

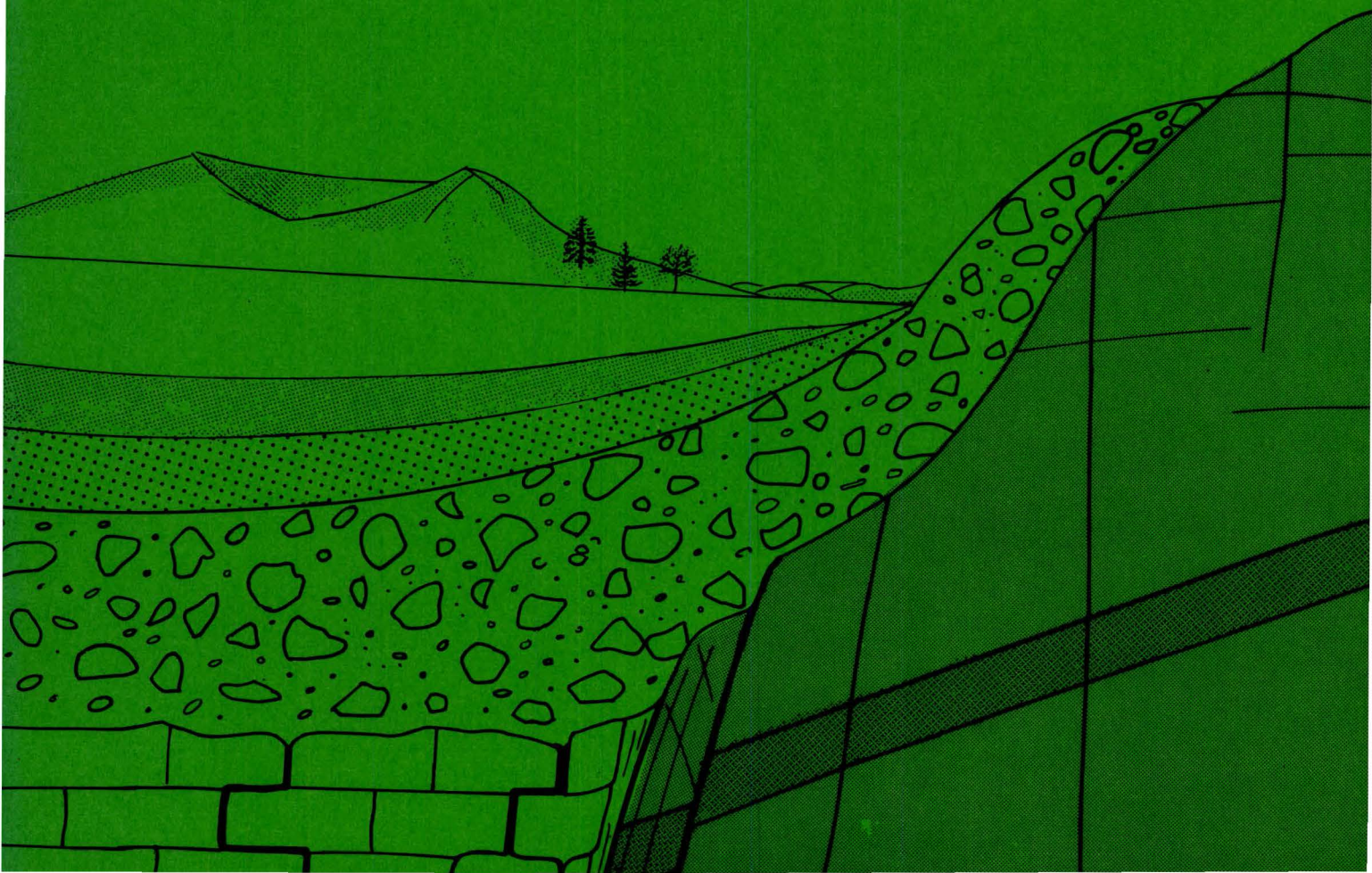


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Ulf Sivhed

**Upper Cretaceous
Ostracodes from the Malen
limestone quarry and
the river Stensån,
southern Sweden**

Uppsala 1983



ULF SIVHED

UPPER CRETACEOUS OSTRACODES FROM THE
MALEN LIMESTONE QUARRY AND THE
RIVER STENSAN, SOUTHERN SWEDEN



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ABSTRACT

Ostracodes are described for the first time from the Campanian of the Malen limestone quarry. 13 species are described, including the two new species *Eucytherura malensis* and *Neocythere reticulata*. Many of the ostracodes species have previously only been reported from the Maastrichtian. The ostracode fauna indicates mesohaline to epineritic conditions.

INTRODUCTION

The Båstad area is situated at the boundary between the Fennoscandian Shield and the Fennoscandian Border zone. This zone is markedly disturbed by tectonic events discussed by several authors (for instance Bergström et al 1973, Norling 1981).

According to Brotzen (1945), the Båstad and Kristianstad areas were connected with each other in the Campanian. Connections were also established between the Båstad-Kristianstad area in the north and the Vomb and Malmö-Ystad areas in the south. A central Scanian island with a varying extent existed between the northern and southern areas. The island delivered terrigenous material to surrounding areas. It also formed a more or less dominant barrier between the northern and southern areas.

In the Early Campanian the sediments were deposited in a marine, slightly transgressive sea. A regression took place in the "middle Campanian" succeeded by a regression in the Late Campanian. This transgression continued into the Maastrichtian. In the Campanian the water depth was low and neritic conditions prevailed.

