

Revision of the Gault foraminifera from the Hollis and Neaverson Collection (1921)

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ABSTRACT – In 1921, Hollis and Neaverson listed 135 species and varieties of foraminifera from the Gault Phosphatic Nodule Bed at Ford, Buckinghamshire, England. The material has been re-examined, the list is brought up to date and the species are figured. The Collection has yielded a diverse and well preserved foraminiferal fauna of 90 species. Nodosariacea are the dominant group, though Ataxophragmiacea, Hedbergellacea and Miliolacea are abundant. The recorded assemblages allow us to date the Phosphatic Nodule Bed at Ford as belonging to the uppermost *Euhoplites lautus* Zone to lower part of *Mortonicerias inflatum* Zone within the Albian standard ammonite zonation. *J. Micropalaeontol.* 16(1): 73–84, May 1997.

INTRODUCTION

Hollis and Neaverson (1921) published a short paper on the Gault foraminifera from the workings for phosphatic nodules at Ford, four miles southwest of Aylesbury, Buckinghamshire (England). They listed 135 species and varieties of foraminifera but neither descriptions nor illustrations were given by the authors. After their paper no other workers have given additional information about the foraminifera of the Gault at Ford. In fact, no references to the paper of Hollis and Neaverson (1921) have been found in the Early Cretaceous literature of Great Britain except for one by Crittenden (1988: p. 19, Unpublished Ph.D. Thesis, Plymouth Polytechnic).

The location of the site in which the Gault was worked at

Ford for phosphatic nodules is not known exactly. In their paper, Hollis and Neaverson (1921) commented that the workings from which Hollis had collected his material in 1919 were abandoned and nothing remained but the spoil-heap which was by then (1921) completely grassed over. The available information, about the fields where the workings are said to have been (Fig. 1), was provided by the locals or elderly relatives of the locals to the Buckinghamshire County Museum (pers. comm. Ms K. M. Hawkins, Keeper of Biology and Geology of that Museum).

The only description of the nodules beds is that of Keeping, who saw earlier workings near Ford in 1876. According to Jukes-Brown, who incorporated his observations into his

