

NEW SPECIES OF AUSTRALIAN FRESHWATER
AND LAND CRAYFISHES (Family PARASTACIDAE)¹By *Ellen Clark*.

Plate X.

In the following pages seven new specimens belonging to four genera are added to the Australian section of the family Parastacidae, and one previously described species is reinstated.

Genus CHERAX Erichson.

Astacus (*Cherax*) Erichson, Arch. f. Naturg., xii, 1846, pp. 88-89.

Astacus (*Cheraps*) Erichson, l.c., p. 101.

Cherax Er., Clark, Mem. Nat. Mus. Vict., v, 1936, p. 18.

In the paragraph referring to the derivations of the name *Cherax* (Mem. Nat. Mus. Vict., 10, p. 19), a printer's error occurs in the Greek lettering; for *Χάραξ* read *χαραξ* and for *χαζάσσειν* read *χρασσειν*.

This is the most widely distributed Australian genus. Seven species have already been described, and with the addition of three species described herein, ten species are now included in the genus. Three of the species (*C. quinquecarinatus* (Gray), *C. bicarinatus* (Gray), and *C. tenuimanus* (Smith)) are found in the south-west of Western Australia; three species (*C. punctatus* Clark, *C. rotundus* sp. nov., and *C. davisii* sp. nov.) occur in coastal areas in New South Wales and Queensland; *C. albidus* Clark is found in Victoria, New South Wales and South Australia; *C. destructor* Clark in Victoria, New South Wales, South Australia, Central Australia, Queensland and Dunk Island; *C. quadricarinatus* (von Martens) has been found in the Northern Territory, Queensland, New Guinea and the Aru Islands; and *C. barretti* sp. nov., is described from the Wessell Islands, off the north coast of Australia.

The genus has not been recorded from Tasmania nor Kangaroo Island, although the closely allied genus *Geocharax* is found in each of these islands.

Cherax barretti sp. nov.

Plate X, Fig. 1.

Length of type male, 57 mm.

Rostrum broad, reaching almost to base of third segment of second antennae, apex obtuse, carinae sharp, three or four small tubercles on each carina near apex; lateral carinae sharp, ending in a small rounded boss, a small sharp spine anteriorly on each carina.

¹Results of work assisted by a grant from the Commonwealth Research and Endowment Fund.

Squame of each second antenna slender, terminal spine short and sharp. Interantennal spine short and broad, apex sharp, lateral margins rather sharp.

Carapace shorter than abdomen, broader than high, densely punctate; branchio-cardiac grooves obsolete, areola very broad; four or five small sharp spines along anterior of branchiostegites below the cervical groove.

Telson with a small sharp spine on each lateral margin at posterior third; posterior third of telson membranous. Uropods longer than telson; inner rami each divided by a longitudinal median carina, ending in a small sharp spine at membranous junction, a spine on each outer lateral margin at middle, posterior half of each ramus membranous. Outer rami each divided at apical third by a transverse suture, numerous small sharp spines along the suture, posterior two-thirds of each ramus membranous. Lobes at base of uropods with upper and lower lobes produced to a small sharp spine.

Sternal keel high, very slender and sharp. First two pairs of lateral processes small and sharp, third pair larger, sharp; fourth pair large, concave, each with a small round opening on outer lateral surface, lateral margins sharp; processes between fourth pereopods short, upper surface concave, lateral margins sharp.

Great chelae stout, with a few scattered small punctures; propodus twice as long as broad, upper margin serrated, lower margin smooth, four or five small tubercles along cutting edge; dactylus stout, upper margin smooth, one or two small tubercles along the cutting edge. Carpus with three sharp spines along upper margin and a row of small tubercles on upper surface below the spines, a small spine at anterior margin, surface of carpus punctate. Merus with one large sharp spine and several small tubercles along the upper margin.

Habitat.—Wessell Island, Japanese Creek (C. Barrett).

This species is based on a single specimen obtained by Mr. Charles Barrett from the Wessell Island, which is situated N.W. of the Gulf of Carpentaria, 30 miles from the coast of the Northern Territory. The distinctive characters, however, remove any doubt as to the specimen being an aberrant form of any known species.

