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Crabs of the family XANTHIDAE (Crustacea: Brachyura) from the Philippine Islands and adjacent waters based largely on collections of the U.S. Fish Commission steamer *Albatross* in 1908–1909

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Preface

Among the unworked collections accepted for study by the senior author in 1962 as part of the AEC-ONR Project of the Smithsonian Institution, the Xanthidae of the Albatross Philippine Expedition of 1908–1909 proved to be the largest segment to which a common origin could be assigned. As such they were set aside for independent study, and when their elucidation from the literature proved intractable, collections in western European museums were consulted. These, while rich in material from adjacent western Pacific regions, had scant representation from the Philippines, and following their examination many of the Albatross specimens remained unidentified. It was not until the appearance of basic revisions of the Pilumninae by Takeda and Miyake (1968, 1969, 1970 a) and of the Actaeinae by Guinot (1969, 1971, 1976) that the taxonomic framework essential to their elaboration was provided.

While at the Leiden Museum in 1966 the senior author learned that the Albatross Philippine Xanthidae had been among collections under study by the late Alida M. Buitendijk at the time of her death in 1950. From her manuscript notes it became apparent that Miss Buitendijk had identified many more species than were reported in her two publications (1941; 1960, posthumous), but her failure to insert corresponding labels in the specimen jars made it impossible to match the specimens to her notations. Dr. L. B. Holthuis was therefore obliged to return the collection to the Smithsonian Institution largely unidentified. The incident demonstrated Miss Buitendijk's recognition that the Albatross Expedition Xanthidae from the Philippines, housed in Washington, were germane to the Snellius Expedition Xanthidae from the former Dutch East Indies (Indonesia), housed at Leiden, and that the two collections could profitably be studied concurrently.

Before extending to Dr. H. S. Kim of Seoul National University, Korea, an invitation to collaborate on the project, the senior author received assistance on the genus *Pilumnus* from Dr. Masatsune Takeda of the National Museum of Japan.

Introduction

Concerning crabs of the Family Xanthidae, Adams and White (1848) first recorded 11 species from the Philippine Islands, based on the collections made by Cuming and White. They did not show, however, exact localities of collections. Dana (1852 b) described 26 species, of which 20 were new, in his report on collections made by the United States Exploring Expedition. Of 26 species, 25 were from Sooloo (Sulu) Sea or Balabac Straits and one from Manila. A. Milne Edwards (1865) recorded five species, of which four were from the Philippines and one from Sooloo (Sulu) Sea. Miers (1884 b) recorded eight species, of which five were from the Philippines (without precise locality) and one each from Guimaras, Siquijor, and Corregidor islands. Miers (1886) recorded 10 species, of which eight were from Zamboanga, based on collections made by the Challenger Expedition. He described *Pilumnus dehaani* as a new species, but this is a synonym of *Actumnus squamosus* (de Haan, 1835). Odhner (1925) recorded four species, of which two were from Jolo, Sulu Archipelago, and the locality of the third was not shown exactly. He described *Carpilodes caelatus* (=*Liomera caelata*) as a new species. Balss (1933) recorded two species, of which one was from Jolo and the other from Zamboanga, Sulu Archipelago. Buitendijk (1941) recorded *Platypodia corallina* (Alcock, 1898) collected by the Albatross from the Gulf of Davao and she (1960) recorded 11 species, of which two species [*Carpilodes venosus* (H. Milne Edwards, 1834) from near Jolo, Tawitawi off Sulu Archipelago and the Gulf of Davao; *Hypocolpus granulatus* (de Haan, 1837) from Jolo] were collected by the Albatross, and nine species from Sulu Archipelago and four other localities were not collected by the Albatross. Estampador (1937, 1959) listed 47 species, of which 36 species were based on collections of the University of the Philippines and the Bureau of Science, chiefly from Mindoro and Palawan, and 11 were cited from previous literature. The occurrence from Philippine waters of at least five of these is doubtful because they are west American or west Atlantic species. Ward (1941) described 10 new species and two subspecies, proposing one new name, listing 55 previously known species "based on two collections made on coral reefs and beaches and in shallow water along the western coast of the Gulf of Davao [Mindanao]". Garth (1971) described *Demania toxica* from Siaton, Negros Oriental, and (1975) *Demania alcalai* from Dumaguete City, Negros Oriental, both new species. Serène (1971) described *Peleianus suluensis* as a new species from Sulu Sea. Serène and Umali (1972) recorded seven species, of which three were from Sulu Sea, one from Balabac Strait, one from Quezon, Palawan, one from Batangas and one from Sisiman Bay, Luzon.

In reporting on the results of the MUSORSTOM Expedition to the Philippines, March 18–28, 1976, Serène and Vadon (1981) list 12 species of Xanthidae, eight of which are new to the islands: *Paratergatis longimanus* Sakai, *Liomera coelata* (Odhner), *Paramedaeus planifrons globosus* Serène & Vadon, *Crosnierius carinatus* Serène & Vadon, *Miersiella haswelli* (Miers), *Neoxanthias michelae* Serène & Vadon, *Demania intermedia* Guinot, and *Pseudactaea corallina* (Alcock). The Pilumninae of this expedition, still under study, may reveal additional new species.

As a result of examining new material and combining previous records we can say that about 136 species of crabs of the family Xanthidae have been found from Philippine waters, and that the systematic study of this taxon is very incomplete.

The present report deals primarily with xanthid crabs collected by the Albatross from 84 stations of Philippine and adjacent waters during 1908–1909, excluding several specimens recorded by Buitendijk (1941, 1960), and including several

specimens also in the collections of the Smithsonian Institution obtained by various collectors from eight stations in Basilan Strait, Panay Is., Guimaras Is., and Balayan Bay in 1927, 1929, and 1940. The range of the Albatross stations from which the present material was collected extends northward to near Hong Kong and southward to Gillolo I. and Buton Strait, or from 21°33′N. to 4°31′40″S. in latitude, and from 116°15′E. to 129°29′E. in longitude, and from the intertidal zone to a depth of 338 fms. 66 of the 84 stations (78·6%) range in the area of 4°N.–14°N. in latitude and from 119°N.–126°E. in longitude. If we divide the whole area of Albatross stations into three parts: northern (N) (north of Mindoro, approximately 13°30′N.), central (C) (9°N.–13°30′N.) and southern (S) (south of Negros–N. Mindanao, 9°N) (Griffin 1976), N includes 10 stations, C includes 22 stations, and S includes 52 stations. Of the eight stations occupied by non-Albatross collectors, one is included in N, six in C, and one in S.

The Albatross stations from which specimens dealt with in this report were collected are listed in Table 1 (the data are taken from Department of Commerce and Labor Bureau of Fisheries Document No. 741, Government Printing Office, Washington, 1910), which includes 69 numbered stations and 15 unnumbered stations where shore collections were made; only position, date, depth, and character of bottom are given. Depths are given in fathoms (1 fm = 1·829 m); it is convenient to convert fathoms to metres by multiplying by 9 and dividing by 5.

Collectors subsequent to the Albatross whose xanthid material is reported: [University of the Philippines] Zoology I students, Balayan Bay, 1927; H. C. Kellers, Guimaras Island; Iloilo, Panay Island, 1929; W. D. Pierce, Magnanod River, Viejo Victorias, and Cadiz Viejo, Negros Island, 1929; Fred Baker, Basilan Strait, Little Santa Cruz Island, 1940.

All specimens reported, including types of new species, are deposited in the United States National Museum of Natural History (U.S.N.M.), Smithsonian Institution, Washington, D.C. 20560.

In the accounts of known species, only the references, range, material, and remarks in some are given. In the new species, material examined and description are given with figures. The material examined is summarized into the number of males and females, size of carapace (length × width) in mm, and Albatross station. The descriptions employ the system proposed by Dana (1852 b, p. 29) for indicating the areolations of the carapace (i.e., 2F, 4M). As these are familiar to most carcinologists and are available in Rathbun (1930, p. 6, text-fig. 3), they are not repeated here.

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Systematic account

Order DECAPODA
Suborder *REPTANTIA*
Section *Brachyura*
Subsection Brachyrhyncha
Family **XANTHIDAE**
Subfamily ***XANTHINAE***
Genus ***Liomera*** Dana, 1852

Liomera caelata (Odhner, 1925)

Carpilodes caelatus Odhner, 1925, p. 21, pl. 1, fig. 19 [Type locality: China Sea]; Sakai, 1939, p. 475: Buitendijk, 1960, p. 255.

Liomera caelata: Takeda & Koyama, 1974, p. 111, pl. 11, fig. C: Sakai, 1976, p. 397.

Table 1. Stations at which Xanthidae were collected by 'Albatross' during the Philippine expedition, 1908–1909

Station No.	Position	Date	Depth (fathoms)	Character of bottom
	Grand I., China Sea off southern Luzon	Jan. 8 1908		scattered clumps coral
5108	Corregidor Lt., China Sea off southern Luzon (14°05′5″N, 120°19′45″E)	Jan. 15 1908	13	coral
5123	Malabrigo Lt., east coast of Mindoro (13°12′45″N, 121°38′45″E)	Feb. 2 1908	283	green mud
5133	Id. off Panabutan Pt., Sulu Sea, vicinity southern Panay	Feb. 6 1908	38	green mud, sand
5134	Balukbaluk Id., Sulu Archipelago (6°44′45″N, 121°48″E)	Feb. 7 1908	25	fine sand
	Marongas Id., vicinity of Jolo	Feb. 10 1908		scattered coral, sand
	Jolo Id.	Feb. 11 1908		
5136	Jolo Lt., vicinity of Jolo (6°04′20″N, 120°59′20″E)	Feb. 14 1908	22	sand, shell
5137	Jolo Lt., vicinity of Jolo (6°04′25″N, 120°58′30″E)	Feb. 14 1908	20	sand, shell
5138	Jolo Lt., vicinity of Jolo (6°06′N, 120°58′50″E)	Feb. 14 1908	19	sand, coral
5139	Jolo Lt., vicinity of Jolo (6°06′N, 121°02′30″E)	Feb. 14 1908	20	coral sand
5141	Jolo Lt., vicinity of Jolo (6°09′N, 120°58′E)	Feb. 15 1908	29	coral sand
5142	Jolo Lt., vicinity of Jolo (6°06′10″N, 121°02′40″E)	Feb. 15 1908	21	coral sand, shell
5144	Jolo Lt., vicinity of Jolo (6°05′50″N, 121°02′15″E)	Feb. 15 1908	19	coral sand
5145	Jolo Lt., vicinity of Jolo (6°04′30″N, 120°59′30″E)	Feb. 15 1908	23	coral sand, shell
5146	Sulade Id., Sulu Archipelago (5°46′40″N, 120°48′50″E)	Feb. 16 1908	24	coral sand, shell
5147	Sulade Id., Sulu Archipelago (5°41′40″N, 120°47′10″E)	Feb. 16 1908	21	coral sand, shell
5149	Sirun Id., Sulu Archipelago (5°33′N, 120°42′10″E)	Feb. 18 1908	10	coral, shell
5151	Sirun Id., Sulu Archipelago (5°24′40″N, 120°27′15″E)	Feb. 18 1908	24	coral sand, shell
5152	Pajumajan Id., Sulu Archipelago (5°22′55″N, 120°15′45″E)	Feb. 18 1908	34	white sand
5157	Tinaka Id., Sulu Archipelago (5°12′30″N, 119°55′50″E)	Feb. 21 1908	18	fine sand
5158	Tinakta Id., Sulu Archipelago (5°12′N, 119°54′30″E)	Feb. 21 1908	12	coarse sand, shell
5159	Tinakta Id., Sulu Archipelago (5°11′50″N, 119°54′E)	Feb. 21 1908	10	coral sand

Station No.	Position	Date	Depth (fathoms)	Character of bottom
5160	Tinakta Id., Sulu Archipelago (5°12′40″N, 119°55′10″E)	Feb. 22 1908	12	sand
	Tawi Tawi, Papitag Id.	Feb. 23 1908		shore
5163	Observation Id., Sulu Archipelago (4°59′10″N, 119°51′E)	Feb. 24 1908	28	coral sand
5164	Observation Id., Sulu Archipelago (5°01′40″N, 119°52′20″E)	Feb. 24 1908	18	green mud
5165	Observation Id., Sulu Archipelago (4°58′20″N, 119°50′30″E)	Feb. 24 1908	9	coral
5168	Observation Id., Sulu Archipelago (4°56′30″N, 119°45′40″E)	Feb. 25 1908	80	coral sand
5174	Jolo Lt., vicinity of Jolo (6°03′45″N, 120°57′E)	Mar. 5 1908	20	coarse sand
5179	Romblon Lt., vicinity of Romblom (12°38′15″N, 122°12′30″E)	Mar. 25 1908	37	hard sand
	Romblon	Mar. 26 1908		(150 ft. seine)
	Guijulugan (beach), Tanon Strait, east coast of Negros	Apr. 2 1908		sand, gravel, grassy
5209	Taratara Id., off western Samar (11°45′25″N, 124°48′05″E)	Apr. 14 1908	20	green mud
	Catbalogan (Pamuntangan Reef), off western Samar	Apr. 14 1908		soft coral, sand
5214	Palanog Lt., East of Masbate Id. (12°25′18″N, 123°37′15″E)	Apr. 21 1908	218	green mud
5218	Anima Sola Id., between Burias and Luzon (13°11′15″N, 123°02′45″E)	Apr. 22 1908	20	coarse sand
5235	Nagubat Id., east coast of Mindanao (9°43′N, 125°48′15″E)	May 9 1908	44	soft mud
5243	Uanivan Id., Pujada Bay and vicinity (6°50′55″N, 126°14′35″E)	May 15 1908	218	grey mud
5249	Lanang Pt., Gulf of Davao (7°06′06″N, 125°40′08″E)	May 18 1908	23	coral, sand
5250	Linao Pt., Gulf of Davao (7°05′07″N, 125°39′45″E)	May 18 1908	23	coral, sand
5251	Linao Pt., Gulf of Davao (7°05′12″N, 125°39′35″E)	May 18 1908	20	coral
5253	Linao Pt., Gulf of Davao (7°04′48″N, 125°39′38″E)	May 18 1908	28	coral
5254	Linao Pt., Gulf of Davao (7°05′42″N, 125°39′42″E)	May 18 1908	21	sand, coral
	Davao Bay	May 18 1908		(from pearl oyster)
	Zamboanga (West-end Little Sta. Cruz. Id., reef)	May 26 1908		soft coral, coral heads

Station No.	Position	Date	Depth (fathoms)	Character of bottom
5276	Malavatuan Id., China Sea, vicinity southern Luzon (13°49′15″N. 120°14′45″E)	July 17 1908	18	shell, pebbles, sand
5310	China Sea, vicinity Hong Kong (21°33′N, 116°13′E)	Nov. 4 1908	100	sand, shell
5311	China Sea, vicinity Hong Kong (21°33′N, 116°15′E)	Nov. 4 1908	88	coarse sand, shell
5321	Ibugos Id., China Sea, vicinity Formosa (20°19′30″N, 121°51′15″E)	Nov. 9 1908	26	white sand, coral, broken shell
5325	Hermanos Id., off northern Luzon (18°34′15″N, 121°51′15″E)	Nov. 12 1908	224	green mud
	Linapacan Id., Malcochin Harbor, Linapacan Strait	Dec. 19 1908		sand, coral
5355	Balabac Lt., North Balabac Strait (8°08′10″N, 117°19′15″E)	Jan. 5 1909	44	coral, sand
5358	Sandakan Lt., Jolo Sea (6°06′40″N, 118°18′15″E)	Jan. 7 1909	39	mud
5360	Corregidor Lt., Manila Bay (14°21′N, 120°41′E)	Feb. 7 1909	12	hard
5373	Tayabas Lt., Marinduque Id. (13°40′N, 121°31′10″E)	Mar. 2 1909	338	soft mud
	San Pascual, Burias Id.	Mar. 8 1909		
5401	Tanguingui Id., North of Cebu (11°24′45″N, 124°06′E)	Mar. 16 1909	30	fine sand
5402	Capitancillo Id., between Leyte and Cebu (11°11′45″N, 124°15′45″E)	Mar. 16 1909	188	green mud
5406	Ponson Id., Dupon Bay and vicinity (10°49′03″N, 124°22′30″E)	Mar. 17 1909	298	mud
5426	30th of June Id., Eastern Palawan (9°12′N, 118°28′E)	Apr. 3 1909	27	fine grey sand
5442	S. Fernando Pt. Lt., west coast of Luzon (16°30′36″N, 120°11′06″E)	May 10 1909	45	coral sand
	Port Palapag	June 3 1909		
	Batan Id., east coast of Luzon	June 5 1909		tide pool
5453	Legaspi Lt., east coast of Luzon (13°12′N, 123°49′18″E)	June 7 1909	146	
5482	Cabugan Grande Id., between Samar and Leyte (10°27′30″N, 125°18′E)	July 30 1909	67	broken shell, sand, green mud
5483	Cabugan Grande Id., between Samar and Leyte (10°27′30″N, 125°19′15″E)	July 30 1909	74	sand, broken shell
	Mahinog, Camiguin Id., between Leyte and Mindanao	Aug. 3 1909		sand, coral
5517	Pt. Tagolo Lt., northern Mindanao (8°45′30″N, 123°33′45″E)	Aug. 9 1909	169	Globigerina

Station No.	Position	Date	Depth (fathoms)	Character of bottom
5518	Pt. Tagolo Lt., northern Mindanao (8°48′N, 123°31′E)	Aug. 9 1909	200	grey mud, Globigerina
5519	Pt. Tagolo Lt., northern Mindanao (8°47′N, 123°31′15″E)	Aug. 9 1909	182	Globigerina, sand
5536	Apo Id., between Negros and Siquijor (9°15′45″N, 123°22′00″E)	Aug. 19 1909	279	green mud
5543	Tagolo Lt., northern Mindanao (8°47′15″N, 123°35′00″E)	Aug. 20 1909	162	sand
5554	Cabalian Pt. (Jolo), Jolo Id. (5°52′27″N, 120°52′18″E)	Sep. 18 1909	25	coral, sand
5555	Cabalian Pt. (Jolo), Jolo Id. (5°51′15″N, 120°58′35″E)	Sep. 18 1909	34	coarse sand
5557	Cabalian Pt., Jolo Id. (5°51′30″N, 121°01′00″E)	Sep. 18 1909	13	sand, coral
5558	Cabalian Pt., Jolo Id. (5°51′33″N, 121°00′58″E)	Sep. 18 1909	15	coral
5559	Cabalian Pt., Jolo Id. (5°51′36″N, 121°00′45″E)	Sep. 18 1909	13	coral
5617	Ternate Id., Dodinga Bay, Gillolo Id. (00°49′30″N, 127°25′30″E)	Nov. 27 1909	131	
5626	Kayoa Id., between Gillolo and Kayoa Is. (0°07′30″N, 127°29′00″E)	Nov. 29 1909	265	grey mud, fine sand
5640	Labuan Blanda Id., Buton Strait (4°27′00″S., 122°55′40″E)	Dec. 13 1909	24	sand, broken shell
5641	Kalono Pt., Buton Strait (4°29′24″S., 122°52′30″E)	Dec. 14 1909	39	sand, shell
5642	Tikola Peninsula, Buton Strait (4°31′40″S., 122°49′42″E)	Dec. 14 1909	37	grey mud
	Makasser Id., Buton Strait	Dec. 16 1909		tide pool

Range: China Sea; Sulu Is.; Saparoea Is. (Amboina); Torres Strait; Kei Is.; Bonin Is., Yoron Is., Ishigaki Is., Kii Peninsula, Japan. 10–41 fms.

Material: 1 young ♂ (3·4 × 5·6 mm), Guimares Is., Philippines, May 12, 1929, H. C. Kellers.

Genus ***Euxanthus*** Dana, 1851

Euxanthus herdmani Laurie, 1906

Euxanthus herdmani Laurie, 1906, p. 400, pl. 1, figs. 9, 9 a [Type locality: Manaar, Ceylon]; Guinot, 1967 b, p. 557, fig. 29 a, b.

Range: Sri Lanka.

Material: 2 carapaces (12·7 × 17·5 mm, 13·7 × 19·0 mm), Mahinog, Camiguin Is., Aug. 3, 1909, tide pool.

Remarks: 2M and 5L are prominent.

Genus *Leptodius* A. Milne Edwards, 1863

Leptodius exaratus (H. Milne Edwards, 1834)

Chlorodius exaratus H. Milne Edwards, 1834, p. 402.
Xantho (Leptodius) exaratus: Alcock, 1898, p. 118; Estampador, 1937, p. 525; 1959, p. 79; Balss, 1938a, p. 41; Sakai, 1939, p. 464, pl. 58, fig. 3, pl. 91, fig. 1.
Leptodius exaratus: A. Milne Edwards, 1873a, p. 222; Henderson, 1893, p. 362; de Man, 1895, p. 521; Lanchester, 1900, p. 738; Balss, 1922, p. 127; Yokoya, 1933, p. 189; Sakai, 1934, p. 309; 1965b, p. 140, pl. 70, fig. 6; 1976, p. 423, pl. 153, fig. 1; Forest and Guinot, 1961, fig. 54 (p. 62); Edmondson, 1962, p. 242; Kim, 1970, p. 14; 1973, p. 380, 630, text-fig. 381, pl. 82, fig. 109.
Xantho (=Leptodius) exaratus: Gordon, 1934, p. 29, fig. 166; Stephenson, 1945, p. 149.

Range: This species ranges widely throughout the warmer regions of the Indo-Pacific, from the Red Sea and the east coast of Africa northward to Korea and Japan and eastward to Hawaii, between high and low tidal marks.

Material: 1 chela, Zamboanga, Mindanao, May 26, 1908; 1 ♀ (12·6 × 19·6 mm), Negros, the Philippines, Apr. 11, 1929, W. D. Pierce; 1 ♂ (8·6 × 12·6 mm), Cadiz Viejo, Negros, the Philippines, Jun. 5, 1929, W. D. Pierce.

Genus *Neolioxantho*, gen. nov.

Type species: *Lioxantho latifrons* Rathbun, 1911.

Etymology: The name *Neolioxantho* is composed of *Neo* (neos, Gr.: new) and *Lioxantho* Alcock, 1898 [lio (leios, Gr.: smooth) + xantho (xanthos, Gr.: yellow)]; its gender is masculine.

Diagnosis: Carapace broad and ovoid, flat in posterior half, convex anteriorly, smooth, punctate, regions well or faintly indicated. Fronto-orbital region marked off by a groove, breadth more than half as great as width of carapace. Front bilobed, lobes separated by a broad, V-shaped emargination, convex and fused with the supra-orbital angles. Width of front a little more or less than one-third width of carapace. Anterolateral border divided into four lobes, the first and second slightly arcuate and almost coalescent, the third and fourth projecting slightly as blunt teeth. Chelipeds nearly equal in both sexes, the surface smooth and glossy to the naked eye, fingers grooved and pointed. Ambulatory legs without hairs or spines, propodus and dactylus cylindrical and furrowed. Abdomen of male seven-segmented, third to fifth segments fused. First pleopod of male provided with long plumose hairs near distal end and several rows of short conical spines more proximally. This pleopod is different from those of *Lachnopodus* species and more nearly resembles those of *Xanthias* species.

Remarks: The genus *Lioxantho* was established by Alcock in 1898; however, of the species then or subsequently placed in *Lioxantho*, most were transferred to other genera: *Lioxantho punctatus* (H. Milne Edwards, 1834) (Alcock, 1898; Nobili, 1906b; Klunzinger, 1913; Bouvier, 1915; Balss, 1924) to *Xanthias* Rathbun, 1897 (Balss, 1924, Forest and Guinot, 1961), *Lioxantho subacutus* (Stimpson, 1858) (=*Lioxantho tumidus* Alcock, 1898) (Nobili, 1906b; Klunzinger, 1913; Bouvier, 1915; Ward, 1934) and *Lioxantho laevidorsalis* (Miers, 1886) (=*Xantho bidentatus* A. Milne Edwards, 1867) (Ward, 1934) to *Lachnopodus* Stimpson, 1858 (Forest and Guinot, 1961). Guinot (1968, p. 718) mentioned that *Lioxantho*, of which the type-species is *Lioxantho tumidus* Alcock, 1898, a synonym of *Lioxantho subacutus* (Stimpson, 1858), by subsequent designation of Ward (1934, p. 12), was synonymous with *Lachnopodus*, thereby leaving at least one species subsequently referred to

Lioxantho, *L. latifrons* Rathbun, 1911 (Serène 1968, p. 77), and the proposed new species without an applicable generic name.

In describing *Lioxantho latifrons*, Rathbun (1911, p. 213) said, 'not a typical *Lioxantho* because the fronto-orbital breadth is more than half as great as width of carapace'. All species of *Lachnopodus* as presently recognized (*cf.* Guinot, 1971, p. 1069) have a narrow fronto-orbital border and bear hairs and spines on the ambulatory legs; on the other hand, *Lioxantho latifrons* Rathbun, 1911 and the proposed new species have a wide fronto-orbital border and lack hairs and spines on the ambulatory legs. We are therefore establishing a new genus, '*Neolioxantho*' to accommodate them.

Neolioxantho asterodactylus, sp. nov.

Fig. 1

Material: 1 male (HOLOTYPE), (U.S.N.M. 195342), St. 5558 (Jolo I. and vicinity, 5°51′38″N, 121°00′58″E); Sept. 18, 1909; 15 fms, coral.

Measurements: Male HOLOTYPE, length of carapace 6·2 mm, width of carapace 10·1 mm, of fronto-orbit 5·9 mm, of front 3·2 mm, length of propodus of cheliped 7·0 mm, of dactylus 3·6 mm, height of palm 3·1 mm.

Description: Carapace flat in posterior half, convex anteriorly, the part behind mesogastric region (3M) depressed, smooth and glossy, punctate, especially distinct punctae occurring along interregional grooves. Regions except the hepatic well indicated: fronto-orbital region (1F, 2F and 0) marked by a groove; 1M, 2M and 3M well defined; 3M narrow, especially its anterior prolongation; 4M hardly defined; 1L, 2L and 3L confluent; 4L and 5L confluent; 6L defined, a groove passing obliquely inward from the notch between second and third lobes of anterolateral margin about two thirds of the distance to the protogastric region (2M); 1P and 2P hardly defined; 1R, 2R and 3R confluent.

Front bilobed, lobes separated by a broad and deep emargination and fused with the supraorbital angles, lateral lobules indistinct; each frontal lobe convex, its inner portion more produced, a shallow groove behind the margin. Width of front a little less than one-third width of carapace; fronto-orbital breadth more than half as great as width of carapace. Supraorbital border almost smooth, a trace of fissure present at middle, its outer part formed by a low ridge distinctly marked off from the carapace by a groove, a small extraorbital lobe with minute granules present. Infraorbital border granulated, inner part projecting and rounded, outer part also projecting, nodular; these projections visible in dorsal view.

Anterolateral border of carapace covered with minute granules and divided into four lobes, the first and second slightly arcuate and almost coalescent, the third and fourth projecting slightly as blunt teeth, the former larger than the latter. Posterolateral border as long as anterolateral, very slightly convex, covered with minute granules. Posterior border wider than front.

Thoracic sternum smooth and glossy, with punctae.

Chelipeds stout and nearly equal, smooth and glossy to the naked eye, but covered with microscopically fine granules; arm short and thick, not entirely concealed under the carapace but distal and outer portion exposed beyond carapace, its upper border somewhat crest-like, without subterminal tooth; wrist stout and unarmed, bluntly angled within; upper and lower border of palm round, a shallow longitudinal groove on its outer surface just below upper margin; movable finger longer than upper margin of palm; six longitudinal grooves on its surface from

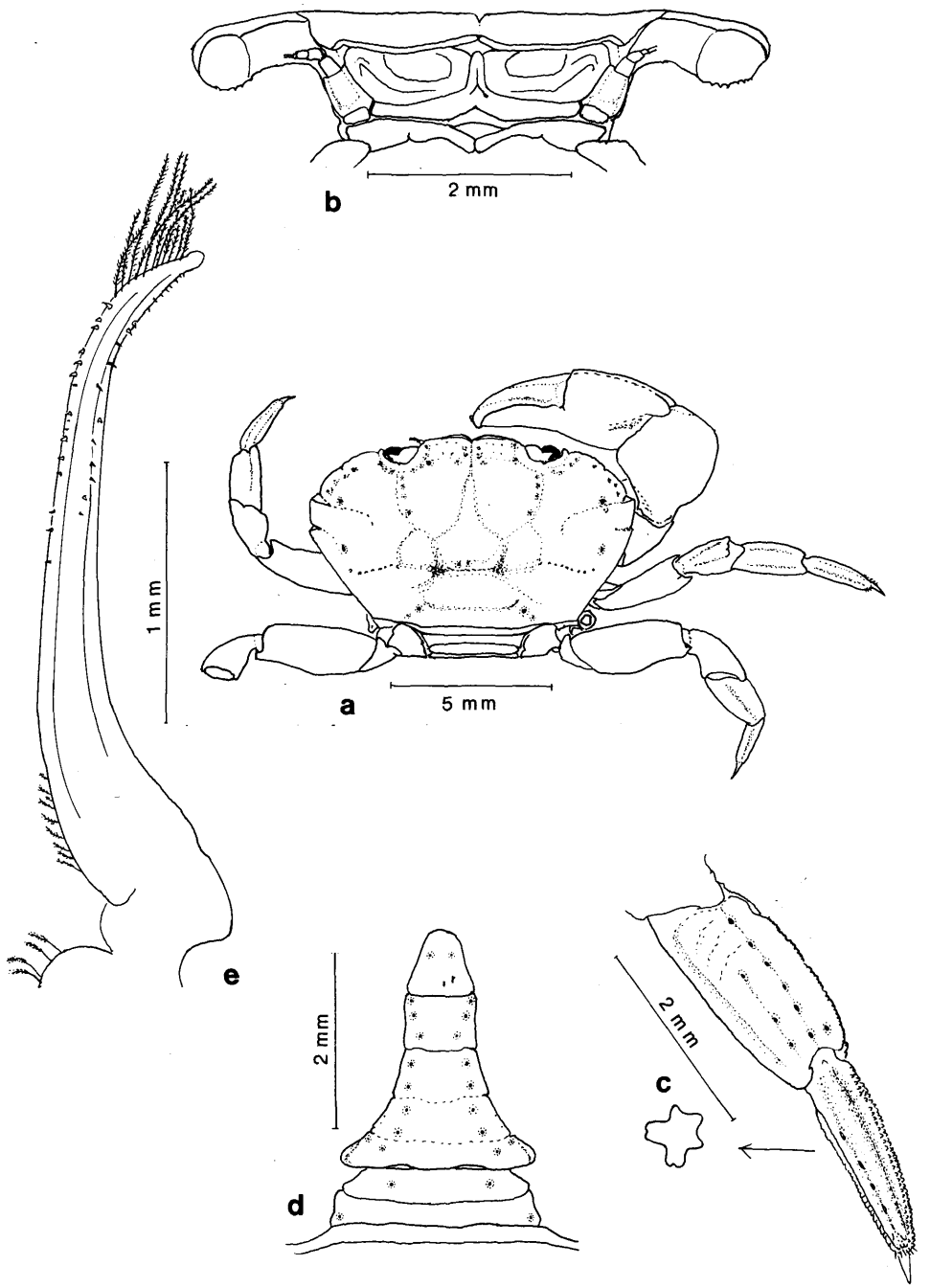

FIG. 1. *Neolioxantho asterodactylus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view: *c*, propodus and dactylus of walking leg; *d*, abdomen; *e*, first pleopod.

proximal end to tip: two on upper surface, two on outer surface and two on inner surface, provided with six teeth on the cutting edge of which the most proximal one is very small; five longitudinal grooves on the surface of immovable finger, seven teeth on the cutting edge of which the most proximal and distal ones are very small; tips of both fingers bluntly pointed, crossing each other, and leaving no gap when the fingers are closed.