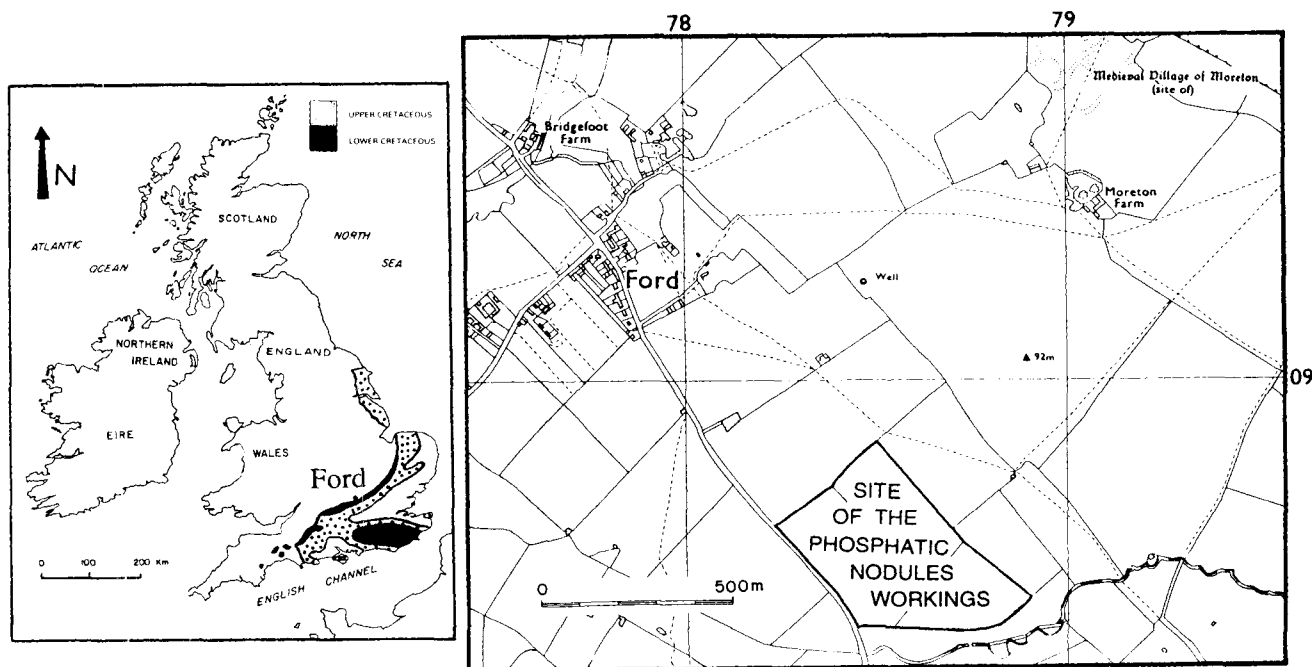


Fig. 1. Cretaceous outcrops in southern Britain and location of the site of phosphatic nodules ('coprolites') workings, modified from sheet SP 70 NE (by courtesy of Ms K. M. Hawkins, Buckinghamshire County Museum, Aylesbury).

memoir (1900), the nodules were worked on this occasion between the years 1875 and 1884. Keeping's remarks include the following:

The coprolite seam is 3 to 4 inches thick and is constant throughout the pit, though the bed is irregular in position. The irregularity is of two kinds, the commonest being slips of a few inches (4 to 10), cutting off the seam with a clear face marked by slickensides; in other cases the bed is bent downwards to a similar extent, and this bending is due, I am inclined to think, to subsequent folding and not to irregularity of deposition.

The matrix of the seam is a stiff calcareous clay crowded with phosphatised shells and lumps of 'coprolite' which in my cursory search, I could not prove to have suffered from erosion previous to being embedded in the Gault, while some of them, such as *Hamites* were in such a condition that they could not have sustained much knocking about on a shore.

Above the [nodule] bed comes a hard clay with iron-stained joint planes, which is covered by a true clay, somewhat lighter in colour than ordinary Gault, and containing a second irregular coprolite zone in a series of lenticular patches. Its nodules are smaller than in the regular seam below.

It should be noted that the emphasis on structural relationships in this account may be explained by the fact that Keeping was teaching geology at Aberystwyth at this time and attempting to work out the structure of Plynlimmon!

Jukes-Brown visited the workings in 1885 after they had been abandoned but was able to collect fossils. Collections were also made by a local schoolmaster (Mr Hayter of Monks Risborough) which put together with those of Keeping presented a 'curious assemblage for the Lower Gault', including 'Ammonites' *auritus*, *cristatus* and *lautus*.

Hollis and Neaverson in their remarks on the ammonites said,

Judging by specimens of ammonites in the Bucks. County Museum, Aylesbury, the deposit worked belonged to the zones of *Hoplites auritus* and *H. lautus*. At the typical locality of Folkestone, these zones occupy 17 feet out of a total of 99 feet for the whole of the Gault; but at Ford only three or four feet seem to have been worked. Critical zonal study is, of course, impossible; ...

We were pleasantly surprised to discover that there were three different sets of slides of the Hollis and Neaverson Collection of the Gault at Ford. One set is located in the Buckinghamshire County Museum (Aylesbury, England), the other one in the Natural History Museum (London, England) and the last one in the Micropalaeontological Museum of the University of Wales (Aberystwyth, Wales). The first two sets in the Museums were donated by E. Hollis while the third one was eventually deposited at Aberystwyth when acquired by Prof. A. Wood from Neaverson who had been his research supervisor at Liverpool University.

The aim of this work is to bring up to date the list of foraminifera of the Hollis and Neaverson paper, document the three scattered collections of slides and their contents and illustrate all the species, which are mostly represented by very well preserved specimens. On this basis we will attempt to relate the fauna to the modern, foraminiferal biostratigraphy of the

Gault, foraminiferal ranges now being regarded as somewhat more 'critical' than in the time of Hollis and Neaverson who were under the heavy influence of Chapman and the 'English School'.

MATERIAL

The state and characteristics of the collections are described below.

