

Notes on the Genus *Ilyoplax* Stimpson (Brachyura, Ocypodidae)

By M. W. F. TWEEDIE, M.A.

(Plates II, III)

The genus *Ilyoplax* was founded by Stimpson¹ for the species *I. tenella* from the Canton River in 1858, the type of which is no longer extant.

In 1888 de Man² founded the genus *Dioxippe* to accommodate *Cleistostoma pusilla* de Haan and a new species from Mergui, which he named *Dioxippe orientalis*.

Rathbun³ in 1897 showed that *Dioxippe* was preoccupied and proposed the name *Tympanomerus* for the genus. In 1921 the same author,⁴ in a footnote to her description of *Ilyoplax formosensis*, considered that *Tympanomerus* and *Ilyoplax* were inseparable, the latter name having priority.

The last comprehensive survey of the genus is that given by Kemp⁵ in 1919 in which he gives a key to eleven species, including three new ones, and *Cleistostoma lingulatum* Rathbun.

Since that date the following species and subspecies have been described.—

I. formosensis Rathbun, Proc. Biol. Soc. Wash., XXXIV, 1921, p. 156. (Formosa).

I. delsmanni de Man, Zool. Meded. Leiden, IX, 1926, p. 16. (Bay of Batavia).

I. delsmanni yuhana Rathbun, Lingnan Science Journal, VIII, 1929, p. 98. (Fukien).

I. serrata Shen, Bull. Fan Mem. Inst. Biol., II, 1931, p. 177. (Fukien).

I. pingi Shen, Zoologica Sinica, IX, 1932, p. 246. (Shantung and Liaotung Peninsulas and Peichihli Bay).

I. dentimerosa Shen, t.c., p. 250. (Shantung Peninsula).

I. dentata Ward, Australian Zoologist, VII, 1933, p. 391. (Port Curtis, Queensland).

In my opinion *I. serrata* Shen is probably identical with *I. delsmanni yuhana* Rathbun.

1. Stimpson, Proc. Acad. Nat. Sci. Phil., X, 1858, p. 98 [44].

2. de Man, Journ. Linn. Soc., Zool., XXII, 1888, p. 137.

3. Rathbun, Proc. Biol. Soc. Wash., XI, 1897, p. 164.

4. Rathbun, Proc. Biol. Soc. Wash., XXXIV, 1921, p. 156.

5. Kemp, Rec. Ind. Mus., XVI, 1919, p. 336.

In the present paper two new species from Singapore are described and the other five species and subspecies in the collection of the Raffles Museum are commented on. The types of the new species will be deposited in the British Museum.

In his description of *Scopimera intermedia*¹ Balss points out that the female abdomen of this species is broadened and completely covers the sternum, "ähnelt so also dem der Gattung *Ilyoplax*." Actually in the species of *Ilyoplax* in the present collection only two, *I. orientalis* (de Man) and *I. gangeticus* (Kemp), have the female abdomen broadened to this extent. In the other four species and the single subspecies the abdomen does not completely embrace the sternal segments.

For purposes of comparison figures are given of both male and female abdomina of all the species in the present collection.

Ilyoplax delsmanni de Man. Plate III; a, b.

1926. *Ilyoplax delsmanni* de Man, Zool. Meded. Leiden, IX, p. 16. (Bay of Batavia).

Material.—A number of specimens from Port Swettenham on the west coast of the Malay Peninsula.

Most of the specimens were collected in and around the mouths of burrows apparently much too large to have been excavated by themselves; sometimes as many as eight or ten would be present in one burrow. No other animal was found in these burrows, and I cannot be sure whether they were abandoned or inhabited by an animal that burrows very deeply.

de Man, on the authority of Dr. Delsman, describes them as occurring amidst the colonies of *Gelasimus*. Several species of *Gelasimus* (*Uca*) were present on the mud-flats at Port Swettenham, but they were mostly living higher above low water mark than the *Ilyoplax*.

Ilyoplax delsmanni yuhana Rathbun.²

1929. *Ilyoplax delsmanni yuhana* Rathbun, Lingnan Science Journal, VIII, p. 98. (Fukien).

1931. ? *Ilyoplax serrata* Shen, Bull. Fan. Mem. Inst. Biol., II, p. 177.

In his description of *I. serrata* Shen gives no comparison of his species with *I. delsmanni yuhana* Rathbun. The two descriptions, however, obviously refer to closely related, if not identical, forms, and as part of Dr. Rathbun's material came from near the type locality of *I. serrata* (Amoy), it seems probable that *I. serrata* should be reduced to the synonymy of *yuhana*.

