

# Lower Jurassic ostracods from Ilminster, Somerset, England

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## ABSTRACT

Pliensbachian and Toarcian ostracods are described from an interbedded marlstone/carbonate-mud sequence in South-West England. Sediments of this age in other parts of Britain rarely offer a lithology favourable to the examination of calcareous microfossils. The fauna possesses similarities with other European sequences, particularly to the south. The presence of one species, *Ektyphocythere dharensourensis* Boutakiout, Donze & Oulmalch, 1982 suggests possible links with North-West Africa at this time. *J. Micropalaeontol.* 11 (1): 47-57, June, 1992.

## INTRODUCTION

Roadworks in connection with the A303 Ilminster By-pass (Fig. 1) have revealed an alternating carbonate/argillite sequence which appears to span the uppermost Pliensbachian and most of the Toarcian. The sediments are generally fossiliferous and abundant ammonites have permitted the section to be accurately dated. The stratigraphical importance of this section becomes apparent when one looks at contemporary sediments on the nearby Dorset coastal section. There, the greater part of the Toarcian is represented by a condensed sequence, the Junction Bed (Cope *et al.* 1980).

The sediments, which apparently lack any anaerobic or dysaerobic conditions, have been the subject of an integrated lithological, micro/palaeontological study at University College London and the British Geological Survey. (Boomer *et al.* in press). An initial report on the ostracods of the section was given by the author in that work.

The only previously published works on British Toarcian ostracods are those of Bate & Coleman (1975) from the East Midlands, Lord (1974) from the Down Cliff Clay, Dorset, Ainsworth (1986) from the Fastnet Basin and Boomer (1991) from the Mochras Borehole. The present lithology contrasts with the more extensive argillaceous sequences in other parts of Britain, therefore, any faunal differences observed may reflect the facies dependence of certain taxa.

## LITHOLOGY

The sediments encountered at Ilminster are contemporary with the Middle and Upper Lias Junction Bed (*sensu* Wilson *et al.*, 1958). The presence of microfossil rich marl bands within this section permits the first detailed chronostratigraphical and micro-biostratigraphical study of this interval, in full, in Britain. A detailed lithological description together with the stratigraphical distribution of ammonites, calcareous nanofossils, foraminifera and palynological remains are described elsewhere (Boomer *et al.*). The sediments represent the Junction-Bed Formation, which is composed of two

members, namely the Barrington Beds Member (equivalent to the Junction-Bed of Howarth in Cope *et al.*, 1980) and the Marlstone Rock Bed Member (equivalent to the Marlstone Rock-Bed of Howarth in Cope *et al.* 1980).

Due to the unfavourable lithology, only one horizon within the Marlstone Rock Bed Member was suitable for study. This was the oldest sample studied (ILM-KP 1) and was assigned to the spinatum zone, hawkskerense subzone based on ammonite evidence. The remaining sixteen samples, all Toarcian, were from the Barrington Beds Member and range in age from tenuicostatum zone to the thouarsense zone.

The samples investigated are listed below and a brief lithological description is given for each. The sequence discussed is a composite of two separate sections, see location map (Fig. 1) and Fig. 2. Samples represent the entire thickness of each bed, except where otherwise stated e.g. ILM-9951/ILM-9950 & ILM-9947.

*Marlstone Rock Bed Member.*

ILM-KP 1 Calcareous and in parts, marly sand contains occasional fragments of marly or bioclastic limestone. 10cm.

*Barrington Beds Member.*

ILM-KP 2 Grey, marly, with shell debris laminae and occasional ferruginous nodules. 15cm.

ILM-KP 4 Grey to green marl. 3cm.

ILM-KP 3 Grey marl. 10cm.

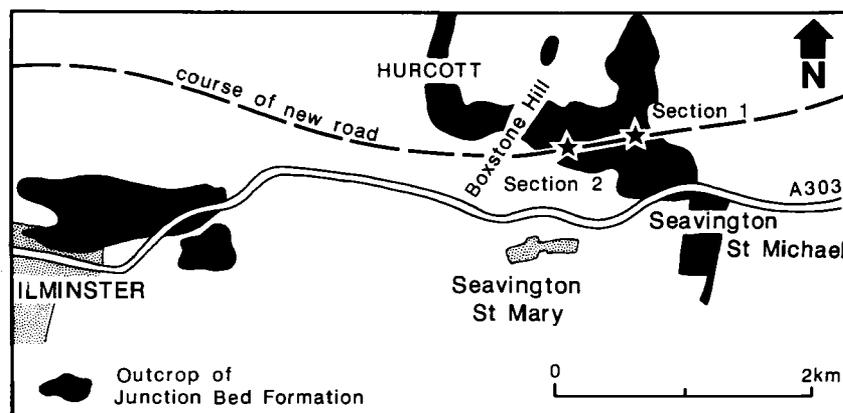


Fig. 1. Map showing location of Ilminster sections.

