

Rotaliine Foraminiferida from the type section of the Atherfield “Group” (Lower Aptian), Isle of Wight, U.K.

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ABSTRACT—A preliminary study has been made of the Foraminiferida fauna of the type section of the Atherfield “Group” on the Isle of Wight. The fauna is sparse but diagnostic of the Lower Aptian as defined by faunas worldwide. This paper describes and illustrates the rotaliine Foraminiferida fauna and complements a previous publication describing and illustrating the textulariine fauna.

INTRODUCTION

The Aptian Foraminiferida faunas of onshore United Kingdom are poorly known. This is illustrated by the recently published Index Foraminiferida range chart for the Cretaceous of the United Kingdom (Hart *et al.*, in Jenkins, D.G. & Murray, J. (Eds.), 1981). The “apparent” faunal break at the top of the Barremian to the top of the Aptian is a direct result of the lack of published research on Foraminiferida faunas from the Aptian strata of the United Kingdom. The textulariine fauna from the type Atherfield Clay *sensu stricto* has been discussed and illustrated by the present author (Crittenden, First International Workshop on Arenaceous Foraminiferida, Amsterdam, 1981, in press) and the present paper complements that work by illustrating and describing the rotaliine Foraminiferida from the Atherfield “Group” (Lower Aptian) of which the Atherfield Clay is a part.

The Aptian and Lower Albian strata in S.E. England are grouped together as the Lower Greensand “Formation”, consisting of a sequence of sands and clays. The Atherfield “Group” is the basal unit of this “Formation” and consists of the Perna Bed, the Atherfield Clay, the Lower Lobster Bed, the Crackers and the Upper Lobster Bed (Fig. 1) and rests disconformably at Atherfield on a thick series of fresh and brackish water sediments called the Wealden Beds.

MATERIAL

Samples (about 1–1.5 kgs. each) were collected at approximately 1 m intervals through the Perna Bed and Atherfield clay by Dr. A. Swiecicki and Dr. M.B. Hart in the Spring of 1979, from the cliff section approximately 45 m E. of Atherfield Point. Further samples were collected by Dr. M.B. Hart in the Spring of 1981, and by the author and Mr. M.D. Bidgood in the Summer of 1981 at the same locality through the complete Atherfield “Group” (Fig. 2). Samples were also taken through the overlying Ferruginous Sands but were all barren of

microfauna. Casey (1961) described the Atherfield section and proposed an ammonite biostratigraphy which provides a documented macrofossil zonation with which to calibrate the Foraminiferida fauna (Fig. 1). The fauna is the earliest fully marine Foraminiferida fauna described and published from the Cretaceous of S.E. England and is similar to, but smaller in number and less diverse than, the Aptian faunas recorded by Damotte & Magniez-Jannin (1973) and Damotte *et al.* (1978) from the Paris Basin, by Colin *et al.* (1981) from the north Celtic Sea Basin, by Jaworski (pers. comm., 1981) from S.E. England and by Dupeuble from the Bay of Biscay (1979).

The complete fauna from the Atherfield “Group” is reminiscent of the *Ammobaculites* Association of Haig (1979) where a low diversity association is characterised by abundant arenaceous Foraminiferida, with the accompanying rotaliine species being mainly very small and unornamented. This association, according to Haig, is extensively developed in shallow, partially enclosed, epicontinental seas in the northern and southern cool temperature belts of the late Early Cretaceous. However, the fauna from the Atherfield “Group” does suggest a Tethyan “warm” water influence (the Trinidad Lower Cretaceous fauna is also a transitional Tethyan/Temperate type according to Bartenstein & Bolli, 1977).

THE ROTALIINE FORAMINIFERIDA FAUNA

The fauna described herein was not well preserved; indeed it shows signs of etching, breakage, wear and replacement by pyrite. These phenomena of preservation are probably due to a combination of decalcification of the strata by percolating ground water, distortion of the fauna by compression and post-mortem transport of the fauna. The section at Atherfield is a S.W.-facing (dominant wind direction) sea cliff which is

