propose here the new name ***Squilla calmani*** nom. nov. for it.

DE HAAN (1844, Fauna Japonica Crust., pl. 51 fig. 6) figured a new species of stomatopod which he named *Squilla Empusa*, and which at present is generally known as *Pseudosquilla empusa* (De Haan). As *Squilla empusa* De Haan, 1844, is a junior primary homonym of *Squilla empusa* Say, 1818, it is invalid, and may not be used. Since no other name is available for the species, I propose here that of ***Pseudosquilla haani*** nom. nov. as a replacement for *Squilla empusa* De Haan.

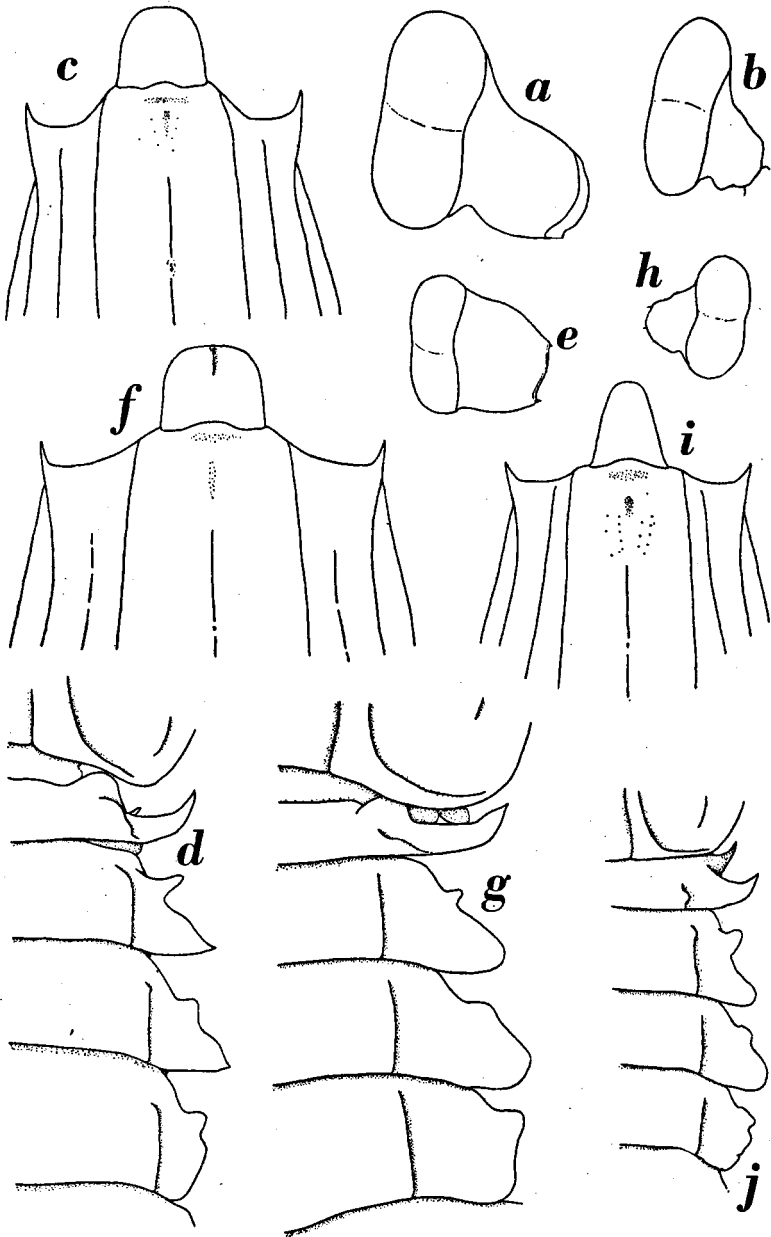


Fig. 76. *Squilla empusa* Say: a, eye. — *Squilla lijdingi* n.sp.: b, eye; c, anterior part of carapace and rostrum, dorsal view; d, pleura of the free thoracic somites. — *Squilla surinamica* n.sp.: e, eye; f, anterior part of carapace and rostrum, dorsal view; g, pleura of the free thoracic somites. — *Squilla obtusa* n.sp.: h, eye; i, anterior part of carapace and rostrum, dorsal view; j, pleura of the free thoracic somites. (a-d, h-j, $\times 3.3$; e-g, $\times 6.7$)

Squilla lijdingi new species

[Plate IX 1-2, Fig. 76 b-d].

