SVERIGES GEOLOGISKA UNDERSÖKNING

SER C NR 632 ÅRSBOK 62 NR 3

OLE BRUUN CHRISTENSEN

SOME DEPOSITS AND MICROFAUNAS FROM THE UPPER JURASSIC IN SCANIA

WITH NEW SPECIES OF OSTRACODS

STOCKHOLM 1968

Redaktör: Per H. Lundegårdh

C. DAVIDSONS BOKTRYCKERI AB, VÄXJÖ 1968

CONTENTS

ABSTRACT

Some Upper Jurassic deposits from Scania, known from borings and from the comprehensive exposure Fyleverken, are described on the basis of their ostracod faunas. The Fyledal Clay, from the Kimmeridgian and the Lower Portlandian, consists mainly of 140 metres of sticky clay. It is separated from the Vitabäck beds, of Lower Purbeckian age, by a thin sandy formation. The thickness of the Vitabäck beds and a possible transition to the Lower Cretaceous beds are unknown in the south-eastern Scania, but are known from Bornholm. The youngest of the Purbeckian ostracods from Scania belong to the Vitabäck Faunas of the Lower Purbeckian. In the western Scania the Lunda Sandstone of Campanian age rests nonconformably on the Fyledal Clay of Lower Portlandian age.

Ostracods of the Lower Purbeckian and the Portlandian age are described, and one new genus and two new species are established.

INTRODUCTION AND ACKNOWLEDGMENTS

An important exposure for studies of the Jurassic deposits of Scania is the sand pit of AB Fyleverken in the south-eastern part of Scania. The beds here exposed have been studied by fil. lic. Seth Steneström for many years, especially around the year 1950. In the pit of Fyleverken, Steneström has among other things studied the ostracods in the so-called Vitabäck Faunas of Purbeckian age. He did not, however, complete his work before his decease in 1961. His work has been briefly mentioned in connection with a discussion of a lecture (Gry 1956).

In a couple of borings in the central part of Scania, sent to the Drilling Archive by the Geological Institute of Lund, some ostracod faunas have been found. These faunas have been handed over to the author for study. They were found to be of Purbeckian age and to be closely related to the faunas of Steneström's collections from the pit of Fyleverken.

A few years ago it was deemed desirable to undertake a more careful study of the ostracod faunas from the Purbeckian beds in Scania, and for that purpose Steneström's ostracod material, including various notes, correspondance, and photos, were handed over to the author.

I wish to express my gratitute to Mrs. Steneström (Lund, Sweden) and to Professor, Dr. G. Regnéll (Paleontologiska Institutet, Lund, Sweden) for the great confidence shown me in entrusting me with the examination of Steneström's material. I also wish to thank fil. cand. S. Holmberg for the material from the boreholes, and for many interesting conversations at the Geological Institute of Lund and at the localities in the field. Among a great number of Polish geologists I especially wish to thank Dr. W. Bielecka for informative talks and for the opportunity to examine Upper Jurassic ostracod samples from borings in Poland. I am deeply indebted to Dr. F. Brotzen (Geological Survey of Sweden, Stockholm) for giving me an opportunity to examine ostracod material from Scania, and to Dr. F. W. Anderson (Geological Survey of Great Britain) and Dr. H. Malz (Forschungs-Institut Senckenberg, Frankfurt a. M) for interest shown and for helpful discussions in connection with some of the paleontological problems discussed in this paper. At the Geological Survey of Denmark, where most of the work has been done, the author especially wants to thank Mr. Chr. Westergaard for the photographic work, Mrs. K. Sperling for typing, and Mr. S. E. Henriksen, geophysicist, for correcting my English manuscript.

THE SAND PIT OF FYLEVERKEN

The sand pit of AB Fyleverken located on the north side of the valley of Fyledal about 1 000 metres to the north-east of the Eriksdal railway station in the south-eastern part of Scania, has recently been described by Oertli, Brotzen

& Bartenstein (1961), and by Tralau (1966). It exposes a number of formations in the interval from the middle part of the Lower Jurassic to the Upper Jurassic. The strata stand almost vertical or are even slightly inverted with an inclination of 70–80° to the NE. The strata become successively younger towards the SW. Locally the strata show glaciogene disturbances.

LITHOLOGY

The upper part of a rather more than 200 metres thick sequence chiefly of sand and clay with coal beds is exposed in the pit of Fyleverken. This series, designated the "Eriksdal deposits" (Tralau, 1966), contains fossil plants at several levels (the Eriksdal Flora). The uppermost formation (the "Glas sand") of the Eriksdal Series is about 100 metres thick and consists mainly of koalinized quartzsand. Plant remains from a layer at the base of the light-coloured "Glas sand" have been described by Tralau (1966), who remarks: "The flora is assumed as being consistent with an age between the Inferior Oolite, e. g. Bajocian, and the Oxfordian, being, perhaps, somewhat in favour of the Bajocian and Bathonian. There is striking resemblance between the present flora and that of Yorkshire".

Under the name of the "Green Clay Series" Steneström included all those deposits which in the pit of Fyleverken are stratigraphically above the light-coloured "Glas sand". These beds are Upper Jurassic or younger. The upper part of the sequence is not exposed; it may be of Lower Cretaceous age. The boundary against the Upper Cretaceous beds south of the Fyleverken pit has not been entirely determined, but it is probably a boundary of overthrust. Steneström has made up several sections of the south side of the pit and has surveyed these and placed them in relation to the sections in the pit. From various zones in these sections samples have been collected.

Fyledal Clay

The lowermost part of the "Green Clay Series" is a 140 metres thick formation, which almost exclusively consists of sticky, vari-coloured clay with a few thin beds of clay-ironstone and sand. The lower part of the clay is mostly light-green, while darker colours in brown and green dominate in the upper part of the formation. The small beds of sand are also more common in the

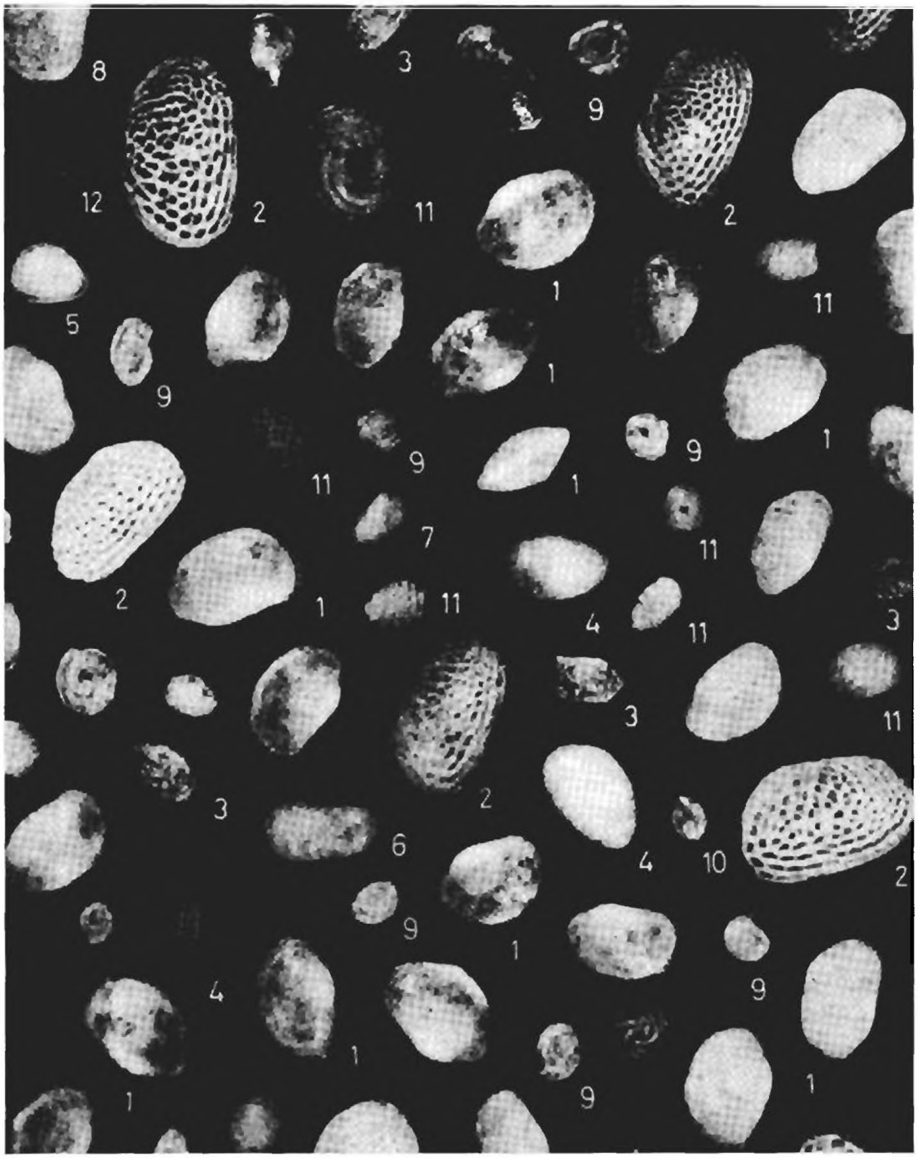

Fig. 1. Microfossils from the lower part of the Fyledal Clay in the pit of Fyleverken (cf. Oertli, Brotzen & Bartenstein, 1961), all 30 x: OSTRACODS: 1: *Klieana* sp., 2: *Macrodentina* sp., 3: *Rectocythere (n. subgen.) aff. R. pustulata* (KLINGLER), 4: *Schuleridea triebeli* (STEGHAUS), 5: *Schuleridea* ? sp. 754 BR. CHR., 1965 a, 6: *Rhinocypris jurassica* MARTIN, 7: *Timiriasevia* sp. 804 (BR. CHR., 1965 a), 8: *Fabanella prima* MARTIN. FORAMINIFERAS: 9: *Ammodiscus* sp. sp., 10: "*Eoguttulina*" sp. PLANT FOSSILS: 11: Charophytegyrogonites, 12: Megaspore. COLL: O. *Bruun Christensen*.

upper part of the formation, which is bounded upwards by a deposit of sand of at least 18 metres thickness. It is here proposed to call these beds of chiefly sticky clay the Fyledal Clay.

The deposit of sand immediately above the Fyledal Clay is not now exposed in the pit of Fyleverken; likewise the stratigraphically still younger deposits of the "Green Clay Series" are known mainly through the collecting and measuring which Stenström with great effort has made directly south of the pit. The thickness of the sand deposits is at least 18 metres, but the upper boundary is unknown, since there never seems to have been exposed a profile through the complete thickness of the deposit.

Vitabäck beds

At a distance of 50–72 metres above the upper boundary of the Fyledal Clay the so-called Vitabäck Faunas have been found in mainly greenish clayey sediments. These beds will here be called the Vitabäck beds. Perhaps the beds ought to be named the Rabekke Formation (Bruun Christensen 1963, 1966), which is known from Bornholm on account of the affinity of the bio- and lithostratigraphy of these two deposits and the relatively small distance to Bornholm (85 km to the SE of Fyleverken). The thickness i very uncertain and the sediments are somewhat varying. Above the Vitabäck beds, about 180 metres south-west of the upper boundary of the Fyledal Clay, there are some beds consisting of about 27 metres of sand, covered by clay. At a distance of about 255 metres from the Fyledal Clay there are found sediments from the Upper Cretaceous.

The following diagram shows which deposits from the Fyledal area, correlated with the aid of zones (localities) containing ostracods, may be classified as Upper Jurassic:

?	27 m.	*Sand* covered by clay.
	At least 70 m.	*Vitabäck beds* (Rabekke Formation?) with:
		Vitabäck loc 4: "Dark, blackgrey slaty clay".
		Vitabäck loc. 9: "Limonitic claystone".
Upper		Vitabäck loc. 11: "Arenaceous marlstone".
Jurassic	At least 18 m.	*Sand* (Rabekke Formation?).
	140 m.	*Fyledal Clay* with:
		Ostracod Zone II: "Chamositic sideritestone".
		Ostracod Zone I: "Light greenish, greasy clay".
?	100 m.	*"Glas sand"*.

BIOLOGY

Faunas of the Fyledal Clay

At the pit of Fyleverken there has been found no macrofossils in the Fyledal Clay, except in a zone about 30 cm thick, located of the author about 8 metres above the base of the Fyledal Clay, which contains numerous partly dissolved fragments of molluscs. This zone contains no calcareous microfossils; these have probably been dissolved. From a similar horizon, located of the author at about twice that distance, the following fauna of microfossils has been described by Oertli, Brotzen & Bartenstein (1961): *Ilyocypris jurassic spinosa* MARTIN, 1940, *Klieana* sp. 1, *Klieana* sp. 2, *Klieana* sp. 3, Indet. gen. sp. 1, *Macrodentina (Macrodentina)* sp., and *Ammodiscus* sp. A better material has more recently been found by the author (Fig. 1).

In the paper from 1961 referred to above, another fauna of microfossils from a similar sediment has been described from the boring Hilleshög, located to the north-east of Landskrona in west Scania. This fauna, which has *M. (Macrodentina)* sp. in common with the above mentioned fauna consists besides that of the following species (cf. Oertli, Brotzen & Bartenstein [1961]): *Schuleridea* sp., *Cytherideinarum* gen. sp. 2, *Eocytheropteron* sp., *Amphicythere (Amphicythere?)* sp., *Macrodentina (Polydentina?)* sp., and *Eoguttulina* sp.

Oertli, Brotzen & Bartenstein considered the sediments containing these faunas, from respectively the Fyleverken and the borehole of Hilleshög, to have been deposited during the same time interval, and they supposed that the Fyledal Clay was probably of Middle Purbeckian age (approximately "Serpulit" of the north-western Germany). This fauna from the pit of Fyleverken (the Fyledal Fauna) has been found in the lower part of the Fyledal Clay (Ostracod Zone I). In contrast the fauna in the boring by Hilleshög comes from the upper part of the formation, since at least 70 metres of fossil-free clay was found below the zone containing the Hilleshög Fauna.

The Hilleshög Fauna has been found again in one of the test borings made in connection with a project for a bridge between Helsingör and Hälsingborg in the northern part of the Sound (Larsen et al., 1965). It occurs here as elements of a number of closely spaced, different faunas (Bruun Christensen, 1965 a). Only about nine metres of true thickness were drilled through these beds, which probably are considerably thicker. The sediments mostly consist of a greenish or grey clay, greasy to silty, with some thin beds of coal. Also some thin, shell-bearing beds of limestone and sandstone in beds of about one metre thickness have been found. Nonconformable upon these sediments rests the Lunda Sandstone of Campanian age.