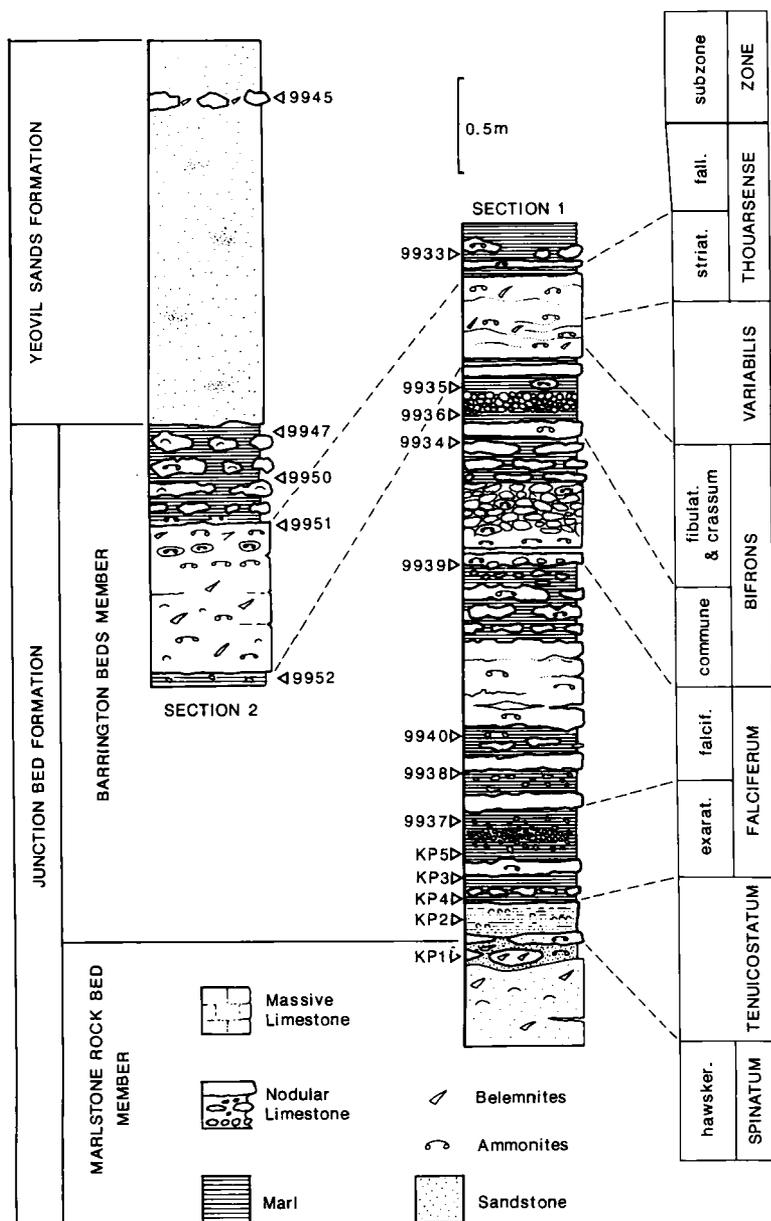


Fig. 2. Lithological sections at Ilminster and sampled horizons.

ILM-KP 5 & ILM-9937 Grey marl with a band of <1cm sized limestone fragments in the middle of the bed. ILM-KP 5 from top of this bed, ILM-9937 from the bottom. 25cm.

ILM-9938 Grey marl with <1cm sized limestone fragments. 12cm.

ILM-9940 Grey marl with irregular/lenticular patches of argillaceous micrite. 15cm.

ILM-9939 Grey marl with 1-2cm sized limestone nodules in common. 15cm.

ILM-9934 Sample taken from top of 30cm section of interbedded grey marls and nodular argillaceous limestone.

ILM-9935 Grey marl with ammonites and limestone nodules. 7cm.

ILM-9933 Sample taken from the lowest part of a clay

(weathered brown) passing vertically into a loamy soil. 20cm. The lowest 15cm of this bed contains a discontinuous band of limestone nodules of varying size.

ILM-9952 Grey marl seam visible at the base of the section, thickness unknown.

ILM-9951/ILM-9950 & ILM-9947 Dark grey clay with bands of lenticular limestone concretions. Black streaks occur near the junction with the overlying Yeovil Sands (ILM-9947). The basal 15cm contains abundant (mainly fragmented) ammonites and belemnites (ILM-9951). Sample ILM-9950 is from the middle of the bed.

ILM-9945 A distinctive band of widely spaced limestone nodules within the Yeovil Sands, which at this horizon become more silty. Belemnite and shell fragments common.

### OSTRACOD BIOSTRATIGRAPHY OF THE ILMINSTER SECTIONS.

#### Upper Pliensbachian

The lowest sample investigated is characterised by the occurrence of species belonging to the genera *Ogmoconcha* and *Ogmoconchella* including vallate forms, assigned to the genus *Hermiella* by Kristan-Tollmann, (1977) but considered by the present author to belong to *Ogmoconcha* Triebel, 1941. These have been referred to as Tethyan forms of the genus *Ogmoconcha* due to their occurrence in the sediments of southern Germany (Malz, 1975; Lord & Moorley, 1974), Portugal (Exton, 1979), Italy (Farinacci *et al.*, 1979 and North Africa (Boutakiout *et al.* 1982, Maupin 1977, Maupin & Vila 1976). These forms have now also been recorded, although in fewer numbers, from the Fastnet Basin (Ainsworth, 1986), Mochras Borehole, (Boomer, unpublished) and the Paris Basin (Bodergat & Donze, 1988).

Other *Ogmoconcha* specimens from ILM-KP 1 possess carapaces with a bi-convex outline in dorsal view thus differentiating them from species attributed to the 'amalthaei' and 'contractula' groups (Michelsen, 1975) which possess flattened lateral surfaces in dorsal view. *O. convexa* Boomer, 1991 originally recorded from the spinatum and

tenuicostatum zones of the Mochras Borehole is one such species. The assemblage is similar to that recorded from the Ammonitico Rosso of the Appennines by Lord *in* Farinacci *et al.* 1979 and also to samples recovered from massive carbonate sediments at Djebel Zaghuan, Tunisia (Lord, *pers. comm.*). The present section differs, however, in that unlike the aforementioned sections both cytheracean and metacopine ostracods occur together.

A comparison with the Mochras section reveals that the ostracod assemblage from sample ILM-KP 1 is similar to samples of tenuicostatum zone age rather than those of spinatum age. This may be due to the distinctly different lithologies. ILM-KP 1 includes the youngest record of both *Cytherelloidea anningi* Lord, 1974, although only one specimen

