

NEW SPECIES OF *MANDELSTAMIA* (OSTRACODA) FROM THE ENGLISH MESOZOIC

by JOHN W. NEALE and T. I. KILENYI

ABSTRACT. The diagnosis of *Mandelstamia* is translated into English and the distribution of the genus is examined. Four new species from the English Kimmeridgian are described and one new species from the Lower Cretaceous.

THE genus *Mandelstamia* has been described in two publications. In 1955 Lübmova described *Mandelstamia* Lübmova 1955 from the Russian Upper Jurassic, together with five species belonging to the genus. In 1956 an authoritative 'Diagnosis' of *Mandelstamia* *gen. nov.* was given. No problem is involved regarding nomenclature or priorities but the Diagnosis given below is translated from the 1956 publication which differs little from the 1955 description.

Family CYTHERIDAE.

'Genus *Mandelstamia* Lübmova *gen. nov.*

Type species—*Mandelstamia facilis* Lübmova *sp. nov.*

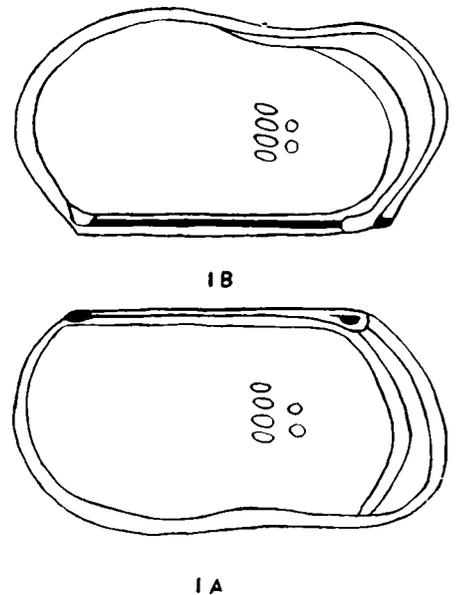
Upper Jurassic. Lower Volgian Beds. Zone of *Virgatites virgatus* Buch.

Kiubyshev District, Basin of the River Irgiz, Village of Ukrainka.

VNIGRI Coll. No. 226-17.

'Diagnosis. Carapace irregularly oval in shape, weakly convex, sometimes concave in outline in the anterior third of the dorsal part of the valve. Left valve insignificantly larger than the right and enveloping the latter. Anterior end bow-shaped and rounded off in more sloping fashion than the posterior. Dorsal margin straight. Ventral margin concave in approximately the middle part of the valve. Shell ornament cellular or cellular-tuberculate. Inner margin coincides with the outer margin of the shell [*sic* с наружным краем. This statement appears in both the 1955 and 1956 texts and is difficult to understand. Possibly it should read 'the inner margin coincides with the line of concrescence' (линия сращения).] Pore canal zone broad at the anterior end and moderately developed at the posterior end of the shell. Pore canals straight and sparse.

'Hinge with the bar in the left valve and consisting of three different elements. In the right valve (fig. 53b, see fig. 1b) a lamellar, half-moon shaped tooth appears in the anterior part of the hinge, merging with the margin in front, and behind—with the inner margin of the valve. Middle part of the hinge appears as a narrow, smooth groove arranged above the anterior tooth and passing behind it. Posterior end of the hinge appears as a small, compressed, half-moon shaped tooth, also merging with the edge of the valve. The hinge in the left valve (fig. 53a, see fig. 1a) has a shallow, parallel-sided socket in the anterior part joined with a straight, smooth ridge forming the middle part of the hinge. Posterior part of the hinge also consists of a socket but of considerably lesser dimensions than the anterior.'



TEXT-FIG. 1. Structure of *Mandelstamia facilis* Lübmova. A, Inside of left valve. B, Inside of right valve. $\times 94$. From Lübmova 1956, p. 141.

The following remarks on the genus are drawn from both papers quoted above and represent a free translation:

'The genus *Mandelstamia* is distinguished by the characteristic structure of the hinge and five species occur in the Upper Jurassic sediments of the Middle Volga Region and the Obshchii Syrt. These species are characterized by the elongate shape of the shell, the characteristic appearance of a vertical transverse furrow and well-marked cellular ornament. In appearance the genus is close to the genus *Cyclocytheridea* Mandelstam 1955, particularly in general shape and valve ornament, but may be distinguished by the weaker development of the hinge with the lack of large sockets open at the anterior and posterior ends in the left valve, the rather greater elongation of the shell, and the strongly marked concavity in the anterior third of the dorsal part of the shell. The genus *Mandelstamia* also shows some resemblance in shape and shell ornament to the genus *Palaeocytheridea* Mandelst. (Mandelstam 1947, p. 243) from the Middle Jurassic sediments of Mangyschlak, but is distinguished from it mainly on the structure of the hinge which has not got notched sockets in the left valve or notched teeth in the right valve.'