- N.N.W. of the mouth of the Marowijne River, about 20 miles offshore; depth 35 m; 8-12 April 1957; second voyage of the "Coquette".-4 males, 2 females. (L.)
- N.N.W. of the mouth of the Marowijne River, about 20 miles offshore; depth 27 m; 29 April-3 May 1957; fifth voyage of the "Coquette".-2 males, 5 females. (L.)
- 15 miles N. of the mouth of the Suriname River; depth about 18 m; 3 May 1957; fifth voyage of the "Coquette".-4 males, 9 females. (L.)
- 20 miles N. of the mouth of the Suriname River; depth 9 m; 6-9 May 1957; sixth voyage of the "Coquette".-3 females. (L.)
- "Coquette" Sta. 2, off the mouth of the Suriname River, 6°23' N 55°05.5' W; bottom mud; depth 27 m; 11 May 1957.-7 males, 7 females. (W.)
- "Coquette" Sta. 3, off the mouth of the Suriname River, 6°24' N 55°05' W; bottom shells; depth 27 m; 11 May 1957.-2 females. (L.)
- "Coquette" Sta. 4, off the mouth of the Suriname River, 6°25' N 55°05' W; depth 29 m; 11 May 1957.-1 male, 1 female. (L.)
- "Coquette" Sta. 5, off the mouth of the Suriname River, 6°25' N 55°04' W; bottom gray mud and shells; depth 27 m; 11 May 1957.-2 females. (L.)
- "Coquette" Sta. 6, off the mouth of the Suriname River, 6°24.5' N 55°03' W; bottom gray mud and shells; depth 27 m; 11 May 1957.-1 male, holotype. (L.)
- "Coquette" Sta. 7, off the mouth of the Suriname River, 6°24.5' N 55°02.5' W; bottom gray mud and shells; depth 27 m; 11 May 1957.-2 males. (L.)
- "Coquette" Sta. 8, off the mouth of the Suriname River, 6°24' N 55°02.5' W; bottom gray mud and shells; depth 27 m; 11 May 1957.-6 males, 3 females. (L.)
- "Coquette" Sta. 15, N.E. of the mouth of the Suriname River, 6°,24.5' N 54°59.5' W; bottom mud and shells; depth 29 m; 11 May 1957.-1 male. (W.)
- "Coquette" Sta. 20, N.E. of the mouth of the Suriname River, 6°28' N 54°57.5' W; bottom shells; depth 31 m; 11 May 1957.-2 females. (W.)
- "Coquette" Sta. 21, N.E. of the mouth of the Suriname River, 6°21' N 55°00' W; depth 26 m; 12 May 1957.-2 males. (W.)
- "Coquette" Sta. 33, N.E. of the mouth of the Suriname River, 6°52' N 54°53' W; bottom mud and shells; depth 51 m; 12 May 1957.-1 male. (W.)
- "Coquette" Sta. 36, N.E. of the mouth of the Suriname River, 6°55' N 54°54' W; bottom mud; depth 55 m; 12 May 1957.-2 females. (W.)
- "Coquette" Sta. 144, N.E. of the mouth of the Suriname River, 6°22.5' N 54°58' W; bottom mud; depth 26 m; 30 May 1957.-2 males. (W.)
- "Coquette" Sta. 159, off the mouth of the Suriname River, 6°22' N 55°02.5' W; bottom mud; depth 26 m; 4 June 1957.-1 male. (W.)
- "Coquette" Sta. 209, between the mouths of the Suriname and Marowijne Rivers, 6°41' N 54°33' W; bottom mud and shells; depth 40 m; 14 June 1957.-1 female. (W.)
- "Coquette" Sta. 218, N.W. of the mouth of the Marowijne River, 6°42' N 54°13.5' W; bottom mud; depth 44 m; 14 June 1957.-6 males, 5 females. (W.)
- "Coquette" Sta. 220, N.W. of the mouth of the Marowijne River, 6°42.5' N 54°11' W; bottom mud; depth 42 m; 14 June 1957.-11 males, 16 females. (L.)
- "Coquette" Sta. 221, N.W. of the mouth of the Marowijne River, 6°42.5' N 54°10' W; bottom mud; depth 42 m; 14 June 1957.-7 males, 8 females. (L.)

"Coquette" Sta. 283, between the mouths of the Coppename and Suriname Rivers, 6°47' N 55°40' W; bottom mud and fine shells; depth 46 m; 26 June 1957.—1 male, 1 female. (W.+L.)

"Coquette" Sta. 284, between the mouths of the Coppename and Suriname Rivers, 6°49' N 55°42' W; bottom mud and fine shells; depth 46 m; 26 June 1957.—1 male. (W.)

"Coquette" Sta. 298, off the mouth of the Suriname River, 6°45' N 55°17' W; bottom mud and fine shells; depth 44 m; 28 June 1957.—1 male, 2 females. (L.)
Off Suriname; "Coquette" collection. — 2 females. (W.)

The males examined are 28 to 76 mm long, the females 36 to 104 mm.

The rostrum is tongue-shaped, with the anterior margin rounded. The lateral margin is raised and forms a carina. There is no median carina, though there may be a slight elevation in the median line of the rostrum. The antero-lateral spines of the carapace are strong and sharp, but fail to reach the level of the base of the rostrum. The carapace shows five distinct longitudinal carinae. In the posterior part of the distance between the base of the rostrum and the dorsal pit of the carapace, the median carina is visible as a sharp single ridge. Slightly behind the middle of this distance, the carina bifurcates. The bifurcated portion is extremely inconspicuous and consists of only a few indications of carinae, which may even be lacking entirely in some specimens. The posterior part of the lateral margin of the carapace shows a distinct angle.