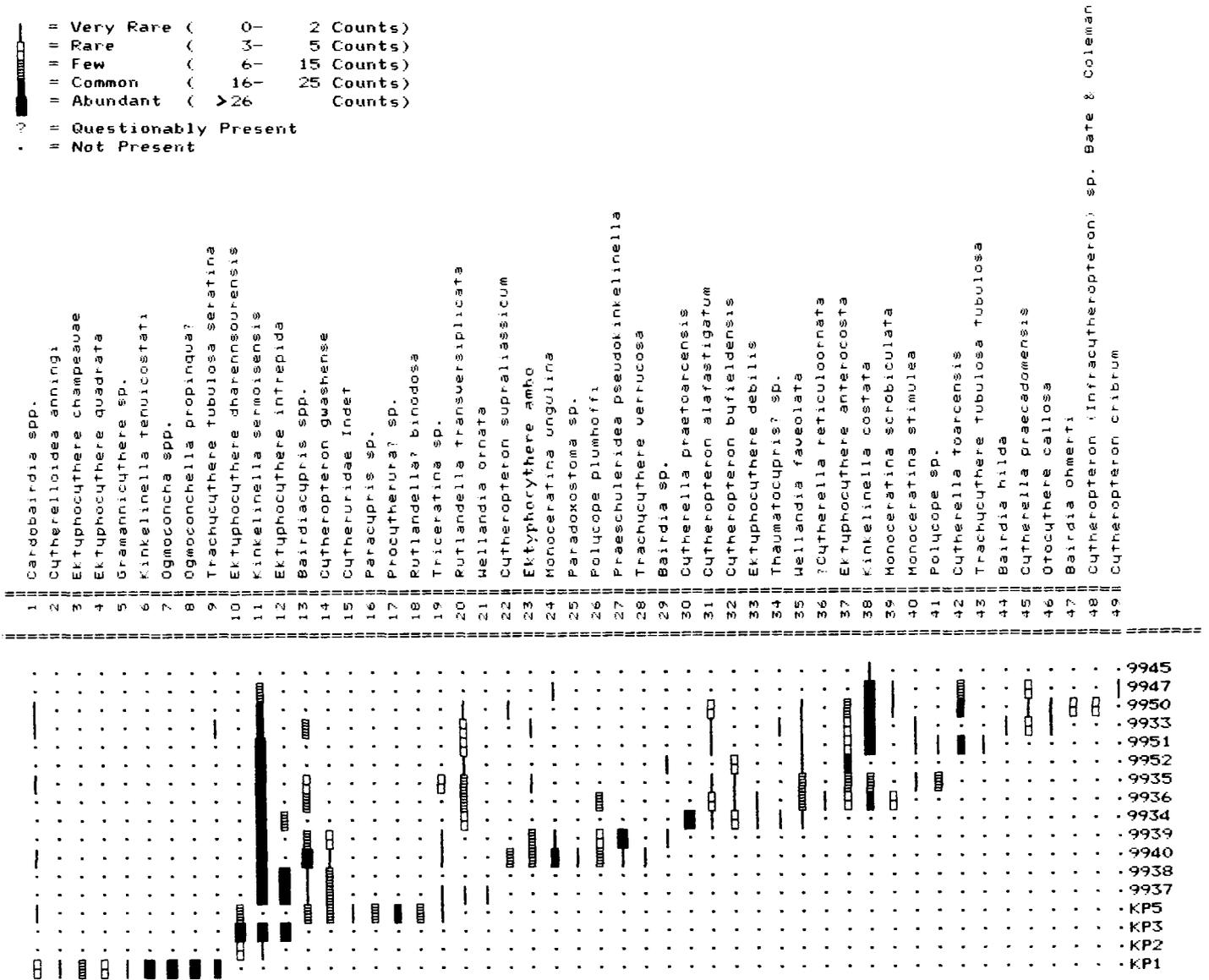


Fig. 3. Composite biostratigraphy of the Ilminster sequence. KP1, spinatum zone, hawskerense subzone; KP2 - 9937, falciferum zone, excavatum subzone; 9938-9939, falciferum zone, falciferum subzone; 9934, bifrons zone, commune subzone; 9936-9952, bifrons zone, fibulatum/crassum subzone; 9951-9947, thouarsense zone, fallacosum subzone; 9945, levesquei zone.

was recovered, and a few poorly preserved specimens of *Ektyphocythere quadrata* Boomer & Lord, 1988. The low abundance and poor preservation of these specimens may indicate reworking. Specimens of *Ektyphocythere tenuicostati* (Martin, 1960), previously recorded from the spinatum zone of Portugal (Exton, 1979) and Germany (Martin, 1960), are common while a few valves of *E. champeauae* (Bizon, 1960) are also present.

**Lower Toarcian**

The succeeding sample (ILM-KP 2) marks a distinct faunal change with the disappearance of the Metacopina and a reduction in diversity from nine to two species. A similar faunal change occurs in the lowermost part of the falciferum zone, Lower Toarcian of the Mochras Borehole.

*Ektyphocythere dharennsourensis* (Boutakiout, Zone & Oumalch, 1982), originally described from Morocco, is a large species (? >1mm) with a distinctive outline in lateral view and strong sexual dimorphism. The species continues through the section to sample ILM-KP 5. Only in sample ILM-KP 3 are the male dimorphs present. ILM-KP 2 has the lowest occurrence of *E. sermoensis* Apostolescu, 1959 the most abundant ostracod within the sequence and common in many European Toarcian sequences. The following sample (ILM-KP 3) marks the first appearance in the section of *E. intrepida* Bate & Coleman, 1975. Sample ILM-KP 5 marks a recovery in ostracod diversity within the section to nine species. This is particularly due to the introduction of four cytherurid species, *Procytherura* sp. (represented only by A-1 instars), *Cytheropteron gwashense* Bate & Coleman, 1975, *Rutlandella* sp. and *Procytherura* cf. *P.*

*mediocostata* Bate & Coleman, 1975. Furthermore, three further species are recorded, *Bairdiacypris triangularis* Ainsworth, 1986, *Paracypris* sp. together with a bythocytherid species *Triceratina triassica* Kozur, 1970 (Pl. 3, fig. 1) a species originally described from the Upper Anisian of Hungary. This species has not previously been recorded from Lower Jurassic sediments in Britain but does occur in the Middle Jurassic of the Cotswolds (Morris, 1983). Further specimens have been seen by the author in the collections of the Senckenberg Museum Frankfurt from the Middle Jurassic sediments of Eastfield Quarry, South Cave, Yorkshire. The species has also been recorded from the Middle Jurassic of France (Depeche, 1985, p. 136, Pl. 31, fig. 14) and the Lower Jurassic of Germany (Knitter & Reigraf, 1984, p. 69, Pl. 3, fig. 5).

Four of the aforementioned species are only recorded within this sample (see Fig. 3). The succeeding sample ILM-9937 sees the introduction of two more cytherurid species *Rutlandella transversiplicata* Bate & Coleman, 1975 and *Wellandia ornata* Ainsworth, 1986 the former species being recorded throughout much of the succeeding sequence. ILM-9938 is dominated (50%) by *K. sermoisensis* with no new species introduced while the following ILM-9940 is marked by the introduction of seven species including *Ektypocythere* sp. A and *Cytheropteron supraliassicum* Herrig, 1969 previously recorded from Upper Liassic sediments throughout Germany and now from the Toarcian of South-West England (this work) and the Mochras Borehole, Wales (Boomer, unpublished). *Praeschuleridea pseudokinkelinella* Bate & Coleman, 1975 is recorded from this and the succeeding sample, ILM-9939. Although this species possesses a similar lateral ornament to *E. dharensourensensis* it can be distinguished by its smaller size.

#### Middle Toarcian

Ten incoming taxa are recorded from samples ILM-9934 and ILM-9936. The lowest sample from the Middle Toarcian (ILM-9936) includes *Cytherella praetoarcensis* Boomer, 1991 and *Cytheropteron byfieldensis* Boomer & Bodergat M.S. (in press) a species similar to *C. alafastigatum* Fischer, 1962 but distinguished by the coarse lateral punctation and the more robust nature of the carapace. This section is the type locality for *E. anterocosta* Boomer, 1988 which first occurs at the base of the fibulatum/crassum subzone, Middle Toarcian, and continues into the Upper Toarcian. Sample ILM-9936 marks the first occurrence in the section of *Kinkelinella costata* Knitter, 1983. *K. sermoisensis* (Apostolescu) and *K. costata* (Knitter) are quite discrete species within this sequence. There does not appear to be any

intermediate specimens between the former reticular species and the latter dominated by vertical ribbing. Furthermore, whereas *E. sermoisensis* is by far the most abundant species (46-70%) in all but one sample from ILM-9937 to ILM-9935 (8 samples, lowest falciferum zone to uppermost bifrons zone) the succeeding four samples are dominated (<55%) by *K. costata* with the former species constituting less than 20% of the fauna.

