OSTRACODA FROM AUSTRALIAN INLAND WATERS—NOTES ON TAXONOMY AND ECOLOGY

BY P. DE DECKER

Zoology Department, University of Adelaide, Adelaide, S.A.
(Present address: Department of Biogeography and Geomorphology, Research School of Pacific Studies, Australian National University, Canberra, A.C.T., 2601)

ABSTRACT: One new ostracod genus, *Amphipregma*, and ten new species of ostracods are described: *Candonocypris inosta*, *Cyprignus salinus*, *C. unicorona*, *Heterocypris vatica*, *Ilyodromus amphilola*, *I. condonites*, *I. dikrus*, *Kapycypridopsis asymetrica*, *Limnothyere dorsoscudata*, *L. milh.*. Three other species are re-described, namely *Candonocypris novazelandiae* (Baird 1843), *Cyprignus baylyi* McKenzie 1966 and *Amphipregma oblongata* (Sars 1869); 2 cosmopolitan species *Eucypris viridis* (Jurine 1820) and *Sarsiurythrops antarctica* (Costa 1847) are recorded for the first time in Australia. Ecological notes for these species as well as for *Limnothyere monobravensis* Chapman 1914 are presented.

INTRODUCTION

Knowledge of the taxonomy and ecology of ostracods from Australian inland waters is poor compared to that of other microcrustaceans, although ostracods are quite common in a variety of habitats. This paper presents new data on non-marine ostracods for use in future ecological studies and for studies of Quaternary material. Since ostracod shells are readily fossilized these data may be useful in palaeolimnological studies (see De Decker 1981b). Material for this study is deposited in the Department of Crustacea, National Museum of Victoria under the registry numbers: J1134-J1162. The following abbreviations are used in the text: C = carapace, H = height, L = length, LV = left valve, RV = right valve.

SYSTEMATICS

Subclass OSTRACODA Latreille 1806
Order PODOCOPIDA Müller 1894
Superfamily CYTHERACEA Baird 1850
Family LIMNOCYTHERIDAE Klie 1938
Subfamily LIMNOCYTHERINAE Klie 1938

Genus *Limnothyere* Brady 1867
Type Species: *Limnothyere inopinata* (Baird 1843).

*Limnothyere dorsoscudata* n. sp.

Figs 1. 2a-j

Diagnosis: Member of *Limnothyere* with three to six small posterodorsal spines on the right valve; two small dorsal bosses separated by a main depression in the middle and never higher than the hinge in lateral view. Outline of hemipenis as in Fig. 1H.

Description: Carapace (External)—Rectangular, faintly reticulated, and pitted to smooth; three main depressions on each valve: one in the centre where a vertical column of four muscle scars is often visible, another just above and a third in front just below the hinge line; greatest height at about one quarter to one fifth of length from anterior; greatest width at about 0.6 of length from anterior; right valve with three to six small spines along its edge posterodorsally; in dorsal view, anterior narrow and pointed; two small dorsal bosses, separated by the main depression in the middle, smooth, never higher than the hinge line in lateral profile. Sexual dimorphism pronounced—length/height ratio of valves greater in males.

(Neural)—Hinge with a broad tooth in right valve and a matching depression in the left one at both ends; inner lamella broadest anteriorly and peripheral selvage faint; radial pore canals numerous and straight from which many hairs protrude at a distance from the outer lamella anteriorly.

Anatomy (Antennula)—(Fig. 1A) Six-segmented; length: width ratio of the last five segments: 2:1, 1:1, 1:3, 2:1, 4:2:1, longest distal seta bifid at mid-length.

(Antenna)—(Fig. 1B) Two pinnate distal claws and another thinner and barren; distal segment small and squarish.

(Mandible)—(Fig. 1D) Mandibular coxale with seven teeth; palp with distal segment very small and squarish and with three thin setae; distal seta on penultimate segment thicker than the other three and pinnate.

(Maxillula)—(Fig. 1C) Distal palp elongate with three setae; 3rd lobe with three others, two of which are biramous.

(Maxilla)—(Fig. 1F) Short and stocky; no setae on 1st segment.

(Thoracopoda I)—(Fig. 1G) Longer than maxilla; distal end of 1st segment with two unequal setae; one at proximal end; another at mid segment.

(Thoracopoda II)—(Fig. 1E, J) Longer than thoracopoda I with distal claw almost twice its length and three times that of the maxilla claw; in female, setae pectinate but barren in male where the distal seta on the 2nd segment has a bifid tip.

(Hemipenis)—For outline see Fig. 1H.

(Genitalia)—For outline see Fig. 1I.

(Furca)—(Fig. 1H, I) One small and barren setae near the reproductive organs.
Fig. 1—Limmocytthera dormascula n. sp. Lake Terangom, Vic. A, B, E-H are drawn from the holotype adult male and C, D, I, J from the paratype female. Scale = 100μ. A, antennula, B, antenna, C, maxillula—palp and lobes, D, mandible—palp, E, thoracopoda II, F, maxilla, G, thoracopoda I, H, hemipenis, I, genitalia, J, thoracopoda II.
Ostracoda from Inland Australia

Colour of Shell: Light brown to transparent.
Size: 
- Holotype adult male: LV 410μ, RV 410μ, 230μ
- Paratype adult female: LV 450μ, RV 450μ, 230μ

Type Locality: Lake Terangpom, west of Lake Corangamite, western Victoria.

Derivation of Name: From Latin dorsum (=black) and sicula (=small spine) for the diagnostic posterodorsal spines on the right valve.

Ecology and Distribution: Only two collections of this species are known to me, one from Lake Terangpom in water of 2.0°/oo salinity and the other from South Nerrin Nerrin Lagoon in water of 1.96°/oo salinity, both in western Victoria. At first glance, it appears that this species is indicative of freshwater (<3°/oo) despite the fact that some species of Limnocythere live in saline waters (see L. milta n. sp. below and De Deckker 1981c). However, L. dorsosicula which has been recovered in many samples of a core from Lake George (see De Deckker 1981b), is found in some of these samples co-occurring with other ostracode species indicative of either fresh water or water of salinity <10°/oo.

Remarks: L. dorsosicula is easily distinguishable from L. notodontia Vavra 1906 from west Java since the latter species has a maximum of four posterodorsal spines on the right valve. The anterior of the shell of the former species is narrow and pointed whereas in the latter species, the shell is much broader and rounded at both extremities. L. dorsosicula differs from L. mowbrayensis Chapman 1914 as the latter has broad alae, which are rounded or pointed and curved backward at about midheight near the centre of the shell. Dorsal spines have also been noticed on one fossil juvenile specimen of L. mowbrayensis from Pillie Lake, S. A. (De Deckker 1981b), whereas this feature appears common on specimens from Pulbeena Swamp illustrated by Brehm (1939) for L. percivali (later synonymized to L. mowbrayensis by Hornibrook (1955) and Deevey (1955)). Hornibrook (1955), however, did not mention any spines on his specimens from the same locality. In addition, L. mowbrayensis is characterized by a dorsal boss at mid-length which extends above the hinge line when seen in lateral view, L. stationis Vavra 1891, which inhabits European waters, also possesses posterodorsal spines but only on the left valve.

Limnocythere milta n. sp.

Figs 2k-t, 3

Diagnosis: Member of Limnocythere with faintly reticulated valve; with a vertical depression above the central muscle scars separating a small smooth boss anteriorly from the broad posterior; depression above and in front of the boss; row of fine denticles along the posteroventral margin of left valve. Maxilla and thoracopodae I and II with three long, pectinate setae on the inside of the 1st segment.

Description: Carapace (External) — Subrectangular and finely reticulated all over except for the anterior boss above and in front of the central muscle field and along the anierodorsal margin; this boss is separated from the posterior of the shell by a vertical groove just above the central muscle field; there is a depression adjacent to the boss dorsally which gives it a bilobate appearance in dorsal view; greatest height at about one quarter to one third of length from the anterior; mouth region concave and at about mid-length; dorsum gently curved; in dorsal view shell narrow, anterior pinched and pointed; greatest width at about 0.66 of length from the anterior; left valve slightly longer than right one posteriorly; shell compressed posteroventrally where the inner lamella is broad.