Buckinghamshire County Museum (Aylesbury)

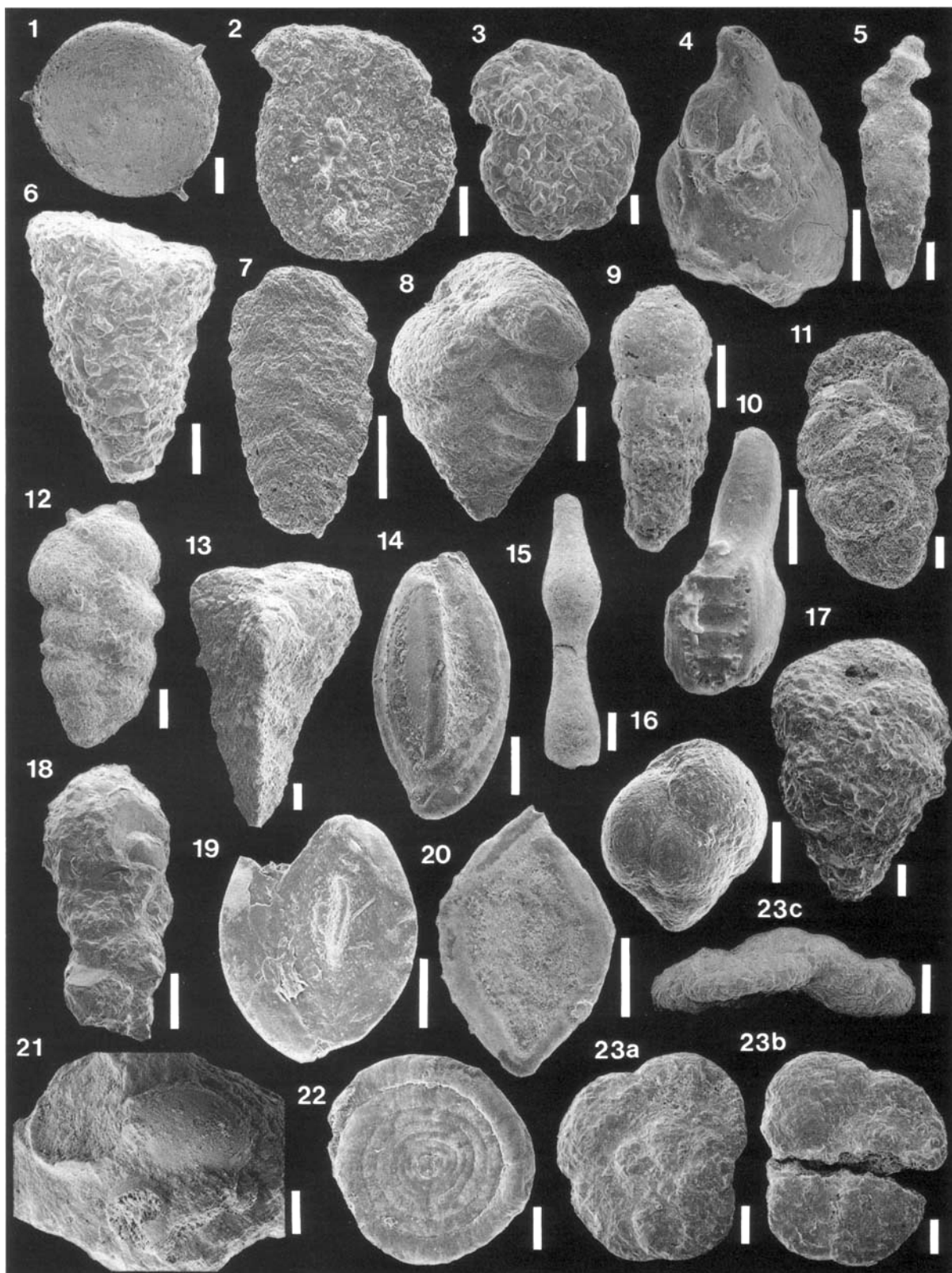
The set consists of slides made of cedar-wood, originally without cover-glasses (covered in the course of this study). The accession register, number 38, dates from 29 January 1920, and to quote from it, describes the collection as consisting of '108 microscope slides, foraminifera from Gault, Ford, Bucks., collected by Hollis 1919'. They are well set out and labelled but the information on them is limited. The labels are arranged in horizontal orientation and comprise on the left side the generic and/or specific identification and the locality and unit (Gault, Ford, Bucks.) and on the right side the specific classification, or nothing. On the back of the slides is written 'E. Hollis 1919' and the slide number (see Tables 1 & 2). As it now stands, the collection includes 124 slides (Trays 38:20). Of them, 17 slides contain specimens as yet unidentified (perhaps not originally registered) and 107 slides with identified specimens. Of the 107, four have specimens with only generic classification [*Nodosaria* (two slides), *Pleurostomella* (one slide) and *Pulvinulina* (one slide)], two have specimens left in open nomenclature (*Nodosaria* sp.) and 101 have specimens with specific identification. Of all the species and varieties that are identified on the slides, 106 are included in Hollis and Neaverson's list published in 1921 and 28 are not included. In addition, there are 29 species on the list which were not found in the slides (see Tables 1 & 2).