In the number of carinae on the carapace *barretti* resembles *C. bicarinatus* (Gray) (6), which was described from specimens collected at Port Essington; Gray's species has not since been recorded from the north, but it is common in the south-west of Western Australia. The types of *bicarinatus* were examined for a previous paper (2) and found identical with *C. intermedius* Smith (12), the types of which are in the National Museum, Melbourne. *C. barretti* and *bicarinatus* may be separated by the form of the rostrum, sternal keel and great chelae.

The only other species known from the north coast of Australia is *C. quadricarinatus* (von Martens) (14). The number of carinae on the carapace immediately separates *quadricarinatus* and *barretti*; other important differences are found in the form of the great chelae and the sternal keel.

The type of *barretti* exhibits a very interesting character recorded by Roux, Nobili and Calman as occurring in males of *C. quadricarinatus*. The propodus of the great chelae bears a soft white patch, equal on both chelae, along the lower margin near the apex. In the figure (Pl. X, fig. 1), this soft portion is indicated by the dotted area.

Cherax davisii sp. nov.

Plate X, Fig. 3.

Length of average adult 107 mm.

Rostrum broad, reaching almost to base of third segment of first antennae, apex obtuse, carinae blunt; lateral carinae blunt, punctate, each ending in a rounded boss.

Squame of each second antenna very broad anteriorly, terminal spine short and sharp. Interantennal spine short and broad, apex blunt, lateral margin serrated.

Carapace shorter than abdomen, broader than high, densely punctate; areola narrow; anterior of carapace and branchiostegites densely minutely punctate.

Telson with a small sharp spine on each lateral margin at posterior third, posterior third of telson membranous. Uropods longer than telson; inner rami each divided by a longitudinal median carina, ending in a small sharp spine at middle, a spine on each outer lateral margin at middle, posterior half of each ramus membranous. Outer rami each divided at apical third by a transverse suture, numerous small sharp spines along suture; posterior two-thirds of each ramus membranous. Lobes at base of uropods with upper lobe produced to a small sharp spine.

Sternal keel slender and sharp, produced to a sharp, backwardly-directed spine below great chelae; first two pairs of lateral processes obsolete, third pair small and sharp, each with a small round opening on outer lateral surface; fourth pair larger, each with a large round opening on upper surface; processes between fourth pereopods short and stout.

Great chelae very stout; propodus two and one-fourth times as long as broad, with a few scattered punctures; upper margin serrated, lower margin smooth, posterior margin with a row of small tubercles; a few small tubercles along the cutting edge of propodus. Dactylus stout, punctate, upper margin smooth, cutting edge with two or three small tubercles. Carpus with a stout, blunt spine, forwardly-directed, on upper margin, two or three small spines near posterior margin; upper margin of merus feebly serrated.

Habitat.—*New South Wales*: Dumaresq Creek, Armidale (Consett Davis).

At first sight this species appears very close to *Astacoides plebejus* Hess (7), which I have not had the opportunity of examining. The description and figure of *plebejus*, however, do not agree with *davisii* in several important characters. Although there are many points of similarity, the points of difference are such that the species must be separated. For example, the telson of *plebejus* is stated to be longer than the uropods, whereas the telson of *davisii* is shorter than the uropods; in addition, Hess gives no indication as to whether the

telson and uropods are membranous. The rostrum and lateral carinae differ in the two species.

Separated from *C. albidus* Clark, by the broader, more rounded rostrum; the more slender sternal keel; the narrow areola; and the shape of the sternal keel.

Described from a large series of specimens received from Mr. Consett Davis.

Cherax rotundus sp. nov.

Plate X, Fig. 2.

Length of average adult specimen 107 mm.

Rostrum short and broad, reaching base of second segment of first antennae, apex rounded; carinae blunt; lateral carinae feeble, each ending in a rounded boss.

Squame of each second antenna very broad anteriorly, terminal spine short and sharp. Interantennal spine short and broad; apex obtuse.