#### Upper Toarcian

The thouarsense zone assemblages are composed of species recorded from contemporary sediments elsewhere in Europe. The faunas are more closely allied to those recorded from France and Germany rather than from Mochras (Boomer, 1991) or the Fastnet Basin (Ainsworth, 1986 *et seq.*) with the incoming species including *Cytherella toarcensis* Bizon, 1960, *Cytherella praecadomensis* (Knitter & Reigraf, 1983) and *Otocythere callosa* Triebel & Klingler, 1959.

#### FAUNAL CHANGE WITHIN THE SEQUENCE

Fig. 4 shows that the rate of faunal change during the Toarcian reflects a relatively stable community given that these assemblages were recovered from marl bands which intercalate with 'limestone' horizons. The marked increase in extinctions, and concomitant decrease in diversity at the top of the section, reflects a facies change. It should be noted that only one specimen, probably reworked, was recorded from the youngest sample. Apart from the extinction of the Metacopina in the lowest part of the sequence there would not appear to be any distinct changes in the Toarcian ostracod fauna of South West Britain.

The most abundant superfamily is always represented by the Cytheracea except for the lowermost sample (KP1) which is dominated by the Healdiacea (Metacopina). The Most Abundant Species graph would indicate that the lowest Toarcian saw not only the disappearance of the Metacopina but also changes in the stability of the environment (i.e. ranging from 20-80%). Subsequently the most abundant species, always cytheracean, generally constitutes 50-60% of the assemblage. This final graph would indicate a higher dominance figure than would be expected in an open marine setting. The average value for the open marine Toarcian sequence in the Mochras section (Boomer, 1991) is 42%. This may reflect a stressed environment under which these alternating limestone and argillaceous sediments were deposited.

#### Explanation of Plate 1.

(SP) indicates the use of Stereo-Pairs.

**Figs 1, 4.** *Cytherella praecadomensis* (Knitter & Reigraf, 1984), **Fig. 1a-b.** (SP) ? RV, External, OS 13668, (Ur thouarsense, ILM-9950), x71; **Fig. 4a-b.** (SP) ? LV, External, OS 13671, (Ur thouarsense, ILM-9950), x72.

**Fig. 2a-b.** *Ogmoconchella* sp. (SP) LV Adult, External, OS 13669, (Tenuicostatum, ILM-KP 1), x46.

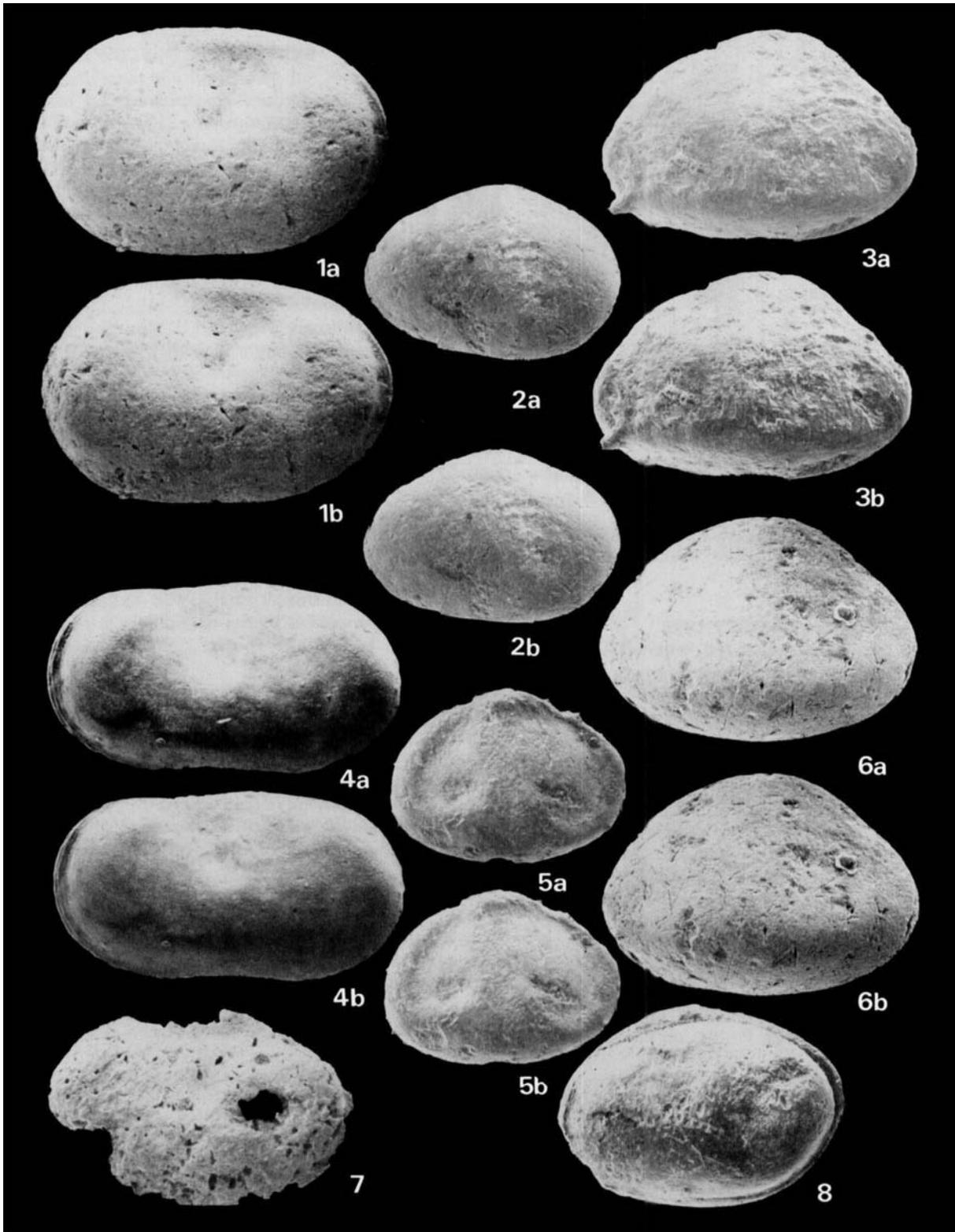
**Fig. 3a-b.** *Ogmoconcha* sp.B. (SP) RV Adult (?), External, OS 13670, (Tenuicostatum, ILM-KP 1), x75.

**Fig. 5a-b.** *Ogmoconcha inflata* (Ainsworth, 1987) (SP) LV Adult, External, OS 13672, (Tenuicostatum, ILM-KP 1), x46.

**Fig. 6a-b.** *Ogmoconcha* sp.A. (SP) RV Adult (?), External, OS 13673, (Tenuicostatum, ILM-KP 1), x74.

**Fig. 7.** *Cytherella praecadomensis* (Knitter & Reigraf, 1984) LV Adult, External, OS 13674, (Ur thouarsense, ILM-9950), x71. Compare preservation of this specimen with Figs 1 and 4 (above) from the same sample suggesting the presence of reworking or sub-aerial erosion. Note also the possible predation boring in posterior third of valve.

