

1931

Miss Rathbun.

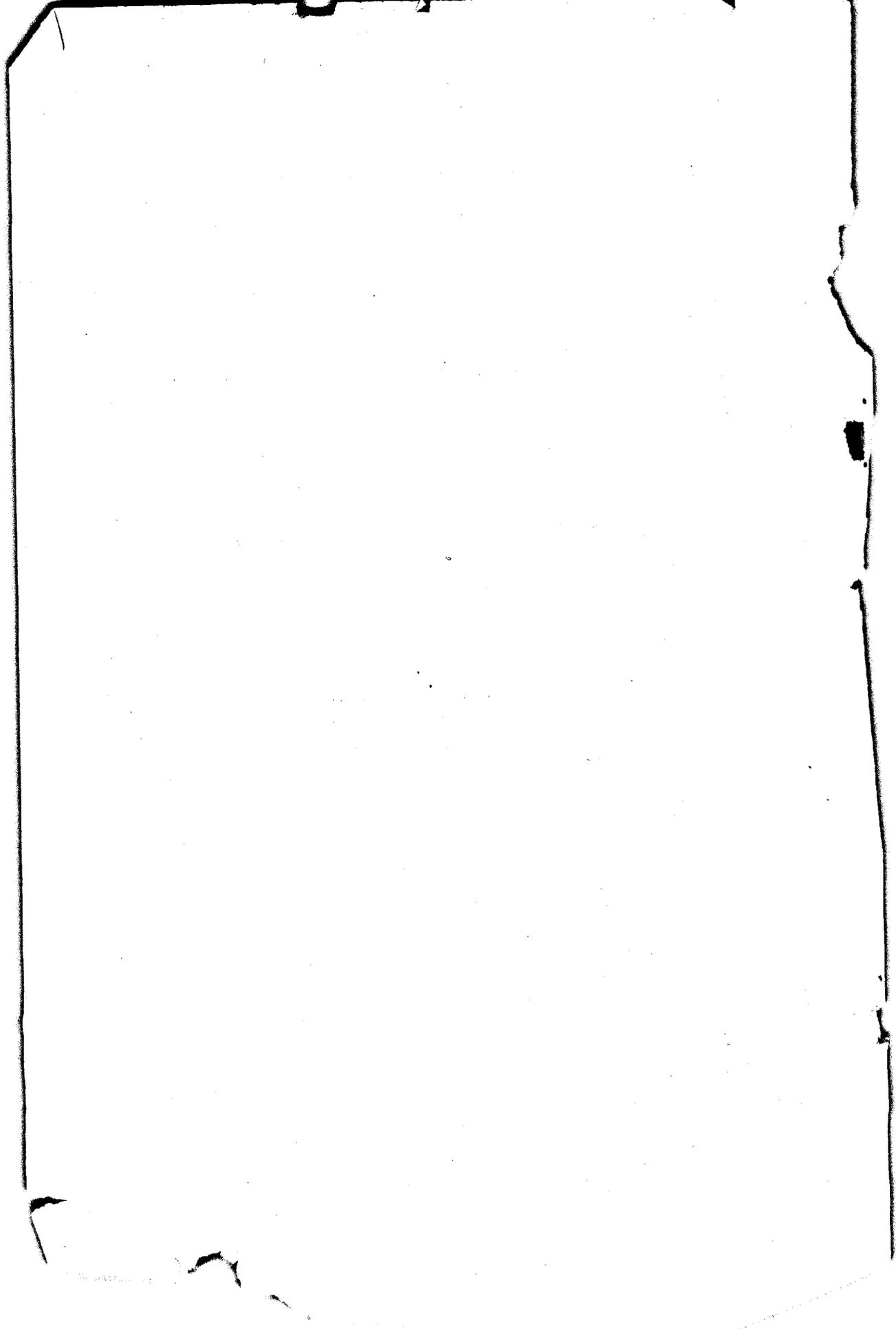
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BRACHYURA FROM THE COASTS OF CHINA.

BY

ISABELLA GORDON, D.Sc., Ph.D.

INVERTEBRATE
ZOOLOGY.
Crustacea



Brachyura from the Coasts of China.

By ISABELLA GORDON, D.Sc., Ph.D.

(With 36 Text-figures.)

[Read 6th November, 1930.]

INTRODUCTION.

The material with which the present paper deals consists of (1) a small collection of Decapoda, chiefly Brachyura, from Amoy and Pei-tai-ho, sent for identification by C. J. Shen, Esq., of the Fan Memorial Institute of Biology, Peking; (2) a much larger collection from Hongkong, presented to the British Museum by R. W. D. Barney, Esq.; (3) several specimens from Chufoo*, Shantung, presented by Dr. E. Hindle.

The majority of the species are well known and, for literature dealing with these as well as information regarding synonymy and distribution, the following works will be found most useful:—(a) Alcock, various papers in *J. Asiat. Soc. Beng.* vols. lxiv., lxv., lxvii.–lxix., 1895–1900; (b) Parisi, a series of papers in *Atti Soc. ital. Milano*, vols. liii.–lvii., 1914–1918, and (c) Balss, several papers in *Arch. Natg. Berlin*, vols. lxxxviii.–xc., 1922–1924.

Mr. Barney had identified many of the species in his collection; only new or little-known species are dealt with very briefly in the succeeding pages, and the author is entirely responsible for all descriptions and figures as well as for the determination of all new and most of the other species described.

The male abdominal appendages have been studied in considerable detail, because, although hitherto overlooked by most carcinologists, it is probable that they may prove to be of considerable systematic importance in many Brachyura. For example, these appendages afford a ready and reliable means of distinguishing males of (1) the three species of Xanthidæ compared on pp. 543–545; (2) closely allied species of Portunidæ (text-figs. 10, 12, & 13); and (3) the three species of the genus *Paracleistostoma* (text-figs. 26, 27, & 28) examined.

Leaving aside the genus *Pilumnus*, no two species of the Xanthidæ examined had identical anterior male appendages, although the differences can sometimes be observed only under the microscope after the appendages have been removed from the specimens. The two species of (a) *Atergatis* and (b) *Halimede* † differ considerably from each other as regards these appendages, but it has not

* These localities are denoted by the letter A., P., H., and C. in the list of species, pp. 526–529.

† See list of species, p. 528.

been deemed advisable to include figures for all the Xanthid species in the present paper.

As regards the second pair of male abdominal appendages, the species of Xanthidæ in the Chinese collections fall into two groups. In the first group, the larger by far, these appendages are short, measuring only one-fifth to one-third the length of the anterior pair (text-fig. 22 C, 2). In the second group (e. g., in *Menippe convexa* Rathbun, *Epixanthus frontalis* (A. M.-Edw.), and *Eriphia lævimana* var. *smithi* McLeay), these appendages exceed the anterior pair in length, and may be bent back upon themselves distally. Whether or not this difference is of systematic importance could be determined only after a revision of the whole group. I hope to be able to look into this question at some future date.

Several species referred to the genus *Pilumnus* have the anterior male appendages either of the type represented in text-fig. 17 a (without a large spine under the beak-like apex) or that illustrated in text-figs. 16 c and 18 b (with a very large spine under the apex). The fact that both these types occur also in the genus *Litocheira* (text-fig. 25 A & B) suggests a much closer relationship between these genera than has hitherto been admitted. Authors are agreed that there is a close resemblance between certain Xanthids and certain of the Gonoplacidæ; it is not always easy to detect, in small species, whether or not the male genital duct passes forward along a shallow depression in the sternum. In any revision of these allied Cyclometopa and Catometopa a careful study of the male appendages might be of considerable help.

The author is indebted to Dr. B. Parisi of the Museo di Storia Naturale, Milan, to Prof. A. Schellenberg of the Zoologisches Museum, Berlin, and to the authorities of the Strasbourg and Lübeck Museums for sending material on loan or in exchange.

List of Species represented.

ANOMURA.

GALATHEIDEA.

- Petrolisthes lamarcki* * (Leach). H.
Porcellana ornata Stimpson. H.
 „ *pulchra* Stimpson. P.
 „ *serratifrons* Stimpson. P., A.
 „ *spinulifrons* Miers. H.
Raphidopus ciliatus Stimpson.

BRACHYURA.

I. DROMIACEA.

- Dromia dehaani* † Rathbun. H.
Petalomera granulata Stimpson. H.

* *P. "speciosus"* Stimpson—see Parisi, 1917, p. 7.

† Rathbun, 1923, p. 68.

2. OXYSTOMATA.

- Dorippe dorsipes* (Linn.). H.
 „ *facchino* (Herbst). H.
 „ *japonica* v. Siebold. H.
Mursia armata de Haan. H.
Matuta planipes Fabr. (= *M. lunaris* Alcock). P., H.
 „ *victor* of authors (= *M. lunaris* (Forsk&I) Balss). H., C.
Myra fugax (Fabr.). H.
Philyra tuberculosa Stimpson. H., P.
Leucosia unidentata de Haan *. H.
 „ *rhomboidalis* de Haan (= *L. maculata* Stimpson). H.
Ixoides cornutus (?) MacGilchrist. H.
Pariphiculus marianne (Herklots) †. H.
Arcania quinquispinosa Wood-Mason. H.
 „ *septemspinosa* (Fabr.). H.
 „ *undecimspinosa* de Haan. H.
Lyreidus politus Parisi. H.

3. BRACHYRHYNCHA.

a. CYCLOMETOPA.

- Lissocarcinus arkati* Kemp. H.
Neptunus (*Neptunus*) *sanguinolentus* (Herbst). H.
 „ (*Amphitrite*) *argentatus* (White). H.
 „ (*Hellenus*) *hastatooides* (Fabr.). H.
 „ „ *pulchricristatus*, nom. nov. H.
 „ „ *tuberculatus* A. M.-Edw. H.
 „ (*Lupocycloporus*) *gracilimanus* (Stimpson). H.
Charybdis (*Goniohellenus*) *sinensis*, sp. n. H.
 „ „ *truncatus* (Fabr.). H.
 „ (*Goniosoma*) *anisodon* de Haan. H.
 „ „ *barneyi*, sp. n. H.
 „ „ *merguiensis* de Man. H.
 „ „ *miles* de Haan. H.
 „ „ *variegata* (de Haan). H.
Thalamita crenata Latr. H.
 „ *sima* A. M.-Edw. H.
Scylla serrata (Forsk.). H.
Kraussia integra (de Haan). H.
Cancer pygmaeus Ortmann. P.
Merippe convexa Rathbun (= *M. ortmanni* de Man). H.
Pilumnus laevimanus Dana. H.
 „ *penicillatus*, sp. n. H.
 „ *seminudus* Miers. H.
 „ *sinensis*, sp. n. H.
Actumnus setifer (de Haan). H.
Galene bispinosa (Herbst). H.
Actæa amoyensis (de Man). A.
 „ *helleri* (?) A. M.-Edw. H.

* *L. obtusifrons unidentata* Balss, 1922, Arch. Naturg. A. 3, p. 128.

† Nobili, 1906, Ann. Sci. nat. (9) iv. p. 165, footnote.

- Actæa nodulosa* White. H.
 „ *savignyi* var. *pura* Stimpson. H.
Atergatis integerrimus (Lam.). H.
 „ *reticulatus* (de Haan). H.
Medæus granulatus Haswell. H.
Xantho exaratus (M.-Edw.). H., P.
 „ *distinguendus* (de Haan). H., P.
Halimede ochtodes (Herbst). H.
 „ *tyche* (Herbst). H.
Liagore rubromaculata de Haan. H.
Ectisus lævimanus Randall. H.
Epixanthus frontalis (A. M.-Edw.). H.
Eriphia lævimana var. *smithi* McLeay. H.
Parathelphusa sinensis (A. M.-Edw.). H., A.

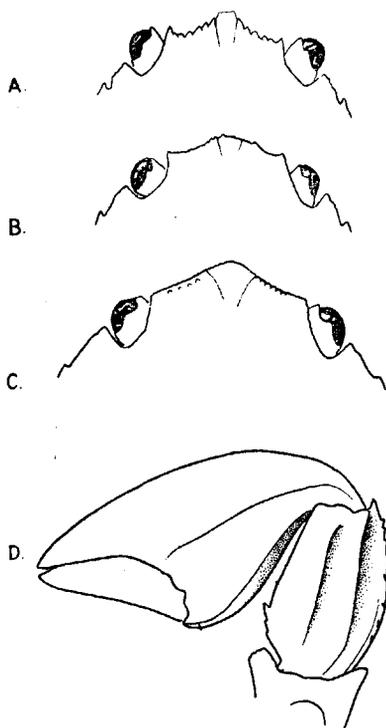
b. CATOMETOPA.

