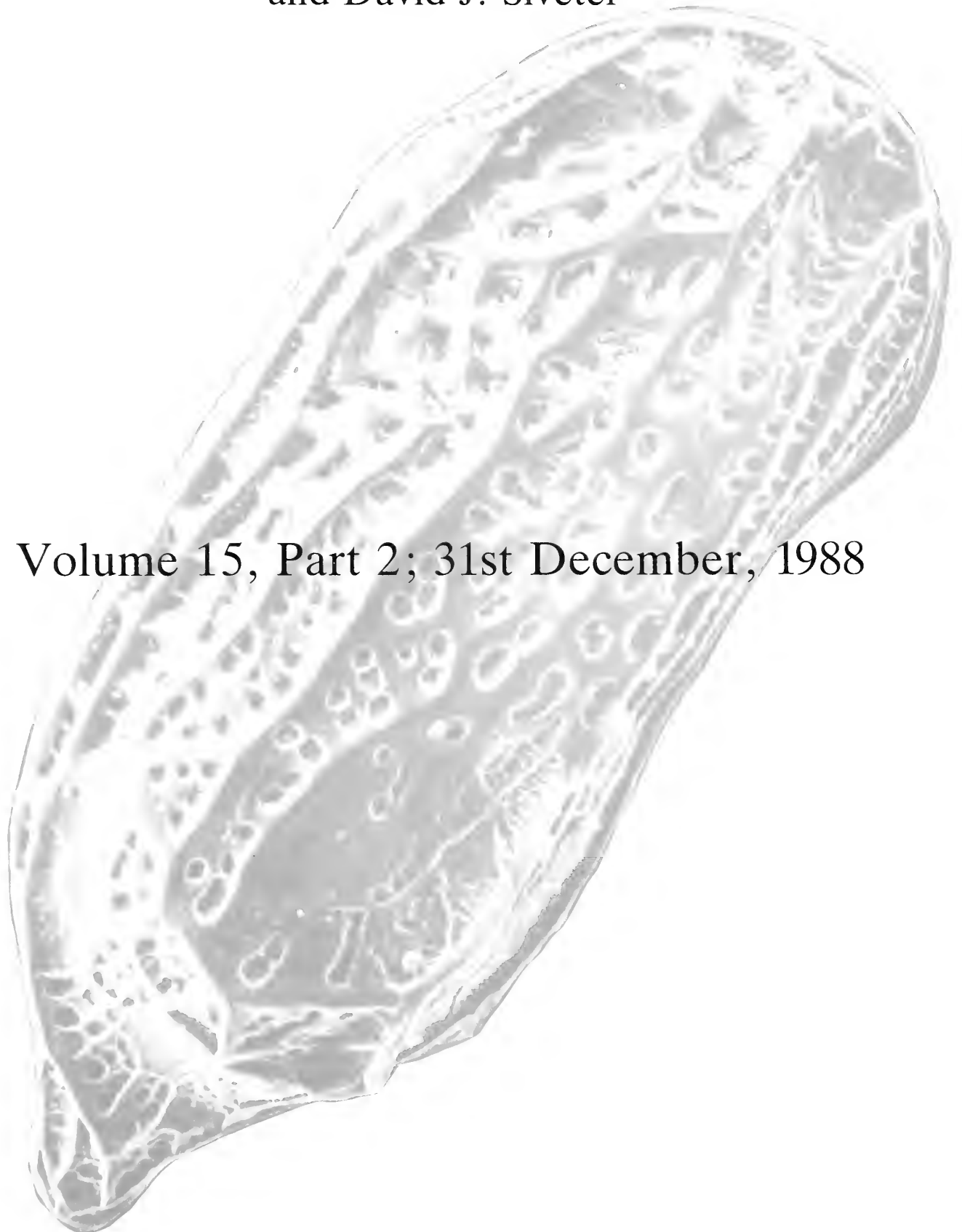


A Stereo-Atlas of Ostracod Shells

edited by J. Athersuch, D. J. Horne, J. W. Neale,
and David J. Siveter

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Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

The front cover shows a male right valve of *Semicytherura striata* (Sars) from intertidal algae collected at Blue Anchor, Somerset SW England. Photograph by Dr J. E. Whittaker, British Museum (Natural History), London.

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ON *ELOFSONIA PAPILLATA* WHATLEY & MAYBURY sp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Elofsonia papillata sp. nov.

Holotype: British Museum (Nat. Hist.) no. OS 12888; ♀ LV.

[Paratypes: British Museum (Nat. Hist.) nos. OS 12889–OS 12891].

Type locality: Blue Clay, sample no. 25, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, referring to the papillate micro-ornament of the valves.

Figured specimens: British Museum (Nat. Hist.) nos. OS 12888 (holotype, ♀ LV: Pl. 15, 74, fig. 1), OS 12889 (paratype, ♀ RV: Pl. 15, 74, fig. 2; Pl. 15, 76, fig. 4), OS 12890 (paratype, ♂ LV: Pl. 15, 74, fig. 3), OS 12891 (paratype, ♂ LV: Pl. 15, 76, figs. 1–3). Paratypes OS 12889, OS 12890 and OS 12891 from the type locality and type horizon, sample nos. 2, 28 and 27 respectively (see C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and North West France*, unpubl. PhD thesis, Univ. Wales, 1, 3–6, 1985 for sample details).

Explanation of Plate 15. 74

Fig. 1, ♀ LV, ext. lat. (holotype, OS 12888, 490 µm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 12889, 460 µm long); fig. 3, ♂ LV, ext. lat. (paratype, OS 12890, 480 µm long).
Scale A (100 µm; ×128), figs. 1–3.

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Elofsonia papillata (3 of 4)

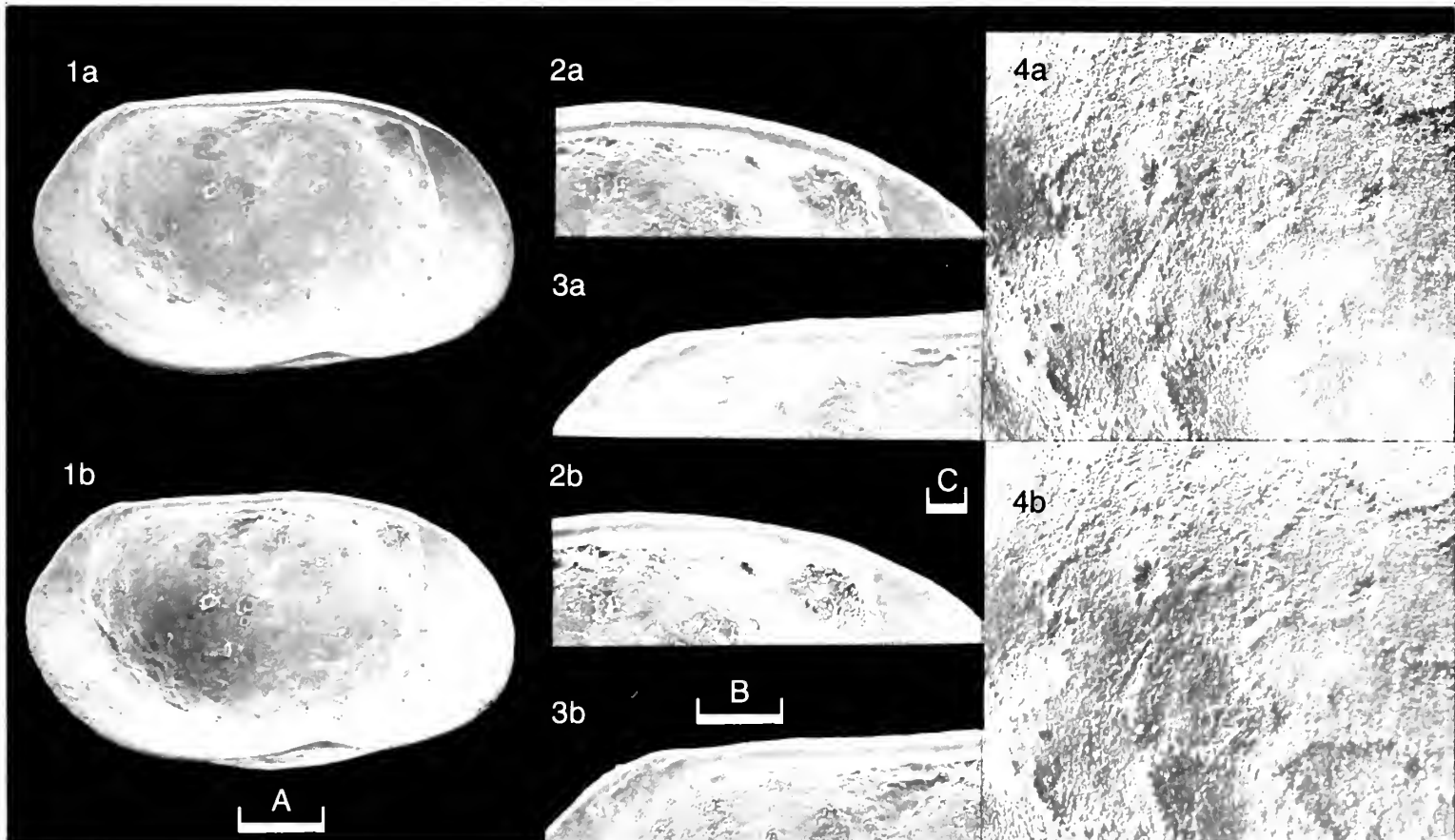
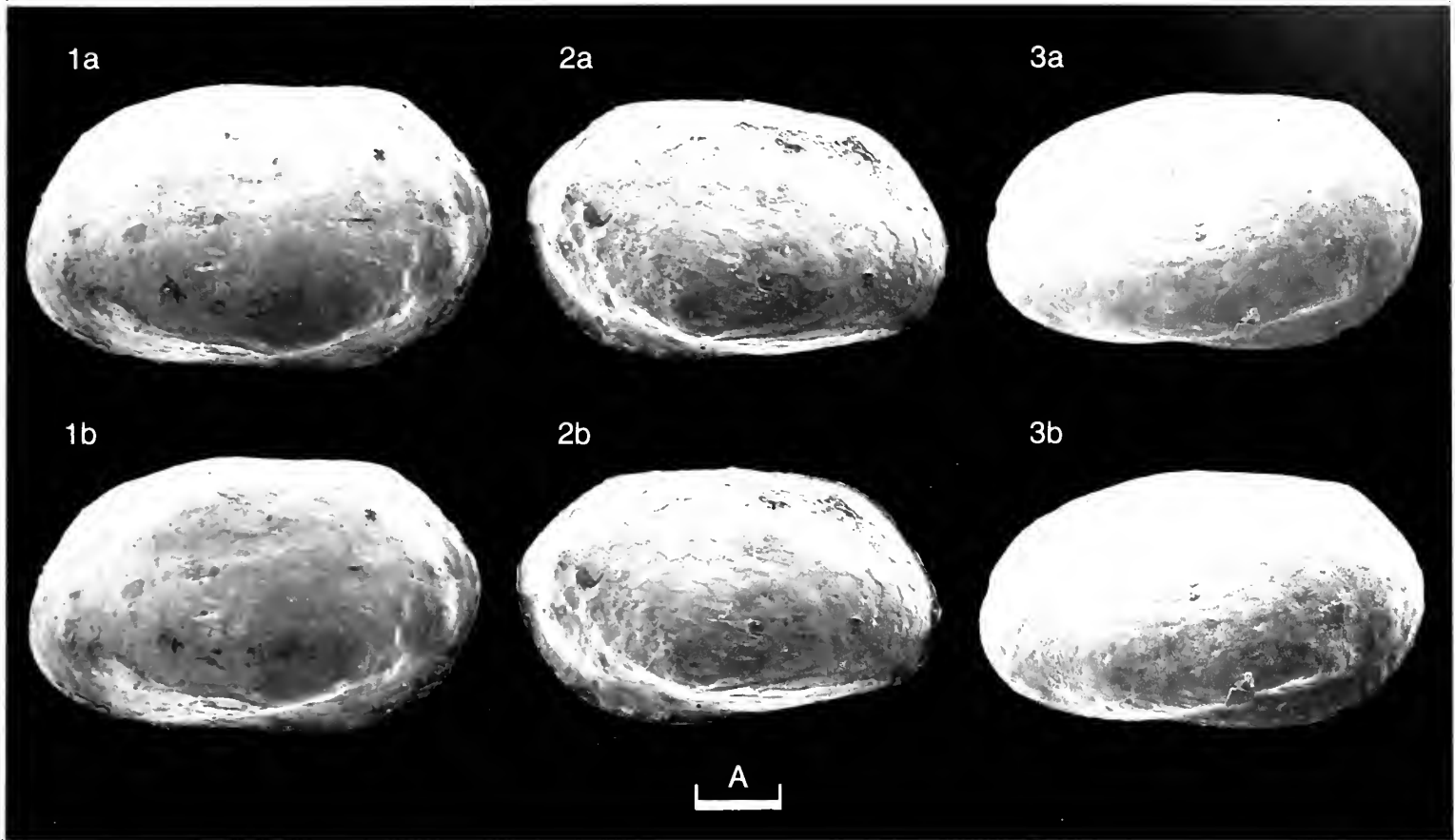
Diagnosis: A small to medium, subelliptical, posteroventrally compressed species of *Elofsonia* with a very delicate micropapillate ornament of pentagonal and hexagonal units and a subelliptical eye spot. A distinct keel-like rim occurs posteroventrally. Sieve-type normal pores commonly fringed by a circle of papillae. Hinge simple, comprising a smooth bar with indistinct posterior socket in the left valve. There is no distinct anterior terminal element, although the dorsal surface of the median bar of the left valve is weakly denticulate anteriorly. Right valve hinge complementary.

Remarks: In common with *E. papillata*, *E. baltica* (Hirschmann, 1909) *Meddn Soc. Fauna Flora fenn.*, 35, 294, figs. 11–12; see also J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, 1, 193–200, 1973) possesses sieve-type normal pores occasionally surrounded by papillae; *Elofsonia pusilla* (Brady & Robertson, 1870) (*Ann Mag. nat. Hist.*, 6(4), 23, pl. 8, figs. 1–3, 1870; see also J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, 1, 201–204, 1973) possesses a papillate ornament similar to that of the new species. *E. papillata*, however, is quite distinct from these two species with respect to its shape and outline: it is less tapered anteriorly and posteriorly and shows marked lateral compression posteroventrally, where a broad marginal rim is developed (this rim is absent in *E. pusilla* and *E. baltica*). A weakly developed anterior terminal hinge element is present in the other two species; but there is no clearly defined anterior terminal element in *E. papillata*, except for faint crenulations on the dorsal surface of the anterior end of the hinge groove/bar. In all specimens of *E. papillata* examined by the authors, the muscle scars were difficult to observe, so that no direct comparison could be made between those of this species and those of previously described *Elofsonia*.

Distribution: In addition to its occurrence in the Upper Pliocene deposits of St. Erth, England (sample nos. 2, 7, 10, 23, 25, 27–29; see C. Maybury *op. cit.* for sample details), *E. papillata* has been recovered from the French Redonian (Upper Pliocene) deposits of Apigné (Le Temple du Cerisier), Beugnon (sample no. 2) and L'Orchère Pincourt (see J.-P. Margerel, *Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, 1, 8–26, 1986 for sample details).

Explanation of Plate 15. 76

Figs. 1–3, ♂ LV (paratype, OS 12891, 450 µm long); fig. 1, int. lat.; fig. 2, ant. hinge element; fig. 3, post. hinge element; fig. 4, ♀ RV, ornament of lateral surface (paratype, OS 12889, 460 µm long).
Scale A (100 µm; ×128), fig. 1; scale B (40 µm; ×283), figs. 2, 3; scale C (10 µm; ×590), fig. 4.



ON *ELOFSONIA PRAEPUSILLA* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Elofsonia praepusilla sp. nov.

- Holotype*: British Museum (Nat. Hist.) no. **OS 12892**; ♀ RV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12893–OS 12895**].
- Type locality*: Brown Clay, sample no. 29, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.
- Derivation of name*: Latin, referring to the close similarity and possible ancestral relationship of the new species to the Pleistocene to Recent species: *Elofsonia pusilla* (Brady & Robertson, 1870) *Ann. Mag. nat. Hist.*, **6**(4), 23, pl. 8, figs. 1–3, 1870).
- Figured specimens*: British Museum (Nat. Hist.) nos. **OS 12892** (holotype, ♀ RV: Pl. 15, 78, fig. 1), **OS 12893** (paratype, ♂ LV: Pl. 15, 78, fig. 2; Pl. 15, 80, fig. 2), **OS 12894** (paratype, ♂ RV: Pl. 15, 80, fig. 1), **OS 12895** (paratype, ♀ RV: Pl. 15, 78, fig. 3; Pl. 15, 80, figs. 3–4). Specimen **OS 12895** is from sample no. 10 at the same locality and horizon as the holotype (see C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and North West France*, unpubl. PhD thesis, Univ. Wales, **1**, 3–6, 1985 for sample details) and specimens **OS 12893** and **OS 12894** are both from a sample of light grey, fine to medium grained sand from Le Bosq d'Aubigny (approx. lat. 49° 07'N, long. 1° 05'W), NW France; Upper Pliocene, Redonian (see J.-P. Margerel, *Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, **1**, 8–26, 1968 for geographical and stratigraphical details).

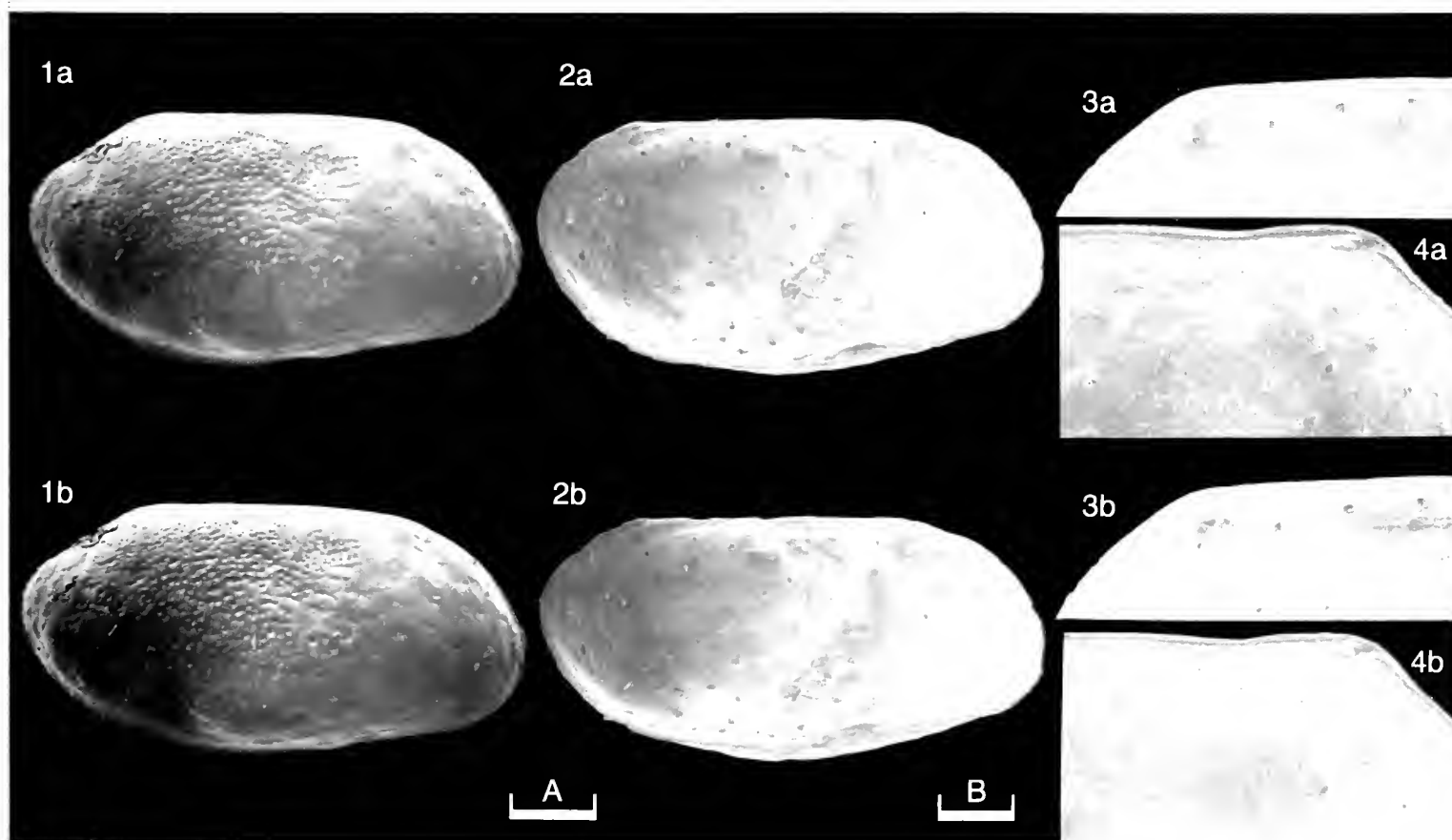
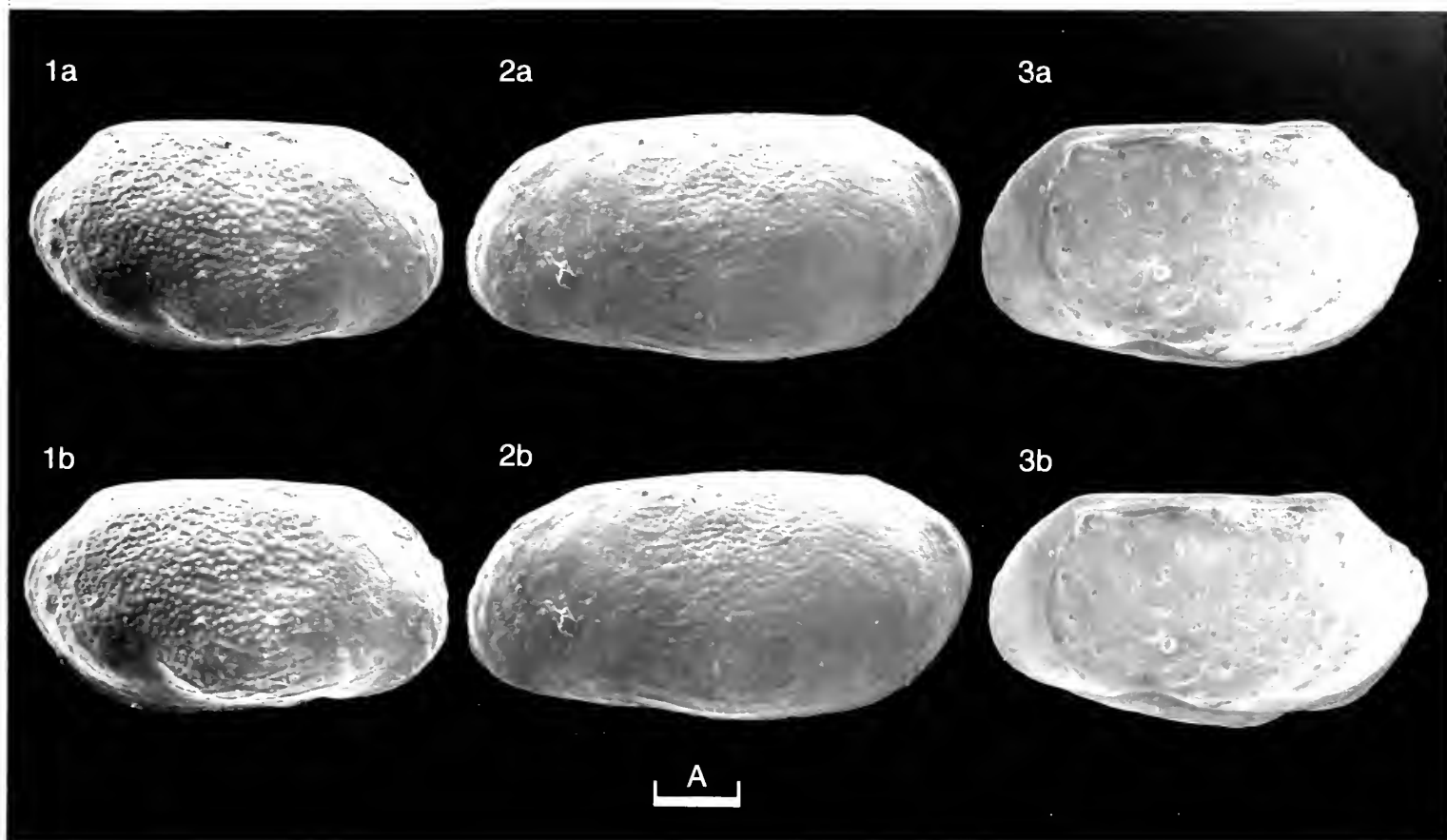
Explanation of Plate 15, 78

Fig. 1, ♀ RV, ext. lat. (holotype, **OS 12892**, 440 µm long); fig. 2, ♂ LV, ext. lat. (paratype, **OS 12893**, 520 µm long); fig. 3, ♀ RV, int. lat. (paratype, **OS 12895**, 460 µm long).
Scale A (100 µm; ×129), figs. 1–3.

- Diagnosis*: A small to medium, subelliptical to subrectangular, punctate and micropapillate species of *Elofsonia* with a weakly developed alar projection midventrally. Sexual dimorphism very strongly developed with males very much longer than females.
- Remarks*: This species closely resembles *Elofsonia pusilla* (see J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **1**, 201–204, 1973) in shape and outline, although the alar protuberance of *E. praepusilla* is more prominent and overall the valves of the present species are less tumid. Both *E. pusilla* and *E. praepusilla* possess a punctate and micropapillate ornament; but whereas the punctate component of the ornament dominates in the latter species, it is subordinate in the former. The most striking difference between the two species is the strong degree of carapace dimorphism exhibited by *E. praepusilla*. Both males and females of *E. pusilla* are elongate, whereas the females of *E. praepusilla* are much less elongate in relation to the male. Precocious sexual dimorphism is also evident in the A-1 and A-2 instars of the present species.
- E. praepusilla* differs from *E. papillata* Whatley & Maybury, 1988 (*Stereo-Atlas Ostracod Shells*, **15**, 73–76), the only other recorded Pliocene species of *Elofsonia*, in its more elongate carapace and punctate ornament.
- Distribution*: This species has been recovered from the Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos. 1–3, 7, 10, 16, 18, 23, 26–29) and the Upper Pliocene (Redonian) deposits of Beugnon (sample no. 2), L'Orchère Pincourt, Le Bosq d'Aubigny and a mixed sample, NW France. See C. Maybury (*op. cit.*) and J.-P. Margerel (*op. cit.*) for details of the British and French samples respectively.

Explanation of Plate 15, 80

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12894**, 530 µm long); fig. 2, ♂ LV, int. lat. (paratype, **OS 12893**, 520 µm long); figs. 3, 4, ♀ RV (paratype, **OS 12895**, 460 µm long); fig. 3, ant. hinge element; fig. 4, post. hinge element.
Scale A (100 µm; ×129), figs. 1, 2; scale B (50 µm; ×223), figs. 3, 4.



ON *LOXOCONCHA ATHERSUCHI* WHATLEY & MAYBURY sp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Loxoconcha athersuchi sp. nov.

Holotype: British Museum (Nat. Hist.) no. OS 12882; ♀ RV.

[Paratypes: British Museum (Nat. Hist.) nos. OS 12883–OS 12887].

Type locality: Fine glauconitic, grey sand between 26.7–32.4 m, Apigné (Borehole II), SW of Rennes (approx. lat. 48° 07'N, long. 1° 41'W), NW France; Redonian, Upper Pliocene.

Derivation of name: In honour of Dr John Athersuch in recognition of his important work on the Loxoconchidae.

Figured specimens: British Museum (Nat. Hist.) nos. OS 12882 (holotype, ♀ RV: Pl. 15, 82, fig. 1), OS 12883 (paratype, ♂ LV: Pl. 15, 82, fig. 2), OS 12884 (paratype, ♂ RV: Pl. 15, 82, fig. 3), OS 12885 (paratype, ♀ LV: Pl. 15, 84, fig. 1), OS 12886 (paratype, ♀ RV: Pl. 15, 84, fig. 2), OS 12887 (paratype, ♂ RV: Pl. 15, 84, fig. 3). Paratypes OS 12883–OS 12884 are from the same sample as the holotype; paratypes OS 12886–OS 12887 are from a bulk sample (sample no. 1), Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid. Ref. SW 556352); Upper Pliocene.

Explanation of Plate 15, 82

Fig. 1, ♀ RV, ext. lat. (holotype, OS 12882, 630 µm long); fig. 2, ♂ LV, ext. lat. (paratype, OS 12883, 750 µm long); fig. 3, ♂ RV, ext. lat. (paratype, OS 12884, 720 µm long).

Scale A (200 µm; ×86), figs. 1–3.

Diagnosis: A medium to large, subovate (♀) to subrectangular (♂) species of *Loxoconcha*, coarsely punctate medianly and reticulate peripherally with distinct radiate muri anteriorly. Free marginal rim broad, except orally and with an ornament of weakly developed muri with micropunctate sola. Internal details typical of the genus.

Remarks: This species is similar in carapace morphology to *Loxoconcha linleyi* Horne, 1982 (*Stereo-Atlas Ostracod Shells*, 9, 33–40), but whereas *L. athersuchi* possesses a coarsely punctate ornament medianly, *L. linleyi* is finely pitted. The reticulate component of the ornament of the present species is also more strongly developed and male specimens are both absolutely and relatively more elongate.

