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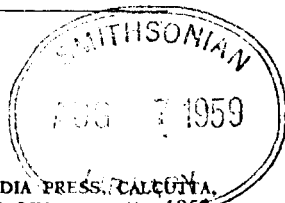
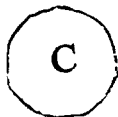
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ON TWO NEW SPECIES AND A NEW VARIETY OF CRABS (DECAPODA : BRACHYURA) FROM BOMBAY STATE

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INTRODUCTION

During the course of study of a collection of crabs from Bombay State, the author came across some forms which, on cursory inspection, could not be identified with hitherto described specimens. A detailed examination, assisted by comparison with allied forms, however, revealed that the forms were new to science. The findings were confirmed by Dr. K. K. Tiwari of the Zoological Survey of India, and Dr. M. W. F. Tweedie of the Raffles Museum, Singapore.

It may here be remarked that the nearest allied forms to the new crabs have not been recorded from the west coast of India. The type species *Leptodius euglyptus* Alcock, of the new variety *Leptodius euglyptus quadrispinosus*, occurs in Galle and Mergui. *Pinnotheres quadratus* Rathbun, which is most nearly allied to *Pinnotheres vicajii*, the new species described here, has as its type locality the Gulf of Siam, where it was first collected by Rathbun¹ in 1910. Tesch² (1918) also described it from Labuan in his Siboga Expedition Reports. The species of *Pseudograpsus* so far known to science have been recorded from Japan through the East Indian Seas to New Caledonia and Fiji, Flores, Celebes, Halmaheira, Amboina, the Moluccas, etc. The nearest locality of a species of *Pseudograpsus* is Nicobars, the home of *Pseudograpsus setosus*. The presence of the new species from Bombay thus extends the range of this genus further westwards.

A description of the forms is given below.

SYSTEMATIC ACCOUNT

Tribe BRACHYGNATHA

Subtribe BRACHYRHYNCHA

Family XANTHIDAE

Subfamily XANTHINAE

Genus *Leptodius* Milne-Edwards

Leptodius euglyptus Alcock

1898. *Leptodius euglyptus*, Alcock, *J. Asiat. Soc. Bengal*, LXVII, pp. 121, 122.

quadrispinosus, var. nov.

¹ Rathbun, M. J., *K. danske vidensk. Selsk.* (7) V, no. 4, p. 333, text-fig. 15 (1910).

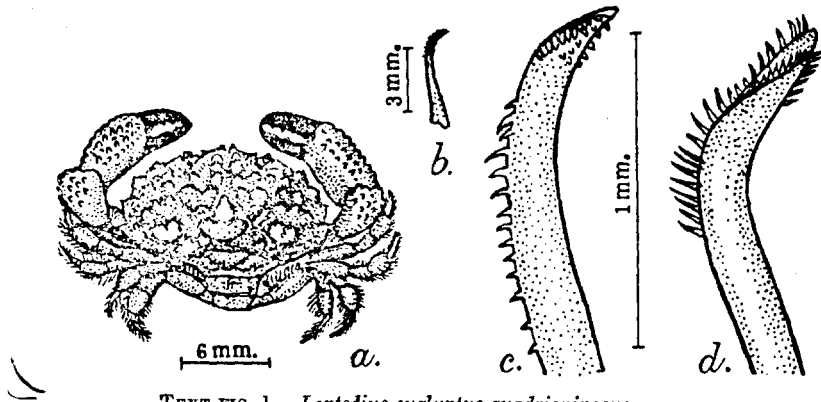
² Tesch, J. J., *Siboga Exped.* XXXIXc₁, p. 261, pl. 17, fig. 2 (1918).

Material examined.—Numerous adult specimens, of both sexes, were collected among rocks at Port Okha, on the Saurashtra coast.

Description.—Carapace two third as long as broad, rather strongly convex in its anterior two-thirds, flat posteriorly; its regions well delimited, convex, and as completely areolated as any *Actaea*, the areolae being strongly convex and somewhat pitted transversely (text-fig. 1).

Front projecting beyond the orbit, from which it is separated by a notch, cut into two lobes of which the outer angles are prominent; its breadth not quite a third of the carapace.

Antero-lateral borders cut into four conical teeth, not including the outer angle of the orbit, or a small denticle below it; postero-lateral borders strongly convergent, as long as the chords of the antero-lateral borders.