Comparison of this form with *I. delsmanni* de Man from the west coast of the Malay Peninsula leads me to agree with Dr. Rathbun in regarding *yuhana* as a subspecies of *I. delsmanni*.

¹. Balss, Zool. Anzeiger, CVI, 1934, p. 233.

². Dr. Rathbun has kindly conformed the identification of these specimens.

Material.—A number of specimens from mud-flats at Kuala Sedili, Johore, on the east coast of the Malay Peninsula, Nov., 1934. Their environment and habits are exactly as described for *I. delsmanni*.

Ilyoplax orientalis (de Man). Plate III; c, d.

1888. *Diozippe orientalis* de Man, Journ. Linn. Soc., Zool., XXII, p. 138. (Mergui Archipelago).

1919. *Tympanomerus orientalis*, Kemp, Rec. Ind. Mus., XVI, p. 347.

Material.—Numerous specimens from Singapore (Serangoon River, Jurong River); the Johore Strait; Kuala Sedili, east coast of Johore; Port Swettenham.

This species is found abundantly burrowing in soft mud between tide marks, particularly at the mouths of rivers.

Ilyoplax gangetica (Kemp). Plate III; e, f.

1919. *Tympanomerus gangeticus* Kemp, Rec. Ind. Mus., XVI, p. 347. (Gangetic Delta).

This species was described by Kemp from two specimens from the Gangetic delta, a comparison being made with the closely allied *I. orientalis* (de Man). The present series enables me to supplement the original description in a few minor points.

The carapace of *I. gangetica* is distinctly longer in relation to its breadth than that of de Man's species, the ratio of breadth to length being 0.8 as against about 0.74 in *I. orientalis*.

In the male abdomen, as Kemp points out, the constriction at the fifth segment is less marked in the present species, and also the sides of the penultimate segment are regularly convex, whereas in *I. orientalis* they are sinuous and bluntly angled at their distal extremities.

The chelipeds are described as a little shorter than in *I. orientalis*. This is a character which in both species varies with the size of the specimen. In the largest male of *I. gangetica* in the present series, measuring 5.6 mm. in anterior carapace breadth, the chelipeds are much elongated, the carpus and chela measuring 4.0 and 6.5 mm. respectively.

Material.—Fifteen males and an equal number of females from Port Swettenham, Dec., 1934, found burrowing in soft mud between tide marks, associated with *I. orientalis* and *I. delsmanni*.

Ilyoplax lingulata (Rathbun). Plate III, g, h.

1909. *Cleistostoma lingulatum* Rathbun, Proc. Biol. Soc. Wash., XXII, p. 108. (Lem Ngob, Gulf of Siam).

1910. *Cleistostoma lingulatum*, Rathbun, K. Danske Vidensk. Selske. Skrift. (7), Afd. V, p. 323.

1919. *Tympanomerus lingulatus*, Kemp, Rec. Ind. Mus., XVI, p. 344.

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An interesting feature of this species, which appears to have escaped notice until now, is the presence on the infra-orbital ridge of the male of a row of brown papillæ, directed inwards and decreasing in size laterally. They occupy the same position as the teeth on the infra-orbital ridge of, for example, *I. delsmanni*, de Man, but are quite different in character, being soft and slightly flexible when touched with a needle, and somewhat translucent. In the female they are replaced by a row of sharp, setiferous granules, which are clearly indicated in Rathbun's figure 8 (l.c.).

It is difficult to be sure of their function, but possibly they form part of a stridulating organ used in conjunction with the compressed spine on the carpus of the cheliped, with which they may be brought into contact by an inward movement of the cheliped.

Material.—A good series of specimens from Singapore (Jurong River and the Johore Strait).

All the specimens were taken in mangrove swamps, crawling about the roots of the trees. They do not appear to inhabit burrows.

Ilyoplax punctata sp. n. Plate II; 1, 1 a. Plate III; i, j.

Cotypes.—Adult male and female collected by the writer in mangrove swamp near the river Jurong, Singapore, April, 1934.