- Scalopidia spinosipes* Stimpson. H.
Uca arcuata (de Haan). A.
 „ *gaimardi* H. M.-Edw. (= ? *U. splendida* Stimpson). H.
 „ *lactea* (de Haan). H.
 „ *mani* Rathbun (= *U. acutus* de Man). H.
 „ *marionis* var. *nitidus* Dana. H.
Ocypoda ceratophthalma (Pallas). H.
Eucrate crenata de Haan. A., H.
 „ *dentata* (Stimpson). H.
 „ *sulcatifrons* (Stimpson). H.
 „ *transversus* (Stimpson). H.
Carcinoplax longimanus de Haan. H.
Litocheira amoyensis, sp. n. A.
 „ *subintegra* Lanchester. H.
Macrophthalmus convexus Stimpson. H.
 „ *latreillei* (Desm.). H.
 „ *pacificus* Dana. H.
 „ *teschi* Kemp. H.
Paracleistostoma depressum de Man. A.
Scopimera globosa de Haan. H.
Tympanomerus ceratophora (Koelbel). H.
Mictyris longicarpus Latr. H.
Grapsus strigosus Herbst. H.
Metopograpsus quadridentatus Stimpson. A., H.
Brachynotus penicillatus de Haan. A., H.
 „ *sanguineus* (de Haan). H., P.
Eriocheir sinensis M.-Edw. P.
 „ *japonicus* de Haan. H.
Gædice depressus (de Haan). A., H.
Chasmagnathus convexus de Haan. A., H.
Metaplax elegans de Man. H.
 „ *longipes* Stimpson. A., H.
 „ *sheni*, sp. n. A.
Sesarma (Chromantes) bidens (de Haan). H.
 „ (*Holometopus*) *hæmatocheir* (de Haan.)
 „ (*Sesarma*) *intermedia* (de Haan). A., H.
 „ (*Parasesarma*) *picta* (de Haan). H.

4. OXYRHYNCHA.

- Egeria arachnoides* (Rumph.). H.
Doclea canalifera (?) Stimpson (incomplete). H.
 „ *ovis* (Herbst). H.
Micippa phillyra (Herbst). H.
Lambrus longimanus Leach. H.
 „ *validus* de Haan. H.
Pugettia cristata, sp. n. A.
 „ *quadridens* de Haan. P.

TEXT-FIG. 1.

*Porcellana ornata* Stimpson.

A-C, anterior portion of carapace of three specimens, camera lucida drawing, $\times 12.5$; D, cheliped, $\times 8.5$.

GALATHEIDEA.

PORCELLANA ORNATA Stimpson.

Stimpson, 1858, p. 242; 1907, p. 188.

Three specimens from Hongkong appear to belong to *Porcellana ornata* Stimpson; as no figures were given by that author, the cheliped and the front are now illustrated (see text-fig. 1 D and 1 A-C). The setæ on the outer

lower border of the palm had been rubbed off the chela from which the illustration was obtained; the carpus is characterised by two pronounced longitudinal ridges on the dorsal surface. The front differs somewhat in all three specimens, but is always triangular with concave sides and a marked median depression towards the apex. The areolations described by Stimpson on the anterior portion of the carapace are present in all three. In two specimens there is a single small spine a short distance behind the orbit. In the other specimen (that represented in text-fig. 1 A) there are five or six spinules on the convex portion of the lateral border immediately posterior to the antenna.

Previously recorded from Hongkong.

PORCELLANA PULCHRA Stimpson.

Stimpson, 1858, p. 243; 1907, p. 192.

This species is represented by a single specimen from Pei-tai-ho (Shen Coll.). As Stimpson's figure (1907, pl. xxii. fig. 1) is rather small, an outline of the carapace, which is very characteristic, and of the cheliped are given (text-figs. 2 & 3). Previously recorded from Hongkong.

PORCELLANA SPINULIFRONS Miers.

Miers, 1879, p. 46.

Several specimens in the Barney collection prove to be identical with the type-specimens of *P. spinulifrons* Miers. As no figures were given by that author, it has been thought advisable to give several illustrations (text-figs. 4 A-C & 5).

The species is, in many respects, similar to *P. serratifrons* Stimpson (1907, p. 189, pl. xxiii. fig. 2), and it is possible that transitional forms may yet be found. The specimens referred to Stimpson's species (see list on p. 526) have, as a rule, only a single spine on the postero-lateral border of the carapace (text-fig. 6), but occasionally other spinules are present; the lobules of the front are not so deeply separated off from each other, and the spines on the anterior margin of the carpus of the cheliped are, as a rule, less pronounced, sometimes almost obsolete. It is just possible that *P. spinulifrons* is a young, though sexually mature (larger ♀ ovigerous), form of *P. serratifrons*.

Previously recorded from Korea and Japan.

OXYSTOMATA.

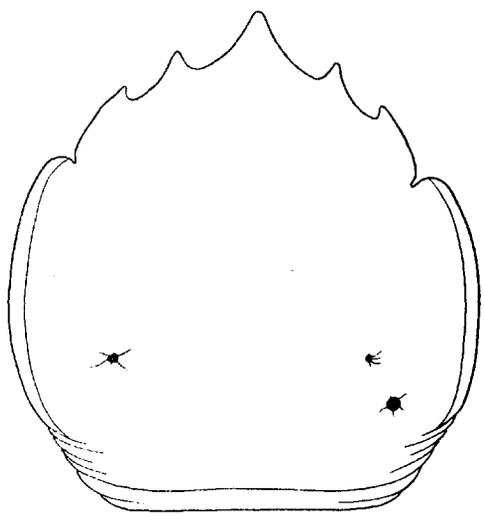
IXOIDES CORNUTUS (?) MacGilchrist.

MacGilchrist, 1905, p. 255; pl. lxxiii, figs. 2-2 b, Ill. Zool. 'Investigator,' Crustacea (referred to under Alcock and others, 1892-1908; Ihle, 1918, p. 314.

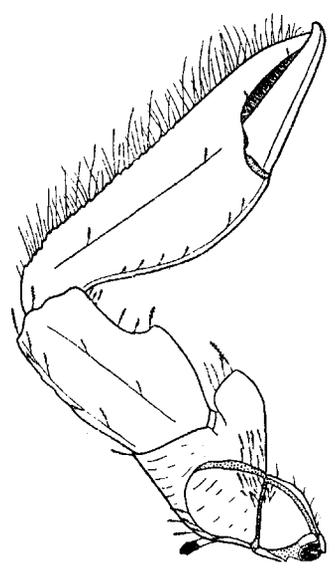
This genus is known only from the three ♂♂ of *I. cornutus* described by MacGilchrist from the Persian Gulf. In the Barney collection are three specimens (2 ♂♂ 53 × 30 mm.* and 52.8 × 26.4 mm.; 1 ovigerous ♀, damaged)

* The length of carapace does not include the stout posterior processes, but the breadth includes the lateral processes.

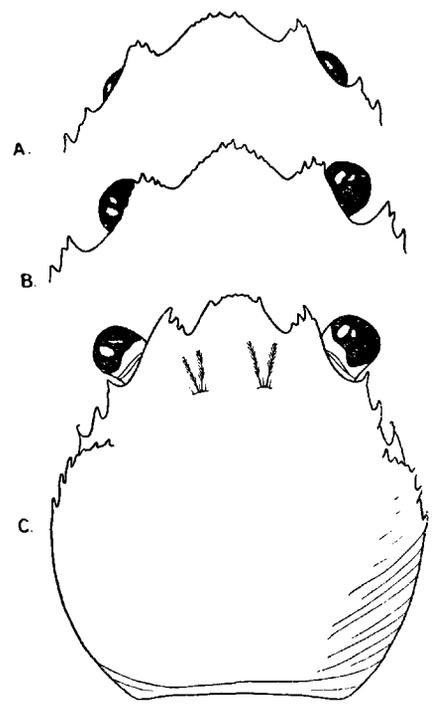
TEXT-FIG. 2



TEXT-FIG. 3.



TEXT-FIG. 4.



TEXT-FIG. 5.

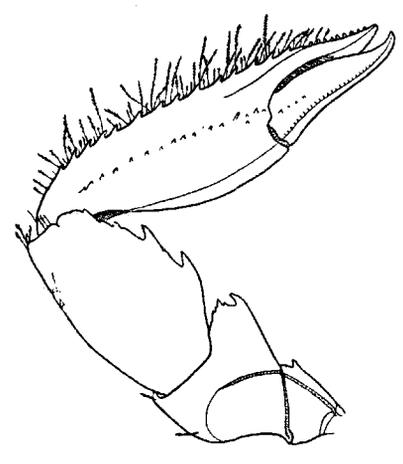
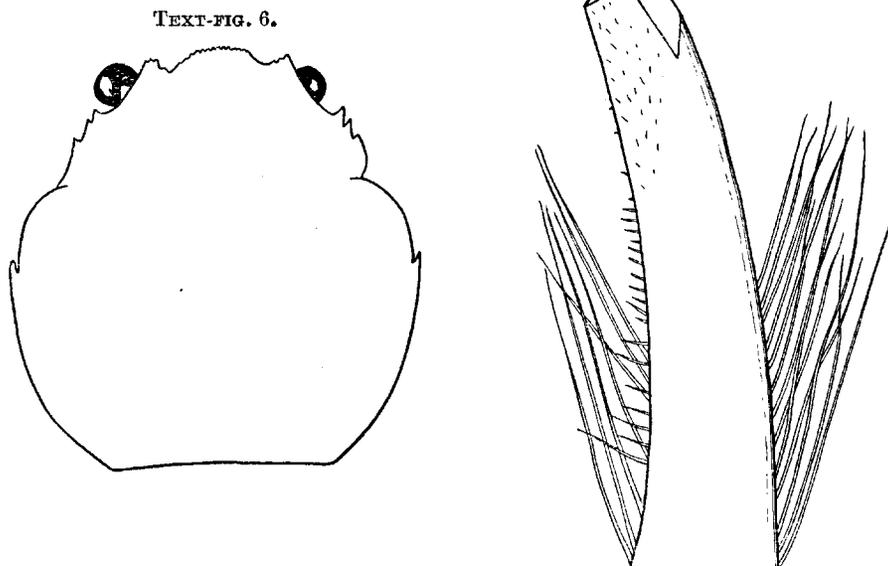


Fig. 2.—*Porcellana pulchra* Stimpson, carapace in dorsal aspect, $\times 12.5$.
 Fig. 3.—*Porcellana pulchra* Stimpson, cheliped, $\times 12.5$.
 Fig. 4.—*Porcellana spinulifrons* Miers. A & B, anterior portion of carapace of type-specimens; C, carapace of a specimen from Hongkong. $\times 15$.
 Fig. 5.—*Porcellana spinulifrons* Miers, cheliped, $\times 8.5$.

which undoubtedly belong to this genus, but, owing to the fact that all are incomplete, their identity with MacGilchrist's species is by no means certain. The lateral processes are shorter than in *I. cornutus*, being only about one-fifth instead of one-fourth of the total length. In the male specimens they are slightly inclined forwards and end in a blunt rounded tip. In *I. cornutus*, on the other hand, they project straight outwards, and taper away to an acute point. The first abdominal appendage is long and straight, with apex as represented in text-fig. 7. Only the arm of the cheliped remains.

The only known ♀ of the genus is very incomplete, the left lateral process tapers abruptly towards the apex which is acute; that on the right side is

TEXT-FIG. 7.

Fig. 6.—*Porcellana serratifrons* Stimpson, carapace in dorsal aspect, $\times 8.5$.Fig. 7.—*Izoides cornutus*? MacGilchrist, apex of anterior ♂ abdominal appendage, $\times 45$.

wanting. The left cheliped is complete, save for the digits; the palm is somewhat longer and narrower than in *I. cornutus* (Ill. Zool. 'Investigator,' pl. lxxiii. fig. 2 b). The abdomen has five segments, but the first of these would, in all probability, be concealed by the carapace.

LYREIDUS POLITUS Parisi.

Parisi, 1914, p. 34, pl. xiii, fig. 5.

Material.—3 ♂♂ measuring 29.4×15.5 – 34.8×18.5 mm.; 1 ♀ measuring 37×19.5 mm. from Hongkong.

This is only the second occurrence of the species; the type-specimen (♂) was recorded from Enoshima, Japan.

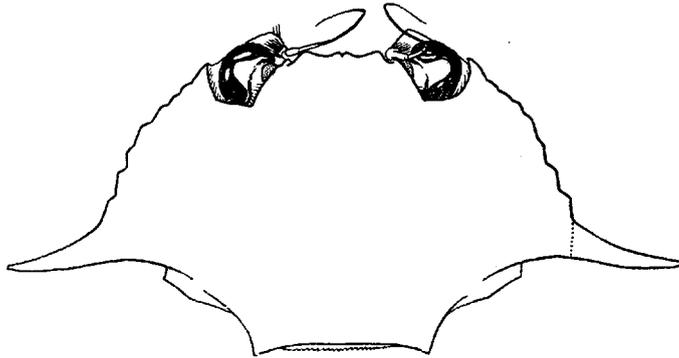
CYCLOMETOPA.

LISSOCARCINUS ARKATI Kemp.

Kemp, 1923, pp. 405-408, pl. x, fig. 1.