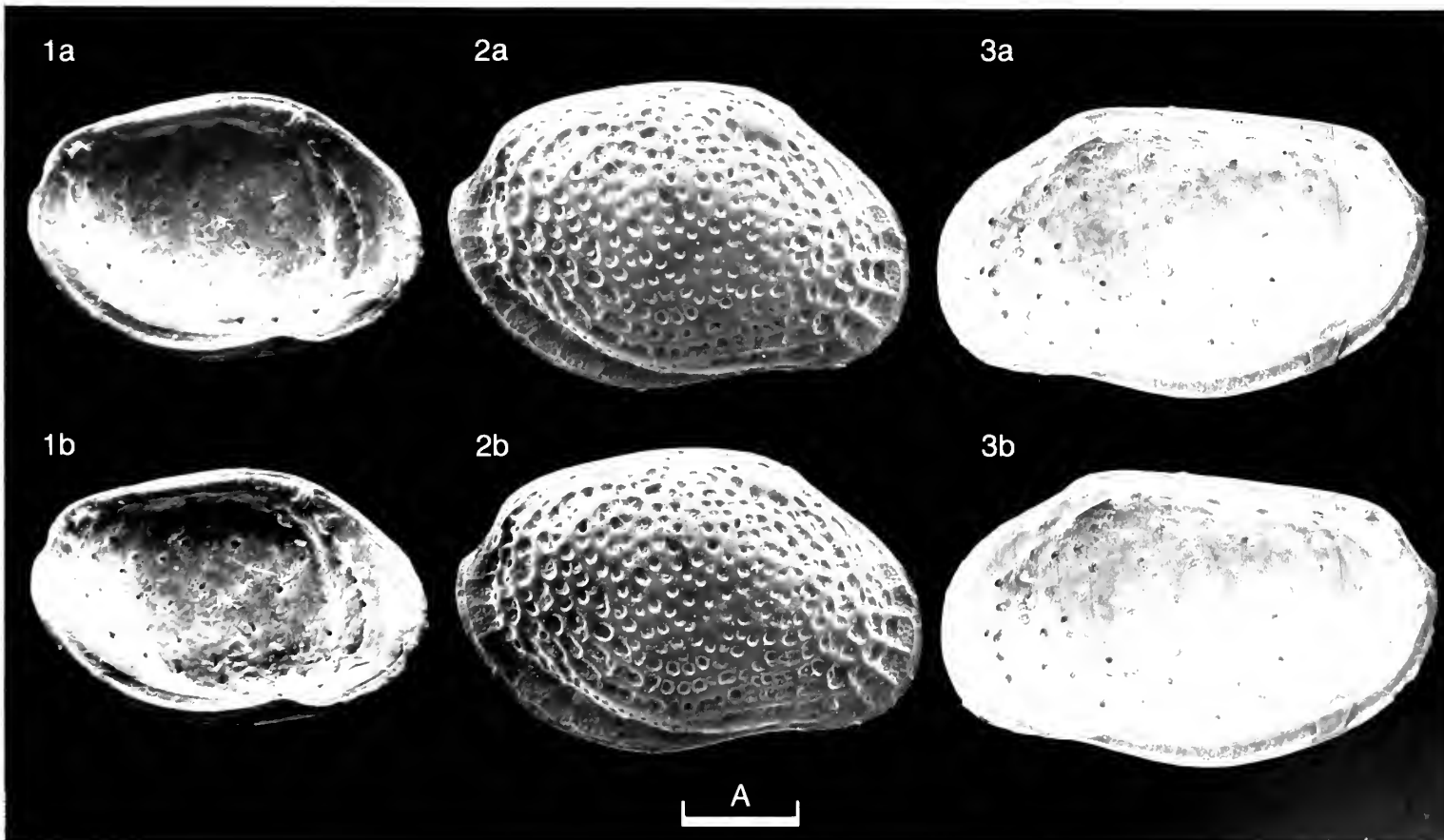
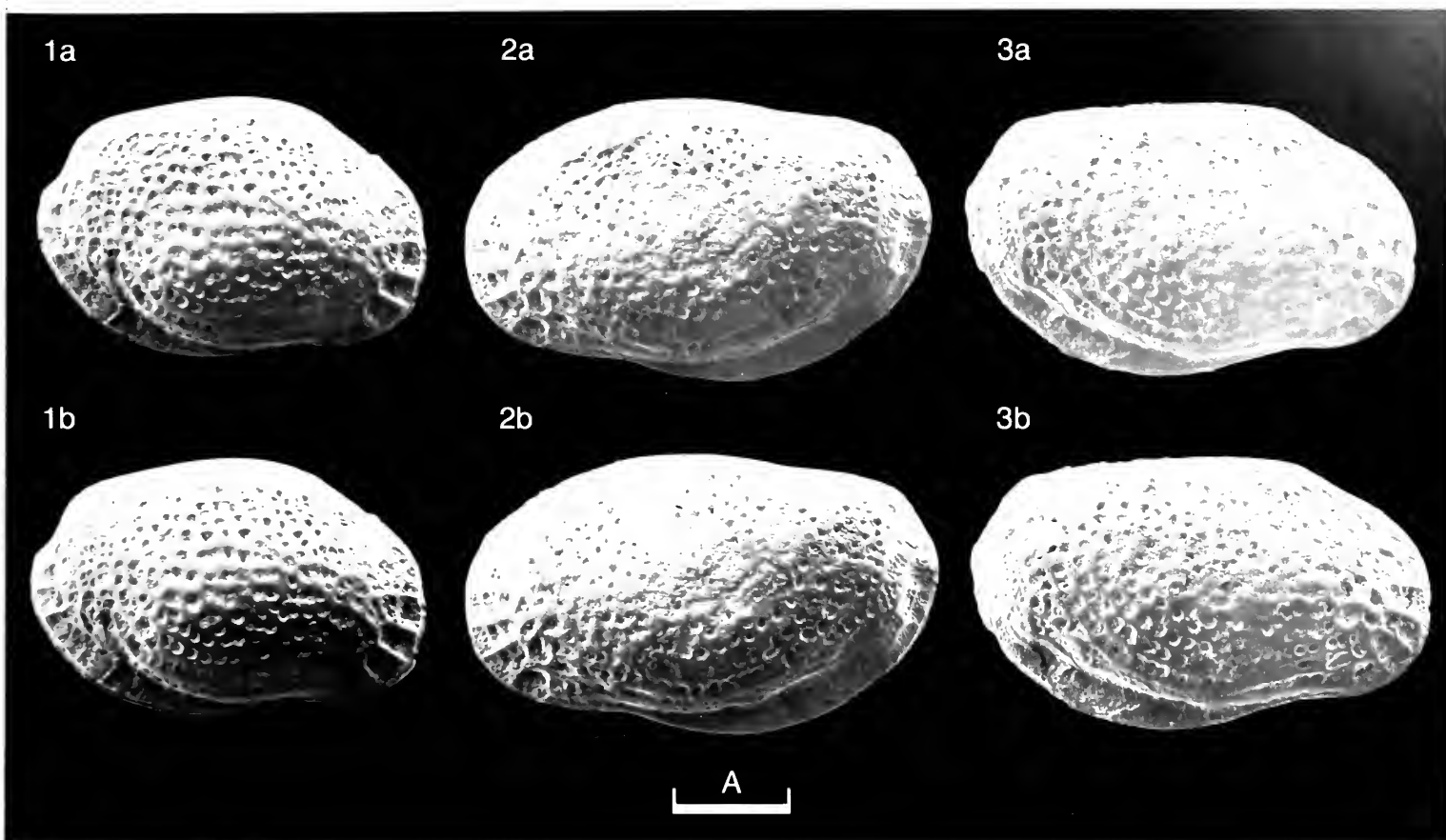
L. athersuchi is an abundant component of the ostracod fauna from the two French localities in the Apigné region listed below; but only ten valves have been recovered from the single British locality, St. Erth and these, without exception, are larger than the French specimens. Both French (Pl. 15, 82, figs. 1–3 and Pl. 15, 84, fig. 1) and British (Pl. 15, 84, figs. 2–3) specimens are illustrated for comparison; their size difference may be a consequence of their disjunct geographical distribution.

Distribution: The species has been recovered from the Redonian, Upper Pliocene deposits of Apigné (Borehole II and Le Temple du Cerisier), L'Orchère Pincourt, Palluau I, Palluau II and a mixed sample, all from NW France (see J.-P. Margerel, *Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, 1, 8–26, 1968 for sample details). It also occurs in a bulk sample (sample no. 1) and a sample of blue clay (sample no. 29) from the Upper Pliocene deposits of Vicarage Pit, St. Erth, Cornwall, England (see C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, 1, 3–6, 1985 for sample details).

Explanation of Plate 15, 84

Fig. 1, ♀ LV, int. lat. (paratype, OS 12885, 620 µm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 12886, 720 µm long); fig. 3, ♂ RV, int. lat. (paratype, OS 12887, 780 µm long).

Scale A (200 µm; ×86), figs. 1–3.



ON *EKTYPHOCY THERE QUADRATA* BOOMER & LORD sp. nov.

by Ian Boomer & Alan Lord
(University College, London)

Ektyphocythere quadrata sp. nov.

1974 *Ektyphocythere* sp. A.; A. Lord, *Palaeontology*, 17 (3), 614, pl. 90, figs. 11, 12.

1985 *Ektyphocythere* sp. A of Lord, 1974; P. Donze, in: Oertli, H. J. (Ed.), Atlas des Ostracodes de France. *Mémoires Elf-Aquitaine*, 9, 114, pl. 25, figs. 12, 13, Pau.

Holotype: British Museum (Nat. Hist.) no. OS 13237; ♀ LV.

Type locality: Thorncombe Beacon, Dorset Coast; lat. 50° 43' 0" N, long. 2° 48' 30" W. *Amaltheus margaritatus* clay (sample 62 of Lord 1974); late Pliensbachian, *Amaltheus subnodosus* Subzone, Jurassic.

Derivation of name: With reference to the distinctive lateral outline.

Figured specimens: British Museum (Nat. Hist.) nos. OS 13236 (♂ LV: Pl. 15, 86, fig. 1), specimen lost (♂ RV: Pl. 15, 86, fig. 2), OS 13237 (♀ LV: Pl. 15, 88, fig. 3), OS 13238 (♀ RV: Pl. 15, 88, fig. 1), OS 13239 (♀ RV: Pl. 15, 88, fig. 2), OS 13240 (♀ LV: Pl. 15, 88, fig. 3).

All specimens from the type level and locality.

Diagnosis: A distinctly quadrate species of *Ektyphocythere*. Valves elongate, slightly more elongate in the larger left valve. Dorsal and ventral margins converge only slightly posteriorly, with well-marked posterior cardinal angles in both valves. Ornament consists of uniform, longitudinal ribs showing weak triangular alignment. Intercostal surface finely punctate. Hinge hemimerodont, each tooth comprising seven bifid elements. Muscle scars as figured (see Text-fig. 1). Inner lamella broad, fused throughout. Marginal pore canals simple and straight, seven anteriorly, four posteriorly. Sexual dimorphism is apparent, the presumed males being more elongate (Pl. 15, 86, figs. 1, 2). Overlap is best developed along posterior margin and at anterior cardinal angle.

Explanation of Plate 15, 86

Fig. 1, ♂ LV, ext. lat. (OS 13236, 745 μm long); fig. 2, ♂ RV, ext. lat. (specimen lost, 775 μm long); fig. 3, ♀ LV, ext. lat. (holotype, OS 13237, 695 μm long). Scale A (100 μm; ×105), figs. 1–3.

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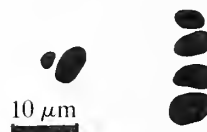
Ektyphocythere quadrata (3 of 4)

Remarks: Recorded from the Dorset Coast only from the *subnodosus* Subzone (Lord 1974). Donze (1985) figured two specimens from the early Domerian of France, one from the *A. margaritatus* Zone of Tilly-sur-Seulles, Calvados and the other from the *Amaltheus stokesi* Subzone (equivalent to the lower part of the British *A. margaritatus* Zone) of Saint-Vincent-Sterlange, Vendée, both of which undoubtedly belong to the new species. In his accompanying range chart Donze gives a stratigraphical distribution for the species of late Pliensbachian. The present authors also have sporadic records of this species from the Mochras borehole, Wales. The youngest record of the species is from a *Dactyloceras tenuicostatum* Zone marl from the Ilminster area (Nat. Grid Ref. 406157), England.

Maupin (*Geobios*, 11, 107–111, 1978) described two new species of "*Procytheridea*?" from the earliest Toarcian of Vendée, France. One of these species, *P. jardensis*, has an outline similar to that of *E. quadrata* (Maupin 1978, pl. 1, figs. 5–11.) but has fewer, less distinct primary ribs. The second species, *P. neumanna*, has an outline similar to the genus *Gramannella* but possesses a ribbing pattern similar to *E. quadrata* (Maupin 1978, pl. 1, figs. 1–4.). *P. jardensis* has been recorded from the *P. spinatum* Zone of the Mochras Borehole and probably evolved from *E. quadrata* in the late Pliensbachian.

Material studied: Three adult carapaces, 150 adult valves and 30 juvenile valves.

Text fig. 1. Adductor and frontal muscle scars
of right valve of *Ektyphocythere quadrata*.

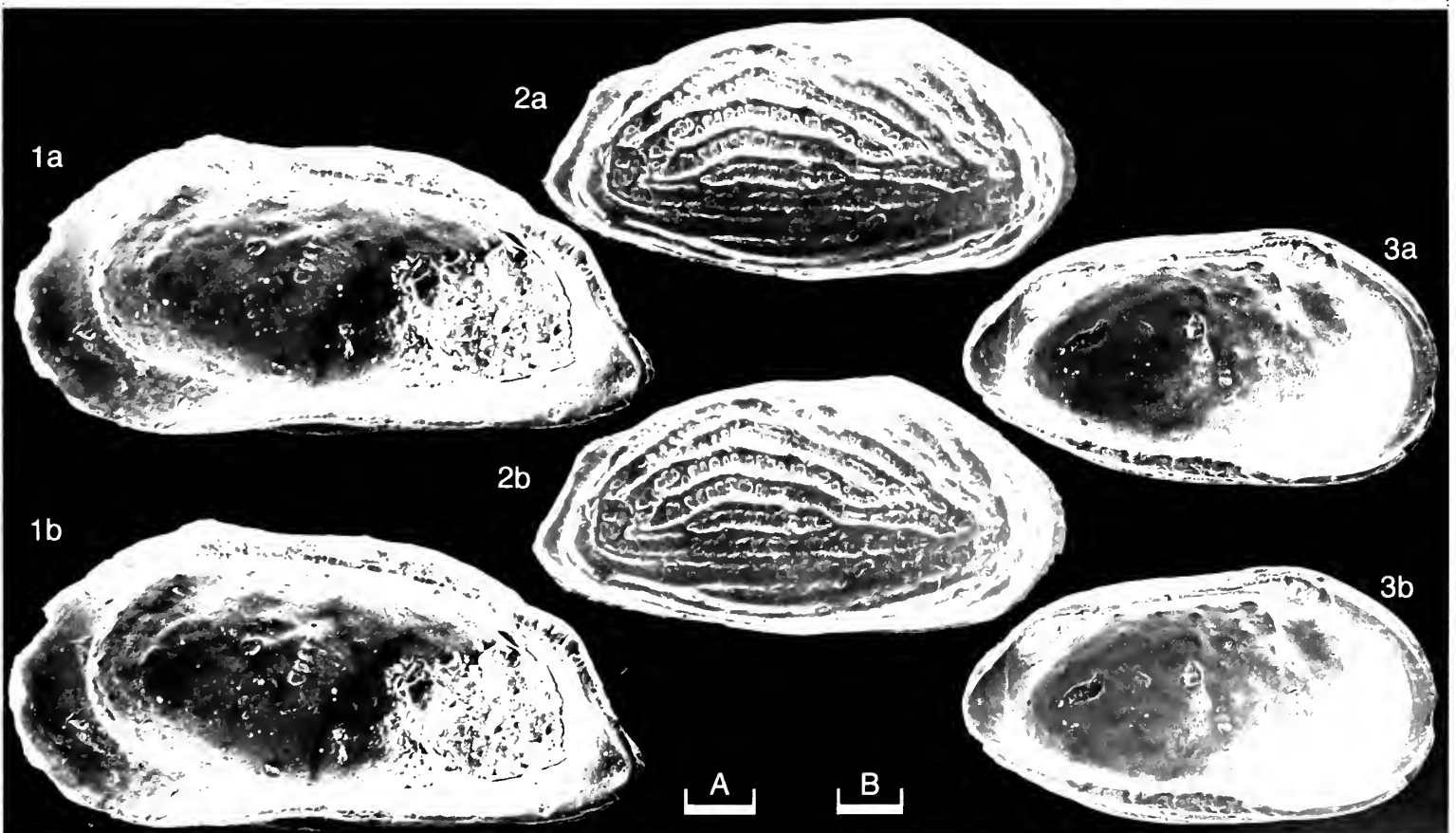
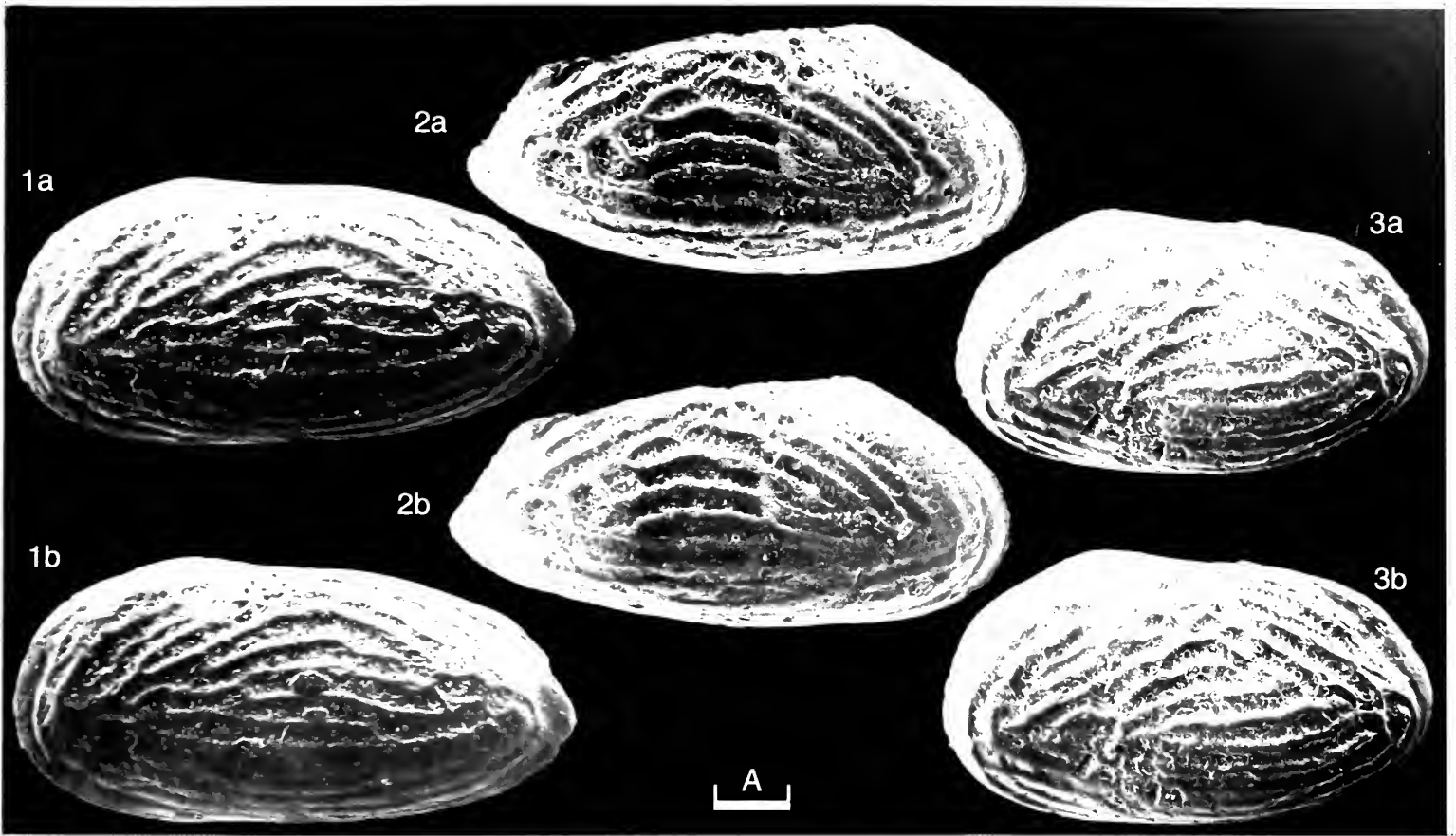


Distribution: The Pliensbachian *Pleuroceras spinatum*, *A. margaritatus* (*A. stokesi* Subzone) and *Tragophylloceras ibex* zones of the Mochras borehole, Wales; *A. stokesi* to *P. spinatum* zones, late Pliensbachian of France (Donze, 1985); *A. subnodosus* Subzone of the Dorset Coast (Lord 1974) and the Toarcian, *D. tenuicostatum* Zone of the Ilminster area, England.

Acknowledgements: Dept Education, Northern Ireland and University College, London, for their financial support.

Explanation of Plate 15, 88

Fig. 1, ♀ RV, int. lat. (OS 13238, 645 μm long); fig. 2, ♀ RV, ext. lat. (OS 13239, 715 μm long); fig. 3, ♀ LV, int. lat. (OS 13240, 640 μm long). Scale A (100 μm; ×146), fig. 1; scale B (100 μm; ×100), figs. 2, 3.



ON *EKTYPHOCY THERE LANCEOLATA* BOOMER sp. nov.

by Ian Boomer
(University College, London)

Ektyphocythere lanceolata sp. nov.

Holotype: British Geological Survey, Keyworth no. **MPK 5800**, ♀ carapace.

Type locality: Mochras Borehole, Dyfed, Wales (Nat. Grid Ref. 55332594); lat. 52° 51'0"N, long. 4° 06'30"W. Sample no. 5 (609.8–611.2m); Toarcian, *Dumortieria levesquei* Zone (*D. moorei* Subzone), Jurassic.

Derivation of name: With reference to the valve outline in lateral view.

Figured specimens: British Geological Survey nos. **MPK 5800** (holotype, ♀ car.: Pl. 15, 90, fig. 1), **MPK 5801** (♀ LV: Pl. 15, 90, fig. 2), **MPK 5802** (♀ RV: Pl. 15, 92, fig. 1), **MPK 5803** (♀ car.: Pl. 15, 92, fig. 2), **MPK 5804** (♀ LV: Pl. 15, 94, fig. 3).

All specimens are from type level and locality.

Explanation of Plate 15, 90

Fig. 1, ♀ LV, ext. lat. (holotype, **MPK 5800**, 730 μm long); fig. 2, ♀ RV, ext. lat. (**MPK 5801**, 750 μm long). Scale A (100 μm; ×115), figs. 1, 2.

Diagnosis: A species of *Ektyphocythere* with a distinctly elongate (lanceolate) lateral outline. Dorsal and ventral margins converging to a narrowly rounded posterior in the left valve, with a more triangular and pointed posterior margin in the right valve. Ornament consists of fine longitudinal ribs in weak triangular alignment with intercostal punctation. Marginal zone broad and fused throughout. Hinge hemimerodont, but details of the terminal elements unknown. Material available suggests that muscle scars are typical of the genus. Left valve larger than right; overlap generally weak but best developed at the cardinal angles. Sexually dimorphic, the presumed males being more elongate and less inflated posteriorly.

Remarks: *Ektyphocythere lanceolata* is closely related to the Pliensbachien to Toarcian *E. quadrata* Boomer & Lord (Stereo-Atlas Ostracod Shells, 15, 85–88, 1988), the main distinguishing feature being the more obviously tapering outline of the former. Their respective stratigraphical positions suggests a close evolutionary link.

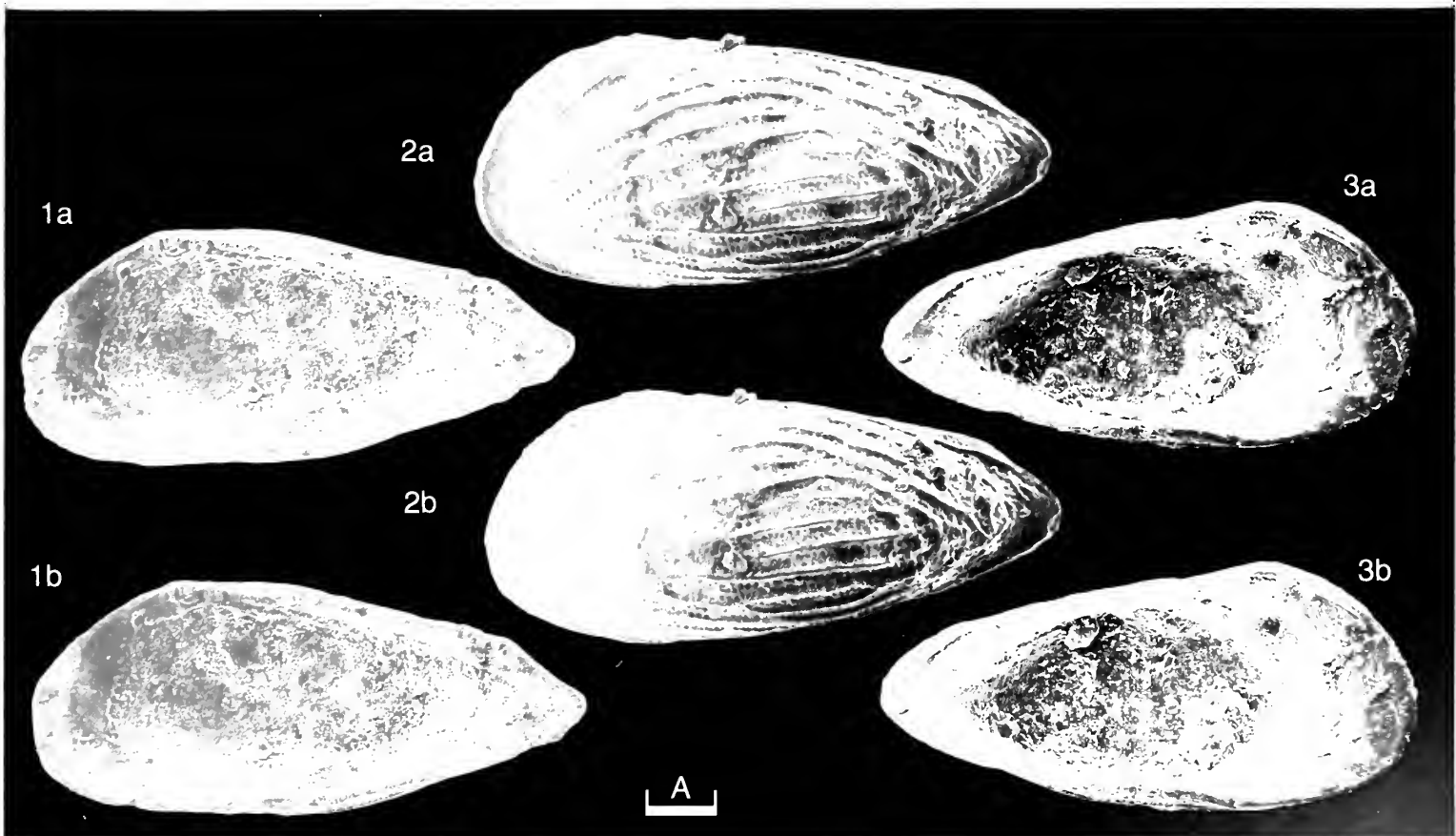
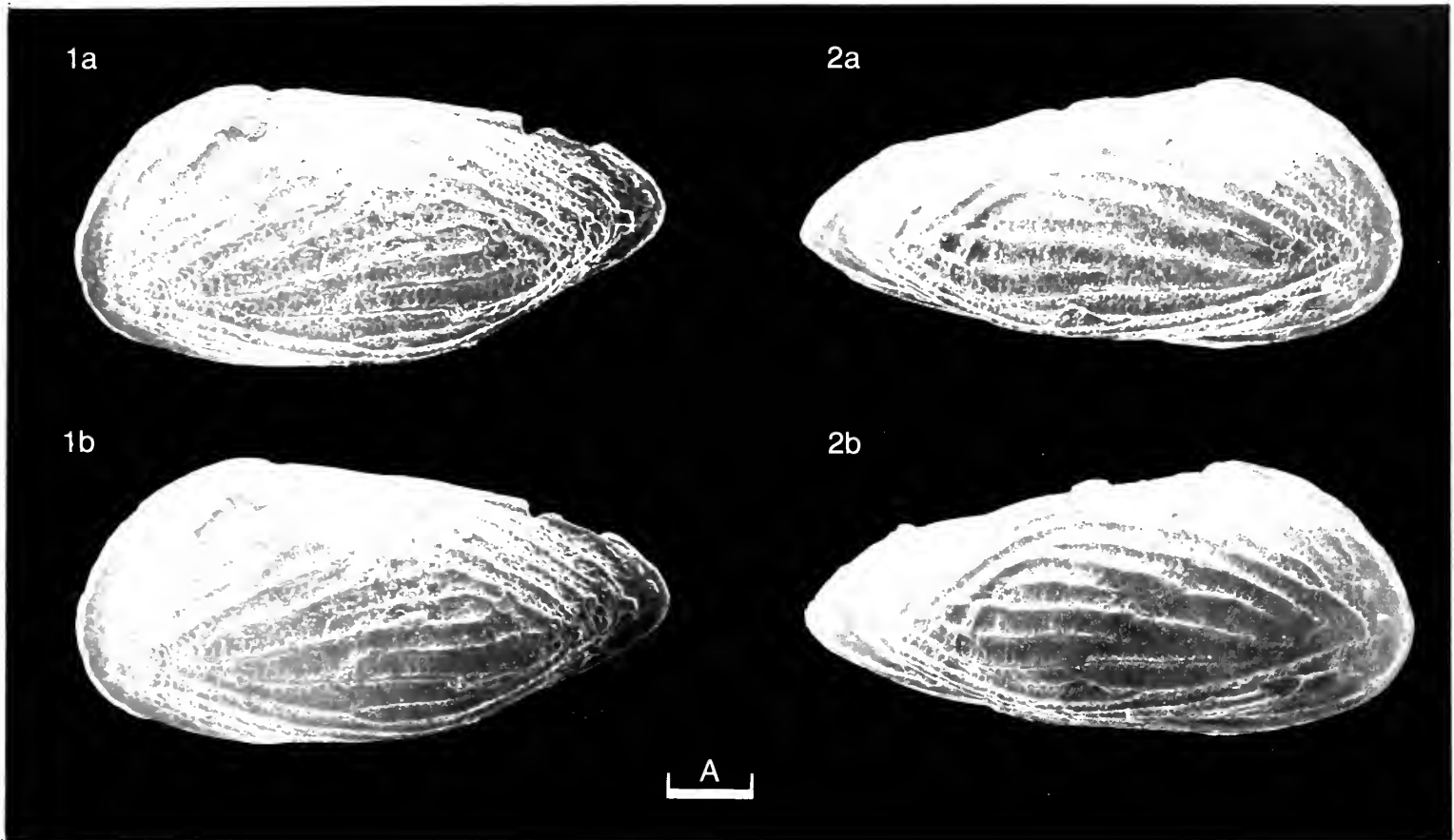
Material studied: 20 adult carapaces, 35 adult valves and 15 juvenile valves and fragments. Only a few poorly preserved male specimens were recovered.