(Internal) — Inner lamella broad anteriorly in both valves and of almost similar width posteroventrally; posteriorly at mid-height and above, selvage absent; numerous straight radial pore canals from which many hairs protrude anteriorly at a distance from the outer margin; central muscle field with a vertical row of four scars; two narrow horizontal ones in the middle separated by two circular to oval ones; one antennal scar in front of the row at the level of the top scar and an additional scar above the vertical row of four; all these scars are met by depressions on the outside of the shell. Four to six minute spines along the margin of the left valve posteroventrally; hinge with broad tooth at both ends in the right valve with matching socket in the left valve; the posterior tooth is the largest.

Anatomy (Antennula) — (Fig. 3A) Six-segmented; length width ratio of last five segments: 2:1, 1:2:1, 1:2, 1:1, 5:1; longest seta bident at ½ from its base.

(Antenna) — (Fig. 3B) Three barren distal claws; distal segment almost rectangular.

(Mandible) — (Fig. 3C, D) Mandibular coxale with seven teeth, the inner two aciculate; palp with distal segment almost squarish; at the distal end of the 1st segment, thick seta (a bristle?) stout, pointed and pilose; on 2nd segment there are four setae, two long ones and two pectinate and shorter (one is a β bristle?); distal end of third segment with one long and barren seta and another half its length and pectinate (γ bristle?); three unequal setae on distal end of last segment.

(Maxillula) — (Fig. 3E) Epipod with 14 long and one small plumose Strahlen plus a shorter barren one; palp two-segmented with distal segment rectangular; for chaetotaxy see Fig. 3E.

(Maxilla) — (Fig. 3F) Distal claw stout and curved; three thick and pectinate setae on inner side of 1st segment and a longer pectinate one near its base outside.

(Thoracopoda I) — (Fig. 3G) Similar to maxilla but larger.

(Thoracopoda II) — (Fig. 3H) Similar to thoracopoda I but larger and with no basal seta on the outside of the 1st segment.

(Genitalia) — Weakly chitinized (see Fig. 3I).

(Furca) — (Fig. 3I) Single barren seta.

(End of body) (Fig. 3J) With tuft of hairs and one biramous short seta.
Fig. 2—a-j, Limnocythere dorsocicula n.sp. Lake Terangpom, Vic. a, e, g, i, j female paratypes; b-d, f male paratypes; h male holotype. a, C showing RV. b, RV external. c, LV external. d, C showing RV. e, C dorsal. f, C dorsal. g, RV internal. h, LV internal. i, LV internal. j, anterior detail of l. k-r, Limnocythere milta n.sp. Small lake N.W. of Lake Werowrap, Vic. k, l, o-r female paratypes; m, n female holotype. k, C showing RV. l, LV external. m, LV internal. n, RV internal. o, RV external. p, C showing LV. q, C dorsal. r, C ventral. (Scales: 1 = 200\(\mu\) for a-j, = 35\(\mu\) for j; 2 = 200\(\mu\) for k-r.)
COLOUR OF SHELL: Yellow to light brown.
SIZE: L H L H

**Holotype adult**

**Female**
LV 545g, 310s, RV 540g, 310s

**TYPE LOCALITY:** Small lake north-west of Lake Werowrand, Red Rock area, near Colac, western Victoria (38°15'23"S, 143°29'35"E).

**DERIVATION OF NAME:** From Greek milios meaning red earth for the Red Rock area.

**ECOLOGY AND DISTRIBUTION:** *L. milia* is known only from the type locality where salinity was 15.42%o and pH 9.9. This limnic is known to dry up occasionally. No males have yet been found.

**REMARKS:** *L. milia* differs from *L. aspera* Henry 1923, as the latter does not possess the typical posteroventral spines along the margin of the left valve.

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**Lyndocyclothere mowbrayensis** Chapman 1914

1914 *Linnocyclothere mowbrayensis* Chapman p. 60.
1955 *Linnocyclothere sicula*; Hornibrook p. 268.
1955 *Linncyclothere mowbrayensis*; Hornibrook p. 268.
1980 *Linncyclothere sp.*; De Decker & Geddes, p. 691.

**DIAGNOSIS:** Member of *Linncyclothere* with almost straight dorsum and deeply concave ventrum; two large dorsal bosses, which, in lateral view, extend above the hinge line, are separated by a vertical groove which is situated above a vertical row of four muscle scars; in front of the row, there is a broad lateral process which, on most occasions, is pointed and curved backwards.

**DISCUSSION:** *L. mowbrayensis* has recently been re-described by De Decker (1981a). *Linncyclothere sp.*, briefly described by De Decker and Geddes (1980) from an ephemeral salt lake near the Coorong Lagoon, is here considered to be *L. mowbrayensis* as it is almost identical to the specimens of *L. sicula* described by Chapman (1919), later synonymized by Hornibrook (1955) to *L. mowbrayensis*, as it has poorly developed lateral processes.

**ECOLOGY AND DISTRIBUTION:** *L. mowbrayensis* cannot swim; it is usually found crawling among filamentous algae. It is a fresh water species which can tolerate slightly saline waters up to 6%o. This upper record relates to the *Linncyclothere sp.* of De Decker and Geddes (1980) mentioned above, and is not surprising as some other *Linncyclothere* species can inhabit saline waters (e.g. *L. milia*; see De Decker 1981c).

*L. mowbrayensis* has also been recorded at 2.8%o in Fresh Dip Lake, near Robe, S. A. Apart from the ephemeral locality near the Coorong Lagoon where *L. mowbrayensis* was collected only once, all other localities are permanent; this species has never been found in temporary pools.

*L. mowbrayensis* has been recorded from southern Australia (even Kangaroo Island) and as fossil from north-western Tasmania (from where it was originally described) and New Zealand.

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**Genus Canodonocypris** Sars 1896

**TYPE SPECIES:** *Cypris canadensis* King 1855 (= *Canodonocypris novaeboradensis* Baird 1843).

**DIAGNOSIS:** Adult with smooth elongated shell and with broad inner lamellae anteriorly; selvage prominent and raised posteroventrally in the right valve. Two jointed sensory setae on the 2nd segment of the antenna. Thoracoporta II with two setae at mid-length on the last segment.

**REMARKS:** The opinion held by Sars (1894) that the well defined selvage placed far away from the edge of the right valve anteriorly was a diagnostic feature of *Canodonocypris* species is no longer valid as this feature is not present in *C. incosta* which, on other features of the shell and anatomy, is considered here to be a true *Canodonocypris*.

Two Australian species are included in *Canodonocypris* namely, *C. incosta* n. sp. and *C. novaeboradensis* (Baird 1843). *Herpetocypris caledonica* Mées 1939, from New Caledonia, definitely represents a *Canodonocypris* species since he illustrated the distal segment of thoracoporta II with two setae at mid-length. No type material could be examined, as it has not been deposited in the Natural History Museum in Basle, Switzerland contrary to Mées (1939) indication. (C. Stocker pers. comm. 26 Jan. 1981).

**Canodonocypris incosta** n. sp.

Figs 4, 5

1914 *Candona lutea*; Chapman, p. 59, fig. 6.
1971b *Illydromus cf. smaragdinus*; McKenzie, p. 396.

**DIAGNOSIS:** Member of *Canodonocypris* with peripheral selvage anteriorly in both valves and broad and near the outer margin in the posterior of the right valve.

**DESCRIPTION:** (External)—Smooth and elongated, ellipsoidal shell with dorsum arched and with ventrum flat except in front of the middle where it is slightly concave. Both ends of the valves tapering but posterior more pointed. Greatest height at about mid-length. Shell narrow in dorsal view. Obvious overlap of the left valve anterior and posterodorsally.