The lateral process of the fifth thoracic somite is single, sharply pointed, slender, and with the distal part curved strongly forwards. The lateral processes of the sixth and seventh somites are triangular and sharply pointed; they are directed somewhat backwards. The process of the sixth somite bears a rounded or acute lobe on the anterior margin; this lobe is about half as long as the process itself and is far better developed than similar lobes in the previous species. The seventh somite shows a similar but smaller lobe. The submedian carinae are distinct on the last three thoracic and on all the abdominal somites. The spine formula of the abdominal carinae is as follows: submedian (4), 5 + 6, intermediate (2), 3-6, lateral (1), 2-6. There are no additional spinules on the posterior margin of the fifth and sixth abdominal somites. The telson has a single median carina, which ends in a sharp point. The margin of the telson

is not thickened in the males, being similar to that of the females. The submedian teeth have immovable tips. The pre-lateral lobes are distinct. The denticular formula of the telson is: submedian (1), 2-4, (5), intermediate (7), 8-11, lateral 1. The outer submedian denticle is much broader than the inner. The tips of the denticles are rounded or bluntly pointed.

The eyes are large, and the cornea is placed very obliquely on the stalk. The stalk is short, and greatly widens distally.

The raptorial claw possesses 6 slender teeth, the tip of the dactylus included. The lower margin of the dactylus is evenly convex. The upper margin of the carpus shows two blunt teeth, sometimes with an indication of a third or fourth, much smaller tooth. Five pairs of epipods are present.

The inner margin of the bifurcate process of the uropods is serrate or crenulate. The penultimate segment of the uropodal exopod bears 7 to 9 (generally 8, seldom 7) movable spines.

Colour. A narrow dark band extends along the posterior margin of the carapace and of the last three thoracic and first five abdominal somites. The longitudinal grooves of the carapace are also marked with a dark line. A broad dark median spot is present on the second abdominal somite. At each side of the base of the median carina of the telson a dark spot is present; the inner half of each of these spots is black, the outer gray. The inner half of the last and penultimate segments of the uropodal exopod, and the distal half of the endopod, are black. The merus of the raptorial claw shows a dark line parallel to and slightly below the upper margin of the outer surface.

The present new species is most closely related to *Squilla empusa* and *S. brasiliensis*. It differs from *S. empusa* in having (a) no distinct median carina on the rostrum, (b) the median carina of the carapace with the bifurcation indistinct and separated from the dorsal pit by a large distance over which the carina is single, (c) the sixth and seventh thoracic pleura with a well-developed anterior lobe, (d) eight to eleven, instead of six to nine intermediate denticles on the telson, (e) a black spot on either side of the base of the median carina of the telson, (f) the lower margin of the dactylus of the

raptorial claw evenly convex. From *S. brasiliensis* the present new species differs in having (a) the telson similar in both sexes, the margin not being swollen in the male, (b) a well developed anterior lobe on the sixth and seventh thoracic pleura, (c) 8 to 9 (seldom 7) spines on the penultimate segment of the uropodal exopod.

Squilla surinamica new species

[Plates VIII 5 and IX 5, Fig. 76 e-g]

Near "Suriname Rivier" light vessel; depth 7 m; 3 May 1957; fifth voyage of the "Coquette".—1 male. (L.)
 15 miles N. of the mouth of the Suriname River; depth about 18 m; 3 May 1957; fifth voyage of the "Coquette".—3 males, 2 females. (L.)
 20 miles N. of the mouth of the Suriname River; depth 9 m; 6-9 May 1957; sixth voyage of the "Coquette".—1 male, holotype. (L.)
 "Coquette" Sta. 1, off the mouth of the Suriname River, 6°22' N 55°06' W; bottom mud; depth 26 m; 11 May 1957.—1 male. (W.)
 "Coquette" Sta. 2, off the mouth of the Suriname River, 6°23' N 55°05.5' W; bottom mud; depth 27 m; 11 May 1957.—9 males, 2 females. (W.)
 "Coquette" Sta. 6, off the mouth of the Suriname River, 6°24.5' N 55°03' W; bottom grey mud and shells; depth 27 m; 11 May 1957.—1 male. (W.)
 "Coquette" Sta. 66, off N.W. French Guiana, 6°00' N 53°29' W; bottom hard mud; depth 27 m; 21 May 1957.—1 male. (L.)
 "Coquette" Sta. 86, off N.W. French Guiana, 5°49.5' N 53°09' W; bottom rocky with mud, coral and shells; depth 27 m; 22 May 1957.—1 male. (L.)
 "Coquette" Sta. 144, N.E. of the mouth of the Suriname River, 6°22.5' N 54°58' W; bottom mud; depth 26 m; 30 May 1957.—17 males, 11 females. (W.)
 "Coquette" Sta. 159, off the mouth of the Suriname River, 6°22' N 55°02.5' W; bottom mud; depth 26 m; 4 June 1957.—3 males, 1 female. (W.)
 Near "Suriname Rivier" light vessel; trawl; December 1953; D. C. Geijskes.—1 female. (L.)