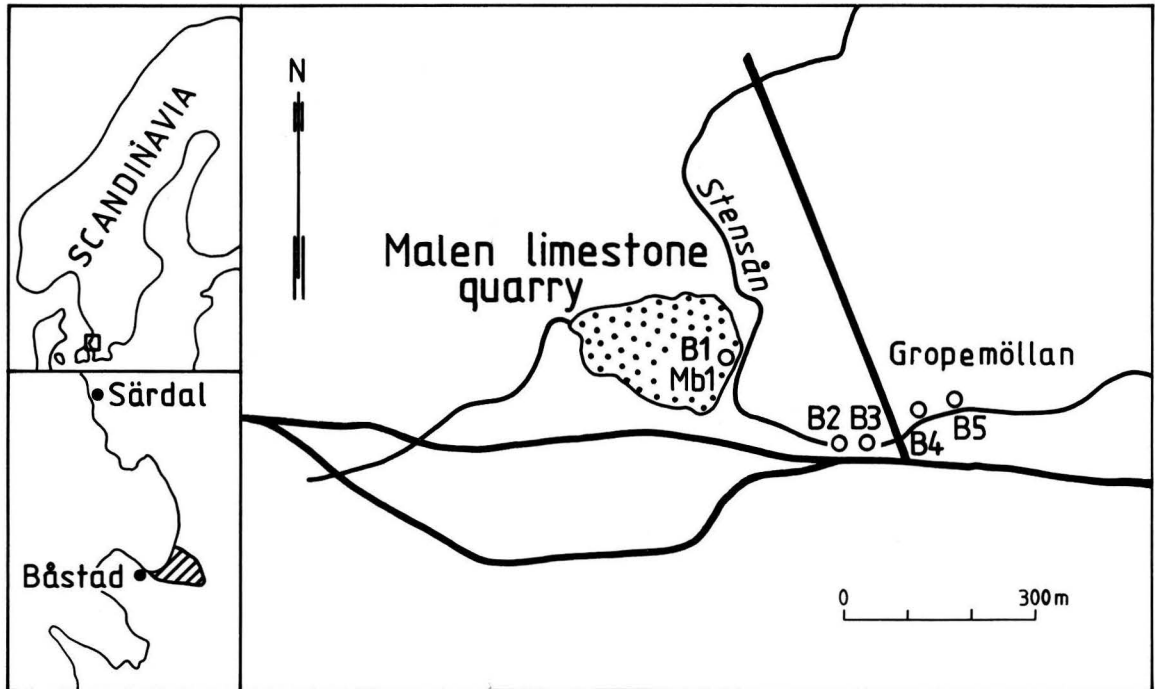


Fig. 1. The map shows the sampled area with the sample sites. The inset maps show the position of the samples area relative to the rest of Scandinavia and the distribution of Upper Cretaceous sediment in northwest Scania and Halland.

THE BÅSTAD AREA

In the Båstad area Cretaceous deposits have been known since the eighteenth century (Fischerström 1761). Wiman (1916) gave an account of the macrofossil fauna originating from the Malen limestone quarry. The quarry, now abandoned and water filled, is situated in the eastern part of the town of Båstad (Fig. 1, Bergström and Wikman 1981). Wiman (1916) compared his fauna with the macrofauna originating from Gropemöllan, described by Lundgren (1889). The locality named Gropemöllan is situated at the river Stensån, where Cretaceous beds are exposed approximately 250 m east of the Malen limestone quarry (Fig. 1). The macrofossils determined by Wiman (1916) indicate a middle Campanian age of the rock. The evidence for this age is the many specimens of the belemnites *Belemnitella mucronata* (LINK, 1807) and *Belemnellocanax mammillatus* (NILSSON, 1826). Hummel (1872) and Bexell (1938) discussed geological problems related to the Cretaceous of the Båstad area. Bryozoans from Gropemöllan were treated by Hennig (1892). Carlsson (1953) described cirripeds and Brood (1972) stromatoporoids from the Malen limestone quarry. Christensen (1970) discussed belemnites from a locality close to the quarry.

Foraminifers indicating a Campanian age obtained from the uppermost section in the southeast part of the quarry were briefly commented on by Norling (1973) and van Gorsel (1973). Specimens of the following three species were reported by Norling: "*Daviesina minuscula*" (HOFKER, 1957), *Bolivinooides decoratus decoratus* (Jones, 1886) and *Stensioeina exculpta* (REUSS, 1960). Van Gorsel discussed foraminifers related to the genus *Helicorbitioides* (Mc GILLAVRY, 1963). These foraminifers indicate a Campanian age.

MATERIAL

The ostracode fauna treated originates from samples (M 1-5) collected by Mr. C.-O. Eriksson at Malen in the summer 1976. The purpose of the sampling was to study the local foraminiferal fauna. At the same time a minor drilling (Mbl, total depth 20.5 m) was carried out in the eastern wall of the Malen quarry. Ostracodes gathered in mud samples from that drilling were treated. The sample sites are shown in Fig. 1.

Some 100-200 g of each sample were sifted through a sieve (71 μ m) in gently running water. The residue was then dried and treated with carbon tetrachloride. The two fractions were dried and microfossils were separated from the light fraction.

The illustrated specimens are stored in the type collection of the Geological Survey of Sweden (SGU), Uppsala, Sweden.

THE OSTRACODE FAUNA

The discussed ostracodes are arranged systematically according to Moore (1961).

In addition to the 13 described ostracode species a few representatives of the genus *Bairdia* and *Xestoloberis* were also recorded.

The identified ostracodes are typical representatives of the Upper Cretaceous in the North European Province (Christensen 1976). The two new species are very similar to other North European species.

Rather few ostracode species were recorded at Malen. The frequency can be compared with that in Denmark generally, where Jørgensen (1970) recorded around 40 species in Lower Maastrichtian samples of 50 g each.

Stratigraphy: Stratigraphic studies in the Campanian almost exclusively deal with foraminifers, while studies of ostracodes from this stage are rare. Problems therefore arise when other faunas are looked for to compare with. However, Herrig (1967) studied the ostracode zonation in two drill cores from northeastern Germany. These drill cores penetrate Coniacian to Maastrichtian sediments. Two of the Malen species, *Schizocythere chelodon* and *Cythereis zygopleura zygopleura*, were reported by Herrig. *S. chelodon* ranges from the Lower Campanian to the Lower Maastrichtian and *C. zygopleura zygopleura* from the Lower Santonian to the Lower Campanian in the two borings. *S. chelodon* has also been recorded from the Campanian in England and *C. zygopleura zygopleura* from the Turonian of Czechoslovakia. The fact that only two of the German species (Herrig 1967) are the same as those at Malen might be due to environmental differences. The sediments at Malen were deposited at the margin (near shore) of the North European Basin, while those in northeastern Germany were deposited in the central part of the basin.