(Internal)—Inner lamellae similar in both valves anteriorly and approximately twice as broad anteriorly compared to the posterior area. Selvage peripheral anteriorly and only prominent posteroventrally in the right valve. This selvage is met by a depression in the left valve where the selvage is peripheral.

**ANATOMY:** The species fully described by McKenzie (1971b) as *Illydromus cf. smaragdinus* from New Guinea is here synonymized to *C. incosta*. Its diagnostic anatomical features are the short third segment of the antenna with a length width ratio of about 1.6:1 (Fig. 5A), strongly arched palps on the male maxilla (Fig. 5I,
Fig. 4—Condrycymis incosta n. sp. Spring at base of limework quarry at Pulbeena Swamp, Tas. Scale—1 000 μ: a, b, i, k, m female paratypes; c, d male holotype; e-h, j-l male paratypes. a, LV internal. b, RV internal. c, LV internal. d, RV internal. e, RV external. f, RV external. g, LV internal. h, RV internal. i, C dorsal. j, C dorsal. k, C showing LV. l, C showing RV. m, C showing RV.
Fig. 6 – Canthocypris novaehollandiae (Baird 1843). a-d, Kangaroo Creek Reservoir, Adelaide, S.A. e-k, t, Milbrook Reservoir, Adelaide, S.A. l-s, Small farm dam near Gilmandyke Creek, S. of Bathurst, N.S.W. Scales: 1 = 500μ for a-d, t, s; 2 = 50μ for r, a, b, e-h, k; c, adult male; e-o, i, j, l, m, t, adult female; n-p, r, juvenile female; q, juvenile. a, RV internal. b, LV internal. c, RV internal. d, LV internal. e, C dorsai. f, RV external. g, LV external. h, C showing RV and hemipenis. i, LV external. k, C showing LV and hemipenis. l, RV internal. m, LV internal. n, RV internal. o, LV internal. p, C showing LV. q, C showing LV. r, RV internal, anterior detail of n. s, C showing LV. t, C showing LV.
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Candonocypris novaezelandiae (Baird 1843)
Figs 6, 7
1843 Cypris Novae Zelandiae Baird, p. 268.
1855 Cypris candonooides King, p. 66.
1855 Cypris sydenia King, p. 65
1889 Herpetocypris stanleyana Sars, p. 35.
1894 Candonocypris assimilis Sars, p. 36.
1894 Candonocypris candonooides Sars, p. 35.
1919 Candonocypris assimilis Chapman, p. 28.
1955 Candonocypris assimilis Hornibrook, p. 271.
1956 Candonocypris candonooides; Hornibrook in Gill &
Banks, p. 19.
1969 Candonocypris assimilis; Hussainy, p. 305.
1971 Candonocypris novaezelandiae; Edgar, p. 55.
1975 Candonocypris assimilis; Okubo, p. 157.
1976 Candonocypris novaezelandiae; Chapman &
Lewis, p. 95.
1976 Candonocypris assimilis; Chapman & Lewis, p. 95.

Diagnosis: Member of Candonocypris with prominent
selvage in right valve usually half way between the outer
and inner margins and following the curvature of the
shell; posteriorly in the right valve and near the inner
margins, selvage is prominent.

Description: Carapace (External)—Smooth shell like a
flattened ellipsoid with dorsal area slightly arched;
overlap of left valve over right one ventrally and to a
lesser extent dorsally at both extremities of the hinge
area; right valve larger and like a flatter ellipsoid
compared to left one.

(coloured)—Broad selvage all around and placed at a
distance from the anterior edge of the right valve; in the
left valve, it is faint and peripheral; in both valves, inner
lamella twice as broad anteriorly; posteriorly in the right
valve, the selvage is prominent, especially posteroventrally
where it is near the inner margin: this area is met by
a depression in the left valve where the selvage is
faint.

Anatomy: Characterized by a long third segment of the
antennae with a length to width ratio of 2.2:1 (Fig. 7A);
males maxillae differently arched (Fig. 7G, H); outer
extremity of copulatory sheath at mid-length
forming a narrow but prominent hump (Fig. 7K); forca
with unequal claws (Fig. 7M).

Colour of Shell: Green to beige brown.

Size Range:

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<th>L</th>
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<tbody>
<tr>
<td>adult male</td>
<td>1 400-1 500μ</td>
<td>700-800μ</td>
</tr>
<tr>
<td>adult female</td>
<td>1 650-1 800μ</td>
<td>750-850μ</td>
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Note: LV narrower but taller than RV in both sexes.

Ecology and Distribution: This freshwater species is
usually found in farm dams and eutrophic waters, even
sewage lagoons. It is commonly found in high
numbers crawling in among decaying vegetal matter and
black organic muds, especially near lake shores.

Hussainy (1969) was the first to describe the male of C.
assimilis (synonymized here to C. novaezelandiae) from
Lake Purrumbete. Males have since been found in a
number of permanent waterbodies (e.g. Milbrook and
Kangaroo Creek Reservoirs) but not in ephemeral
waters or small waterbodies such as farm dams.

Adults of C. novaezelandiae are a benthic species and
have never been seen to swim. Juveniles, on the other hand, are good swimmers, having natatory setae of their antennae much longer than in adults.

Remarks: Examination of the type material of C. novaezelandiae (empty valves only) kept in the British Museum confirmed the suggestion of Edgar (1971) that this species is synonymous with C. candonioides. Additionally, since in many collections taken in ephemeral waters, morphs representing both C. candonioides and C. assimilis, as illustrated by Sars (1894, Plate V.1 and 2), are found together, it is suggested here that they represent the same species: C. candonioides synonymized to C. novaezelandiae. For example, forms of C. assimilis as illustrated in Fig. 6 n-p from a small farm dam near Gilmandyke Creek, south of Bathurst in New South Wales are considered to be young specimens of C. novaezelandiae found in the same collection and illustrated in Fig. 6 l, m, s. There are no morphological differences in anatomy except that appendages of C. novaezelandiae are bigger. In the latter, the colour of the shell is green with yellow to brown diagonal bands caused by the ovaries, whereas shells of C. assimilis morphs are beige brown in colour with similar bands for the ovaries (Sars 1894).

The latter morph is smaller and has a slightly arched dorsum (the greatest height is at the middle) whereas the C. novaezelandiae morph is larger, more arched dorsally (greatest height at about 0.66 of length from the anterior) and with the right valve much larger than the left anteriorly and posteriorly. This synonymy is further confirmed by the fact that the anatomy of male specimens described by Hussainy (1969) from Lake Purumbete in Victoria for C. assimilis is identical to that of male specimens of C. novaezelandiae found in Milbrook Reservoir in South Australia. The presence of well formed ovaries in juveniles in some ostracod species is not uncommon in the family Cyprididae and this would therefore explain why previous authors have considered C. assimilis morphs to represent the last molt stage of the species.

From the original illustration and short description of Cypris sydneya King 1855, it appears that King's species represents the C. assimilis morph because of the outline and colour of the shell, limited ability to swim, and the habit of crawling on mud.

C. novaezelandiae is found in New Zealand (Sars 1894, Chapman & Lewis 1976), Australia (Sars 1894, 1896a, Henry 1923) and Japan (Okubo 1975). Originally Sars (1894) stated that this species was also present in South Africa as he had raised it in his aquaria from samples of dried mud collected at Knysna, Cape of Good Hope, but later (Sars 1924) suggested that this had been caused by contamination by Australian material in his aquaria.

**Genus Ilyodromus** Sars 1894

**Type Species:** Candona stanleyana King 1855.

**Diagnosis:** See Danielopol & McKenzie (1977, p. 305).

**Remarks:** The genus Ilyodromus has recently been redescribed by Danielopol and McKenzie (1977) who provided a diagnosis for I. stanleyanus and redescription of I. varrovilum (King 1855) from New Zealand specimens. Both species were originally described from Australia. These authors also discussed all the other Ilyodromus species and their geographical distribution.