Carapace densely punctate; branchiostegites densely, minutely tuberculate; cervical groove deeply impressed; branchio-cardiac grooves deeply impressed; areola narrow. Anterior of carapace as broad as posterior, giving an appearance of great rotundity.

Abdomen densely punctate. Telson longer than broad, with a spine at apical third of each lateral margin; posterior third of telson membranous. Uropods longer than telson; inner rami each divided by a longitudinal median carina ending in a small sharp spine at membranous junction; a spine on each lateral margin at middle; posterior half of uropods membranous; outer rami each divided at apical third by a transverse suture, numerous small spines along suture; each ramus divided by a longitudinal median carina ending in a small sharp spine at the transverse suture; posterior two-thirds of uropods membranous. Lobes at base of uropods without spines.

Sternal keel slender and sharp; first two pairs of lateral processes very small, third pair larger, posterior pair larger, flattened; processes between fourth pereopods short and stout.

Great chelae short and stout; propodus one and three-fourths times as long as broad, upper surface punctate, upper margin serrated, lower margin smooth, several small tubercles along cutting edge, apex sharp; a large patch of short setae on lower surface of propodus. Dactylus stout, punctate, upper margin smooth, several small tubercles along the cutting edge, apex sharp. Carpus with a stout, blunt spine on upper margin, upper surface with a few punctures; upper margin of merus smooth.

Habitat.—*Queensland*: Muddy River, Severn (E. Sutton).

This species comes nearest to *C. punctatus* Clark, but may be distinguished by the form of the carapace, great chelae, and the sternal keel.

Genus *GEOCHARAX* Clark.

Geocharax Clark, Mem. Nat. Mus. Vict., x, 1936, p. 31; Clark, Proc. Roy. Soc. Tasmania, 1938, p. 118.

The genus *Geocharax* is found in various localities in Victoria, on the north coast of Tasmania, and on Kangaroo

Island. Each of the five known species is found in Victoria, the most widely distributed species being *G. gracilis* Clark. It is found in Victoria, Tasmania and Kangaroo Island.

All the species live in the marshy ground along the banks of rivers or creeks.

Key to species of GEOCHARAX Clark.

Rostrum slender.

Great chelae slender; propodus with upper and lower margins smooth *laevis* sp. nov.

Great chelae slender; propodus with upper margin serrated, lower margin smooth *gracilis* Clark.

Rostrum broad.

Great chelae slender *lyelli* Clark.

Great chelae very stout; dactylus sickle shaped *falcata* sp. nov.

Geocharax laevis sp. nov.

Plate X, Fig. 4.

Length 52 mm.

Rostrum slender, reaching almost to apex of third segment of first antenna, apex obtuse; carinae sharp, carried well back on to carapace; lateral carinae sharp, not ending in a rounded boss.

Squame of each second antenna long and very slender; terminal spine long, slender and sharp. Interantennal spine small and slender, semi-pyramidal. Median arch of upper lip smooth. Eyes small.

Carapace higher than broad, twice as long as broad, shorter than abdomen. Cervical suture deeply impressed rounded; branchio-cardiac grooves feebly impressed, areola broad. Branchiostegites and anterior of carapace studded with numerous minute tubercles.

Sternal keel broad and blunt between second and third pereopods, high, slender and sharp between first and second pereopods. Lateral margins of lateral processes between second pereopods sharp; processes between third pereopods obliquely flattened, upper margin sharp; sternal keel continued across as an obsolete carina. Processes between fourth pereopods short and slender, upper margins sharp.

Telson entirely calcareous, with a spine on each lateral margin at apical third; inner rami of uropods each divided by a longitudinal median carina, ending in a sharp spine near posterior margin; outer rami each divided by two longitudinal median carinae, inner carina continued across the transverse suture, ending spineless at posterior margin, the transverse suture placed at the apical third, several sharp spines along the suture; a sharp spine at centre of outer lateral margin of each ramus.

Pereopods slender.