Natural History Museum (London)

As in the Aylesbury collection the slides are made of cedar-wood and without cover-glasses. The labels are arranged in the same way. The only difference is that there are no labels on the back of the slides. The accession register indicates that the material was deposited by E. Hollis in 1926 and the register numbers are from P23018 to P23232 (Tray Q94). All the slides have specific identification and of those, 56 are included in the published list of Hollis and Neaverson, 10 are not in it and 79 species and varieties of the list were not found in the slides (see Tables 1 & 2).

Micropalaeontological Museum, University of Wales (Aberystwyth)

This last set consists of 47 slides, also made of cedar-wood, originally without cover-glasses and now with them, attached in the course of this work. The labels on the slides are arranged in vertical orientation. The label includes at the top the following items: 'Foraminifera, Gault, Ford, Bucks., Aug. 1919, Eng.'. The generic and specific identification is written down in ink or in pencil at the bottom of the label. The accession number is JH.389 and now all the slides have been numbered (see Tables 1 & 2). Two of the slides contain specimens as yet unidentified, another two with only generic classification (*Bulimina* and *Nodosaria*) and 43 with specific identification. Of all the species



Explanation of Plate 1. Hollis and Neaverson Collection of the Gault of Ford (Buckinghamshire, England). Unless specified, all the specimens are from the Micropalaeontological Museum, University of Wales (Aberystwyth). Scale bars 100 μ m. Fig. 1. *Thurammina* sp., AYBCM.1920.38.1.6, Buckinghamshire County Museum (Aylesbury). Fig. 2. *Ammodiscus cretaceus* (Reuss, 1845), JH.389.7.1. Fig. 3. *Haplophragmoides nonionoides* (Reuss, 1863), JH.389.5.3. Fig. 4. *Haplostiche?* *sherborni* Chapman, 1892, JH.389.6.14. Fig. 5. *Spiroplectinata annectens* (Parker & Jones, 1863), JH.389.14.12. Fig. 6. *Dorothia turris* (d'Orbigny, 1840), JH.389.9.8. Fig. 7. *Textularia minuta* Berthelin, 1880, JH.389.8.6. Fig. 8. *Textularia chapmani* Lalicker, 1935, JH.389.8.5. Fig. 9. *Bigerina?* *asperula* (Chapman, 1896), JH.389.38.2. Fig. 10. *Nodobacularia nodulosa* (Chapman, 1891), JH.389.1.16. Fig. 11. *Gaudryina dispansa* Chapman, 1892, JH.389.14.10. Fig. 12. *Gaudryina gradata* Berthelin, 1880, JH.389.10.11. Fig. 13. *Tritaxia pyramidata* Reuss, 1863, JH.389.13.13. Fig. 14. *Quinqueloculina antiqua* (Franke, 1928), JH.389.3.17. Fig. 15. *Nubeculinella?* sp., AYBCM.1920.38.3.1, Buckinghamshire County Museum (Aylesbury). Fig. 16. *Eggerellina mariae* Ten Dam, 1950, JH.389.9.9. Fig. 17. *Arenobulimina chapmani* Cushman, 1936, JH.389.15.7. Fig. 18. *Reophax* sp., JH.389.4.4. Fig. 19. *Spiroloculina gaultina* (Ten Dam, 1950), JH.389.2.19. Fig. 20. *Spiroloculina cretacea* Reuss, 1854, JH.389.2.18. Fig. 21. *Nubecularia?* *depressa* Chapman, 1891, AYBCM.1920.38.4.1, Buckinghamshire County Museum (Aylesbury). Fig. 22. *Cornuspira cretacea* (Reuss, 1845), JH.389.7.15. Fig. 23. *Trochammina concava* Chapman, 1892, AYBCM.1920.38.18.1, Buckinghamshire, County Museum (Aylesbury), (a) dorsal view, (b) ventral view, (c) lateral view.