Distribution: Only recorded from the late Toarcian of the Mochras Borehole, Wales.

Explanation of Plate 15, 92

Fig. 1, ♀ RV, int. lat. (**MPK 5802**, 745 μm long); fig. 2, ♀ LV, ext. lat. (**MPK 5803**, 705 μm long); fig. 3, ♀ LV, int. lat. (**MPK 5804**, 740 μm long).

Scale A (100 μm; ×100), figs. 1–3.



ON *EKTYPHOCY THERE ANTEROCOSTA* BOOMER sp. nov.

by Ian Boomer
(University College, London)

Ektyphocythere anterocosta sp. nov.

?1986 *Ektyphocythere* sp. A. N. R. Ainsworth, *Bull. geol. Surv. Ir.*, 3, 316, pl. 9, figs. 7, 8, 10–12.

Holotype: British Museum (Nat. Hist.) no. OS 13277; ♂ RV.

Type locality: Temporary road exposure on the A303 Ilminster bypass, Boxstone Hill, Dorset, Nat. Grid Ref. 402156 (lat. 50° 44'N, long. 2° 30'W); marl approximately 30cm below base of Yeovil Sands, Toarcian, *Pseudogrammoceras fallaciosum* Subzone.

Derivation of name: With reference to the ornament on the anterior lateral surfaces.

Figured specimens: British Museum (Nat. Hist.) nos. OS 13276 (♂ LV: Pl. 15, 94, fig. 1), OS 13277 (holotype, ♂ RV: Pl. 15, 94, fig. 2; Pl. 15, 96, figs. 1, 5), OS 13278 (♀ LV: Pl. 15, 94, fig. 3; Pl. 15, 96, fig. 4), OS 13279 (RV juv.: Pl. 15, 94, fig. 4), OS 13280 (LV juv.: Pl. 15, 94, fig. 5), OS 13281 (♀ LV: Pl. 15, 96, fig. 2), OS 13282 (♀ car: Pl. 15, 96, fig. 3). Nos. OS 13276–78, 81, 82 from type level and locality; nos. OS 13279, 80 from upper part of *Hildoceras bifrons* Zone, type section, 80cm below type level.

Diagnosis: A species of *Ektyphocythere* distinguished by the coarsely reticulate ornament especially on the anterior third of the lateral surface where it is dominated by several primary costae aligned parallel to the anterior margin. In lateral view, carapace is elongate oval tapering to a narrowly rounded posterior; right valve slightly more quadrate than left; ornament of primary ribs in roughly triangular alignment; secondary cross ribs are strongly developed in well-preserved specimens; in

Explanation of Plate 15, 94

Fig. 1, ♂ LV, ext. lat. (OS 13276, 820µm long); fig. 2, ♂ RV, ext. lat. (holotype, OS 13277, 800µm long); fig. 3 ♀ LV, int. lat. (OS 13278, 780µm long); fig. 4, juv. RV, ext. lat. (OS 13279, 700µm long); fig. 5, juv. LV, ext. lat. (OS 13280, 690µm long). Scale A (100µm; ×75), figs. 1–5.

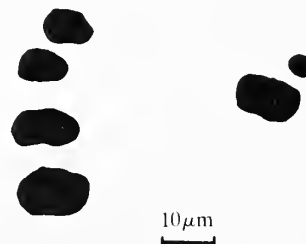
Diagnosis (cont.): the right valve apex of the triangular ribbing projects beyond dorsal margin. Left valve overlaps right most markedly at the cardinal angles and along the ventral margin (see Pl. 15, 96, fig. 3). Males more elongate than females. Inner margin is broad and fused throughout. Six anterior and four posterior simple marginal pore canals. Hinge hemimerodont(?) with each tooth socket consisting of seven or eight bifid elements (see Pl. 15, 94, fig. 4). Details of the median element unknown. Muscle scars as figured (Text–fig. 1).

Remarks: Material studied consists of five carapaces and 69 valves. In well-preserved specimens this species is quite distinct. It may, however, be confused with *E. intrepida* Bate & Coleman, 1975 in poorly preserved specimens. The two may be differentiated by the form of the anterior lateral ornament. In *E. anterocosta* the primary ribs parallel the anterior margin whereas in *E. intrepida* the primary ribs meet at an acute angle in that part of the valve. In the latter, no primary ribs follow the course of the anterior margin. *E. rugosa* (Bizon, 1960) and *E. bucki* (Bizon, 1960) differ from the new species both in outline and pattern of ribbing.

Ainsworth (*op. cit.*) described similar specimens from the Toarcian and Aalenian of the Fastnet Basin; his material is too poorly preserved for an accurate taxonomic assessment.

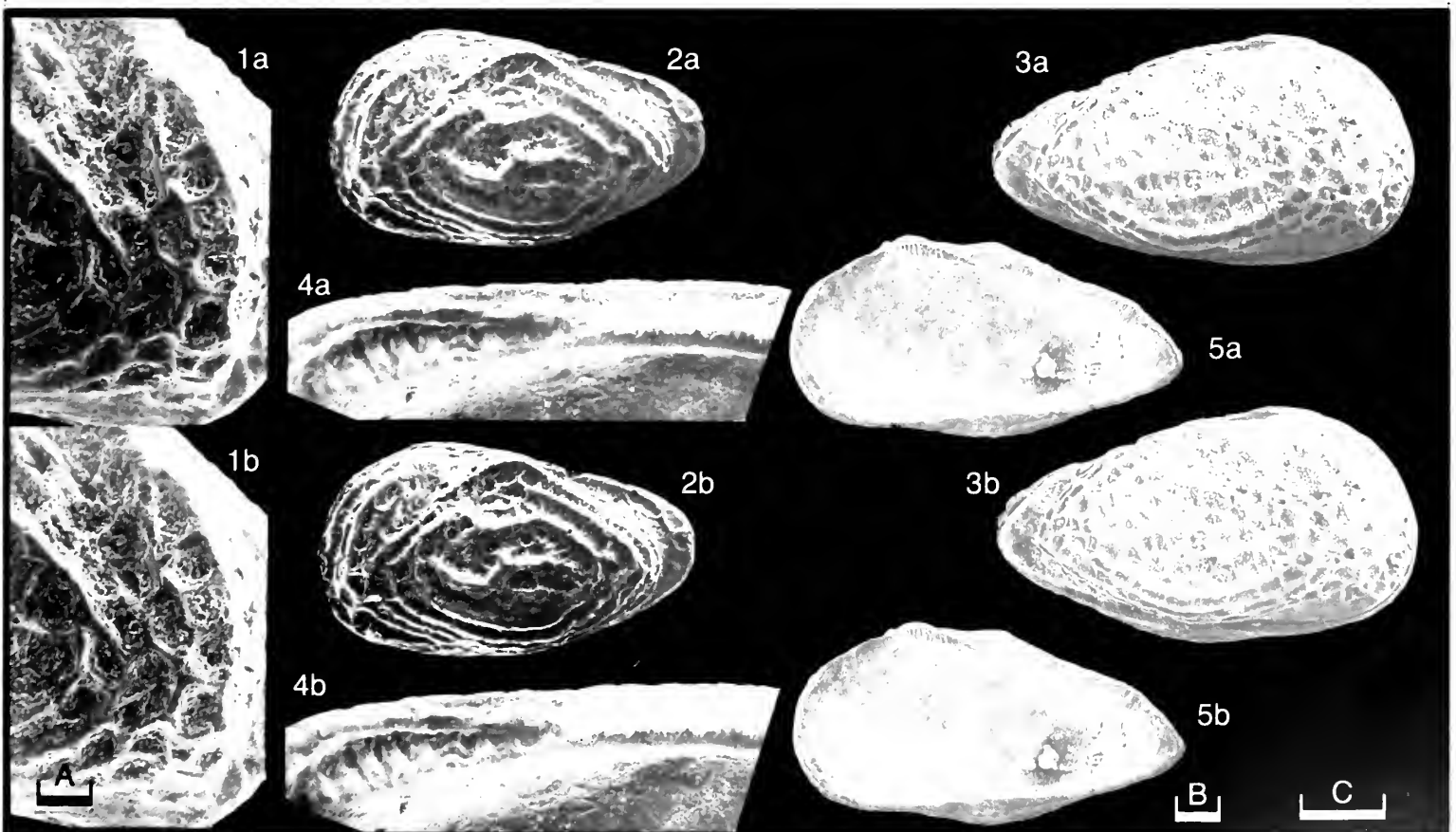
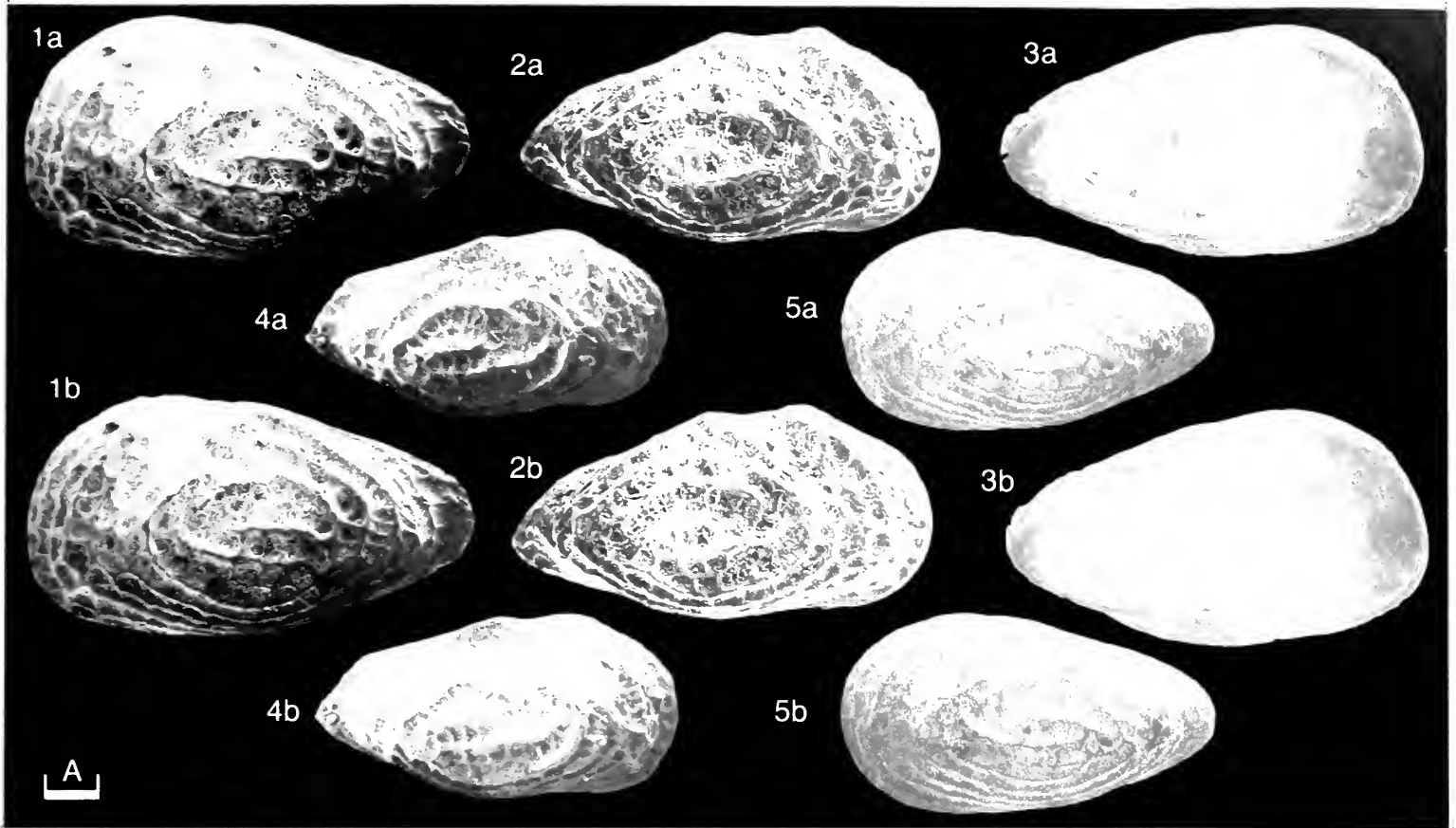
Distribution: *H. bifrons* and *Grammoceras thouarsense* zones, Toarcian, of the Ilminster area, England.

Text fig. 1. Adductor and frontal muscle scars of female left valve of *E. anterocostata* (OS 13278).



Explanation of Plate 15, 96

Fig. 1, ♂ RV, ant. ornament (holotype OS 13277); fig. 2, ♀ LV, ext. lat. (OS 13281, 730µm long); fig. 3, ♀ car., ext. lat. (OS 13282, 790µm long); fig. 4, ♀ LV, int. lat. post. hinge (OS 13278); fig. 5, ♂ RV, int. lat. (holotype, OS 13277, 800µm long). Scale A (50µm; ×160), fig. 1; scale B (100µm; ×70), figs. 2, 3, 5; scale C (50µm; ×250), fig. 4.



ON *ROMECCYTHERIDEA TENUISCVLPTA* (ROME)

by Karel Wouters

(Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Genus *ROMECCYTHERIDEA* nom. nov.

1962 *Neocytheridea* gen. nov. D. R. Rome, *Expl. Hydrobiol. Lac Tanganika, Rés. Scient.*, 3(8), 291 (non *Neocytheridea* Grekoff, 1953, non *Neocytheridea* Rajagopalan, 1962).

Type-species (by original designation): *Neocytheridea tenuisculpta* Rome, 1962.

Derivation of name: After DOM R. Rome (1893–1974) who described the genus *Neocytheridea* from Lake Tanganyika.

Diagnosis: Medium-sized valves with anterior and posteroventral rim; sexual dimorphism pronounced; females with posteroventral brood-pouch; males very narrow in dorsal view; females broad in dorsal view; hinge merodont; V-shaped frontal scar; fulcral point present; small anterior and indistinct posterior vestibulum; numerous marginal pore canals, often bifurcating; valve surface reticulated, sometimes with nodes and protuberances.

Romeccytheridea tenuisculpta (Rome, 1962)

1962 *Neocytheridea tenuisculpta* sp. nov. D. R. Rome, *Expl. Hydrobiol. Lac Tanganika, Rés. Scient.*, 3(8), 291, figs. 81, 82.

Holotype: Rome's collection "Ostracodes du Lac Tanganika" is deposited in the "Koninklijk Belgisch Instituut voor Natuurwetenschappen", Brussels, but the type-series of *Neocytheridea tenuisculpta* is lacking and its whereabouts unknown.

Type locality: Lake Tanganyika, Zaire, SE of Kalemie (=Albertville) (approx. lat. 5° 57'S, long. 29° 10'E), depth 7m. Recent, non-marine.

Explanation of Plate 15, 98

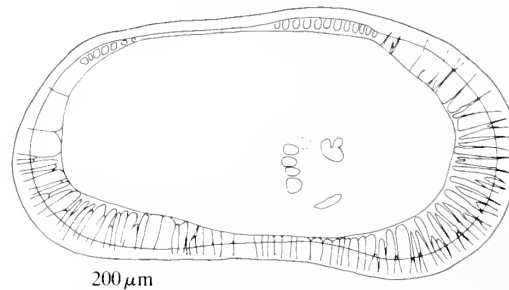
Fig. 1, ♀ LV, ext. lat. (OC 1287, 670 μm long); fig. 2, ♂ LV, ext. lat. (OC 1290, 660 μm long); fig. 3, ♂ RV, ext. lat. (OC 1288, 680 μm long). Scale A (200 μm; ×90), figs. 1–3.

Figured specimens: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, nos. OC 1287 (♀ car.: Pl. 15, 98, fig. 1), OC 1288 (♂ car.: Pl. 15, 98, fig. 3), OC 1289 (♂ LV: Pl. 15, 100, fig. 1), OC 1290 (♂ car.: Pl. 15, 98, fig. 2; Pl. 15, 100, fig. 2)), OC 1291 (♀ car.: Pl. 15, 100, fig. 3), OC 1292 (♂ LV: Text-fig. 1). All figured specimens are from Lake Tanganyika, Zaire, Isle of Kavala, Bay of Bracone (lat. 5° 39'S, long. 29° 22'E), depth 12m (Kavala is an islet near the West bank, at about 40km NE of Kalemie), and were found in a sediment sample which was collected by the "Mission Hydrobiologique du Lac Tanganika" on 2nd February 1947 (Station no. 138).

Diagnosis: Valves relatively large and thick-shelled; subcentral tubercle present; posteroventral brood pouch small; posterodorsal node lacking; hinge strongly developed; numerous marginal pore canals; males without mediolateral protuberances; posterior extremity of male carapace in dorsal view narrow.

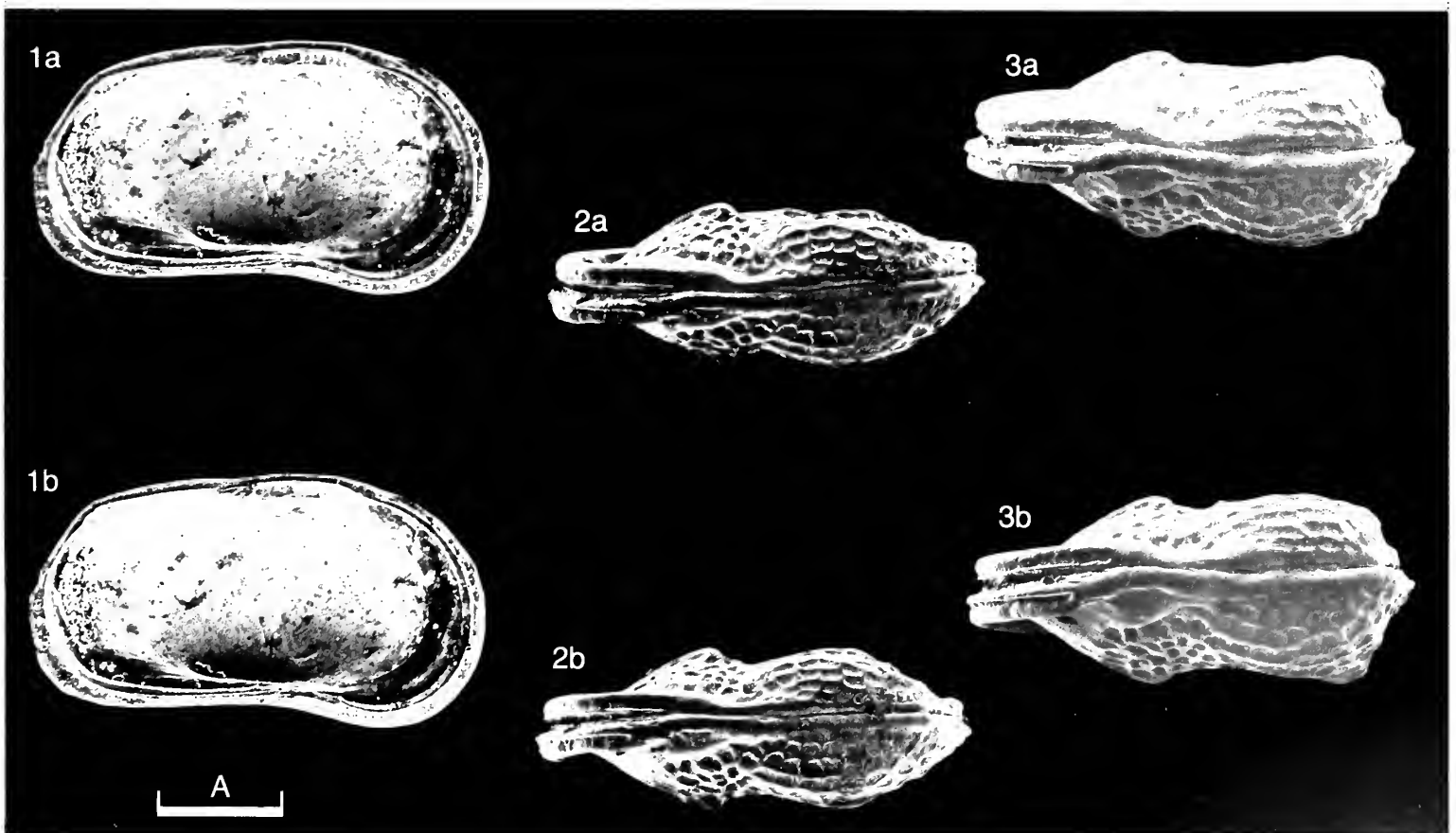
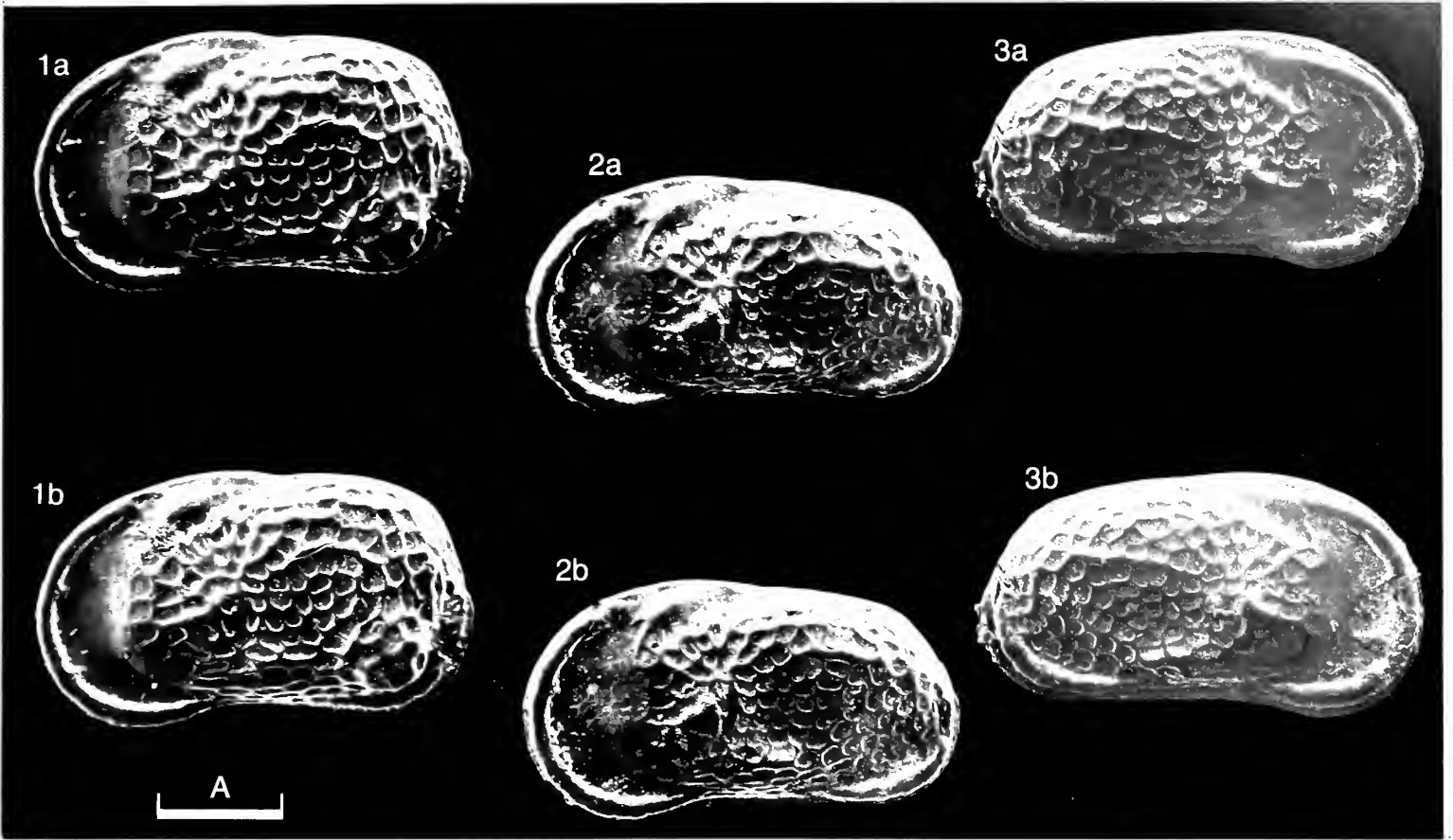
Distribution: Recent: *R. tenuisculpta* is known from different localities in Lake Tanganyika. (1) the type-locality, (2) Zaire, Bay of Bracone of the Isle of Kavala, 40km NE of Kalemie. (3) Zaire, off Moliro, depth 3m (coll.: L. Stappers, 21st November 1912; sample no. 1686), (4) Burundi, N end of Maholi Mountains, depth 2m (coll.: A. Cohen, 1986; sample no. 86.RJ.61B) and (5) Tanzania, Kapili, depth 30m (coll.: A. Cohen, 1986; sample no. 86.RJ.76).

Text-fig. 1. ♂ LV, int. lat.
(OC 1292, 710 μm long).



Explanation of Plate 15, 100

Fig. 1, ♂ LV, int. lat. (OC 1289, 670 μm long); fig. 2, ♂ car., dors. (OC 1290, 660 μm long); fig. 3, ♀ car., dors. (OC 1291, 680 μm long). Scale A (200 μm; ×90), figs. 1–3.





ON *ROMECCYTHERIDEA AMPLA* WOUTERS sp. nov.

by Karel Wouters

(Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Romecytheridea ampla sp. nov.

Holotype: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, no. **OC 1295**; ♀ car.
[Paratypes: nos. **OC 1296–OC 1309**].

Type locality: Lake Tanganyika, Zaire, Isle of Kavala, Bay of Bracone, 40km NE of Kalemie (approx. lat. 5° 39'S, long. 29° 22'E); Recent, non-marine.

Derivation of name: Latin, *amplus* = wide, because of the wide female carapace (in dorsal view).

Figured specimens: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, nos. **OC 1295** (holotype, ♀ car.: Pl. 15, 102, fig. 1), **OC 1296** (paratype, ♀ car.: Pl. 15, 102, fig. 2), **OC 1297** (paratype, ♂ car.: Pl. 15, 102, fig. 3), **OC 1298** (paratype, ♂ car.: Pl. 15, 104, fig. 2), **OC 1299** (paratype, ♀ car.: Pl. 15, 104, fig. 3), **OC 1301** (paratype, ♀ LV: Pl. 15, 104, fig. 1), **OC 1303a** (paratype, ♂ LV: Text-fig. 1a), **OC 1303b** (paratype, preparation, ♂ appendages: Text-fig. 1b, 1c, 1d, 1e, 1g; Text-fig. 2b, 2d, 2f), **OC 1302b** (paratype, preparation, ♂ appendages: Text-fig. 1f; Text-fig. 2c, 2e), **OC 1309b** (paratype, preparation, ♀ appendages: Text-fig. 2a, 2g). **OC 1295–OC 1300** are from the type-locality; **OC 1301–OC 1309** are from Zaire, S Lake Tanganyika, between Moliro and Vua (station 1718) (approx. lat. 8° 11'S, long. 30° 31'E); collected at a depth of 8m by Dr Louis Stappers on 25th November 1912 during the "Mission Stappers 1911–1913", the first Belgian zoological expedition to Lake Tanganyika.

