

A NEW SPECIES OF *HEMICYPRIS*
(OSTRACODA) FROM ANCIENT BEACH
SEDIMENTS OF LAKE RUDOLF, KENYA

by R. H. BATE

ABSTRACT. A new fossil species of *Hemicypris* (*H. posterotruncata* sp. nov.) is described from ancient beach sediments of Lake Rudolf, Kenya. The presence of marginal sockets within the duplicature of the right valve, for the reception of the marginal denticles of the left valve, is recorded for the first time.

TOWARDS the end of 1968 two sieved residues of beach sand (samples M4 and M7) were received from Dr. B. Verdcourt. These samples consisted of 90% ostracod and small gastropod shells with a very subordinate amount of smooth, water worn, quartz grains. The beach sand was collected from two localities: M4 from a site 20 ft. below the beach crest (east side) and approximately 100 yards out from the ridge crest to the south of Lothagam Hill, and M7 from the west of Lothagam Hill. Both samples were collected by Dr. M. D. Gwynne during the Royal Geographical Society South Turkana Expedition. The map showing the location of the samples (text-fig. 1) is based on a sketch provided by Dr. Gwynne. This paper is no. V of the South Turkana Expedition Papers.

The ostracods, present in very large numbers, are all referable to the single new species *Hemicypris posterotruncata* sp. nov. It is difficult to give a precise age dating to the beach deposits as neither the ostracod nor the molluscs listed below are of any assistance in this matter. All that can be said is that they are sub-Recent, possibly Holocene or even Pleistocene in age. What is indicated, however, is that Lake Rudolf was very much more extensive in the past than is the case at the present time.

The following molluscs have been identified by Dr. Verdcourt from the two samples mentioned above:

Sample M3 (from which the residue M4 was obtained)

1. *Bellamyia unicolor costulata* (Von Mts.)
2. *Cleopatra bulimoides pirothi* (Jickeli)
3. *Melanoides tuberculata* (Müll)
4. *Caelatura chefneuxi* (Neuv. and Anthony)
5. *Caelatura rothschildi* (Neuv. and Anthony)
6. *Corbicula africana pusilla* (Philippi)
7. *Biomphalaria pfeifferi* (Krauss)

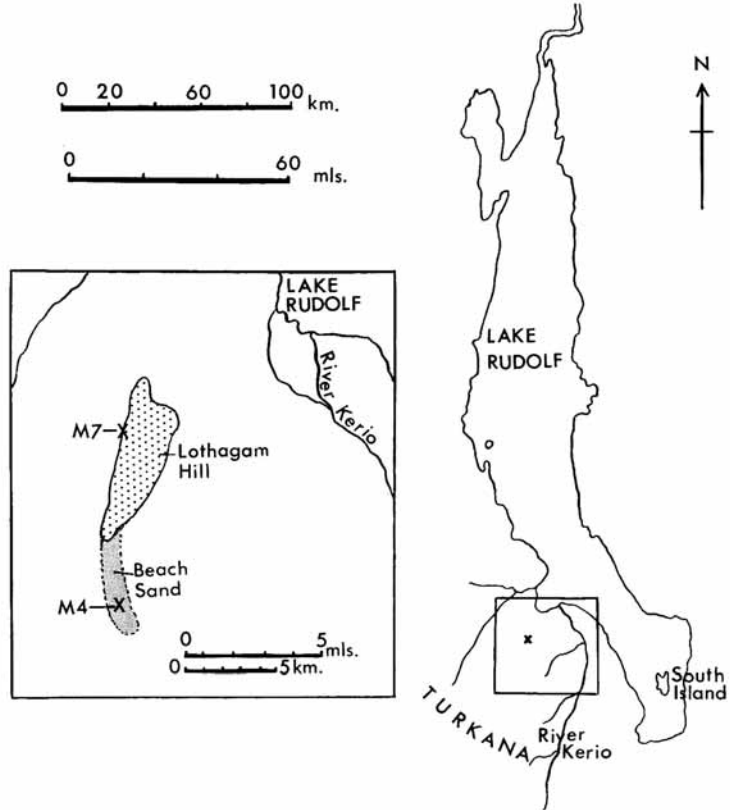
Sample M7. Associated molluscs were nos. 1, 2, 3 and 5 together with:

- Mutella nilotica* (Cailland)
- Mutella alluaudi* (Germain)

All the material described in this paper is in the collections of the Department of Palaeontology, British Museum (Natural History).

