

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

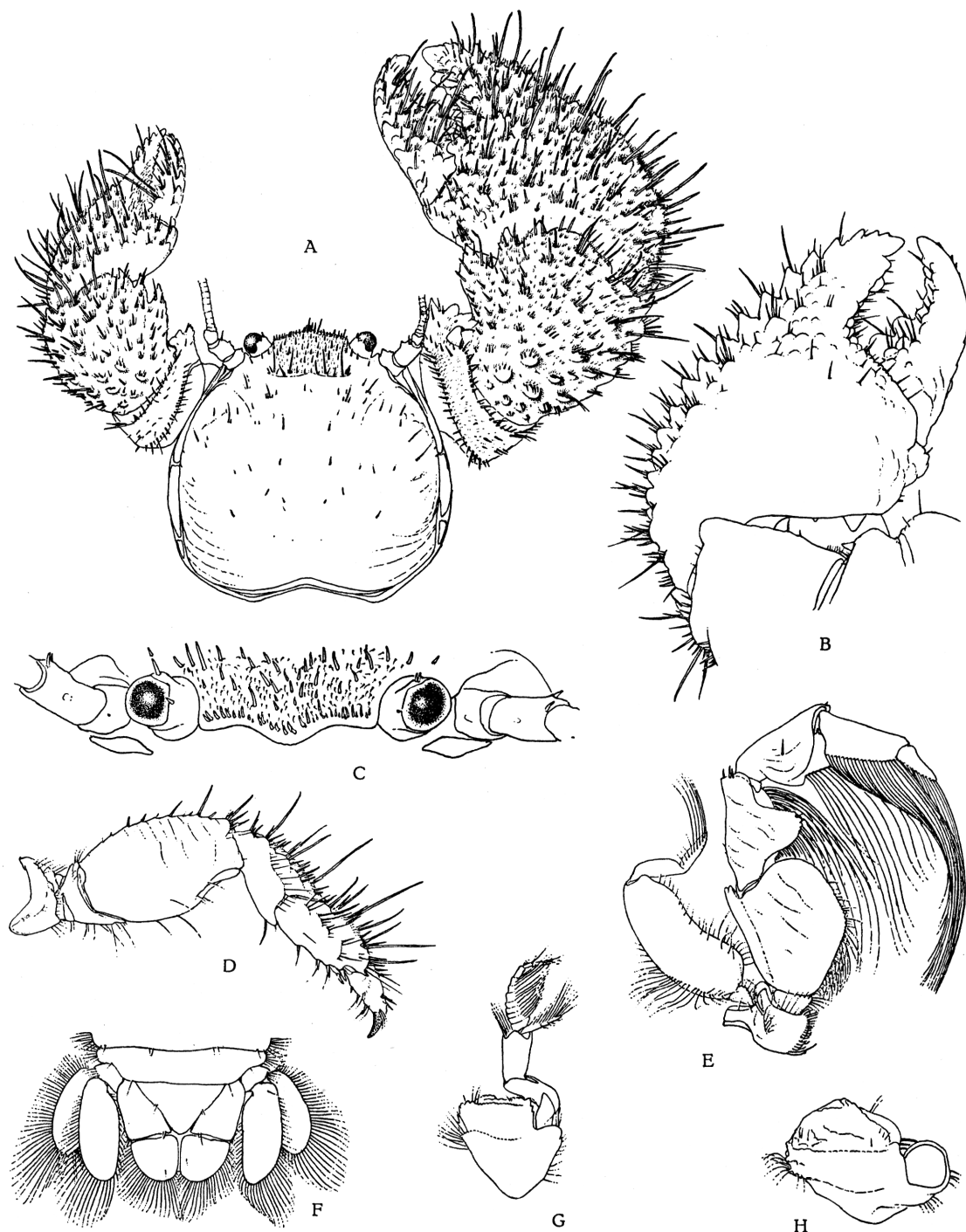


FIG. 2. — *Pachycheles barbatus* A. MILNE-EDWARDS, 1878.