Of ambulatory legs the left second, right second and third pair missing. Legs smooth and glossy to the naked eye, the fourth shorter, wider, and flatter than first, which is rather cylindrical; first leg covered with microscopically fine granules, merus unarmed, carpus with a blunt terminal tooth on anterior border and a longitudinal shallow groove on the middle of upper surface; propodus cylindrical, with a longitudinal wide and deep groove on anterior and posterior surfaces, their proximal ends not reaching proximal end of propodus but passing the mid-point, a longitudinal punctate shallow groove on upper surface and a longitudinal ridge on under surface; dactylus longer than propodus, its surface covered with minute granules, provided with five longitudinal grooves of which the one on upper surface is widest and deepest, the two lower grooves shallow, and anterior and posterior ones medium; a horny claw with rather large conical granules and setae near proximal portion; fourth leg of same structure as first.

Abdomen smooth and glossy; third to fifth segments fused, suture lines recognizable; first and third very wide, of equal width, second segment narrower; every segment punctate near outer borders.

First pleopod of male provided with 11 long plumose hairs near distal end and several rows of short conic spines more proximally.

The proposed new species is very close to *Lioxantho latifrons* Rathbun, 1911, from which it differs in the following characters:

Regions of carapace well indicated.

Arm without subterminal tooth.

Movable finger longer than upper margin of palm.

Carpus of ambulatory legs except 4th with a blunt terminal tooth on anterior border.

Remarks: The name *asterodactylus* [astero (aster, L.: a star)+dactylus (L.: finger)] is based upon 'the cross section of the dactyli of the legs is aster form'.

Genus ***Euryxanthops***, gen. nov.

Type species: *Eurypanopeus orientalis* (Sakai, 1939).

Etymology: The name *Euryxanthops* is composed of Eury (eurys, Gr.: wide) and xanthops (xanthos, Gr.: yellow) (opsis, Gr.: like). The gender of *Euryxanthops* is masculine.

Diagnosis: Carapace transversely subovate, length a little more than two thirds width; convex; surface naked and smooth to the naked eye, regions well defined. Fronto-orbital border more or less half and front a third or little more than a third width of carapace. Front produced beyond outline of carapace, divided into two lobes by an indistinct or obscure notch. Anterolateral border divided into four lobes, extremely crested and upturned; the first low, very broad, and completely fused with the external orbit angle (i.e., comprising first and second of the customary five anterolateral teeth). Posterolateral border slightly longer than anterolateral. Basal

antennal segment rather broad, inner angle touching ventral prolongation of the front. Chelipeds markedly unequal in both sexes; fingers acute. Anterior border of merus, carpus, and propodus of ambulatory legs sharply crested. First pleopod of male slightly or greatly curved and tapering, with or without several long setae near tip, and with several rows of conic spines over most of surface.

Remarks: With the exception of *Eurypanopeus orientalis* Sakai, described from Japan in 1939, and the closely related new species, described below, all the known species of the genus *Eurypanopeus* A. Milne Edwards, 1880 (Rathbun 1930, p. 403) occur on the east and west coasts of America. However, the structure of the male first pleopod of the oriental species differs absolutely from that of the occidental species, the front of the oriental species projects more strongly than in the occidental species, and the anterior border of the ambulatory legs is carinated, to mention only the most apparent distinctions. We therefore are establishing a new genus '*Euryxanthops*' to accommodate the oriental species formerly referred to *Eurypanopeus*.

Euryxanthops orientalis (Sakai, 1939), comb. nov.

Eurypanopeus orientalis Saki, 1939, p. 453, text-fig. 24 [type locality: Misaki, Japan]; 1965, p. 132, pl. 68, fig. 1; 1976, p. 434, text-fig. 228.

Range: Japan—Sagami Bay, Kii Minabe, Tosa Bay.

Material: 1 ♀ (19·2 × 27·9 mm), Sta. 5243; 1 ♂ (10·1 × 14·2 mm), Sta. 5453.

Remarks: First pleopod of male curved and tapering, several rows of conic spines covering almost entire surface, without long setae near tip.

Euryxanthops dorsiconvexus, sp. nov.

Fig. 2

Material examined: 1 (holotype) (U.S.N.M. 195343), 1 ♂, 2 ♀ (paratypes), Sta. 5406 (Vicinity of Ponson River, 10°49′03″N, 124°22′30″E), Mar. 17, 1909, 298 fms. mud.

Measurements: HOLOTYPE male, length of carapace 14·5 mm, breadth of carapace 19·7 mm, of front 5·8 mm, of fronto-orbit 10·0 mm, length of propodus of cheliped (right) 13·5 mm, of dactylus 7·0 mm, height of palm 6·3 mm; PARATYPE (Sta. 5406): 1 male, 12·1 × 16·4 mm, 2 females, 9·8 × 13·9 mm and 12·1 × 15·8 mm.

Description of HOLOTYPE: Carapace transversely subovate, naked and smooth to naked eye, but covered with microscopically fine granules; the dorsal surface slightly convex from side to side and in posterior half, much convex anteriorly. Regions indicated by shallow and rather smooth grooves as follows: fronto-orbital region (1F, 2F, 0) marked by a shallow depression, gastric region marked by shallow grooves and 1M, 2M, 3M and 4M defined without difficulty, anterior prolongation of 3M narrow and long and well marked, 2M without subdivision; 1L depressed, 2L and 3L confluent, 4L depressed, 5L and 6L scarcely defined, 1R, 2R and 3R confluent, 1P and 2P almost confluent.

Front produced beyond general outline of carapace, divided into two lobes by a very small and obscure notch, appearing almost entire, each lobe slightly convex and laterally deeply separated from prominent supraorbital angle; frontal margin provided with minute granules, 1F covered with granules larger than those on margin. Supraorbital border provided with granules, with closed fissures, infra-orbital border granulated, bearing a deep notch near external orbital angle, which is not produced, its inner part projecting much and visible in dorsal view.

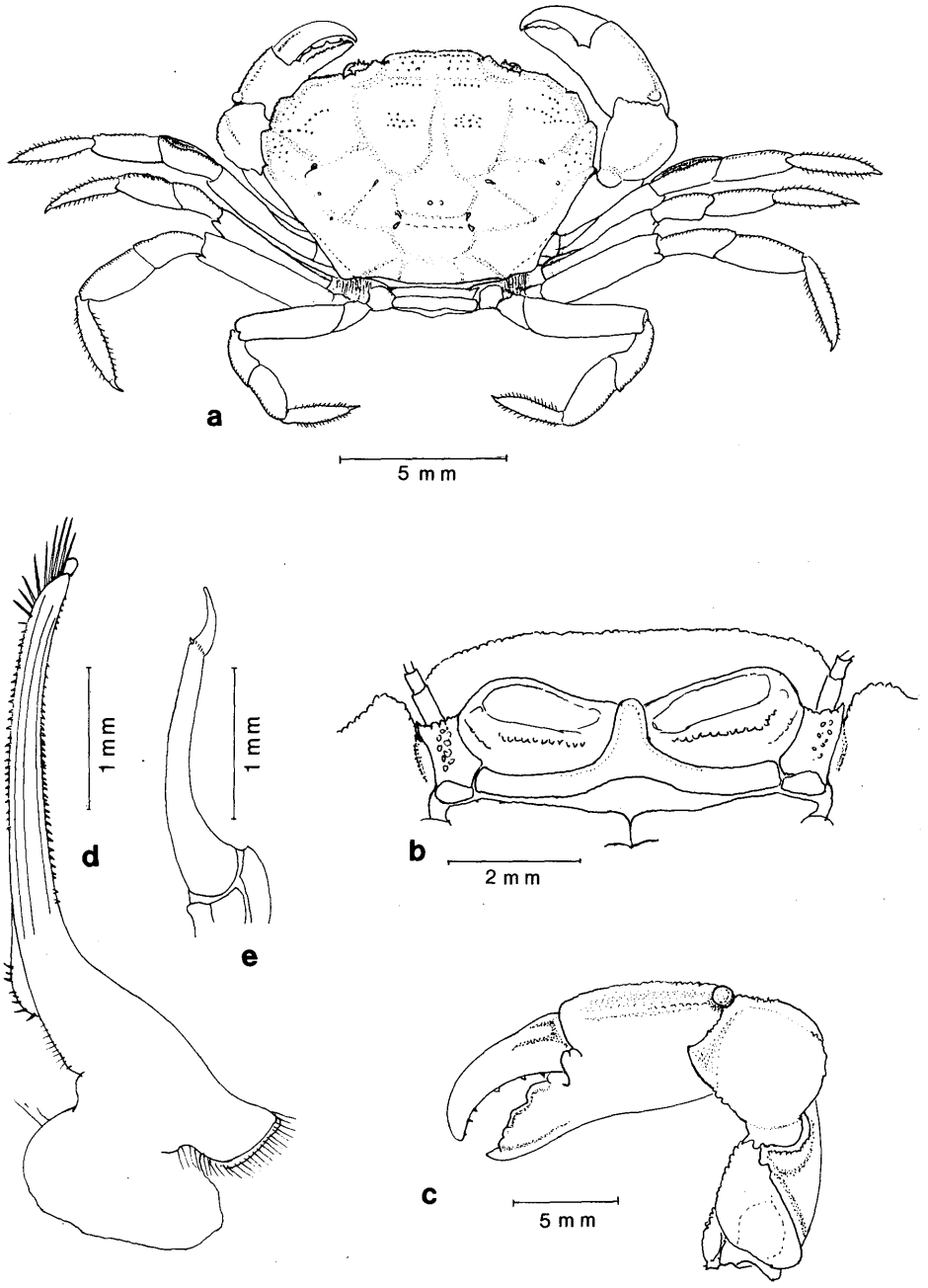

FIG. 2. *Euryxanthops dorsiconvexus*, sp. nov., female paratype: *a*, dorsal view; male holotype: *b*, frontal view; *c*, right chela; *d*, first pleopod; *e*, second pleopod.

Eyestalk with three tubercles. Basal antennal segment provided with granules, its inner part just touching the prolongation of the front; second and third segments rather thin, the former thicker and longer than the latter; antennal flagellum about one and one-half times the major diameter of the orbit.

Anterolateral border of the carapace covered with minute granules and divided into four lobes, externally crested and upturned; first lobe largest, completely fused with external orbital angle and somewhat convex; second and third lobes subequal in size and of like form, projecting slightly, anterior slope much shorter than posterior and each slope almost straight, last one smallest, tip round. Posterolateral border very slightly convex, slightly longer than the anterolateral border. Posterior border very slightly convex.

Ventral surface of carapace covered with minute granules. Thoracic sternum covered with very fine granules. Abdomen rather smooth, third to fifth segments fused, but their border lines recognizable, lateral borders of third segment projecting in triangular form, wider than first segment.

Chelipeds markedly unequal, covered with minute granules, the right one stouter than the left. Merus of right cheliped short, its inner surface smooth and slightly concave, upper border sharply crested, with a terminal blunt tooth, a deep notch between them; wrist enlarged, surface uneven, bearing a large and a very small tooth at inner angle; palm very high, upper border bearing two parallel indistinct longitudinal ridges enclosing a longitudinal flat surface, lower border round and smooth; immovable finger broad and short, cutting edge with six teeth of which middle two are large, beside these one small tooth situated at inner proximal portion; movable finger longer than immovable one, its upper border strongly arcuate and with a blunt longitudinal ridge at proximal portion, cutting edge with six irregular teeth of which the basal one is dominantly enlarged and directed backward. Left cheliped of almost same form as right one but fingers thinner, teeth sharply triangular, immovable finger armed with five major teeth and about five minor ones of variable sizes, cutting edge of movable finger consisting of five low, thin and sharp major teeth.

Ambulatory legs, of which the right first and second are missing from the type specimen, covered with minute granules. Merus with anterior border sharply crested and posterior border tomentose at proximal half, provided with two longitudinal inconspicuous ridges through its entire length, border appearing flat; anterior and posterior border of carpus and propodus sharply crested, anterior and posterior border of propodus and whole surface of dactylus covered with velvety tomentum.

First pleopod of male slightly curved and tapering, provided with nine long setae near tip, a scoop-like sheath extending beyond it, and several rows of conic spines over almost entire surface. Second pleopod short, its tip spine-like.

Paratypes collected from same station as the holotype, when compared with holotype have no remarkable variable characteristics except size and sex. Colour in alcohol after many years rosy pink.

Remarks: The present new species is closely related to *Euryxanthops orientalis* (Sakai, 1939) from Japan, but differs from that species in having the dorsal surface of the carapace remarkably convex, the front less projecting, the lobes of the anterolateral border of the carapace lower, and the male first pleopod with nine long setae near the tip.

The name *dorsiconvexus* [dors (dorsum, L.: the back) + convexus (L.: convex)] is based upon 'the dorsal surface of the carapace is convex'.

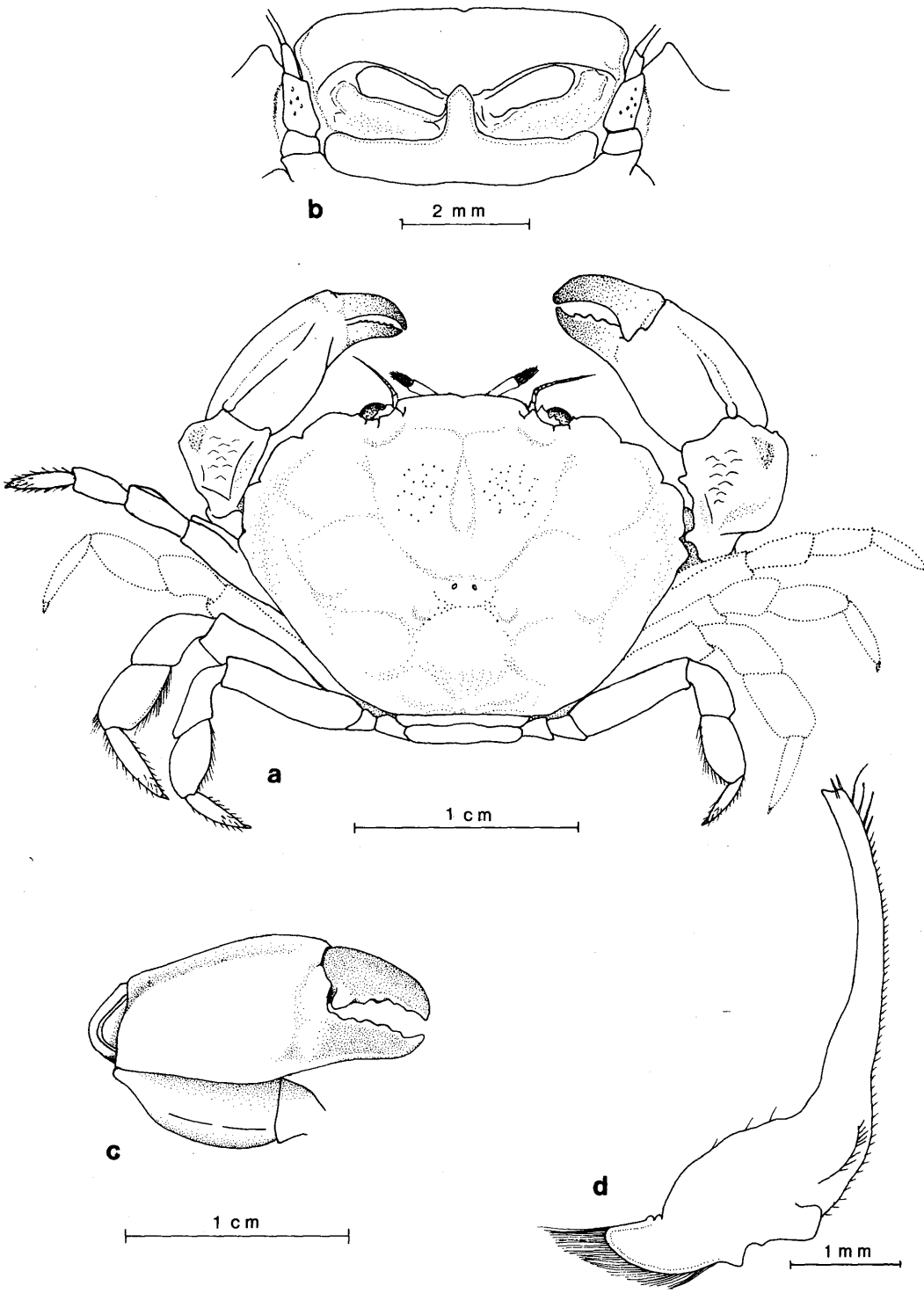

FIG. 3. *Euryxanthops flexidentatus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view; *c*, right cheliped; *d*, first pleopod.

Euryxanthops flexidentatus, sp. nov.

Fig. 3

Material examined: 1 (HOLOTYPE), (U.S.N.M. 19345), Sta. 5519, off Pt. Tagalo Lt., northern Mindanao, (8°47′N, 123°31′15″E); Aug. 9, 1909, 182 fms; Globigerina, sand.

Measurements: HOLOTYPE male, length of carapace 14·4 mm, breadth of carapace 20·2 mm, of fronto-orbit 10·0 mm, of front 5·7 mm, length of major chela 13·5 mm, of dactylus 6·4 mm, height of palm 6·8 mm.

Description of HOLOTYPE: Carapace transversely subovate, smooth to the naked eye, microscopically granulate, slightly convex from side to side and posteriorly, strongly convex anteriorly. Regions well defined by shallow, smooth grooves as follows: fronto-orbital (1F, 2F, 0) depressed, anterior protogastric (1M, 2M) separate and distinct, each with a short, transverse, granulate ridge, anterior prolongation of 3M especially apparent, posterior gastric (4M) not clearly separable from mesogastric (3M); of the anterolateral, 2L and 3L fused, surmounted with a continuous granulate ridge, 5L prominent, rounded.

Front produced beyond general outline of carapace, divided into two shallow lobes by a slight median emargination, rather than a notch, each lobe slightly convex and separated laterally from supraorbital angle by a U-shaped notch, margin minutely granulate with larger granules submarginally. Inner supraorbital angle sharp (the left broken in the type specimen), supraorbital border granulated, two closed fissures in outer half, inner fissure more prominent; infraorbital border granulate, external angle not produced, margin following contour of retracted eye, internal angle prominent, dorsally visible, and nearly as advanced as outer margin of front. Eyestalk with two or three sharp tubercles. Basal antennal article barely reaching downward projection of front; antennal flagellum lodged in orbital hiatus. External maxilliped with merus rectangular, anteroexternal angle produced, anterior margin rounded, setose.

Anterolateral border cut into four lobes, strongly crested and upturned; first lobe largest, completely fused with external orbital angle, anterior slope almost horizontal, posterior slope arcuate; second and third lobes subequal, anterior slopes successively shorter than straight or slightly concave posterior slopes; fouth tooth smallest, tip rounded. Posterolateral border shorter than anterolateral, sides slightly concave.

Chelipeds unequal, the right the larger in the type specimen, minutely granulate, granules of carpus in a reticulating pattern. Merus of right cheliped short, concealed beneath carapace, anterior margin strongly cristate, a distinct tooth distally and a deep notch between. Carpus swollen, rounded and grooved externally, a cristate triangular projection internally with a sharp tooth beneath it, surface reticulate. Manus high, superficially smooth, microscopically granulate, two crests above with a longitudinal groove between, external surface with transverse striations, lower margin sinuous. Fingers pointed, meeting without gape, tips crossing; immovable finger short and broad, cutting edge with six teeth, the middle two larger; movable finger longer, strongly downcurving, ridged, with five teeth, the basal tooth enlarged and backward-pointing. Left cheliped resembling right but smaller, fingers thinner, straighter, more pointed, ridges stronger, teeth smaller and sharper. Light brown colour of fingers not extending onto palm of either hand.

Ambulatory legs minutely granulated, sharply cristate. Merus sharply crested anteriorly, tomentose posteriorly and proximally; carpus and propodus broad,

crested anteriorly, carpus of leg one also ridged medianly; propodus and dactylus tomentose. The left fourth leg of the holotype is less robust than the others; this is not borne out by the merus of the right fourth leg (the only portion of any of the walking legs on the right side of the type specimen remaining), suggesting that the left fourth leg has regenerated.

Male abdomen smooth, segments 3–5 fused but borders distinct, widest at segment 3, third segment projecting laterally in triangular form, segment one narrower, segment 7 broader triangular, angles rounded.

Male first pleopods (both left and right) with tips broken, but of a form consistent with the genus.

Remarks: As compared with *Eurypanopeus orientalis* Sakai (here brought to *Euryxanthops*): (1) The fused first and second tooth of the anterolateral border is not straight but arcuate. (2) The carapace is more strongly convex fore and aft. (3) The carpus of the cheliped shows a reticulate pattern of granulations. (4) The upper border of the palm of the cheliped has two longitudinal ridges separated by a groove. (5) The outer angle of the infraorbital border is not dentiform but low and rounded.

As compared with *Euryxanthops dorsiconvexus*, sp. nov.: (1) The ambulatory legs are more sharply crested on their anterior borders. (2) The second tooth on the carpus of the cheliped is larger and more prominent. (3) The fused first and second anterolateral tooth is more sharply angled at its midpoint. (4) The front is more strongly produced, especially at its lateral angles, and more distinctly bilobate. (5) The pink colouring of the carapace is absent.

The name *flexidentatus* [flexi (flexus, L.: turned) + dentatus (L.: toothed)] is based upon 'The lobes of the anterolateral border are strongly crested and upturned'.

Genus ***Parapanope*** de Man, 1895

Parapanope euagora hexacarapas, subsp. nov.

Fig. 4 a, b

Material examined: 1 ♂ (HOLOTYPE) (U.S.N.M. 73168), Iloilo, Panay I., Philippines, May 3, 1929, H. C. Kellers.

Measurements: HOLOTYPE male, length of carapace 7·8 mm, breadth of carapace 10·0 mm, of fronto-orbit 5·8 mm, of front 2·8 mm, length of manus of cheliped 5·2 mm, of dactylus 3·9 mm, height of palm 2·5 mm.

Description: Outer surface of whole body covered with a dense, extremely short, branny or velvety pubescence.

Carapace hexagonal, the dorsal surface slightly convex from side to side and in posterior half, much more convex anteriorly; regions well defined and tumid, smooth and without granules.

Front prominent beyond the orbits and separated from them by a shallow notch; divided by a medium v-shaped notch into two lobes, each having its anterior margin concave; outer angle of each lobe rounded; anterior margin and dorsal surface of front smooth and without granules. Supraorbital border provided with two closed fissures, without granules; infraorbital border bearing a deep notch near external orbital angle, this angle very low, without granules, its outer part less projecting, round, scarcely visible in dorsal view, its inner part more projecting and visible in dorsal view.

Basal antennal segment without granules, its inner part touching the prolongation of the front: second and third segment rather thin and almost same size.

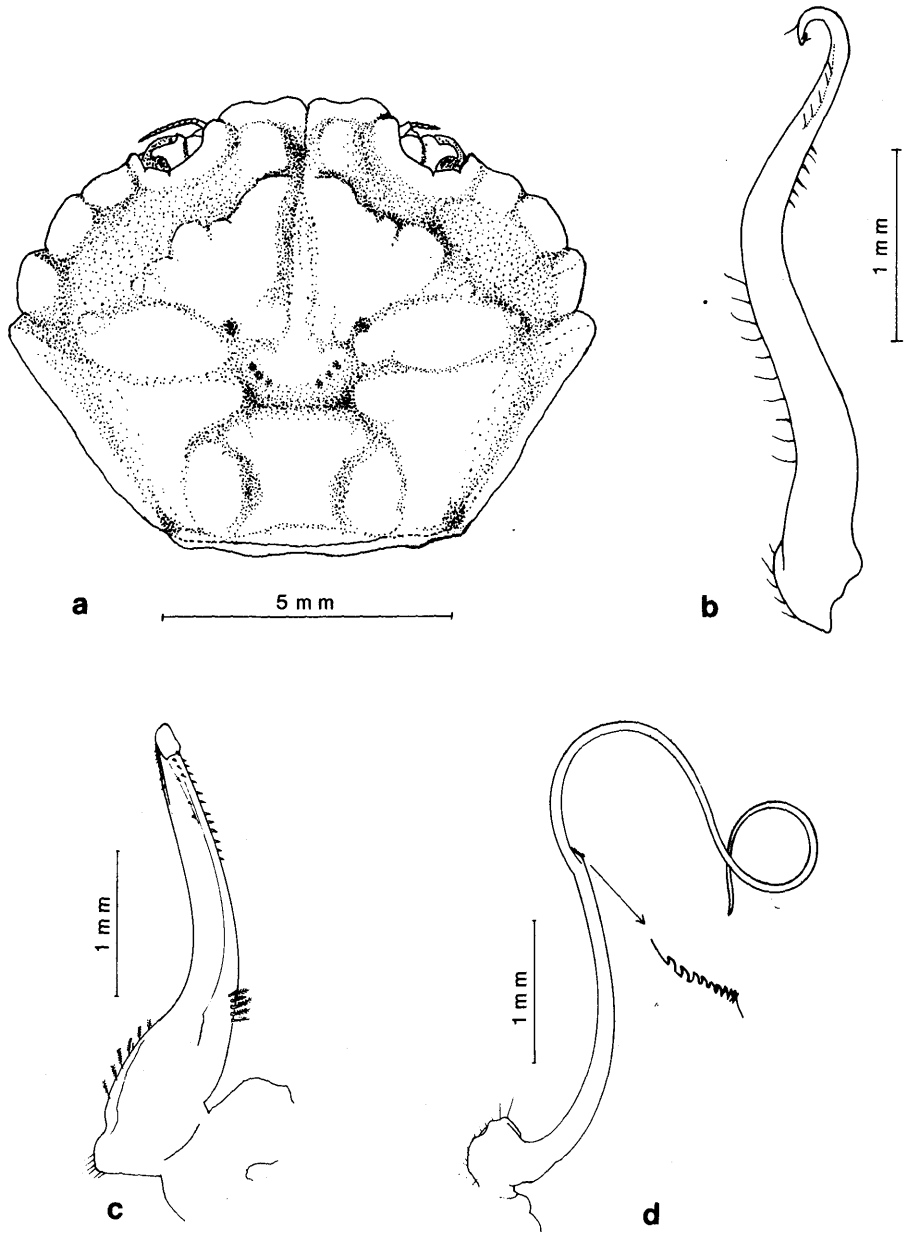

FIG. 4. *Parapanope euagora hexacarapas*, subsp. nov., male holotype: *a*, dorsal view; *b*, first pleopod. *Globopilumnus multituberous*, sp. nov., male holotype: *c*, first pleopod; *d*, second pleopod.

Anterolateral border of carapace rather thin and sharp, cut into four teeth without granules, the first and second teeth very low and not triangular, the third and fourth teeth somewhat triangular but not sharp. Posterolateral border of carapace obliquely straight and smooth, dorsal to it the wall of the carapace forming a distinct posterolateral facet somewhat concave longitudinally and not sharply marked off from the general surface of the carapace. Under surface of carapace somewhat granulated; subhepatic region smooth.

Left (larger) cheliped of holotype missing. Arm of right cheliped provided with some granules on the dorsal and ventral margins; wrist uneven on dorsal surface and without granules, bearing a broad external sulcus and a blunt tooth at the inner angle, below this a rounded lobe; upper surface of palm bearing two distinct parallel longitudinal ridges, the inner consisting of four tubercles; outer surface bearing four longitudinal rows of granules, the lowest row extending nearly to tip of movable finger, lower border granulate; immovable finger provided with five teeth on cutting edge, the last tooth small; movable finger bearing two longitudinal granulated ridges on its upper surface, the cutting edge provided with five small teeth.

The remaining four ambulatory legs long, slender, smooth, and pubescent; propodus and dactylus bearing long hairs on their posterior margins, dactylus of fourth leg bearing six or more short, dentiform spines on its posterior margin.

Abdomen seven-segmented and narrowly elongated. First pleopod curved and tapering, hooked ventrally at terminal portion, bearing a row of several short spines near middle portion.

Remarks: The present new subspecies is identified with *Parapanope euagora* de Man, 1895 (synonym: *Hoploxanthus hextii* Alcock, 1898), one of two known species of the genus *Parapanope* (de Man, 1895, p. 514; Alcock, 1895, p. 126; Lanchester, 1900, p. 737; Balss, 1935, p. 134; 1938 b, p. 52; Shen, 1937, p. 293; Sakai, 1976, p. 434), on the basis of its first pleopod, which is almost the same as that of *Parapanope euagora* in form and structure. In the new subspecies the carapace is relatively narrower, its surface without granules; the teeth of anterolateral border are lower and without granules; and the subhepatic region is without prominent granules as compared to typical *Parapanope euagora*.

The name *hexacarapas* [hexa (hex, Gr.: six) + carapas [cara (kara, Gr.: head)] + pas (Gr.: whole, entire)].

Subfamily *ACTAEINAE*

Genus *Actaeodes* Dana, 1851

Actaeodes hirsutissimus (Rüppell, 1830)

Xantho hirsutissimus Rüppell, 1830, p. 26, pl. 5, fig. 6; H. Milne Edwards, 1834, p. 389 [Type locality: Red Sea].

Cancer (*Actaea*) *hirsutissimus*: de Haan, 1833, p. 18.

Actaea hirsutissima: Ortmann, 1893, p. 453; Alcock, 1898, p. 141; Rathbun, 1907, p. 42; Odhner, 1925, p. 69, fig. 13; Boone, 1934, p. 124, pl. 66; Miyake, 1936, p. 508; 1939, p. 211; Estampador, 1939, p. 527; 1959, p. 81; Ward, 1941, p. 2; Sakai, 1939, p. 488; Barnard, 1950, p. 234; Holthuis, 1953, p. 10; Forest and Guinot, 1961, p. 78.

Actäa (*Actäana*) *hirsutissima*: Klunzinger, 1913, p. 196 [100].

Actaeodes hirsutissimus: Guinot, 1967, p. 561; 1971, p. 1072; 1976, p. 245, fig. 38 E, pl. 15, figs. 2, 2 a; Serène *et al.* 1974, p. 22; Sakai, 1976, p. 448, pl. 159, fig. 3; Chen and Lan, 1978, p. 264, pl. 5, fig. 20.

Range: This species ranges widely throughout the Indo-west Pacific regions (including Philippines), from Red Sea northward to Japan and eastward to Tahiti; coral reef, shallow waters.

Material: 1 ♀ (11·5 × 16·3 mm), Sta. 5557.

Actaeodes quinquelobatus, sp. nov.

