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## STUDIES IN AUSTRALIAN CARCINOLOGY.

No. 2\*

By

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(Plates ix-x and Figures 1-4.)

### A REVISION OF THE FAMILY MICTYRIDAE.

In the present paper an effort has been made to revise the family Mictyridae, and to assemble under one heading the literature concerning the species of the monotypic genus *Mictyris*. Large series of specimens in the Australian Museum collection afford an opportunity to elaborate upon the subject, and to submit previously unconsidered data concerning the genotype *Mictyris longicarpus* Latreille. Stress has been laid on the unique distribution of this species, and Stimpson's *M. brevidactylus* has been regarded as a distinct variety of it. A new species has also been added, which occurs within the eastern Australian range of *M. longicarpus*, living in association with it on the same tidal flats.

The compilation of the paper has been materially aided by the kindness of Dr. Mary J. Rathbun of the United States National Museum, Dr. W. T. Calman of the British Museum (Natural History), and the authorities of the South Australian Museum; the two former for their ready assistance and advice and the latter for allowing me to examine their collection of *Mictyris* spp. Thanks is also extended to Mr. T. Iredale of the Australian Museum for valuable data concerning the activities of early scientific expeditions to Australia, and for some references to literature otherwise unavailable to me.

Apart from a few references to old works of the dictionary or encyclopedia type which have come under my notice, and contain only repetitions of the more important publications, there appears to be only three works which are not available to me for consultation. These are:—Aurivillius, Zur. Biol. Amphib. Dekap., p. 38, pl. iii, figs. 10-11 (Mitg. K. Ges. Wiss. Upsala, 1893); Nauck, Zeits. Wiss. Zool., xxxiv, 1880, p. 22, pl. i, figs. 5-7 (gastric teeth); and the 3rd edit. of Cuvier, which is referred to elsewhere in the text. A further reference to "*Mélanges Carcinologiques*, p. 118" (*vide* Stimpson, 1858 and A.M.E., 1873) is thought to refer to an unpublished MS.

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\*For No. 1, see Rec. Austr. Mus., xiii, 3, 1920, p. 105.

*Family MICTYRIDAE.*

In view of the interesting discussion on the aberrant characters of the unique genus *Mictyris*, as given by Kemp,<sup>1</sup> I feel that it rightly deserves the family rank to which it was evidently first elevated by Dana,<sup>2</sup> and which has not yet received universal recognition.

*Genus MICTYRIS Latreille.*

Latreille, *Genera Crust. et Insect.*, tome 1, 1806, p. 40 (*longicarpus*).

*Definition.*—Carapace elongate, globose, oval but truncated posteriorly by the short and almost straight posterior border; the cervical and cardio-branchial grooves well developed, and making the regions distinct and convex; the posterior border fringed with bristles, as is also the apposed very prominent edge of the first abdominal tergum.

The afferent branchial orifice is a singular valvular recess, formed dorsally by a semicircular notch in the margin of the carapace, and ventrally by a curious cup-shaped dilatation of the base of the epipodite of the external maxillipeds.

Front a narrow deflexed lobe as in *Ocypode*. Orbits represented by a small post-ocular spine, and the eyes, which are borne on shortish stalks, are quite unconcealed.

Antennules as in *Ocypode*, the basal joint being large and exposed, while the flagellum is rudimentary and concealed beneath the front. Antennae small but well formed, standing in the usual position.

Epistome short, lozenge-shaped. Buccal cavity enormous, and somewhat oval in outline. External maxillipeds very large and foliaceous, with a hemispherical bulge causing them to face as much laterally as ventrally; their greater part is formed by the ischium, the inner margin of which is hairy, especially at the base; the merus is very much smaller than the ischium, and carries the coarse hairy flagellum at its antero-external angle; the exognath is small, slender, and very inconspicuous.

Chelipeds moderately long and rather slender, stouter and a little shorter than the legs; their freest motion is in a vertical plane. The wrist is a rather elongate trigonal obconical joint.

Legs somewhat compressed; the first pair are the longest and the others decrease slightly in length in posterior succession.

The abdomen in both sexes is of a broad truncate oval shape, the segments from the second to the sixth gradually increasing in length, and the seventh much narrower. In both sexes the abdomen is fringed with hairs.

This definition is mainly after Alcock.<sup>3</sup>

<sup>1</sup>Kemp—*Rec. Indian Mus.*, xvi, v, 1919, p. 307.

<sup>2</sup>Dana—*United States Explor. Exped.*, Crust., i, 1852, p. 389.

<sup>3</sup>Alcock—*Journ. Asiat. Soc. Bengal*, n. ser., lxi, 2, No. 3, 1900, p. 383.

## MICTYRIS LONGICARPUS Latreille.

(Plate ix and Figure 1.)

- Crab, White, J., Journ. Voy. N.S. Wales, 1790, p. 260 and fig. 3 on opposite plate.
- Mictyris longicarpus* Latreille, Genera Crust. et Insect., i, 1806, pp. 40 and 41.
- Mictyris*, sp. nov.<sup>4</sup> Latreille, in Cuvier's Règne Animal, iii, 1817, p. 21.
- Myctiris longicarpus* Latreille, Tableau Encycl. et Méthodique, Crust., Arach. et Insects, pt. xxiv., 1818, pl. 297, fig. 3, explication des planches, p. 3.
- Mictyris longicarpus* Latreille, Nouv. Dict. d'Hist. Nat., xx, 1818, pp. 522 and 523.
- Mictyris longicarpa* Schinz, Das Thierreich [Cuvier], iii, 1823, p. 28.
- Mictyris longicarpus* Desmarest, Dict. Sci. Nat., xxviii, 1823, pp. 235 and 236, and plate xi, fig. 2 of the Crustacés in the planches of the Dict. Sci. Nat., 1816-1830; Consid. Générales des Crust., 1825, p. 115, pl. 11, fig. 2. *Id.*, Guérin, Dict. Classique D'Hist. Nat., x, 1826, p. 549 (part — ? *Amboina record*).
- Mictyris longicarpus* Guérin, Iconographie du Règne Anim. de Cuvier, iii, 1829-1844, Crust. plate iv, fig. 4.
- Ocypode (Myctiris) longicarpus* De Haan, Siebold's Fauna Japonica, Crust. 2, 1835, p. 25.
- ?*Ocypode (Myctiris) deflexifrons* De Haan, tom. cit., 1835, p. 25 (*sine descr.*).
- Mictyris longicarpus* Guérin, Dict. Pitt. D'Hist. Nat., v, 1837, p. 316, pl. 362, fig. 2.
- Myctiris longicarpus* H. Milne Edwards, Hist. Nat. Crust., ii, 1837, p. 37. *Id.*, Lamarek, Hist. Nat. Anim. sans Vert., 2nd edit., v, 1838, pp. 408 and 409.
- Mictyris longicarpus* Lucas, Hist. Nat. Crust., 1840, p. 61.
- Myctiris longicarpus* White, A., List Crust. Brit. Mus., 1847, p. 34 (part — *not specimen from China*). *Id.*, H. Milne Edwards, Ann. Sci. Nat., Zool. (3), xviii, 1852, p. 154.
- Myctiris longicarpus* Dana, United States Expl. Expd., Crust. i, 1852, p. 389.

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<sup>4</sup>A few words of definition are completed by the misleading statement, "L'es-pèce est nouvelle."

- Myctiris longicarpus* Stimpson, Proc. Acad. Nat. Sci. Philad., 1858 (1859), p. 99.
- Myctiris longicarpis* Lucas, in D'Orbigny's Dict. Univ. d'Hist. Nat., viii, 1861, pp. 496-497. *Id.*, Hess, Archiv für Naturg., xxxi, 1865, p. 142.
- Myctiris longicarpus* Heller, Reise der "Novara," Zool., ii, 3, 1868, Crust. p. 40.
- Myctiris longicarpis* Tozzetti, Bull. Soc. Entom. Italiana, Firenze, iv, 1872, p. 393.
- Myctiris longicarpus* A. Milne Edwards, Nouv. Arch. Mus. D'Hist. Nat., ix, 1873, p. 276. *Id.*, Tozzetti, Pub. R. Istit. Stud. Super., Firenze, i, Crostacei "Magenta," 1877, p. 185, pl. xi, figs. 5, 5a-e.
- Mycteris longicarpus* Haswell, Cat. Austr. Crust., 1882, p. 116. *Id.*, Miers, Zool. "Alert," 1884, p. 248 (part — ?specimens from Billiton Is. and Timor Laut, not specimens from Negros, Philippine Ids. and China seas); "Challenger" Zool., xvii, 1886, Brachyura, p. 278.
- ?*Myctiris longicarpus* De Man, Archiv für Naturg., liii, I, 1887, p. 358.
- Mycteris longicarpus* Whitelegge, Journ. Roy. Soc. N.S. Wales, 1889, p. 230.
- ?*Myctiris longicarpus* De Man, Notes Leyden Mus., xii, 1890, p. 83 (without locality).
- ?*Myctiris longicarpus* Henderson, Trans. Linn. Soc. London, Zool., (2), v, 10, 1893, p. 390.
- Myctiris longicarpus* Thallwitz, Kön. Zool. Mus. Dresden, Abhand., 1890-91, No. 3, (1892), p. 52. ?*Id.*, Ortmann, Zool. Jahrb., Syst., vii, 1894, p. 748 (part—not specimens from Hongkong).
- ?*Myctiris brevidactylus*, Zehntner, Revue Suisse Zool. et Ann. Mus. D'Hist. Nat. Geneve, ii, 1894, p. 177, pl. viii, figs. 21 and 21a.
- Myctiris longicarpus* Zehntner, *tom. cit.*, 1894, p. 177, pl. viii, figs. 22 and 22a (no locality). ?*Id.*, Ortmann, Semon's Zool. Forschungsr. Austr., v (Denkschr. med.—naturw. Gesellschaft, viii), 1894, p. 58.
- Mycteris longicarpus* Saville-Kent, Naturalist in Austr., 1897, p. 241, and figs. on p. 242 (including illust. of "*Mycteris platycheles*"). *Id.*, Stead, Zoologist (4), ii, London 1898, p. 207.
- Myctiris longicarpus* Nobili, Ann. Mus. Civico Storia Nat. Genova (2a), xx (xl), 1899, p. 272.
- ?*Mictyris longicarpus* Alcock, Journ. Asiat. Soc. Bengal (n.s.), lxxix, 2, No. 3, 1900, p. 384. ?*Id.*, De Man, Abh. Senck. Naturf. Ges., xxv, 3, 1902, p. 499.

*Mictyris longicarpus* Grant and McCull., Proc. Linn. Soc. N.S. Wales, xxxi, 1, 1906, p. 23.

*Mictyris longicarpus* Stimpson, Smith. Misc. Coll., xlix, No. 1717, 1907, p. 102 (a posthumous paper published at the instigation of Dr. Mary J. Rathbun).