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 chélipèdes 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, Togô; 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 carapace 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.

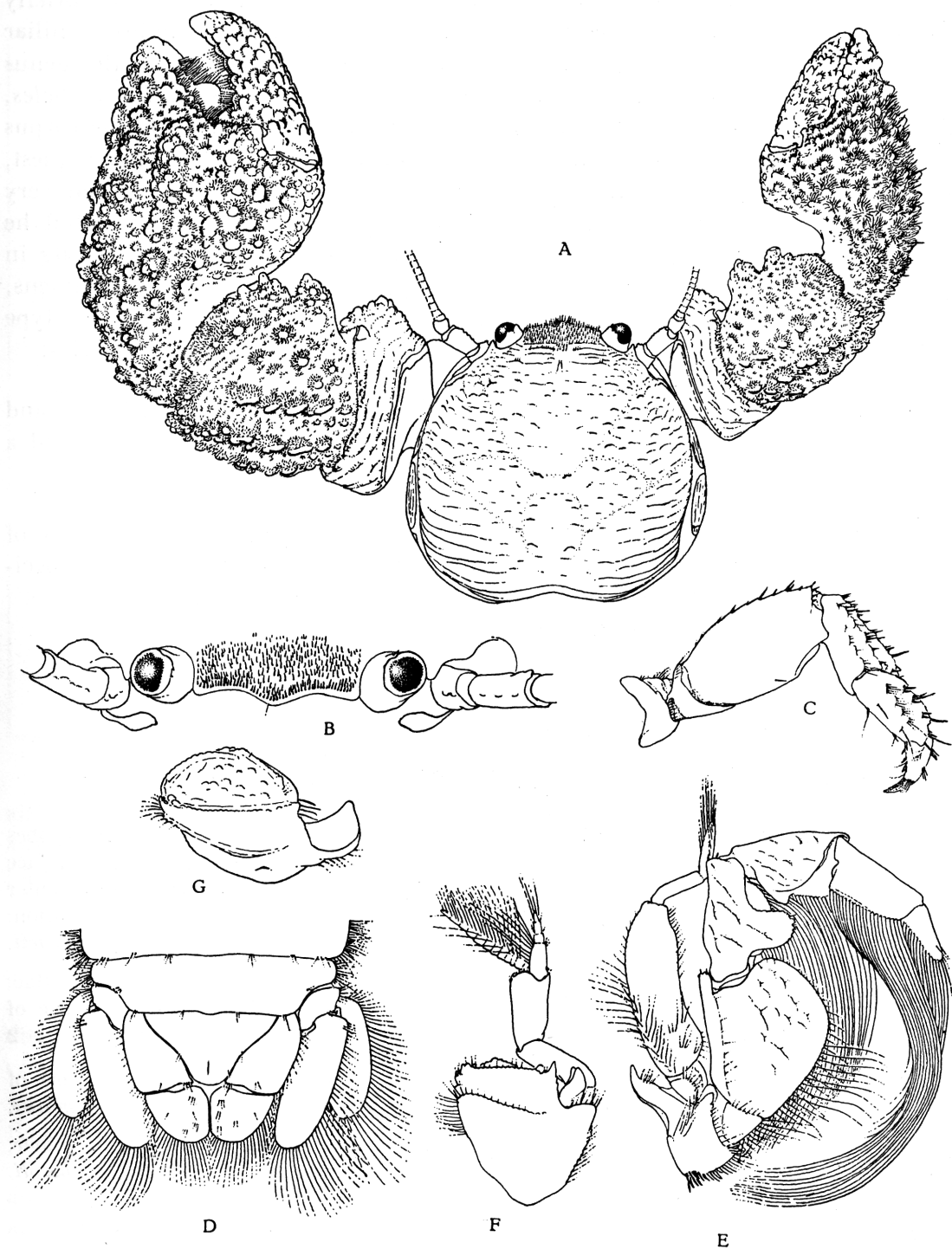


FIG. 3. — *Pachycheles bellus* (OSORIO, 1887).

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.