The above males are 28 to 49 mm long; the females measure 34 to 58 mm.

The rostrum is almost quadrangular, with the anterior angles broadly rounded; the anterior width is only slightly less than the basal width. There is a short but distinct median carina in the anterior third of the rostrum. The antero-lateral spines of the carapace are strong and almost reach the level of the base of the rostrum. The carinae of the carapace are far less distinct than in *S. lijdingi*; the intermediate carinae, in particular, are inconspicuous and often interrupted. The part of the median carina situated before

the cervical groove shows no bifurcation, either in front or behind. The bifurcation behind the cervical groove is indistinct and interrupted. Before the dorsal pit the median carina is visible as a single ridge which extends to about halfway between the pit and the base of the rostrum. The lateral margin of the carapace shows a not very distinct angle in its posterior part.

The lateral process of the fifth thoracic somite is single, sharply pointed, slender, and with the distal point directed forwards. The lateral processes of the sixth and seventh thoracic somites are triangular, with a broadly rounded top which is directed posteriorly. Both these processes bear a tiny rounded lobe on the anterior margin. The lobe of the sixth somite is distinctly less than half as long as the process itself, in the seventh somite it is still smaller. The submedian carinae are distinct on the last three thoracic and on all the abdominal somites. The spine formula of the carinae of the abdominal somites is: submedian (5), 6, intermediate 4-6, lateral (3), 4-6. There are no additional spinules on the posterior margin of the fifth and sixth somites. The telson possesses a single median carina which ends in a sharp point. The margin of the telson is slightly more swollen in the males than in the females, but the difference is not conspicuous. The tips of the submedian teeth are immovable. A distinct pre-lateral lobe is present. The denticular formula is as follows: submedian 2-4, (5), intermediate 7-10, lateral 1. The outer submedian denticle is rounded; the other denticles are pointed as a rule.

The eyes are small. The cornea is only slightly broader than the stalk, and is placed slightly obliquely on the latter. The stalk is of about the same breadth over its entire length. The eyes thereby acquire a more quadrangular than triangular shape.

The raptorial claw possesses six slender teeth, the tip of the dactylus included. The lower margin of the dactylus is convex in the distal half, and flattened or slightly concave in the basal part. The upper margin of the carpus bears a single ridge which ends in a blunt tooth. Five pairs of epipods are present.

The inner margin of the bifurcate process of the uropods is crenulate. The outer margin of the penultimate segment of the uropodal exopod bears 8 (seldom 7) spines.

Colour. The grooves and the posterior margin of the carapace are indicated by dark lines. Dark lines are also visible along the posterior margin of the last three thoracic and all the abdominal somites. Broad, dark median spots are present on all these somites, the spot on the second abdominal somite being somewhat more distinct than the others. The last three thoracic somites sometimes have a small dark spot near the anterior end of the intermediate carinae. A longitudinal dark spot is present on each side of the base of the median carina of the telson. The inner half of the last segment of the uropodal exopod is of a dark colour, being darkest in the median line of the segment. The penultimate segment of this exopod shows a median dark line. The tip of the uropodal endopod is also of a dark colour. The merus of the raptorial claw has a dark longitudinal streak on the outer surface near the upper margin, and a transverse line near the anterior margin.

Squilla surinamica is closely related to *Squilla brasiliensis*, *S. lijdingi*, and *S. obtusa*, resembling those species in the fact that the median carina of the carapace is not bifurcated immediately before the dorsal pit as in *S. empusa*. The present species resembles *S. obtusa* in the blunt lateral processes of the sixth and seventh thoracic somites, which are sharply pointed in *S. brasiliensis* and *S. lijdingi*. From all these species *S. surinamica* differs in that the lateral carinae of the second abdominal somite, and sometimes also of the third, have no posterior spine. The presence of the short anterior median carina on the rostrum is also characteristic of the species.

***Squilla obtusa* new species**

[Plate IX 3-4, Fig. 76 h-j]

N.N.W. of the mouth of the Marowijne River, about 20 miles offshore; depth 35 m; 8-12 April 1957; second voyage of the "Coquette".-1 female. (L.)
 "Coquette" Sta. 144, N.E. of the mouth of the Suriname River, 6°22.5' N 54°58' W; bottom mud; depth 26 m; 30 May 1957.-1 female. (W.)
 "Coquette" Sta. 209, between the mouths of the Suriname and Marowijne Rivers, 6°41' N 54°33' W; bottom mud and shells; depth 40 m; 14 June 1957.-1 male. (L.)
 "Coquette" Sta. 221, N.W. of the mouth of the Marowijne River, 6°42.5' N 54°10' W; bottom mud; depth 42 m; 14 June 1957.-1 male, holotype. (L.)