**Fig. 8.** *Cytherella praetoarcensis* Boomer, 1991. ? CP, Left lateral, OS 13675, (Lr bifrons, ILM-9934), x65. PA



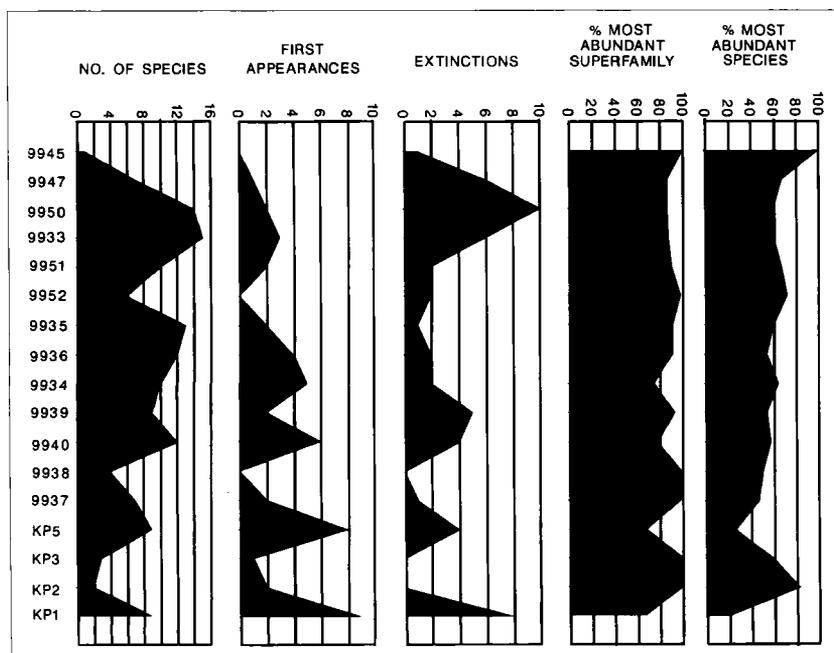


Fig. 4. This diagram displays the number of species in each sample together with the number of species making their first and last appearances in each sample. The two right hand graphs illustrate what percentage of each sample is represented by the most abundant superfamily (Healdiacea in lowest sample, Cytheracea thereafter) and finally what percentage of each sample is constituted by the single most abundant species (i.e. Dominance).

#### COMPARISON WITH OTHER SECTIONS

Many of the species recorded by Bate & Coleman (1975) have been found in the present sections, the main exceptions being species attributed by those authors to the genera *Procytherura*, *Camptocythere* and *Eucytherura*. Direct biostratigraphical comparison between the present material and that from the East Midlands is not possible due to the absence, at Ilminster, of two of the zonal fossils designated by Bate & Coleman (i.e. *Camptocythere toarciana* Bate & Coleman and *Kinkelinella persica* Bate & Coleman). The ranges of the two remaining zone fossils described by those authors (*E. intrepida* and *E. debilis*) accord well with the present section. It should be noted that the ranges of these last two species, although apparently concurrent in both the East Midlands and Dorset, are much shorter than their total ranges recorded in the Mochras Borehole. This is true for many of the species recorded from these sites.

Although the Ilminster section has certain affinities with assemblages further to the south, there would appear to be no direct connection with either the Fastnet or Cardigan Bay Basins.

All specimens are deposited at the British Museum (Natural History), London.

#### SYSTEMATIC DESCRIPTIONS

Subclass *Ostracoda* Latreille, 1806

Order *Podocopida* Muller, 1894

Suborder *Metacopina* Sylvester-Bradley, 1961

Superfamily *Healdiacea* Harlton, 1933

Family *Healdiidae* Harlton, 1933

Genus *Ogmoconcha* Triebel, 1941

*Ogmoconcha inflata* (Ainsworth, 1987).

(Pl. 1, fig. 5)

1987 *Hermiella inflata* Ainsworth n.sp.; Ainsworth: 56, Pl.2, figs 15-17, text figs 1-2.

**Remarks:** The oldest sample investigated at Ilminster (ILM-KP 1) contained a mixed ostracod fauna of both Upper Pliensbachian and Lower Toarcian aspect. At least three species of *Ogmoconcha* are present in this sample, including some vallate forms assigned to *Ogmoconcha inflata* (Ainsworth). The other species, described below, (*Ogmoconcha* sp. A, sp. B) are smooth shelled and without distinct marginal inflations. Certain ostracod assemblages from other parts of Europe are similar to that described here. Upper Pliensbachian faunas from the Apennines (Lord in Farinacci *et al.* 1979) are similar in the

metacopine component of the assemblage. Contemporary faunas from Tunisia also possess comparable assemblages (Lord, pers. comm.).

Ainsworth (1987) described *Hermiella inflata*, from the Upper Pliensbachian of the Fastnet Basin and considered his new species to be conspecific with *Ogmoconcha ambo* Lord & Moorley recorded by Exton (1979) from the Lusitanian Basin.

The two species described below are smaller than *Ogmoconcha inflata*, however, they are not considered to be juveniles of that species since the marginal inflations seen in suites of vallate healdiids in the collection of A.R. Lord, including *Ogmoconcha ambo*, are distinctly developed as early as the A-3 instar.

**Distribution.** The spinatum and tenuicostatum zones of Mochras; Lower Toarcian, Paris Basin; Upper Pliensbachian/Lower Toarcian, Fastnet Basin; Upper Pliensbachian, Lusitanian Basin.

*Ogmoconcha* sp. A.

(Pl. 1, fig. 6)