**Ilyodromus amplicollis** n. sp.

Figs 8, 9 b-r

**Diagnosis:** Member of Ilyodromus with striated shell; anterior and posterior ends broadly rounded; a slight concavity in front of the hinge anteriorly; inner lamellae broad anteriorly and posteriorly; lateral lobe of hemipenis broad and rectangular in shape; maxilla palps of male similar to each other.

**Description:** Carapace (External)—Weakly calcified; elongated elliptoid with joint striations all over; dorsum straight along the hinge line and slightly concave anterior to its dorsally behind the hinge line it is flat and inclined; anterior and posterior broadly rounded but the latter is narrower; ventral almost flat except in the middle of the mouth region where it is concave; greatest height at 0.33 of length from the anterior, left valve slightly larger.

(Internal)—Inner lamellae very broad and similar in both valves; anteriorly, the width of the inner lamella is one-third of the length of the shell; there it is slightly broader and it extends all around the shell except in the hinge area dorsally; valvulae and peripheral in both valves.

**Anatomy (Antennula)**—Fig. 8 A) Seven-segmented; length width ratio of the last six segments: 1.2:1, 1.6:1, 1.2:1, 1.6:1, 2:1; natatory setae as long as last five segments; 3-segmented sensory organ on second segment with distal end pointed.

**Antenna**—Fig. 8 B) Natatory setae short: two longest ones shorter than the penultimate segment and two minute ones reaching the proximal end of the same segment.

**Mandible**—Fig. 8 D) Mandibular coxal with seven teeth; palps with a bristle short, barren and slim, β bristle stout, pointed and densely pilose, γ bristle thick, slightly longer than the last segment and pilose in the distal half.

**Rake-like organ**—Fig. 8 C, D) Seven to nine teeth with an additional bifid one on the inner side.

**Maxillula**—Fig. 8 E) Distal palp trapezoid and two smooth Zahnborsten on third lobe.

**Maxilla**—Sexually dimorphic; in male (Fig. 8 G, H) palps strongly and similarly arched and one slightly narrower in the proximal 0.33 of its length; in female (Fig. 8 F) three plumose setae, the middle one being twice the length of the other two which are equal; in both sexes, epipod with five long and a shorter plumose stylum; for chaetotaxy of protopod, see Fig. 8 L.

**Thoracopoda I**—Fig. 8 J) Third segment well divided; inner distal seta of second segment shorter than half the length of the 3rd segment and outer seta on distal segment 0.2 of the length of the claw.

**Thoracopoda II**—Fig. 8 N) Three-segmented with large distal pincers; distal setae unequal: shorter one
hook-shaped and about 0.33 of the length of the other. (Hemipenis)—(Fig. 8M) Lateral lobe broad and rectangular; inner lobe broad, subrectangular but about 0.8 of the width of the lateral lobe and almost the same length; near the base of the lateral lobe on the inside, small knob-like protuberance.

(Zenker organ)—More than 30 rosettes.

(Furca)—(Fig. 8K) Claws almost equal with pectinate and thick posterior seta half the length of the posterior claw and 0.66 longer than the pectinate and narrow anterior seta.

(Furcal attachment)—Median branch long, divided distally and with a broad, but short, spine at right angle near its proximal end ventrally.

COLOUR OF SHELL: White to transparent ventrally and bluish green dorsally.

Size: L H L H

holotype adult male LV 1 540μ 720μ RV 1 550μ

paratype adult male LV 2 000μ 920μ RV 2 020μ 960μ

TYPE LOCALITY: Granite rock pool on top of Boyagin Rock, between Brookton and Pingelly, W.A.

DERIVATION OF NAME: From Latin amplectus (= large) and colis (= penis) for the unusually large penis.

ECOLOGY AND DISTRIBUTION: This species has been collected in the following localities: granite rock pools in Sullivan Rocks, 11 km south of Gleneagles, W.A. (or 63 km south of Perth on Albany Highway); roadside ditch north of Scaddan, W.A. (56 km north of Esperance on road to Norseman). I. amplecicos appears to be restricted to fresh, temporary pools.

REMARKS: I. amplecicos differs from I. varroviillus (King 1855) and I. stanleyanus (King 1855), which have similar shell outlines, by the absence of long natatory setae on its antennae (in specimens of these two species examined in Sars' collection, the natatory setae extend past the tip of the antennal claws). No males have been found in the latter two species.

Ilyodromus candonites n. sp.

Figs. 9 a-k, 10

DIAGNOSIS: Ilyodromus with subrectangular shell in lateral view, with posterior broadly rounded and anterior tapering; valves faintly striated; inner lamella anteriorly almost three times the width of the posterior in both valves; faint selage peripheral in the right valve and broader, 0.33 of width from the outer margin on the inner lamella posteriorly and ventrally; natatory setae of antenna atrophied; maxilla palps in male similar, hook-shaped and angular; lateral lobe of hemipenis digitate and broadest distally.

DESCRIPTION: CARAPACE (External)—Subrectangular in lateral outline with posterior broadly rounded and almost forming a right angle with the dorsum which is almost flat; anterior tapering but rounded and anterodorsal area inclined; ventrum almost flat except in the mouth region which is slightly concave 0.4 of length from the anterior; surface of shell faintly striated with two generations of striae (Fig. 9k); in dorsal view, like a flattened ellipsoid with both ends pointed; simple normal pore canals scattered with broad rim.

(Internal)—Inner lamella anteriorly almost three times the width of the posterior in both valves; selage peripheral and faint in the right valve and broader and 0.33 from the outer margin on the inner lamella posteriorly and ventrally; anteriorly the inner lamella is faintly reticulated like all Ilyodromus species.

ANATOMY (Antennula)—(Fig. 10A) Seven-segmented: length width ratio of last six segments: 2:3, 1.8:1, 1.2:1, 1.4:1, 1.8:1, 1.3:1; sensory organ on second segment 3-segmented and short; natatory setae as long as all segments together.

(Antennula)—(Fig. 10B) Three claws on penultimate segment and a fourth one on the distal one; natatory setae extremely short except for the outer one which is as long as half the length of the penultimate segment.

(Mandible)—(Fig. 10C) Mandibular coxale with seven teeth; palp 3-segmented and with a bristle stylie-like, β bristle stout, pointed and densely pilose, γ bristle slightly longer than distal segment, stout and densely pilose in the distal two thirds; epipod with five long plumose Strahlen plus a shorter one at mid-length and a smaller barren seta near its base.

(Rake-like organ)—Seven to nine teeth plus a bifid one on the inner side of each rake.

(Maxillula)—(Fig. 10C) Distal part short and trapezoidal; third lobe with two smooth Zahnborsten; epipod plate with 22 Strahlen.

(Maxilla)—Sexually dimorphic: in male (Fig. 10D, E) palpss similar, narrow, angular and hook-shaped; in female (Fig. 10F) three plumose setae with middle one twice the length of the other two which are of almost equal length; for chaetotaxy of propodop, see Fig. 10F.

(Thoracopoda I)—(Fig. 10I) 3rd segment divided; distal seta of 2nd segment as long as half of the length of the 3rd segment; outer seta on 4th segment 0.25 of the length of the distal claw.

(Thoracopoda II)—(Fig. 10K) Three-segmented; distal setae unequal with shorter one curved and about 0.33 of the length of the other; distal pincers small.

(Hemipenis)—(Fig. 10H) Lateral lobe digitate with distal end broadest; inner lobe bilobate distally and curved inward.

(Zenker organ)—With about 27 rosettes.

(Furca)—(Fig. 10J) Both claws of almost equal length; posterior seta thick; pectinate and half the length of the posterior claw; thin anterior seta barren and about half length of the other seta.

(Furcal attachment)—median branch long, divided distally and with a broad, short and curved spine at right angle near its proximal end ventrally.

COLOUR OF SHELL: Green.