Among the rest of the treated ostracodes eight species have been recorded from elsewhere in the Maastrichtian. One of them is also known from the Upper Campanian and two from the Paleocene of the North European Province. The ostracode records at Malen lower the deepest appearance of these ostracodes to the uppermost part of the Lower Campanian.

Most of the treated genera (11) have a world wide distribution. Two genera, *Neocythere* and *Schizocythere*, are restricted to Europe and Asia, respectively Europe and north Africa (Morkhoven 1962, enclosure 1).

Substratum: Elofson (1941, p. 428) investigated the connection between ostracode faunas and bottom conditions in recent sediments. He divided the ostracodes into two morphological groups, ornamented and smooth ones. When grouping the investigated species in the same way as Jørgensen (1970, pp. 25-26), the Malen fauna indicates an almost clean sand bottom, which is supported by the arenitic dominance in the treated samples.

Depth: According to the bathymetric distribution schedule compiled by Morkhoven (1962, enclosure 1), five of the treated genera are restricted to mesohaline and epineritic conditions. The other eight genera are not restricted to any bathymetric range.

CONCLUSION

The sediments in the Malen limestone quarry are referred to the uppermost Lower Campanian through the co-occurrence of the belemnites *Belemnellocamax mammillatus* and *Belemnitella mucronata*. A Campanian age is also indicated by finds of the foraminifers "*Daviesina minuscula*", *Bolivinooides decoratus*, *Stensioeina exculpta* and species of the genus *Helicorbitoides*.

Most of the ostracode genera recorded at Malen have a world wide distribution. The fauna is dominated by Maastrichtian species. The ostracode records at Malen lower the first appearance of these ostracodes to the uppermost part of the Lower Campanian. However, the co-occurrence of *Cythereis zygopleura zygopleura* and *Schizocythere chelodon* indicates an Early Campanian age.

The ostracode fauna indicates mesohaline to epineritic conditions. This indication is supported by the great number of foraminifers related to the genus *Helocorbitoïdes* and by the statement made by Brotzen (1945; p. 3 this paper). The fauna also indicates a sandy bottom which is in accordance with the arenitic sediment at Malen.

A relatively small number of ostracode species and specimens were recorded. This might depend on environmental conditions. There is, however, also a possibility that the sediment at Malen consists of redeposited material, an alternative indicated by the very short distance to the fault line bordering the Hallandsåsen Horst and the connected conclusions that the shoreline may have been situated here for long time intervals (Bergström and Wikman 1981). The fault line is situated less than 100 metres to the south.

INDEX OF OSTRACODES

Order PODOCOPIDA MÜLLER, 1894

Suborder PODOCOPINA SARS, 1866

Superfamily CYTHERACEA BAIRD, 1850

Family BYTHOCYTHERIDAE SARS, 1926

Subfamily BYTHOCYTHERINAE SARS, 1926

Genus *Protojenesia* DEROO, 1966

Protojenesia cf. *simplex* (VEEN, 1936)

Pl. I, Fig. 1.

cf. 1936 *Loxoconcha simplex* VEEN. - P. 23, Pl I, Figs 20-23.

cf. 1958 *Loxoconcha ? simplex* VEEN. - Howe & Laurencich, pp.
386-387.

cf. 1966 *Loxoconcha ? simplex* VEEN. - Herrig, p. 892, Pl XXXIII,
Figs 2-3.

MATERIAL. - 1 complete carapace in sample Mb1: 18.76-18.50 m.

DESCRIPTION. - See Veen 1936, p. 23.

MEASUREMENTS. - The treated specimen has a length of 0.44 mm and
a height of 0.24 mm.

REMARKS. - Deroo (1966, p. 84) referred the species to the genus
Protojenesia.

According to its small size the investigated specimen is probably
an instar. This would explain why the typical lateral rib for the
species is lacking. Due to the missing rib, the specimen is only
tentatively referred to the species *P. simplex*.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne.
Protojenesia simplex is reported from the upper part of Lower
Maastrichtian in northeastern Germany (Herrig 1966, p. 892),

and the Upper Maastrichtian in Holland (Veen 1936, p. 23)

Family CYTHERIDEINAE SARS, 1925

Subfamily CYTHERIDEINAE SARS, 1925

Genus *Clithrocytheridea* STEPHENSON, 1936

Clithrocytheridea preciosa (VEEN, 1936)

Pl. I, Fig. 2.

1936 *Cytherura* (?) *preciosa* VEEN. - Pp. 108-109, Pl. IV, Figs 77-85.

1958 *Clithrocytheridea preciosa* (VEEN). - Howe & Laurencich, p. 113.

1966 *Clithrocytheridea preciosa* (VEEN). - Herrig, p. 791, Pl. XII, Figs 2a-c; Pl. XIV, Figs 1a-b.

1970 *Clithrocytheridea preciosa* (VEEN). - Jørgensen, pp. 88-90, Text-Fig. 16, XI, Figs 3-5.

MATERIAL. - 1 complete carapace in sample B:4.

DESCRIPTION. - See Veen 1936, pp. 108-109.

MEASUREMENTS. - The recorded specimen has a length of 0.44 mm and a height of 0.23 mm.

REMARKS. - Its small size may indicate that the recorded specimens represent an instar form. When comparing it with the instar figured by Herrig (1966, Pl. XIII, Fig. 2a) it is, however, remarkable that the ornamentation of the Båstad specimen is so well developed. This fact might be explained by a generally smaller size of the species in the Båstad area, which means that the present specimen may represent a mature specimen.