**Material.** Mochras, 25 CP, 37 V; Ilminster, 10 CP, 28 V.

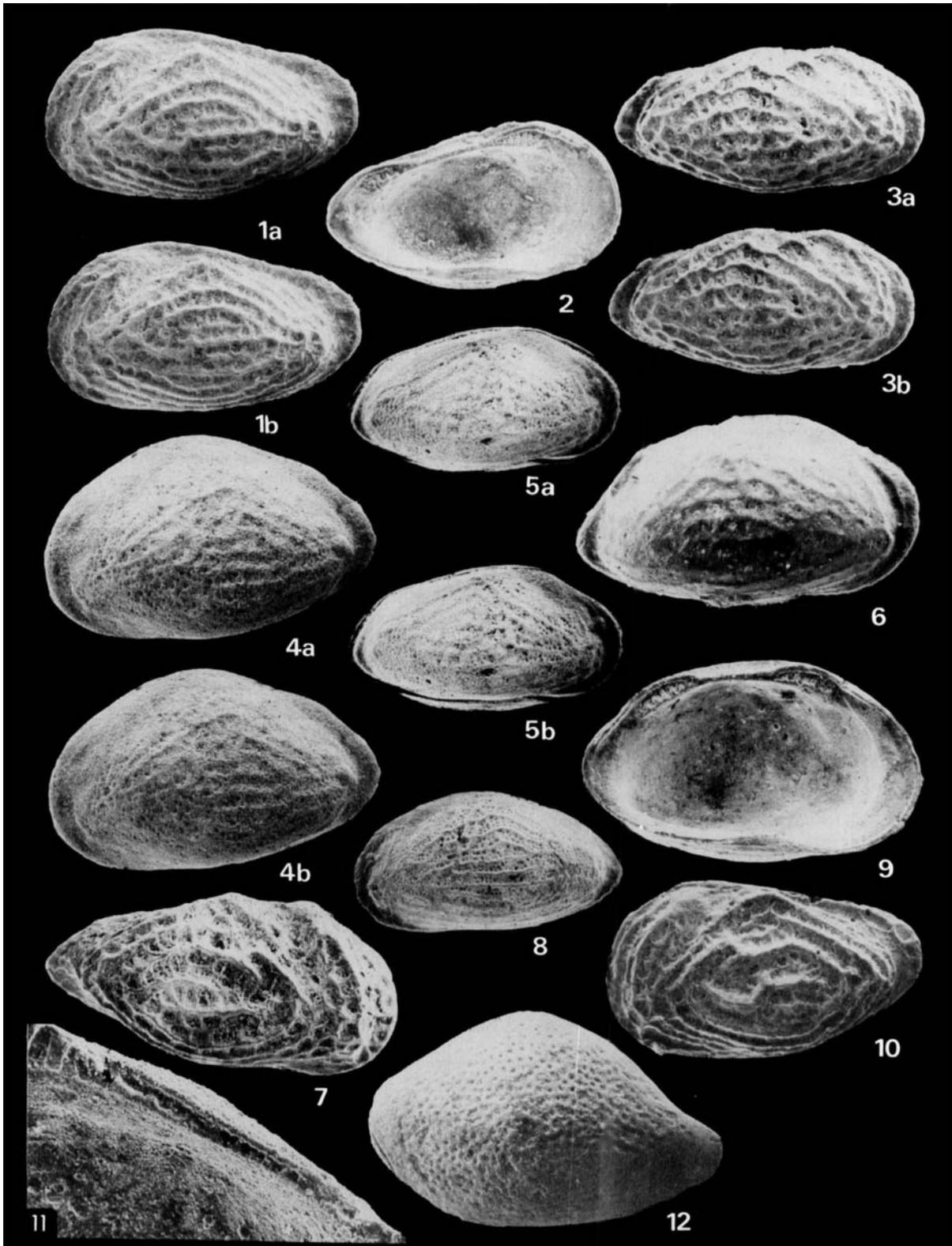
#### Explanation of Plate 2

Figs 1-3. *Ektyphocythere ambo* sp. nov. Fig. 1a-b. (SP) ? LV, External, OS 136676, (Ur bifrons, ILM-9952), x71; Fig. 2. ?LV, Internal, OS 13677, (Ur falciferum, ILM-9939), x71; Fig. 3a-b. (SP) ? RV, External, OS 13678, (Ur falciferum, ILM-9939), x72.

Figs 4-6, 8, 9, 11. *Ektyphocythere dharemsourensis* Boutakiout, Donze & Oumalch, 1982. Fig. 4a-b. (SP) ? LV, External, OS 13679, (Lr falciferum, ILM-KP 3), x7; Fig. 5a-b. (SP) ? CP, Right lateral, OS 13680, (Lr falciferum, ILM-KP 3), x46; Fig. 6. ? RV, External, OS 13681, (Lr falciferum, ILM-KP 5), x70; Fig. 8. ? LV, External, OS 13682, (Lr falciferum, ILM-KP 3), 46; Fig. 9. ? LV, Internal, OS 13683, (Lr falciferum, ILM-KP 3), x74; Fig. 11. ? RV, Internal, Detail of hinge, OS 13684, (Lr falciferum, ILM-KP 3), x375.

Figs 7, 10. *Ektyphocythere anterocesta* Boomer, 1988. Fig. 7. (Holotype) ? RV, External, OS 13277, (Ur thouarsense, ILM-9950), x72; Fig. 10. ? LV, External, OS 13281, (Ur thouarsense, ILM-9950), x66.

Fig. 12. *Bairdia ohmertii* Knitter, 1984. LV (A-1), External, OS 13685, (Ur thouarsense, ILM-9950), x86.



**Remarks.** A species of *Ogmoconcha* without the distinct marginal inflations of species such as *O. ambo* and *O. inflata* but with a definite ventro-lateral swelling on each valve, thus implying a relationship to the vallate forms. The lateral swellings give the carapace a sub-triangular outline in anterior view. In lateral view the carapace has a triangular oval outline with a convex ventral margin. Steeply rounded anterior and posterior margins converge at the greatest height just anterior of the mid-length. This species is distinguished from *O. convexa* (Boomer, 1991) by the different outline in anterior view, the latter species having a strongly convex oval outline. A similar species was figured by Knitter & Riegraf (1983, Pl. 4, fig. 3) from the Upper Pliensbachian of SW Germany. Although that material was assigned to *O. circumvallata* Dreyer, 1965 the figured specimen is quite different from the holotype figured by Dreyer (1965, Pl. 1, fig. 4; Pl. 2, figs 1-4). A similar species was also figured by Bodergate & Donze, 1988. This species is left in open nomenclature due to the lack of well preserved internal details, particularly the muscle adductor scars. Furthermore, few of the recorded specimens are adult valves thus making difficult a comprehensive comparison with other species.

**Distribution.** Uppermost spinatum zone (uppermost Pliensbachian) and tenuicostatum zone (Lower Toarcian) at Mochras and sample ILM-KP 5 (Upper Pliensbachian or Lower Toarcian) at Ilminster.

*Ogmoconcha* sp. B  
(Pl. 1, fig. 3)

**Material.** Ilminster, 8 V.

**Remarks.** This species possesses a large postero-ventral spine similar to the specimen figured by Riegraf (1985; Pl. 1, fig. 16) as *Ogmoconcha rotunda* Dreyer, 1967. The outline and shape of the present material is very close to that of *Ogmoconcha* sp. A the main difference being the presence of the postero-ventral spine. Lord in Farinacci *et al.* 1979 recorded similar specimens from the Upper Pliensbachian of Strettura in the Italian Apennines. Material deposited with the British Museum (Natural History) and in the personal collection of A.R. Lord, collected by R.H. Bate from the Pliensbachian of Djebel Zaghuan, Tunisia also bears similarities to the present material. The Southern European and North African material differs in that they possess a more pronounced ventro-lateral inflation with a greater degree of antero- and postero-marginal compression with respect to the British material.

**Distribution.** Present in the lowest sample from Ilminster with similar material recorded from contemporary levels in southern Europe.