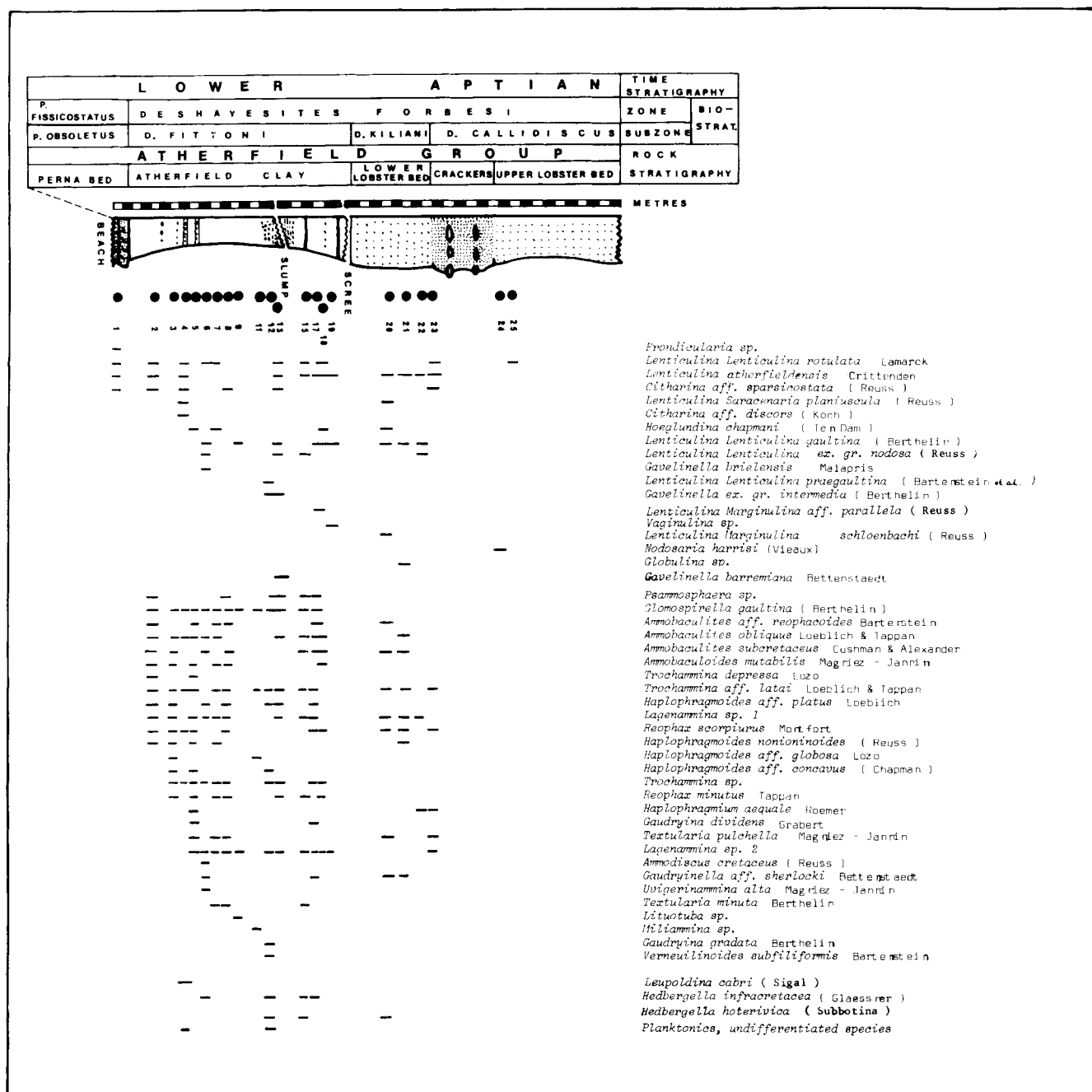


Fig. 1. Lithology of the section and range chart of the Foraminiferida.

highly weathered, fractured and slumped and is partially obscured by downwash.

The rotaliine fauna recorded from the Atherfield "Group" is low in numbers of individuals and of species. This is a reflection of the preservation phenomena mentioned above and perhaps also subtle differences in ecology between the Isle of Wight and other areas where the faunas are much more diverse. That recorded by Jaworski (pers. comm.) from S.E. England, for

example, is diverse and abundant and includes species neither previously recorded from the Aptian of the U.K., e.g. *Lenticulina schreiteri* (Eichenberg), *L. spinosa* (Eichenberg) and *L. crepidularis* (Roemer) (recorded as *L. tricarinnella* (Reuss 1863) by Magniez-Jannin, 1973), nor by the present author from the Isle of Wight. Jaworski's faunas are, however, from subsurface sections. All those rotaliine species recorded from the Isle of Wight are present also in S.E. England (pers. comm.).

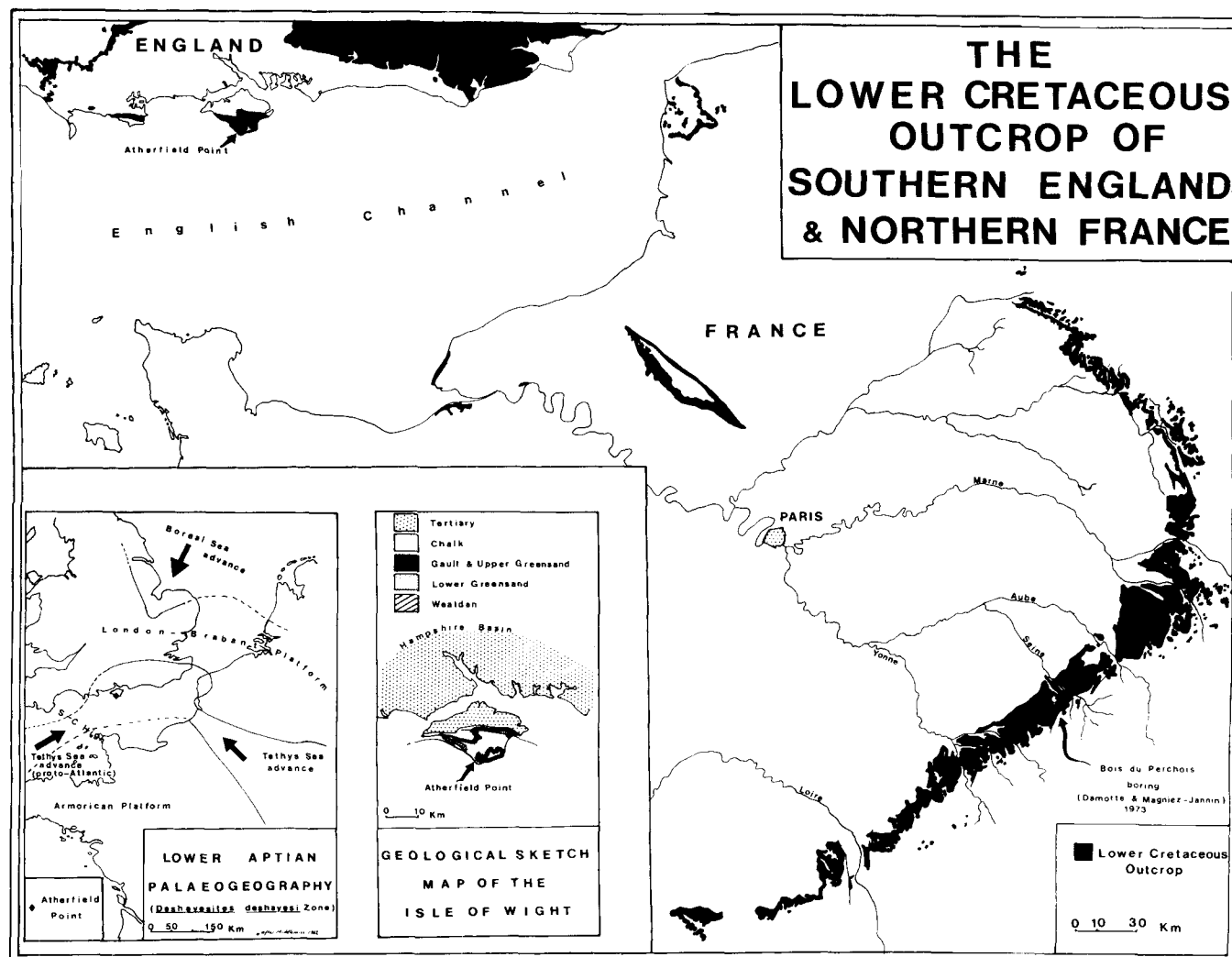


Fig. 2. Location of the Atherfield section on the Isle of Wight.