The photographs were taken on the scanning electron microscope.

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TEXT-FIG. 1. Location map of the beach sand sample, Lake Rudolf, Kenya.

SYSTEMATIC DESCRIPTION

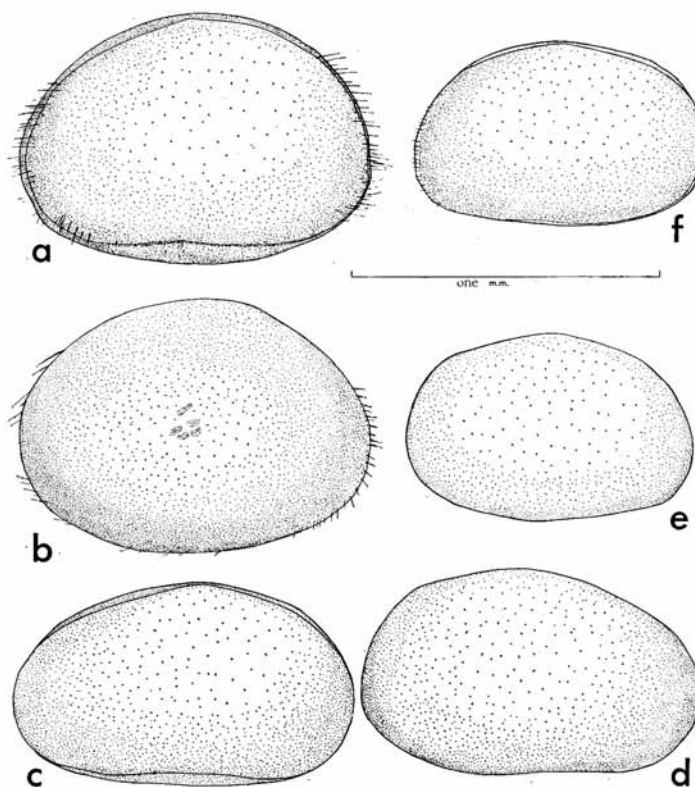
Subclass OSTRACODA Latreille 1806
 Order PODOCOPIA Müller 1894
 Suborder PODOCOPINA Sars 1866
 Family CYPRIDIDAE Baird 1845
 Subfamily CYPRIDINAE Baird 1845
 Genus HEMICYPRIS Sars 1903

Type species. *Hemicypris pyxidata* (Moniez), designated Swain (1961, p. Q221).

Remarks. Sars included three species in his new genus *Hemicypris*: *Hemicypris pyxidata* (Moniez), *H. ovata* sp. nov., and *H. megalops* sp. nov., although he did not designate a type species (see above). His reasons for distinguishing *Hemicypris* from the closely related genus *Cyprinotus* Brady were that the right valve in each case was larger than

the left, the second pair of maxillae were devoid of a vibratory plate and that they all reproduced parthenogenetically.

The validity of *Hemicypris* was refuted by Klie (1932, p. 471) after he had examined material identified by Sars. Klie pointed out that the three species placed in *Hemicypris*



TEXT-FIG. 2. *a, b*, *Hemicypris pyxidata* (Moniez), F. 12294, Univ. Oslo; left and right views, complete carapace. *c, d*, *Hemicypris ovata* Sars, F. 12293, Univ. Oslo; left and right views, complete carapace. *e, f*, *Hemicypris megalops* Sars, F. 12292, Univ. Oslo; right and left views, complete carapace.

by Sars did in fact possess a vibratory plate and that this was clearly visible in both *pyxidata* and *ovata*. He further stated that, as recommended in a previous publication of his (1930), the genus *Cyprinotus* should be retained for those species in which the valves have a crenulate margin and a dorsal hump, and that *Heterocypris* should be used for those species lacking a dorsal hump whether or not the valves were crenulate at their margins. Accordingly he placed *pyxidata* and *megalops* in *Heterocypris*.