As mentioned by Jørgensen (1970, p. 90), the carapace outline, the irregular ornamentation on the lateral surface, and the

merodonte/entomodonte hinge (Jørgensen 1970, Pl. XI, Fig. 4) are typical characteristics of the genus *Clithrocytheridea*. However, this statement conflicts with a notion by Van Morkhoven (1963, pp. 281-284). According to the latter, the genus is restricted to Paleocene - Eocene and all geologically older and younger described species of *Clithrocytheridea* differ in one or more features from that genus and should be excluded. In this report I follow Jørgensen.

DISTRIBUTION. - Campanian in Skåne (this publication and Herrig 1966, p. 791), Maastrichtian in Denmark (Jørgensen 1970, p. 89), upper part of Lower Maastrichtian in northeastern Germany (Herrig 1966, p. 791), Upper Maastrichtian in Holland (Veen, 1936, p. 108).

Family CYTHERURIDAE MÜLLER, 1894

Genus *Cytherura* SARS, 1866

Cytherura staringi VEEN, 1936

Pl. I, Fig. 3.

1936 *Cytherura staringe* VEEN. - P. 99, Pl. IV, Figs 42-45.

1958 *Cytherura staringi* VEEN. - Howe & Laurencich, p. 314.

1966 *Cytherura staringi* VEEN. - Herrig, p. 863, Pl. XXVIII, Figs 14a-b.

1970 *Cytherura staringi* VEEN. - Jørgensen, pp. 161-162, Pl. XVII, Fig. 6.

MATERIAL. - 1 complete carapace in sample B:4.

DESCRIPTION. - See Veen 1936, p. 99.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Lower Maastrichtian in Denmark (Jørgensen 1970, p. 161), upper

part of Lower Maastrichtian in northeastern Germany (Herrig 1966, p. 863), Upper Maastrichtian in Holland (Veen 1936, p. 99).

Cytherura ubaghsi VEEN, 1936

Pl. I, Fig. 4.

1936 *Cytherura ubaghsi* VEEN. - P. 99, Pl. IV, Figs 36-41.

1958 *Cytherura ubaghsi* VEEN. - Howe & Laurencich, pp. 316-317.

1966 *Cytherura ubaghsi* VEEN. - Herrig, p. 864, Pl. XXVIII,
Figs 10-12.

1970 *Cytherura ubaghsi* VEEN. - Jørgensen, pp. 163-164, Pl. XVIII,
Fig. 1.

MATERIAL. - 1 complete carapace in sample B:4.

DESCRIPTION. - See Veen 1936, p. 99.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Maastrichtian in Denmark (Jørgensen 1970, p. 164), upper part of Lower Maastrichtian in northeastern Germany (Herrig 1970, p. 864), Upper Maastrichtian in Holland (Veen 1936, p. 99).

Genus *Eucytherura* MÜLLER, 1894

Eucytherura malensis n.sp.

Pl. I, Figs 5-7.

DERIVATION OF THE NAME. - Latin *Malensis*, from the Malen limestone quarry, the type locality.

HOLOTYPE. - A carapace, SGU Type 1220.

TYPE LOCALITY. - Locality B:5 in this paper.

TYPE STRATUM. - A biocalcarenite, Campanian.

MATERIAL. - 10 complete carapaces in samples B:1,4,5.

DIAGNOSIS. - A species of *Eucytherura* with an anteromedian lobe forming the center of a more or less pronounced radiating system of ribs.

DESCRIPTION. - The carapace is small and subtriangular in lateral view. The outline in dorsal view is basally subrectangular, the anteromedian lobe and the posteroventral tubercle are strongly marked making a subtriangular impression. In posterior view it is subtriangular with the greatest width ventrally. The dorsal margin is almost straight. The cardinal angles are distinct. The ventral margin is straight. The anterior margin is slightly convex denticulate in its midanterior and anteroventral parts. The posterior margin is straight ventrally to midposterior and slightly elongated midventrally. The posterodorsal margin is S-shaped. The eye tubercle is distinct.

The lateral ornamentation is dominated by an anteromedian lobe which forms the centre of a radiate system of ribs. These ribs are more or less pronounced. There is a distinct ventral ridge and a posteroventral tubercle. Posterodorsally there is a small curved ridge parallel to the posterodorsal margin.

The left valve is slightly larger than the right one which it overlaps antero- and posterodorsally.

No inner features have been observed.

MEASUREMENTS. - The adult specimens are between 0.34 and 0.38 mm long. Their height varies between 0.17 and 0.22 mm.

DISCUSSION: - A larval specimen (Pl. I, Fig. 7) has also been recorded. It differs from an adult one only in lacking in the anteromedian lobe and the radiating ribs. The ribs which

form the ornamentation in the larval form have, however, a tendency to form a radiating feature. If these ribs were broader and formed a lobe the ornamentation would be identical to that of the adult.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne.

Genus *Cytheropteron* SARS, 1866.

Cytheropteron (*Aversoalva*) *v-scriptum* VEEN, 1936

Pl. II, Fig. 17.

1936 *Cytheropteron v-scriptum* VEEN. - P. 71. III, Figs 51-54.

1941 *Cytheropteron v-scriptum* VEEN. - Bonnema, pp. 26-27,

Pl. VI, Figs 51-54.

1958 *Cytheropteron v-scriptum* VEEN. - Howe & Laurencich, p. 307.

1965 *Cytheropteron v-scriptum* VEEN. - Szczechura, pp. 490-491,

Pl. II, Fig. 12; XIX, Figs 9-13.

pars. 1966 *Cytheropteron* (*Aversoalva*) *v-scriptum* VEEN. - Herrig, pp. 884-887, Text-Figs. 109-112, Tab. 38, Pl. XXXI, Figs 5-10; Pl. XXXII, Figs 1-4, Pl. XLIV, Fig. 9.

1966 *Aversoalva v-scriptum* VEEN. - Deroo, p. 112, Pl. VII, Figs. 84-85; Pl. XV, Figs 346-348.