There are great resemblances between the ostracod faunas from the Upper Jurassic beds of the western Scania and corresponding faunas from the north-western Germany. The local ostracod faunas is in some cases nearly identical with faunas known from the Ober Kimmeridge and from the lower part of the *Gigas* Schichten in the Wiehen and the Weser Gebirge (Schmidt, 1955). The sequence of faunas of these two places shows great similarities also in several other particulars, such as mass occurrence of the pelecypod *Corbula,* occurrence of *Ostrea* and small gastropods in some horizons, and presence of arenaceous foraminiferas and "*Eoguttulina*"-species. These similarities probably indicate similar ecological conditions in the two areas.

All the identifiable species from the Hilleshög boring have been directly compared with the species from the boring in the Sound (Øresund No. 1 A, D. G. U. File No. 188.345), and all of the species of the Hilleshög Fauna are thought to be present in the Öresund Faunas (Bruun Christensen, 1964 a, b). These contain among other species also *Rhinocypris jurassica spinosa* (MARTIN, 1940), which in Scania is known only from the Fyledal Fauna and which, moreover, as a subspecies was formerly known only from the Purbeckian deposits. The different species in the Öresund Faunas indicate the age of the Fyledal Clay to be Middle and Upper Kimmeridgian to Lower Portlandian.

The following selection from the ostracod faunas of the Öresund boring may be given:

Macrodentina (Macrodentina) sp. OERTLI, BROTZEN & BARTENSTEIN, 1961; *Mandelstamia? inflata* (STEGHAUS, 1951) (punctate); *Fabanella?* sp.; *Progonocytheridea?* sp.; *Cytheropteron decoratum* SCHMIDT, 1954; *C.?* aff. *Cytheropteron purum* SCHMIDT 1954; *Cetacella?* sp.; *Galliaecytheridea* sp.; *Dicrorygma (Orthorygma) brotzeni* BR. CHR., 1965; *Exophthalmocythere? gigantea* SCHMIDT, 1954 (Lower Portlandian).

Fabanella prima MARTIN, 1961; *Macrodentina (Macrodentina)* sp. OERTLI, BROTZEN & BARTENSTEIN, 1961; *Mandelstamia? inflata* (STEGHAUS, 1951) (punctate); *Cytheropteron decoratum* SCHMIDT, 1954; *C.?* aff. *Cytheropteron purum* SCHMIDT, 1954; *Dicrorygma (Orthorygma) brotzeni* BR. CHR., 1965; *Schuleridea?* sp.; *Schuleridea triebeli* (STEGHAUS, 1951); *Metacytheropteron elegans* OERTLI, 1957; *Galliaecytheridea* sp.

Klieana sp. OERTLI, BROTZEN & BARTENSTEIN, 1961; *Fabanella prima* MARTIN, 1961; *Dicrorygma (Orthorygma) brotzeni* BR. CHR., 1965; *Rhinocypris jurassica spinosa* (MARTIN, 1940); *Macrodentina (Macrodentina)* sp. OERTLI, BROTZEN & BARTENSTEIN 1961; *Schuleridea?* sp.

Amphicythere semisulcata TRIEBEL, 1954; *Schuleridea triebeli* (STEGHAUS, 1951); *Macrodentina (Polydentina)* sp. sp.; *Galliaecytheridea wolburgi* (STEGHAUS, 1951); *Macrodentina (Polydentina) rudis* MALZ, 1958 (Middle Kimmeridgian).

The author has collected and examined a large number of samples from throughout the Fyledal Clay at the pit of Fyleverken without finding any other ostracods than those in the fauna described by Oertli, Brotzen & Bartenstein (1961). In several samples there are found arenaceous foraminiferas, and in others there occur a large number of charophyte-gyronites, which shows a highly varying salinity during the time of deposition. However, Steneström had discovered some valves of *Klieana* in a sample from the uppermost part of the formation, which is now no longer exposed. After washing the sample the author found the following fauna poor in species (Ostracod Zone II):

Klieana calyptroides (ANDERSON, 1941)
Rhinocypris rasilis nov. sp.
Macrocypris? sp.,

and a few fragments of an indet. ostracod, a few arenaceous foraminifera, some polymorphide foraminifera such as "*Eoguttulina*" sp. sp., and some fish remains.

Faunas of the Vitabäck beds

In a brief notice, R. Hägg (1940) has discussed a discovery of some mollusc faunas at Vitabäck immediately south of Fyleverken. He states that the faunas must be of "Purbeck" or "Wealden" age. Hägg was also able to show that these Vitabäck Faunas include some genera of molluscs which indicate freshwater as well as saltwater environments. Steneström has, together with the molluscs, collected ostracods from three zones (localities) in the Vitabäck beds. The samples from these localities (p. 8) often contain a large number of ostracods, which Steneström has directly prepared out of the sediments and examined. Before washing the samples on a sieve with a mesh of 0.1 millimetre, the author has used a number of different methods for breaking down the samples.

Samples of the shaly clay from Vitabäck loc. 4 could easily be broken down when the sediment, after having been drenched by petrol, was treated by boiling water. It was found, however, that the composition of the fauna could be estimated quite differently according to whether the valuation was based on the sample before or after the washing. *Mantelliana purbeckensis* (FORBES, 1855) is very common in the untreated sample (fig. 3), while the washed sample, even after cautious washing, contained no valves of this species. This must be due to the fact that the valves of *M. purbeckensis* are so thin or filled with cracks that they break up and disappear through the sieve by the washing.

The following ostracods have been found in Vitabäck loc. 4, which moreover is the uppermost strata that contains determinable macrofossils in the pit of Fyleverken.

Mantelliana purbeckensis (FORBES, 1855)
Fabanella boloniensis (JONES, 1882)
Fabanella ornata (STEGHAUS, 1953)
Scabriculocypris trapezoides ANDERSON, 1941
Cypridea sp., ex. gr. *setina* ANDERSON

Samples of claystone from Vitabäck loc. 9 have been boiled in Na_2CO_3-solution and exposed for crystallizing in water and in Na_3PO_4 etc. for breaking down the sample, but practically without effects. The following species have been observed only by direct examination of the untreated samples:

Macrodentina retirugata (JONES, 1885)
Klieana calyptroides (ANDERSON, 1941)

Samples of the arenaceous marlstone of Vitabäck loc. 11 are the oldest samples that have the Vitabäck Faunas. The samples may be broken down only with great difficulty, and the following ostracod fauna has been found in the samples labeled from this zone:

Procytheropteron cf. *P. brodiei* (JONES, 1894)
Macrodentina retirugata (JONES, 1885)
Indet. gen. sp. 861
Klieana calyptroides (ANDERSON, 1941)
Fabanella mediopunctata MARTIN, 1961
Paracypris sp. 918
Dicrorygma (Orthorygma) groenwalli BRUUN CHRISTENSEN, 1963
Eucypris ? sp. 146 (BRUUN CHRISTENSEN, 1963)
Damonella sp. 1142
Metacytheropteron sp. 132 b BRUUN CHRISTENSEN, 1963
Cytheridella ? sp. 1174
Orthonotacythere rimosa MARTIN, 1940
Palaeocytheridella sp. 822 a et 822 b
Scabriculocypris trapezoides ANDERSON, 1941
? Cypridea valendis praecursor OERTLI, 1963
Galliaecytheridea wolburgi (STEGHAUS, 1951) s. l.,
and also a few foraminifera (*"Eoguttulina"* sp. sp.)

All the faunas from Vitabäck loc. 4 to 11 indicate an age of Lower Purbeckian and Upper Portlandian. Since the samples are small and since some of them are questionably labeled, a useful quantitative analysis of the faunas cannot be made.

BORINGS IN THE VITABÄCK BEDS

Deposits of Upper Jurassic age are known from a number of borings in Scania. In the above, there have been mentioned some borings in the Fyledal Clay; here will be mentioned two borings with ostracods of Purbeckian age.

The boreholes are situated in the central part of Scania, in the broad syncline of sediments in the Ystad-Vomb area, which on the south-west side is bounded by the horst of Pre-Cambrian rocks, Romeleåsen. The youngest Pre-Quaternary deposits in the syncline are of Upper Cretaceous age and are found in the north-eastern central part of the syncline, the axis of the syncline plunges slightly to the south-east. As observed in the Fyledal, situated along the northeastern limit of the syncline, the sediments there are almost in vertical position.

The two boreholes are

G. I. No. 2030, at Everlövs Skola, Blentarp, and

G. I. No. 615, at Silvåkragården.

They are located respectively 15 and 25 kilometres north-west of Fyledalen. The material from the borings has been sent to the Archive of Drilling by the Geological Institute of Lund.

The beds that contain Purbeckian ostracods have been found immediately below the Quaternary. According to earlier geological maps, Upper Cretaceous beds are to be expected just below the Quaternary deposits at the localities in question.

Borehole G. I. No. 2030, at Everlövs Skola, Blentarp

In this borehole the Quaternary is at least 36 metres thick. Below the Quaternary beds there is a dark grey, silty clay with some beds of sand and silt. In the bore-hole interval 68.1–74.0 m. the author has found faunas of Lower Purbeckian age. This section consists mostly of green and grey-green greasy clay, which has varying quantities of silt and which is rich in fragments of pelecypods and gastropods.

The following ostracods have been found in samples from the bore-hole interval 68.1–68.5 metres:

Macrodentina retirugata (JONES, 1885)
Klieana alata MARTIN, 1940
? *Fabanella ornata* (STEGHAUS, 1953)

A sample marked 69.0–74.0 metres contains at least two faunas from two different sediments. From this sample, consisting of greasy, olive green clay together with clayish silt, some small clean pieces of the greasy, olive green clay were separated. The contents of microfossils from this part of the sample was dominated by *Klieana alata* MARTIN and charophyte-gyrogonites. The clay did not seem to contain marks of *Macrodentina retirugata* (JONES) or other species which indicate higher-haline environments and which are rather common in the entire sample. Small separat samples from 69.0 m., 70.2 m., and 72.0 m. contain:

Macrodentina retirugata (JONES, 1885)
Orthonotacythere rimosa MARTIN, 1940
Klieana alata MARTIN, 1940
Cypridea sp.

but no charophyte-gyrogonites.

For these reasons the author supposes that a zone with greasy, olive green clay (from the interval of 72.0–74.0 m.) has been deposited in a fresh water or brackish environment. Above the greasy clay (in the interval of 69.0–72.0 m.) there occurs silty clay or silt with shells deposited mainly in a brackish-marine environment.

The entire fauna from the sample marked 69–74 metres is composed of:

Klieana alata MARTIN, 1940
Cypridea valdensis praecursor OERTLI, 1963
Macrodentina retirugata (JONES, 1885)
Scabriculocypris trapezoides ANDERSON, 1941
Damonella pygmaea (ANDERSON, 1941)
Klieana calyptroides (ANDERSON, 1941)
Cypridea sp., ex gr. *setina* ANDERSON
Cypridea sp. sp.
Stenestroemia vitabaeckensis nov. gen. et sp.
Procytheropteron cf. *P. brodiei* (JONES, 1894)
Indet gen. sp. 206
Timiriasevia sp. sp. 826
Stenestroemia decipiens (ANDERSON, 1941)
Palaeocytheridella sp. 822
Damonella ? sp.
Orthonotacythere rimosa MARTIN, 1940
Rhinocypris jurassica jurassica (MARTIN, 1940)
? *Mantelliana purbeckensis* (FORBES, 1855)
? *Fabanella boloniensis* (JONES, 1882)
? *Galliaecytheridea wolburgi* (STEGHAUS, 1951), s. l.,

and fish remains such as otholiths, teeth and scales, a few arenaceous foraminifera, and many charophyte-gyrogonites.

Borehole G. I. No. 615, at Silvåkragården

The Quaternary deposits in this borehole are at least 44 metres thick. From the depth of 44 metre to the bottom of the hole, there has been found a dark grey, silty clay. In the bore-hole interval 69.0–75.0 m. there was found some shells, and a fauna of the following microfossils has been worked out of the sample:

Macrodentina retirugata (JONES, 1885)
Mantelliana purbeckensis (FORBES, 1855)
Klieana calyptroides (ANDERSON, 1941)
Palaeocytheridella sp. 822,

and fish remains.

STRATIGRAPHICAL RELATIONS

The faunas of the Fyledal Clay in the western Scania suggest that the upper part of the formation here represents the stratigraphical interval Middle Kimmeridgian to Lower Portlandian (Bruun Christensen, 1965 a). The rather thick fossil-free interval of drilling below the Kimmeridgian faunas in the formation at Hilleshög (Oertli, Brotzen & Bartenstein, 1961) may be of Middle and Lower Kimmeridgian, and perhaps of Oxfordian age. The Fyledal Fauna (Fig. 1) from the lower part of the formation at the pit of Fyleverken is of Kimmeridgian age. Various hypotheses of correlation of the different profiles may be adduced, but further analysis is to be made in order to verify these. However, there is no doubt that the largest part of the Fyledal Clay is of Kimmeridgian age, and that the uppermost part of it may be of Lower Portlandian age (Fig. 2).

The oldest of those ostracods that are described in this paper originate from the uppermost part of the Fyledal Clay in the pit of Fyleverken (Ostracod Zone II). From these beds the species *Klieana calyptroides* (ANDERSON, 1941) has only slight stratigraphical value. In England this species occurs in the Portlandian Beds. The uppermost part of the formation in the western Scania is of Lower Portlandian age, as shown by its ostracod faunas, and since the conformity here may represent an erosion surface, it is not probable that the uppermost Fyledal Clay in Fyledalen is older – if the sedimentation of the beds in both places have been roughly synchronal. The presence of *Klieana calyptroides*, which in Scania also occurs in the Vitabäck beds of Lower Purbeckian age about 50 metres stratigraphically above the Fyledal Clay, makes it probable that the Ostracod Zone II is of Lower Portlandian age, although developed in an oligohaline environment.