*Mictyris longicarpus* Rathbun, Proc. Zool. Soc. London, 1914, 3, p. 661.  
? *Id.*, Tesch, "Siboga" Expd., Monogr. xxxix c, Decapoda Brachyura I, 1918, p. 42.

*Mictyris longicarpus* Parisi, Atti. Soc. Ital. di. Sci. Nat. Mus. Civico, Milano, lvii, 1918, p. 100 (part—specimens from "Australia" only).

*Description.*—Body sub-globular, its width appreciably less than its length between the front and the hinder margin of the carapace, and not quite reaching as far forwards as the bases of the antero-lateral spines; breadth 1.2 in the length. Branchial regions moderately swollen, not overlapping the lower edges of the carapace at the bases of the ambulatory limbs. Posterior border truncated, and conspicuously produced beyond the curve of the abdomen, its width less than the interspace between the antero-lateral spines, and the interspace between the extremities of the eyes; the lateral margins rounded.

Carapace smooth to the touch. Branchial regions with minute, closely set microscopic granules, which are a little more abundant here than on the median areas. A pair of rounded tubercles between the anterior portions of the branchial regions. Regional grooves well defined, deeply furrowed in parts in the example described, but variable in other specimens. Subhepatic regions visible from above. Antero-lateral spines prominent, recurved, and directed obliquely upward and outward, each with an ill-defined microscopically granular ridge<sup>5</sup> extending backwards between them and the branchial regions, and another short microscopically granular ridge extending from the outside base of each onto the subhepatic regions.

Eyes large and globose, the space between their tips greater than the width of the produced hinder margin of the carapace, and equal to the space between the mid-branchial regions. Front vertical and channelled, its depth between the eyes equal to its width; the median lobe is obtusely pointed, the obtuse lateral angles are a little produced (see figure 1), and the sides sinuate.

Outer maxillipeds large, their greatest length about one third longer than the interspace between the antero-lateral spines, and almost as long as the upper palm and movable finger of the hand. The length of the merus is slightly less than half that of the naked surface of the ischium.

The first segment of the abdomen is narrower posteriorly than at its articulation with the posterior border of the carapace. The successive

<sup>5</sup>The figure of the species on Plate ix shows this as a hard line, due to an error in draftsmanship.

segments increase in breadth to the fifth ; the sixth is narrower, but more than twice as wide as the seventh. This last is rounded, and slightly longer than the sixth.

Ischium of each cheliped with a large spine directed forwards. Lower outer margin of each merus with one stout spine on its distal half, and two or more smaller ones behind. Outer surface of merus sparsely granular above and below the median area, which is smooth except for some microscopic hair pits ; the upper half is faintly furrowed transversely.

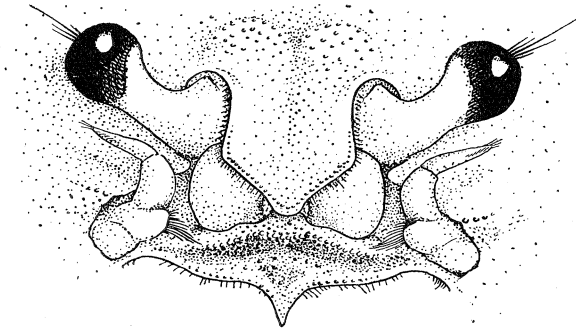


Fig. 1. *Mictyris longicarpus* Latr. view of front and rostrum of an adult male. Example from Trial Bay, New South Wales.

Wrist and outer surface of the palm smooth to the touch, the former even clothed with minute microscopic granules, the latter sparsely so. Both with shallow transverse furrows as in the merus. The upper margin of the wrist clearly serrated. The depth of the palm is equal to the length of its lower margin, and is about three-quarters the length of the immovable finger ; the upper margin is very finely serrated. A shallow groove extends along the upper surface of the palm, defined above by an obtuse scarcely granular ridge ; an oblique scarcely granular and narrow ridge extends backwards and downwards across the palm from the base of the movable finger, and a similar ridge extends downwards and forwards to form a keel on the side of the immovable finger. A well-defined scarcely granular ridge is present near the outer edge of the lower surface of the palm, and continues forwards to form the lower edge of the immovable finger ; another less defined but similar ridge on the inner edge of the palm extends forwards to form the inner edge of the immovable finger, and defines the edge of a groove which runs along the mid-ventral surface of the finger. Movable finger not quite as long as the wrist, immovable one conspicuously shorter. The movable finger has a groove along its dorsal surface, which is defined by two low ridges running almost the length of the finger ; the outer one is finely serrated, the inner scarcely so. Another ridge runs from the base of the movable finger and forms a keel on its outer surface. Both fingers meet at a little distance from their extremities. The movable finger curves inwards to a greater extent than

the immovable one, which is turned slightly outwards towards its tip; the latter finger is widened towards its extremity in the specimen here described and figured, but this minor character is variable in other examples from the same locality. The cutting edge of the movable finger is armed with a strong smooth tooth near its base, and several serrations are present on the cutting edge of the immovable finger near its base.

Ambulatory limbs long and slender. The merus of the last pair is sparsely covered with microscopic granules. These are also present on the meri of the remaining three pairs, but are conspicuously enlarged towards the dorso-posterior edges. Each merus also possesses a finely serrated ridge on its antero-dorsal and ventral edges, and a similar ridge is present on the postero-ventral edge; these are more pronounced on the three anterior pairs of limbs. Carpus and propodus almost smooth, except for some shallow transverse furrows which are more evident on the merus. Dactyls smooth and triangular in section, the fourth pair more slender than the others, and slightly curved outwards towards the tip. Merus of the third pair of limbs slightly longer than the first to sixth segments of the abdomen.

*Colour.*—When alive, the conspicuous dorsal colour of the body of *M. longicarpus* is sky-blue. Abdomen and outer maxillipeds of the same hue, but lighter, and the sternum white. Branchial regions creamy white. Limbs white underneath, with some fine streaky light brown lines across the upper sides of the meral and carpal joints; on the chelipeds these lines extend onto the palms. Junction of ischial and meral, and meral and carpal joints of ambulatory limbs strongly marked with patches of dark brown, sometimes purplish brown; these patches are less conspicuous on the females. Similar patches of colour occur on the chelipeds at the junction of the meral and carpal joints, but are not so conspicuous here as on the other limbs.

One unique individual observed was white along the middle of the carapace, and the branchial regions were coloured yellow. Another was coloured yellow with streaks of sky-blue along the middle of the carapace, and the branchial regions were a bright orange hue. The foregoing, however, are only freakish colourings which are usually rare in their occurrence.

Described and figured from an adult male example collected in Port Jackson, New South Wales, and measuring 24.5 mm. between the front and the hinder margin of the carapace, and 20.5 mm. across the branchial regions. These dimensions represent the average size of the adult males occurring on the coast of New South Wales, but as the tropics are approached they appear to diminish somewhat in bulk. This is particularly noticeable in a series of 23 adult males from Port Darwin, and is a condition prevalent in some Australian tidal flat Ocypodids, evidently due to an unfavourable environment.

*Occurrence and habits.*—*M. longicarpus* is a gregarious species, and congregates in vast armies on the tidal sand flats of estuarine waters.



Many of the flats in Botany Bay, New South Wales, are composed of a mixture of sand and mud (silt) particularly suitable to the crabs, and observations in this locality have shown them to be particularly plentiful during the warmer months between November and March. When the tide is out they are seen to be moving slowly about in massed groups of thousands of individuals. If followed at a little distance they will become alarmed and break up their compact formations in order to effect individual escape from impending danger. In this wild scramble the crabs walk and run over each other, two, three, and sometimes four deep. The rush continues until a softer part of the flat is reached, where they are enabled to commence "cork-screwing" movements and quickly disappear below the surface.

The peculiar burrowing actions are very interesting to watch, and, along with those of the other species of the genus, are probably unique among the Decapoda. Beginning with the chela and ambulatory legs of either the left or right side, the crab digs deeply into the yielding surface of the sand; these limbs then begin a forward scooping motion, assisted meantime by the limbs of the opposite side, which are used as levers against the sand, moving backwards as progression increases. The side of the body on which the crab had begun to burrow soon becomes partly sunken, and the real work of excavation then commences. The bulk of the task is performed by the anterior ambulatory limb and cheliped of the lower side. The outer palm of the latter appendage is pushed forwards against the sand, and the material dislodged in this manner is passed under and across the front of the body with the aid of the first ambulatory limb. Having now reached the opposite side of the body, the sand is shovelled backwards and upwards by the inner palm of the other cheliped. The three remaining limbs on the lower side continue a forward digging motion with the limbs in front, while the four ambulatory limbs on the upper side take backward steps, digging their dactyls into the sand, and, acting as levers, contribute their share to the work of excavation. When the crab has burrowed as deep as the width of its body the upper posterior limb becomes doubled up over the carapace to such an extent that only the tip of its dactyl is able to touch the sand as its owner performs its spiral burrowing "walk." Soon this limb becomes useless for further action, as it is forced into such a dorsal position that it can no longer lever against the sand, and remains so during the rest of the burrowing.

When burrowing, a crab can disappear from sight in comparatively hard sand in about ten seconds, and only takes half this time in softer places. It evidently continues its rotary movement until a depth of six to nine inches is reached; the excavation of specimens has proved that the distance they burrow from the surface varies irrespective of the size of individuals. In some instances crabs were found to have moved several inches to the side of their recent perpendicular line of retreat, but this was only in places where the soft watery sand was very near the surface. The only indication left to show where a crab has lately burrowed is a circular sunken convexity on the surface, which persists before smoothing over for varying lengths of time, according to the consistency of the sand.

As the incoming tide covers the flats the crabs disappear into the sand until the water recedes again. They work their way upwards as the tide ebbs and evidently loiter to feed below the crust of the sand. Prior to their reappearance on the exposed flat numerous conspicuous hummocks of disturbed sand can be observed, which indicate the subterranean operations of one or more individuals just before breaking through the surface. These hummocks may be simple in structure or composed of one or more short radiating tunnels roofed in by loosely packed sand; they often occur so thickly on a flat that it is difficult to distinguish one from the other. Then, as though in answer to some unexplainable instinct, great numbers will appear above the surface of the previously barren sand. They immediately congregate and begin feeding by scraping the surface of the flats and passing the material thus gathered to their jaws, where it is carefully sieved for the contained food particles.

Saville-Kent (*loc. cit.* 1897) states that the external maxillipeds are largely responsible for the spiral motion communicated to the body of the burrowing crab, and, as a consequence, lays stress on the importance of their structure. He states that their inferior edges are driven foremost into the sand, but I did not observe any movement of the maxillipeds of burrowing crabs and it is highly improbable that such delicate structures could assist their owner in so hard a task. Further, it would be necessary for the crab to separate these external jaws widely before they were free of the end of the abdomen. If brought into play against the sand while in this position they would be hopelessly clogged, and tend to retard rather than assist burrowing.