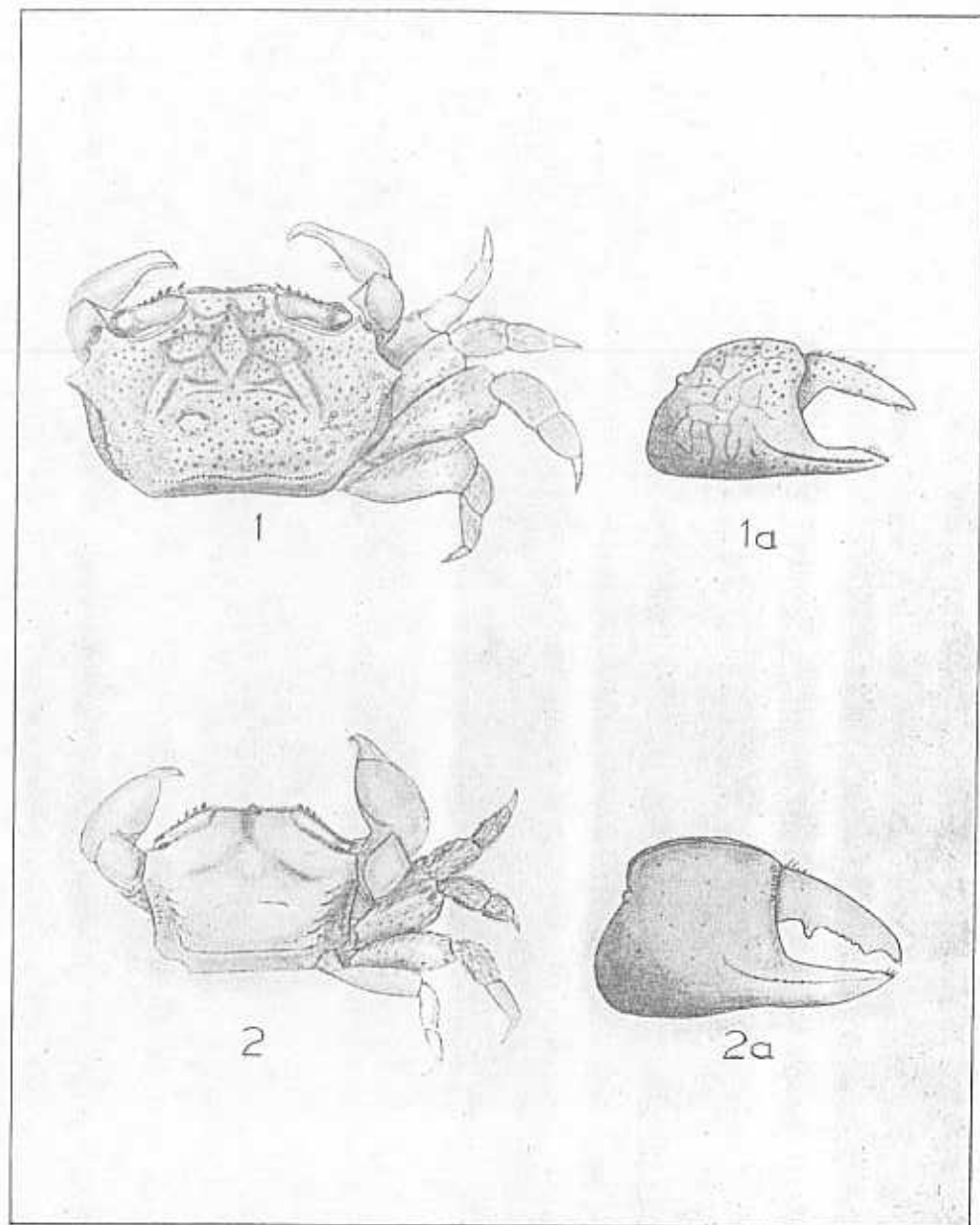
This species is found commonly in mangrove swamps. It is usually associated with *I. lingulata* (Rathbun) and has the same habits.

Material.—Numerous specimens from Singapore (Jurong River); the Johore Strait; Kuala Sedili, east coast Johore; Port Swettenham.

Characters.—This species has its nearest ally in *I. lingulata* (Rathbun) from which it is immediately distinguished by the coarsely punctate condition and the absence of hair on the carapace, by the absence of the distinctive oval depressions which are present on the front of *I. lingulata*, and by the unarmed fingers of the chelæ.

Description.—The carapace is convex fore and aft, the front being strongly deflexed. From side to side, at the level of the epibranchial teeth, it is nearly flat, but behind this the branchial regions are steeply declivous laterally.