Jaworski) and in the Lower Aptian fauna recorded from France by Damotte & Magniez-Jannin (1973). The Aptian fauna from the north Celtic Sea Basin (Colin *et al.*, 1981) consists of the following species: *Hoeglundina chapmani* (ten Dam), *Valvulineria gracillima* (ten Dam), *Lenticulina* ex.gr. *nodosa* (Reuss), *Lenticulina* cf. *L. gaultina* (Berthelin) and *L. (Vaginulina) humilis* (Reuss) (= *L. (A.) atherfieldensis* Crittenden). No planktonics were observed.

The fauna recorded from D.S.D.P. Leg 48 in the Bay of Biscay (Dupeuble, 1979) is very similar and provides a faunal link to the Tethys area to the south during early Aptian times. Other remarkably similar faunas include those from the Scotian shelf, offshore eastern Canada (Ascoli, 1976) and from Trinidad (Bartenstein & Bolli, 1977).

Examination of the total Foraminiferida fauna is important in providing an overall picture comparable to

the pattern of Lower Aptian deposits worldwide (Bartenstein, 1976 a, b, c, 1977, 1978, 1979). The biostratigraphical, palaeogeographical and palaeoecological implications of the total fauna recorded from the Atherfield "Group" are further discussed by Crittenden (in press). In that paper, a number of planktonic species were recorded on the range chart for the Atherfield clay S.S. These species, apart from the ones described herein are now placed in "undifferentiated planktonics".

Systematic descriptions

The classification follows that of Loeblich & Tappan (1964, 1974). For brevity, the synonymy consists of the first citation of the species in the literature plus one or two other references where appropriate. The figured material is deposited in the collections of the British Museum (Natural History).

Order Foraminiferida Eichwald, 1830
 Sub-order Rotaliina Delage & Hérourard, 1896
 Superfamily Nodosariacea Ehrenberg, 1838
 Family Nodosariidae Ehrenberg, 1838

Remarks

The study of the Nodosariidae is notorious for the problems posed for classification both generically (as *Lenticulina*, *Astacolus*, *Marginulina*, *Dentalina*, *Nodosaria*, etc.) and subgenerically. Magniez-Jannin (1973, 1975) has discussed this taxonomic problem in some detail with reference to whether the great morphological variation seen in the Nodosariidae should be placed at a generic or sub-generic level. In this study the material available was not sufficient to enable a full appreciation of the generic problems.

Genus *Lenticulina* Lamarck, 1804

Lenticulina (*Lenticulina*) *gaultina* (Berthelin, 1880)
 (Pl. 1, Fig. 1)

- 1880 *Cristellaria gaultina* Berthelin: 49, pl. 3, figs. 15, 19.
 1967 *Lenticulina* (*Lenticulina*) *gaultina* (Berthelin);
 Fuchs: 293, pl. 11, figs. 4a-b.
 1973 *Lenticulina gaultina* (Berthelin); Magniez-Jannin:
 28, pl. 3, fig. 31.
 1975 *Lenticulina*/*Lenticulina* – *Astacolus*/*gaultina*
 (Berthelin); Magniez-Jannin: 102, pl. 9, figs. 7–8,
 10, text-fig. 44.

Remarks. This species differs from *L. rotulata* (Lamarck) by the tendency of the last chambers to become higher, to unroll and become uniserial. Juveniles of the two species are particularly difficult to separate.

Stratigraphical range. This species is not very common at Atherfield but it is extant throughout the Albian in north-west Europe. Bartenstein (1976a, 1977) includes this species within his Lower Cretaceous benthonic index Foraminiferida scheme as it is restricted to the Aptian and Albian stages.

Lenticulina *Lenticulina* ex.gr. *nodosa* (Reuss, 1863)
 (Pl. 1, fig. 6)

- 1863 *Robulina nodosa* Reuss: 78, pl. 9, fig. 6.
 1967 *Lenticulina* (*Lenticulina*) *nodosa* (Reuss);
 Michael: 34, pl. 3, figs. 8, 11.
 1974 *Lenticulina* (*Lenticulina*) *nodosa* (Reuss);
 Bartenstein: 540–551, pl. 1, figs. 1–2; text fig. 6
 (*Nodosa*); pl. 1, figs. 3–17; pl. 2, figs. 5–6, 9–12,
 16–17; text figs. 1–7, (*Nodosa nodosa*); pl. 2,
 figs. 26–27; text figs. 1–2, 2–5, 7, (*nodosa*
hilseana); pl. 2, figs. 26–29, text figs. 1–5, 7,
 (*nodosa barremiana*); pl. 2, figs. 7–8, 13–15,
 text figs. 1, 3, 6, (*nodosa gibber*).
 1976 *Lenticulina nodosa* (Reuss); Ascoli: Fig. 27;
 pl. 4, fig. 4; pl. 14, fig. G.

- 1976 *Lenticulina* *Lenticulina nodosa* (Reuss) group;
 Aubert & Bartenstein: pl. 1, figs. 1–21; pl. 2,
 figs. 1–22; pl. 3, figs. 1–8; pl. 4, figs. 1–8.

Remarks. Bartenstein (1974) and Aubert & Bartenstein (1976) have discussed fully the taxonomy, and stratigraphical and worldwide distribution of the *L. (L.) nodosa* group. The material from the Atherfield “Group” is too sparse to enable a “splitting” of the specimens into the various subspecies noted by the above mentioned authors. To place it into the new species *Lenticulina (L.) Kemperi* Aubert & Bartenstein created for Aptian “forms” of the Boreal province would be incorrect.