This arrangement of Klie's is not, however, satisfactory as the characters of the carapace play an important role in the grouping of ostracods into natural units, and the

possession of marginal denticles is considered here to indicate a close genetic affinity between the species. These species should not, therefore, be placed in *Heterocypris*. Coupled with a general umbonate dorsal outline the genus *Cyprinotus* may be clearly divided into those forms in which the left valve is the larger (*Cyprinotus* s.s.) and those in which the right valve is the larger (*Hemicypris* s.s.). In both groups it is the smaller valve which possesses the marginal denticles. If there was but a single species having the right valve larger than the left it would be unnecessary to retain the genus *Hemicypris*. There are, however, twelve species having a wide geographical distribution which may be assigned to the *Hemicypris* group. Should this morphological group be placed in *Cyprinotus* or separately identified? If the latter case, are the characters present sufficient for a generic or a subgeneric determination? It is considered here that the presence of at least twelve species indicates that this group has developed sufficiently for a generic determination to be made.

The following species are here placed in *Hemicypris*:

- Cyprinotus pyxidatus* Moniez 1892, the type species, described from a pond in Luwu in the Célèbes.
Hemicypris ovata Sars 1903, from dried mud, north-eastern Sumatra.
Hemicypris megalops Sars 1903, from dried mud, north-eastern Sumatra.
Cyprinotus (Hemicypris) kaufmanni Vávra 1906, from an ornamental fish pond, the Bronze Horse Temple, Nagasaki, Japan.
Cyprinotus fossulatus Vávra 1898, from Usaramo, Tanzania.
Cyprinotus decoratus Daday 1910, from the Zoological Gardens, Giza [Gizeh], Egypt.
Cyprinotus inversus Daday 1913, from Ku-Gudič, Kalahari, South Africa.
Cyprinotus fullerborni Daday 1910, from Lake Rukwa [Rikwa], Tanzania.
Cyprinotus humbertii Gauthier 1933, from Ambovombe, Malagassy Republic.
Heterocypris reticulatus Klie 1930, from Gran Chaco, Paraguay.
Hemicypris posterotruncata sp. nov., this paper, sub-Recent beach sediment, Lake Rudolf, Kenya.
Heterocypris dentatmarginata Kiss 1959, from Lake Tanganyika.

Hemicypris posterotruncata sp. nov.

Plate 52, figs. 1–7; text-fig. 3*d–i*, text-fig. 4*a, b*

Diagnosis. *Hemicypris* with strongly calcified carapace, of angular outline with truncated, broadly flattened posterior end. Dorsal margin arched, umbonate, with greatest height passing through anterior cardinal angle; greatest length passing well below mid-point.

Holotype. Io. 1410, carapace, figured Plate 52, fig. 1, text-fig. 3, figs. *d–g*. Sub-Recent beach sediment, Lake Rudolf, Kenya.

Paratypes. Io. 1411–49, carapaces and single valves from the same locality as above.