Explanation of Plate 15. 102

Fig. 1, ♂ LV, ext. lat. (holotype, **OC 1295**, 460µm long); fig. 2, ♀ RV, ext. lat. (paratype, **OC 1296**, 460µm long); fig. 3, ♂ RV, ext. lat. (paratype, **OC 1297**, 450µm long).

Scale A (200µm; ×140), figs. 1–3.

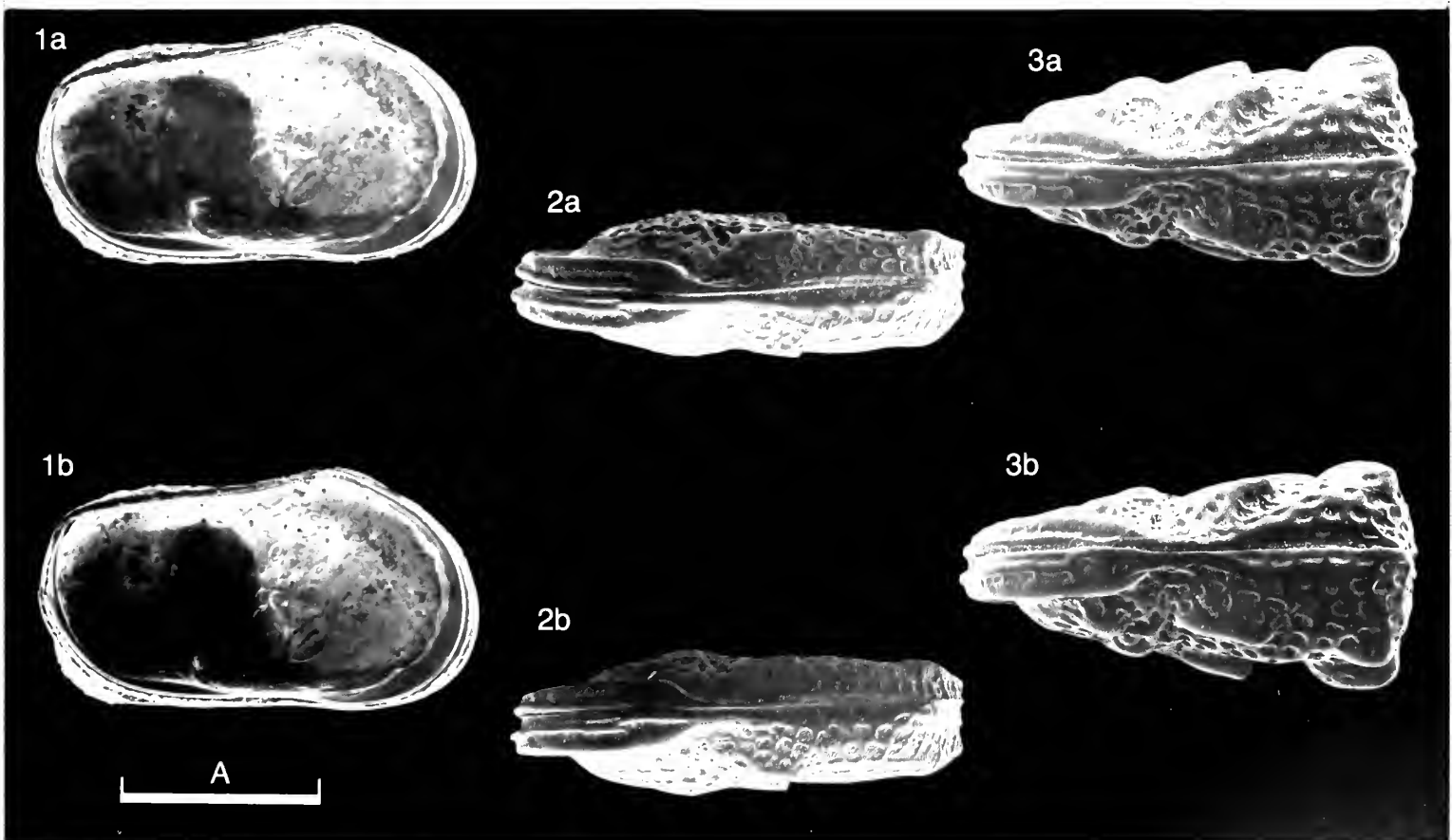
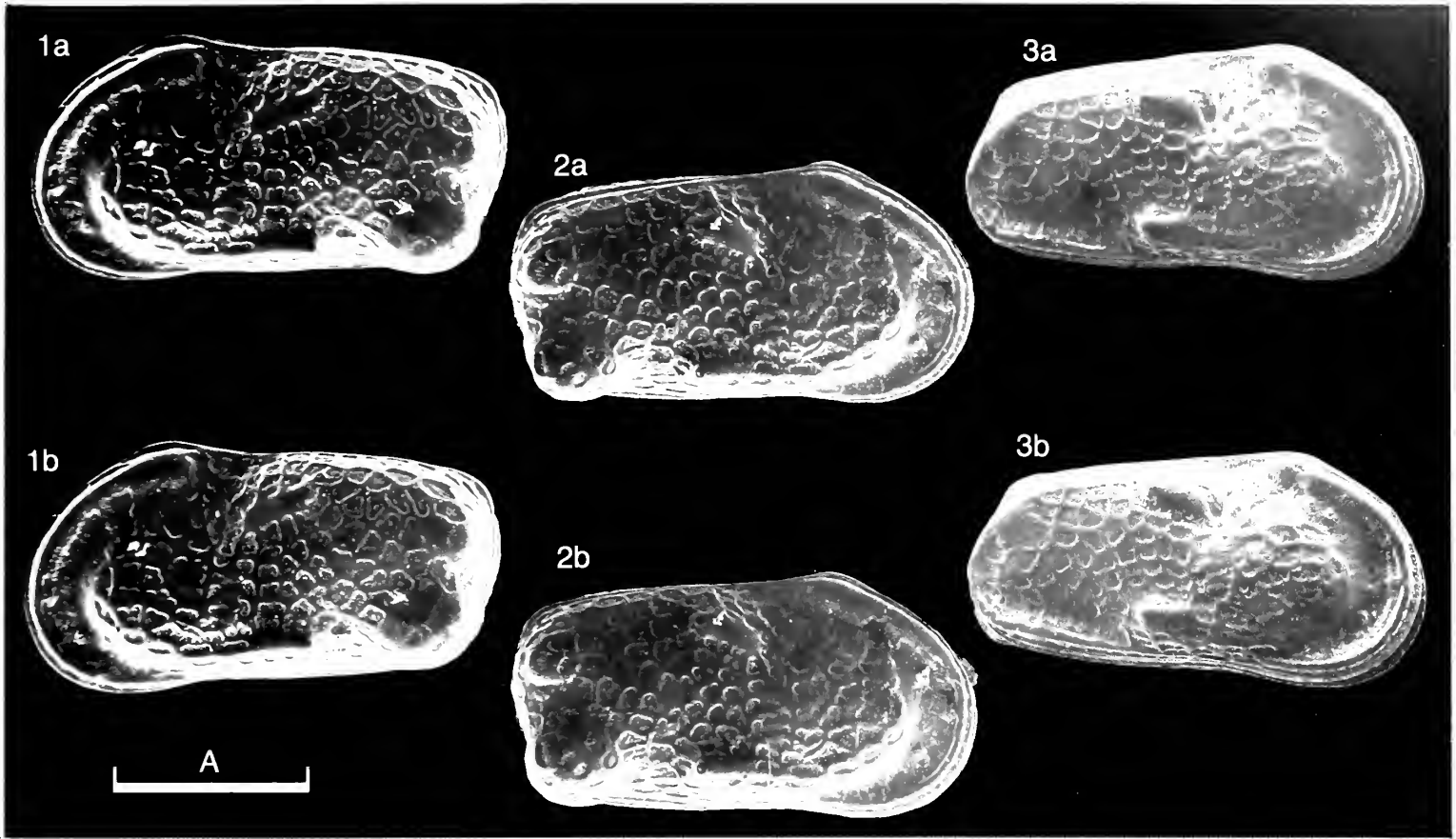
Diagnosis: Valves relatively small and thin-shelled; subcentral tubercle absent; large posteroventral brood pouch and slightly smaller posterodorsal knob-like thickening; hinge very weakly developed; few marginal pore canals; male with mediolateral protuberances; posterior extremity of male carapace truncate in dorsal view.

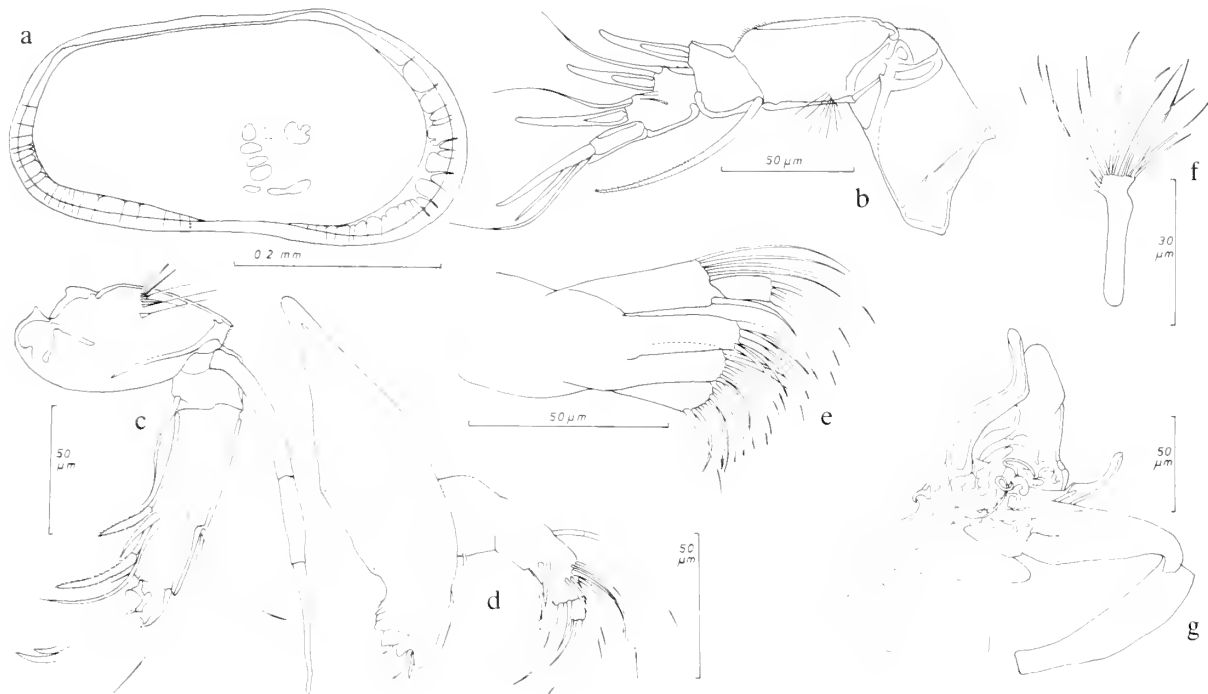
Distribution: Recent: *R. ampla* is known from different localities in Lake Tanganyika. (1) the type-locality, (2) Zaire, between Moliro and Vua, depth 8m, coll. L. Stappers, 25th November 1912 (sample no. 1718), (3) Zaire, off Moliro, depth 30m (sample no. 1680) and 3m (sample no. 1686), coll. L. Stappers, 21st November 1912. (4) S Burundi, about 100km S of Busumbura, depth 2.5m, coll. Andrew Cohen, 1985 (sample no. 85.18), (5) Burundi, 39km S of Busumbura, depth 27m, coll. A. Cohen, 1986 (sample no. 86.RJ.56). The species was also recorded by Mondeguer (1984) as "*Neocytheridea*" cf. *tenuisculpta* from the Bay of Burton, N Lake Tanganyika (A. Mondeguer. *La Baie de Burton (Fossé Nord du Lac Tanganyika), approche sédimentologique et structurale*. Unpubl. Dipl. Etude Approf., Univ. de Bretagne, 95 pp, 1984.).

Explanation of Plate 15. 104

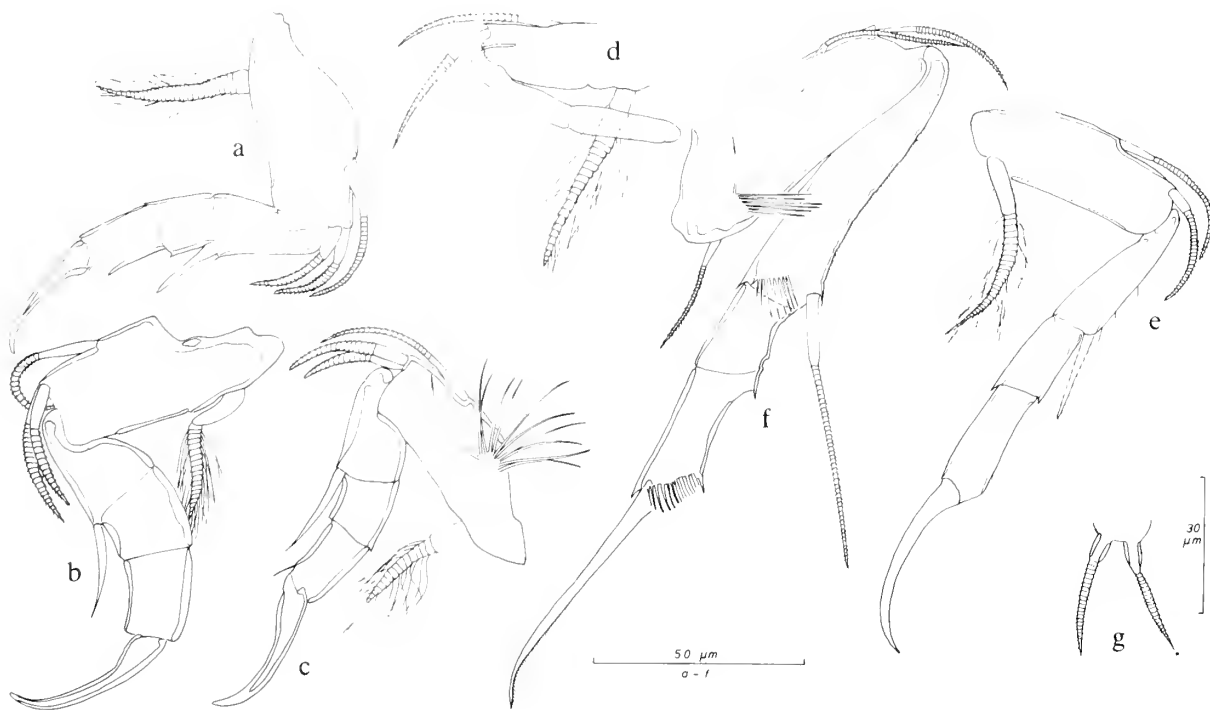
Fig. 1, ♀ LV, int. lat. (paratype, **OC 1301**, 440µm long); fig. 2, ♂ car., dors. (paratype, **OC 1298**, 440µm long); fig. 3, ♀ car., dors., (paratype, **OC 1299**, 450µm long).

Scale A (200µm; ×140), figs. 1–3.





Text-figs. 1a-g ♂ paratype (OC 1303, 450 μm long): a, LV, int. lat.; b, antennula; c, antenna; d, mandibula; e, maxillula; f, brush-like organ; g, copulatory organ.



Text-fig. 2. a, ♀ 1st leg (paratype, OC 1309); b, ♂ right 1st leg (paratype, OC 1303); c, ♂ left 1st leg (paratype, OC 1302); d, ♂ right 2nd leg (paratype, OC 1303); e, ♂ left 2nd leg (paratype, OC 1302); f, ♂ 3rd leg (paratype, OC 1303); g, ♀ furca (paratype, OC 1309).

ON *ANISOCYAMUS ELEGANS* (HARRIS)

by David J. Siveter & Mark Williams
(University of Leicester, England)

Genus *ANISOCYAMUS* Martinsson, 1960

Type-species (by original designation): *Primitiopsis elegans* Harris, 1957

Diagnosis: Primitiopsid ostracodes lacking adductorial pit, preadductorial node, or any discrete lobation. Valves unequal (right valve larger), reticulate. Ornamentation of the right valve is absent, reduced, or restricted in distribution. No velum in adult tecomorph. Dolon of heteromorph extends from the posterior hinge corner along the rear part of the valve, to the central ventral area, but is continued only as a bend along the rest of the ventral and anterior surfaces. Adductor muscle spot present.

Remarks: Only two species, *A. bassleri* (Harris, 1931) (see Siveter & Williams, *Stereo-Atlas Ostracod Shells* 15 (25) 115–122, 1988), and *A. elegans* are so far assigned to this genus (Martinsson 1960). Martinsson (op. cit.) also questionably assigned *Primitiopsis minutiperforata* Harris, 1957 to this genus. Work in progress will seek to clarify the taxonomic position of the latter species.

Jangadellina Melnikova, 1980 (= *Neocyamus* Melnikova, 1979; *Paläont. z.*, 4, 47–59) apparently differs from *Anisocyamus* by lacking distinct reticulation and by having dorsal valve surfaces extend above the hingeline in lateral view (Melnikova 1979, op. cit.).

Explanation of Plate 15, 108

Fig. 1, ♂ car., post. (OS 13304, 1.12 mm long). Figs. 2–5, ♂ car. (OS 13305, LV 1.14 mm long): fig. 2, LV ext. lat.; fig. 3, obl. vent.; fig. 4, vent.; fig. 5, RV, ext. lat.
Scale A (250 μm; ×45), figs. 1, 2, 5; scale B (250 μm; ×40), figs. 3, 4.

Anisocyamus elegans (Harris, 1957)

1957 *Primitiopsis elegans* n. sp., R. W. Harris, *Okla. Geol. Surv. Bull.*, 75, 203, pl. 6, fig. 18.

1960 *Anisocyamus elegans* (Harris); A. Martinsson, *Bull. Geol. Inst. Univ. Upps.*, 38, 143, pl. 1, figs. 1–8, pl. 2, figs. 1–8, text-fig. 1.

1960 *A. elegans* (Harris); R. W. Harris, *Okla. Geol. Notes*, 20, 178, text-fig. 1.

1964 *P. elegans* Harris; R. W. Harris, *Okla. Geol. Notes* 24, 137, tab. 1.

1979 *P. elegans* Harris; R. E. L. Schallreuter, *Neues Jb. Geol. Paläontol.*, 12, 745.

Holotype: Museum of Comparative Zoology, Harvard University, U.S.A., no. 4594; ♀ left valve (shows distortion posteriorly, adjacent to dolon).

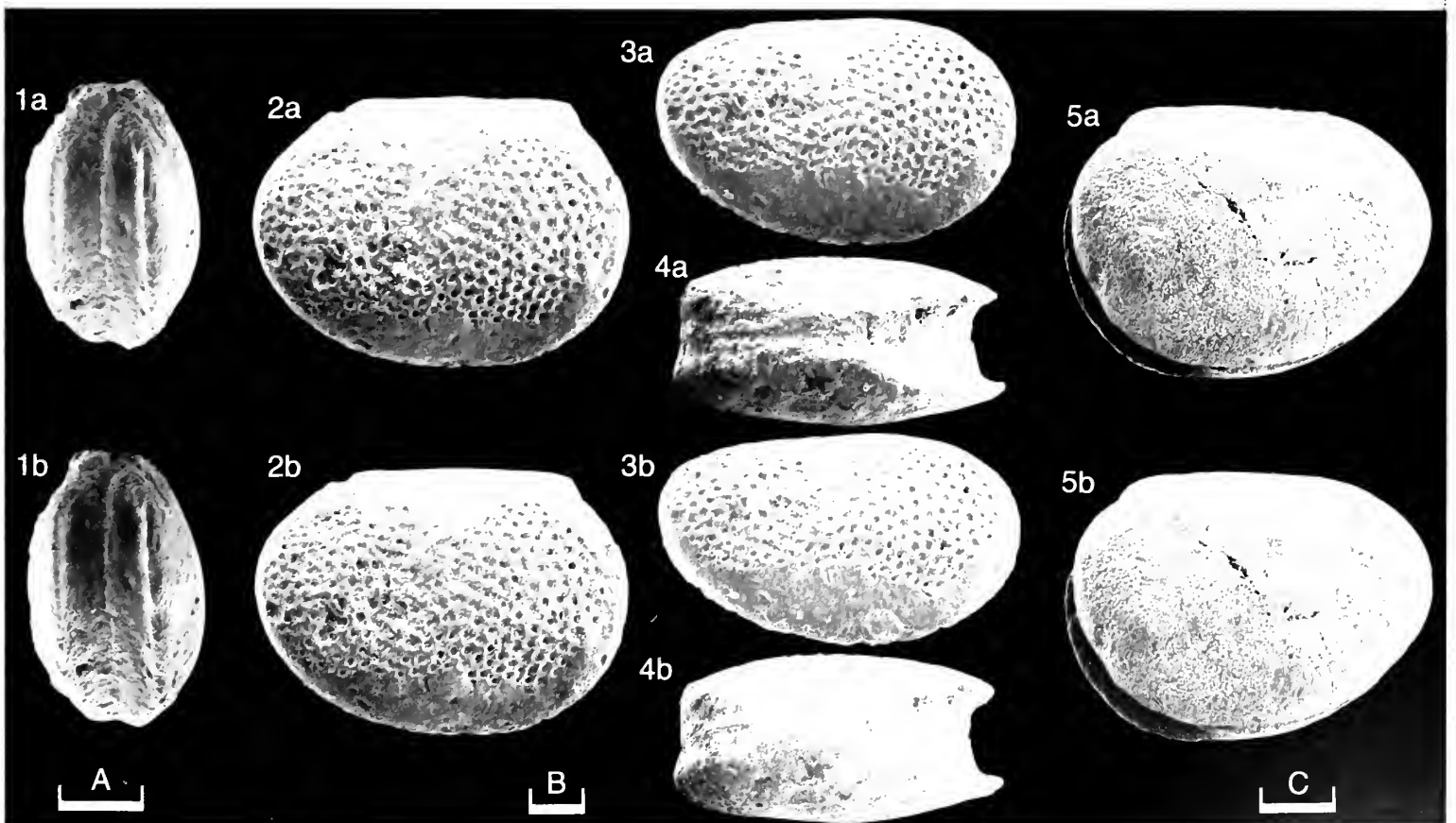
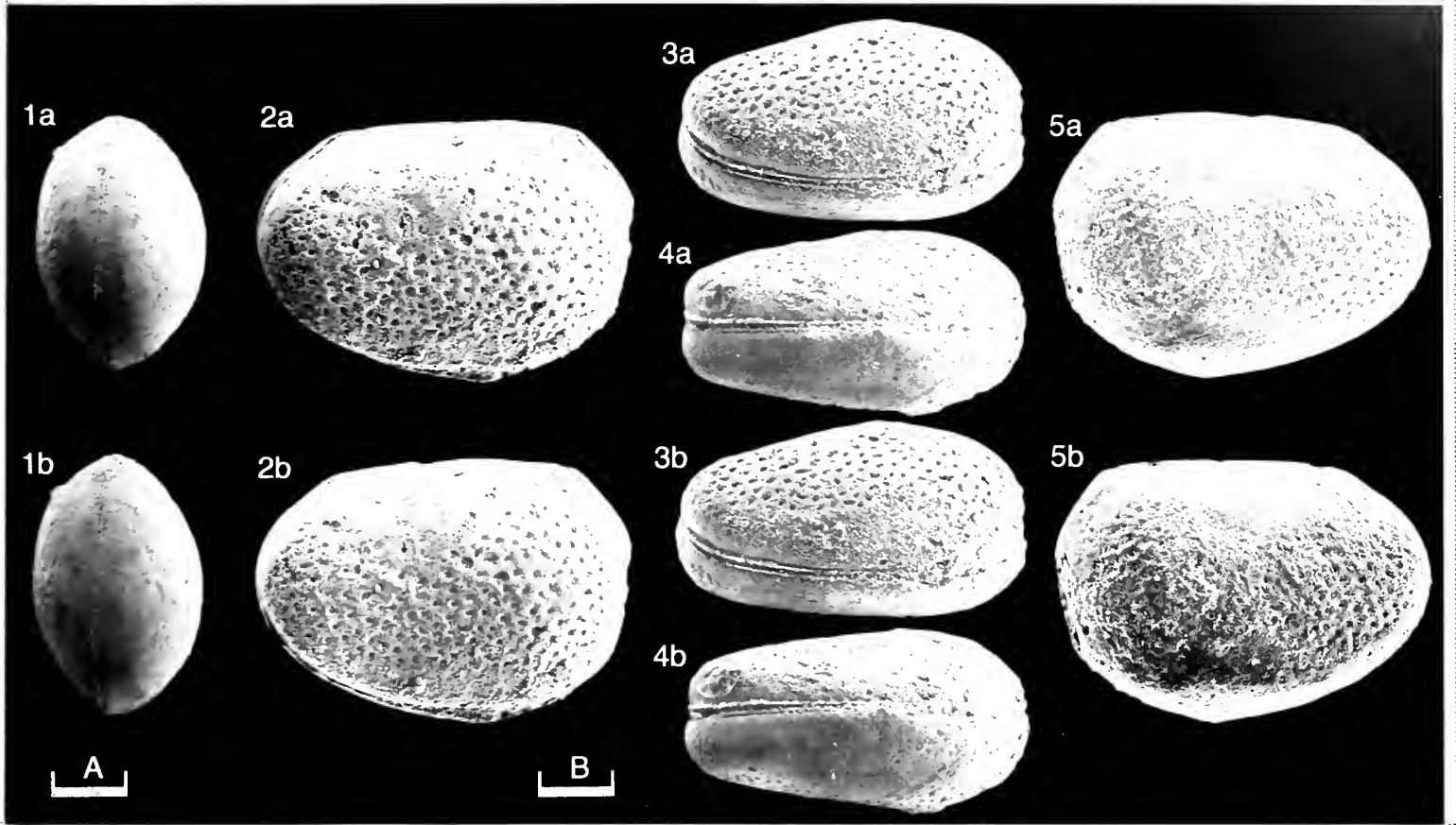
Type locality: Approximately 2.5 m above the base of Decker's Zone 32 (see Harris 1957). Tulip Creek Formation, Simpson Group, Ordovician; U.S. Highway 77 (Sec. 25, T. 2s. R1E), Arbuckle Mountains, Oklahoma, U.S.A.; approximately lat. 34° 25'N, 97° 08'W.

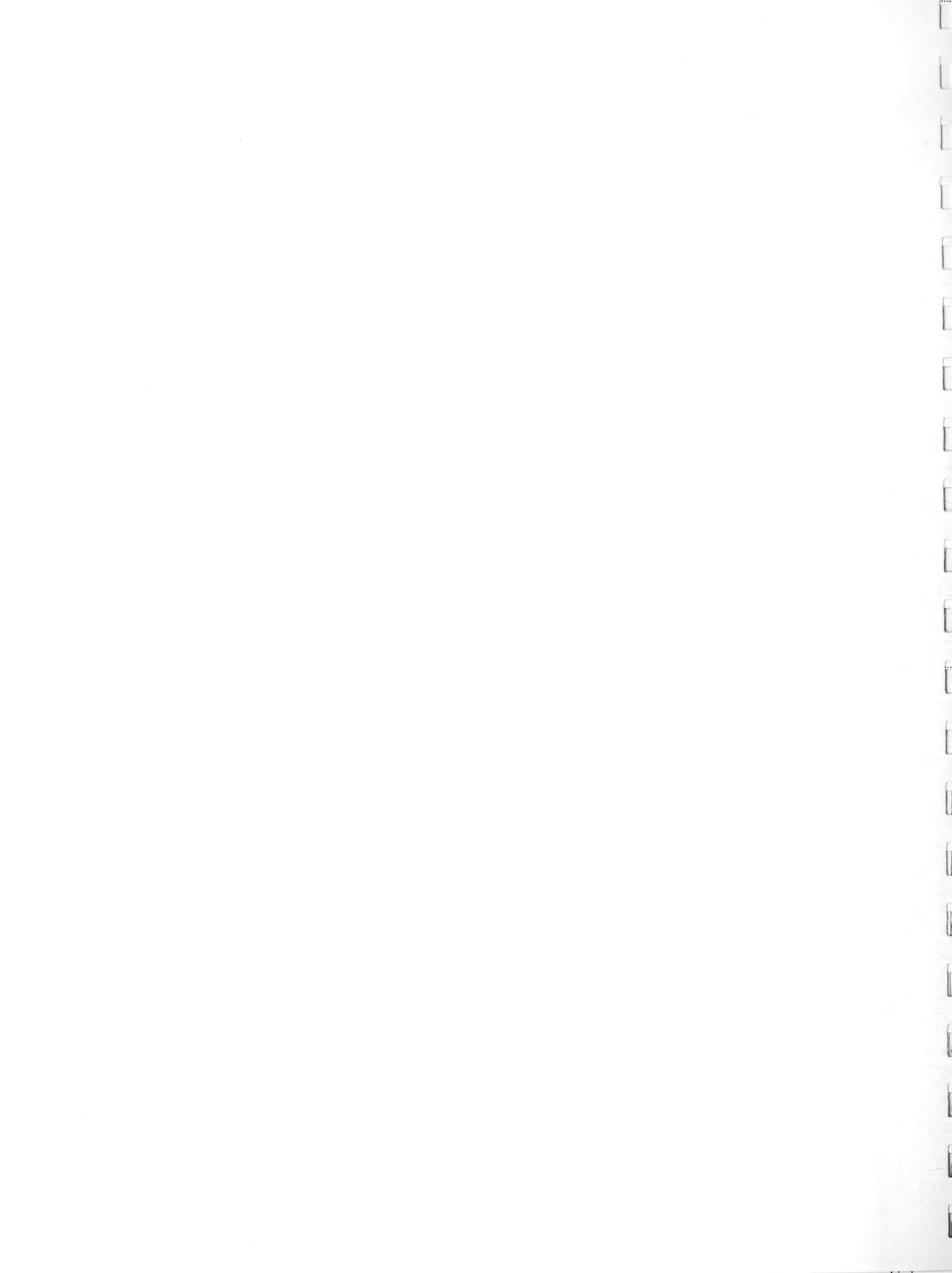
Figured specimens: British Museum (Nat. Hist.) nos. OS 13304 (♂ car.: Pl. 15, 108, fig. 1), OS 13305 (♂ car.: Pl. 15, 108, figs. 2–5), OS 13306 (♀ car.: Pl. 15, 110, figs. 1, 4), OS 13307 (♀ LV: Pl. 15, 110, figs. 2, 3; Pl. 15, 112, fig. 5; Pl. 15, 114, fig. 6), OS 13308 (♀ car.: Pl. 15, 110, fig. 5; Pl. 15, 114, fig. 5), OS 13309 (♀ LV: Pl. 15, 112, figs. 1–3), OS 13310 (♀ RV: Pl. 15, 112, fig. 4), OS 13311 (juv. car.: Pl. 15, 114, figs. 1, 2), OS 13312 (juv. RV: Pl. 15, 114, figs. 3, 4).