The surface of the carapace is everywhere coarsely punctate, the punctæ being larger on the branchial regions than elsewhere. On the gastric region there are seven low prominences. The



Ilyoplax punctata n.sp.; *I. obliqua* n.sp.

anterior two are situated just behind the front, between the orbits; next, a row of three across the protogastric and mesogastric regions, and finally another pair on the metagastric region. Just behind these two there is, in the adult male, a depressed transverse line, curved back towards its lateral extremities and briefly interrupted in the middle. In females and small males this feature is obscure. On the cardiac region there is a pair of prominences about as large as those on the protogastric areas. As is usual in the genus, there is a raised line running close and parallel to the posterior border. The branchial regions are beset with granules, singly and in clusters; posteriorly the granules are arranged in oblique, irregular lines, the hindmost one of which is sharply angled, its inner half coinciding with the outer extremity of the line parallel to the posterior border. There is, in addition, a longitudinal granular line on the steeply declivous part of the branchial regions.

The anterolateral borders are short, the external orbital angle is dentiform and directed obliquely outwards; just behind it is another smaller tooth, and behind this, separated by a rather larger gap, is the epibranchial tooth, which is blunt but salient and directed outwards.

The posterolateral borders are beaded in all their extent.

The frontal border is transverse and nearly straight, its median quarter being a little in advance of the lateral portions, and very slightly emarginate. Laterally it meets the upper orbital margins in a right angle.

The eyes are short and thick, and the orbits slightly oblique. The upper orbital margin is sinuous, thickened and finely beaded; in the middle, opposite the thinnest part of the eye stalk, it is double and encloses a small, smooth space. Here the thickening and beading follows the posterior of the two margins. The lower orbital margin is also finely beaded, and separated from the external orbital angle by a gap; in its inner two thirds it is beset with hairs. Below it there is a minutely denticulate line starting at a point near the basal antennal joint and running obliquely outwards and upwards to join the suborbital border at a point two thirds of its length from its inner end. Below this is the suborbital ridge, the armature of which differs in the two sexes in the same way as described in *I. lingulata*. In the male there are usually seven brown papillæ, developed much as in *I. lingulata*, but larger and more conspicuous. Here against they decrease in size from within outwards, and external to the outer one the suborbital ridge is marked by fine setiferous granules, and curves sharply to a point just below the outer orbital angle.

As in *I. lingulata* the antennules are minute and almost concealed beneath the front and the inter-antennular septum is wide. The median tooth of the epistome is broader and shorter than in the allied species.

The buccal cavern is relatively smaller and much broader than in *I. lingulata*. The merus of the external maxillipeds is triangular in shape and has a sulcus parallel to its outer margin; its surface is finely punctate. The ischium is much broader than long, and its outer margin meets that of the merus at a marked angle. As in *I. lingulata* it carries an oblique hairy ridge.

The abdomen of the male is similar in shape to that of *I. lingulata*, but is less broadened towards the base and its terminal segment is a little narrower. In both species the female abdomen, though much broader than that of the male, does not completely cover the sternal segments. The abdomen and sternum of *I. punctata* are punctate in both sexes.

The male chelae are relatively small and weak. The merus is short and trigonal with the inner margin rounded and the lower one armed with a few spinules. The carpus is about as broad as long and is armed on its inner aspect with a compressed spine. The palm is as high as it is long and its surface is smooth except for scattered punctae. It bears an obscure and minutely serrulate crest on its upper margin, and a punctate and setose line runs from it on to the immobile finger. Its surface is ornamented with dark, reticulating lines. The fingers bear no large teeth on their inner edges but are obscurely denticulate a little way behind the tips. The tips are brown in colour, spoon-shaped and setose. The dactylus is setose along its upper margin. When closed the fingers only meet at the tips, leaving a wide gap between the bases.

The ambulatory legs are thick and strong. The meri are granular above and somewhat tomentose, below they are coarsely punctate. The carpi and propodi are tomentose above and punctate below.

Measurements of male cotype.—

Greatest breadth of carapace	..	6.9 mm.
Length of carapace	..	4.5 "
Breadth of front	..	2.0 "
Antero-lateral border	..	1.3 "
Postero-lateral border	..	3.0 "
Posterior border	..	3.6 "
Merus of cheliped	..	2.0 "
Carpus of cheliped	..	1.5 "
Chela	..	2.8 "

Ilyoplax obliqua sp. n. Plate II; 2, 2a. Plate III; k, l.

Cotypes.—Adult male and female collected by the writer in mangrove swamp near the river Jurong, Singapore, August, 1934.

This species is found associated with *I. lingulata* (Rathbun) and *I. punctata* Tweedie in mangrove swamps, but is less common than either.