Size: L H L H

holotype adult male LV 1 140μ 600μ RV 1 140μ 600μ

TYPE LOCALITY: Small granite rock pool at summit of Mt. Chuvalus, near Northcliffe, W.A.
Fig. 9 — a–k Ilyodromus candorites n. sp. a–e, k Small granite rock pool on Muirillup Rock, near Northcliffe, W. A. f–j Small granite rock pool at summit of Mt Chudalup, near Northcliffe, W. A. Scales: 1 = 500 μm for a–j; 2 = 10 μm for k. a–c, k females; f–j male paratypes; g, h male holotype. a, LV internal. b, RV internal. c, Dorsal. d, C showing LV. e, C showing RV. f, C showing RV. g, LV internal. h, RV internal. i, RV external. j, LV internal. k, C showing LV. detail of d–f, Ilyodromus ampicolus n. sp. Granite rock pool on top of Boyagin Rock, between Brookton and Pingelly, W. A. Scale: 1 = 500 μm. l, m holotype female; n, o paratype male; p, r paratype female. l, RV internal. m, LV internal. n, LV internal. o, RV internal, specimen distorted. p, C dorsal. q, C showing RV, same specimen as p, r, C showing LV, specimen distorted.
Fig. 11—Hyodromus dikrus n. sp. Dam at Wasley Well, near Nallan, W.A. Scales: 1 = 500μm for a-l; 2 = 100μm for m, n, = 20μm for o. a-d, j, l, o female paratypes; c, f, i-k male paratypes; g, h, m, n male holotype. a, LV internal. b, RV internal. c, LV external. d, RV external. e, RV internal. f, LV internal. g, LV external. h, RV external. i, C dorsal. j, C ventral. k, C showing LV, penis and some appendages. l, C showing RV. m, LV external, posterior detail of g. n, LV external, detail of g. o, C showing RV, anterior detail of i.
OSTRACODA FROM INLAND AUSTRALIA

DERIVATION OF NAME: From the genus Candona plus the Greek suffix —ites (= like) as the lateral profile of this species is reminiscent of many species of Candona.

ECOLOGY AND DISTRIBUTION: This species has only been collected in Western Australia. It occurs in many temporary granite pools near Northcliffe—at and near summit of Mt. Chudalup, and on and near Muirilup Rock.

The size of I. candonites is variable: the length of adult specimens can vary between 1 100μ and 1 400μ.

REMARKS: Ilyodromus candonites differs from I. viridulus specimens examined in Sars' collection on the following important details: the natatory setae of the antenna almost reach the tip of the claws in the latter species, and its shell is more elongated: it is faintly concave dorsally in front of the hinge (I. candonites is flat) and the selvage is near the inner margin posteriorly in the left valve and is broader posteriorly in the right valve. The greatest extension of the shell posteriorly in I. viridulus is at mid-height whereas it is near the ventrum in I. candonites. The latter species differs from type specimens of I. substriatus Sars 1894 and I. obtusus Sars 1894 from Sars' collection (which have short natatory setae on the antenna extending to the middle of the penultimate segment), on the following features of the shell: I. substriatus has a broad selvage posteriorly in the right valve which is met by a depression in the left valve where the selvage is faint and along the periphery of the inner margin; in I. obtusus the selvage is faint and along the outer margin in both valves. No males are known for Sars' species.

Ilyodromus dikrus n. sp.

Figs 11, 12

DIAGNOSES: Member of Ilyodromus like an inclined parallelogram with rounded ends in lateral view; obvious depression anterior to the hinge dorsally; with the greatest extension of the shell anteriorly 0.4 from the dorsum plane; inner lamella broad throughout in both valves; male maxilla palps asymmetrical, the narrower one being more arched; outer seta of 4th segment thoracopoda more than half the length of the distal claw; hemipenis with digitate lateral lobe and inner lobe like an elongated rectangle reaching almost the tip of the lateral lobe.

DESCRIPTION: CARAPACE (External) — Inclined parallelogram with rounded ends in lateral view, with obvious depression anterior to the hinge dorsally; shell with longitudinal striations of two generations (Fig. 11n) all over except in the anterior area near the margin; simple type normal pores; greatest extension of the shell anteriorly at 0.4 from dorsum plane and 0.6 posteriorly; ventrum concave just before mid-length. In dorsal view extremely narrow and with both ends pointed.

(INternal) — Inner lamella similar in both valves and of similar width anteriorly and posteriorly; it is broadest anteriorly where the valve extends the furthest, and narrowest in the mouth region above the concavity.

ANATOMY. (Antennula) — (Fig. 12A) Seven-segmented: length width ratio of last six segments: 1:1, 1.8:1, 1:1, 1.3:1, 1.7:1, 2.5:1; natatory setae as long as last six segments, sensory organ on second segment elongate.

(Annea) — (Fig. 12B) Three distal claws on the penultimate segment with a shorter one on the distal segment; natatory setae extending much further than the tip of the claws.

(Mandible) — (Fig. 12I, J) Mandibular coxae with seven teeth; palp with α bristle styllet-like, β bristle stout and densely pilose; γ bristle broad, almost twice the length of the distal segment and pilose in the distal half; epipod plate with four pilose Strahlen.

(Rake-like organ) — Seven to nine teeth, plus one bifid tooth on inner side of each rake.

(Maxillula) — (Fig. 12C) Distal segment of palp trapezoidal and third lobe with two smooth Zahnbörsten; epipod with about 18 plumose Strahlen.

(Maxilla) — Sexually dimorphic: male (Fig. 12G, H) palps asymmetrical with the narrower more strongly arched; the other is broadest at mid-length; female (Fig. 12F) palp with three short plumose setae, the middle one almost twice the length of the other two which are of similar length; for chaetotaxy of protopod see Fig. 12F.

(Thoracopoda I) — (Fig. 12D) Seta at mid-length on outer side of fourth segment thick and more than half the length of the distal claw; proximal seta on first segment 0.33 of the length of the distal one.

(Thoracopoda II) — (Fig. 12L) Three-segmented; distal pincers small and distal setae unequal: longest seta 1.6 times the length of the shorter and slightly curved one.

(Hemipenis) — (Fig. 12B) Lateral lobe digitate and inner lobe like an elongated rectangle reaching almost the tip of the lateral lobe; the broad tip of the inner lobe is covered with small hooks.

(Zenker organ) — (Fig. 12K) Elongate, with 25 rosettes.

(Furca) — (Fig. 12N) Claws almost equal; posterior seta slim, pecinate, twice the length of the other barren seta and 0.66 of the length of the posterior claw.

(Furcal attachment) — (Fig. 12M) Median branch thick, bifurcate distally and with broad spike at right angle near its base.

COLOUR OF SHELL: White.

SIZE:

Holotype

adult male LV 1 270μ 560μ RV 1 270μ 560μ

adult female LV 1 470μ 660μ RV 1 470μ 660μ

TYPE LOCALITY: Dam at Wasley Well, near Nallan, 21 km NNE of Cue, W.A. (27°16′54″S, 118°09′06″E).

DERIVATION OF NAME: From Greek dikrus (= forked) for the forked appearance of the distal end of the thoracopoda I which has a long outer seta on the last segment.

ECOLOGY: This species has only been collected once from the type locality: water was fresh and turbid.

REMARKS: Although this species appears at first glance to resemble the elongated I. varroviellus (King 1855), it is easily separated from the latter by its long seta on the
Fig. 13 – *Ampullacypria oblongata* (Sars 1896). Roadside pool, on Gibb River Road, 58 km E. of Derby, W. A. Scale: = 500μm. a, b, h, j–m females, c–g, i, n males. a, C showing LV. b, C showing RV. c, C showing LV. d, RV internal. e, LV internal. f, LV external. g, RV external. h, C dorsal. i, C dorsal. j, RV internal. k, LV internal. l, LV external. m, RV external. n, C ventral.
last segment of the thoracopoda I and by its inclined parallelogram outline in lateral view. I. varroelliius in Sars’ collection has short natatory setae on the antenna.

**Ilyodromus williamisi** (McKenzie 1966)

1966 *Iscypris williamisi* McKenzie, p. 266.