A noticeable fact about *M. longicarpus* is the scarceness of females in the numerous series examined. This suggests that they do not congregate on the surface of the flats to the same extent as the males, which is a question I have unfortunately neglected to verify in the field.

The foregoing notes disagree in one particular with those published by Cowles<sup>6</sup> for "*M. longicarpus*" (= var. *brevidactylus*) from the Philippines. This author states that the hummocks are formed by the crabs when feeding on the surface, while in the Botany Bay examples observed the hummocks or mounds were made prior to the crabs congregating on the recently exposed flats. On the other hand, an opportunity of verifying another of Cowles' statements was afforded by the careful excavation of several crabs from sand immediately after being exposed by the outgoing tide. These examples were found to be in cavities larger than their bodies and the imprisoned air in them escaped in bubbles through the very moist sand.

*Sexual dimorphism.*—The adult females in all the series before me are only about two-thirds the size of their consorts. They agree with the males in all essential characters, but are not so sturdy, the chelipeds are more evenly covered with granules, and the fingers are slender; the movable one always without a tooth on its cutting edge.

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<sup>6</sup>Cowles—Philippine Journ. Sci., x, section D, 1, 1915, p. 14.

*Variation.*—Along the eastern Australian coastline the adults of the species are consistent in all major structural details. A very slight variation is noticeable in the character of the front, some specimens having the lateral lobes more obtuse and the median lobe more or less pointed. In young examples, however, slight differences occur which are consistent irrespective of sex. These have a more evenly convex carapace than the adults, the branchial regions being ill-developed, and the regional grooves ill-defined.

In specimens from the northern coastline of Australia some small variable characters are exhibited in series of specimens from different localities. Six of a total of eight adult male specimens from Groote Eylandt in the Gulf of Carpentaria possess two well developed spines, one on each of the two lower margins of the merus of the cheliped; these are situated opposite one another on the distal half, and the one on the inner margin may be bicuspid or followed by another smaller spine. With the exception of the secondary spine on the inner margin of each merus, the same character is also apparent in the majority of eleven small male specimens from the general locality "Northern Territory," but in six males of a batch of larger sized specimens from Palmerston, Northern Territory, there is no spine developed on the inner margin of the merus. The above character is also absent in thirty one adult male examples from Cygnet Bay on the north western coast, and in two other batches of four and five specimens from the general locality "North West Australia." It is in the material from the north west coast that one finds the greatest divergence from the typical form. The specimens from there approach *brevidactylus* in some features, and may be said to represent an intermediate form. The differences, however, are considered inadequate for the creation of a new varietal name. The major points of variation in the adult males of these series are:—Median area of carapace smooth, with irregularly disposed areas of granules visible to the naked eye on dried examples; in places these are arranged in groups composed of three or four granules. The closely set granules on the branchial regions tend to form rugae on the posterior halves. Antero-lateral spines highly granular around their bases and on their anterior faces, with a strong granular ridge connecting their bases with the branchial regions. Lateral angles of front consistent in character, being very obtuse and not produced. Eyes much smaller than in the typical form, the outer margin of each merus of the chelipeds often with only one stout spine on its distal half, rarely more. Sometimes this is armed with one or two small subsidiary teeth which give the structure a crude tricuspid appearance. Outer surface of merus of chelipeds strongly granular above and below the median area; faintly furrowed as in the typical form. Wrist strongly granular; outer surface of palm sparsely covered with strong granules tending to form a reticulated pattern; all the ridges are well defined and strongly granular. Both ridges on the dorsal surface of the movable finger serrated. Teeth on the cutting edge of the movable finger occasionally with some posterior indications of serration. Both fingers more tapering than in the typical form. Dactyls of fourth pair of ambulatory limbs markedly curved outwards towards their tips.

*History.*—The vague locality “Oceano Indiæ orientalis” was given to *M. longicarpus* by Latreille when he described the species in 1806 from a specimen or specimens in the Paris Museum. Most of the essential characters were embodied in this original diagnosis, and a somewhat crude figure of the species was prepared in 1818 under Latreille’s direction, which, nevertheless, clearly shows these features. The posterior border of the carapace is depicted as being almost straight, but an ill-defined prolongation can be distinguished when the engraving is closely examined.

In the same year that the above figure appeared, Latreille again wrote on *M. longicarpus*, and supplied some new and valuable data as to the origin of the species, viz., “recueillie dans les Indes Orientales, par Péron et M. Lesueur.”

Later, Desmarest was responsible for the appearance in 1823 of a good figure of *M. longicarpus*, in which all the characters were well depicted, including the prolonged posterior border of the carapace. This same illustration appeared again in 1825 in the separate bearing Desmarest’s name.

In 1826 Guérin gave the following information concerning *M. longicarpus*.—“a été rapporté des Indes-Orientales par Péron et Lesueur. Lesson et Garnot l’ont recueilli sur les côtes de la Nouvelle-Hollande et à Amboine.” Following on this there appeared a note on *Mictyris* by Latreille in 1829,<sup>7</sup> which he concludes by giving the amended locality “l’Océan australasien.” Guérin’s *Inconographie* was published about this time, and a fine new figure of *M. longicarpus* appeared, which truthfully presents the striking posterior extension of the carapace. This was supplemented by a similarly characteristic figure supplied by the same author in 1837.

It is apparent from literature that another good figure of *M. longicarpus* appeared about the same time as the last named in the crustacea section of the “Disciples edition” of Cuvier,<sup>8</sup> but unfortunately this is not available to me for comment.

In the same year as Guérin’s last figure of *M. longicarpus* appeared (1837), H. Milne Edwards altered the general habitat of the species to “Australasie,” and still later (1852) amended it to “Australie,” when he described his species *M. platycheles*.

*Identity.*—It is obvious that the figure of *M. longicarpus* provided by Desmarest must have been prepared from Latreille’s original specimen or series of specimens, and at that time (1823) the only one available in France. This was the second illustration of the species to appear, and served to rectify any omissions in Latreille’s crude original figure. Desmarest’s illustration clearly shows the characters of the common eastern Australian “Soldier Crab,” and there can be little doubt as to the identity of Latreille’s *M. longicarpus*.

<sup>7</sup>Latreille—Cuvier’s *Règne Animal*, 2nd edit., iv, 1829, p. 47.

<sup>8</sup>H. Milne Edwards—Cuvier’s *Règne Animal*, 3rd [“Disciples”] edit., 1836-1849, Crustacea, pl. xviii, fig. 2.

A close study of the literature provides sufficient evidence for a conclusion that Latreille's original material of *M. longicarpus* came from an Australian locality. The possibilities of the important disclosure that Péron and Lesueur collected it have not previously been fully considered. Among other groups are a considerable number of typical Australian forms credited to the Indian Seas and East Indies by these voyagers, e.g., *Megatebennus javanicensis* Lamarck,<sup>9</sup> a common Tasmanian mollusc which is also recorded from New South Wales.

The localities visited by Péron and Lesueur<sup>10</sup> in the seas of Australasia included Timor, Shark Bay and King George's Sound in Western Australia, Kangaroo Island off South Australia, King Island in Bass Strait, Adventure Bay in Tasmania, and Port Jackson in New South Wales. As far as I am aware *M. longicarpus* has not been recorded from Timor, which suggests that it does not occur there, or is not thriving in the accessible parts. Further, the species has not been recognised from the southern part of the Australian continent apart from a unique record of Miers' (*loc. cit.* 1884), giving the general locality "Tasmania," which I consider to be of very doubtful value. There is a possibility that the species was collected at Shark Bay, where, judging from its distribution, it must be very common. Apparently, large collections of marine forms were made at this last locality by Péron and Lesueur, and it is unlikely that the species could be overlooked if present. On the other hand, Port Jackson is a veritable stronghold of *M. longicarpus*, and, although Péron's narrative does not include any glowing accounts of its fauna, there is every reason to believe that such an obtrusive species as this would not be overlooked. Moreover, Desmarest's figure of the species compares better with the Port Jackson examples before me than with a number of specimens from Cygnet Bay, a Western Australian locality somewhat farther north than Shark Bay. As already pointed out in the notes on variation the Cygnet Bay specimens vary somewhat from the Port Jackson examples in that their carapaces are visibly granular, and their eyes minute, whereas the Port Jackson specimens have comparatively smooth carapaces and large eyes as depicted in Desmarest's figure.

The foregoing arguments in support of an Australian origin for Latreille's type material of *M. longicarpus* are strengthened by that author's action in later (1829) altering the habitat of his species to "l'Océan australasien." The advent of Lesson and Garnot's material as recorded by Guérin three years earlier may have been responsible for Latreille's action. No other reference to the fact that Lesson and Garnot collected *M. longicarpus* appears to have been published, and, as Port Jackson in New South Wales is the only locality they collected at in "Nouvelle-Hollande"—during the voyage of the "Coquille"—it is certain that the record here referred to applies to the typical eastern Australian *M. longicarpus*. The same can also be said of Guérin's two subsequent figures of the species, which in all probability were prepared from

<sup>9</sup>Hedley—Journ. Roy. Soc. N.S. Wales, li, 1917 (checklist Marine Fauna N.S.W.), p. m.40. Proc. Linn. Soc. N.S. Wales, xxix, 1904, p. 204; xxxviii, 1913, pp. 270-271.

<sup>10</sup>Péron—Voy. de decouv. aux Terres Australes, 2 Tom. and Atlas. 4to and fol. Paris, 1807-16.

the more recent and perhaps better specimens brought back from Port Jackson by Lesson and Garnot.

The action of H. Milne Edwards in eventually amending the general habitat of *M. longicarpus* to "Australie" was evidently a carefully considered procedure, as we can only assume that it was done in an attempt to more truthfully localise one of the many species of vague origin in the jumbled collections secured during the ill-fated expedition of Péron and Lesueur.

*Synonymy and distribution.*—The crab figured in White's Journal (*loc cit.* 1790) is undoubtedly referable to *M. longicarpus*. No name was given to the species by this author, and the only information offered at the time was—"A small species of Crab or Cancer, of a pale colour, and which should be ranked amongst the Cancri Brachyuri in the Linnæan division of the genus." Furthermore, no reference was made to any specific locality, but there is no doubt that all the forms described by White were secured at Port Jackson, New South Wales, or in close proximity thereto.

It has already been noted that some slight but certain variation exists in specimens of *M. longicarpus* from North Western Australia. This fact, coupled with the evidence available from literature, enables some deductions to be made which will probably help future workers to understand better the unique distribution of the species, and its ultimate development into what is considered here to be a distinct varietal form (*brevidactylus*).