Fig. 5

Material examined: 1 ♀ (HOLOTYPE) (U.S.N.M. 195346), 1 ♂ (PARATYPE), Sta. 5482 (Cabugan Grande Id., vicinity of Surigao Strait, 10°27′30″N, 125°18′E.), July 30, 1909, 67 fms, broken shells, sand, green mud.

Measurements: HOLOTYPE female, length of carapace 5·0 mm, breadth of carapace 7·2 mm, of front 2·1 mm, of fronto-orbit 5·3 mm, length of propodus of cheliped (left) 4·2 mm, of dactylus 2·0 mm, height of palm 2·2 mm; of PARATYPE male, length of carapace 3·8 mm, breadth of carapace 5·4 mm.

Description of HOLOTYPE: Carapace flat in posterior half, convex anteriorly, regions bearing lobules covered by microscopically fine granules, without hairs. Carapace apparently divided into four parts by three clear, transverse grooves connecting both lateral borders. 2F covered by two or three lobules, the posterior one semicircular; 0 bearing four or five lobules; 1M divided into two parts, the outer one small and bearing one round lobule, the inner one large and very high, its upper surface surrounded by two or three lobules, its central part hollow; 2M divided into two parts by a wide and deep longitudinal groove, outer one larger and bearing a transverse lobule anteriorly and eight lobules posteriorly; inner one bearing five lobules; 3M bearing a transverse lobule posteriorly, the remainder divided into three parts: an anterior long part with eight small and large lobules arranged longitudinally, two posterior parts situated symmetrically, each consisting of two transverse lobules, the posterior one wider and its posterior slope divided by four longitudinal fine furrows; central part of 4M high; 2L, 3L, 4L, 5L and 6L distinct, 5L slightly larger than 6L, 4L small, each region bearing tubercles. Areolation more obscure posteriorly; 1R and 2R bearing three obliquely arranged large tubercles, tubercles on 3R and 1P not as noticeable, posterior slopes of 2R, 3R and 2P covered by small granules.

Front much deflected downward, divided into two lobes by a large v-notch, each lobe consisting of an inner rounded lobule, a middle arched wide lobule, and the downward prolongation, separated from the supraorbital angle.

Of two surpraorbital fissures, inner one clear but outer one obscure, exorbital lobule obscure, inner and outer angles of infraorbital border almost same size, the notch between exorbital angle and infraorbital border obscure. Eyestalk very short and thick with two terminal edges.

Basal antennal segment broad, its inner angle touching the ventral prolongation of the front, its outer angle inserted into the orbital hiatus; second segment thin and about twice the length of third.

Anterolateral border of carapace bearing five granulated lobes, the first lobe almost completely fused with the external orbital angle, second to fourth lobes large and triangular, fifth lobe the smallest.

Under surface of the carapace covered with minute granules and short, soft hairs, merus of third maxilliped bearing a large rounded tubercle, abdominal border fringed with long hairs.

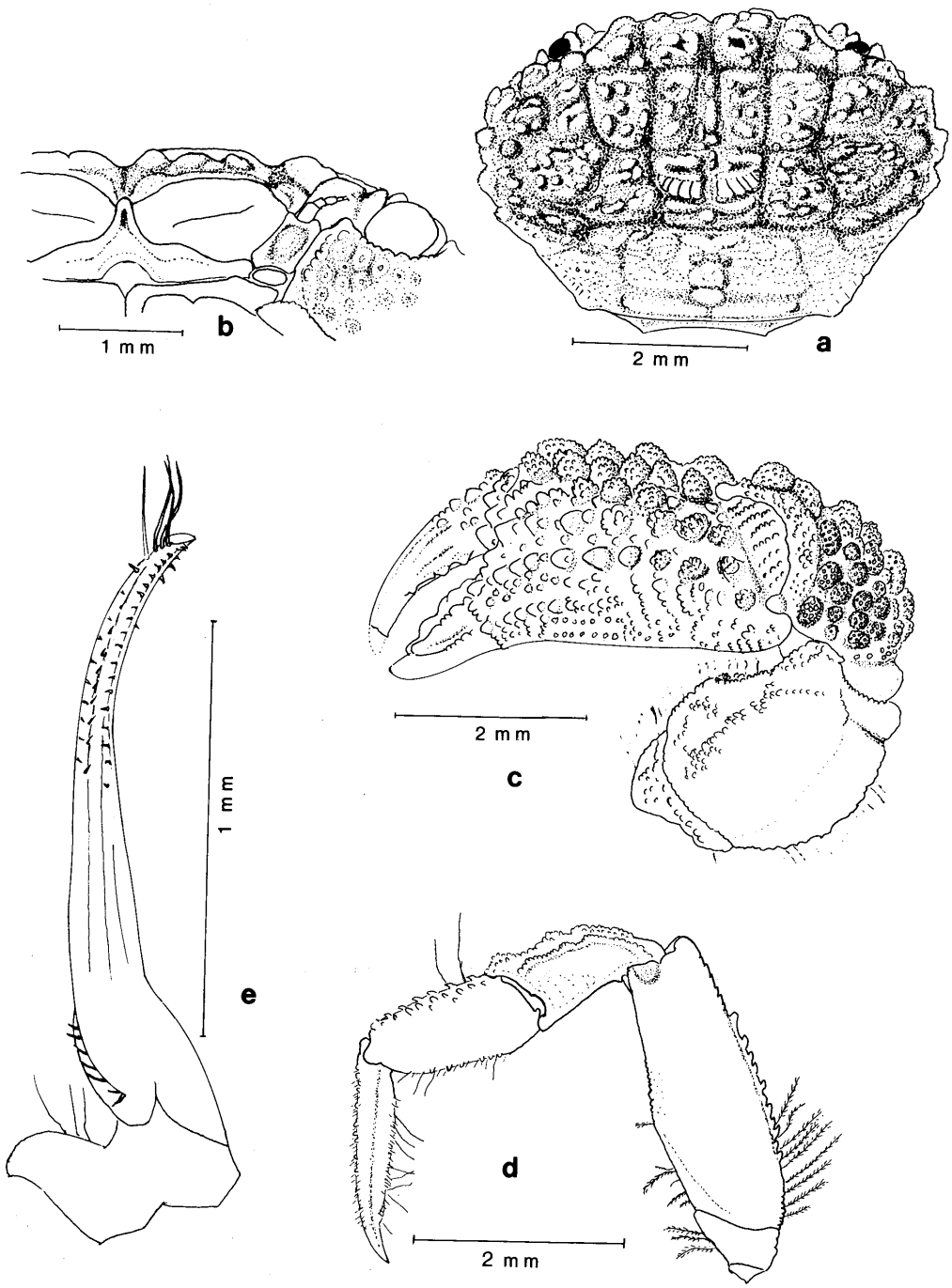

FIG. 5. *Actaeodes quinquelobatus*, sp. nov., young male paratype: *a*, dorsal view; *b*, frontal view; *c*, left chela; *d*, left walking leg; *e*, first pleopod.

Chelipeds subequal in size and similar in form, arm short and thick, edge of its inner surface with long plumose hairs and granulated; wrist and hand remarkably nodulous, palm bearing seven main rows of nodules decreasing in size but increasing in number from upper to lower row, sixth and seventh rows extending onto immovable finger, movable finger bearing large nodules on proximal surface and three rows of granulated ridges, cutting edge with four blunt teeth; immovable finger with five teeth. Colour of fingers light brown.

Upper border of merus of ambulatory legs minutely serrated and fringed with long plumose hairs, upper border of carpus divided into several lobules, a longitudinal granulated ridge on the outer upper surface and a groove between upper border and this ridge, propodus also grooved between upper serrated border and serrated ridge, dactylus bearing minute granules and short bristles on the anterior border and longer bristles and longish hairs.

Paratype male crushed and decalcified, abdomen consisting of five free segments. First pleopod slightly curved, bearing four long hairs near tip and several rows of conic spines.

Remarks: Five species of *Actaeodes* have been recorded previously from Indo-Pacific waters (Guinot, 1976). The proposed new species is unique in the lobulation of the regions of the carapace, although the general pattern of areolation is nearest that of *Actaeodes consobrinus* (A. Milne Edwards, 1873) (A. Milne Edwards, 1873 b; de Man, 1895–1897; Rathbun, 1911; Odhner, 1925; Ward, 1933; Sakai, 1939; Guinot, 1976). The new species differs from *consobrinus* in bearing five lobes on the anterolateral border instead of four, hence the specific name *quinque-lobatus*.

The name *quinquelobatus* [quinque (L.: five)+lobatus (L.: lobed)] is based upon 'Anterolateral border of carapace bears five lobes'.

Genus ***Paractaea*** Guinot, 1969

Paractaea tumulosa (Odhner, 1925)

Actaea tumulosa Odhner, 1925, p. 61, pl. 4, fig. 10 [Type locality: Nordwachter]; Sakai, 1939, p. 490, pl. 94, fig. 6; 1976, p. 450, text-fig. 241.
Paractaea tumulosa: Guinot, 1969, p. 244; 1971, p. 1072; Sakai, 1976, p. 450, text-fig. 241.
Paractaea (?) tumulosa: Guinot, 1976, p. 250.

Range: Dar-es-Salaam, East Africa; Java-Sea; New Guinea; Gilbert Is.; Tahiti; Japan——Yoron Is., Daitozima. Coral reef, shallow waters.

Material: 1 ♂ (4·9 × 7·0 mm); Feb. 10, 1908, Marongas Is.; scattered coral.

Paractaea rufopunctata rufopunctata (H. Milne Edwards, 1834)

Xantho rufopunctatus H. Milne Edwards, 1834, p. 389.
Actaea rufopunctata: A. Milne Edwards 1865, p. 268, pl. 18, fig. 1, 1 a.
Paractaea rufopunctata rufopunctata: Guinot, 1969, p. 246, figs. 19, 20 [Neo-type locality: Mauritius]; 1976, p. 249; Sakai, 1976, p. 449, text-fig. 240 a.

Range: Red Sea, Madagascar; Aldabra; Mauritius; Japan—Kii Nagashima, 15–30 m.

Material: 1 ♂ (9·5 × 13·3 mm), Sta. 5179.

Genus ***Gaillardiellus*** Guinot, 1976

Gaillardiellus rueppelli (Krauss, 1843)

Cancer (Aegle) rüppelli Krauss, 1843, p. 28, pl. 1, fig. 1 [Type locality: Natal].

Actaea ruppellii: A. Milne Edwards, 1865, p. 270; Alcock, 1898, p. 144; Borradaile, 1902, p. 254; Laurie, 1906, p. 403; Rathbun, 1911, p. 219; 1924, p. 17; Estampador, 1937, p. 527; 1959, p. 81.
Actaea rüppellii: Miers, 1880, p. 232; Lanchester, 1900, p. 733; de Man, 1902, p. 610; Yokoya, 1933, p. 188; Sakai, 1939, p. 491, pl. 93, fig. 6; 1965 b, p. 146, pl. 72, fig. 6; Barnard, 1950, p. 235, figs. 37 d, 43 i, j.
Actaea Rüppellii: Calman, 1900, p. 7.
Actäa Rüppellii: Klunzinger, 1913, p. 184 [88].
Actaea ruppelli: Odhner, 1925, p. 45, pl. 3, fig. 6.
Paractaea ruppelli ruppelli: Guinot, 1969, p. 244.
Paractaea ruppelli: Sakai, 1976, p. 451.
Gaillardiellus rueppelli: Guinot, 1976, p. 254, fig. 42 A, 43 A, 43a, 44 B, pl. 16, fig. 1, 1 a.

Range: This species ranges widely throughout the warmer regions of the Indo-west Pacific (including the Philippines) from the east coast of Africa southward to Australia, northward to southern Korea and Japan, and eastward to Tahiti and Hawaii.

Material: 3 young ♂ (3·3 × 4·2 mm–4·1 × 5·7 mm), Sta. 5139; 1 ♂ (7·5 × 10·0 mm), Sta. 5145; 1 ♂ (11·0 × 14·5 mm), 1 ♀ (10·9 × 14·5 mm), Sta. 5159; 1 ♂ (5·6 × 7·8 mm), Sta. 5249; 1 ♀ (8·2 × 11·3 mm), Sta. 5251; 1 young ♀ (3·5 × 4·6 mm), Sta. 5325; 1 ♂ (6·0 × 7·7 mm), Sta. 5401; 1 ♀ (ovi., 12·2 × 16·6 mm), Balayan Bay, the Philippines, Aug. 27, 1927, Zoology I students.

Genus ***Actaea*** de Haan, 1833
Actaea capricornensis Ward, 1933

Actaea capricornensis Ward, 1933, p. 384, pl. 22, figs. 1, 2. [Type locality: North West Island, Capricorn Group, Queensland, Australia]; Guinot, 1969, p. 238; 1971, p. 1071.
[*Actaea*] *capricornensis*: Guinot, 1976, p. 204, 207, figs. 47 B, 47 b, pl. 9, fig. 3.

Range: Capricorn Group, Queensland.

Material: 1 ♂ (5·6 × 8·0 mm), 1 ♀ (7·8 × 11·0 mm), Sta. 5142; 2 ♀ (9·4 × 13·5 mm, 9·4 × 13·9 mm). Sta. 5249; 1 ♂ (8·5 × 11·8 mm), 1 ♀ ovi., (9·3 × 13·3 mm), Sta. 5251; 1 ♂ (10·4 × 14·5 mm), Sta. 5253; 1 ♀ (10·9 × 15·4 mm), Sta. 5254; 1 ♀ (5·9 × 8·1 mm), Sta. 5557.

Genus ***Pseudactaea*** Serène, 1961
Pseudactaea corallina (Alcock, 1898)

Lophactaea corallina Alcock, 1898, p. 102 [Type locality: off Ceylon]; Alcock and Anderson, 1900, pl. 36, fig. 6.
Platypodia corallina: Buitendijk, 1941, p. 300, fig. 2 a.
Pseudactaea corallina: Serène, 1961, p. 673–693; Guinot, 1968, p. 160; 1971, p. 1072; Takeda and Koyama, 1974, p. 113, pl. 12, figs. A, B; Sakai, 1976, p. 454, pl. 160, fig. 4.

Range: Sri Lanka; Indonesia; Gulf of Davao, Philippines; Kii Province, Japan, 15–30 m.

Material: 1 ♂ (10·9 × 15·1 mm), Sta. 5250.

Remarks: Buitendijk (1941) reported one male collected by the *Albatross* from the same station as the present material.

Subfamily ***CHLORODINAE***
Genus ***Pilodius*** Dana, 1851
Pilodius granulatus Stimpson, 1858

Pilodius granulatus Stimpson, 1858, p. 34 [Type locality: outer side of Hong Kong Island]; 1907, p. 58, pl. 7, fig. 2; Sakai, 1965 b, p. 148, pl. 73, fig. 6; 1976, p. 460, pl. 164, fig. 3.

Chlorodopsis granulata: Sakai, 1936, p. 164, pl. 49, fig. 1; Sakai, 1939, p. 503, text-fig. 41, pl. 62, fig. 1, pl. 97, fig. 6.

Range: Hong Kong; Japan—Sagami Bay, Izu Peninsula, Kii, Yoron Is.

Material: 1 ♂ (4·6 × 6·7 mm), 1 ♀ (4·1 × 5·8 mm), Sta. 5174; 1 ♀ (6·1 × 9·4 mm), Sta. 5558.

Pilodius pilumnoides (White, 1847)

Chlorodius pilumnoides White, 1847, p. 227; Adams and White, 1848, p. 41, pl. 9, fig. 3.
Pilodius pilumnoides?: Dana, 1852 b, p. 221, pl. 12, figs. 10 a–c.
Chlorodopsis pilumnoides: Ortmann, 1893, p. 470; Alcock, 1898, p. 167; Lanchester, 1900, p. 737; Laurie, 1906, p. 406; Rathbun, 1923, p. 108; Gordon, 1934, p. 47; Miyake, 1936, p. 509; Balss, 1938 a, p. 59, pl. 1, fig. 4; Sakai, 1939, p. 505, text-fig. 43 a, b, c.
Pilodius pilumnoides: Forest and Guinot, 1961, p. 89; Sakai, 1976, p. 461, text-fig. 249 a, b, b′.

Range: Maldive Archipelago; Sri Lanka; Andaman Is.; Mergui; Malacca; Singapore; Timor; Bandanaira, Indonesia; Amboina; Cape York; Queensland; Samoa; Fiji Is.; Philippines; Ishigaki I.; Ryukyu Is. Coral reef, shallow waters.

Material: 1 ♀ (? × 10·4 mm), Zamboanga, May 26, 1908; soft coral, coral heads.

Genus ***Phymodius*** A. Milne Edwards, 1863

Phymodius monticulosus (Dana, 1952)

Chlorodius monticulosus Dana, 1952 a, p. 79; 1852 b, p. 206; 1855, pl. 11, fig. 9 a–f; Stimpson, 1858, p. 34; 1907, p. 50; A. Milne Edwards, 1868, p. 71.
Phymodius monticulosus: A. Milne Edwards, 1868, p. 71; Miers, 1886, p. 139; Henderson, 1893, p. 363; Whitelegge, 1897, p. 136; Alcock, 1898, p. 163; de Man, 1895, p. 524; Gordon, 1934, p. 34, 37, figs. 17 a, a′, 18 a, 19 a; Barnard, 1950, p. 217, fig. 40 a–h; Tweedie, 1950, p. 122; Forest and Guinot, 1961, p. 106, pl. 10, fig. 1–6; Takeda and Nunomura, 1976, p. 73; Chen and Lan, 1978, p. 273, pl. 6, fig. 21.
Chlorodius obscurus Jacquinot, 1852, pl. 3, fig. 4.
Phymodius obscurus: A. Milne Edwards, 1873 a, p. 220; Holthuis, 1953, p. 24.

Range: This species widely ranges throughout the Indo-Pacific, from the Red Sea and South Africa across the Indian Ocean eastward to Hawaii and Tuamotu and northward to Ryukyu Is., Japan.

Material: 3 ♂ (13·4 × 18·0 mm–14·5 × 20·0 mm), Marongas I., Philippines, Feb. 10, 1908, shore, coral bed (U.S.N.M. Cat. No. 154891); 1 ♀ (10·4 × 13·9 mm), Makasser I., Philippines, Dec. 16, 1909, tide pool (U.S.N.M. Cat. No. 154903).

Phymodius ungulatus (H. Milne Edwards, 1834)

Chlorodius ungulatus H. Milne Edwards, 1834, p. 400, pl. 16, figs. 6–8 [Type locality: Australia]; Dana, 1852 b, p. 205; 1855, pl. 11, fig. 8 a, b.
Chlorodius (*Phymodius*) *ungulatus*: Hilgendorf, 1879, p. 790.
Phymodius ungulatus: A. Milne Edwards, 1873 a, p. 218; Henderson, 1893, p. 362; Ortmann, 1893, p. 464; de Man, 1895, p. 524; Alcock, 1898, p. 162; Rathbun, 1907, p. 46, pl. 3, 4; Nobili, 1907, p. 393; Boone, 1934, p. 140, pl. 73; Gordon, 1934, p. 36, figs. 17 b, b[1], 18 b, 19 b; Balss, 1938 a, p. 55; Sakai, 1939, p. 509, pl. 97, fig. 4; 1976, p. 463, pl. 165, fig. 1; Barnard, 1950, p. 216, fig. 40 i, j; Tweedie, 1950, p. 122; Holthuis, 1953, p. 25; Estampador, 1937, p. 528; 1959, p. 82; Forest and Guinot, 1961, pl. 110, fig. 86 a, b, pl. 11, figs. 1–4, pl. 12, figs. 1–4, pl. 13, figs. 1–3, pl. 14, figs. 1–3; Sankarankutty, 1962, p. 136, figs. 34–35; Takeda and Nunomura, 1976, p. 74; Chen and Lan, 1978, p. 273, pl. 6, fig. 22.

Range: This species ranges widely throughout the Indo-Pacific, including the Philippines, from the east coast of Africa and the Red Sea across the Indian Ocean eastward to Hawaii and Tuamotu and northward to Ryukyu Is., Japan.

Material: 1 ♂ (10·7 × 15·3 mm), 1 ♀ (10·1 × 14·3 mm), Balayan Bay, Philippines, Aug. 27, 1927, Zoology I Students (U.S.N.M. Cat. No. 154951).

Genus ***Chlorodiella*** Rathbun, 1897

Chlorodiella corallicola Miyake and Takeda, 1968

Chlorodiella corallicola Miyake and Takeda, 1968, p. 389, figs. 1, 2 a–f [Type locality: Ngarsmau, Babldáob I., Palau Is.].

Range: Palau Is.

Material: 1 ♀ (ovi., 3·0 × 4·5 mm), Sta. 5179; 7 ♂ (3·3 × 5·1 mm–5·0 × 7·2 mm), 2 ♀ ovi. (2·9 × 4·4 mm, 3·6 × 5·9 mm), Sta. 5218.

Chlorodiella nigra (Forskål, 1775)

Cancer niger Forskål, 1775, Descr. Anim., p. 89 [Type locality: Djeddah].
Chlorodius niger: Rüppell, 1830, p. 20, pl. 4, fig. 7, pl. 6, fig. 14; H. Milne Edwards, 1834, p. 401; Dana, 1852 b, p. 216, pl. 12, fig. 5 a–c; Stimpson, 1858, p. 33; 1907, p. 50; Heller, 1861, p. 335; A. Milne Edwards, 1868, p. 71; 1873, p. 214; Miers, 1880, p. 234; 1884 a, p. 10, 11; 1884 b, p. 183, 215, 517, 531; de Man, 1880, p. 174; 1887–88, p. 32; 1895, p. 519; 1902, p. 618; Richters, 1880, p. 147; Haswell, 1882, p. 62; Henderson, 1893, p. 361; Ortmann, 1893, p. 465; 1894, p. 51; Alcock, 1898, p. 160; Lanchester, 1900, p. 737; Borradaile, 1902, p. 259; Nobili, 1906 b, p. 262; Klunzinger, 1913, p. 217, pl. 6, fig. 10 a–d; Stephensen, 1945, p. 156, fig. 38 d–e.
Chlorodiella niger: Gordon, 1934, p. 50; Sakai, 1936, p. 166; Balss, 1938 a, p. 52; Shen, 1940, p. 72; Barnard, 1950, p. 213; 1955, p. 29, fig. 10; Estampador, 1937, p. 527; 1959, p. 82; Edmondson, 1962, p. 281; fig. 23 d.
Chlorodiella nigra: Montgomery, 1931, p. 441; Miyake, 1936, p. 508; 1938, p. 192, text-fig. 3 a; 1939, p. 213; Sakai, 1939, p. 508, pl. 97, fig. 1; 1965, p. 150, pl. 75, fig. 2; 1976, p. 465, pl. 166, fig. 1; Edmondson, 1946, p. 296, fig. 179 a; Tweedie, 1947, p. 27; Barnard, 1955, p. 29; Holthuis, 1953, p. 15; Guinot, 1958, p. 180; 1964, p. 69; Forest and Guinot, 1961, p. 95, figs. 87–89, 97 a, b; Takeda and Nunomura, 1976, p. 62; Chen and Lan, 1978, p. 268, figs. 1, 7 : 6–7, pl. 1, fig. 1; Kikuchi and Miyake, 1978, p. 40.
Chlorodius hirtipes White, 1848, p. 226; Adams and White, 1848, p. 40, pl. 11, fig. 4.
Chlorodius nebulosus Dana, 1852 a, p. 80; 1852 b, p. 214, pl. 12, fig. 3.
Chlorodius depressus Heller, 1861, p. 11.

Range: This species ranges very widely in Indo-Pacific waters, including the Philippines, from the east coast of Africa and the Red Sea across the Indian Ocean southward to east Australia, eastward to Hawaii, and northward to Japan (from Sagami Bay to Ryukyu Is.).

Material: 3 ♂ (7·2 × 10·2 mm–9·6 × 13·5 mm), 2 ♀ (7·0 × 10·1 mm, 7·3 × 10·5 mm), Little Sta. Cruz I., Mindanao, May 26, 1908; 1 ♀ (5·0 × 7·4 mm), Burias I., San Pascual, Mar. 8, 1909.

Chlorodiella miliaris (A. Milne Edwards, 1873)

Chlorodiella miliaris (A. Milne Edwards, 1873 a, p. 216, pl. 8, fig. 3 [Type locality: New Caledonia]; Miers, 1884, p. 531.
Chlorodiella miliaris: Balss, 1938 a, p. 38, 51, 52; Forest and Guinot, 1961, p. 96.

Range: Seychelles; New Caledonia.

Material: 1 young ♂ (3·5 × 4·9 mm), Sta. 5218.

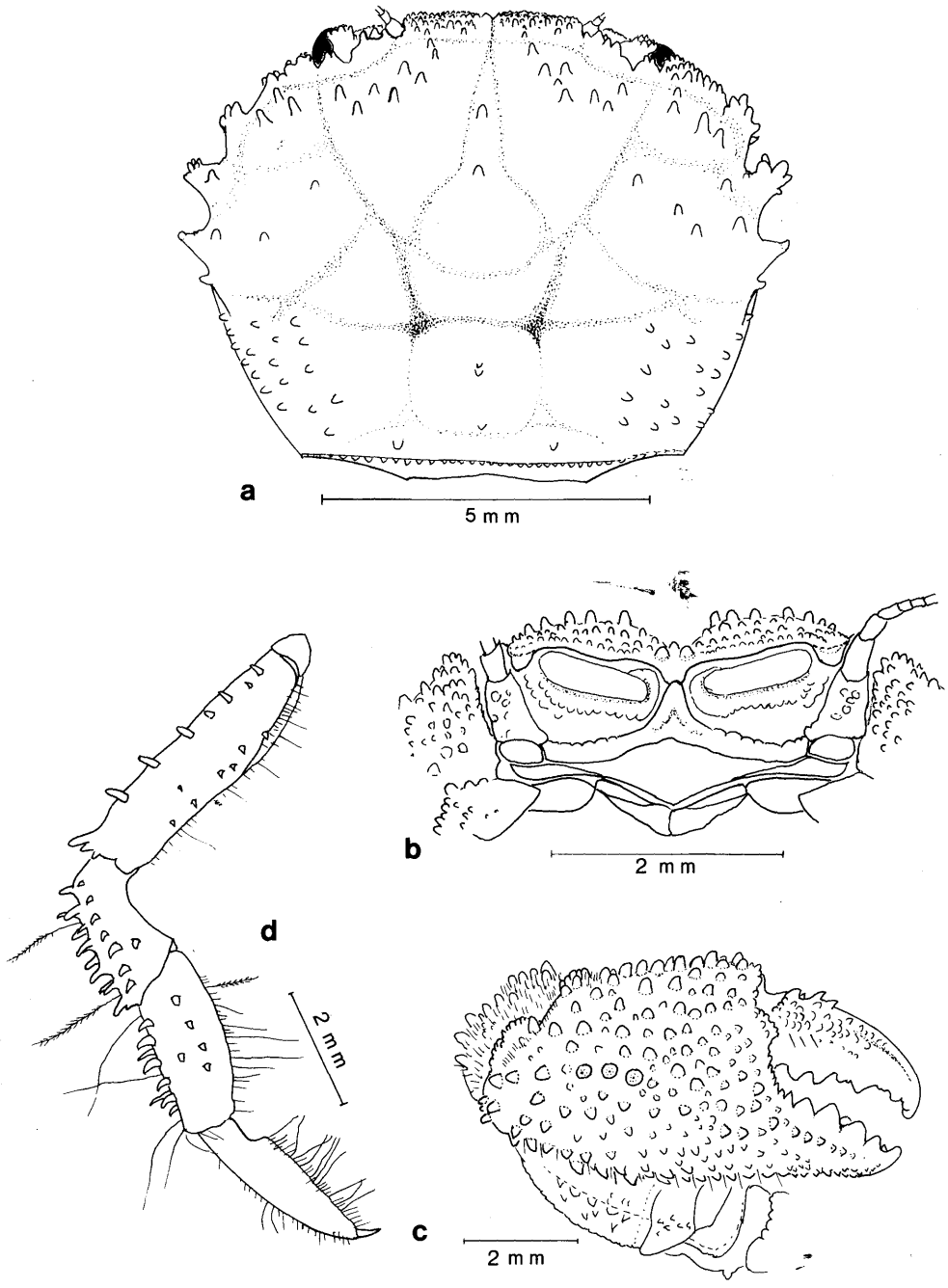

FIG. 6. *Globopilumnus multituberosus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view; *c*, right chela; *d*, left third walking leg.

Genus *Cymo* de Haan, 1833

Cymo andreossyi (Audouin, 1826)

Pilumnus andreossyi Audouin, 1826; Savigny, 1817, p. 86, pl. 5, fig. 5.

Cymo andreossyi: de Haan, 1833, p. 22; Stimpson, 1907, p. 59, 60; Heller, 1861, p. 346; A. Milne Edwards, 1873 a, p. 252; de Man, 1887, p. 291; 1888, p. 35; Ortmann, 1893, p. 443; Henderson, 1893, p. 363; Alcock, 1898, p. 173; Nobili, 1906 b, p. 271; Klunzinger, 1913, p. 255 [159], pl. 3, fig. 7 a–d, pl. 7, fig. 5; Miyake, 1936, p. 508; Sakai, 1939, p. 507; 1976, p. 467, pl. 166, fig. 4; Holthuis, 1953, p. 18; Guinot, 1964, p. 86.

Cymo andreossii: Miers, 1879 b, p. 487; 1884 b, p. 517, 532.

Range: This species ranges widely throughout the Indo-west Pacific regions from the Red Sea eastward to Samoa and Tahiti and northward to Kii Peninsula of Japan.

Material: 1 young ♀ (5·5 × 5·8 mm), Marongas I., vicinity of Jolo, Feb. 10, 1908, scattered coral, sand; 1 ♀ (ovi., 8·8 × 9·9 mm), Balayan Bay, Philippines, Zoology I student, Aug. 27, 1927.

Subfamily *MENIPPINAE*

Genus *Globopilumnus* Balss, 1933

Globopilumnus multituberosus, sp. nov.

Fig. 4 c, d; fig. 6

Material: 1 ♂ (HOLOTYPE) (U.S.N.M. 195347), 2 ♀ (PARATYPES), Sta. 5373 (vicinity of Marinduque Id., 13°40′N, 121°31′10″E), Mar. 2, 1909, 338 fms, soft mud; 2♀ (PARATYPES), Sta. 5123 (vicinity of east coast of Mindoro, 13°12′45″N, 121°38′45″E), Feb. 2, 1908, 283 fms, green mud; 4 ♀ (PARATYPES), Sta. 5536 (between Negros and Siguijor, 9°15′45″N, 123°22′00″E), Aug. 19, 1909, 279 fms, green mud; 1 ♀ (PARATYPE), Sta. 5543 (vicinity of northern Mindanao, 8°47′15″N, 123°35′00″E), Aug. 20, 1909, 162 fms, sand; 1 ♀ (PARATYPE), Sta. 5626 (between Gillolo and Kayoa Is., 0°07′30″N, 127°29′00″E), Nov. 29, 1909, 265 fms, grey mud, fine sand; 1 ♂ (PARATYPE), Sta. 3751 (Suno Saki, off Honshu Is., Japan, 87°E, 8·5 mi.), May 19, 1900, 148, 140 fms, green mud, volcanic sand.