1970 *Cytheropteron* (*Aversoalva*) *v-scriptum* VEEN. - Jørgensen, pp. 171-172, Pl. 18, Fig. 5.

MATERIAL. - 1 complete carapace in sample B:1.

DESCRIPTION. - See Szczechura 1965, p. 490.

REMARKS. - Herrig (1966, pp. 884-887) suggests that *Cytheropteron inaequivalve* BONNEMA, 1941 represents an instar form of

C. v-scriptum. As already pointed out by Jørgensen (1970, p. 172) the specimens figured by Bonnema (1941, Pl. VI, Figs 24-28) are longer than those of *C. v-scriptum* figured by VEEN, Bonnema and others. This fact, together with the difference in carapace outline, supports a separation into two species.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Maastrichtian in Denmark (Jørgensen 1970, p. 172), Maastrichtian in northeastern Germany (Herrig 1966, p. 884), Upper Campanian to Upper Maastrichtian in Holland (Deroo 1966, p. 112), Upper Campanian to Paleocene in Poland (Szczechura 1965, p. 491).

Genus *Hemicytherura* ELOFSON, 1941

Subgenus *Hemicytherura* (*Hemicytherura*) HORNIBROOK, 1952

Hemicytherura (*Hemicytherura*) *bisulcata* (VEEN, 1936)

Pl. II, Fig. 12.

1936 *Cytherura bisulcata* VEEN. - Pp. 84-85, Pl. IV,

Figs 1-6.

1953 *Hemicytherura bisulcata* (VEEN). - Ruggieri, p. 49.

1958 *Hemicytherura bisulcata* (VEEN). - Howe & Laurencich, p. 360.

pars. ? 1966 *Hemicytherura bisulcata* (VEEN). - Herrig, pp. 874-875; 1964 Tab. 48, Pl. XXX, Figs 3-6.

1966 *Hemicytherura bisulcata* (VEEN). - Deroo, p. 114, Pl. XV,

Figs 367-368.

1970 *Hemicytherura bisulcata* (VEEN). - Jørgensen, pp. 182-183.

Pl. 18, Fig. 7.

MATERIAL. - 10 complete carapaces and 1 left valve in samples B:1,2,4,5; Mb1:14.00-12.60, 11.32-11.09 m.

DESCRIPTION. - See Veen 1936, pp. 84-85 and Howe & Laurencich 1958, p. 360.

MEASUREMENTS. - The examined specimens have a length between 0.32 and 0.38 mm. Their height varies between 0.18 and 0.23 mm.

REMARKS. - The investigated specimens differ slightly from the type specimens described by Veen (1936, pp. 84-85). In the type material the median rib runs from mid anterior to mid posterior. In the present specimens the same rib runs from mid anterior to median.

Herrig (1966, pp. 874-875) suggests that *Hemicytherura unisulcata* (VEEN, 1936) represents a juvenile form of *H. bisulcata*. The present material neither supports nor rejects that suggestion. However, some of the Malen specimens are the same size as those referred to as juvenile by Herrig. These specimens have an ornament identical to that of *H. bisulcata*.

The fact that we are dealing with two separate species is supported by specimens referred to *H. unisulcata* by Szczechura (1965, p. 408) having a carapace corresponding in size to that of adults of *H. bisulcata*.

Judging from its carapace outline and type of ornament *H. unisulcata* should be referred to the subgenus *H. (Hemicytherura)*.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Maastrichtian in Denmark (Jørgensen 1970, p. 183), upper part of Lower Maastrichtian in northwestern Germany (Herrig 1966, p. 874), Upper Maastrichtian in Holland (Deroo 1966, p. 114).

Family PROGONOCYTHERIDAE SYLVESTER-BRADLEY, 1948

Subfamily PROGONOCYTHERINAE SYLVESTER-BRADLEY, 1948

Genus *Neocythere* MERTENS, 1956

Neocythere? reticulata n.sp.

Pl. I, Fig. 9, Pl. II, Fig. 14.

DERIVATION OF THE NAME. - Latin *rete*, net, and *latus*, side referring to the ornamentation on the lateral surface.

HOLOTYPE. - A carapace, SGU Type 1227.

TYPE LOCALITY. - Locality B:5 in this paper.

TYPE STRATUM. - A biocalcarenite, Campanian.

MATERIAL. - 31 complete carapaces in samples B:1-5, Mb1: 18.30-17.84, 17.28-16.82, 16.30-15.90, 11.32-11.09, 9.02-8.56, 6.87-6.61 m.

DIAGNOSIS. - A species of *Neocythere* with a reticulated ornamentation on the lateral surface and with a posteroventral ridge.

DESCRIPTION. - The carapace is oval, ventrally tumid. Greatest height at one-third length, greatest width at midlength. It is subtriangular in lateral view. The dorsal margin of the left valve is slightly concave. The dorsal margin of the right valve is straight to slightly convex, with marked cardinal angles. The ventral margin is slightly convex. The anterior margin is angled ventrally, straight mid-anterior and rounded dorsally. The posterior margin is straight dorsally, rounded and extended ventrally. There are two short spines postero-ventrally. The surface ornamentation is dominated by concentric ribs most prominent ventrally. They enclose a pattern of finer diagonal ribs forming a mesh-like pattern when crossing each other. The posterior end is flattened and smooth.

MEASUREMENTS. - The adult specimens are between 0.80 mm and 0.86 mm long. Their height varies between 0.50 and 0.55 mm.

REMARKS. - Judging from the carapace outline and the concentric ribs the species should be referred to the genus *Neocythere*. This determination is only tentative as no inner features have been observed.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne.

Family SCHIZOCYTHERIDAE MANDELSTAM, 1959

Genus *Schizocythere* TRIEBEL, 1950

Schizocythere chelodon (MARSSON, 1880)

Pl. II, Fig. 13

1880 *Cythere chelodon* MARSSON. - P. 43, Pl. 3, Figs 13a-f.