Unfortunately, most of the references to *M. longicarpus* are based on specimens from a vast East Indian area, and it is these records that have formed the basis of former discussion. It is evident that the species is subject to no little variation in the above mid-region of its range, and after an exhaustive study of large series of specimens it may be proved that definite racial forms exist there in circumscribed areas.

De Haan was the first indirectly to bring under notice the fact that *M. longicarpus* is variable, when he published the *nomen nudum* "*deflexifrons*" in 1835.<sup>11</sup> In 1894 Zehntner identified some specimens from Amboina as Stimpson's *brevidactylus*, and gave comparative characters and figures separating them from typical *M. longicarpus* as it is here understood. Nevertheless, there is insufficient evidence to satisfy me that his record correctly referred to the *brevidactylus* finally described and figured by Stimpson in his posthumous paper of 1907. It is possible that Zehntner, upon finding differences between the two forms he examined, was encouraged by Stimpson's suggestion that *brevidactylus* was synonymous with De Haan's "*deflexifrons*," which led him to the belief that the Amboina material in his possession was correctly referable to Stimpson's

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<sup>11</sup>Published with a reference to "Illustr. Reinwardt ex Insulis Moluccensibus," which consists of a collection of unpublished paintings in the Leyden Museum, Holland.

so called species.<sup>12</sup> Unfortunately he did not record the source of the examples of *M. longicarpus* used for his comparative notes, and thus robbed us of further data concerning the distribution of what is quite obviously the typical form as here understood.

It is worthy of note that De Man (1887) was in possession of material from Amboina similar to that examined by Zehntner. He suggested that the characters of his specimens approached those described by Stimpson for *brevidactylus*, but nevertheless was of the opinion that Stimpson's "species" was identical with *M. longicarpus*. It was admitted, however, that Stimpson cited the latter species—an important fact that may well be emphasised here. When Stimpson described *brevidactylus* he was in possession of specimens of typical *M. longicarpus* (*loc. cit.* 1858 and 1907) which he personally collected in Port Jackson and Botany Bay, New South Wales.

Tesch (1918) states that he has examined De Haan's original specimens of "*deflexifrons*," and identifies them with *M. longicarpus*. He lightly disposes of Zehntner's arguments in support of the distinctness of Stimpson's *brevidactylus*, and states that "the 'Siboga' specimens at least could, by a mixture of characters, be referred to either of the two species" (*M. longicarpus* and var. *brevidactylus*). From the foregoing it is presumed that Tesch had not the opportunity of examining specimens of *M. longicarpus* from the eastern Australian coastline. If so, he may have placed a little more value on Zehntner's argument, and given some valuable information concerning the variation of *M. longicarpus*.

In dealing with the references to *M. longicarpus* it has been found necessary through the lack of convincing data to query those relating to Indian and East Indian records, but for the purpose of var. *brevidactylus* all references to records from the Philippine Islands and northwards thereof have been regarded as rightly applicable thereto.

The distribution of *M. longicarpus* together with the var. *brevidactylus*, ranges from the lower New South Wales coast and Perth, Western Australia, in the south, to Loo Choo Islands, China Sea, in the north; and

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<sup>12</sup>On the other hand, if it is later proved that the representatives of *Mictyris* from the nearby Moluccas are synonymous with *brevidactylus* or another racial form possessing sufficient distinguishing characters to separate it from this and typical *M. longicarpus*, the validity of De Haan's "*deflexifrons*" may be reviewed.

In anticipation of this possible contingency, and despite the fact that I here accept De Haan's name as a *nomen nudum*, others may place a different value on the facts.

De Haan in 1835 (*loc. cit.*) recorded *Mictyris* as a subgenus of *Ocypode*, and gave a diagnosis (mainly on mouth parts) of the genus based on specimens before him, which appear to have been his "*deflexifrons*, sp. nov.," as the figures provided in the series depicting the mouth parts of different genera bear this name. The name "*deflexifrons*" also appears at the end of the generic diagnosis, after that of "*Ocypode (Mictyris) longicarpus*, Latr." Although figures were given, no definite specific description was offered by De Haan for "*deflexifrons*," and it is questionable whether the regional drawings of no distinguishing value in association with a locality, and the assumption that the diagnosis was based upon the same specimens, should validate the name.

from New Caledonia and New Guinea in the east, to the Bay of Bengal, India, in the west.

*Localities*<sup>13</sup>—? Tasmania (Miers): ?Victoria (Stead)<sup>14</sup>: Botany Bay, N.S. Wales (Stimpson): Sydney and Port Jackson, N.S. Wales (Guérin and White, A. as New Holland, White, J., Dana, Stimpson, Heller, Tozzetti, Haswell, Miers, Whitelegge, Stead, Nobili): Moreton Bay, Wide Bay, Carnarvon in the Gulf of Carpentaria, Queensland; and Roebuck Bay in North Western Australia (Saville Kent): Port Curtis, Queensland (Grant and McCulloch): Port Molle and Albany Island, Queensland; Nicol Bay, N.W. Austr., and Swan River in W. Austr. (Miers): Port Essington, N. Austr. (White, A. and Miers): Beagle Bay and Wolverine Passage, N.W. Austr. (Nobili): Monte Bello Islands, N.W. Austr. (Rathbun): New Caledonia (A. Milne Edwards, Thallwitz, Haswell).

Records from the following localities are tentatively considered to be referable to typical *M. longicarpus*.—Amboina (Guérin, De Man, Zehntner, Ortman, Tesch): Moluccas (De Haan and De Man): New Guinea, Timor Laut, and Billiton Is. in the Java Sea (Miers): Talaut Is. in the Celebes, and Bawean Is. in the Java Sea (Tesch): Singapore (Ortmann): Andaman and Nicobar Isds. (Alcock): Akyab, Bay of Bengal (Henderson).

There are specimens in the Australian Museum from.—

Lake Illawarra, New South Wales; coll. G. McAndrew, Aug. 1923 (3 adult males): this collection includes a specimen measuring 23 mm. across the branchial regions and 28 mm. from the front to the hinder margin of the carapace, and is the largest examined by me.

Gunnamatta Bay, Port Hacking, N.S. Wales; coll. F. A. McNeill, 1924 (4 adult males).

Port Hacking, N.S. Wales; old collection (1 adult male).

E. side of Botany Bay, N.S. Wales; coll. F. A. McNeill, Dec. 1923 (8 adult males).

N. shore of Botany Bay, N.S. Wales; coll. G. P. Whitley, July 1922 (3 adult males and 1 adult female).

Sailor Bay in Middle Harbour, Port Jackson, N.S. Wales; coll. W. Boardman, 1923 (16 adult and 1 juvenile males), including the figured male example.

Middle Harbour, Port Jackson, N.S. Wales; coll. Dene B. Fry (3 adult males and 1 ovigerous female).

Port Jackson, N.S. Wales; old coll. (2 adult males).

<sup>13</sup>The vague and general habitats associated with the early and subsequent records of *M. longicarpus* are omitted.

<sup>14</sup>Grave doubt is placed on this vague record. I do not believe the species occurs farther south than New South Wales.



Rose Bay, Port Jackson, N.S. Wales ; coll. R. Helms, 4th March, 1900 (4 adult males and 1 ovigerous female) : the female of this series is the largest of the sex examined ; it measures 15.5 mm. across the branchial regions and 19.5 mm. from the front to the hinder margin of the carapace.

Parramatta River, Port Jackson, N.S. Wales ; coll. R. Grant, Feb. 1895 (1 adult male).

Clareville Beach, Pittwater in Broken Bay, N.S. Wales ; coll. G. P. Whitley, Oct. 1923 (2 juvenile females, one with soft shell).

Hawkesbury River, N.S. Wales ; old coll. (2 adult males and one adult female).

Port Hunter, Newcastle, N.S. Wales ; old coll., 15th March, 1907 (2 adult males).

Lagoon tidal flats at South West Rocks, Trial Bay, N.S. Wales ; coll. J. R. Kinghorn, 1919 (12 adult, 6 half grown, and four juvenile males ; 3 adult and 5 juvenile females).

Richmond River near Ballina, N.S. Wales ; coll. A. O'Sullivan, 1924 (2 juvenile males and 2 juvenile females).

Richmond River at Ballina, N.S. Wales ; coll. R. Etheridge, Jnr., 1893 (6 juvenile males and 2 juvenile females).

N. side of Magazine Island, Port Denison, Queensland ; coll. E. H. Rainford, 1923 (22 adult and 1 juvenile males ; 1 ovigerous, 3 half grown, and 2 juvenile females).

Townsville, Queensland ; coll. Dr. Eland Shaw, Aug. 1925 (3 adult, 2 half grown, and 2 juvenile males).

Endeavour River estuary at Cooktown, Queensland ; coll. A. R. McCulloch, 1913 (3 adult and 1 half grown males).

Port Darwin, N. Australia ; coll. Messrs. Christie and Godfrey, 1903 (23 adult males).

N.W. coast of Australia ; coll. Capt. Walcott, old coll. (8 adult males and 1 adult female).

Specimens from the following localities were kindly lent to me for examination by the authorities of the South Australian Museum :—

Cairns, Queensland ; coll. E. Allan (2 adult males).

E. side of Groote Eylandt, Gulf of Carpentaria, N. Australia ; coll. N. B. Tindale (8 adult males).

Northern Territory, Australia ; old coll. (11 males of small size, but apparently adult).

Palmerston, Northern Territory, Austr. ; old collection (4 adult and 2 half grown males ; 1 adult and 1 half grown females).

Cygnets Bay, N.W. Australia ; old collection (31 adult males).

MICTYRIS LONGICARPUS, var. BREVIDACTYLUS *Stimpson*.

(Pl. ix, figs. 3-4 and Figure 2.)

*Myctiris longicarpus* White, List Crust. Brit. Mus., 1847, p. 34 (part—specimen from China only.)

*Myctiris deflexifrons* White (*tom. cit.*), 1847, p. 34.

*Myctiris deflexifrons* Adams and White, Zool. "Samarang," Crust., i, 1848, p. ii of the introduction.

*Myctiris brevidactylus* Stimpson, Proc. Acad., Nat. Sci. Philad., 1858 (1859), p. 99 (? suggested synonymy).

*Myctiris longicarpus* Miers, Zool. "Alert," 1884, p. 248 (part—specimens from China seas and Negros, Philippine Islands only.)

*Myctiris longicarpus* Ortmann, Zool. Jahrb., Syst., vii, 1894, p. 748 (part—specimens from Hongkong only).

*Myctiris brevidactylus* Stimpson, Smithsonian Misc. Coll., xlix, No. 1717, 1907, p. 103, pl. xiii, fig. 4 (a posthumous paper published at the instigation of Dr. Mary J. Rathbun).

*Myctiris longicarpus* Cowles, Philippine Journ. Sci., x, sect. D, No. 1, 1915, p. 14, pls. ii-iii (habits). *Id.*, Parisi, Atti. Soc. Ital. di Sci. Nat. Mus. Civico, Milano, lvii, 1918, p. 100 (part—specimens from Formosa only).