TEXT-FIG. 1.—*Leptodius euglyptus quadrispinosus*, var. nov.

a. Dorsal view of Crab: $\times 2$; b. 2nd left abdominal appendages of male: $\times 3$; c. Tip of same, enlarged: $\times 40$; d. Tip of 2nd left abdominal appendage of male *Leptodius euglyptus* Alcock: $\times 40$.

Chelipeds unequal; the upper and outer surfaces of the wrist strongly wrinkled and pitted; the upper surface of the hand nodular, upper half or more of the outer surface of the hand longitudinally ridged and transversely wrinkled; fingers short, stout, hollowed (but not broadened) at the tip.

Legs with the carpopodite and propodite longitudinally ridged and grooved above, the carpus more distinctly so, the dactylus furred.

Side walls of carapace, edges of the upper surface of the arm, and edges of legs, but especially the upper edge of the meropodites, hairy.

Colour, during life, of carapace pink, a white longitudinal band from the front across the gastric region, fingers of chelipeds and front lower corner of the hands blackish brown.

Type-specimen.—Male, (No. C3359/), Zoological Survey of India (Ind. Mus.), Calcutta.

Type-locality.—Port Okha on the Saurashtra coast, 11th & 12th February, 1953. (Coll. B. F. Chhapgar.)

The measurements of the holotype (male) are given below :

length of carapace	:	:	:	:	:	:	10.0 mm.
breadth of carapace	:	:	:	:	:	:	14.5 mm.

Remarks.—This variety resembles *Leptodius euglyptus* Alcock in the sharp *Actaea*-like sculpture of the carapace, but differs from it in having only four teeth on the antero-lateral borders, as well as in the relationship of the lengths of the antero-lateral and postero-lateral borders. In this case, the postero-lateral borders are as long as the chord of the antero-lateral borders, whereas in *Leptodius euglyptus* Alcock they are shorter than the chord of the antero-lateral borders.

The posterior male abdominal appendages are elegantly bent, serrulate near the tip, proximal to which are about 12 to 15 larger spinules. These spinules do not extend up to the tip. (In *Leptodius euglyptus* Alcock the spinules are longer and sharper and extend right up to the tip; the serrulations are also sharper and form only a single row.)

Family PINNOTHERIDAE

Subfamily PINNOTHERINAE

Genus *Pinnotheres* Latreille

Pinnotheres vicajii,¹ sp. nov.

Material examined.—Four females (two of them berried), and two males represent the present collection. Both sexes were obtained from the bivalve *Paphia malabarica* at Bombay, each crab living separately in a shell.

Description.—Female (text-fig. 2): Body soft, carapace subquadrate anterior angles pronounced but with rounded corners, smooth, without any indication of grooves, slightly convex, no pigment spots. Length and breadth of carapace subequal. Lateral margins entire, curved, diverging behind the anterior angles; posterior border straight.

Front straight, broad, about a third the breadth of the carapace at the anterior angles. Eyes small, pigmented, visible in a dorsal view, orbits circular, eyestalks short. Antennae minute and placed within the orbital hiatus.

Merus-ischium of external maxillipeds a broad plate, with the inner (posterior) margin slightly concave and the antero-internal angle pronounced: propodus elongate, broad and spatulate, it reaches farther than the inner angle of the merus. Dactylus minute, styliiform, inserted at inner margin of propodus, just over-reaching the inner angle of the merus, and reaching to the end of the propodus.

