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REPORT ON THE CRUSTACEA BRACHYURA OF THE PERCY SLADE TRUST EXPEDITION TO THE ABROLHOS ISLANDS UNDER THE LEADERSHIP OF PROFESSOR W. J. DAKIN, D.Sc., F.L.S., IN 1913; ALONG WITH OTHER CRABS FROM WESTERN AUSTRALIA.

BY

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Report on the Crustacea Brachyura of the Percy Sladen Trust Expedition to the Abrolhos Islands under the Leadership of Professor W. J. DAKIN, D.Sc., F.L.S., in 1913; along with other Crabs from Western Australia.

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(PLATES 24–30, and 1 Text-fig.)

[Read 21st November, 1929.]

THE collection which is the subject of this report was made at the Abrolhos Islands, off Geraldton, Western Australia, by the Percy Sladen Trust Expedition under the leadership of Professor W. J. Dakin, D.Sc., in November 1913. In addition there are specimens from Rottnest Island, the Swan River near Perth, the coast near Fremantle, and Albany.

The collection consists of 248 specimens, 192 of which are from the Abrolhos, and contains 55 species two of which show distinct varieties; of these 42 species occur at the Abrolhos, one of which is represented by two varieties. Eight new species are described, 6 of them from the Abrolhos, and 4 new varieties, 3 from the Abrolhos. For one of the new species a new genus is set up. Nine species beside the new species are new to the Australian fauna, and 14 others new to Western Australia. In the list of species in the collection subjoined, those not found at the Abrolhos are marked with an asterisk (*), those new to Australia (other than new species) with a dagger (†), and those new to Western Australia by an exclamation mark (!).

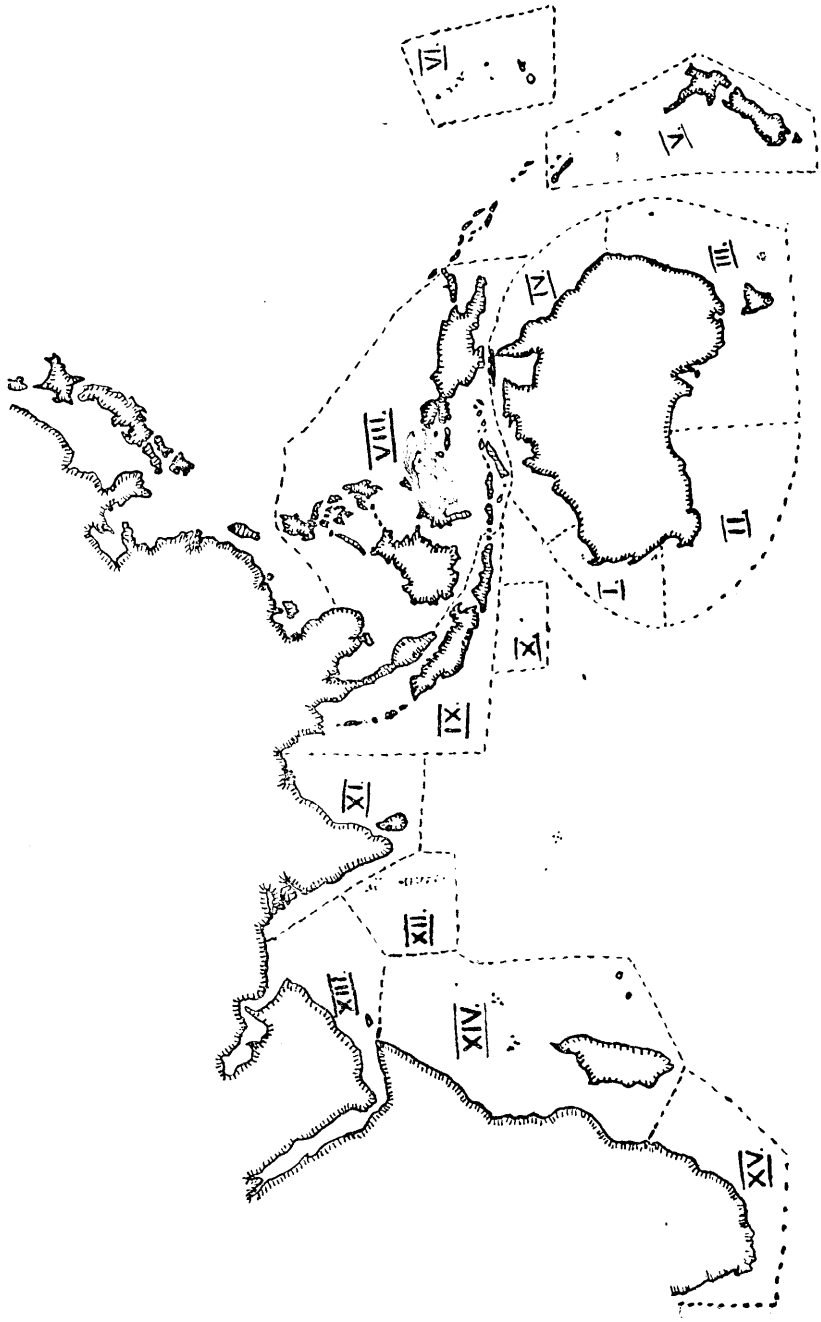
LIST OF SPECIES.

1. *Cryptodromia tumida* Stimpson, 1859 †.
1 *a*. —— —— var. *spinifera*, var. n.*.
2. *Dromidiopsis abrolhensis*, sp. n.
3. *Ephippias endeavouri* Rathbun, 1918.
4. *Hucnia proteus* de Haan, 1839 *.
5. *Menœthius monoceros* Latreille, 1825.
6. *Paranaxia serpulifera* Guérin-Méneville, 1834 (?).
7. *Cyclax* (*Cyclomaia*) *suborbicularis* Stimpson, 1858.
8. *Schizophrys dama* Herbst, 1804.
9. *Micippa philyra* Herbst, 1803.
10. *Naxia aurita* Latreille, 1825 !.
11. *Halicarcinus australis* Haswell, 1882 *b* *.
12. —— *bedfordi*, sp. n.*.
13. *Elamena truncata* Stimpson, 1859 !.
14. *Portunus pelagicus* Linnæus, 1758.

15. *Thalamita prymna* (Herbst, 1803) var. *pelsarti*, var. n.
15 *a*. —— —— var *proxima*, var. n.
16. —— *sima* Milne-Edwards, 1834.
17. —— *macropus*, sp. n.
18. —— *dakini*, sp. n.
19. *Kraussia hendersoni* Rathbun, 1902 †.
20. *Liomera cinctimana* White, 1847 *a* !.
21. —— *bella* Dana, 1852.
22. *Lophozozymus pulchellus* A. Milne-Edwards, 1867 †.
23. *Xantho impressus* Lamarck, 1818 †.
24. —— *hydrophilus* Herbst, 1790.
25. *Actæa helleri* A. Milne-Edwards, 1865 *a* !.
26. —— *calculosa* Milne-Edwards, 1834.
27. —— *savignyi* Milne-Edwards, 1834 *.
28. —— *depressa* (White, 1847 *b*) var. *abrolhensis*, var. n.†.
29. —— *rufopunctata* Milne-Edwards, 1834 †.
30. —— *levidorsalis*, sp. n.
31. *Paraxanthias elegans* Stimpson, 1859.
32. *Chlorodiella nigra* Forsk[illegible] 1775.
33. *Phymodius ungulatus* [illegible]ilne-Edwards, 1834.
34. *Chlorodopsis areolata* [illegible]ilne-Edwards, 1834.
35. *Ozius truncatus* H. Mil[illegible]-Edwards, 1834 !.
36. *Pilumnus contrarius* Rathbun, 1923 * !.
37. —— *digitalis* Rathbun, 1923 !.
38. —— *edamensis* de Man, 1888 *b* †.
39. —— *pulcher* Miers, 1884 * !.
40. —— *semilanatus* Miers, 1884 * !.
41. —— *spinicarpus* Grant & McCulloch, 1906 * !.
42. —— *granti*, sp. n.
43. —— *maccullochi*, sp. n.
44. *Actumnus obesus* Dana, 1852 *a* †.
45. *Litochira bispinosa* Kinahan, 1856 *.
46. *Pinnotheres edwardsi* de Man, 1888 *a* †.
47. *Ocypode pygioides* Ortmann, 1894 *b*.
48. *Leptograpsus variegatus* Fabricius, 1775.
49. *Leptograpsodes*, gen. n., *webhaysi*, sp. n.
50. *Planes minutus* Linnæus, 1758 *.
51. *Cyclograpsus audouinii* H. Milne-Edwards, 1837 * !.
52. *Percnon planissimum* Herbst, 1804.
53. *Plagusia capensis* de Haan, 1835 * !.
54. —— *depressa* (Fabricius, 1775) var. *tuberculata* Lamarck, 1818.
55. Corystoid gen. et sp. indeterm.

The knowledge of the crabs of the West Australian coast is relatively scanty : for example, among the species described as new to Western Australia, two, *Plagusia capensis* de Haan, 1835, and *Cyclograpsus audouinii* Milne-Edwards, 1837, are quite common and of everyday occurrence, while another, *Ocypode pygioides* Ortmann, 1894 *b*, occurs literally in tens of thousands, though it has never been reported since Ortmann's original description.

As a foundation to the present work W. A. Haswell's ' Catalogue of Australian Malacostraca,' 1882, has been taken ; the main additions to the Australian



Sketch-map of Indo-Pacific Region, showing arbitrary divisions.

Brachyuran fauna since then have been made by the work of T. Whitelegge, A. R. McCulloch, and F. A. McNeill in New South Wales, S. W. Fulton and F. E. Grant in Victoria, and W. H. Baker in South Australia; by E. J. Miers in his 'Alert' and 'Challenger' reports, A. Ortmann, W. T. Calman, and M. J. Rathbun, the four recent papers of the last-named on Australian crustacea being most useful. As in all work on the Indo-Pacific fauna A. Alcock's 'Materials for a Carcinological Fauna of India' is essential, and much assistance has been derived from the works of J. G. de Man, H. Balss, L. A. Borradaile, and R. D. Laurie, the latter's Red Sea report being of great use from the point of view of geographical distribution. T. R. R. Stebbing's South African Crustacea and the 'Siboga' reports of J. E. W. Ihle and J. J. Tesch have been of great use for synonymies. A full list of the literature cited is appended at the end of the paper.

In order to assign the Abrolhos Brachyura their proper place in the Indo-Pacific fauna, it is necessary to compare them with the Australian fauna as a whole.

For purposes of discussion of the distribution of the Brachyura the Indo-Pacific has been divided arbitrarily into districts as shown in the sketch-map on p. 407.

The list of Australian Brachyura shows 508 species, and 23 varieties in addition. It is found that 89 species have been reported from the North-West district, which has been taken to range from just south of Geraldton to the southern end of the Ninety-Mile Beach, south of Broome. Of these, 42 species are in the Abrolhos collection; the only species of which previous record from the Abrolhos has been found is *Cyclax* (*Cyclomaia*) *suborbicularis* Stimpson, 1857, by Haswell in his Catalogue. Of these 42 species, 13 have been found both on the Islands and elsewhere in the north-west district; 23 are common to the northern district and 19 common to the southern. In estimating the relations of the Abrolhos with other districts, account must be taken of the large numbers of extremely widespread forms which are common practically to the whole of the Indo-Pacific; thus of the 23 forms common to the Abrolhos and the northern district, 15 occur also in the southern district and 12 elsewhere in the north-west; and, in order to affirm that the Abrolhos Crabs show a predominantly tropical or a predominantly temperate facies, this factor must be borne in mind. Of the nine species in the collection which are new to Australia, all are from the Abrolhos, two occur also in the northern district (one being varietally distinct), and all are tropical. If one neglects the common factor of 15 almost universal species common both to north and south, there are, therefore $(23-15)+9=17$ out of $(42-15)=27$ species of northern or tropical distribution at the Abrolhos and $(19-15)=4$ of southern. There is, therefore, a distinct tropical bias among the Abrolhos Crabs.

The homogeneity of the Indo-Pacific Brachyuran fauna has been stressed by Laurie, 1915. His conclusion is that "the Indo-Pacific figures suggest that one may prophesy with a probable error of ± 5 or 6 that 35 is the most

likely percentage of species common to the Red Sea which will be found in a collection of, say, 200 species of crabs from any hitherto insufficiently explored portion of the Indo-Pacific region." The Australian fauna is not altogether consistent with his findings ; the southern fauna is definitely not comparable with the rest of the Indo-Pacific faunas, and even the northern shows less relation than Laurie's average ; the north-west fauna alone approaches Laurie's 35 per cent. of crabs common to the Red Sea.

For purposes of comparison, Laurie's complete list of Red Sea Crabs has been taken and the percentage of Australian Crabs occurring in it has been shown in Table I (p. 410). Table II shows the distribution in Australia of the species which occur in more than one district.

It will be noted that the different families of crabs vary considerably in the " percentage of homogeneity " ; this may be noted also in Laurie's table. The Portunids, as might be expected, are above the average, and the Xanthids are the next most widespread. It may be remarked, too, that it is the extremely widespread species, occurring in all Australian districts, which bring the " percentage of homogeneity " up ; this may be inferred in Table I from the fact that, where one considers species in the Australian fauna occurring only in one particular district, the percentage of forms common to the Red Sea is almost invariably much lower than when one considers all the forms of that district.

It seems that in general the distribution of the crabs falls into three classes—local, focal, and general. In many cases there are local varieties of a species of generalized distribution as in the case of the *Thalamita prymna* series, or *Actæa peroni* var. *occidentalis* (Odhner, 1925) ; certain species of *Pilumnus* tend to be very local in their distribution. Other species appear to be more widespread round some focus, usually, in the case of the Indo-Pacific Crabs, somewhere about the western side of the Malay Peninsula, or else more easterly among the Pacific Islands ; *Xantho impressus* (Lamarck, 1818) exemplifies the former, and perhaps *Pilumnus vestitus* (Haswell, 1882 *b*) the latter. The generalized forms are quite 20 per cent. of the total ; Laurie's figure, 35 per cent. of any Indo-Pacific collection common to the Red Sea, is too high for the Australian fauna, and is very largely made up, in any particular case, of these generalized forms.

Perhaps the most striking example of the focal distribution is shown by the Oxystomata ; 26 out of 65 Australian forms are not found elsewhere. Of the rest, quite a large majority are found roughly in the distribution—East Indies, India, Ceylon, and the Maldive Islands ; a few are generalized and a few show other areas of distribution ; in support of the view that the Oxystomata have spread from a Malayan focus, it is worth remark that only 65 Oxystomes out of 506 species occur in the Australian fauna, whereas in Alcock's ' Carcinological Fauna of India ' 113 occur out of 601 species ; further, the number of Oxystome species in Australia grows progressively less as one goes farther from

TABLE I.—Showing Percentage of Australian Species of each Family common to the Red Sea.

	Total Australian species.	Number common to Red Sea.	Percentage common to Red Sea.	Australian species only in northern district.	Number common to Red Sea.	Percentage.	Total species in northern district.	Number common to Red Sea.	Percentage.	Australian species only in southern districts.	Number common to Red Sea.	Percentage.	Total species in southern districts.	Number common to Red Sea.	Percentage.	Australian species only in north-west district.	Number common to Red Sea.	Percentage.	Total species in north-west district.	Number common to Red Sea.	Percentage.
Dromiidæ	24	0	0	7	0	0	9	0	0	13	1	7	15	0	0	2	0	0	2	0	0
Oxystomata	66	11	17	31	6	19	44	9	20	17	1	6	30	5	17	3	0	0	9	2	22
Oxyrhyncha	110	14	13	50	7	14	72	14	19	35	0	0	52	3	6	1	0	0	15	5	33
Portunidæ	39	16	41	18	6	33	24	11	46	11	2	18	17	8	47	4	0	0	9	3	33
Xanthidæ	142	43	30	75	20	27	111	39	35	16	2	12	45	16	36	13	2	15	35	15	43
Goneplacidæ	16	0	0	6	0	0	11	0	0	5	0	0	10	0	0	0	0	0	0	0	0
Pinnotheridæ	11	0	0	4	0	0	5	0	0	5	0	0	6	0	0	1	0	0	1	0	0
Grapsoidea	71	15	21	14	3	21	34	12	35	30	2	7	50	11	22	6	0	0	15	5	33
Palicidæ	4	2	50	4	2	50	4	2	50	0	0	0	0	0	0	0	0	0	0	0	0
Hapalocarcinidæ	2	1	50	2	1	50	2	1	50	0	0	0	0	0	0	0	0	0	0	0	0
Hymenosomidæ	11	0	0	0	0	0	1	0	0	9	0	0	11	0	0	0	0	0	1	0	0
Corystoidea	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichiidæ	3	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
Potamonidæ	5	0	0	4	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Mictyridæ	3	0	0	1	0	0	2	0	0	1	0	0	2	0	0	0	0	0	1	0	0
	508	102	20	218	47	21	326	92	28	143	7	5	240	43	18	31	2	6	89	30	34

TABLE II.—Showing Distribution in various Districts of Australia.

Districts.	Dromiidæ.	Oxystomata.	Oxyrhyncha.	Portunidæ.	Xanthidæ.	Goneplacidæ.	Pinnotheridæ.	Grapsoidea.	Palicidæ.	Hapalocarcinidæ.	Hymenosomidæ.	Trichiidæ.	Potamonidæ.	Mictyridæ.	Corystoidea.	
N.+S.E.	1	9	9	1	13	4	1	12	..	..	..	..	1	..	..	51
N.+S.W.	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	2
N.+N.W.	..	2	7	..	9	..	..	1	..	..	..	..	..	..	..	19
S.E.+S.W.	1	1	8	..	1	1	..	2	..	..	1	..	..	..	..	15
S.E.+N.W.	..	2	1	..	2	..	..	1	..	..	1	..	..	..	..	7
S.W.+N.W.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
N.+S.E.+S.W.	1	..	..	..	2	1	..	..	..	..	1	..	..	..	..	5
N.+S.E.+N.W.	..	2	3	2	9	..	..	3	..	..	..	..	..	..	..	19
N.+S.W.+N.W.	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1
S.E.+S.W.+N.W.	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
N.+S.E.+S.W.+N.W.	..	..	2	3	2	..	..	3	..	..	..	..	..	1	..	11

N.=Northern district.
S.E.=South-eastern district.
S.W.=South-western district.
N.W.=North-western district.

Total	131
N. only	218
S. only	143
N.W. only	31
	523
Less S.E.+S.W. (included in S. only)	15
Total species	508

Cape York and Northern Australia ; 44 of the 65 are northern, 29 southern, and 9 north-western. Of the southern species 3 only occur in the south-west—*Merocryptus lambriformis* (A. Milne-Edwards, 1873 *b*) at Eucla, *Philyra globosa* (Fabricius, 1798) at Fremantle, and *Philyra lævis* (Bell, 1855) at Albany. At the Abrolhos, no representative of the group has been recorded.

Another notable absentee from the Abrolhos is the genus *Sesarma* (Say) ; the species of this genus may possibly also have spread from a Malayan focus ; of the eight Australian species, all are from the north or the east of Australia, and none occur among the fourteen Mergui specimens of de Man, 1888 ; the genus is probably in a rather fluid evolutionary state, and different variations have adapted themselves as species in different localities as it has spread south.

It will be observed that the Ninety-Mile Beach, south of Broome, has been taken as the northerly limit of the north-western district ; the collections are not yet sufficiently complete for a definite opinion, but it seems probable that this will turn out to be a true " zoological barrier." At present, 20 species are known to occur in Western Australia both north and south of the beach, 52 are confined to the north, up to the Holothuria Bank and King's Sound, and 88 to the south, as far as Eucla. By comparison, of the 72 species from the north, 50 occur elsewhere in the North of Australia, and 22 only are confined to the west ; while of the 20 West Australian species which are common to districts north and south of the Ninety-Mile Beach, all are found elsewhere in the north of Australia.

The author's best thanks are due and are gratefully recorded to Professor W. J. Dakin for having placed the collection at his disposal, and for having given him both the stimulus and opportunity to undertake the work ; to Dr. W. T. Calman, who has given him access to the collections in the keeping of the British Museum (Natural History), and has been ever ready both with helpful advice and criticism and the loan of literature ; to Dr. J. G. de Man and Professor Ch. Gravier for assistance with regard to synonymies and the loan of a very valuable specimen ; to Miss F. R. Mold for her careful work in preparation of the figures ; and to the Library staffs at South Kensington, who most assiduously helped in a long and arduous check of the literature. I must also record my indebtedness to the Trustees of the Dixon Fund of the University of London, both for a very munificent grant in aid of publication, and also for great forbearance in their demands for the completion of the work.