Hitherto, apart from one new species from the Kimmeridgian of Dorset described by Malz (1958), this genus has not been recorded outside the U.S.S.R. In the course of work on the English Kimmeridge and marine Lower Cretaceous ostracod faunas five new species of the genus have been discovered and these are described below. The distribution of all species of the genus known to date is shown in Table 1.

Acknowledgements. J. W. N. would like to acknowledge the great kindness and help of Professor V. V. Drushchitz of the University of Moscow, and Drs. P. S. Lüvimova and M. I. Mandelstam of the All-Union Petroleum Geological Exploration Institute, Leningrad, who have made available the necessary Russian literature; also the help of Mr. E. N. Blackmore, A.R.C.A., who very kindly made the drawings for text-fig. 3.

Abbreviations. In giving dimensions the following abbreviations are used throughout the text: L, length; H, height; W, width; Hi, hinge length; M/a, width of anterior marginal area; M/p, width of posterior marginal area. In all cases the dimensions are in millimetres. Numbers preceded by the index letters 'HU' indicate the catalogue numbers in the collection of the Geology Department, University of Hull, where all the specimens here described and figured are stored.

SYSTEMATIC DESCRIPTIONS

Family CYTHERIDAE Baird 1850

Subfamily LOXOCONCHINAE Sars 1925

Genus MANDELSTAMIA Lüvimova 1955

Mandelstamia rectilinea Malz 1958

Plate 71, figs. 1-4, 6

Mandelstamia rectilinea Malz 1958, p. 38, pl. 11, figs. 58-63

Material. Fifty-two valves and carapaces. HU.2.J.1.21; HU.3.J.20.2-52.

Distribution. *Rasenia mutabilis* Zone, L. Kimmeridgian, Black Head, 3½ miles north-east of Weymouth, Dorset; 'Lower Kimmeridge Clay of Ely'; 'Lower Kimmeridge Clay of Ringstead'.

Measurements

	L	H	W	Hi	M/a	M/p
Left valve HU. 2.J.1.21.	0.69	0.39	0.16	0.45	0.06	0.03

Description. Carapace oblong shaped, both ends equally rounded, the posterior being higher than the anterior. The two valves are about equal in size. In dorsal view the

carapace is oval shaped with a 'waist' just above the middle. The greatest width is in the posterior half, about one-third of the way from the posterior end. The two valves

DISTRIBUTION OF KNOWN SPECIES OF MANDELSTAMIA.

		M. VERRUCIFERA LUBIMOVA	M. VENTROCORNUATA (SHARAPOVA)	M. FACILIS LUBIMOVA	M. ABDITA LUBIMOVA	M. IGNOBILIS LUBIMOVA	M. ANGULATA KILENYI	M. TRIEBELI KILENYI	M. RECTILINEA MALZ	M. MACULATA KILENYI	M. SP I KILENYI	M. SEXTI NEALE	
													BERRIASIAN
UPPER VOLGIAN													PURBECKIAN
LOWER VOLGIAN	NIKITINELLA NIKITINI												PORTLANDIAN
	VIRGATITES VIRGATUS												
	PAVLOVIA PANDERI												
	PERISPINCITES BLEICHERI												
KIMMERIDGIAN													UPPER KIMMERIDGIAN
													LOWER KIMMERIDGIAN
UPPER OXFORDIAN													UPPER OXFORDIAN
LOWER OXFORDIAN													LOWER OXFORDIAN
U. S. S. R.							U. K.						

TABLE 1.

are symmetrical. The dorsal margin is straight, both cardinal angles being more or less marked, whilst the ventral margin is concave for the first third of its length. The surface of the valve is reticulate, the shell being built up of a system of pits and ribs. The size of these pits is larger on the anterior half of the valve, the two size groups being separated

by a distinct vertical line. In polarized light a faint uniaxial interference figure occurs, while in addition every pit shows a small Brewster-cross and one or two interference rings. There is a vertical depression on each valve, about one-third of the way from the anterior end.

The marginal areas are narrow, inner margin and line of concrescence coinciding. The selvage is well developed, the selvage lip being narrow, and in most cases the inner lamella does not disappear under it ventrally. Radial porecanals are simple and straight, their basal part being wide, and getting gradually narrower towards the exterior end. They number between seven and twelve anteriorly and between two and four posteriorly. The hinge is lophodont and in the right valve consists of three elements. The anterior one is a smooth, ellipsoidal ridge, the median one a smooth, narrow groove, while the posterior element resembles the anterior, but is smaller. In the left valve the terminal elements are smooth half-moon-shaped sockets, the anterior one being the wider. These are joined by a smooth ridge which runs in the middle of the contact margin. The muscle scar pattern consists of an oblique row of four equally sized scars and one anterior scar in line with the top of the row. Sexual dimorphism is not apparent.