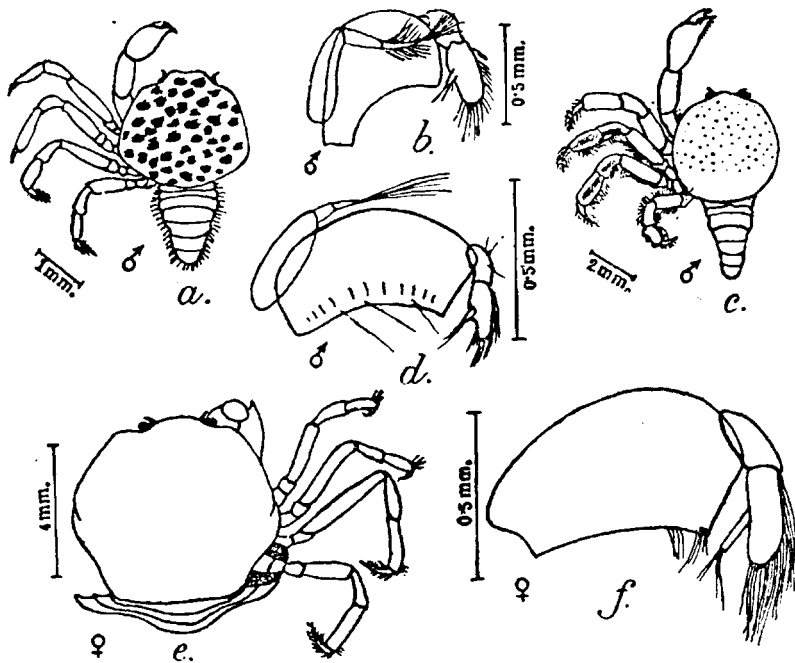
Chelipeds smooth, equal, stout; wrist longer than broad, palm twice as long as high, and twice as long as the fingers, a triangular tooth on the movable finger, three teeth on the proximal half of the thumb—the

¹ The author has great pleasure in naming this species after Mr. Vicaji D. B. Taraporevala, with whose munificence the completion of the Taraporevala Aquarium and Marine Biological Research Station was possible.

middle one smaller than the other two, which are subequal; tips of finger and thumb crossed, pointed. A fringe of hair on the inner part of the lower border of the thumb.

Third pair of walking legs the longest, last pair longer than the first; propodites with a few silky hairs distally; dactyli of the first two pairs subequal in length, strongly hooked, those of the third and fourth pairs about twice as long as the first two, subequal, hairy and slender, regularly curved. Abdomen of seven joints.

Male: Carapace smooth, well calcified, circular, without any trace of anterior angles, widest at the base of the first pair of walking legs: covered with minute, scattered pigment spots on the anterior half of the carapace up to a line joining the bases of the second pair of walking legs. Lateral margins entire, posterior border convex.



TEXT-FIG. 2.—*Pinnotheres vicajii*, sp. nov.

a. Dorsal view of male *Pinnotheres quadratus* Rathbun, with abdomen extended; b. External maxilliped of same; c. Dorsal view of male *Pinnotheres vicajii*, sp. nov., with abdomen extended; d. External maxilliped of same; e. Dorsal view of female *Pinnotheres vicajii*, sp. nov.; f. External maxilliped of same.

Front about a fourth the greatest breadth of the carapace, straight. Eyes, orbits and antennae similar to those of the female.

Merus-ischium and propodus of external maxillipeds similar to those of the female, except that the propodus is abruptly narrowed in the distal half. Dactylus not even reaching the antero-internal angle of the merus, as it does in the female. A brush of hairs at the tip of the last joint of the exognath of the external maxillipeds, but no hairs along the sides of this joint.

Chelipeds smooth, equal, stout; a fringe of hair on the inner (anterior) border of the arm: palm inflated distally, $1\frac{1}{2}$ times as long as high, twice as long as the fingers; a fringe of hair on the inner side of the lower border of the hand extending to the tip of the thumb: a large, triangular tooth on the movable finger fits between two smaller ones on the thumb.

Third pair of walking legs the longest, the last pair shortest: inner borders of carpus and propodus of the second and third pair of legs, as also all borders of the last pair fringed with silky hairs. A fringe of hair runs diagonally from the inner border of the proximal end of the carpus to the outer border of the distal end of the propodus of the second and third pairs of legs. Dactyli of first three pairs of legs subequal, those of the last pair slightly shorter; all hairy.

Abdomen seven-jointed, narrow, no fringe of hair on its borders. The breadth at the base of the terminal segment surpasses the length.

Colour, during life, yellow; in the male the carapace is covered with minute black pigment spots.

