

PORCELLANID CRABS

BY

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INTRODUCTION

The porcellanid crabs thus far known from West Africa are not numerous. M. RATHBUN (1900) mentioned only three species in her list of West African decapods. One of these has not been recorded again since it was briefly described by B. OSORIO in 1887 and it must be considered a *species dubia* for the present; one is redescribed below; the third is described below under a new name. Previously, C. HELLER (1863) had recorded a common European porcellanid from the Canary Islands and A. MILNE-EDWARDS (1878) had described two species from the Cape Verde Islands; all three of these have since been found on the shores of the African mainland. In the present report, the Canary and Cape Verde Islands are treated as part of the West African faunal region. H. BALSS (1916) listed six West African species; one of these is synonymized below. W. SCHMITT (1926) recorded no porcellanids from the collections of the American Museum Congo Expedition. Since H. BALSS compiled his survey, only two species have been added to the known porcellanid fauna of West Africa, both by TH. MONOD (1933). Including the *species dubia* mentioned above, nine valid species have apparently been recorded from this region heretofore.

The first shipment of specimens on which the present study is based was received in 1948 from Dr. THÉODORE MONOD, Director of the Institut Français d'Afrique Noire at Dakar. This material, most of it from Senegal, had been sent previously to the late STEVE A. GLASSELL who added so much to our knowledge of the porcellanids of the Pacific coasts of America, but he preferred not to report on it because of the lack of some of the pertinent literature. Two subsequent collections were sent by Dr. TH. MONOD in 1949 and 1953, the second one containing not only material from Senegal but also collections made by Dr. JACQUES FOREST and others off French Guinea and by Dr. R. BASSINDALE off the Gold Coast. Prior to this last shipment, in 1950, the porcellanids collected by the Expédition Océanographique Belge and those taken earlier off West Africa by the « Mercator » had been received from Dr. ANDRÉ CAPART of the Institut royal des Sciences naturelles de Belgique. Finally, two shipments were received in 1954 and 1955 from Dr. J. FOREST; the first included the remainder of the collections made by him off the coasts of Senegal and French Guinea and the second was made up of lots of unidentified porcellanids previously collected off West Africa for Muséum National d'Histoire Naturelle at Paris. Because of commitments made to Dr. TH. MONOD and the advantages of combining data from all of these sources in a single study, permission was granted to include all of the records in this report.

These various collections, amounting to more than 1400 specimens, contain seven of the nine valid species previously known from West Africa. A specimen of one of the other two was kindly made available by Dr. J. FOREST; the remaining species is unknown today. In addition to the known species, the collections include six previously undescribed species and a new subspecies; one of the species and the subspecies had been recorded earlier under other names. Including the *species dubia* referred to above, the porcellanids now known from West Africa and the neighboring islands number fifteen species and a subspecies in four genera.

Of these fifteen species, all but three are thus far known from no other faunal region. Of the three, one ranges from Sweden and Norway to Angola; one occurs in the northeastern Atlantic and the Mediterranean from the Shetland and Orkney Islands to the Canary Islands, with a subspecies on the mainland from Rio de Oro to Senegal; and one is common on the tropical and subtropical Atlantic and Pacific shores of America, as well as in the eastern Atlantic. It may be significant that these three widely ranging species are the most abundant ones in the collections studied; together, they account for more than 85 per cent of the specimens examined.

Although several species will undoubtedly be added to the known porcellanid fauna of West Africa when other parts of that coast, especially the more southern shores, are investigated thoroughly, the collections available for this study are probably fairly complete for the littoral zone to the west and north of the Gulf of Guinea. The fact that none of the species in these collections seems to agree with any of those recorded by K. BARNARD (1950) from South Africa emphasizes the importance of collecting extensively along the coast of Angola and southward; additional investigation of this area is also needed if one of the species described from Angola by B. OSORIO (1887) is to be rediscovered.

Special thanks are due to Dr. TH. MONOD, Dr. A. CAPART, and Dr. J. FOREST for entrusting these interesting collections to my care and for assisting with the preparation of the manuscript. I am greatly indebted to Dr. J. FOREST for checking type specimens and sending material for comparative study; without his expert help, two of the most perplexing problems encountered would have gone unsolved.

Most of the material studied has been returned to the institutions from which it was received: the Institut Français d'Afrique Noire at Dakar; the Institut royal des Sciences naturelles de Belgique at Brussels; and the Muséum National d'Histoire Naturelle at Paris. Some duplicate specimens have been retained for the collections of the U.S. National Museum at Washington. The disposition of type material is indicated under each of the new species.

PORCELLANID CRABS

FAMILY PORCELLANIDAE DE HAAN, 1849.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY *PORCELLANIDAE*.

1. Epimeral plate (lateral wall of carapace) divided into two or more pieces separated by membranous interspaces; movable segments of antenna barely separated from orbit; front little prominent, nearly transverse in dorsal view *Pachycheles*.
— Epimeral plate entire 2
2. Basal antennal segment small, not meeting margin of carapace, so that movable segments of antenna have free access to orbit; carapace about as long as wide; front prominent, subtriangular *Petrolisthes*.
— Basal antennal segment strongly produced anteriorly and broadly in contact with margin of carapace, so that movable portion of antenna is considerably removed from orbit 3
3. Carapace slightly longer than wide; front prominent; dactyls of walking legs simple, with small, movable accessory spinules on lower margin *Porcellana*.
— Carapace much wider than long; front bent downward, nearly transverse in dorsal view; dactyls of walking legs with two or more fixed spines in addition to movable spinules *Polygonyx*.

Genus *PACHYCHELES* STIMPSON 1858.

KEY TO THE WEST AFRICAN SPECIES OF *PACHYCHELES*.

1. Front bare; major cheliped bare except in gape of fingers, minor chela hairy on outer half; carpus without pearly tubercles; telson composed of seven pieces *P. sahariensis*.
— Surface of front hairy; both chelipeds hairy or bristly; carpus with rows of pearly tubercles; telson composed of five pieces 2
2. Chelipeds bearing long, stiff, light-brown setae and shorter plumose hairs on carpus and hand; merus with three or four teeth on inner margin; carpus with three sharp, denticulate teeth; tubercles of major chela scattered and largely hidden by setae *P. barbatus*.
— Chelipeds bearing short, stiff, dark bristles arranged in clusters on carpus and chela; merus with subtriangular denticulate lobe on inner margin; carpus of major cheliped with two large denticulate teeth and a smaller simple one; major chela with tuberculate nodules arranged in rows *P. bellus*.

***Pachycheles sahariensis* MONOD, 1933.**

(Fig. 1, A-E.)

Pachycheles sahariensis MONOD, T., 1933, p. 474 [19], fig. 26.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
TH. MONOD	Sao Thiago, Cape Verde Is.	2.XI.1948	—	—	—	1 ♂
R. SOURIE	Anse Bernard, Dakar, Senegal	14.VI.1946	Under stones at low tide			1 ♂
D'COLIN	Rufisque, Senegal	22.III.1890	Rocks of the fort and neighboring island			1 ♂, 3 ovig. ♀
J. FOREST	Off N'Gazobil, Senegal	21.II.1953	4	—	—	1 ♂, 4 ♀ (1 ovig.)
—	Joal, Senegal	24.II.1947	From cavities of sponges collected on the beach			1 ♂ (figured), 1 ovig. ♀
J. FOREST	»	18.II.1953	6	—	—	2 ♂, 3 ♀ (1 ovig.)
»	»	19.II.1953	4	—	—	1 ♂
—	»	14.IV.1953	—	—	—	1 ♂, 1 ovig. ♀
I. MARCHE- MARCHAD	Banc de Guque, Joal, Senegal	14.IV.1953	6	—	—	2 ♂, 1 ovig. ♀
»	Off Joal, Senegal	17.IV.1953	15-17	—	—	2 ♂, 1 ovig. ♀
J. CADENAT	Saloum, Senegal	16.VI.1947	On buoy at entrance			1 ♂, 1 ovig. ♀
« SYLVANA » St. 98	11°38'N-15°49'W (channel between Rouban and Bubaque, Portuguese Guinea)	12.VI.1913	25-30	—	— Rock, coral	11 ♂, 8 ♀ (6 ovig.)
SYLVANA » St. 100	Same	13.VI.1913	Rocks at low tide			2 ♂, 1 ♀
J. FOREST	Conakry, French Guinea	13.III.1953	Low tide			2 ovig. ♀
»	Tombo (Conakry) French Guinea	15.III.1953	»			1 ♂
R. BASSINDALE	Apam, Gold Coast	16.II.1949	Shore			2 ♂
»	Christiansborg, Gold Coast	15.I.1949	»			1 ovig. ♀
»	»	17.III.1949	»			1 ♂, 1 ovig. ♀
»	»	19.XI.1949	—	—	—	1 ♂
»	Accra or Tenpobo, Gold Coast	13.II.1949	Shore			1 ♂, 2 ♀ (1 ovig.)
»	Tenpobo, Gold Coast	17.I.1949	»			7 ♂, 8 ♀ (5 ovig.)
»	»	13.II.1949	»			2 ♂, 1 ovig. ♀
»	Winneba, Gold Coast	22.XI.1949	»			1 ♂, 1 ovig. ♀

Diagnosis. — Carapace broader than long in adults. Surface irregularly rugose on frontal and hepatic regions regularly so on lateral branchial areas, and with a pair of transverse crests on protogastric region. Carapace practically devoid of hairs dorsally. Front regularly convex in dorsal view, with a prominent median lobe in frontal view. Lateral wall of carapace usually of two pieces, rarely of three or four.

Carpus of cheliped with three broad teeth on anterior margin. Dorsal surface practically bare, except for a fringe of hairs along distal margin, and ornamented with rather crowded tubercles of various sizes which are depressed

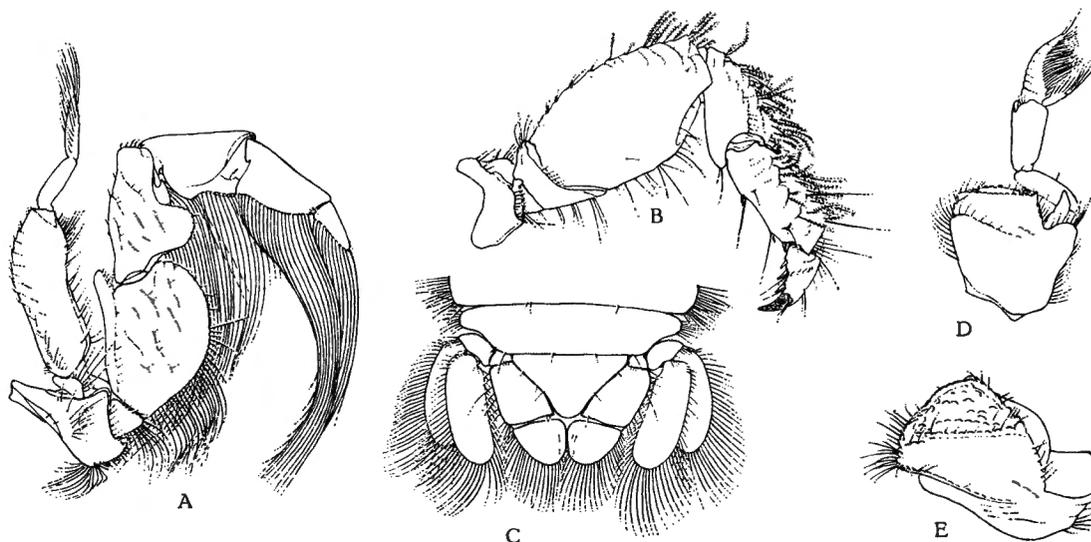


FIG. 1. — *Pachycheles sahariensis* MONOD, 1933.

A, right third maxilliped. — B, right first walking leg. — C, telson and uropods.

D, right antennule in ventral view. — E, same in anterior view.

Male; Joal, Senegal; scale: A, $\times 11,4$; B, $\times 6,6$; C, $\times 7,2$; D, $\times 15,6$; E, $\times 24$.

and distally truncate on central part of segment. Major chela grossly tuberculate; most prominent tubercles compound and arranged roughly in two longitudinal rows on median part of hand; distal tubercle of inner row considerably larger than others. Surface almost bare except for a dense growth of plumose hairs along cutting edge of fixed finger. Minor chela clothed with stout setae and plumose hairs on outer two thirds of dorsal surface, without hairs in gape of fingers.

Telson composed of seven pieces.

No abdominal appendages in male.

The carapaces of the males are from 2.2 to 6.5 mm. long and from 2.2 to 7.5 mm. wide; those of the females, 2.2 to 7.3 mm. long and 2.2 to 8.5 mm. wide, and of ovigerous specimens, 2.8 to 7.3 mm. long and 3.0 to 8.5 mm. wide.

Remarks. — This species can hardly be a synonym of *Porcellana mattosi* B. OSORIO, 1887, as suggested by TH. MONOD. Not only is the margin of the

larger hand practically devoid of hairs, in contradistinction to OSORIO's description, but the carpus of the chelipeds is far from « lisse », as noted by OSORIO in *Porcellana mattsosi*.

Ecology. — No ecological information is available in the literature. *P. sahariensis* occurs in the intertidal zone and to a depth of 25 or 30 meters. One lot was found in sponges on the beach and another on a buoy: Oviparous females were taken in every month for which collections were available: January, February, March, April, and November.

Geographical distribution. — *Pachycheles sahariensis* was recorded previously only from the type lot of nine specimens from Lemsid, Mauritania.

***Pachycheles barbatus* A. MILNE-EDWARDS, 1878.**

(Fig. 2, A-H.)

Pachycheles barbatus MILNE-EDWARDS, A., 1878, p. 228 [9]. — HENDERSON, J. R., 1888, p. 114, pl. XI, fig. 4. — ORTMANN, A., 1894, p. 29; 1897, pp. 292-293. — MILNE-EDWARDS, A., and BOUVIER, E. L., 1900, p. 348. — BALSS, H., 1916, p. 42. — MONOD, T., 1933, p. 476 [21].

Pachycheles ornatus BOUVIER, E. L., 1906, p. 494 [4]. — BALSS, H., 1914, p. 101; 1916, p. 41. — MONOD, T., 1933, p. 476 [21].

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
« SYLVANA » St. 137	Praia, Sao Thiago, Cape Verde Is.	3.V.1913			Shore	1 ovig. ♀
TH. MONOD	Anse Bernard, Dakar, Senegal	30.XI.1947	—	—	—	1 ♂, 2 ovig. ♀
R. SOURIE	Dakar, Senegal	—	—	—	—	1 ♂ (figured), 5 ♀ (3 ovig.)
I. MARCHE- MARCHAD	Wreck of the « PERSÈE », between Cap Manuel and Gorée, Senegal	7.V.1953	15	—	—	1 ovig. ♀
»	»	29.V.1953	15	—	—	1 ♂
J. CADENAT	Gorée, Senegal	26.III.1946	—	—	—	4 ♀
»	»	30.III.1946	—	—	—	1 ♂, 2 ♀
DELAIS	»	IX.1950	2-3	—	—	1 ovig. ♀
M. DELAIS and I. MARCHE- MARCHAD	Wreck of the « TACOMA », Gorée, Senegal	7.I.1953	1 1	— —	— —	1 ♂, 1 juv. 1 ♂, 1 juv.
SERAND	Pointe Topsail, Tamara I., Iles de Los, French Guinea	13.III.1914	—	—	—	1 ovig. ♀
R. BASSINDALE	Tenpobo, Gold Coast	17.I.1949			Intertidal	1 ♂ (chelipeds missing)
—	Senegal or Gold Coast	—	—	—	—	1 ♀

Diagnosis. — Carapace slightly broader than long. Surface somewhat rugose or obscurely tuberculate on hepatic regions and with a pair of transverse crests on protogastric region. A few scattered setae on anterior two-thirds of carapace, becoming more numerous and interspersed with short plumose hairs on frontal region. Front broadly obtuse in dorsal view, distinctly trilobate from in front. Lateral wall of carapace composed of three or more pieces.

Carpus of cheliped with three stout teeth on inner margin. Dorsal surface covered with groups of stout setae surrounded by short plumose hairs, and ornamented with more or less prominent pearly tubercles arranged roughly in three longitudinal rows on the posterior half. Chela with similar groups of stout setae and plumose hairs and scattered tubercles; the latter form a row of subacute tubercles near outer margin of movable finger. Outer margin of palm and fixed finger grossly dentate.

Telson composed of five pieces.

A pair of abdominal appendages in male.

The carapaces of the males are from 4.0 to 7.7 mm. long and from 3.8 to 7.7 mm. wide; those of the females, 3.0 to 9.1 mm. long and 3.1 to 10.0 mm. wide, both extremes being represented by ovigerous specimens. The single juvenile is 1.9 mm. long and 1.8 mm. wide.

Remarks. — This species seems to be very variable. The carapace may be moderately convex or almost flat across the branchial regions. It may be prominently sculptured on the hepatic regions or very obscurely so. In large specimens the carapace is usually distinctly broader than long, but in small ones it may be slightly longer than broad. The lateral wall of the carapace is composed of three pieces in most smaller specimens, but there may be as many as seven in large ones. The major chela is on the right side in thirteen specimens, on the left in four, and in two specimens the chelipeds are subequal. The merus of the major cheliped may be armed with either three or four teeth, and in one specimen the carpus has four, rather than three, anterior marginal teeth. There is also considerable variation in the size of the tubercles on the carpus and chela : in some specimens, several of these appear as very prominent, slightly elongate pearls, whereas in others they may form relatively indistinct semicircular cups around one side of a group of stout setae. Finally, in the largest ovigerous female the uropods are much longer than in any of the other specimens, the outer branch reaching about as far as the end of the telson and the inner branch extending well beyond it.