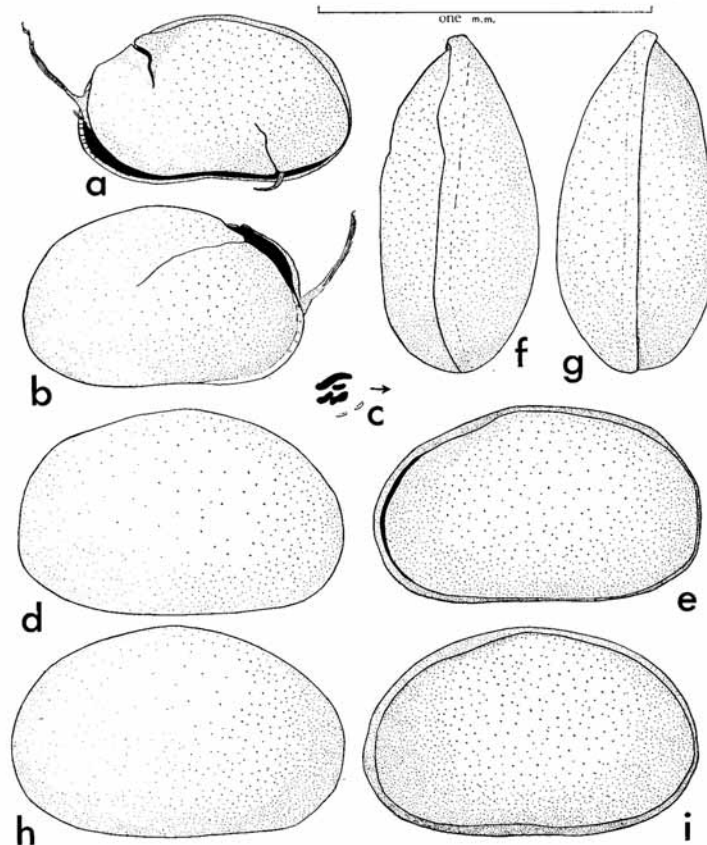
Other material. Io. 1450A, B. Topotype material contained in the original sample (M4); locality as above.

Description. Carapace strongly calcified, subrectangular in outline with broadly rounded anterior end and broad, truncated posterior end. Postero-dorsal slope long, flattened;

EXPLANATION OF PLATE 52

Hemicypris posterotruncata sp. nov. 1, left view of complete carapace, holotype, Io. 1410, $\times 85$. 2, right valve, paratype, Io. 1419, $\times 85$. 3, internal view of left valve showing anterior and posterior marginal denticles, paratype Io. 1415, $\times 85$. 5, section of anterior duplicature, right valve, showing small pits (sockets) for the reception of the marginal denticles of the left valve; paratype, Io. 1416, $\times 500$. 6, anterior duplicature, left valve, to show marginal denticles, paratype, Io. 1415, $\times 500$. 7, central and dorsal muscle scars, internal view of right valve, paratype, Io. 1418, $\times 85$.

postero-ventral slope convex. Posterior cardinal angle situated very close to extreme posterior end of carapace and prominently developed. Dorsal margin convex, umbonate at anterior cardinal angle which is situated above, or slightly in front of mid-point of carapace. Line of greatest height of valve passes through this cardinal angle. Extreme



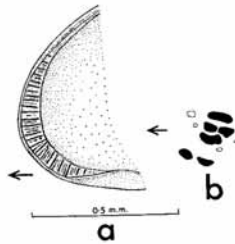
TEXT-FIG. 3. *a-c*, *Hemicypris fossulata* (Vávra), K. 19043, Zool. Staatsinstitut, Hamburg; left and right views, complete carapace and muscle scars. *d-g*, *Hemicypris posterotruncata* sp. nov. Io. 1410, holotype; right, left, dorsal and ventral views, complete carapace. *h, i*, *Hemicypris posterotruncata* sp. nov. Io. 1411, paratype; right and left views, complete carapace.

posterior termination of carapace is situated below mid-height and as a result line of greatest length passes well below mid-point. Line of greatest width passes through carapace slightly behind mid-point. Antero-dorsal slope long and obliquely convex. Ventral margin moderately convex with shallow median incurvature.

Right valve much larger than left, overlapping it strongly in region of antero-dorsal slope. Right valve also overlaps left along ventral margin and around posterior margin,

but anteriorly merely projects beyond the left. Mid-dorsally valves tend to diverge slightly and there is no overlap or overreach of either valve.

Shell surface granular, showing no evidence of surface pitting.



TEXT-FIG. 4. *a*, Anterior radial pore canals, paratype, Io. 1421. *b*, Muscle scars, right valve, paratype, Io. 1418, $\times 115$.