1958 *Amphicytherura chelodon* (MARSSON). - Howe & Laurencich, p. 46.

1964 *Amphicytherura chelodon* (MARSSON). - Kaye, p. 49, Pl. I.
Figs 6-7.

1965 *Amphicytherura chelodon* (MARSSON). - Szczechura, 544-545,
Pl. V, Figs. 8-8a; Pl. XXVII, Figs 13-22.

1966 *Schizocythere chelodon* (MARSSON). - Herrig, pp. 840-848,
Text-Figs. 84-87, Tabs 28-30, Pl. XXVII, Figs 13-22.

1970 *Schizocythere chelodon* (MARSSON). - Jørgensen, pp. 202-204.
Pl. 21, Figs 3,5.

1978 *Amphicytherura chelodon* (MARSSON). - Neale, Pl. 359, Figs
11-12, Table 5.

MATERIAL. - 80 complete carapaces in samples B.1-5; Mb1:19.25-18.76, 16.30-15.90, 12.29-12.01, 8.35-7.79, 7.79-7.33, 8.10-7.04, 7.33-6.57 m.

DIAGNOSIS AND DESCRIPTION. - See Herrig 1966, pp. 841-844.

REMARKS. - In accordance with the discussion in Herrig (1966, p. 840) the species is referred to the genus *Schizocythere*. He

suggested that *Amphicythere* is a subgenus of *Schizocythere*.

The investigated specimens normally show a more pronounced lateral ornamentation than that figured in Pl. II, Fig. 13. They are generally identified by their anteroventral "ear". This "ear" is a small lobe in the anteroventral part of the left valve and it overlaps the anteroventral part of the right valve. This feature is discussed by Herrig (1966, pp. 840-841) as being a main characteristic for the species and it distinguishes *Schizocythere chelodon* from *S. limburgensis* (HOWE & LAURENCICH, 1958).

Some of the treated specimens have a strongly pronounced horizontal lateral ridge like those figured by Herrig (1966, Pls XXVII and XXVIII).

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Maastrichtian in Denmark (Jørgensen 1970, p. 203; Herrig 1966, p. 848), Campanian and upper part of Lower Maastrichtian in northeastern Germany (Herrig 1966, p. 848; 1967, Pl. I), Maastrichtian and Paleocene in Poland (Szczuchura 1965, p. 545), Campanian and Lower Maastrichtian in England (Neale 1978, Tab. 5).

Family TRACHYLEBERIDIDAE SYLVESTER-BRADLEY, 1948

Genus *Curfsena* DEROO, 1966

Curfsina minor (VEEN, 1936)

Pl. II, Fig. 10.

1936 *Cythereis minor* VEEN. - P. 153, Pl. VI, Figs 39-44.

1958 *Cythereis minor* VEEN. - Howe & Laurencich, pp. 214-215.

1966 *Cythereis parva* BONNEMA, 1941. - Herrig, pp. 808-809.

Tabl 73e, Pl. XX, Figs 1-3; Pl. XI, Fig 7.

1966 *Curfsina minor* (VEEN). - Deroo, pp. 141, 178, Pl. XX,
Figs 591-594.

MATERIAL. - 2 complete carapaces in samples B:2, 4.

DESCRIPTION. - See Veen 1936, p. 153.

REMARKS. - The present specimens agree with the males of *Curfsina parva* BONNEMA 1941 figured by Herrig (1966, Pl. XX, Fig. 3). The lateral ornamentation of these specimens is identical to that of *C. minor*. According to the original description of *C. parva* (Bonnema 1941, p. 8) the anteromedian lobe is extended postero-ventrally and anteroventrally. The ventral loba of *C. minor* lacks these extensions, as is the case in Herrigs specimens.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, upper part of Lower Maastrichtian in northeastern Germany (Herrig 1966, pp. 808-809), Upper Maastrichtian in Holland (Deroo 1966, p. 141).

Curfsina reginaeastrid (VEEN, 1936)

Pl. II, Fig. 11.

1936 *Cythereis reginae-Astrid* VEEN. - P. 153, Pl. VI, Figs 45-51.

1958 *Cythereis reginae-astrid* VEEN. - Howe & Laurencich, p. 229.

1966 *Cythereis reginaeastrid* VEEN. - Herrig, p. 809, Pl. XIX, Fig. 2.

1966 *Curfsina reginae-astrid* (VEEN). - Deroo, p. 142, Pl. XX,
Figs 605-608.

MATERIAL. - 28 complete carapaces and one right valve in samples B:2-5; Mb1:7.79-7.33, 5.95-5.49 m.

DESCRIPTION. - See Veen 1936, p. 153.

REMARKS: - The posteromedian angles are more or less distinct in the present material, but lacking in some of the specimens. The horizontal median to the posteromedian ridge is directed postero-

dorsally in some specimens. It is possible that more than one *Curfsina* species are represented in the present material.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, upper part of Lower Maastrichtian in northeastern Germany (Herrig 1966, p. 809), Upper Maastrichtian in Holland (Deroo 1966, p. 142).

Genus *Cythereis* JONES, 1749

Cythereis zygopleura zygopleura POKORNY, 1965

Pl. I, Fig. 8; Pl. II, Fig. 15.

1965 *Cythereis zygopleura* POKORNY. - Pp. 76-77, Pl. I, Figs 1-2.

1967 *Cythereis zygopleura zygopleura*. - Herrig Pl. I, Figs 7-9.

MATERIAL. - 58 complete carapaces and 1 left valve in samples B:1-5; Mb1:17.28-16.82, 16.82-17.28; 8.25-7.79, 7.79-8.25 m.

DIAGNOSIS AND DESCRIPTION. - See Pokorny 1965, pp. 76-77.

REMARKS. - Two main types of ornamentation occur. One type is heavily ornamented with many fine lateral ribs (Pl. I, Fig. 15), while the other type has a smooth lateral area except for the anteromedian lobe and the posteromedian rib. Intermediate forms between these two types occur. The ornamented type dominates in the Båstad material.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, Lower Santonian to Lower Campanian in northeastern Germany (Herrig 1967, Fig. 2), Upper Turonian in Czechoslovakia (Pokorny 1965, p. 77).