"Coquette" Sta. 298, off the mouth of the Suriname River, 6°45' N 55°17' W; bottom mud and fine shells; depth 44 m; 28 June 1957.—1 female. (L.)

The males are 47 and 49 mm long, the length of the females ranges from 44 to 57 mm.

The rostrum is tongue-shaped, is somewhat more slender than in *Squilla lijdingi*, and has a less rounded and more truncate top. There is no median carina on the rostrum, though an indistinct elevation may be seen in the median region. The lateral margins of the rostrum are raised. The antero-lateral spines of the carapace are strong, but fail to reach the level of the rostral base. The five longitudinal carinae of the carapace are distinct. The median carina shows no anterior bifurcation; anteriorly to the dorsal pit it is visible as a single ridge, which extends to halfway between the pit and the base of the rostrum. The posterior part of the lateral margin of the carapace shows a distinct angle.

The lateral process of the fifth thoracic somite is single, sharply pointed, slender, and with the distal part curved strongly forward. The lateral processes of the sixth and seventh thoracic somites are triangular with a bluntly rounded top; they are directed somewhat backward. The process of the sixth somite bears a well-developed, bluntly triangular lobe on the anterior margin. This lobe is more than half as long as the process itself. A much smaller lobe is present on the process of the seventh thoracic somite. The submedian carinae are distinct on the last three thoracic and on all the abdominal somites. The spine formula of the abdominal carinae is as follows: submedian 5 + 6, intermediate 3-6, lateral 2-6. There are no additional spinules on the posterior margin of the fifth and sixth abdominal somites. The telson has a single median carina which ends in a sharp point. The margin of the telson is not noticeably thicker in the males than in the females. The tips of the submedian teeth are immovable. A distinct pre-lateral lobe is present. The denticular formula is as follows: submedian 3-4, intermediate 7-8, lateral 1. The outer of the submedian denticles is much broader than the inner, and is rounded at the top. The carinae of the teeth of the telson are high in the basal part, inconspicuous on the teeth themselves.

The eyes are large. The cornea is placed only very slightly

obliquely on the stalk. The latter is short and gradually widens distally. The outline of the eyes is therefore more triangular than T-shaped.

The raptorial claw possesses six slender teeth, the tip of the dactylus included. The lower margin of the dactylus is evenly convex. The upper margin of the carpus shows a ridge which ends in a blunt tooth and shows in the middle a trace of a second tooth. There are five pairs of epipods.

The inner margin of the bifurcate process of the uropod is serrate or crenulate. There are 8 or 9 spines on the outer margin of the penultimate segment of the uropodal exopod.

Colour. The ridges and grooves of the carapace are indicated by dark lines. A dark band is visible along the posterior margin of the carapace, the last three thoracic and all abdominal somites. A broad dark median spot is present in the second and fifth abdominal somites; furthermore, a dark spot is present in the antero-lateral angle of the sixth somite. At each side of the base of the median carina of the telson a dark spot may be seen, while further dark spots are situated at the bases of the submedian, intermediate, and lateral teeth of the telson. The entire distal segment of the uropodal exopod and the distal part of the endopod are black. A dark longitudinal line extends over the middle of the penultimate segment of the exopod. The merus of the raptorial claw has a dark line along the upper margin of the outer surface, one along the proximal part of the lower margin, and one along the anterior margin.

This new species is rather closely related to *Squilla lijdingi*, but differs in the following points: (1) the more slender rostrum, (2) the obtuse lateral processes of the sixth and seventh thoracic somites, (3) the smaller number of intermediate denticles on the telson, (4) the shape of the eyes, in which the stalk is placed almost vertically on the cornea, (5) the colour pattern of the abdomen, (6) the entirely black distal segment of the uropodal exopod, (7) the colour pattern of the raptorial claw.

***Squilla quadridens* Bigelow, 1893**

[Plate IX 6]

"Coquette" Sta. 4, off the mouth of the Suriname River, 6°25' N 55°05' W; depth 29 m; 11 May 1957.—1 female. (L.)

The specimen, which is 32 mm long, checks extremely well with BIGELOW's (1894) description. The lateral process of the fifth thoracic somite is sharply triangular and points straight outwards. The spine formula of the abdominal carinae is as follows: submedian 6, intermediate 5, 6, lateral 4-6. The tips of the submedian teeth of the telson are movable. There is no trace of a pre-lateral lobe. The denticular formula of the telson is: submedian 4, intermediate 8-10, lateral 1. The number of intermediate denticles seems to be variable; in BIGELOW's specimen they numbered 6 and 8, in the present specimen 8 and 10. All the denticles are sharply pointed. The carinae of the submedian teeth are distinct, but anteriorly they do not reach beyond the base of the spine at the end of the median carina of the telson.

There are only four pairs of epipods.

In my specimen the inner margin of the bifurcate process of the uropod bears 4 slender teeth in the left, and only two in the right uropod; according to BIGELOW six teeth are placed there in the type specimen. The outer margin of the penultimate segment of the uropodal exopod bears five spines, the last of which is about twice as long as the penultimate one.