Stratigraphical range. This species is important stratigraphically in N.W. Germany. Ascoli (1976) uses its first occurrence downhole to denote the Aptian on the Scotian shelf. However, Michael (1967) states that the *L. (L.) nodosa* group represents an iterative evolutionary modification of a smooth “lenticuline” root-stock (e.g. *L. L. muensteri*). Therefore, at successive geological times and in different geographical locations (worldwide) in the Lower Cretaceous “forms” (? homeomorphs) attributable to the *L. (L.) nodosa* group have developed in response to similar ecological conditions. Ideally, each lineage arising from iterative evolution should be given a species name but in practice this is very difficult especially when dealing with borehole cuttings or when the age of the fauna of which the “form” is a member is not precisely known. Therefore these “forms” are of limited use to a stratigrapher but are useful in palaeoecological reconstruction.

Lenticulina (*Lenticulina*) *praegaultina* (Bartenstein, Bettenstaedt & Bolli, 1957)

- 1957 *Lenticulina* (*Lenticulina*) *praegaultina* Bartenstein, Bettenstaedt & Bolli: 24, pl. 3, fig. 48; pl. 4, pgs. 63–65.

Remarks. Only one specimen was found in the Atherfield “Group”. This species is characterised by a broad keeled periphery and transparent sutures which are continuous with a calcareous umbilical callus.

Stratigraphical range. This species has a rare occurrence in the Barremian, Aptian and Albian worldwide.

Lenticulina (*Lenticulina*) *rotulata* (Lamarck, 1804)
 (Pl. 1, figs. 2, 3, 4, 5)

- 1804 *Lenticulites rotulata* Lamarck. Series of
 “Mémoires sur les fossiles des environs de Paris”,
 Annales Mus. Nat. Hist. Paris, Vol. 5, also, 1806,
 Vol. 8, pl. 62(14), fig. 11 (in Ellis & Messina
 Catalogue).
 1973 *Lenticulina*/*Lenticulina*/*rotulata* (Lamarck);
 Magniez-Jannin: 27, pl. 3, figs. 23–28.
 1975 *Lenticulina*/*Lenticulina*/*rotulata* (Lamarck);
 Magniez-Jannin: 100, pl. 9, figs. 3a-b.

Remarks. This species has a closed spire which is regular and a circular periphery which places it distinctively within the morphology of “*Lenticulina*”. It portrays a remarkable variation in a number of characters which have been discussed by Magniez-Jannin (1973). The specimens from the Atherfield “Group” section display the same variation and could conceivably by “split” into a number of morphotypes (species ?) e.g. *Lenticulina subangulata* (Reuss, 1863, p. 74, pl. 8, fig. 7) and *L. macrodisca* (Reuss, 1863, p. 78, pl. 9, fig. 5). Magniez-Jannin (1973) recognises these forms plus others not seen at Atherfield e.g. *L. roemeri* (Reuss, 1863, p. 75, pl. 8, fig. 9) and *L. secans* (Reuss, 1863, p. 214, pl. 9, fig. 7). *L. rotulata* is similar to *L. heiermanni* Bettenstaedt, 1952.

Stratigraphical range. This species has been recorded from the Albian and Lower Aptian of France (Magniez-Jannin, 1973, 1975). It has no stratigraphical importance as an index species but does illustrate the wide range of variation exhibited by a single species which previous authors have “split” into separate species.

Lenticulina (Astaculus) atherfieldensis Crittenden, 1982
(Pl. 1, figs. 7, 8, 9; pl. 2, figs. 10–13)

1973 *Lenticulina Marginulina humilis* (Reuss); Magniez-Jannin: 28, pl. 3, figs. 32–39.

1981 *Lenticulina (Vaginulina) humilis* (Reuss); Colin *et al.*: 127 (non-Reuss, 1863).

1982 *Lenticulina Marginulina humilis* (Reuss); Crittenden, *sensu* Magniez-Jannin, 1973, in press.

1982 *Lenticulina (A.) atherfieldensis* Crittenden, in press.

Remarks. Crittenden (1982) has discussed the taxonomy, morphology, stratigraphical range and geographical distribution of this species. Its presence in the Aptian of the Isle of Wight and France (Magniez-Jannin 1973) demonstrates the iterative evolution of the “form” from a smooth “Lenticuline” rootstock in the Lower Cretaceous.

Lenticulina (Marginulina) aff. Parallela (Reuss, 1863)
(Pl. 1, figs. 14, 15)

1863 *Cristellaria parallela* M. Reuss: 67, pl. 7, figs. 1–2.

1973 *Lenticulina/Marginulina/aff. parallela* (Reuss); Magniez-Jannin: 29, text-fig. 16.

Remarks. An elongate “lenticuline” species which is compressed, has 2–6 chambers in the enrolled stage, with 3–5 in the uniserial stage, has an angular dorsal periphery, a compressed oval cross-section, and depressed slightly curved sutures.

Stratigraphical range. Although very rare in the section studied, this species appears very similar to that described by Magniez-Jannin (1973) from the Lower Aptian of the Paris Basin and to the illustrations of Reuss (1863).

Lenticulina (Marginulina) schloenbachi (Reuss, 1863)
(Pl. 1, figs. 10, 11, 16)

1863 *Cristellaria schloenbachi* Reuss: 65, pl. 6, figs. 14–15.

1938 *Cristellaria* D 63 Hecht: pl. 6a, figs. 76–80.

1973 *Lenticulina Marginulina* aff. *schloenbachi* (Reuss); Magniez-Jannin: 29, text-fig. 15.

1981 “*Lenticulina*” *schloenbachi* (Reuss); Hart *et al.*: 208, pl. 7.18, fig. 5.

Remarks. This species is similar to *Lenticulina (Astaculus) pachynota* (ten Dam) but differs in lacking the limbate, elevated sutures and is not so laterally depressed. Ten Dam’s species has been renamed *L. (A) neopachynota* Bartenstein & Kaefer (1973).

Stratigraphical range. Although occurring very rarely in the Atherfield section its presence is important as it has been previously recorded only from the Upper Ryazanian to the Lower Barremian of Speeton.

Lenticulina (Saracenaria) planiuscula (Reuss, 1863)
(Pl. 1, figs. 12, 13)

1863 *Cristellaria planiuscula* Reuss: 71, pl. 8, fig. 15.

1880 *Cristellaria planiuscula* Reuss; Berthelin: 53, pl. 3, fig. 25.

1954 *Lenticulina planiuscula* (Reuss); Bartenstein: 46.