Suborder PLATYCOPINA SARS, 1866

Family CYTHERELLIDAE SARS, 1966

Genus *Cytherelloidea* ALEXANDER, 1929

Cytherelloidea auricularis (BOSQUET, 1847)

Pl. II, Fig. 16

1847 *Cypridina auricularis* BOSQUET. - P. 16, Pl. III, Figs 2a-d.

- 1854 *Cytherella auricularis* (BOSQUET). - Bosquet, p. 60, Pl. IV,
Figs 19a-d.
- 1880 *Cytherella auricularis* (BOSQUET). - Marsson, p. 33.
- 1932 *Cytherelloidea auricularis* (BOSQUET). - Veen, pp. 351-352,
Pls XVII and XVIII.
- 1958 *Cytherelloidea auricularis* (BOSQUET). - Howe & Laurencich,
pp. 259-260.
- 1966 *Cytherelloidea auricularis* (BOSQUET). - Herrig, pp. 748-749,
Pl. VI, Figs 1-6.

MATERIAL. - 13 complete carapaces in samples B:1-5; MB1: 6.41-
5.95 m.

DESCRIPTION. - See Veen 1932, pp. 351-352.

DISTRIBUTION. - Uppermost part of Lower Campanian in Skåne, upper
part of Lower Maastrichtian in northeastern Germany (Herrig 1966,
p. 749), Upper Maastrichtian in Holland (Veen 1932, p. 451).

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PLATE I

Fig. 1. *Protojenesia* cf. *simplex* VEEN, 1936.

Carapace, left side. Sample Mb1:18.76-18.50. SEM X 135. SGU Type 1215.

Fig. 2. *Clithrocytheridea preciosa* (VEEN, 1936).

Carapace, right side. Sample B:4. SEM X 140. SGU Type 1216.

Fig. 3. *Cytherura staringi* VEEN, 1936.

Carapace, left side. Sample B:4. SEM X 250. SGU Type 1217.

Fig. 4. *Cytherura ubaghsi* VEEN, 1936.

Carapace, left side. Sample B:4. SEM X 160. SGU Type 1218.

Figs 5-7. *Eucytherura malensis* n. sp.

5. Carapace, right side. Sample B:5. SEM X 200. SGU Type 1219.

6. Carapace, right side. Holotype. Sample B:5. SEM X 175. SGU Type 1220.

7. Carapace, ventral view. Holotype. Sample B:5. SEM X 175. SGU Type 1220.

Fig. 8. *Cythereis zygopleura zygopleura* POKORNY, 1965.

Carapace, ventral view. Sample B:5. SEM X 125. SGU Type 1221.

Fig. 9. *Neocythere* ? *reticulata* n. sp.

Carapace, ventral view. Sample B:5. SEM X 65. SGU Type 1222.