Measurements: HOLOTYPE male, length of carapace 7·0 mm, breadth of carapace 9·2 mm, of fronto-orbit 5·5 mm, of front 2·8 mm, length of propodus of larger (right) cheliped 7·5 mm, of dactylus 3·5 mm, height of palm 4·0 mm; PARATYPES: 2 ♀ (Sta. 5373) 5·6 × 7·2 mm, 7·5 × 9·7 mm; 2 ♀ (Sta. 5123), 7·2 × 9·7 mm, 7·4 × 9·5 mm; 4 ♀ (Sta. 5536), 7·6 × 9·7–9·7 × 12·8 mm; 1 ♀ (Sta. 5543) 5·2 × 6·4 mm; 1 ♀ (Sta. 5626), 8·8 × 11·9 mm; 1 ♂ (Sta. 3751), 6·2 × 8·0 mm.

Description of HOLOTYPE: Entire body tubercular and hairy. Cephalothorax rather thick. Upper surface of carapace very convex in the anterior direction and moderately so in posterior and lateral directions; covered densely with short and soft hairs, and sparsely with longish hairs; bearing rather high, small and scattered tubercles except on central portion and neighbouring parts, tubercles smaller and more numerous on frontal and metabranchial regions; well areolated by wide, deep and glabrous interregional grooves, the median groove and the one running from near outer notch of supraorbital border to metagastric region most prominent.

Front very narrow, distance between internal angles of orbits measuring a little less than a third of breadth of carapace, much deflexed, divided into two slightly convex lobes by a v-shaped notch, the margins finely granulated, without external lobule and not separated by an incision from the internal orbital angle. Supraorbital border bearing two convex lobes beside external orbital angle, each provided with three or four tubercles, two deep supraorbital fissures, external angle separated by a

shallow notch from infraorbital border and forming a dominant lobe covered with granules, inferior orbital border presenting similar longish granules, its internal angle rather high, visible in dorsal view, and covered with smaller granules. Eyestalks covered with granules.
with granules, inferior orbital border presenting similar longish granules, its internal angle rather high, visible in dorsal view, and covered with smaller granules. Eyestalks covered with granules.

Basal antennal segment barely failing to touch the ventral prolongation of the front, third segment a little narrower and shorter than second segment, the flagellum about three times the major diameter of orbit and much longer than breadth of front.

Anterolateral border a little shorter than posterolateral, divided into four teeth, the first lowest and coalescent with external orbital angle, second and third triangular, slightly upturned and provided with some granules, the last also triangular but without granules; a prominent tubercle at the posterior basal margin of the fourth.

Under surface of carapace covered with larger granules. Anterior part of buccal frame distinctly crested. Surface of third maxilliped sparsely granulate. Sternum covered densely with smaller granules.

Chelipeds unequal (the right the larger), entire surface covered with tubercles and soft, short, dense hairs and sparse longish hairs between tubercles, these varying in size and form according to their position, tubercles on upper side of wrist and palm of larger cheliped largest, those on same segments of smaller cheliped more conic; wrists with a large and sharp projection at internal angle. Fingers furrowed, immovable finger of larger hand with seven teeth on cutting edge, the third tooth largest, movable finger also with seven teeth, the proximal tooth largest; cutting edges of smaller hand sharp and divided roughly into three lobes each bearing small teeth.

Ambulatory legs rather slender, merus bearing eight longish tubercles on anterior border and six low ones on outer surface near posterior border, carpus bearing two rows of tubercles on anterior border and a row on middle of outer surface, propodus bearing tubercles in almost same pattern as carpus except the position of lower row, dactylus almost unarmed and provided with long, dense plumose hairs, with a sharp, horny claw.

Abdomen seven-segmented, covered with smaller granules.

First pleopod of male stout, slightly curved and tapering, bearing spines on distal portion. Second pleopod very long and slender, greatly exceeding the tip of first pleopod, its thread-like flagellum coiled.

Abdomen of female paratypes much narrower than sternum, densely fringed with long soft hairs, sternum and abdomen almost without granules; the number of tubercles on carapace variable: the paratype from Japan has fewer than the holotype; some paratypes have more. Usually the hairs of the entire body very dense. Of 11 paratypes seven have the right cheliped larger than the left.

Remarks: Up to now four species of *Globopilumnus* have been recorded from Indo-Pacific waters, two from west Africa, and one from west America (Garth, 1968). The proposed new species is near *Globopilumnus globosus* (Dana, 1852) (Dana, 1852 b) in the second pleopod of the male and *Globopilumnus actumnoides* (A. Milne Edwards, 1873) in carapace. The new species differs from both in being very tubercular and in having the anterolateral border of the carapace divided into four lobes.

The name *multituberosus* [multi (multus, L.: many)+tuberosus (L.: full of humps)] is based upon 'Entire body is tubercular'.

Genus ***Sphaerozius*** Stimpson, 1858
Sphaerozius nitidus Stimpson, 1858

Sphaerozius nitidus Stimpson, 1858, p. 35 [Type locality: Hong Kong]; 1907, p. 62, pl. 7, figs. 5, 5 a; Miers, 1886, p. 144, pl. 12, fig. 4; Ortmann, 1893, p. 433; Doflein, 1902, p. 660; Balss, 1934, p. 517; Sakai, 1936, p. 167, text-fig. 83; 1939, p. 513, pl. 98, fig. 2; 1965 b, p. 151, pl. 75, fig. 4; 1976, p. 471, pl. 171, fig. 1; Kamita, 1941, p. 126, text-fig. 68; Barnard, 1947, p. 364; 1950, p. 254, fig. 47 a–d; Edmondson, 1962, p. 282; Kim, 1970, p. 15; 1973, p. 388, 632, pl. 28, fig. 114, text-figs. 150, 151.
Sphärozius nitidus: Klunzinger, 1913, p. 285 [189], pl. 7, fig. 9.
Menippe convexa Rathbun, 1893, p.239; 1906, p. 861, pl. 11, fig. 4; de Man, 1913, p. 12, pl. 1; Balss, 1922, p. 115; Shen, 1936, p. 62, text-fig. 1 a, b. Estampador, 1937, p. 528; 1959, p. 83.
Menippe ortmanni de Man, 1899, p. 60, pl. 5, fig. 2; 1913, p. 12.

Range: This species ranges widely throughout the Indo-Pacific regions (including the Philippines), from the Red Sea and South Africa eastward to Hawaii and northward to China, Korea and Japan, below low tidal mark.

Material: 1 ♀ (7·7 × 10·6 mm), Catbalogan, off western Samar, Apr. 14, 1908, soft coral, sand.

Genus ***Epixanthus*** Heller, 1861
Epixanthus frontalis (H. Milne Edwards, 1834)

Ozius frontalis H. Milne Edwards, 1834, p. 406 [Type locality: Tranquebar]; Stimpson, 1858, p.34; 1907, p. 60, pl. 7, fig. 4.
Ozius (*Epixanthus*) *frontalis*: Miers, 1884, p. 517, 534.
Epixanthus (*Ozius*) *frontalis*: Richters, 1880, p. 148, p. 16, fig. 16.
Epixanthus frontalis: Heller, 1865, p. 20; A. Milne Edwards, 1873 a, p. 241; de Man, 1887–88, p. 46; 1887, p. 292; 1895, p. 525; Henderson, 1893, p. 364, Ortmann, 1893, p. 477; Alcock, 1898, p. 185; de Man, 1902, p. 629; Nobili, 1906 b, p. 273; Grant and McCulloch, 1906, p. 13; Lenz, 1905, p. 356; Stebbing, 1910, p. 301; Rathbun, 1910, p. 359; Klunzinger, 1913, p. 295; Sakai, 1934, p. 310; 1936, p. 168, text-fig. 85; 1939, p. 519, pl. 98, fig. 4; 1976, p. 474, text-fig. 254, pl. 169, fig. 2; Estampador, 1937, p. 528; 1959, p. 83; Takeda and Nunomura, 1976, p. 75.
Epixanthus Kotschii Heller, 1861, p. 325, pl. 2, fig. 14.

Range: This species ranges widely in the Indo-west Pacific, including the Philippines, from the east coast of Africa and the Red Sea southward to Queensland, Australia, eastward to Melanesia, and northward to Japan (from Sagami Bay to Ryukyu Is.).

Material: 1 ♂ (9·5 × 15·4 mm), Mouth of Magnanod River, Negros, Apr. 11, 1929, W. D. Pierce.

Genus ***Lydia*** Gistel, 1848
Lydia annulipes (H. Milne Edwards, 1834)

Ruppellia annulipes H. Milne Edwards, 1834, p. 422; Dana, 1855, pl. 14, figs. 4 a–c; Stimpson, 1858, p. 37; 1907, p. 71.
Ruppellia annulipes?: Dana, 1852 b, p. 246.
Eurüppellia annulipes: Miers, 1884, p. 533.
Euruppellia annulipes: de Man, 1887, p. 293, pl. 11, fig. 4; Borradaile, 1900, p. 589; Odhner, 1925, p. 85.
Ozius (*Euruppellia*) *annulipes*: Alcock, 1898, p. 188.
Ozius (*Eurüppellia*) *annulipes*: Balss, 1922, p. 132.
Lydia annulipes: Rathbun, 1906, p. 862; Stimpson, 1907, p. 71 (footnote); Edmondson, 1925, p. 42; 1962, p. 288, fig. 25 e; Miyake, 1936, p. 509; Balss, 1938 a, p. 66; Sakai, 1939, p. 521, pl. 64, fig. 3; 1976, p. 477, pl. 171, fig. 2; Tweedie, 1950, p. 124; Holthuis, 1953, p. 23; Forest and Guinot, 1961, p. 10, 122, figs. 109 a, b, 110.

Range: This species ranges widely throughout the Indo-Pacific, from the east coast of Africa, Seychelles and Muscat eastward to Hawaii, Society Is., Tahiti and Tuamotu and northward to Ryukyu Is., Japan.

Material: 1 ♀ (22·8 × 36·4 mm), Iloilo, Panay I., Philippines, Apr. 1, 1929, H. C. Kellers (U.S.N.M. Cat. no. 73190).

Subfamily ***PILUMNINAE***

Genus ***Pilumnus*** Leach, 1815

Pilumnus longicornis Hilgendorf, 1878

Pilumnus longicornis Hilgendorf, 1878, p. 794, pl. 1, figs. 8, 9 [Type locality: Mozambique]; Alcock, 1898, p. 193; Calman, 1900, p. 16; de Man, 1902, p. 635; 1914, p. 336; Nobili, 1906 a, p. 135; Rathbun, 1910, p. 355; 1911, p. 228; Balss, 1933 b, p. 15; Chopra and Das, 1937, p. 406, pl. 6, fig. 3; Sakai, 1939, p. 533, pl. 100, fig. 3; 1965 b, p. 158, pl. 78, fig. 4; 1976, p. 486, pl. 175, fig. 1; Stephensen, 1945, p. 144, fig. 36 A; Barnard, 1947, p. 365; 1950, p. 265. fig. 49 c; Edmondson, 1962, p. 294, fig. 29 a; Guinot, 1964, p. 94; Takeda and Miyake, 1968 a, p. 53, fig. 13 d–f.

Pilumnus andersoni de Man, 1887, p. 59, pl. 3, figs. 5, 6; 1895, p. 552; Alcock, 1898, p. 194; Rathbun, 1906, p. 863; 1907, p. 55; 1910, p. 355; 1911, p. 228; Miyake, 1939, p. 218.

Range: This species ranges widely from east Africa through the Indian Ocean to Australia, New Zealand, Hawaii and northward to Sagami Bay, Japan: 10–80 m.

Material: 1 ♂ (5·8 × 7·7 mm), Grand I., China Sea off southern Luzon, Jan. 8, 1908, scattered clumps coral; 2 ♀ (8·6 × 11·7 mm, 8·7 × 11·7 mm), Marongas I., Feb. 10, 1908, scattered coral, sand; 1 young ♀ (2·8 × 3·4 mm), Jolo I., Feb. 11, 1908; 1 ♀ (9·3 × 12·0 mm), 3 young ♀ (3·7 × 4·8 mm–4·3 × 6·2 mm), Sta. 5145; 1 ♂ (7·9 × 10·5 mm), Sta. 5147; 1 ♀ ov. (14·2 × 18·1 mm), Sta. 5276; 1 ♀ (10·0 × 13·0 mm), Sta. 5401; 1 ♀ (6·0 × 7·5 mm), Sta. 5555.

Pilumnus guinotae Takeda and Miyake, 1969

Pilumnus guinotae Takeda and Miyake, 1968 a, p. 46, fig. 11, 12 d–f, pl. 3, fig. D [HOLOTYPE locality: Ngarmid Passage, Goréor I., Palau Is., 7°22′N, 134°30′E; PARATYPES: Ngardarák Reef, Palau Is.].

Range: Type localities only.

Material: 1 ♂ (8·8 × 11·6 mm), Little Santa Cruz I., Basilian Strait, Philippines, Feb. 28, 1914, Fred Baker.

Pilumnus rotundus Borradaile, 1902

Pilumnus rotundus Borradaile, 1902, p. 246, fig. 46 [Type locality: Kolumadulu Atoll, Maldive Archipelago].

Range: Type locality only? 35 fms.

Material: 4 ♂ (3·7 × 5·1 mm–9·7 × 14·8 mm), 1 ♀ ov (10·6 × 16·5 mm), Sta. 5147.

Pilumnus orbitospinis Rathbun, 1911

Pilumnus orbitospinis Rathbun, 1911, p. 229, pl. 16, figs. 14, 15 [Type locality: Salomon Bank, Chagos Archipelago, Indian Ocean]; Parisi, 1916, p. 185; Estampador, 1937, p. 529; 1959, p. 84; Sakai, 1939, p. 536, pl. 100, fig. 6; 1965 b, p. 158, pl. 78, fig. 3; 1976, p. 487, text-fig. 261 a; Takeda and Miyake, 1968 a, p. 19, fig. 4 d–f, pl. 3, B.

Range: Salomon Bank, Chagos Archipelago; Luzon and Samar, Philippines; Sagami Bay, Kii and Tosa Bay, Japan; 50–200 m.

Material: 1 ♀ (8·2 × 10·9 mm), Sta. 5482.

Pilumnus zimmeri Balss, 1933

Pilumnus zimmeri Balss, 1933 b, p. 28, pl. 5, figs. 24, 25 [Type locality: Zanzibar].

Range: Zanzibar.

Material: 1 ♀ ov. (8·1 × 11·9 mm), Sta. 5147; 1 ♀ ov. (9·1 × 12·6 mm), Sta. 5174; 1 ♀ ov. (8·2 × 12·0 mm), Sta. 5558.

Pilumnus prunosus Whitelegge, 1897

Pilumnus prunosus Whitelegge, 1897, p. 133, pl. 6, figs. 1. 1 a, 1 b [Type locality: Funafuti I., Ellice Group]; Takeda and Miyake, 1968 a, p. 27, figs. 5 d–e, 6, pl. 2, fig. A.

Range: Funafuti I.; Palau Is.

Material: 1 ♀ (4·4 × 6·4 mm), Sta. 5144.

Pilumnus caerulescens A. Milne Edwards, 1873

Pilumnus caerulescens A. Milne Edwards, 1873 a, p. 242, pl. 9, fig. 3 [Type locality: New Caledonia]; Zehntner, 1894, p. 153; Rathbun, 1910, p. 355, pl. 1, fig. 15; 1914, p. 660; McNeil, 1926, p. 315; Ward, 1932, p. 253; Takeda and Miyake, 1968 a, p. 30, fig. 7, pl. 2, fig. D; Sakai, 1976, p. 490.

Pilumnus forskalii coerulescens: Balss, 1933 b, p. 14; 1938, p. 67; Miyake, 1939, p. 218; Holthuis, 1953, p. 25.

?*Pilumnus caerulescens*: Alcock, 1898, p. 196.

Range: Andamans; Amboina; Gulf of Siam; Banda Sea; Monte Bello Is. and Capricorn Group, Australia; New Caledonia; New Guinea; Fiji, Ellice, Gilbert and Marshall Is.; Ryukyu Is.

Material: 1 ♀ (4·4 × 5·9 mm), South side of Marongas I., vicinity of Jolo, Feb. 10, 1908, scattered coral, sand.

Pilumnus scabriusculus Adams and White, 1848

Pilumnus scabriusculus Adams & White, 1848, p. 44, pl. 9, fig. 5 [Type locality: Eastern Seas]; Balss, 1933 b, p. 24; 1938, p. 56; Estampador, 1937, p. 530; 1959, p. 85; Sakai, 1939, p. 533, pl. 100, fig. 5; 1976, p. 486, text-fig. 259; Takeda and Miyake, 1968 a, p. 23, fig. 10 c–d; Takeda and Koyama, 1974, p. 15, pl. 11, fig. D.

Pilumnus scabriusculus (?): Miers, 1886, p. 155.

Pilumnus forskalii: de Man, 1888, p. 295, pl. 12, fig. 1.

Pilumnus sluiteri de Man, 1892, p. 283, pl. 1, fig. 2; Ortmann, 1893, p. 438; Lanchester, 1901, p. 541; Lenz, 1905, p. 356; Ward, 1932, p. 252.

Range: This species ranges widely throughout the tropical Indo-west Pacific regions (including the Philippines) from Aldabra Island eastward to Samoa, southward to Queensland, Australia, and northward to Japan—northeastward to Izu Simoda.

Material: 1 ♂ (8·4 × 10·5 mm), Sta. 5321; 1 ♀ (15·2 × 21·5 mm), Port Palapag, June 3, 1909; 1 ♀ (15·2 × 21·0 mm), Sta. 5557.

Pilumnus minutus de Haan, 1835

Cancer (*Pilumnus*) *minutus* de Haan, 1835, p. 50, pl. 3, fig. 2 [Type locality: Japan].

Pilumnus minutus: A. Milne Edwards, 1873 a, p. 250; Parisi, 1916, p. 183; Balss, 1933 a, p. 12 (in list); Sakai, 1934, p. 307; 1936, p. 170, pl. 51, fig. 2; 1939, p. 535, fig. 53, pl. 66, fig. 2, pl. 100, fig. 9; 1965 b, p. 158, pl. 79, fig. 2; 1976, p. 487, text-fig. 260, pl. 174, fig. 2; Kamita, 1941, p. 130, text-fig. 70; Takeda and Miyake, 1968 a, p. 40, fig. 9 d–e; Kim, 1970, p. 16; 1973, p. 395, 633, text-fig. 155, pl. 83, fig. 117.

Pilumnus hirsutus Stimpson, 1858, p. 37; 1907, p. 69, pl. 9, fig. 1; Miers, 1879c, p. 20, 31; Haswell, 1882, p. 69; Ortmann, 1893, p. 437; Nobili, 1906b, p. 278; Rathbun, 1910, p. 355; 1911, p. 229; 1923, p. 122, pl. 28; Klunzinger, 1913, p. 261; Balss, 1922, p. 117; 1933b, p. 20; Yokoya, 1933, p. 184; Chopra and Das, 1937, p. 407, fig. 11; Stephensen, 1945, p. 146, fig. 36 D–F; Barnard, 1950, p. 263, fig. 49 d–g; Sankarankutty, 1962, p. 144.
Pilumnus minutus (!) var. *hirsutus*: Miers, 1886, p. 154.
? Pilumnus hirsutus: Alcock, 1898, p. 197.
Pilumnus hirsutus ?: Rathbun, 1902, p. 129.
Pilumnus minutus hirsutus: Lanchester, 1900, p. 743.
Pilumnus habererianus Doflein, 1902, p. 629, pl. 5, fig. 6; Parisi, 1916, p. 185.

Range: This species ranges widely throughout the Indo-west Pacific regions (including the Philippines), from South Africa, Red Sea and the Iranian Gulf across the tropical Indian Ocean eastward to New Caledonia, southward to Australia, northward to southern Korea and Japan (northward to Tsugaru Strait); littoral—50 m.

Material: 1 ♀ (4·0 × 5·9 mm), Sta. 5134; 1 ♀ (4·0 × 5·6 mm), 2 ♀ ov. (4·2 × 6·3 mm, 4·5 × 6·5 mm), Sta. 5136; 1 ♀ (6·5 × 9·3 mm), Sta. 5139; 1 ♂ (4·2 × 6·0 mm), 3 ♀ ov. (4·0 × 5·7 mm–3·5 × 5·0 mm), Sta. 5141; 1 ♀ (6·4 × 9·2 mm), Sta. 5142; 2 ♂ (5·6 × 7·5 mm, 3·0 × 4·1 mm), 1 ♀ (6·8 × 10·1 mm), Sta. 5145; 1 ♂ (7·2 × 10·0 mm), 4 ♀ (7·7 × 10·8 mm–6·4 × 8·9 mm), Sta. 5146; 3 ♂ (3·7 × 5·1 mm–4·8 × 6·5 mm), 2 ♀ (4·9 × 6·7 mm, 5·7 × 8·0 mm), Sta. 5147; 1 ♂ (9·5 × 12·8 mm), 1 ♀ (8·2 × 11·3 mm), Sta. 5157; 5 ♂ (3·1 × 4·4–6·4 × 8·9 mm), 1 ♀ (4·3 × 6·4 mm), 2 ♀ ov. (3·8 × 5·6 mm, 4·7 × 7·0 mm), Sta. 5159; 1 young ♂ (2·8 × 4·0 mm), Sta. 5165, 1 young ♂ (3·4 × 4·6 mm), 1 young ♀ (3·7 × 5·2 mm), 4 ♂ (3·8 × 5·4 mm–8·3 × 11·6 mm), 6 ♀ (3·7 × 5·2 mm–8·5 × 11·8 mm), 1 ♀ ov. (6·8 × 9·6 mm), Sta. 5174; 3 ♂ (4·3 × 6·1 mm–5·5 × 7·9 mm), 1 ♀ (4·0 × 5·7 mm), Sta. 5179; 1 ♂ (3·3 × 4·9 mm), Sta. 5209; 1 ♀ ov. (11·0 × 15·4 mm), Sta. 5235; 4 ♂ (2·9 × 4·0 mm–5·3 × 7·6 mm), 1 ♀ ov. (4·7 × 6·8 mm), Sta. 5249; 1 ♀ (4·0 × 5·5 mm), Sta. 5254; 1 ♀ (4·8 × 6·7 mm), Davao Bay, May 18, 1908, from pearl oysters; 1 ♂ (8·6 × 11·8 mm), Sta. 5360; 2 young ♂ (3·4 × 5·7 mm, 3·5 × 4·3 mm), 1 young ♀ (3·1 × 4·5 mm), 1 ♀ ov. (8·5 × 12·2 mm), Sta. 5401; 1 ♀ (7·7 × 11·0 mm), Bataan I., east coast of Luzon, June 5, 1909, from tide pool; 1 ♂ (carapace crushed), Sta. 5482; 1 young ♂ (3·4 × 4·7 mm), 1 ♂ (5·0 × 7·0 mm), 1 ♀ (3·8 × 5·4 mm), Sta. 5555; 1 ♀ ov. (3·6 × 5·3 mm), Sta. 5559; 2 ♀ (9·0 × 12·9 mm, 9·1 × 13·0 mm), Sta. 5641.

Pilumnus ransoni Forest and Guinot, 1961

Pilumnus ransoni Forest and Guinot, 1961, p. 130, figs. 123, 124, 127, pl. 17, fig. 2 [Type locality: Tahiti]; Takeda and Miyake, 1968a, p. 32, fig. 12a–c, pl. 3, fig. C.

Range: Tahiti; Ryukyu Is.
Material: 1 ♀ (3·0 × 4·3 mm), Sta. 5151.

Pilumnus tantulus Rathbun, 1923

Pilumnus tantulus Rathbun, 1923, p. 116, pl. 25 [Type locality: Platypus Bay, Queensland, Australia]; Balss, 1933b, p. 13, 15.

Range: Queensland, Australia, 24–26 fms.
Material: 1 ♂ (3·7 × 4·8 mm), 1 ♀ (3·1 × 4·0 mm), Sta. 5133; 1 young ♂ (3·3 × 4·3 mm), 1 ♀ (5·6 × 7·8 mm), Sta. 5137; 1 ♀ (4·9 × 6·9 mm), Sta. 5141; 1 ♂ (6·3 × 8·6 mm), 2 ♀ (4·0 × 5·5 mm, 4·2 × 5·9 mm), 1 ♀ ov. (4·4 × 6·2 mm), Sta. 5145; 2 ♀ (5·1 × 7·3 mm, 5·3 × 7·4 mm-ov.), Sta. 5147; 2 ♂ (4·5 × 6·5 mm, 4·5 × 6·3 mm), 1 ♀ ov.

(5·0 × 7·0 mm), Sta. 5151: 1 ♀ (5·2 × 7·3 mm), Sta. 5152 2 ♀ (3·8 × 5·2 mm, 3·0 × 4·0 mm), Sta. 5158: 1 ♀ ov. (4·8 × 6·6 mm), Sta. 5160.

Remarks: Balss (1933, pp. 13, 15–17) treated *Pilumnus tantalus* as a synonym of *P. longicornis* Hilgendorf, believing that it represented the young of the latter: '*Pil. tantulus* Rathbun 1923 scheint ebenfalls nur auf junge Examplare gegründet zu sein' (p. 17). Our specimens, which agree very well with Rathbun's original description, although relatively small are indubitably adult. The two species differ from one another in form of teeth on anterolateral border, length of ambulatory legs, and form of carapace.

Pilumnus sinensis Gordon, 1931

Pilumnus sinensis Gordon, 1931, p. 539, text-figs. 14, 15, 16 a–c [Type locality: Hong Kong]: Balss, 1933 b, p. 22, pl. 4, figs. 20, 21 (with synonymy).
? *Pilumnus dorsipes*: Alcock, 1898, p. 197.
Pilumnus dorsipes: Borradaile, 1902, p. 246; Rathbun, 1910, p. 356, pl. 1, figs. 3, 9.

Range: Laccadive Archipelago; Andamans; Gulf of Siam; Hong Kong; Key. 12–70 fms.

Material: 2 ♂ (5·6 × 7·6 mm, 6·3 × 8·4 mm), Sta. 5641; 1 ♀ (5·0 × 7·2 mm), Sta. 5158.

Genus ***Planopilumnus*** Balss, 1933

Planopilumnus minabensis Sakai, 1969

Planopilumnus minabensis Sakai, 1969, p. 266, text-figs. 12 a, 13 [Holotype locality: Kii Minabe]; Sakai, 1976, p. 490, text-fig. 263, pl. 176, fig. 1.

Range: Kii, Japan.

Material: 1 ♂ (8·5 × 10·7 mm), Sta. 5138.

Genus ***Actumnus*** Dana, 1851

Actumnus forficigerus (Stimpson, 1858)

Pilumnus forficigerus Stimpson, 1858, p. 36 [Type locality: east coast of Oshima Island, Ryukyu, Japan]; 1907, p. 68, pl. 8, figs. 6, 6 a.
Actumnus forficigerus: Balss, 1922, p. 119; Sakai, 1939, p. 528, text-fig. 516, pl. 99, fig. 4; 1965 b, p. 155, pl. 76, fig. 4; 1976, p. 496, text-fig. 265; Takeda and Miyake, 1968 b, p. 557, fig. 2 b–d; 1969, p. 114, fig. 5 d–f; Takeda, 1973, p. 49; 1978, p. 77 (in list).

Range: East China Sea; Japan—from Ryukyu Is. to Sagami Bay; Bonin Is. 35–200 m.

Material: 1 ♂ (5·8 × 8·2 mm), Sta. 5136; 1 ♀ ov. (6·2 × 8·9 mm), Sta. 5139; 1 ♀ (4·9 × 6·9 mm), Sta. 5145; 1 ♂ (6·5 × 9·1 mm), Sta. 5149; 1 ♂ (4·9 × 6·9 mm), Sta. 5218; 6 ♂ (6·0 × 8·2 mm–8·8 × 12·0 mm), Sta. 5310; 2 ♀ (5·6 × 7·6 mm, 6·8 × 9·0 mm), Sta. 5311; 1 ♂ (7·7 × 10·6 mm), 1 ♀ (7·2 × 10·3 mm), Sta. 5355; 1 ♀ ov. (5·6 × 7·8 mm), Sta. 5483; 1 ♂ (5·1 × 7·6 mm), 1 ♀ (5·8 × 8·2 mm), Sta. 5640; 1 ♀ (8·1 × 12·2 mm), Sta. 5641.

Remarks: Found at 11 stations, *Actumnus forficigerus* was second only to *Pilumnus minutus* in frequency of occurrence among Philippine xanthids collected by the Albatross.

Actumnus obesus Dana, 1852

Actumnus obesus Dana, 1852 b, p. 244, pl. 14, fig. 3 a, b [Type locality: Maui Island, Hawaiian Islands]: A. Milne Edwards, 1865, p. 284; Paulson, 1875 (1961), p. 50, pl. 7, figs. 2, 2 a; Nobili, 1906 b, p. 285; Rathbun, 1906, p. 865, pl. 11, fig. 2; 1911, p. 232; Klinzinger, 1913, p.

274: Edmondson, 1925, p. 42; 1962, p. 290: Montgomery, 1931, p. 449; Balss, 1933 b, p. 37; Boone, 1934, p. 154, pl. 70; Stephensen, 1945, p, 142; Takeda and Miyake, 1969, p. 107, fig. 6: Sakai, 1976, p. 498.

Range: This species ranges widely throughout the tropical Indo-west Pacific, from Madagascar, Amirante and the Persian Gulf across the Indian Ocean southward to western Australia, eastward to Samoa and Hawaiian Islands and northward to Kyushu, Japan.

Material: 1 ♂ (6·5 × 9·1 mm), 1 ♀ (6·3 × 8·8 mm), Sta. 5149; 2 ♀ (4·1 × 5·4 mm, 8·5 × 11·4 mm), Sta. 5159; 1 ♀ ov. (8·3 × 11·4 mm), Tawi Tawi, Papitag I., Feb. 23, 1908, from shore; 1 ♂ (9·8 × 13·1 mm), Sta. 5164; 4 ♂ (3·9 × 5·6 mm—8·3 × 11·9 mm), 4 ♀ (5·1 × 7·4 mm–8·1 × 11·7 mm), 2 ♀ ovi. (7·6 × 10·5 mm, 6·2 × 8·9 mm), Sta. 5165; 1 ♂ (? × 18·0 mm, broken), Romblon, Mar. 26, 1908, with 150 ft. seine; 2 ♂ (4·9 × 6·9 mm, 5·3 × 7·8 mm), Sta. 5218; 1 ♂ (9·0 × 12·0 mm), Malcochin Harbour, Linapacan I., Dec. 19, 1908, with seine.

Actumnus dorsipes (Stimpson, 1858)

Pilumnus dorsipes Stimpson, 1858, p. 37 [Type locality: Hong Kong]; 1907, p. 70, pl. 9, figs. 3, 3 a.

Actumnus dorsipes: Sakai, 1939, p. 529, pl. 99, fig. 1: 1965 b, p. 156, pl. 76, fig. 5; 1976, p. 497, text-fig. 266; Takeda and Miyake, 1969, p. 118, fig. 9 a–c; Takeda, 1973, p. 49; 1978, p. 77 (in list).

nec *Pilumnus dorsipes*: Alcock, 1898, p. 197; Borradaile, 1902, p. 246; Rathbun, 1910, p. 356, pl. 1, figs. 3, 9 (*Pilumnus sinensis* Gordon, 1930) (cited from Balss, 1933 b, p. 22, 36).