Suborder *Platycopina* Sars, 1866  
Family *Cytherellidae* Sars, 1866  
Genus *Cytherella* Jones, 1850

*Cytherella praecadomensis* (Knitter & Riegraf, 1984)  
(Pl. 1, figs 1, 4)

1984 *Cytherelloidea praecadomensis* Knitter & Riegraf p. 67, Pl. 4, figs 2, 3.

1986 *Cytherella? depressum* sp. nov. Ainsworth p. 291, Pl. 1, figs 14-19.

**Material.** Mochras, 17 CP, 40 V; Ilminster 7 CP, 15 V.

**Remarks.** The carapace is more robust than in *Cytherella cadomensis* (Bizon) which possesses distinct marginal inflations. The deep muscle sulcus is a very distinctive feature which exaggerates the marginal inflation. The females appear to possess only one posterior swelling and therefore this species, as with the descendant *C. cadomensis* (Bizon), is assigned to *Cytherella*. *Cytherella? depressum* Ainsworth, 1986 is considered to be a junior synonym of the present species.

**Distribution.** Recorded in the thouarsense zone of Ilminster and mid-bifrons to uppermost variabilis zone at Mochras (Boomer, unpublished). Although only recently described, this species appears to be geographically widespread in the Middle and Upper Toarcian sediments across North-West Europe.

Suborder *Podocopina* Sars, 1866  
Superfamily *Cytheracea* Baird, 1850  
Family *Protocytheridae*, Ljubimova, 1955  
Subfamily *Kirtonellinae* Bate, 1963  
Genus *Ektyphocythere* Bate, 1963

*Ektyphocythere dharensourensis* Boutakiout, Donze & Oulmalch, 1982  
(Pl. 2, figs 4-6, 8, 9, 11)

1975 *Ektyphocythere dharensourensis* Boutakiout *et al.* p. 97, Pl. 1, figs 9, 10; Pl. 2, figs 1-6.

**Material.** Ilminster, 35 CP, 61 V.

**Remarks.** This large species displays marked sexual dimorphism and is easily recognised. Prior to the present study the species had only been recorded from Lower and Middle Toarcian sediments, at the type locality, to the West of Fez, Morocco. Lord (1988) in his review of the Tethyan distribution of Lower Jurassic Ostracods suggested that the

#### Explanation of Plate 3

Fig. 1a-b. *Triceratina* sp. (SP) LV Adult, External, specimen lost, (Mid-bifrons, ILM-9936), x73.

Fig. 2. *Wellandia faveolata* Bate & Coleman, 1975. RV Adult, External, OS 23686, (Mid-bifrons, ILM-9936), x147.

Fig. 3a-b. *Ektyphocythere champeauae* (Bizon, 1960). (SP) LV Adult, External, OS 13687, (Tenuicostatum, ILM-KP 1), x73.

Fig. 4a-b. *Rutlandella?* sp. (SP) LV Adult, External, OS 13688, (Lr falciferum, ILM-KP 5), x159.

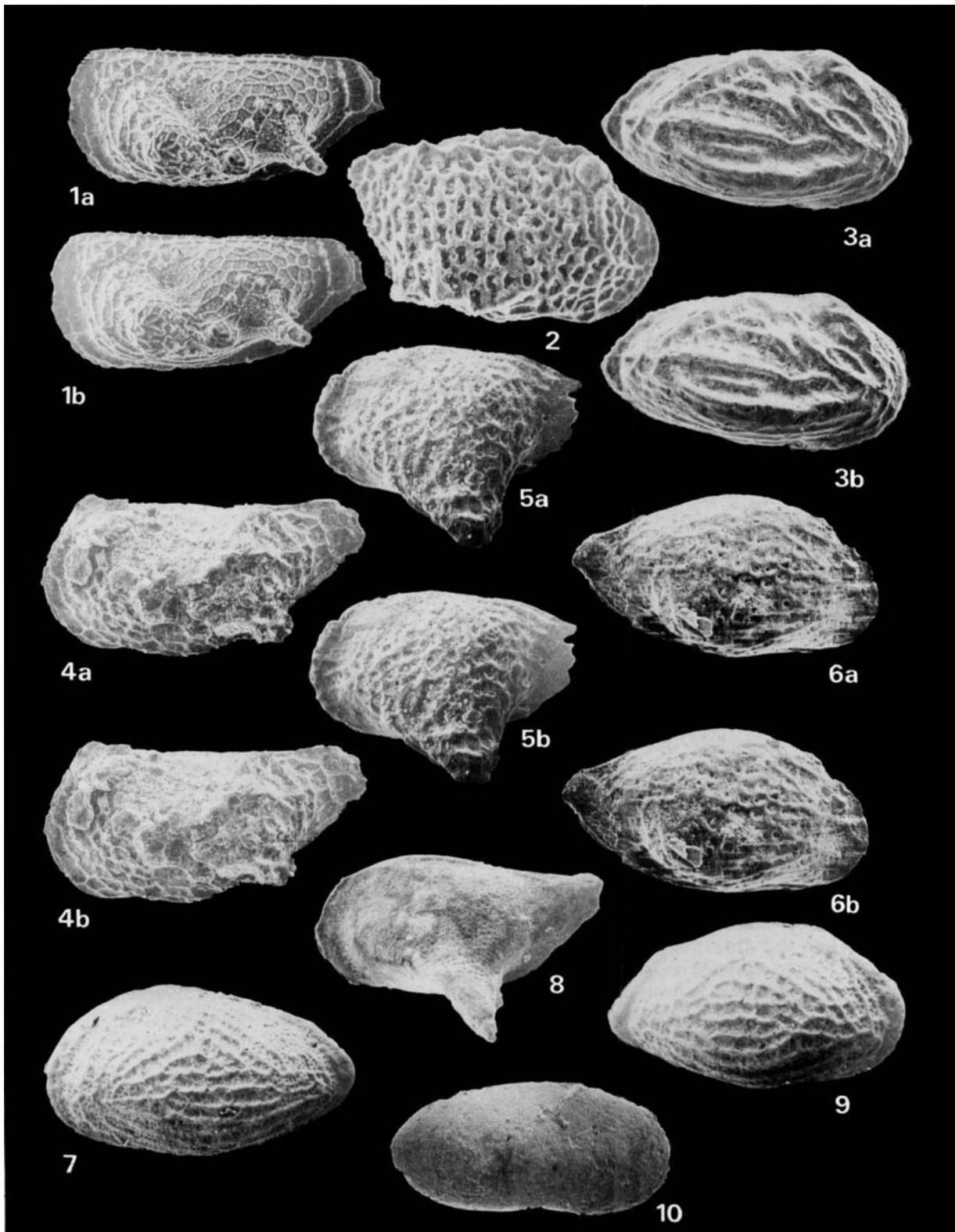
Fig. 5a-b. *Cytheropteron byfieldensis* Boomer & Bodergat in-press. (SP) LV Adult, External, OS 13689, (Lr bifrons, ILM-9934), x85.