*Mictyris longicarpus* Balss, Archiv für Naturg., lxxxviii, Abt. A, 11, 1922, p. 144 (?specimens from Annam).

The recent acquisition of several specimens of var. *brevidactylus* enables me to compare them with local examples of typical *M. longicarpus*, and to note the striking differences between the two forms. The status of the variety is fully discussed in the text relating to the synonymy and distribution of the typical form (*M. longicarpus*).

*Description*.—Body sub-globular, its width across the branchial regions hardly less than its length between the front and the hinder margin of the carapace ; breadth 1.04 in the length. Branchial regions swollen and overlapping portions of the lower edges of the carapace at the bases of the ambulatory limbs. Posterior truncated border nearly straight, not produced beyond the abdomen as in the typical form, its

width less than the interspace between the antero-lateral spines, but equal to the interspace between the extremities of the eyes; the lateral angles sub-acute. Branchial regions with short, closely set and granular ridges or rugae, and single granules visible to the naked eye; these are separated by finely granular interspaces. Median area of the carapace appearing smooth, but evenly covered with microscopic granules and numbers of scattered groups of larger granules regularly disposed over the surface; a pair of rounded tubercles is present between the anterior portions of the branchial regions as in the typical form. Regional grooves well defined. Sub-hepatic regions visible from above. Antero-lateral spines small, recurved, and directed obliquely upward and outward, with their bases granular; each with a granular ridge extending backwards between them

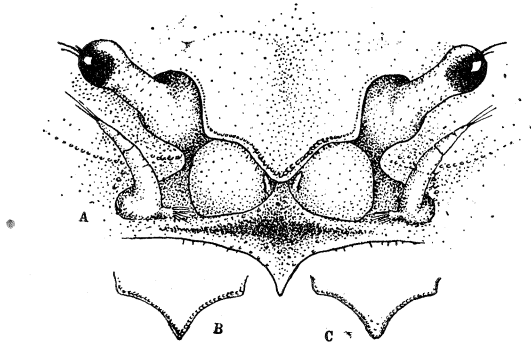


Fig. 2. *Mictyris longicarpus*, var. *brevidactylus* Stimp.

- A. View of front and rostrum of an adult male example from Subig Bay, Luzon, Philippine Islands.  
 B. Rostrum of a female from the same locality.  
 C. Rostrum of another male from the same locality.

and the branchial regions, and another short granular ridge extending from the outside base of each onto the sub-hepatic regions.

Eyes normal, the space between their tips equal to the width of the hinder margin of the carapace. Front vertical and only faintly channelled, its depth between the eyes about two-thirds its width; the median lobes are obtusely pointed and the sides are almost vertical.

Outer maxillipeds as in the typical form, their greatest length about one-third longer than the interspace between the antero-lateral spines and almost as long as the upper palm and the movable finger of the hand; the length of the merus, however, is only half that of the naked surface of the ischium.

Abdomen as in the typical form, except that the last segment is as long as the sixth.

Ischium of each cheliped with a large forwardly directed spine as in the typical form. Lower outer margin of each merus with one stout spine on its distal half and two or three smaller ones; its outer surface almost covered with small granules. Wrist and outer surface of palm evenly covered with granules. The upper margin of the wrist clearly serrated. The depth of the palm is equal to the length of its lower margin, and is about three quarters the length of the immovable finger; the upper margin is serrated. A shallow groove extends along the upper surface of the palm defined above by an obtuse granular ridge; an oblique, imperfect, and scarcely granular ridge extends backwards and downwards across the palm from the base of the movable finger, and a low granular ridge extends downwards and forwards to form a keel on the side of the immovable finger; a well defined granular ridge is present near the outer edge of the lower surface of the palm, and continues forwards to form the lower edge of the immovable finger; another less defined ridge on the inner edge of the palm extends forwards to form the inner edge of the immovable finger and defines the edge of a groove which runs along the mid-ventral surface of the finger. Movable finger as long as the wrist, immovable one shorter. The movable finger has a groove along its dorsal surface which is defined by two finely serrated ridges running almost the length of the finger; another ridge runs from the base of the finger and forms a keel on its outer surface. Both fingers curve evenly inward, and meet only at their pointed tips. The cutting edge of the movable finger is armed with a strong and broad serrated tooth near its base, and several serrations are present on the cutting edge of the immovable finger near its base.

Ambulatory limbs long and slender as in the typical form. The merus of the third pair is as long as the first to fifth segments of the abdomen. The dactyls of the fourth pair are curved outwards, and triangular in section.

*Colour*.—Specimens preserved in alcohol are dark slaty-blue on the mid-dorsal regions; lighter on the branchial regions, with a suggestion of reddish purple in their hue. Limbs and under surface brownish yellow; viewed through a binocular microscope the limbs are seen to be covered with dark spots which are more conspicuous towards their tips.

Described and figured from an adult male example measuring 11.5 mm. between the front and the hinder margin of the carapace and 11 mm. across the branchial regions. Five other specimens (two males and three females) also before me, measure from 8.5 mm. in length and 7.6 mm. in width, to 12.2 mm. in length and 11.4 mm. in width. The small size of the specimens is due, no doubt, to their existence in an unfavourable environment, a feature which is noticeable in the case of *M. longicarpus*. It is evident that var. *brevidactylus* attains a greater size than the specimens here dealt with, as indicated by the Formosa record referred to below.

Stimpson's types of *brevidactylus* are not extant; they were lost when the Chicago Academy of Sciences was destroyed by fire in 1871 (*vide* Rathbun in Stimpson, *loc. cit.* 1907, p. 4).

*Sexual dimorphism.*—The females agree with the males in all essential features, but the ambulatory limbs are not quite as stout, and the chelipeds are weaker. There is no tooth developed on the movable finger of the hand, nor any sign of serration on the cutting edge of the immovable finger. The forwardly directed spine on the ischium of each cheliped is almost obsolete in the females.

*Variation.*—The branchial regions of the younger specimens are not so thickly covered with granules as in the more adult examples. The rostrum is also subject to slight variation, and may have the median lobe acute or sub-acute irrespective of age (see text figure 2).

*Localities.*—The following are accepted as referable to var. *brevidactylus*, with perhaps the exception of Balss' Annam records.

China (White, A.); China seas (Miers); Philippine Islands (White, A. and Cowles); Negros, Philippine Islands (Miers); Meia-co-shimah or Majico-sima, China Sea (Adams and White, A.); Hongkong (Stimpson and Ortmann); Loo Choo Islands, China Sea (Stimpson, Balss); Formosa (Parisi, Balss) and Swatow, China (Balss).

In the Australian Museum collection there are six specimens from Súbig Bay, Luzon, northern Philippine Islands (shore), which were kindly identified and presented to the Institution by Dr. Mary J. Rathbun, and form part of a large series collected on January 7th, 1908, by the United States Bureau of Fisheries, "Albatross" Philippine Expedition, 1907-9.

Dr. Rathbun (*in lit.*) informs me that there is also in the collection of the United States National Museum, Washington, a large specimen of the variety from the Island of Formosa, half way between Loo Choo Islands and Hongkong—Stimpson's type localities.

*Distribution.*—Philippine Islands and China Sea.

MICTYRIS LIVINGSTONEI,<sup>15</sup> *sp. nov.*

(Pl. x, figs. 1-2 and Figure 3.)

*Description.*—Body sub-globular, its width across the branchial regions equal to its length between the front and hinder margin of the carapace. Branchial regions only moderately swollen, and not overlapping the lower edges of the carapace at the bases of the ambulatory limbs. Posterior truncated border nearly straight, not produced beyond the abdomen posteriorly, its width equal to the space between the anterolateral spines; the lateral margins acute. Branchial regions with well spaced short granular ridges or rugae visible to the naked eye, and separated by microscopically granular interspaces; traces of these rugae are also present on the postero-lateral lobes of the cardiac regions. Median area of carapace evenly covered with minute microscopic granules, otherwise almost smooth, with only a few granules and scattered pits, together

<sup>15</sup>Named for Mr. A. A. Livingstone, Assistant in Zoology, Australian Museum.

with a pair of rounded tubercles between the anterior portions of the branchial regions. Regional grooves shallow, less conspicuous than in var. *brevidactylus*. Sub-hepatic regions visible from above. Antero-lateral spines small and directed obliquely outward, with a few granules behind them; no granular ridge extending backwards between each of them and the branchial regions, but a short granular ridge connecting the outside base of each to the sub-hepatic regions.

Eyes very small, the space between their tips less than the width of the hinder margin of the carapace. Front vertical and almost flat, its width between the eyes equal to about two-thirds its length. The median lobe is somewhat truncate in the holotype, but is obtusely pointed in several paratypes.

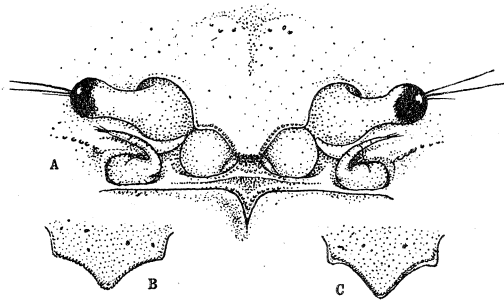


Fig. 3. *Mictyris livingstonei* sp. nov.

- A. View of front and rostrum of the adult male holotype.  
 B. and C. Rostrums of two male paratypes.

Outer maxillipeds smaller than in var. *brevidactylus*, their greatest length but little greater than the distance between the antero-lateral spines. The length of the merus is more than half that of the naked surface of the ischium.

The first segment of the male abdomen much narrower posteriorly than at its articulation with the posterior border of the carapace. The succeeding segments increase in breadth to the fifth, which is twice as wide as the constriction between the first and second; the sixth segment is narrower, but more than twice as wide as the seventh. This last is rounded and is as long as the sixth.

Ischium of each cheliped with a large spine directed forwards. Lower outer margin of the merus with three or four stout spines; its outer surface with scattered granules, almost smooth. Wrist and outer surface of palm with extremely fine, curved, granular lines, forming a scale-like pattern, between which the surface is smooth; there is also a slight indication of these on the outer surface of the merus. The upper margin of the wrist scarcely serrated. The depth of the palm is equal to the

length of its lower margin; a shallow groove extends along its upper surface, defined above by an obtuse ridge; an oblique line of pores extends backwards and downwards across the palm from the base of the movable finger, and a low ridge extends downwards and forwards to form a keel on the side of the immovable finger; a very imperfect ridge is present near the outer edge of the lower surface of the palm, which merges into the edge of the immovable finger; another very strong ridge occurs on the inner edge of the palm, and continues as a ridge along the inner margin of the immovable finger; this defines the inner edge of a groove which runs along the mid-ventral surface of the finger. The movable finger has a rather imperfect groove along a portion of its dorsal surface, defined by an obtuse ridge on each side; another obtuse ridge runs throughout the length of the finger and forms a keel on its outer face. Both fingers are shorter than the wrist and curve evenly inward; they gape widely at the base, and meet only at their pointed tips. The cutting edge of the movable finger is armed with an almost obsolete tooth near its base which is practically indiscernible in half grown males, and there are a few imperfect serrations on the cutting edge of the immovable finger near its base.