Range: Hong Kong; Sagami Bay and Kyushu, Japan.

Material: 1 ♂ (8·9 × 12·3 mm), 1 ♀ (5·6 × 7·7 mm), Sta. 5358; 2 ♂ (8·8 × 12·1 mm, 11·1 × 15·3 mm), 1 ♀ (6·4 × 9·3 mm), Sta. 5360; 1 ♂ (5·8 × 8·1 mm), 1 ♀ ov. (5·0 × 7·0 mm), Sta. 5426; 1 ♀ (9·2 × 12·8 mm), Sta. 5442; 1 ♀ (9·2 × 12·1 mm), Sta. 5642.

Remarks: *Actumnus dorsipes* is one of five Philippine xanthids collected by the Albatross that is common to the South China Sea and Japan.

Actumnus elegans de Man, 1887

Actumnus elegans de Man, 1887, p. 47 [Type locality: Sullivan Island, Mergui Archipelago]: Alcock, 1898, p. 206; Chopra and Das, 1937, p. 408, figs. 12, B; Takeda and Miyake, 1969, p. 97, figs. 1, 2 d–f; Sakai, 1976, p. 498.

Range: Mergui Archipelago; Burma; Japan.

Material: 1 ♀ (6·6 × 8·5 mm), Sta. 5249; 1 ♀ (5·7 × 7·2 mm), Sta. 5254; 2 ♀ ov. (5·3 × 6·9 mm, 6·8 × 8·4 mm), Sta. 5554; 1 ♂ (3·5 × 5·1 mm), Sta. 5559.

Actumnus granotuberosus, sp. nov.

Fig. 7

Material examined: 1 ♂ (HOLOTYPE), (U.S.N.M. 195349), Sta. 5134 (Sulu Archipelago, near Basilan Id., 6°44′45″N, 121°48′E), Feb. 7, 1908, 25 fms, fine sand.

Measurements: HOLOTYPE male, length of carapace 7·7 mm, breadth of carapace 10·0 mm, of front 2·8 mm, of fronto-orbit 1·2 mm, length of propodus of large cheliped (right) 8·1 mm, of dactylus 4·2 mm, height of palm 4·7 mm.

Description of HOLOTYPE: Carapace subcircular, rather more than three-fourths as long as broad: moderately convex anteriorly, rather flat posteriorly, covered with

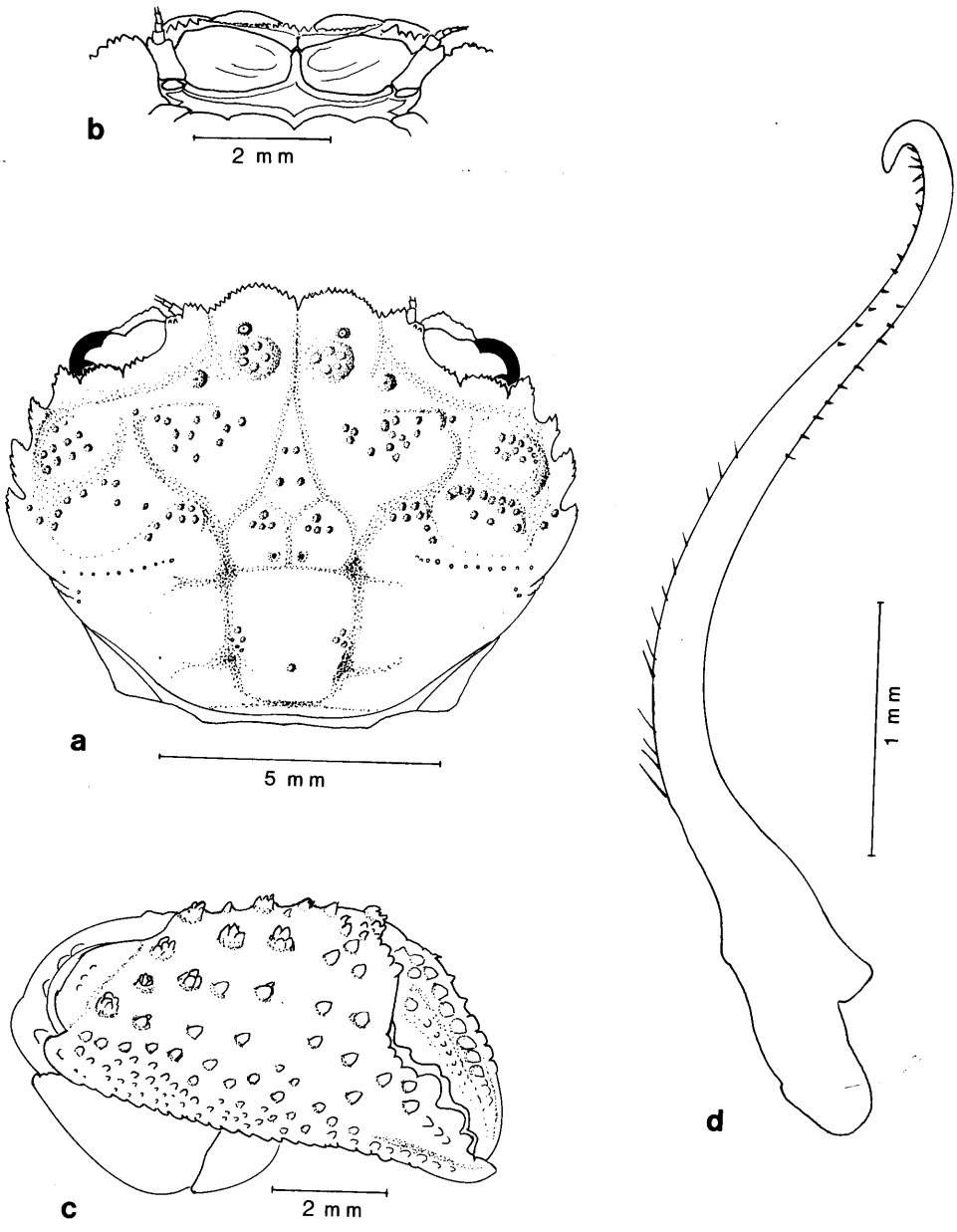

FIG. 7. *Actumnus granotuberosus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view; *c*, right chela; *d*, first pleopod.

a very dense, short and smooth tomentum and microscopically minute granules, without long hairs. Similar tomentum also covering exposed surface of chelipeds and ambulatory legs, the latter fringed with long fine hairs.

Regions of carapace well delimited by wide and deep interregional grooves, the areolae moderately convex though faint on the undenuded carapace. Areolae on anterior half of carapace sparingly granulated, a few granules on posterior half.

Front much deflexed and cut into two finely denticulated lobes by a narrow, deep, v-shaped notch, each lobe deeply excavated laterally and bearing a triangular lobule; inner major lobes almost equally convex, external lobules sharply separated from supraorbital angle. Supraorbital margin finely denticulated and provided with two notches, inner notch very small, outer notch distinctly v-shaped, external orbital angle dentiform and finely denticulated, infraorbital margin also finely denticulated and slightly fissured below the external orbital angle. Subhepatic and suborbital regions bearing distinct granules.

Basal antennal segment narrow and long, its inner angle touching the ventral prolongation of the front and slightly exceeding its tip, external angle projecting into orbital hiatus.

Anterolateral border cut into three prominent, almost uniform teeth with pointed tips similar to exorbital angle, the first tooth smallest. Posterolateral border much longer than anterolateral border and not as concave.

Right cheliped a little larger than the left, arm smooth except upper and under margins of outer surface, inner angle of wrist sharp, its inner borders and anterior border provided with sharp granules, upper and outer surfaces with a few larger granules, under surface covered with smaller granules; upper border of palm bearing two rows of sharp granules, the inner ones arranged regularly, a shallow longitudinal groove beneath the outer one, outer surface bearing three rows of scattered high granules and large granulate tubercles, under surface covered thickly with many smaller conic granules; basal half of granules and tubercles concealed under tomentum. Immovable finger provided with two longitudinal rows of conic granules on outer surface and five large and small teeth on the cutting edge; movable finger with three rows of conic granules on its upper and outer surfaces, outer two rows running from proximal end to near tip, inner row just passing the midpoint of upper border, with five smaller teeth on cutting edge.

Ambulatory legs not wide, anterior and posterior borders of merus finely denticulated, dactylus longitudinally grooved.

Abdomen seven-segmented, first segment wider than third. First pleopod of male slender, tapering, its distal portion strongly recurved, tip broadened, several rows of short setae present.

Remarks: To the present time 26 species of the genus *Actumnus* have been recorded from Indo-Pacific waters (Takeda and Miyake, 1969, Takeda and Kim, 1977, Takeda, 1977). These include *Actumnus setifer* (de Man, 1835) and *Actumnus dorsipes* (Stimpson 1858), to which the proposed new species is closely related. It differs from the former in having the teeth on the anterolateral border separated by deep notches and highly dentiform, and from the latter in having the carapace less convex, the posterolateral border less concave, the palm bearing several tucercles with conic granules in addition to simple tubercles, and the merus of the ambulatory legs with the upper border finely denticulate. The proposed new species lacks the longitudinal row of hairs on the dorsal surface of the propodus of the ambulatory legs said by Sakai (1939, p. 529) to characterize *Actumnus dorsipes*.

The name *granotuberosus* [grano (granum, L.: grain)+tuberosus (L.: full of humps)] is based upon 'Entire body is tubercular'.

Genus ***Neoactumnus*** Sakai, 1965

Neoactumnus unispina, sp. nov.

Fig. 8

Material examined: 1 ♀ (ov.) (HOLOTYPE), (U.S.N.M. 195350), Sta. 5163 (Sulu Archipelago, Tawi Tawi Group, 4°59′10″N, 119°51′E), Feb. 24, 1908, 28 fms, coarse sand.

Measurements: Female HOLOTYPE, length of carapace 10·5 mm, breadth of carapace 13·5 mm, of front 4·4 mm, of fronto-orbit 8·0 mm, length of manus of right cheliped 7·8 mm, of dactylus 4·2 mm, height of palm 3·8 mm.

Description of HOLOTYPE: Carapace covered with a very short, scant pubescence not visible to the naked eye; a transverse line of long hairs and small granules behind the front, with several pairs of punctae. Carapace very convex in both directions, regions not too clear but traceable, branchio-gastric, branchio-cardiac and cardio-intenstinal furrows shallow, without cardio-gastric furrow, 1R and metabranchial region covered with minute granules.

Front much deflexed, low-triangular in shape, its margin crested and provided with granules, without a median emargination, external lobule low-triangular, its tip connected by a straight line with the orbital angle. Supraorbital margin granulated, with two small but clear fissures; the fissures between external orbital angle and infraorbital margin small, v-shaped, the inferior orbital border granulated, its external angle very small, internal angle projecting and with a conic tubercle at inner slope. Basal antennal segment short, not firmly fixed, not touching the ventral prolongation of the front, and exceeding inner inferior orbital angle.

Anterolateral border cut by three shallow notches, the first notch very shallow, into four granulated lobes, the first lobe coalescent with external orbital angle, its margin almost straight, second and third lobes slightly convex, and the last lobe bluntly dentiform. Posterolateral border slightly concave.

Under surface of carapace and abdominal surface covered with minute granules and short hairs.

Chelipeds almost equal in size and similar in shape, right cheliped slightly larger, upper border of arm bearing tubercles; outer surface of wrist covered with sparse minute granules, its upper border forming a tuberculated ridge, its inner angle armed with a sharp spine, upper border of palm grooved shallowly and forming two inconspicuous ridges covered with minute granules, its outer surface furnished with five longitudinal rows of granules, granules on lower three rows large; fingers furrowed and with pointed tips, their cutting edge bearing about seven irregular teeth. Colour of fingers in alcohol light brown.

Ambulatory legs only slightly compressed, provided with plumose hairs on anterior borders; dactylus covered with hairs and plumes and armed with numerous setae on posterior border, it horny claw relatively long, curved, and very sharp.

Abdomen of female with seven segments, last segment semicircular, fringed.

For lack of a male specimen the structure of the pleopod is undescribed.

Remarks: The proposed new species appears to be most closely related to *Actumnus simplex* Rathbun, 1911 and *Neoactumnus convexus* Sakai, 1965. It differs from *Actumnus simplex* in having the front entire instead of medianly emarginate, and in having the surface of the carapace weakly aerolate and punctate, rather than

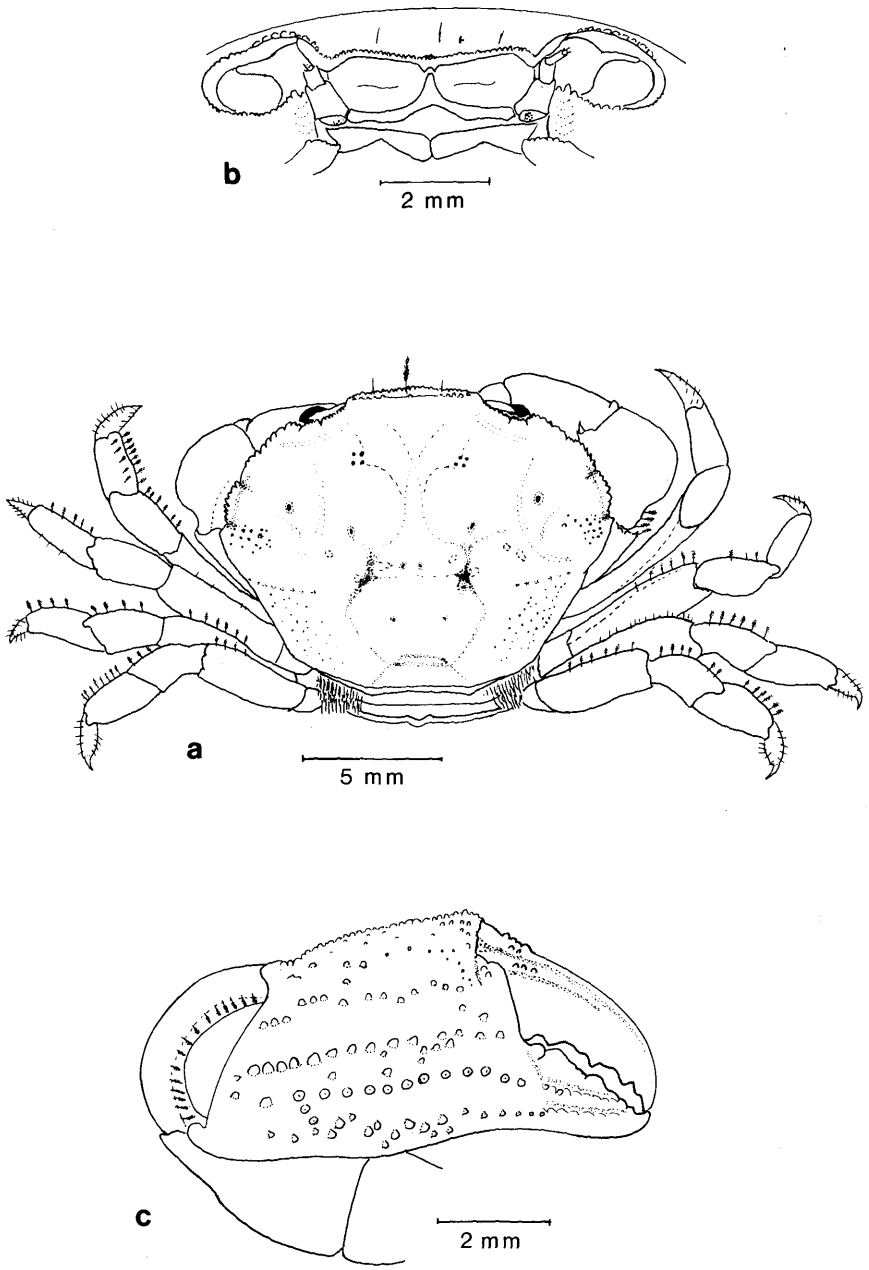

FIG. 8. *Neoactumnus unispina*, sp. nov., female holotype: *a*, dorsal view; *b*, frontal view; *c*, right chela.

with shallow branchio-cardiac furrows the only indication of regional separation. It differs from *Neoactumnus convexus* in having two fissures on the supraorbital border rather than a single fissure, and in having the carapace punctate and weakly areolate rather than smooth and without areolation. It has only one spine at the inner angle of the wrist, rather than two spines. Our specimen is comparatively large (10·5 × 13·9 mm), whereas Sakai (1965 a, p. 105; 1965 b, p. 153) said that *Neoactumnus convexus* is 'a curious tiny crab' (4·0 × 4·5 mm).

The name *unispina* [uni (unus, L.: one) + spina (L.: spine)] is based upon 'Only one spine at the inner angle of the wrist'.

Genus ***Glabropilumnus*** Balss, 1932

Glabropilumnus kasijani Serène, 1969

Glabropilumnus kasijani Serène, 1969, p. 288, figs. 16–24, pl. 4, A, B, C [Type locality: Djalanidhi, Indonesia].

Range: Djalanidhi, Indonesia.

Material: 1 ♂ (3·6 × 5·1 mm), Sta. 5146; 4 ♂ (2·5 × 3·8 mm–4·4 × 6·4 mm), 2 ♀ (2·7 × 3·9 mm, 3·2 × 4·6 mm), 1 ♀ ov. (3·6 × 5·1 mm), Sta. 5401.

Glabropilumnus sodalis (Alcock, 1898)

? *Liomera sodalis* Alcock, 1898, p. 88 [Type locality: off south-east corner of Ceylon]; 1899, pl. 36, fig. 5.
Pilumnus sodalis: Odhner, 1925, p. 26; Sakai, 1939, p. 538.
Glabropilumnus sodalis: Takeda and Miyake, 1968 b, p. 558, fig. 3 a–f, pl. 6, figs. C, D; 1969, p. 133; 1972, p. 83.
Glabropilumnus (?) *sodalis*: Sakai, 1976, p. 500.
Liomera spinipes Borradaile, 1902, p. 253, text-fig. 52.

Range: Maldive Is.; Sri Lanka; Bonin; East China Sea.

Material: 1 ♀ (7·0 × 11·1 mm), Sta. 5214.

Glabropilumnus latimanus Gordon, 1934

Glabropilumnus latimanus Gordon, 1934, p. 54, fig. 30 [Type locality: Banda Neira, Indonesia].

Range: Banda Neira, Indonesia.

Material: 1 ♀ ov. (4·4 × 6·9 mm), Sta. 5159.

Glabropilumnus spinidentatus, sp. nov.

Fig. 9

Material examined: 1 ♀ (HOLOTYPE), (U.S.N.M. 195351), 3 ♂ (PARATYPES), 5 ♀ (PARATYPES), Sta. 5321 (China Sea, vicinity of Taiwan, 20°19′15″N, 121°51′E), Nov. 9, 1908, 26 fms, white sand, coral, broken shell.

Measurements: Female HOLOTYPE, length of carapace 5·3 mm, breadth of carapace 7·6 mm, of fronto-orbit 5·7 mm, of front 2·6 mm, length of propodus of major (right) cheliped 5·0 mm, of dactylus 3·0 mm, height of palm 3·6 mm; male PARATYPES, 3·7 × 4·9 mm, 4·2 × 5·4 mm, 5·1 × 6·7 mm; female PARATYPES, 4·5 × 6·7 mm, 5·0 × 6·5 mm, 5·3 × 6·9 mm, 5·4 × 7·0 mm, 6·2 × 9·4 mm.

Description of HOLOTYPE: Carapace convex from side to side and very convex fore and aft; smooth and glabrous to the naked eye; finely punctate under high

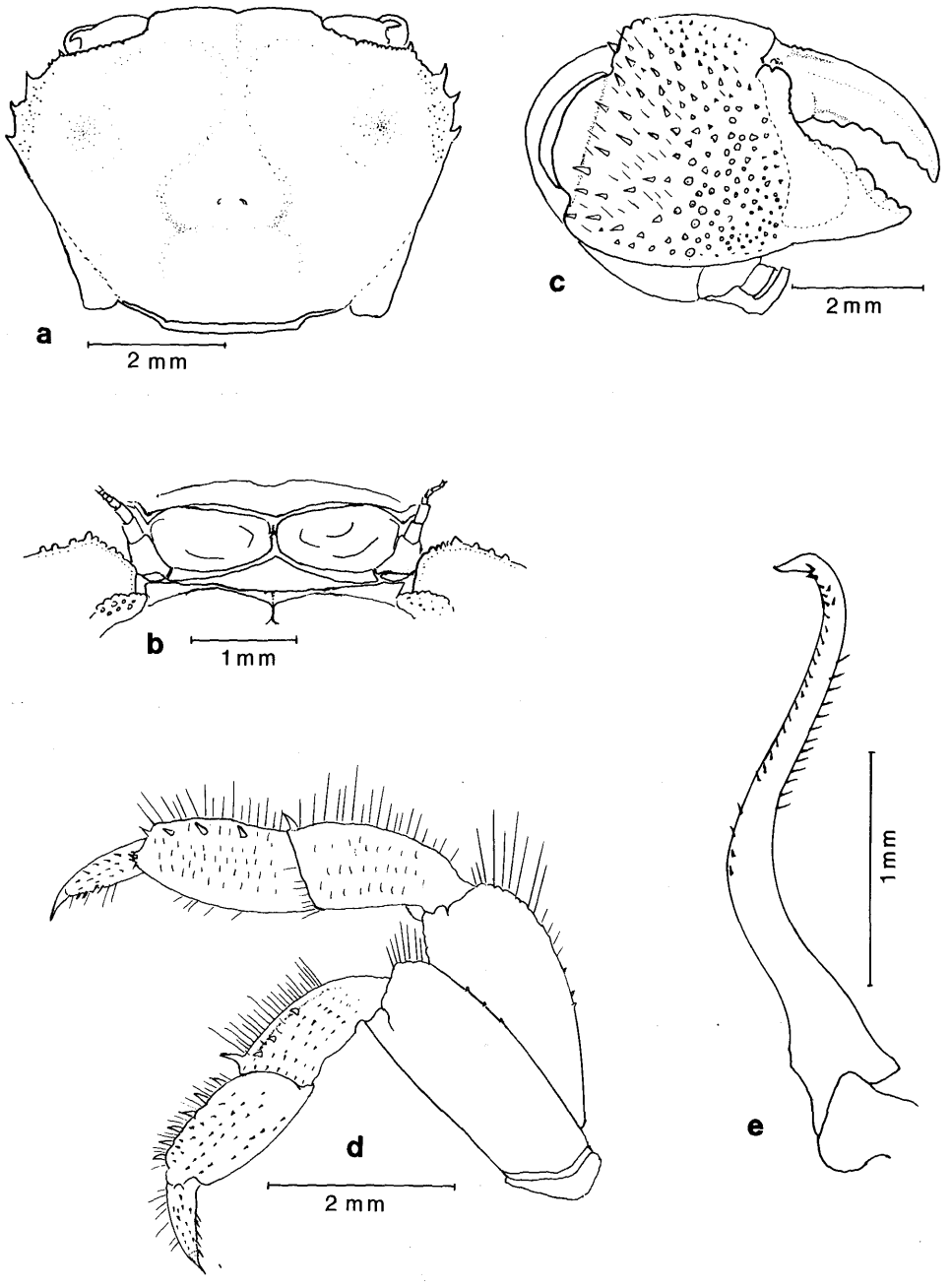

FIG. 9. *Glabropilumnus spinidentatus*, sp. nov., female holotype: *a*, dorsal view; *b*, frontal view; *c*, right chela; *d*, two left walking legs; male paratype: *e*, first pleopod.

magnification: the portion near anterolateral border minutely granulated. Regions quite indistinct, a concave portion between 4 L and 5 L. Front very much deflexed, divided into two very slightly arched lobes by a wide, very shallow notch, each lobe bearing no distinct lateral lobule and passing gradually into supraorbital border. Supraorbital border granulated and with a trace of fissure near the middle, extraorbital angle with a prominent spine, inferior border granulated, its inner angle low and without projection, bearing a wide, v-shaped notch near external orbital angle.

Basal antennal segment short and not quite reaching ventral prolongation of the front.

Anterolateral border divided into four distinct, somewhat triangular (except the first) lobes, first lobe coalescent with extraorbital angle and bearing some granules, second and third lobes similar in shape and subequal in size and provided with a long spine, last lobe small and bearing a spine. Posterolateral border much longer than anterolateral.

Chelipeds very unequal and dissimilar; the right larger and stout, with a very deep palm and a broadly triangular immovable finger. Upper and lower borders of palm smooth, its outer surface covered with numerous conic, spine-like granules, with numerous short bristles and a few long hairs interspersed, the granules on the portion near the carpo-propodal articulation higher and sharper and fewer in number, fingers bearing six teeth on cutting edge in outer view, immovable finger bearing several conic granules on proximal surface. Arm short and high, its outer surface smooth except granulated borders, and covered with stiff hairs; wrist only a little longer than broad, its outer surface with sparse conic granules and longish bristles, the granules on the portion near the carpo-propodal articulation longer and sharper, the granules on the dorsal surface much smaller, its blunt inner angle beset with a prominent spine and several round granules. Smaller cheliped having a rather narrow palm with uniform conic, spine-like granules on the outer surface, its upper border provided with several blunt granules and its lower border almost smooth; fingers sharp-pointed, slenderer and distinctly grooved, with six irregular teeth; movable finger with three or four conic, spine-like granules standing in a row on each ridge. Wrist with granules and bristles of same pattern as larger cheliped, its blunt inner angle with a conic tooth.

Merus of all ambulatory legs provided with small granules on upper border and a spine at distal end of the border; carpus, propodus and dactylus having a number of short and long bristles and a few plumose setae; all carpi with a large sharp spine at the dorsal distal end, beside this terminal spine carpi in fourth legs and right third leg have three spines and one shorter spine respectively on dorsal surface; all propodi bearing one to four spines on dorsal surface near upper border and one spine on dorsal surface near upper border and one spine on dorsal distal rounded end; dactylus provided with spine-like bristles and longer bristles, having a long sharp horny claw.

Abdomen narrow and seven-segmented. First pleopod of pilumnid form, tip acute.

All paratypes have larger right cheliped; in two female PARATYPES the third lobe of anterolateral border of carapace has an accessory spine: the spine on the external orbital angle is very small in some specimens: superior orbital border is entire: the armature on carpus of first to third ambulatory legs is variable according to individuals, and even according to legs in same individual; in some specimens spines on dorsal surface are lacking.

Remarks: Ten species of the genus *Glabropilumnus* have been described hitherto from Indo-Pacific waters [Takeda and Miyake, 1969; Serène, 1970 (1971)]: of these the new species is closest to *Glabropilumnus latimanus* Gordon, 1934, especially in the form of chelipeds. It differs from the latter because its anterolateral border has distinct lobes with sharp spines and its ambulatory legs bear prominent spines besides a spine on the distal end of the propodus.

The name *spinidentatus* [spini (spina, L.: spine) + dentatus (L.: toothed)] is based upon 'lobes of anterolateral border provided with a long spine'.

Genus ***Pilumnopeus*** A. Milne Edwards, 1863

Pilumnopeus granulatus Balss, 1933

Pilumnopeus serratifrons granulatus Balss, 1933 b, p. 34 [Type locality: Fiji I.]; Sakai, 1976, p. 501.

Pilumnopeus granulatus: Takeda and Miyake, 1969, p. 127, fig. 12 c–f.

Range: Fiji I.; New Mecklenburg; Ryukyu Is.

Material: 2 ♂ (4·5 × 6·1 mm, 5·9 × 8·0 mm), 1 ♀ ov. (4·5 × 6·2 mm), Guijulugan, Negros, Apr. 2, 1908, shore.

Pilumnopeus marginatus (Stimpson, 1858)

Pilumnus marginatus Stimpson, 1858, p. 37 [Type locality: Loo Choo, Ryukyu Is.]; 1907, p. 70, pl. 9, fig. 2; Yokoya, 1933, p. 185 (south of Misaki, west of Suno-saki, Sagami Bay); Sakai, 1939, p. 534.

Pilumnopeus marginatus: Takeda and Miyake, 1969, p. 120, figs. 10, 11 a.

Range: Ryukyu Is.; Sagami Bay (?).

Material: 1 ♂ (12·9 × 16·7 mm), Balayan Bay, Philippines, Zoology I student, Aug. 27, 1927.

Remarks: Takeda and Miyake (1969) mentioned 'The occurrence in the Sagami Bay is, however, somewhat questionable'.

Genus ***Parapilumnus*** Kossmann, 1827

Parapilumnus euryfrons, sp. nov.

Fig. 10

Material examined: 1 ♂ (HOLOTYPE), (U.S.N.M. 195353), 1 ♀ (PARATYPE), Sta. 5108 (China Sea, off southern Luzon, 14°05′05″N, 120°19′45″E), Jan. 15, 1908, 13 fms, coral.

Measurements: male HOLOTYPE, length of carapace 5·5 mm, breadth of carapace 7·0 mm, of front 2·4 mm, of fronto-orbit 5·6 mm, length of propodus of large (right) cheliped 5·8 mm, of dactylus 3·2 mm, height of palm 2·6 mm; of female PARATYPE, length of carapace 3·5 mm, breadth of carapace 4·0 mm.

Description of HOLOTYPE: Fronto-orbital border very wide, its breadth (5·6 mm) about four-fifths of carapace breadth. Carapace convex anteriorly, rather flat on posterior half and from side to side; poorly aerolated, gastric regions easily traceable. Surface of carapace provided with several symmetrical rows of granules of good size and hairs each usually growing in front of a granule, some hairs plumose and others stiff and long; these rows situated on frontal border, on anterior margins of 2F, 1M, 2M, 3M and 1R, and on outer margin of 4L; few granules on surface of posterior half.