The following is the annotated list of species in the collection. All measurements are in millimetres, unless otherwise stated. The abbreviations are : C=Carapace, l=length, b=breadth, W.-L.=Walking-leg, Ch.=cheliped, R.=Rostrum. In the distributional lists the figures in brackets refer to the serial numbers in the list of publications cited.

Subtribe **DROMIACEA.**

Family DROMIIDÆ.

1. CRYPTODROMIA TUMIDA (Stimpson, 1859). (Pl. **29.** figs. 4, 4 *a*.)

Cryptodromia tumida Stimpson, 1907, p. 175.
Cryptodromia tumida Ihle, 1913, p. 37, *ubi* synn. *et* bibliog.

Localities.—*a–d*, 2 ♂, 2 ♀, shore-collecting, Long Island; *e*, *j–k*, 1 ♂, 2 ♀, Abrolhos Islands; *f*, *h–i*, 1 ♂, 2 ♀, Wooded Island, Abrolhos; *g*, 1 ♀, Sandy Island, Albrolhos.

All the specimens except *d* and *i* carry a cap either of a sponge or a colonial ascidian, held in position by the last two legs on either side.

The species has not hitherto been figured.

Measurements (in mm.) :—

	a.	*b*.	*c*.	*d*.	*e*.	*f*.	*g*.	*h*.	*i*.	*j*.	*k*.
C. l. from middle tooth of rostrum	14	12	13	12	13	13	12	9	14	13·5	12·5
C. b. between post. teeth	16	13·5	14·5	13·5	15	14·5	14	10	16	16	14
l. of meropodite of W.-L. 2	6	5	..	..	5	5	5	4	6	5·5	5
b. of ,, ,, ...	3	3	..	..	3	3	3	2	3	3	3
l. of carpopodite of W.-L. 2	5	4	..	..	4	4	4·5	3	5	5	4·5
b. of ,, ,, ...	2	2	..	..	2	2	2	1·5	2·5	2·5	2·5
l. of propodite of W.-L. 2	2·5	2	..	..	2	2	2	1·5	3	3	2·5
b. of ,, ,, ...	1·5	1·5	..	..	1·5	1·5	1·5	1	1·5	1·5	2
l. of dactylopodite of W.-L. 2 ...	2	2	..	..	2	2·5	2	1·5	3	3·5	3
b. of ,, ,, ...	·5	·5	..	..	..	·5	·5	·5	..	·5	·5

Distribution.—Abrolhos; Ousima (128); Liu-Kiu Islands (101); Batjan (79); " Eastern part of Indian Archipelago " (56).

1 *a*. CRYPTODROMIA TUMIDA var. SPINIFERA, var. n. (Pl. **29.** figs. 3, 3 *a*, 3 *b*.)

Locality.—1 ♀, North-West, F (Broome).

Measurements (in mm.) :—

C. l.	14
C. b.	14
l. meropodite of W.-L. 2	6
b. ,, ,, ...	2·5
l. carpopodite of W.-L. 2	5
b. ,, ,, ...	2
l. propodite of W.-L. 2	3·5
b. ,, ,, ...	1·5
l. dactylopodite of W.-L. 2	3·5
b. ,, ,, ...	·5

The teeth, whether rostral, supraorbital, infraorbital, or subhepatic, are much more strongly developed, and the ridges and knobs more marked than in the typical *C. tumida*. The antero-lateral teeth are three on the right side, only two on the left, the middle one being represented by a slight sinuosity only. There is no epipodite on the chelipeds (*i. e.*, it is a true *Cryptodromia*, *vide* Borradaile, 1903 *c*), but otherwise it strongly resembles *Paradromia lateralis* (Gray, 1831) [*vide* Balss, 1921], if the left antero-lateral border is taken as typical and the right as aberrant. The first tooth of the antero-lateral border, which is the outer orbital angle, and the second tooth are so strongly marked as to obscure the stout subhepatic tooth from dorsal view ; the eyes also are not visible from above.

The propodite of the last pair of legs bears four sharp spines at its distal end surrounding the base of the sharp curved dactylus ; two spines are behind the dactylus, two in front.

The sternal ridges are peculiar, ending wide apart on the level of the coxa of the first pair of legs, not in a small mound as in the typical *C. tumida*, but in a transverse ridge.

These characters may be simply those of immaturity, and one hesitates to separate a distinct species ; nevertheless, it is significant that this specimen is the only one in the collection from outside the Abrolhos Islands, where the typical species is abundant.

Distribution.—Broome.

2. DROMIDIOPSIS ABROLHENSIS, sp. n. (Pl. 25. fig. 4 ; Pl. 30. figs. 1, 1 *a*, 1 *b*, 1 *c*.)

Locality.—1 ♀, Coral Flats, East Wallaby Island.

Measurements (in mm.) :—

C. l.	43
C. b.	43
W.-L. 5 l.	45 (23+22)
W.-L. 4 l.	33 (16+17)
W.-L. 3 l.	53 (23+30)
Propodite W.-L. 5 l.	8
,, ,, b.	5

This species is closely allied to *D. edwardsi* (Rathbun) [=*D. caput-mortuum* (Milne-Edwards, *nec* Linnæus), *vide* Rathbun, 1919, p. 195], and to *D. cranioides* (de Man, 1888 *b*, p. 208) and *D. australiensis* (Haswell, 1882 *b*), which is redescribed by de Man, 1888 *b*, p. 396, pl. xvii, fig. 6 ; Ihle, 1913, p. 26.

In *D. abrolhensis* (i) the lateral teeth (Pl. 30. fig. 1, *a*) of the front are sharper and more prominent than in *D. edwardsi*, and the middle tooth (fig. 1 *a*, *b*) is extremely small, is downwardly directed, and, arising as it does from a plane posterior to the roots of the lateral teeth, is entirely invisible from dorsal view ; the front is broader than in *D. edwardsi*, narrower than in *D. australiensis*, and is cleft much deeper than in the latter ; (ii) the supra-orbital border is more prominent than in *D. edwardsi*, is not spined " with an acuminate tooth "

as in *D. cranioides* (Alcock, 1899 *b*), but projects as a sinuous rounded edge (Pl. **30**. fig. 1, *c*) ; the front is separated from the supraorbital border by a fairly deep bay (fig. 1, *d*), much deeper than the " slight baying out " of *D. australiensis* ; (iii) owing to the prominence of the supraorbital border and of the antero-lateral teeth, there is a distinct bay (fig. 1, *e*) between the latter and the outer orbital angle (fig. 1, *g*), not a gentle curve as in *D. edwardsi* ; (iv) the fissure separating the infraorbital from the supraorbital border is fairly deep, not " a tiny linear fissure " as in *D. australiensis* or " small fissure " as in *D. edwardsi* ; (v) the infraorbital border has a distinctly separate tooth (fig. 1 *a*, *f*) as in *D. cranioides* and *D. australiensis*, and unlike *D. edwardsi*, but it is rounded off, not spined ; (vi) the teeth of the antero-lateral border are four in number, excluding the outer orbital angle ; they are sharper than in *D. edwardsi* and *D. australiensis*, but not so prominent as in *D. cranioides* ; the third (fig. 1, *k*) and fourth (fig. 1, *l*) are larger than the second (fig. 1, *j*), which is quite rudimentary and is barely to be distinguished arising from the lateral aspect of the first (fig. 1, *h*). The interval between the first tooth and the third tooth is greater than that between the third tooth and the branchial grooves, not, as in *D. cranioides*, equal to it. The first tooth is not transversely truncated, as in *D. edwardsi*, but is pointed ; (vii) the prominence of the frontal teeth and antero-lateral teeth causes the general outline of the fronto-orbital region, in front of a line joining the first antero-lateral teeth, to be trapezoid, not semicircular as in de Man's figure of *D. edwardsi* (*vide* de Man, 1888 *b*, pl. xvii, fig. 5) ; (viii) the chelipeds are equal ; the merus has some very small teeth on two borders only, there being five and a rudiment on the upper border ; on the carpus, there are no teeth on the upper border, except at the distal end which has the form of a small blunted tooth ; the hand has, on the upper border, four small indistinct tubercles, the middle two being the largest, but no teeth (as compared with *D. edwardsi*, which has two teeth, and *D. cranioides*, which has three) ; the chelipeds are stout and covered with tomentum which extends to the base of the fingers, and, in certain parts, along them toward the point. On the outer side of each finger is a deep pointed groove filled with tomentum. In the mobile finger the upper border of this groove is continuous through the apical tooth of the finger with the inner margin of the finger. The lower border of the groove forms the outer margin of the finger and bears five sharp triangular teeth, excluding the apical tooth, and decreasing in size from the tip backward ; behind these are two blunt teeth. The inner margin bears a single blunt tooth just proximal to the tip, and more proximally still becomes rounded off and no longer sharp. A point of tomentum fills a groove placed between the proximal ends of the outer and inner margins. The immobile finger is similar, with a groove for the tomentum on the outer surface, whose lower border ends in an apical tooth and is continuous with the inner margin of the finger, which bears a single sharp tooth ; the outer margin, which is the upper border of the groove, bears four strong triangular teeth, with two smaller rounded teeth behind them ; a point of tomentum fills a groove between

the proximal portions of the outer and inner margins. In both fingers the outer surface is much broader than the inner, so that the toothed outer margins approximate much more readily than the sharp inner margins ; (ix) the peræiopods are heavy, the length of the propodite being in the proportion of 8 to 5 to its breadth, but they are not nodose as in *D. australiensis*.

The carapace is strongly arched and almost hemispherical, the tomentum is even, interspersed with some few longer hairs ; the cervical grooves are the only ones visible, and appear to cross posteriorly forming a small depression at the point of crossing.

The cheliped has an epipodite and the sternal grooves end together on the first walking-leg segment, while the fifth leg is about as long as the third and has a thorn on the outer side of the last joint, *i. e.*, the specimen is a *Dromidiopsis* (*vide* Borradaile, 1903 *c*, p. 298).

Distribution.—Abrolhos.

Subtribe **BRACHYGNATHA.**

Superfamily *OXYRHYNCHA*.

Family MAMAIIDÆ.

3. EPHIPPIAS ENDEAVOURI (Rathbun, 1918).

Locality.—1 ♂, Sandy Island, Abrolhos. In a poor state of preservation.

Measurements (in mm.) :—

C. l.	30
C. b.	21
L. of W.-L. 1	l. of dorsal border of meropodite (24)+l. of dorsal border of 3 distal segments (32)=56.

The chelipeds and walking-legs are not so massive as in Rathbun's type, and the spines are not so definitely sharp nor the tubercles so well defined. The typical saddle-shaped posterior hump is not so prominent, but the specimen has been crushed in this region. A fine specimen, collected off Fremantle, is in the Western Australian Museum.

Distribution.—Abrolhos. Fremantle. Kangaroo Island, S.A. (116) ; N.S.W. (73).

4. HUENIA PROTEUS (de Haan, 1839).

Maia (*Huenia*) *proteus* de Haan, 1839, p. 95, pl. xxii, figs. 4–6.
Huenia proteus Alcock, 1895, p. 195, *ubi synn.*

Locality.—1 ♂, Broome, W.A. (Fisheries Dept.).

Measurements (in mm.) :—

C. l. (without rostrum)	17
R. l.	8 (R. l.÷C. l.=0·47)
C. b. (including spines branchial region)	13
Interorbital b.	5
Ch. l.	26

The eye is 3 mm. behind the preocular spine.

The walking-legs are lost. A long filamentous seaweed growth arises from the sides of the rostrum just in front of the preocular spine.

The specimen is similar to that of Adams and White, 1848, pl. iv, fig. 4 *a*. In Laurie's specimens (Laurie, 1906, p. 372) the ratio R. l.÷C. l. varies from 0·36 to 0·45. As in his specimens, the inferior surface of the rostrum is sharp-edged and the tip sharp. Along either side of the upper borders of the rostrum there is a line of closely set, downward curving hairs of a yellowish colour, as in *H. proteus* var. *tenuipes* (Adams and White, 1848, p. 22, pl. iv, fig. 5).

On the gastric region there are three small tubercles arranged in a triangle with the apex pointing posteriorly, as in *Simocarcinus simplex* var. *pyramidatus* (Laurie, 1906, p. 373). In previously published figures and descriptions, and in all the specimens examined in the collection of the British Museum (Natural History), these are represented by a low elevation in the middle line.

The merus joint of the chelipeds has on its dorsal border three little spines in series with equal distances between them ; the most distal is well-developed, the two proximal tuberculiform. These were present in all specimens examined. The carpus is almost globiform.

Distribution.—N.W. Australia (114) ; N. Australia (46, 84, 23, 104, 119) ; Broome ; Hawaii (110) ; S.W. Malay (2) ; India, Ceylon (2) ; Maldives and Laccadives (20) ; Red Sea, Persian Gulf (69) ; Seychelles (113).

5. MENÆTHIUS MONOCEROS (Latreille, 1825).

Menœthius monoceros Alcock, 1895, *ubi synn.*

Localities.—*a–b*, 2 ♀, Broome, ⟨F⟩ ; *c*, 1 ♀, dredged between RatIsl and and Pelsart group, Abrolhos ; *d*, 1 ♂ small, Sandy Island, Abrolhos ; *e*, 1 ♂, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*
C. l.+R. l.	20	20	12	10	15
C. l.÷R. l.	4	5	4	3·3	3·75
C. l.÷Ch. l.	1·43	1·43	1·33	1·0	0·83
C. l.÷W.-L. 1 l. .	..	1·11	1·09	1·11	1·07
C. b.	14	13	8	6·5	10
Interocular b. ..	5	5	3·5	2·5	4

Distribution.—Indo-Pacific. Abrolhos. N.W. Australia (84) ; N. Australia (23, 36, 46, 84, 85) ; S.E. Australia (31) ; Fiji, Rotuma (16) ; Hawaii (110) ; N.E. Malay (76, 112) ; S.W. Malay (64, 76) ; Maldives and Laccadives (20) ; Red Sea, Persian Gulf (69) ; East Africa (104) ; Seychelles (113).

6. PARANAXIA SERPULIFERA (Guérin-Méneville, 1834 ?).

Pisa serpulifera Guérin, 1834 ?, pl. viii, fig. 2.

Naxia serpulifera H. Milne-Edwards, 1834, p. 313. Nec *Naxia* (Leach) Latreille, 1825 (*vide* Rathbun, 1897, pp. 163–167), *q.*=*Pisa aurita* (Latreille, 1825)=*Halimus* (*vide* McCulloch, 1913).

Naxia serpulifera Miers, 1879.

Naxioides serpulifera Rathbun, 1897, part. Nec *Naxioides* A.Milne-Edwards, 1865 *b*.

Paranaxia serpulifera Rathbun, 1924.

Miers, 1879, combines *Naxia* (H. Milne-Edwards, 1834) and *Naxioides*

(A. Milne-Edwards, 1865); Rathbun, 1897, preferred *Naxioides* to *Naxia* (preocc. by (Leach) Latreille, 1825). Genotype of *Naxioides* is *N. hirta* (A. Milne-Edwards, 1865). Rathbun, 1924, separates *Paranaxia serpulifera* as a distinct genus. *Naxia* (Leach) Latreille, 1825, has *Pisa aurita* (Latreille, 1825) as genotype; this is congeneric with *Halimus* (Latreille, 1828) *aries* (Latreille, 1825) the type-species of *Halimus*; *Naxia* therefore replaces *Halimus* (*vide* McCulloch, 1913, p. 321).

Localities.—a, 1 ♀, Geraldton, W.A.; *b*, 1 ♂, Wooded Island, Abrolhos; *c*, 1 ♀, Geraldton, W.A., dried specimen collected by Mr. J. Clark.

Measurements (in mm.):—

	a.	*b.*	*c.*
C. l.	127	91	117
C. l. ÷ C. b.	1·27	1·22	1·27
C. l. ÷ R. l.	4·78	4·14	4·87
Interocular b.	25	18	23
Ch. l.	94	65	90
W.-L. 1 l.	134	106	131
W.-L. 2 l.	109	75	101

A. Milne-Edwards, 1865 *b*, distinguished his *Naxioides* from *Naxia* (i. e., *Paranaxia*) by a hiatus in the inferior border of the orbit and by the absence of a preocular spine. Miers, 1879, demonstrated the insufficiency of this criterion of separation. Rathbun, 1924, gives other grounds of distinction.

In the orbit of *Naxioides*, in dorsal view, there is a distinct tooth protruding from the upper border of the postocular cup into the supraorbital hiatus. In the specimens in the collection of the British Museum (Natural History) this tooth is sharp-pointed and straight in *N. spinifera* (Borradaile, 1903 *b*), *N. petersii* (Hilgendorf, 1878=*Podopisa vide* Miers, 1879, p. 658), *N. investigatoris* (Alcock, 1895), and *N. hystrix* (Miers, 1886), sharp and curved slightly outward in *N. robillardii* (Miers, 1882), more or less blunt in *N. hirta* (A. Milne-*Edwards*, 1865 *b*, *q.*=*N. petersii* according to Alcock, 1895), and broad and square in *N. taurus* (Pocock, 1890). Further, in these species there is a distinct spine, either sharp or blunt, on the antero-lateral corner of the basal antennal joint (*vide* Miers, 1886, p. 59; Alcock, 1895, p. 216). In *N. hirta* this spine is tuberculiform, as noted by A. Milne-Edwards, 1865 *b*, and it is only in this species that it is more than moderately blunted.

In *Paranaxia serpulifera* neither of these spines is represented. Specimens were examined from the collection of the British Museum (Natural History) ranging from 1·9 cm. to 12·7 cm. in carapace length. Rathbun's figures, also, of post-larval forms (Rathbun, 1914, p. 611, pl. ii, figs. 9, 10) show them not to be present.

Further, the basal antennal joint is expanded laterally at its base as a broad blunt prominence nearly completely filling the floor of the orbit, leaving a very small hiatus between it and the postocular cup. In *Naxioides*, there may be a spine, a spiniform tubercle (*N. hirta*), or a slightly rounded prominence (*N. robillardii*) in this position. Again, the hiatus in the supraorbital border is wide in all the species of *Naxioides*; in *Paranaxia serpulifera* it is present

only in the very youngest specimens. It is a " triangular sinus " in Rathbun's newly hatched specimens, a narrow cleft in the specimen of carapace length 1·9 cm., a still narrower cleft in those of 2·0 cm. and 2·2 cm., and is closed entirely in that of 3·7 cm. In the full-grown adult there is nothing but a closed groove to mark the hiatus.

The position of the antennal flagellum differs in the two genera. In *Naxioides* it is plainly visible in dorsal view on one side or other of the rostral spines ; only in *N. robillardii* is there any difficulty in seeing it thus, and in it the flagellum can usually be distinguished to the inner side of the spines. In *Paranaxia*, except in the very smallest specimens, not a trace of the flagellum is visible in dorsal view past the rostral spines.

The rostral spines themselves in *Naxioides* are long, tapering, and of varying degrees of divergence, the least divergent being in *N. hirta*. There is an accessory spinule, which is small, never more than one-quarter the length of the part of the rostral spine which projects beyond it, and is always developed on the medial side of the spine ; whether it is developmentally the original tip of the spine is not known. In *Paranaxia serpulifera* the rostral spines are about a quarter as broad as long, are straight and parallel, and bifid into two subequal spines at the tip ; Rathbun, 1914, has shown that the medial develops first as the true tip of the spine and that the lateral develops as the accessory spinule.

The chelipeds and ambulatory legs in *Paranaxia* are stout, and the dactyli markedly curved ; in *Naxioides* the chelipeds and legs are " slender and moderately developed " and the dactyli " nearly straight " (Alcock, 1895).

Hyastenus (White, 1847 *b*) is distinguished from *Naxioides* by the absence of the accessory spinule on the spines of the rostrum. As doubt has been expressed of the validity of this distinction, it is noteworthy that in *Hyastenus* the tooth standing in the supraorbital hiatus, described above in *Naxioides*, is either absent or represented by a small tubercle, never by a sharp spine ; whereas the spine at the antero-lateral angle of the basal antennal joint is prominent, though it may be either sharp or blunt.

Alcock's description of the subfamily Pisinæ (Alcock, 1895, p. 216), " eyes with commencing orbits of which one of the most characteristic parts is a large blunt, usually but not always cupped postocular process into which the eye is retractile, but never to such an extent as to completely conceal the cornea from dorsal—still less from ventral—view," does not apply to *Paranaxia serpulifera*, the cornea being completely hidden from dorsal view when retracted.

Distribution.—Abrolhos ; Geraldton ; Monte Bello Islands (114) ; C. Jaubert (119) ; Shark Bay (84) ; N. Australia (23 ; 46).

7. CYCLAX (CYCLOMAIA) SUBORBICULARIS (Stimpson, 1858).

Cyclax (*Cyclomaia*) *suborbicularis* Alcock, 1895, p. 245, *ubi synn.*
Cyclax suborbicularis Laurie, 1915, p. 410

Localities.—*a–k*, 9 ♂, 1 ♀, 1 ♀ ovig., Long Island, Abrolhos ; *l*, 1 ♀ ovig., Pelsart Island ; *m–n*, 2 ♂, Wooded Island.