**Remarks:** The transfer of this species to *Ilyodromus* is suggested here because this species possesses many typical anatomical features of that genus. These are: 3-segmented sensory organ on the 2nd segment of the antenna; slender style-like α bristle; stout, pointed and densely pilose β bristle; thick, stout γ bristle which is pilose in its distal half; trapezoid palp and smooth Zahnborsten on maxillula; presence of two setae on 1st segment of thoracopoda I; thick and pectinate posterior seta on furca and furcal attachment with short spine forming a right angle with the median branch near its base. All these were seen on the holotype.

Although *I. williamisi* has a smooth shell (when examined under a binocular microscope), contrary to most *Ilyodromus* species, it is still included in that genus for the reasons given above. It is worth noting, however, that striations on the shell of many *Ilyodromus* specimens, all belonging to the one species and collected together, can vary; on some specimens of *I. viridulus*, for example, striations are only visible anteriorly and posteriorly, on others the shell is smooth, and others the shell is finely striated.

McKenzie (1971a) has already pointed out that *I. williamisi* was not an *Iscypris sensu stricto* on shell characters alone. This species in fact is closely related to *I. dikerus* as they both have a similar shell outline but *I. williamisi* has a faint selvage at a distance from the outer lamella anteriorly in the left valve and has a very short outer seta on the distal segment of the thoracopoda I. **I. williamisi** is only known from the type locality, about 16 km west of Invermay, N.T.

**Genus Ampullacypris n. gen.**

**Type Species:** *Ampullacypris oblongata* (Sars 1896).

**Diagnosis:** Smooth ellipsoidal shell with normal pore canals and flattened when viewed dorsally; inner lamella broad anteriorly and posteriorly in both valves; central muscle field consisting of a row of three in front and two behind plus a hollow inclusion above and in front of the upper adductor scar; two mandibular scars in front and below the adductor scars; two toothed Zahnborsten and rectangular palp on maxillula; mandibular palp with α bristle smooth and slender, β bristle longer (but not stout) and densely pilose, γ bristle longer than last segment, stout and pilose on its distal half; maxilla palps on male asymmetrical; 1st segment of thoracopoda I with one long seta, furcal shaft smooth and posterior seta on furca thick and pectinate; furcal attachment with median branch long and no distal ornament plus dorsal branch forming narrow elongated loop.

**Derivation of Name:** from Latin *ampulla* meaning flask (as the type species has been described from specimens originally grown in an aquarium by G. O. Sars) and the generic name *Cypris*.

**Remarks:** *Ampullacypris* n. gen. is closely related to *Psychrodromus* Danielopol & McKenzie 1977 and *Ilyodromus* Sars 1894. It differs from these two genera on the following important anatomical features: the distal end of the furcal attachment does not have a wedge shaped spike and the dorsal branch forms a loop. *Ampullacypris* differs from *Psychrodromus* by possessing a smooth furcal shaft and from *Ilyodromus* by its two-toothed Zahnborsten and a rectangular palp on the maxillula. The α, β, and γ bristles on the maxilla of *Ampullacypris* are like those of *Psychrodromus* as is the two-segmented, short sensory organ on the 2nd segment of the antennula.

**Ampullacypris oblongata** (Sars 1896)

Figs 13, 14

1896 *Cypris oblongata* Sars, p. 29.

1901 *Amphicypris oblongata*; Sars, p. 18.

1923 *Amphicypris oblongata*; Henry, p. 268.

**Diagnosis:** Smooth ellipsoidal shell with posterior narrower than anterior and ventral area almost flat; in dorsal view, shell narrow and greatest width at about a third from the anterior. Inner lamella broad anteriorly and posteriorly in both valves. Lateral lobe of hemipenis crescent-shaped; Zenker organ with 42 rosettes.

**Description:** Carapace (External)—smooth ellipsoidal shell with posterior narrower than anterior and ventral area almost flat except in the mouth area in the middle where it is faintly concave. Valves similar with left one slightly longer and overlapping the other slightly ventrally. In dorsal view, shell narrow and greatest height at about a third from the anterior. Shell hirsute posteriorly.

(Internal)—Inner lamella broad anteriorly and posteriorly in both valves and selvage faint and peripheral except in the right valve ventrally; thin flange along the periphery of the right valve. Marginal pore canals common, short and straight. Central muscle field consisting of a row of 3 scars in front with the central one the smallest; two scars are situated behind the front row and are at the level of the two lower scars; two mandibular scars in front and below the adductor scars and a hollow inclusion above and in front of the upper adductor scar.

**Anatomy:** (Antennula)—(Fig. 14B) Seven-segmented, length width ratio of the last six segments: 1:1, 2:2:1, 3:3, 8:5:5, 7:4, 3:1; 2nd segment with two segments, short sensory organ.

(Antenna)—(Fig. 14C) Natatory setae reaching the tip of the claws; 3 claws of equal length on penultimate segment and reaching the tip of the other claw on the last segment.

(Mandible)—(Fig. 14A, G) Palp with α bristle smooth and slender, β bristle longer (but not stout) and densely pilose, γ bristle longer than last segment, stout and pilose on its distal half.

(Rake-like organ)—(Fig. 14D) Seven teeth plus one inner bifid tooth.

Maxillula—(Fig. 14F) Distal palp rectangular and two toothed Zahnborsten on the third lobe.
Fig. 15—*Heterocypris vatica* n. sp. Hexham Swamp, Newcastle, N.S.W. Scales: 1 = 500μ for a-d, f-r, = 200μ for e, o, = 40μ for n; 2 = 100μ for p-r. a-e, j, o, p female paratypes; f-g, k, m, n, q, r male paratypes; h-i male holotype. a, LV external. b, RV external. c, LV internal. d, RV internal. e, RV internal, anterior detail of d. f, LV external. g, RV external. h, LV internal. i, RV internal. j, C dorsal. k, C ventral. l, C dorsal. m, C ventral. n, RV external, anterior detail of g. o, RV internal, posterior detail of d. p, C dorsal, anterior detail of j. q, C ventral, posterior detail of k. r, C ventral, anterior detail of k.
(Maxilla) — Sexually dimorphic: male (Fig. 141, J) palps asymmetrical: right one broad and triangular with outer side forming a rounded right angle and two long bristles near the base of the palp; other smaller, narrower and more arches plus, at the base of the palp, with two shorter and also smooth bristles. Female (Fig. 14E) palp with three unequal plumose setae, the middle one being longer than the other two together.

(Thoracopod 1) — (Fig. 14H) Proximal end of 1st segment with a long seta only; penultimate segment divided; seta at the inner distal end of the last 3 segments and at the division of the penultimate segment; last segment with an outer seta, as long as inner one, near the distal end.

(Thoracopod 2) — (Fig. 14K) 3-segmented; distal seta of second segment longer than half the length of the third segment; distal setae unequal with shorter one curved and about one-third the length of the other straight one; distal pincers small.

(Hemipenis) — (Fig. 14M) Broadly elliptoid in shape with lateral lobe crescent-shaped.

(Zenker organ) — (Fig. 14L) Narrow long and with 42 rosettes.

(Furca) — (Fig. 14N) Distal claws unequal; posterior seta pectinate, much thicker and longer than anterior one and half the length of the posterior claw.

(Furcal attachment) — (Fig. 14O) Median branch long and slightly curved with dorsal branch like a narrow, elongate loop normal to the median branch and forming an obtuse angle with the straight ventral branch.

COLOUR OF SHELL: Beige brown.

Size:

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<tr>
<td>From Sars' (1896) female:</td>
<td>carapace 1 900µ 800µ</td>
<td>male : carapace 1 600µ</td>
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Specimens examined here:

|           | adult female: | carapace 1 840µ 880µ | adult male : | carapace 1 520µ 760µ |

ECOLOGY AND DISTRIBUTION: This species was raised by Sars (1896b) from a dry sample of sand collected 64 km east of Roebuck Bay in W.A. In Sars' collection, there are a number of samples of A. oblongata for which the given locality is central Australia and others for which females and one male, all undissected and preserved in a hardened polyvinyl alcohol slide (Oslo Museum — Sars' collection No. 11 600) are syntypes. The male is designated here as lectotype. In addition, the vial containing about 10 specimens of A. oblongata at the "old spirit collection of Sars" held in the Oslo Museum, under the number of 53,3/2 are also syntypes. The specimens described here have been collected in a roadside pool on the Gibb River road, 58 km east of Derby, W.A. The specimens labelled "Eucypriis" cf. oblongata (Sars, 1896) by McKenzie (1966) do not belong to the species described here as one of the specimens studies by him has peripheral tubercles on the right valve.