Ambulatory limbs shorter, stouter, and less rugose than in var. *brevidactylus*. The merus of the third pair is as long as the first to fourth segments of the abdomen. The dactyls of the fourth pair are curved outwards, and triangular in section.

*Colour*.—Specimens freshly preserved in alcohol are light slaty blue on the carapace and abdomen. Sternum and under surfaces of the limbs cream coloured; the limbs are brownish yellow above with their margins outlined by dark grey; several of the dactyls and the fingers of the hands are uniformly dark. A few examples show no sign of the dark markings on the limbs and the bodies are much lighter in colour, and possess a reddish tinge on the carapace.

Described and figured from an adult male example measuring 11 mm. from the front to the hinder margin of the carapace, and 11 mm. across the branchial regions; this specimen has been selected as the holotype of the species, and is housed in the Australian Museum, Sydney. There are six other specimens (paratypes) in the collection from the same locality as the holotype. The smallest is one of three females measuring 9 mm. in length and 8.5 mm. in width; the largest of the three remaining males is 11 mm. long and 10.5 mm. wide.

Judging from the large series of specimens before me from two widely separated localities, it is evident that this species is smaller than its allies, and reached its full adult dimensions when about the size of the holotype. There are several females smaller than the holotype that are heavily laden with eggs.

*Sexual dimorphism*.—The adult females differ slightly from the males in having the carapace more evenly rounded and smoother; the regions

are not so clearly marked off as those of the males, and the branchial regions are less swollen anteriorly. The female chelipeds are much weaker than those of the male, the fingers are straighter, and there is no sign of a tooth on the cutting edge of the movable finger; the forwardly directed spine on the ischium of each cheliped is almost obsolete in the female. The abdomen of the largest female before me is longer and more convex from side to side than that of the largest male; the seventh segment is more produced. On the other hand, the abdomens of the smaller females, some with eggs attached, are similar to those of the males.

*Variation.*—The structure of the front is somewhat variable in the series of specimens before me; the median lobe may have a semi-truncated extremity as wide as in the holotype, or it may be narrower, and is sometimes sub-acute (see figure 3). In young examples the granulation of the branchial regions is not quite so strongly marked as in the more adult forms.

*Affinities.*—Although this species resembles *M. longicarpus* var. *brevidactylus* in the granulation of the branchial regions and the shape of the dactyls of the last pair of ambulatory limbs, it may be easily distinguished by the absence of a ridge connecting the antero-lateral spines with the branchial regions, the stouter limbs and smaller eyes, the character of the median area of the carapace, and the less swollen branchial regions, which do not overlap the bases of any of the ambulatory limbs.

*Habits and occurrence.*—From notes made by collectors in the field it appears that this species has hiding habits, and does not congregate at low tide on the surface of the flats to the same extent as its allies. The comparative smallness of the eyes seems to denote that they are becoming obsolete and tends to strengthen the above belief. All the specimens were dug out of soft sandy mud, and Mr. J. R. Kinghorn of the Museum Staff states that the examples collected by him were at a little distance from the firmer sandy flats frequented by the more numerous typical *M. longicarpus*.

*Distribution.*—Eastern Australian coast from Cooktown, Queensland, to Trial Bay, northern New South Wales.

*Localities.*—Lagoon tidal flats at South West Rocks, Trial Bay, N.S. Wales; about a quarter of a mile from the ocean beach; collected by J. R. and A. Kinghorn in 1920 and 1921 (holotype and six paratypes).

Mud Flats in the Endeavour River estuary at Cooktown, Queensland; coll. by A. R. McCulloch in 1918 (nine males and six females).

Mangrove tidal flats at Yeppoon, Queensland; coll. by A. Musgrave in October, 1924 (one half grown male).

Port Denison, Queensland. Old collection (two males—one half grown).



MICTYRIS PLATYCHELES *H. Milne Edwards.*

(Plate x, figs. 3-4 and Figure 4).

- Myctiris subverrucatus* White, A., List Crust. Brit. Mus., 1847, p. 34 (*nomen nudum*).
- Myctiris platycheles* H. M. Edwards, Ann. Sci. Nat. (3), xviii, Zool., 1852, p. 154. *Id.*, Stimpson, Proc. Acad. Nat. Sci. Philad., 1858 (1859), p. 99.
- M. subverrucatus* Kinahan, Journ. Roy. Dub. Soc., i, 1858, p. 123 (*vide* Miers, 1884).
- Myctiris platycheles?* Tozzetti, Bull. Soc. Entomol. Italiana, Firenze, iv, 1872, p. 394.
- Myctiris platycheles* Tozzetti, Pub. R. Istit. Stud. Super., Firenze, i, 1877, Crostacei "Magenta," p. 186, pl. xi, figs. 6, 6a-e.
- Mycteris platycheles* Haswell, Austr. Mus. Cat. [v], Austr. Crust., 1882, p. 117. *Id.*, Miers, Zool. "Alert," 1884, p. 248 (and synonymy); "Challenger," Rep., Zool., xvii, 1886, Brachyura, p. 279 (and synonymy). *Id.*, Whitelegge, Journ. Roy. Soc. N.S. Wales, xxiii, 1889, p. 230.
- Myctiris sp.* Thallwitz, Kon. Zool. Mus. Dresden, Abhand, 1890-1891 (1892), No. 3, p. 52.
- Myctiris platycheles* Ortmann, Zool. Jahrb., Syst., vii, 1894, p. 748.
- Mycteris platycheles* Saville-Kent, Naturalist in Australia, 1897, p. 241 (not illustration "*Mycteris platycheles*" on p. 242). *Id.*, Stead, Zoologist (4), ii, 1898, p. 207.
- Myctiris platycheles* Stimpson, Smith. Misc. Coll., xlix, No. 1717, 1907, p. 103, pl. xiii, fig. 5 (and synonymy suggested in text)—a posthumous paper.
- Myctiris prostoma* Stimpson, *tom. cit.*, 1907, p. 104.
- Hymenosoma sp.*, Geoffrey Smith, Naturalist in Tasmania, 1909, p. 111.
- Mictyris platycheles* Tesch, "Siboga" Exped., Monogr., xxxix c, Decapoda Brachyura I, 1918, p. 42.

*Description.*—Body irregularly sub-globular, its width about three-quarters its length between the front and hinder margin of the carapace; breadth 1.29 in the length. Branchial regions greatly swollen, particularly towards their antero-dorsal extremities; postero-laterally they do not overlap the lower edges of the carapace at the bases of the ambulatory limbs. Truncated posterior border produced, but not overlapping the curve of the abdomen from a strictly dorsal view; its width equal to more than three-quarters of the interspace between the antero-lateral margins

of the carapace, and less than the interspace between the extremities of the eyes ; the lateral margins very sinuate.

Carapace almost completely covered with large whitish tubercles, otherwise smooth. These tubercles are thickest on the branchial regions, which are traversed on their sides by several shallow longitudinal furrows. On the cardiac region is a pair of prominent rounded excrescences, one on each side of the median line. Regional grooves well defined, those marking off the branchial regions deeply furrowed. Sub-hepatic regions visible from above. Each antero-lateral margin armed with several simple and bicuspid spinules. Immediately posterior on each side is a conspicuously granular ridge which extends backwards to the anterior portion of the branchial region, and forms a produced lateral edge to the hepatic region.

Eyes moderately large and globose, the space between their tips greater than the width of the produced hinder margin of the carapace, and one-

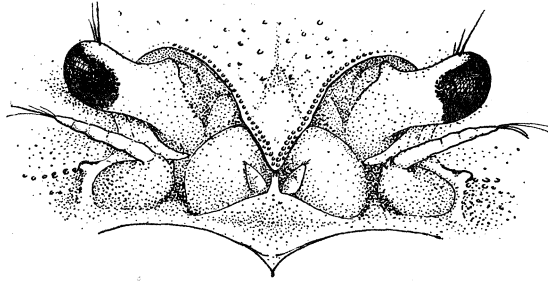


Fig. 4. *Mictyris platycheles* H. M. Edw. View of front and rostrum of an adult male from the Hawkesbury River, New South Wales. (Same specimen as figured on Plate X.)

third again as great as the space between the mid-branchial regions. Front almost vertical and turned slightly inwards at the tip, shallowly channelled on its upper half ; the sides converge to form an elongated and acute median extremity.

Outer maxillipeds large, their inner margins forming a produced edge which projects beyond the vertical of the front ; their greatest length is about one-third wider than the hepatic regions, and about one-quarter longer than the upper palm and movable finger of the hand. The length of the merus is one-third that of the naked surface of the ischium, which is almost covered with large granules similar to those on the carapace.

The first segment of the abdomen is narrower posteriorly than at its articulation with the posterior border of the carapace, the former being about only two-thirds that of the latter. The successive segments increase in breadth to the fourth ; the fifth is about as broad as the fourth, but not as long ; the sixth is narrower and shorter than the fifth, and is about two-

thirds the length of the seventh. This last is rounded, and one-third longer than the sixth.

Sternum covered with large tubercles along each side of the abdomen, and with two strong spines anteriorly, one on each side of the seventh segment of the abdomen.

Ischium of each cheliped with a large spine directed forwards. Lower outer margin of merus faintly furrowed transversely, otherwise almost smooth except for a few granules which occur near the dorsal and ventral edges; the former is clearly serrated. Wrist and outer surface of palm smooth to the touch, but covered with minute microscopic granules which are a little enlarged near the dorsal and ventral edges of the wrist. This last is finely serrated along portion of its dorsal margin and is microscopically furrowed transversely above the median line, which is defined by an obtuse microscopically granular ridge on the distal half of the joint. Microscopic indications of furrows are noticeable on the ventral half of the palm. The depth of the palm is almost equal to the length of its lower margin, and is more than three quarters the length of the immovable finger; the upper margin is smooth. A shallow groove extends along the upper surface of the palm, defined above by an obtuse, scarcely granular ridge; an oblique, finely granular ridge extends backwards and downwards across the palm from the base of the movable finger, and a similar ridge extends downwards and forwards to form a keel on the side of the immovable finger. A well defined granular ridge forms the lower outer margin of the palm and continues forwards to form the lower outer edge of the immovable finger; another less defined but similar ridge on the inner edge of the palm extends forwards to form the inner edge of the immovable finger, and defines the edge of a groove which runs along the mid-ventral surface of the finger. Movable finger distinctly shorter than the wrist; immovable one only two-thirds the length of the wrist. The movable finger has a groove along two thirds of its dorsal surface, which is defined by two low ridges, the outer of which is a little higher than the inner. Two other finely granular ridges run from the base of the movable finger and form two keels on portion of its outer surface. The fingers meet a little before their tips and the immovable one is slightly in advance of the movable one; the latter curves evenly inwards while the former is curved outwards towards its tip. The cutting edge of the movable finger is armed with a very large smooth tooth near its base, which overlaps the immovable one when the fingers are closed. Several strong serrations are present on the cutting edge of the movable finger near its base.