1966 *Lenticulina (Astaculus) planiuscula* (Reuss); Bartenstein, Bettenstaedt & Bolli: 148, pl. 2, figs. 142–146.

1973 *Lenticulina (Astaculus) planiuscula* (Reuss); Bartenstein & Bolli: 402.

Remarks. A distinctive species which is not very common in the Atherfield ‘group’ section; it has no real stratigraphical value.

Genus *Nodosaria* Lamarck, 1812
Nodosaria harrisi (Vieaux, 1941)
(Pl. 1, fig. 17)

1941 *Nodosaria harrisi* Vieaux: 625, pl. 85, fig. 4.

1973 *Lenticulina/Nodosaria/harrisi* (Vieaux); Magniez-Jannin: 33, pl. 4, figs. 12–13.

Remarks. A species characterised by globular chambers separated by depressed sutures and by the high lamellar ribs; these are depressed as they cross the sutures and join together at the summit of the last chamber to form a small collar around the fine apertural neck.

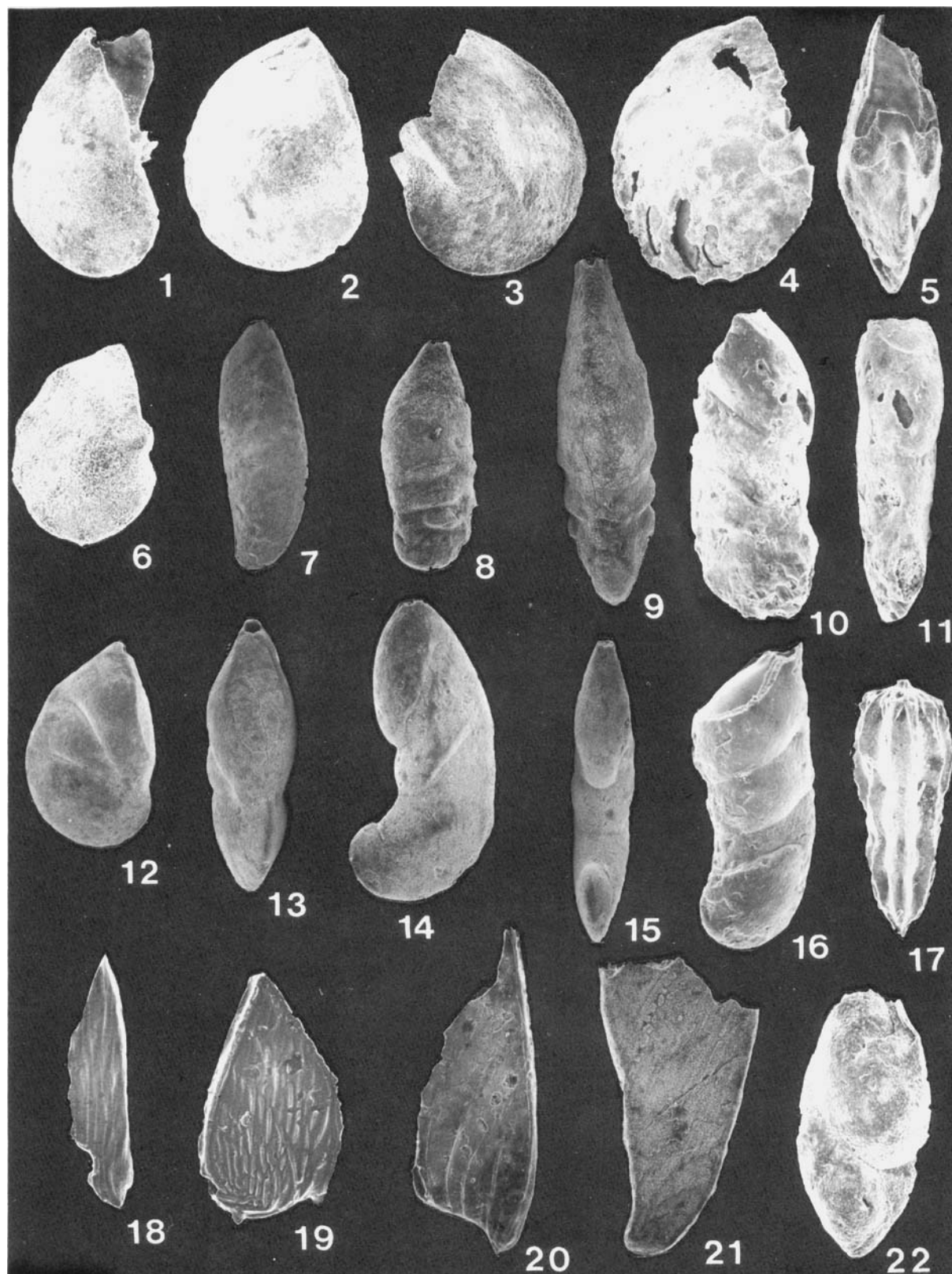
Stratigraphical range. This species is recorded from the Aptian and Albian of the Paris Basin (Magniez-Jannin 1973, 1975) and has no stratigraphical value.

Genus *Citharina* d’Orbigny in de la Sagra, 1839
Citharina aff. *sparsicostata* (Reuss, 1863)
(Pl. 1, figs. 18, 19)

Explanation of Plate 1

The dimensions given are for maximum diameter, except where otherwise stated.