At my request, Dr. J. FOREST of the Muséum National d'Histoire Naturelle at Paris very kindly compared the type specimens of *Pachycheles barbatus* and *P. ornatus* and furnished me with a sketch of the frontal region of the latter species. His remarks are so significant that they are quoted directly :

« J'ai comparé ce spécimen [holotype of *P. ornatus*] aux types de *P. barbatus* A. MILNE-EDWARDS et je pense qu'il s'agit d'une seule et même espèce. Il est probable que E. BOUVIER n'a pas comparé l'individu qu'il avait entre les mains

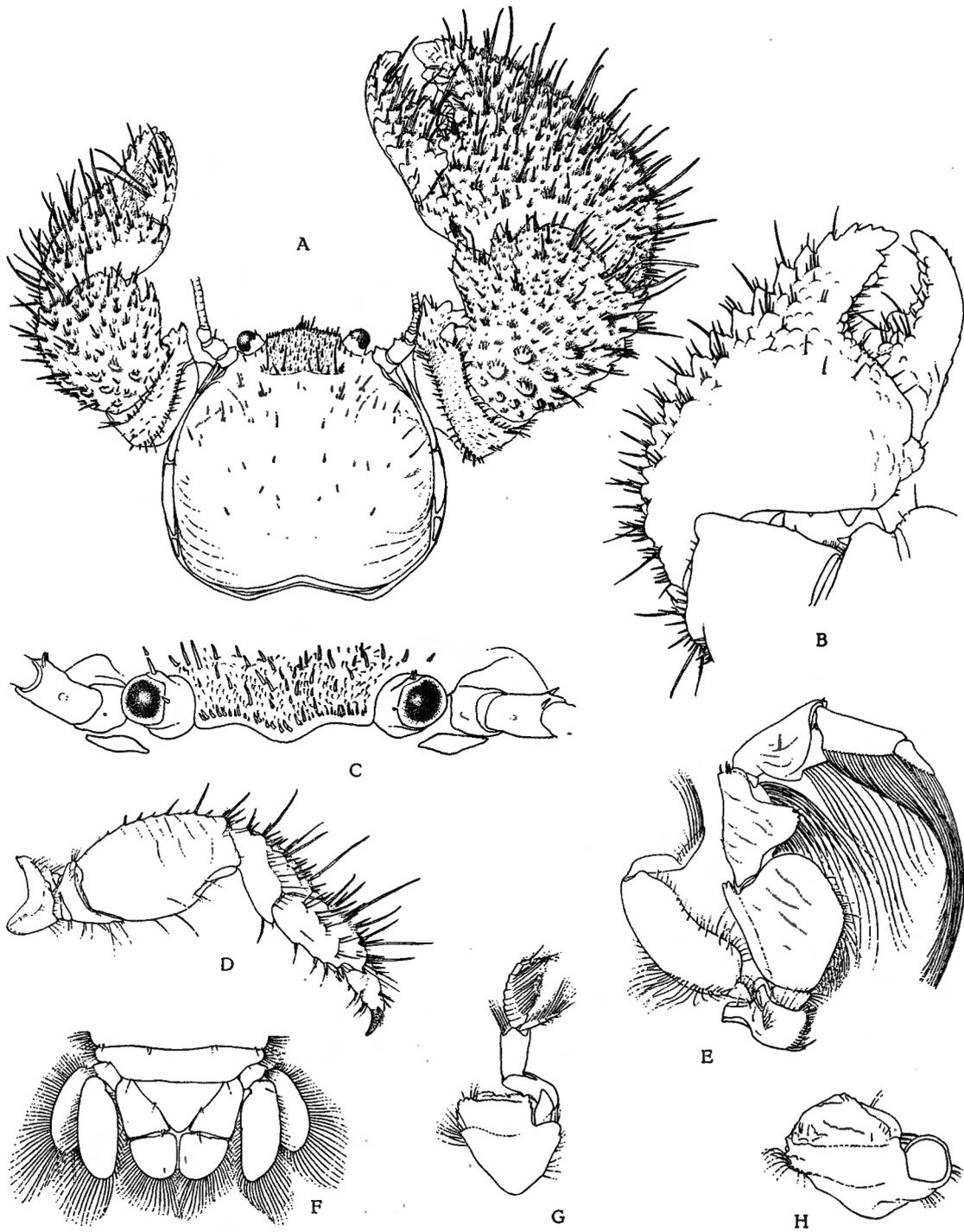


FIG. 2. — *Pachycheles barbatus* A. MILNE-EDWARDS, 1878.

A, carapace and chelipeds. — B, major chela in ventral view. — C, front in anterior view.
 D, right first walking leg. — E, right third maxilliped. — F, telson and uropods.

G, right antennule in ventral view. — H, same in anterior view.

Male; Senegal, scale: A, D, $\times 6.6$; B, $\times 6.9$; C, G, $\times 15.6$; E, $\times 12$; F, $\times 7.2$; H, $\times 24$.

à un *P. barbatus* car, même s'il avait relevé des différences de détails, il aurait pensé à rapprocher sa nouvelle espèce de celle de A. MILNE-EDWARDS, plutôt que du *P. vicarius* NOBILI, vraisemblablement bien différent.

» La forme, la pilosité et l'ornementation des chélicèdes sont fort voisines chez *barbatus* et chez *ornatus* : Les tubercules sur les carpes et les mains sont assez peu saillants chez ce dernier, mais affectent la même disposition que chez les *barbatus*... [The frontal margin] paraît régulièrement convexe en vue dorsale mais la « trilobation » apparaît lorsqu'on incline quelque peu l'animal. »

In view of the variability of *P. barbatus* mentioned above and of the proximity of the type localities of the two species, there would seem to be little doubt that they are the same.

Ecology. — *P. barbatus* is found in the intertidal zone and to a depth of at least 15 meters. The ovigerous type specimen of *P. ornatus* was found at low tide in an old oyster shell. Ovigerous specimens were found in every month in which females were taken : March, May, September, and November.

Geographical distribution. — *P. barbatus* was described from the Cape Verde Islands and *P. ornatus* from São João dos Angolares, São Thomé Island. The species has also been recorded by Balss from Annobon Island and Prampram on the Gold Coast and from Lomé, Togo; its known range is therefore from the Cape Verde Islands and Senegal to Annobon Island.

***Pachycheles bellus* (OSORIO, 1887).**

(Fig. 3, A-G.)

Porcellana bella OSORIO, B., 1887, p. 229.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
Expéd. Océanogr. Belge A.S. 116	9°20'S-13°04'E (8 M. W. Rio Cuanza, Angola)	31.I.1949	17	24,38	Mud, sand	10 ♂, 10 ♀ (9 ovig.)

Diagnosis. — Carapace slightly broader than long. Surface distinctly rugose on all but central portion and nearly bare except for dense growth of short setae on frontal region. Front broadly obtuse in dorsal view, distinctly trilobate from in front. Lateral wall of carapace composed of three pieces in large specimens, occasionally of only two in small specimens.

Merus of major cheliped with subtriangular, tuberculate lobe on inner margin and finely setose rugae on dorsal surface. Carpus armed along inner margin with two large, triangular, tuberculate teeth and a smaller, simple tooth distad to the two large ones. Dorsal surface ornamented with pearly tubercles, each of which is more or less completely surrounded by a cluster of short, stout, plumose, brown setae. Tubercles on central and outer part of segment very elongate obliquely and arranged in rows to form three prominent, discontinuous, longitudinal ridges. A broad ridge, surmounted by a few round tubercles, parallels distal margin of carpus and curves obliquely to a point behind gap between two larger teeth on inner margin. Hand very tuberculate, the tubercles coalescing into prominent swellings on much of the surface. Largest swelling is elongate one extending from near gape of fingers for more than half the distance to carpal articulation. Proximal to, and in line with, elongate swelling is a rounded one, and proximal to that a single large simple tubercle. About midway between this row and dentate outer margin of hand is a row of about six prominent tuberculate nodules and a few less prominent and less complex ones. Between proximal ends of these two rows is a short row of two or three tuberculate nodules. At articulation with finger is a large tuberculate mound and, extending proximad from that, about three rows of simple tubercles. Opposable surface of fixed finger provided with a large rounded tooth, with many densely matted hairs distal to it. Movable finger decorated with rows of subacute tubercles and with fine hairs on opposable margin.

Merus and carpus of minor cheliped similar to those of major cheliped. Tubercles of hand arranged in rows but they are simple, not compound as on major hand. Surface of minor hand largely concealed, especially on outer portion, by dense growth of setae. Outer margin dentate and fringed with long plumose setae. Cutting edge of fixed finger provided with five teeth, that of movable finger with six teeth. Lower surfaces of both chelae tuberculate near outer margins.

Telson composed of five pieces.

A pair of abdominal appendages in male.

The carapaces of the males range from 4.1 to 6.2 mm. long and from 4.1 to 6.7 mm. wide. The ovigerous females have carapaces from 2.7 to 5.6 mm. long and from 2.6 to 6.3 mm. wide. The smallest of these has only three eggs. The single non-ovigerous female has recently molted and has the caparace 5.6 mm. long and 6.1 mm. wide.

Remarks. — Of the 20 specimens of this species in the collection, 11 specimens (6 males and 5 females) have the major cheliped on the left side and 8 specimens (4 males and 4 females) have it on the right; one female lacks both chelipeds.

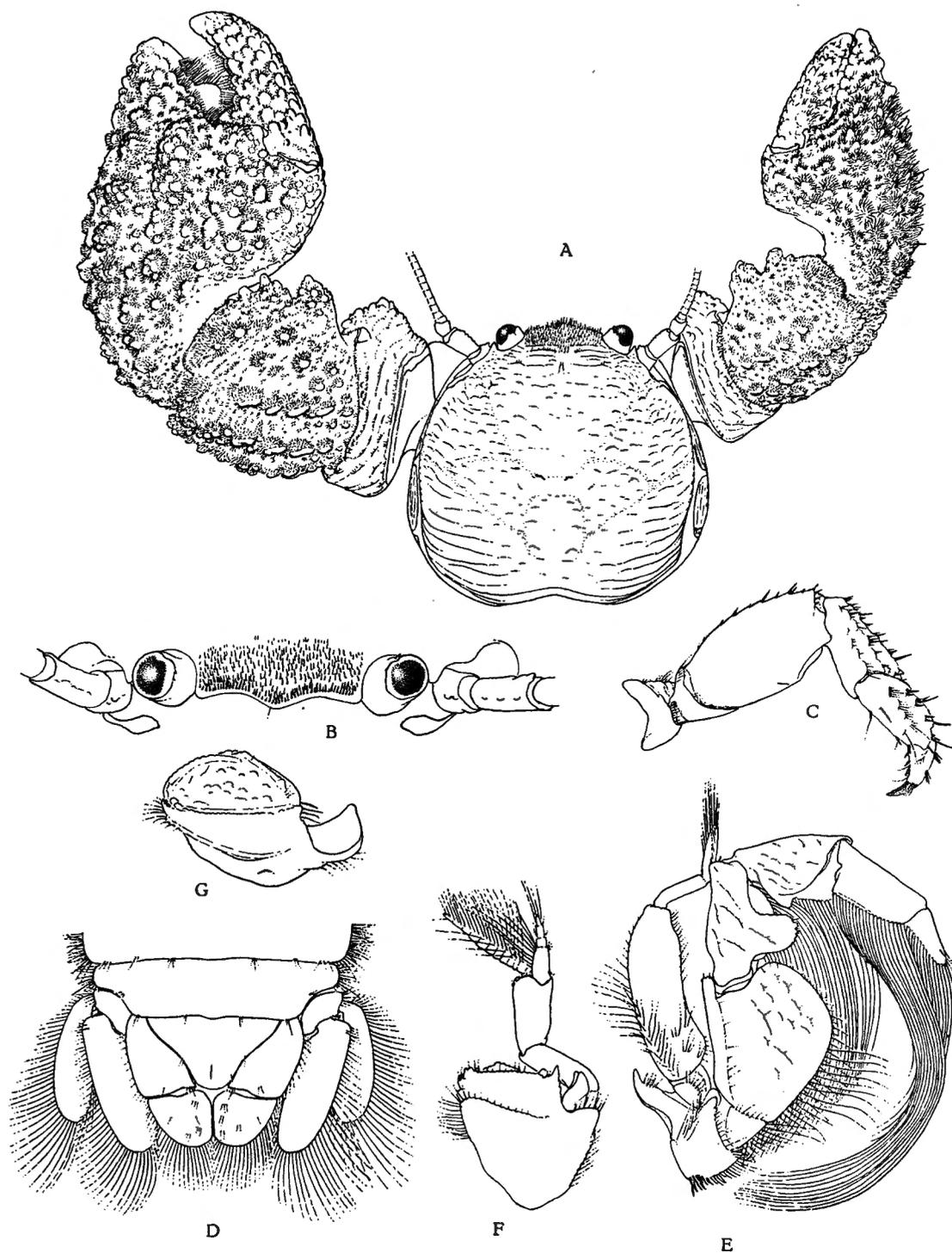


FIG. 3. — *Pachycheles bellus* (OSORIO, 1887).

A, carapace and chelipeds. — B, front in anterior view. — C, right first walking leg.
 D, telson and uropods. — E, right third maxilliped. — F, right antennule in ventral view.
 G, same in anterior view.

Male; A.S. 116; scale: A, $\times 6,7$; B, $\times 13,2$; C, $\times 6,6$; D, $\times 10,2$; E, $\times 13,8$; F, $\times 21,6$; G, $\times 30$.

There may be some doubt that these specimens belong to the species briefly described by B. OSORIO. That author, who seemed to be thoroughly familiar with the decapod nomenclature of his time, assigned his species to the genus *Porcellana*, whereas the present lot very obviously belongs in *Pachycheles*. Also B. OSORIO did not mention the prominent elongate tubercles on the carpus of the cheliped which are characteristic of the present species. At my request, Dr. ALFREDO M. RAMALHO of the Estação de Biologia Marítima at Lisbon very kindly searched for OSORIO's types of *Porcellana bella* and *P. mattsosi* but he reported that apparently they are no longer in existence. There is nothing in the original description of *P. bella* that is not applicable to the present specimens, and the fact that these specimens were found only a few miles from the type locality of *P. bella* lends support to the belief that they belong to that species.

Ecology. — The specimens examined were taken from a mud and sand bottom off the mouth of the Rio Cuanza, Angola, in a depth of 17 m. and a temperature of 24.38°.

Geographical distribution. — The types, the only specimens of *P. bellus* previously recorded, were taken at Loanda, Angola; the present specimens were found in the same general area.

Genus PETROLISTHES STIMPSON, 1858.

KEY TO THE WEST AFRICAN SPECIES OF *PETROLISTHES*.

1. Surface of carapace and chelipeds covered with a fine, soft pubescence; lateral lobes of front nearly transverse and distinct from projecting median lobe; upper surface of palm of chela sharply divided into a horizontal inner face and a slanting outer face by a distinct ridge running from gape of fingers nearly to carpal articulation; meri of walking legs with five to twelve spines on anterior margin *P. cessacii*.
- Surface of carapace and chelipeds either bare or sparsely covered with stout setae; lateral lobes of front oblique and not distinct from median lobe; upper surface of palm of chela rather evenly convex, median longitudinal ridge not prominent ... 2
2. Teeth on inner margin of carpus of cheliped low and widely separated; meri of walking legs with one to five spines on anterior margin *P. armatus*.
- Teeth on inner margin of carpus of cheliped outstanding, broad, and crowded together; meri of walking legs with five to ten spines on anterior margin *P. monodi*.

Petrolisthes cessacii (A. MILNE-EDWARDS, 1878).

(Fig. 4, A-E.)

Porcellana Cessacii MILNE-EDWARDS, A., 1878, p. 229 [10].

Petrolisthes Cessaci MILNE-EDWARDS, A., and BOUVIER, E. L., 1900, p. 346.

Petrolisthes cessaci BALSS, H., 1914, p. 101, fig. 6.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
TH. MONOD	Anse Bernard, Dakar, Senegal	30.XI.1947	—	—	—	5 ♂ (1 figured), 1 ovig. ♀
J. FOREST	Yoff (Dakar), Senegal	15.II.1953		Low tide		1 ♂
J. CADENAT	Gorée, Senegal	26.III.1946	—	—	—	2 ♂
IFAN-Gorée	»	20.VII.1950	—	—	—	1 ♂
J. CADENAT	»	12.II.1953		Washed up on beach		1 ♂
IFAN-Gorée	Senegal (?)	—	—	—	—	3 ♂
»	»	—	—	—	—	1 ♂, 1 ♀ 1 damaged specimen
—	Senegal or Gold Coast	—	—	—	—	1 ♂
M. SERAND	Tamara, Iles de Los, French Guinea	1913	—	—	—	1 ♂, 1 ovig. ♀
R. BASSINDALE	Lighthouse Reef, Axim, Gold Coast	14.IV.1949		Tidal		1 ♂
»	Tenpobo, Gold Coast	17.I.1949		Intertidal		1 ♂, 1 ovig. ♀
»	»	3.II.1950	—	—	—	1 ♂, 1 ovig. ♀

Diagnosis. — Carapace about as wide as long, covered with a short, almost invisible pubescence, smooth except for a few faint rugae posterolaterally, and armed with a sharp epibranchial spine. Front with prominent median lobe and nearly transverse lateral lobes; pubescence somewhat longer on median frontal region than elsewhere and usually filled with fine mud.

Carpus of chelipeds armed on inner margin with three to five, usually three or four, minutely serrate, spine-tipped teeth. Outer margin with two to six spines in addition to bifid one at distal angle. Chelae pubescent and bearing a distinct ridge running back from gape of fingers and separating flat inner portion of hand from slanting outer portion. Outer margins of chelae spinose in small specimens, obscurely dentate in large ones. Lower, inner surface of movable finger covered with very short pubescence.

Merus of first walking leg armed with six to ten spines on anterior margin and two spines at posterodistal angle. Merus of second leg with five to twelve anterior and one or two posterodistal spines. Merus of third leg with five to eight anterior spines and none at posterodistal angle.