All the specimens were recovered by the authors from a 3 cm thick shale bed in the Mountain Lake Member of the Bromide Formation (Simpson Group, Ordovician) approximately 42 m below the base of the overlying Viola Limestone. Collected from the W side of Highway 99 (sec. 12, T. 1 N., R. 6 E), about 5 km S of Fittstown, Oklahoma, U.S.A.; approximately lat. 34° 41'N, long. 97° 41'W.

Explanation of Plate 15, 110

Fig. 1, 4, ♀ car. (OS 13306, 1.03 mm long): fig. 1, post.; fig. 4, vent. Figs. 2, 3, ♀ LV (OS 13307, 1.08 mm long): fig. 2, ext. lat.; fig. 3, vent. obl. Fig. 5, ♀ car., ext. rt. lat. (OS 13308, 1.0 mm long).
Scale A (250 μm; ×48), figs. 2, 3; scale B (150 μm; ×45), figs. 1, 4; scale C (200 μm; ×50), fig. 5.





Diagnosis: Species of *Anisocyamus* with finely reticulate left valve. Reticulation developed only as a restricted field antero-centrally of the muscle spot on the right valve, allowing 10–12 fossae to occur between the anterior edge of the adductor muscle spot and the anteriormost part of the valve.

Remarks: A row of tubercles occurs along the admarginal surface (from the antero-central to the postero-central area) of juvenile and adult tecomorph left valves, and is also present but not posteriorly in heteromorphs. Martinsson (*op. cit.*) also noticed these tubercles in both *A. elegans* and *A. bassleri* but considered them to be restricted to the anteroventral section of the left valve margin. A second row of faint tubercles are also located more admarginally in the anteroventral area of the left valve.

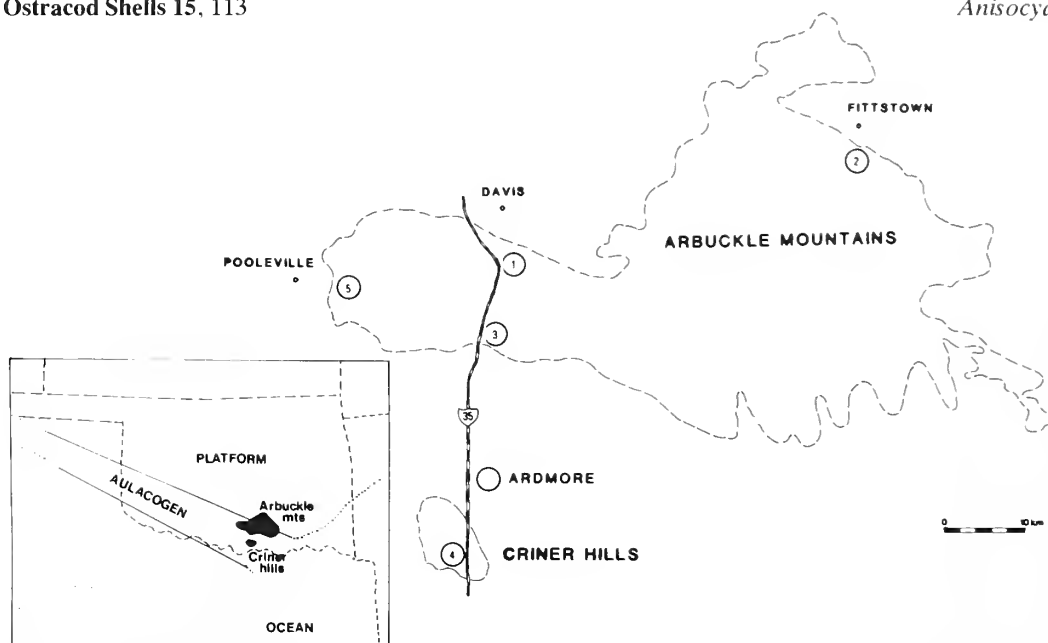
The reticulate ornament of the right valve occasionally extends beyond the adductor muscle spot to the postadductorial area of the right valve. As suggested by Martinsson (*op. cit.*) the spacing of ornament is often better described as punctate on this valve. In a few cases the ornament of the adult left valve also has the appearance of punctation rather than the more usual reticulation.

Martinsson's (*op. cit.*) material (from Oklahoma) was indicated to be from the Tulip Creek Formation, but is probably from the Bromide Formation (Mountain Lake Member) according to the stratigraphy of Fay & Grafham (*Univ. Kansas Paleontol. Contrib. Monograph 1, 14, 1982*).

Distribution: *A. elegans* is known from the Tulip Creek and Bromide formations, middle Ordovician (Whiterockian), Arbuckle Mountains, Oklahoma, U.S.A.

Explanation of Plate 15, 112

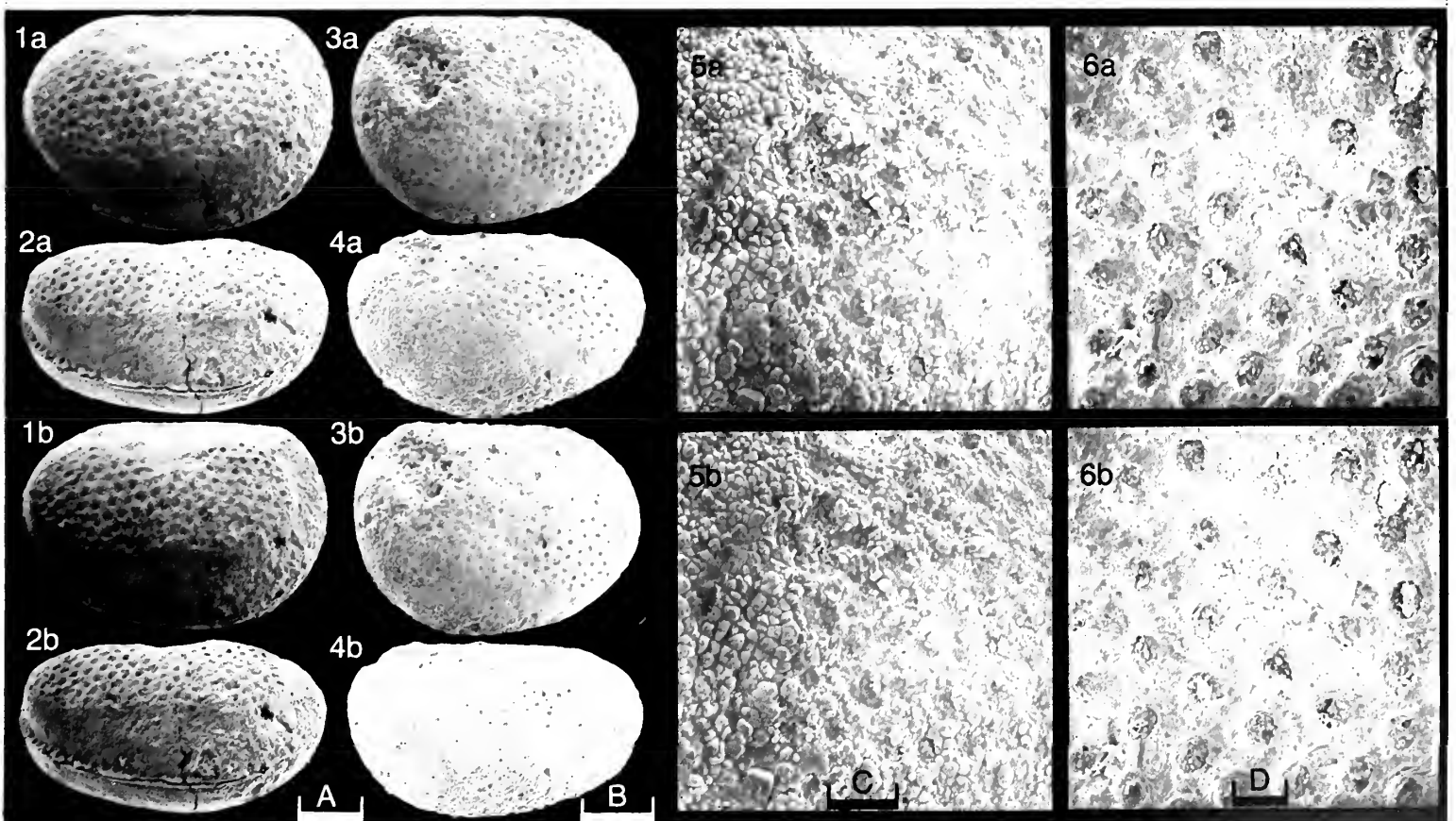
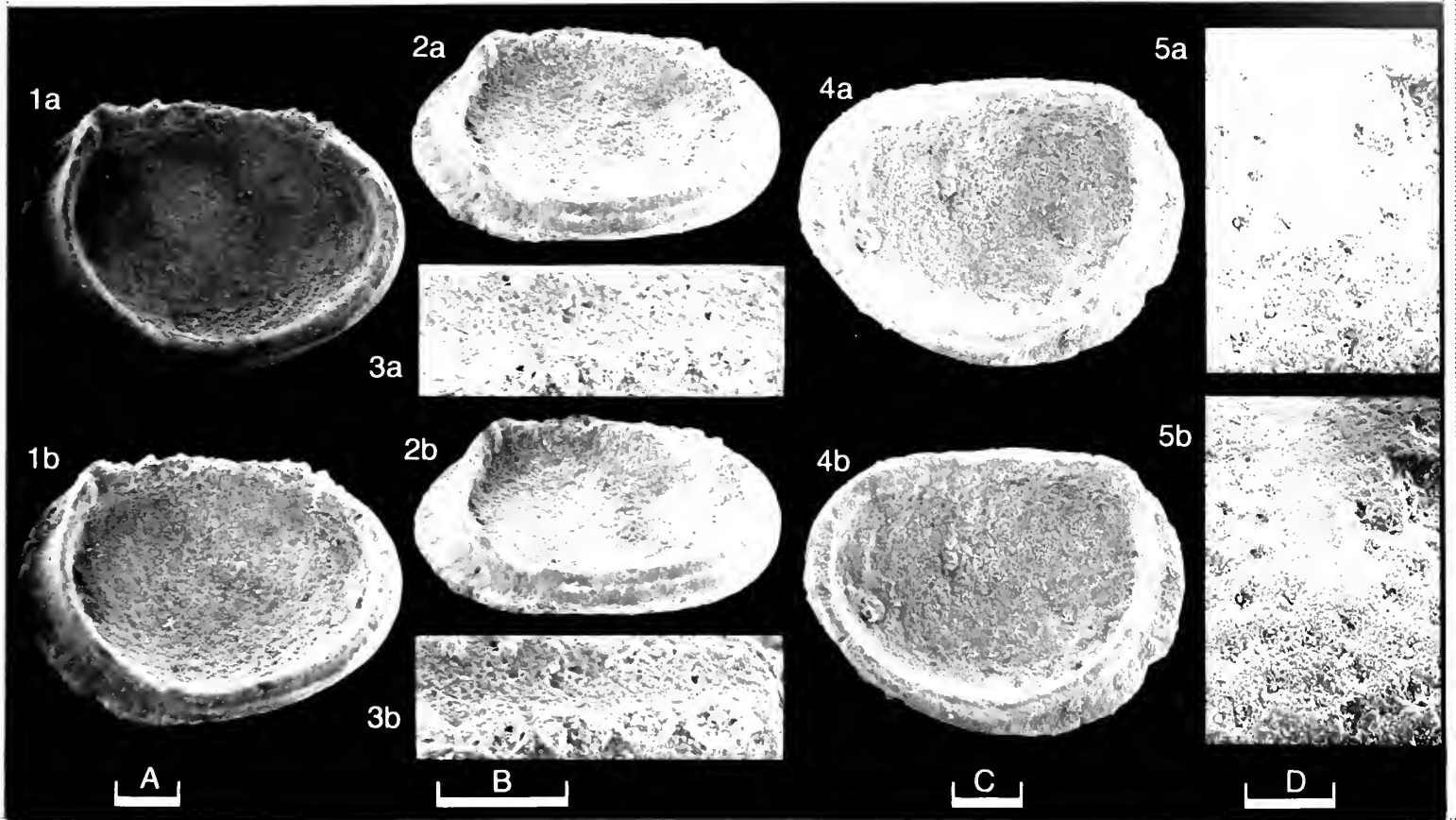
Figs. 1–3, ♀ LV (OS 13309, 1.16mm long): fig. 1, int. lat.; fig. 2, int. lat. obl.; fig. 3, detail of tubercles on admarginal surface. Fig. 4, ♀ RV, int. lat. (OS 13310, 1.12mm long). Fig. 5, ♀ LV, ext. detail of muscle spot (OS 13307). Scale A (200µm; ×46), figs. 1, 2; scale B (50µm; ×370), fig. 3; scale C (200µm; ×48), fig. 4; scale D (50µm; ×255), fig. 5.



Text-fig. 1. Principal Ordovician Simpson Group sections in southern Oklahoma, U.S.A. (see Fay & Grafham 1982, *Univ. Kansas Paleontol. Contrib. Monograph 1, 335–369*). 1, North Interstate 35; 2, Highway 99 south of Fittstown; 3, South Interstate 35; 4, Rock Crossing, Criner Hills; 5 Spring Creek, Arbuckle Ranch east of Pooleville. Inset shows middle Ordovician palaeogeography of Oklahoma (adapted from Longman 1982, *Univ. Kansas Paleontol. Contrib. Monograph 1, 7*).

Explanation of Plate 15, 114

Figs. 1, 2, juv. car. (OS 13311, 0.86mm long): fig. 1, ext. lt. lat.; fig. 2, ext. lt. lat. obl. Figs. 3, 4, juv. RV (OS 13312, 0.88mm long): fig. 3, ext. lat.; fig. 4, ext. vent. obl. Fig. 5, ♀ car., RV ornament (OS 13308). Fig. 6, ♀ LV, ornament (OS 13307). Scale A (200µm; ×49), figs. 1, 2; scale B (200µm; ×45), figs. 3, 4; scale C (200µm; ×192), fig. 5; scale D (50µm; ×240), fig. 6.



ON *ANISOCYAMUS BASSLERI* (HARRIS)

by David J. Siveter & Mark Williams
(University of Leicester, England)

Anisocyamus bassleri (Harris, 1931)

- 1931 *Primitiopsis bassleri* n. sp., R. W. Harris in: C. E. Decker, *Okla. Geol. Surv. Bull.*, **55**, 91, 92, pl. 11, figs. 2a, d, pl. 14, figs. 2a, b.
1934 *Primitiopsis bassleri* Harris; R. S. Bassler & B. Kellet, *Geol. Soc. Am. Spec. Pap.*, no. 1, 465.
1936 *Primitiopsis bassleri* Harris; R. W. Harris in: C. E. Decker, Field Conference for the study of the Simpson Formation: *Okla. City Geol. Soc., Guidebk.*, 7.
1936 *Primitiopsis bassleri* Harris; F. M. Swartz, *J. Paleontol.*, **10**, no. 7, 558, pl. 83, figs. 2a, b.
1941 *P. bassleri* Harris; E. A. Schmidt, *Abh. Senckenb. Naturforsch. Ges.*, **454**, 52.
1949 *P. bassleri* Harris; I. Hessland, *Bull. Geol. Inst. Univ. Upps.*, **33**, 239.
1950 *P. bassleri* Harris; S. A. Levinson, *J. Paleontol.*, **24**, no. 1, 67, 68, text-figs. 4a, b.
1951 *P. bassleri* Harris; C. E. Decker, *Am. Assoc. Pet. Geol. Bull.*, **24**, 913.
1952 *P. bassleri* Harris; C. E. Decker, *Am. Assoc. Pet. Geol. Bull.*, **36**, 135.
1955 *P. bassleri* Harris; A. Martinsson, *Bull. Geol. Inst. Univ. Upps.*, **36**, 1, 19.
1957 *P. bassleri* Harris; R. W. Harris, *Okla. Geol. Surv. Bull.*, **75**, 202, pl. 6, figs. 17a, b.
1960 *A. bassleri* (Harris); A. Martinsson, *Bull. Geol. Inst. Univ. Upps.*, **38**, 146, pl. 3, figs. 1–10.
1960 *A. bassleri* (Harris); R. W. Harris, *Okla. Geol. Notes*, **20**, 178, text-fig. 1.
1964 *P. bassleri* Harris; R. W. Harris, *Okla. Geol. Notes*, **24**, 136, tab. 1.
1979 *P. bassleri* Harris; R. E. L. Schallreuter, *Neues Jahrb. Geol. Palaeontol. Monatsh.*, **12**, 745.

Explanation of Plate 15, 116

Fig. 1, ♂ car., post. (OS 13313, 0.94mm long). Figs. 2, 3, ♂ car. (OS 13314, 1.19mm long): fig. 2, ext. lt. lat.; fig. 3, obl. vent. Fig. 4, ♂ car., vent. (OS 13315, 1.27mm long). Fig. 5, ♂ RV, ext. lat. (OS 13316, 1.19mm long).
Scale A (150µm; ×66), fig. 1; scale B (250µm; ×46), figs. 2, 3; scale C (250µm; ×38), fig. 4; scale D (250µm; ×43), fig. 5.

Stereo-Atlas of Ostracod Shells 15, 117

Anisocyamus bassleri (3 of 8)

Lectotype: Designated Martinsson 1960, 146; Harvard Museum of Comparative Zoology, U.S.A. no. **MCZ 4593A**; poorly preserved ♀ carapace (= Harris 1931, pl. 14, figs. 2a, b). Both valves are abraded with consequent reduction of ornament.

Martinsson (*op. cit.*, 153) stated that the specimen he had chosen for the lectotype of *A. bassleri* was not registered in the collections of the Harvard Museum of Comparative Zoology, U.S.A., the repository for Harris's (1957) material. We have, however, examined the type material and Martinsson's chosen lectotype is present in the collection. Harris (1931, 92) mentioned a 'Type' but failed to specify which it was. Later Harris (1960, 180) referred his original figures (Harris 1931, pl. 11, figs. 2a, b, and pl. 14, fig. 2b) to Harvard Museum specimen no. **MCZ 4593A**, which he stated to be the Holotype. This was, however, preceded by Martinsson's designation of the same specimen as lectotype.

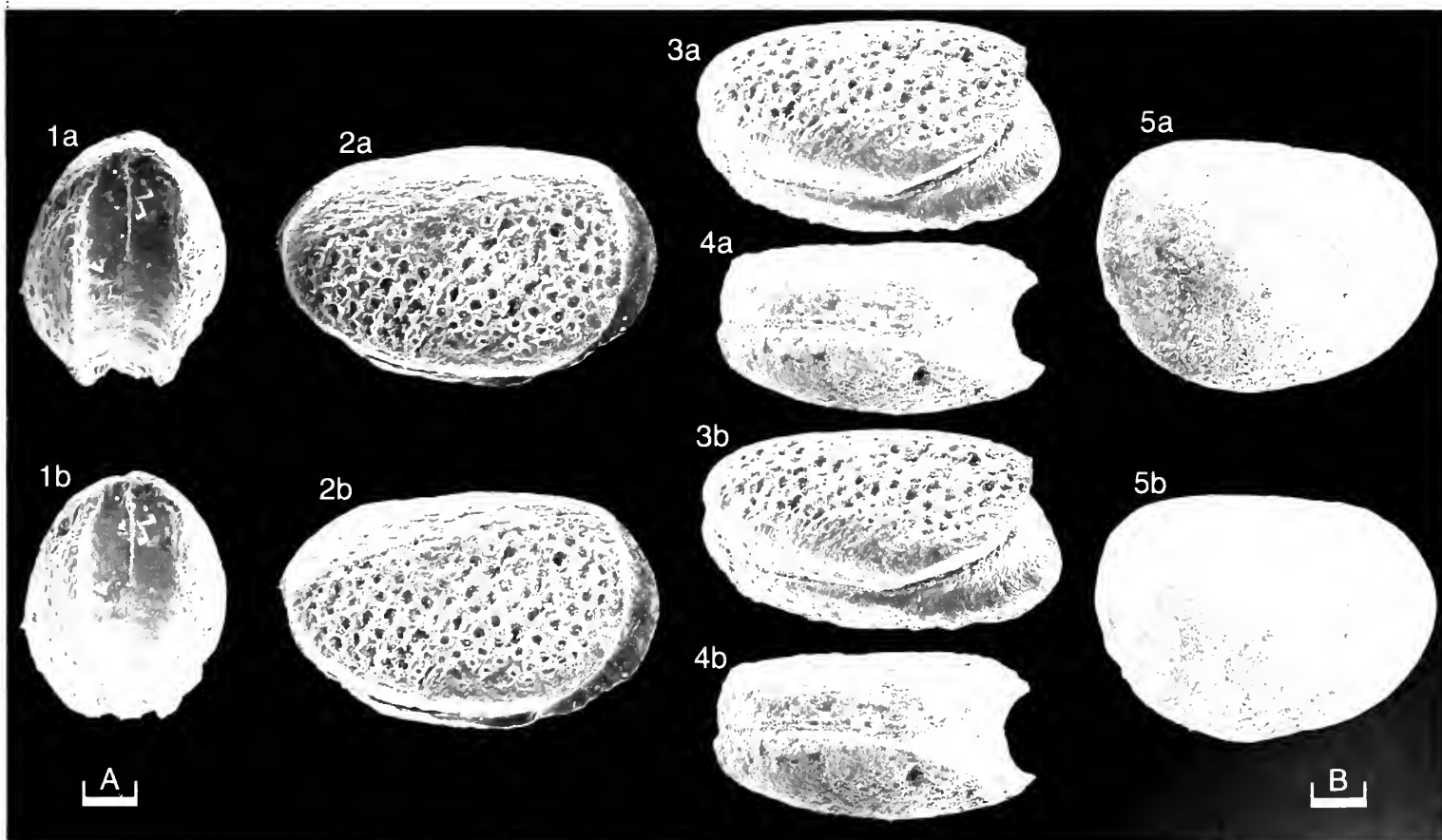
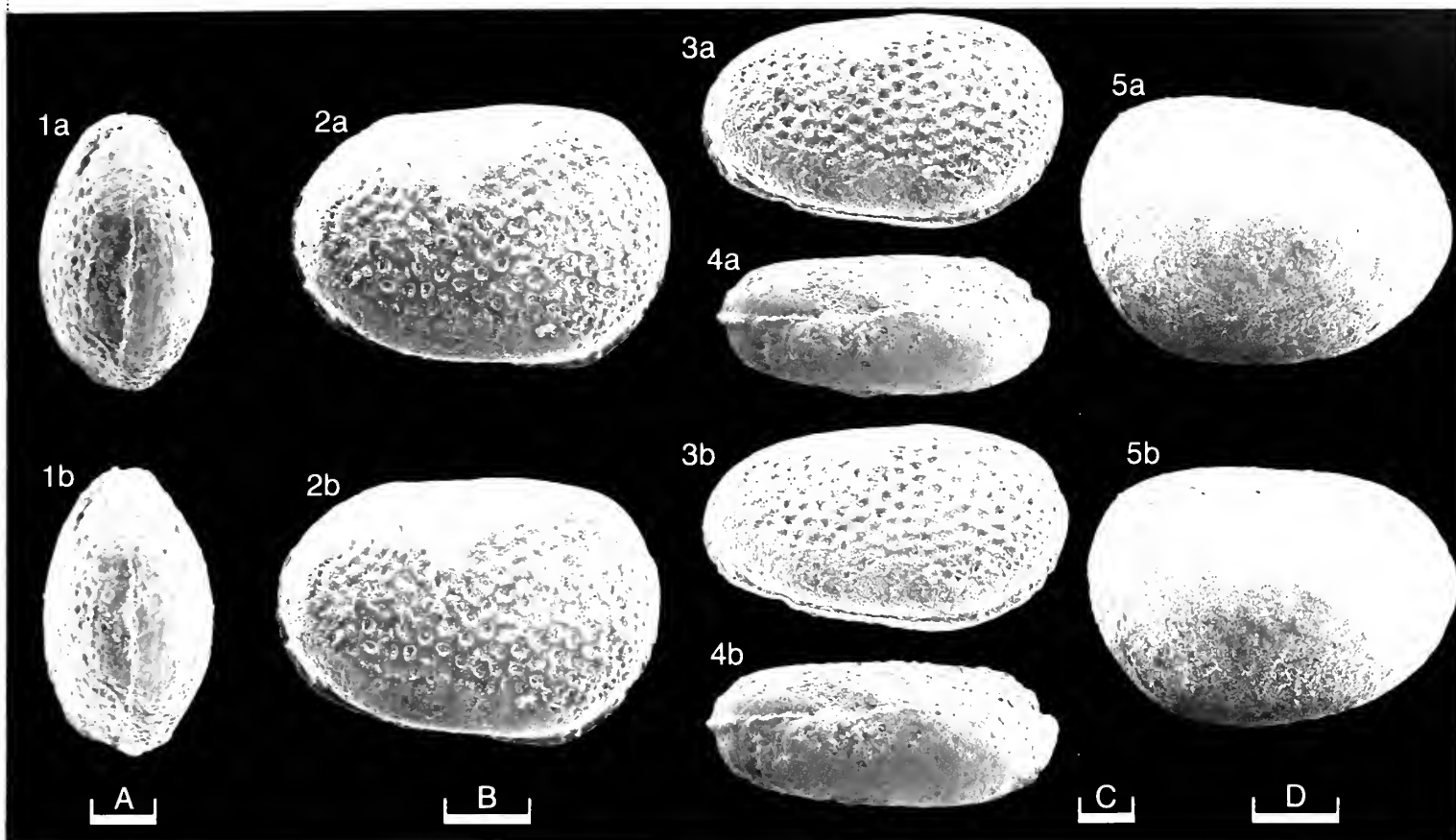
Type locality: From the top of Decker's Zone 8 (see Harris 1957), Bromide Formation, 29.9m below the top of the Simpson Group, Ordovician; about 400m W of U.S. Highway 77 (Sec. 25, T. 2s, R1E), Arbuckle Mountains, Oklahoma, U.S.A.; approximately lat. 34° 25'N, long. 97° 08'W.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 13313** (♂ car.: Pl. 15, 116, fig. 1), **OS 13314** (♂ LV: Pl. 15, 116, figs. 2, 3), **OS 13315** (♂ car.: Pl. 15, 116, fig. 4), **OS 13316** (♂ car.: Pl. 15, 116, fig. 5), **OS 13327** (♀ car.: Pl. 15, 118, fig. 1), **OS 13317** (♀ car.: Pl. 15, 118, figs. 2, 3; Pl. 15, 122, fig. 3), **OS 13318** (♀ car.: Pl. 15, 118, fig. 4), **OS 13319** (♀ RV: Pl. 15, 118, fig. 5), **OS 13320** (♀ car.: Pl. 15, 120, fig. 1), **OS 13321** (♀ RV: Pl. 15, 120, fig. 2), **OS 13322** (♀ LV: Pl. 15, 120, fig. 3), **OS 13323** (♀ LV: Pl. 15, 120, fig. 4), **OS 13324** (juv.: Pl. 15, 122, figs. 1, 2), **OS 13325** (♀ car.: Pl. 15, 122, fig. 4), **OS 13326** (♀ RV: Pl. 15, 122, fig. 5).

These specimens were recovered from two samples we collected from the Mountain Lake Member, Bromide Formation, Simpson Group, middle Ordovician; from the E side of the Interstate 35 North roadcut (Sec. 30, T.1 S., R.2 E), Arbuckle Mountains, Oklahoma, U.S.A.; approximately lat. 34° 25'N, long. 97° 08'W. Specimens **OS 13313–OS 13315** are from a shale bed

Explanation of Plate 15, 118

Fig. 1, ♀ car., post. (OS 13327, 0.83mm long). Figs. 2, 3, ♀ car. (OS 13317, 0.88mm long): fig. 2, ext. lt. lat.; fig. 3, vent. obl. Fig. 4, ♀ car., vent. (OS 13318, 0.83mm long). Fig. 5, ♀ RV, ext. lat. (OS 13319, 0.88mm long).
Scale A (150µm; ×67), fig. 1; scale B (150µm; ×55), figs. 2–5.