Specimen *g* is parasitised by a Rhizocephalan and is beginning to take on a female form of abdomen.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*
C. l.	36	30	30	26	24	14	21	26
C. l. ÷ C. b.	1	1	1·03	1	·96	1·17	1	·96
C. l. ÷ Interorbital b.	2·57	2·31	2·31	2·17	2·18	2·33	2·1	2·36
C. l. ÷ Ch. l.	·60	1·0	·66	..	..	1·0	..	1·04
C. l. ÷ W.-L. 1 l.	·80	·81	·82	..	..	·77	..	·86

	i.	*j.*	*k.*	*l.*	*m.*	*n.*	*x.*
C. l.	27	12	11	23	20	18	40
C. l. ÷ C. b.	·97	1·09	1·2	1·15	1·11	1·12	1·03
C. l. ÷ Interorbital b.	2·45	2·0	2·0	2·3	2·2	2·1	2·66
C. l. ÷ Ch. l.	..	..	..	1·0	·95	1·0	1·25
C. l. ÷ W.-L. 1 l.	..	..	..	·82	·74	·82	·83

The measurements under *x* are taken from Rathbun's figure (Rathbun, 1893, pl. viii, fig. 2).

The chelipeds in *a* and *c* are far larger than in the other specimens, and are swollen and glabrous ; a similar variation occurs in *Schizophrys dama* (Herbst, 1804) in old males (*vide* Alcock, 1895, p. 244). The spines are less acute throughout, and the carapace more hairy than in Rathbun's figure (*l. c.*). A small spine in the medial part of the lower border of the orbit is very conspicuous and pointed in some of the specimens, being in this respect unlike specimens in the British Museum (Natural History).

Distribution.—Abrolhos. N. Australia (23). Fiji (16). S.W. Malaya (2) ; India, Ceylon (2) ; Red Sea (69) ; E. Africa, Seychelles (113).

8. SCHIZOPHRYS DAMA (Herbst, 1804).

Schizophrys aspera Alcock, 1895, p. 343, *ubi synn.*
Cancer dama Herbst, 1804, p. 5, pl. lix, fig. 5.
Schizophrys dama Alcock, 1895, p. 245, *et synn. et auct.*
Mithrax aspera H. Milne-Edwards, 1832.

Localities.—*a*, 1 ♂, Wooded Island, Abrolhos ; *b*–*e*, 4 ♂, Broome, F ; *f*, 1 ♀, Coral-flats, East Wallaby Island.

In addition to the specimens in the collection, a series of 15 specimens of *S. aspera* and 1 of *S. dama* from the Collection of the British Museum Natural History) was examined. They are indicated on p. 421 by the numbers 1 to 16.

Measurements (in mm.).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	*a.*	*b.*	*f.*	*c.*	*d.*	16.	*e.*
	♀.	♂.	♂.	♀.	♀.	♂.	♂.	♂.	♂.	♂.	♀.	♂.	♀.	♂.	♀.	♂.	♂.	♀.	♂.	♂.	♂.	♂.
C. l.	27	32	27	20	13	37	12	12	12	12	16	30	19	18	25	14	12	20	31	23	35	34
C. b.	24	28	23	17	11	31	10	10	10	10	13	24	15	14	19	10·5	9	15	22·5	17	26	25
C. l.÷C. b.	1·12	1·14	1·17	1·18	1·18	1·19	1·20	1·20	1·20	1·20	1·23	1·25	1·27	1·29	1·32	1·33	1·33	1·33	1·35	1·35	1·35	**1·36**
R. l.	4	5	4	3	2	7	2	2	2	2	2	5	2·5	2	4	2	1·7	3	6	4	8	5
C. l.÷R. l.	6·75	6·4	6·75	6·6	6·5	5·3	6·0	6·0	6·0	6·0	8·0	6·0	7·6	9·0	6·25	7·0	7·0	6·75	5·15	5·75	4·4	6·8
2nd Accessory rostral spinule.	0	0	0	0	0	Trace.	0	0	0	0	0	0	0	0	Very small.	0	Trace right, 0 left.	0	Sharp, right. Tubercle, left.	0	Distinct.	Small right.
Subhepatic spine.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Tuberculiform.	Very small.	Tuberculiform.	Tubercles.	Tubercles.	Tubercles.	Tubercles.	Tubercles.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*g.*	*h.*
C. l. (without rostrum) ...	16	15	15	14	12·5	13·5	11·5
C. b.	18	18	17·5	17	14·5	16	14
Front. orb. b.	6	6	5·5	5·5	4·5	5	4·5
Rostrum b. (at base)	3	3	2·5	2·5	2	2·5	2
Rostrum l.	3	3	3	3	2·5	2·5	2

Tesch retains in the family Hymenosomatidæ the genera *Hymenosoma* (Desmarest, 1825), *Halicarcinus* (White, 1846), *Hymenicus* (Dana, 1851 *b*), *Trigonoplax* (H. Milne-Edwards, 1853), *Elamena* (H. Milne-Edwards, 1837), *Elamenopsis* (A. Milne-Edwards, 1873 *b*), and *Rhynchoplax* (Stimpson, 1859). Kemp, while disagreeing with Haswell that *Hymenosoma*, *Halicarcinus*, and *Hymenicus* are synonyms, unites the two latter, with reservations, under *Halicarcinus* ; many species formerly placed under *Hymenicus* he refers, with reserve, to *Rhynchoplax* (Stimpson).

Tesch refers to *Hymenosoma* two species—the genotype *H. orbiculare* (Desmarest, 1825) and *H. depressum* (Jacquinot & Lucas, 1853) ; the latter, as shown by specimens in the Natural History Museum, South Kensington, has a distinct epistome, so that Kemp is correct in regarding *H. orbiculare* as the sole species of the genus. The position of *H. depressum* is doubtful, but it is certainly not a *Hymenosoma*.

Kemp is correct in considering the shape of the rostrum as an insufficient criterion for the separation of *Halicarcinus* and *Hymenicus*. A series of variations can be made out which serve to connect *Hymenicus varius*, Dana's genotype (Dana, 1851 *b*, p. 290) with *Halicarcinus planatus*, the genotype of White (White, 1846, p. 178). A series can be made of *H. planatus*, *H. varius*, *H. australis*, and *H. rostratus* (Haswell, 1882 *b*), the spines of the rostrum becoming progressively more completely fused at the base and the middle spine growing longer. Following Kemp, I designate this species *Halicarcinus australis* ; under Tesch's arrangement, it would be *Hymenicus*.

Haswell's figure is remarkably accurate, as far as it goes. The rostrum is deflexed and concave from side to side, and with three teeth which vary in development from being almost absent to being sharp and prominent ; the middle tooth is on a lower plane than the other two, and is slightly more developed. The " two obscure teeth " on the sides of the carapace also vary, being absent in one case, and never more than a rudiment. The external maxillipedes completely close the buccal cavern, conforming to Kemp's description of the genus, and the sutures of the male abdomen are distinct.

The epistome is strong and wide.

The chelipeds in three cases are very broad and deep and carry a pulvinus between them which is much better developed than Haswell shows in his figure. In other cases the claws are not so deep, nor so sharp and thin along

the inferior border ; but the pulvinus is still present. Possibly this is another case of facultative dimorphism.

Distribution.—Swan River ; S.E. Australia (35, 46).

12. HALICARCINUS BEDFORDI, sp. n. (Pl. 27. figs. 3, 3 *a*, 3 *b*.)

Hymenosoma sp. Montgomery, 1921, p. 95.

Locality.—*a–c*, 3 ♀ ovig., dredged, Swan River, The Narrows.

Measurements (in mm.) :—

	a.	*b*.	*c*.
C. l.	5	4	4·5
C. b.	4·5	4	4

There is a well defined epistome, the regions of the carapace are well defined, the merus and ischium of the external maxillipedes, which completely fill the buccal cavern, are of about equal length, and the rostrum is triangular.

The upper surface of the carapace, excluding the rostrum, is roughly circular, being just under 5 mm. long and about 4·5 mm. broad ; it is smooth and hairless and the regions are reasonably well marked ; there is a slight ridge completely encircling this upper surface and cutting if off from the rostrum.

The rostrum is triangular, projects straight out in the plane of the upper surface of the carapace, and covers the antennules and antennæ, which fold beneath it, from dorsal view. The rostrum ends in a blunt point and is slightly concave upwards ; it is slightly sinuous at its edges and near its base are two very small tubercles which are situated over the eye-stalks, and correspond to the two lateral teeth of *H. australis*. The edges of the rostrum are fringed with short curved hairs.

The side-walls of the carapace are nearly vertical in front, but further back become progressively nearer the horizontal ; this brings the insertions of the walking-legs clearly into a dorsal view, the last leg, in fact, being inserted almost on a level with the upper surface of the carapace.

The antennules fold beneath the rostrum, so as to be hidden from above, and are separated at their base by a septum which thins off anteriorly so that the two antennæ come to lie side by side.

The eyes are set beneath the rostrum and are carried on fairly long stalks. They project forward, reaching about three-quarters of the way to the tip of the rostrum.

The external maxillipedes completely close the buccal cavern. The ischium and merus together form nearly a rectangle and they are separated by a line drawn from the end of the third fifth on the medial side to the end of the second fifth on the outer side. The antero-external angle of the ischium is slightly sinuous and curled over ; and at the antero-internal angle is carried the small flagellum. The exognath is between a quarter and a third as broad as the merus, and is clearly seen throughout the greater part of its length. It bears a flagellum.

The chelipeds are slender, barely stouter than the legs ; the palm and wrist

are slightly turgid, the former being a little longer than the fingers. The merus is somewhat bowed and about twice as long as the carpus. The fingers are not toothed.

The walking-legs are slender, and the third pair are about three times the length of the carapace. Both chelipeds and walking-legs have some scattered hairs on their surface. The dactyli are sharp, strongly curved at the tip, about two-thirds the length of the propodite, and bear on their curved edge a fringe of curled hairs.

Distribution.—Swan River.

13. ELAMENA TRUNCATA (Stimpson, 1858). (Pl. 27. fig. 21.)

Elamena truncata Alcock, 1900 *a*, p. 386.
Elamena truncata Baker, 1906, p. 112, pl. ii, fig. 2.
Elamena truncata Tesch, 1918 *a*, p. 22, pl. i, fig. 4, *ubi synn.*

Locality.—1 ♂, Sandy Island, Abrolhos.

Measurements (in mm.) :—

C. l.	7·5
C. b.	7·5
W.-L. 1 l.	15·5

This specimen agrees with Baker's (Baker, *l. c.*) in having the carapace as long as broad, and with some of his specimens in having the carapace slightly concave, not depressed ; both Kemp (1917, fig. 22) and Tesch (1918 *a*, pl. i, fig. 4) figure the species as broader than long, so that it is possible that there is a distinct Australian species. In the figures of Tesch and Baker there are slight variations to be noted with regard to the eyes, antennæ, and external maxillipedes. The postocular tooth, which Alcock states to be absent and Baker omits from his figure, is present in the Abrolhos specimen. There is no " very prominent, waved, sharp rim " on the pterygostomian region as Tesch describes, but there is a " conical obliquely compressed tubercle " of large dimensions as mentioned by Baker. Possibly Tesch's " three lobes " are the very slightly prominent external angle of the orbit, this compressed tooth, and another, obliquely behind it but smaller, at the base of the first walking-leg.

The epistome is stated by Tesch to be " short but distinct, deeply sunk," by Baker to be " well-developed and not depressed." In the Abrolhos specimen it is well-defined, not depressed, and bears on its lower border a pair of laminated plates projecting perpendicularly, and separated by a notch in the centre ; these plates overhang the buccal cavern like an eave, and the external maxillipedes fit in beneath them, closing the buccal cavern completely, with the exognath almost entirely visible. Baker's description and figure of the external maxillipede are closer to this specimen than those of Tesch.

The male abdomen differs from Tesch's specimens in that the penultimate segment, while shorter than the preceding one and the terminal one, is not shorter than both the preceding segments. As Kemp states, guided by Baker's

figures, segments 3 and 4 are fused and 5 is free ; there is an indication of a line of fusion to be seen is shown in the figure.

Distribution.—Abrolhos ; S.E. Australia (11) ; Fiji, Rotuma (16) ; S.W. Malay (7) ; India, Ceylon (7).

Superfamily *BRACHYRHYNCHA*.

Family PORTUNIDÆ.

14. PORTUNUS PELAGICUS (Linnæus, 1758).

Neptunus pelagicus Alcock, 1899 *a*, p. 34, *ubi synn.*
Lupa pelagicus Stebbing, 1908, p. 11 ; 1910, p. 307.
Portunus pelagicus Rathbun, 1897, pp. 155, 160.

Localities.—*a*, 1 ♂, Wallaby Island, Abrolhos ; *b*–*e*, 4 ♂, Wooded Island, Abrolhos.

Measuremnts (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*
C. l.	44	32	29	29	22
C. b. to tips of spines	97	72	66	64	46
l. lower border of left palm	—	40	34	35	24
b. left palm	—	9	8	8	6
l. 6th abdominal tergum	11	8	7	7	5
Ant. b. 6th abdom. tergum	12	11	10	8	7
Post. b. 6th abdom. tergum	8	6	4	5	3

This is the common edible crab of the Swan River, where the size attained is much greater than in the Abrolhos specimens. The colour varies from slaty-blue to dull brown.

Specimen *a* has the chelipeds in course of regeneration. They appear as a bud enclosed in a single cuticular sac, through which the position of the joints between the meropodite, carpopodite and propodite, and the mobile finger are discernible as grooves. The costæ of the arm and hand appear as low ridges.

In *b* there are 8 teeth on the right antero-lateral border, and the normal 9 on the left. One doubts the value of these teeth as diagnostic characters.

Distribution.—Abrolhos. Swan River. Indo-Pacific. N.W. Australia (84) ; S.W. Australia (84) ; S.E. Australia (46, 31, 134) ; N. Australia (23, 36, 84, 118) ; N. Zealand (80) ; Funafuti (135) ; N.E. Malay (65, 76, 112) ; S.W. Malay (5, 64, 76, 77) ; India, Ceylon (5) ; Red Sea, Persian Gulf, (5, 69) ; S. Africa (124).

15. THALAMITA PRYMNA (Herbst, 1803) var. PELSARTI, var. n. (Pl. 24. fig. 2 ; Pl. 28. figs. 3, 3 *a*.)

Localities.—*a*, 1 ♂, dredged inside lagoon, Pelsart Island ; *b*, 1 ♂, Long Island, Abrolhos.

b has in its chela the broken-off claw of another crab, probably *Cyclax* (*Cyclomaia*) *suborbicularis* Stimpson.

Measurements (in mm.) :—

	a.	*b.*
C. l.	35	22
C. b.	55	33
Lower border left palm l.	41	23
„ „ b.	13	6
6th abdom. tergum l.	6	4
6th abdom. tergum b.	6	4

The carapace is about two-thirds as long as broad as in var. *crenata* (Milne-Edwards, 1834) * ; there is a dense short tomentum and the transverse ridges are very distinct—*cf.* var. *dancæ* (Stimpson, 1859) and var. *annectans* (Laurie, 1906) ; the mid-gastric ridge is continued following the line of the orbits to the interval between the first and second antero-lateral teeth, unlike var. *prymna* Herbst, 1803) †. The front has the two most lateral teeth smaller than the rest, which are closely set, the two middle ones projecting slightly and on a lower level, recalling var. *prymna* ; the supraorbital lobes are fairly broad. The dorsal aspect of the carapace reminds one perhaps more of the *T. admete* (Herbst, 1803) group than of any of those with an eight-lobed front. The fourth tooth of the antero-lateral borders is small, but not rudimentary as in var. *stimpsoni* (A. Milne-Edwards, 1861) and var. *annectans*. The basal antennal joint is very broad, being about three-eighths the carapace breadth ; as in var. *prymna* it bears a row of spines. The chelipeds are most like those of var. *dancæ* in this group : they are (i) slightly unequal ; (ii) covered with granules on all surfaces, except the costæ of the fingers and part of the under surface of the arm ; (iii) have four teeth on the upper surface of the arm, the fourth being terminal and on a lower plane than the other three, which increase progressively in size as one passes distally ; (iv) have on the posterior border of the arm a series of squamiform granules, with an imbricated appearance ; (v) have four large teeth on the wrist, that at the inner angle being very strongly marked, and three costæ, each marked by a row of granules ; (vi) have six spines in two rows on the upper border of the hand ; (vii) have two marked costæ on the outer border of the hand running towards the upper and lower borders of the immobile finger ; these costæ are cut into numerous closely set over-lapping blunt teeth ; (viii) have the whole of the lower and inner surface of the hand covered with slightly imbricating squamiform granules ; these are largest at the junction of the inner and lower surfaces and on the costate ridge in the middle of the inner surface. The greater part of the chela

* =*Thalamita crenata* (Latr.) Edw. Alcock, 1899 *a*, p. 76. Milne-Edwards, not Latreille, must be regarded as the author of the species, as Latreille did not publish the name ; it is, according to Milne-Edwards, that of a specimen in the Paris Museum. *Vide* Opinion 1 of International Commission on Zoological Nomenclature (Proc. Biol. Soc., Washington, xxxix, 1926, p. 91).

† The typical variety of Herbst is designated var. *prymna* on the analogy of typical subgenera bearing the name of the genus—*vide* Art. 10 International Rules of Zool. Nomenclature (*l. c.* p. 77).

is clothed with a fine tomentum, through which the spines and granules appear. The fingers are costate and ringed near the tip with a dark band. In characters (i) and (iv) this variety resembles var. *dancæ*, in (vi) and (vii) is like var. *annectans*; but the chelipeds really are most like those of the allied *T. admete* group with a two-lobed front.

The propodite of the last pair of legs is serrated throughout the length of the posterior border (*cf.* var. *prymna*).

Distribution.—Abrolhos, W.A.

15 *a*. THALAMITA PRYMNA (Herbst, 1803) var. PROXIMA, var. n. (Pl. 24. fig. 1; Pl. 29. figs. 1, 1 *a*.)

Localities.—*a*–*b*, 2 ♂, North Island, Abrolhos.

Measurements (in mm.) :—

	a.	*b*.
C. l.	50	36
C. b.	77	56
Lower border left palm l.	53	42
Left palm b.	16	14
6th abdom. tergum l.	8	6
6th abdom. tergum posterior b.	9	7

In general appearance, these are very similar to var. *pelsarti*, but differ in the same way that var. *stimpsoni* differs from var. *prymna*—namely, that the ridge on the basal antennal joint is granular rather than toothed. The ridges on the carapace are similar, but the larger specimen *a* has little tomentum, being smooth and glabrous, except just anterior to the ridges. In the front, the two middle teeth are slightly overlapped by the two next lateral to them; in var. *pelsarti* the overlapping is not marked, though the middle teeth are on a lower plane. In a ventral view, there is a strong smooth ridge running down from the lower aspect of the lateral frontal tooth towards the epistome, separating the antennular fossa from the inner end of the basal antennal joint. The chelipeds differ from those of var. *pelsarti* in the following characters :—(ii) the granules are not so general and are absent from the lower surface of the hand; (iii) there are three teeth only on the upper surface of the arm, the fourth being represented by a blunt prominence; (iv) the posterior border of the arm has no granules, but is ridged in a manner recalling "ripple-marking"; (vi) there are only five spines on the upper border of the hand, the most proximal of the median row being absent; (vii) the granules on the costæ of the palm are blunt, not tooth-like; (viii) the lower surface of the hand is smooth—a band of granules, representing a ridge in var. *dancæ*, separates it from the inner surface.

Distribution.—Abrolhos, W.A.

The two varieties support the view of Kossmann, 1877, adopted by Alcock, 1899 *a*, p. 76, Calman, 1900, p. 22, and Laurie, 1906, p. 419, that all the Thalamitas with an eight-lobed front are specifically identical. These two bear more

resemblance to one another than they do to any other member of the group, but they have affinities with var. *dancæ* and var. *stimpsoni* (whose close relationship has been noted by de Man, 1888 *a*, p. 78), and with var. *prymna*, var. *crenata*, and var. *annectans*; the carapace and chelipeds, moreover, approach very closely to those of some of the two-lobed front *T. admete* group, especially *T. margaritimana* (Rathbun, 1911, p. 208, pl. i, fig. 12) and *T. granosimana* (Borradaile, 1902 *a*, p. 202).