The smallest male has the carapace 6.1 mm. long and 6.1 mm. wide; the largest is 17.0 mm. long and 17.2 mm. wide. The female without eggs is 14.0 mm. long and 14.3 mm. wide; ovigerous specimens are 7.0 to 12.6 mm. long and 7.1 to 13.2 mm. wide.

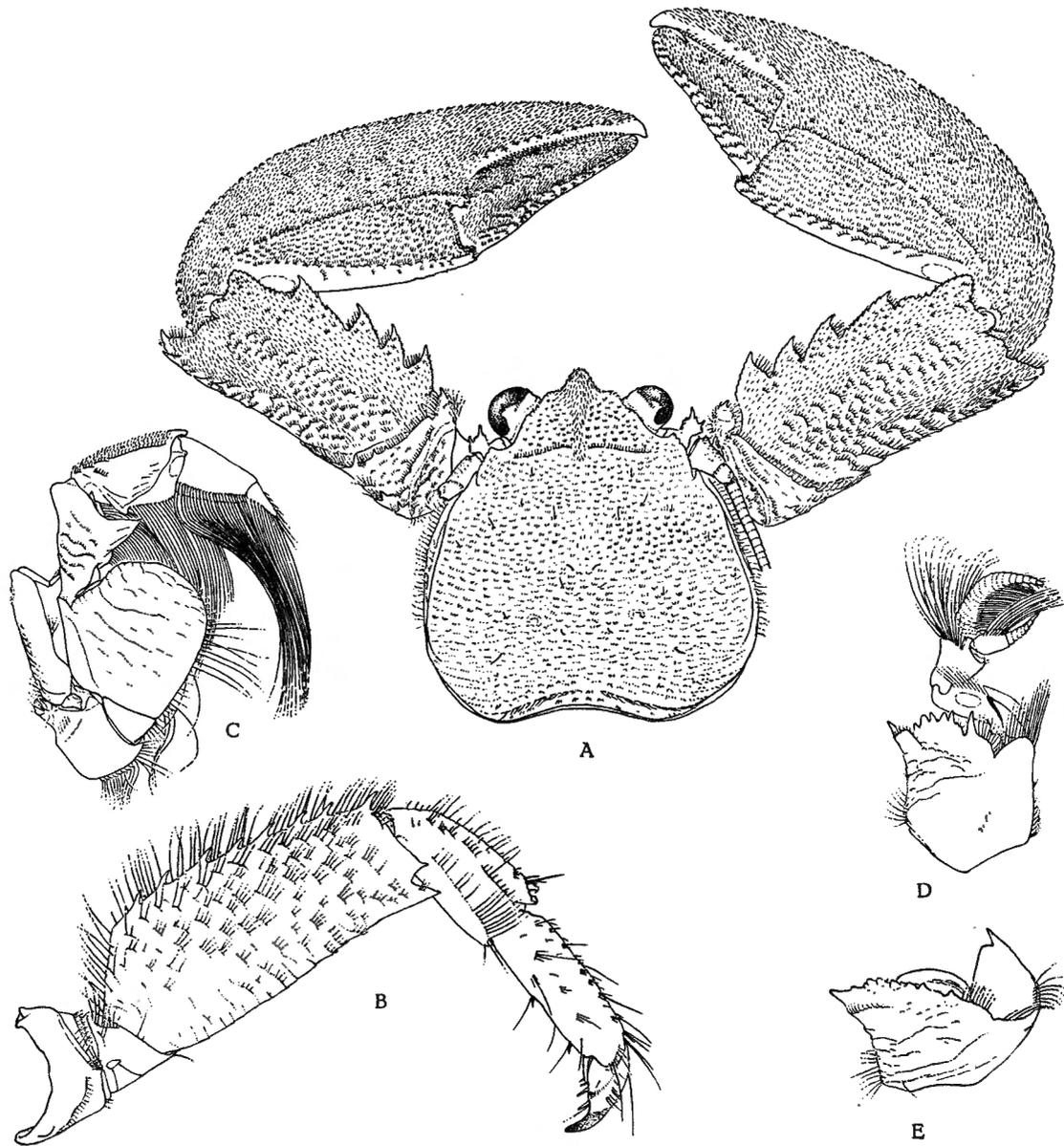


FIG. 4. — *Petrolisthes cessacii* (A. MILNE-EDWARDS, 1878).

A, carapace and chelipeds. — B, right first walking leg. — C, right third maxilliped.
 D, right antennule in ventral view. — E, same in anterior view.
 Male; Dakar, Senegal; scale: A, $\times 3,7$; B, $\times 6,2$; C, $\times 6$; D, $\times 9,6$; E, $\times 13,8$.

Remarks. — This is probably one of the most striking porcellanids on the West African coast. Even after several years in alcohol, the scarlet spots on the dorsal surface of the carapace and the deep crimson color of the lower surfaces of the chelipeds and outer maxillipeds is still visible.

Ecology. — *P. cessacii* may be restricted to the littoral and sublittoral zones; it was found in the intertidal zone on at least three occasions. The four ovigerous females were taken in January, February, and November.

Geographical distribution. — The type locality of this species is in the Cape Verde Islands. It has been recorded by Balss from Annobon Island. These two localities represent the limits of the known range.

Petrolisthes armatus (GIBBES, 1850).

(Fig. 5, A-E.)

Porcellana armata GIBBES, L. R., 1850, p. 190.

Petrolisthes armatus STIMPSON, W., 1858, p. 227. — VERRILL, A. E., 1908, p. 434, pl. 27, fig. 3, pl. 28, fig. 4. — BALSS, H., 1916, p. 41.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
TH. MONOD	Toubacouta, Senegal	6.VII.1939	—	—	—	1 ovig. ♀
J. FOREST	N'Gazobil, Senegal	18.II.1953		Low tide		1 ♀
TH. MONOD	Bubaque, Bijagos Ids., Portuguese Guinea	19.XII.1947	—	—	—	4 ♂, 3 ♀ (2 ovig.)
« SYLVANA » St. 98	11°38'N-15°49'W (channel between Rouban and Bubaque, Bijagos Ids., Portuguese Guinea)	12.IV.1913	25-30	—	Rock, coral	1 ♂
« SYLVANA » St. 100	»	13.IV.1913		Low tide	Rocks	2 ♂
« SYLVANA » St. 93	11°38'N-15°13'W (Bolola River, near Mato Grande, Portuguese Guinea)	9.IV.1913	15-25	—	Rock, pebbles	1 ovig. ♀
SERAND	Pointe Topsail, Tamara, Iles de Los, French Guinea	13.III.1914	—	—	—	2 ovig. ♀
« MERCATOR »	Kassa Id., Iles de Los, French Guinea	24.XI.1935	—	—	—	1 ♂
DYBOWSKI	Conakry, French Guinea	20.XII.1895	—	—	—	1 ♂, 1 ovig ♀
DUFOSSÉ	»	1905	—	—	—	3 ♂ (1 figured)
J. FOREST	»	8.III.1953		Low tide		1 ♂
»	Tombo (Conakry), French Guinea	15.III.1953		»		1 ♂, 4 ♀ (3 ovig.)
—	Conakry, French Guinea	—	—	—	—	5 ♀ (3 ovig.)
DUPORT	Camayenne (near Conakry), French Guinea	1909	—	—	—	1 ♂
J. CADENAT	Aberdeen, Freetown, Sierra Leone	6.III.1948		Low tide		4 ♂, 5 ovig.♀

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. CADENAT and H. BROWN	Kissi Dockyard, Freetown, Sierra Leone	7.III.1948		Low tide	Muddy sand	3 ♂, 3 ♀ (2 ovig.)
J. CADENAT	»	III.1948	—	—	—	2 ♂
»	Pointe de Shenge, Sierra Leone	19.III.1948	—	—	—	12 ♂, 4 ♀ (3 ovig.)
H. BROWN and J. CADENAT	Freetown and Pointe de Shenge Sierra Leone	6-19.III.1948	—	—	—	19 ♂, 10 ovig. ♀
—	Senegal or Gold Coast	—	—	—	—	1 ♂, 2 ♀ (1 ovig.)
R. BASSINDALE	Axim, Gold Coast	13.IV.1949	—	—	—	1 ovig. ♀
»	Tenpobo, Gold Coast	21.XI.1949		Shore		1 ♂
»	»	4-6.II.1950	—	—	—	2 ♂, 4 ♀ (1 ovig.)
Expéd. Océanogr. Belge A.S. 98	12°20'S-13°34'E (Baie de Lobito, Angola)	17-20.XII. 1948	12	—	Mud sand	1 ovig. ♀

Diagnosis. — Carapace usually slightly longer than wide, bare and faintly rugose dorsally, more prominently so laterally, and armed with an epibranchial spine or tooth. Front depressed, unarmed, and sinuously triangular.

Carpus of chelipeds armed on inner margin with three, rarely four, rather distantly placed acute teeth. Outer margin with one to four, usually two or three, spines in addition to bifid one at distal angle. Chelae bare and convex dorsally without prominent longitudinal ridge running proximally from gape of fingers. Outer margins of chelae spinose and with fringe of hairs in small specimens, nearly entire in large ones. Lower, inner surface of movable finger and, to lesser extent, of fixed finger densely pubescent.

Merus of first walking leg with one to four spines on anterior margin and one spine, rarely two, at posterodistal angle. Merus of second leg with two to five anterior and one, rarely two posterodistal spines. Merus of third leg with one to four anterior spines and none, rarely one, at posterodistal angle.

Males vary in carapace length and width from 3.8 and 3.7 mm. to 11.5 and 11.1 mm. The smallest female is 4.4 mm. long and 4.3 mm. wide; the smallest ovigerous specimen is 4.5 mm. long and 4.4 mm. wide; the largest female, an ovigerous specimen deformed by a parasite in the left branchial chamber, is 11.0 mm. long. In West African specimens of both sexes the relative carapace width appears to increase with age. Young males have an average length-width ratio of about 1.06, whereas the largest males have a ratio of about 1.01. Comparable average ratios in females are about 1.02 and 1.00.

Remarks. — The different superficial appearance of West African specimens of *P. armatus* from typical examples from Florida has led to a detailed study of the extensive series of the species from the western Atlantic and the eastern Pacific in the U. S. National Museum. This study indicates that populations from different localities show considerable variation.

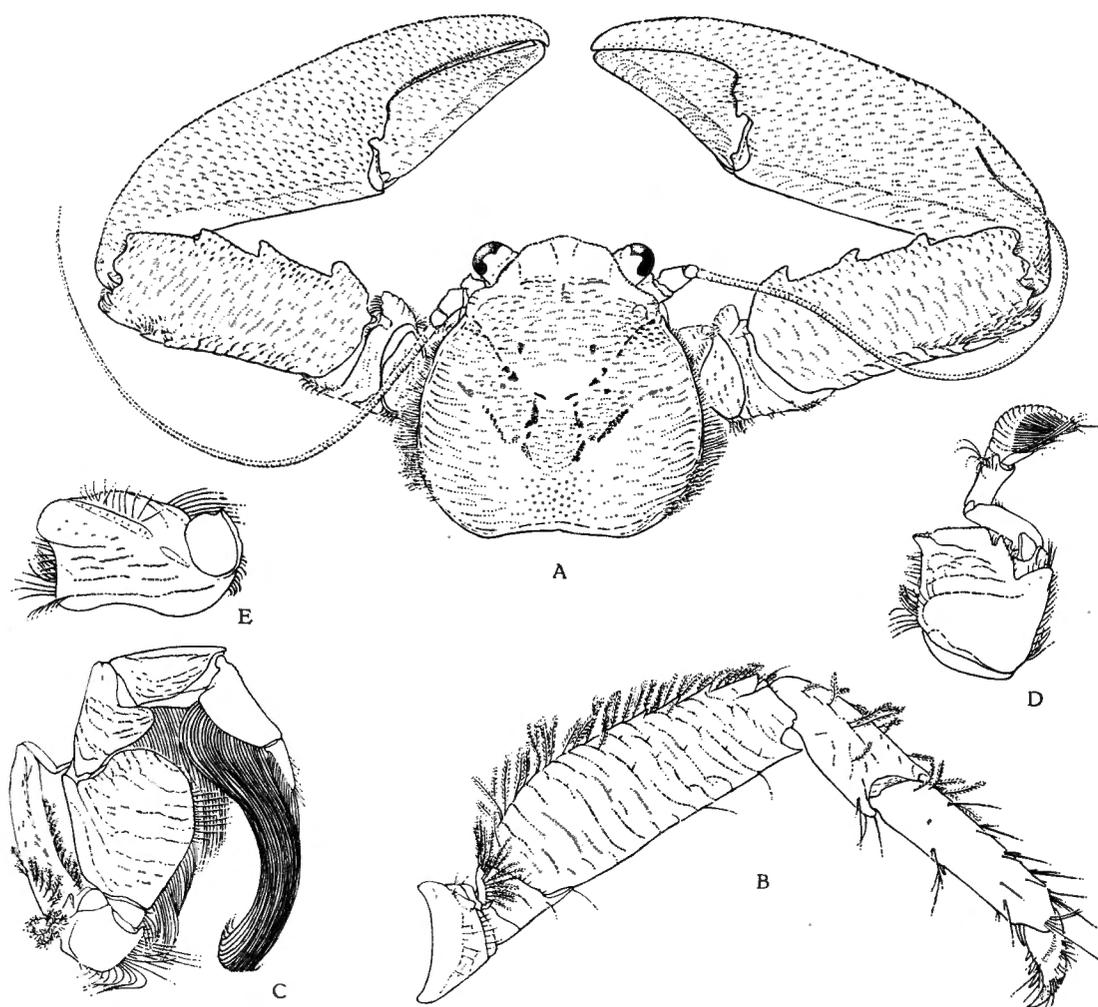


FIG. 5. — *Petrolisthes armatus* (GIBBES, 1850).

A, carapace and chelipeds. — B, right first walking leg. — C, right third maxilliped.
 D, right antennule in ventral view. — E, same in anterior view.
 Male; Conakry, French Guinea; scale: A, $\times 3.2$; B, C, $\times 6.6$; D, $\times 9.6$; E, $\times 13.8$.

The typical form from the Gulf of Mexico coast of the United States is usually characterized by a series of distinct marginal spines on the outer edge of the chelae in all but the largest specimens; by the presence in about 75 per cent of the specimens of three spines on the outer margin of the carpus of the chelipeds, in addition to the double terminal pair; by having the inner tooth on the merus of the chelipeds sharp or acute; and by having the chelipeds little

dissimilar, as indicated by the relative lengths of the movable fingers. This form is fairly constant throughout its range along the Atlantic coast of North, Central, and South America, throughout the West Indies, and at Bermuda, although there seems to be a tendency for the average number of outer spines on the carpus to be slightly less toward the southern end of the range.

Specimens from the Pacific coasts of Mexico and Central and South America are often markedly different from the typical form. Only in the smallest specimens are there marginal spines on the chelae; the meral tooth is usually blunt in all but small specimens; the chelipeds are more dissimilar; and the number of outer spines on the carpus is noticeably reduced. In examples from the west coasts of Mexico and Central America, there is usually at most one outer carpal spine in addition to the bifid terminal one. Specimens from Peru, on the other hand, have from one to three outer carpal spines, nearly half of the specimens examined having three.

In this respect, specimens from the west coast of Africa are more nearly like those from the west coast of South America than they are like those from the western Atlantic. In fact, eastern Atlantic and eastern Pacific specimens are very similar in general appearance. Possibly ecological similarities in these two regions has resulted in similar divergences from the typical form, if indeed it can be assumed that the species originated in the western Atlantic. Although extreme examples of the Pacific and African forms are sufficiently distinct from the typical form to be accorded specific recognition, the amount of variation is such that even subspecific designation of these populations seems unjustified at present.

Ecology. — In American waters, *P. armatus* is usually found in the intertidal zone under rocks and stones, in oyster beds, and among coral, as well as on pilings. It is occasionally dredged in depths of as much as 10 or 12 meters. West African specimens were found in depths as great as 25 or 30 meters. Of the 48 females in the present collections, 37 are ovigerous. Ovigerous specimens were taken in every month in which females were collected: February, March, April, and December.

Geographical distribution. — *P. armatus* has been found in the eastern Atlantic from Senegal to Lobitø, Angola. The record of the species at Gibraltar, based on *Porcellana digitalis* HELLER, 1862, needs verification. The absence of *P. armatus* from the extensive collections made in the vicinity of Dakar and Gorée suggests that Senegal marks the northern limit of its normal range on the West African coast. It could readily be introduced elsewhere on the hulls of ships, however. In the western Atlantic, it is found from the western Florida keys and along the shores of the Gulf of Mexico and Caribbean to Rio de Janeiro, Brazil, as well as throughout the West Indies, the Bahamas, and at Bermuda. It has also been found at Ascension Island. M. RATHBUN (1905) recorded it from near New Haven, Connecticut, but that locality must be viewed with suspicion or as a temporary introduction inasmuch as the species

has apparently not been found elsewhere on the east coast of the United States. In the eastern Pacific, the species is known from the Gulf of California to Peru and in the Galapagos Islands. Although *P. armatus* has been recorded from the Indo-Pacific region, I have seen no specimens assignable to the species from that area. The specimen from the Gulf of Kutch, India, questionably identified as *P. armatus* by Southwell (1909) is certainly distinct.

***Petrolisthes monodi* sp. nov.**

(Fig. 6, A-G.)