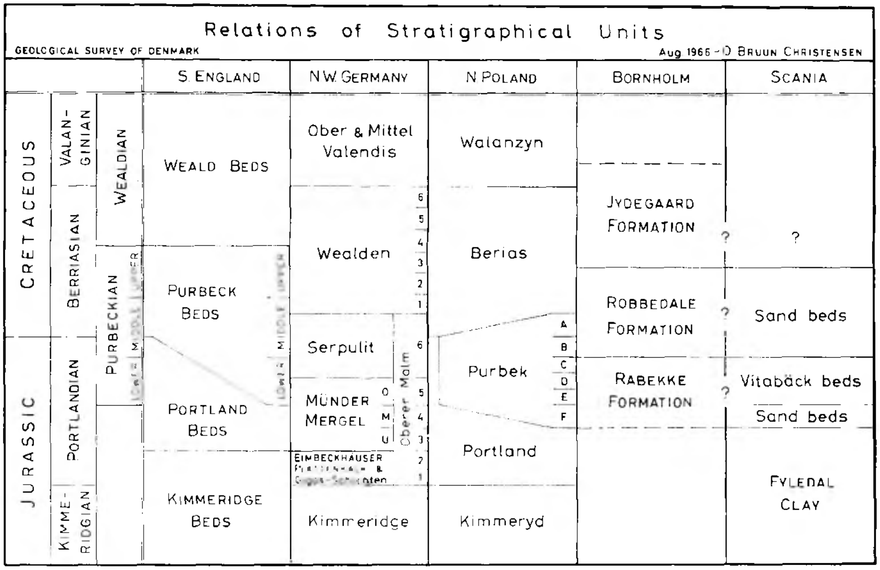

Fig. 2. Relations of stratigraphical terms (expanded after Bruun Christensen [1964]). The stratigraphy of Northern Poland after Bielecka & Sztejn [1966].

In England the term Purbeck has been used as a facies name. The facies in the Aylesbury district demonstrate changes from the marine Portland through the more or less freshwater beds of the Lower Purbeck to the marine sands of the Middle Purbeck (cf. Barker, 1966 a, b). In other places in South England the boundary of the Portland Beds against the Lower Purbeck Beds has been found to vary so much that the Lower Purbeck Beds are taken to be a facies of the uppermost Portlandian. The boundary Jurassic-Cretaceous is now considered to be located near the Cinder Bed of Middle Purbeckian age (cf. Martin & Weiler, 1963).

In the Polish-Scanian Basin the terms of Portlandian and Berriasian are used for truly marine Uppermost Jurassic and Lowermost Cretaceous, while the term Purbeckian is to be used for more or less freshwater deposits which can be biostratigraphically correlated with the English Purbeck Beds. For the present, the Lower Portlandian is to be followed stratigraphically by the Lower Purbeckian or the Upper Portlandian in respectively mixohaline-limnic and marine environments (Fig. 2).

The sand beds above the Fyledal Clay and below the Vitabäck beds may be dated either Lower Portlandian or lower part of Lower Purbeckian.

The three faunas from the Vitabäck beds at the pit of Fyleverken and the faunas from the borings in central Scania are all of Lower Purbeckian age. The following ostracods from these faunas have outside Scania been found exclusively in Lower Purbeckian deposits:

Cypridea valdensis praecursor Oertli, 1963
Fabanella mediopunctata Martin, 1961
Stenestroemia vitabaeckensis nov. gen. et sp.

Stenestroemia decipiens (ANDERSON, 1941)
Eucypris? sp. 146
Damonella sp. 1142

The following ostracods from the Vitabäck beds are common in the Lower Purbeckian, but have in some places outside Scania been found also in beds closely below or above the Lower Purbeckian. Thus, the following four species occur in the Portlandian as well as in the Lower Purbeckian:

Macrodentina retirugata (JONES, 1885)
Procytheropteron brodiei (JONES, 1894)
Orthonotacythere rimosa MARTIN, 1940
Fabanella ornata (STEGHAUS, 1953)

The following two species:

Scabriculocypris trapezoides ANDERSON, 1941
Mantelliana purbeckensis (FORBES, 1855)

have, besides from the Lower Purbeckian, been reported from beds younger than this, namely Wealden 2 in NW. Germany and the lower part of the Middle Purbeckian in England.

The lower fauna from the Vitabäck beds (Vitabäck loc. 11) contains species which indicate a more saline environment (polyhaline?) than the uppermost beds with ostracods (i. e. Vitabäck loc. 4) (mesohaline). The faunas from the boring G. I. No. 2030 represent different environments (p. 13). Here the uppermost faunas seem to indicate stronger salinity than the lowermost faunas. In the boring G. I. No. 615 the ostracod fauna indicates a mesohaline environment.

In Bornholm the Rabekke Formation is of Lower Purbeckian age and can be correlated with the Vitabäck beds. From the Rabekke Formation of Salene in the north-eastern part of Bornholm there is reported a polyhaline fauna (Bruun Christensen, 1963) with *Fabanella boloniensis* (JONES) and species of *Galliaecytheridea, Orthonotacythere, Scabriculocypris, Klieana, Palaeocytheridella,* and *Eucypris?* sp. 146. At another place in the northern Bornholm this fauna has been found together with a valve of *Dicrorygma (Orthorygma) groenwalli* BR. CHR. At Salene, there have also been found some oligohaline and perhaps mesohaline faunas (Bruun Christensen, 1966), with essential ostracods such as *Klieana alata* MARTIN, *Cypridea inversa* MARTIN, and accessory ostracods such as *Fabanella ansata* (JONES), *F. boloniensis* (JONES), *Scabriculocypris trapezoides* ANDERSON, *Damonella pygmaea* (ANDERSON), *Darwinula leguminella* (FORBES), *Stenestroemia decipiens* (ANDERSON), and *S. vitabaeckensis* nov. gen. et sp.

The Rabekke Formation in Bornholm rests on Lower or Middle Jurassic Beds or on the Pre-Cambrian, and it consists of two members. The lowermost one is a gravelly sand and sandstone, with a maximum thickness of 30 metres. The upper member consists mainly of sticky clay with a Lower Purbeckian fauna. Upon the Rabekke Formation rests the Robbedale Formation, which is a sequence of sand and gravel with a maximum thickness of 40 metres; it is bounded at the top by the Jydegaard Formation. The Jydegaard Formation may attain a thickness of 100

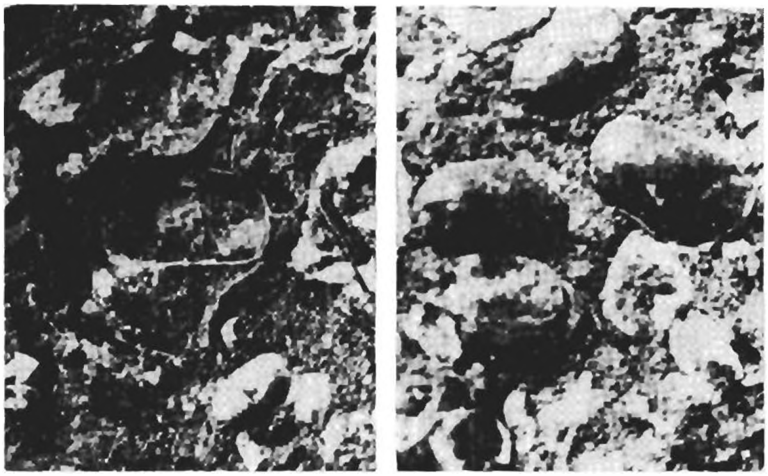

Fig. 3. *Mantellina purbeckensis* (FORBES). Impressions in shaly clay from Vitabäck loc. 4, 40 x. Fyledalen, Scania. PHOTO: *Seth Stenestrôm.*

metres and consists chiefly of grey clay with beds of sand and clay-ironstone. From the lower part of this formation there have been described ostracod faunas of Upper Purbeckian age (Bruun Christensen, 1963). The boundary between the Jurassic and the Cretaceous in Bornholm can be localized in the Robbedale Formation, particularly on basis of the above-mentioned biostratigraphical data, but also on basis of a stratigraphical comparison with northern Poland.

The relatively thick beds of sand and clay above the Vitabäck beds at the pit of Fyleverken may be younger than the Lower Purbeckian and may be correlated with the upper formations from Purbeckian in Bornholm; so far, however, stratigraphical data adequate to verify this have not been produced, neither at Vitabäck nor in the boreholes of central Scania.

Paleontological part

Fam. *CYPRIDIDAE* BAIRD, 1845
Subfam. *Cypridinae* BAIRD, 1845
Gen. *Eucypris* VAVRA, 1891
Eucypris ? sp. 146

Figs. 4 a–c.

? 1940 Ostracode (581) WICHER – Pl. 3, fig. 17.
? 1940 *Eucypris* ? sp. MARTIN – p. 356, Pl. 8, figs. 117–118.
1963 *Eucypris* sp. (146) BRUUN CHRISTENSEN – p. 26, Pl. 5, fig. 5.

MATERIAL. – 16 carapaces from Vitabäck loc. 11.

REMARKS and DISTRIBUTION. – This species is known from the Rabekke Formation at Salene, Bornholm. It is very probably, on the basis of illustrations, synonymous with the above-mentioned species from the Serpulit and the Mündel Mergel in the north-western Germany. The material, however, is still so badly preserved that a closer analysis is not possible. The carapaces are filled with dense calcite.

The specimens resemble the more or less reticulate species of *Petrabrasia* KRÖMMELBEIN, 1965, but as long as the interior of the carapaces of this genus is not known using the name *Eucypris* ? may be continued.

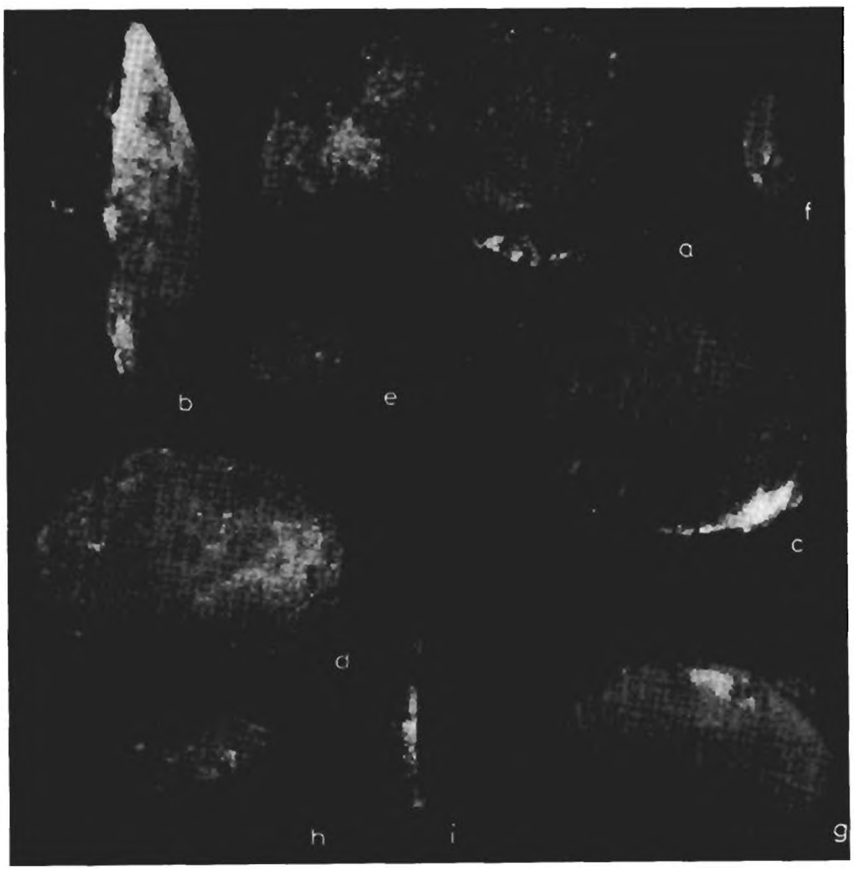

Fig. 4.

a–c. *Eucypris* ? sp. 146. a: Carapace in right aspect, 50 X. b–c: Carapace in dorsal and in right aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
d. *Mantelliana purbeckensis* (FORBES). Left valve, 50 X. Boring G. I. 615, 69–75 m. Scania.
e–f. *Damonella* sp. 1142. Carapace in right and in dorsal aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
g. *Damonella pygmaea* (ANDERSON). Right valve, 75 X. Boring G. I. 2030, 69–74 m., Scania.
h–i. *Paracypris* sp. 918. Carapace in right and in dorsal aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.

Gen. *Mantelliana* ANDERSON, 1966
Mantelliana purbeckensis (FORBES, 1855)
Figs. 3, and 4 d.

1855 *Cypris purbeckensis* FORBES in Lyell – p. 297, text-fig. 339 a.
1865 *Cypris purbeckensis* FORBES. – Loriol & Jaccard, Pl. 2, figs. 1–3.
1885 *Cypris purbeckensis* FORBES. – Jones, p. 347, Pl. 9, figs. 1–6.
1886 *Cypris purbeckensis* FORBES. – Jones, p. 147, Pl. 4, figs. 5 a–c.
1963 "*Cypris*" *purbeckensis* (FORBES). – Oertli, p. 18, Pl. 5, figs. 28–32.
1966 *Mantelliana purbeckensis* (FORBES). – Anderson, p. 438, text-figs. 2, 4–7, 11.
1966 b *Mantelliana purbeckensis* (FORBES). – Barker, p. 469, Pl. 7, fig. 5.
1966 "*Cypris*" *purbeckensis* (FORBES). – Bielecka & Sztejn, fig. 3 (tab).

MATERIAL. – 14 valves and steinkerns from boring G. I. 615, 69–75 m. and probably a few defective valves from boring G. I. 2030, 69–74 m. A great number was observed covering the bedding-planes of the shale from Vitabäck loc. 4 (figs. 3), but they have been destroyed by washing and have disappeared through the sieve.

DISTRIBUTION. – In England the species is known from the Purbeck Beds above the Portland Stone, and it is not known from strata higher than the lower part of the Middle Purbeck.

In Germany the species occurs in the Oberer Münder Mergel and in the Unterer Serpulit, and in the northern France it occurs in strata of Lower Purbeckian age. In the northern Poland the species occurs in the Purbeck Beds F–C.

Subfam. *Cyprideinae* MARTIN, 1940
Gen. *Cypridea* BOSQUET, 1852
Cypridea valdensis praecursor OERTLI, 1963
Figs. 5 a–e.

1940 *Cypridea* (603) WICHER. – p. 264, Pl. 2, fig. 6.
1940 *Cypridea valdensis* (FITTON, 1836). – Martin, p. 228, Pl. 1, figs. 1–4.
1959 *Cypridea* sp. aff. *valdensis* (SOWERBY in Fitton) et *C.* "*valdensis*" sensu MARTIN 1940. – Wolburg, p. 267, text-figs. 6 a and 14 a.
1963 *Cypridea valdensis praecursor* OERTLI. – p. 16, Pl. 3, figs. 13–19, Pl. 4, fig. 20.
1966 *Cypridea valdensis praecursor* OERTLI. – Bielecka & Sztejn, p. 101, fig. 3 (tab.).