Front divided into two lobes by a deep v-shaped notch; each lobe having a rather straight border in the middle, its inner border provided with a few granules, and with

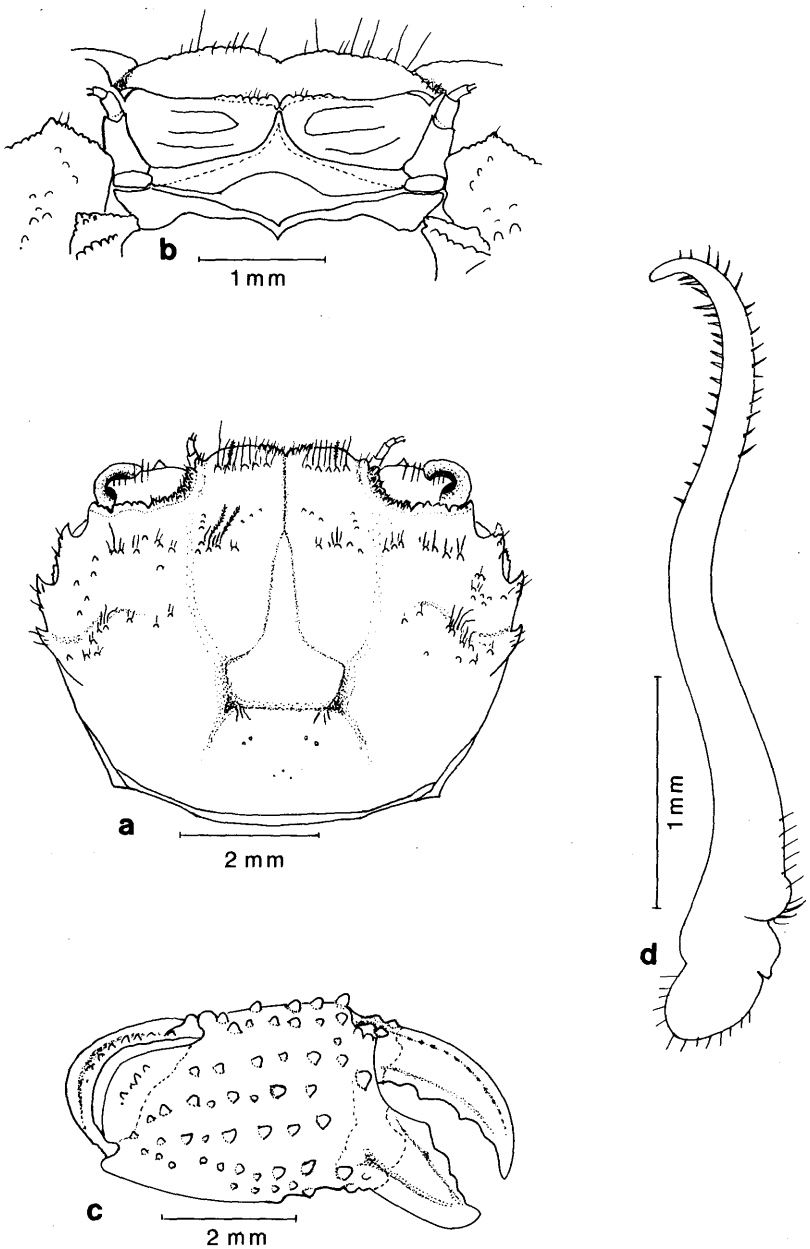

FIG. 10. *Parapilumnus euryfrons*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view: *c*, right chela; *d*, first pleopod.

a distinct external lobule separated from internal supra-orbital angle by a large v-shaped notch. Orbit very large, its major diameter more than one-fourth of carapace breadth: supra-orbital border granulated, divided into three lobes by two distinct notches of which the inner is larger, the inner lobe provided with numerous short bristles besides granules; external orbital angle distinct and sharp; infra-orbital border crested and granulated; a large v-shaped notch near the external orbital angle, its internal angle projecting and sharp.

Basal antennal segment not quite reaching the low ventral prolongation of the front.

Anterolateral border cut into three somewhat triangular teeth excluding the external orbital angle, a short ridge behind this angle, each tooth having a large, sharp, forward-curving tip, bearing one or two granules and a few bristles on the posterior slope. Posterolateral borders a little longer than anterolateral, slightly convex and convergent. Under surface of carapace covered with granules of various size.

Chelipeds subequal in size and similar in shape, the right a little larger; arm armed with a sharp subterminal tooth and a blunt terminal tooth on upper border, its lower anterior angle with a large sharp spine; wrist covered with conic granules of various size and with long and short stiff hairs and sparse plumose hairs, its blunt inner angle with a large sharp granule; palm provided with six rows of granules on outer surface, each row consisting of large and small granules; in addition to these the upper border has 10 or more small granules surrounded by longer stiff hairs and plumose setae; fingers long and grooved, point tipped, armed with four or five teeth on cutting edge, movable finger bearing several conic granules on the upper proximal portion. Brown colour of finger tips extending inward to base of gape.

Ambulatory legs without granules and spines, fringed with short and long stiff hairs and plumose setae more numerous on upper borders of carpus, propodus and dactylus; each carpus bearing a wide shallow groove on outer surface near upper border. Colour of hairs golden.

Abdomen seven-segmented, its surface smooth. Male first pleopod distally curved and spinose, tip broadened.

The young female paratype is quite the same as the holotype in general features except for the sexual characters.

Remarks: Until now 10 species of the genus *Parapilumnus* have been recorded from Indo-Pacific waters (Takeda and Miyake, 1969). The new species is close to *Parapilumnus truncatospinus* (de Man, 1913) in the dentition of the anterolateral border of the carapace, in the granulation and arrangement of hairs on the upper surface of the carpace and in the granulation of the hand. However, the new species is distinguished clearly from the latter by its broad fronto-orbital border, external lobule of the front, less convex carapace and unarmed ambulatory legs.

The name *euryfrons* [eury (eurys, Gr.: wide) + frons (L.: forehead)] is based upon 'fronto-orbital border is very wide'.

Parapilumnus nefissurus, sp. nov.

Fig. 11

Material: 1 ♂ (HOLOTYPE) (U.S.N.M. 195354), Sta. 5149 (Sulu Archipelago, vicinity of Siasi, 5°33′N, 120°42′10″E), Feb. 18, 1908, 10 fms, coral, shell; 1 ♀ (ov.) (PARATYPE), Sta. 5157 (Sulu Archipelago, Tawi Tawi Group, 5°12′30″N, 119°55′50″E), Feb. 21, 1908, 18 fms, fine sand.

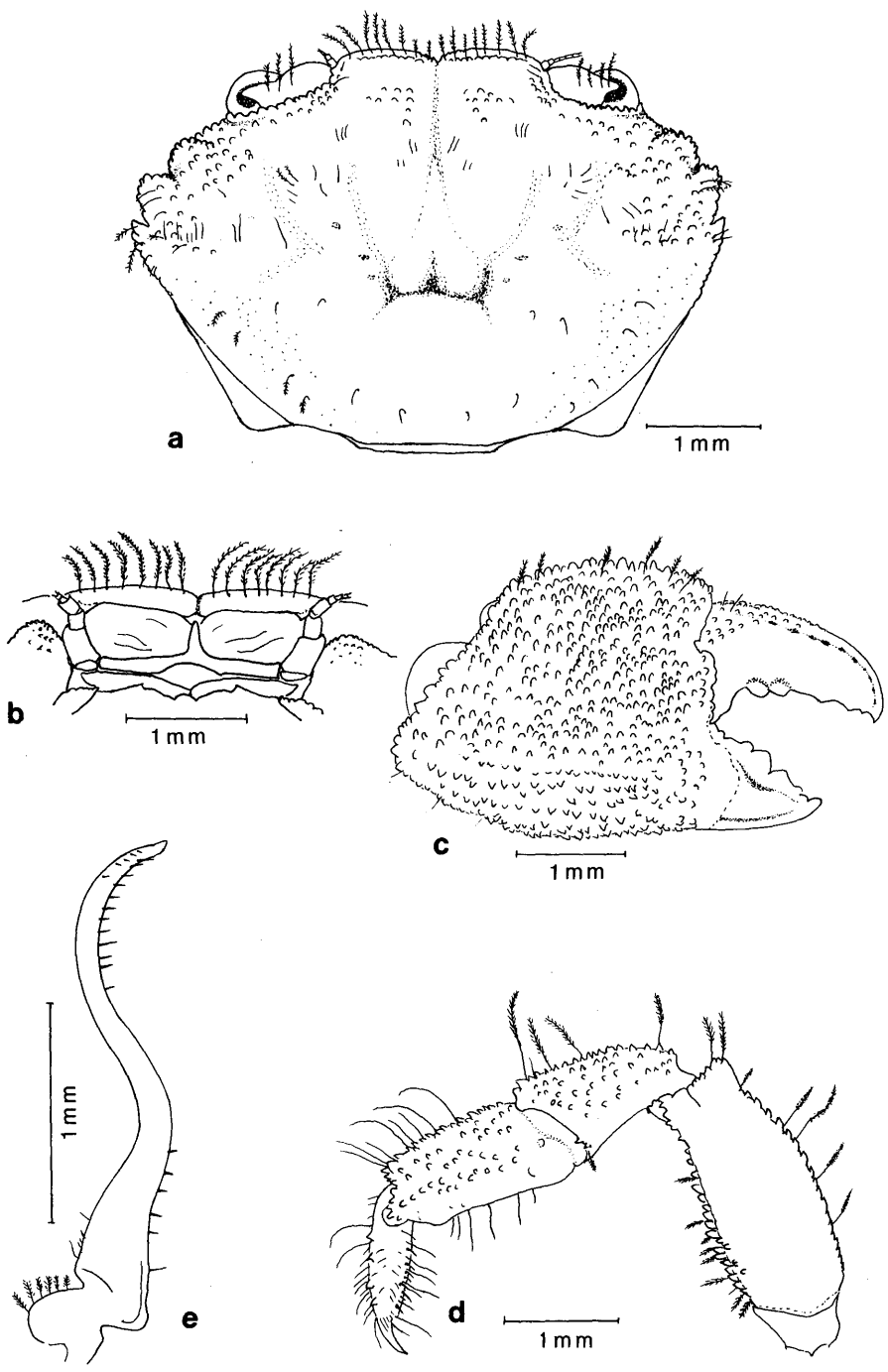

FIG. 11. *Parapilumnus nefissurus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view; *c*, first chela; *d*, left second walking leg; *e*, first pleopod.

Measurements: male HOLOTYPE, length of carapace 3·7 mm, width of carapace 5·4 mm, of fronto-orbit 3·8 mm, of front 1·6 mm, length of propodus of major (right) cheliped 4·0 mm, of dactylus 1·8 mm, height of palm 2·5 mm; female PARATYPE, length of carapace 4·0 mm, width of carapace 6·0 mm.

Description of HOLOTYPE: Carapace slightly convex from side to side and rather more convex fore and aft, finely punctate under high magnification. Areolation very poor, some shallow interregional grooves traceable, mesogastric region clear, its centre convex; surface of carapace provided with several scattered tufts of curved, soft plumose hairs symmetrically disposed, a transverse row of such hairs behind the front. Gastric, cardiac, and intestinal regions almost smooth, but 1F, 2F, 0, 1L, 3L and 4L covered with granules of good size and metabranchial regions covered with minute granules.

Front strongly deflexed, divided into two arched lobes covered with minute granules by a rather wide and deep v-shaped notch, each lobe without an external lobule and separated from supraorbital border by a shallow notch; supraorbital border minutely denticulated, without fissures, its external angle not prominent; inferior orbital border provided with granules, a v-shaped notch near external orbital angle, internal angle blunt.

Basal antennal segment not quite reaching the low ventral prolongation of the front.

Anterolateral border cut into four lobes; first lobe not dentiform but ridged, covered with several granules, coalescent with extraorbital angle; the following three teeth somewhat triangular, each tipped with a somewhat larger pointed granule and bearing some conic granules on its slope, the last tooth smallest of the series. Posterolateral border much longer than anterolateral, slightly convex and moderately convergent. Under surface of carapace covered with minute granules.

Chelipeds unequal, the right being larger; arm armed with a subterminal and a terminal tooth with a pointed granule, and several granules posteriorly on the upper border; wrist covered with numerous sharp granules of almost uniform size and sparsely with long plumose setae, its inner angle prominent and sharp; outer and upper surfaces of palm covered with numerous sharp granules of same size and form as on wrist, bearing also plumose hairs; palm high, granules not disposed in linear arrangement on the larger right palm but somewhat linear on the left palm. Dentition as shown in fig. 11.

Ambulatory legs sparsely bordered with long and short plumose hairs; each merus minutely denticulated on entire upper and lower borders; each carpus with a longitudinal groove near upper border and covered on entire upper and lower surface with rather uniform conic granules, those near lower border smaller; each propodus also covered on entire upper and outer surface with granules like the carpus; each dactylus armed with a few conic granules on upper border and numerous spiniform bristles and silk-like plumose hairs on lower border.

Abdomen seven-segmented, first segment wider than third. First pleopod of male curved and spinose distally, tip pointed.

Female paratype with right cheliped larger than in holotype male, outer surface of palm with large naked area on distal portion.

Remarks: The proposed new species is closely related to *Parapilumnus malardi* (de Man, 1913) in the dentition of the anterolateral border of the carapace and the granulation of the upper surface of the carapace and hand. It is distinguished from that species by the lack of the external lobule on the front, the lack of fissures on the

supraorbital border, and the existence of many granules on the ambulatory legs.

The name *nefissurus* [ne (L.: not) + fissus (L.: a split)] is based upon 'supraorbital border without fissures'.

Parapilumnus tuberculosus, sp. nov.

Fig. 12

Material: 1 ♂ (HOLOTYPE), (U.S.N.M. 195356), Sta. 5554 (Jolo I. and vicinity, 5°52′27″N, 120°52′18″E), Sept. 18, 1909, 25 fms, coral, sand.

Measurements: Male HOLOTYPE, length of carapace 5·1 mm, breadth of carapace 7·7 mm, of front 2·4 mm, of fronto-orbit 4·9 mm, propodus of major (left) cheliped 6·0 mm, dactylus (tip broken) 2·9 mm, height of palm 3·5 mm.

Description: Carapace rather broad, about one and one-half times as wide as length of carapace, fronto-orbital border (4·9 mm) about two-thirds as wide as breadth of carapace. Carapace very convex fore and aft, less so from side to side, finely punctate under high magnification, several pairs of punctae of good size, poorly areolated, the median groove dividing frontal and epigastric regions clear; surface of carapace provided with several symmetrical rows of numerous short and long plumose hairs, these rows situated on anterior margins of 2F, 2M, 1L and 5L; bearing sparsely conic granules of various size on or near anterolateral borders, frontal regions covered with smaller granules.

Front deflexed strongly, divided by a wide v-shaped notch into two arched lobes; each lobe provided with small granules on the border, without external lobule, separated from indistinct supraorbital angle by a very shallow concavity; supraorbital border minutely denticulated, bearing a small notch in the middle of transverse border, external angle not prominent, inferior orbital border also minutely denticulated, bearing a large v-shaped notch near external orbital angle, its internal angle projecting in high-triangular form.

Basal antennal segment not quite reaching low ventral prolongation of the front.

Anterolateral border cut into four prominent granulated lobes; first lobe large and convex, coalescent with extra-orbital angle; second lobe largest with a spiniform granule of good size at tip; third and fourth lobes triangularly dentiform, bearing a large sharp spine; last tooth smallest. Posterolateral border much longer than anterolateral, very slightly convex and strongly convergent. Under surface of carapace covered with granules.

Merus of larger left cheliped armed with a sharp subterminal and a blunt terminal tooth on upper border, lower border armed with two sharp teeth; outer surface of wrist covered with about 45 semicubic granules, about 30 of them large and almost uniform, about 15 much smaller and scattered among larger ones, inner angle provided with a large sharp tooth; palm high, covered with numerous conic granules and sparse short plumose hairs, granules near carpo-propodal articulation and granules near lower border small, upper border and inner surface of upper border also covered with numerous smaller granules; fingers grooved, tips broken, immovable finger with several granules on a ridge of outer surface and five teeth, of which two are larger; movable finger with granules on upper basal surface and five teeth, of which three are larger. Right cheliped lost.

Ambulatory legs unarmed, except for minute dentiform granules on upper and lower borders; fringed with dense short plumose hairs and sparse long plumose hairs on upper border of carpus, propodus, and dactylus, merus very sparsely plumose,

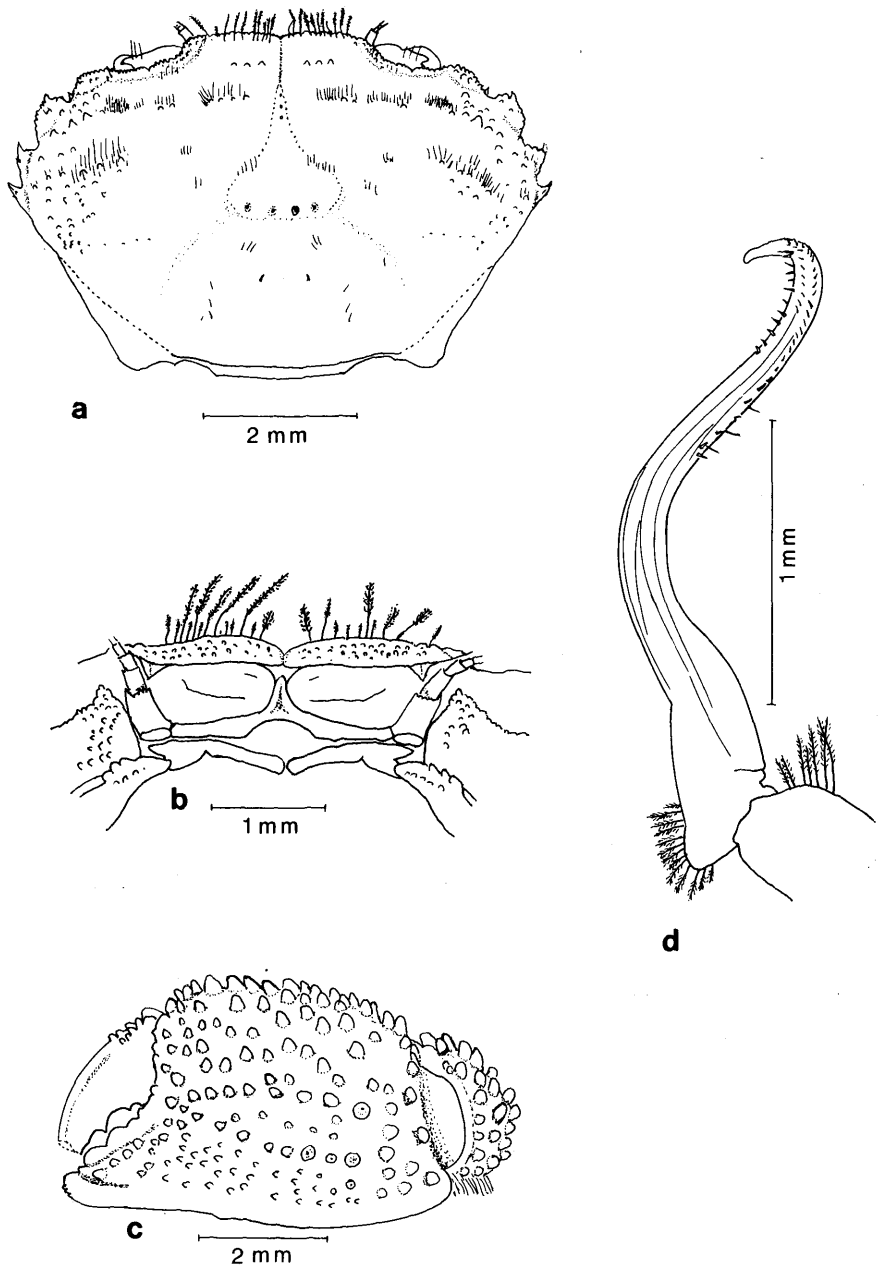

FIG. 12. *Parapilumnus tuberculosus*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view: *c*, left chela; *d*, first pleopod.

dactylus longer than propodus, with numerous bristles on upper and lower borders besides plumose hairs, the claw amber, grooved, long and sharp.

Abdomen showing feminization due to presence of rhizocephalan parasite: relatively wide, seven-segmented, surface smooth. First pleopod arcuate, with spines on distal half; tip beak-like, recurved.

Remarks: The new species is very close to *Parapilumnus truncatospinus* (de Man, 1913) in the dentition of the anterolateral border of the carapace and in the granulation and disposition of hairs on the surface of the carapace, but it is distinguished by its broader carapace and numerous tubercular granules on the outer surface of the wrist and the palm.

The name *tuberculosus* (L.: small tumour) is based upon 'Outer surface of wrist and palm covered with numerous granules'.

Genus ***Heteropanope*** Stimpson, 1858
Heteropanope glabra Stimpson, 1858

Heteropanope glabra Stimpson, 1858, p. 35 [Type locality: Hong Kong]; 1907, p. 63, pl. 8, fig. 1; Parisi, 1916, p. 186; Yokoya, 1933, p. 184 (Koti, 126 m); Balss, 1933 b, p. 32 (mentioning that the following two species are synonymous with this species); Sakai, 1939, p. 545, pl. 99, fig. 6; 1976, p. 503, text-fig. 269.

Pilumnopeus maculatus A. Milne Edwards, 1867, p. 277; 1868, p. 82, pl. 19, figs. 17, 18, 19.

Eurycarcinus maculatus: de Man, 1887, p. 44, pl. 2, figs. 2, 3 (not 4 and 5, Balss, 1933 b, p. 32); Ortmann, 1893, p. 435; Alcock, 1898, p. 212; Lanchester, 1900, p. 744.

Actumnus nudus Grant & McCulloch, 1906, p. 16.

Range: Zanzibar; Seychelles; Salawatti; Amboina; Mergui Archipelago; Sumatra; Singapore; east Australia; Hong Kong; Palao Is.; Japan (Yokoya)?

Material: 1 ♀ (4·2 × 5·9 mm), Iloilo, Philippines, May 3, 1929, H. C. Kellers; 1 ♀ (4·3 × 6·3 mm), Panay I., Philippines, May 12, 1929, H. C. Kellers; 1 ♀ (4·3 × 6·0 mm), Panay I., Philippines, May 12, 1929, Banio Luboc.

Subfamily ***TRAPEZIINAE***
Genus ***Tetralia*** Dana, 1851
Tetralia glaberrima (Herbst, 1790)

Cancer glaberrimus Herbst, 1790, p. 262, pl. 20, fig. 115 [Type locality: unknown].

Tetralia glaberrima: Dana, 1852 b, p. 263, pl. 16, fig. 3; Stimpson, 1858, p. 38; 1907, p. 74; A. Milne Edwards, 1873 a, p. 262; de Man, 1887, p. 321; Henderson, 1893, p. 366; Ortmann, 1893, p. 485; Zehntner, 1894, p. 157; Alcock, 1898, p. 223 (with early literature and synonyms); Rathbun, 1911, p. 235; Klunzinger, 1913, p. 314; Ward, 1932, p. 255; 1941, p. 2; Miyake, 1936, p. 509; Balss, 1938 a, p. 72; Sakai, 1939, p. 553, pl. 100, fig. 8; 1976, p. 511, pl. 183, figs. 1, 2, 4; Stephensen, 1945, p. 161, fig. 42 A–B; Barnard, 1950, p. 280, fig. 52 c, d; Serène and Dat, 1957, pp. 5–6, 13–14, 16–25, figs. 1 C–D, 4 A–L, pl. 2, fig. B 3–4, pl. 3, fig. B 3–4; Forest and Guinot, 1961, p. 139.

Tetralia armata Dana, 1852 b, p. 264, pl. 16, fig. 4 a–c.

Tetralia laevissima Stimpson, 1858, p. 38; 1907, p. 74, pl. 9, figs. 4, 4 a.

Tetralia cavimana Heller, 1861, p. 353, pl. 3, figs. 24, 25; Miers, 1879 b, p. 488; 1884, p. 518, 537; de Man, 1880, p. 180; Whitelegge, 1897, p. 138.

Range: This species ranges widely throughout the Indo-west Pacific regions from the Red Sea, Madagascar and South Africa across the tropical Indian Ocean eastward through Queensland, Australia, New Caledonia, and Fiji I. to Tahiti and northward to Japan—Ryukyu Is., Tosa Bay, Kii; coral reef, shallow waters.

Material: 1 ♀ (6·5 × 7·6 mm), Sta, 5218.

Remarks: Alcock (1898, p. 224) put *Tetralia nigrifrons* Dana in synonymy with *T. glaberrima*, but Serène and Dat (1957) mentioned that these two species were different.

Genus ***Sphenomerides*** Wood-Mason (1891)

Sphenomerides trapezoides (Wood-Mason, 1891)

Sphenomerus trapezoides Wood-Mason, 1891, p. 263 [Type locality: India]; 1892, Illus. Zool. Invest., pl. 5, fig. 2; Alcock, 1898, p. 228.

Sphenomerides trapezoides: Alcock, 1899, p. 66; Serène, 1973, p. 207, figs. 27, 28, pl. 5, figs. A–D.

Range: Andaman Sea; Haruku I. (east of Ambon), Indonesia; 130–290 fms.

Material: 1 ♂ (4·1 × 5·1 mm), Sta. 5168; 2 ♀ ov. (7·0 × 9·0 mm, 7·4 × 10·2 mm), Sta. 5517; 3 ♂ (5·1 × 6·8–7·0 × 9·4 mm), 2 ♀ ov. (6·8 × 8·9 mm, 7·8 × 10·3 mm), Sta. 5519; 1 ♀ (6·7 × 9·2 mm), Sta. 5617.

Genus ***Philippicarcinus***, gen. nov.

Type species: *Philippicarcinus oviformis*, sp. nov.

Etymology: The name *Philippicarcinus* is composed of Philippi of Philippines (named for Philip II of Spain) and carcinus (carcin, Gr.: karkinos: crab). Its gender is masculine.

Diagnosis: Carapace transversely ovoid, convex in both directions, front about two-fifths greatest width, surface smooth and glossy. Orbits closed, not concealing eyes when retracted; supraorbital border without fissures; supraorbital angle slightly produced but not acute; inner suborbital angle meeting front and excluding antenna. Antennules folding transversely. Basal antennal article not reaching front. Anterolateral border of carapace with from one to three teeth behind outer orbital angle; posterolateral border convex, longer than anterolateral border. Chelipeds long, massive, distinctly unequal; merus extending well beyond carapace; carpus with a blunt tooth; fingers long, pointed. Propodus of walking legs with a 'pulley-like' articulation with dactylus. Male abdomen with seven segments distinct.

Remarks: The following two species, both new to science, were to have been referred to *Calocarcinus* Calman, 1909, a genus known until very recently only from its type species *C. africanus* Calman, found 'on a sub-marine telegraph-cable between Aden and Zanzibar, depth about 600 fathoms' (Calman, 1909). However, the discovery of a second species, *C. habei* Takeda, 1980, associated with precious coral off Midway Island, Central Pacific (Takeda, 1980), and of a third species, *C. lewinshoni* Takeda and Galil, 1980, off Izu Islands, Japan (Takeda and Galil 1980), shows *Calocarcinus* to be a genus with uniform characteristics, whereas the following two species differ sufficiently from them, and from each other, to require the erection of a new genus. The name chosen derives from the Philippines, to which the taxon appears endemic.

Philippicarcinus oviformis, sp. nov.

Fig. 13, fig. 14 c, d

Material examined: 1 ♂ (HOLOTYPE), (U.S.N.M. 195357), 1 ♂ (PARATYPE), 6 ♀ (1 ov.) (PARATYPES), Sta. 5519 (vicinity of Mindanao, 8°47′N, 123°31′15″E), Aug. 9, 1909, 182 fms, *Globigerina*, sand; 1 ♀ (ov.) (PARATYPE), Sta. 5402 (between Leyte and Cebu, 11°12′N, 124°15′45″E), Mar. 16, 1909, 188 fms, green mud; 3 ♀ (2 ov.)

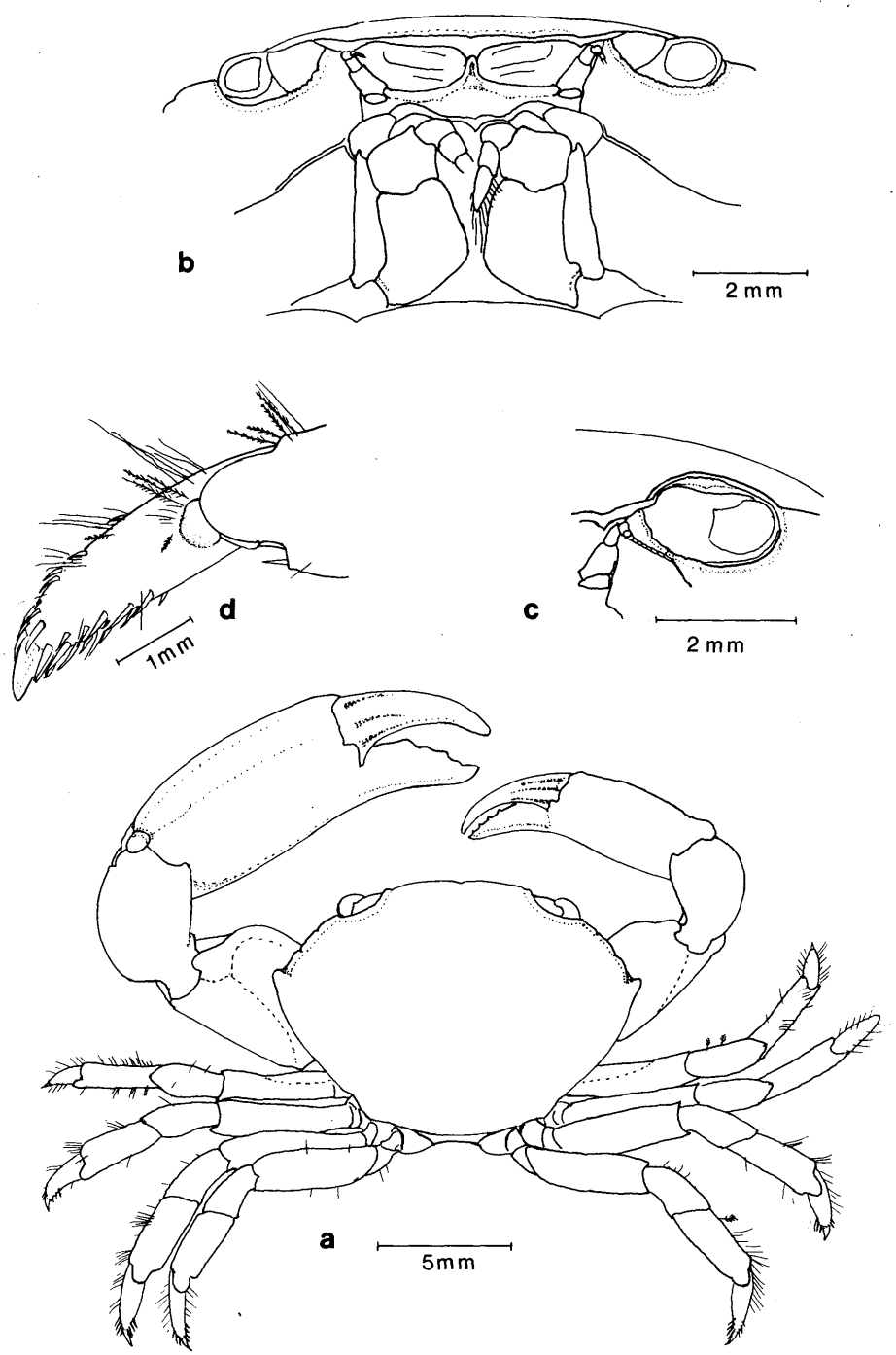

FIG. 13. *Philippicarcinus oviformis*, sp. nov., male holotype: *a*, dorsal view; *b*, frontal view; *c*, detail of eye; *d*, dactyl, left fourth walking leg.