The varieties of *T. prymna*, therefore, include these two, *T. prymna* (Herbst, 1803), *T. crenata* (Milne-Edwards, 1834), *T. dancæ* (Stimpson, 1859), *T. stimpsoni* (A. Milne-Edwards, 1861), *T. picta* (Stimpson, 1859) (for all of which *vide* Alcock, 1899 *a*), and *T. prymna* var. *annectans* (Laurie, 1906). In addition, there are three varieties described by Calman, 1900, p. 22. The following artificial key, modified from Alcock, may serve to separate the varieties :—

Extreme breadth of basal antennal joint far greater than major orbital diameter; front cut into eight lobes, including the broad inner supraorbital lobes.	
Submedian lobes of front half as broad again as median lobes	=Calman *c*.
Submedian lobes not much broader than, equal to, or less than median lobes	1.
1. Ridge on basal antennal joint :—	
(*a*) with tooth-like, smooth entire edge	=var. *picta*.
(*b*) with a row of granules.....	2.
(*c*) with a row of teeth	6.
2. Five teeth in antero-lateral border, 4th equal to or larger than 5th.....	=var. *crenata*.
4th tooth of antero-lateral border smaller than 5th	3.
3. Three medial pairs of frontal lobes ill-separated, only marked off by indistinct notches	=Calman *b*.
Three medial pairs of frontal lobes distinctly marked off from one another	4.
4. A ridge, either of granules or entire, separating inner from inferior surface of hand	5.
No ridge separating these surfaces	=var. *stimpsoni*.
5. Ridge, separating these surfaces, composed of granules	=var. *proxima*.
Ridge, separating these surfaces, faint and entire	=var. *dancæ*.
6. 4th tooth of antero-lateral border rudimentary or absent	7.
4th tooth of antero-lateral border not so complete a rudiment.	8.
7. Transverse ridge on gastric region continued to notch between 1st and 2nd antero-lateral teeth	=var. *prymna*.
Transverse ridge not so continued	=var. *annectans*.
8. Hand granular over all surfaces	=var. *pelsarti*.
Hand not granular over all surfaces	Calman *a*.

16. THALAMITA SIMA (Milne-Edwards, 1834). (Pl. 29. fig. 2.)

Thalamita sima, Alcock, 1899 *a*, p. 81, *ubi synn.*

Localities.—*a*, 1 ♂, dredged off Wallaby Island, Abrolhos; *b*, 1 ♂, North-West Australia. F.

Measurements (in mm.) :—

	a.	*b.*
C. l.	27	24·5
C. b.	4·5	37
Frontal lobe b.	7·5	7
Supraorbital lobe b.	5·5	4·5

The supraorbital lobes are exactly intermediate between those of the *T. admete* and *T. chaptalii* groups, being slightly arched and about three-fourths the width of one of the frontal lobes ; in *T. chaptalii* (Audouin, 1826) the proportion is two-thirds or less, in *T. admete* (Herbst, 1803) and *T. integra* (Dana, 1852 *a*) about five-sixths ; in the former the supraorbital lobe is distinctly arched, in the latter nearly straight.

The chelipeds are approximately equal ; the " transverse squamiform granules " of Alcock's description (Alcock, 1899 *a*, p. 81) on the lower surface of the hand are very characteristic, being in two longitudinal series, giving an appearance exactly like maize in a cob. The movable finger bears a black band not far from the tip.

Distribution.—Abrolhos ; N.W. Australia (84) ; S.W. Australia (84) ; S.E. Australia (46, 84, 85, 134) ; N. Australia (23, 36, 46, 84, 85, 104, 119, 127) ; N. Zealand, N. Caledonia (80, 84) ; Hawaii (110) ; N.E. Malay (112) ; S.W. Malay (77) ; Red Sea, Persian Gulf (5, 69).

17. THALAMITA MACROPUS, sp. n. (Pl. 24. fig. 4 ; Pl. 28. figs. 2, 2 *a*.)

Locality.—1 ♀, East Wallaby Island.

Measurements (in mm.) :—

C. l.	11
C. b.	17
Posterior border of C.	5

This species stands between *T. investigatoris* (Alcock, 1899 *a*) and *T. exetastica* (Alcock, 1899 *a*). The median lobes of the front are on a lower level than the others, as in *T. exetastica*, but are much narrower than the submedian as in *T. investigatoris*. The front is like *T. exetastica* var. *macrodonta* (Borradaile, 1902 *a*, p. 203), but it is distinguished by having the fifth tooth of the antero-lateral border the largest and the fourth at least as large as any of the rest ; no mention is made of a large fourth tooth in any of the described species, though references to a large fifth tooth are common (*vide* Laurie, 1906, p. 420 ; Rathbun, 1911, p. 209).

Alcock's description of *T. exetastica* reads " 4th and 5th being extremely small " (Alcock, 1899 *a*, p. 86) ; but his figure (Alcock, 1900 *b*, pl. xlvii, fig. 2) shows them as of moderate size. *T. macropus* bears at the base of the first antero-lateral tooth a small accessory spinule as in *T. exetastica*.

The chelipeds are like those of *T. investigatoris* with regard to the granulations, but the spines, which are strong and sharp, are disposed exactly as in *T. sima* ;

the fingers, as in *T. exetastica*, are as long as the palm. The legs are very long and slender, and the propodite of the last leg is smooth, without spines.

The general form of the carapace is more like that of *T. investigatoris* than of *T. exetastica*, being about two-thirds as long as broad and with the posterior border less than two-fifths the breadth.

It seems probable that Borradaile is correct in considering *T. investigatoris*, *T. exetastica* and its varieties, and *T. imparimanus* (Alcock, 1899 *a*) as but varieties of yet another highly variable *Thalamita* (*vide* Borradaile, 1902 *a*, p. 204).

Distribution.—Abrolhos, W.A.

18. THALAMITA DAKINI, sp. n. (Pl. 24. fig. 3 ; Pl. 28. fig. 4.)

Locality.—1 ♂, Wooded Island, Abrolhos.

Measurements (in mm.) :—

C. l.	11
C. b.	18
Posterior border of C. b.	6
Basal antennal joint b.	3·5
Major diam. of orbit	2·5
Middle frontal lobe b.	2·5

This species further complicates the problem of the genus *Thalamita*. The striking features are the basal antennal joint and the front. As is shown above, the extreme extent of the basal antennal joint is neither " far greater than the major diameter of the orbit " nor is it " equal to or less " (Alcock, 1899 *a*, p. 73). The proportion between the breadth of the basal antennal joint and the carapace breadth is 2 : 9 in *T. prymna* var. *crenata*, 1 : 4 in *T. prymna* and *T. admete*, 1 : 5 or 6 in *T. chaptalii* ; and in *T. investigatoris* it is less than, in *T. imparimanus* less than half, and in *T. sexlobata* about equal to the major diameter of the orbit. *T. dakini* agrees, therefore, in this respect most nearly with *T. chaptalii*.

There is a ridge of granules on the basal antennal joint. The orbits have a slight dorsal inclination as in *T. sexlobata* (Miers, 1886) and *T. oculea* (Alcock, 1899 *a*).

The front is four-lobed, excluding the inner supraorbital lobe, but the two lateral lobes are very small and are minutely toothed at their margins ; from these a line of granules continues on in the line of the front beneath the inner supraorbital lobe, between it and the extension into the orbit of the basal antennal joint. The front is thus unique among the Thalamitas.

The inner supraorbital lobes are slightly concave forwards, and each is about equal in extent to the middle frontal lobes, though disposed on an alignment behind and above these ; the front is slightly flexed downward. The carapace is hairy and the lines of the carapace are disposed much as in *T. admete*. The teeth of the antero-lateral border are five in number, the fourth being small. The posterior border of the carapace is straight and about one-third the greatest breadth of the carapace.

The chelipeds are smooth on the inner and lower borders, spined, granular, costate, and hairy on the upper and outer surface. The spines are disposed as in *T. sima* with the addition of an extra large spine on the upper border of the hand ; the spines are everywhere sharper and the granules tend to be spiny.

The hands bear three costæ on the outer surface, which are granular, the granules tending to be sharp. The fingers are stumpy, but strongly denticulated.

The legs are stout and costate ; the propodite of the last pair of legs is hairy, but not spined.

Distribution.—Abrolhos, W.A.

Family CANCRIDÆ.

Subfamily THIINÆ.

19. KRAUSSIA HENDERSONI (Rathbun, 1902).

Kraussia nitida Alcock, 1899 *a*, p. 98. *Nec* Stimpson, 1859, p. 40.
Kraussia hendersoni Rathbun, 1902, p. 132 ; Balss, 1922, p. 97.

Locality.—1 ♂, Wooded Island, Abrolhos.

Measurements (in mm.) :—

C. l.	11
C. b.	13
Frontal-orbital b.	6·5
Last joint of W.-L. 2 l	3·7
Last joint of W.-L. 2 b.	1·2

The specimen supports Rathbun's differentiation of *K. nitida* (Stimpson) and *K. hendersoni* at all points, including the sharp granules on the inner angle of the wrist, and the denticulations on the last three joints of the walking-legs, points which differ from the description of *K. nitida* by Alcock (*l. c.*), whose specimens are taken by Rathbun to be *K. hendersoni*. Henderson's figure exaggerates the grooves running back from the inner angle of the orbit and also the prominence of the front (*vide* Henderson, 1893, pl. xxxvii, fig. 9).

The fingers of the chelipeds are much less stumpy than in *K. nitida*, the movable finger being about as long as the greatest breadth of the palm.

Distribution.—Abrolhos ; Hawaii (110) ; S.W. Malay (5) ; India, Ceylon (5) ; Japan (14) ; Maldives (109).

Family XANTHIDÆ.

20. LIOMERA CINCTIMANA (White, 1847 *a*).

Liomera cinctimana Alcock, 1898, p. 88, *ubi synn.*
Carpilodes cinctimana Odhner, 1925, p. 9.

Localities.—*a–d*, 1 ♀ ovig., 3 ♂, Long Island, Abrolhos ; *e*, 1 ♀, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*
C. l.	19	14	12	12	21·5
C. b.	36	26	22·5	22	40
Fronto-orbital b.	12	10	8·5	9	14
Post. border of C. b.	10	7·5	6	6	13

The specimens show considerable variation in colour, and in all the characteristic dark band on the hand is absent or incomplete. The colour varies from pink to red and orange-red, and in *c* the fingers and tips of the dactyli are light brown ; in *e* this lightening of the colour is patchy, so that the coxopodites of the chelipeds and the pterygostomian region in their vicinity are a porcelain white, and there are patches of white on the other legs ; there is a white band separating the black claw at the end of the dactylus from the orange-red at the base.

The big ♂ *e* has on the chelipeds a very distinct groove on the outside of the hand running down towards the movable finger ; this is only faintly marked in the other specimens. The lobulation of the antero-lateral borders is also much more deep than in the others.

I follow Odhner (Odhner, 1925, p. 9) and Stimpson (Stimpson, 1907, p. 38) in considering *Liomera* congeneric with *Carpilodes* in part ; the character of the basal antennal joint is quite a variable one and cannot be used as of generic importance. Odhner, however, though pointing out that *Liomera* has page precedence over *Carpilodes* (Dana, 1851 *a*, pp. 124, 126), retains *Carpilodes* as the generic name—a procedure entirely unjustifiable.

Distribution.—Abrolhos. N. Australia (23, 36) ; S.W. Malay (4) ; Maldives and Laccadives (18) ; Red Sea, Persian Gulf, (4, 69) ; E. Africa, Seychelles (4, 113).

21. LIOMERA BELLA (Dana, 1852).

Carpilodes rugatus Alcock, 1898, p. 85. *Nec* A. Milne-Edwards, 1865 *a*, p. 230.
Carpilodes bella Odhner 1925, p. 16, pl. i, fig. 9.

Localities.—*a–c*, 2 ♀, 1 ♂, Long Island, Abrolhos ; *d–e*, 1 ♀, 1 ♂, Wooded Island, Abrolhos ; *f*, 1 ♂, Sandy Island, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*
C. l.	9	8	8	9	8	8·5
C. b.	16	14	14	17	14·5	15
Fronto-orbital b.	7·5	7	7	8	7	7·5
Posterior border of C. b.	5·5	4·5	4·5	5·5	5	5

The variations in colour in this species are through white (*a*), pink and white (*d*), to pink (*f*) and purple. In (*d*) the anterior portion of the carapace is pink, but it is white posteriorly and underneath, and on the major portion of the legs. The chelipeds show a variation in colour similar to that in *L. cinctimana* ; in (*d*) the light brown coloration of the tips of the dactyli extends along the

whole of the underside of the palm; in (*f*) it is distinctly visible in this situation, but does not extend the whole distance. In (*f*) the lower border of the palm is remarkable for a distinct smooth area, in a postion which is well granulated in all the others. In the purple specimens, the tips of the dactyli and the fingers of the chelipeds are white instead of brown at the tip and shade off into purple through a light brown.

Distribution.—Abrolhos; N. Australia (46); Fiji, Rotuma (35); Hawaii (110); N.E. Malay (76); S.W. Malay (4, 76); Christmas Island (24); India, Ceylon (4); Maldives and Laccadives (18); Red Sea, Persian Gulf (4, 69); Seychelles, E. Africa (4, 113). *Vide* also Odhner, 1925. Not in S. Africa, *vide* Stebbing, 1910.

22. LOPHOZOZYMUS PULCHELLUS (A. Milne-Edwards, 1867).

Lophozozymus pulchellus A. Milne-Edwards, 1867, p. 273; 1873 *a*, p. 205, pl. vi, fig. 3; Rathbun, 1911, p. 214.

Locality.—1 ♀, Wooded Island, shore.

Measurements (in mm.) :—

C. l.	15
C. b.	25
Fronto-orbital b.	11·5
Post. border of C. b.	8

Distribution.—Abrolhos; India, Ceylon (68); Red Sea, Persian Gulf (69); Seychelles, E. Africa (113).

23. XANTHO IMPRESSUS (Lamarck, 1818).

Xantho impressus Alcock, 1898, p. 115, *ubi synn.*; Odhner, 1925, p. 79.

Localities.—*a*, 1 ♂, Wooded Island, Abrolhos; *b–c*, 2 ♀, Wooded Island, Abrolhos; *d*, 1 ♀ ovig., Long Island; *e*, 1 ♀ ovig., Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*
C. l.	25	30	25	30	29
C. b.	43	52·5	42·5	50	51·5

Distribution.—Abrolhos; S.W. Malay (4, 77); E. Africa, Seychelles (4, 113). *Vide* also Ortmann, 1894 *a*, pp. 444, 449.

24. XANTHO HYDROPHILUS (Herbst, 1790).

Cancer hydrophilus Herbst, 1790, i, pt. 8, p. 266, pl. xxi, fig. 124.
Xantho affinis de Haan, 1835, p. 48, pl. xiii, fig. 8.
Chlorodius exaratus Milne-Edwards, 1834, i, p. 402.
Xantho (*Leptodius*) *exaratus* Alcock, 1898, p. 118.
Leptodius exaratus Rathbun *in* Stimpson, 1907, p. 52, pl. vi, figs. 3–4, 6–9.
Xantho hydrophilus Stebbing, 1908, p. 7, *ubi synn.*; 1910, p. 297; Laurie, 1915, p. 444.

Localities.—*a–b*, 2 ♂, Reefs, North Island, Abrolhos ; *c–o*, 4 large ♂ ; 9 small immature specimens, West Wallaby Island, Abrolhos ; *p–q*, 1 ♂, 1 ♀ ovig,, between Pigeon Island and Wallaby Island, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*
C. l.	16·5	14·5	14	12	11·5	11·5	7·5	7	6·5
C. b.	26·5	22·5	22·5	18·5	18	18	11	11	10
Fronto-orb. b.	13·5	12	11·5	10	10	10·5	7	6·5	6
Post. border of C. b.	10	8	8	6·5	6·5	6·5	4	4	3·5

	j.	*k.*	*l.*	*m.*	*n.*	*o.*	*p.*	*q.*
C. l.	6	6	5	4·5	3·5	2·5	11	9
C. b.	9	8·5	7·5	7	5	4	17	14
Fronto-orb. b.	6	6	5	4·5	4	3	9·5	8
Post. border of C. b.	3	3	2·5	2·5	2	1·5	6·5	5

Along with specimens *p* and *q* there is a large piece of sponge which fits on obviously to the carapace as a commensal cap such as is carried by some Dromiids. From which specimen it comes is uncertain ; possibly it was from the female, which might explain the great preponderance of males in the collection.

The specimens approximate most closely to Stimpson's variety "*h*," *latus*. They differ from the typical specimens in having the antero-lateral teeth trimmed with a series of subsidiary teeth, and in having the sculpturing of the carapace less marked—for example, on the gastric region, in the typical specimen, there is a longitudinal groove dividing the region and a transverse one medial to it on either side ; these are absent in the Abrolhos specimens. The outer angle of the orbit is on a slightly higher level than that of the antero-lateral borders.

Distribution.—Abrolhos ; N.W. Australia (84) ; S.E. Australia (46) ; N. Australia (23, 36, 46, 84) ; Funafuti (135) ; Hawaii (110) ; N.E. Malay (112) ; S.W. Malay (4) ; Christmas Island (24) ; India, Ceylon (4) ; Maldives and Laccadives (4, 18) ; Red Sea, Persian Gulf (4, 65) ; Seychelles (113). *Vide* also Ortmann, 1894 *a*, p. 445.

25. ACTÆA HELLERI (A. Milne-Edwards, 1865 *a*).

Actæa helleri Odhner, 1925, p. 77, fig. 7, *ubi synn.*

Nec *Actæa helleri* de Man, 1888 *b*, p. 261; *q.*=*A. depressa* (White, 1847 *b*), *vide* Odhner, 1925.

Locality.—1 ♂, Long Island, Abrolhos.

Measurements (in mm.) :—

C. l.	38
C. b.	57

The lobulation of this species is like that of *A. depressa* (White, 1847 *b*), but it is readily distinguished by the much greater breadth of the carapace.

The specimen is much larger than those formerly described, comparing with Nobili's largest, 29 mm. broad (Nobili, 1906, p. 256), and Rathbun's, 15·3 mm. broad (Rathbun, 1911, p. 221, pl. xviii). The species is quite like *A. hirsutissima* (Rüppell, 1830, p. 26, pl. v, fig. 6), from which it can be distinguished by the following points.

The under surface of the carapace is minutely granular, not hairy, and there are no grooves or fissures subdividing the antero-lateral borders. There are no bristles on the external surface of the maxillipedes or on the distal abdominal terga ; nor are there hairs on the sternum or proximal abdominal terga. The lobulation of the carapace is not so distinct, the hairs are much more sparse posteriorly and are yellowish instead of black. The antero-lateral borders are scarcely lobulated.

The hand of the chelipeds is short and stumpy, exactly as in Odhner's figure (Odhner, 1925, p. 78, fig. 7), except that the hairs are sparser and not so long. In *A. hirsutissima* the hand is long, narrow, and costate.

Distribution.—Abrolhos ; N. Australia (100) ; N.E. Malay (87) ; Red Sea, Persian Gulf (69) ; Seychelles (113) ; S. Africa (125).

26. ACTÆA CALCULOSA (Milne-Edwards, 1834).

Actœa calculosa Alcock, 1898, p. 152, *ubi synn.*
Actœa calculosa Calman, 1900, p. 8.

Locality.—1 ♂ with *Sacculina.* Dredged between Wallaby and Pelsart Islands.

Measurements (in mm.) :—

C. l.	10
C. b.	14
Fronto-orb. b.	8
Posterior border of C. b.	5

The basal antennal joint just reaches the orbit, but the specimen is fully adult. The fingers of the chelipeds are black, not brown, and the teeth on the fingers are not very marked.

It is noteworthy that not only this specimen but also two out of four of the following species are parasitised by a *Sacculina*, whereas only one out of twenty specimens of *A. depressa* (White, 1847) var. *abrolhensis* in the collection is so infected.

Distribution.—Abrolhos ; N.W. Australia (84, 100) ; S.W. Australia (84, 100) ; S.E. Australia (84, 100, 118) ; N. Australia (23, 36, 46, 84, 100, 119) ; N.E. Malay (112) ; S.W. Malay (4) ; India, Ceylon (4) ; Red Sea, Persian Gulf (4, 69).

27. ACTÆA SAVIGNYI (Milne-Edwards, 1834).

Actæa granulata Alcock, 1898, p. 151, *et synn.*; Calman, 1900, p. 8.
Nec *Cancer granulatus* Fabricius, *vide* Kossman, 1877, p. 25.
Nec *Cancer granulatus* Linnæus, 1758, *vide* Rathbun, 1910, p. 350.
Actæa savignyi Kossmann, 1877, *et* Rathbun, 1910, *l. c.*
Actæa granulata Laurie, 1915, pp. 414, 447.
Actæa savignyi pura Balss, 1922, p. 122.
Actæa savignyi Odhner, 1925, p. 52.