Figured specimens: 25.2m below the base of the overlying *Viola* Limestone. All the other specimens are from a shale bed 31.4m below the base of the *Viola* Limestone.

Diagnosis: Species of *Anisocyamus* with coarsely reticulate left valve, reticulation absent on right valve. The reticulation on the left valve allows 6–8 fossae to occur between the anterior edge of the adductor muscle spot and the anteriormost part of the valve.

Remarks: *A. bassleri* is distinguished from the only known other congeneric species, *A. elegans* (Harris, 1957) (see Siveter & Williams, *Stereo-Atlas Ostracod Shells*, 15, 107–114, 1988) principally by its coarser reticulation and absence of ornament on the right valve. In addition the dolon, which occupies the posterior and posteroventral part of heteromorphic valves, is longitudinally shorter than in *A. elegans*, while the velar bend of the heteromorph lies closer to the valve edge in *A. bassleri* (see Martinsson 1960).

The hinge of the right valve consists of a groove but no ‘teeth’; the left valve exhibits a ridge confluent with two minor, terminal depressions (see Pl. 15, 120, figs. 2–4). The tooth and socket arrangement observed by Levinson (1950) for *A. bassleri* has not been seen in the extensive material we have studied and is considered not to be present in the species.

As in *A. elegans*, a row of tubercles along the margin of the left valve stretches from the anteroventral to the posteroventral area in juvenile and adult tecomorphic valves, and again appears to be absent posteriorly in heteromorphic valves.

The reticulate ornament of *A. bassleri* is restricted to the left valve during all the observed ontogenetic stages, but is more dense in juveniles than in adults and also covers less of the ventral lateral surface. In addition, the ratio of valve length to valve width increases from juveniles to adults.

Both Harris (1931, 92; 1957, 202) and Martinsson (1960, 147) noted that male specimens are rarer than females. Our population studies on *A. bassleri* retrieved from the Bromide Formation (Interstate 35 Section, Arbuckle Mountains, Oklahoma) have corroborated these statements

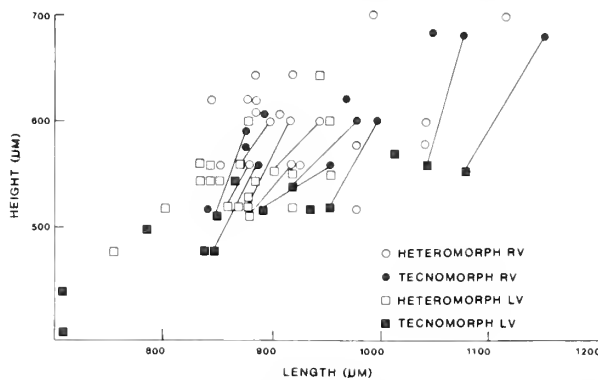
Explanation of Plate 15, 120

Fig. 1, ♀ car., ant. (OS 13320, 0.88mm long). Fig. 2 ♀ RV, int. lat. (OS 13321, 0.91mm long). Fig. 3, ♀ LV, int. lat. (OS 13322, 0.88mm long). Fig. 4, ♀ LV, int. lat. (OS 13323, 0.88mm long). Scale A (150µm; ×67), fig. 1; scale B (150µm; ×57), figs. 2–4.

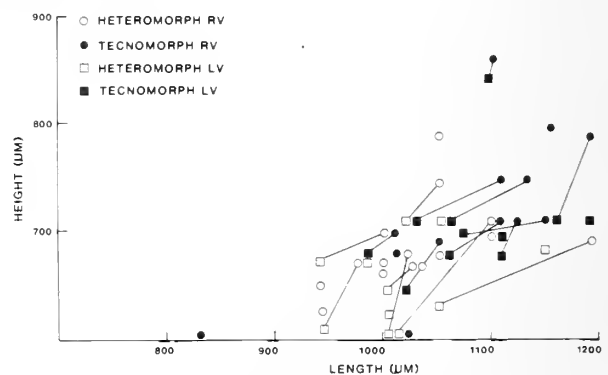
Remarks (cont.): (Text-figs. 1, 2), but only if valves and carapaces are treated as individual specimens.

The muscle scar pattern of *Anisocyamus* is illustrated for the first time herein (Pl. 15, 122, fig. 4). It is ovate and appears to consist of alternating and radiating ridges and grooves.

Distribution: *A. bassleri* is so far only known from the Bromide Formation, middle Ordovician (Whiterockian-Mohawkian), Arbuckle Mountains, Oklahoma, U.S.A.



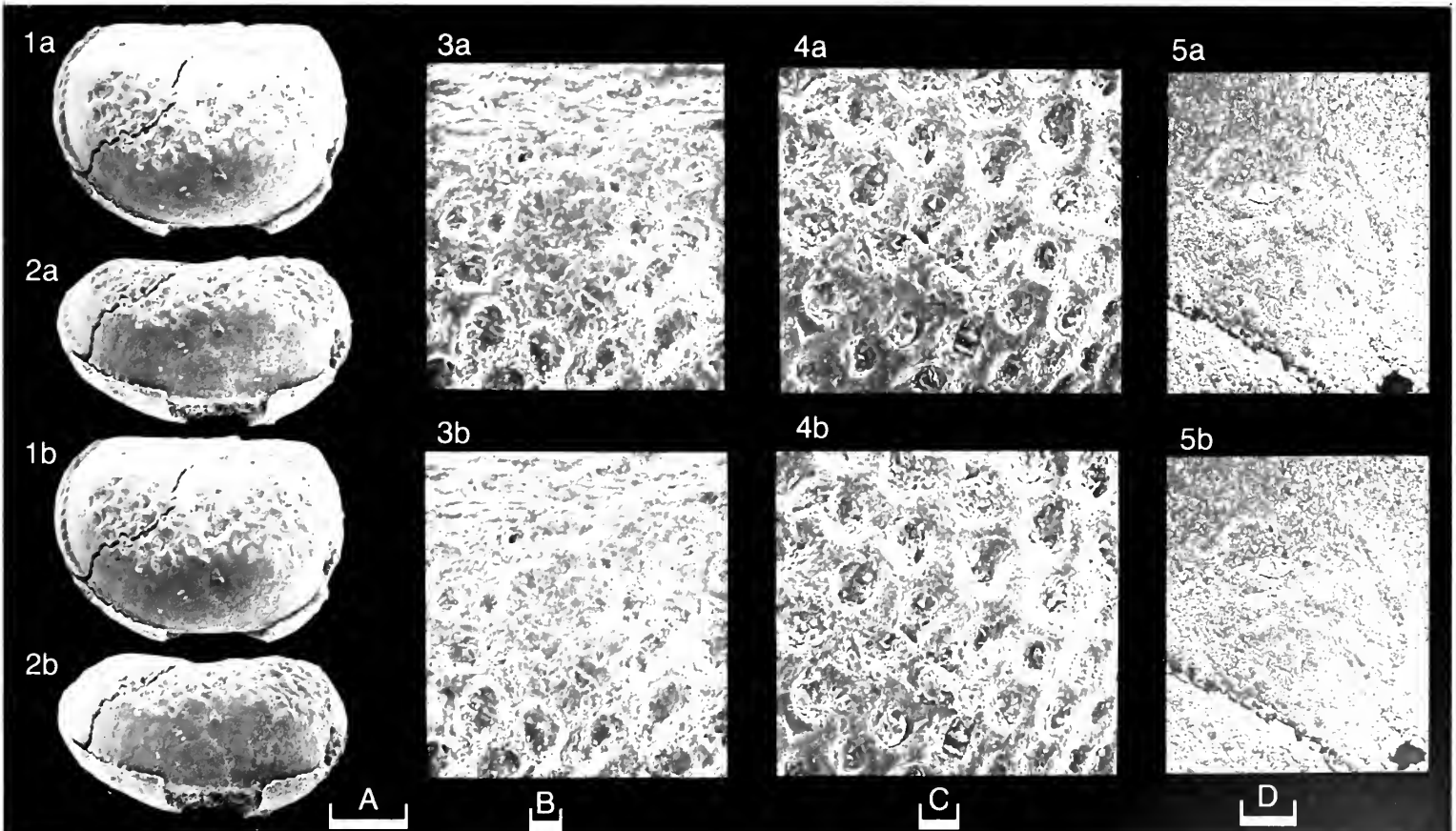
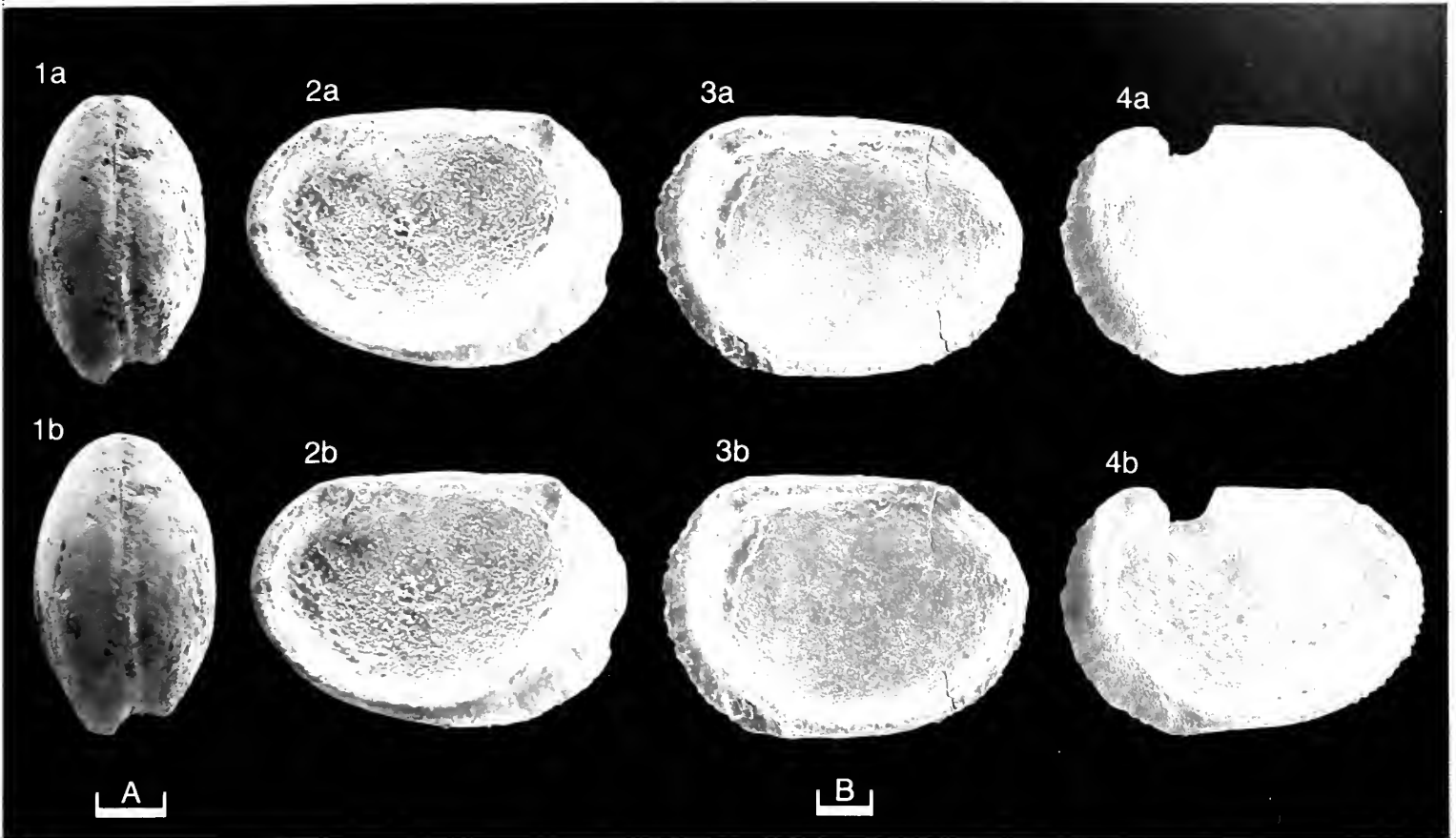
Text-fig. 1. Size variation for a ‘population’ of 55 specimens (from a single sample) of *A. bassleri*. Collected from the Mountain Lake Member of the Bromide Formation, 31.4m below the overlying *Viola* Limestone, on the Interstate 35 North roadcut section, Arbuckle Mountains, Oklahoma, U.S.A. Sampled material probably crosses time stratigraphic levels and is not intended to infer a single living population.



Text-fig. 2. Size variation for a ‘population’ of 34 specimens (from a single sample) of *A. bassleri*. Collected from the Mountain Lake Member of the Bromide Formation, 25.2m below the overlying *Viola* Limestone, on the Interstate 35 North roadcut section, Arbuckle Mountains, Oklahoma, U.S.A. Sampled material probably crosses time stratigraphic levels and is not intended to infer a single living population.

Explanation of Plate 15, 122

Figs. 1, 2, juv. car. (OS 13324, 0.5 mm long): fig. 1, ext. lt. lat.; fig. 2, obl. vent. Fig. 3, ♀ LV, ext. lat. muscle spot (OS 13317). Fig. 4, ♀ car., ext. rt. lat. reticulation (OS 13325). Fig. 5, ♀ RV, int. lat. obl., muscle scar pattern (OS 13326). Scale A (150µm; ×82), figs. 1,2; scale B (50µm; ×170), fig. 3; scale C (50µm; ×153), fig. 4; scale D (50µm; ×206), fig. 5.



ON *LEPTOCY THERE PSAMMOPHILA* GUILLAUME

by Marie-Claude Guillaume
(Université Pierre et Marie Curie, Paris, France)

Leptocythere psammophila Guillaume, 1976

- 1874 *Cythere pellucida* Baird; G. S. Brady, H. W. Crosskey & D. Robertson, *Palaeontogr. Soc. (Monogr.)*, **28**, 142, pl.3, figs. 20–24 (non Baird, 1850).
1976 *Leptocythere psammophila* sp.nov. M.-C. Guillaume, *Abh. Verh. naturwiss. Ver. Hamburg (NF)* **18/19** (Suppl.), 328, pl.1, fig. 4, pl.5, figs. a-c, pl.6, fig. c, text-fig. a.

Holotype: Natural History Museum, Paris, no. **FG756**; ♂ valves and appendages.
[Paratypes, nos. **FG758–762**]

Type locality: Pempoul, near Roscoff, Brittany, France; lat. 48° 44'N, long. 04° 01'W. Intertidal fine sand. Recent.

Figured specimens: Natural History Museum, Paris, nos. **FG756** (holotype, ♂ LV: Pl. **15**, 124, fig. 1), **FG757** (♀ LV: Pl. **15**, 124, fig. 5), **FG758** (♀ LV: Pl. **15**, 124, fig. 3), **FG759** (♂ car.: Pl. **15**, 124, fig. 2), **FG760** (♀ car.: Pl. **15**, 124, fig. 4), **FG761** (♂ car.: Pl. **15**, 126, fig. 2), **FG762** (♂ LV: Pl. **15**, 126, figs. 3–5), **FG788** (juv.-1 RV: Pl. **15**, 126, fig. 1).

All except **FG757** and **FG788** collected by the author from the type locality: **FG757** collected at Roscoff, Brittany (lat. 48° 43'N, long. 03°59' W), **FG788** at Paimpol, Brittany (lat. 48°47'N, long. 03°03'W). Water temperature in the vicinity of the type locality varies from around 16°C in August to 9.5°C in March; salinity varies from 34.4‰ in April to 35.2‰ in August–September.

Explanation of Plate 15. 124

Fig. 1, ♂ LV, ext. lat. (holotype, **FG756**, 580µm long); fig. 2, ♂ car., dors. (**FG759**, 570µm long); fig. 3, ♀ LV, ext. lat. (**FG758**, 580µm long); fig. 4, ♀ car., dors. (**FG760**, 550µm long); fig. 5, ♀ LV, ext. lat. (**FG757**, 550µm long).
Scale A (100µm; ×110), figs. 1–5.

Stereo-Atlas of Ostracod Shells 15, 125

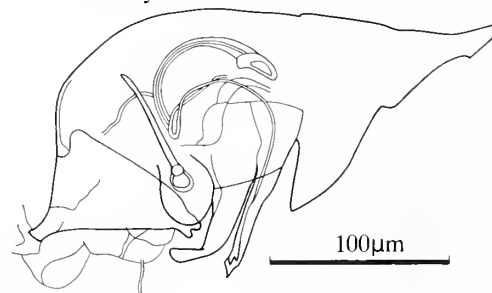
Leptocythere psammophila (3 of 4)

Diagnosis: Medium to large (530–650 µm long) *Leptocythere*, ornament varying from fine to coarse pitting. Post-ocular sulcus weak, dorsomedian sulcus distinct. Posteroventral alar protuberances weak or absent. Colour white, buff or dark brown in living specimens. Both free corners of distal process of male copulatory appendage pointed, one acute, the other obtuse; ventral margin nearly straight with two small indentations; proximal finger-like process curved, a little longer than the ejaculatory duct.

Remarks: This species was for a long time confused with two others, *L. pellucida* (Baird, 1850) (*The Natural History of the British Entomostraca*, Ray Soc., London, 173, pl. 21, fig. 7) and *L. castanea* (Sars, 1866) (*Forh. VidenskSelsk. Krist.*, **1865**, 32.), from which it is distinguished by size, the form and proportions of the valves, and the morphology of the male copulatory appendage (see Guillaume, *op. cit.* for full discussion of the problem). The confusion arose mainly from the variation in external ornament exhibited by *Leptocythere* species, populations of which may include both “finely” and “coarsely” ornamented individuals according to the degree of calcification of the valves (e.g., compare Pl. **15**, 124, fig. 3, with Pl. **15**, 124, fig. 5) (see C. Kuhl. *Abh. Verh. naturwiss. Ver. Hamburg*, (NF) **23**, 275–301, 1980).

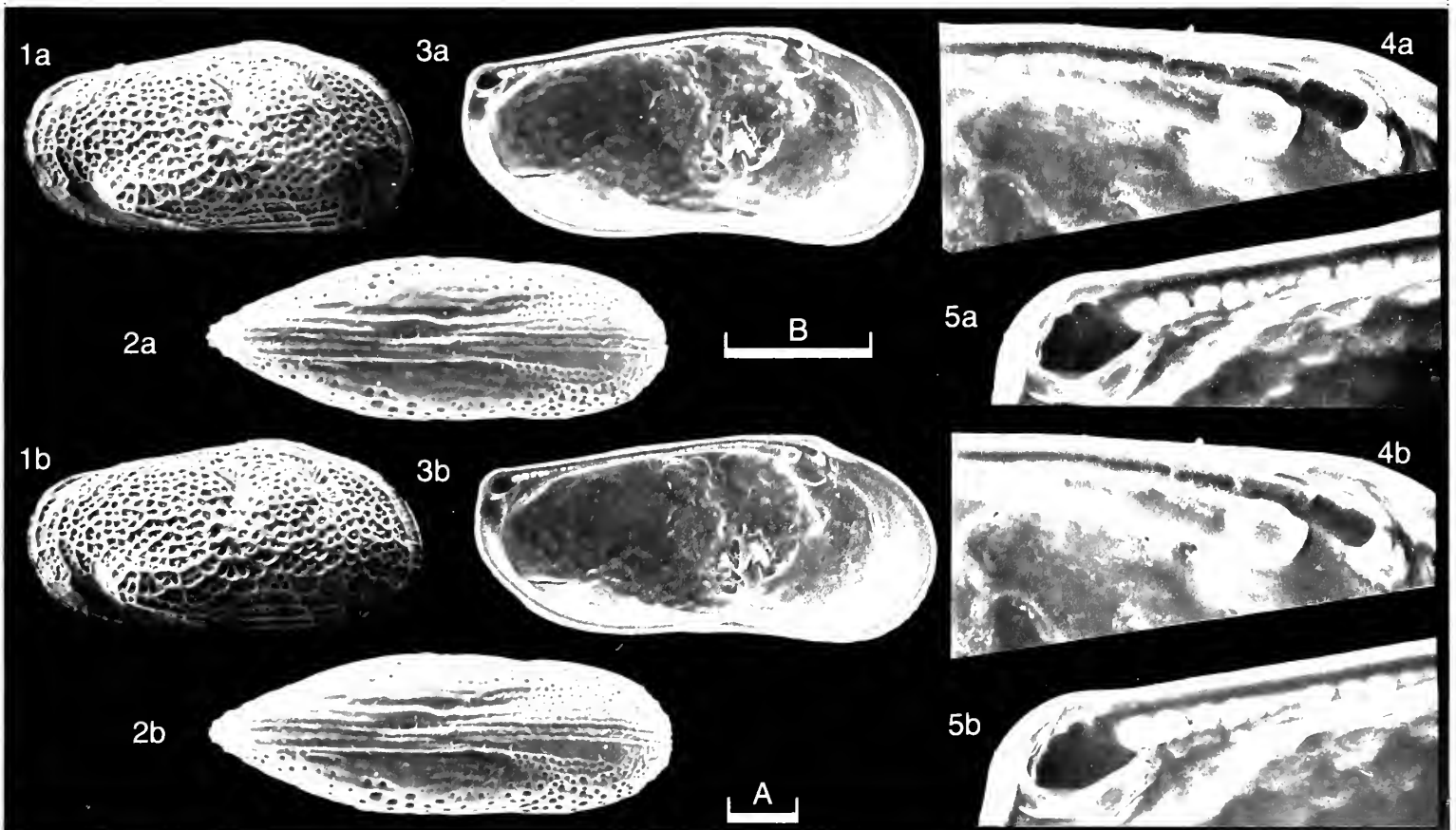
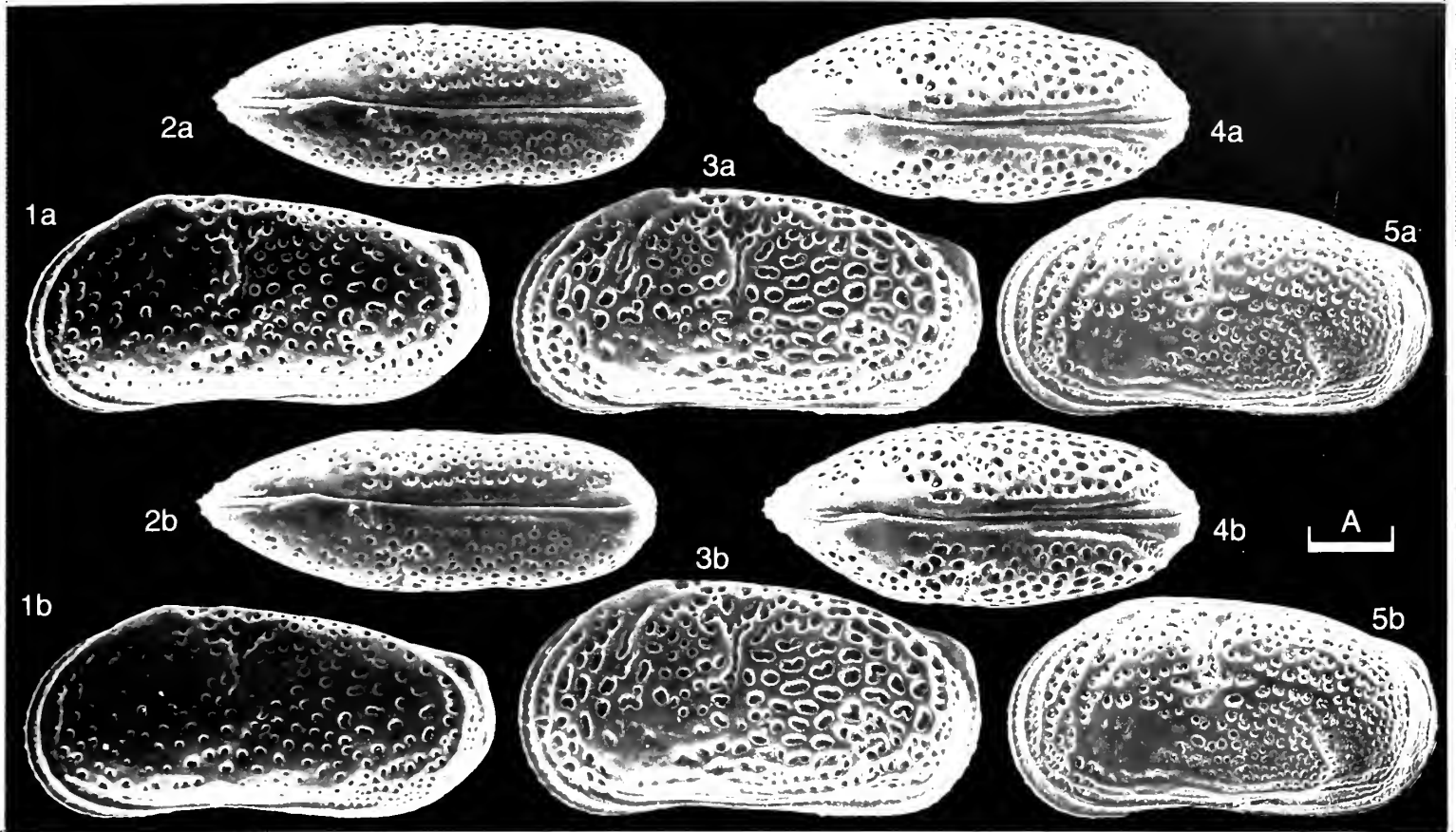
Distribution: Recent: an outer estuarine species found on sandy substrates, from the Atlantic coast of France to the Baltic.

Text-fig. 1. ♂ copulatory appendage (holotype, **FG756**).



Explanation of Plate 15. 126

Fig. 1, juv.-1, RV (**FG788**, 490µm long); fig. 2, ♂ car., vent. (**FG761**, 570µm long); figs. 3–5, ♂ LV (**FG762**, 580µm long); fig. 3, int. lat.; figs. 4, 5, ant. and post. hinge elements.
Scale A (100µm; ×110), figs. 1–3; scale B (50µm; ×450), figs. 4, 5.





ON *CYTHEROPTERON LATISSIMUM* (NORMAN)

by David J. Horne & John E. Whittaker
(Thames Polytechnic & British Museum, (Natural History), London)

Genus *CYTHEROPTERON* Sars, 1866

Type species (designated by Brady & Norman, 1889): *Cythere latissima* Norman, 1865.

1866 *Cytheropteron* gen. nov. G. O. Sars, *Forh. VidenskSelsk. Krist.*, **1865**, 79.

1957 *Kobayashiina* gen. nov. T. Hanai, *J. Fac. Sci. Univ. Tokyo*, (2), **11**, 30.

1974 *Lobosocytheropteron* gen. nov. K. Ishizaki & F. J. Gunther, *Sci. Rep. Tohoku Univ.*, sr.2, Geol., **45**, 38.

Diagnosis: Carapace variable in shape; sub-rhomboidal to sub-ovate in lateral view, sub-hexagonal, sub-ovate or shaped like an arrowhead in dorsal view; usually inflated posteroventrally, often with conspicuous alae. Caudal process usually present. Ornament variable; smooth, pitted or reticulate. Eye spots absent. Valves conspicuously unequal; left valve larger than right valve, but the right valve is usually higher and overlaps the left valve dorsally. Inner lamella of moderate width; anterior vestibulum present, small, posteroventral vestibulum very small or absent. Marginal pore canals straight or weakly sinuous, of varying length: 10–12 anteriorly. Frontal muscle scar v-shaped or heart-shaped, sometimes subdivided. Hinge merodont/entomodont, strongly crenulate or locellate, often with modified anteromedian or posterior elements; the median element varies from straight to sinuous. Sexual dimorphism inconspicuous.

Explanation of Plate 15, 128

Fig. 1, ♀ LV, ext. lat. (lectotype, **1987.331**, 605µm long); fig. 2, ♀ RV, vent. (**1988.303**, 640µm long); fig. 3, ♂ LV, ext. lat., (paralectotype, **1988.302**, 600µm long); fig. 4, ♂ RV, vent. (**1988.304**, 670µm long); fig. 5, ♂ RV, ext. lat. (paralectotype, **1988.302**, 600µm long).

Scale A (100µm; × 90), figs. 1–5.

Diagnosis (cont.): Antennula with five articulated podomeres, the distal one relatively very short. Antenna with two relatively long, curved distal chelate setae. Setal formulae of basal podomeres of legs: (1:2:1), (1+1:1:1 or 2), (0:1:1). Male copulatory appendage usually with three distal processes: one broad and lamellar, the other two narrow, pointed, variously shaped and situated one on either side of the thick, curved ejaculatory duct.

Remarks: Species of *Cytheropteron* exhibit considerable variation both in external ornament and in details of the hinge; in our opinion the minor differences used to distinguish *Kobayashiina* Hanai and *Lobosocytheropteron* Ishizaki & Gunther are insufficient to justify separate generic status for these taxa.

Cytheropteron latissimum (Norman, 1865)

1865a *Cythere latissima* sp. nov. A. M. Norman, in: G. S. Brady (Ed.), *Rep. Br. Ass. Advmt. Sci.*, **1865**, 191.*

1865b *Cythere latissima* sp. nov. A. M. Norman, in: G. S. Brady (Ed.), *Nat. Hist. Trans. Northumb.*, **1**, 19, pl. 6, figs 5–8*.

1866 *Cytheropteron convexum* (Baird); G. O. Sars, *Forh. VidenskSelsk. Krist.*, **1865**, 80–81 (*non Cythere convexa* Baird, 1850).