Remarks. *Mandelstamia rectilinea* corresponds in many respects with the type species, *M. facilis* Lübmimova, but its hinge seems to be simpler, and in *M. facilis* the size of the surface pits appears to be uniform.

Mandelstamia triebeli Kilenyi sp. nov.

Plate 71, figs. 5, 9, 10, 14, 15

Derivation of name. In honour of Dr. E. Triebel.

Holotype. A left valve. HU.2.J.1.22. *Paratypes.* Five hundred and thirteen valves and carapaces. HU. 3.J.21.1-513.

Occurrence of holotype and paratypes. Sixty feet above the base of the *Rasenia mutabilis* Zone, L. Kimmeridgian, Black Head, 3½ miles north-east of Weymouth, Dorset.

Distribution. *Rasenia mutabilis* and *Aulacostephanus pseudomutabilis* Zones, Lower Kimmeridgian. Black Head, 3½ miles north-east of Weymouth, Dorset.

Measurements

	L	H	W	Hi	M/a	M/p
Holotype						
Left valve:	0.60	0.34	0.15	0.40	0.05	0.04
Paratypes						
Left valve:	0.55-0.61	0.30-0.35	0.15-0.17	0.40	0.06	0.04
Right valve:	0.57-0.64	0.32-0.36	0.15-0.17	0.40	0.06	0.04

Diagnosis. A species of *Mandelstamia* in which the valves are equal in size, the carapace tapering towards the posterior end. Anterior end rounded, posterior cardinal angle more or less prominent; dorsal margin straight, ventral convex. Marginal areas broad.

Description. Carapace elongated, tapering slightly posteriorly. The two valves are equal in size. In dorsal view the valves are trapezoid shaped, with a slight depression just above the middle, the greatest width being in the posterior half of the carapace. The two valves are nearly the same shape, the only significant difference being in the posterior end, which is more angular in the right valve. Dorsal margin straight and cardinal angles marked, especially on young moults. The anterior end is equally rounded on both valves, the ventral margin being slightly convex, curving gently upwards towards the posterior

end and having a short, straight section in the middle. The posterior end is rounded, but is slightly angular on the right valve. No trace of sexual dimorphism was found. Line of concrescence and inner margin coincide; the selvage is wide, the selvage lip being wider on the right valve than on the left. Radial porecanals are few (about six to eight anteriorly) and simple, with their interior part wider than their exterior.

The hinge is lophodont, consisting of two terminal ellipsoidal ridges (right valve) and corresponding sockets (left valve). The median element on the left valve is a smooth straight ridge, fitting into a smooth groove on the opposite valve. The surface of the valve is strongly reticulate, the shell being built up of a network of strong ribs and pits, the size of these latter being fairly uniform all over the valve. In polarized light a small Brewster-cross can be seen in every pit, the rest of the shell remaining dark. Muscle-scar pattern consists of an oblique row of four scars in vertical superposition, and two anterior scars. The upper anterior scar is larger than the others and half-moon shaped.

Remarks. *Mandelstamia triebeli* differs from *M. rectilinea* Malz in the uniform reticulation and pronounced posterior tapering of the shell seen in side view.

Mandelstamia angulata Kilenyi sp. nov.

Plate 71, figs. 11, 12, 16–18

Derivation of name. Angulatus (Lat.)—angled.

Holotype. A female (?) left valve HU.2.J.1.23. *Paratypes.* Fifty-six valves and carapaces. HU.3.J.22. 1–56. *Occurrence of holotype and paratypes.* Eleven feet above base of the *Rasenia cymodoce* Zone, Black Head, 3½ miles north-east of Weymouth, Dorset.

Distribution. *Pictonia baylei* and *Rasenia cymodoce* Zones, Lower Kimmeridgian, Black Head, Dorset.

Measurements

Holotype	L	H	W	Hi	M/a
	0.45	0.26	..	0.35	0.03
Paratypes	L	H	Hi	M/a	M/p
Left valve:	0.42–0.45	0.25–0.27	0.33–0.35	0.03	0.01
Right valve:	0.42–0.44	0.22–0.23	0.35	0.03	0.01

Diagnosis. A small species of *Mandelstamia* with pointed posterior end. Dorsal margin of the right valve is convex, that of the left valve straight. Left valve slightly rounded posteriorly, right valve pointed. Sexual dimorphism doubtful.