MATERIAL. – Borehole G. I. No. 2030, 69–74 m.: One defective carapace, two left valves, and fragments of at least 45 valves. ? Vitabäck loc. 11: One defective carapace.

REMARKS. – Synonymity postulated by Barker (1966, p. 471) between *Cypridea tumescens* ANDERSON and *C. valdensis praecursor* OERTLI is doubtful. Among other things, a *C. tumescens* Anderson det. in my possession shows very little similarity to *C. valdensis praecursor* OERTLI.

The diminutive tubercles situated between the sulcus and the anterior margin and at the posterior part of the valves have not been described by Martin, 1940 or Oertli, 1963, but may be observed in the illustrations of Martin (Plate 1 figs. 3–4). In the present material the rostrum usually is weakly developed, but in material produced by an especially careful washing a thin and rather wide selvage may be preserved on the rostrum, which makes the rostrum look relatively strongly built (fig. 5 a). In the same material, it may be observed that the posteroventral angle on the left valve has been tapering and very thin (fig. 5 e).

DISTRIBUTION. – In NW. Germany the species occurs in the "Serpulit". In the Basin of Paris it has been found in the upper part of Lower Purbeckian. In the northern Poland it occurs in the Purbeck C–E.

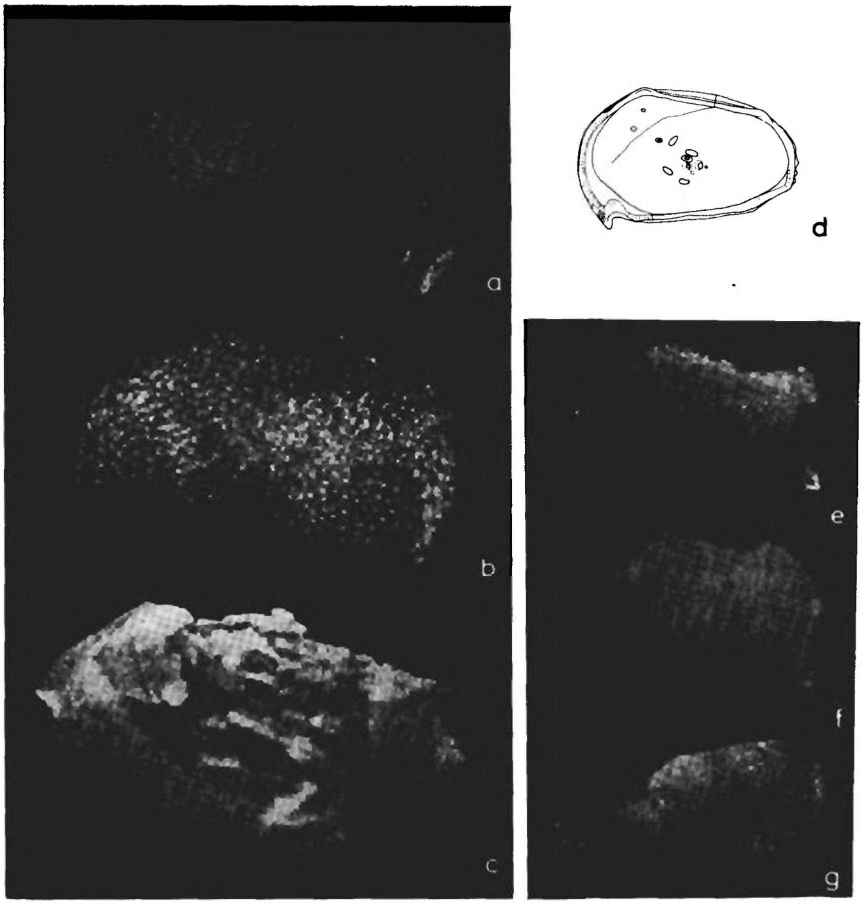

Fig. 5.

a–b. *Cypridea valdensis praecursor* Oertli. a–b: Right valves, 50 X. c: Defective carapace in left aspect, 50 X. d: Drawing of interior of right valve, 25 X. e: Posteroventral part of defective right valve, 50 X.
f–g. *Cypridea* sp. sp. Posteroventral parts of defective valves, 50 X.
Boring G. I. 2030, 69–74 m., Scania.

Cypridea sp., ex gr. *setina* ANDERSON

Fig. 6.

1966 *Cypridea* ex gr. *setina* ANDERSON. – Bielecka and Sztejn, p. 101, fig. 3 (tab.).

REMARKS. – Fragments of more or less smooth and thin valves of a large *Cypridea* with diminutive rostra etc. are here classified under the above-mentioned designation. A fragment with well-preserved musclescars (fig. 6) may verify the species.

DISTRIBUTION. – Apart from the northern Poland, where specimens named *C.* ex gr. *setina* occur in the Purbeckian Beds, fragments have been found in the Rabekke Formation of Bornholm in the boring No. 244.247, 39.55–39.76 m. (Bruun Christensen, 1963), in the Scanian borehole G. I. No. 2030, 69–74 m., and at Vitabäck loc. 4.

Cypridea sp. sp.

Figs. 5 f–g.

REMARKS. – Based on the morphology of the posteroventral part of fragments of left valves, it can be shown that the material from borehole G. I. No. 2030, 69–73 m. contains, besides *C. valdensis praecursor* and *C.* sp., ex gr. *setina*, fragments of at least two other species of *Cypridea*. These differ from *C. valdensis praecursor* in having smoothly pointed posteroventral valves in the dorsal aspect. The species illustrated in fig. 5 g, for instance, has a smooth lateral surface unlike the species in fig. 5 f.

Gen. *Damonella* ANDERSON, 1966
Damonella pygmaea (ANDERSON, 1941)

Fig. 4 g.

1941 *Cypris pygmaea* ANDERSON. – sp. 379, Pl. 19, fig. 17.
1951 *Cytherella pygmaea* (ANDERSON). – Anderson, p. 211.
1963 "*Cypris*" *pygmaea* (ANDERSON). – Oertli, p. 19, Pl. 5, figs. 34, 35.
1966 *Damonella pygmaea* (ANDERSON). – Anderson, p. 441, text-figs. 22, 30.
? 1966 *Damonella denticulata* ANDERSON. – Anderson, p. 442, text-figs. 19, 23.

MATERIAL. – 17 more or less defective valves from borehole G. I. 2030, 69–74 metres.

REMARKS. – Some of the valves have minute denticulations along the anterior and posterior part of the ventral margins. These are therefore closely related to *D. denticulata* ANDERSON from the upper part of the Weald Clay of

Sussex, England. Most of the valves do not have marginal denticulations. The present material is, however, so small and defective that the above-mentioned valves cannot clearly be separated.

DISTRIBUTION. – *Damonella pygmaea* (ANDERSON) *sensu stricto* is often very abundant in the Purbeck and the Wealden of England. The species is present in the Purbeckian sediments in the Basin of Paris and from Switzerland. In the Rabekke Formation at Salene, Bornholm, it has recently been found together with Lower Purbeckian ostracods (Bruun Christensen, 1966).

Fig. 6. *Cypridea* sp., ex gr. *setina* ANDERSON. Muscles scars in a left valve of *Cypridea* sp. ?, 150 X. Boring G. I. 2030, 69–74 m., Scania.

Damonella sp. 1142

Figs. 4 e–f.

MATERIAL. – Eleven carapaces and three valves from Vitabäck loc. 11.

AFFINITIES and REMARKS. – Small and smooth carapaces somewhat like *D. pygmaea* (ANDERSON, 1941) or *D. denticulata* (ANDERSON, 1966), but relatively higher and wider. The ventral margin concave, mostly near the posterior end, which is ventrally situated. The species has been observed in the Purbeckian Beds of Poland, at the base of the Purbeck C (personal communication from Dr. W. Bielecka).

Damonella ? sp.

MATERIAL and REMARKS. – Two defective and very thin valves from boring G. I. 2030, 69–74 m., somewhat like the species of *Damonella*, but lengthy and with nearly parallel dorsal- and ventral margins must be mentioned, in order to make the list of ostracods from the Vitabäck beds.

Subfam. *Macrocypridinae* G. W. MÜLLER, 1912
Gen. *Macrocypris* BRADY, 1867
Macrocypris ? sp.

MATERIAL and REMARKS. – One badly preserved carapace has been found in samples from Fyleverken loc. II. In outline it shows a resemblance to *M. horatiana* JONES & SHERBORN, but it is smaller than half the size of *M. horatiana*.

Subfam. *Paracypridinae* G. O. SARS, 1923
Gen. *Paracypris* G. O. SARS, 1866
Paracypris sp. 918
Figs. 4 h–i.

? 1966 b *Paracypris* ? sp. BARKER. – p. 471, Pl. 9, figs. 9, 10.

MATERIAL. – 24 carapaces from Vitabäck loc. 11.

REMARKS. – The carapaces are filled with dense calcite, but the presence of a broad marginal zone can be observed in transparent light. The left valve is larger than the right one, and the muscle-scar spots are developed as observed in *Paracypris*.

AFFINITIES. – This species seems to be related to *Paracypris*? sp. A. SCHMIDT, 1955 from the interval of Kimmeridge to Mittleren Münder Mergel, and to *Candona* ? sp. MARTIN, 1940 from the Serpulit, but it differs from this species of the north-western Germany in having two distinct dorsal angles between which the dorsal margin is almost straight.

The position of the muscle scars is behind the point of greatest height, whereas the muscle scars seem to have been observed at the point of greatest height in some specimens of *Paracypris?* sp. BARKER from the Lower Purbeck or Portland Beds in England (Barker, 1966 b).

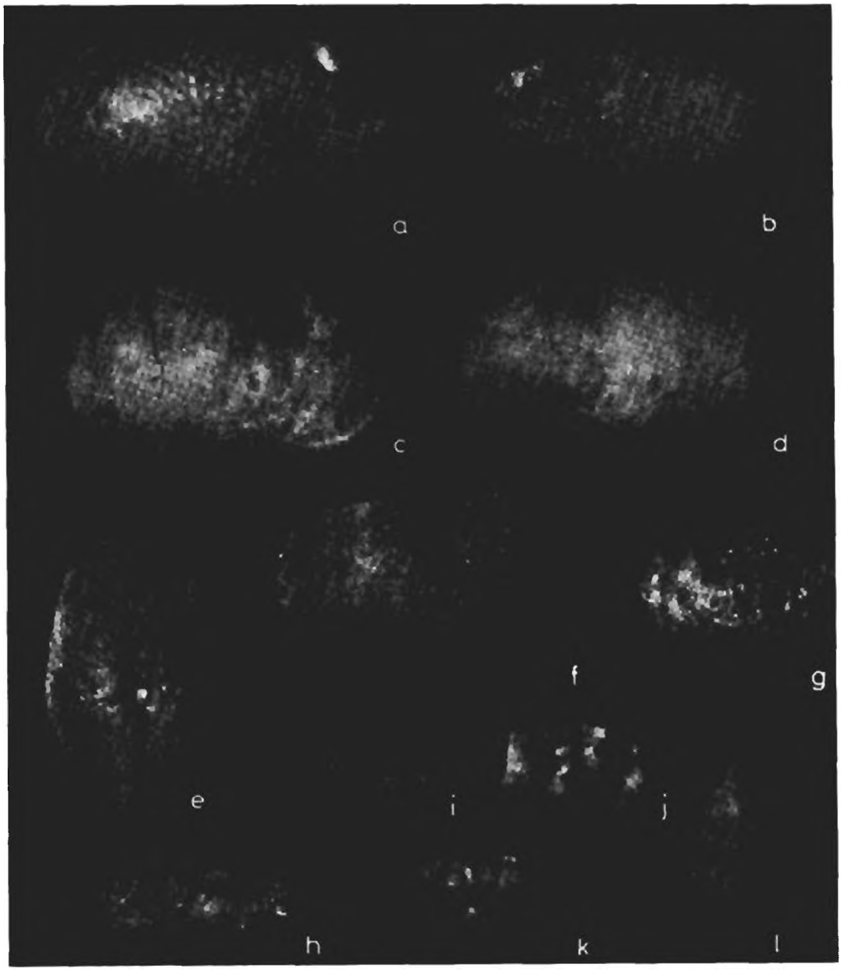

Fig. 7.

a–b. *Fabanella ornata* (STEGHAUS). Right and left valves of respectively male and female, 50 X.
c–d. *Fabanella boloniensis* (JONES). Right and left valves of females, 50 X. Vitabäck loc. 4, Fyledalen, SE. Scania.
e–g. *Fabanella mediopunctata* MARTIN. e–f: Carapace in dorsal and in right aspects, 50 X. g: Coloured posterior part of right valve, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
h. *Rhinocypris jurassica jurassica* (MARTIN). Defective left valve, 50 X. Boring G. I. 2030, 69–74 m., Scania.
i–l. *Rhinocypris rasilis* nov. sp. i–j: Carapaces in right aspect, 50 X. k–l: Carapace in right and in dorsal aspect, holotype, 50 X. Fyleverken loc. II, SE. Scania.

Subfam. *Ilyocypridinae* KAUFMANN, 1900
Gen. *Rhinocypris* ANDERSON, 1941
Rhinocypris jurassica jurassica (MARTIN, 1940)
Fig. 7 h.

1940 *Ilyocypris jurassica jurassica* MARTIN. – p. 312, Pl. 4, figs. 51–54.
1941 *Rhinocypris scabra hamata* ANDERSON. – p. 379, Pl. 19, fig. 19.
1966 b *Rhinocypris jurassica* (MARTIN). – Barker, p. 470, Pl. 7, figs. 17, 18.
1966 *Ilyocypris jurassica jurassica* (MARTIN). – Bielecka & Sztejn, fig. 3 (tab.).

MATERIAL. – Three defective valves from the boring G. I. 2030, 67–74 m.

REMARKS. – The valves are less spinose than the valve described as *R. jurassica spinosa* (MARTIN) from the lower and the upper part of the Fyledal Clay, respectively by Oertli, Brotzen & Bartenstein, 1961, and Bruun Christensen, 1965. The larger spines, about six in number, on the granulose to finely spinose valves are curved backwards into hooks, as described by Anderson, 1941.

DISTRIBUTION. – In NW. Germany from the Oberen Kimmeridge to the Wealden 4, in England in the Lower Purbeckian Beds, and in the northern Poland throughout the Purbeck Beds.

Rhinocypris rasilis nov. sp.
Figs. 7 i–l.

? 1963 *Rhinocypris jurassica jurassica* (MARTIN, 1940). – Oertli, p. 18, Pl. 5, figs. 25–27.