1868 *Cytheropteron latissimum* (Norman); G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, 448, pl. 34, figs. 26–30.

1878 *Cytheropteron latissimum* (Norman); G. S. Brady, *Trans. Zool. Soc. Lond.*, **10**, 403, pl. 69, fig. 1a–d.

1973 *Cytheropteron latissimum* (Norman); J. W. Neale & H. V. Howe, *Crustaceana*, **25**, pl. 1, figs. 4a, b.

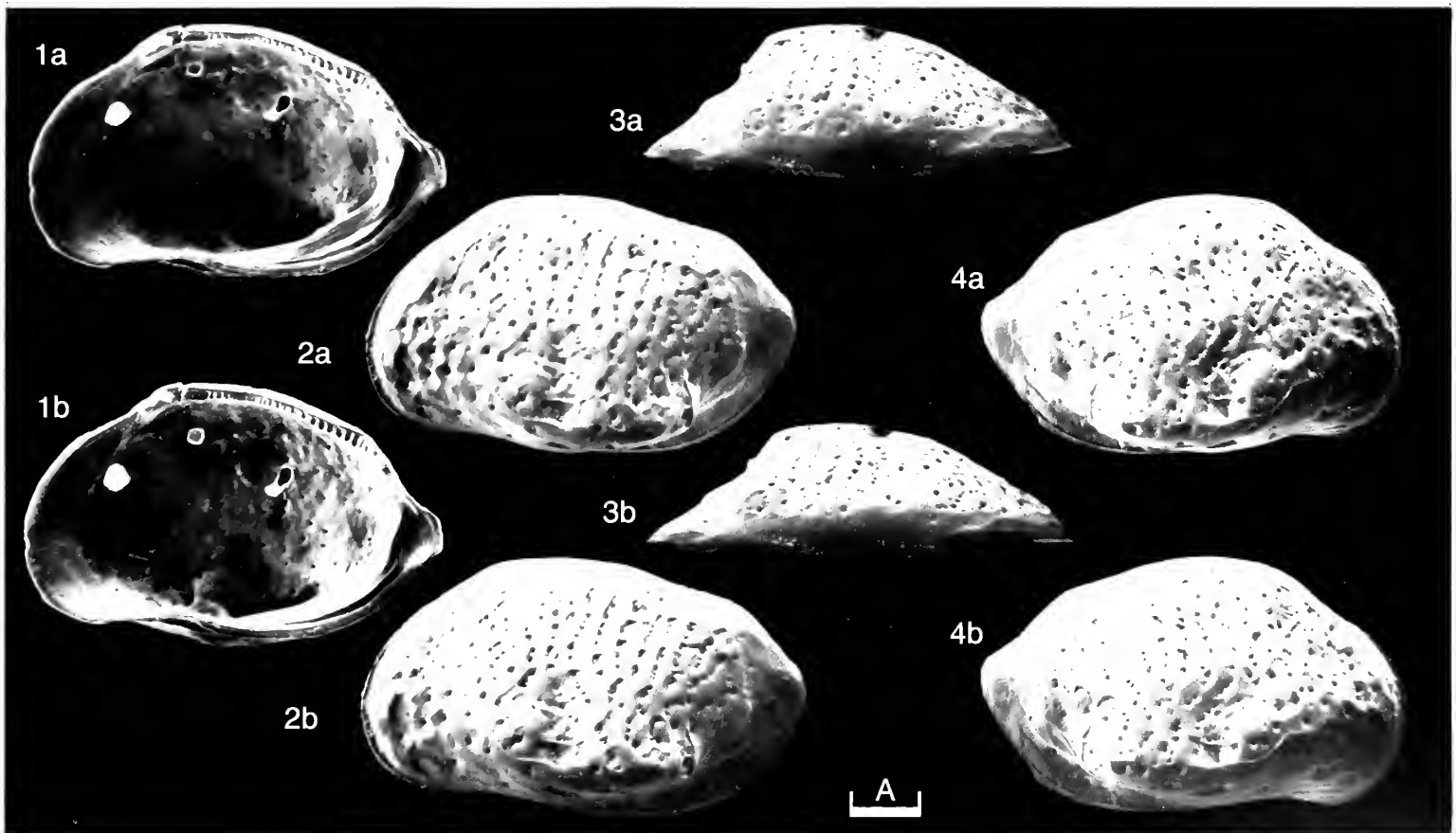
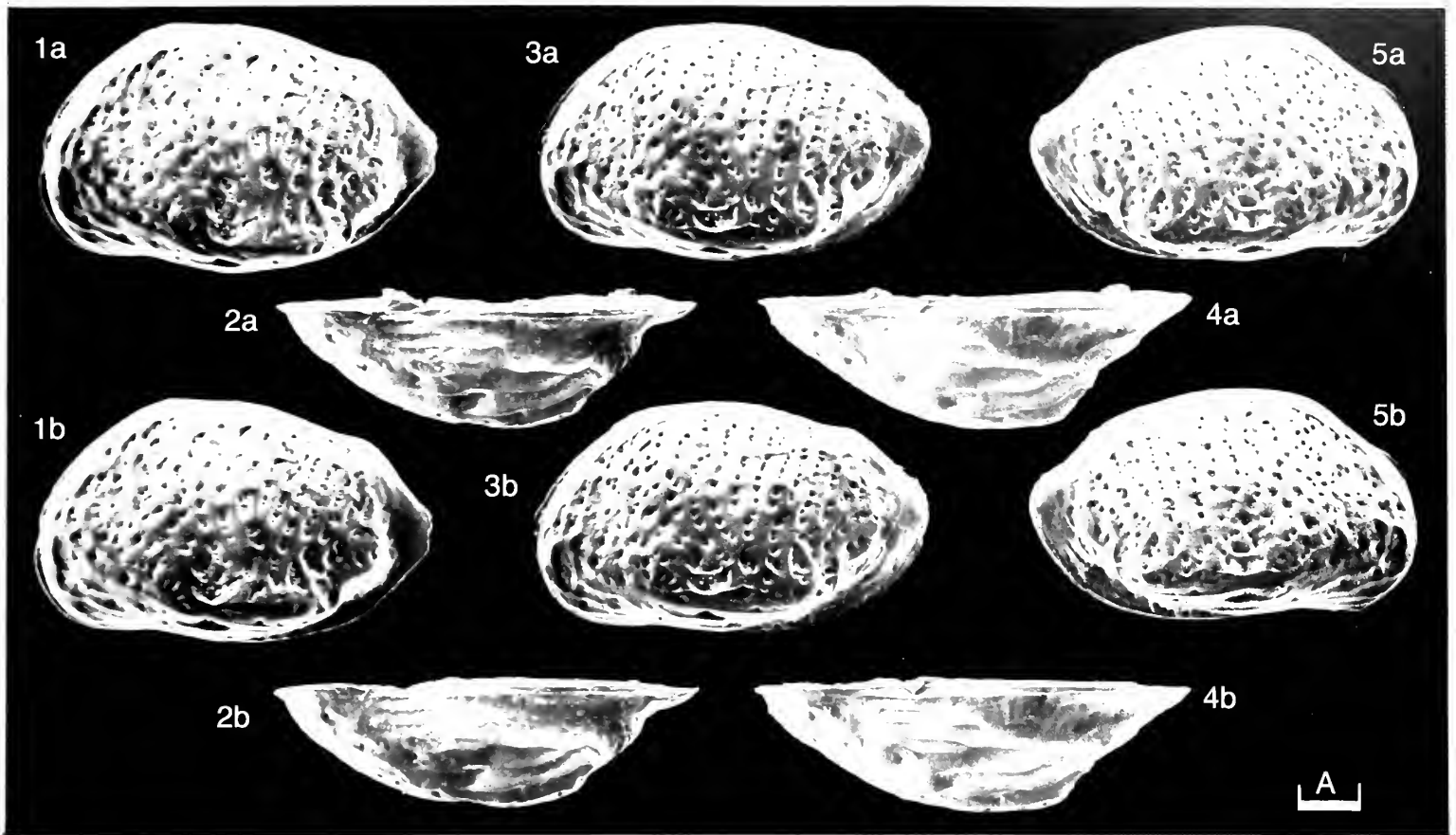
1980 *Cytheropteron latissimum* (Norman); R. C. Whatley & D. Masson, *Revta esp. Micropaleont.*, **11**, 225–227, pl. 6, figs. 7, 9, 12.

* Norman published identical type descriptions in two separate publications in 1865; only in one was the species illustrated, however.

Explanation of Plate 15, 130

Fig. 1, ♀ RV, int. lat. (**1988.303**, 640µm long); figs. 2–4, ♂ (**1988.304**, 670µm long); fig. 2, LV, ext. lat.; fig. 3, LV, dors.; fig. 4, RV, ext. lat.

Scale A (100µm; × 90), figs. 1–4.



Lectotype: Here designated: British Museum (Nat. Hist.) no. **1987.331**; ♀ left valve.

[Paralectotype: no. **1988.304**, ♂ left and right valves]

Type locality: Dogger Bank, central North Sea (approx. lat. 50°45'N, long. 2°00'E); Recent, marine.

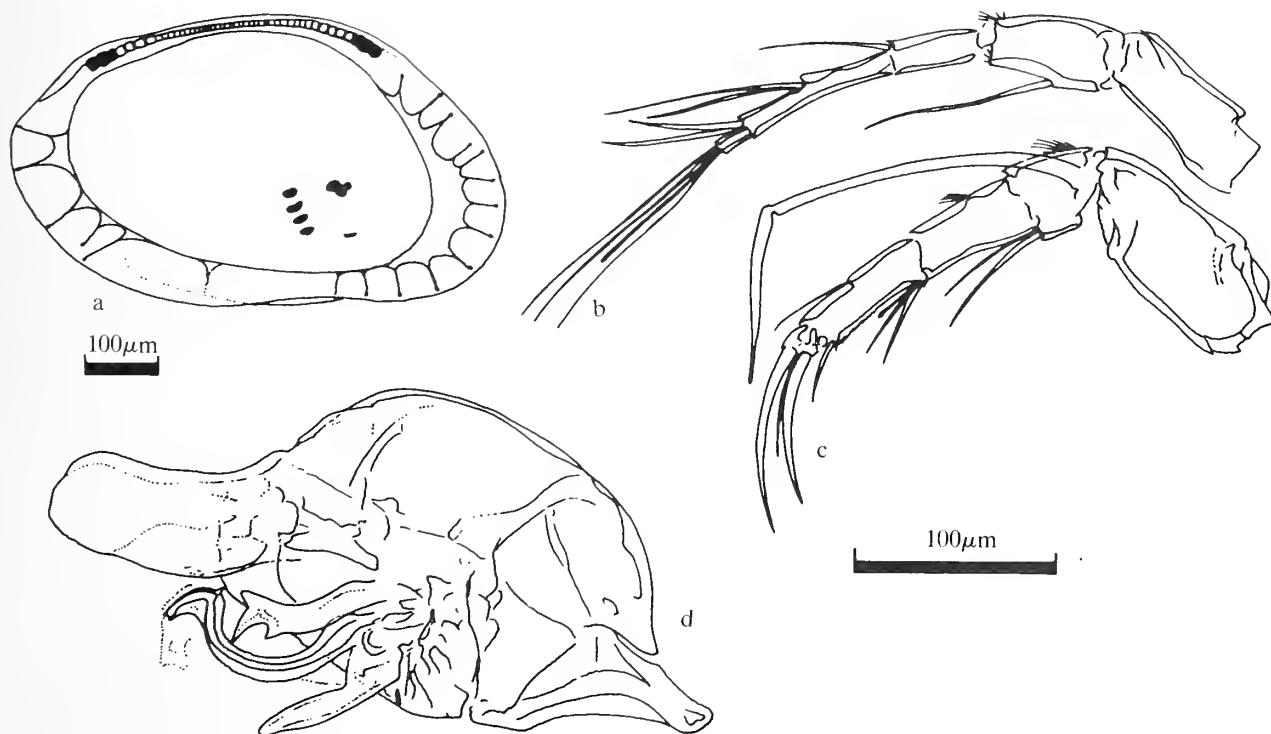
Figured specimens: British Museum (Nat. Hist.) nos. **1987.331** (lectotype, ♀ LV: Pl. 15, 128, fig. 1), **1988.302** (paralectotype, ♂; LV: Pl. 15, 128, fig. 3; RV: Pl. 15, 128, fig. 5), **1988.303** (♀ RV: Pl. 15, 128, fig. 2; Pl. 15, 130, fig. 1), **1988.304** (♂; RV: Pl. 15, 128, fig. 4; LV: Pl. 15, 130, figs. 2–4).

All were taken from slides in the Norman Collection at the British Museum (Nat. Hist.); the lectotype and paralectotype are from slide no. **1911.11.8 M3673**; **1988.303** and **1988.304**, from slide no. **1911.11.8 M3670**, were collected "between the Cumbrae Isles" (W Scotland, approx. lat. 55°45'N, long. 4°56'W) on July 8th, 1885, depth 15–25 fathoms (27–46m).

Diagnosis: Carapace sub-rhomboidal in lateral view, with a blunt caudal process above mid-height and rounded, truncate alae terminating well behind mid-length. Posteroventral margin compressed. Greatest width a little behind mid-length. Ornamented with vertically elongate fossae in the posterior half, giving way anteriorly to more rounded, scattered fossae.

Remarks: Neale & Howe (*op. cit.*) illustrated a syntypic LV from Norman's type material from Holy Island, NE England (housed in the G. S. Brady Collection at the Hancock Museum, Newcastle-upon-Tyne) but did not designate a lectotype.

Distribution: Recent: NW European coasts between 50° and 70°N; records from the Arctic and off NE America are questionable. A sublittoral species found on a variety of sediment substrates in water depths of 5–80m, usually in normal marine salinities, although in the Baltic it can tolerate salinities as low as 10 o/oo (see Whatley & Masson *op. cit.* for detailed discussion of distribution and ecology). Pleistocene: many localities in NW Europe (see Whatley & Masson, *op. cit.* for details). Pliocene: Antwerp Crag (Brady, 1978, *op. cit.*).



Text-fig. 1: a, ♀ LV, int. lat., viewed in transmitted light; b, ♂ antennula; c, ♂ antenna; d, ♂ copulatory appendage. All drawings based on study of several specimens.

ON *BUNTONIA BRUNENSIS* ŘÍHA sp. nov.

by Jaroslav Říha
(Moravian Museum, Brno, Czechoslovakia)

Buntonia brunensis sp. nov.

Holotype: Dept. of Geology and Paleontology, Moravian Museum, coll. no. MM VI-13-1/3; ♂ ? , RV.
[Paratypes, nos. MM VI-13-1/2, 4-11].

Type locality: Borehole Česká HV-208 (35.6-35.8m) near Brno, southern Moravia, Czechoslovakia; lat. 49°15'N, long. 16°30'E. Calcareous clays, *Orbuline sunuralis* Zone, lower Badenian, Miocene.

Derivation of name: Latin name of Brno.

Figured specimens: Dept. of Geology and Paleontology, Moravian Museum, coll. nos. MM VI-13-1/2 (paratype, ♀ ? LV: Pl. 15, 134, figs. 1,2), MM VI-13-1/3 (holotype, ♂ ? LV: Pl. 15, 134, fig. 3), MM VI-13-1/4 (paratype, ♀ ? LV: Pl. 15, 136, fig. 2), MM VI-13-1/6 (paratype, ♂ ? RV: Pl. 15, 136, fig. 3), MM VI-13-1/7 (paratype, ♂ ? RV: Pl. 15, 136, fig. 1).

All collected by the author from the type locality and horizon.

Diagnosis: Ornament reticulate/pitted; primary reticulation faint, with four bow-shaped ventrolateral ribs, two transverse ribs in the area of anterodorsal corner; secondary reticulation conspicuous, in the form of small, rounded pits. Five denticles on posteroventral margin and a conspicuous spine at the end of the shortest ventrolateral rib in the posteroventral area.

Explanation of Plate 15, 134

Fig. 1, 2, ♀ ? LV (MM VI-13-1/2, 480µm long): fig. 1, ext. lat.; fig. 2, detail of posteroventral spine; fig. 3, ♂ ? LV, ext. lat. (holotype, MM VI-13-1/3, 510µm long).

Scale A (100µm; ×150), figs. 1, 3; scale B (25µm; ×620), fig. 2.

Remarks: *B. brunensis* is similar to *B. sublatissima dertonensis* Ruggieri, 1954 (*Atti della Soc. Ital. Sci. Nat.*, 93, 565, 568), having a prominent spine which serves as a base for distinguishing *B. dertonensis* from *B. sublatissima* (Neviani). To quote Professor G. Ruggieri (pers. comm., 1983): "*Buntonia dertonensis* was erected as a subspecies many years ago, in the pre-SEM time. Of course, it is a species, not a subspecies. And the original description lacks an important detail, that is the presence of a little spine in the posteroventral region". However, *B. brunensis* does in fact have a spine much more pronounced than in *B. dertonensis*, it also differs in having smaller diameter pits, as well as different muscle scars and their manifestation on the external side of the valve. *B. dertonensis* has its eye tubercle formed in another way and the valves are sharply inclined down to a short ventrolateral rib.

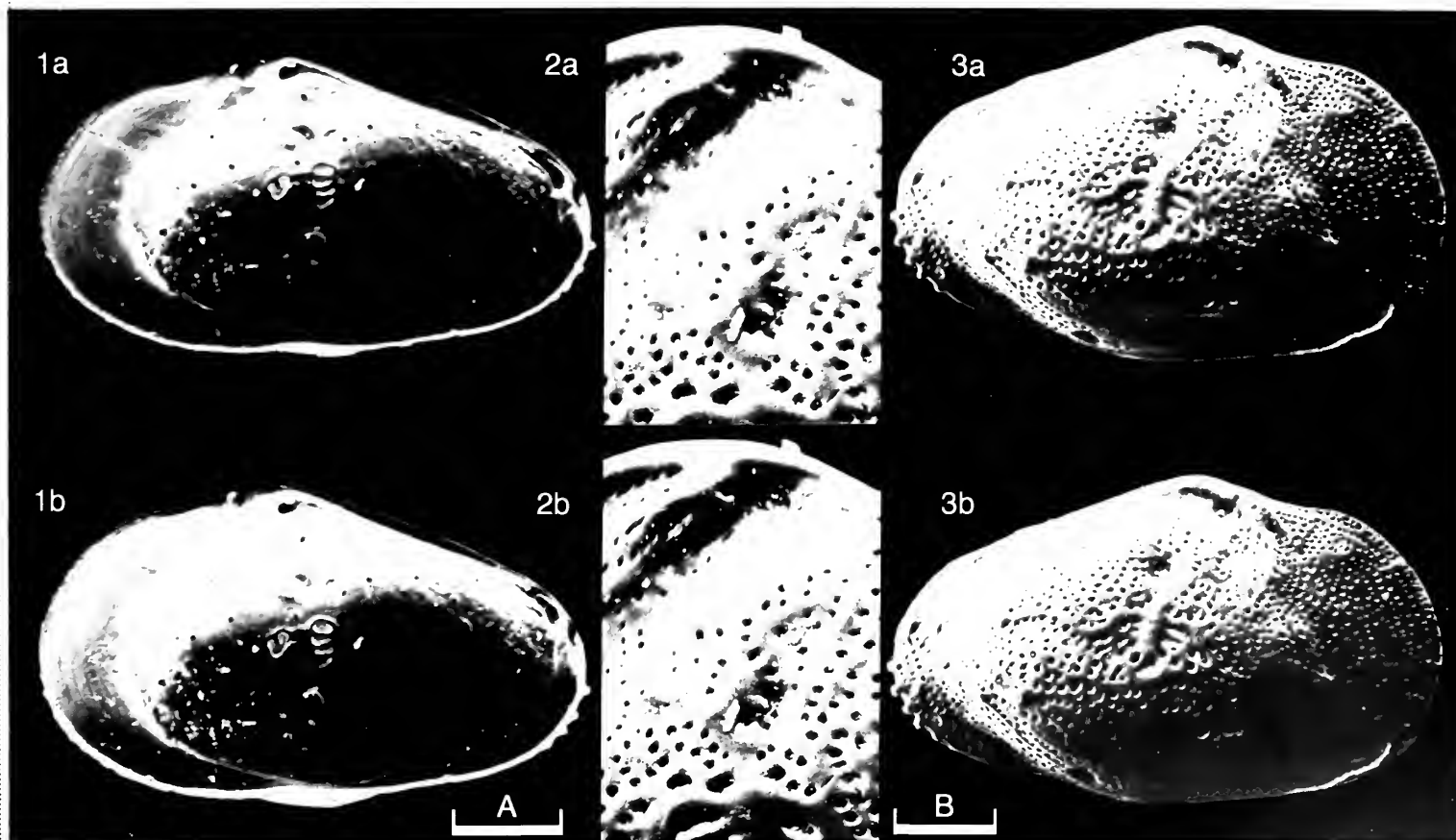
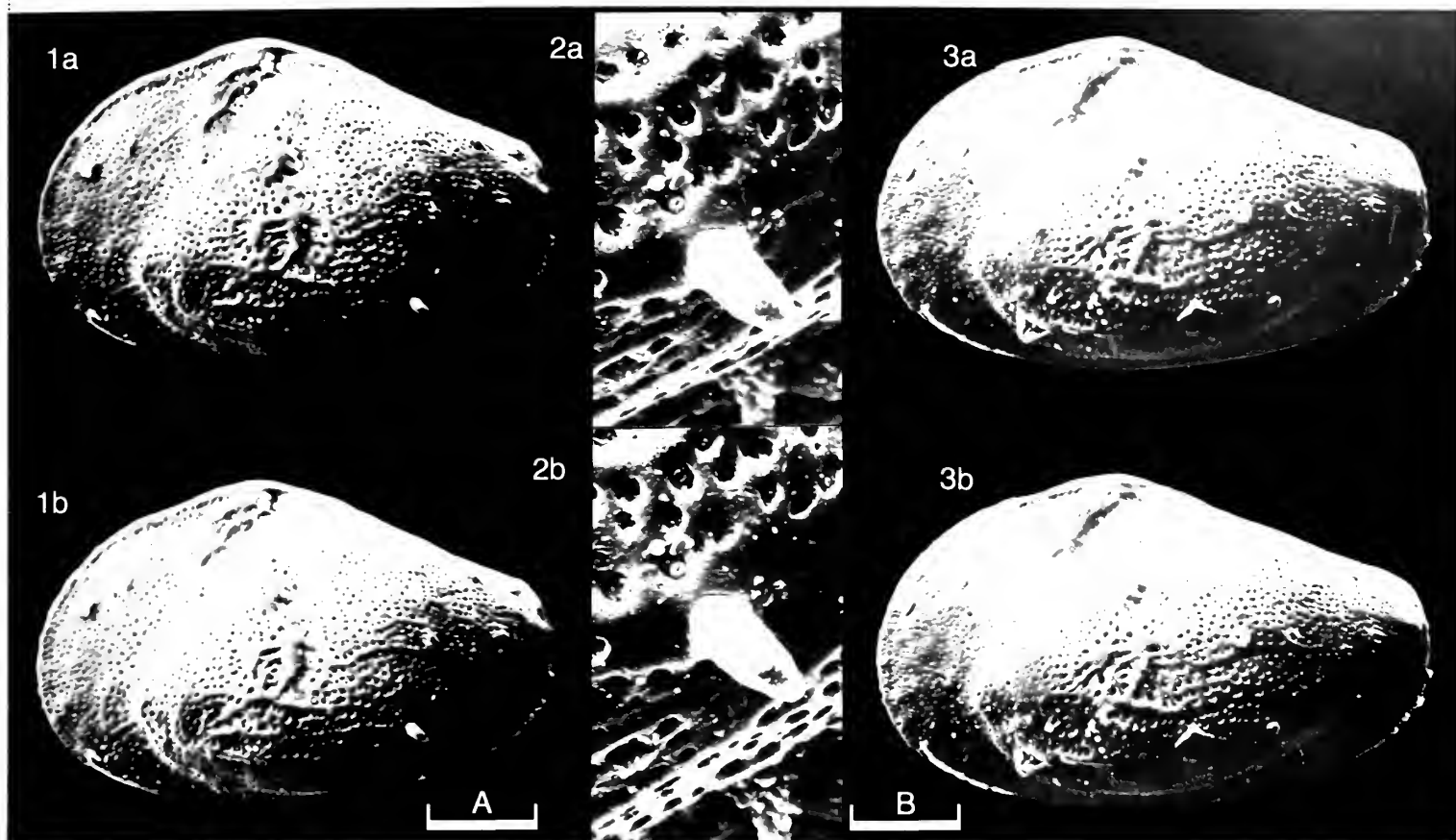
Sexual dimorphism has not been definitely proved in the small quantity of material.

Distribution: Known only from the type locality.

Explanation of Plate 15, 136

Fig. 1, ♂ ? RV, int. lat. (MM VI-13-1/7, 528µm long); fig. 2, ♀ ? LV, ext. lat., detail of eye tubercle (MM VI-13-1/4, 490µm long); fig. 3, ♂ ? RV, ext. lat. (MM VI-13-1/6, 522µm long).

Scale A (100µm; ×150), figs. 1, 3; scale B (50µm; ×260), fig. 2.



ON *JAANUSSONIA UNICERATA* SCHALLREUTER

by Jean Vannier
(University of Leicester, England)

Genus *JAANUSSONIA* Schallreuter, 1971

1971 *Jaanussonia* gen. nov.; R. E. L. Schallreuter, *N. Jb. Geol. Paläont. Mh Jg.* 1971, 4, 255.

1986 *Jaanussonia*; R. E. L. Schallreuter in: von Hacht, U. (ed.), *Ostrakoden aus Öjlemyrflint Geschieben von Sylt in Fossilien von Sylt II*, 14, Hamburg.

Diagnosis: Small (adults < 700µm long), asymmetric, non-sulcate ostracodes. Amplete to postplete outline. Carapace rounded to ovate in lateral view. Ratio of valve length: height = 1.3–1.7. Long (approx. 0.7 length) straight dorsal margin. Curved, faint 'sulcament' (*sensu* Schallreuter, *Palaeontographica A*, 144 1973) may occur on dorsal inner surface. Posterodorsal hollow spine on left valves only. Right over left overlap. Lateral surface smooth to locally densely punctate. (Modified after Schallreuter 1971; *op. cit.*, 255).

Remarks: *Jaanussonia* is closest to *Kayina* Harris, 1957, *Hemiaechminoides* Morris & Hill, 1952 and *Hemeaschmidtella* Schallreuter, 1971. The main features in common are a dorsal/posterodorsal asymmetry (involving umbonate sculpture, knob or spine) and a right over left ventral overlap. These four genera form the family Jaanussoniidae Schallreuter, 1971.

Schallreuter (1971, *op. cit.*) implicitly considers jaanussoniids as paraparchitaceans on the basis of a possible reversal of overlap, on the supposed occurrence of a calcified inner lamella and on external sexual dimorphism. However, no such morphological features appear to exist in typical jaanussoniids. Also

Explanation of Plate 15. 138

Figs. 1, 2, 4, LV (GPIMH 3420, 518µm long): fig. 1, ext. lat.; fig. 2, ext. dors.; fig. 4, ext. vent. obl. Figs. 3, 5, 6, LV (GPIM-G 27/1, 521µm long): fig. 3, detail ventral margin, int. lat. obl.; fig. 5, detail dorsal margin, ext. ant. obl.; fig. 6, detail ventral margin, ext. ant. obl.

Scale A (100µm; ×140), figs. 1, 2, 4; scale B (50µm; ×320), fig. 3; scale C (50µm; ×480), figs. 5, 6.

Remarks (cont.): according to Schallreuter, *Barsella* Shishkinskaja, 1964 (in: *Biostratigrafija neftegazonosnykh oblastej SSSR [Paleontologija i biostratigrafija paleozojskich otlozenij neftegazonosnykh oblastej SSSR]*, 105–140, Moscow) from the Devonian of the Russian Platform, is very similar to *Jaanussonia* and *Hemiaechminoides*. However, its distinctive 'kloedenellid-type' dimorphic features distinguish it from jaanussoniids.

New S.E.M. observations on well preserved Ordovician Baltic ostracodes extracted from cherts and cherty limestones by hydrofluoric acid (R. Schallreuter's collections, University of Hamburg), demonstrate that no inner lamella comparable to that of Palaeozoic (e.g. Schallreuter in: Kristic (ed.), *Proc. 7th. Inter. Symposium on Ostracodes, Serbian Geol. Soc.*, Beograd 1979) or Recent podocopes occurs in jaanussoniids as defined in the present paper. Furthermore, simple right over left ventral overlap seems to be a common characteristic of all jaanussoniids. The only example (Schallreuter 1971, *op. cit.*) of a reversal of overlap, in *Kayina hybosa* (Harris, 1957) (see R. W. Harris, *Bull. Oklahoma Geol. Surv.* 75, 160, pl. 3, fig. 11, 1957) is dubious. Current studies on Harris' Ordovician material (M. Williams, pers. com.) indicate that ventral overlap conditions of *Kayina hybosa* are apparently identical to those of all jaanussoniids.