Locality.—*a–d*, 1 ♂ with *Sacculina*, 1 ♀ with *Sacculina*; 2 ♀, Broome, F.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*
C. l.	14	14	28·5	14·5
C. b.	17·5	17·5	21·5	18
Fronto-orbital b.	10·5	10·5	15	10·5
Post. border of C. b.	6	6	10	6

The specimens are relatively large when compared with the majority hitherto described.

Distribution.—N.W. Australia (100); S.E. Australia (46, 134); Broome; N. Australia (46, 85, 119); N. Zealand (80); N.E. Malay (112); S.W. Malay (4); India, Ceylon (4); Maldives and Laccadives (18); Red Sea, Persian Gulf (4, 69); Seychelles (113).

28. ACTÆA DEPRESSA * (White, 1847 *b*) var. *abrolhensis*, var. n.

Localities.—*a–f*, 2 ♂, 4 ♀, Long Island; *g*, 1 ♂, North Island; *h–n*, 5 ♂, 2 ♀ (one with *Sacculina*), Wooded Island; *o–q*, 1 ♂, 2 ♀, Sandy Island; *r–s*, 2 ♂, Abrolhos; *t*, 1 ♂, inside lagoon, Pelsart Island.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*	*j.*
C. l.	16	14·5	12·5	10	10	8·5	20·5	20·5	15	9·5
C. b.	21·5	20	17	14	14·5	11	28	28	21	13·5

	k.	*l.*	*m.*	*n.*	*o.*	*p.*	*q.*	*r.*	*s.*	*t.*
C. l.	8	7	13·5	12	16·5	13·5	8	17	12·5	8·5
C. b.	11	9	19·5	17	22·5	18	10·5	23	17·5	11

These specimens are not quite like those described by Odhner, but approach *A. depressa* (White, 1847 *b*) more closely than any other species. The granules of the carapace are fewer, coarser, and sharper than in Odhner's specimens,

* *Actæa depressa* (White)=*Actæa parvula* Alcock, 1898, p. 146. Nec *Menippe parvula* de Haan, 1833, *nom. nud.* *Vide* Odhner, 1925, p. 38, pl. ii, fig. 19, *ubi synn.*

some of which have been compared from the collection of the British Museum, Natural History. The grooves of the carapace are deeper and the granules are unevenly scattered ; there is some variation among the individual specimens, but generally the granulation is more marked over the posterior two-thirds of the carapace than typically. The fur is variable in amount, but is often so long as to mask the areolæ ; in all cases it is longer than typically.

The lobulation of the antero-lateral border of the carapace also varies in the collection, and in one specimen (*s*) the border is entire.

The chelipeds also show variation. In some cases the pigmentation is confined to the fingers, in others it covers the whole lower border of the hand and part of both its inner and outer surfaces. The chelipeds are stumpy, the palm is not quite so broad at the base of the immobile finger as shown in Odhner's figure (Odhner, *l. c.* pl. iii, fig. 13 *a*), and the two big teeth are not so prominent ; in none is the cheliped so long and narrow as in *A. parvula* (de Haan, 1833) [*vide* Odhner, *l. c.* pl. ii, fig. 19].

Distribution.—Abrolhos ; and *vide* Odhner, *l. c.*

29. ACTÆA RUFOPUNCTATA (Milne-Edwards, 1834).

Actæa rufopunctata Alcock, 1898, p. 142, *ubi synn.*
Actæa garretti Rathbun, 1906, p. 852, pl. ix, fig. 8.
Actæa rufopunctata var. *retusa* Nobili, 1905, p. 404.

Localities.—*a*, 1 ♀, Long Island, Abrolhos ; *b*, 1 ♀, Wooded Island, shore-collecting.

Measurements (in mm.) :—

	a.	*b*.
C. l.	10	9
C. b.	15·5	14
Fronto-orbital b.	8·5	7·5
Post. border of C. b.	5	4·5

The red colouration on certain of the lobules is beautifully preserved ; the whole of the lobule is not coloured, but only the anterior two-thirds or three-quarters.

Distribution.—Abrolhos ; Fiji, Rotuma (16) ; Hawaii (110) ; S.W. Malay (4, 76, 77) ; N.W. Malay (100) ; Christmas Island (24) ; India, Ceylon (4) ; Maldives and Laccadives (18) ; Red Sea, Persian Gulf (69) ; E. Africa (104) ; West Indies (100).

30. ACTÆA LEVIDORSALIS, sp. n. (Pl. **26.** figs. 3, 3 *a*, 3 *b*, 3 *c*.)

Locality.—1 ♂, Long Island, Abrolhos.

Measurements (in mm.) :—

C. l.	14
C. b.	22
Fronto-orbital b.	11
Front b.	7

The carapace is about two-thirds as long as broad, arched fore and aft, almost flat transversely across the branchial regions. The areolation of the carapace is very incomplete, being almost absent over the posterior part of the gastric and branchial regions, and over the intestinal region ; the granulation is microscopic in these areas. Anteriorly, areolæ are well marked and covered with conical granules which are in no case squamiform. There is very little hair on the carapace, not more than fifty or sixty hairs being present all told ; there is a row of about eight in a groove behind the front, about five on either side in a groove on the branchial region, and a little tuft of six to eight at the junction of the gastric and branchial regions on either side ; a few appear between the lobules of the front.

The front is deflexed, divided by a well-marked median fissure, there being on each side a broad median lobe and a small lateral lobe, which is fairly sharp and separated by a groove from the outer orbital angle. The orbit shows a small indentation above and below the outer orbital angle, which is ill-marked ; in the lower border of the orbit, the inner angle forms a pronounced forwardly projecting tooth. The antero-lateral borders show four lobes, excluding the external orbital angle ; the first three bear teeth, the first of which is obsolescent, the second larger, and the third fairly well marked ; the teeth bear secondary spiny granulations.

The chelipeds are about equal and are granular over the whole outer surface. Three costæ, granular throughout, appear on the outer surface of the hand, the upper one being broad low, and looking as if it were double. Hairs are very sparse, and there is no prominent spine, except for a blunt double tooth at the antero-internal angle of the carpus. The colour of the fingers is bluish black, lightening to brown at the tips ; the colouration does not extend along the lower border of the palm. The walking-legs have a line of conical granules, almost dentiform, along the upper margin of the femur, which is otherwise smooth ; the more distal joints are granular, particularly on the outer aspect, and are sparsely hairy above and below.

The lack of lobulation and granulation posteriorly suggest *Lioxantho* (Alcock, 1898) ; there is also a superficial resemblance to *Xantho* (particularly the *Leptodius* species) in the anterior part. The front, however, is that of an *Actæa*, though one expects a greater degree of sculpture and areolation. *A. hawaiiensis* (Rathbun, 1906, p. 853, pl. ix, fig. 9) appears to approach this species closely, but is distinguished by :—(i) the carapace is " narrow " (not, however, in Rathbun's figure) ; (ii) the regions are deeply separated and granules scaly ; (iii) the hairs on the carapace are more numerous ; (iv) the walking-legs and chelæ are more hairy ; (v) the colour of the fingers runs far on to the palm ; (vi) the orbits have two V's above and one below the outer orbital angle ; (vii) the last antero-lateral tooth is narrow, simple, and almost upturned.

Distribution.—Abrolhos.

31. PARAXANTHIAS ELEGANS (Stimpson, 1859).

Xanthodes elegans Stimpson, 1859, p. 33.
Xanthias elegans Rathbun, in footnote to Stimpson, 1907, p. 47, pl. v, fig. 3, and 1897, p. 165.
Xanthodes atromanus Haswell, 1882 *a*.
Xanthodes atromanus Grant & McCulloch, 1906, p. 12.
Paraxanthias elegans Odhner, 1925, p. 84.

Localities.—*a*, 1 ♂, Wooded Island; *b*, 1 ♀, Long Island; *c*, 1 ♀, between Pigeon Island and Wallaby Group.

Measurements (in mm.) :—

	a.	*b*.	*c*.
C. l.	10	10·5	4·5
C. b.	15	15	7
Fronto-orbital b.	9	9·5	5
Post. border of C. b.	5·5	5·5	3

The areolations of the carapace are not quite so distinct as in specimens preserved in the British Museum (Natural History), which came from the Australian Museum. The triangular tooth on the inner angle of the lower orbital margin is distinct, as described by Haswell, but this tooth is indicated in *Xanthias notatus* (Dana, 1852) also.

The specimens agree well with the description and figures of Stimpson (Stimpson, 1907, p. 47, pl. v, fig. 3), except that the hands are much more tuberculated. The granulations on the outer side of the palm are more numerous than in the types of *Xanthodes atromanus* (Haswell); there are four rows of granules below the groove on the upper part of the palm instead of two; in the British Museum specimens these two extra rows are indicated but not well developed. The fingers vary considerably: in the British Museum specimens, in some the fixed finger is as long as the depth of the palm, in others only half this. Grant and McCulloch (*l. c.* p. 12) draw attention to the variability of colour in this species, "deep chocolate mottled to almost white," the specimens from 17 fathoms being much lighter than "those from the reef"; the fingers are described as black, the black extending "far down the palm." In the Abrolhos specimens and in many of the British Museum specimens the black does not extend far along the underside of the palm, and its extent is very variable.

Distribution.—Abrolhos; Japan (127); N.W. Australia (114); S.E. Australia (31, 46, 134); N. Australia (36); Norfolk Island (37).

32. CHLORODIELLA NIGRA (Förskal, 1775).

Chlorodius niger Alcock, 1898, p. 160, *et synn.*; Balss, 1921, p. 62; Odhner, 1925, p. 85.
Chlorodiella nigra Rathbun, 1897, p. 165; Balss, 1922, p. 130; Laurie, 1915, p. 447 *et synn.*

Localities.—*a–b*, 2 ♂, shore-collecting, Long Island; *c*, 1 ♀, shore-collecting, north end of Pelsart Island; *d*, 1 ♂, Wooded Island.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*
C. l.	16	13	15·5	11
C. b.	24	20·5	23	18
Fronto-orbital b.	18	16	18	14
Front b.	12·5	11	12	10
Left Ch. l.	44	38	38	32

As in Laurie's Ceylon specimens (Laurie, 1906, p. 405), *a* and *b* have the last two antero-lateral teeth blunt, not " terminating in procurved spine-like points " (Alcock, *l. c.*) ; there is a tendency to a forward curve, however, plainly visible even in the blunt teeth. In *c* the last tooth is a procurved spine, in *d* the last two as Alcock describes. The anterior border of the arm is tuberculate in *b* and *c*, spined in *d*, but merely slightly sinuous at its middle in *a*. The carapace under a lens is minutely pitted in appearance.

For the variability of this species *vide* Laurie, 1915, p. 447.

Distribution.—Abrolhos ; S.E. Australia (31, 46, 84) ; N. Australia (23, 36, 46, 84, 118) ; Fiji, Rotuma (16) ; Hawaii (110) ; N.E. Malay (65, 76, 112) ; S.W. Malay (4, 64, 76, 77) ; Christmas Island (24) ; India, Ceylon (4) ; Maldives and Laccadives (18) ; Red Sea, Persian Gulf (69) ; E. Africa (104, 113).

33. PHYMODIUS UNGULATUS (H. Milne-Edwards, 1834).

Phymodius ungulatus Alcock, 1898, p. 162, *ubi synn.*
Phymodius monticulosus Alcock, 1898, p. 163, *ubi synn.*
Chlorodius monticulosus Dana, 1852, p. 79.
Chlorodius obscurus Lucas, 1852, p. 26, pl. iii, fig. 4.
Phymodius obscurus Rathbun, 1906, p. 858 ; Rathbun, 1907, p. 46.
Phymodius ungulatus Nobili, 1906 ; Rathbun, 1906, p. 857 ; Laurie, 1915, p. 450, *ubi synn.*

Localities.—*a–d*, 4 ♂, shore, Long Island, Abrolhos ; *e*, 1 ♀, shore, Long Island, Abrolhos ; *f–h*, 2 ♂, 1 ♀, dredged, Long Island, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*
C. l.	22	18·5	15·5	13·5	12	17·5	17	17
C. b.	32·5	26	22	19	16·5	26·5	25	24·5
Fronto-orb. b.	20	17	14·5	13	11	16	15·5	15·5
Post. border of C. b.	10	8	7	6	5	7·5	9	8·5

Distribution.—Abrolhos ; S.E. Australia (31) ; N. Australia (23, 36, 46) ; Fiji, Funafuti (16, 135) ; Hawaii (110) ; N.E. Malay (104) ; S.W. Malay (4) ; Christmas Island (24) ; India, Ceylon (4, 68) ; Maldives and Laccadives (18) ; Red Sea (69) ; Seychelles (113) ; E. Africa (104) ; S. Africa (124).

34. CHLORODOPSIS AREOLATA (Milne-Edwards, 1834).

Chlorodius areolata Milne-Edwards, 1834, p. 400.
Chlorodopsis areolata Alcock, 1898, p. 166, *et synn.*
Etisodes cœlatus Dana, 1852, p. 118, pl. ix, 1855, fig. 4.
Actœodes affinis Dana, 1852, p. 197, pl. xi, 1855, fig. 5.
Actœa affinis A. Milne-Edwards, 1865 *a*, p. 263.
Actœodes affinis Miers, 1886, p. 135. Nec *A. tomentosus.*
Actœa affinis Rathbun, 1906, p. 852; 1907, p. 42; 1911, p. 219; 1914, p. 658; Borradaile, 1900, p. 583; 1902 *b*, p. 255. *Nec* Lanchester, 1900, p. 734 *q*. = *A. hirsutissima* (Rüppell).
Chlorodopsis areolata Rathbun, 1906, p. 858; Bouvier, 1915, p. 101; Odhner, 1925, p. 36.

Localities.—*a–j*, 4 ♂, 3 ♀, 3 ♀ ovig., Wooded Island, Abrolhos; *k–m*, 3 ♂, Long Island; *n*, 1 ♀ ovig., Abrolhos; *o*, 1 ♀, Swan River.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*
C. l.	19·5	16·5	14	15	13·5	14	11·5	15
C. b.	26	23	21	22	18	19	17	21
Fronto-orbital b.	17	14	13	15	11	12	10·5	13·5
Front b.	11	10	9	10	8·5	9	8	9·5

	i.	*j.*	*k.*	*l.*	*m.*	*n.*	*o.*
C. l.	15	13	15	13	12	14·5	8·5
C. b.	22	19	22	20	18	21·5	12
Fronto-orbital b.	14	12	14	12	11	13	8
Front b.	9·5	8	10	9	8	9·5	5·5

k has two legs in course of regeneration. The buds come out in a single envelope, which is, however, marked with indentations where the individual joints are to occur.

A very constant character in these specimens is a pair of lobules over the intestinal region, placed like a pair of outstretched wings, which have fewer granules and less dark hair than the rest, making them appear lighter in colour. The only figure of *Actœodes affinis* (Dana) illustrates these areolets.

Alcock, 1898, p. 166, describes the fingers as " smooth except for some grooving and granulations at the base of the dactylus." There are two rows of granules on the upper border of the movable finger; these granules enclose a gutter between them which is continued almost to the tip of the finger, beyond the point to which the granules reach.

The subspinous granules on the walking-legs described by Alcock as " peeping through " the fur, are only conspicuous in the male specimens.

Distribution.—Abrolhos; Swan River; N.W. Australia (114); S.E. Australia

(46, 134); N. Australia (36, 46, 136); Hawaii (110); Palmyra and Fanning Islands (30); S.W. Malay (4); Christmas Island (24); India, Ceylon (4); Maldives and Laccadives (18); Red Sea, Persian Gulf (69); E. Africa, Seychelles (4); S. Africa (124, 125).

35. Ozius truncatus (Milne-Edwards, 1834).

Ozius truncatus Grant & McCulloch, 1906, p. 153.

Localities.—*a*, 1 ♀, North Island, Abrolhos; *b*, 1 ♂, island at entrance to lagoon, Wallaby Group.

Measurements (in mm.):—

	a.	*b*.
C. l.	28	22·5
C. b.	41	33
Fronto-orb. b.	22	17·5
Post. border of C. b.	9·5	8·5

Distribution.—Abrolhos; S.E. Australia (31); N. Australia (36, 46); N. Zealand, Norfolk Island (37, 46, 80).

36. Pilumnus contrarius (Rathbun, 1923).

Locality.—1 ♂, Swan River.

Measurements (in mm.):—

C. l.	7
C. b.	9·5
Front b.	3·5
Front. orb. border	5·5
W.-L. 1 l.	4·5+4+3=11·5
W.-L. 2 l.	4·5+4+3=11·5
W.-L. 3 l.	4·5+4+3=11·5
W.-L. 4 l.	4+3·5+2·5=10
W.-L. 1 b. of femur.	1

This specimen is referred to Miss Rathbun's species with considerable reserve.

The carapace is curved, but not strongly, both fore and aft and transversely, is about three-quarters as long as broad, with a smooth surface, covered all over with a rather thin covering of long soft hairs; between these is a shorter fur which is also fairly sparse. The regions are visible, but there is no definite areolation. The front is deflexed and divided by a shallow groove into two lobes, which are little prominent, and which run almost in continuity with the supraorbital border, only a rudiment of a lateral lobe being present. In the supraorbital border are two very ill-marked emarginations, another being present below the obscure outer orbital angle. The lower border of the orbit ends in a poorly developed tooth at its inner end, and is fringed with hairs. The antero-lateral borders bear four lobes, the first obscure and continuous with the outer orbital angle, the next more marked, and the third and fourth forming blunt teeth, bearing tufts of hairs.

The right cheliped is slightly the larger ; both are smooth externally except for a few low granules above and proximally, the largest being the more distal ; the greater part of the outer surface is covered rather sparsely with hairs and more thickly with fur. The carpus bears a strong tooth at the antero-internal angle. The colour of the fingers is brown, and differs little from the rather muddy colour of the rest of the chela, and, indeed, of the carapace as a whole. The walking-legs are slender, the first three almost of equal length, the last shorter ; the terminal joint is especially elongated and slender.

Distribution.—Swan River ; North Australia (118).

37. PILUMNUS DIGITALIS (Rathbun, 1923).

Locality.—1 ♀ juv., dredged between Rat Group and Pelsart Island.

Measurements (in mm.) :—

C. l.	5·5
C. b.	7·5
Fronto-orb. b.	15·5
Front b.	3·5
Major palm l.	5
„ „ b.	2·5

Distribution.—Abrolhos ; Queensland (118).

38. PILUMNUS EDAMENSIS (de Man, 1888 *b*). (Pl. 27. figs. 1, 1 *a*.)

Localities.—*a–g*, 7 ♂, Long Island ; *h–r*, 13 ♀, Long Island ; *u–x*, 4 ♀ ovig., Long Island ; *y–z*, *α*, 3 ♂, Wooded Island ; *β*, 1 ♀, Wooded Island ; *γ*, 1 ♂, inside lagoon, Pelsart group ; *δ*, *ε*, 2 ♂, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*	*j.*
C. l.	14	14	14	13·5	11·5	8	6	12	12	12
C. b.	19	19	19	18	16	11	8·5	16·5	16·5	16
Fronto-orbital b.	11	11	11	10·5	9	7	5·5	9·5	9·5	9·5
Post. border of C. b.	7	7	7	6·5	5·5	4	3	5·5	5·5	5·5

	k.	*l.*	*m.*	*n.*	*o.*	*p.*	*q.*	*r.*	*u.*	*v.*
C. l.	11·5	11	11	10	10	10	10	8·5	13·5	12·5
C. b.	16	15	14·5	14	14	14	14	13	18	17
Fronto-orbital b.	9·5	9	9	8·5	8·5	8·5	8·5	8	11	10
Post. border of C. b.	5·5	5·5	5·5	5	5	5	5	4·5	7	6

	w.	*x.*	*y.*	*z.*	*α.*	*β.*	*γ.*	*δ.*	*ε.*
C. l.	12·5	10·5	9·5	9·5	6·5	11	6	14	9
C. b.	17·5	14·5	13	13	9	15	8	19	11·5
Fronto-orbital b.	10	8·5	8	7	6	9	5·5	11	7·5
Post. border of C. b.	6	5·5	5	5	3·5	6·5	3	7	4·5

There is very little hesitation in placing these specimens in de Man's species ; but the genus *Pilumnus* is having further strain on its already wide boundaries.

Firstly, the division of the Xanthidæ by the character of the ridges of the endostome breaks down here ; the ridges are very poorly developed in the anterior part and are only visible under a powerful lens. The teeth of the antero-lateral border, which one expects to be present in a *Pilumnus*, are scarcely apparent, being almost microscopic and barely more than tubercles. Again, the carapace is almost completely devoid of hair on the dorsal surface, an almost unique occurrence in a *Pilumnus*. The most remarkable feature of the specimens, when fresh, was a ridge of stiff outstanding fulvous hairs about 2 to 4 mm. in length, projecting forward from the antero-lateral borders and the front ; these are visible in the preserved specimens, but are much crushed and broken.