Description. Carapace small, ovoid-triangular. Left valve slightly larger than the right, with only a slight overlap on the dorsal and anterior part. In dorsal view the carapace is pear shaped, with a marked 'waist' at about the middle, the greatest width being in the posterior half of the carapace. The two valves differ in shape. In the right valve the dorsal margin is convex, both cardinal angles are rounded, and the posterior end is pointed, although the extreme end is blunt. The ventral part of the margin is straight with a short concave section in the middle, while the anterior end is rounded. The left valve, on the other hand, differs from the right both dorsally and posteriorly. The left valve dorsal margin is nearly straight, the anterior cardinal angle is marked, while the posterior end is more rounded than that of the right valve. Both valves are highest at the anterior cardinal angle. Some of the left valves have a more pointed posterior end and these are tentatively regarded as males. The surface of the valve is reticulate, the shell structure

being characterized by a network of ribs, the pits between the ribs being roughly hexagonal shaped. The inner lamella is relatively broad and is well developed posteriorly also. Along the entire free margin the selvage is wide and forms a narrow selvage lip ventrally. The inner margin and line of concrescence coincide. Radial porecanals are straight and simple, about eight on the anterior part and four or five on the posterior part.

The hinge is lophodont. In the left valve the hinge consists of two oval-shaped terminal sockets with a straight, smooth bar between them. The right valve bears the complementary ridge-groove-ridge arrangement. The hinge is narrow and rather delicate. The muscle-scar pattern was not clearly seen. In one case an oblique row of four scars was observed, the lower three being larger than the dorsal one and elongated longitudinally.

Remarks. This species is similar in certain respects to *Mandelstamia triebeli* but has a more angular contour and a more pointed posterior end.

Mandelstamia maculata Kilenyi sp. nov.

Plate 71, figs. 19–25

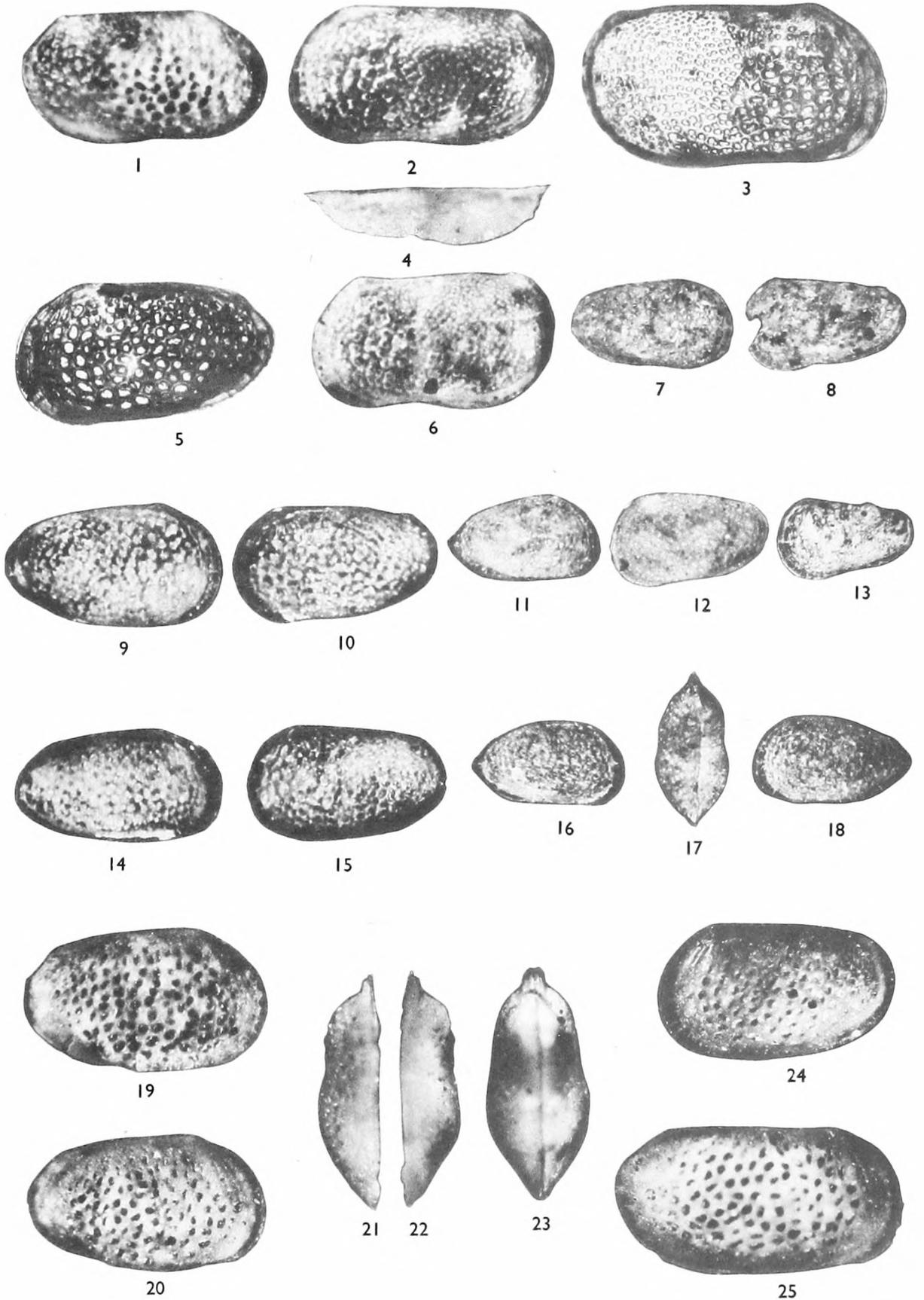
Derivation of name. Maculatus (Lat.)—spotted, speckled.