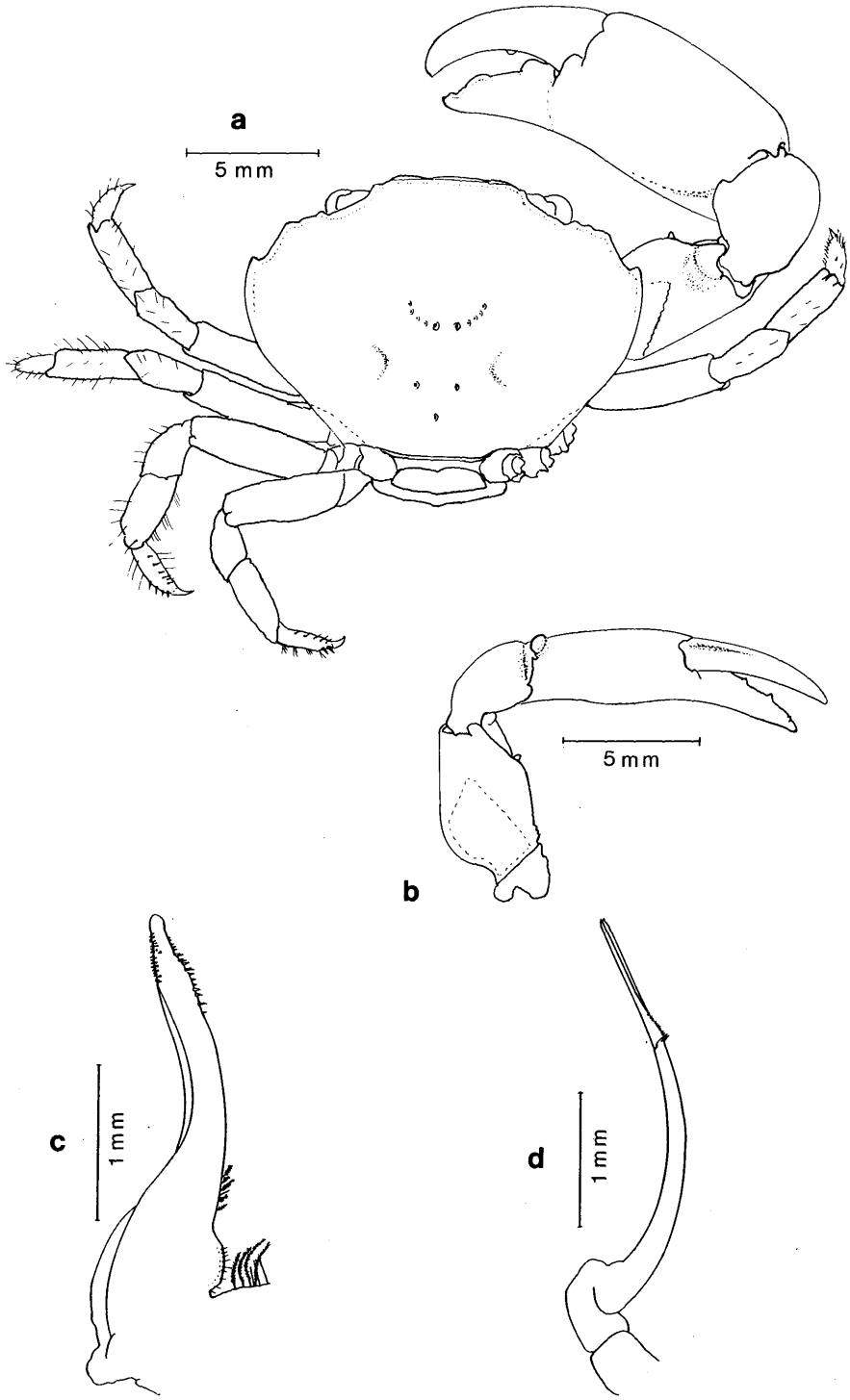

FIG. 14. *Philippicarcinus tuberomerus*, sp. nov., female holotype: *a*, dorsal view; *b*, left cheliped. *P. oviformis*, sp. nov., male holotype: *c*, first pleopod; *d*, second pleopod.

(PARATYPES), Sta. 5536 (between Negros and Siquijor, 9°15′45″N, 123°22′00″E), Aug. 19, 1909, 279 fms, green mud.

Measurements: HOLOTYPE male, 9·2 × 12·8 mm; PARATYPE male (Sta. 5519), 9·7 × 13·8 mm; PARATYPE females, 8·7 × 12·7, 9·5 × 13·8, 10·1 × 14·4, 19·7 × 15·0, 11·0 × 16·0, and 11·4 × 16·6 mm (Sta. 5519); 10·5 × 15·2, 11·0 × 15·8, 11·3 × 16·2 mm (Sta. 5536); 8·7 × 12·4 mm (Sta. 5402).

Description of HOLOTYPE: Carapace convex in both directions, glabrous, smooth and glossy, inter-regional grooves not recognizable; transversely ovoid in outline. Front about two-fifths of greatest width of carapace, arched, with a very shallow median notch, without external lobule, a deep groove running transversely behind frontal margin. Orbit without fissures, completely closed, the inner suborbital angle meeting the front and excluding the antenna, orbital border slightly crested and provided with minute granules, the supraorbital angle slightly produced but not acute, without tooth at external angle. Eye not concealed in the orbit when retracted.

Basal antennal segment not touching the short ventral prolongation of the front, but inner angle of second segment touching it, third segment thinner and shorter than second one, antennular flagellum a little shorter than the major diameter of the orbit.

Anterolateral border of carapace bearing only one prominent tooth at posterior end, the border between this tooth and external orbital angle almost straight, very obscurely divided into three lobes; postero-lateral border convex in outline and much longer than the antero-lateral.

Under surface of carapace covered with minute granules, the surface near antero-lateral border rough and covered with rather prominent granules. Buccal frame slightly narrowed anteriorly. Merus of third maxilliped a little broader than long, its anterior margin almost straight, its external angle slightly projecting.

Chelipeds distinctly unequal, their surface smooth and glossy to naked eye, microscopically finely granulate and sparsely setose; larger left cheliped long and massive, about 2·7 times the length of carapace; merus with a blunt anterior ridge, the greater part of merus extending beyond the carapace; outer and upper surface of carpus convex and smooth, its inner angle forming a blunt tooth; palm long and smooth, its upper margin forming a blunt ridge scarcely defined externally and internally by a groove, lower edge round, its depth increasing slightly distally, the greatest depth almost equal to the length of movable finger; fingers furrowed, their cutting edge bearing three blunt-pointed teeth. Depth of palm of smaller cheliped not increasing distally, less than half its length, and shorter than the fingers.

Ambulatory legs moderately slender, smooth to the naked eye; merus, carpus and propodus covered with minute dentiform granules on their upper border and bearing plumes very sparsely on their surface, propodus bearing some long movable spines on posterior border, dactylus ornamented with many longish movable spines and plumes. Propodus having a 'pulley-like' articulation with dactylus on posterior side.

Male abdomen with seven segments. First pleopod of male stout, slightly curved, covered with short spines on its distal portion. Second pleopod long and slender, its terminal portion straight, reaching almost to tip of first pleopod.

In the paratype male the right cheliped is larger, and in 10 paratype females six have larger right chelipeds and four have larger left chelipeds. There are no significant variations among paratypes. Female abdomen narrower than sternum.

Remarks: The name *oviformis* [ovi. (ovum, L.: egg)+forma (L.: form)] is based upon 'Carapace transversely ovoid in outline'.

Philippicarcinus tuberomerus, sp. nov.

Fig. 14 a, b

Material examined: 1 ♀ (HOLOTYPE), (U.S.N.M. 195362), Sta. 5518 (vicinity of northern Mindanao, 8°48'N, 123°31'E), Aug. 9, 1909, 200 fms, grey mud, *Globigerina*.

Measurements: Female HOLOTYPE, length of carapace 10·6 mm, breadth of carapace 14·9 mm, of fronto-orbit 9·8 mm, of front 5·0 mm, length of propodus of major (right) chela 13·7 mm, of dactylus 8·0 mm, height of palm 6·6 mm.

Description of HOLOTYPE: Carapace transversely ovoid in outline, convex in both directions, glabrous, smooth and glossy, inter-regional grooves, except those defining the depressed metagastric regions, not recognizable, a few inconspicuous punctae present. Front about two-fifths of greatest breadth of carapace, divided into three arched lobes, without median notch and external lobule; a deep groove running transversely behind frontal margin. Orbit without fissures and, except for shallow indentation on right supraorbital border near external angle, completely closed; inner suborbital angle meeting the front and excluding the antenna; orbital border crested, supraorbital border smooth, suborbital border granulated; supraorbital angle rounded, orbit without a tooth at external angle. Eye not concealed in orbit when retracted.

Basal antennal segment not touching the short ventral prolongation of the front, but inner angle of second segment touching it; second segment relatively wide and very short, third segment longer than the second and a little thinner.

Anterolateral border of carapace very minutely granulated, bearing three teeth, of which the first tooth is very small and obscure, the second largest, its posterior slope much longer than its anterior, the third projecting forward; posterolateral border strongly convex in outline and much longer than antero-lateral.

Under surface of carapace very finely granulated and smooth to the naked eye, surface near antero-lateral border smooth. Lateral borders of buccal frame subparallel. Merus of third maxilliped broader than long, its external angle roundly projected.

Chelipeds distinctly unequal, their surface glossy and smooth even under microscope; the larger right cheliped long and massive, about 2·6 times the length of carapace; the greater part of arm extending beyond the carapace, its inner angle rounded and bearing a distinct tubercle; outer and upper surface of carpus convex and smooth, its inner angle forming a lobate tooth; palm long and smooth, its upper and lower edges rounded, its depth increasing very slightly distally, the greatest depth almost equal to the length of movable finger; fingers indistinct, their cutting edge bearing two blunt teeth, tooth near base of immovable finger largest, teeth blunt-pointed. Arm of smaller cheliped bearing a tubercle at its inner angle as in larger cheliped; depth of palm increasing very slightly distally, more than half the length and shorter than the finger; fingers furrowed, immovable finger bearing three small but distinct teeth on the cutting edge, movable finger with one small tooth in the middle.

Ambulatory legs moderately slender, smooth to the naked eye, stiff long hairs occurring on the distal margin of merus, anterior margin of carpus, and anterior and posterior margins of propodus; propodus also bearing four movable spines on

posterior border; dactylus provided with many movable spines and stiff long hairs, and some plumose setae. Propodus having a 'pulley-like' articulation with dactylus on posterior side.

Female abdomen narrower than sternum. In the absence of a male specimen, no description of the abdomen or pleopods of that sex is possible.

Remarks: This new species is near the former new species, but is distinguished from it by the teeth on the anterolateral border, the form of the front, and the tubercle on the inner angle of the arm.

The name *tuberomerus* [tubero (tuber, L.: tumour) + merus (L.: merus)] is based upon 'Arm of chelipeds bearing a tubercle at its inner angle'.

Discussion

The total number of 60 identified xanthid crab species collected largely by the 'Albatross', chiefly from the Philippine Islands, are distributed among six subfamilies and 30 genera (see Table 2). Of these, 13 species and one subspecies are new to science, 30 species are newly recorded from the Philippine Islands, and the remaining 16 species have been previously known from the islands, and, excepting *Pilumnus orbitospinis* Rathbun, are widely distributed in the Indo-west Pacific.

Forty species are known from the southern part of the islands (S), of which 25 species were found only from S; 30 species are known from the central part (C), of which 15 were found only from C; and 11 species occur in the northern part (N), of which three were found only from N. The numbers of species in each part approximately coincide with the number of stations in each part. Each of 34 species (57%) were from only one station, 12 from two stations, four from three, two from four, two from five, one from six, three (*Pilumnus longicornis*, *Gaillardiellus rueppelli* and *Actumnus obesus*) from eight, one (*Pilumnus tantalus*) from nine, one (*Actumnus forficigerus*) from 11, and one (*Pilumnus minutus*) from 25 stations.

The majority of the species are known from the continental shelf (intertidal zone—180 m). Of the 34 species occurring subtidally (10·8 m to the upper part of the continental slope (180 m)), 11 occur in depths of less than 36 m and 10 are known only between 36 m and 180 m; 12 species are found across most of the continental shelf and two species (*Gaillardiellus rueppelli* and *Sphenomerides trapezoides*) extend from the shelf to upper slope depths. Eight species (*Euryxanthops orientalis*, *E. dorsiconvexus*, sp. nov., *E. flexidentatus*, sp. nov., *Globopilumnus multituberosus*, sp. nov., *Pilumnus orbitospinis*, *Glabropilumnus sodalis*, *Philippicarcinus oviformis*, sp. nov., and *P. tuberomerus*, sp. nov.) are confined to water deeper than 180 m.

At least 14 species (*Euxanthus herdmani*, *Leptodius exaratus*, *Paractaea tumulosa*, *Pilodius pilumnoides*, *Phymodius monticulosus*, *Chlorodiella nigra*, *Cymo andreossyi*, *Sphaerozius nitidus*, *Epixanthus frontalis*, *Pilumnus longicornis*, *P. caerulescens*, *P. minutus*, *Actumnus obesus*, and *Pilumnopeus granulatus*) occur in intertidal or shallow subtidal waters; one of these (*Actumnus obesus*) extends into depths up to 36 m, and two species (*Pilumnus longicornis*, *P. minutus*) occur in deeper water.

The above remarks relate only to material collected by the 'Albatross' as bathymetric information is lacking for other collections.

Concerning distribution beyond the Philippine Islands and adjacent waters, 18 species (about 30%) are widespread Indo-west Pacific (including Japan) forms; most of these are shallow-water species. Twenty-two are shared with Indonesia, 33 species with Japanese shores washed by the Kuroshio warm current, two species (*Euxanthus herdmani* and *Pilumnus rotundus*) with the Indian Ocean only, five species

Table 2. List of xanthid crabs accounted in the present report showing bathymetric and geographic distribution.

	No. of Sta.	Depth (fms) ≤5	6–20	21–100	100–200	>200	Philippine Distribution N	C	S	Indian Ocean	Pacific Ocean	Australia	Indonesia	S. China Sea	E China Sea and Yellow Sea	Japan
Subfamily Xanthinae																
(1) *Liomera coelata* (Odhner)	1	?						+			+	+	+	+?		+
(2) *Euxanthus herdmani* Laurie	1	+						+		+						
(3) *Leptodius exaratus* (H. M. Edw.)	2	+						+	+	+	+		+	+		+
(4) *Neolioxantho asterodactylus*, sp. nov.	1		+						+							
(5) *Euryxanthops orientalis* (Sakai)	2				+	+		+	+							+
(6) *E dorsiconvexus*, sp. nov.	2				+	+		+	+							
(7) *E flexidentatus*, sp. nov.					+				+							
(8) *Parapanope euagora hexacarapas*, subsp. nov.	1	?						+								
Subfamily Actaeinae																
(9) *Actaeodes hirsutissimus* (Rüppell)	1		+						+	+	+	+	+	+		+
(10) *A. quinquelobatus*, sp. nov.	1			+				+								
(11) *Paractaea tumulosa* (Odhner)	1	+						+		+	+		+			+
(12) *P. rufopunctata rufopunctata* (H. M. Edw.)	1			+				+		+						+
(13) *Gaillardiellus rueppelli* (Krauss)	8	?	+	+		+	+	+	+	+	+	+	+			+
(14) *Actaea capricornensis* Ward	6		+	+					+			+				
(15) *Pseudoactaea corallina* (Alcock)	1			+					+	+			+			+
Subfamily Chlorodinae																
(16) *Pilodius granulatus* Stimpson	2		+						+					+		+
(17) *P. pilumnoides* (White)	1	+							+	+	+	+	+			+
(18) *Phymodius monticulosus* (Dana)	2	+							+	+	+	+	+	+		+
(19) *P. ungulatus* (H. M. Edw.)	1	?					+			+	+	+	+	+		+
(20) *Chlorodiella corallicola* (Miyake and Takeda)	2		+	+				+			+					
(21) *C. nigra* (Forskal)	2	+						+	+	+	+	+	+			+
(22) *C. miliaris* (A. M. Edw.)	1		+					+		+	+					
(23) *Cymo andreossyi* (Audouin)	2	+					+		+	+	+		+			+
Subfamily Menippinae																
(24) *Globopilumnus multituberosus*, sp. nov.	5				+	+	+	+	+							

(25) *Sphaerozius nitidus* Stimpson	1	+						+		+	+		+	+	+	+
(26) *Epixanthus frontalis* (H. M. Edw.)	1	+						+		+	+	+	+			+
(27) *Lydia annulipes* (H. M. Edw.)	1	?						+		+	+			+		+
Subfamily Pilumninae																
(28) *Pilumnus longicornis* Hilgendorf	8	+	+	+			+	+	+	+	+	+	+	+		+
(29) *P. guinotae* Takeda & Miyake	1	?							+		+					
(30) *P. rotundus* Borradaile	1			+					+	+						
(31) *P. orbitospinis* Rathbun	1				+			+		+						+
(32) *P. zimmeri* Balss	3		+	+					+	+						
(33) *P. prunosus* Whitlegge	1		+						+		+					
(34) *P. caerulescens* A. M. Edw.	1	+							+	+	+	+	+	+		+
(35) *P. scabriusculus* Adams & White	3	?	+	+			+	+	+	+	+	+	+			+
(36) *P. minutus* de Haan	25	+	+	+			+	+	+	+	+	+		+	+	+
(37) *P. ransoni* Forest & Guinot	1			+					+		+					+
(38) *P. tantalus* Rathbun	9		+	+				+	+			+				
(39) *P. sinensis* Gordon	2		+	+					+	+				+		
(40) *Planopilumnus minabensis* Sakai	1		+						+							+
(41) *Actumnus forficigerus* (Stimpson)	11	+	+				+	+	+					+		+
(42) *A. obesus* Dana	8	+	+					+	+	+	+	+	+			+
(43) *A. dorsipes* (Stimpson)	5		+	+			+	+	+					+		+
(44) *A. elegans* de Man	4		+	+					+	+						+
(45) *A. granotuberosus*, sp. nov.	1			+					+							
(46) *Neoactumnus unispina*, sp. nov.	1			+					+							
(47) *Glabropilumnus kasijani* Serène	2			+				+	+				+			
(48) *G. sodalis* (Alcock)	1					+		+		+					+	+
(49) *G. latimanus* Gordon	1		+						+				+			
(50) *G. spinidentatus*, sp. nov.	1			+			+									
(51) *Pilumnopeus granulatus* Balss	1	+						+			+					+
(52) *P. marginatus* (Stimpson)	1	?					+									+
(53) *Parapilumnus euryfrons*, sp. nov.	1		+													
(54) *P. nefissurus*, sp. nov.	2		+						+							
(55) *P. tuberculosus*, sp. nov.	1			+					+							
(56) *Heteropanope glabra* Stimpson	2	?						+		+	+	+	+	+		+
Subfamily Trapeziinae																
(57) *Tetralia glaberrima* (Herbst)	1		+					+		+	+	+	+	+		+
(58) *Sphenomerides trapezoides* (Wood-Mason)	4			+	+				+	+			+			
(59) *Philippicarcinus oviformis*, sp. nov.	3				+	+		+	+							
(60) *P. tuberomerus*, sp. nov.	1				+				+							

(*Euryxanthops orientalis*, *Pilodius granulatus*, *Planopilumnus minabensis*, *Actumnus dorsipes*, and *Pilumnopeus marginatus*) with the South China Sea and/or Japan. Two species (*Paractaea rufopunctata rufopunctata* and *Pilumnus orbitospinis*) are shared with both the Indian Ocean and Japan.

Summary

Most of the specimens were collected by the U.S. Fisheries Steamer 'Albatross' from 84 stations of Philippines and adjacent waters during 1908–1909. Sixty-six of these (78·6%) range in the area of 4°N–14°N in Latitude and 119°E–126°E in Longitude, and 52 of these (62%) are included in the southern part of the area (south of Negros—N. Mindanao, 9°N); the bathymetric range is from the intertidal zone to a depth of 618 m: several specimens were collected by non-Albatross collectors from the Philippine Islands.

The total number of 60 identified species are distributed among six subfamilies and 30 genera. Of the six subfamilies, the Pilumninae were overwhelmingly represented with 29 species belonging to eight genera. The genus *Pilumnus* alone was represented by 12 species, *Actumnus* by five species, *Glabropilumnus* by four species. It was in the Pilumninae also that the new species were concentrated: of *Parapilumnus*, three, and of *Actumnus*, *Neoactumnus*, and *Glabropilumnus*, one each, for a total of six new species. Of the 30 genera, three, *Neolioxantho*, *Euryxanthops*, and *Philippicarcinus*, were defined as new. Of the 60 species, 13 species and one subspecies are new to science: *Neolioxantho asterodactylus*, *Euryxanthops dorsiconvexus*, *E. flexidentatus*, *Parapanope euagora hexacarapas*, *Actaeodes quinquelobatus*, *Globopilumnus multituberosus*, *Actumnus granotuberosus*, *Neoactumnus unispina*, *Glabropilumnus spinidentatus*, *Parapilumnus euryfrons*, *P. nefissurus*, *P. tuberculosus*, *Philippicarcinus oriformis* and *P. tuberomerus*; 30 species are newly recorded from the Philippine Islands and the remaining 16 species have been previously known from the islands.

Forty-one species are known from the southern part of the islands, 30 from the central part and 11 from the northern part (north of Mindoro, 13°30′N). Each of 34 species (57%) was from only one station; on the other hand, five species, *Pilumnus longicornis*, *P. tantalus*, *Gaillardiellus rueppelli*, *Actumnus obesus* and *A. forficigerus*, from 8–11 stations each, are relatively common, and *Pilumnus minutus*, from 25 stations, is the most common species in the islands.

At least 45 species occur at varying depths on the continental shelf and eight species are confined to depths greater than 100 fms (183 m).

Eighteen species (about 30%) are widespread Indo-west Pacific (including Japan) forms; most of these are shallow-water species. Twenty-two are shared with Indonesia, 33 with Japanese shores, two with the Indian Ocean only, five with the South China Sea and/or Japan, and two with both the Indian Ocean and Japan.

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References

Adams, A., and White, A., 1848, Crustacea. In: *A. Adams, The Zoology of the Voyage of H.M.S. 'Samarang' under the Command of Captain Sir Edward Belcher during the Years 1843–1846*. p. i–viii. 1–66, pl. 1–13.

Alcock, A., 1895–1900, *Materials for a Carcinological Fauna of India. Journal of the Asiatic Society of Bengal, no. 3*. The Brachyura Cyclometopa. Part I. The Family Xanthidae, 1898, **67,** pt. 2, no. 1, 67–233; no. 4. The Brachyura Cyclometopa. Part II. The Families Portunidae, Cancridae, and Corystidae, 1899, **68,** pt. 2, no. 1, 1–104.

Balss, H., 1922, Ostasiatische Decapoden. IV. Die Brachyrhynchen (Cancridea). *Archiv für Naturgeschichte*, **88** A, no. 11, 94–166, figs. 1–2, pl. 1–2.

—— 1933 a, Über zwei interessante Xanthidae (Crustacea Dekapoda) des Naturhistorischen Museums in Wien. *Annales des Naturhistorischen Museums in Wien*, **46,** 297–301, figs. 1–3.

—— 1933 b, Beiträge zur Kenntnis der Gattung *Pilumnus* (Crustacea Decapoda) und verwandter Gattungen. *Capita Zoologica, s'Gravenhage*, deel **4,** afl. 3, p. 1–47, fig. 1–5, pl. 1–7.

—— 1934, Sur quelques Décapodes Brachyoures de Madagascar. In: A. Gruvel, Faune des Colonies Françaises. *Contributions à l'étude des Crustacés de Madagascar*, vol. **5**, fasc. 8, no. 31, p. 501–528, 1 fig., 1 pl.

—— 1935, Brachyura of the Hamburg Museum Expedition to South-Western Australia, 1905. *Journal of the Royal Society of Western Australia*, **21,** 113–151, figs. 1–5, pl, 13.

—— 1938 a, Die Dekapoda Brachyura von Dr. Sixten Bocks Pazifik-Expedition 1917–1918. *Göteborgs K. Vetenskaps- och Vitterhets Samhälle Handligar, ser. B*, **5,** no. 7, 1–85, figs. 1–18, pl. 1–2.

—— 1938 b, Ueber einige Xanthidae (Crustacea Dekapoda) von Singapore und Umgebung. *Bulletin of the Raffles Museum, Singapore*, no. **14,** 48–63, figs. 1–2, pl. 2–3.

Barnard, K. H., 1947, Descriptions of new species of South African Decapod Crustacea, with notes on Synonymy and new Records. *The Annals and Magazine of Natural History*, ser. 11, **13,** no. 102, 1946 (1947), 361–392.

—— 1950, Descriptive Catalogue of South African Decapod Crustacea (Crabs and Shrimps). *Annals of the South African Museum, Cape Town*, **38,** 1–837, figs. 1–154.

—— 1955, Additions to the fauna-list of South African Crustacea and Pycnogonida. *Annals of the South African Museum, Cape Town*, **43,** pt. 1, 1–107, figs. 1–53.

Boone, L., 1934, Crustacea: Stomatopoda and Brachyura. Scientific Results of the World Cruise of the Yacht 'Alva', 1931, William K. Vanderbilt, Commanding. *Bulletin of the Vanderbilt Marine Museum, Huntington, N.Y.*, **5,** 1–210, 109 pl.

Borradaile, L. A., 1900, On some Crustaceans from the South Pacific. Part IV. The Crabs. *Proceedings of the Zoological Society of London*. 568–596, pl. 40–42.

—— 1902, Marine Crustaceans. III. The Xanthidae and some other Crabs. In: J. S. Gardiner, *The Fauna and Geography of the Maldive and Laccadive Archipelagoes*, vol. **1**, pt. 3, pp. 237–271, figs. 41–60.

Bouvier, E.-L., 1915, Décapodes marcheurs (Reptantia) et Stomatopodes, recueillis à l'île Maurice par M. Paul Carié. *Bulletin scientifique de la France et de la Belgique*, sér. 7. **48,** no. 3, 178–318 [1–141], figs. 1–42, pl. 4–7.

Buitendijk, A. M., 1941, Biological Results—XIII. On some Xanthidae, chiefly of the genus *Platypodia* Bell. *Temminckia*, **6,** 295–312, figs. 1–3.

—— 1960, Brachyura of the families Atelecyclidae and Xanthidae. Part I. In: Biological Results of the Snellius Expedition. XXI. *Temminckia*, **10,** 252–338, figs. 1–9.

Calman, W. T., 1900, On a Collection of Brachyura from Torres Straits. *Transactions of the Linnean Society of London (Zoology)*, **8,** pt. 1, 1–49, 3 pl.

—— 1909 a, On a new Crab taken from a deep-sea Telegraph-Cable in the Indian Ocean. *The Annals and Magazine of Natural History*, ser. 8, **3,** no. 13, 30–33, 1 fig.

—— 1909 b, On Decapod Crustacea from Christmas Island, collected by Dr. C. W. Andrews, F.R.S., F.Z.S. *Proceedings of the Zoological Society of London*, 703–713, pl. 72.

Chen, H., and Lan, J., 1978, Preliminary Studies on the Xanthidae (Brachyura, Crustacea) of the Xisha Islands, Guangdong Province, China. In: *Report on the scientific Results of marine Biology of the Xisha Islands and Zhongsa Islands (South China Sea). South China Sea Institute of Oceanography, Academia Sinica*, pp. 261–268, text-figs. 1–12, pl. 1–8.

Chopra, B. N., and Das, K. N., 1937, Further Notes on Crustacea Decapoda in the Indian Museum. IX. On Three Collections of Crabs from Tavoy and Mergui Archipelago. *Records of the Indian Museum, Calcutta*, **39,** pt. 4, 377–434, figs. 1–21, pl. 6.

Dana, J. D., 1852 a, Conspectus Crustaceorum, etc. Conspectus of the Crustacea of the Exploring Expedition under Capt. Wilkes, U.S.N., including the Crustacea Cancroidea Corystoidea. *Proceedings of the Academy of Natural Sciences of Philadelphia*, **6,** 73–86.

—— 1852 b, Crustacea. *United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N.*, Vol. **13,** pt. 1, 1852, pp. i–viii, 1–685.

—— 1855, Crustacea. *United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842 under the command of Charles Wilkes, U.S.N.*, Vol. **14,** Atlas, pp. 1–27, pl. 1–96. Philadelphia.

Doflein, F., 1902, Ostasiatische Dekapoden. *Abhandlungen bayerische Akademie Wissenschaften, Munich*, **21,** pt. 3, 613–670, figs. 1–4, pl. 1–6.

Edmondson, C. H., 1925, Crustacea. In: Marine Zoology of the Tropical Central Pacific (Tanager Expedition Publication I). *Bulletin of the Bernice Pauahi Bishop Museum, Honolulu*, no. **27,** 3–62, figs. 1–8, pl. 1–4.

Edmondson, C. H., 1946, Reef and Shore Fauna of Hawaii. *Special Publications of the Bernice Pauahi Bishop Museum, Honolulu*, **22,** i–iii, 3–381, figs. 1–223.

—— 1962, Xanthidae of Hawaii. *Occasional Papers of the Bernice Pauahi Bishop Museum, Honolulu*, **22,** no. 13, 215–309, figs. 1–34.

Estampador, E. P., 1937, A Check List of Philippine Crustacean Decapods. *Philippine Journal of Science*, **62,** 465–559.

—— 1959, Revised Check List of Philippine Crustacean Decapods. *Natural and Applied Science Bulletin, University of the Philippines, Quezon City*, **17,** no. 1, 1–127.

Forest, J., and Guinot, D., 1961, Crustacés Décapodes Brachyoures de Tahiti et des Tuamotu. In: Expédition française sur les récifs coralliens de la Nouvelle-Calédonie. Volume préliminaire. Paris, *Éditions de la Fondation Singer-Polignac*, pp. ix–xi, 1–195, figs. 1–178, pl. 1–18, tbl. 1–3, 7 maps.

Garth, J. S., 1968, *Globopilumnus xantusii* (Stimpson), n. comb., a stridulating Crab from the west Coast of tropical America, with Remarks on discontinuous Distribution of some west American and west African Genera of Brachyrhynchous Crabs. *Crustaceana*, **15,** pt. 3, 312–318, figs. 1–5.

—— 1971, *Demania toxica*, a new Species of poisonous Crab from the Philippines. *Micronesica*, **7,** nos. 1–2, 179–183, pl. 1.

—— 1975, *Demania alcalai*, a second new Species of poisonous Crab from the Philippines. *Philippine Journal of Science*, **104,** nos. 1–2, 1–6, fig. 1.

GORDON, I., 1931, Brachyura from the Coasts of China. *Journal of the Linnean Society of London, Zoology*, **37,** no. 254, 525–558, figs. 1–36.

—— 1934, Crustacea Brachyura. In: Résultats Scientifiques du Voyage aux Indes Orientales Néerlandaises de le Prince et la Princesse Léopold de Belgique, vol. **III**, fasc. 15. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique, Bruxelles*, hors. sér., 78 p., 37 figs.

GRANT, F. E., and MCCULLOCH, A. R., 1906, On a Collection of Crustacea from the Port Curtis District, Queensland. *Proceedings of the Linnean Society of New South Wales, Sydney*, **31,** pt. 1, 1–53, figs. 1–3, pl. 1–4.

GRIFFIN, D. J. G., 1976, Spider Crabs of the Family Majidae (Crustacea: Brachyura) from the Philippine Islands. *Journal of Natural History, London*, **10,** 179–222.

GUINOT, D., 1958, Sur une Collection de Décapodes Brachyoures (Portunidae et Xanthidae) de l'île Mayotte. II. Xanthidae. *Bulletin du Muséum national d'Histoire naturelle, Paris*, sér. 2, **30,** no. 1, 84–93, figs. 11–17; *Id.* II. Xanthidae (suite). *Ibid.*, no. 2, 175–183, figs. 18–27. *Id.* II. Xanthidae (suite). *Ibid.*, no. 3, 276–284, figs. 28–30.