Subfamily CYPRINOTINAE Bronstein 1947
Genus Heterocypris Claus 1892

TYPE SPECIES: Heterocypris incongruens (Ramsdorh 1808).

Heterocypris vatica n. sp.

Figs 15, 16

DIAGNOSIS: Member of Heterocypris with anterior edge of right valve bent outward; lateral lobe of hemipenis boot-shaped with "sole" of the boot convex; inner lobe of hemipenis with scattered minute hooks.

DESCRIPTION: CARAPACE (EXTERNAL) — Bean-shaped in lateral view with dorsum curved; greatest height at 0.4 to 0.5 from the anterior; posterior slightly more broadly arched than anterior; ventral area nearly flat except in the mouth region which is faintly concave; in dorsal view like a flattened ellipsoid with both ends pointed; anteriorly the extremity is bent slightly clockwise; anteriorly and posteroventrally the right valve bends outward along the edge; the left valve bends inward to meet the right valve all along its periphery except ventrally where it overlaps the outer; shell pseudopunctate with numerous rounded wart-like tubercles on the anterior of the shell; a hair protrudes from each tubercle.

INTERNAL — Right valve faintly tuberculatate all along its periphery except dorsally; inner lamella broadest anteriorly in both valves; in right valve, selvage broad following the curvature of the shell halfway between the outer and inner margins anteriorly, whereas it is near the inner margin posteroventrally; the inner lamella between the outer margin and the selvage is convex anteriorly and posteroventrally; in left valve, selvage faint and peripheral and presence of narrow flange all along; radial pore canals numerous and straight.

ANATOMY (Antennula) — (Fig. 16A) Seven-segmented; length width ratio of the last six segments: 1:1, 2.25:1, 1.5:1, 1.5:1, 1.7:1, 2.5:1; small, rod-shaped, sensory organ at mid-length on the second segment; natatory setae slightly longer than all segments together.

(ANTENNA) — (Fig. 16C) Sexually dimorphic: in female the claw attached to the small 3rd segment is narrower and smaller.

(MANDIBLE) — (Fig. 16E, F) Mandibular coxale with seven teeth (Fig. 16F); inner tooth longer than the previous two and pointed and near its base two setae, one of which is pilose; endopod (Fig. 16E) with a bristle short and narrow, β bristle of same length, wrinkled and covered with a few short hairs, γ bristle longer than last segment, stout and thickly pilose externally in its distal half; epipod with five plumose Strahlen; a shorter one half way and a short, stout and pilose setae at its base.

(Rake-like organ) — With seven teeth and inner one bifid.

(MAXILLULA) — (Fig. 16D) Endopod with about 17 plumose Strahlen; length width ratio of palp: 3:1, 2:1; third lobe with two toothed Zahnbresten and near their base presence of a short and thick tufted bristle.

(MAXILLA) — Sexually dimorphic: male palps strongly asymmetrical (Fig. 16J) with left one narrower and strongly arched; female palp with three plumose setae,
Fig. 17 — *Eucypris viridis* (Jurine 1820). Pond close to Peel Inlet (coastside), 19 km S. of Mandurah, W.A. Scales: 1 = 500 μm for a-g, h, i-j; 2 = 40 μm for h, = 20 μm for i, = 10 μm for l. All females. a, LV internal. b, RV internal. c, LV internal. d, RV internal. e, C dorsal. f, C showing RV. g, C showing LV. h, C dorsal, anterior LV detail of i, j. i, C ventral. j, C dorsal. k, C showing RV, posterior detail of f. l, C showing RV, anterior detail of f.
the two outside ones being of similar length; for chaetotaxy, see Fig. 16L.

(Thoracopoda I)—(Fig. 16G) Penultimate segment weakly divided and distal claw 1.2 times the length of the last two segments together.

(Thoracopoda II)—(Fig. 16K) Distal setae on last segment unequal; the longer one four times the length of the other which is hook-shaped.

(Hemipenis)—(Fig. 16L) Outer lateral lobe boot-shaped with “sole” part of the boot convex and “heel” part slightly angular and forming an obtuse angle; inner lobe broadly rectangular and covered with numerous short hooks.

(Zenker organ)—Both ends rounded with 48 rosettes.

(Furca)—(Fig. 16M) Setae almost equal with posterior one finely pectinate; claws unequial; anterior one 1.6 times the length of the other.

(Furcal attachment)—(Fig. 16N) Median branch straight with short dorsal branch normal to it; ventral branch curved and 2.5 times the length of the dorsal one.

(Eye)—Cups of nauplius eye fused; brown in colour.

COLOUR OF SHELL: Translucent pale brown.

Size: 

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<td>LV</td>
<td>2400</td>
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TYPE LOCALITY: Hexham Swamp, behind the University campus at Newcastle, New South Wales.

DERIVATION OF NAME: From Latin varius meaning bent outward for the diagnostic feature of the right valve.

ECOLOGY AND DISTRIBUTION: This species has only been collected once; water at the type locality is known to be fresh.

REMARKS: It was thought that this species belonged to *H. leana* (Sars 1896) because of its large size. The female specimens described by Sars (1896a) were 2.70 mm long and came from Hay, N.S.W. However, after examination of Sars' collections in the Oslo Museum, it became obvious that none of the male specimens labelled *H. leana* by Sars have the same outline of the lateral lobe as the specimens from Hexham Swamp; all Sars' specimens have a small and pointed protuberance in the “heel” part, the boot-shaped lateral lobe of the hemipenis. This feature is not seen in *H. varius*. However, no specimen from Hay was found in Sars' collection; only specimens which are labelled as “Victoria A or C are found. Therefore, designation of a lectotype will prove to be difficult. However, a 2.4 mm long male specimen collected from Goulburn Billabong, Alexandra, Vic. by R. Shiel corresponds to Sars' description of *H. leana* and possesses the pointed “heel” on the lateral lobe of the hemipenis. This substantiates the separation of the two taxa into different species which have a large shell but different anatomy. *H. varius* differs from all other *Heterocyclops* species recently reviewed in Victor and Fernando (1980).

**Ostracoda from Inland Australia**

Subfamily **EUCYPRIDINAE** Bronstein 1947

**Genus Eucypris** Vavra 1891

**Type Species:** *Eucypris virens* (Jurine 1820)

**Eucypris virens** (Jurine 1820)

Figs 17, 18

1820 *Monoculus virens* Jurine, p. 171.
1900 *Eucypris virens* Daday, p. 143.

DIAGNOSIS: Subrectangular shell with dorsum arched and greatest height in the middle; length height ratio of carapace: 1.45 to 1.65; shell convex ventrally just in front of the slightly concave mouth region; in dorsal view oval in shape with anterior more pointed than posterior; wart-like protuberances (Fig. 17h, k, l) near the outer margin anteriorly best seen in dorsal view. Colour of shell: pale green.

REMARKS: *E. virens* is a cosmopolitan species well known outside Australia; description of the shell and anatomy is therefore unnecessary but illustrations are provided in Figs 17, 18. This species has already been recorded from New Zealand (Barclay 1968, Chapman & Lewis 1976). In Australia, it is a common inhabitant of temporary pools and is usually found in fresh waters but has been recorded in slightly saline water; the highest salinity record for *E. virens* is 4.4% in a Western Australian locality (Geddes et al. 1981). So far *E. virens* has been collected in southern Australia (W.A., S.A., Vic.).