Holotype. A complete female carapace. HU.2.J.1.24. *Paratypes.* Eighty-nine valves and carapaces. HU.3.J.23.1–89. *Occurrence of holotype.* Forty-four feet above the base of the *Subplanites* (V.) *grandis* Subzone, Upper Kimmeridgian, Rope Lake Head, Kimmeridge, Dorset. *Occurrence of paratypes.* Kimmeridgian, New Closes Cliff, Speeton, Yorkshire. Horizon uncertain.

EXPLANATION OF PLATE 71

Magnification $\times 50$ except where stated

- Figs. 1–4, 6. *Mandelstamia rectilinea* Malz 1958. Sixty feet above base of *Rasenia mutabilis* Zone, L. Kimmeridgian, Black Head, Dorset. 1, Right valve. External view. HU.3.J.20.2. 2, Left valve. External view. HU.2.J.1.21. 3, Left valve, in transmitted light. HU.2.J.1.21. $\times 60$. 4, Left valve. Dorsal view. HU.2.J.1.21. 6, Left valve. External view. HU.3.J.20.3.
- Figs. 7, 8, 13. *Mandelstamia* sp. 1. 7, 8. Ten feet above base of *Pavlovia pallasioides* Zone; 13, 17 feet below top of *Pectinatites pectinatus* Zone, U. Kimmeridgian, about one-third of a mile east of Freshwater Steps, Dorset. 7, Right valve. External view. HU.3.J.30.1. 8, Left valve. External view. HU.3.J.30.2. 13, Left valve. External view (juvenile). HU.3.J.30.7.
- Figs. 5, 9, 10, 14, 15. *Mandelstamia triebeli* Kilenyi sp. nov. 60 feet above base of *Rasenia mutabilis* Zone, L. Kimmeridgian, Black Head, Dorset. 5, Right valve in transmitted light. HU.3.J.21.3. $\times 60$. 9, Right valve. External view. HU.3.J.21.2. 10, Holotype. Left valve. External view. HU.2.J.1.22. 14, Right valve. External view. HU.3.J.21.5. 15, Left valve. External view. HU.3.J.21.7.
- Figs. 11, 12, 16–18. *Mandelstamia angulata* Kilenyi sp. nov. 11 feet above base of *Rasenia cymodoce* Zone, L. Kimmeridgian, Black Head, Dorset. 11, Male right valve. External view. HU.3.J.22.7. 12, Male left valve. External view. HU.3.J.22.8. 16, Female right valve. External view. HU.3.J.22.2. 17, Female carapace. Dorsal view. HU.3.J.22.10–11. 18, Female (?) left valve. External view. HU.3.J.22.6.
- Figs. 19–25. *Mandelstamia maculata* Kilenyi sp. nov. 19–22, 24, 25, Zone uncertain, U. Kimmeridgian, New Closes Cliff, Speeton, Yorkshire; 23, 44 feet above base of *Subplanites* (V.) *grandis* Subzone, U. Kimmeridgian, Rope Lake Head, Dorset. 19, Female right valve. External view. HU.3.J.23.7. 20, Female right valve. External view. HU.3.J.23.8. 21, Female left valve. Dorsal view. HU.3.J.23.5. 22, Female right valve. Dorsal view. HU.3.J.23.4. 23, Holotype. Female carapace. Dorsal view. HU.2.J.1.24. 24, Female left valve. External view. HU.3.J.23.5. 25, Male right valve. External view. HU.3.J.23.6.



This and all the species described below differ from the type species in hinge structure. The difference is not regarded as being of subgeneric importance.