Hinge is simple with dorsal edge of smaller left valve (terminally thickened) fitting into groove situated in dorsal margin of right valve. This dorsal groove terminally widens to produce elongate sockets which are open at their ends to interior of valve.

Duplicature is of moderate width anteriorly and slightly more narrow posteriorly; selvage is particularly well developed in left valve. Inner margin and line of concrescence do not quite coincide but a distinct vestibule is not developed. Around antero-ventral and postero-ventral parts of free margin, small marginal denticles are developed in smaller left valve (Pl. 52, figs. 3, 6). These denticles fit into small pits (sockets) situated in duplicature of right valve (Pl. 52, figs. 4, 5). Posteriorly these sockets are overhung by prominent development of selvage. Marginal

denticles are a device for holding valves firmly together when closed.

Muscle scars (text-fig. 4*b*, Pl. 52, fig. 7), typical of the Cyprididae, consist of group of 4 laterally elongate adductor scars with 2 oval scars situated below. Prominent dorsal muscle scars are situated above these scars, just below hinge.

Anterior radial pore canals (text-fig. 4*a*) are straight and simple, numbering approximately 40-45.

Dimensions (in mm.)

	<i>Length</i>	<i>Height</i>	<i>Width</i>
<i>Holotype</i> , Io. 1410, carapace	0.95	0.59	0.48
<i>Paratypes</i> , Io. 1411, "	0.96	0.60	0.46
Io. 1412, "	0.98	0.60	0.45
Io. 1413, "	0.96	0.60	0.45
Io. 1415, left valve	0.95	0.55	
Io. 1416, right valve	0.93	0.59	
Io. 1418, " "	0.88	0.54	
Io. 1419, " "	0.93	0.59	

Remarks. *Hemicypris pyxidata* (Moniez) (text-fig. 2*a, b*) is more oval in outline and too compressed when viewed dorsally to be confused with *H. posterotruncata*. Some similarity in outline exists between the latter species and the slightly larger *H. ovata* Sars which is more oval in outline and without the truncated posterior margin. *Hemicypris megalops* Sars is close to *H. posterotruncata* in outline and size, but as is also the case for *H. ovata*, the valvular relationships when viewed from the left are completely different. This is evident in the camera lucida drawings (text-figs. 2*c, f*; 3*e, i*), in which the characteristic overlap of the left valve by the right in the antero-dorsal region of *H. posterotruncata* is clearly shown. This feature is not present in the other two species.

Hemicypris fossulata (Vávra) is distinguished from *H. posterotruncata* by the narrower, more evenly rounded anterior and posterior ends and by the less acute posterior cardinal angle. It has a punctate shell surface which is less pronounced than shown

by Vávra (1898, fig. 8), though this may be due to decalcification of the material during storage.

The specimens of *Hemicypris fossulata* (Vávra) in the collections of the Zoologisches Staatsinstitut, Hamburg, were collected from Kilimanjaro by Professor F. Fülleborn (1898–1900) and determined by Daday.

The other species placed in *Hemicypris* (*Heterocypris dentatmarginata*, *Cyprinotus fullerborni*, *C. humbertii* and *C. decoratus*) all differ from *H. posterotruncata* in carapace outline, whilst *Heterocypris reticulatus*, although of angular outline, is clearly distinguished by its surface ornamentation. *Cyprinotus inversus* Daday differs from *H. posterotruncata* not only in the possession of a more smoothly convex dorsal outline but also in the possession of straight radial pore canals in the right valve and branching canals in the left.

Conclusions. *Hemicypris* Sars is retained as a valid genus. The identification of *Hemicypris posterotruncata* sp. nov., a fossil species from ancient beach sediments of Lake Rudolf, indicates that the genus has a longer developmental history than had previously been understood. The assignment here of one fossil species and eleven living species to *Hemicypris* has extended the geographical distribution of the genus to include South America, North, South, and East Africa, Malagassy Republic, Java, Sumatra, the Célèbes and Japan. No species have yet been recorded from outside the area bounded by the latitudes 40° North and 40° South of the Equator. The genus *Cyprinotus*, on the other hand, besides being recorded from tropical climates, is also known to occur in the colder climates of the U.S.A., Canada, and Greenland.