—— 1964, Crustacés Décapodes Brachyoures (Xanthidae) des Campagnes de la Calypso en Mer Rouge (1952), dans le Golfe Persique et à l'île Aldabra (1954). *Mémoirs du Muséum national d'Histoire naturelle, Paris*, sér. A. *Zool.*, **32,** fasc. 1, 1–108, i–iii, figs. 1–57, pl. 1–12.

—— 1967, Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyoures. III. A propos des affinités des genres *Dairoides* Stebbing et *Daira* de Haan. *Bulletin du Muséum national d'Histoire naturelle, Paris*, sér. 2, **39,** no. 3, 540–563. figs. 1–36.

—— 1969, Sur divers Xanthidae, notamment sur *Actaea* de Haan et *Paractaea* gen. nov. (Crustacea Decapoda Brachyura). *Cahiers du Pacifique, Paris*, no. 13, 222–267, figs. 1–36.

—— 1971, Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyoures. VIII. Synthèse et bibliographie. *Bulletin du Museum national d'Histoire naturelle. Paris*. sér. 2. **42,** no. 5. 1970 (1971). 1063–1090.

—— 1976, Constitution de quelques groupes naturels chez les Crustacés Décapodes Brachyoures. 1. La super-famille des Bellioidea et trois sous-familles de Xanthidae (Polydectinae Dana, Trichiinae de Haan, Actaeinae Alcock). *Mémoires du Muséum national d'Histoire naturelle, Paris*, nouv. sér., sér. A. *Zool.*, **97,** 1–308, figs. 1–47, pl. 1–19.

HAAN, W. DE, 1833–1850, Crustacea. In: *P. F. von Siebold, Fauna Japonica, sive Descriptio animalium, quae in itinere per Japoniam, jussu et auspiciis superiorum, qui summum in India Batava imperium tenent, suscepto, annis 1823–1830 collegit, notis, observationibus e adumbrationibus illustravit. Lugduni Batavorum*, fasc. 1–8, p. i–xxi, vii–xvii, ix–xvi, 1–243, pl. 1–55, A–Q, circ. pl. 2.

HASWELL, W. A., 1882, *Catalogue of the Australian stalk- and sessile-eyed Crustacea. Sydney, The Australian Museum*, p. iii–xxiv, 1–324, fig. 1–8, pl. 1–4.

HELLER, C., 1861, Beiträge zur Crustaceen-Fauna des rothen Meeres. Erster Theil. *Sitzungsberichte Akademie der Wissenschaften, Wien*, **43,** pt. 1, 297–374, pl. 1–4. [Not seen.]

—— 1865, Crustaceen. In: *Reise der osterreichischen Fregatte 'Novara' um die Erde, in den Jahren 1857, 1858, 1859, unter den Befehln des Commodore B. von Wüllerstorf-Urbair. Zoologischer Theil, Wien*, **2,** pt. 3, no. 1, 1–280, pl. 1–25.

HENDERSON, J. R., 1893, A Contribution to Indian Carcinology. *Transactions of the Linnean Society of London*, ser. 2. **5,** 325–458. pl. 36–40.

HERBST, J. F. W., 1790, *Versuch einer Naturgeschichte der Krabben und Krebse; nebst einer systematischen Beschreibung ihrer verschiedenen Arten*. vol. **1,** 1782–1790. p. 1–274, pl. 1–25.

HILGENDORF, F., 1879, Die von Hrn. W. Peters in Moçambique gesammelten Crustaceen. *Monatsberichte der Akademie der Wissenschaften, Berlin, 1878 (1879)*, 782–852, pl. 1–4.

HOLTHUIS, L. B., 1953, Enumeration of the Decapod and Stomatopod Crustacea from Pacific Coral Islands. *Atoll Research Bulletin*, no. **24,** 1–66, 2 maps.

KAMITA, T., 1941, *Studies of the Decapod Crustaceans of Chosen*. Pt. 1, *Crabs*. The Fisheries Society of Chosen. Keijo. p. 1–289. figs. 1–146, pl. 1–2, 1 map.

KIKUCHI, T., and MIYAKE, S., 1978, Fauna and Flora of the Sea around the Amakusa Marine Biological Laboratory. Decapod Crustacea (Revised Edition). *The Amakusa Marine Biological Laboratory, Kyushu University, Fukuoka*, p. 1–52.

KIM, H. S., 1970, A Checklist of the Anomura and Brachyura (Crustacea Decapoda) of Korea. *Seoul National University Journal, Biology and Agriculture Series (B)*, **21,** 1–34, fig. 1, pl. 1–5.

—— 1973, A Catalogue of Anomura and Brachyura from Korea. In: *Illustrated Encyclopedia of Fauna and Flora of Korea, Vol.* **14.** *Anomura and Brachyura, Samhwa Publishing Company*. p. 1–694. figs. 1–265. pl. 1–112. tabl. 1. 2. 1 map.

KLUNZINGER, C. B., 1913, Die Rundkrabben (Cyclometopa) des Rothen Meeres. Deutsche Akademie der Naturforscher, Halle. *Nova Acta Leopoldina*, **99,** no. 2, 97–402, 14 figs., pl. 5–11.

KRAUSS, F., 1893, *Die Südafrikanischen Crustaceen. Eine Zusammenstellung aller bekannten Malacostraca, Bemerkungen über Lebensweise und geographische Verbreitung, nebst Beschreibung und Abbildung mehrer neuen Arten*. Stuttgart, p. 1–68, pl. 1–4.

LANCHESTER, W. F., 1900, On a Collection of Crustaceans made at Singapore and Malacca. Part I. Crustacea Brachyura. *Proceedings of the Zoological Society of London*, 719–770, pl. 44–47.

—— 1901, On the Crustacea collected during the 'Skeat Expedition' to the Malay Peninsula, together with a Note on the Genus *Actaeopsis*. Part I. Brachyura, Stomatopoda and Macrura. *Proceedings of the Zoological Society of London*, 534–574, pl. 33–34.

LAURIE, R. D., 1906, Report on the Brachyura collected by Prof. Herdman, at Ceylon, in 1902. In: W. A. Herdman, *Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar*. Part V. Supplementary Report no. 40, p. 349–432, figs. 1–12, 2 pl.

LENZ, H., 1905, Ostafrikanische Dekapoden und Stomatopoden. Gesammelt von Herrn Prof. Dr. A. Voeltzkow. In: A. Voeltzkow, Wissenschaftliche Ergebnisse der Reisen in Madagaskar und Ostafrika in den Jahren 1889–95. Vol. III. *Abhandlungen Senckenbergische Naturforschende Gesellschaft, Frankfurt am Main*, **27,** p. 341–392, pl. 47–48.

MAN, J. G., DE, 1880, On some podophthalmous Crustacea, presented to the Leyden Museum by Mr. J. A. Kruyt, collected in the Red Sea near the city of Djeddah. *Rijksmuseum van Natuurlijke Historie, Leyden*, Notes, **2,** p. 171–185.

—— 1887–1888, Report on the Podophthalmous Crustacea of the Mergui Archipelago, collected for the Trustees of the Indian Museum, Calcutta, by Dr. John Anderson, F.R.S., Superintendent of the Museum. Parts I–V. *Journal of the Linnean Society, Zoology*, **22,** 1887, nos. 136–137, 1–128; **22,** 1888, nos. 138–140, 129–312, pl. 1–19.

—— 1888, Bericht über die im indischen Archipel von Dr. J. Brock gesammelten Decapoden und Stomatopoden. *Archiv für Naturgeschichte, Berlin*, **53,** 1887 (1888), 215–600, pl. 1–16, 16 a.

—— 1895–1897, Bericht über die von Herrn Schiffscapitän Storm zu Atjeh, an den westlichen Küsten von Malakka, Borneo und Celebes sowie in der Java-See gesammelten Decapoden und Stomatopoden. *Zoologische Jahrbücher*, Jena, Abtheil für Systematik, vol. **8**, p. 485–609, figs. 1–15. *Id., Ibid.*, vol. **9** (1897), Zweiter Theil, 20-XII-1895, p. 75-218, figs. 16–39; Dritter Theil, 4-VI-1896, p. 339–386, figs. 40–49; Vierter Theil, 10-IX-1896, p. 459–514, figs. 50–59; Fünfter Theil. 3-III-1897. p. 725–790. pl. 12–14.

—— 1899, Zoological Results of the Dutch scientific Expedition to central Borneo. *Rijksmuseum van Natuurlijke Historie, Leyden*, Notes, **21,** 53–144, pl. 5–12.

—— 1902, Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. In: W. Kükenthal, Ergebnisse einer Zoologischen Forschungsreise in den Molukken und Borneo. *Abhandlungen Senckenbergische Naturforschende Gesellschaft, Frankfurt am Main*, **25,** 467–929, pl. 19–27.

—— 1913, Note sur l'identite de la *Menippe Ortmanni* de Man avec la *Menippe convexa* Rathbun. *Bulletin du Muséum national d'Histoire naturelle, Paris. Réunion mensuelle des Naturalistes du Muséum*, no. 1, 12–14, pl. 1.

—— 1914, Description de deux espèces nouvelles du genre *Pilumnus* Leach de d'une jeune femelle du *Pil. longicornis* Hilgend., découverts dans les coquilles vides de balanes. *Bulletin Société zoologique de France, Paris*, **39,** 330–343.

McNeill, F. A., 1926, Studies in Australian Carcinology, No. 2. *Records of the Australian Museum, Sydney*, **15,** 100–131, pl. 9, 10.

Miers, E. J., 1879 a, On a Collection of Crustacea made by Capt. H. C. St. John, R.N., in the Korean and Japanese Seas. Part I. Podophthalmia. With an Appendix by Capt. H. C. St. John. *Proceedings of the Zoological Society of London*, 18–61, pl. 1–3.

—— 1879 b, Crustacea. The Collections from Rodriguez. In: An Account of the Petrological, Botanical and Zoological Collections made in Kerguelen's Land and Rodriguez during the Transit of Venus Expeditions, carried out by order of Her Majesty's Government in the Years 1874–75. *Philosophical Transactions of the Royal Society of London*, **168,** 485–496, pl. 1.

—— 1879 c, On Crustacea from the Korean and Japanese Seas. *Proceedings of the Zoological Society of London*, 18–60, pl. 1–3.

—— 1880, On a Collection of Crustacea from the Malaysian Region. Part I. Crustacea Oxyrhyncha and Cyclometopa, except Telphusidea. *The Annals and Magazine of Natural History*, ser. 5, **5,** 226–239, [1–15], pl. 13.

—— 1884 a, On some Crustaceans from Mauritius. *Proceedings of the Zoological Society of London*, 10–17, pl. 1.

—— 1884 b, Crustacea. In: *Report on the zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. 'Alert' 1881–1882. Part I. The Collections from Melanesia. Part II. The Collections from the Western Indian Ocean. London*, p. 178–322, 513–575, pl. 18–32, 46–51.

—— 1886, Report on the Brachyura collected by H.M.S. 'Challenger' during the Years 1873–76. In: Report on the Scientific Results of the Exploring Voyage of H.M.S. 'Challenger', *Zoology*, Part 49, Vol. **17;** London, Edinburgh and Dublin, 1–362 p., 29 pl.

Milne Edwards, A., 1865, Études zoologiques sur les Crustacés récents de la famille des Cancériens. *Nouvelles Archives du Muséum national d'Histoire naturelle, Paris*, sér. 1, **1,** 177–308, pl. 11–19.

—— 1867, Descriptions de quelques especes nouvelles de Crustacés Brachyures. *Annales de la Société Entomologique de France, Paris*, sér. 4, **7**, 263–288.

—— 1868, Description de quelques Crustacés nouveaux provenant des voyages de M. Alfred Grandidier à Zanzibar et à Madagascar. *Nouvelles Archives du Muséum national d' Histoire naturelle, Paris*, **4,** 69–92, pl. 19–21.

—— 1873 a, Recherches sur la faune carcinologique de la Nouvelle-Calédonie. Deuxième Partie. *Nouvelles Archives du Muséum national d'Histoire naturelle, Paris*, **9,** 155–332, pl. 4–18.

—— 1873 b, Description de quelques Crustacés nouveaux ou peu connus provenant du Musée de M. C. Godeffroy. *Journal of the Museum Godeffroy, Hamburg*, **1,** no. 4, 77–88 [1–12], pl. 12–13.

Milne Edwards, H., 1834–1837, *Histoire naturelle des Crustacés, Paris*, I, 1834, pp. i–xxxv, 1–468. II, 1837, 532 p. Atlas.

Miyake, S., 1936, Reports on the Brachyura of Riukiu Islands collected by the Yaéyama Expeditions during the years 1932–1934. II. A list of the known Species of the Brachyura from Ishigaki-shima. *Annotationes zoologicae japonenses, Tokyo*, **15,** no. 4, 506–513.

—— 1939, Notes on Crustacea Brachyura collected by Prof. Teiso Esaki's Micronesia Expeditions 1937–1938. Part II: A Check List of Micronesian Brachyura. Part III: Table showing the Distribution of Micronesian Brachyura. *Records of oceanographic Works in Japan*, **10,** no. 2, 198–247, pl. 12–17 [1–6], 1 tabl.

Miyake, S., and Takeda, M., 1968, Two new Species of xanthid Crabs from the Palau Islands. *Journal of the Faculty of Agriculture, Kyushu University, Fukuoka, Japan*, **14,** no. 3, 389–398, figs. 1–4.

Montgomery, S. K., 1931, Report on the Crustacea Brachyura of the Percy Sladen Trust Expedition to the Abrolhos Islands under the Leadership of Professor W. J. Dakin, in 1913; along with other Crabs from Western Australia. *Journal of the Linnean Society of London, Zoology*, **37,** 405–465, 1 fig., pl. 24–30.

Nobili, G., 1906 a, Crustacés Décapodes et Stomatopodes. In: Mission G. Bonnier et Ch. Pérez (Golfe Persique 1901). *Bulletin scientifique de la France et de la Belgique*, **40,** 13–159, figs. 1–3, pl. 2–7.

—— 1906 b. Faune carcinologique de la Mer Rouge. Décapodes et Stomatopodes. *Annales des Sciences naturelles, Paris*, sér. 9, **4,** 1–347, figs. 1–12, pl. 1–11.

—— 1907. Ricerche sui Crostacei della Polinesia. Decapodi, Stomatopodi, Anisopodi e Isopodi. *Memorie Accademia delle Scienze di Torino*, sér. 2, **57,** 351–430, pl. 1–3.

ODHNER, T., 1925, Monographierte Gattungen der Krabbenfamilie Xanthidae. I. *Göteborgs K. Vetenskaps- och Vitterhets Samhälle Handlingar*, ser. 4, **29,** no. 1 (*Meddelanden från Göteborgs Musei Zoologiska Avdelning* 37), 1–92, figs. 1–7, pl. 1–5.

ORTMANN, A., 1893, Die Decapoden-Krebse des Strassburger Museums. VII. Theil. Abtheilung: Brachyura (Brachyura genuina Boas) II. Unterabtheilung: Cancroidea, 2. Section: Cancrinea, 1. Gruppe: Cyclometopa. *Zoologische Jahrbücher, Jena, Abtheil für Systematik*, **7,** 411–495, pl. 17.

—— 1894, Decapoden. In: R. Semon, Zoologische Forschungsreisen in Australian und dem Malayischen Archipel. *Denkschriften Medizinisch-Naturwissenschaftliche Gesellschaft zu Jena*, **8,** 1–80, pl. 1–3.

PARISI, B., 1916, I Decapodi giapponesi del Museo di Milano. IV. Cyclometopa. *Atti della Societa Italiana di Scienze Naturali*, **55,** 153–190, figs. 1–4, pl. 7–11.

PAULSON, O., 1875, Studies on Crustacea of the Red Sea with notes regarding other Seas. Part 1. Podophthalmata and Edriophthalmata (Cumacea). *The Israel Program for Scientific Translations*, Jerusalem, p. 1–164, pl. 1–21. (English translation of the original Russian publication, Israel, 1961.)

RATHBUN, M. J., 1893, Description of new Genera and Species of Crabs from the west Coast of North America and the Sandwich Islands. Scientific Results of Explorations by the U.S. Fish Commission Steamer 'Albatross'. *Proceedings of the United States National Museum*, **16,** 223–260.

—— 1902, Crabs from the Maldive Islands. *Bulletin of the Museum of Comparative Zoology, Harvard*, **39,** 123–138, 1 pl.

—— 1906, The Brachyura and Macrura of the Hawaiian Islands. *Bulletin of the United States Fish Commission*, **23,** 1903 (1906), pt. 3, i–viii, 827–930, figs. 1–79, pl. 3–24.

—— 1907, Reports on the scientific Results of the Expedition to the tropical Pacific, in Charge of Alexander Agassiz, by the U.S. Fish Commission Steamer 'Albatross', 1899–1900. IX. Reports on the scientific Results of the Expedition to the eastern tropical Pacific, in Charge of Alexander Agassiz, by the U.S. Fish Commission Steamer 'Albatross' 1904–1905. X. The Brachyura. *Memoirs of the Museum of Comparative Zoology, Harvard*, **35,** no. 2, 23–74, pl. 1–9.

—— 1910, Brachyura. V. *In*: The Danish Expedition to Siam 1899–1900. *K. Danske Videnskabernes Selskabs Skrifter, Copenhagen*, ser. 7, **5,** no. 4, 301–367, 44 figs., pl. 1–2, 1 map.

—— 1911, Marine Brachyura. In: The Percy Sladen Trust Expedition to the Indian Ocean in 1905 under the Leadership of Mr. J. Stanley Gardiner. Vol. III. No. XI. *Transactions of the Linnean Society of London, Zoology*, **14,** pt. 2, 191–261, pl. 15–20.

—— 1914, Stalk-eyed Crustaceans collected at the Monte Bello Islands. *Proceedings of the Zoological Society of London*, 1914, 653–664, pl. 1–2.

—— 1923, Report on the Brachyrhyncha, Oxystomata, and Dromiacea. In: Report on the Crabs obtained by the F.I.S. 'Endeavour' on the Coasts of Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Biological Results of the Fishing Experiments carried on by the F.I.S. 'Endeavour' 1909–14, Sydney*, **5,** pl. 3, pp. 95–156, figs. 1–3, pl. 16–42.

—— 1924, Brachyura, Albuneidae and Porcellanidae. 37. In: Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia 1910–1913. *Arkiv för Zoologi, Stockholm*, **16,** no. 23, 1–33, figs. 1–7, pl. 1.

—— 1930, The Cancroid Crabs of America of the Families Euryalidae, Portunidae, Atelecyclidae, Cancridae, and Xanthidae. *Bulletin of the United States National Museum*, no. **152,** xvi–609 p., 85 figs., 230 pl.

RICHTERS, F., 1880, Crustacea Decapoda of Mauritius and the Seychelles. In: K. A. Möbius, *Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen, bearbeitet von K. Möbius, F. Richters und E. von Martens, Berlin*, p. 139–178, pl. 15–18.

RÜPPELL, E. W., 1830, *Beschreibung und Abbildung von 24 Arten kurzschwänzigen Krabben, als Beiträg zur Naturgeschichte des rothen Meeres*. Frankfurt am Main; H. L. Brönner, p. 3–28, pl. 1–6. [Not seen.]

SAKAI, T., 1934, Brachyura from the Coast of Kyushu, Japan. *Science Reports of the Tokyo Bunrika Daigaku*, sect. B, **1**, no. 25, 281–330, figs. 1–26, pl. 17–18.

—— 1936, *Crabs of Japan*, 66 Plates in life Colours with Descriptions, Sanseido, Tokyo, p. 1–239, 66 pl.

—— 1939, *Studies on the Crabs of Japan*, IV, Brachygnatha, Brachyrhyncha, Yokendo, Tokyo, p. 365–741, figs. 1–129, pl. 42–111, tabl. 1.

—— 1965 a, On two new Genera and five new Species of xanthoid Crabs from the Collection of His Majesty the Emperor of Japan made in Sagami Bay, *Crustaceana*, **8**, pt. 1, 97–106, figs. 1–4.

—— 1965 b, *The Crabs of Sagami Bay collected by His Majesty the Emperor of Japan*, Maruzen Co., Tokyo, p. i–xvi, 1–206, figs. 1–27 (in English), p. 1–92 (in Japanese), p. 1–32, pl. 1–100, 1 map.

—— 1969, Two new Genera and twenty-two new Species of Crabs from Japan. *Proceedings of the Biological Society of Washington*, **82**, 243–280, pl. 1–2, text-fig. 1–20.

—— 1976, *Crabs of Japan and the adjacent Seas*. Kodansha Ltd., Japan, p. i–xxix, 1–773, text-fig. 1–379, pl. 1–251, Japanese edition, p. 1–461.

SANKARANKUTTY, C., 1962, On Decapoda Brachyura from the Andaman and Nicobar Islands. 2. Family Xanthidae. *Journal of the Marine Biological Association of India*, **4**, no. 1, 121–150.

SAVIGNY, J. C., 1817, Crustacés Description de l'Egypte. *Histoire naturelle, Zoologie*, Planches, vol. 2, pl. 1–13.

SERÈNE, R., 1961–1962, Les espèces indo-pacifiques d'*Actea* [sic] et celles des genres *Pseudactea* [sic] et *Banareia*. *Bulletin Société zoologique de France, Paris*, **86**, nos. 2–3, 195–212; *Id.*, (2e partie), *ibid.*, **86**, no. 6, 1961 (1962), 673–693, figs. 1–2, pl. 1.

—— 1968, The Brachyura of the Indo-West Pacific Region. In: *Prodromus for a Check List of the (non-planctonic) Marine Fauna of Southeast Asia*. UNESCO, Singapore, Special Publication no. 1, Fauna III Cc3, p. 1–112.

—— 1969, Description de deux espèces nouvelles et redécouverte d'une espèce de Brachyoure (Decapoda–Crustacea) dans les eaux d'Indonésie. *Cahiers du Pacifique*, no. **13** (mai 1969), 281–293, pl. 1–4, text-fig. 1–24.

—— 1971, Observations préliminaires sur les brachyoures nouveaux ou mal connue du sud-est Asiatique. *Bulletin du Muséum national d'Histoire naturelle, Paris*, sér. 2, **42** (1970), no. 5, 903–918, pl. 1–6.

—— 1973, Observations sur les espèces des genres *Quadrella* Dana 1851 et *Sphenomerides* Rathbun 1898 (Decapoda–Brachyura). *Bulletin Société zoologique de France*, **98**, no. 1, 191–209, fig. 1–28, pl. 1–5.

SERÈNE, R., and PHAM THANH DAT, 1957, Note sur *Tetralia nigrifrons* Dana 1852. *Institute Oceanographique de l'Indochine, Nhatrang*, Contribution no. 27, p. 1–27, pl. 1–3, text-fig. 1–4.

SERÈNE, R., ROMIMORTARTO, K., and MOOSA, M. K., 1974, The Hippidea and Brachyura collected by the Rumphius Expedition. In: Report on the Rumphius Expedition I (January 6–February 1, 1973). *Oseanologi di Indonesia*, no. 1, p. 17–26.

SERÈNE, R., and UMALI, A. F., 1972, The Family Raninidae and other new and rare Species of Brachyuran Decapods from the Philippines and adjacent Regions. *Philippine Journal of Science*, **99**, no. 1–2, 21–105, text-figs. 1–131, pl. 1–9.

SERÈNE, R. and VADON, C., 1981, Crustacés Décapodes: Brachyoures. Liste préliminaire, description de formes nouvelles et remarques taxonomiques. In: Resultats des Campagnes MUSORSTOM. I—Philippines (18–28 mars 1976), 5. *Mémoires ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer)*, **91**, 117–140, pl. 1–4, figs. 1–3.

SHEN, C. J., 1936, Additions to the Fauna of Brachyuran Crustacea of North China. *Contributions from the Institute of Zoology, National Academy of Peiping*, **3**, no. 3, 59–75, text-figs. 1–4.

—— 1937, Second Addition to the Fauna of Brachyuran Crustacea of North China, with a Check List of the Species recorded from this particular Region. *Contributions from the Institute of Zoology, National Academy of Peiping*, **3**, no. 6, 277–312, text-figs. 1–11.

—— 1940, On the Collection of Crabs from South China. *Bulletin of the Fan Memorial Institute of Biology, Peiping, Zoology Series*, **10**, no. 2, 69–104.

Stebbing, T. R. R., 1910, General Catalogue of South African Crustacea (Part V of S. A. Crustacea, for the Marine Investigations in South Africa). *Annals of the South African Museum, Cape Town*, **6,** 281–593, pl. 15–22.

Stephensen, K., 1945, The Brachyura of the Iranian Gulf. With an Appendix: The Male Pleopoda of the Brachyura. In: *Danish scientific Investigations in Iran*, Part IV. Copenhagen: E. Munksgaard, p. 57–237, figs. 1–60.

Stimpson, W., 1858, Prodromus descriptionis animalium evertebratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit W. Stimpson. Pars IV. Crustacea Cancroidea et Corystoidea. *Proceedings of the Academy of Natural Sciences of Philadelphia*. **10,** 31–40.

—— 1907, Report on the Crustacea (Brachyura and Anomura) collected by the North Pacific Exploring Expedition, 1853–1856. *Smithsonian Miscellaneous Collections*, **49,** no. 1717, 1–240, pl. 1–26.

Takeda, M., 1973, Report on the Crabs from the Sea around the Tsushima Islands collected by the Research Vessel 'Genkai' for the Trustees of the National Science Museum, Tokyo. *Bulletin of the Liberal Arts and Science Course, Nihon University School of Medicine, Japan*, **1,** 17–68, figs. 1–5, tabl. 1–3.

—— 1974, Accounts of some Crabs from Mutsu Bay, with Description of a new Grapsid from Onagawa Bay. *Bulletin of the Marine Biological Station of Asamushi, Tohoku University, Japan*, **15,** 13–21, text-figs. 1–3.

—— 1977, Crabs of the Ogasawara Islands. V. A Collection made by Dredging. *Memoirs of the National Science Museum, Tokyo*, no. **10,** 113–139, text-figs. 1–5, pl. 12–17.

—— 1978, Biogeographical Notes on the Crabs obtained by Dredging at the Sea around Nii-jima and O-shima, Izu Islands. *Memoirs of the National Science Museum, Tokyo*, no. **11,** 73–80.

Takeda, M., and Galil, B. S., 1980, A new Species of *Calocarcinus* (Crustacea, Brachyura) from the Submarine Bank off the Izu Islands, Central Japan. *Bulletin of the National Science Museum, Tokyo*, ser. A (Zoology), 6, no. 4, 191–194, text-figs. 1–8.

Takeda, M., and Kim, H. S. 1977, A new *Actumnus* (Crustacea; Decapoda; Brachyura) from Jeju Island, Korea. *Korean Journal of Zoology*, **20,** no. 3, 135–139, fig. 1.

Takeda, M., and Koyama, Y., 1974, On some rare Crabs from Kii Province. *Researches on Crustacea, Carcinological Society of Japan*, no. **6,** 103–121, pl 10–12.

Takeda, M., and Miyake, S., 1968 a, Pilumnid Crabs of the Family Xanthidae from the West Pacific. I. Twenty-three Species of the Genus *Pilumnus*, with Description of four new Species. *OHMU, Occasional Papers of Zoological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan*, **1,** no. 1, 1–60, figs. 1–13, pl. 1–3.

—— 1968 b, Crabs from the East China Sea. I. Corystoidea and Brachygnatha Brachyrhyncha. *Journal of the Faculty of Agriculture, Kyushu University, Fukuoka, Japan*, **14,** no. 4, 541–582, figs. 1–11, pl. 6.

—— 1969, Pilumnid Crabs of the Family Xanthidae from the West Pacific. II. Twenty-one Species of four Genera, with Descriptions of four new Species. *OHMU, Occasional Papers of Zoological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan*, **2,** no. 7, 93–156, text-figs. 1–18.

—— 1972, Crabs from the East China Sea. V. A remaining Collection. *OHMU, Occasional Papers of Zoological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan*, **3,** no. 8, 63–90, text-fig. 1, pl. 3.

Takeda, M., and Nunomura, N., 1976, Crabs collected by the Melanesia Expedition of the Osaka Museum of Natural History, 1958. *Bulletin of the Osaka Museum of Natural History, Japan*, no. **30,** 61–92, figs. 1–3.

Tweedie, M. W. F., 1947, On the Brachyura of Christmas Island. *Bulletin of the Raffles Museum, Singapore*, no. **18,** 27–42, fig. 1.

—— 1950, The Fauna of Cocos-Keeling Islands, Brachyura and Stomatopoda. *Bulletin of the Raffles Museum, Singapore*, no. **22,** 105–148, figs. 1–4, pl. 16–17.

Ward, M., 1932, The true Crabs of the Capricorn Group, Queensland. *Australian Zoologist, Sydney*, **7,** 237–255.

—— 1933, New Genera and Species of Marine Decapoda Brachyura, from the Coasts of New South Wales and Queensland. *Australian Zoologist, Sydney*, **7,** pt. 5, 377–394, pl. 21–23.

—— 1934, Notes on a Collection of Crabs from Christmas Island, Indian Ocean. *Bulletin of the Raffles Museum, Singapore*, no. 9, 5–28, pl. 1–3.

—— 1941, New Brachyura from the Gulf of Davao, Mindanao, Philippine Islands. *American Museum Novitates*, no. 1104, 1–15, figs. 1–30.

WHITE, A., 1847, Descriptions of new Crustacea from the Eastern Seas. *Proceedings of the Zoological Society of London*, pt. 15, no. 175, 56–58.

WHITLEGGE, T., 1897, The Crustacea of Funafuti. In: The Atoll Funafuti, Ellice Group: its Zoology, Botany, Ethnology, and general Structure based on Collections made by Mr. Charles Hedley, of the Australian Museum. *Memoirs of the Australian Museum, Sydney*, **3,** 125–151, pl. 6–7.

WOOD-MASON, J., 1892, *Illustrations of the Zoology of the royal Indian marine surveying Steamer Investigator . . . Crustacea*, Part 1, pl. 1–5. Calcutta.

WOOD-MASON, J., and ALCOCK, A., 1891, Natural History Notes from H.M. Indian Marine Survey Steamer 'Investigator', Commander R. F. Hoskyn, R. N., Commanding. No. 21. Note on the Results of the last Season's deep-sea Dredging. *The Annals and Magazine of Natural History, London*, ser. 6, **7,** 1–272, figs. 1–5.

YOKOYA, Y., 1933, On the Distribution of Decapod Crustaceans inhabiting the Continental Shelf around Japan, chiefly based upon the Materials collected by S.S. Sôyô-Maru, during the Year 1923–1930. *Journal of the College of Agriculture, Tokyo University, Japan*. **12,** no. 1. 1–226, figs. 1–71, tabl. 1–4.

ZEHNTNER, L., 1894, Crustacés de l'Archipel malais. Voyage de MM. M. Bedot et C. Pictet dans l'Archipel malais. *Revue Suisse de Zoologie et Annales du Musée d'Histoire naturelle de Genève*, **2,** 135–214, p. 7–9.