Great chelae long and slender. Propodus three times as long as broad; upper margin smooth, lower margin smooth, apex sharp, cutting edge smooth or with two or three small tubercles. Dactylus slender, upper margin smooth, cutting edge smooth or with a few small tubercles, apex blunt. Upper margin of carpus smooth; upper margin of merus with one short sharp spine.

Habitat.—Victoria: Bunyip (D. J. Mahony).

Type in the National Museum, Melbourne.

Although somewhat resembling *G. gracilis* Clark, this species is distinguished by the form of the great chelae, the squame of the second antennae, and the sternal keel.

Geocharax gracilis Clark.

Geocharax gracilis Clark, Mem. Nat. Mus. Vict., x, 1936, p. 31, pl. i, fig. 8, pl. vi, fig. 26; Proc. Roy. Soc. Tasmania, 1938, p. 118, pl. xii, figs. 1, 1a, 1b.

Originally described from Victoria, this species has since been recorded from Smithton, on the north-west coast of Tasmania.

Geocharax lyelli Clark.

Geocharax lyelli Clark, Mem. Nat. Mus. Vict., x, 1936, p. 32, text-fig. 1.

Since the original description of this species, it has been found in the following localities in Victoria:—Lima South, between Benalla and Mansfield (E. Clark); Swanpool (Mrs. G. Clark); Wandon, near Kilmore (A. Massola).

Abundant in the flats along the Broken River, between Benalla and Mansfield, this species was found to be doing great damage to the maize crops growing in that area.

It is interesting to note that the localities mentioned above are on the north of the Main Divide of the Victorian watershed; the other species of the genus have been found only to the south of the Main Divide.

Geocharax falcata sp. nov.

Plate X, Fig. 5.

Length of average adult specimen 80 mm.

Rostrum broad, reaching base of third segment of second antennae; apex blunt, carinae sharp, arched broadly outward posteriorly, carried well back on to carapace; lateral carinae sharp, each ending in a rounded boss.

Second antennae long and slender, reaching the base of third abdominal segment; squame large, reaching the end of third segment of first antenna; terminal spine short and sharp. Interantennal spine long and broad, sharply pointed. Median arch of upper lip smooth and swollen. Eyes moderately large.

Carapace higher than broad, one and one-half times longer than broad, shorter than abdomen. Cervical suture deeply impressed, rounded; branchio-cardiac grooves feebly impressed; areola broad. Branchiostegites and anterior of carapace studded with numerous minute tubercles.

Sternal keel narrow, very sharp; first three pairs of lateral processes obsolete, fourth pair flattened downwards; sharp ridge of sternal keel continued across fourth pair of processes. Processes between fourth pereopods long and stout, each with a sharp ridge on upper margin.

Telson with a spine on each lateral margin at apical third; inner rami of uropods each divided by a longitudinal median carina, continued without spines to the posterior margin; outer rami each divided by two longitudinal median carinae, inner carina continued across transverse suture, ending spine-

less at posterior margin, the transverse suture placed at apical third, several small sharp spines along the suture.

Pereopods stout.

Great chelae large and stout. Propodus twice as long as broad, with a few scattered punctures on upper surface, upper margin serrated, lower margin smooth, apex sharp, cutting edge with a few small tubercles, margin formed into a peculiar curve into which the cutting edge of the dactylus conforms. Dactylus slender, sickle-shaped, with a few scattered punctures on surface, upper margin smooth, cutting edge with one small tubercle near base, apex sharp, incurved; propodus and dactylus gaping when closed. Upper margin of both carpus and merus serrated.

Colour.—General appearance from above, light chocolate brown, translucent blue below. Anterior-lateral portion of carapace dark blue; branchiostegites buffy-brown above, fading to grey below. Telson and lateral margins of abdomen buffy brown; uropods light buffy brown tinged with blue. Propodus and carpus dark amber above, lighter on lower margins, bluish sheen below at apex, shading to cream at base; merus light amber at apex, fading to honey at base, with a large bluish area below; dactylus brownish blue above with a bluish sheen below. Pereopods translucent cream, tinged with blue.

Habitat.—*Victoria*: Grampian Mountains (E. Clark).