? *Porcellana speciosa*? OSORIO, B., 1889, p. 136.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
G. VIEILLARD	Dakar, Senegal	20.VIII.1939	—	—	—	3 ♂
J. CADENAT	Gorée, Senegal	26.III.1946	—	—	—	5 ♂, 1 ♀, 1 fragment
»	»	30.III.1946	—	—	—	1 ♀
»	»	23.IX.1947	—	—	—	1 young ♂
»	»	6.I.1948			From stomach of <i>Puntazzo puntazzo</i> (CETTI)	1 ♂ holotype (figured)
»	»	V-VI.1948	—	—	—	1 ovig. ♀
»	»	15.II.1950			Beach	1 young ♂
E. POSTEL « GERARD TRÉCA » St. 34	9°40'N-14°21'W (near Conakry, French Guinea)	3.II.1953	25	—	Sandy mud with sponges and gorgonians	1 ovig. ♀
A. CREMOUX « GERARD TRÉCA » St. 28	9°16'N-13°42'W (near Conakry, French Guinea)	27.I.1953	20	—	Gray sandy mud with sponges and gorgonians	1 ovig. ♀
J. FOREST « GERARD TRÉCA » St. 48	9°13'N-14°21'W (near Conakry, French Guinea)	17.III.1953	40	—	Rocks with barnacles, gorgonians, and pearl oysters	1 ovig. ♀
J. FOREST « GERARD TRÉCA » St. 39	Boulbinet, French Guinea	8.III.1953	3-5	—	Mud and laterite	1 ♂
J. FOREST « GERARD TRÉCA » St. 40	9°N-13°50'W (French Guinea- Sierra Leone border)	9.III.1953	30	—	Shell sand with sponges and hydroids	2 young ♂, 4 ♀ (3 young, 1 ovig.), 1 juv.
—	Senegal or French Guinea	—	—	—	—	1 young ♂, 2 young ♀

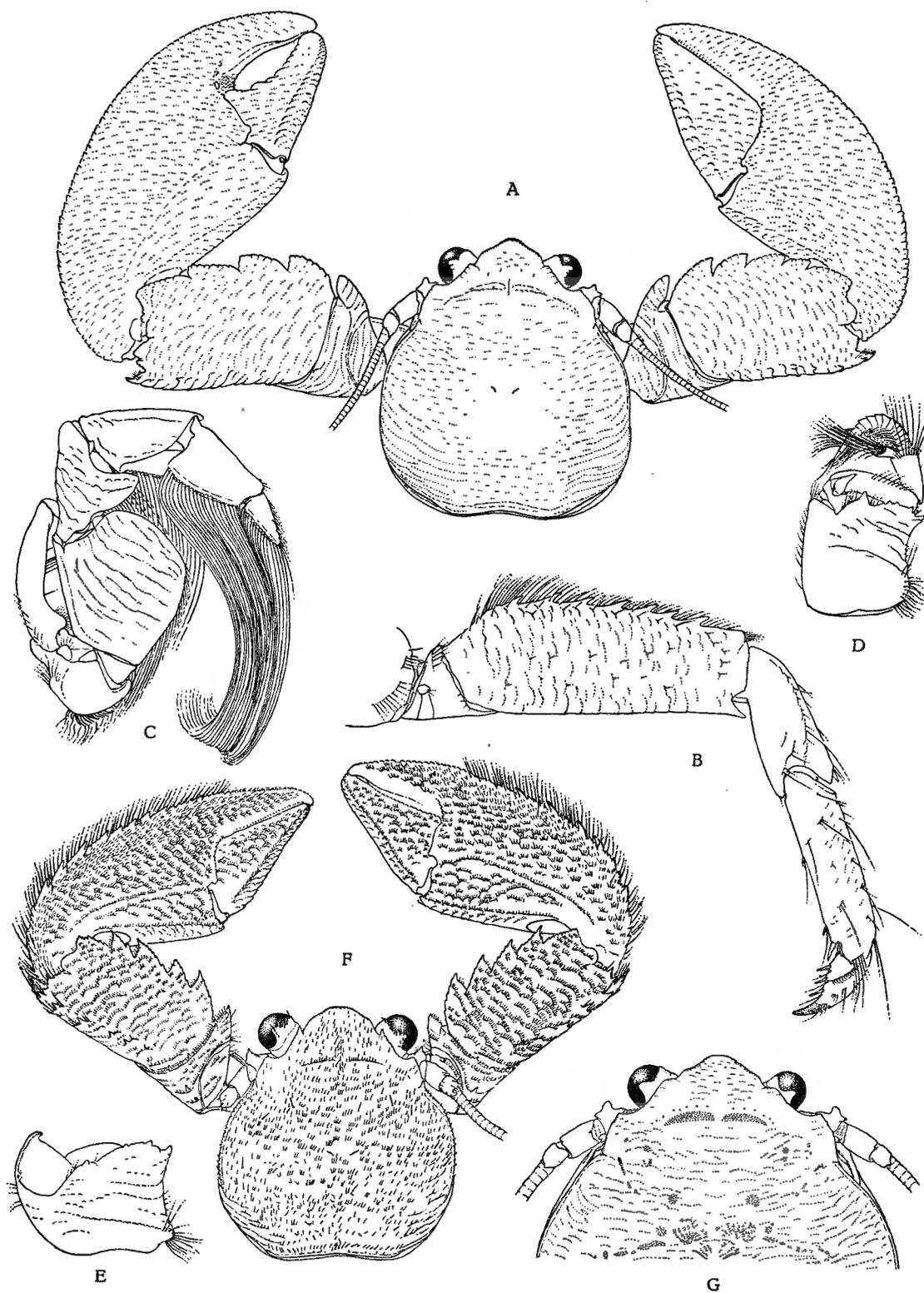


FIG. 6. — *Petrolisthes monodi* sp. nov.

A, carapace and chelipeds of male holotype from Gorée, Senegal. — B, right first walking leg of same. — C, right third maxilliped of same. — D, left antennule of same in ventral view. — E, same in anterior view. — F, carapace and chelipeds of young female from Senegal. — G, anterior part of carapace of large male from Gorée, Senegal.

Scale: A, G, $\times 3.2$; B, $\times 5.8$; C, $\times 6$; D, $\times 9.3$; E, $\times 13.8$; F, $\times 6.3$.

Types. — The holotype and a few paratypes are deposited in the Muséum National d'Histoire Naturelle at Paris. Most of the paratypes are in the Institut Français d'Afrique Noire at Dakar; a few are in the U.S. National Museum at Washington.

Diagnosis. — Carapace slightly longer than wide except in very large specimens. Surface bare and faintly rugose in adult specimens, sparsely covered with short setae in small individuals. A sharp epibranchial spine which becomes obsolescent in very large specimens. Supra-ocular spine absent in adults but prominent in immature specimens. Front prominent, sinuously triangular, and crenulate or denticulate on margins. Lateral wall of carapace entire and provided with several prominent longitudinal carinae.

Chelipeds slightly unequal, dissimilar. Merus rugose dorsally; inner lobe blunt in mature specimens, sharp in immature ones; a single sharp spine ventrally. Carpus faintly rugose and bare in adult specimens, distinctly rugose and setose in young; inner margin with three or four, rarely five, broad, denticulate teeth, which are blunt in mature specimens, tipped with a sharp spine in immature ones; outer margin strongly rugose and armed, in addition to terminal pair of spines, with two, one, or no spines in adults and three to five in immature specimens. Chela nearly smooth and bare in adults, distinctly rugose and setose in young; outer margin denticulate and without fringe in mature individuals, strongly dentate and fringed with long hairs in small specimens. Fingers of major chela gaping, those of minor one meeting throughout their length and pubescent on inner, lower margins.

Merus of first walking leg armed with five to nine strong spines and fringe of hairs on anterior margin and with one or two spines at posterodistal angle. Merus of second leg with five to ten anterior and one, rarely two, posterodistal spines. Merus of third leg with five to seven anterior spines and none at posterodistal angle.

The carapace of the male holotype is 12.6 mm. long and 12.2 mm. wide. The largest male paratype has the carapace 17.0 mm. long and wide. One damaged carapace measures 19.0 mm in length. The smallest male is 3.2 mm. long and 2.8 mm. wide; the abdominal appendages of this specimen are not fully developed. The largest female is 14.9 mm. long and 15.5 mm. wide, and the smallest, 3.6 mm. long and 3.3 mm. wide. Ovigerous specimens vary from 6.6 to 10.1 mm. in length and from 6.4 to 10.5 mm. in width. The single juvenile is 2.5 mm. long and 2.2 mm. wide.

Remarks. — This species varies considerably with growth but it seems to differ from all previously described species. OSORIO (1889) probably confused it with the Indo-Pacific *P. speciosus* (DANA). That species apparently differs most noticeably in having the meri of the walking legs unarmed. *P. acanthophorus* (H. MILNE-EDWARDS and LUCAS) from the west coast of South America is red, spotted with yellow, rather than yellow, spotted with red, as in the present species; adult specimens of *P. acanthophorus* also have a pronounced supra-ocular spine and the inner projection of the merus of the cheliped spine-tipped,

as well as the carpus armed internally with six teeth and externally with seven, in addition to the terminal pair. *P. dentatus* (H. MILNE-EDWARDS) from the Indo-Pacific has the meri of the walking legs unarmed, or at most with one or two inconspicuous spines, and no pubescence on the lower surfaces of the fingers. *P. moluccensis* (DE MAN) from Amboina has the last two segments of the walking legs dark reddish violet with white spots; it also lacks pubescence on the fingers and has no prominent posterodistal tooth on the merus of the first two pairs of walking legs. *P. obtusifrons* MIYAKE from Japan is a small species with a light blue carapace and ivory legs; it has no gape between the fingers of the major chela and apparently has the meri of the walking legs unarmed anteriorly. *P. rufescens* (HELLER) from the Indo-Pacific is a small species which lacks an epibranchial spine and which probably has the outer margin of the carpus of the chelipeds and the anterior margins of the meri of the walking legs unarmed; it also lacks pubescence on the fingers of the minor chela. *P. amoenus* (GUÉRIN) from the West Indies and the Galapagos Islands is also a small species with a spinose front, supra-ocular spines, and five to seven outer carpal spines. Finally, *P. marginatus* STIMPSON from the West Indies and Ecuador has a broader front, more numerous outer carpal spines, the outer margin of the fixed finger nearly straight, and no spines on the anterior margins of the meri of the walking legs.

It is a pleasure to name this species for Dr. THÉODORE MONOD, Director of the Institut Français d'Afrique Noire, whose studies have added so much to our knowledge of the carcinological fauna of West Africa and who fostered my interest in the porcellanids of this region by furnishing a considerable part of the collections on which the present study is based.

Ecology. — *P. monodi* has been taken in shallow water and in depths of at least 40 meters. Oviparous females were found in all months in which females were taken: January, February, March, and May or June.

Geographical distribution. — The type series came from the area between Dakar, Senegal, and Sierra Leone. If the specimens tentatively identified as *Porcellana speciosa* by OSORIO belong to this species, the known range is extended to São Tomé Island. The specimen from Durban, South Africa, identified by STEBBING (1918) as *Petrolisthes speciosus* and subsequently assigned to *P. lamarckii* (LEACH) by BARNARD (1950), is certainly not *P. monodi*.

Genus PORCELLANA LAMARCK, 1801.

KEY TO THE WEST AFRICAN SPECIES OF *PORCELLANA* ⁽¹⁾.

1. Dorsal surface of carapace and chelipeds largely concealed by pubescence; outer margins of chelae with dense fringe of long setae 2

⁽¹⁾ The species from Loanda, Angola, briefly diagnosed by B. OSORIO, (1887) under the name *Porcellana mattsosi* is omitted from this key. Additional specimens must be obtained before even the true generic status of this species can be determined.

- Pubescence not so dense as to conceal most of surface of carapace and chelipeds; fringe on chelae sparse or lacking 3
- 2. One to three outstanding spines on outer margin of carpus of major cheliped, in addition to terminal spine *P. platycheles platycheles*.
- No spines on outer margin of carpus of major cheliped proximad to terminal spine *P. platycheles africana*.
- 3. Front nearly entire, lobes indistinctly separated; eyestalk with inner distal spine or sharp tubercle 4
- Frontal lobes distinctly separated; eyestalks unarmed 5
- 4. Frontal and lateral margins of carapace and margins of carpus of chelipeds spinose *P. caparti*.
- Frontal and lateral margins of carapace and margins of carpus of chelipeds finely tuberculate *P. elegans*.
- 5: Chelipeds slender; inner margin of carpus with two teeth or lobes ... *P. longicornis*.
- Chelipeds robust; inner margin of carpus nearly straight, irregularly spinose *P. foresti*.

***Porcellana platycheles platycheles* (PENNANT, 1777).**

(Fig. 7, H-I.)

Cancer Platy-cheles PENNANT, T., 1777, p. 6, pl. 6, fig. 12.

Porcellana platycheles HELLER, C., 1863, p. 316. — NICOL, E. A. T., 1932, p. 88. — BOUVIER, E.-L., 1940, p. 178, figs. 35 (3-4), 130, pl. 5, fig. 7.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
L. GARRETA	Las Palmas, Canary Islands	1911	—	—	—	1 ♂, 1 ♀

Diagnosis. — Carapace and legs covered with pubescence which largely conceals the surface and becomes a prominent fringe along outer margins of chelae. Carapace usually longer than wide, feebly convex, and armed with a series of marginal spines on hepatic and anterior branchial regions. Front divided into three deeply separated, subtriangular, entire lobes, the median one the largest.

Chelipeds slightly unequal and dissimilar. Merus armed ventrally with one or more sharp spines. Carpus with a proximal spinose lobe on internal margin and one to three distinct spines in addition to terminal one on external margin. Chelae not grossly tuberculate dorsally beneath pubescence.

The male in the collection has the carapace 8.4 mm. long and 8.1 mm. wide; the carapace of the female is 7.1 mm. long and wide..

Ecology. — This species frequents muddy shores where it is usually found clinging to the under sides of rocks in the intertidal zone. The biology of the species at Plymouth, England, has been described by NICOL (1932).

Geographical distribution. — The typical subspecies ranges from the Shetland and Orkney Islands, the coasts of Ireland, and along the European and Mediterranean shores as far as Port Said. The Canary Islands seem to mark the southern limit of the typical form.

Porcellana platycheles africana subsp. nov.

(Fig. 7, A-G.)

? *Porcellana platycheles* MONOD, T., 1933, p. 477 [22].

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
« MERCATOR »	24°13'N-15°44'W (Bahia de Caballo, Rio de Oro)	2.XI.1935	—	—	—	23 ♂, 13 ♀ (7 ovig.) (1 ♂ figured)
»	Villa Cisneros, Rio de Oro	3.XI.1935	22	—	—	1 ♂
»	Port Etienne, Mauritania	5.XI.1935	—	—	—	1 ♂, 3 ♀ (1 ovig.)
I. MARCHE-	Pointe de Cansado, Mauritania	27.VII.1953		Low tide		3 ♂, 3 ♀ (1 ovig.)
MARCHAD	»	VII.1953	—	—	—	8 ♂, 4 ♀ (2 ovig.)
GRUVEL	Atlantic coast of the Sahara	1908	—	—	—	2 ♂
IFAN-Gorée	Dakar, Senegal	—	—	—	—	1 ♂
R. SOURIE	Anse Bernard, Dakar, Senegal	14.VI.1946	—	—	—	2 ♂, 7 ♀ (4 ovig.)
»	»	19.VI.1947	—	—	—	1 ♂, 1 ♀
TH. MONOD	»	30.XI.1947	—	—	—	2 ♂, 1 ♀
« MERCATOR »	Baie de Dakar, Senegal	13.XI.1935	—	—	—	1 ♂
IFAN-Gorée	Wreck of the « PERSÉE », between Cap Manuel and Gorée, Senegal	4.V.1953	15	—	—	4 ♂, 6 ovig. ♀
I. MARCHE-	»	6.V.1953	15	—	—	3 ♂, 9 ♀ (7 ovig.)
MARCHAD	»	7.V.1953	15	—	—	19 ♂, 36 ♀ (26 ovig.)
»	»	29.V.1953	15	—	—	1 ♂, 1 ovig. ♀
»	»	—	9	—	—	7 ♂, 9 ♀ (3 ovig.)
TH. MONOD	Gorée, Senegal	26.III.1946	—	—	—	2 ♂
J. CADENAT	»	27.III.1946	—	—	—	4 ♂, 1 ♀ (1 ♂ is holotype- figured)

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
»	»	30.III.1946	—	—	—	1 ovig. ♀
»	»	VIII.1946	—	—	—	2 ♂
F. PARAÍSO	»	24.V.1948	—	—	—	1 young ♂, 1 young ♀
»	»	22.V.1949	—	—	—	1 ♂, 1 juv.
J. CADENAT	»	14.XII.1949	—	—	—	1 ♂
»	»	22.VIII.1950		Lobster trap		1 ♂, 2 ♀
F. PARAÍSO	»	5.IX.1950		»		2 ♂
M. KEITA	»	6.X.1950		»		2 ♂, 3 ♀
J. FOREST	»	25.II.1953	10-11	—	—	1 ovig. ♀
IFAN-Gorée	»	21.VII.1953		Piles of bridge		1 ♀
I. MARCHE- MARCHAD	»	—	—	—	—	1 ♀
IFAN-Gorée	Off Gorée, Senegal	9.IV.1953	10	—	—	1 ovig. ♀
J. CADENAT	NE. Gorée, Senegal	19.VIII.1950	4-5	—	—	2 ♂, 2 ♀
IFAN-Gorée	Off Thiaroye, Senegal	22.VII.1953	7	—	—	73 ♂, 69 ♀, 5 juv.
« MERCATOR »	Off Rufisque, Senegal	14.XI.1935	—	—	—	1 ♂, 1 ♀
G. BERRIT	Off Mbour, Senegal	X.1950		On buoy		1 ♂
CHAPES	Senegal	1895 ?	—	—	—	3 ♂, 1 ♀

Types. — The holotype and a few paratypes are deposited in the Muséum National d'Histoire Naturelle at Paris. Most of the paratypes are in the Institut Français d'Afrique Noire at Dakar. Those collected by the « Mercator » are in the Institut royal des Sciences naturelles de Belgique at Brussels. A few are in the U.S. National Museum at Washington.