A single ovigerous ♀ from Hongkong agrees in all points with the description and figure given by Kemp, save that (1) the transverse setose ridges are restricted to the anterior portion of the carapace and (2) the posterior is equal to the

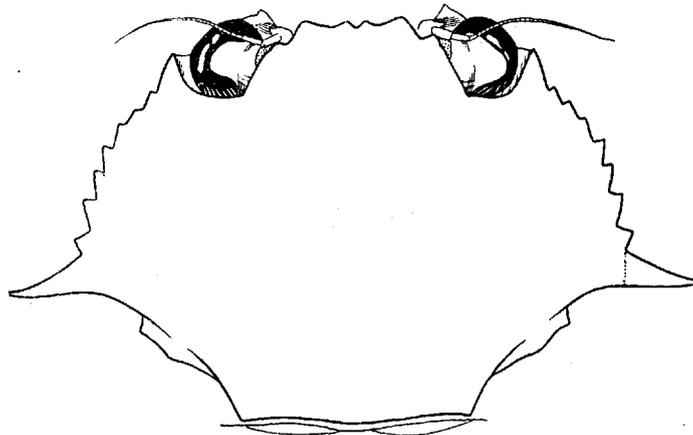
TEXT-FIG. 8.



Neptunus (Hellenus) pulchricristatus, nom. nov., carapace in dorsal aspect, $\times 4$.

fronto-orbital border. In the former respect it resembles *L. boholensis* Semper, but, as Kemp has pointed out, it differs in several important respects from the latter species as described by Rathbun (1910, p. 363).

TEXT-FIG. 9.



Neptunus (Hellenus) spinipes Miers, carapace of co-type in dorsal aspect, $\times 4.5$.

The measurements (in mm.) of the specimen are as follows:—length of carapace=17.5; breadth of carapace=21.5; fronto-orbital breadth=14.5; breadth of front excluding inner orbital angles=7.1.

Previously recorded from off the mouth of the River Hughli.

NEPTUNUS (*HELLENUS*) PULCHRICRISTATUS*, nom. nov.

(=*Neptunus spinipes* Alcock, 1899, pp. 31-32, 39-40, nec Miers, 1886, p. 178, pl. xv, fig. 1.)

Material.—5 ♂♂ measuring 27×11.7 – 32×12.8 mm.; three ♀♀ measuring 24.9×10.6 – 27×11.8 mm. (2 ovigerous).

Description.—According to Alcock's key (1899, pp. 31-32), these specimens belong to the species *N. (Hellenus) spinipes* Miers (1886). On comparing them with the type-specimens, however, they were found to differ from these in several important respects:—(1) The angle formed by the junction of the posterior with the postero-lateral border of the carapace is distinctly more spiniform (cf. text-figs. 8 & 9). (2) The first eight teeth of the antero-lateral border are merely blunt lobes, the first three of which are almost obsolete; in *N. spinipes* they are much more pronounced and acute. (3) The lateral epibranchial spine is much longer than in the 'Challenger' specimens, so that the total breadth—from tip to tip of spines—is 2.3-2.5 times as against 1.7-1.85 times the length of the carapace. (4) Both species have a crest on the second and on the third abdominal segments in both sexes; in the Hongkong specimens both crests are "elegantly beaded," whereas in *N. spinipes* the crests are more prominent, but, while that on segment 2 is faintly beaded, that on segment 3 is smooth and markedly bilobed. (5) The abdominal appendages in the ♂ are also rather different in the two species (cf. text-figs. 10 A & 10 B).

These specimens are undoubtedly the same as Alcock's material (1899, pp. 39-40). This author remarks that "the specimens figured by Miers has abnormally short lateral epibranchial spines," but all Miers's three co-types have similar short spines.

Previously recorded from Madras, Andamans, Gulf of Martaban, Arakan Coast, and Muscat.

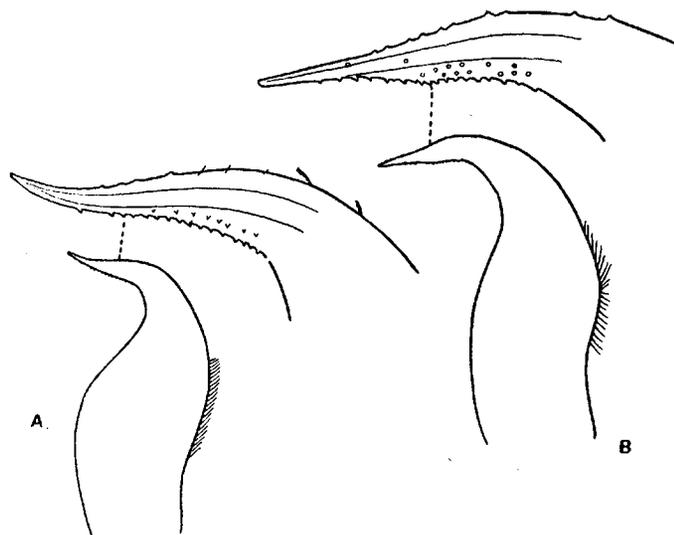
CHARYBDIS (*GONIOHELLENUS*) SINENSIS, sp. n.

Material.—1 ♂, 22.7×13.8 mm. (holotype); 2 ♀♀, 20.7×12.3 and 26×15.5 mm., the latter ovigerous from Hongkong.

Description.—According to Alcock's key (1899, pp. 48-51), these specimens would be identified as *G. hoplites* Wood-Mason. On comparing the Chinese specimens with a ♂ and a ♀ specimen of that species in the British Museum Collection the ♂ especially proved to be different. In *G. hoplites* the sixth abdominal segment is of the form represented in text-fig. 12 a, truncate triangular, whereas in the Chinese specimens (text-fig. 12 c) that segment is broadest in the centre and each lateral border is convex. The first pair of abdominal appendages differ markedly as illustrated in text-fig. 12, b, b' and d, d'. There are other minor differences:—(1) In *G. hoplites* the teeth on the lateral margin are more conspicuously serrated along the posterior margin and "are square-cut lobules separated by wide and deep notches" (Alcock and Anderson, Ill. Zool. 'Investigator,' Crust. pl. xxiii, fig. 6; Alcock,

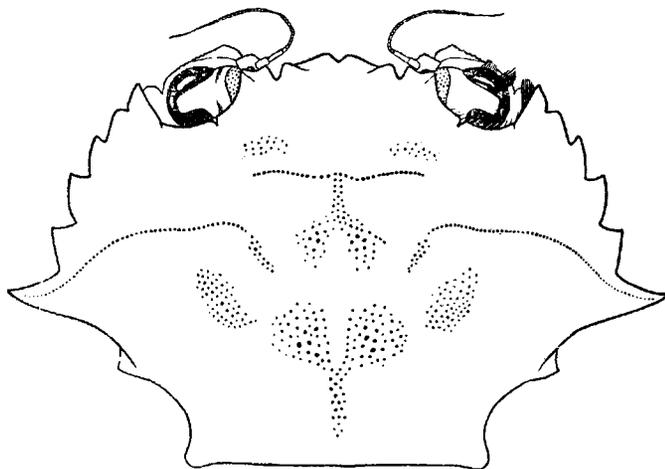
* This species was described under the name of *N. (H.) alcocki* in a preliminary note (Ann. & Mag. Nat. Hist. (10) vi, p. 521, 1930), but that name is preoccupied.

TEXT-FIG. 10.



Anterior ♂ abdominal appendage of (A) *Neptunus (Hellenus) pulchricristatus*, nom. nov., and (B) *N. (H.) spinipes* Miers. $\times 15$ and 45 .

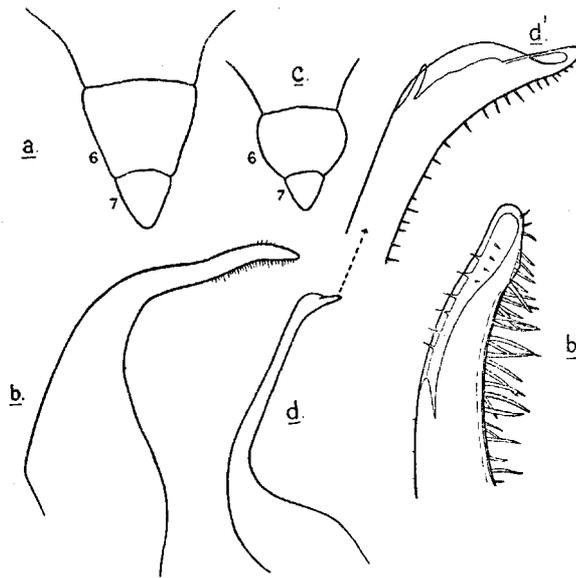
TEXT-FIG. 11.



Charybdis (Gonihellenus) sinensis, sp. n., carapace in dorsal aspect, $\times 4.5$.

1899, p. 66); compare with text-fig. 11. (2) The scale-like granulations on the palm of the chela are more highly developed in *G. hoplites*, and (3) the lobulations on the carapace are much more pronounced. While most of these differences might be due to the marked difference in size of the specimens (*G. hoplites* ♂ measures 42.5×21.7 mm.; ♀ 30.5×16.4 mm.), those illustrated in text-fig. 12 *a-d* are certainly not such as can be explained away thus.

TEXT-FIG. 12.



a, segments 6 and 7 of ♂ abdomen (×4); *b*, anterior ♂ abdominal appendage (×9), and *b'*, apex of same enlarged (×36) of *Charybdis (Goniosoma) hoplites* Wood-Mason; *c*, *d*, & *d'*, ♂ abdominal segments 6 and 7 and anterior ♂ abdominal appendage of *Ch. (G.) sinensis*, sp. n., at same magnifications.

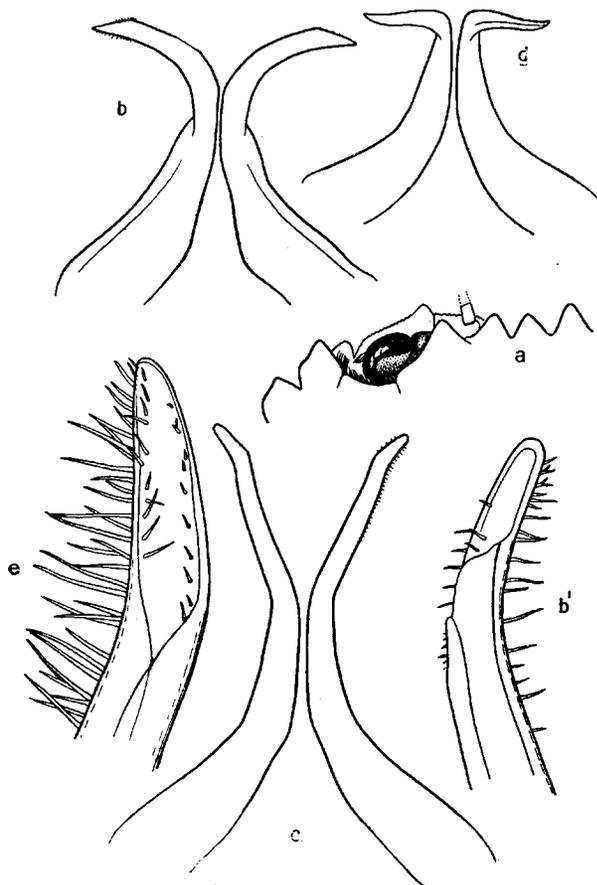
CHARYBDIS (GONIOSOMA) BARNEYI, sp. n.

Material.—2 ♂♂, measuring 50×32 mm. (holotype) and 43×28.4 mm., respectively.

Description.—A *Goniosoma* with no transverse ridges on the carapace behind the level of the last lateral spine and with not more than three large spines on the anterior border of the arm (Alcock, 1899, p. 49, group A 1). External orbital spine (text-fig. 13 *a*) rather blunt and slightly notched; second spine also notched, though to a lesser extent in the holotype; succeeding spines acute. Carapace pubescent. Chelipeds just over twice the length of the carapace, smooth, save for the usual spines; six low costæ (one of which is on the inner surface) on the palm; three more or less distinct ridges on the outer surface of the wrist; two or three spines on anterior border of arm, one spine and three spinules on wrist, four spines and one spinule on palm.

Sixth abdominal segment with sides parallel for about two-thirds of their length, then rapidly converging. Anterior pair of abdominal appendages as illustrated in text-fig. 13 *b* and *b'*. Merus of last pair of thoracic appendages 1.5 times as long as broad, armed with a spine near the distal end of the posterior border.

TEXT-FIG. 13.