Colour. A dark, broad transverse band extends over the entire width of the posterior part of the carapace. A broad median dark spot is present in the second abdominal somite. A dark spot is visible on the posterior margin of the first to fourth abdominal somites near the end of each of the intermediate carinae. A narrow dark band, which is interrupted in the middle, extends along the posterior margin of the sixth abdominal somite. The median carina of the telson shows a dark spot at either end. The tips of the exo- and endopod of the uropods are darker than the rest.

The present species differs from all the other Suriname Stomatopoda in the absence of most of the carinae on the carapace, the

absence of the submedian carinae of the thoracic and first five abdominal somites, the movable tips of the submedian teeth of the telson, the raptorial claws, which bear only four teeth, and in having only four pairs of epipods. The species is most closely related to *Squilla schmitti* Lemos de Castro and *S. tricarinata* Holthuis, which, however, are immediately distinguished by having the submedian carinae of the telson reaching forwards almost to the base of the median carina.

Type locality. Off Key Largo, Florida, U.S.A., 26°5' N 80°15' W; 26 fms.

Distribution. The species proves to be rather rare. Adult specimens have been reported from off Key Largo, Florida, 26 fms (BIGELOW, 1894), off Apalachicola Bay, Florida, 35 fms (SPRINGER & BULLIS, 1956), and from Gairaca, Santa Marta, Colombia, 0-30 m (HOLTHUIS, 1941). The larvae, which have been reported upon under the name *Alima bigelowi* Hansen, are known from Bimini (BIGELOW, 1894), the region near, and east of Fernando Noronha, Brazil (HANSEN, 1895), and between Fernando Noronha and the mouth of the Pará River, Brazil (HANSEN, 1895).