Distribution. *Subplanites* (V.) *grandis* Subzone. Upper Kimmeridgian, Rope Lake Head, Kimmeridge, Dorset, and Kimmeridgian, New Closes Cliff, Speeton, Yorkshire, zone uncertain.

Diagnosis. Carapace elongated, tapering posteriorly. Anterior end rounded, posterior rather more angular. Ventral margin of the right valve strongly concave, that of the left valve straight, the ventral side of the valves overhanging the ventral margins to form a sort of ala. Surface covered with equally dispersed pits. The hinge of the right valve has the following structure: The anterior element is a minute oval-shaped ridge with four small rounded projections, the middle two of which are larger than the others. The median element is a wide and smooth groove, which ends on both sides in a rounded pit, which is slightly deeper than the groove itself. The posterior element is like the anterior but smaller. The left valve terminal elements are oval-shaped sockets, with three or four faint loculi in them. The median element lies in the middle of the contact margin and consists of a smooth bar, both ends of which are thickened and slightly projecting. Marginal areas relatively broad with a few straight, simple porecanals. Sexual dimorphism very pronounced, males being much longer than females.

Measurements

	L	H	W	Hi	M/a	M/p
Holotype:	0.72	0.41	0.31			
Left valve:	0.72	0.40	0.17	0.50	0.08	0.04
♀Right valve:	0.72	0.42	0.17	0.50	0.07	0.04
♂Right valve:	0.86	0.45	..	0.59	0.07	0.06
Juvenile forms:						
Instar 8:	0.56	0.34				
„ 7:	0.46	0.26				
„ 6:	0.41	0.25				

Description. Carapace trapezoidal (♀) or elongate oblong shaped (♂). The left valve larger than the right. Overlap is doubtful, but there may be slight overlap dorsally. In dorsal view carapace is pear shaped with a marked depression just above the middle. The greatest width is in the posterior part of the carapace, about one-third of the length from the posterior end. The dorsal margin is straight on both valves, and the anterior end rounded; both cardinal angles are marked. The posterior end of the left valve is rounded, but is more angular in the right valve, and the posterodorsal margin is straight. The ventral margin is straight (left valve) or slightly concave (right valve), and the side of the valve overhangs the ventral margin, especially on the right valve, forming a sort of ala. Only one male specimen was found (a right valve), and this is oblong shaped and much longer than the female. There are also a few denticles on the anterior margin. In side view the greatest height of the female valve is at the anterior cardinal angle, the male valve is highest at the middle. The surface of the valve is strongly reticulate, the pits being arranged in vertical rows. The inner lamella is broad; the inner margin and line of concrescence coincide. The selvage is wide and projecting, the selvage lip being very prominent on the right valve. Radial porecanals are simple and straight and only about six occur on the anterior margin. The hinge is strongly developed, and is of a new type which has been fully described in the diagnosis above.

The structure of the shell is a network of ribs similar to that in other species of *Mandel-*

stamia. In polarized light only faint interference figures can be seen in the pits and the overall cross is absent. The ventral parts of the valve, where the 'ala' is developed, appear dark in every position of the microscope stage.

Mandelstamia sp. 1. Kilenyi

Plate 71, figs. 7, 8, 13

Material. Twenty-three valves. HU.3.J.30.1-23.

Occurrence. Upper *Pectinites* and Lower *Pavlovia* Zones, U. Kimmeridgian, Freshwater Steps to Hounstout Cliff, Dorset.

Measurements

	L	H	W	Hi	M/a
Left valve:	0.50	0.32	0.16	0.30	0.04
Right valve:	0.48	0.28	0.15	0.30	0.04

Diagnosis. Shape like *Mandelstamia maculata* but the hinge is more advanced towards the merodont hinge type, the terminal teeth being more markedly dentate. The median ridge on the left valve is straight and has no terminal widening. Radial porecanals few.

Description. Only a few, badly preserved specimens were found. The contour of the valves is similar to that of *Mandelstamia maculata* but this form is more tumid. In dorsal view the 'waist' is less prominent, the carapace being more oval-shaped. The hinge structure is more advanced towards the merodont type. The terminal ridges are more markedly dentate, and the corresponding sockets loculate; the median element is straight with no projections or widening at the ends. Inner margin and line of concrecence coincide; the inner lamella is narrow. Radial porecanals few and simple. Selvage wide, well developed along the entire free margin.

Mandelstamia sexti Neale sp. nov.

Text-figs. 2, 3, 4

Derivation of Name. Sextus (Lat.)—sixth. An allusion to the fact that this species is confined to the sixth stratum of the D. Beds at Speeton and is not found above or below.