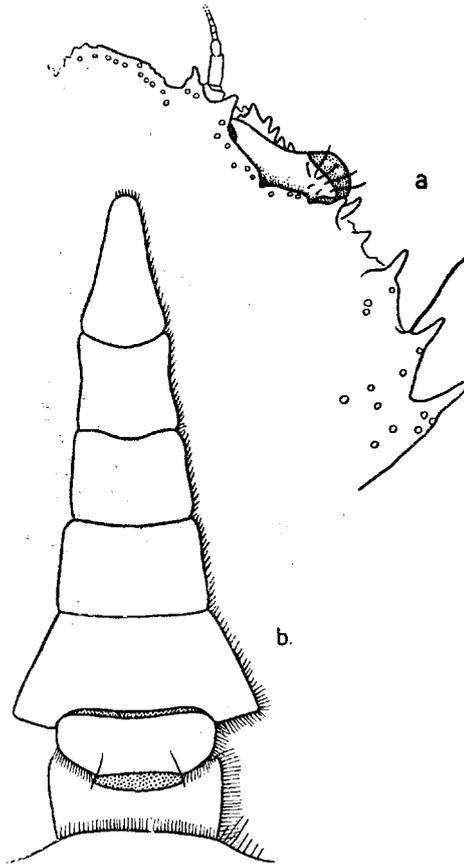
a, part of antero-lateral border and front of *Charybdis (Goniosoma) barneyi*, sp. n.; *b*, anterior ♂ abdominal appendages of same species; *b'*, apex of one of these enlarged; *c*, anterior ♂ abdominal appendages of *Ch. (G.) rivers-andersoni* Alcock; *d*, same of *Ch. (G.) annulata* (Fabr.); *e*, apex of one of these in *Ch. (G.) crucifera* (Fabr.). (*a*, *b*, *c*, & *d*, $\times 7$; *b'* & *e*, $\times 37$.)

Remarks.—In the British Museum Collection are specimens, presented by the Indian Museum, of all the species of *Goniosoma* mentioned by Alcock (1899, p. 49) in group A.1 of his key. The Chinese specimens, however, do not agree with any of these, nor with specimens that appear to belong to *Charybdis*

(*Goniösoma*) *japonica*, A. M.-Edw. All these species, with the exception of *Ch. (G.) annulata* (Fabr.), have straight ♂ abdominal appendages somewhat after the type represented in text-fig. 13 c. In *Ch. (G.) annulata* (text-fig. 13 d) the bending is more abrupt and occurs nearer the apex than in *Ch. (G.) barneyi*.

This species appears to be most nearly related to *Ch. (G.) crucifera* (Fabr.) and *Ch. (G.) rivers-andersoni* Alcock. It differs from the former in having

TEXT-FIG. 14.

*Pilumnus sinensis*, sp. n.

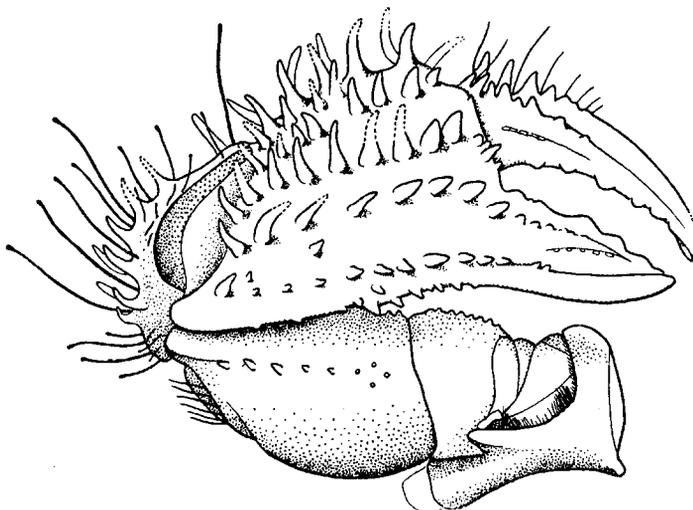
a, part of front and antero-lateral border of holotype, $\times 4.5$; b, ♂ abdomen, $\times 3$.

(1) the outer orbital spine less truncated anteriorly; (2) the sides of the sixth ♂ abdominal segment convergent only in the distal third of their length; (3) the ♂ abdominal appendages also differ (cf. text-figs. 13 b' and 13 e). From *Ch. (G.) rivers-andersoni* it differs in having (1) the spines on the lateral border as well as all the spinous lobes of the front less acute; (2) less prominent

spines on the chelipeds and a more inflated palm; (3) the inner notch or fissure on the upper orbital border almost obsolete, merely indicated by a faint linear depression (in *Ch. (G.) rivers-andersoni* there is a conspicuous fissure); and (4) more curved ♂ abdominal appendages (cf. text-fig. 13 b & c). It also differs from both in having three instead of two longitudinal sulci on the outer surface of the palm.

Ch. (G.) barneyi may prove to be identical with the *Ch. (G.)* "affine" of de Man (1887, p. 80, pl. v. fig. 2) from Mergui. Miss Rathbun (1906, p. 872) has suggested that de Man's specimen may belong to *Ch. (G.) japonica* A. M.-Edw.

TEXT-FIG. 15.



Pilumnus sinensis, sp. n., right cheliped of holotype, $\times 4.5$.

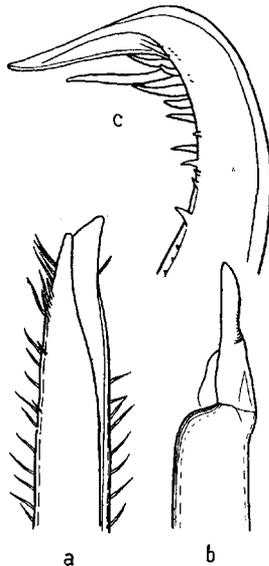
PILUMNUS SINENSIS, sp. n.

Material.—1 ovigerous ♀, 24×18.7 mm. (holotype), and 1 ♂, 30×23.4 mm., from Hongkong.

Description.—(a) *Female*. Regions of carapace scarcely indicated; anterior half covered with long, rather stiff, yellowish-brown bristles. Antero-lateral margin armed with three spines directed forward and outward from expanded bases (text-fig. 14 a); two spines at outer angle of orbit; one small spine and two granules on subhepatic region. Front about one-third the greatest width of carapace, divided into two broad inner lobes, separated medially by a V-shaped fissure, and two small triangular outer lobes each terminating in a small spine. Antenna standing in the notch between front and spine of inner orbital angle, being prevented from entering orbital hiatus by a slight upgrowth of the basal segment (text-fig. 14 a). Lower orbital border armed with spines on inner half and serrations on outer half; a group of two spines and some five spinules

beneath the inner three spines. A deep fissure below the two outer orbital spines and two indistinct notches on the upper orbital margin. Right chela (text-fig. 15) considerably smaller than left; 6-7 rows of spines on palm, the larger spines usually curved towards the apex, the smaller conical; three* rows of spines on the proximal upper border of dactylus. The outer surface of carpus of cheliped with numerous curved spines and, projecting far beyond these, bristles similar to those on the dorsal surface of the carapace. Most of these and all the bristles on the upper two-thirds of the palm have been omitted in text-fig. 15. One spine near the distal end of upper margin of the merus. Entire surface of palm of left chela also armed with spines and spinules, with the exception of a small area near the proximal lower border.

TEXT-FIG. 16.



Pilumnus sinensis, sp. n., apex of (a) anterior and (b) posterior ♂ abdominal appendage
c, *Pilumnus spinohirsutus* Rathbun, apex of anterior ♂ appendage, × 45.

Walking-legs thickly covered with bristles similar to, but somewhat more slender than, those on the carapace; no spines on the merus-joints.

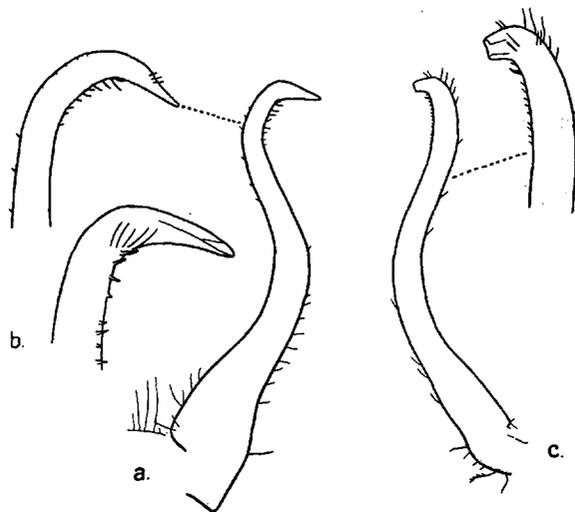
(b) *Male*. Bristles stiffer and darker in colour; of the two spines at the outer orbital angle the dorsal is the more prominent. Chelipeds more nearly equal in size, the left somewhat smaller than the right; eight to ten rows of spines on the palm; proximal half of fingers more spinose on the left than on the right chela. Abdomen long and slender, the terminal segment nearly equal in length to the sum of the two preceding ones (text-fig. 14 b). The anterior

* The third row is poorly developed in the smaller chela and is not visible in the text-figure.

pair of abdominal appendages long and slender, distal half perfectly straight. The apex of one of these is represented in text-fig. 16 *a*. The second pair (text-fig. 16 *b*) is relatively short, about one-fourth the length of the preceding pair.

Remarks.—These specimens do not appear to belong to any of the numerous species of *Pilumnus* already known. They are nearly related to *P. orbitospinis* Rathbun (1911, p. 229, figs. 14 & 15, pl. xvi), which is known only from the ♀. But, from the photographs given, the latter species does not appear to have nearly such long curved spines on the palm and wrist of each cheliped. Moreover, Parisi (1916, p. 185) states that there are one to three

TEXT-FIG. 17.



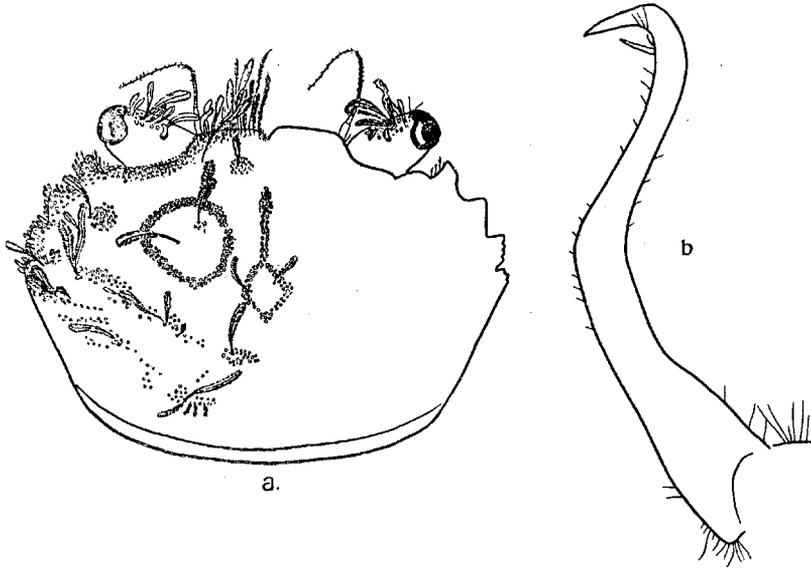
Anterior ♂ abdominal appendage of: *a*, *Pilumnus seminudus* Miers from Hongkong; *b*, apex of same in a much larger type-specimen in 'Alert' collection; *c*, *P. quadri-dentatus* de Man, co-type. (× 27 and 45.)

spines on the merus of the walking-legs. *P. orbitospinis* is characterised by the presence of two spines near the distal extremity of the upper margin of the arm. In *P. sinensis*, in addition to the spine already mentioned, there is a smaller spine, and sometimes, in addition, two spinules at the point of articulation with the wrist; the series of small teeth that precedes the spines in *P. orbitospinis* (Parisi, 1916, p. 185) are absent in the Chinese specimens.

Of the species represented in the British Museum Collection, that which most resembles the present species is *P. spinohirsutus* Rathbun from San Francisco. In the latter species there are, however, (1) three spines on each median frontal

lobe; (2) two spines on the upper orbital margin in addition to those at the inner and outer angles; (3) some six spines on the lower orbital border; (4) one or two rows of spines on the carpus and a few smaller spines on the propodus of each walking-leg. In addition, all the spines are horny and dark brown in colour, whereas in *P. sinensis* they are of the same colour as the carapace and slightly calcareous. The ♂ abdomen is also different, the seventh segment being only as long as broad and the anterior abdominal appendage curved outward and downward at the apex (text-fig. 16 c); one of the spines posterior to the apex is very long.

TEXT-FIG. 18.



Pilumnus penicillatus, sp. n.

a, dorsal aspect of carapace of holotype, $\times 15$; b, anterior ♂ abdominal appendage, $\times 45$.

PILUMNUS SEMINUDUS Miers.

Miers, 1884, p. 222, pl. xxi. fig. C; 1886, p. 161.

This species is represented by a number of small individuals, the largest of which is only 7 mm. in breadth, from Hongkong. As stated by de Man, this species differs from *P. quadridentatus* (de Man, 1895, pp. 537-544) chiefly in having three instead of four teeth on the antero-lateral border. On comparing small specimens of *P. seminudus* with co-types of de Man's species from Pontianak, Borneo*, the carapace in the latter proves to be somewhat

* Obtained from Lübeck Museum.

broader in proportion to the length, and narrows considerably more posteriorly. Apparently the ♂ abdominal appendages also differ somewhat (*cf.* text-fig. 17 *a* & *c*). The males were of approximately equal size, but the appendage is less fully developed in *P. quadridentatus*.

PILUMNUS PENICILLATUS, sp. n.

Material.—Holotype (♀, text-fig. 18 *a*); 1 ovigerous ♀, measuring approximately 5 mm. in breadth and 1 ♂.