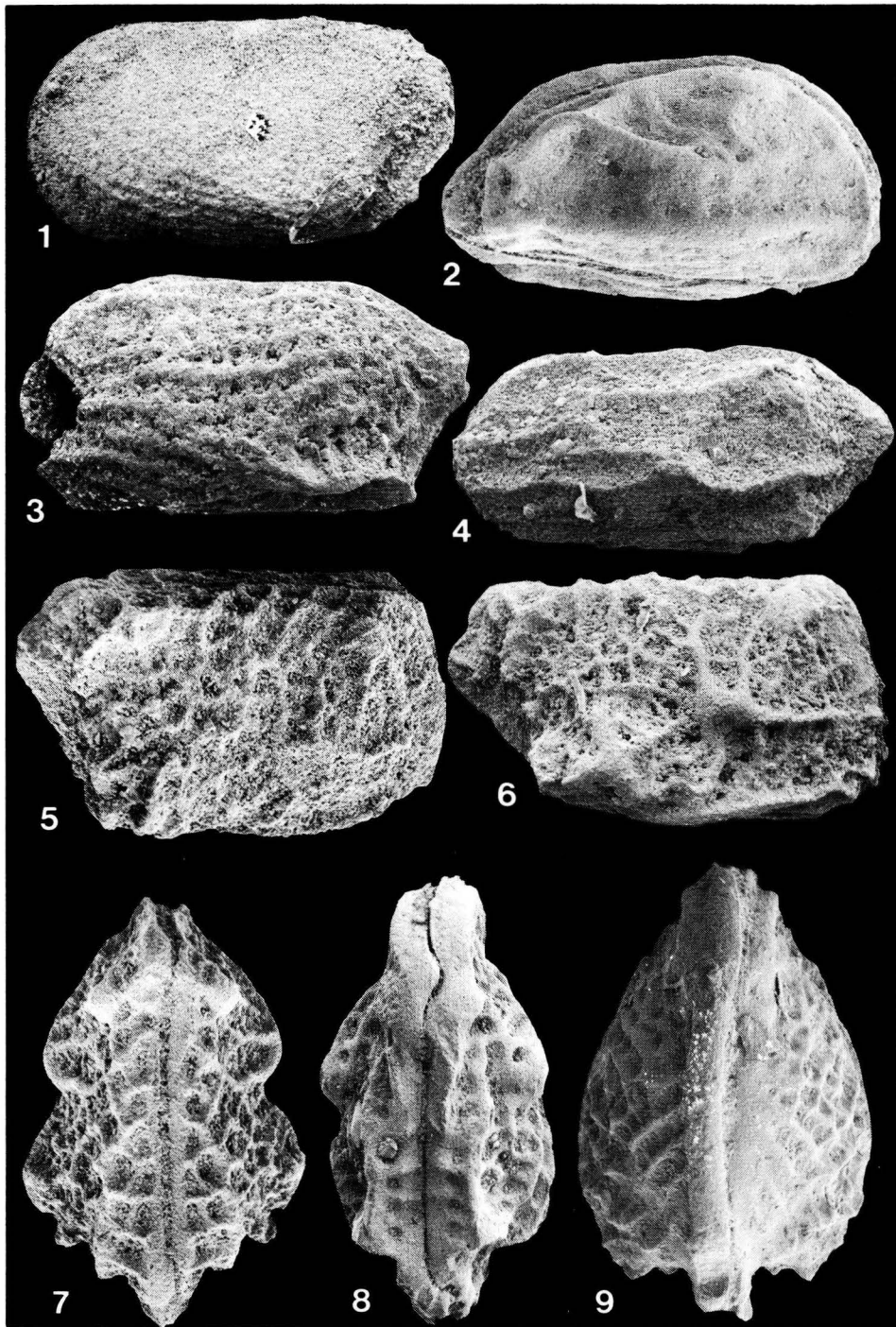


PLATE II

Fig. 10. *Curfsina minor* (VEEN, 1936).

Carapace, left side. Sample B:4. SEM X 105. SGU Type 1223.

Fig. 11. *Curfsina reginaeastrid* (VEEN, 1936).

Carapace, left side. Sample B:5. SEM X 90. SGU Type 1224.

Fig. 12. *Hemicytherura bisulcata* (VEEN, 1936).

Carapace, right side. Sample B:5. SEM X 170. SGU Type 1225.

Fig. 13. *Schizocythere chelodon* (MARSSON, 1880).

Carapace, left side. Sample B:5. SEM X 150. SGU Type 1226.

Fig. 14. *Neocythere ? reticulata* n. sp.

Carapace, left side. Holotype. Sample B:5. SEM X 70. SGU Type 1227.

Fig. 15. *Cythereis zygopleura zygopleura* POKORNY, 1965.

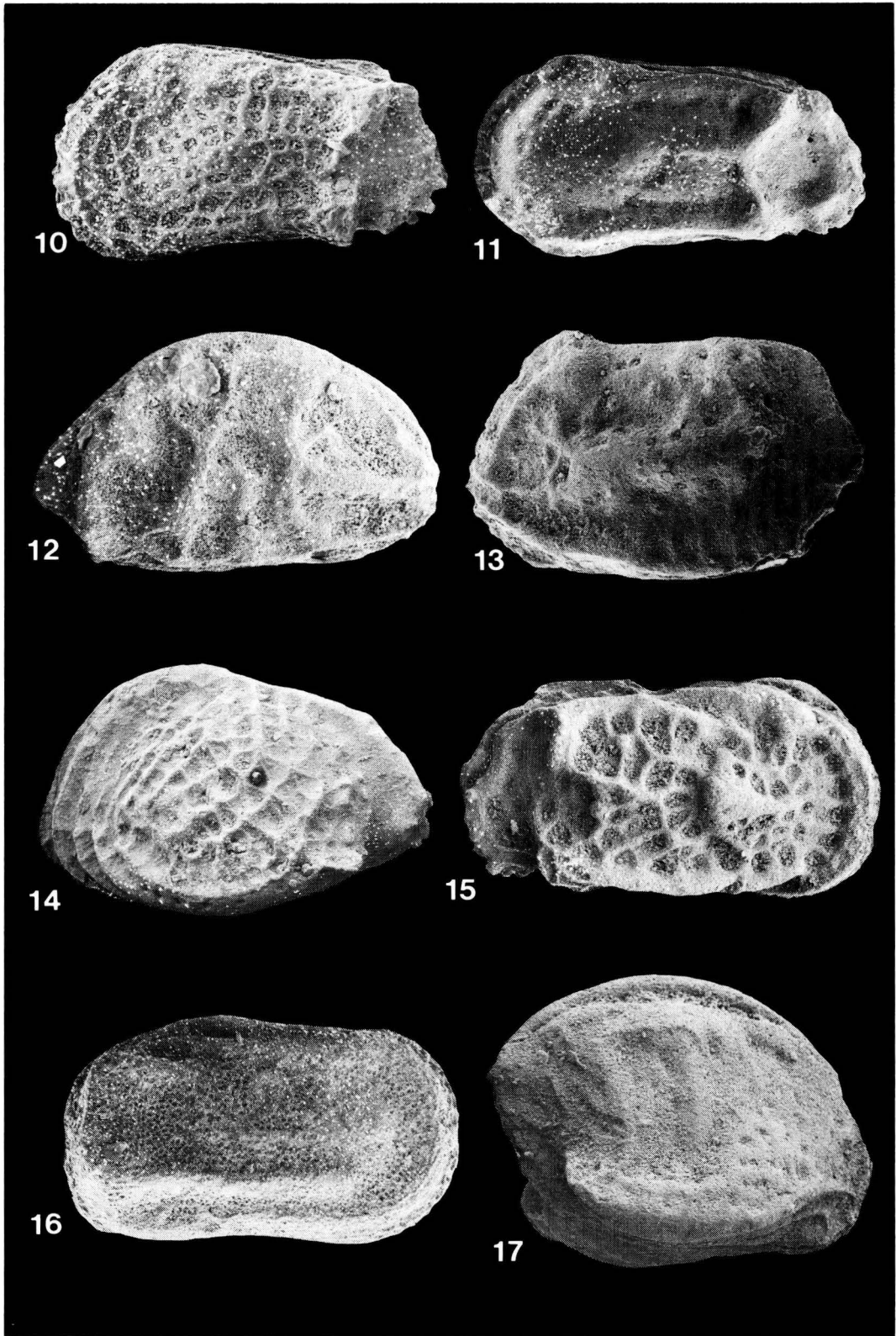
Carapace, right side. Sample B:5. SEM X 105. SGU Type 1228.

Fig. 16. *Cytherelloidea auricularis* (BOSQUET, 1847).

Carapace, right side. Sample B:1. SEM X 105. SGU Type 1229.

Fig. 17. *Cytheropteron v-scriptum* VEEN, 1936.

Carapace, right side. Sample B:1. SEM X 170. SGU Type 1230.



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