There is considerable variation in carapace colour, from white to light brown, and in the colour of the fingers, from light brown (almost white) to dark brown (almost black).

The antennules are remarkable in that the inner ramus is short, stiff, curved, and pointed, and the outer ramus plumose and curved toward the inner, giving a pseudo-chelate appearance.

The right claw is the smaller and is covered on the outer aspect of the palm with a short fur. The left hand has fur only in about one-sixth of the extent at the base of the outer aspect.

Distribution.—Abrolhos ; N.E. Malay (112) ; S.E. Malay (76).

39. PILUMNUS PULCHER (Miers, 1884). (Pl. 25. fig. 2.)

Locality.—1 ♂, Broome (Fisheries dept.).

Measurements (in mm.) :—

C. l.	23
C. b.	30
Front b.	8·5
Fronto-orb. b.	15·5

Distribution.—Broome ; Northern Australia (23, 84, 85, 104, 118, 119).

40. PILUMNUS SEMILANATUS (Miers, 1884).

Pilumnus semilanatus Rathbun, 1923, p. 14, pl. xxiv, figs. 1–2.

Localities.—*c–e*, 1 ♂, 2 ♀, Broome, / F \.

	c.	*d.*	*e.*
C. l.	36	25	23·5
C. b.	42	33	29
Fronto-orbital b.	22	18	17
Post. border of C. b.	15	12	11

These specimens agree in every respect except size with those of Miers (Miers, 1884, pp. 183, 222, pl. xxii, fig. B) and McCulloch (McCulloch, 1913, p. 325, fig. 43). The largest measures 46 mm. across the carapace as against

McCulloch's largest, 18 mm. across. The frontal lobes are distinctly notched, as Miers shows in his figure, though not mentioning it in the text. There are two little tufts of hair on the carapace just behind the cardiac region; the granules on the wrist are conspicuous; the fingers are black. These points are given in amplification of Miers's description. The brilliant red colour of the granules on the chelipeds makes the species instantly conspicuous.

Distribution.—Abrolhos; N. Australia (36, 72, 118, 119).

41. PILUMNUS SPINICARPUS (Grant & McCulloch, 1906).

Pilumnus spinicarpus Grant & McCulloch, 1906, p. 15, pl. i, figs. 2, 2 *a*.
Pilumnus spinicarpus Rathbun, 1923, p. 123.
Pilumnus cursor Alcock, 1898, p. 195. *Nec* A. Milne-Edwards, 1873 *a*, p. 244.

Localities.—1 ♀, Broome, F.

Measurements (in mm.):—

C. l.	8·5
C. b.	12·0
Fronto-orbital b.	8·0
Front b.	4·0
3rd leg l.	19·0

Distribution.—Broome; N. Australia (23, 36, 46, 84, 118); N.E. Malay (76); Andamans (4).

42. PILUMNUS GRANTI, sp. n. (Pl. 26. figs. 1, 1 *a*.)

Locality.—*a*–*b*, 1 ♂, 1 ♀ ovig., dredged off Long Island.

Measurements (in mm.):—

	a.	*b*.
C. l.	16	15
C. b.	20·5	20
W.-L. 1 l.	31	26
W.-L. 2 l.	27·5	26
W.-L. 3 l.	26·5	27
W.-L. 4 l.	22·5	23
Major palm l.	17	13·5
Major palm b.	11	8
Fronto-orb. b.	14	13·5
Front b.	7·5	7

This is a species very near to *P. contrarius* (Rathbun, 1923); in both the tubercles on the major palm increase instead of decreasing in size towards the distal and lower portion. It is dintisguished by the following:—(i) the median lobes of the front are much more prominent and sharply rounded, while the outer lobes are obsolete, though slightly acute, and almost coincident with the rounded inner angle of the orbit, from which it is separated by only a slight furrow; (ii) the lateral notch of the front is of the same size as the median, not larger; (iii) the notch in the superior orbital margin is small but distinct and near the outer orbital angle; it is of nearly the same size as the shallow

notch below the outer angle ; (iv) the antero-lateral teeth are four in number, are prominent, and made up of a base covered with accessory low denticles ; the first (or external angle of the orbit) is not low, and but slightly smaller than the second ; the third and fourth are largest and are equal in size. All are much sharper than in *P. contrarius*, where the second is the largest ; (iv) the chelipeds have the lower margins of the arm smooth, not tuberculate, and the inner margin minutely granular only ; the proximal half of the lower margin in the major palm, which is the right, is smooth.

Distribution.—Abrolhos.

43. PILUMNUS MACCULLOCHI, sp. n. (Pl. 26. figs. 2, 2 *a*.)

Locality.—1 ♀, Broome, F.

Measurements (in mm.) :—

C. l.	14·5
C. b.	19
W.-L. 1 l.	24
W.-L. 2 l.	31
W.-L. 3 l.	29
W.-L. 4 l.	23
Major palm l.	17
Major palm b.	10
Antero-lat. border l.	5
Fronto-orb. border b.	12
Front b.	7

The carapace is about three-fourths as long as broad, strongly curved antero-posteriorly, with the greatest curve in front, and little curved from side to side across the greatest breadth. The surface is very finely granulated all over, more coarsely at the sides than over the gastric and intestinal regions, which are almost bare, the rest being covered with a somewhat sparse coat of small fine hairs, among which long coarse hairs arise either singly or in clumps ; the most conspicuous clumps are on the branchial regions in the grooves bounding these anteriorly.

The fronto-orbital breadth is about two-thirds the carapace breadth, and is divided by a deep median notch into two broad lobes, from each of which a deep lateral notch cuts off a tiny tooth-like lateral lobe, separated by a slight groove from the more rounded inner orbital angle.

The antero-lateral border is about one-quarter the carapace breadth, and bears three strong procurved spines, of about equal length and each consisting of a somewhat tuberculated base ending in a horny sharp smooth spine. The external angle of the orbit is sharp, consisting of a pyramidal tooth bearing several sharp spinules ; it is separated by a fissure from the lower border of the orbit, which bears a row of six fairly sharp spinules equally spaced. There are two slight crenulations in the upper border of the orbit.

The right is the major cheliped. The whole of the outer aspect of both palms is smooth except for a small area of granulation and pubescence, similar

to that on the carapace, which appears on the proximal end of the smaller. In both chelæ, the carpus is granular and pubescent, and bears a stout pointed tooth at its antero-internal angle, but it is otherwise unarmed. The meropodite bears a series of irregular bluntly procurved teeth on its lower border and two similar rather conspicuous teeth on its upper border ; its outer surface is, in the main, smooth ; from its lower border the line of teeth is continued on to the more proximal joints. The fingers are dark brown, the palm a very light cream or buff, the dark being separated from the cream by a line of ivory-white into which the cream fades.

The walking-legs are unarmed, except for the stout dactylus ; the femur is smooth, with some long hairs, but the more distal joints are very hairy, with short and long hairs intermixed, looking under a lens not unlike a bottle-brush. The middle two legs are much longer than the others.

The species appears to be most akin to *P. fissifrons* (Stimpson, 1859, p. 36 ; *vide* Stimpson, 1907, p. 67, pl. viii, fig. 4).

Distribution.—Broome, W.A.

44. ACTUMNUS OBESUS (Dana, 1852).

Actumnus obesus Rathbun, 1906, p. 865, pl. xi, fig. 2.

Localities.—*a–c*, 1 ♀, 2 ♂, dredged between Pelsart Group and Rat Island ; *d*, 1 ♂ (damaged), Broome, F.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*
C. l.	8	5	10	7·5
C. b.	10	7	12	9
Fronto-orb. b.	7	4·5	8·5	6·5
Post. border of C. b.	3	3	4	3

These specimens are referred to *A. obesus* (Dana, 1852), but in some respects they approach *A. setifer* (de Haan, 1835). Rathbun's figures of her Hawaiian specimen appear to agree with *A. obesus* in regard to the carapace, and with *A. setifer* in regard to the antero-lateral teeth (*vide* Rathbun, 1906, *l. c.*). A. Milne-Edwards figures *A. setifer* with antero-lateral teeth much sharper than in my specimens (A. Milne-Edwards, 1865 *a*, pl. 287, pl. xviii, figs. 5 & 5 *a*, *not*, as in text, pl. xv, and as copied by Alcock, 1898, p. 202), and than specimens so labelled, in the British Museum (Natural History) ; of the latter those collected by Dr. Coppinger at Thursday Island (labelled 81.31) are the same as mine, while those from the Bowerbank collection (Australia, labelled 66.75) are markedly more spiny on the antero-lateral borders, and the granules are much sharper, in both respects approaching A. Milne-Edwards's figure. De Haan's figure (de Haan, 1835, p. 50, pl. iii, fig. 3) agrees with that of Milne-Edwards.

The specimens agree well with Dana's description and figures (Dana, 1852, p. 244, pl. xiv, fig. 3) ; but the granules are not marked, and are, in fact, microscopic ; the front is definitely divided medially ; the antero-latera

borders are almost entire, not denticulate; the under surface of the hand and the lower part of the outer surface are, as Dana describes the carapace, granular, but with spaces between the granules filled with pubescence. Lastly, areolet 3 M (by Dana's nomenclature) is divided. Rathbun's specimen from Hawaii is figured as having areolet 3 M divided, but her specimen is much more spiny than mine or than Dana's figure, being more like *A. setifer* in this respect.

It seems possible that the two species may not be distinct and that further connecting forms will be found later.

Distribution.—Abrolhos; N. Australia; Hawaii (110); Red Sea, Persian Gulf (69); Seychelles (113).

Family GONEPLACIDÆ.

45. LITOCHEIRA BISPINOSA (Kinahan, 1856).

Litocheira bispinosa McCulloch, 1913, p. 323, *ubi synn.*

Locality.—1 ♀, Albany.

Measurements (in mm.) :—

C. l.	12
C. b.	15
Fronto-orbital b.	12
Front b.	7
Post. border of C. b.	7·5

Distribution.—Albany. S.W. Australia (72, 84); S.E. Australia (35, 46, 72); N. Australia (46, 84). Fiji.

McCulloch, 1913, doubts " Torres Strait " as a locality for this species, referred to by Kinahan as collected by Macgillivray at that place and kept in the British Museum. There is no specimen in the British Museum from Torres Strait, but there is one labelled " Fiji." Miers, 1884, p. 232, also gives Port Curtis as a locality.

Family PINNOTHERIDÆ.

46. PINNOTHERES EDWARDSI (de Man, 1888 *a*).

Pinnotheres edwardsi de Man, 1888 *a*, p. 103, pl. vi, figs. 6–9.

Locality.—2 ♀, Abrolhos. No locality-slip, but undoubtedly from the Abrolhos, probably escaping unnoticed from a bivalve molluscan host.

Measurements (in mm.) :—

	a.	*b.*
C. l.	13	12
C. b.	13	12·5

The two kinds of hairs in the pubescence, noted by Tesch (Tesch, 1918 *b*, p. 258), are present; the longer are readily brushed off. The blunt tooth nearer the bases of the fingers on the cheliped than the tip, which Tesch remarks,

is also seen; it occurs as well in *P. pisum*, the chelipeds of which de Man (de Man, 1888 *a*, p. 103) states exactly resemble those of *P. edwardsi*. At the sides of the carapace the pubescence is absent, revealing a definite, though very wide, angle between the antero-lateral and postero-lateral borders. The side-walls of the carapace are more or less vertical.

Distribution.—Abrolhos. Mergui (7, 77); Kei Islands (130).

Family OCYPODIDÆ.

47. OCYPODE PYGIOIDES (Ortmann, 1894 *b*). (Pl. 25. fig. 1; Pl. 27. figs. 5, 5 *a*.)

Localities.—*a–c*, 1 ♂, 2 ♀, Wooded Island, Abrolhos; *d*, 1 ♂, Cottesloe; *e*, 1 ♂, North Beach.

Measurements (in mm.):—

	a.	*b.*	*c.*	*d.*	*e.*
C. l.	24	36	32	35	24·5
C. b.	29	39	38·5	37	30
Front b.	4	6	5·5	5·5	4
Major palm b.	12·5	20	18	20·5	12·5
Stridulatory ridge l.	6	11	9	12	6

There are slight differences only from Ortmann's rather unsatisfactory figure (Ortmann, 1894 *b*, pl. xxiii, fig. 19). The sides of the carapace near the anterior angle are almost straight in the larger specimens, though slightly curved, approximating to Ortmann's figure, in the smaller. The stridulating ridge on the palm is nearly exactly half the breadth, and is therefore not as long as Ortmann figures; nor does it start so near the lower border. In the large specimens, *b* and *d*, there is distinct groove distal to the ridge. This species, therefore, does not fit into Alcock's key (Alcock, 1900 *a*, p. 345). Either cheliped may be the larger.

In the large female *b* the carapace has become longitudinally puckered, forming grooves of which the most marked run from the middle of the upper borders of the orbits to the anterior corners of the cardiac regions.

Specimen *d* shows a tendency to puckering, and the line at which this will take place is indicated in the smaller specimens by a slightly pigmented line.

The species occurs as a sand-burrowing crab in enormous numbers on the more northerly coasts of Western Australia.

Distribution.—Abrolhos; Cottesloe (N. of Fremantle); Geraldton; Naturaliste Channel (103).

Family GRAPSIDÆ.

48. LEPTOGRAPSUS VARIEGATUS (Fabricius, 1775).

Leptograpsus variegatus Rathbun, 1917, p. 234, *ubi synn.*

Localities.—*a–d*, 1 ♀, 1 ♀ ovig., 1 ♀, 1 ♂ juv., Abrolhos Islands; *e*, 1 ♀, Sandy Island, Abrolhos; *f–h*, 1 ♀, 2 ♂ juv., Fremantle, South Mole; *i–k*, 1 ♀, 2 ♂, North Beach.

Measurements (in mm.) :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*	*j.*	*k.*
C. l.	35·5	51	30	10·5	45	40	14·5	13	23	16·5	30
C. b.	40	59·5	33	12	51	48	17·5	14	25·5	18·5	34·5
Front b.	20	27	17	6	25	22	9	8	13	10	16
Fronto-orbital b.	30	41	26·5	11	36	34	15	13	21	16	26
Post. border of C. b.	17	24	12	5	20	18·5	8	6	10	8	14

In *c*, the second tooth of the antero-lateral border is ill-developed, thus approaching *Grapsus* (sens. strict.).

The merus-joint of the cheliped is extended anteriorly on its inner edge as a dentate lamelliform plate, somewhat as in *Geograpsus crinipes* (Dana, 1852) and *Metopograpsus messor* (Förskal, 1775).

Tesch asserts that " the species though occasionally recorded from Australia, Tasmania, and China is chiefly a West American one " (Tesch, 1918 *a*, p. 70, footnote). It is actually quite the most common shore-crab on the south-western coasts of Australia, and is common also at the Abrolhos, since a special note " Shore-crabs " is included with the specimens in this collection.

Distribution.—Abrolhos ; N.W. Australia (46) ; S.W. Australia (46) ; S.E. Australia (36, 46, 134) ; ? N. Australia (46) ; New Zealand (80) ; W. America (129, 115) ; Shanghai (47). *Vide* also Rathbun, 1917.

49. LEPTOGRAPSODES, gen. n., WEBHAYSI, sp. n. (Pl. 25. fig. 5 ; Pl. 28. figs. 1, 1 *a*, 1 *b*.)

Localities.—1 ♀ ovig., Abrolhos Islands ; 1 ♀, Long Island, Abrolhos.

Measurements (in mm.) :—

	a.	*b.*
C. l.	27	16
C. b.	34	20
Fronto-orbital b.	23·5	15
Front b.	11·5	7
Merus of last leg l.	13	8
„ „ b.	4	3
Palm l.	6	3·5
„ b.	8	4

The two specimens of this new species were unfortunately lost in transit when being sent by post to the Paris Museum for comparison with the specimen believed to be the type of *Brachynotus octodentatus* (Milne-Edwards, 1837). The description is therefore made from notes already taken and not in the presence of the specimen itself. It was hoped from these specimens to clear up the doubts existing with regard to *Brachynotus octodentatus* (Milne-Edwards) and *Grapsus inornatus* (Hess, 1865), which are probably identical (*vide* de Man, 1887). The latter species has been redescribed by de Man, but the Abrolhos

specimens have not been compared with the type. Through the very kind consent of Professor Chas. Gravier, however, it has been possible to re-examine the type of Milne-Edwards's species ; the Abrolhos specimens are very closely allied to this, but differ in certain small particulars. A full description is given, so that it may serve as a redescription of Milne-Edwards's species, except in the points of difference noted.

The carapace is about a third broader than long, sub-hexagonal, smooth on the posterior part except for some fine striæ on the postero-lateral part of the branchial regions, but finely granular anteriorly. It is moderately convex from front to back, little convex from side to side. The branchial regions are rather swollen ; the gastric region is separated from the cardiac region by a transverse depression, and, in front of the ends of this, carries a deep pit on either side near the point of junction of the hepatic, gastric, and branchial regions. The front is moderately deflexed ; it tends to be produced anteriorly, and its edge is folded under as in *Leptograpsus variegatus* ; the edge of the fold, however, is slightly convex upwards, not slightly convex downwards as in that species.

The epistome is broad and of varying depth, being produced up to form a triangular interantennular septum by its junction with the front ; this is again as in *L. variegatus*, but again there is the difference that in that species there is a slight convexity downward, but here slightly upward. The lower edge of the epistome bordering the buccal cavern is finely granular.

The pterygostomian region and the whole of the side-wall of the body is covered by a thick pubescence.

The antero-lateral borders carry four teeth, of which the first two are strong, the last two obsolescent. These teeth are themselves microscopically serrated or granular. These serrations are present, though scarcely visible, in *B. octodentatus*.

The fronto-orbital border is about three-fifths the greatest breadth of the carapace, the front about one-third the breadth.

The orbit is bounded externally by a tooth which is the most anterior of the antero-lateral border ; this tooth is pyramidal in shape with four edges, the upper two (Pl. 28. fig. 1, *a* & *b* ; fig. 1 *a*, *a* & *b*) of which are the antero-lateral border and the upper border of the orbit. The other two edges (fig. 1 *a*, *c* & *d*) curve downward to be continuous with two ridges which form the lower border of the orbit. The outer ridge (fig. 1 *a*, *c*) is strongly marked, and expands into a slight protuberance on the outer side of the tooth, from which it then runs forward and medially to end on the base of a pyramidal tubercle, which is separated from the antero-lateral corner of the buccal cavern by a deep groove ; in its medial part this ridge lies in the same line as the epistome. The inner ridge (fig. 1 *a*, *d*) runs down on a more medial plane to a little accessory tooth and thence onward along the floor of the orbit till it comes to lie just behind the first ridge, to end on another aspect of the same tubercle ; this ridge is very small, but nevertheless distinct. From the tubercle on which these ridges

meet a third small ridge passes backward along the floor and posterior wall of the orbit, surrounding the base of the eye-stalk.

The external maxillipedes are widely gaping, showing a diamond-shaped opening between them; the ischium is much longer than the merus and bears a fringe of hairs on both medial and lateral sides; the merus is trapezoid, being narrower proximally than distally; it bears on the medial side of its outer surface a raised ridge which forms the border. There is an indication of a smaller ridge on the ischium. The exognath is slender and tapering, bears a flagellum, and is fringed with hairs.

The antennules are transversely placed in deep fossæ hidden beneath the front. The antennæ stand in the orbit, and their broad irregular basal joints limit the orbit on the medial side.

The chelipeds are equal, smooth, and slender; the merus is irregular in section and bears a few short hairs on its borders; the carpus is rounded and has a small lamellar toothed projection at the antero-internal angle, the strongest tooth being anteriorly. The hand is longer than deep, and the fingers about half as long again as the palm; each finger carries an obscure costa on its outer aspect. The fingers have very small teeth and meet for about a third of their length in a sharp ridge, which is continued round the point of the finger for a very small distance along its inner aspect, giving the appearance of a very narrow spoon at the tip.

The walking-legs are slender, the second and third being the longest and stoutest. The section of the merus is triangular, and there is a ridge of minute granules along the upper border, which terminates in a prominent spine. The dactyli and propodites carry a number of irregularly arranged, very short, stiff, black spines. The dactyli are slender, long, and slightly curved.

The female abdomen is broadly circular, but the last joint has a median projection forward, which distorts the circle, making the joint not a segment of the circle.

The *colour* in spirit is a dirty yellow mottled with red in patches; there are discontinuous rings of a similar dull red on the merus, carpus, and propodus of the legs.