Description.—A small, unusually hairy species with numerous long feathered or brush-like setæ on all thoracic appendages (maxillipeds excepted); similar setæ on eye-stalks, front, and scattered over the dorsal surface of carapace. Body and limbs everywhere covered with a fine pubescence; in addition, a characteristic arrangement of rather long club-shaped outgrowths on dorsal surface of carapace (diagrammatically represented in text-fig. 18 *a*). This pattern, of which the most striking features are the longitudinal median strand ending in a diamond, and the circle or ocellus on either side of this, is very similar in both sexes. Teeth of antero-lateral border concealed by the pubescence; when carapace is cleaned they are seen to be four in number (see text-fig. 18 *a*). Two distinct notches in the upper, one in lower, border of orbit. Areolation of carapace very faintly indicated. Antennal flagellum with sparse delicate setæ. Chelipeds nearly equal in both sexes, an unusual occurrence in small species of this genus. A number of longitudinal rows of small white granules on outer surface of palm; of these four or five along the upper margin are most conspicuous, and can be seen without removing the hairy covering. Small granules here and there on upper outer surface of wrist, which bears no spine. All seven segments of ♂ abdomen separate, the anterior appendage well developed and chitinised, although the specimen is under 5 mm. in breadth (text-fig. 18 *b*); the genital duct appears to open at the base of the last thoracic limb. Colour light brown.

Locality.—Hongkong.

Medæus granulatus (Haswell), *Xantho exaratus* (M.-Edw.),
and *Xantho distinguendus* de Haan compared.

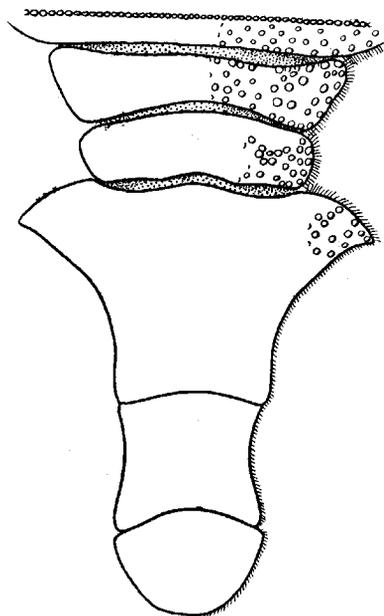
Odhner (1925, p. 81) has concluded that specimens referred erroneously by various authors to *Xantho distinguendus* de Haan belong to the genus *Medæus* Dana. The species in question, *Medæus granulatus* (= *Leptodius granulatus* Haswell, 1882) has four synonyms (see Odhner, 1925, p. 81); of these "*Xantho macgillivrayi*" Miers (1884, p. 211, pl. xx, c) and "*Lophozozymus bellus* var. *leucomanus* Lockington" (Miers, 1886, p. 115, pl. xi, fig. 1, and Lanchester, 1900, p. 736) are represented by specimens in the British Museum Collection. There are in the Barney Collection, in addition to specimens of *Medæus granulatus* (Hasw.), specimens that appear to be identical with *Xantho distinguendus* de Haan. Since these two species show a superficial resemblance to each other

and also to *Xantho exaratus* (= *Leptodius exaratus* A. M.-Edw.), a comparison of all these three is given below :—

<i>Medeus granulatus.</i>	<i>Xantho exaratus.</i>	<i>Xantho distinguendus.</i>
1. Fingers sharp-pointed.	Fingers spoon-shaped.	Fingers spoon-shaped.
2. Pterygostomium with short sparse hairs; a few short simple hairs on meri of thoracic appendages.	Pterygostomium, upper and lower margin of arm, and upper margin of meri of walking-legs heavily fringed with setose hairs.	Adult specimens as in <i>X. exaratus</i> .
3. Numerous short transverse rows of bead-like granules on anterior half of carapace; more scattered granules on lateral part of branchial region; beading conspicuous on posterior border, between antero-lateral teeth, and extending on to subhepatic region.	Granules uniformly distributed over carapace becoming smaller posteriorly and in centre—not arranged in rows.	Granules small, uniformly distributed on anterior part of carapace, occasionally forming short transverse rows; faint granulation on lateral branchial and on subhepatic regions.
4. Antero-lateral lobes more prominent and acute than in either of the other two species.		
5. Raised rows and patches of beaded granules on dorsal surface of palm, carpus, and part of merus of chelipeds.	Granular areolation of chelipeds simpler and much less pronounced.	Granulation of chelipeds almost obsolete.
6. Upper margin of merus of walking-legs crested.	Upper margin of merus of walking-legs not crested.	Upper margin of merus of walking-legs not crested.
7. Longitudinal raised ridges of granules separated by distinct depressions, on carpus and propodus of walking-legs.	Raised patches of granules fewer, less regular, and less distinct.	Hardly any trace of the granulation.
8. Abdomen of ♂ as represented in text-fig. 19.	Abdomen of ♂ as represented in text-fig. 20.	Abdomen of ♂ as represented in text-fig. 21.
9. First ♂ abdominal appendages as represented in text-fig. 22 A.	First ♂ abdominal appendages as represented in text-fig. 22 B.	First ♂ abdominal appendages as represented in text-fig. 22 C.

The abdomen of the ♂ *Xantho distinguendus* closely resembles that of *Medæus granulatus*, but they may be distinguished from each other by the difference in shape of segments 6 and 7. In *Xantho exaratus* the abdomen is relatively narrower; segments 3-6 are more elongated than in either of the other two species; beading is almost absent on the proximal segments and segment 2 has a characteristic form (text-fig. 20, cf. text-figs. 19 & 21). Males of the three species can readily be distinguished from each other by the first abdominal appendages (text-fig. 22 A-C); even very small specimens 6-10 mm. broad exhibit the same types of appendages as do adults. In all three species the second abdominal appendage is of the type represented in text-fig. 22 C, 2, and is only one-fifth to one-third the length of the anterior one.

TEXT-FIG. 19.

*Medæus granulatus* (Haswell), ♂ abdomen, × 6.

CATOMETOPA.

LITOCHEIRA AMOYENSIS, sp. n.

Material.—1 ♂ measuring 6.4 × 4.6 mm.

Description.—Carapace quadrilateral (text-fig. 23), covered anteriorly and laterally by a very short, light brown felt which also fills in the shallow grooves, rendering the areolation distinct; fronto-orbital width slightly less than the length of the carapace; antero-lateral considerably shorter than postero-lateral border; outer orbital angle slightly pronounced, rounded and confluent with

the long anterior lobe of the antero-lateral border ; the second lobe is succeeded by two teeth, of which the anterior is well developed. When the short felt is removed, the upper orbital border is slightly undulating in the outer half, perhaps indicating the presence of one or two closed, obsolete notches ; lower border entire (text-fig. 24). Eye-stalk broadened at base (text-fig. 24), freely movable in orbit. Chelipeds approximately equal ; palm and base of each finger somewhat more heavily felted than dorsal surface of carapace, faintly granulose beneath ; fingers white where free from down, two sulci on fixed one. The long silky hairs characteristic of the genus occur

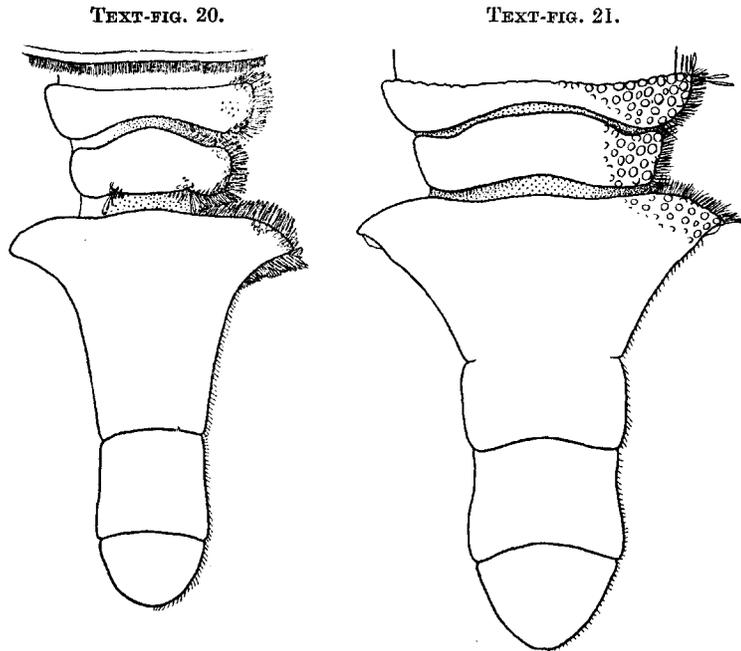
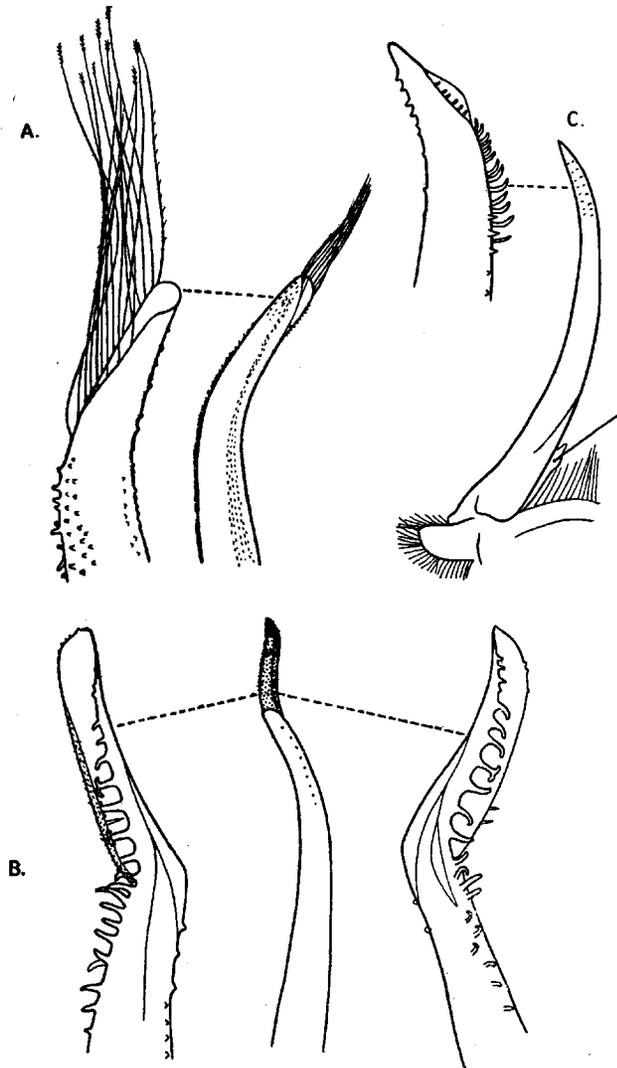


Fig. 20.—*Xantho exaratus* (A. M.-Edw.) ; ♂ abdomen, $\times 6$.
 Fig. 21.—*Xantho distinguendus* de Haan, ♂ abdomen, $\times 12$.

on palm, wrist, and walking-legs ; on the carapace they appear to be restricted to a single row parallel to the front, but most of these have been rubbed off ; there are much shorter setae along the antero-lateral border. The first abdominal segment covers all the space between the fourth pair of walking-limbs ; the anterior abdominal appendages cross over near the apex which is turned inwards (text-fig. 25 c *) ; the genital duct passes forward from the base of the last leg along a wide shallow groove in the sternum.

* See p. 526.

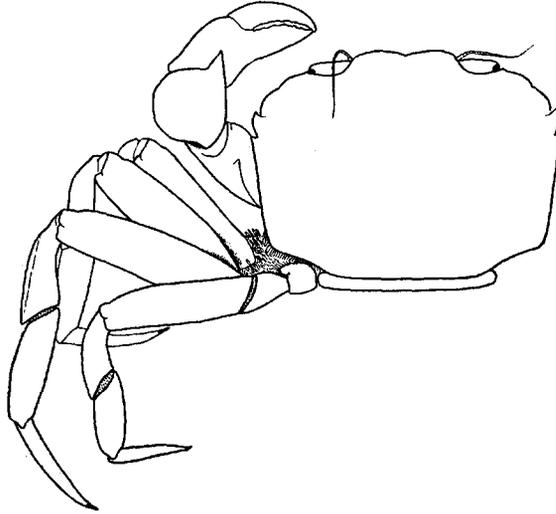
TEXT-FIG. 22.



Anterior ♂ abdominal appendage of: A, *Medæus granulatus* (Haswell); B, *Xantho exaratus* (A. M.-Edw.); C, *Xantho distinguendus* de Haan; 2, second appendage seen behind first. ($\times 15$ and $\times 45$.)

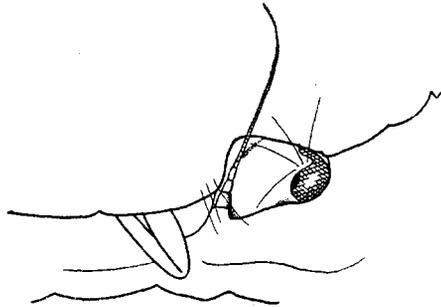
Remarks.—This specimen does not appear to agree with any of the species mentioned in Tesch's key (1918 *a*, pp. 163-5); although most nearly related to the *L. ciliata*, *angustifrons*, *cristata* group (p. 163) it differs from all three

TEXT-FIG. 23.