Diagnosis. — Carapace longer than wide, more or less covered with tufts of short, stout setae, and with several groups of longer setae arranged symmetrically. A few short, blunt spines or tubercles on margins of hepatic and anterior branchial regions. Frontal lobes covered with rather long, stout, distally curved setae, except for a bare median area extending nearly to tip of median lobe. Median lobe rounded triangular; lateral lobes bent downward and inward, nearly straight along median margin, convex laterally. Lateral wall of carapace entire, armed with a few denticles on dorsal margin beneath antennal peduncle, and covered with long, fine, plumose hairs which arise from long, prominent longitudinal rugae. Basal segment of antenna extending forward beyond cornea as a distally sharp scale.

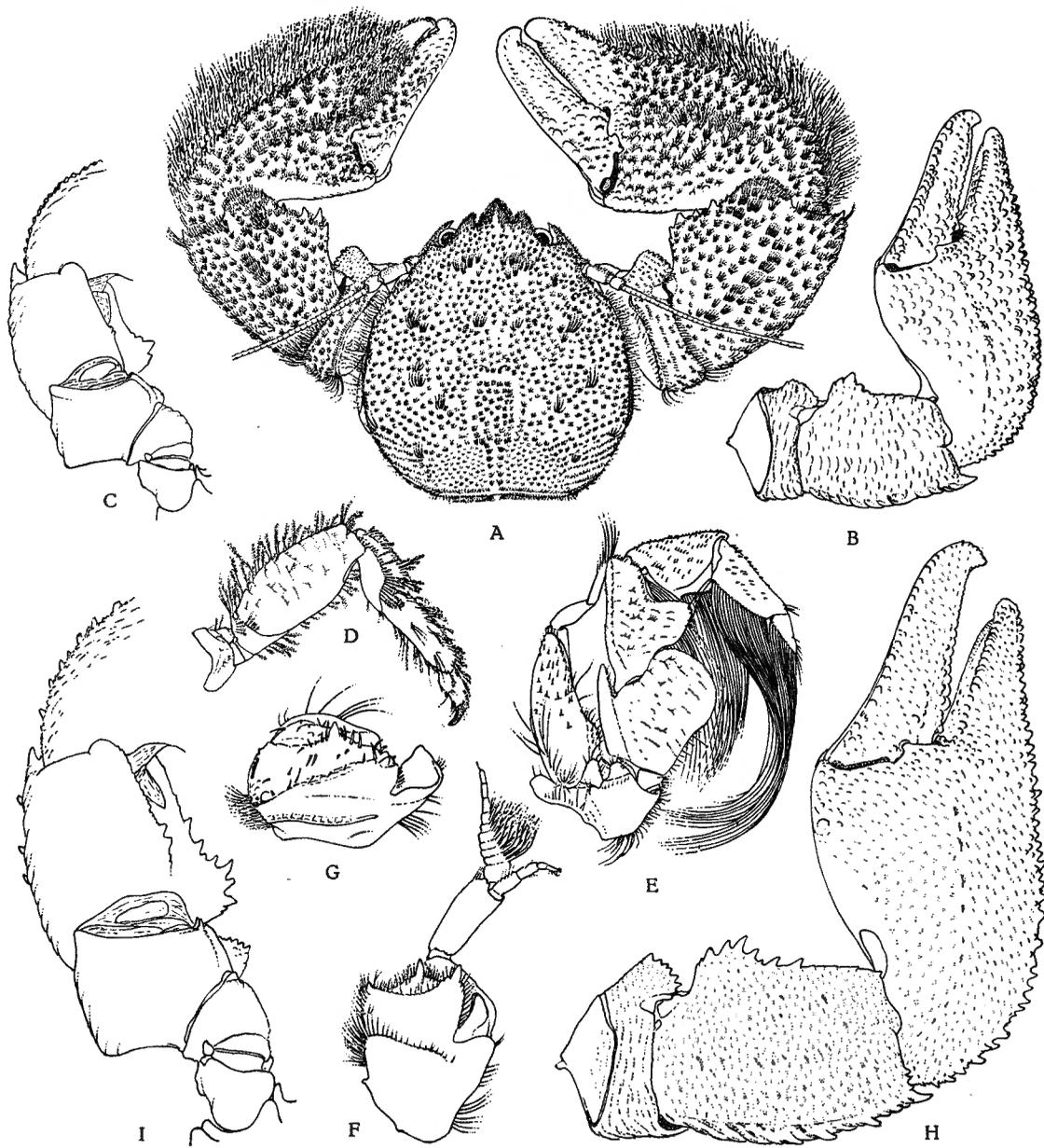


FIG. 7. — *Porcellana platycheles africanus* subsp. nov.

and *Porcellana platycheles platycheles* (PENNANT, 1777).

A, carapace and chelipeds of male paratype of *P. p. africanus* from Bahia de Caballo, Rio de Oro. — B, major cheliped (denuded) of male holotype from Gorée, Senegal. — C, ventral surface of same. — D, right first walking leg of holotype. — E, right third maxilliped of same. — F, right antennule of same in ventral view. — G, same in anterior view. — H, major cheliped (denuded) of male specimen of *P. p. platycheles* from the Channel Islands. — I, ventral surface of same.

Scale: A, $\times 4.9$; B, $\times 6$; C, D, $\times 6.3$; E, $\times 13.8$; F, $\times 21.6$; G, $\times 30$; H, I, $\times 6.1$.

Chelipeds somewhat unequal and dissimilar. Merus rugose dorsally, with rows of very short spines arising from the rugae; inner lobe denticulate; lower distal angle unarmed or at most with a pair of acute tubercles. Carpus rugose and clothed with clusters of stout setae, those on median and inner distal areas longest and most prominent; inner margin with dentate proximal lobe and a few teeth or acute tubercles distally; outer margin strongly rugose but unarmed except for a stout distal spine. Hand more or less covered dorsally with clusters of setae arising from tubercles of various sizes, the setae in a median band running from carpal articulation to gape of fingers being longest and most prominent; outer margin with dense growth of plumose hairs arising from several marginal rows of bluntly angular tubercles.

Eyestalks largely hidden from dorsal view, only the cornea being plainly visible. Outer maxillipeds sparsely covered with very short setae. Walking legs robust; dactyls armed with two or three movable spinules on ventral margin.

The carapace of the male holotype from Gorée measures 6.1 mm. long and 5.5 mm. wide. The largest male paratype has the carapace 11.1 mm. long and 10.2 mm. wide, and the smallest male yields comparable measurements of 2.3 and 2.1 mm. The carapaces of females range in size from 2.7 mm. long and 2.4 mm. wide to 9.9 mm. long and 9.5 mm. wide. Ovigerous specimens vary in carapace length and width from 4.8 and 4.5 mm. to 8.6 and 8.6 mm. In males, the proportions of the carapace remain fairly constant during growth; they range from an average length-width ratio of about 1.09 in the smallest males to about 1.08 in the largest. In females, however, the carapace appears to become wider with age. The average length-width ratio of non-ovigerous females ranges from about 1.10 in the smallest to about 1.02 in the largest. Ovigerous specimens seem to have still wider carapaces, the ratio in those specimens varying from about 1.02 in the smallest to 0.99 in the largest.

Remarks. — This proposed subspecies differs from the limited number of available specimens of the typical form from Dunbar, Scotland; the Channel Islands; Naples, Italy; and the Canary Islands in its smaller size, more noticeably tuberculate upper surface of the chelae, the absence of one to three strong spines on the outer edge of the carpus of the major cheliped in addition to the distal spine, and the reduction in adults of the spine or spines at the lower distal angle of the merus of the major cheliped to at most one or two tubercles. The West African subspecies is generally less spinose and more tuberculate and rugose beneath the hairy covering than is the typical form. The spines on the anterolateral margin of the carapace are often reduced to tubercles or short, blunt spines; the meral lobe of the major cheliped is usually less spinose; and the rows of spines or teeth along the outer margin of the chela are usually less sharp or reduced to tubercles. The median lobe on the merus of the outer maxillipeds, as well as the peduncle of the exopod of that appendage, are frequently wider

than in the typical form. Most of these characters are somewhat variable, but the presence or absence of spines on the outer margin of the carpus of the major cheliped is constant in the material examined and seems to afford a reliable means of distinguishing the northern and southern subspecies.

The carapaces of very young specimens resemble those of *P. longicornis*, but the two species can always be separated by the form and relative hairiness of the chelipeds and legs.

Ecology. — Like the typical form, *P. p. africana* seems to be fairly common in the intertidal zone. It has also been taken in depths of at least 22 meters. Ovigerous specimens were taken in every month for which adequate samples are available: February, March, April, May, June, July, and November.

Geographical distribution. — This subspecies seems to have a comparatively limited range, from Rio de Oro to Senegal. It may or may not be significant that no specimens were found in the collections examined from French Guinea and the Gold Coast.

***Porcellana caparti* sp. nov.**

(Fig. 8, A-E.)

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
Expéd. Océanogr. Belge A.S. 23	4°55'S-11°35'E (16 M. WSW. Pointe-Noire, Middle Congo)	3.IX.1948	115	15	brown mud, rocks	3 ♂, 2 ♀ (1 ♂ is holotype- figured)
Expéd. Océanogr. Belge A.S. 122	8°30'S-13°E (20 M. W. Pointa do Dandé, Angola)	6-7.II.1949	150	—	sand, mud, rocks	1 ♀

Types. — The holotype and all but one of the paratypes have been deposited in the Institut royal des Sciences naturelles de Belgique at Brussels. One of the male paratypes has been retained for the collections of the U.S. National Museum at Washington.

Diagnosis. — Carapace slightly longer than wide, sparsely covered with plumose hairs of varying lengths. Surface with a few transverse rugae, the pair across the protogastric region being the most prominent. Cervical groove well marked. Two spines near middle of upper orbital margin; outer orbital angle sharp and outstanding; a prominent marginal spine above base of antena;

four or five distinct spines on lateral margin of branchial region, with a series of crowded denticles anterior to these curving inward onto carapace; and several spines on dorsal surface mediad to denticulate marginal ridge. Frontal lobes indistinctly separated so that front appears broadly triangular in dorsal view. Lateral lobes short, broad, oblique, and armed with four or five large, subequal, curved spines. Median lobe narrower, depressed, deeply furrowed medially, and extending beyond lateral lobes; it is armed with short spines and denticles. Lateral wall of carapace entire and provided with a few sinuous longitudinal rugae, the dorsal one forming a short, prominent, dentate crest below antenna, and the next below it a long, denticulate keel partially visible in dorsal view. Basal segment of antenna extending forward as far as middle of cornea as a broad, distally spinose scale.

Chelipeds more or less similar but unequal. Merus armed with a few dorsal spines, a spinose internal lobe, and three or four sharp spines at lower, inner, distal margin. Carpus very rugose and spinose, the prominences arranged roughly in longitudinal rows, the two inner rows being separated by a comparatively smooth longitudinal interspace from the outer four or five rows. Inner margin armed with about six curved spines or teeth between which are groups of denticles. Outer margin with about five curved spines. A very few plumose hairs near outer margin. Hand bare except for a few plumose hairs near proximal end of outer margin, and grossly tuberculate, the tubercles on inner half more or less flattened and compound, those on outer half simple and often subacute. Outer margin armed with acute tubercles or short spines.

Eyestalks with a prominent inner distal spine extending well beyond cornea. Four distal segments of outer maxillipeds elongate and bearing very long setae. Dactyls of walking legs elongate and armed ventrally with five or six movable spines.

The carapace of the male holotype measures 4.4 mm. long and 4.1 mm wide. A slightly larger male has the carapace 4.4 mm. long and 4.2 mm. wide. The third male is 3.7 mm. long and 3.5 mm. wide. The largest female is 4.1 mm. long and 3.6 mm. wide and the smallest, 3.5 mm. long and wide.

Remarks. — The largest male paratype differs from the holotype in having the major cheliped on the left side, the carpus of the cheliped less sharply spinose, and in having only two dorsal spines on each epibranchial region. The smallest female lacks the left cheliped, but the right one is armed with very sharp spines. The female from station 122 differs from the other five specimens in having five rather than four spines on the lateral frontal lobes.

The spinose and obscurely lobed front in combination with the distal spines on the eyestalks and the form and ornamentation of the chelipeds seem to separate this species from those known previously. It superficially resembles *Porcellana spinuligera* DANA from the Philippine Islands, but that species apparently has only three rather than four or five spines on each lateral lobe of the front; the appendages of *P. spinuligera* are thus far unknown.

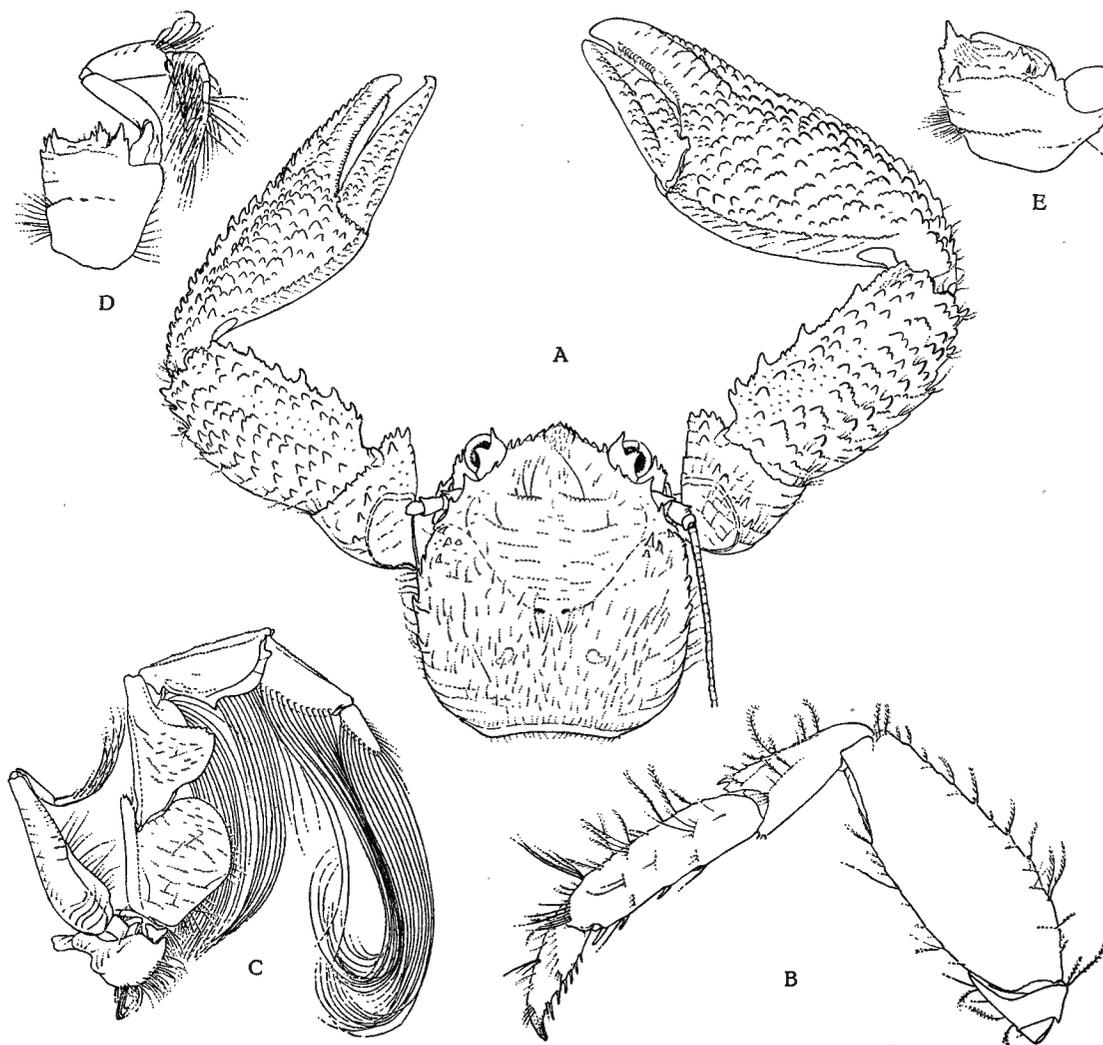


FIG. 8 — *Porcellana caparti* sp. nov.

A, carapace and chelipeds. — B, left first walking leg. — C, right third maxilliped.
 D, right antennule in ventral view. — E, same in anterior view.
 Male holotype; A.S. 23; scale : A, $\times 9$; B, C, $\times 13,8$; D, $\times 21,6$; E, $\times 28,8$.

It is a pleasure to name this species for Dr. ANDRÉ CAPART, leader of the Expédition Océanographique Belge, who has contributed greatly to our knowledge of the marine fauna of West Africa.

Ecology. — *P. caparti* was found in depths of 115 and 150 meters on bottoms of brown mud and rocks and of sand, mud, and rocks.

Geographical distribution. — Off Middle Congo and northern Angola.

Porcellana elegans sp. nov.

(Fig. 9, A-E.)

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
« TALISMAN St. 105	Between Branco and Razo, Cape Verde Islands	27.VII.1883	85	—	—	1 ♂ holotype (figured)

Type. — The unique specimen is in the collections of the Muséum National d'Histoire Naturelle at Paris.