Ambulatory limbs short and thick. The meri are heavily granular above and below the median line, which is smooth except for some shallow transverse furrows; a serrated or granular ridge is present on the dorsal margin of each. Carpus of each limb granular except for that of the last pair, which is almost smooth; all are finely serrated on their upper margins. Propodus of each limb broad, flat and clothed with granules; the upper margins of the penultimate pair irregular. Dactyls smooth, broad, and deeply channelled on their upper surfaces; those of the two anterior pairs of about equal length, whilst those of the two hinder pairs

are shorter ; the last pair are more slender than the others and are turned upwards and outwards towards the tip. The merus of the third pair of limbs not as long as the first to fifth segments of the abdomen.

Described and figured from an adult male example from the Hawkesbury River, New South Wales, measuring 15.5 mm. between the front and the hinder margin of the carapace, and 12 mm. across the branchial regions. These dimensions represent the average size of the adult male examples examined.

*Colour.*—Adult male specimens freshly preserved in alcohol are dark slaty blue on the back, with the branchial regions and portion of the cardiac region brownish. Abdomen, sternum, and underside of limbs creamish. Outer maxillipeds and pterygostomial regions light slaty blue. Upper side of ambulatory limbs and chelipeds brownish yellow, with the whole of the carpal joints and portions of the others lightly tinged with mauve.

The females are lighter in colour on the back than the males, and the branchial regions and limbs are creamish yellow. When viewed under a binocular microscope the whole of the branchial regions, the upper sides of the limbs, and the outer maxillipeds are seen to be covered with minute dark spots ; in some paler examples these spots are to be seen over the whole of the carapace.

*Occurrence and habits.*—*M. platycheles* occurs on the same tidal flats as *M. longicarpus* in the New South Wales section of its range. It is, however, not so plentiful, and does not congregate to such a noticeable extent as the genotype. According to verbal report it is very numerous in certain localities on the north coast of Tasmania, which is no doubt the centre of its distribution.

*Sexual dimorphism.*—Several adult females in the series before me are considerably smaller than the males. They have the branchial regions much less swollen antero-dorsally, and the ambulatory limbs are not so sturdy in structure. The chelipeds are weaker, and the tooth on the cutting edge of the movable finger is almost obsolete, as is also the tooth on the ischium. No large spines are present on the anterior part of the sternum as in the male.

*Variation.*—The adults are consistent in character, except that in some of the males there is an extra smooth obtuse ridge situated between the two described as on the upper half of the palm, and the front is slightly broader and shorter in some examples. The juveniles differ from the adults only in the matter of development ; in the case of the juvenile males a noticeable feature is the absence in some instances of the spines which later develop on the sternum.

*History and synonymy.*—Geoffrey Smith in 1909 described a crab occurring on a sandy beach at Bridport, Tasmania, as “ a little round bluish Crab (*Hymenosoma*), present in such swarms that the sand was absolutely riddled with their little round burrows, and they themselves

as they ran had the appearance of, and made almost as much noise as, a swarm of bees." There can be little doubt that this reference refers to *M. platycheles*. It is true that Miers records *M. longicarpus* from Tasmania, but I am of the opinion that the specimen or specimens he examined were either wrongly labelled or correctly referable to *M. platycheles*.

The name "*Myctiris subverrucatus*" was given by Adam White in 1847 to a specimen in the British Museum secured in Van Diemen's Land, now Tasmania, during the voyage of the "Beagle." No description has appeared to validate the name, and the *nomen nudum* has since been associated by Miers (1884 and 1886) with H. M. Edwards' *M. platycheles*, a species described in 1852 from material from Western Port, Victoria, obviously collected many years earlier by Quoy and Giamard during the voyage of the "Astrolabe."

Stimpson (1907), being uncertain whether his specimens of *M. platycheles* from Botany Bay, New South Wales were correctly referable to that species, suggested the provisional name *M. prostoma*. The specimens of *M. platycheles* from Botany Bay in the Australian Museum collection agree in all details with examples from Victoria. The uselessness of the name *M. prostoma* is therefore apparent, and it must be relegated to the synonymy of *M. platycheles*.

*Localities.*—*M. platycheles* has been recorded to date from.—Port Western, Victoria—type locality (H. M. Edw., Ortmann); Melbourne, Vic. (Thallwitz); Tasmania (White, A.—as "Van Diemen's Land," Haswell, Miers, Smith); Botany Bay, N. S. Wales (Stimpson, Miers, Whitelegge); Port Jackson, N.S.W. (Tozzetti, Stead); Broken Bay, N.S.W. (Miers).

There are specimens in the Australian Museum from.—

Tasmania; old collection (4 adult males and 1 adult female; all of small size).

Victoria; collected late F. E. Grant (1 adult male, and 1 half grown male).

Jervis Bay, N.S.W.; coll. T. Whitelegge, 1893 (4 adult males of small size, 1 juvenile male, and 1 ovigerous female).

Shellharbour, N.S.W.; coll. G. McAndrew, 1923 and 1924 (2 adult males).

Gunnamatta Bay, Port Hacking, N.S.W.; coll. T. Iredale, 3rd May, 1925 (3 adult males, and 1 adult female). This series contains the largest male examined, which is 14 mm. wide and 16 mm. long.

Botany Bay, N.S.W.; coll. G. P. Whitley, 9th July, 1922 (1 adult male).

Botany Bay, N.S.W.; Exch. British Museum—from "Challenger" collection (1 adult male).

Rose Bay, Port Jackson, N.S.W. ; coll. A. R. McCulloch (1 female with soft shell).

Hawkesbury River, N.S.W. ; old collection (6 adult males, 1 half grown and 1 juvenile females). This series includes the figured specimen.

Nelson Bay, Port Stephens, N.S.W. ; coll. A. R. McCulloch, 22-24th September, 1919 (1 half grown and 1 juvenile males).

Fingals Bay, Port Stephens, N.S.W. ; coll. A. Musgrave, 24th August, 1920 (1 ovigerous female).

Port Stephens, N.S.W. ; coll. R. Etheridge, jnr. 1897 (1 half grown and 4 juvenile males, and 6 juvenile females).

Moreton Bay, Queensland ; coll. J. D. Ogilby (7 adult males).

The following specimens were lent for examination by the South Australian Museum.—Victoria ; old collection (1 adult male, and 1 ovigerous female). The female in this series is the largest examined, and measures 12.5 mm. across the branchial regions and 13.5 mm. from the front to the hinder margin of the carapace.

*Distribution*.—Tasmania (north), Victoria, and thence northwards along the eastern Australian coast to Moreton Bay, Queensland.

#### Key to the species of the genus *Mictyris*, Latr. (males only).

- A. A large conspicuous tooth on the cutting edge of the movable finger, antero-lateral spines connected by ridges with the anterior branchial regions.
  - B. Posterior border of carapace conspicuously produced beyond the curve of the abdomen ; appearing smooth, and covered with only minute microscopic granules.....*longicarpus*, Latr.
  - C. Posterior border of carapace not conspicuously produced ; median area with groups of granules, and branchial regions covered with granular ridges or rugae. ....*longicarpus*, var. *brevidactylus*, Stimp.
  - BB. Posterior border of carapace conspicuously produced, but not overlapping the curve of the abdomen from a strictly dorsal view ; median area, branchial regions and outer maxillipeds covered with large whitish tubercles.....*platycheles*, H. M. Edw.
- AA. An almost obsolete tooth on the cutting edge of the movable finger ; antero-lateral spines not connected by ridges with the anterior branchial regions.
 

*livingstonei*, sp. nov.

#### THE STATUS AND SYNONYMY OF THE GENUS MEGAMETOPE, AND ITS CONTAINED SPECIES.

I am indebted to my late esteemed colleague, Allan Riverstone McCulloch—to whose interest and ever friendly encouragement I owe much—for his indispensable aid in elucidating the complex problems presented by this genus.

MEGAMETOPE (*H. M. Edw.*) *Filhol.*

*Megametope* (*H. M. Edw.*) *Filhol*, Miss. l'Île Campbell, 1886, p. 373 (*rotundifrons*, *H. M. Edw.*).

*Gabrielia* McCulloch, Rec. Austr. Mus., vii, 1, 1908, p. 54 (*haswelli* *Fult. & Grant* = *punctatus* *Haswell*).

*Megametope* McCulloch, Rec. Austr. Mus., ix, 3, 1913, p. 326.

*Status.*—The name *Megametope* was first published by *Filhol*, who discovered it in the Paris Museum on the label of a specimen originally described by *H. Milne-Edwards* as *Xantho rotundifrons*. Although *Filhol* figured that species, he gave neither generic nor specific characters in the text relating to it. The fact that the name *Megametope* was published by *Filhol* in association with a species previously described by *H. Milne-Edwards*, however, entitles it to recognition.

*Synonymy.*—The name *Gabrielia* was proposed by *McCulloch* for a genus to accommodate several species from south-eastern Australia, which had been erroneously relegated to the genera *Cycloxanthus* and *Lioxantho*, with which they have no real affinity. It was properly defined, but the selection of *haswelli*, *Fulton* and *Grant*, as the genotype was somewhat unfortunate, because the identity of that species is debatable. *McCulloch* believed *haswelli* to be a valid species, but, as shown below, the name is properly referable to *M. punctatus* (*Haswell*). The identity of *Gabrielia* and *Megametope* was recognised by *McCulloch* in 1913, when he relegated his genus to the synonymy of that of *Filhol* (ex *H. Milne Edwards' MS*).

MEGAMETOPE PUNCTATUS *Haswell.*

*Cycloxanthus punctatus* *Haswell*, Proc. Linn. Soc. N.S. Wales, vi, 1882, p. 752; and Cat. Austr. Crust., 1882, p. 50.

*Cycloxanthus* ? *punctatus* vel *Lioxantho haswelli* *Fulton* and *Grant*, Proc. Roy. Soc. Vict. (n.s.), xix, 1906, p. 6-7 (part—name and references only).

*Gabrielia punctata* *McCulloch*, Rec. Austr. Mus., vii, 1, 1908, p. 56, pl. xii, fig. 4.

*Generic position.*—This species was referred to the genus *Cycloxanthus* by *Haswell*, and, in confusion with an allied species (= *rotundifrons*), to *Lioxantho* by *Fulton* and *Grant*, but it has not the characters of either of those two genera. *McCulloch* established *Gabrielia* for its reception together with two allied species, but that genus proves to be synonymous with the older *Megametope* from New Zealand.