*Litocheira amoyensis*, sp. n., $\times 6$.

in having the third division of the antero-lateral border prominent and acute, not truncated. It differs from *L. subintegra* Lanchester in (1) being less hirsute; (2) having longer dactyli and narrower propodi on the last pair of walking

TEXT-FIG. 24.

*Litocheira amoyensis*, sp. n., portion of carapace viewed from in front, $\times 15$.

appendages (in *L. subintegra* the propodus is two-thirds as broad as long and the dactylus is three-fourths the length of the propodus—*cf.* text-fig. 23); (3) having the third tooth of the antero-lateral border more prominent and

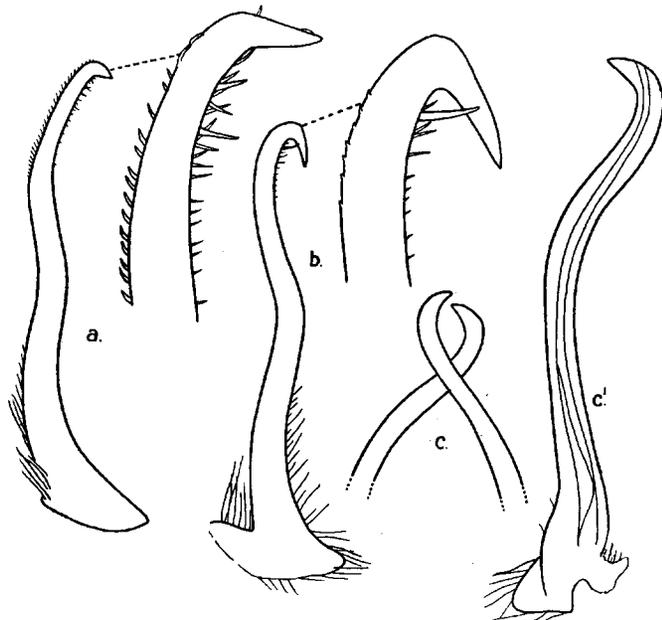
acute; (4) having a rather longer fronto-orbital border and the front less deflexed. Moreover, the anterior abdominal appendages cross over near the apex (text fig. 25 *c*), whereas in *L. subintegra* * (Lanchester, 1900, p. 750) and *L. subintegra* var. *hirsutior* (Lanchester, 1900, p. 751) these appendages are in contact along the distal third of their length and the apex of each is bent outwards (text-fig. 25 *a* & *b*).

MACROPHTHALMUS TESCHI Kemp.

Kemp, 1919, p. 393, pl. xxiv, figs. 8 & 9.

A single ♂, measuring 27 × 18 mm. was referred by Barney to *M. teschi* Kemp. It differs from that species in the following respects:—(1) the upper

TEXT-FIG. 25.



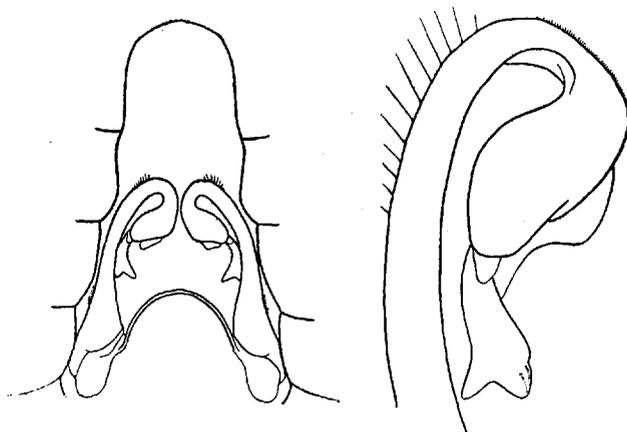
Anterior ♂ abdominal appendage of: *a*, *Litocheira subintegra* var. *hirsutior* Lanchester; *b*, *Litocheira subintegra* Lanchester; *c'*, *Litocheira amoyensis*, sp. n.; *c*, apex of anterior pair of ♂ appendages of *L. amoyensis* in natural position as they rest on the sternum. (*a* & *b*, × 15 and 45; *c'*, × 35.)

orbital border is not so straight as is shown in Kemp's figure; (2) the inner row of granules on the branchial region is broken in the centre; (3) the first three pairs of walking-legs are more heavily furred, so that the minute spinule near the distal end of the upper margin of the merus is concealed, while a minute

* This species is not the same as *L. integra* (Miers), for Miers's type-specimen (1884, p. 543, pl. xlvi, C) shows no trace of teeth on the antero-lateral border, while the width of the fronto-orbital border is considerably more than the length of the carapace.

spine is also present on the merus of the last limb ; (4) the antero-lateral border is more conspicuously crenulated ; (5) there are several rows of minute crowded granules, each with the apex of a darker colour than the base, along the dorsal margin of the palm and dactylus of the chela ; similar, more prominent granules

TEXT-FIG. 26.



TEXT-FIG. 27.

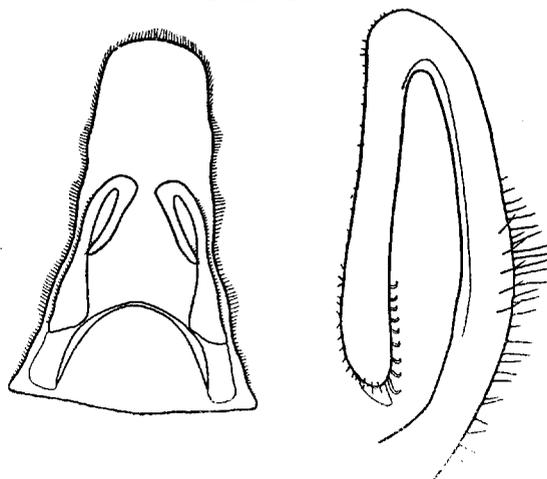


Fig. 26.—*Paracleistostoma depressum* de Man, anterior ♂ abdominal appendages ($\times 6.5$) and apex of one of these ($\times 27$).

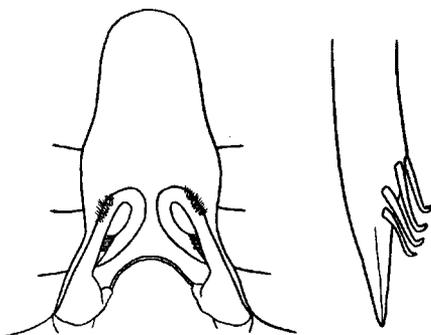
Fig. 27.—*Paracleistostoma leachi* (Audouin), anterior ♂ abdominal appendages resting on abdomen ($\times 6.5$) and enlarged view of apex of one of these ($\times 27$).

are present on the lower border of the palm and are continued on to the proximal inner surface as well as on to the proximal half of the immovable finger.

The carapace is 1.5 times as broad as long ; in *M. teschi* from 1.52–1.64 times (see Kemp's measurements, 1919, p. 394).

These differences are slight and, until more material from the Indian and Pacific Oceans is available, it seems best to refer this Chinese specimen to *M. teschi*. It also shows affinities with *M. japonicus* de Haan, but cannot

TEXT-FIG. 28.

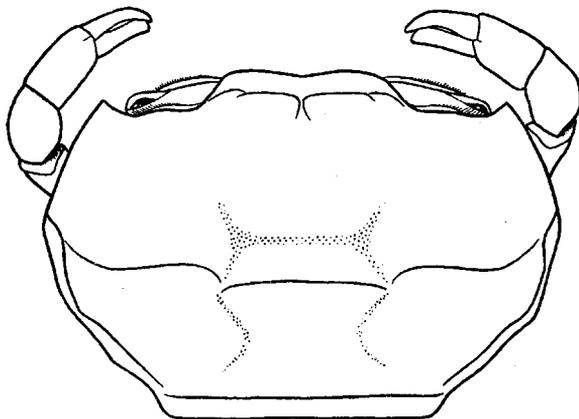


Paracleistostoma cristatum (Ortmann) de Man, anterior ♂ abdominal appendages of a type-specimen ($\times 6.5$) with enlarged view of apex of one of these ($\times 27$).

be identified with that species because the inner surface of the palm and fingers is heavily felted.

Previously recorded from Port Canning, Arakan Coast, and Mergui.

TEXT-FIG. 29.



Paracleistostoma cristatum (Ortmann) de Man, carapace in dorsal aspect and chelipeds of a type-specimen, $\times 6$.

PARACLEISTOSTOMA DEPRESSUM de Man.

de Man (1895) pp. 581-590, pl. xiv, fig. 13 in Bd. 9, 1896; Tesch (1918) p. 63, in key.

In the Peking collection are two ♂♂ which have been compared with co-types from Pontianak, Borneo, received in exchange from Lübeck Museum. In the

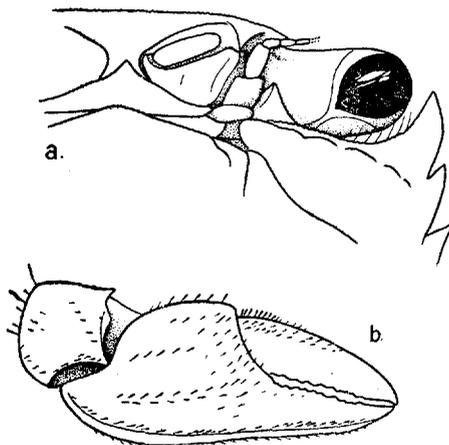
three species of this genus of which specimens have been examined the anterior ♂ abdominal appendages* are so strikingly different that figures of these are given. Text-fig. 26 represents these appendages in *P. depressum* de Man; text-fig. 27 in *P. leachi* (Audouin), and text-fig. 28 in *P. cristatum* de Man (1895, pp. 590-595=*Cleistostoma dilatatum* Ortmann, *nec* de Haan). Since the latter species has never been figured, the carapace of a co-type, in dorsal aspect, is represented in text-fig. 29 by permission of the authorities of the Strasbourg Museum.

BRACHYNOTUS PENICILLATUS de Haan.

For references see Tesch (1918) p. 104; Yokoya (1928) pp. 780-781, text-fig. 8.

Two ♂♂ from Amoy, two ♂♂ and one ♀ from Hongkong, agree with *B. brevidigitatus* Yokoya in having the dactylus shorter than twice the dorsal

TEXT-FIG. 30.



Brachynotus longitarsis Miers.

a, part of anterior ventral surface of carapace to show infraorbital ridge;
b, chela. × 15.

length of the palm, the front sinuous and the merus of the outer maxilliped partially concealing the exognath. The infraorbital crest is the same as in *B. penicillatus* (Tesch, 1918, p. 104, key), and the differences are so slight that Yokoya's species should, in all probability, be included in *B. penicillatus* de Haan.

Since Tesch (1918, pp. 104-5) was unable to include *B. longitarsis* Miers (1879, p. 37, pl. ii, fig. 3) in his key because the infraorbital ridge had not been described, a note on Miers's species may conveniently be added here, although it is not represented in the Chinese collections. In the ♂ the infraorbital ridge is divided into six or seven lobes; the first is faintly crenulate and only indistinctly marked off from the short second lobe (text-fig. 30 a); the third

* See p. 525.

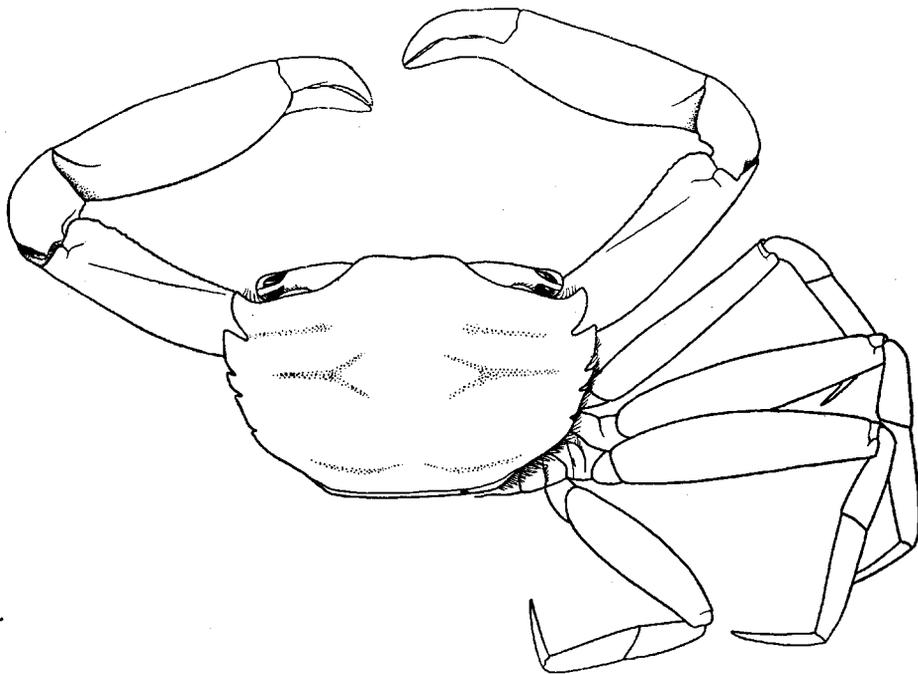
and fourth are about equal in length and longer than the second; the succeeding ones rapidly diminish in size, so that the seventh, when present, is extremely minute. Thus *B. longitarsis* is allied to the *B. harpax*, *penicillatus*, *oregonensis* group (Tesch, 1918, p. 104), but has the infraorbital ridge divided into six or seven instead of three or four lobes.