Holotype. Female carapace, HU.1.C.4.49. *Paratypes*. One hundred and four valves and carapaces belonging to various growth stages. HU.1.C.4:47,48,50-54; HU.1.C.5.1-97. Other material: Several hundred valves and carapaces from the Speeton Clay D6 Beds (D6B-D6I). *Occurrence of holotype and paratypes*. Speeton Clay D6A, Berriasian, Lower Cretaceous. Middle Cliff, Speeton, Yorkshire.

Distribution. This species is unknown outside the Speeton Clay Blue Bed (D6) which is about 6 feet thick, in the coastal exposures.

Diagnosis. A species of *Mandelstamia* with well-differentiated hinge, and differing in shape from previously described species in that the height is somewhat greater in proportion to the length. The terminal hinge cusps in the right valve are divided to form four or five small teeth; the median bar in the left valve is finely denticulate. Sexual dimorphism not very marked, the presumed males having shells which in side view taper slightly more posteriorly than those of the presumed females.

Measurements

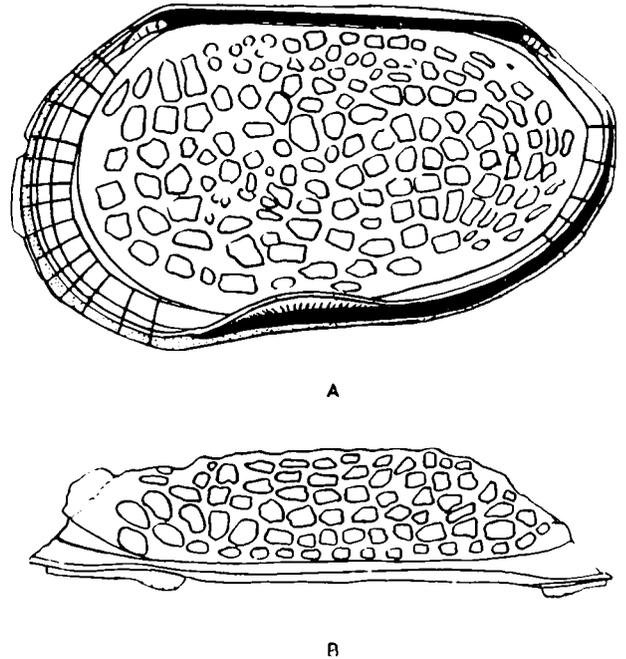
	L	H	W	Hi	M/a	M/p
Dimensions of Holotype:	0.71	0.40	0.35
L.V. female HU.1.C.4.48.	0.69	0.40	0.16	0.47	0.06	0.04

Description. Shape elongate-oval, tapering somewhat posteriorly, rather more so in the case of the male than in the case of the female. Anterior margin forms an asymmetrical curve which bulges ventrally, while the dorsal and ventral margins are relatively straight, although the latter may, on occasion, be slightly concave. Posterior margin rounded-subangular with a straight postero-dorsal section. Cardinal angles marked. In dorsal view the shell is widest posteriorly, the greatest width lying about three-quarters of the length from the anterior end. The inflation in the female is a little greater than in the male but sexual dimorphism is not pronounced.

Ornament is typical of *Mandelstamia* and consists of deep concentrically arranged pits. Radial pore canals (text-fig. 2) are straight and sparse. The flange and selvage are very well developed and in well-preserved specimens the inner margin and the line of concrescence are narrowly separated anteriorly. Elsewhere, the inner margin and line of concrescence coincide. Hinge structure as described above differs from that of *Mandelstamia facilis* Lübmova. The tiny denticles on the hinge bar in the left valve consist of minute elliptical granules of calcite with the long axes of the ellipses set at right angles to the length of the bar. These are similar to the granules which beset the margin of the shell and it is perhaps better to term the bar 'granulate' rather than 'denticulate'. This median bar fits into a shelf-like groove under the margin of the right valve. The latter overlaps the left valve dorsally except at the cardinal angles.

The pattern of growth is the same as that generally found in the Ostracoda and the various growth stages are indicated on the graph shown in text-fig. 4.