From comparison with the specimen which is believed by Professor Gravier to be the type of *Brachynotus octodentatus* (Milne-Edwards) the following points of difference appear. In the latter,

(*a*) there is no border, corresponding to fig. 1 *a*, *c*, on the antero-lateral tooth running down to a protuberance on the outer angle of the orbit; instead the outer angle is open, smooth, and rounded;

(*b*) the interorbital ridge corresponding to *c* does not run as far laterally as in *L. webhaysi*, but stops short before it turns upward;

(*c*) the ridge corresponding to *d* is distinctly granular, not smooth as in *L. webhaysi*;

(*d*) the superior border of the orbit, strongly granular in *L. webhaysi*, is scarcely granular;

(*e*) the groove on the pterygostomian region and the pit at the outer angle of the epistome are not so deep ;

(*f*) the pits on the back are not so deep ;

(*g*) the toothed lamellar plate on the carpus is less broad and less projecting.

The description given by de Man of *Grapsus inornatus* (Hess) shows that this species differs from both of the above in,

(*a*) having the claws scarcely toothed (untoothed, according to Hess) ;

(*b*) having some sharp granules on the inner angle of the carpus, instead of the toothed lamellar plate of the other two. The character of the ridges running from the outer orbital tooth is not stressed by de Man, so that it is impossible to make the comparison without reference to the type, which is in the collection of the Gottingen Museum.

Dr. J. G. de Man, in a very kind and helpful personal communication, points out that Miss Rathbun in her key to the subfamilies and American genera of the Grapsidæ (Rathbun, 1917, p. 225) divides those in which the antennulæ fold beneath the front in the ordinary way and in which there is no oblique hairy ridge on the exposed surface of the external maxillipedes into two subfamilies, the Grapsinæ and the Varuninæ ; in the former the lower border of the orbit runs downward toward the buccal cavern ; in the latter, " the lower border of the orbit does not run downward toward the buccal cavern, but is supplemented by a rather distant sub-orbital crest, which is in line with the anterior border of the epistome." Dr. de Man remarks that in *Leptograpsus marmoratus* (Fabricius), a representative of the first group, " the finely granulated lower border of the orbits extends to the antero-external angle of the buccal cavern, curving medially toward that angle and there is no trace of a suborbital crest posterior to the lower border." In the Japanese *Brachynotus sanguineus* (de Haan), however, " one observes a smooth orbital crest, that is transversely striated, immediately posterior to the finely granulated lower border of the orbit ; this crest, in line with the granulated border of the epistome, extends, gradually narrowing, to the middle of the 2nd antero-lateral tooth of the carapace."

In *L. webhaysi*, it will be noted that there is no suborbital crest in the sense of the above ; but it is possible that the ridge *c* represents it and the ridge *d* is the true lower border of the orbit ; the former, however, certainly does not run up to the second antero-lateral tooth, nor is it posterior to the ridge *d*. Dr. de Man writes that he considers it justifiable, in the absence of a suborbital crest, to regard this species as belonging not to *Brachynotus* (Varuninæ) but to a new genus of the Grapsinæ, and most closely related to *Leptograpsus*. The name *Leptograpsodes* is suggested to include the three species *L. octodentatus* (Milne-Edwards), *L. inornatus* (Hess), which may be identical, and *L. webhaysi* (sp. n.). The description of *L. inornatus* by de Man differs from the Paris Museum specimen of *L. octodentatus* in having coarse granules on the carpus instead of a lamellar toothed plate, and in having untoothed claws. The habitat of these two is Eastern Australia ; while *L. webhaysi* is Western Australian.

50. PLANES MINUTUS (Linnæus, 1758).

Locality.—*a–g*, 3 ♂, 4 ♀, Cottesloe Beach.

In bank of seaweed left by storm, July 1919.

There is great variation in carapace colour and pattern, and in the size of the postocular tooth. Though almost universal, this species does not appear in Alcock's Indian fauna (Alcock, 1900) nor in Laurie's Ceylon report (Laurie, 1906) nor in the Persian Gulf (Nobili, 1906).

Distribution.—Almost universal, pelagic.

51. CYCLOGRAPSUS AUDOUINII (H. Milne-Edwards, 1837). (Pl. 25. fig. 3; Pl. 27. fig. 6.)

Cyclograpsus audouinii H. Milne-Edwards, 1837, p. 78.
Cyclograpsus lavauxii H. Milne-Edwards, 1853, p. 197.
Cyclograpsus lavauxii Haswell, 1882 *c*, p. 103, *et synn.*
Cyclograpsus lævis Hess, 1865, p. 152.
Cyclograpsus audouinii de Man, 1887, p. 700; 1896, p. 352; Tesch, 1918 *a*, p. 126, *ubi synn.*

Locality.—3 ♂, North Beach.

Measurements (in mm.) :—

	a.	*b.*	*c.*
C. l.	14·5	18	11
C. b.	18	22·5	14
Fronto-orbital b.	13	16	10
Front b.	7	8	6
Post. border of C. b.	7·5	9	7

Hess describes this species as *C. lævis* (Hess, 1865), and states it to be very near *C. cinereus* (Dana, 1852) and perhaps not to be distinguished. From material in the British Museum (Natural History) the two species appear to be separable as follows :—(i) the abdomen of the male in *C. cinereus* has parallel edges, in *C. audouinii* convergent and slightly sinuous edges ; (ii) in *C. cinereus* (Pl. 27. fig. 7) the lateral edges of the carapace overhang the side-wall, forming a groove which bears a line of sparse hairs ; in *C. audouinii* the overlap is not sufficient to form a gutter, and the line of hairs is thick and regular ; (iii) there is a ridge of teeth beneath the orbit in both species. In *C. cinereus* this ridge is irregularly toothed, and continues as a beaded ridge on to the pterygostomian region ; starting medially, it inclines upward but quickly turns laterally and horizontally ; in *C. audouinii* the teeth are regular, the ridge is straight and horizontal, and is continued on the pterygostomian region as a few regular rounded teeth, not as a continuous ridge ; (iv) the outer angle of the orbit is produced downwards in *C. cinereus* so that it forms an almost complete side-wall to the orbit ; in *C. audouinii* the outer angle reaches barely to the upper part of the fully retracted eye, and the orbit is fairly open laterally.

Distribution.—Cottesloe (near Fremantle, S.W. Australia) ; S.E. Australia (46, 129) ; New Guinea (129) ; New Zealand (80, 129).

Family PLAGUSIIDÆ.

52. PERCNON PLANISSIMUM (Herbst, 1804).

Liolophus planissimus Alcock, 1900 *a*, p. 439, *et synn.*
Percnon planissimum Rathbun, 1900, p. 281; 1906, p. 842, *et synn.*

Locality.—*a–b*, 2 ♀, Long Island, Abrolhos.
Measurements (in mm.) :—

	a.	*b.*
C. l.	22	32
C. b.	20	29
Post. border of C. b.	10	15
Fronto-orb. b.	13	17
Epistome b.	5·5	7
W.-L. 3 l.	45·5	65

Distribution.—Abrolhos. "West India region. Oriental region to Japan and Sandwich Islands. Clarion Island. Cape St. Lucas. Chile. Azores. West coast of Spain and Portugal. West and South Africa" (Rathbun, 1906). N.W. Australia (46); S.W. Australia (46); S.E. Australia (31, 46); N. Australia (46, 84); New Zealand, Norfolk Island (37, 80); Fiji, Funafuti (16, 135); Hawaii (110); N.E. Malay (76); S.W. Malay (7); Christmas Island (24); India, Ceylon (7); Maldives, Laccadives (7, 19); Red Sea, Persian Gulf (69); Seychelles (113); S. Africa (124).

53. PLAGUSIA CAPENSIS (de Haan, 1835).

Plagusia chabrus Haswell, 1882 *c*, p. 111.
Plagusia capensis Stebbing, 1905, p. 47, *ubi synn.*
Plagusia capensis Tesch, 1918 *a*, p. 129, *ubi synn.*

Locality.—Part of carapace; 1 cheliped. North Beach.
A fairly common species on South-Western Australian coasts.
Distribution.—S.W. Australia; S.E. Australia (35, 37, 46, 118); New Zealand (80); S. Africa (124); Tonga (129); Juan Fernandez, Chile (129).

54. PLAGUSIA DEPRESSA (Fabricius, 1775) var. TUBERCULATA (Lamarck, 1818). (Pl. 27. fig. 8.)

Plagusia depressa var. *squamosa* Alcock, 1900 *a*, p. 437, *et synn.*
Plagusia depressa var. *tuberculata* Rathbun, 1906, p. 841, *synn*; 1917, p. 234; Tesch. 1918 *a*, p. 128.

Localities.—*a*, 1 ♂, Abrolhos Islands; *b*, 1 ♀, Long Island, Abrolhos.
Measurements (in mm.) :—

	a.	*b.*
C. l.	12·5	23
C. b.	13	25
Post. border of C. b.	6·5	13
Fronto-orb. border b.	10	16
Epistome b.	4·5	8·5
W.-L. 3 l.	26	48

Miers (1878, p. 149) distinguishes an Atlantic form *P. depressa* (Fabricius, 1775) from an Indian form, *P. tuberculata* (Lamarck, 1818), by the dentate coxal process; he is uncertain with regard to *P. squamosa* (Herbst, 1790). Hilgendorf (1882, p. 24) takes *P. tuberculata* as a synonym of *P. squamosa*, claiming to have examined Herbst's type, and is followed by other authors who style the form with entire coxal process *P. depressa* var. *squamosa* (*vide* Alcock, 1900 *a*, p. 437). Rathbun (1906, p. 841), citing Hilgendorf, considers that a doubt exists with regard to the identity of *P. squamosa* (Herbst), and will not accept it as a type, referring to the variety as *P. depressa* var. *tuberculata* (Lamarck). There is no reason to doubt, however, that *P. squamosa* (Herbst, 1790, p. 260, pl. xx, fig. 113) is a form with dentate coxal process and identical with *P. depressa* (Fabricius) and *P. depressa* (Herbst, 1790, p. 117, pl. iii, figs. 35 *a–b*). The only reasons for considering it otherwise are (*a*) the locality given "East Indies" which should be the habitat of the form with the entire coxal process, (*b*) the colour, which Herbst uses to separate his two species, and (*c*) the misreading by Hilgendorf of Herbst's description. The locality cannot be considered a valid criterion, as the Atlantic form with dentate coxal process has since been described by many observers from the Indian Ocean.

The colour, likewise, is very variable. Herbst's original description of *P. squamosa* reads "Die Füsse haben rothe Banden und Flecken, und auf den Hüften steht eine Längsbinde,die an den Seitenrändern blumenförmig ausgezackt ist, und das Ausehen von Bildhauerarbeit hat; sie wird eigentlich durch zwey kieine [*sic*=kleine ?] breite etwas vertiefte Furchen oder Streifen gebildet, die wegen der kleinen Härchen, womit sie überzogen sind, eine graue Farbe bekommen. Der innere Rand der Hüften hat eine kielförmige Erweiterung, die oberhalb in einen spitzigen Zahn ausläuft." Hilgendorf claims to have examined Herbst's types in the Berlin collection; he refers to "der Beschreibung Herbst's, der 'einen' spitzigen Zahn' auf der Hufte erwahnt," adding that this does not agree with the figure (pl. xx, fig. 113) and that the type agrees with the text. He appears to have taken "Hufte" to mean "coxa," whereas it obviously refers to the meropodite or "femur"; if it refers to the coxa, then Herbst's description of "Langsbinde" with a "flower-like sculptured appearance formed by two small gutters filled with little hairs" has no meaning; the femur, however, is well fitted by the description, the sharp spine being that which is present on both Atlantic and Indian forms on the anterior border ("innere Rand") at its distal end; this is indicated in Herbst's short description of *P. squamosa* by the phrase "*femoribus unidentatis*" (*cf.* Pl. 27. fig. 8).

There is nothing in Herbst's description, therefore, to indicate that the coxal processes are entire, whereas his figure shows them to be dentate. Clearly, Herbst's species is identical with *P. depressa* (Fabricius), and the form with the entire coxal process was unknown to him; for the latter, Lamarck's name *P. tuberculata* must stand. Should a re-examination of the type of *P. squamosa* (Herbst) confirm Hilgendorf's observation that the coxal process is entire,

one will have to assume that a mistake was made by the artist who drew Herbst's figure, and also that Herbst, in seeking to differentiate the two forms, overlooked this rather obvious point in his description, though remarking on the dentate coxal process in *P. depressa* (Fabricius). A more natural assumption would be that the specimen examined by Hilgendorf was not the type of Herbst.

Of the Abrolhos specimens the small male *a* has the epistome cut into three lobes only, the female *b* having the normal seven lobes ; this lobation is probably a growth-change.

The chelipeds are small and very little tuberculated ; those of the young male are in all respects similar to those of the female. They show, instead of the transverse tubercles on the outer side of the hand, a reticulated marking only visible under a lens ; the inner angle of the wrist might be described as " coarsely dentiform " (Alcock, 1900 *a*, p. 438), but, in addition, is almost hidden in a mass of stiff bristles. Possibly, the chelipeds in this species exhibit facultative dimorphism (for *cf.* Alcock, *l. c.*).

Distribution.—Abrolhos ; " Cape St. Lucas. Throughout Oriental region, from the Hawaiian Islands westward and southward to Japan and the Arabian Sea " (Rathbun, 1917). S.E. Australia (46) ; Hawaii (110) ; N.E. Malay (112) ; India, Ceylon (7) ; Maldives and Laccadives (19) ; Red Sea, Persian Gulf (69) ; Seychelles (113) ; S. Africa (124).

Family CORYSTIDÆ.

55. Genus et species indeterm.

Locality.—1 ♂, Abrolhos.

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EXPLANATION OF THE PLATES.

PLATE 24.

Fig. 1. *Thalamita prymna* var. *proxima*, var. nov., dorsal view. × 1.
2. *Thalamita prymna* var. *pelsarti*, var. nov., dorsal view. × 1.
3. *Thalamita dakini*, sp. n., dorsal view. × 2.
4. *Thalamita macropus*, sp. n., dorsal view. × 2.

PLATE 25.

Fig. 1. *Ocypode pygioides* (Ortmann, 1894 *b*), dorsal view. × 1.
2. *Pilumnus pulcher* (Miers, 1884), dorsal view. × 1.
3. *Cyclograpsus audouinii* (H. Milne-Edwards, 1837), dorsal view. × 1.
4. *Dromidiopsis abrolhensis*, sp. n., dorsal view. × 1.
5. *Leptograpsodes*, gen. n., *webbaysi*, sp. n., dorsal view. × 1.

PLATE 26.

Fig. 1. *Pilumnus granti*, sp. n., dorsal view, × 2 ; 1 *a*, cheliped, outer aspect, × 2.
2. *Pilumnus maccullochi*, sp. n., dorsal view, × 2 ; 2 *a*, cheliped, outer aspect, × 2.
3. *Actæa levidorsalis*, sp. n., dorsal view, × 2 ; 3 *a*, cheliped, outer aspect, × 2 ; 3 *b*, last walking-leg, × 2 ; 3 *c*, 3rd walking-leg, × 2.

PLATE 27.

Fig. 1. *Pilumnus edamensis* (de Man, 1888 *b*), carapace, × 2 ; 1 *a*, cheliped, × 2.
2. *Elamene truncata* (Stimpson, 1858), ♂, abdomen. × 2.
3. *Halicarcinus bedfordi*, sp. n., carapace, × 8 ; 3 *a*, buccal and antennal region, × 8 ; 3 *b*, last walking-leg, × 8.
4. *Halicarcinus australis*, carapace, × 2 ; 4 *a*, anterior aspect, front, orbits, and antennal region, × 2.
5. *Ocypode pygioides* (Ortmann, 1894 *b*), orbit, × 2 ; 5 *a*, inner surface, major cheliped, × 2.
6. *Cyclograpsus audouinii* (H. Milne-Edwards, 1837), orbit. × 3.
7. *Cyclograpsus cinereus* (Dana, 1852), orbit. × 3.
8. *Plagusia depressa* var. *tuberculata* (Lamarck, 1818), last walking-leg, outer aspect, × 2.

PLATE 28.

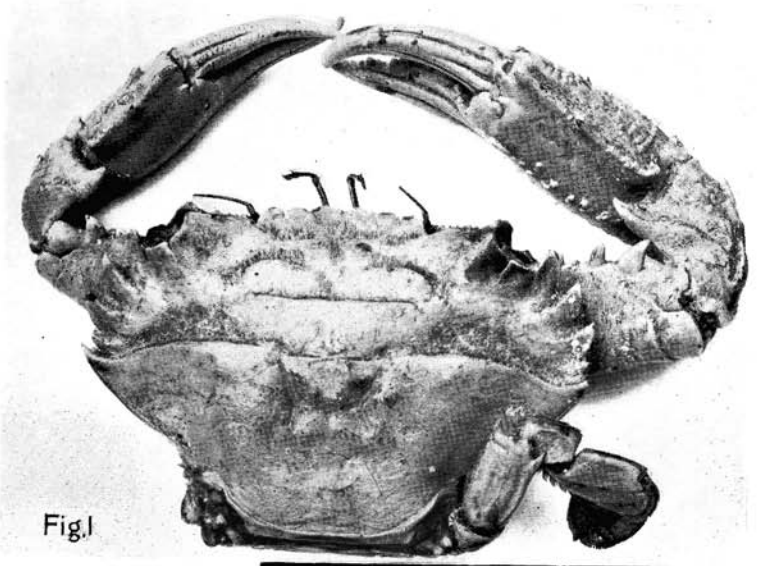
Fig. 1. *Leptograpsodes*, gen. n., *webbaysi*, sp. n., carapace, × $\frac{3}{2}$; 1 *a*, fronto-orbital region, × 2. *a*, ridge from external orbital angle continuous with antero-lateral border ; *b*, ridge continuous with supraorbital border ; *c*, ridge continuous with infra-orbital border ; *d*, fourth ridge in lower part of orbit. 1 *b*, cheliped, × 3.
2. *Thalamita macropus*, sp. n., carapace, × 2 ; 2 *a*, front, orbits, and antero-lateral borders, × 2.
3. *Thalamita prymna* var. *pelsarti*, var. nov., caparace, × 1; 3 *a*, fronto-orbital region and antero-lateral border, ventral view, × 2.
4. *Thalamita dakini*, sp. n., fronto-orbital region and antero-lateral borders, dorsal view, × $\frac{7}{2}$.

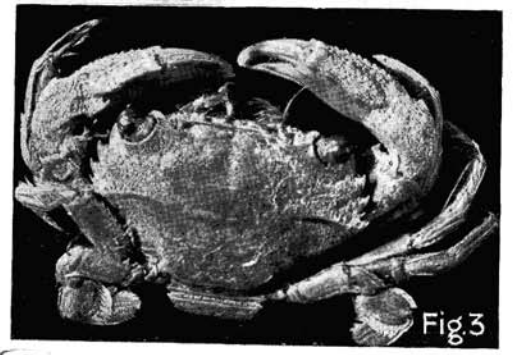
PLATE 29.

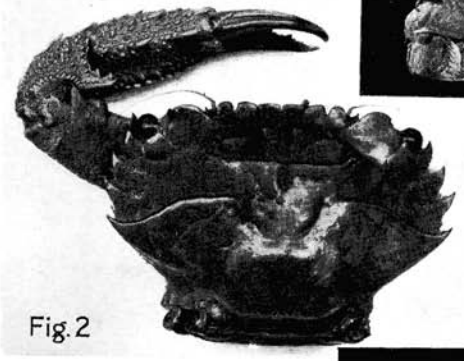
Fig. 1. *Thalamita prymna* var. *proxima*, var. nov., anterior half of carapace, × 1; 1 *a*, fronto-orbital region and antero-lateral border, ventral view, × 2.
2 *Thalamita sima* (Milne-Edwards, 1834), cheliped outer aspect, × 2.
3. *Cryptodromia tumida* var. *spinifera* var. nov., anterior half of carapace, × 4 ; 3 *a*, genital ridges of ♀, × 3 ; 3 *b*, last walking-leg, × 2.
4. *Cryptodromia tumida* (Stimpson, 1859), carapace, × $\frac{3}{2}$; 4 *a*, antero-lateral and fronto-orbital borders, × 4.

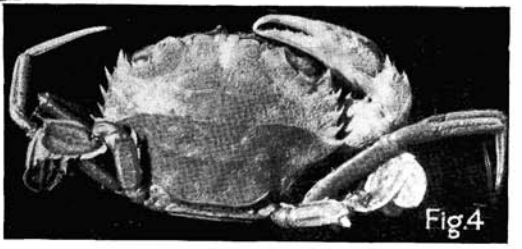
PLATE 30.

Fig. 1. *Dromidiopsis abrolhensis*, antero-lateral and fronto-orbital borders, dorsal view, × 2 ; 1 *a*, cheliped, ventral view, × 2 ; 1 *b*, carapace, front view, × 2 ; 1 *c*, cheliped, × 1. In all figs. - *a*, lateral tooth of front ; *b*, middle tooth of front ; *c*, supraorbital lobe ; *d*, bay between outer orbital angle and first antero-lateral tooth ; *f*, separate tooth in infraorbital border ; *g*, outer orbital angle ; *h*, first anterolateral tooth ; *j*, second antero-lateral tooth ; *k*, third antero-lateral tooth ; *l*, fourth antero-lateral tooth.