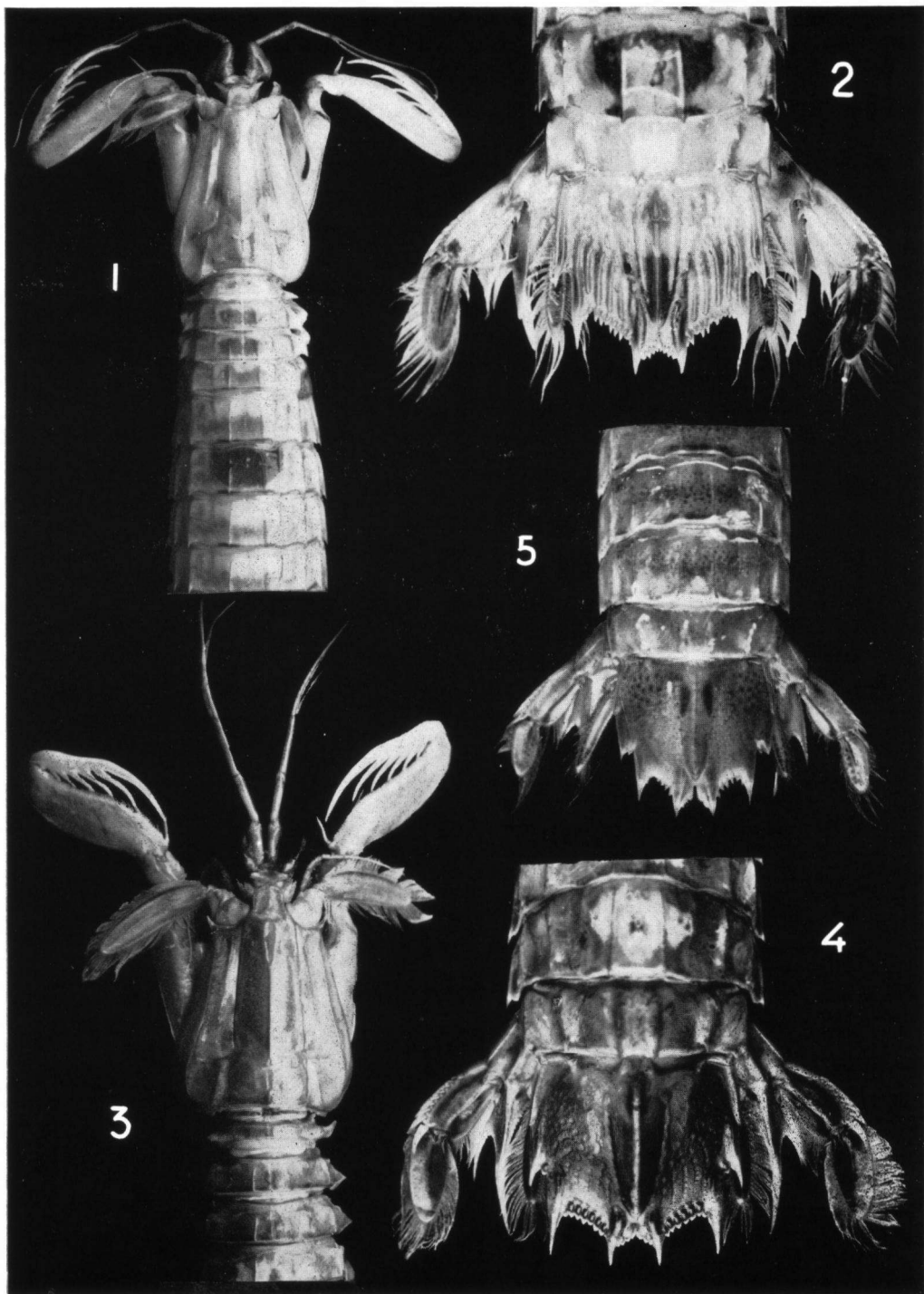
ADDENDUM

After the present paper had gone to the press MANNING (1959) reported that material of *Squilla empusa* Say, *Squilla intermedia* Bigelow, and *Squilla rugosa* Bigelow was collected N. of Suriname by the vessel "Oregon" of the U.S. Fish and Wildlife Service. MANNING moreover provided additional new localities for these species and for *Squilla quadridens* Bigelow.

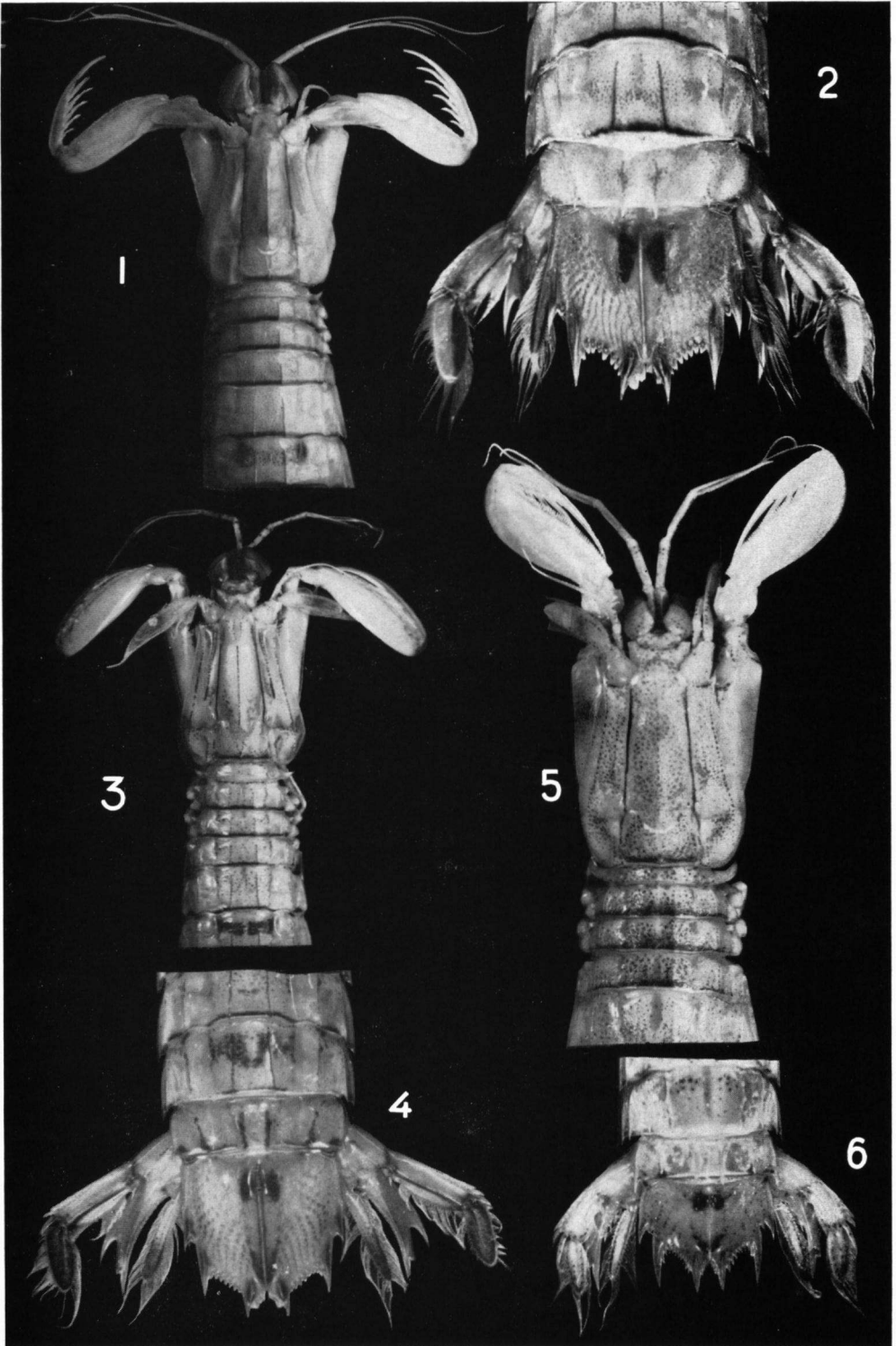
BIBLIOGRAPHY

- BALSS, H., 1910. Ostasiatische Stomatopoden. In: DOFLEIN, F., Beiträge zur Naturgeschichte Ostasiens. *Abh. Bayer. Akad. Wiss. suppl. 2 pt. 2*, pp. 1-11, figs. 1, 2.
- BIGELOW, R. P., 1894. Report upon the Crustacea of the Order Stomatopoda collected by the Steamer Albatross between 1885 and 1891, and on other specimens