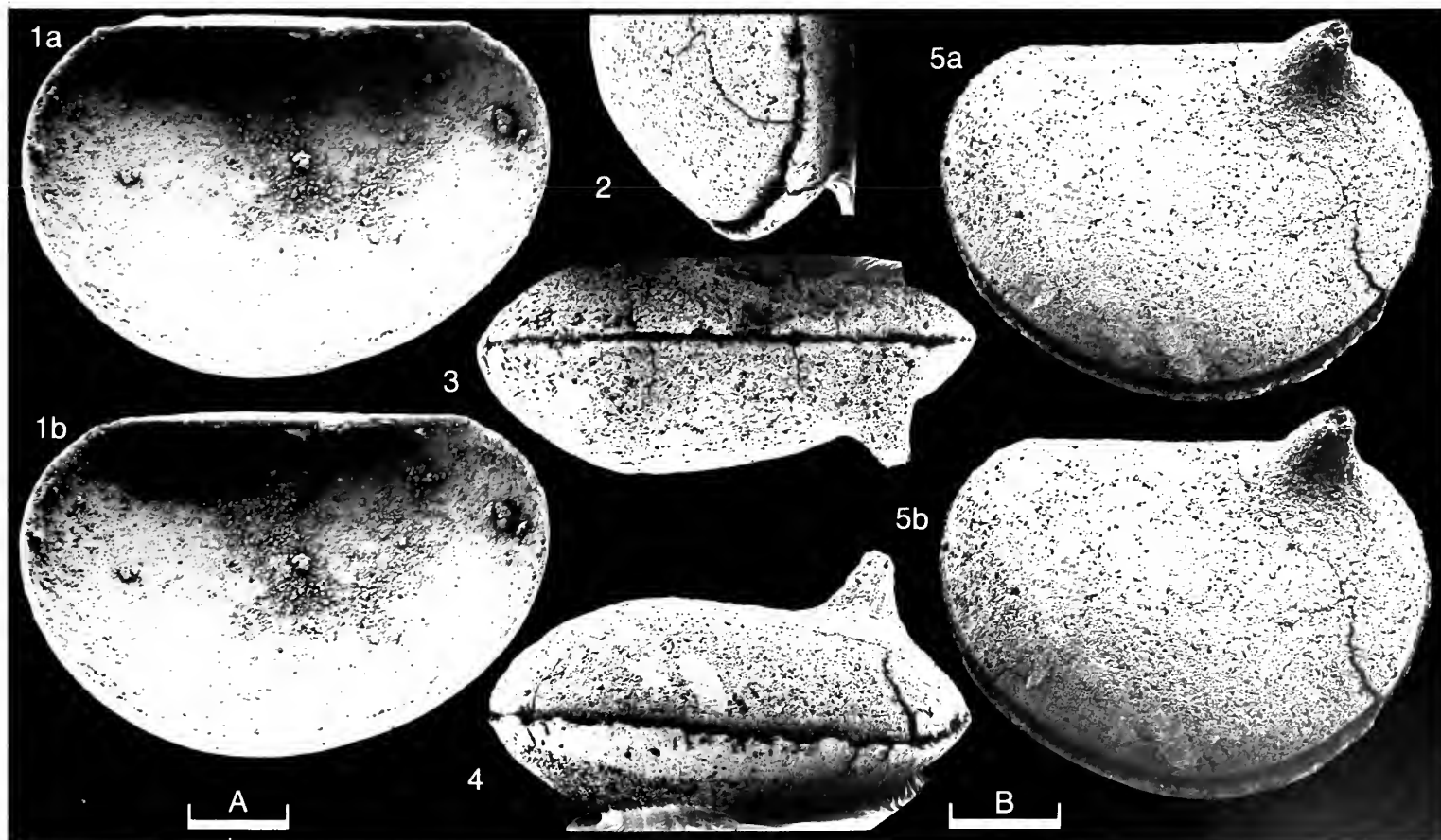
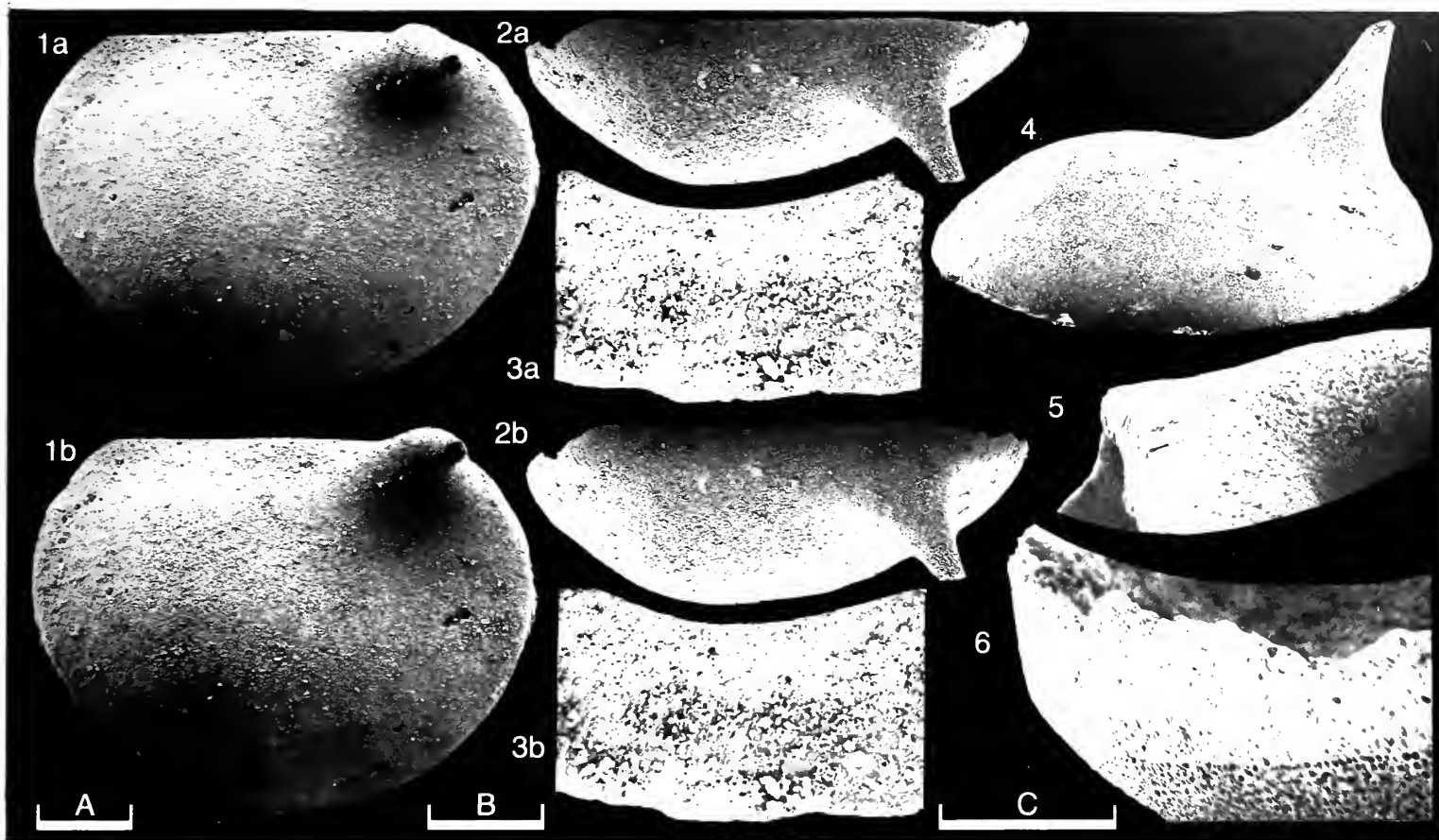
Most jaanussoniids (middle Ordovician to (?) late Palaeozoic) are more probably related to leiocopes rather than to podocopes such as the superfamily Paraparchitacea (see I. G. Sohn, *U.S. Geol. Surv. Prof. Pap.*, 711-A, 1971). Typical leiocopes (Vannier in prep.) are small-sized, non-sulcate, non-dimorphic and exhibit a left valve (ventral) asymmetry (e.g. *Brevidorsa* Neckaja, 1966; see Text-fig. 1 herein and Schallreuter, in: *Fossilien von Sylt II*, von Hacht, U. (ed.), Hamburg, pl. 5, fig. 9, 1986) and a remarkably constant right over left overlap. Moreover, they lack a distinct calcified inner lamella. All these fundamental internal and external features are found in most jaanussoniids.

Leiocope valves are typically like two more or less elongate domes joined at a short dorsal margin; their evenly convex external surfaces lack any lobal or sulcal features. These morphological characteristics and their small size generally distinguish leiocopes from other Palaeozoic ostracodes. However, an extremely simple 'architectural type' of the carapace (see R. Benson, *Ann. Rev. Earth Planet. Sci.*, 9, 1981) also occurs in other taxonomic groups (e.g. late Palaeozoic paraparchitaceans; see discussion above). Obsolence of lobal/sulcal sculpture in binodicopes (e.g. *Vogdesella*; see Vannier, *Palaeontographica A*, 193, 1986) or reduction of dimorphic brood-care features (e.g. *Ochescapha*; R. Schallreuter in prep.) are responsible for numerous other examples of homeomorphic species. Dome-like thin-walled carapaces are also common

Explanation of Plate 15. 140

Fig. 1, LV (GPIM-G 27/1, 521µm long), int. lat. Figs. 2–5, car. (GPIM-G 27/2; LV, 442µm long): fig. 2, detail of external overlap conditions, ventral margin, ext. ant. obl.; fig. 3, ext. lat. (LV); fig. 4, ext. dors.; fig. 5, ext. vent.

Scale A (100µm; ×140), fig. 1; scale B (100µm; ×155), figs. 2–5.



Remarks (cont.): amongst fossil (e.g. Silurian cyprinidids; see D. J. Siveter *et al.*, *Palaeontology*, **30**, 1987) and Recent myodocopid ostracodes (e.g. *Polycopse*; see Hasan, *Stere-Atlas Ostracod Shells*, **10**, 63–66, 1983). According to Benson (*op. cit.*), a dome-like carapace represents the most economical and efficient design to carry uniform mechanical stresses. This architectural design is common to active swimmers (e.g. pelagic myodocopid ostracodes), burrowers or interstitial dwellers (e.g. some Recent podocope ostracodes). Dome-like carapaces have a very low potential for positional stability on the water-sediment interface and therefore, are rarely found in true benthic forms. Consequently leiocopes such as typical dome-shaped thin-walled aparchitids (*Brevidorsa*, Text-fig. 1) might be interpreted as swimming forms or possible burrowing forms (e.g. strongly asymmetrical jaanussoniids like *Jaanussonia*; Text-fig. 1).

Jaanussonia unicerata Schallreuter, 1971

1971 *Jaanussonia unicerata* sp. nov. R. E. L. Schallreuter, *N. Jb. Geol. Pálaont. Mh. Jg.* **1971**, **4**, 256, fig. 4.

1986 *Jaanussonia unicerata* Schallreuter; R. E. L. Schallreuter, *Ostrakoden aus Öjlemyrflint-Geschieben von Sylt, op. cit.*, pl. 6, fig. 9.

Holotype: Geologisch-Paläontologisches Institut und Museum, University of Hamburg (GPIMH), German Federal Republic, no. GPIM-G 29/4, LV.

Type locality: Norderstrand Visby, Isle of Gotland, Baltic Sea, Sweden; lat. 57° 40'N, long. 18° 18'30"E; Öjlemyrflint erratic boulder (no. G2; Schallreuter coll.), upper part of Harjuan 'Series', upper Ordovician.

Figured specimens: Geologisch-Paläontologisches Institut und Museum, University of Hamburg, nos. GPIMH 3420 (LV; Pl. 15, 138, figs. 1, 2, 4), GPIM-G 27/1 (LV; Pl. 15, 138, figs. 3, 5, 6; Pl. 15, 140, fig. 1) and GPIMH 27/2 (carapace; Pl. 15, 140, figs. 2–5). GPIM-G 27/1 and GPIM-G 27/2 are from the Isle of Karlsö, Sweden; lat. 57° 18'N, long. 18° 8'E; Öjlemyrflint erratic boulder (no. G30; Schallreuter coll.), upper part of Harjuan 'Series', upper Ordovician. GPIMH 3420 is from the Isle of Sylt, North Sea, German Federal Republic; lat. 54° 56'N, long. 8° 21'E; Öjlemyrflint erratic boulder (Sy 60; Schallreuter coll.), Upper Harjuan 'Series', upper Ordovician.

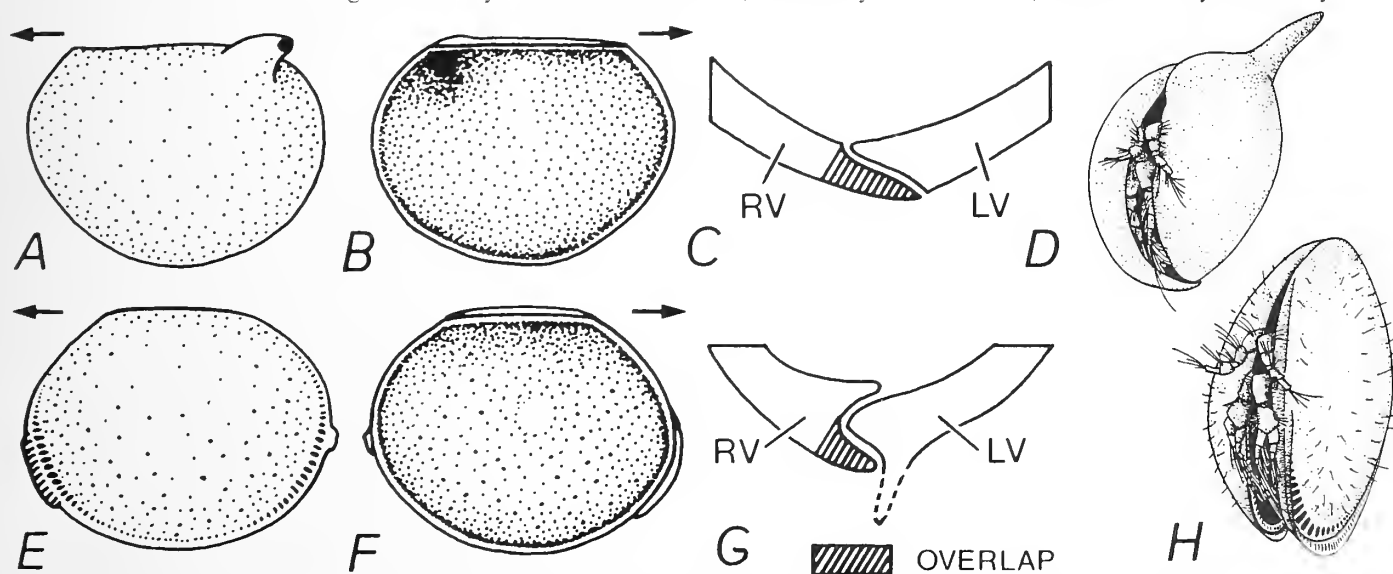
Diagnosis: Adults < 640µm long. Rounded carapace, postplete in outline. Ratio valve of length: height = 1.3–1.5. Well defined straight dorsal margin. 'Sulcament' (*sensu* Schallreuter, 1973, *op. cit.*) faintly expressed internally as a curved dorsal partition. Strong ventral right-over-left overlap. Valve separation straight in dorsal and ventral view. Prominent curved spine located in posterior cardinal area of left valves only, projecting backwards and overreaching dorsal margin.

Remarks: For a full description of this species see Schallreuter 1971 (*op. cit.*) *Jaanussonia unicerata* shares many morphological features with *Jaanussonia valdari* Schallreuter, 1984 (*Geol. För. Stockholm*

Remarks (cont.): Förh. **106**, fig. 4B) and *Jaanussonia rossica* (Neckaja, 1966). However, it has a low length:height ratio compared to that of *J. valdari* from the middle Ordovician of Sweden and a much more prominent posterodorsal spine than in *J. valdari* or *J. rossica* from the middle Ordovician of Lithuania (see Neckaja, *Tr. VNIGRI*, **251** 1966).

Distribution: Erratic boulders from the Baltic region: Öjlemyrflint boulders from the Isles of Gotland (Sweden) and Sylt (German Federal Republic). Harjuan 'Series', upper Ordovician.

Acknowledgements: To Roger Schallreuter, the Humboldt Foundation (Bonn) for my Research Fellowship at Hamburg University; to David Siveter (University of Leicester) and the Royal Society.



Text-fig. 1. Comparison between *Jaanussonia unicerata* (A-D) and a typical leiocope ostracode, *Brevidorsa limbata* (Sidaravičiene, 1975) (E-H). A, E: external lateral views of a left valve; B, F: internal lateral views of a left valve; C, G: schematic cross-sections of the ventral margin; D, H: reconstruction of ostracode in inferred life attitude with protruding frontal appendages.

ON *HEMICYTHERURA TRICARINATA* HANAI

by David J. Horne & Ichiro Okubo
(Thames Polytechnic, England & Shujitsu Joshi University, Japan)

Hemicytherura tricarinata Hanai, 1957

- 1957 *Hemicytherura tricarinata* sp. nov. T. Hanai, *J. Fac. Sci. Tokyo Univ.*, (2), **11**, 25.26, pl. 2, figs. 3a, b.
1980 *Hemicytherura tricarinata* Hanai; I. Okubo, *Publ. Seto mar. biol. Lab.*, **25**, 16–18, figs. 1e, f, 2i–l, 6a–k.
1982 *Hemicytherura tricarinata* Hanai; Y. Hou *et al.*, *Cretaceous-Quaternary Ostracode Fauna from Jiangsu*, 176, 177, pl. 74, fig. 18, text-figs. 38a, b, Geological Publishing House, Beijing.

Holotype: University of Tokyo, **UMUT-CA-2621**, ♀ car. Figured Hanai 1957, pl. 2, fig. 3a.
[Paratype, **UMUT-CA-2622**, ♀ car. Figured Hanai 1957, pl. 2, fig. 3b.]

Type locality: About 1 km NE of Akase railroad station, near Hiraiwa, Uto-shi, Kumamoto Prefecture, Japan (approx. lat. 32°40'N, long. 130°31'E); beach sand, Recent.

Figured specimens: National Science Museum, Tokyo no. **NSMT-Cr 9369** (♂ copulatory appendage: Text-fig. 1b). British Museum (Nat. Hist.) nos. **1988.318** (♀; RV: Pl. 15, 144, fig. 1; LV: Pl. 15, 144, fig. 3), **1988.319** (♂; LV: Pl. 15, 144, fig. 2; RV: Pl. 15, 146, fig. 1), **1988.320** (♀ car.: Pl. 15, 146, fig. 2), **1988.321** (♂ LV: Pl. 15, 146, fig. 3). All collected alive by I. Okubo from intertidal sand with *Zostera* in the Inland Sea of Seto, Japan: **NSMT-Cr 9369** on 27th June, 1975 (lat. 34°31'N, long. 134°00'E), all the rest on 11th July, 1980 (lat. 34°27'N, long. 133° 59'E). **NSMT-Cr 9369** was previously illustrated by Okubo (*op. cit.*, fig. 6d) under the provisional no. **MO-879**.

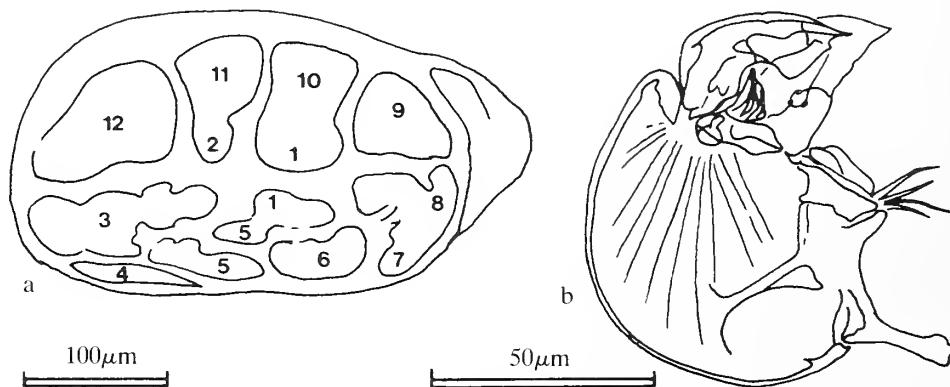
Diagnosis: Small species of *Hemicytherura* with a short caudal process and without a discrete central group of fossae. Using the numerical notation of I. R. Hoskin (*Revt. esp. Micropaleont.*, 7, 91–98, 1975): fossa 1 divided by a longitudinal murus, the upper part being fused with fossa 10; 2 fused with 11 (see Text-fig. 1a). Male copulatory appendage with subtriangular processes and ejaculatory duct.

Explanation of Plate 15, 144

Fig. 1. ♀ RV, ext. lat. (**1988.318**, 360 µm long); fig. 2. ♂ LV, ext. lat. (**1988.319**, 310 µm long); fig. 3. ♀ LV, ext. lat. (**1988.318**, 360 µm long). Scale A (100µm; ×190), figs. 1–3.

Remarks: The appendages of *H. tricarinata* have been fully illustrated by Okubo (*op. cit.*). As noted by Hanai (*op. cit.*), this species closely resembles *Hemicytherura quadrazea* Hornibrook, 1953 (*Palaeont. Bull. Wellington*, **18**, 61, pl. 14, figs. 219–223) from the Recent of New Zealand; the latter differs mainly in having narrow muri subdividing fossa 12 and separating fossae 11 from 2 and 10 from 1.

Distribution: Pleistocene to Recent of Japan and China. A marine species usually found on intertidal sand amongst *Zostera*.

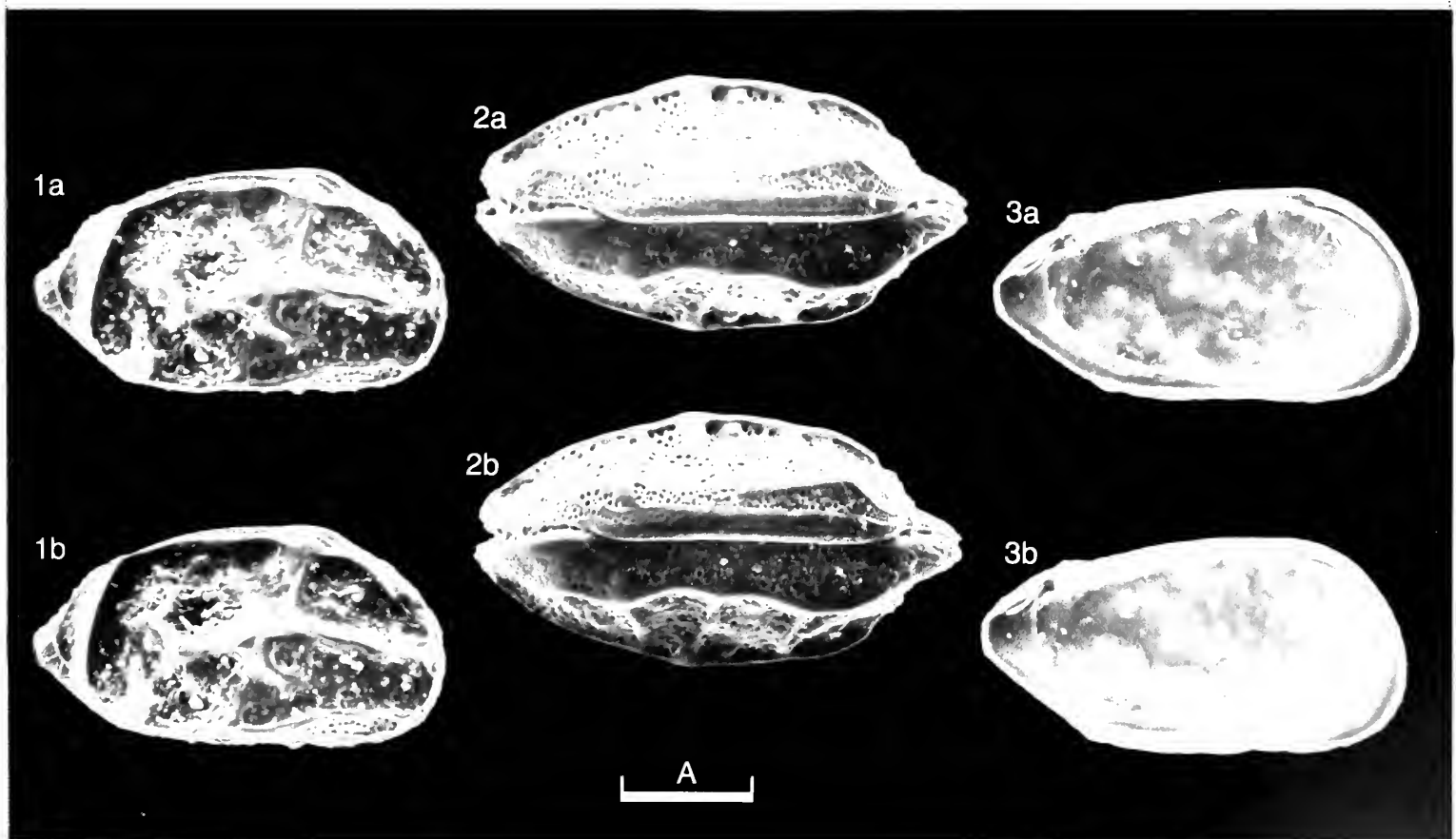
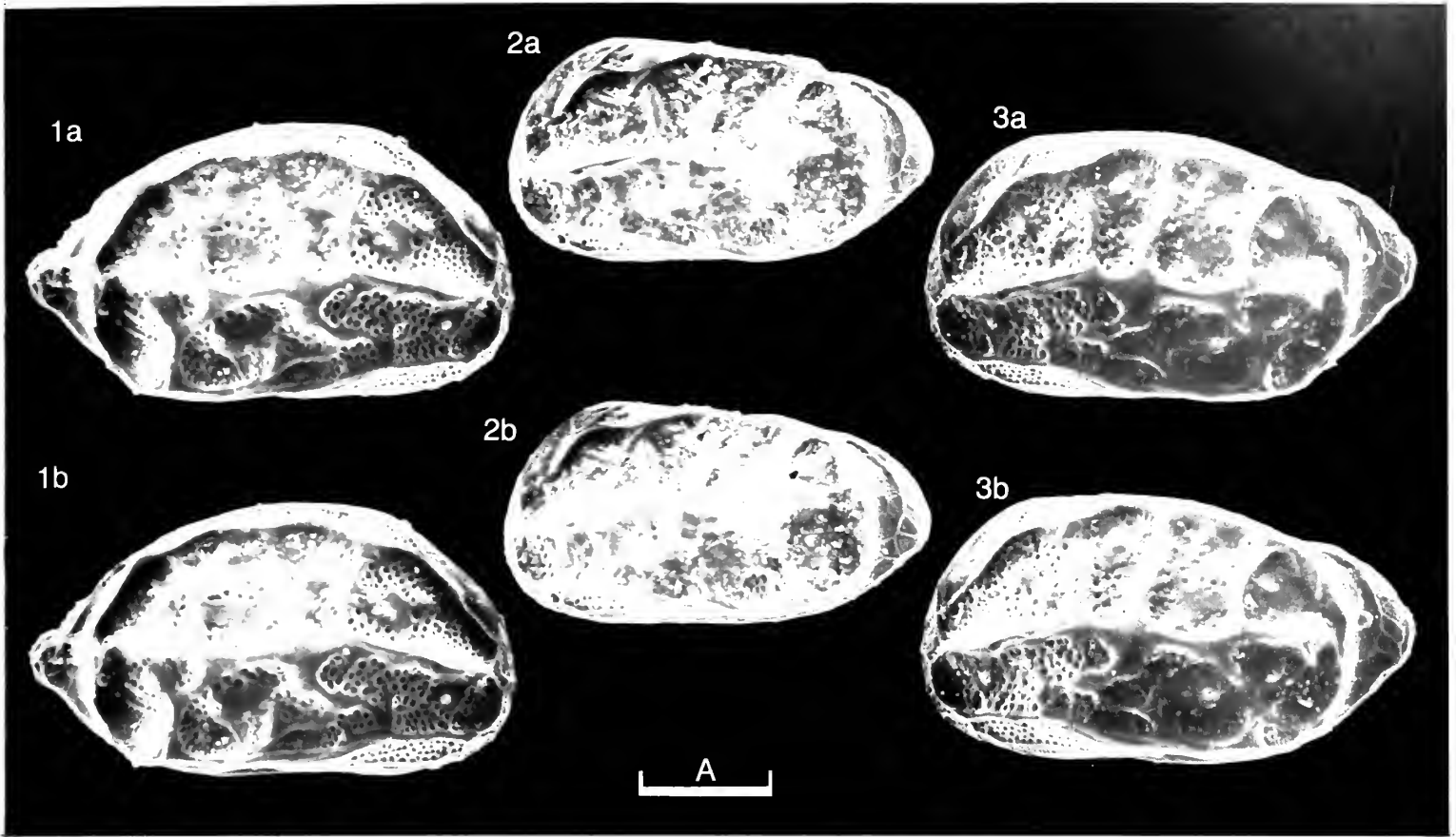


Text-fig. 1a. Generalised sketch of a ♀ LV with Hoskin's (1975) numerical notation of the fossae; 1b. ♂ copulatory appendage (**NSMT-Cr 9369**).

Explanation of Plate 15, 146

Fig. 1. ♂ RV, ext. lat. (**1988.319**, 310µm long); fig. 2. ♀ car., dors. (**1988.320**, 360µm long); fig. 3. ♂ LV, int. lat. (**1988.321**, 310µm long).

Scale A (100µm; ×190), figs. 1–3.



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