The measurements of the type-specimens in millimetres are given in the following table:—

	Type female.		Type male.	
Length of carapace	5.6		4.0	
Breadth of carapace	6.4		4.0	
Breadth of front	1.3		1.1	
Breadth of anterior border of carapace	4.1		—	
	left.	right.	left.	right.
1st walking leg				
merus	0.75	0.75	0.84	0.84
carpus	0.45	0.47	0.34	0.36
propodus	0.66	0.67	0.47	0.49
dactylus	0.28	0.28	0.20	0.23
2nd walking leg				
merus	1.13	1.14	1.00	1.07
carpus	0.50	0.56	0.45	0.45
propodus	0.75	0.79	0.50	0.52
dactylus	0.28	0.29	0.20	0.24
3rd walking leg				
merus	1.69	1.13	1.70	1.73
carpus	0.84	0.66	0.44	0.47
propodus	1.28	0.90	0.60	0.75
dactylus	0.46	0.38	0.26	0.28
		(regenerated)		
4th walking leg				
merus	0.84	1.03	0.71	0.70
carpus	0.41	0.52	0.37	0.33
propodus	0.73	0.75	0.49	0.47
dactylus	0.47	0.51	0.23	0.22

Type-specimen.—Male, No. C3361/1, Zoological Survey of India (Ind. Mus.), Calcutta.

Type-locality.—Bombay, 17th April, 1953. (Coll. B. F. Chhapgar.)

Remarks.—This species is allied to *Pinnotheres quadratus* Rathbun in the pigmentation of the male carapace and the small size of the dactylus of the external maxillipeds, but differs from it in several important characters as shown below :—

P. quadratus Rathbun

P. vicajii, sp. nov.

Carapace of male subquadrate.	Carapace of male circular.
Anterior angles of male carapace pronounced, though rounded.	No trace of anterior angles in male.
Carapace of male divergent from before backward, with the lateral borders straight, widest near the bases of the third pair of walking legs.	Carapace of male circular, lateral borders curved, widest near the bases of the first pair of walking legs.
Posterior border of carapace in the female concave.	Posterior border of carapace in the female straight.
A triangular depression on the cardiac region in the female.	No triangular depression on the cardiac region in the female.
The whole surface of the carapace of male covered with coarse, irregularly-shaped pigment spots.	Only the anterior half of the carapace of male covered with minute, rounded, scattered pigment spots.
Last joint of exognath of external maxillipeds of male with hair along the sides as well as at the tip.	Last joint of exognath of external maxillipeds of male with hair only at the tip.
Dactylus of external maxillipeds of male spatulate, of the same width throughout its length.	Dactylus of external maxillipeds of male narrowed in the distal half.
Palm of male chelipeds bulbous throughout.	Palm of male chelipeds inflated only distally.
Dactyli of only the last two pairs of walking legs of male hairy.	Dactyli of all the walking legs of male hairy.
Abdomen of male broad, with hair on its border.	Abdomen of male narrow, without hair on its borders.
Very minute crabs (Tesch ¹ mentions a berried female measuring 2.85 mm. long and 3.2 mm. broad, and a male 2.4 mm. long and 2.75 mm. broad. Rathbun ² mentions a female 5.2 mm. long and 5.3 mm. broad).	Larger crabs—berried female 5.6 mm. long and 6.4 mm. broad. Male 4.0 mm. long and 4.0 mm. broad.

¹ Tesch, J. J., *Siboga Exped.* XXXIXc¹, p. 261, pl. 17, fig. 2 (1918).

² Rathbun, M. J., *K. danske vidensk. Selsk.* (7) V, no. 4, p. 333, text-fig. 15 (1910).

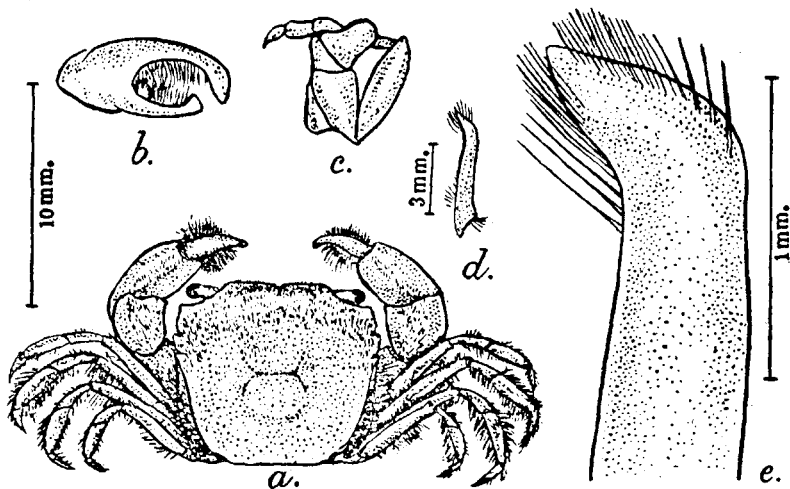
Family GRAPSIDAE

Subfamily VARUNINAE

Genus *Pseudograpsus* Milne-Edwards*Pseudograpsus intermedius*, sp. nov.