DERIVATION OF THE NAME. – Latin rasilis, smooth.

HOLOTYPE. – A carapace. figs. 7 k–l. Paleontological Institute, University of Lund.

TYPE LOCALITY. – Fyleverken loc. II by the pit of Fyleverken.

TYPE STRATUM. – Chamositic siderite-stone from the uppermost Fyledal Clay, Lower Portlandian.

MATERIAL. – 112 carapaces from Fyleverken loc. II.

DIAGNOSIS. – A species of *Rhinocypris* with smooth lateral surfaces and strongly developed hollow tubercles. Fine denticles are found along the margins of the valves.

AFFINITIES. – The species differs from *R. jurassica jurassica* in lacking pustules and spines on the lateral surfaces.

DESCRIPTION. – The dorsal and ventral margin are nearly straight. The posterior and anterior margins are rounded with a weak posterodorsal angle. The left valve is larger than the right one along the whole of the periphery. In dorsal aspects the carapace is rather broad in the posterior half, and tapering in the anterior half. The posterior end is more or less rounded and the anterior end is often pointed. Three strongly developed hollow tubercles stand out distinctly in dorsal view at about the middle third of the carapace length. The posterior tubercle is the largest one and is situated just above the longitudinal median axis of the carapace. The anterior tubercles are of equal size and are placed in the middle of the upper half of the valve. In the central part of the valve in the posterior sulcus there is a distinct, rounded, deep and pointed groove. The lateral surfaces are smooth, but in a few carapaces a very delicate punctation may be observed. Along the anterior, posterior, and part of the ventral margins there are fine, densely placed denticles. The interior structures of the carapaces cannot be studied in the local material.

REMARKS. – The specimens described as *R. jurassica jurassica* (MARTIN) by Oertli (1963) from the Lower Purbeckian in the Paris Basin are very closely related to the local species, in the similar outline as well as in the more or less absence of fine spines.

Fam. *CYTHERIDAE* BAIRD, 1850

Subfam. *Cytherideinae* G. O. SARS, 1925

Gen. *Fabanella* MARTIN, 1961

Fabanella boloniensis (JONES, 1882)

Figs. 7 c–d.

1882 *Cythere boloniensis* JONES. – pp. 615, 616.
1885 *Candona bononiensis* JONES. – p. 348, Pl. 9, figs. 7, 8.
1940 *Cyprideis polita* MARTIN. – p. 352, Pl. 7, figs. 110–113, Pl. 9, figs. 149–151.
1961 a *Fabanella polita polita* (MARTIN). – Martin, p. 113, Pl. 14, fig. 9.
1961 b *Fabanella polita polita* (MARTIN). – Martin, p. 186, Pl. 1, figs. 1–4, 10–12.
1963 *Fabanella polita polita* (MARTIN). – Oertli, p. 21, Pl. 7, figs. 46–52.
1963 *Neocytheridea bononiensis bononiensis* (JONES). – Bruun Christensen, p. 36, text-fig. 11, Pl. 3, figs. 2 a–c.
1964 *Fabanella boloniensis* (JONES). – Anderson, p. 155, Pl. 11, fig. 45, Pl. 12, figs. 62, 63.
1966 b *Fabanella boloniensis* (JONES). – Barker, p. 472, Pl. 7, fig. 7.
1966 *Fabanella polita polita* (MARTIN). – Bielecka & Sztejn, fig. 3 (tab.).

MATERIAL. – In Vitabäck loc. 4, at least 54 valves. In boring G. I. 2030, 69–74 m., perhaps some fragments.

DISTRIBUTION. – The species is known from Upper Jurassic and Lower Cretaceous Beds in the north-western Europe. In Bornholm it occurs in the Rabekke Formation as well as in the Jydegaard Formation.

Fabanella mediopunctata MARTIN, 1961
Figs. 7 e–g.

1961 b *Fabanella polita mediopunctata* MARTIN. – p. 189, Pl. 1, fig. 8.

MATERIAL. – 21 carapaces and three valves from Vitabäck loc. 11.

REMARKS and AFFINITIES. – Martin considers this species to be a subspecies of *Fabanella polita* (MARTIN, 1940) [= *Fabanella boloniensis* (JONES)] on an analogy with *Fabanella ornata* (STEGHAUS, 1953). The occurring together of *Fabanella ornata* and *Fabanella polita* legitimates the classification used here. *Fabanella mediopunctata* MARTIN differs from both *Fabanella boloniensis* and *F. ornata* in being smaller and in having more swollen lateral surfaces. *F. mediopunctata* and *F. ornata* have lateral reticulations but *F. mediopunctata* only in the central part of the valves.

DISTRIBUTION. – *F. mediopunctata* MARTIN has earlier been found only in the north-western Germany, where it occurs close to the boundary between the Münder Mergel and the Serpulit.

Fabanella ornata (STEGHAUS, 1953)
Figs. 7 a–b.

1953 *Cyprideis polita ornata* STEGHAUS. – p. 42, Pl. 2 B, figs. 1–4.
1961 b *Fabanella polita ornata* (STEGHAUS). – Martin, p. 188, Pl. 1, fig. 9.
1963 *Fabanella polita ornata* (STEGHUAS). – Oertli, p. 21, figs. 41–42.

MATERIAL. – 47 more or less defective valves from Vitabäck loc. 4. From the borehole G. I. 2030, one valve from the depth of 68.1 m. and one from 69–74 m. are supposed to belong to this species.

REMARKS. – In Vitabäck loc. 4 the species has been found together with *Fabanella boloniensis* (JONES) [syn. *Fabanella polita polita* (MARTIN)]; thus the species will here not be classified as a subspecies of *F. boloniensis* (JONES).

On the dorsal part of the valves of many of the local specimens the surface are nearly smooth. This is characteristic of the stratigraphically younger specimens in NW. Germany (Steghaus, 1953) and shows close phylogenetic relations to *F. boloniensis* (JONES).

DISTRIBUTION. – The species occurs in the Upper and Middle Münder Mergel and in the lower part of the Serpulit in NW. Germany. In the Basin of Paris it occurs in the upper part of the Lower Purbeckian, and in the northern Poland it is recognised in the Lower Purbeckian beds.

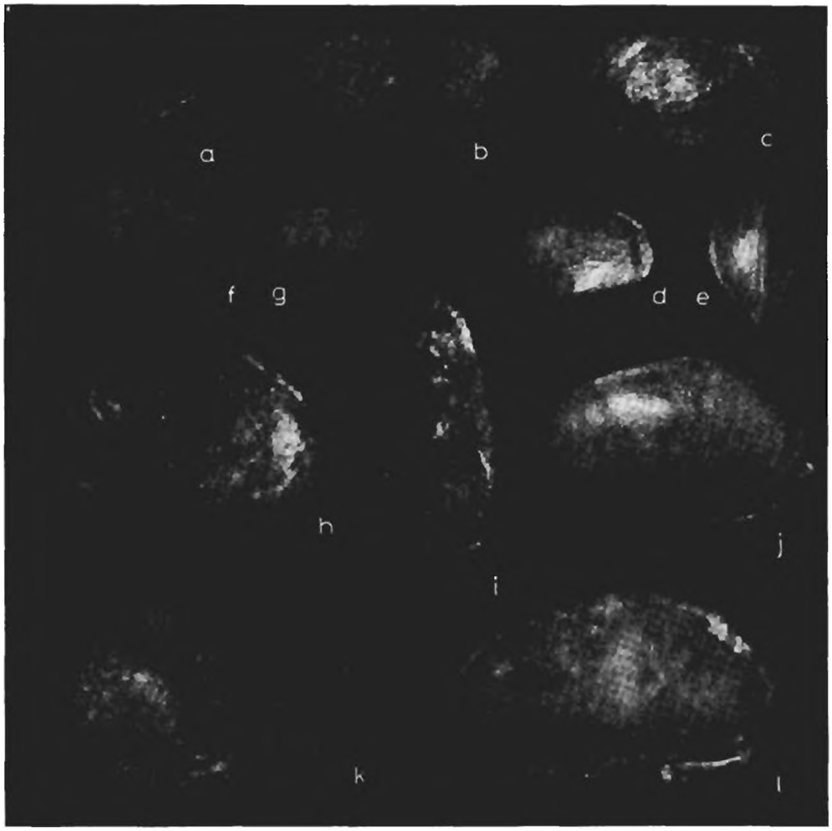

Fig. 8.

a. *Orthonotacythere rimosa* MARTIN. Defective right valve, 50 X. Boring G. I. 2030, 69–74 m., Scania.
b–e. *Procytheropteron* cf. *P. brodiei* (JONES). b–c: Carapaces of males in left aspects, 50 X. d–e: Carapace in right and dorsal aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
f–g. *Timiriasevia* sp. sp. 826. Right valves, 50 X. Boring G. I. 2030, 69–74 m., Scania.
h–j. *Palaeocytheridella* sp. 822 b. h–i: Carapace in right and in dorsal aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania. j: Right valve of larva, 50 X. Boring G. I. 615, 69–75 m., Scania.
k. *Palaeocytheridella* sp. 822 a. Right valve, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
l. *Galliaecytheridea wolburgi* (STEGHAUS) s. l. Carapace in right aspect, 50 X. ? Boring G. I. 2030, 69–74 m., Scania.

Gen. *Galliaecytheridea* OERTLI, 1957
Galliaecytheridea wolburgi (STEGHAUS, 1951) s. l.

Fig. 8 e.

1951 *Cyprideis wolburgi* STEGHAUS. – p. 213, Pl. 14, figs. 24, 25, Pl. 15, fig. 16.
1955 *Cyprideis wolburgi* STEGHAUS (with subspecies). – Schmidt, p. 58, Pl. 2, figs. 25–30.

1957 *Galliaecytheridea wolburgi* (STEGHAUS). – Oertli, p. 657, Pl. 2, figs. 56–60, Pl. 3, figs. 61–68.
1962 *Galliaecytheridea wolburgi* (STEGHAUS). – Klingler, Malz & Martin, p. 176, tab. 10, Pl. 26, fig. 15, Pl. 27, fig. 19.
1966 a *Galliaecytheridea wolburgi* (STEGHAUS). – Barker, p. 450, Pl. 2, figs. 1–8.

MATERIAL. – Only two rather different carapaces have been found. In Vitabäck loc. 11, and perhaps in boring G. I. 2030, 69–74 m.

REMARKS and DISTRIBUTIONS. – It is remarkable to find this species in the Purbeckian beds. In England it has recently been reported from the Portland Beds, but in Germany and France it occurs in the Upper Kimmeridgian or older deposits. As long as there is no more material from the Vitabäck beds, I will not attach much importance to the occurrence of the species before a further examination of the variation of *G. wolburgi s. l.*

Gen. *Palaeocytheridella* MANDELSTAM, 1958
Palaeocytheridella sp. 822 a & b.

Figs. 8 h–k.

MATERIAL. – Vitabäck loc. 11, one right valve of *P.* sp. 882 a, and one carapace of *P.* sp. 882 b. Boring G. I. 615, 69–75 m., one right valve of a larva of *P.* sp. 882 b. Boring G. I. 2030, 69–74 m., fragments of at least two valves of *P.* sp. 882 b?.

REMARKS. – In all of these specimens the lateral surfaces are covered by dense punctations while the outlets of the normal pore canals are distinct and relatively diffused. The difference between *P.* sp. 822 a, and *P.* sp. 822 b is based on the lateral outline, and appears in fig. 8.

Subfam. *Cuneocytherinae* MANDELSTAM, 1958
Gen. *Dicrorygma* POAG, 1961
Subgen. *Orthorygma* BRUUN CHRISTENSEN, 1965 b
Dicrorygma (Orthorygma) groenwalli BRUUN CHRISTENSEN, 1963

Figs. 9 j–l.

1963 *Dicrorygma groenwalli* BRUUN CHRISTENSEN. – p. 46, Pl. 3, figs. 1 a–g.
1965 b *Dicrorygma (Orthorygma) groenwalli* BRUUN CHRISTENSEN. – p. 9, Pl. 2, figs. 6 a–b.

MATERIAL. – 17 carapaces and two valves from Vitabäck loc. 11.

REMARKS. – Some of the carapaces diverge a little from the type material in that the postero-dorsal margin is less steep and slightly convex, but for the time being these specimens ought not to be separated as a new subspecies.

DISTRIBUTION. – This species is characteristic and often very common in Purbeckian deposits of the Scanian-Polish basin. It has been published that the species has been found in a fauna from the Jydegaard Formation, Bornholm (Upper Purbeckian) and in the fauna from a large erratic clay body from Habbedam, Bornholm (Rabekke-Formation, Lower Purbeckian). The species indicates an increase in salinity during poikilohaline environments.

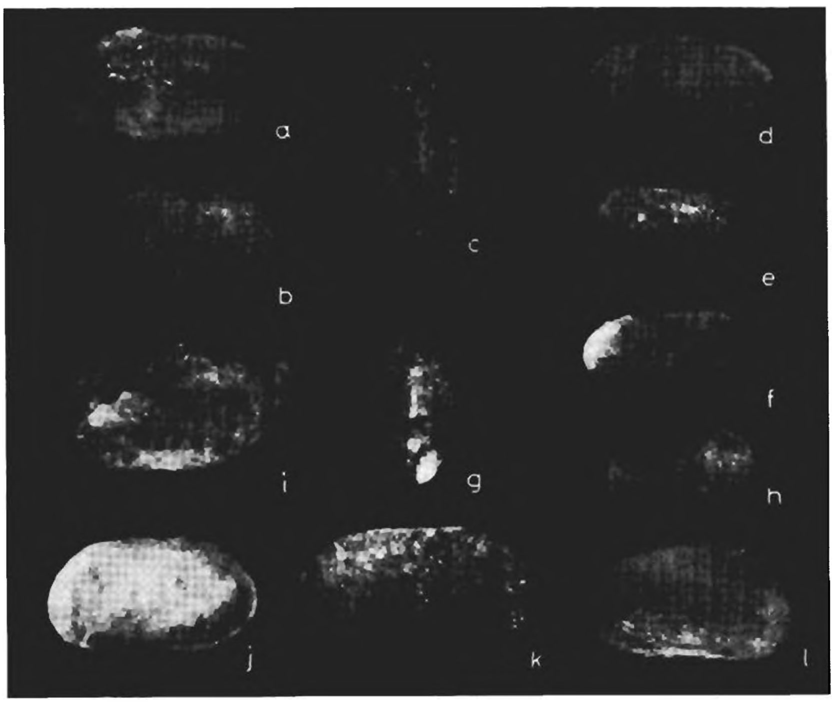

Fig. 9.

a–c. *Metacytheropteron* sp. 132 b. Carapaces in left, right and dorsal aspects, 75 X. Vitabäck loc. 11, Fyledalen, SE. Scania.
d. *Procytheropteron* cf. *P. brodiei* (JONES). Left valve of larva, 75 X. Boring G. I. 2030, 69–74 m., Scania.
e–h. Indet. gen. sp. 861. e and h: Carapaces in lateral aspects, 75 X. f–g: Carapace in lateral and dorsal aspects, 75 X.
i. *Orthonotacythere rimosa* MARTIN. Carapace in left aspect, 75 X.
j–l. *Dicrorygma (Orthorygma) groenwalli* BRUUN CHRISTENSEN. j: Carapace of female in left aspect, 75 X. k: Carapace of male in right aspect, 75 X. l: Carapace of female in right aspects, 75 X.
Vitabäck loc. 11, Fyledalen, SE. Scania.