Variations in the outline of *E. virens* have been commonly noted, even on specimens collected in the same locality. These variations are illustrated in Fig. 17. They are best seen in lateral view and correspond to variations in shell outline already noted by Müller (1900) who designated the following variations: *E. virens* var. *eximina* which has a more elongated shell (see Fig. 17a, b, f) and *E. virens* var. *obliqua* which has a more compressed shell and more broadly curved outline posteriorly (see Fig. 17c, d, g). These variations may be ecologically significant but remain as yet unexplained.

It is likely that *Eucypris pruensis* Eagar 1970, recorded only from three localities near Wellington in New Zealand (Eagar 1970), is also a variant of *Eucypris virens*.

**Eucypris virens** in Australia is a parthenogenetic species although both sexes have been recorded in other parts of the world (North Africa (Gauthier 1928); pond in the delta of the River Don, USSR — material received from Dr. E. I. Shornikov).

Subfamily **CYPRICERINAE** McKenzie 1971

**Genus Cypricereus** Sars 1895

**Type Species:** *Cypricereus cuneatus* Sars 1895.

**Cypricereus salinus** n. sp.

Figs 19 a-1, 20

DIAGNOSIS: Smooth, triangular shell, elongated ellipsoid
Fig. 19—a1. *Cypricercus salinus* n. sp. Small lake N. of Lake Terrangom, Vic. Scale: = 200μ. a, b male holotype; c-e, i, j male paratypes; f-h, k, l female paratypes. a, RV internal. b, LV internal. c, LV external. d, RV external. e, C showing LV. f, LV internal. g, RV external. h, LV external. i, C dorsal. j, C ventral. k, C dorsal. l, C anterior. m-q, *Cypricera beydii* McKennie 1966. Granite rock pool on top of Boyaggin Rock, between Brookton and Pingelly, W.A. Scale: = 200μ for m-p, = 40μ for q. m, n male; o-q unknown sex. m, RV internal. n, LV internal. o, LV external. p, C dorsal. q, LV external, detail of o (central muscle scar area).
in dorsal view; distal end of lateral lobe of hemipenis broader than its base.

**Description:** Carapace (External)—Triangular in lateral view with greatest height at about middle; anterior and posterior ends broadly rounded; anterodorsal area almost straight whereas posterodorsally it is slightly arched; ventral area almost flat except in the mouth region in the middle where it is concave. Left valve slightly larger anteriorly and overlapping ventrally, especially in the mouth region. In dorsal view, like a flattened ellipsoid.

(Internal)—Inner lamella twice as broad anteriorly in both valves compared to posteroventral area; selvage near the rounded outer margin in right valve anteriorly, and at about 0.33 of the width of the inner lamella from the outer margin posteroventrally; in left valve, selvage bordering the rounded outer margin antero- and posteroventrally and separated from it by a broad groove all along; ventrally it is distant from the outer margin.

**Anatomy (Antennula)—**(Fig. 20A) Length width ratio of the last six segments: 1:1.4, 1.7:1, 1.2:1, 1.2:1, 1.6:5, 2.7:1; natatory setae slightly longer than all segments together.

(Antenna)—**(Fig. 20B) Natatory setae much longer than the last three segments and claws together; four terminal claws in both sexes.

(Mandible)—**(Fig. 20C) Endopod with α and γ bristles long, narrow and smooth; β bristle short, stout and pilose; mandibular coxale with seven teeth: Inner one slightly longer than the two adjacent.

(Rake-like organ)—Seven teeth plus one bifid on the inner side of each rake.

(Maxillula)—**(Fig. 20E) Third palp with two smooth Zahnbositen; length width ratio of palps 4.5:1, 2.5:1.

(Maxilla)—Sexually dimorphic: in male (Fig. 20 H, I) distal palps unequal with the narrow one strongly arched and forming a right angle; female (Fig. 20 D) endopod with three unequal setae. For chaetotaxy of epipod, see Fig. 20 D, H.

(Thoracopoda I)—**(Fig. 20F) Third segment divided at mid-length where an inner seta as long as the distal half of the third segment and the fourth one together occurs.

(Thoracopoda II)—**(Fig. 20L) Distal setae unequal with small one hook-shaped; seta at mid-length of the last segment shorter than hook-shaped distal seta; small distal pincers present.

(Hemipenis)—**(Fig. 20G, K) Outline of copulatory sheath triangular with greatest length on inner side; lateral lobe arched inward and discl end broader than its base.

(Zenker organ)—**(Fig. 20M) Elongate with 13 broad rosettes.

(Trupa)—**(Fig. 20J) Anterior claw 1.6 times longer than posterior one; anterior seta slightly longer than posterior one.

(Furcal attachment)—**(Fig. 20N) Ventral branch almost as long as median one and hook-shaped distally; dorsal branch short with a spike at each end on the distal side to form an almost closed eyelet which is typical of the genus as illustrated for the type species C. cuneatus by McKenzie (1977). (In the latter species, the eyelet is closed).

(Eye)—Cups of nauplius eye fused; dark brown in colour.

**Colour of Shell:** Pale Green.

**Size:**

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<tr>
<td>holotype adult male</td>
<td>LV 600μ</td>
<td>380μ</td>
<td>RV 580μ</td>
</tr>
<tr>
<td>paratype adult female</td>
<td>LV 640μ</td>
<td>390μ</td>
<td>RV 620μ</td>
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**Type Locality:** Small lake (38°06'06"S, 143°18'47"E) north of Lake Tanganyika, west of Lake Corangamite, western Victoria.

**Derivation of Name:** From Latin salinus meaning saline as this species has been collected in many slightly saline waters.

**Ecology and Distribution:** C. salinus has been collected from lakes in the vicinity of Collac and Camperdown, Victoria (e.g., Lakes Martin, Koreetung, Karah, Wingal, Tanganyika). The salinity range of the species is: 0.34-12.3%/oo. Salinity of the water at the type locality was 4.9%/oo.

**Cyprioceros unicornis n. sp.**

Figs 21, 22

**Diagnosis:** Pseudopunctate, ellipsoid shell with asymmetrical valves; left valve longer especially posteriorly where it often tapers to a broad and rounded spike; no spike in the right valve; lateral lobe of hemipenis digitate and straight.

**Description:** Carapace (External)—Ellipsoid in lateral view with greatest height at about middle in the right valve; surface of shell deeply pseudopunctate except dorsally and ventrally. Anterior broadly rounded, ventrum almost flat and posterior tapered. Valves asymmetrical: left valve, which overlaps the right one all around, has protuberance posteriorly which extends slightly outward. The extension of this protuberance is variable; in some specimens, it is almost non-existent. In dorsal view, like a flattened ellipsoid except in the posterior area of the left valve where the protuberance occurs. Normal pore canals of two types; some simple and others simple with a broad rim.

(Internal)—Inner lamella twice as broad anteriorly compared to posterior; selvage faint and peripheral in the right valve whereas it is broad and follows the periphery of the left valve where it is separated from the rounded outer margin by a narrow but deep groove. The posterior protuberance in the left valve is hollow. Radial pore canals numerous, narrow and straight.

**Anatomy (Antennula)—**(Fig. 22A) Length width ratio of the last six segments: 1:1, 2.6:1, 1.6:1, 2:1, 2.3:1, 4:1; natatory setae slightly longer than all segments together.

(Antenna)—**(Fig. 22B) Four terminal claws in both sexes: the claw attached to the small distal segment is
Fig. 21 - Cypricercus unicornis n. sp. Granite pool, Newmann's Rocks, 140 km E. of Norseman, W. A. Scales: 1 = 500µ for a-n; 2 = 40µ for o, = 20µ for p, = 60µ for r; 3 = 10µ for q, a, b, c, f, i-l, p female paratypes; c, d, r male holotype; g-l, m-n, q male paratypes. a, RV internal. b, LV internal. c, RV internal. d, LV internal. e, RV external. f, LV external. g, RV external. h, LV external. i, C showing LV. j, C showing RV. k, C dorsal. l, C ventral. m, C dorsal. n, C ventral. o, C ventral, posterior detail of n. p, C ventral, anterior detail of l. q, RV external, detail of g. r, LV internal, posterior detail of d.