The peculiar shape of the great chelae distinguishes this species from all other known members of the family.

Very abundant in the swamp at the head of the Wannon River and Fyans Creek. The burrows descend vertically three or four feet, and almost invariably contain only one occupant.

Genus ENGÆEUS Erichson

Astacus (Engæus) Erichson, Arch. f. Naturg., xii, 1846, p. 102.

Engæus, Huxley, Proc. Zool. Soc. Lond., p. 769, 1878; Smith and Schuster, Proc. Zool. Soc. Lond., 1913, p. 118; Clark, Mem. Nat. Mus. Vict., x, 1936, p. 37; Clark, Proc. Roy. Soc. Tasmania, 1938, p. 122.

The genus *Engæus* is found in Victoria and Tasmania. Of the fourteen known species, ten have been found in Victoria, the most widely distributed species being *E. quadrimanus* Clark; it has been found all through the southern half of Victoria, as far north as Benalla, and also on King Island.

Since the publication of the previous revision (2), *E. victoriensis*, Sm. & Sch., has been collected at Mooroopna and Shepparton, on the hills around the Goulburn and Broken Rivers. It is noteworthy that both *E. victoriensis* and *E. quadrimanus* are found along the banks of the Broken River, *E. quadrimanus* being found abundantly between Benalla and Mansfield. These two species are found together at Warburton, Croydon, Ferntree Gully, and in south Gippsland, *E. quadrimanus* inhabiting the swamps and water-courses, whilst *E. victoriensis* burrows in the drier land, usually on the slopes of hills.

Engaeus fultoni Smith and Schuster.

Plate X, Fig. 6.

E. fultoni Sm. & Sch., Proc. Zool. Soc. Lond., 1913, p. 126.

E. fossor, Clark, Vict. Nat., liii, 1936, p. 66, fig. 2; Mem. Nat. Mus., Vict. x, 1936, p. 42.

Length of average adult specimen 53 mm.

Rostrum slender, reaching base of third segment of first antennae; apex sharp and upturned; carinae sharp, carried well back on to the carapace.

Squame of second antennae long and slender, sharply pointed. Inter-antennal spine short, broadly triangular, bluntly pointed. Exopod of third maxillipedes either long and slender, or indicated by a small papilla.

Sternal keel slender and sharp; first three pairs of lateral processes small, each with a conspicuous round opening; processes between third pereopods small and somewhat flattened, slightly grooved, lateral margins blunt, each with a small round opening under the lateral margin; processes between fourth pereopods long and stout.

Telson narrowly cone-shaped, almost as long as uropods, with a spine on each lateral margin; inner rami of uropods rounded, each with a sharp spine on outer lateral margins near posterior margin, divided by a longitudinal median carina ending in a sharp spine near posterior margin; outer rami rounded, with a spine on outer lateral margin above the transverse suture, each divided by a longitudinal median carina, ending in a spine at the transverse suture, suture placed at the posterior third of uropods, numerous small spines along the suture.

Great chelac short and stout, almost twice as long as broad; propodus with one row of large tubercles, and one or two rows of smaller tubercles along the upper margin, lower margin with a tuberculate carina posteriorly, and a smooth carina anteriorly, cutting edge with two large and several smaller tubercles; dactylus short and stout, upper margin smooth or punctate, one or two large and several small tubercles along the cutting edge. Carpus and merus each with a row of tubercles along the upper margin.

Posterior pleurobranch long and well developed.

Habitat.—*Victoria*: Beech Forest, Otway Ranges, Ferntree Gully.

Types in the National Museum, Melbourne.

In a previous paper (2) this species was confused with two other species, under the name *E. fossor* Erichson.

Specimens received from Smithton, Tasmania, were taken as typical *E. fossor*, but material received later from the Tasmanian Biological Survey contained examples of the true *E. fossor*. These specimens are quite distinct from the Smithton examples. In a later paper (4) *E. fossor* was re-described and the Smithton example described as *E. ignotus*.

Comparison of the larger series of Tasmanian specimens with Victorian specimens has warranted the reinstating of *E. fultoni* for the Victorian species.