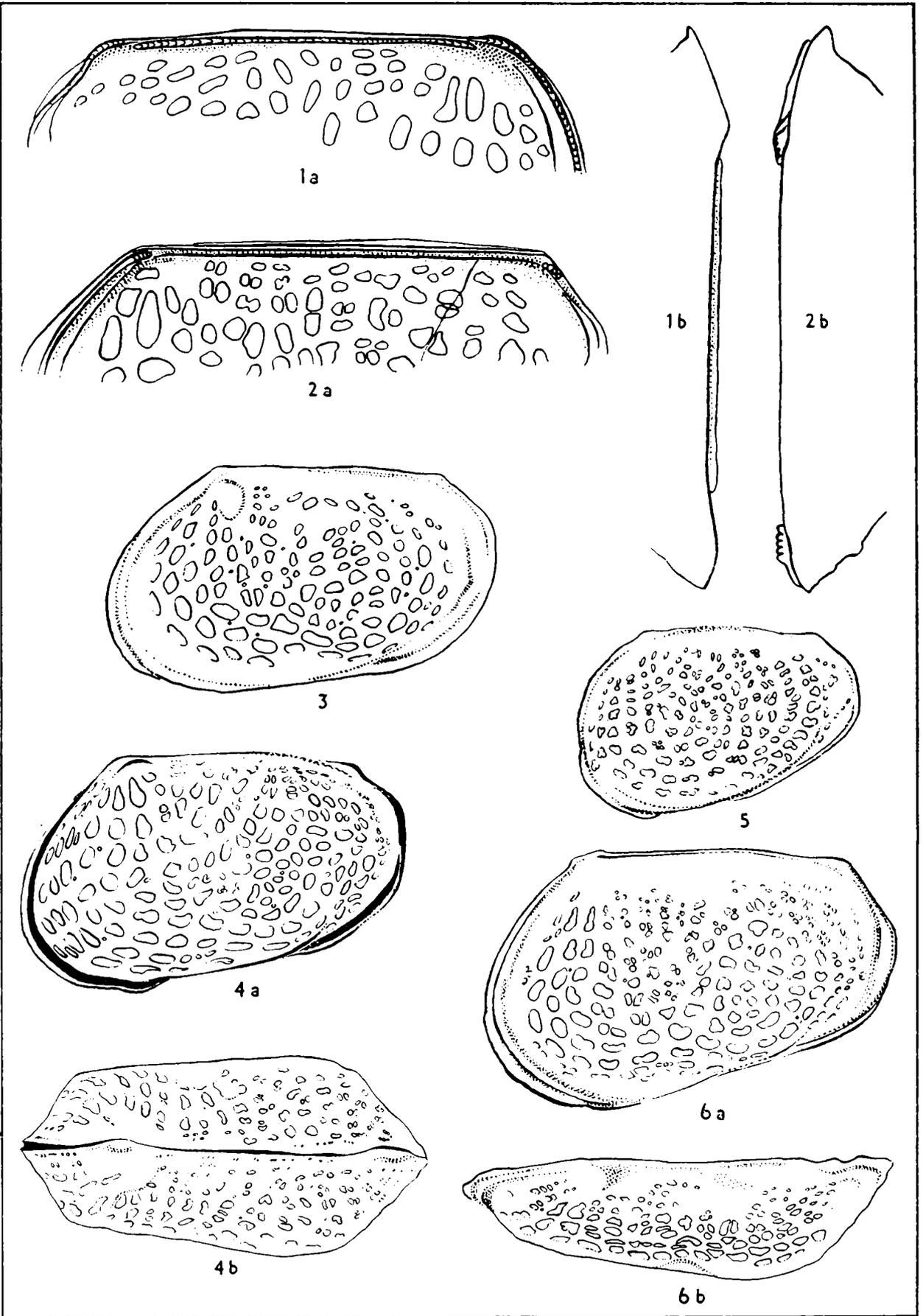
Remarks. In this species the height is slightly greater in proportion to the length than in other species of *Mandelstamia* and it differs from *M. maculata* in the more pronounced taper posteriorly and in the straighter ventral margin.



TEXT-FIG. 2. Structure of *Mandelstamia sexti* Neale sp. nov. Adult male right valve. HU.1.C.4.47. Specimen destroyed. A, Inside. B, Dorsal view. $\times 90$.

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TEXT-FIG. 3

MALZ. H. 1958. Die Gattung *Macrodentina* und einige andere Ostracoden-Arten aus dem Oberen Jura von NW-Deutschland, England und Frankreich. *Abh. senckenb. naturf. Ges.* 497, 1-67, pl. 1-11.

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TEXT-FIG. 3. *Mandelstamia sexti* Neale sp. nov. 1, 2, Hinge structure. 1, Left valve. HU.1.C.4.53 (a) from inside, (b) dorsal view. $\times 150$. 2, Right valve. HU.1.C.4.54 (a) from inside, (b) dorsal view.

157. 3, Female left valve. Adult. HU.1.C.4.48 from outside. $\times 84$. 4, Holotype. Female carapace. Adult. HU.1.C.4.49 (a) from left, (b) dorsal view. $\times 82$. 5, Left valve. Instar 7. HU.1.C.4.51 from outside. $\times 89$. 6, Left valve. ?Male. Instar 8. HU.1.C.4.50 (a) from outside, (b) dorsal view. 110.