Subfam. *Progonocytherinae* SYLVESTER-BRADLEY, 1948
Gen. *Klieana* MARTIN, 1940

Klieana alata MARTIN, 1940
Figs. 10 d–e.

1940 Ostracod (602) WICHER. – Pl. 3, fig. 19.
1940 *Klieana alata* MARTIN. – p. 323, Pl. 5, figs. 64–75, Pl. 2, fig. 158–161.
1962 *Klieana alata* MARTIN. – Klingler, Malz & Martin, p. 178, Pl. 25, fig. 24.
1963 *Klieana alata* MARTIN. – Oertli, p. 22, Pl. 7, figs. 53–56.
1963 *Klieana alata* MARTIN. – Bruun Christensen, p. 34, text-figs. 9, 10 (*part*), Pl. 5, figs. 1 a–g.
1966 b *Klieana alata* MARTIN. – Barker, p. 480, Pl. 7, figs. 10–14.
1966 *Klieana alata* MARTIN. – Bielecka & Sztejn, fig. 3 (tab.).

MATERIAL and REMARKS. – Several hundred specimens from the borehole G. I. No. 2030, 69–74 m. They show the same variation as is known from the population of the Rabekke Formation in Bornholm. A few valves from boring 246.179, 19.0–19.5 m. (in Bornholm) must be classified as *Klieana calyptroides* (ANDERSON, 1941) (Bruun Christensen, 1963, 1966).

Klieana calyptroides (ANDERSON, 1941)
Figs. 10 a–c, 11 f–g.

? 1940 *Klieana alata* MARTIN (*partim*). – p. 323, Pl. 5, figs. 64–66, 71, Pl. 11, figs. 158–161.
1941 *Cytheridea calyptroides* ANDERSON. – p. 376, Pl. 19, fig. 13.
1963 *Klieana alata* MARTIN (*partim*). – Bruun Christensen, p. 34, text-fig. 10 (the valve from 246.197, 19.0–19.5 m.).

MATERIAL. – Several hundred carapaces and valves from Fyleverken loc. II. In the boring G. I. 2030, 70.2 m., fragments?; 69–74 m., two carapaces and ten valves. Boring G. I. 615, 69–75 m., one carapace. Vitabäck loc. 9, four carapaces and seven valves. Vitabäck loc. 11, 27 carapaces and three valves.

AFFINITIES and REMARKS. – This species differs from *Klieana alata* MARTIN, 1940 in lacking the winglike processes on the ventral sides. The processes are faintly suggested by a more or less strong development of the ventral ridges. Like in *K. alata* MARTIN, 1940, there are specimens that are nearly without reticulation, but when it is well developed, the surfaces are "covered with coarse, flat, more or less hexagonal reticulations within which are arranged groups of small rounded thin-walled cells" (Anderson, 1941) as known from *Klieana* sp. aff. *alata* MARTIN from the Kimmeridgian, but unlike the reticulation on *K. alata* MARTIN. The species differs from *K. kujaviana* BIELECKA & SZTEJN, 1966 in its lateral outline and in lacking the posteromedian and posteroventral nodes. Some of *K. kujaviana* lacking the nodes and a single valve from Fyleverken loc. 11 has a posteromedian node.

DISTRIBUTION. – *K. calyptroides* (ANDERSON, 1941) has been found in the Swindon Sands and Stone of the Portlandian in the Southern England, and a few specimens have been found in the Rabekke Formation of Lower Purbeckian age in Bornholm.

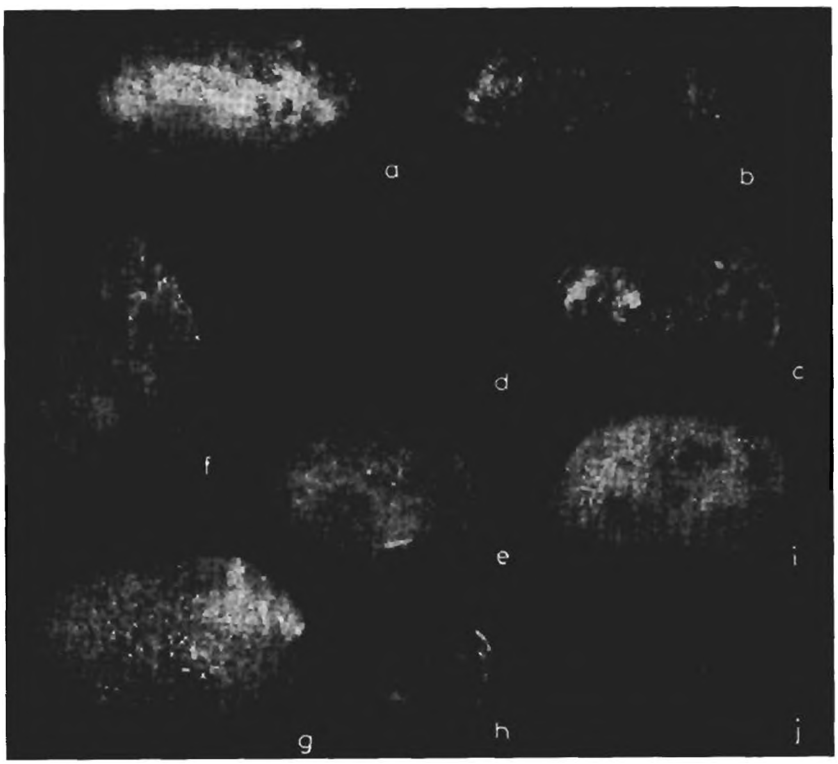

Fig. 10.

a–c. *Klieana calyptroides* (ANDERSON). a–b: Carapaces of males in right aspect, 50 X. c: Carapace of female in right aspect, 50 X. Fyleverken loc. II, Fyledalen, SE. Scania.

d–e. *Klieana alata* MARTIN. Left valves of male and female. Boring G. I. 2030, 69–74 m., Scania.

f–h. *Cytheridella?* sp. 1174. f–g: Carapace in dorsal and right aspects, 50 X. h: Carapace of larva in right aspect, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania.

i–j. *Scabriculocypris trapezoides* ANDERSON. Left and right valves, 50 X. Boring G. I. 2030, 69–74 m., Scania.

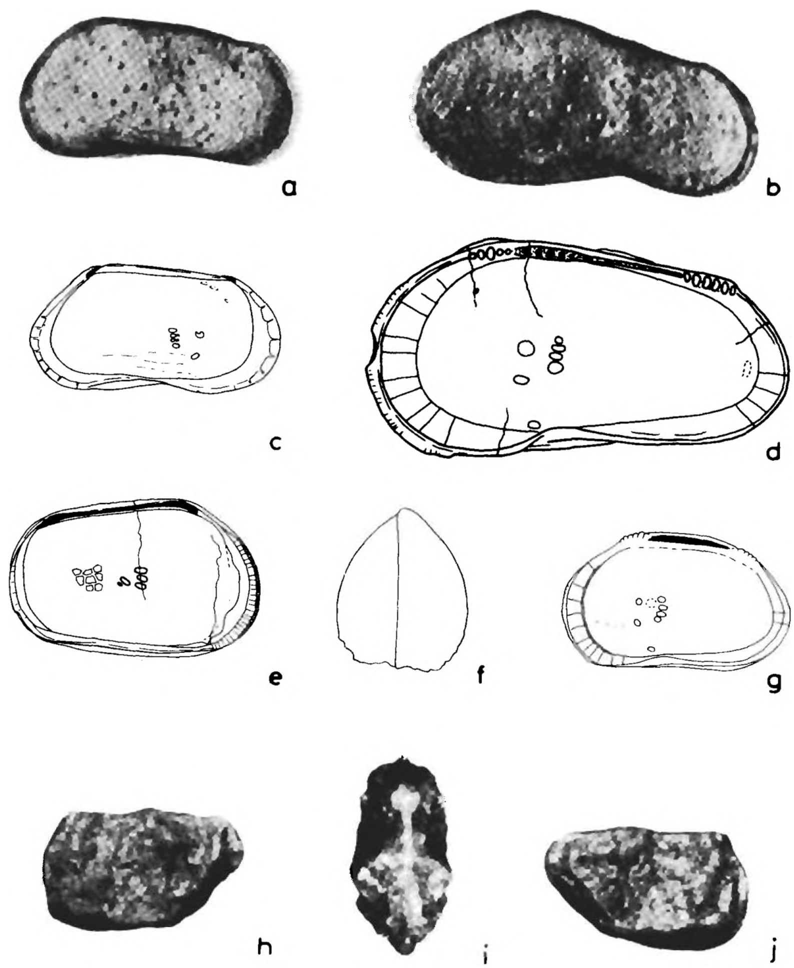

Fig. 11.

a–c. *Stenestroemia vitabaeckensis* nov. gen. et sp. a: Left valve of female in transparent light, specimens fig. 13 b, 50 X. b: Left valve of male in transparent light, specimens fig. 13 a, 50 X. c: Drawing of left valve in interior aspect, female, holotype, specimens fig. 13 c, 50 X.

d. Indet. gen. sp. 206. Drawing of right valve in interior aspect, specimens fig. 13 e, 100 X.

e. *Scabriculocypris trapezoides* ANDERSON. Drawing of left valve in interior aspect, 50 X. Boring G. I. 2030, 69–74 m., Scania.

f–g. *Klieana calyptroides* (ANDERSON). f: Carapace in frontal aspect, 50 X. g: Drawing of right valve in interior aspect, 50 X. Fyleverken loc. II, Fyledalen, SE. Scania.

h–j. *Orthonotacythere rimosa* MARTIN. Carapace in left, dorsal, and right aspects, 50 X. Boring G. I. 2030, 72 m., Scania.

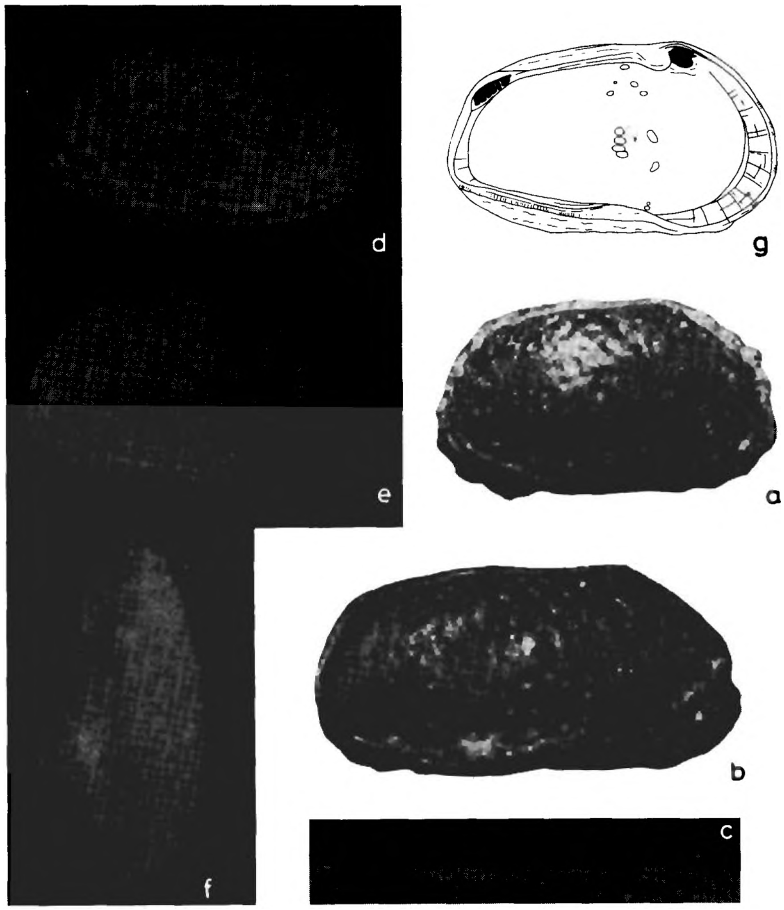

Fig. 12. a–g. *Macrodentina retirugata* (JONES). a–b: Carapaces of female and male in right aspects, 50 X. Vitabäck loc. 11, Fyledalen, SE. Scania. c: Hinge of right valve, 75 X. d: Left valve, 50 X. e–f: Carapace in left and dorsal aspects, 50 X. g: Drawing of left valve in interior aspect, 50 X. Boring G. I. 2030, 69–74 m., Scania.

Gen. *Macrodentina* MARTIN, 1940
Macrodentina retirugata (JONES, 1885)

Fig. 12.

1885 *Cythere retirugata* JONES. – p. 350, Pl. 9, figs. 17–24.
1894 *Cythere retecostata* JONES. – p. 166, Pl. 9, fig. 10.
1940 *Cythere retirugata* JONES var. *textilis* JONES et var. *decorata* ANDERSON. – Anderson, p. 374, Pl. 18, figs. 2–4.

1956 *Dictyocythere (Dictyocythere) retirugata* (JONES) et *D. (Dictyocythere) decorata* (ANDERSON). – Sylvester-Bradley, p. 15, 17, Pl. 3, figs. 1, 7–10, Pl. 4, figs. 3, 4, 11, 16, 17.
1958 *Macrodentina (Dictyocythere) retirugata* (JONES) et *M. (Dictyocythere) textilis* (JONES). – Malz, p. 25–26, Pl. 6, figs. 87–91.
1964 *Macrodentina retirugata* (JONES) – Anderson, p. 154, Pl. 10, figs. 26–30.
1966 a, b *Macrodentina (Dictyocythere) retirugata* (JONES). – Barker, p. 453, 476, Pl. 1, figs. 1–8, Pl. 8, figs. 18–22.