Fig. 6a-b. *Procytherura?* sp. (SP) RV Adult (?), External, OS 13690, (Lr falciferum, ILM-KP 5), x159.

Fig. 7, 9. *Praeschuleridea pseudokinkelinella* Bate & Coleman, 1975. ? LV, External, OS 13691, (Ur falciferum, ILM-9939), x73; Fig. 9. ? RV, External, OS 13693, (Ur falciferum, ILM-9939), x72.

Fig. 8. *Cytheropteron alafastigatum* Fischer, 1962. LV Adult, External, OS 13692, (Ur thouarsense, ILM-9950), x84.

Fig. 10. *Bairdiacypris* sp. RV Adult (?), External, OS 13694, (Ur falciferum, ILM-9940), x71.



dating of these sediments may be incorrect: the presence of the genus *Marslatourella*, previously only recorded from Middle Jurassic strata, supporting this theory. The present study further supports a Lower Jurassic age for the Moroccan material. The species bears similarities to *Praeschuleridea pseudokinkelinella* Bate & Coleman. The latter species, however, is neither as large as, nor does it display the marked dimorphism seen in *E. dharennsourensis*. Examination of the marginal zone reveals between twelve and fifteen simple straight marginal pore canals anteriorly and four to five posteriorly contrasting with the typical pattern in *Ektyphocythere* where the maximum number anteriorly is about ten.

The nature of the dimorphism and distribution of anterior marginal pore canals is similar to that observed in *Praeschuleridea*, however, the present species appear to possess an antimerodont hinge typical for *Ektyphocythere*. The present material has been retained within the latter genus due to the poorly preserved nature of the hingement and the form of the external ornament. It is possible, however, that this species may represent an intermediate stage between *Ektyphocythere* and *Praeschuleridea*.

**Distribution.** The species is recorded in the falciferum zone of Ilminster, Lower and Middle Toarcian of Morocco

*Ektyphocythere ambo* sp. nov.

(Pl. 2, figs 1-3)

1975 *Ektyphocythere intrepida* Bate & Coleman in part. p. 20, Pl. 7, fig. 4.

non 1975 *Ektyphocythere intrepida* Bate & Coleman p. 20, Pl. 7, figs 1-3, 5, 8-10; Pl. 8, figs 7, 8.

**Derivation of name.** From the greek *ambon* meaning rim, referring to the postero-dorsal rim of the left valve in this species which distinguishes it from similarly ornamented, contemporary taxa.

**Diagnosis.** A species of *Ektyphocythere* Bate (1963) with well developed open reticulation dominated by longitudinal elements. The species possesses a more dorsally extended postero-dorsal margin than that of other *Ektyphocythere* species.

**Holotype.** Left valve, OS 13676.

**Material.** Mochras, 5 CP, 12 V; Ilminster, 18 V.

**Type locality and horizon.** Ilminster (55° 55' 0" N, 2° 55' 0" W), Sample ILM-9952, Upper bifrons Zone, Middle Toarcian.

**Description.** An oval carapace in lateral outline similar to *E. intrepida* Bate & Coleman, distinct dimorphism is apparent with the males somewhat more elongate and particularly notable for the poster-dorsal flange in the left valves which is a much stronger feature than in the females. Both anterior and posterior margins are rounded, the latter more narrowly so. In dorsal view the outline is moderately inflated with the maximum width just behind the mid-length. The greatest height is at the anterior cardinal angle, dorsal margin is straight in the right valve and slightly concave in the left valve due to the presence of the postero-dorsal flange referred to above. Ventral margin slightly sinuous. Left valve overlaps the right dorsally especially at the cardinal angles, also in the mid-ventral area. Weak eye swelling present below the anterior cardinal angle.

Ornament typical for the genus but the present material is characterised by strong secondary cross ribbing producing a

coarse reticulation in the mid-valve region. The inner lamellae is fused throughout, broad anteriorly moderate ventrally and posteriorly. Hinge is antimerodont, muscle scars indistinct but appear to represent a crescentic row of four adductor scars, the frontal scars are not clearly observed. Marginal pore canals not seen.

**Remarks.** A species of *Ektyphocythere* which bears a strong resemblance to *E. intrepida* Bate & Coleman. The presence of a postero-dorsal flange is the main difference between this species and *E. intrepida* Bate & Coleman. It must be noted, however, that the two species have not been found in the same sample at Ilminster (see Fig. 3). The current author believes that one example of this species was figured in the type description of *E. intrepida* (*op. cit.* 1975; Pl. 7, fig. 4). The species is distinguished by the stronger development of secondary cross-ribs than is seen in *E. intrepida* producing a more strongly reticulate pattern.

**Distribution.** Uppermost falciferum and lower bifrons at Mochras, falciferum and bifrons zones of the East Midlands and falciferum to thouarsense zones, Ilminster.

## CONCLUSIONS

The lowest sample examined (ILM-KP 1) although assessed as spinatum zone (Upper Pliensbachian) on the basis of ammonites, has an ostracod fauna similar to that of tenuicostatum zone assemblages (Lower Toarcian) from the Mochras Borehole. The succeeding samples, particularly in the falciferum and bifrons zones, bear a strong correlation with those described by Bate & Coleman (1975) from the Lower and Middle Toarcian of the East Midlands. Stratigraphical ranges of certain species at the English sites are, however, much shorter than the total ranges recorded from the extensive sequence at Mochras. Furthermore the lowest sample contains an assemblage which may indicate a certain degree of reworking. Indeed, some samples higher up the section include badly dissolved specimens, also possibly indicative of erosion/reworking (see Pl. 1, figs 1, 4, 7).

It is important to note that despite the lithological differences between Ilminster and the East Midlands section, the faunal similarities are quite strong. However, the present material would suggest that the Fastnet and Cardigan Bay Basins to the West are systems quite distinct from other parts of Britain as reflected in the facies differences. There would appear to be a strong palaeoceanographical link with parts of southern Europe and North Africa at certain times, particularly so in the lowest Toarcian. This may be due to changes in sea-level and/or the inception of new pathways bringing Tethyan forms further North. Records of vallate forms of *Ogmoconcha* in the uppermost Pliensbachian and lowest Toarcian of North West Europe would support such an idea. These species are considered to be essentially Tethyan in their distribution. Indeed during the Upper Triassic, ornamented Healdiids often dominated marine ostracod assemblages from Eastern Europe through the Tethyan region into what is now South-East Asia. It should also be noted that specimens of *Oligocythereis? mochransensis* from the Pliensbachian of the Mochras Borehole have been recorded from D.S.D.P. site 547 of northwestern Africa (Boomer, 1991). The section at Ilminster therefore details the evolution of

ostracod faunas in Southern England during the Toarcian and implies an increased influence from Tethys in the earliest Toarcian.

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