Diagnosis. — Carapace slightly longer than wide. Surface bare, except for a very few symmetrically placed setae, and everywhere rugose, markedly so on branchial regions. Cervical groove broad and deep. Progastric elevations distinct; posterior to them on gastric area, and forming a circle with them, are two pairs of smaller prominences, each surmounted by a seta. A pair of high, rugose, lateral prominences immediately behind cervical groove, and a lower pair near middle of branchial regions. Orbital margin nearly entire, outer orbital angle subrectangular. Lateral margin projecting, upturned, and bluntly denticulate; a suture at end of cervical groove separates hepatic and branchial margins; anterior half of branchial margin bimarginate. Frontal lobes indistinctly separated so that front appears truncate on either side of depressed median lobe; margin denticulate, obscurely bimarginate medially. Lateral wall of carapace entire and provided with a few sinuous, longitudinal ridges, the dorsal one forming a short minutely denticulate crest below antennal peduncle, and the next one below it extending for nearly entire length of plate as a high, sharp carina. Basal segment of antenna reaching to middle of cornea as an acute or subtruncate scale.

Chelipeds nearly similar and only slightly unequal. Merus rugose, with a convex, denticulate inner lobe, with three or four short spines or acute tubercles on upper distal margin, and with three or four blunt spines on lower, inner, distal margin. Carpus strongly rugose but unarmed along outer margin and in dorsal midline, with a few scattered tubercles near inner margin. Inner margin with low dentate lobe at proximal end, followed by series of close-set denticles, two or three of which are enlarged. Chelae flared outward and upward in distal half and bare, except for a few long, straight, scattered hairs, mostly near outer margin; surface finely rugose or tuberculate, the tubercles becoming larger and more acute along outer margin and forming oblique rugae along margin of movable finger. Fixed finger of major chela with blunt tooth

proximal to middle of cutting edge, and movable finger with two similar teeth, one basal and one near middle of length; cutting edges of fingers of minor chela minutely and regularly denticulate.

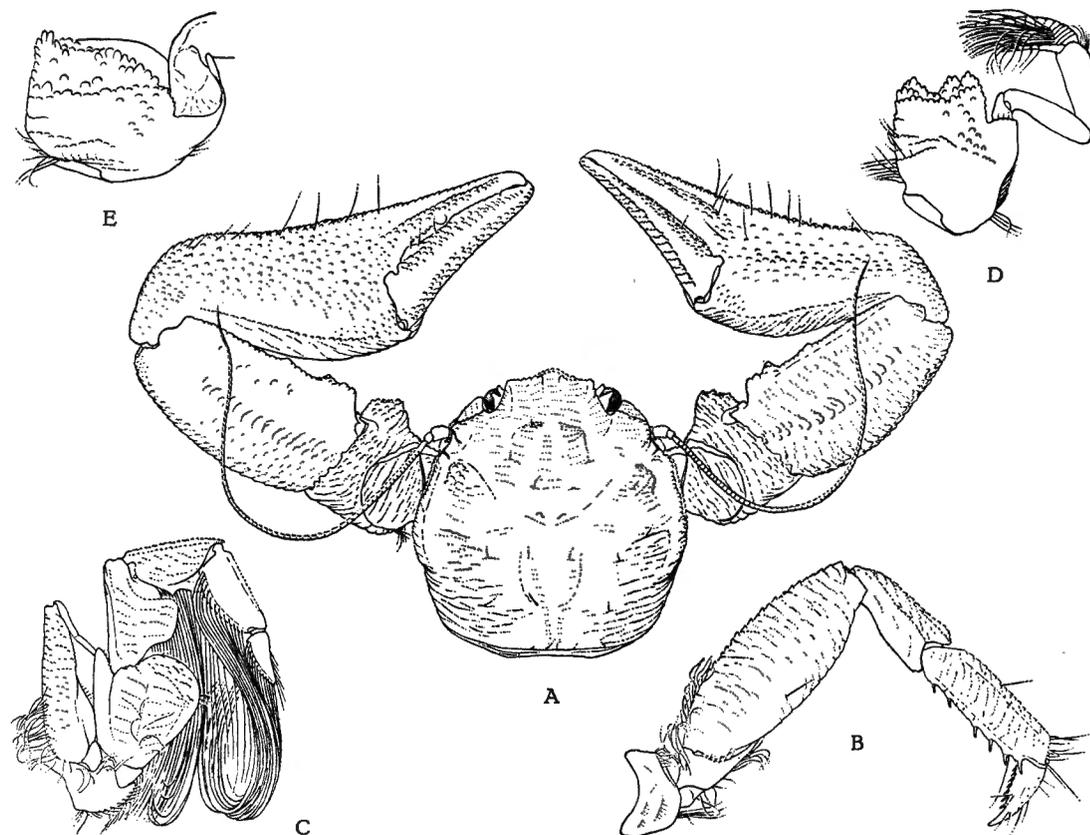


FIG. 9. — *Porcellana elegans* sp. nov.

A, carapace and chelipeds. — B, right first walking leg. — C, right third maxilliped.
 D, right antennule in ventral view. — E, same in anterior view.
 Male holotype; « Talisman » Sta. 105; scale : A, $\times 4.3$; B, $\times 6.6$; C, D, $\times 13.2$; E, $\times 21$.

Eyestalks with two short distal spines or acute tubercles, one dorsal, one anterior or median. Outer maxillipeds large, visible in dorsal view when flexed, and provided with unusually long setae. Dactyls of first pair of walking legs with seven ventral movable spines behind terminal one; dactyls of second and third pairs with six such spines.

The carapace of the unique specimen is 8.7 mm. long and 8.5 mm. wide.

Remarks. — The unarmed carapace and obscurely lobed front, together with the shape of the chelipeds, separate this striking species from all other members of the genus. It seems to have no close relatives among the described species of *Porcellana*.

Ecology. — The single specimen was taken from a depth of 85 meters.

Geographical distribution. — Known only the type locality in the Cape Verde Islands.

Porcellana longicornis (LINNAEUS, 1767).

(Fig. 10, A-E.)

Cancer hexapus LINNAEUS, C., 1767, p. 1039.

Cancer longicornis LINNAEUS, C., 1767, p. 1040.

Porcellana longicornis BOSCH, L. A. G., 1801-1802, p. 233. — BOUVIER, E.-L., 1940, p. 177, fig. 35 (1-2), 131, pl. 5, fig. 6.

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
« MERCATOR »	Bahia de Pulpito, Rio de Oro	25.XI.1936	18-27	—	—	2 ♂, 1 ovig. ♀
»	Bahia de Pulpito, S. Garnet Head, Rio de Oro	29-31.X. 1935	—	—	—	3 ♀ (1 ovig.)
»	24°39'N-15°W (S. Garnet Head, Rio de Oro)	2.XI.1935	—	—	—	1 ♂, 1 ovig. ♀
»	Bahia de Caballo, Rio de Oro	2.XI.1935	—	—	—	4 ♂, 6 ovig. ♀
»	Villa Cisneros, Rio de Oro	3.XI.1935	22	—	—	1 ovig. ♀
»	20°53'N-17°02'W (Cap Blanc, Mauritania)	9.XI.1935	—	—	—	2 ovig. ♀
»	Cap Blanc, Mauritania	9.XI.1935	18	—	—	19 ♂, 15 ♀ (13 ovig.)
»	Port Étienne, Mauritania	5.XI.1935	—	—	—	1 ♂
TH. MONOD	Sao Thiago, Cape Verde Is.	2.XI.1948	—	—	—	2 ♂, 1 ovig. ♀
I. MARCHE- MARCHAD	S. Iles Madeleines, Senegal	29.XI.1952	49	—	—	2 ♂, 1 ovig. ♀
J. FOREST	S. Ile de la Madeleine, Senegal	4.III.1953	40	—	—	1 ♂, 3 ovig. ♀
»	SE. Ile de la Madeleine, Senegal	25.III.1953	35	—	—	2 ♂, 1 ovig. ♀
»	»	25.III.1953	40	—	—	1 ♂
—	Dakar, Senegal	—	—	—	—	1 ovig. ♀

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. FOREST	Between Dakar and Gorée, Senegal	5.III.1953	16	—	—	2 ovig. ♀
J. CADENAT	Gorée, Senegal	7.VIII.1946			In shells with <i>Petrochirus</i>	2 ♀ (1 ovig.)
»	»	VIII.1946	—	—	—	6 ♂, 4 ♀ (2 ovig.)
IFAN-GORÉE	»	12.IX.1947	—	—	—	1 ♂
»	»	16.IX.1947	—	—	—	1 ♂
»	»	23.IX.1947	—	—	—	5 ♂, 2 ovig. ♀
J. CADENAT	»	13.X.1947	—	—	—	1 ♂, 3 ♀ (2 ovig.)
»	»	9.V.1948	—	—	—	2 ♂, 2 ovig. ♀
F. PARAÍSO	»	14.IV.1950	8-10		Lobster grounds	1 ovig. ♀
J. CADENAT	»	22.VIII.1950			Lobster traps	11 ♂, 14 ♀ (4 ovig.)
F. PARAÍSO	»	5.IX.1950			»	11 ♂, 13 ♀ (5 ovig.)
M. KEITA	»	6.X.1950			»	1 ♂, 2 ovig. ♀
IFAN-GORÉE	»	10.II.1951	—	—	—	2 ♂, 3 ovig. ♀ (1 ♂ figured)
»	»	19.IV.1951			Dredged	1 ovig. ♀
F. PARAÍSO	»	22.VIII.1951			Lobster traps	14 ♂, 9 ♀ (2 ovig.)
J. FOREST	»	25.II.1953	10-11	—	—	4 ♂, 2 ♀ (1 ovig.)
»	»	25.II.1953	10-12	—	—	6 ♂, 2 ovig. ♀
IFAN-GORÉE	»	21.VII.1953			Piles of bridge	1 ♀
I. MARCHE- MARCHAD	»	10.IX.1953	—	—	—	4 ♂, 2 ♀ (1 ovig.)
—	»	—	14	—	—	1 ♀
IFAN-GORÉE	Off Gorée, Senegal	29.XII.1950			Dredged	1 ♂, 1 ♀
I. MARCHE- MARCHAD	Near Point M, Senegal	12.XI.1952	32	—	—	19 ♂, 12 ♀ (7 ovig.)
J. FOREST	S. Gorée, Senegal	4.III.1953	30	—	—	15 ♂, 8 ovig. ♀
I. MARCHE- MARCHAD	»	30.IX.1953	41	—	—	1 ovig. ♀
»	»	27.X.1953	42	—	—	1 ♂
»	»	24.XI.1953	40-41	—	—	1 ♂
»	»	26.XI.1953	25	—	—	3 ♂, 1 ovig. ♀
TH. MONOD and P. BUDKER « VERS L'HORIZON » St. 9	14°39'N-17°23'W (SE. Gorée, Senegal)	22.I.1941	22-34	—	—	4 ♂, 1 ♀, 1 moult

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. CADENAT	NE. Gorée, Senegal	19.VIII.1950	4-5	—	—	3 ♂
IFAN-GORÉE	Behind wreck of « TACOMA », Senegal	28.IV.1953	19	—	—	3 ♂, 5 ovig. ♀
I. MARCHE- MARCHAD	Between wreck of « TACOMA » and Bel-Air, Senegal	16.II.1954	14-16	—	—	1 ♂
»	Near Banc du Séminole, Baie de Gorée, Senegal	8.XII.1953	38	—	—	4 ♂, 2 ovig. ♀
»	Between Gorée and Thiaroye, Senegal	18.IV.1952	15	—	Stones, ascidians, and bry- ozoans	1 ♂, 1 ovig. ♀
»	»	1.VII.1953	21-22	—	—	1 ♂, 1 ovig. ♀
IFAN-GORÉE	Off Thiaroye, Senegal	29.IV.1953	10	—	—	1 ovig. ♀
»	»	22.VII.1953	7	—	—	35 ♂, 35 ♀ (10 ovig.)
« MERCATOR »	14°43'30"N-17°20'- 17°25'W (NE. Dakar, Senegal)	14.XI.1935	—	—	—	100 ♂, 63 ♀ (40 ovig.) 1 juv.
« VERS L'HORIZON » St. 14	Banc de la « RESOLUE », off M'Bao, Senegal	23.I.1941	—	—	—	1 ♂
TH. MONOD and P. BUDKER « JEAN-FRANÇOIS » St. 21	»	II.1941	—	—	—	3 ♂
M. DELAIS	M'Bao, Senegal	7.II.1951	—	Dredged	—	4 ♂, 1 ovig. ♀
I. MARCHE- MARCHAD	S. M'Bao, Senegal	11.IX.1953	31	—	—	1 ♂
TH. MONOD and P. BUDKER « CABELLOU » St. 2	14°41'N-17°20'30"W (E. Gorée, Senegal)	4.I.1941	—	—	—	1 ♂, 1 ♀
« JEAN-FRANÇOIS » St. 18	Baie de Rufisque, Senegal	28.I.1941	—	—	—	1 ♂
TH. MONOD and P. BUDKER « JEAN-FRANÇOIS » St. 17	14°30'-14°37'N- 17°13'-17°14'W (SE. Dakar, Senegal)	28.I.1941	—	—	—	8 ♂, 4 ♀
TH. MONOD and P. BUDKER « JEAN-FRANÇOIS » St. 20	14°38'30"-14°39'45"N- 17°14'-17°14'45"W (SE. Dakar, Senegal)	1.II.1941	15-17	—	—	2 ♂, 1 ovig. ♀
J. FOREST	N'Gazobil, Senegal	19.II.1953	—	—	—	1 ovig. ♀
J. CADENAT	Joal, Senegal	24.II.1947	Shore	—	Algae	1 ♀
J. FOREST	»	18.II.1953	6	—	—	1 ♂
»	»	20.II.1953	10-11	—	—	3 ♂, 1 ovig. ♀

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
I. MARCHE- MARCHAD	Off Joal, Senegal	17.IV.1953	15-17	—	—	1 ovig. ♀
»	Banc de Faguque, Joal, Senegal	15.IV.1953	9	—	—	1 ♂
A. CRÉMOUX « GÉRARD TRÉCA »	Entrance to Saloum, Senegal	6.V.1949	—	—	—	1 ♂
« SYLVANA » St. 98	11°38'N-15°49'W (channel between Rouban and Bubaque, Bijagos Is., Portuguese Guinea)	12.IV.1913	25-30	—	Rock, coral	11 ♂, 16 ♀ (12 ovig.), 1 post-larva
« SYLVANA » St. 100	»	13.IV.1913	Low tide	—	Rocks	2 ♂, 3 ♀
« SYLVANA » St. 104	Off Rouban and Bubaque, Bijagos Is., Portuguese Guinea	15.IV.1913	25-30	—	Sand, gravel, rock	11 ♂, 8 ♀ (4 ovig.)
A. CRÉMOUX « GÉRARD TRÉCA » St. 38	10°06'N-14°48'W (French Guinea)	4.II.1953	25	—	Shelly sand with sponges and gorgonians	1 ovig. ♀
A. GRÉMOUX « GÉRARD TRÉCA » St. 34	9°40'N-14°21'W (French Guinea)	3.II.1953	25	—	Muddy sand with sponges and gorgo- nians	8 ♂, 10 ♀ (4 ovig.)
J. CADENAT « GÉRARD TRÉCA » St. 4	9°38'N-13°59'W (French Guinea)	23.XII.1952	15	—	Sand	2 ♂, 1 ovig. ♀
J. FOREST « GÉRARD TRÉCA » St. 47	9°25'N-13°55'W (Off Conakry, French Guinea)	12.III.1953	15	—	Muddy sand	2 ♂
J. FOREST « GÉRARD TRÉCA » St. 50	9°22'N-13°37'W (Near Conakry, French Guinea)	14.III.1953	10	—	Sand	1 ♂
J. CADENAT « GÉRARD TRÉCA » St. 1	9°19'N-13°53'W (French Guinea)	19.XII.1952	23	—	Mud with gorgonians	1 ♂
A. CRÉMOUX « GÉRARD TRÉCA » St. 26	9°16'N-13°34'W (French Guinea)	27.I.1953	10	—	Muddy sand	1 ♂
A. CRÉMOUX « GÉRARD TRÉCA » St. 27	9°16'N-13°38'W (French Guinea)	27.I.1953	14-15	—	Muddy	10 ♂, 10 ♀ (8 ovig.)
A. CRÉMOUX « GÉRARD TRÉCA » St. 28	9°16'N-13°42'W (French Guinea)	27.I.1953	20	—	Gray muddy sand with sponges and gorgo- nians	2 ♂, 1 ♀
J. FOREST « GÉRARD TRÉCA » St. 46	9°15'N-14°50'W (Near Conakry, French Guinea)	11.III.1953	45	—	Sand	2 ♂, 2 ovig. ♀

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
I. MARCHE- MARCHAD	Conakry, French Guinea	27.I.1953	—	—	—	4 ♂, 5 ♀ (4 ovig.)
E. POSTEL « GÉRARD TRÉCA » St. 21	Near Conakry, French Guinea	21.I.1953	—	—	—	1 ♂
DEBYSER	Between Kassa and Conakry, French Guinea	2.I.1950	On submarine cable			4 ♂, 5 ♀ (3 ovig.)
J. FOREST « GÉRARD TRÉCA » St. 45	9°10'N-14°55'W (French Guinea)	11.III.1953	50-45	—	Sand	1 ♂, 5 ♀ (3 ovig.)
E. POSTEL « GÉRARD TRÉCA » St. 33	9°07'N-13°41'W (Mattakong, French Guinea)	31.I.1953	25	—	Muddy sand with sponges and gorgo- nians	5 ♂, 10 ♀ (6 ovig.) 1 juv.
I. MARCHE- « GÉRARD TRÉCA »	Off Mattakong, French Guinea	21.I.1953	10	—	Muddy sand	1 ♂
J. FOREST « GÉRARD TRÉCA » St. 41	1 M. SE. Kassa, French Guinea	9.III.1953	15	—	Muddy sand with hydroids and bryo- zoans	3 ♂, 2 ♀ (1 ovig.)
J. FOREST « GÉRARD TRÉCA » St. 53	3 M. NW. Tamara, French Guinea	16.III.1953	12	—	Mud with gorgonians and hydroids	1 ♂
J. FOREST « GÉRARD TRÉCA » St. 56	Between Tamara and Ile de Corail, French Guinea	16.III.1953	10	—	Muddy sand with gorgonians	1 ♂
J. FOREST « GÉRARD TRÉCA » St. 40	9°N-13°50'W (Off French Guinea- Sierra Leone border)	9.III.1953	30	—	Shell sand with sponges and hydroids	1 ♂, 1 ovig. ♀
R. BASSINDALE	2 M. W. Densu River, Accra, Gold Coast	2.III.1949	4	—	—	1 ovig. ♀
»	2 M. off Densu, Accra, Gold Coast	8.IV.1949	8	—	—	1 ♀
»	Off Accra, Gold Coast	21.XII.1950	37	—	—	1 ♂
»	»	31.XII.1950	35	—	—	1 ♀
»	»	22.I.1951	19	—	—	1 ovig. ♀
»	»	24.I.1951	25	—	—	1 ♂
»	»	4.IV.1951	40	—	—	1 ♂
»	»	2.V.1951	37	—	—	1 ♂
»	Tenpobo, Gold Coast	17.I.1949	Inter- tidal	—	—	2 ♂
»	»	13.II.1949	Shore	—	—	1 ♀

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
»	»	21.XI.1949	Shore	—	—	2 ♂
»	»	6.II.1950	—	—	—	1 ♀
Expéd. Océanogr. Belge A.S. 32	7°17'S-12°42'30" E (13 M. W. Ambrizette, Angola)	29-30.IX. 1948	45	20, 30	Rock, gravel, coral	2 ♂
Expéd. Océanogr. Belge A.S. 116	9°20'S-13°04' E (8 M. W. Rio Cuanza, Angola)	31.I.1949	17	24, 38	Muddy sand	1 ♂

Diagnosis. — Carapace slightly longer than wide, dorsally convex, with regions partially delimited. Surface slightly rugose, most noticeably on posterior branchial regions, and largely bare except for a few symmetrically placed tufts of long, plumose setae. Lateral margins armed with a few spines or denticles. Front deeply divided into three widely separated, dentate lobes, the median much the largest and deeply furrowed in the midline.