- Fig. 1. *Lenticulina (Lenticulina) gaultina* (Berthelin): lateral view, (x 100), P51168, .50 mm, sample 2.
- Figs. 2, 3, 4, 5. *Lenticulina (Lenticulina) rotulata* (Lamarck): fig. 2, lateral view (x 100), P51169, .40 mm, sample 13; fig. 3, lateral view (x 75), P51170, .50 mm, sample 13; figs. 4, 5, lateral view (x 50), .80 mm, and aperture view showing pyrite infill (x 50), P51171, .80 mm, sample 25.
- Fig. 6. *Lenticulina (Lenticulina) ex. gr. nodosa* (Reuss): lateral view, (x 100), P51172, .35 mm, sample 13.
- Figs. 7, 8, 9. *Lenticulina (Astacolus) atherfieldensis* Crittenden: fig. 7, lateral view (x 39), P51173, .73 mm, sample 21; figs. 8, 9, lateral view (x 52) and ventral view, (x 75), P51174, 1.01 mm, sample 18.
- Figs. 10, 11, 16. *Lenticulina (Marginulina) schloenbachi* (Reuss): figs. 10, 11, lateral view, (x 100) and ventral view (x 100), .50 mm, sample 20, P51175; fig. 16, lateral view (x 75), P51176, .65 mm, sample 20.
- Figs. 12, 13. *Lenticulina (Saracenaria) planiuscula* (Reuss): lateral view (x 75) and ventral view (x 110), P51178, .50 mm, sample 4.
- Figs. 14, 15. *Lenticulina (Marginulina) aff. parallela* (Reuss): lateral view (x 75) and ventral view (x 75), P 51177, .63 mm, sample 18.
- Fig. 17. *Nodosaria harrisi* (Vieaux): lateral view (x 75), P51179, max. length .60 mm, sample 24.
- Figs. 18, 19. *Citharina aff. sparsicostata* (Reuss): fig. 18, lateral view (x 50), SCAC8168, max. length .80 mm, max. width .40 mm; fig. 19, lateral view (x 50), P51180, max. length .80 mm, max. width .25 mm, sample 1.
- Fig. 20. *Citharina aff. discors* (Koch): lateral view (x 50), P51182, max length 1.0 mm, max. width .4 mm, sample 4.
- Fig. 21. *Vaginulina* sp.: lateral view (x 50), P51183, max. length .9 mm, max. width .5 mm, sample 18.
- Fig. 22. *Globulina* sp.: lateral view (x 100), P51184, max. length .5 mm, sample 21.



- 1863 *Vaginulina sparsicostata* Reuss: 50, pl. 4, fig. 4.
 1938 *Vaginulina* D25, D26, D28, Hecht: pl. 21, figs. 1–6a.
 1951 *Citharina sparsicostata* (Reuss); Bartenstein & Brand: 297, pl. 19B, figs. 45–46.
 1973 *Citharina* aff. *sparsicostata* (Reuss); Magniez-Jannin: 34, pl. 4, figs. 1–4.
 1981 *Citharina sparsicostata* (Reuss); Hart *et al.*: 184, pl. 76, fig. 14.

Remarks. The large compressed, triangular outline, keeled dorsal margin, limbate sutures and costate ornament characterise this species and place it specifically very close to *C. sparsicostata* (Reuss). Magniez-Jannin has reported an identical species from the Lower Aptian of France.

Citharina aff. *discors* Koch, 1851
 (Pl. 1, fig. 20)

- 1981 *Citharina* cf. *C. Discors* (Koch); Hart *et al.*: 184, pl. 7.6, figs. 9, 10.

Remarks. The compressed subtriangular test with 12–15 low broad chambers following an ellipsoidal proloculus coupled with the distinctly oblique sutures partially obscured by strong longitudinal costae place this species very close to the species of Koch. Only one specimen was found at Atherfield.

Genus *Fronidularia* Defrance in d'Orbigny, 1826
Fronidularia sp.

Remarks. A single, broken and badly preserved specimen was recovered from the Atherfield section. The proloculus and last chambers were missing.

Genus *Vaginulina* d'Orbigny, 1826
Vaginulina sp.
 (Pl. 1, fig. 21)

Remarks. The poor preservation of the single specimen found in the Atherfield "Group" precludes a precise specific determination. It is similar to *V. kochi* Roemer as it has a smooth test surface.

Family Polymorphinidae d'Orbigny, 1839
 Genus *Globulina* d'Orbigny in de la Sagra, 1839
Globulina sp.
 (Pl. 1, fig. 22)

Remarks. Only one crushed specimen, very similar to the species recorded by Bartenstein & Bolli (1977) from the Lower Aptian Cuche Formation of Trinidad as *G. prisca* (Reuss), was found in the Atherfield section. Magniez-Jannin (1973) records *G. aff. lacrima* (Reuss) from the Aptian of the Paris Basin.

Superfamily Globigerinacea Carpenter, Parker & Jones, 1862

Family Schackoinidae Pokorny, 1958
 Genus *Leupoldina* Bolli, 1958

Leupoldina cabri (Sigal, 1952)
 (Pl. 2, figs. 3, 4)

- 1952 *Schackoina cabri* Sigal: 20, 21, text-fig. 18.
 1959 *Leupoldina protuberans* Bolli: 277, pl. 2, figs. 1–13a.
 ? 1966 *Schackoina cabri* Sigal; Salaj & Samuel: 165, pl. 7, figs. 5a–c.
 1977 *Leupoldina cabri* Sigal; Masters: 424, pl. 14, fig. 4; pl. 15, fig. 1.
 1977 *Leupoldina protuberans* Bolli; Bartenstein & Bolli: 559, pl. 3, figs. 15–17.
 1979 *Schackoina cabri* Sigal; Dupeuble: pl. 3, figs. 7, 8, 11–14.

Remarks. Masters (1977) has discussed the taxonomic position of this genus and species and states that the phylogeny is unknown.

Stratigraphical range. Only one specimen was found from the Atherfield section but this species (as *L. protuberans*) is used as an index species for the Lower Cretaceous *L. protuberans* Zone of the Cuche Formation, Trinidad (topmost Upper Barremian to base Upper Aptian). This species is also recorded from the D.S.D.P. Leg 48 (Sites 401 and 402) in the Bay of Biscay and implies a Tethyan faunal link via the proto-north Atlantic to the Isle of Wight region during the Lower Aptian.

Family Rotaliporidae Sigal, 1958
 Subfamily Hedbergellinae Loeblich & Tappan, 1961
 Genus *Hedbergella* Bronniman & Brown 1958
Hedbergella hoterivica (Subbotina, 1953)
 (Pl. 2, figs. 1, 2)

- 1953 *Globigerina hoterivica* Subbotina: 50, pl. 1, figs. 1–4.
 1959 *Globigerina kugleri* Bolli: 270, pl. 23, figs. 3–5.
 1976 *Caucasella hoterivica* (Subbotina); Ascoli: fig. 29; pl. 1, fig. 3.
 1976 *Hedbergella hoterivica* (Subbotina); Bartenstein: 256, fig. 1.
 1977 *Globigerina hoterivica* (Subbotina); Masters: 460, pl. 22, figs. 1–3.