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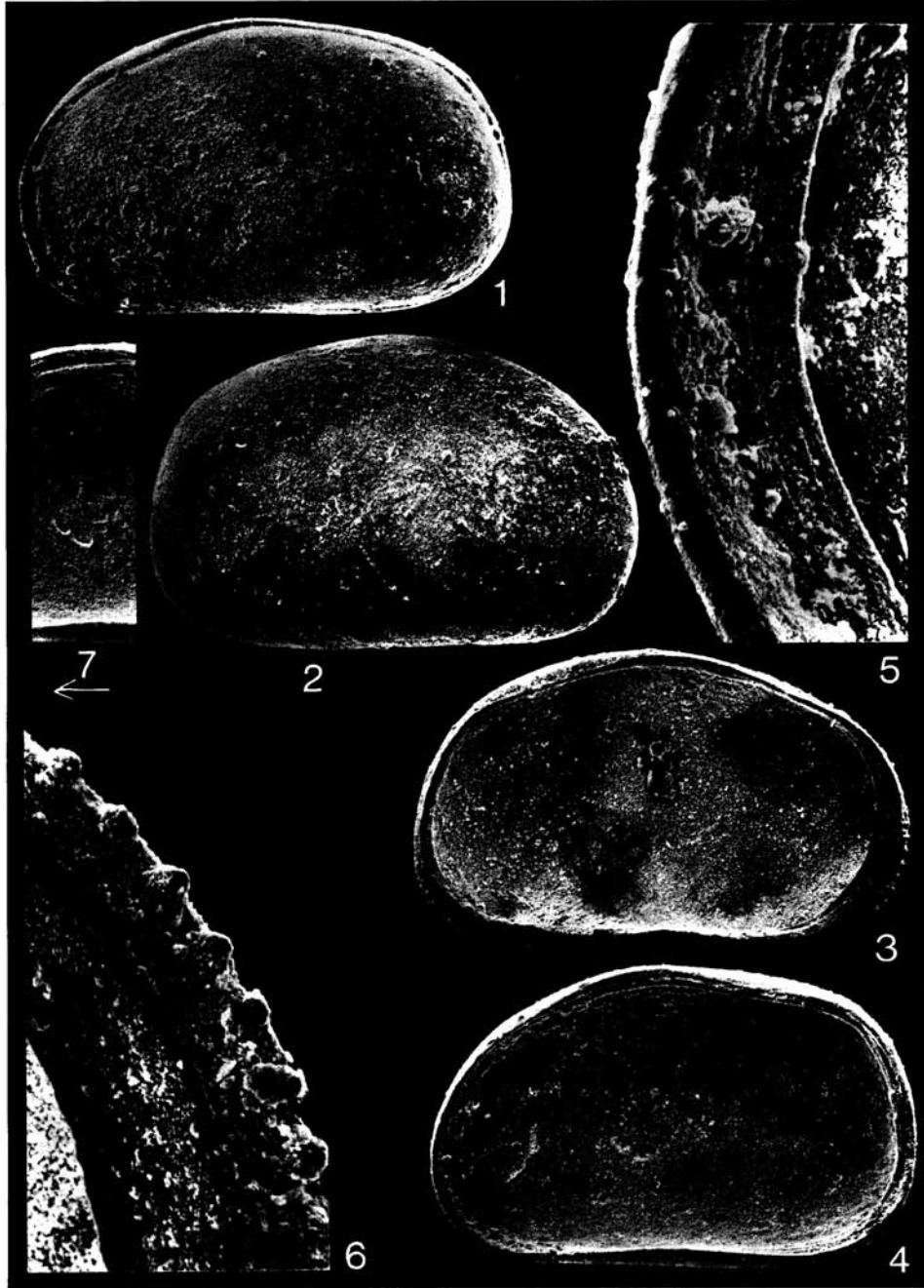
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