Carpus of chelipeds armed on inner margin with two distinct spine-tipped teeth in females and all but largest males. Major chela of males with two large teeth on movable finger and one on fixed finger. Minor chela with fingers strongly curved and twisted and with a dense mat of hairs on opposable margins; fixed finger unequally bifid at tip to receive end of movable finger. Chelae of females similar and less unequal than in males, fingers simple and little bent, without marginal teeth or hairs.

Males in the collection range in size from a carapace length and width of 2.0 and 1.8 mm. to 6.3 and 6.0 mm. The smallest female has the carapace 1.6 mm. long and 1.5 mm. wide; the largest female is ovigerous and has a carapace length of 5.7 and width of 5.9 mm.; the smallest ovigerous female has the carapace 2.4 mm. long and 2.2 mm. wide. As in *P. platycheles africana*, the carapace is slightly broader in females than in males. In young specimens of both sexes, the average length-width ratio is about 1.10; in the largest males it is about 1.04, and in the largest females, 1.00 or less.

Remarks. — No constant differences were found between West African specimens of this variable species and those from European coasts. The present collection has a preponderance of male specimens; of 741 specimens in which the sex is determinable, there are 410 males and 331 females. In addition to the striking sexual dimorphism of the chelipeds mentioned above, there appears to be a tendency toward right-handedness in males. Of 118 males in which both chelipeds are intact, the major cheliped is on the right side in 71, on the left in 46, and subequal in 1. In 63 complete females, on the other hand, the major cheliped is on the right side in 25, on the left in 26, and subequal in 12.

Ecology. — Along the West African coast, *P. longicornis* has been found from the intertidal zone to a depth of about 50 meters. J. BONNIER (1887) recorded the species from more than 180 meters (100 fathoms), but this depth is probably unusual.



FIG. 10. — *Porcellana longicornis* (LINNAEUS, 1767)

A, carapace and chelipeds. — B, right first walking leg. — C, right third maxilliped.
 D, right antennule in ventral view. — E, same in anterior view.
 Male; Gorée, Senegal; scale: A, $\times 6,3$; B, C, $\times 13,8$; D, $\times 21$; E, $\times 40$.

Off West Africa, it has been found on bottoms of mud, sandy mud, sand, gravel, stones, rock, and coral, in association with algae, sponges, hydroids, gorgonians, bryozoans, and ascidians. The studies of E. ALLEN (1899), K. ZIMMERMAN (1913), and E. NICOL (1932) on the occurrence of this common porcellanid off Plymouth, England, indicate that it frequents similar habitats there, where it was taken on bottoms of fine sand, coarse gravel with sand or mud, fine gravel, shell gravel, and stones; it was especially common in *Cellaria* beds and in crevices of *Lepralia*, as well as under stones and in holdfasts of *Laminaria*. In the intertidal zone of the English coast, it is said to avoid thick deposits of mud in crevices where *P. platycheles platycheles* is usually found and it prefers shores where igneous rocks are separated by steep gullies swept clear of mud by tidal currents.

Two specimens were found in a mollusk shell with the hermit crab, *Petrochirus*, at Gorée, Senegal. TH. MONOD (1933) cited a similar association on the Mauritanian coast and he also found specimens of *P. longicornis* on the carapace of the spider crab, *Maja squinado*, in that region.

Ovigerous specimens were taken along the West African coast in every month of the year. At Plymouth, they are found from March to August, according to the publication by the Marine Biological Association (1931). O. PESTA (1918) recorded egg-bearing females from the Adriatic Sea in May and June.

Geographical distribution. — *P. longicornis* has been recorded previously from the Swedish, Norwegian, British, and Irish coasts and the shores of the eastern Atlantic, the Mediterranean, and the Black Sea, and as far south as Cap Blanc on the West African coast. The present collections extend this range more than 1800 miles farther south, to the coast of Angola.

***Porcellana foresti* sp. nov.**

(Fig. 11, A-E.)

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. FOREST	Tombo (Conakry), French Guinea	15.III.1953	Low tide	—	—	2 ♀ (1 is holotype- figured)

Types. — The holotype and paratype are deposited in the collections of the Muséum National d'Histoire Naturelle at Paris.

Diagnosis. — Carapace slightly longer than wide; sparsely covered, especially on frontal and lateral regions, with plumose hairs which are easily rubbed off. Surface partially roughened by short, transverse rugae and with a prominent pair on protogastric region. Cervical groove well marked. Orbital margin denticulate, outer angle subrectangular. Lateral margin anterior to cervical groove armed with several larger denticles. Frontal lobes distinctly separated and irregularly spinose. Median lobe furrowed medially, broader than and extending beyond lateral lobes. Lateral wall of carapace entire and provided with a few sinuous longitudinal rugae, the dorsal one forming a prominent crest below antenna. Basal segment of antenna extending forward as a sharp scale nearly to end of cornea.

Chelipeds slightly unequal and unusually robust. Merus dorsally rugose, with a dentate inner lobe and one or two denticles at lower inner distal angle. Carpus strongly rugose dorsally, the rugae being especially prominent in three rather indistinct longitudinal rows. Inner margin irregularly spinose, as is also outer half of distal margin. Outer margin with sharp rugae but no distinct spines. Hand rugose above, pubescent below between bases of fingers.

Outer maxillipeds robust. Meri of walking legs irregularly denticulate or

sparsely spinose dorsally, but not conspicuously so. Dactyls typically armed on lower margin with four movable spines, the proximal one minute and placed close to succeeding one.

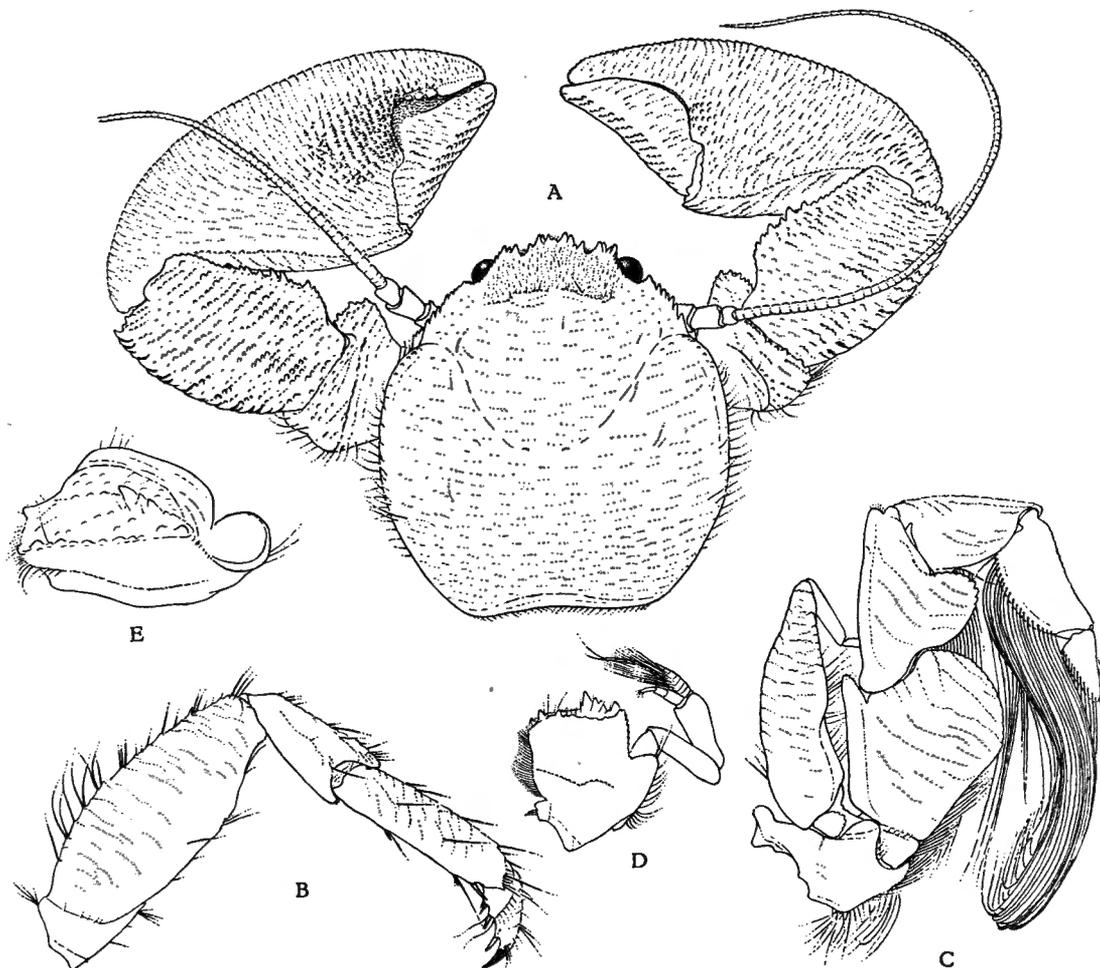


FIG. 11. — *Porcellana foresti* sp. nov.

A, carapace and chelipeds. — B, right first walking leg. — C, right third maxilliped.
D, right antennule in ventral view. — E, same in anterior view.

Female holotype; Tombo (Conakry), French Guinea;
scale : A, $\times 9,6$; B, $\times 13,2$; C, D, $\times 21$; E, $\times 42$.

The carapace of the female holotype measures 4.8 mm. long and 4.6 mm. wide. The other female is 4.5 mm. long and 4.2 mm. wide.

Remarks. — The robust, subequal chelipeds give this species the appearance of certain species of *Petrolisthes* and readily distinguish it from all other species of *Porcellana*.

It is a pleasure to name this species for the collector, Dr. JACQUES FOREST of the Muséum National d'Histoire Naturelle at Paris, who has contributed in several ways toward the completion of this report.

Ecology. — The only two specimens known were collected at low tide.

Geographical distribution. — Known only from the type locality in French Guinea.

Genus POLYONYX STIMPSON, 1858.

KEY TO THE WEST AFRICAN SPECIES OF *POLYONYX*.

1. Carapace subovate; inner margin of carpus of major cheliped evenly convex throughout; outer surface of chela without tubercles; propodus of third walking leg much more than twice as long as wide 2
- Carapace subrectangular; inner margin of carpus of major cheliped concave proximally, convex distally; outer surface of chela with scattered tubercles; propodus of third walking leg about twice as long as wide *P. quadratus*.
2. Fingers of major chela not bent markedly outward; merus of third walking leg distinctly less than twice as long as wide; propodus with three stout spines on lower margin; dactyl with a single small spine on lower margin behind bifid tip ...
P. bowieri.
- Fingers of major chela bent outward distally at an angle of more than 45 degrees; merus of third walking leg about twice as long as wide; propodus with four to nine stout spines on lower margin; dactyl with two small ventral spines behind bifid tip ...
P. senegalensis.

***Polyonyx quadratus* sp. nov.**

(Fig. 12, A-G.)

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. FOREST « GERARD TRÉCA » St. 47	9°25'N-13°55'W (Near Conakry, French Guinea)	12.III.1953	15	—	muddy sand with hydroids	1 ovig. ♀ holotype (figured)
—	Senegal or French Guinea	—	—	—	—	1 ♂
A. LONGHURST	Off Lungi, Sierra Leone	3.II.1955	10	—	—	1 ♀

Types. — The holotype is deposited in the Muséum National d'Histoire Naturelle at Paris; the male paratype is in the Institut Français d'Afrique Noire at Dakar and the female from Sierra Leone is in the U.S. National Museum at Washington.

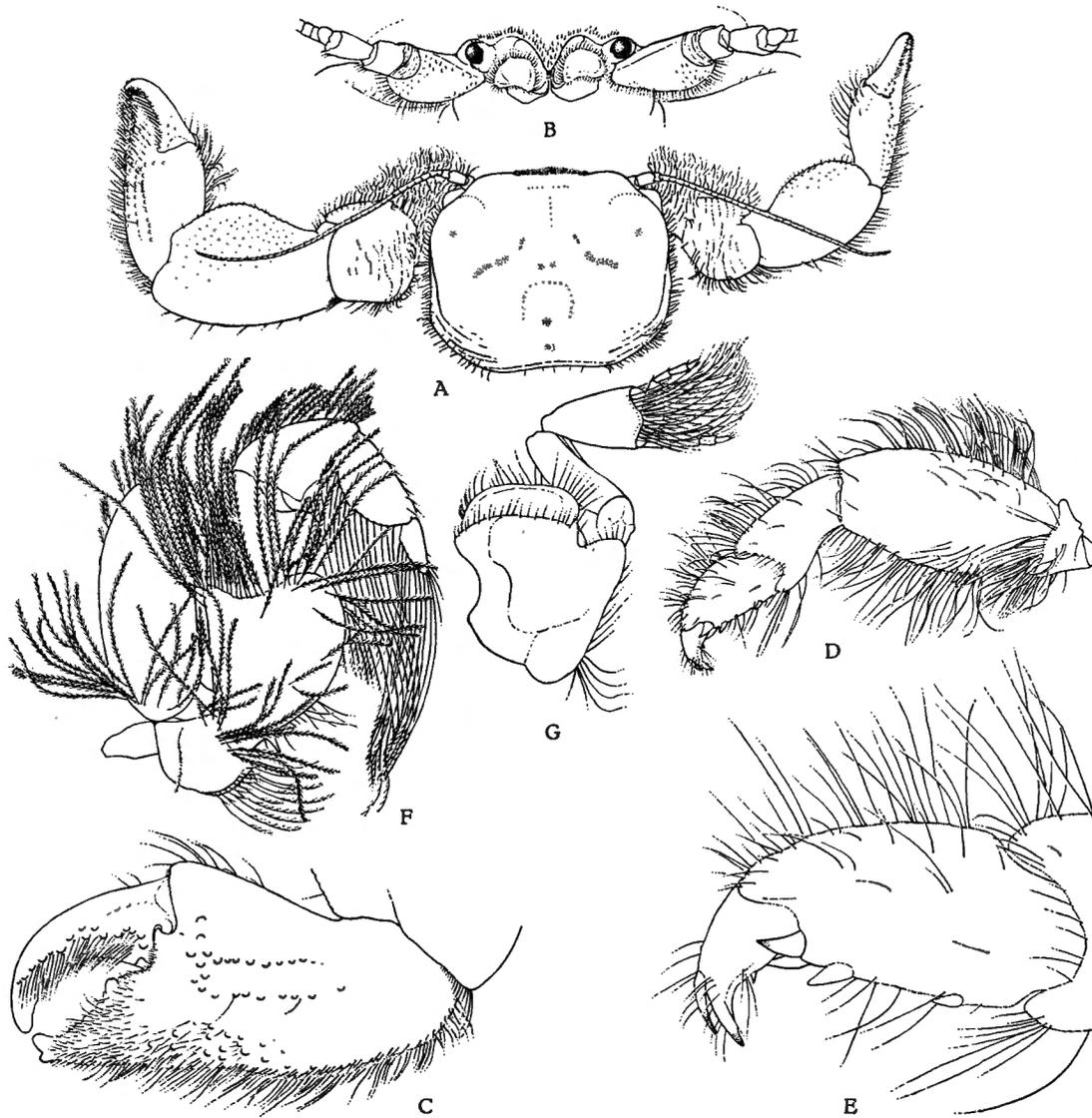


FIG. 12. — *Polyonyx quadratus* sp. nov.

A, carapace and chelipeds. — B, frontal region in anterior view. — C, outer face of left (major) chela. — D, left third walking leg. — E, propodus and dactyl of same. — F, right third maxilliped. — G, right antennule in ventral view. Ovigerous female holotype; « Gérard Tréca » Sta. 47; scale: A, $\times 6.4$; B, D, $\times 7.8$; C, $\times 13.2$; E, $\times 40$; F, $\times 30$; G, $\times 39$.

Diagnosis. — Carapace nearly or more than one and one-fourth times as wide as long, subrectangular, punctate, and bare except on posterolateral walls and on frontal margin. Front vertically deflexed, invisible in dorsal view except for marginal fringe of hairs, trilobate from in front, the median point acute and far exceeding lateral lobes.