Remarks. This small planktonic species is easily recognised by its quadrate shape and umbilical aperture. It is very variable in the size of the last four chambers and in the height of the apertural arch. Masters (1977) & Gradstein (1978) discuss the taxonomy of this species. It is known from the Jurassic (Mid-Bathonian) to Mid-Aptian. Van Hinte (1976) restricts it to the Upper Hauterivian. In the Atherfield "Group" this species is rare but quite distinctive.

Hedbergella infracretacea (Glaessner, 1937)

- 1937 *Globigerina infracretacea* Glaessner: 28, text-fig. 1.
 1962 *Hedbergella infracretacea* (Glaessner) = *Globigerina* D11 Hecht 1938; Bartenstein: 129.
 1965 *Hedbergella* sp = *Globigerina* D5 Hecht; Bartenstein: 348.
 1965 *Hedbergella aptiana* = *Globigerina* D9 Hecht; Bartenstein: 347, text-figs. 3–6.
 1977 *Hedbergella infracretacea* (Glaessner); Price: 519, pl. 61, figs. 7–9.

Remarks. Masters (1977, p. 454) places this species in the synonymy of *H. delrioensis* (Carsey) but both Price (1977) and Carter & Hart (1977) have upheld their separate identity while recognising that the two “species” are end members of a complete range of variability (see also Harris, C.S., 1980, unpubl. Ph.D. thesis, Plymouth Polytechnic, C.N.A.A.).

Bartenstein (1962) originally named *Globigerina* D11 of Hecht (1938) as *Hedbergella infracretacea* but later (1965) changed this to *H. delrioensis*. *Globigerina* D9 (Hecht, 1938) has been named by Bartenstein (1965) as *H. aptiana* but really could be placed within the range of variability of the *H. infracretacea-delrioensis* group. The paucity of material from the Isle of Wight favours this approach and Magniez-Jannin’s (1973) illustrations (pl. 4, figs. 31–34) show a typical *H. infracretacea* (her “forme convexe” of *H. infracretacea*) and also (pl. 4, figs. 26–30) show a typical *H. aptiana* (her “forme plate” of *H. infracretacea*). *H. aptiana* is stratigraphically important as an index fossil in the Lower Aptian of N.W. Germany (Bartenstein, 1965; Hecht, 1938) and the present author recognises its importance as an index fossil in the Lower Aptian of the southern North Sea Basin (from boreholes supplied by Shell UK Exploration & Production). For this stratigraphical reason in the southern North Sea both *H. infracretacea* and *H. aptiana* are separated from *H. delrioensis*. This “species” is rare in the Isle of Wight material and is also rare in the Atherfield Clay material of S.E. England (Jaworski, pers. comm.).

Superfamily *Cassidulinacea* d’Orbigny, 1839

Family *Anomalinidae* Cushman, 1927

Genus *Gavelinella* Brotzen, 1942

Gavelinella barremiana Bettenstaedt, 1952
 (Pl. 2, figs. 6, 7)

- 1938 *Anomalina* D11 Hecht (pars): pl. 9b, figs. 55–58; pl. 10b, figs. 71–78; pl. 11b, figs. 48–49, pl. 12a, figs. 66–83.
 1952 *Gavelinella barremiana* Bettenstaedt: 275, pl. 2, fig. 26–29.

Remarks. This is a distinctive species which displays little variation in morphology. It is distinguished from other species of *Gavelinella* by its large number of chambers in the last whorl (10–12), which all increase uniformly in size as added. The last chamber is commonly slightly more inflated, larger and more arcuate. The species evolves into *G. intermedia* and transitional types can be found e.g. *G. brielensis* Malapris.

Stratigraphical range. This species is found in the Middle and Upper Barremian and the Lower Aptian of N.W. Europe.

Gavelinella brielensis Malapris-Bizouard, 1974

- 1973 *Gavelinella* sp. Magniez-Jannin: 40, pl. 4, figs. 23–25.
 1974 *Gavelinella brielensis* Malapris-Bizouard: 19, pl. 1, figs. 11–16.
 1981 *Gavelinella brielensis* Malapris-Bizouard; Hart *et al.*: 192, pl. 7.10, figs. 6–8.

Remarks: This species seems to be the ancestral form of *G. intermedia* and is similar to *G. cf. barremiana* Bettenstaedt *sensu* Bartenstein & Bettenstaedt 1962.

Stratigraphical range. In the U.K. this species is found in the Lower Aptian Atherfield Clay of Kent. It has not been recorded from the north of England, although the present author has seen specimens attributable to *G. brielensis* from the Lower Aptian of the southern North Sea Basin.

Gavelinella ex. gr. *intermedia* (Berthelin, 1880)
 (Pl. 2, fig. 8)

- 1977 *Gavelinella intermedia* (Berthelin); Price: 516, pl. 60, figs. 7, 8.
 1981 *Gavelinella intermedia* (Berthelin); Hart *et al.*: 194, pl. 7.11, figs. 7–9.

Remarks. This species has had a chequered history in the literature but Price (1977) adequately sums up the main points of controversy. Specimens attributable to this group are extremely rare in the Atherfield section on the Isle of Wight.

Stratigraphical range. Essentially an Albian-Cenomanian species although ancestral species are present in the Aptian. The whole *Gavelinella* group in the Lower Cretaceous is in need of further study and revision.

Superfamily Robertinacea, Reuss, 1850.

Family Ceratobuliminidae Cushman, 1927.

Genus *Hoeglundina* Brotzen, 1948.

Hoeglundina chapmani (ten Dam, 1948)
 (Pl. 2, figs. 5, 9)

- 1948 *Epistomina chapmani* ten Dam: 166, pl. 1, fig. 5.
 1950 *Epistomina chapmani* ten Dam; ten Dam: 53, pl. IV, fig. 6.

Explanation of Plate 2

The dimensions given are for maximum diameter, except where otherwise stated.