Readily separated from *E. ignotus* and *E. fossor* by the form of the squame of the second antennae, the rostrum, and the sternal keel.

Engaeus marmoratus sp. nov.

Plate X, Fig. 7.

Length of average adult specimen 60 mm.

Rostrum broad, reaching almost to base of third segment of first antennae, apex sharp and upturned; carinae sharp, carried well back on to carapace.

Squame of second antennae long and sharply pointed, inner lobe short, broad posteriorly. Interantennal spine large and broad, somewhat triangular, lateral margin serrated. Exopod of third maxillipedes long and slender.

Sternal keel slender and sharp, serrated; second and third pairs of lateral processes with a small round opening, fourth pair large, deeply grooved; processes between fourth pereopods long and stout.

Telson narrowly cone-shaped, almost as long as the uropods, with a spine on each lateral margin; inner rami of uropods rounded, with a sharp spine on outer lateral margin, each divided by a longitudinal median carina ending in a sharp spine near posterior margin; outer rami rounded, with a spine on outer lateral margin above the transverse suture, each divided by a longitudinal median carina, ending in a spine at transverse suture, the suture placed at the posterior third of ramus, numerous small spines along the suture.

Great chelae punctate and setose; propodus more than twice as long as broad, with one row of small tubercles on upper margin, lower margin smooth, several small tubercles along cutting edge of propodus; dactylus long and slender, a smooth carina along upper margin, several small tubercles along the cutting edge. A dense area of long stout setae on upper and lower surfaces of propodus and dactylus. Carpus and merus each with a row of tubercles along upper margin.

Posterior pleurobranch long and well developed.

Habitat.—*Victoria*: South Buchan (E. Clark).

Types in the National Museum, Melbourne.

Near *E. fultoni*, Sm. & Sch., but separated particularly by the great chelae and the sternal keel.

Engaeus orientalis sp. nov.

Plate X, Fig. 8.

Length of average adult specimen 58 mm.

Rostrum broad, reaching almost to base of third segment of first antennae, apex sharp and upturned, carinae sharp, reaching almost to apex, carried well back on to carapace.

Squame of second antennae long and slender, with a long sharp terminal spine, inner lobe slender. Interantennal spine short and broad, apex rounded. Exopod of third maxillipedes short and stout.

Sternal keel broad, more or less bluntly raised; first three pairs of lateral processes obsolete, fourth pair small, deeply grooved, processes between fourth pereopods long and slender.

Telson narrowly cone-shaped, almost as long as uropods, with a spine on each lateral margin near the posterior margin; inner rami of uropods rounded, each with a sharp spine on outer lateral margin, each divided by a longitudinal median carina ending in a sharp spine near posterior margin; outer rami rounded, each with a spine on outer lateral margin above the transverse suture, each divided by a longitudinal median carina ending in a spine at transverse suture, the suture placed at the posterior third of ramus, several small spines along the suture.

Great chelae smooth or setose; propodus twice as long as broad, upper margin with a few small tubercles posteriorly, smooth anteriorly, lower margin smooth, several small tubercles along the cutting edge; dactylus short and stout, upper margin smooth, one large and a few small tubercles along the cutting edge. Carpus and merus each with a row of small tubercles along the upper margin.

Posterior pleurobranch rather long and well developed.

Habitat.—*Victoria*: Cann River Valley (J. B. Ponder); Scanlon's Creek; Orbost (E. Clark).

Near *E. marmoratus* sp. nov., but readily separated by the form of the great chelae and the sternal keel. Some of the specimens have the great chelae covered with numerous tufts of long stiff setae.

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PLATE X.

Chelae and parts of cephalothorax.

Fig. 1. *Cherax barretti* sp. nov.

2. *C. rotundus* sp. nov.

3. *C. davisii* sp. nov.