In the ♀ the ridge is regularly serrate and divided into some eighteen short lobes.

METAPLAX SHENI, sp. n.

Material.—2 ♂♂, measuring 13.2×8.6 mm. (holotype) and 12.8×8.5 mm. respectively.

TEXT-FIG. 31.



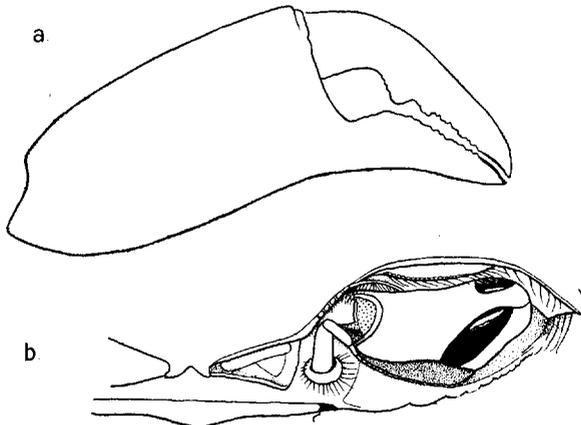
Metaplex sheni, sp. n., holotype in dorsal aspect.

Description.—Tesch (1918, pp. 116–117), who has revised the genus *Metaplex* H. M.-Edw., found that the infraorbital margin in the ♂ was “of great systematic value.” The ♂♂ from China cannot be identified with any of the species in Tesch’s key. The infraorbital crest (text-fig. 32 *b*) is divided into fifteen to nineteen lobules; the first of these, by far the largest, is faintly crenulate on the inner half; the second is about half the length of the first; the third to fifth gradually decrease in size and thereafter they are small and bead-like.

Text-figs. 31 and 32 give a good idea of the general appearance of the holotype, so that no lengthy description is required. The position of the species in Tesch's key may be mentioned; it would come into his second division thus:—

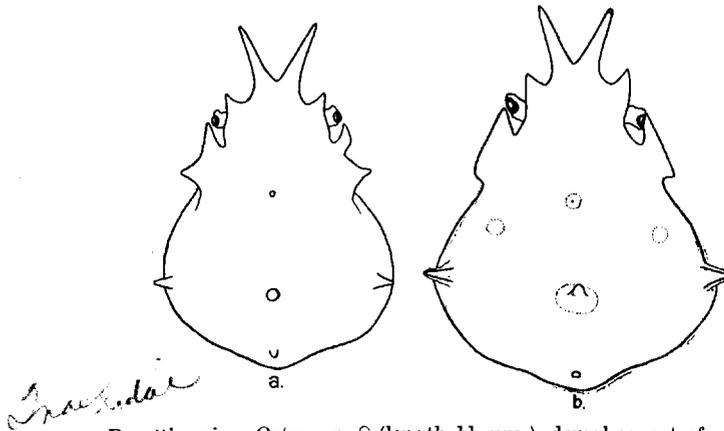
- 2. No. of lobules of the infraorbital ridge of ♂ 7-9 3.
- No. of lobules of the infraorbital ridge of ♂ 15-19 *M. sheni*.
- No. of lobules of the infraorbital ridge of ♂ exceeding 20 4.

TEXT-FIG. 32.



Metaplex sheni, sp. n., holotype. a, smaller chela, $\times 10.5$; b, portion of anterior border of carapace to show infraorbital ridge, $\times 8.5$.

TEXT-FIG. 33.



a, *Pugettia minor* Ortmann, ♀ (length 11 mm.), dorsal aspect of carapace;
b, *Pugettia cristata*, sp. n. $\times 4$.

It is thus most nearly allied to *M. dentipes* (Heller) and *M. distincta* H. M.-Edw., both of which have twenty-five to thirty lobules, but differently arranged.

Locality.—Amoy.

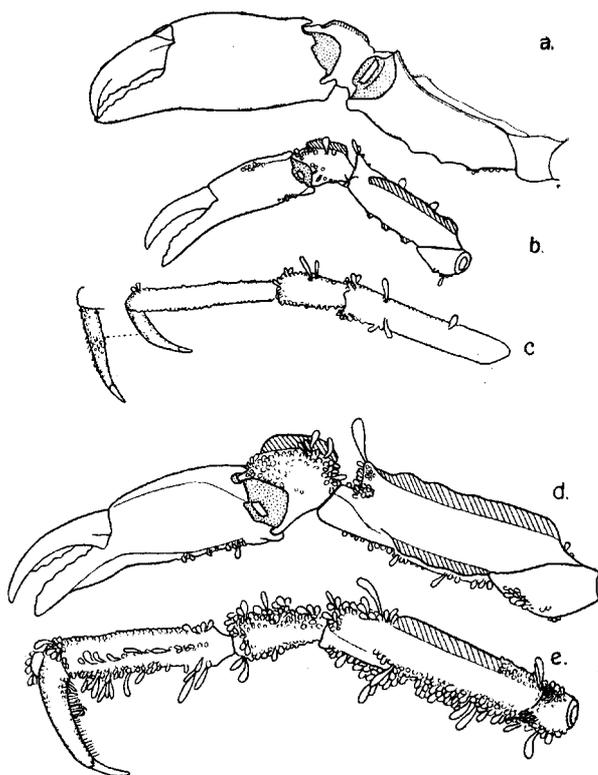
OXYRHYNCHA.

PUGETTIA CRISTATA, sp. n.

Material.—2 ovigerous ♀♀, measuring 13.0×9.6 mm. (holotype) and 13.2×9.5 mm.

Description.—Carapace in general outline resembling *Pugettia incisa* de Haan (1833-1850, pl. xxiv, fig. 3), with postorbital process continued backward for some distance as a wing-like outgrowth (text-fig. 33 b). Cheliped as represented in text-fig. 34 d, with conspicuous crest on the carpus and two crests

TEXT-FIG. 34.



Pugettia minor Ortmann : a, cheliped of ♂, b of ♀ ; c, first walking-leg of ♀. *Pugettia cristata*, sp. n. : d, cheliped of ♀ ; e, first walking-leg of ♀. (d, ×8; others, ×6.)

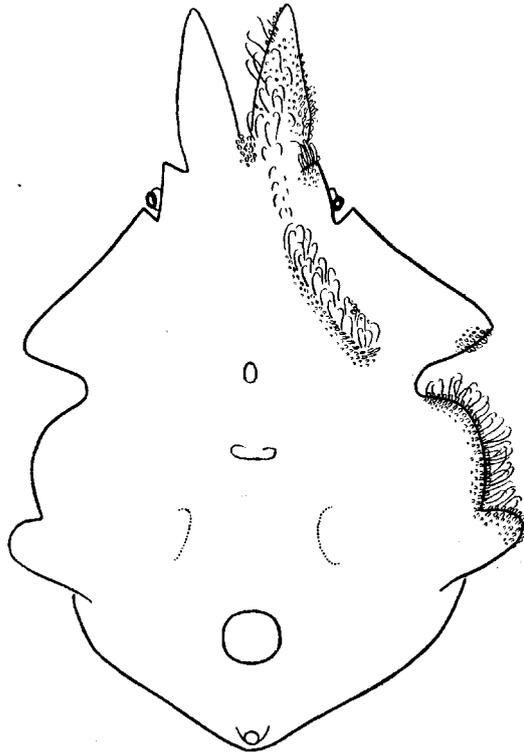
on the merus ; upper and lower borders of palm sharp, approaching to crests. The species is characterised by a high thin crest on the dorsal margin of the merus of the first walking-leg (text-fig. 34 e) ; there is a similar, though shorter, crest on the next appendage and on the third limb it is still more reduced or absent, while on the last appendage it is wanting.

Remarks.—These specimens appear to be related to *P. incisa* from Japan, but, from de Haan's figure (1833, pl. xxiv, fig. 3) it would appear that there

are no crests on the meri of the anterior walking-legs. Crests are absent from these appendages in specimens referred to *P. incisa* by Miers (1879, p. 23), as also in a specimen referred to the same species by Ortmann * (1893, p. 44).

It was thought that these small specimens might belong to *P. minor* Ortmann (1893, p. 44), but, on comparing them with two co-types *, this proved not to be the case. Since *P. minor* has not been figured, permission to include illustrations of the carapace (text-fig. 33 *a*) and certain appendages (text-fig. 34 *a-c*) was obtained. In *P. minor* there is a distinct spinous process behind

TEXT-FIG. 35.



Pugettia sagamiensis (= *P. brevirostris* Parisi, nec Doflein),
carapace in dorsal aspect, $\times 3$.

that which forms the posterior boundary of the orbit. The cheliped of the ♀ is rather similar to that of *P. cristata*, but the second crest on the merus is represented by three separate portions (cf. text-fig. 34 *b* & *d*). The first walking-leg has no trace of a crest on the merus (text-fig. 34 *c*); there are, however, only a few long vesicular outgrowths and the propodus is longer in proportion to the length of the dactylus than in *P. cristata*.

* Specimens of both species obtained for examination from Strasbourg Museum.

The specimens cannot be identified with *P. quadridens* de Haan, nor with *P. brevisrostris* Doflein (1904, p. 85, pl. xxvii, figs. 13, 14) or "*P. brevisrostris*" Parisi (1915, p. 287, pl. vii, fig. 1).

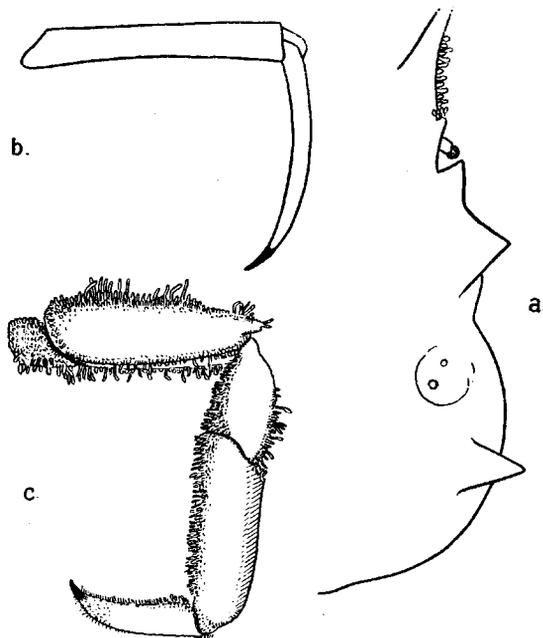
Locality.—Amoy.

PUGETTIA SAGAMIENSIS, nom. nov. (for *P. brevisrostris* Parisi, nec Doflein). *not Chinese*

Parisi, 1915, pp. 287-288, pl. vii, fig. 1, text-fig. 2.

On comparing Parisi's ♂ specimen from Sagami Bay, Japan, with the holotype (♀) of *Pugettia brevisrostris* Doflein (1904, p. 85, pl. xxvii, figs. 13 & 14) it is evident that it cannot belong to that species. The carapace of

TEXT-FIG. 36.