- in the U.S. National Museum. Scientific Results of Explorations by the U.S. Fish Commission Steamer Albatross. *Proc. U.S. Nat. Mus.* 17, p. 489-550, textfigs. 1-28, pls. 20-22.
- CALMAN, W. T., 1916. A new Species of the Crustacean Genus *Squilla* from West Africa. *Ann. Mag. nat. Hist.* (8) 18, p. 373-376, figs. 1, 2.
- HAAN, W. DE, 1833-1850. Crustacea. In: SIEBOLD, P. F. DE, *Fauna Japonica sive Descriptio animalium, quae in itinere per Japoniam, jussu et auspiciis superiorum, qui summum in India Batava Imperium tenent, suscepto, annis 1823-1830 collegit, notis, observationibus et adumbrationibus illustravit*, pp. i-xvii, i-xxxii, ix-xvi, 1-244, pls. 1-55, A-Q, circ. tab. 2.
- HANSEN, H. J., 1895. Isopoden, Cumaceen und Stomatopoden der Plankton-Expedition. *Ergebn. Plankton-Exped.* 2Gc, pp. 1-105, pls. 1-8.
- HOLTHUIS, L. B., 1941. Note on some Stomatopoda from the Atlantic Coasts of Africa and America, with the Description of a new Species. *Zool. Meded. Leiden* 23, p. 31-43, 1 fig.
- HOLTHUIS, L. B., 1959. The Crustacea Decapoda of Suriname (Dutch Guiana). *Zool. Verhand. Leiden* 44, pp. 1-296, textfigs. 1-68, pls. 1-16, maps 1-2.
- LUNZ, G. R., 1937. Stomatopoda of the Bingham oceanographic Collection. *Bull. Bingham oceanogr. Coll.* 5 pt. 5, pp. 1-19, figs. 1-10.
- MANNING, RAYMOND B., 1959. A Checklist of the Stomatopod Crustaceans of the Florida - Gulf of Mexico Area. *Quart. Journ. Florida Acad. Sci.* 22, 1, p. 14-24.
- MIERS, E. J., 1880. On the Squillidae. *Ann. Mag. nat. Hist.* (5) 5, p. 1-30, 108-127, pls. 1-3.
- MOREIRA, C., 1905. Crustaceos. Campanhas de pesca do "Annie". *Arch. Mus. Nac. Rio de Jan.* 13, p. 121-145, 2 textfigs., pls. 1-5.
- NEUMANN, R., 1878. *Systematische Uebersicht der Gattungen der Oxyrhynchen, Catalog der Podophthalmen Crustaceen des Heidelberger Museums. Beschreibung einiger neuer Arten*, pp. 1-39.
- RATHBUN, M. J., 1899. Jamaica Crustacea. *Journ. Inst. Jamaica* 2 pt. 6, p. 628-629.
- SPRINGER, S. & BULLIS, H. R., 1956. Collections by the Oregon in the Gulf of Mexico. List of Crustaceans, Mollusks, and Fishes identified from collections made by the exploratory fishing vessel Oregon in the Gulf of Mexico and adjacent seas 1950 through 1955. *Spec. sci. Rep. Fish. U.S. Fish Wildlife Serv.* 196, pp. 1-134.



Squilla rugosa Bigelow — 1. Male from "Coquette" Sta. 298. Anterior part of body in dorsal view ($\times 1.1$). — 2. Same specimen. Telson and uropods ($\times 1.6$).
Squilla empusa Say — 3. Larger female, third voyage of the "Coquette". Anterior part of body in dorsal view ($\times 0.9$). — 4. Same specimen. Telson and uropods ($\times 1.0$).
Squilla surinamica new species — 5. Holotype. Telson and uropods ($\times 3.0$).



Squilla lijdingi new species — 1. Female paratype, "Coquette" Sta. 283. Anterior part of body in dorsal view ($\times 1.4$). — 2. Same specimen. Telson and uropods ($\times 2.1$). *Squilla obtusa* new species — 3. Female paratype, "Coquette" Sta. 298. Anterior part of body in dorsal view ($\times 1.8$). — 4. Same specimen. Telson and uropods ($\times 2.3$). *Squilla surinamica* new species — 5. Male paratype, "Coquette" Sta. 86. Anterior part of body in dorsal view ($\times 3.1$). *Squilla quadridens* Bigelow — 6. Female specimen, "Coquette" Sta. 4. Telson and uropods ($\times 3.0$).