Material.—Thirty specimens from Singapore (Jurong River and Serangoon) and two from Port Swettenham.

Characters.—This species is related to *I. punctata* and to *I. lingulata*, the male having the characteristic papillae on the infra-orbital ridge. It is immediately distinguishable from either by the smooth and hairless carapace and the very obliquely directed orbits.

Description.—The carapace is only slightly convex in both directions, and the posterior branchial regions are deflected less steeply than in *I. punctata*, forming a triangular facet. The surface of the carapace is smooth and very finely and sparsely punctate. A broad and rather deep longitudinal sulcus occupies the median part of the front, and a pair of shallow, transverse sulci run from near the epibranchial angles on to the lateral portions of the gastric region. The usual raised line is present, parallel to the posterior border.

On the posterior branchial regions are a series of beaded lines. The most anterior one is very short and runs inwards from the epibranchial angle. Behind it is a series of four or five rather longer curved lines arranged *en échelon*, one behind the other, the last one sharply curved and joining the outer ends of the line parallel to the posterior border. Another series of granules or granular lines runs from a point near the epibranchial angle backwards across the posterior branchial facet. This ornamentation on the otherwise smooth carapace is always distinctly developed and appears to be highly characteristic of the species.

The external orbital angles are sharp and rectangular, and the antero-lateral borders are short and entire and usually straight, but may be a little sinuous. They meet the postero-lateral borders at a very slight angle, so that the lateral epibranchial angles are very obtuse, somewhat as in certain species of *Uca*, for example *U. dussumieri* (M.E.).

The surface of the front is sulcate in the middle line, as mentioned above, and its free edge is almost straight.

The orbits are very oblique. Their upper margins are smooth, somewhat sinuous, and double for a short distance about the middle of their length, just as described for *I. punctata*.

The lower orbital margin is sinuous and beaded; it carries a few long hairs at a point just opposite the cornea of the eye. Below it, as in *I. punctata*, there is a denticulate line starting near the basal antennal joint, but it runs more nearly parallel to the infra-orbital margin, and does not actually meet it.

Below this in the male the suborbital ridge carries a series of seven to eight inwardly directed, conical papillæ, graded as in *I. punctata*. Here, however, they are even larger and more conspicuous. In the female the suborbital ridge is sharply denticulate and in both sexes its external continuation is setiferous and curves upwards towards the outer orbital angle.

The median tooth of the epistome is triangular rather than lingulate, and is strongly inclined forwards, so that it is distinctly visible in dorsal view.