MATERIAL. – In the boring G. I. 2030, 68.1 m., three valves; 68.5 m., one valve; 70.2 m., one carapace and some fragments; 72.0 m., one fragment; 69–74 m., four carapaces, 26 valves, and some fragments. In boring G. I. 615, 69–75 m., one carapace, and eight valves. In Vitabäck loc. 9, six carapaces and eight valves. In Vitabäck loc. 11, 67 carapaces and 25 valves.

REMARKS. – Diminutive denticles may often be observed in the anterior hinge element (fig. 12 c) in the local material. These denticles indicate a transition from the subgenus *M. (Macrodentina)* to *M. (Dictyocythere)*. This tendency of the species is mentioned by Malz (1958) and illustrated by Sylvester-Bradley (1956). On the base of a more or less strong development of the reticulation, the species has been divided into subspecies. The local specimens have to be classified as *M. retirugata sensu stricto*.

DISTRIBUTION. – *M. retirugata* occurs in beds of the Lower Purbeckian and the Portlandian in England and NW. France.

Gen. indet.
Indet. gen. sp. 206
Figs. 11 d, 13 d–f.

MATERIAL. – One right and one left valve in sticky, light green clay from 69–74 m. of the borehole G. I. No. 2030.

AFFINITIES. – The lateral surface shows some similarity to that of species of genera such as *Pleurocythere* TRIEBEL, 1951 and *Nodophthalmocythere* MALZ, 1958, but the species probably has to be classified as a species of a new genus.

DESCRIPTION. – Valve is oblong, small, and strongly built. The anterior margin is smoothly rounded. Posterior end is slightly tapered, with a distinct angle at the posterior element of the hinge. The dorsal margin is nearly straight and is composed of the hinge line except in the central part of the right valves, where parts of the lateral ridges compose the dorsal border. The ventral margin is nearly straight and the free edge is here reflexed. In dorsal view anterior and posterior flanges may be observed. The posterior part of the high and sharp margin ridge is highest. The largest breadth is situated in the central part of the valve because of a strongly developed swelling.

On the lateral surface of the valve there is a relatively sharp ridge parallel to the anterior and ventral margins. Along and close to the dorsal margin another ridge is situated. The posterior part of the dorsal ridge, which is stronger built than the anterior part, curves smoothly across the valve towards the posterior end of it. The swelling on the central part of the valve is longitudinal and is strongest developed at the area of the adductor muscle scars. The ridges are covered by fine, dense, but distinct punctations arranged in rows along the ridges. A weak eye tubercle is represented by the anterior hinge element.

The adductor scars consist of four spots situated one below another. The lowest spot is the largest. In front of and below the adductor scars other scars have been observed and illustrated. In the posterior end of the valve an oblong scar thas been observed. The normal pore canals are distinct and are scattered on the surfaces. The line of concrescence and the inner margin seem to coincide throughout the whole length of the marginal zone.

The radial pore canals are straight and simple and occur, 9–12 in number, along the anterior margin.

The hinge of the right valve consists of anterior and posterior elements of coarsely crenulate bars separated by a finely crenulate furrow.

The length of the right valve is 0.55 mm., the height 0.21 mm.

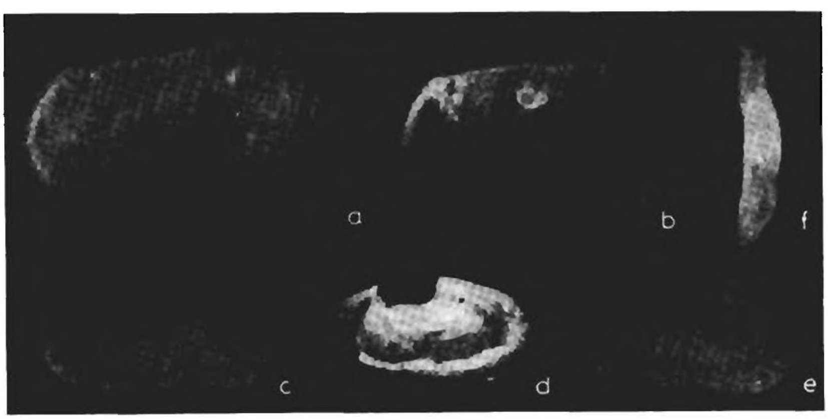

Fig. 13.

a–c. *Stenestroemia vitabaeckensis* nov. gen. et sp. a–b: Left valves of male and female, 50 X. c: Left valve of female, holotype, 50 X.

d–f. Indet. gen. sp. 206. d: Defective left valve, 50 X. e–f: Right valve in lateral and dorsal aspects, 50 X.

Boring G. I. 2030, 69–74 m., Scania.

Subfam. *Limnocytherinae* G. O. SARS, 1925
Gen. *Cytheridella* DADAY, 1905
Cytheridella ? sp. 1174
Figs. 10 f–h.

MATERIAL. – Three carapaces and in sediment two valves from Vitabäck loc. 11.

AFFINITIES and REMARKS. – The genus name *Cytheridella* ? has been used for referring to *Cytheridella* ? *barnstorfensis* MARTIN (Martin & Weiler, 1957) from the Middle and Upper Münder Mergel in NW. Germany. The local species is closely related to the above-mentioned species as far as the exterior features are concerned. *Cytheridella?* sp. 1174 has a nearly straight ventral margin with a rounded ventrolateral expansion, in which the hollows of the reticulation are arranged along distinct longitudinal lines. There are two adult specimens in the local material.

Gen. *Scabriculocypris* ANDERSON, 1941
Scabriculocypris trapezoides ANDERSON, 1941
Figs. 10 i–j, 11 e.

1940 Ostracode (626) WICHER. – p. 264, Pl. 3, fig. 18.
1940 Ostracode gen. et sp. indet. MARTIN. – p. 358, Pl. 8, figs. 121–123.
1941 *Scabriculocypris trapezoides* ANDERSON. – p. 377, Pl. 18, fig. 5.
1962 *Scabriculocypris trapezoides* ANDERSON. – Klingler, Malz & Martin, p. 172, tab. 10, Pl. 26, fig. 16.
1963 *Scabriculocypris trapezoides* ANDERSON. – Oertli, p. 20, Pl. 6, figs. 37–39.
1966 *Scabriculocypris trapezoides* ANDERSON. – Barker, p. 484, Pl. 7, fig. 3.
1966 *Scabriculocypris trapezoides* ANDERSON. – Bielecka & Sztejn, fig. 3 (tab.).
1966 *Scabriculocypris trapezoides* ANDERSON. – Bruun Christensen, Pl. 1, fig. 8.

MATERIAL. – Occurs in Vitabäck loc. 4 and loc. 11, and in the boring G. I. 2030, 69–74 m. One carapace and 33 valves have been found in Scania. The material is generally rather fragile and fragmentary.

DISTRIBUTION. – The species is found in NW. Germany in the interval form the Oberen Münder Mergel to the Wealden 2. In the northern France and the southern England it has been found in Lower Purbeckian Beds. In the northern Poland it is found in the Purbeck Beds F–C, and in Bornholm in the Rabekke Formation.

Gen. *Stenestroemia* nov.

TYPE SPECIES. – *Stenestroemia vitabaeckensis* nov. gen. et sp.

DERIVATION OF THE NAME. – In memory of fil. lic. Seth Steneström, Lund (1908–1961).

DIAGNOSIS. – Small, thin valved species of the family *Limnocytheridae* with kidney-shaped outline and nearly straight hinge line. In dorsal aspect the lateral surfaces are nearly parallel and are terminally pointed with lateral depressions along the margins, more distinct along the anterior margin. The lateral surfaces vary from being smooth to being completely covered with diminutive close, delicate and discontinuous ridges. A very weak sulcus may be developed dorsally of the area of adductor scars and another one in the posteroventral part of the valve. The hinge is weak lophodont. The marginal area is fairly broad and has deep vestibules along the anterior, posterior, anteroventral, and posteroventral margins. The line of concrescence runs parallel to the margins. Simple and straight radial pore canals occur to the number of 8–10 along the anterior as well as the posterior margins. There is a marked sexual dimorphism.

AFFINITIES. – The genus differs from most of the genera of *Limnocytheridae* in having strongly developed vestibules and in lacking welldeveloped sulci. Particularly the exterior of the valves resembles that of the recent genera, such as *Afrocythere, Paracythereis* and *Pseudolimnocythere*. From the Mesozoic genera *Bisulcocypris, Timiriasevia* and *Theriosynoecum* the local genus may be easily distinguished in dorsal aspects.

Stenestroemia vitabaeckensis nov. gen. et nov. sp.

Figs. 11 c, 13 a–c.

1966 b *Dicrorygma fragilis* (MARTIN). – Barker, p. 479, Pl. 7, figs. 19, 20.

DERIVATION OF THE NAME. – From the Vitabäck, immediately south of the pit of AB Fyleverken.

HOLOTYPE. – A left valve, figs. 11 c and 13 c; Paleontological Institute, University of Lund.

TYPE LOCALITY. – Borehole G. I. No. 2030, Everlövs Skola, Blentarp, Scania.

TYPE STRATUM. – Sticky, light green clay. Bore-hole interval 69–74 metres. Lower Purbeckian.

MATERIAL. – Four left and eight right valves, mostly as fragments.

DIAGNOSIS. – A species of the genus *Stenestroemia* with smooth lateral surfaces.

DESCRIPTION. – The valves are small and thin and have kidney-shaped outline. The posteroventral part of the valve is strongly developed, with a rounded periphery. The strongly built posterior part is particularly strongly constructed in valves of males, which for this reason are longer than valves of females. The anterior part of the valves has about the same dimensions in the two sexes. The hinge line is nearly straight and is placed anteriorly on the valve. Especially in the valves of females there is a marked cardinal angle one fourth of the length from the posterior end. The ventral margin is strongly concave. In dorsal aspect the lateral surfaces are flatly curved or nearly parallel and terminally pointed and have lateral depressions along the margins, more distinctly along the anterior margin. The lateral surfaces are smooth, and in the midventral area they have a few delicate ridges parallel to the ventral margin. More clearly in the males, there may be observed a very weakly developed sulcus dorsal of the area of adductor scars, and one in the posteroventral area. The normal pore canals are few in number, irregularly distributed on the valve surface and of sieve type. The hinge is weakly lophodont. Four adductor muscle scars are arranged in a sloping line or in a line that is slightly curved to the anterior and has crescentic antennal ? and oval mandibular ? scars in front. The marginal area is fairly broad, and has deep vestibules along the anterior, posterior, anteroventral and posteroventral margins. The line of concrescence runs parallel to the margins. The radial pore canals are straight and occur to the number of 8–10 along the anterior as well as the posterior margins.

REMARKS. – From the Aylesbury area in England, Barker (1966) has described a Lower Purbeckian fauna closely related to the local fauna with *S. vitabaeckensis*. The species from Aylesbury, classified by Barker as *Dicrorygma fragilis* (MARTIN), the present author does not consider to be synonymous with *Limnocythere fragilis* MARTIN. 1940. *L. fragilis* is nearly twice as long as the English specimens. The lateral outlines and the development of the marginal zone etc. indicates that the English specimens belongs to *S. vitabaeckensis* and that *L. fragilis* MARTIN is hardly related to the genus *Stenestroemia*.

DISTRIBUTION. – This species occurs also in the Lower Purbeckian Beds in the southern England, in the northern Poland and in the Rabekke Formation in Bornholm.

Stenestroemia decipiens (ANDERSON, 1941)

1941 *Cytherella ? decipiens* ANDERSON. – p. 380, Pl. 18, figs. 20, 21.
1966 b *Dicrorygma decipiens* (ANDERSON). – Barker, p. 479, Pl. 7, figs. 15, 16.
1966 *Stenestroemia decipiens* (ANDERSON). – Bruun Christensen, p. 466.

MATERIAL. – Half a valve and a fragment of a valve from boring G. I. 2030, 69–74 m.

DIAGNOSIS. – A species of the genus *Stenestroemia* with the lateral surfaces covered by numerous small, discontinuous ridges nearly parallel to the margins.

REMARKS. – The lateral surfaces are covered by numerous small, discontinuous ridges, but otherwise this species is closely related to *S. vitabaeckensis.* The difference in the outline of the valves figured by Anderson (1941) may be due to the marked sexual dimorphism.

DISTRIBUTION. – This species has been found in the Lower Purbeckian in S. England and in the Rabekke Formation in Bornholm.

Gen. *Timiriasevia* MANDELSTAM, 1947
Timiriasevia sp. sp. 826
Figs. 8 f–g.

MATERIAL and REMARKS. – Three valves and some fragments from boring G. I. 2030, 69–74 m. represent at least two different species, but because of the small number of specimens no description will be given here.

Subfam. *Loxoconchinae* G. O. SARS, 1925
Gen. *Orthonotacythere* ALEXANDER, 1933
Orthonotacythere rimosa MARTIN, 1940
Figs. 8 a, 9 i, 11 h–j.

1940 *Orthonotacythere rimosa* MARTIN. – p. 335, Pl. 6, figs. 84–86.
1941 *Orthonotacythere rimosa* MARTIN. – Triebel, Pl. 15, fig. 174.
1966 a, b *Orthonotacythere rimosa* MARTIN. – Barker, p. 454, 478, Pl. 5, figs. 7, 8, 11, 12, Pl. 8, figs. 12, 13.

MATERIAL. – Boring G. I. 2030: 72 m., one carapace; 69–74 m., one defective valve. Vitabäck loc. 11, one carapace and one valve.

REMARKS. – Apart from different preservation of the material, the intensity of reticulation of the valves varies in the different samples. This must be attributed to ecological causes.

DISTRIBUTION. – In NW. Germany the species occurs in the Serpulit. In S. England it has been found in the Portlandian and the Lower Purbeckian beds.

Subfam. *Cytherurinae* G. W. MÜLLER, 1895
Gen. *Metacytheropteron* OERTLI, 1957
Metacytheropteron sp. 132 b.

Figs. 9 a–c.

1963 *Metacytheropteron* sp. (132 b) BRUUN CHRISTENSEN. – p. 44, Pl. 2, fig. 3.

MATERIAL and REMARKS. – Ten carapaces from Vitabäck loc. 11. A few specimens have been described from the Upper Purbeckian Jydegaard Formation of Bornholm.

Gen. *Procytheropteron* LJUBIMOVA, 1955
Procytheropteron cf. *P. brodiei* (JONES, 1894)

Figs. 8 b–e, 9 d.