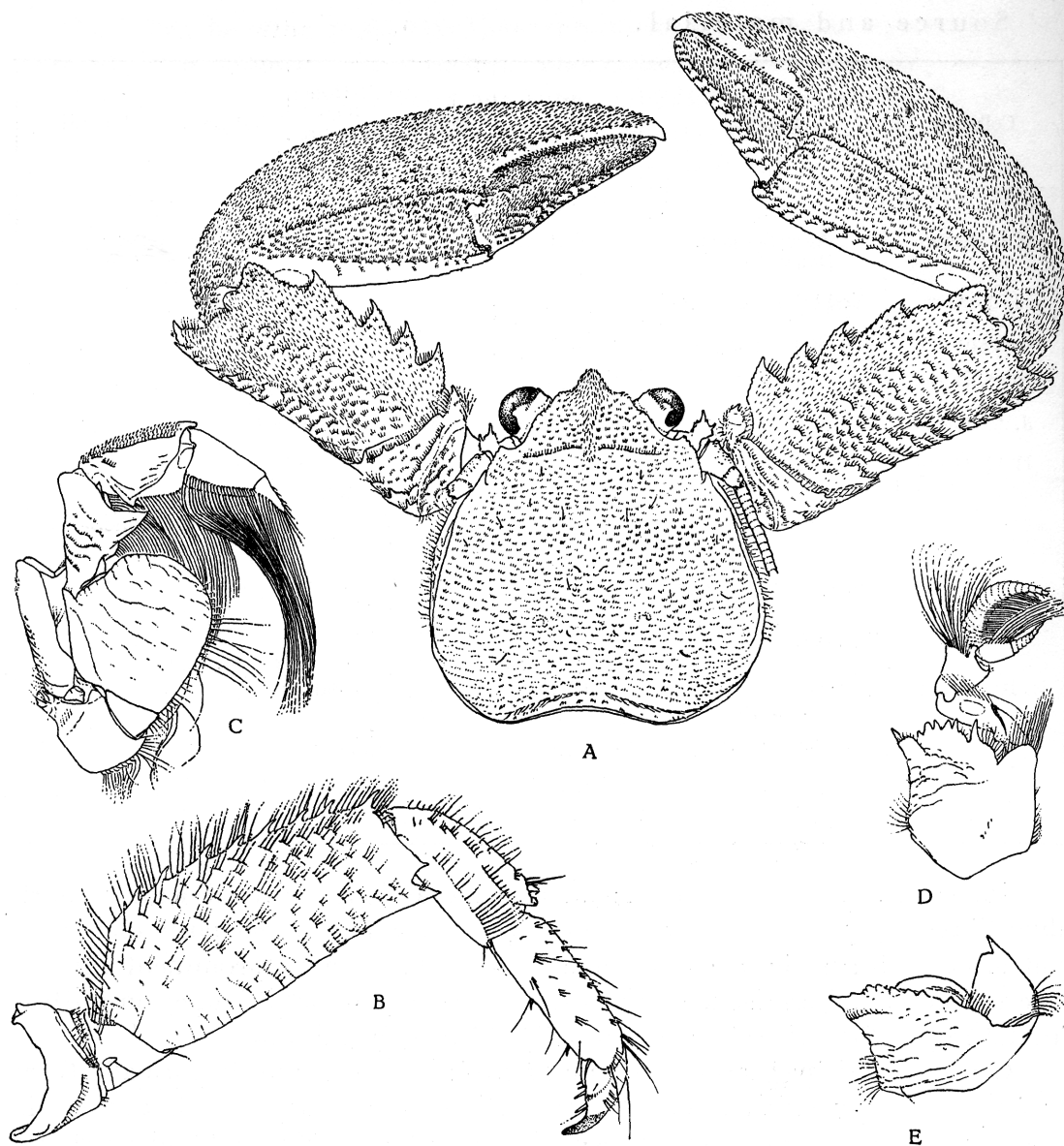


FIG. 4. — *Petrolisthes cessacii* (A. MILNE-EDWARDS, 1878).

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.