Major cheliped with merus rugose, especially proximally; antero-internal lobe long and nearly straight. Carpus about one and one-half times as long as wide; flat inner shelf grossly punctate dorsally and finely scalloped along margin. Chela swollen, hairy on internal and external margins of palm, and with prominent tubercles on outer surface of movable finger and proximad to base of fixed finger, the tubercles extending proximally in two subparallel rows near middle of palm; fingers curved outward, movable one markedly so; largest tooth on cutting edge of movable finger near middle, that on fixed finger much larger and near base; lower edge of palm and fixed finger with a series of outstanding tubercles which increase in size and become blunt teeth distally. Minor cheliped with merus and carpus similar to those of major cheliped but meral lobe more convex and carpal lobe less sinuous and decorated with a few submarginal tubercles. Minor chela similar to major one but with nearly straight fingers and fewer tubercles on palm.

Merus of third walking leg about twice as long as wide. Propodus of similar proportions and armed on lower margin with four stout spines, one on proximal half and three forming a triangle near articulation with dactyl. Dactyl armed with small, stout spine midway between base and bifid tip.

Telson composed of seven pieces. A pair of abdominal appendages in male.

The ovigerous female holotype has the carapace 3.65 mm. long and 4.95 mm. wide. The carapace of the male is 3.7 mm. long and 4.6 mm. wide. The female from Sierra Leone is 3.95 mm. long and 5.05 mm. wide.

Remarks. — The carapace of the male is less convex dorsally and converges slightly anteriorly rather than posteriorly as in the females, and the front is turned down a little less abruptly so that it is just visible in dorsal view. There is a single detached left cheliped with this specimen; it has the fingers straight, as in the minor chela of the female, but the meral lobe is straight and the carpal lobe sinuous, as in the major cheliped of the female.

The species apparently differs from all previously described species of *Polyonyx* in the combination of the following characters: the subrectangular carapace; the prominent and acute median frontal lobe; the shape of the carpus of the major cheliped; the presence of tubercles on the outer surface of the chela; and the relative size and disposition of the spines on the dactyls of the walking legs. It superficially resembles *P. sinensis* STIMPSON from the China Sea, but in that species the front is described as only slightly convex, not sharply trilobate.

Ecology. — *P. quadratus* has been found in depths of 10 to 15 meters. The holotype came from a muddy sand bottom with hydroids. This, the only ovigerous specimen, was taken in the month of March.

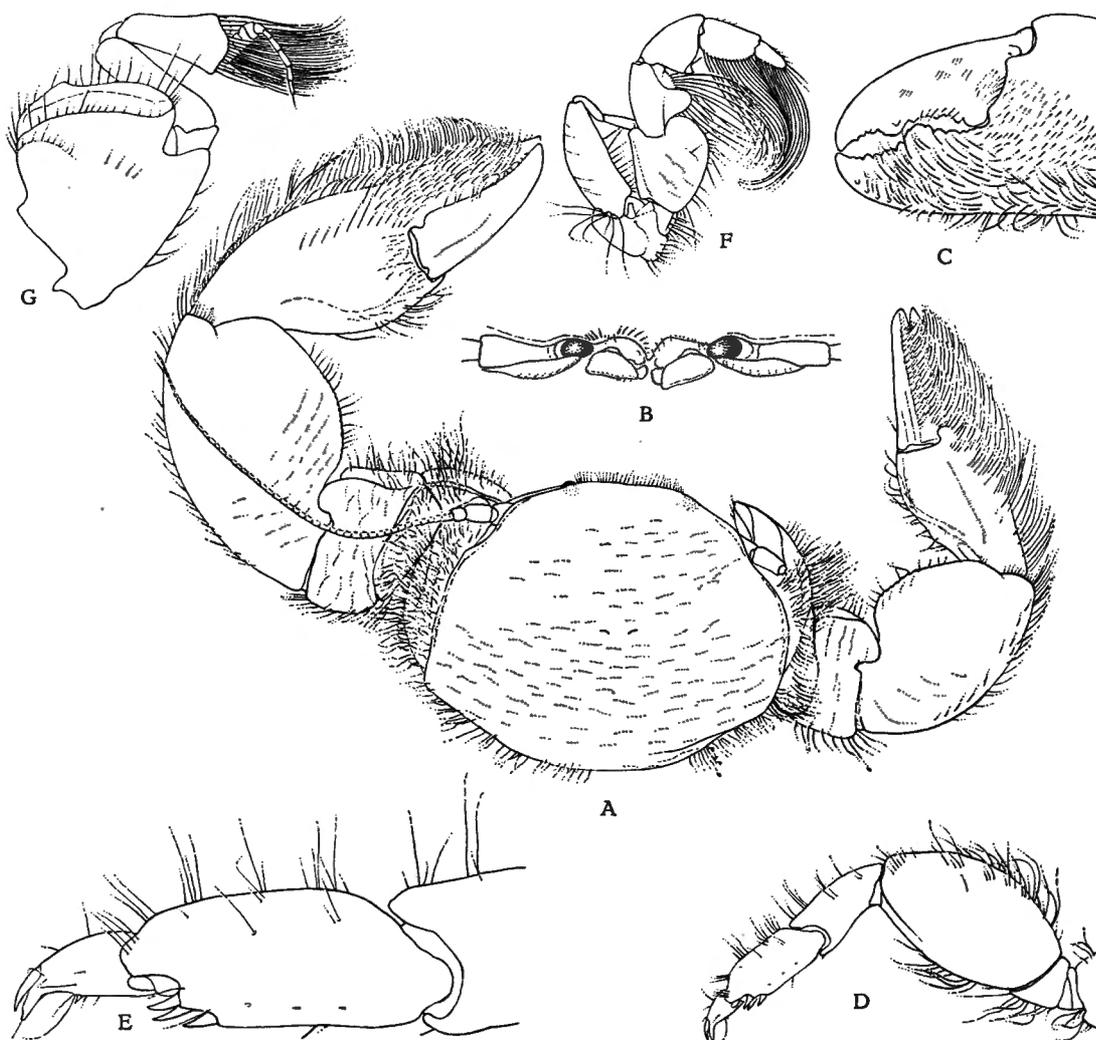
Geographical distribution. — French Guinea and Sierra Leone.

***Polyonyx bouvieri* SAINT-JOSEPH, 1900.**

(Fig. 13, A-G.)

Polyonyx Bouvieri SAINT-JOSEPH, Baron de, 1900, p. 231, pl. 8, figs. 15-18, pl. 9, figs. 19-41. — BALSS, H., 1916, p. 42.

Diagnosis. — Carapace about one-third wider than long, somewhat asymmetrical, dorsally convex, faintly striate posteriorly, and hairy laterally. Front with a fringe of setae, median lobe acute in frontal view and extending well beyond obtuse lateral angles.

FIG. 13. — *Polyonyx bouvieri* SAINT-JOSEPH, 1900.

A, carapace and chelipeds. — B, frontal region in anterior view. — C, outer surfaces of fingers of left (major) chela. — D, left third walking leg. — E, propodus and dactyl of same. — F, right third maxilliped. — G, right antennule in ventral view. Male topotype; Corabane, Senegal; scale: A, $\times 10.8$; B, C, D, F, $\times 13.8$; E, G, $\times 40$.

Merus of chelipeds with entire inner lobe and no ventral armature. Carpus of major cheliped with inner margin convex and nearly entire; outer margin strongly convex. Fingers distinctly more than half as long as palm and not strongly curved outward. Movable finger with a large tooth distad to middle of cutting edge, in addition to a large proximal one. Minor chela densely hairy.

Merus of last walking leg distinctly more than half as wide as long; propodus armed ventrally with three spines near distal end, the last two being placed side by side; dactyl with a single stout spine on ventral margin proximal to terminal pair.

Remarks. — Through the kindness of Dr. J. FOREST of the Muséum National d'Histoire Naturelle at Paris, I was able to examine a topotype of this species identified by Baron DE SAINT-JOSEPH and compared with the type by Dr. J. FOREST. Although this specimen appears to be a cast shell and is therefore somewhat fragile and slightly distorted, it is in good enough condition to indicate the characters by which the species is distinguished from the related one described below.

Ecology. — The type specimens of *P. bouvieri* were found in tubes of the polychaete worm, *Loima medusa* SAVIGNY, living between the body of the worm and the tube.

Geographical distribution. — The type locality of *P. bouvieri* is Corabane [Karabane], one kilometer from the mouth of the Casamance, Senegal. Balss records the species from Gorée, Senegal, and from Kinsembo, Angola, but the identity of these specimens should perhaps be verified in view of the discovery of the following species.

***Polyonyx senegalensis* sp. nov.**

(Fig. 14, A-G.)

Source and material.

Collector	Locality	Date	Depth m	Bottom tem- perature °C	Nature	Material
J. CADENAT	Gorée, Senegal	22.VIII.1950			Lobster trap	1 ♂
F. PARAÍSO	»	5.IX.1950			»	1 ovig. ♀
M. KEITA	»	6.X.1950			»	1 ovig. ♀
J. FOREST	S. Gorée, Senegal	4.III.1953	30	—	—	1 ♂, 2 ♀ (1 ovig.)
I. MARCHE- MARCHAD	Near Banc du Seminole, Baie de Gorée, Senegal	8.XII.1953	38	—	—	1 ovig. ♀
« MERCATOR »	Off Rufisque, Senegal	14.XI.1935	—	—	—	5 ♂, 1 ovig. ♀ (1 ♂ is holotype figured)
J. FOREST « GERARD TRÉCA » St. 56	Between Tamara and Ile de Corail, French Guinea	16.III.1953	10	—	Muddy sand with gorgonians	1 ovig. ♀
J. FOREST « GERARD TRÉCA » St. 41	1 M. SE. Kassa, French Guinea	9.III.1953	15	—	Muddy sand with hydroids and bryozoans	1 ovig. ♀
J. FOREST « GERARD TRÉCA » St. 50	9°22'N-13°27'W (French Guinea)	14.III.1953	10	—	Sand	1 ♀

Types. — The holotype and four of the paratypes are deposited in the Institut royal des Sciences naturelles de Belgique at Brussels. The other paratypes have been distributed among the Institut Français d'Afrique Noire at Dakar, the Muséum National d'Histoire Naturelle at Paris, and the U. S. National Museum at Washington.

Diagnosis. — Carapace from about one and one-fourth to a little more than one and one-third times as wide as long, nearly smooth anteriorly, rugose on posterior half, and bare except near lateral margins and on frontal region, where there are long, plumose hairs. Front broadly obtuse in dorsal view, distinctly trilobate from in front, the median lobe subrectangular.

Major cheliped with merus hairy proximally and laterally, faintly rugose dorsally, and with a prominent rounded lobe at antero-internal angle. Carpus nearly one and two-thirds times as long as wide; flat inner shelf minutely denticulate on proximal half of margin and sparsely fringed with plumose hairs.

Chela swollen, hairy on internal and external margins of palm, and smooth except for faint longitudinal ridges converging proximally from dorsal and lateral articulations of movable finger; fingers curved outward, movable one

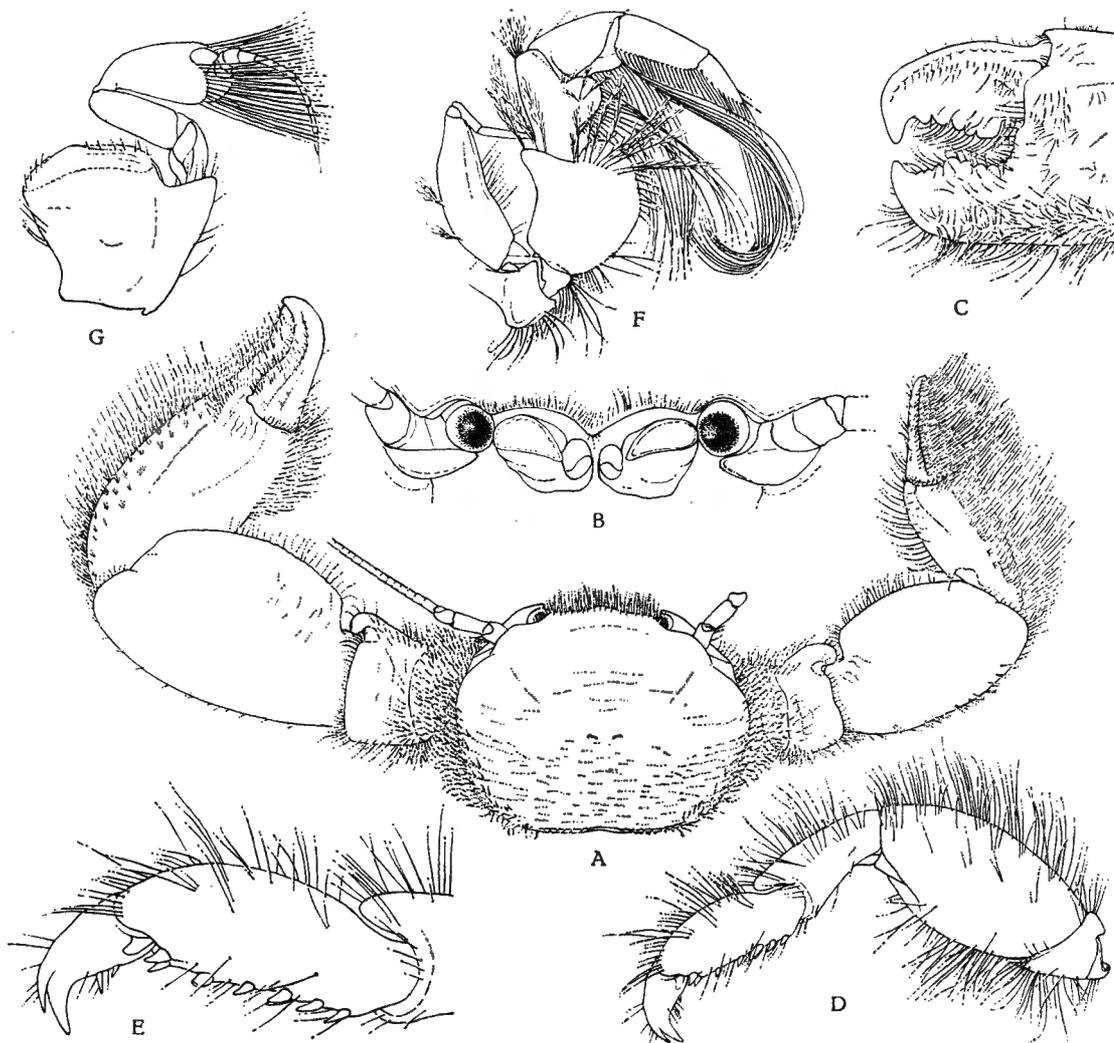


FIG. 14. — *Polyonyx senegalensis* sp. nov.

A, carapace and chelipeds. — B, frontal region in anterior view. — C, outer surfaces of fingers of left (major) chela. — D, left third walking leg. — E, propodus and dactyl of same. — F, right third maxilliped. — G, right antennule in ventral view.

Male holotype; off Rufisque, Senegal;

scale: A, $\times 11,1$; B, $\times 23,2$; C, $\times 14,4$; D, F, $\times 21,6$; E, $\times 43$; G, $\times 40$.

markedly so; largest tooth on cutting edge of movable finger near base, that on fixed finger in middle; lower edge of fixed finger distinctly denticulate. Minor cheliped with merus and carpus similar to those of major cheliped. Surface of minor hand, especially outer portion, concealed by dense growth of setae. Outer margin faintly denticulate, as also cutting edges of fingers.

Merus of third walking leg about twice as long as wide. Propodus armed on lower margin with four to nine stout spines, one or more of them paired. Dactyl armed with two slender spines on lower margin proximal to bifid tip.

Telson composed of seven pieces. A pair of abdominal appendages in male.

The male holotype has the carapace 2.8 mm. long and 3.5 mm. wide. The carapaces of the male paratypes range from 2.2 to 3.0 mm. long and from 2.7 to 4.0 mm. wide. The females are from 2.5 to 4.0 mm. long and from 3.1 to 5.6 mm. wide; the smallest ovigerous female, which has but two eggs, is 2.5 mm. long and 3.2 mm wide; the largest is 4.0 mm. long and 5.6 mm. wide.

Remarks. — Of the sixteen specimens examined, all but two males and two females have the major cheliped on the left side.

This species so closely resembles *P. bouvieri* that the specimens were at first thought to belong to that species, but comparison with one of the original series of *P. bouvieri*, mentioned above, disclosed significant differences. *P. senegalensis* has the orbits better defined, the median frontal lobe less prominent and less acute in frontal view, the movable finger of the major chela turned outward much more noticeably and differently armed along its cutting edge, the meri of the walking legs much more slender, and the propodi and dactyls of those legs armed with more spines. Except for these differences, *P. senegalensis* seems to be more closely allied to *P. bouvieri* than to any other known species of the genus in the following combination of characters: proportions of the carapace, form of the median frontal lobe, the convex and nearly entire inner margins of the merus and carpus of the chelipeds, the general form of the chelae, and the comparative sizes of the terminal spines on the dactyls of the walking legs.

Ecology. — *P. senegalensis* has been found in depths of 10 to 38 meters on bottoms of sand and muddy sand with hydroids, gorgonians, and bryozoans. Since this study was completed, Dr. TH. MONOD has sent me six additional specimens of *P. senegalensis* which were found by I. MARCHE-MARCHAD in the tube of a polychaete worm; fragments of this worm and its tube have been very kindly identified for me by Dr. P. FAUVEL as *Chaetopterus variopedatus* (Renier). Ovigerous specimens occurred in every month in which females were taken: March, September, October, November, and December.

Geographical distribution. — The species is known thus far only from Senegal and French Guinea.

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