Material examined.—Ten males and four females (two of them berried) from Bombay represent the present collection. They were caught in mud under stones.

Description.—Carapace squarish, flat, depressed, very little broader than long, frosted (text-fig. 3). Anterior half of carapace up to the cervical groove covered with minute, scattered, fine, brownish hairs which are more profuse on the front, orbits, epigastric lobes and lateral borders. Regions of carapace not well indicated except in the middle of the carapace where the grooves are disposed in the shape of the letter H. Cervical groove distinct but not very deep, semicircular. Two distinct epigastric lobes behind the front. Borders of carapace thin and sharply defined: the antero-lateral borders lined with profuse hair



TEXT-FIG. 3.—*Pseudograpsus intermedius*, sp. nov.

a. Dorsal view of male; b. External view of chela of male; c. External maxilliped; d. 2nd left abdominal appendage of male; e. Tip of same, enlarged.

and cut into three distinct, flat teeth (including the external orbital angle) which decrease in size from before backward and are not serrate. Posterolateral boundaries of the carapace forming a distinct facet, sharp, keeled and continued to the bases of the last pair of legs.

Front (at its anterior angles) a little more than a third the breadth of the carapace at the external orbital angles: very slightly obliquely deflexed, straight, with a slight concavity towards the middle, prominent, sublaminar.

Buccal cavern square. External maxillipeds gaping, but not very widely: their exognath narrower than the ischium: their merus

shorter, but anteriorly much broader, than the ischium : merus auriculate (expanded) at the outer angle, so that the palp articulates near the middle of the merus.

Chelipeds subequal, but variable in size : considerably longer, and vastly more massive, than the legs in adult males. Shorter in the female, and though stouter than the legs, not vastly so. Inner border of arm and wrist clothed with long, silky hairs. Inner angle of wrist produced sharply to form a broad spine. Fingers gaping, longer than the upper border of the palm : the space between the fingers covered with a thick matt of long, entangled, silky hairs, under which, at the base of the fingers, is hidden a white, fleshy lobe.

The borders of the joints of all the legs, particularly the posterior border of the merus and both borders of the carpus and propodus, thickly fringed with long, dusky hairs. The two middle pairs of legs the longest, the last pair the shortest. Propodites of legs cylindrical, dactyli styli-form.

Abdomen in both sexes of seven segments. In the male the abdomen becomes gradually narrow till the penultimate segment. Last segment abruptly narrowed and tongue-shaped. Posterior male appendages stout and straight, but bent suddenly at the tip, which bears brushes of hairs.

Colour, during life, chestnut.

The measurements of the holotype (male) and an average female, are given below :—

	Male.	Female.
Length of carapace	10.0 mm.	6.75 mm.
Breadth of carapace	11.0 mm.	7.25 mm.
Breadth of front	4.0 mm.	2.6 mm.

Type-specimen.—Male, No. C3363/1, Zoological Survey of India (Ind. Mus.), Calcutta.

Type-locality.—Bombay, 17th March, 1953. (Coll. B. F. Chhapgar.)

Remarks.—Tesch¹, in his discussion of the *Grapsidae* divides the species of *Pseudograpsus* into two different groups, viz.—

- (1) large species (up to 4 cm.), chestnut coloured. Cervical groove very deep, semicircular. Three last joints of the legs with a fur of black hairs ;
- (2) small species (up to 1.5 cm.), white. Cervical groove indistinct, nearly straight. Legs naked.

It will be seen that the new species offers a combination of the characters of the above two groups. Although it is a small species (measuring only up to 1.0 cm.), the specimens are chestnut coloured. Again, the cervical groove, though semicircular, is not very deep. The legs, too, are covered with dusky hair.

¹ Tesch, J.J., *Siboga Exped.* XXXIXc, pp. 97, 98 (1918).

ACKNOWLEDGMENTS

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