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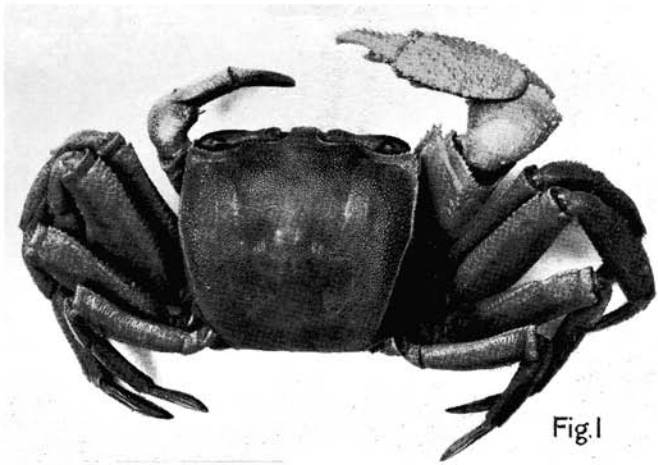
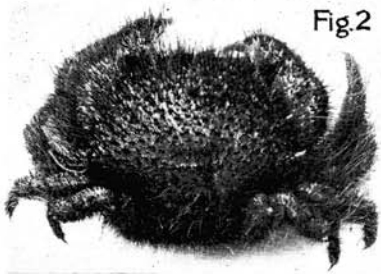


Fig.1

Fig.2



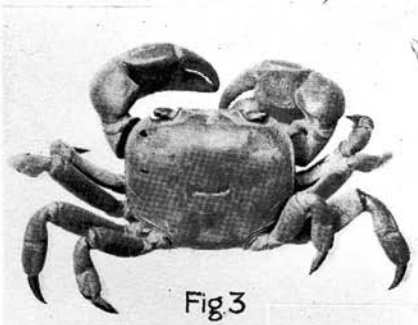
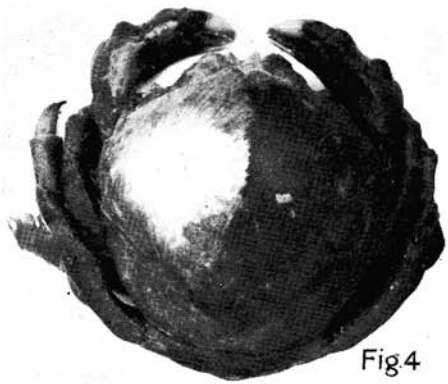


Fig.3



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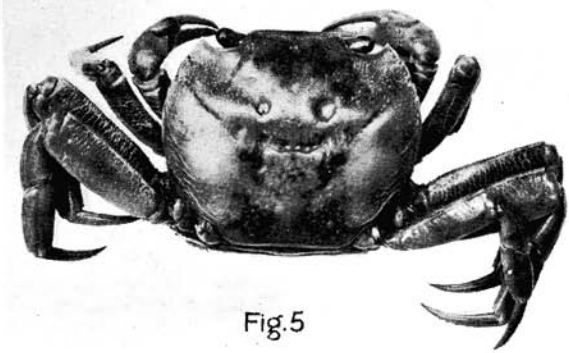

Fig.5

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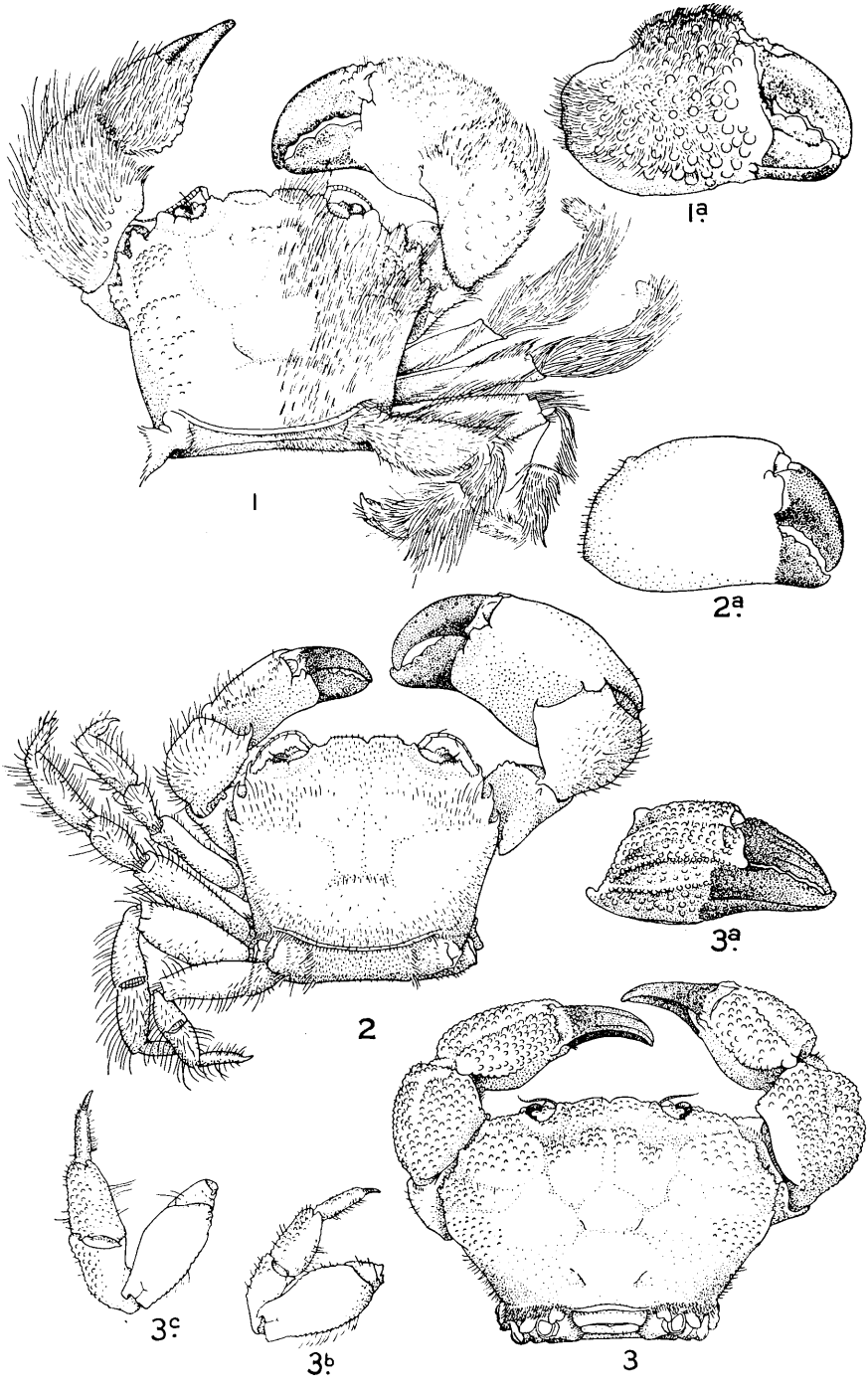

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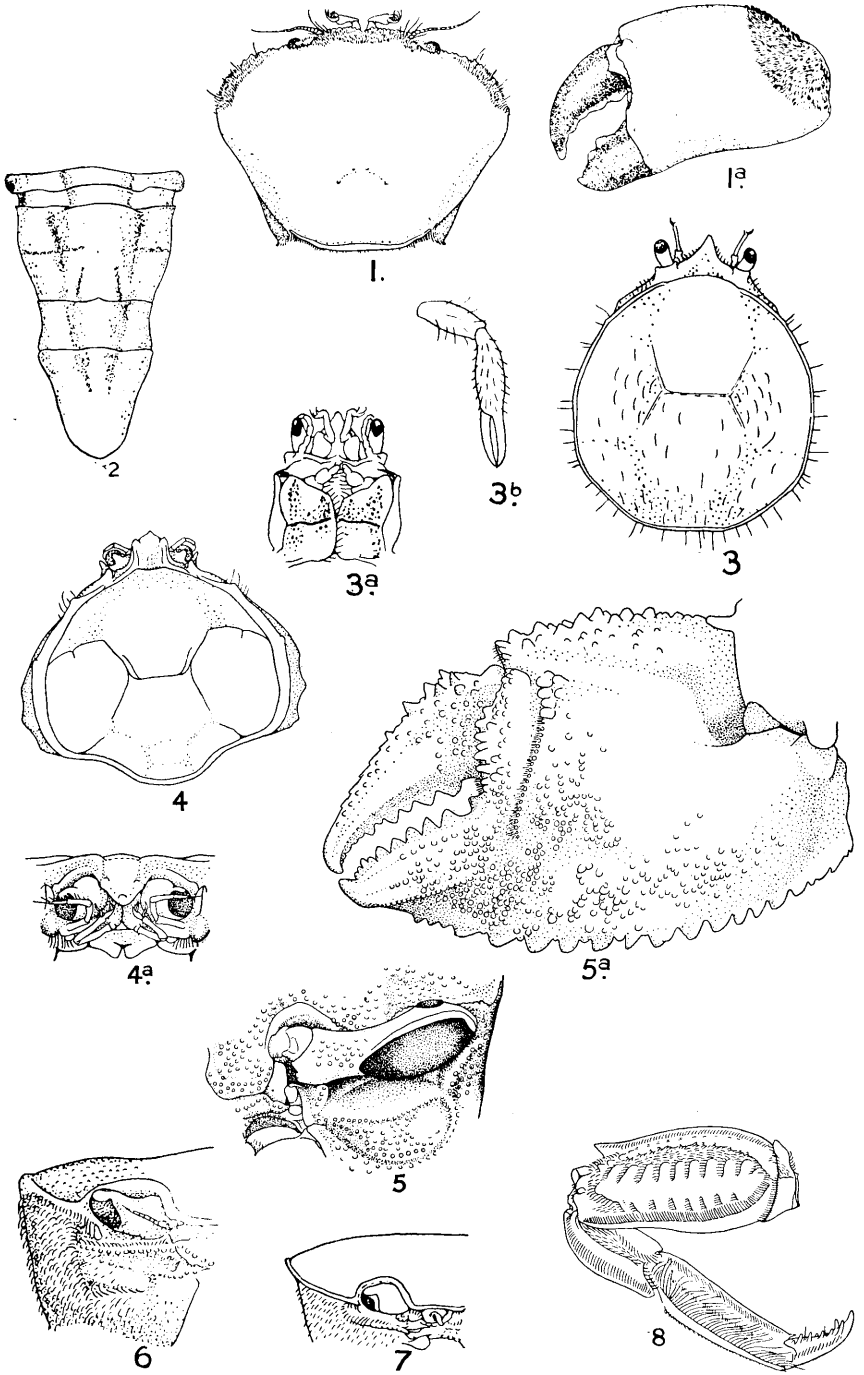

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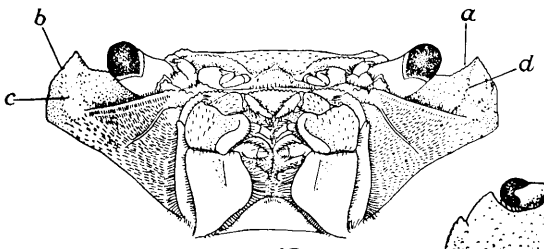

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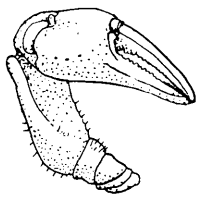

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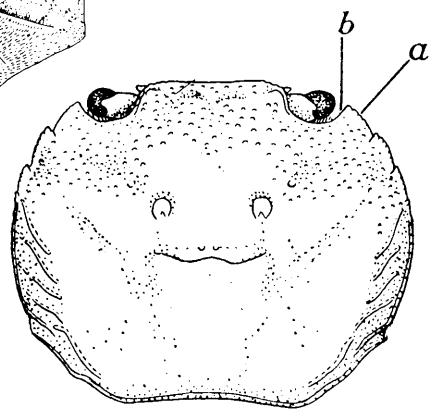

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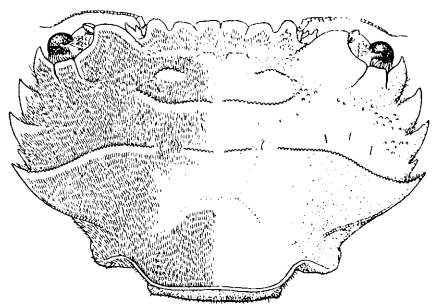

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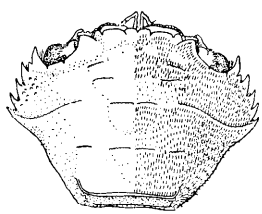

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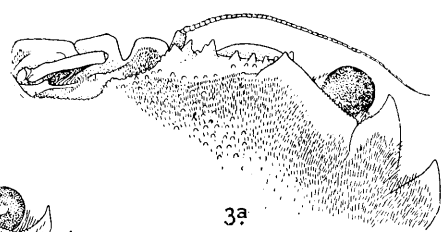

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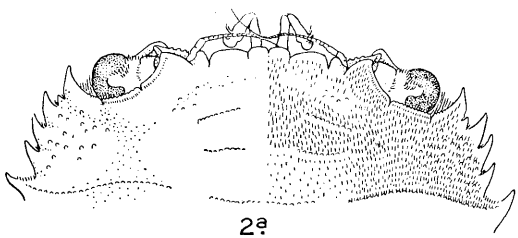

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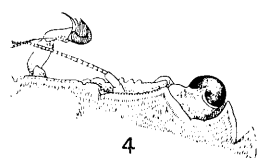

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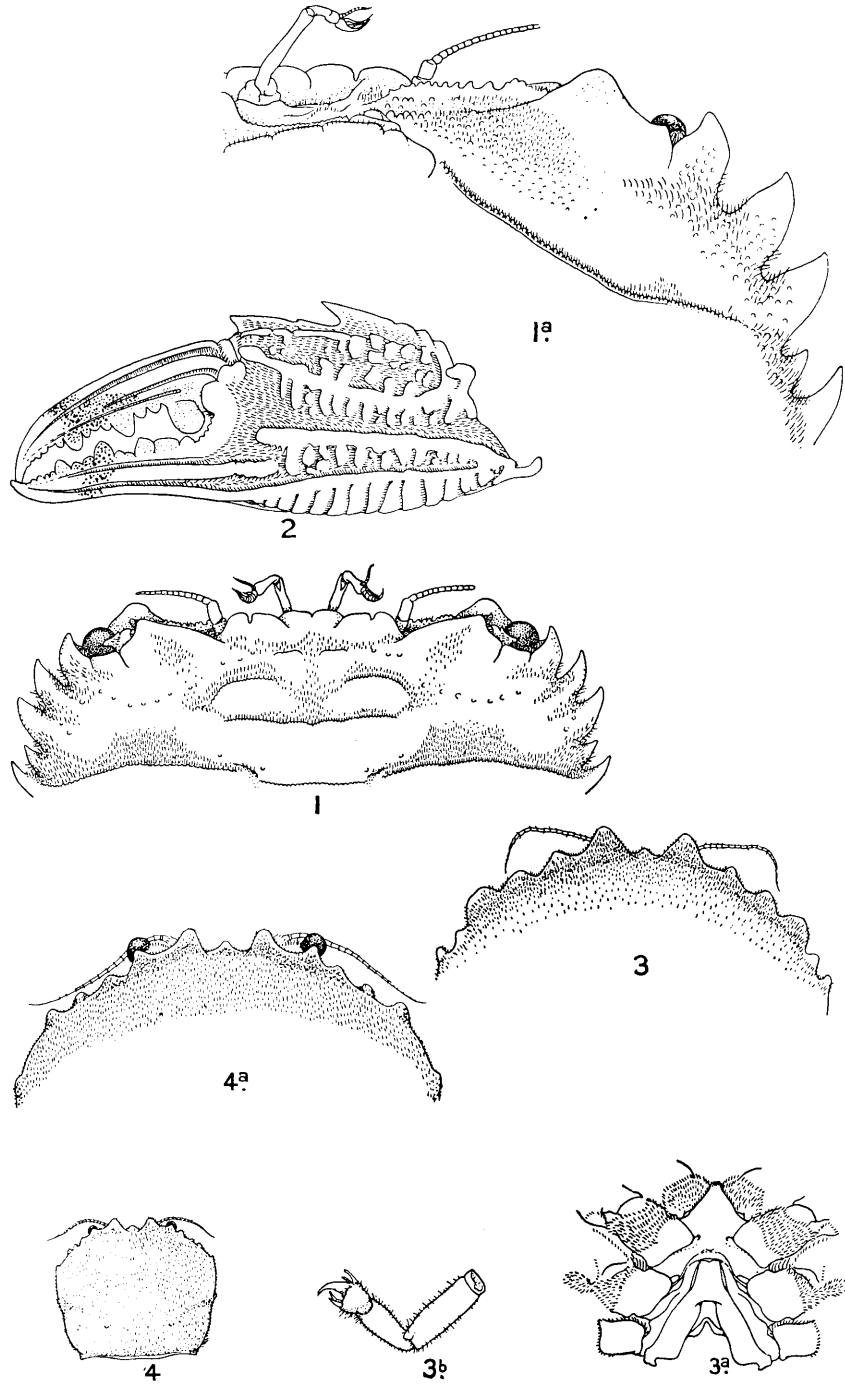

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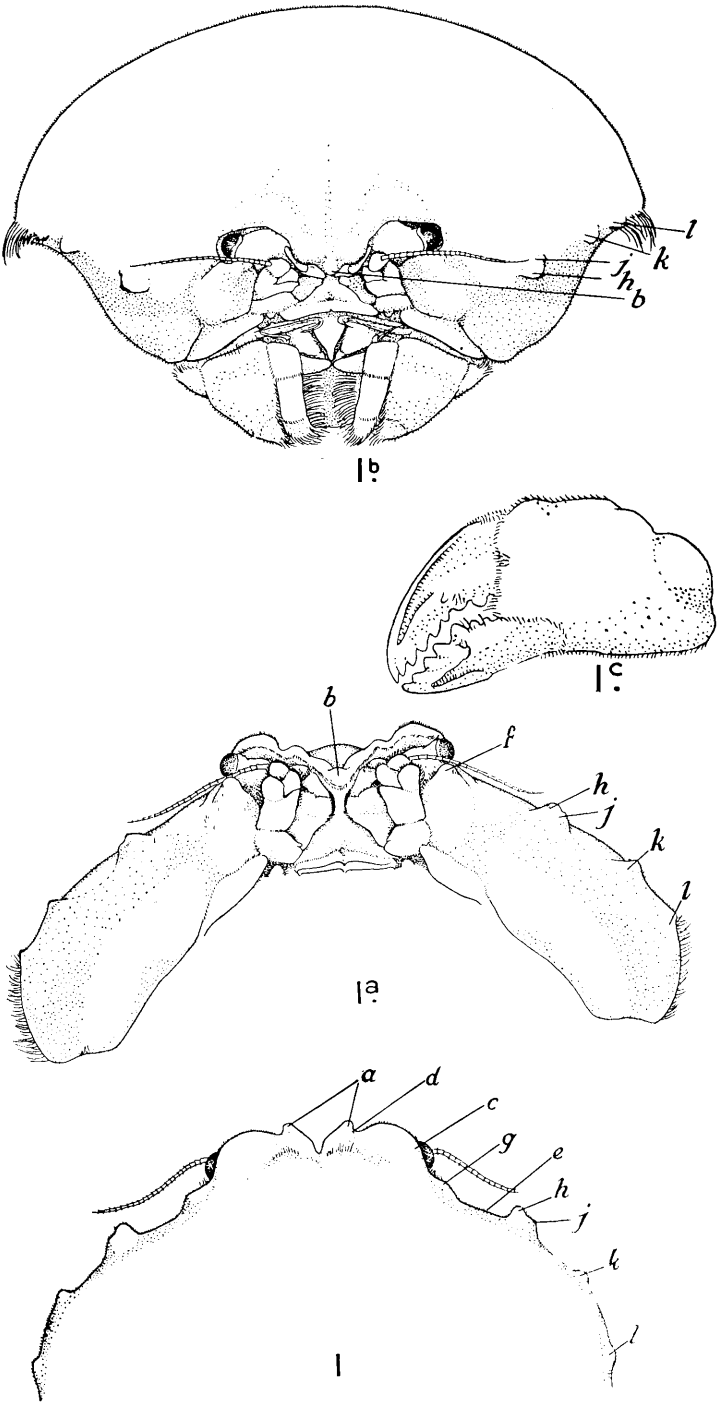

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