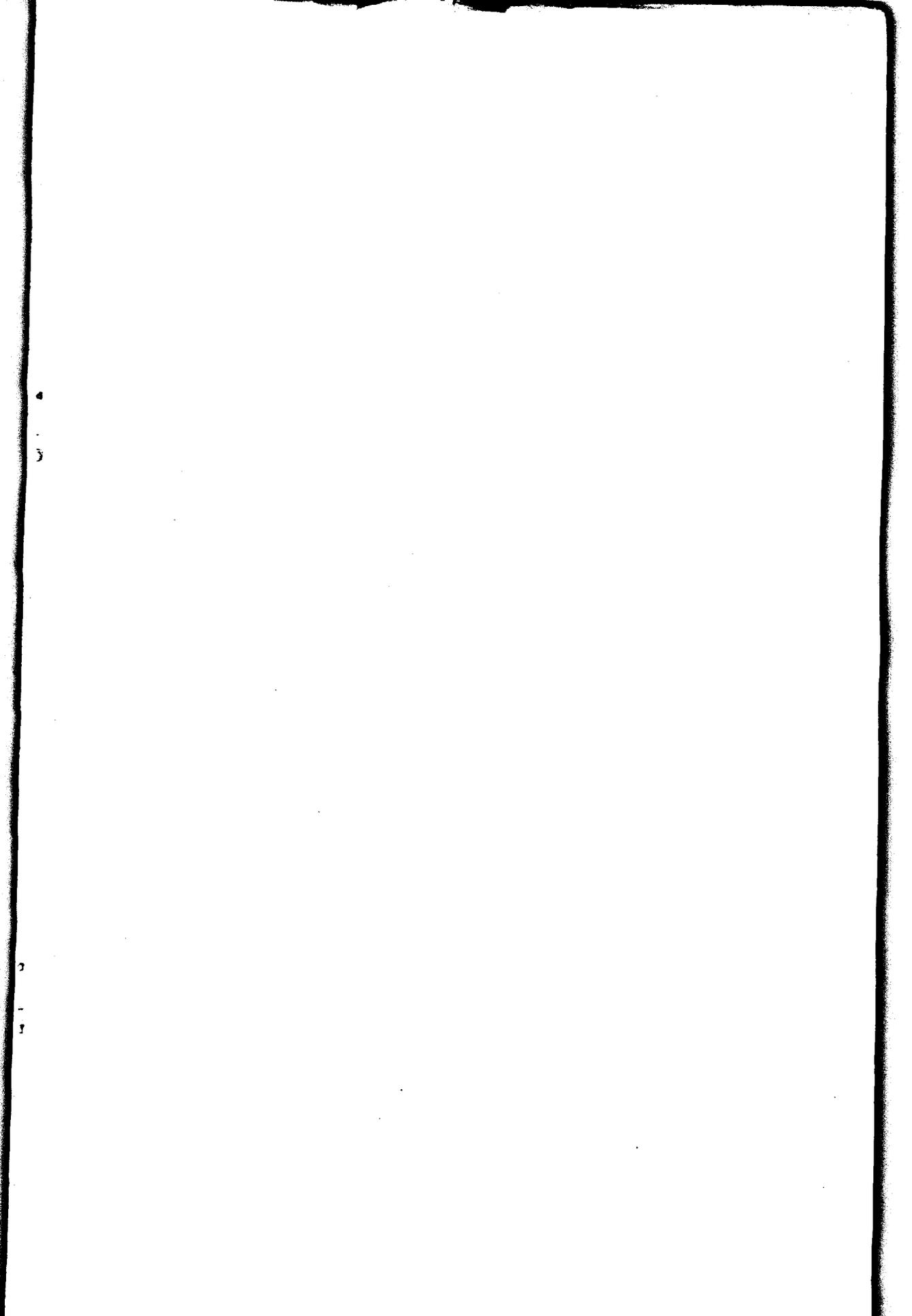
Pugettia brevisrostris Doflein, type: a, right side of carapace; b, dactylus and propodus of second walking-leg, denuded; c, second walking-leg of *P. sagamiensis*. (a, $\times 3$; b & c, $\times 2.5$.)

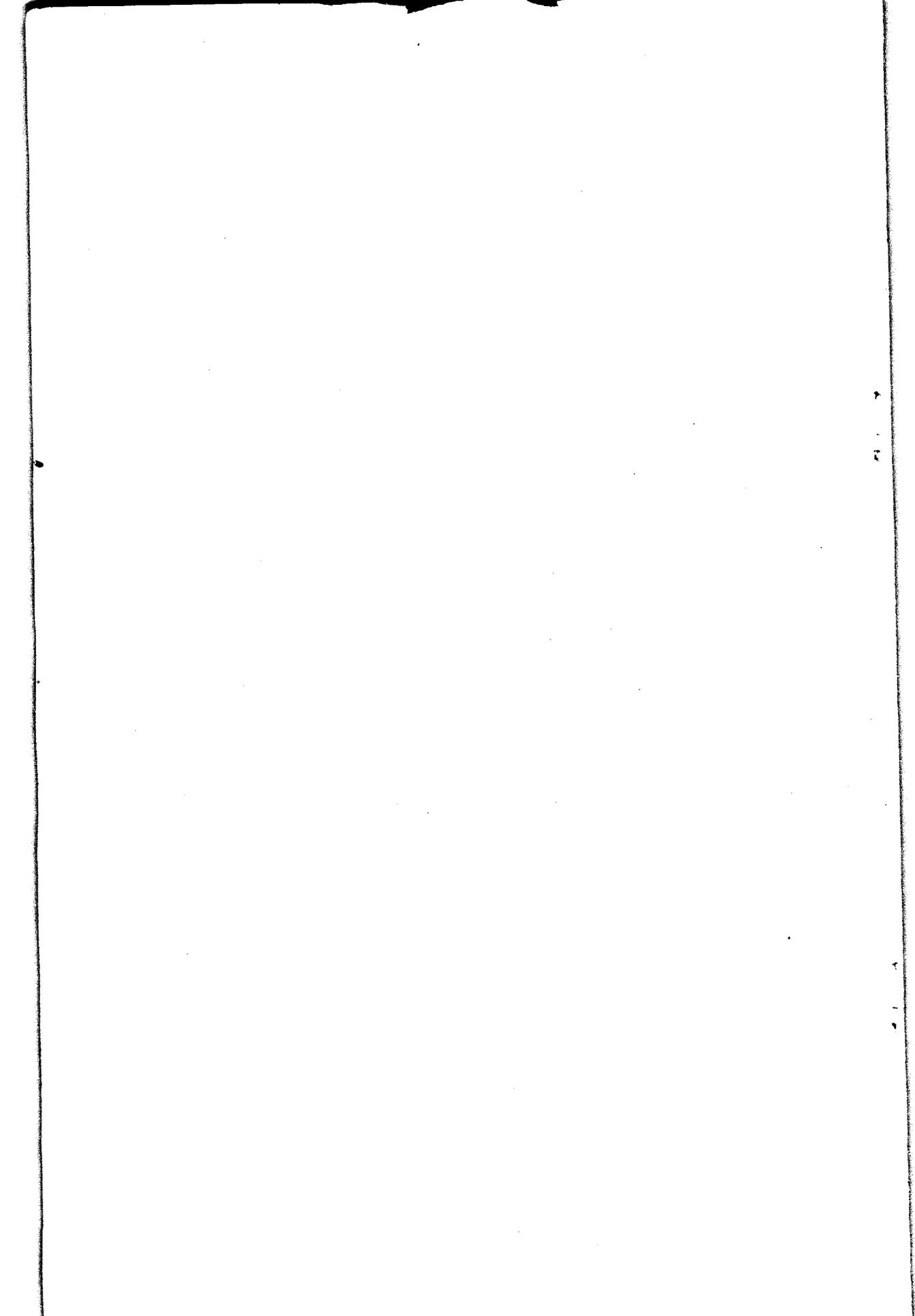
P. sagamiensis is closely covered with low, flattened, vesicular outgrowths, which become somewhat more elongated only on certain small areas, as indicated schematically in text-fig. 35, and in no wise mask the general contour of the carapace. In *P. brevisrostris*, on the other hand, the vesicular outgrowths are everywhere rather prominent and conceal the lateral outline of the carapace, so that it seems to approach that of *P. sagamiensis*. Doflein had removed these vesicles from the right side so as to expose one-half of the carapace (text-fig. 36 a). *P. sagamiensis* differs from *P. brevisrostris* in the following respects:—
(1) there is a broad wing-like outgrowth posterior to the orbit instead of two

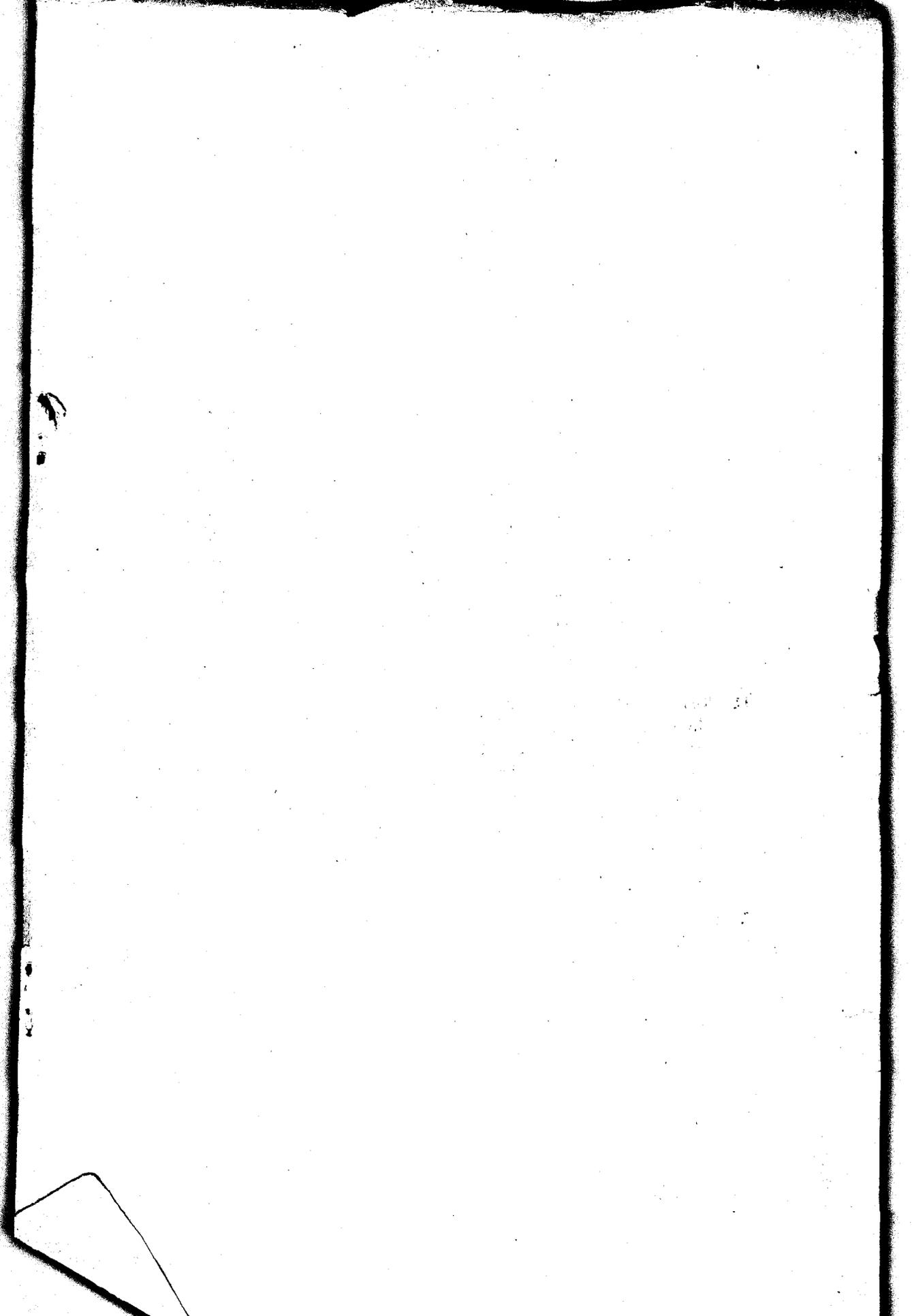
spines (*cf.* text-figs. 35 & 36 *a*); (2) behind this the lateral border is drawn out into two lobes, of which the posterior is the shorter and more prominent, whereas in *P. brevis* there is a raised mound on the anterior branchial region some distance from the actual border and behind this a distinct branchial spine; (3) there is but one pronounced eminence on the gastric region followed by a very low elongated ridge (text-fig. 35), whereas in *P. brevis* there are five—three median, of which the second is most conspicuous, and a very small one on either side between the first pair of median ones; (4) the most marked difference, however, is in the shape of the two terminal joints of the walking-legs. In *P. sagamiensis* these joints are much compressed and, again, the flattened scale-like vesicles do not conceal their general form (text-fig. 36 *b*). The upper third to half of the propodus appears to be a crest (shaded in text-fig. 36 *c*), but the lower portion is almost as thin. In *P. brevis* the prominent vesicles must be removed before the shape of the joints is apparent; when denuded both are slender and approximately circular in cross-section.

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JOURNAL (ZOOLOGY) VOL. XXXVII. (NO. 254.)

CONTENTS.

	Page
I. <i>Micraspides calmani</i> , a new Syncaridan from the West Coast of Tasmania. By GEORGE E. NICHOLLS, D.Sc., A.R.C.S., F.L.S., Professor of Biology in the University of Western Australia, Perth. (Plates 31 & 32, Map, and 1 Text-figure.)	473
II. Further Observations on Biological Races in <i>Hyponomeuta padella</i> (L.). By W. H. THORPE, M.A., Ph.D. (from the Zoological Laboratory, Cambridge). (Communicated by Professor J. STANLEY GARDINER, F.R.S.)	489
III. Studies in Colour-changes in Fish.—Part V. The Colour-patterns in certain Flat-fish and their Relation to the Environment. By H. R. HEWER, M.Sc. (Communicated by Professor E. W. MACBRIDE, F.R.S. (Plates 33 & 34, and 11 Text-figures.)	493
IV. The Development of the External Features of <i>Xenopus laevis</i> , based on Material collected by the late E. J. Bles. By Prof. KARL PETER, University of Greifswald, Germany. (Communicated by G. R. DE BEER, M.A., B.Sc.)	515
V. Brachyura from the Coasts of China. By ISABELLA GORDON, D.Sc., Ph.D. (With 36 Text-figures.)	525