*Synonymy.*—When referring this species to *Lioxantho*, *Fulton* and *Grant* noted that another species named *punctatus* was included in that genus. They therefore proposed the name *haswelli* as a substitute for

Haswell's species from New South Wales. At the same time they unfortunately confused with it an allied but distinct species (= *rotundifrons*) from Victoria which they figured, and this was later redescribed and figured by McCulloch as *Gabrielia haswelli*. The name *haswelli* was definitely proposed as a substitute for *punctatus* Haswell, however, and because that name proves to be valid, their *haswelli* must be relegated to the synonymy of *punctatus*.

*Distribution*.—This species was originally described from a single specimen from the estuary of the Parramatta River, Port Jackson, New South Wales (holotype in the collection of the Macleay Museum, University of Sydney). The only three other known examples of the species are in the Australian Museum collection. These were secured from Coogee and Long Reef, near Port Jackson, New South Wales, and from Shell-harbour, south coast of New South Wales.

MEGAMETOPE ROTUNDIFRONS (*H. Milne Edwards*).

*Xantho rotundifrons* H. Milne Edwards, Hist. Nat. Crust., i, 1834, p. 397.

*Megametope rotundifrons* Filhol, Miss. l'Ile Campbell, 1886, p. 373, pl. xlv, fig. 3.

*Cycloxanthus* ? *punctatus* vel *Lioxantho haswelli* Fulton and Grant, Proc. Roy. Soc. Vict. (n.s.), xix, 1906, p. 6-7, pl. iii (part—figure and locality only).

*Lioxantho haswelli* Fulton and Grant, Proc. Roy. Soc. Vict. (n.s.), xix, 1906, p. 17.

*Cycloxanthus* ? *punctatus* Baker, Trans. Roy. Soc. S. Austr., xxxi, 1907, p. F75.

*Gabrielia haswelli* McCulloch, Rec. Austr. Mus., vii, 1, 1908, p. 54, pl. xii, figs. 5-5a.

*Megametope rotundifrons* McCulloch, Rec. Austr. Mus., ix, 3, 1913, p. 326.

*Generic position*.—Confusing Victorian specimens with the New South Wales species *punctatus*, Fulton and Grant referred them to the genus *Lioxantho*, but they do not have the characters of that genus. McCulloch included the Victorian specimens in his genus *Gabrielia*, which is shown above to be synonymous with *Megametope*.

*Synonymy*.—Fulton and Grant incorrectly identified Victorian specimens as *Cycloxanthus punctatus* Haswell, and for reasons quoted under the foregoing notes upon that species, established an alternative name, *Lioxantho haswelli*. As also is shown above, neither of these names are available for the Victorian species, but being unaware of that fact, McCulloch redescribed and figured it as *Gabrielia haswelli*. He later recognised



the similarity of his specimens to *Megametope rotundifrons* as figured by Filhol, and suggested their identity with that species. As I believe this last conclusion to be correct, I here quote the Victorian species under Filhol's name.

*Distribution.*—*M. rotundifrons* is known so far only from Cook Strait and Foveaux Strait, New Zealand, and Western Port and Port Phillip, Victoria. In the Australian Museum collection there are three specimens from Western Port, Victoria, and two specimens from Port Phillip, Victoria, one of which is a cotype of Fulton and Grant's *Lioxantho haswelli* (see footnote).

#### MEGAMETOPE CARINATA Baker.

*Cycloxanthus? carinatus* Baker, Trans. Roy. Soc. S. Austr., xxxi, 1907, p. 173, pl. xxxiii, fig. 1.

*Gabrielia carinata* McCulloch, Rec. Austr. Mus., vii, 1, 1908, p. 57.

*Distribution.*—Previously recorded only from Port Willunga and Port Lincoln, South Australia. There is another specimen in the Australian Museum collection from King George's Sound, S. West Australia.

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The species here called *Megametope rotundifrons* must not be confused with *Heterozius rotundifrons* A. M. Edwards, both of which species were described and figured together by Filhol from Cook Strait and Foveaux Strait, New Zealand. Filhol's notes upon them are so arranged as to lead easily to confusion, which probably accounts for the fact that *Megametope rotundifrons* has been omitted from Hutton's Index Fauna Novae Zelandiae and other papers on New Zealand crustaceans. Filhol states definitely that both species were collected by him in New Zealand waters, and several specimens of *Heterozius* collected by him at Cook Strait are in the Australian Museum, which were acquired by exchange with the Paris Museum. In addition to these there are two other specimens in the Australian Museum collection from Island Bay, Wellington, N. Zealand, collected by C. Hedley, 1915.

#### Key to the species of *Megametope*.—

- A. Antero-lateral margins of carapace thickened; front markedly bent downwards.
  - B. Outer surfaces of wrists and palms smooth.....*rotundifrons*.
  - BB. Outer surfaces of wrists and palms sculptured.....*punctatus*.
- AA. Antero-lateral margins thin and cristate; front nearly horizontal.....*carinata*.

EXPLANATION OF PLATE IX.

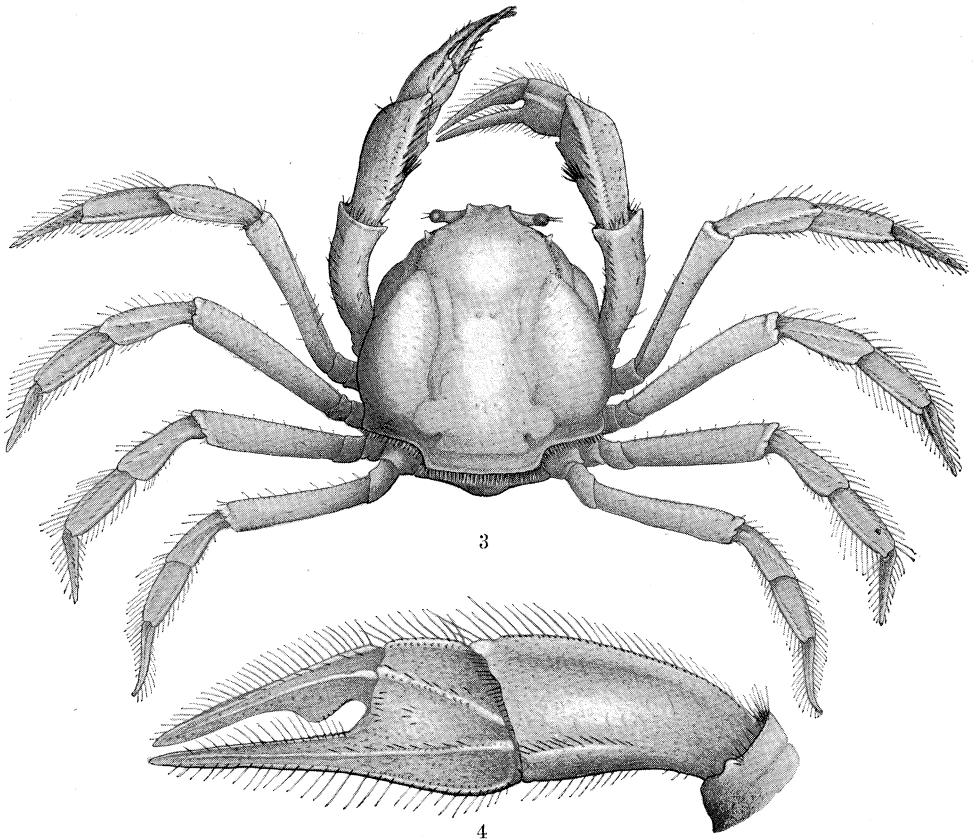
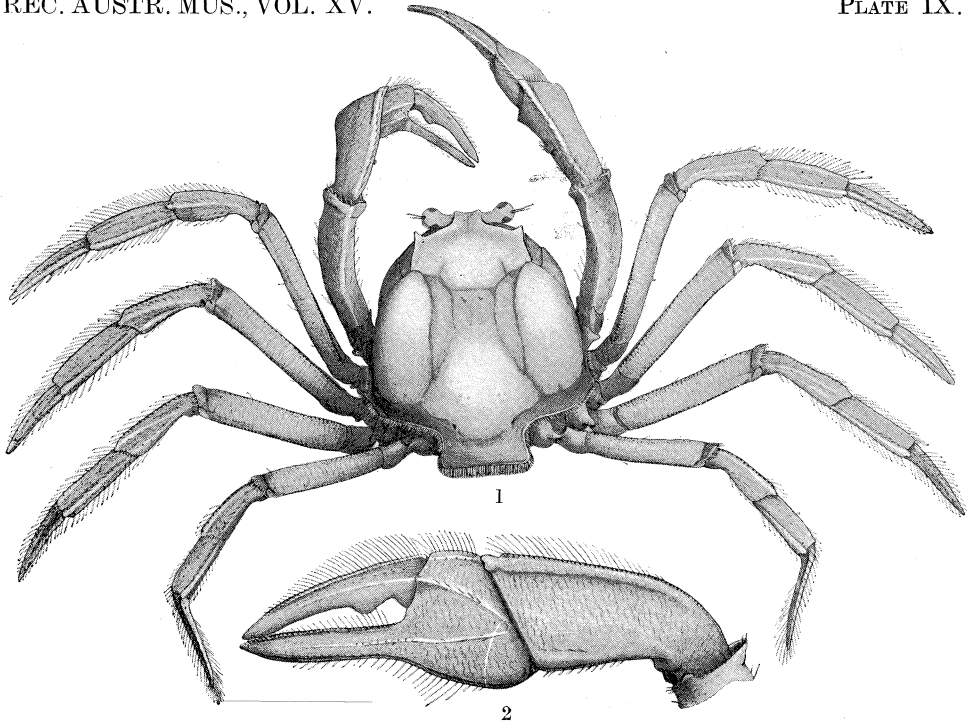
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*Mictyris longicarpus* Latr.

- Fig. 1. Dorsal view of an adult male from Port Jackson, measuring 20.5 mm. across the branchial regions.  
,, 2. Portion of left cheliped.

*Mictyris longicarpus*, var. *brevidactylus* Stimp.

- Fig. 3. Dorsal view of an adult male from Subig Bay, Luzon, northern Philippines, measuring 11 mm. across the branchial regions.  
,, 4. Portion of left cheliped.



EXPLANATION OF PLATE X.

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*Mictyris livingstonei* sp. nov.

- Fig. 1. Dorsal view of the male holotype, measuring 11 mm.  
across the branchial regions.
- „ 2. Portion of left cheliped.

*Mictyris platycheles* H. M. Edwards.

- Fig. 3. Dorsal view of an adult male from the Hawkesbury River,  
New South Wales, measuring 12 mm. across the  
branchial regions.
- „ 4. Portion of left cheliped.