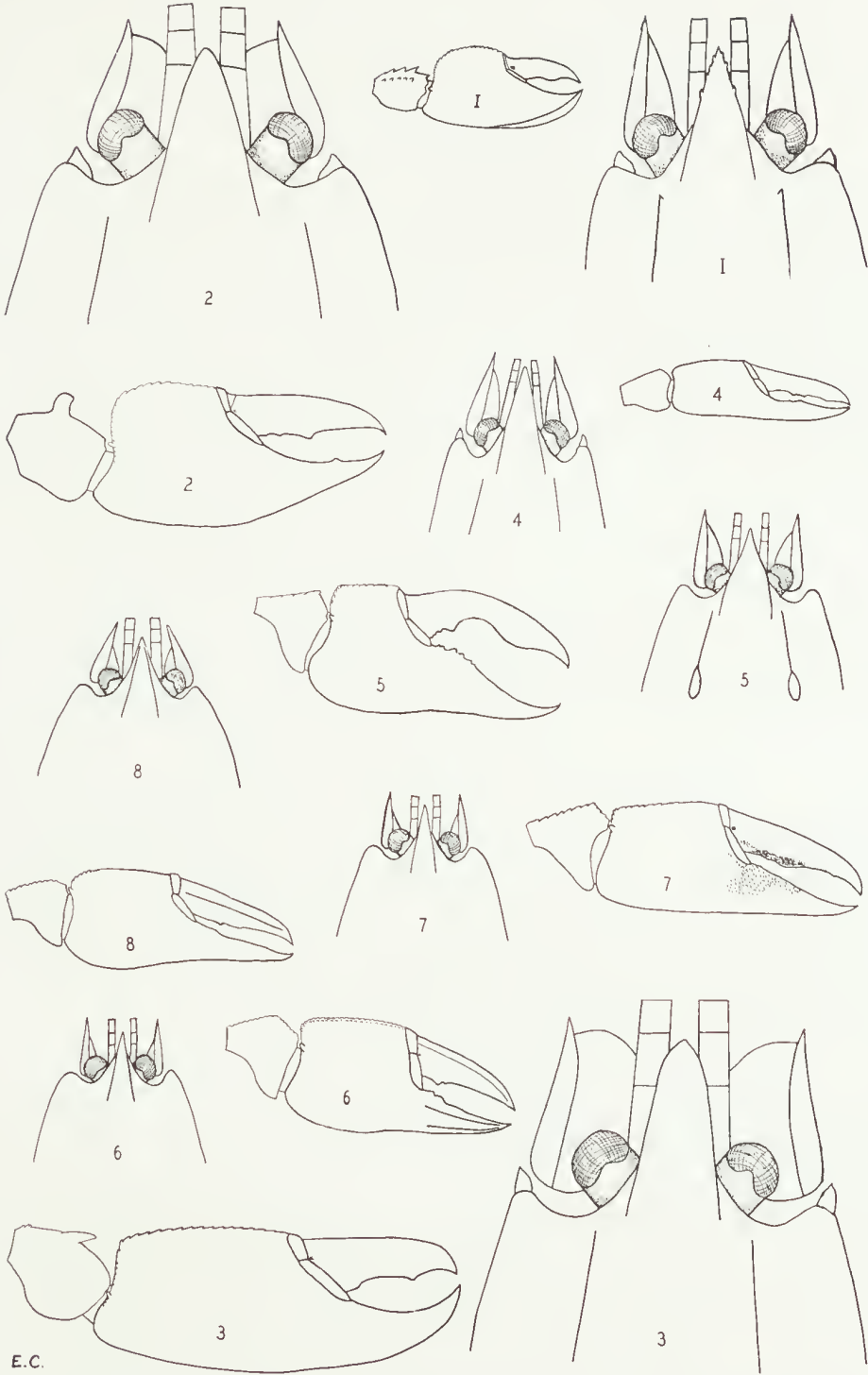
4. *Geocharax laevis* sp. nov.

5. *G. falcata* sp. nov.

6. *Engaeus fultoni* Sm. & Sch.

7. *E. marmoratus*, sp. nov.

8. *E. orientalis* sp. nov.



E.C.

Freshwater and Land Crayfishes; Chelae and parts of Cephalothorax