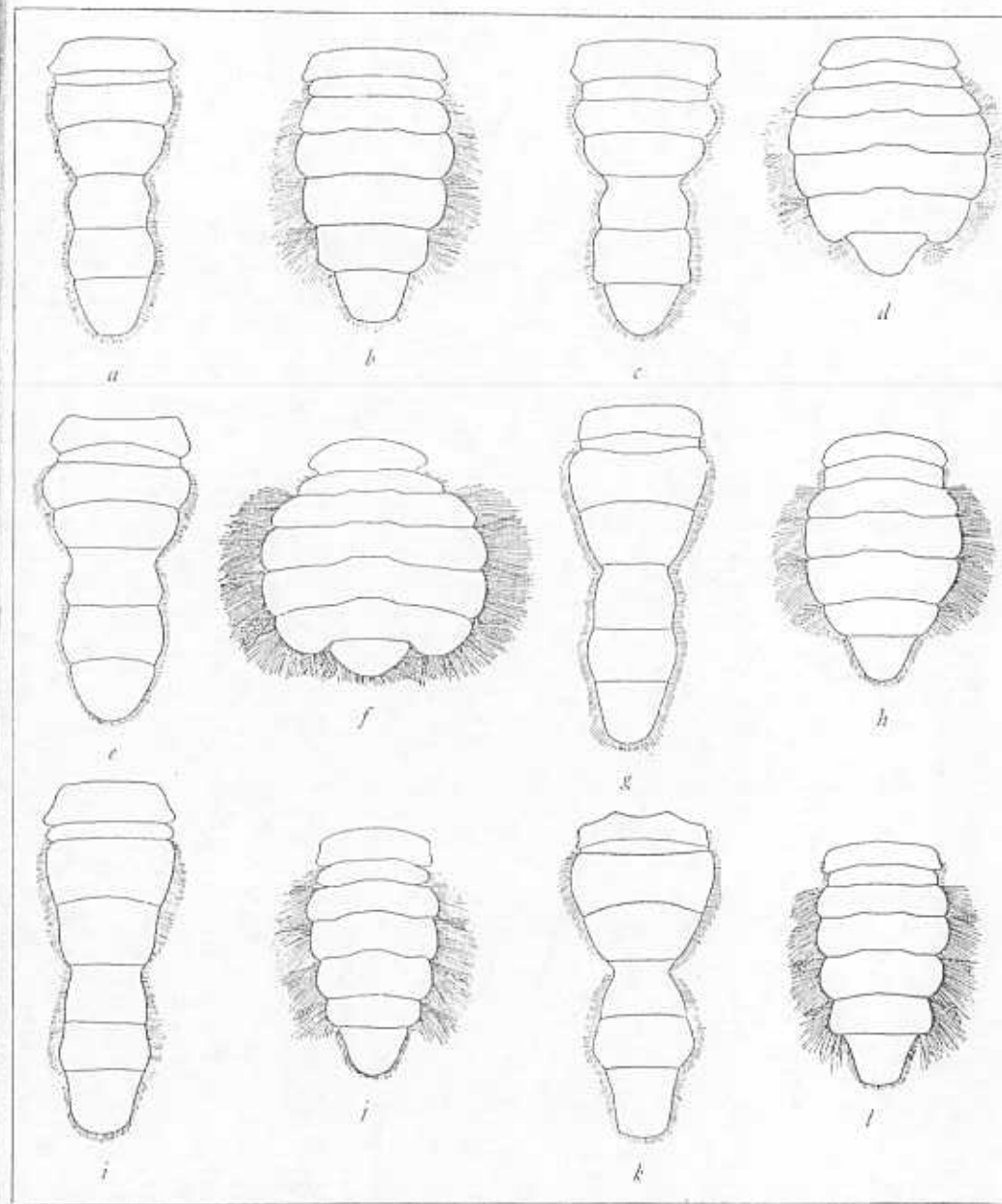
The shape of the buccal cavern and the proportions and sculpturing of the articles of the external maxillipeds is almost exactly as in *I. lingulata*, the meri being oval in shape and the ischia only slightly broader than long.

The abdomen of the male has a highly characteristic shape, being much broadened at the base and at the sixth segment, the sides of which are bluntly angular. The constriction at the fifth segment is far more pronounced than in the two allied species. Here again the female abdomen is not broadened so as to cover the sternal segments.

In the male chela the merus is trigonal. The lower margin is conspicuously denticulate and the inner one granular in its basal half. The outer surface bears some scattered granules. The carpus is short and bears a compressed spine on its inner aspect.

The palm of the chela is about as high as it is long and has a minutely crenulated crest on its upper margin. It is smooth except for a few scattered punctæ and a punctate line running on to the immobile finger. The cutting edge of the dactylus is armed with a strong tooth near the base and another, lower one, near the tip; between the two teeth it is denticulate. The immobile finger has no enlarged teeth, but is denticulate a little behind the tip. The finger tips are setose and slightly expanded.

In the ambulatory legs the meri are broad, but show no trace of "tympana." Their anterior margins are finely granular, and the upper surfaces of those of the three anterior pairs carry scattered spinules. The carpi and propodi and the distal parts of the meri are tomentose.



REPTILES AND AMPHIBIANS FROM PERAK, MALAY PENINSULA

Measurements of male cotype.—

Greatest breadth of carapace	..	5	mm.
Length of carapace	..	3.7	"
Breadth of front	..	1.6	"
Antero-lateral border	..	0.8	"
Postero-lateral border	..	2.0	"
Posterior border	..	2.7	"
Merus of cheliped	..	2.0	"
Carpus of cheliped	..	1.5	"
Chela	..	3.2	"

EXPLANATION OF PLATE II

- Ilyoplax punctata* sp. n. Fig. 1, adult male.
Fig. 1a, male chela.
- Ilyoplax obliqua* sp. n. Fig. 2, adult male.
Fig. 2a, male chela.

EXPLANATION OF PLATE III

Male and female abdomina of *Ilyoplax* spp. *a*, *I. delsmanni* de Man, ♂; *b*, ♀. *c*, *I. orientalis* (de Man), ♂; *d*, ♀. *e*, *I. gangetica* (Kemp), ♂; *f*, ♀. *g*, *I. lingulata* (Rathbun), ♂; *h*, ♀. *i*, *I. punctata* sp. n., ♂; *j*, ♀. *k*, *I. obliqua* sp. n., ♂; *l*, ♀.