Cf.:
1894 *Cytheropteron brodiei* JONES. – p. 167, Pl. 9, fig. 12.
? 1957 *Cytheropteron* cf. *decoratum* SCHMIDT. – Martin & Weiler, p. 227, Pl. 2, figs. 8–9.
1964 *Procytheropteron brodiei* (JONES). – Anderson, p. 11, figs. 41–42.
1966 b *Procytheropteron brodiei* (JONES). – Barker, p. 477, Pl. 8, figs. 23–26, Pl. 9, fig. 8.

MATERIAL. – 34 carapaces and 55 valves from Vitabäck loc. 11. One carapace and four more or less defective valves from boring G. I. 2030, 69–74 m.

AFFINITIES. – This species differs from *P. obesum* LJUBIMOVA, 1955 of the Lower Volgian in being smaller and relatively stronger built. From *P. brodiei* (JONES, 1894) of the Lower Purbeckian of the southern England, most of the local specimens differ in having a long, straight dorsal margin, and they are perhaps to be classed as a different subspecies.

DESCRIPTION. – Anterior margin rounded, posterior and tapering. Dorsal margin straight, with a posterior dorsal angle rather high and posterially. The greatest height, width, and length is in the centre of the carapaces. In dorsal aspect the carapaces mostly taper toward both ends, but specimens with smoothly rounded lateral surfaces occur. In frontal view the carapaces are equilaterally triangular with weakly convex lateral surfaces and a concave ventral surface.

The lateral surfaces are covered by a delicate, more or less longitudinal reticulation partly parallel to the ventral margin. Near the ventral margin and on the ventral surfaces there are weak longitudinal ridges. The hinge of the right valve consists of terminal denticulate bars separated by a groove. In the marginal zone there are 6–7 radial pore canals, and the line of concrescence and the inner margin coincide. The muscles scars cannot be examinated in the local material.

REMARKS. – Some smaller specimens from boring G. I. 2030, 69–74 m., and few of the smaller carapaces from Vitabäck loc. 11 have a slightly coarser ornamentation and a more rounded dorsal margin. These are very close to *P. brodiei* (JONES) from England.

Subfam. indet.

Gen. indet.

Indet gen. sp. 861

Figs. 9 e–h.

MATERIAL and DESCRIPTION. – 32 oblong, small carapaces from Vitabäck loc. 11, with nearly parallel and straight ventral and dorsal margins. The anterior and posterior margins are smoothly rounded. The left valve is larger than the right one. On dorsal aspects the lateral surfaces are in some specimens more flatly arched than in the case illustrated in fig. 9 g, and are in most of the specimens tapered anteriorly. Dimorphism occurs in that some specimens are relatively high (uppermost specimens fig. 9 e). The lateral surfaces are covered by a dense and delicate longitudinal reticulation, which close to the ventral and dorsal margins may change into weak, closely spaced longitudinal ridges.

REFERENCES

ANDERSON, F. W., 1939: Wealden and Purbeck Ostracodes. Ann. Mag. Nat. Hist., Ser. 11, Vol. 3, No. 15, pp. 291–310, Pls. 12–13. London.
- 1941: Ostrtacoda from the Portland and Purbeck Beds of Swindon. Proc. Geol. Assoc., 51, Vol. 51, No. 4 (1940), pp. 373–384, pls. 18–19. London.
- 1951: Note sur quelques Ostracodes fossiles du Purbeckien der Suisse. Arch. Sci., Vol. 4, Fasc. 3, pp. 209–212. Paris.
- 1962: Correlation of the Upper Purbeck Beds of England with the German Wealden. Lpool. Manch. Geol. J., Vol. 3, Pt. 1. Manchester.
- 1964: Rhaetic Ostracoda. Bull. Geol. Survey. G. B., No. 21, pp. 133–174, Pls. 9–15. London.
- 1966: New Genera of Purbeck and Wealden Ostracoda. Bull. Brit. Mus. (Nat. Hist.), Vol. 11, No. 9, pp. 435–446, Figs. 1–22. London.

BARKER, D., 1963: Size in Relation to Salinity in Fossil and Recent Euryhalene Ostracods. J. Mar. biol. Ass. U. K., 43; p. 785–795. Plymouth.
- 1966 a: Ostracods from the Portland Beds of Dorset. Bull. Brit. Mus. (Nat. Hist.), Vol. 11, No. 9, pp. 447–457, Pls. 1–6. London.
- 1966 b: Ostracods from the Portland and Purbeck Beds of the Aylesbury District. Bull. Brit. Mus. (Nat. Hist.), Vol. 11, No. 9, pp. 459–487, Pls. 7–9. London.

BATE, R. H., 1965: Freshwater Ostracods from the Bathonian of Oxfordshire. Paleontology, Vol. 8, Part. 4, pp. 749–759, Pls. 109–111. London.

BIELECKA, W. & SZTEJN, J. 1966: Stratigraphy of the Transition Beds between the Jurassic and the Cretaceous. Based on Microfauna. Kwartalnik Geologiczny, t. 10, nr. 1, pp. 96–115, 1 pl. (In Polish with English summary). Warsaw.

CHRISTENSEN, O. BRUUN, 1963: Ostracods from the Purbeck-Wealden Beds in Bornholm. Danmarks Geolog. Undersøgelse 2. Række, Nr. 86, 58 pp., 14 figs., 5 pls. København.
- 1964: Jura-Kridt grænsen i det skånsk-pommerske område belyst ved ostracoder. Medd. Dansk Geol. Foren., Bd. 15, pp. 431–432 København.
- 1965 a: Biostratigrafisk undersøgelse af Øresundsboringerne overvejende på grundlag af ostracoderne. In LARSEN, G. et al., January 1965.
- 1965 b: The Ostracod Genus *Dicrorygma* POAG 1962 from Upper Jurassic and Lower Cretaceous. Danmarks Geolog. Undersøgelse, 2 Række, Nr. 90, 23 pp., 2 figs., 2 pls. København.
- 1966: Om purbeckien aflejringerne i det nedsænkede område ved Salene Bugt, Bornholm. Medd. Dansk Geol. For., Bd. 16, pp. 465–466, 1 fig. 1 pl. København.

FORBES, E., 1855. In Lyell, C., Manual of Elementary Geology. 5th edit. London.

GREKOFF, N., 1953: Sur l'utilisation des mikrofaunes d'ostracodes dans la stratigraphie précise du passage jurassique – crétacé (Facies continentaux) – Rev. Inst. Franc. Pétrol., Vol. 8, pp. 362–379. Paris.

GRY, H., 1956: Wealdenaflejringerne på Bornholm, deres stratigrafi og tektonik. Medd. Dansk Geol. Foren., Bd. 13, pp. 134–141. København.

HÄGG, R., 1940: Purbeck eller wealden vid Vitabäck i Skåne. Geol. Fören. Förhandl., Bd. 62, H. 3, p. 303. Stockholm.

JONES, T. R., 1862: A Monograph of the fossil Estheriae. Pal. Soc. London, Mongr. 5–8, pp. 1–134, Pls. 1–5. London.
- 1878: Notes on some fossil bivalved Entomostraca. Geol. Mag., Vol. 5, pp. 100–110. London.

– 1882: Lettre sur "le Calcaire a Cypris" du Boulonnais. Bull. Soc. Géol. France, Sér. 3, Vol. 8, p. 616. Paris.
– 1885: The Ostracoda of the Purbeck Formation; with Notes on the Wealden Species. Quart. Jour. Geol. Soc. 41, pp. 311–358, Pls. 8–9. London.
– 1886: On some fossil Ostracoda from Colorado. Geol. Mag., 3, pp. 145–148, 1 pl. London.
– 1888: Ostracoda from the Weald Clay of the Isle of Wight. Geol. Mag., 5, pp. 534–539. London.
– 1894: On the Rhaetic and some Liassic Ostracoda of Britain. Quart. J. Geol. Soc., 50, pp. 156–169, Pl. 9. London.

KLINGLER, W., 1955: Microfaunistische und stratigraphischfazielle Untersuchungen im Kimmeridge und Portland des Weser – Aller – Gebietes. Geol. Jb., 70, pp. 167–246. Hannover.
– & MALZ, H. & MARTIN, G. P. R., 1962: Malm NW-Deutschlands. In Simon & Bartenstein, 1962: Leitfossilien der Mikropaläontologii, pp. 159–190, Tab. 10, Pl. 22–27, fig. 15, Berlin.

KRÖMMELBEIN, K., 1965: Neue, für Vergleiche mit West-Afrika wichtige Ostracoden-Arten der brasilianischen Bahia-Serie (Ober Jura?/Unter Kreide in Wealden-Fazies). Senck. leth., 46 a, 177–213. Frankfurt a. M.

LARSEN, G., 1966: Geologiske resultater af bundundersøgelserne i Øresund. Medd. Dansk Geol. For., Bd. 16, pp. 260–265, 1 fig., 2 pl.
– et al., 1965: Øresund. Helsingør–Hälsingborg Linien. Geologisk rapport udarbejdet ved Danmarks Geologiske Undersøgelse. Januar 1965. (Unpublished, but the research report has to be published in 1967).

LJUBIMOVA, P. S., 1955: Ostracods from Mesozoic Beds of the Volga-Ural Region. Trudy VNIGRI, N. S., 84, pp. 1–190, 13 pls., 19 figs., 6 tab. Leningrad (In Russian).

LORIOL, P. DE & JACCARD, A., 1865: Étude géologique et paléontologique de la formation d'eau douce intracrétacé du Jura. Soc. Phys. Hist. Nat. Genéve, Mém., vol. 18, pt. 1, pp. 64–128. Geneve.

MALZ, M., 1958: Die Gattung *Macrodentina* und einige andere Ostracoden-Arten aus dem Oberen Jura von NW-Deutschland, England und Frankreich. Abh. Senck. Naturf. Ges., 497, pp. 1–67, 11 pls. Frankfurt a. M.

MARTIN, G. P. R., 1940: Ostracoden des Norddeutschen Purbeck und Wealden. Senckenb., 22, pp. 275–361, 13 pls. Frankfurt a. M.
– 1961 a: Eine Mikrofauna in Wealden von Emlichheim (Emsland, NW-Deutschland). Palaeontographica, 116, Abt. A, pp. 105–121, 2 pls. Stuttgart.
– 1961 b: Die Gattung *Fabanella* n. g. (Ostracoda) im NW-deutschen Malm und Wealden. Senckenb. leth., 42, 3/4, pp. 189–195. Frankfurt a. M.
– & WEILER, W., 1957: Das Aldorfer Otolithen – "Pflaster" und seine Fauna. Senckenb. leth. 38, 3/4, pp. 211–250, 3 pls. Frankfurt a. M.
– & WEILER, H., 1963: Der Wealden in der Gegend von Barnstorf (Kreis Grafschaft Diepholz, Niedersachsen). N. Jb. Geol. Paläont. Abh., 118, 1, pp. 30–64. 3 Taf.

OERTLI, H. J., 1957: Ostracodes du Jurassique supérieur du Bassin de Paris (Sondage Vernon I). Rev. Inst. franc. Pétrole, 12, pp. 647–695, Pls. 1–7. Paris.
– 1963: Ostracodes du "Purbeckien" du Bassin Parisien. Rev. Inst. franc. Pétrole., 18, pp. 5–38, Pls. 1–7. Paris.
– & BROTZEN, F. & BARTENSTEIN, H., 1961: Mikropaläontologisch-feinstratigraphische Untersuchung der Jura-Kreide-Grenzschichten in Südschweden. Sveriges Geologiska Undersökning, Ser. C., No. 579, pp. 3–24, 2 pls. (Årsbok 55:3). Stockholm.

SCHMIDT, G., 1954: Stratigraphisch wichtige Ostracoden im "Kimmeridge" und tiefsten "Portland" NW-Deutschlands. Paläont. Z., 28, pp. 81–101, 4 pls. Stuttgart.

– 1955: Stratigraphie und Mikrofauna des mittleren Malm in nordwestdeutschen Bergland mit einer Kartierung am südlichen Ith. Abh. Senck. Naturf. Ges., 491. pp. 1–76, 18 pls. Frankfurt a. M.

STEGHAUS, H., 1951: Ostracoden als Leitfossilien im Kimmeridge der Ölfeld Wietze und Fuhrberg bei Hannover. Paläont. Z., 24, pp. 201–224. Stuttgart.

– 1953: Über die Möglichkeit einer Gliederung der Weiss-Jura von Dalum. Ber. naturf. Ges., 43, 1, pp. 39–46, 1 fig., 2 pls. Freiburg.

SUNG, G. C. L., 1955: The Wealden Formation in the Netherlands. Proc. Fourth World Petrol. Congr. Sect. I/A./3, pp. 151–160. Rome.

SYLVESTER-BRADLEY, P. C., 1949: The Ostracod Genus *Cypridea* and the Zones of the Upper and Middle Purbeckian. – Proc. Geol. Assoc., Vol. 60, Part. 2, pp. 125–151, 2 pls. London.

– 1956: The Structure, Evolution and Nomenclature of the Ostracod Hinge. Bull. Brit. Mus. (Nat. Hist.), Vol. 3, No. 1, 4 pls. London.

TRALAU, H., 1966: Botanical Investigations in the Fossil Flora of Eriksdal in Fyledalen, Scania. Sveriges Geologiska Undersökning, Ser. C., No. 611, pp. 3–36. 10 Figs. (Årsbok 60:6). Stockholm.

TRIEBEL, E., 1941: Zur Morphologie und Ökologie der fossilen Ostracoden. Senck. 23, pp. 294–400, 15 pls. Frankfurt a. M.

WICHER, C. A., 1940: Zur Stratigraphie der Grenzchichten Jura-Kreide Nordwestdeutschlands. Oel und Kohle, 36. Jahrg., Heft. 29, pp. 263–269. Berlin.

WOLBURG, I., 1949: Ergebnisse der Biostratigraphie nach Ostracoden im nordwestdeutschen Wealden. Erdöl und Tektonik in Nordwestdeutschland, pp. 349–360. Hannover-Celle.

– 1959: Die Cyprideen des NW-deutschen Wealden. Senck. leth. 40, 3/4, pp. 223–315. Frankfurt a. M.

– 1961: *Fabanella polita inflata* n. ssp., eine Leit-Ostracode im NW-deutschen Wealden. Senck. leth., 42, 3/4, pp. 197–203, Frankfurt a. M.

– 1962: Die leitenden Ostracoden des nordwestdeutschen Wealden. In Simon & Bartenstein, 1962: Leitfossilien der Mikropaläontologie, pp. 204–224, Tab. 11–16, Pls. 28–32. Berlin.