Figs. 1, 2. *Hedbergella hoterivica* (subbotina): umbilical view (x 100), and edge view (x 100), P51186, .30 mm, sample 20.

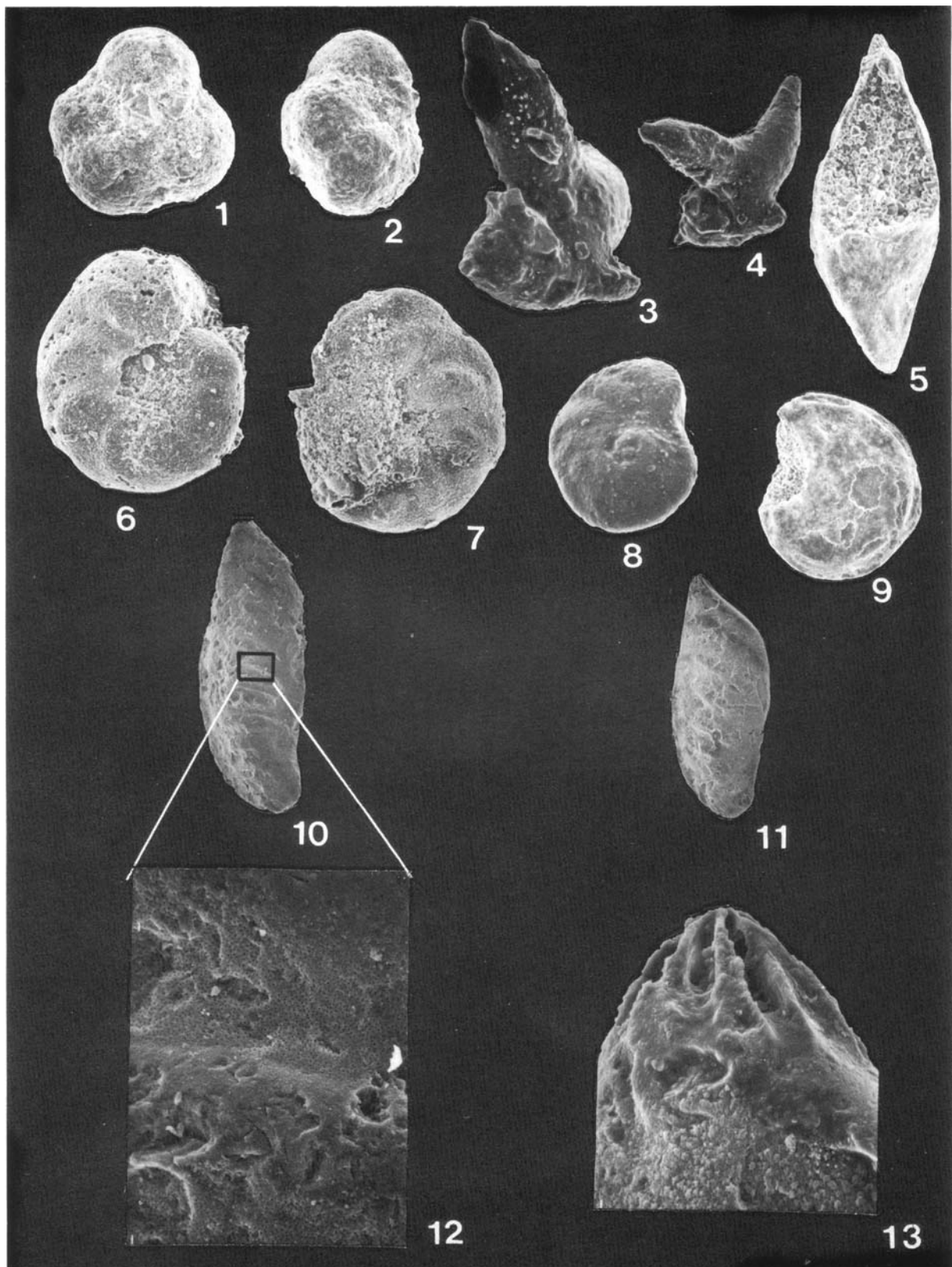
Figs. 3, 4. *Leupoldina cabri* (Sigal): oblique view (x 180) and oblique view (x 100), P51185, .40 mm, sample 4.

Figs. 5, 9. *Hoeglundina chapmani* (ten Dam): edge view (x 175) and ventral view (x 100), P51189, .35 mm, sample 20.

Figs. 6, 7. *Gavelinella barremiana* Bettenstaedt: umbilical view (x 100) and dorsal view (x 100), P51187, .40 mm, sample 13.

Fig. 8. *Gavelinella* ex. gr. *intermedia* (Berthelin): umbilical view (x 100), P51188, .30 mm, sample 12.

Figs. 10, 11, 12, 13. *Lenticulina* (A.) *atherfieldensis* Crittenden: figs. 10, 12, lateral view (x 51) and close up of thickened suture and perforate chamber wall (x 500), P51190, max. length 1.0 mm, sample 18; figs. 11, 13, lateral view (x 52) and close up of aperture (x 520), P51191, max. length .70 mm, sample 21.



- 1973 *Epistomina chapmani* ten Dam; Magniez-Jannin: 41.
 1981 *Hoeglundina chapmani* ten Dam; Hart *et al.*: 206, pl. 7.17, figs. 3–5.

Remarks. This species is obviously related to *H. Caracolla* (Roemer) and *Epistomina hechti* Bartenstein, Bettenstaedt & Bolli, both of which are recorded from the Speeton Clay of N.E. England (Fletcher 1966, unpublished Ph.D. Univ. of Hull). The specimens from the Atherfield “Group” are distinguishable from *H. Caracolla* but are difficult to distinguish from *E. hechti*.

Stratigraphical range. In the U.K. this species is extant from the Lower Aptian to the lowermost Upper Albian and is common in the Atherfield Section.

CONCLUSION

The rotaliine Foraminiferida fauna from the Atherfield “Group” of the type section on the Isle of Wight is sparse and not at all diverse. The fauna is, however, an aid to the identification of the Aptian Stage offshore in the commercially explored areas of the North Sea and the Western Approaches. This paper will, hopefully, stimulate further research on the neglected Aptian Foraminiferida faunas of the United Kingdom.

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