	B C M Slide number	N H M Register number	M M (U W A) Slide no.
1	Anomalina rudis (Reuss)	102	—
2	Clavulina angularis d'Orbigny	19	—
3	Cristellaria latifrons Brady	97	P23128-23129
4	Cristellaria linearis Reuss	84	—
5	Cristellaria mamilligera Karrer	90	—
6	Cristellaria tripleura Reuss	97	—
7	Flabellina didyma (Berthelin)	65	P23087
8	Fronicularia didyma Berthelin	—	26
9	Globigerina aequilateralis Brady	99	—
10	Haplophragmium nontonooides Reuss	14	P23111
11	Marginulina folkenstoniensis Chapman	69	—
12	Nodosaria inflata Reuss	40	—
13	Nodosaria (G.) laevigata d'Orbigny	38	P23102
14	Nubecularia depressa Chapman	4	—
15	Nubecularia tibia (Jones & Parker)	3	—
16	Polymorphina angusta Egger	79	—
17	Polymorphina communis d'Orbigny	80	—
18	Polymorphina compressa d'Orbigny	79	—
19	Polymorphina gibba d'Orbigny	81	—
20	Polymorphina lactea (Walker)	81	—
21	Polymorphina sosoria Reuss	81	—
22	Polymorphina sosoria var. cuspidata Brady	80	—
23	Pulvinulina reticulata Reuss	105	P23157
24	Spiroloculina asperula Karrer	—	42 ⊕ 2 ⊕
25	Textularia gramen d'Orbigny	24	P23170-23172
26	Thurammina papillata Brady	17	P23193-23197
27	Trochammina concava Chapman	18	P23100
28	Vaginulina arguta Reuss	77	P23039
29	Vaginulina recta var. tenuistriata Chapman	77	—
30	Vaginulina truncata var. robusta B. & C.	73	P23093-23096

Table 2. List of species found in the slides and not included in the published list of Hollis and Neaverson (1921). ⊕, the specific identification is written in pencil.

and varieties, 103 (75 written in ink and 28 in pencil) are included in the list of Hollis and Neaverson, three are not in it and 32 specific names on the list were not found in the slides (see Tables 1 & 2).

Combining the three sets of slides, 1311 specimens of foraminifera of the Gault at Ford have been examined (423 from the Buckinghamshire County Museum, 214 from the Natural History Museum and 674 from the Micropalaeontological Museum of the University of Wales). Specimens of two species and two varieties of the original published list of Hollis and Neaverson [*Haplophragmium globigeriniforme* (Parker & Jones), *Gaudryina oxycona* Reuss, *Polymorphina fusiformis* Roemer var. *horrida* Reuss and *Polymorphina lactea* (Walker & Jacobs) var. *acuplacentia* (J. & C.)] are not in either of the three sets (see Table 1), so unfortunately they could not be included in this work.

RESULTS

In bringing up-to-date the list of species names used by Hollis and Neaverson for the Foraminifera of the Gault (see Table 1), it has been necessary to change most of the generic names and a number of specific names as well. In part this simply reflects progress in taxonomic discrimination but also the tendency of the members of the 'English School', such as Chapman, to apply Recent names to fossil species. However, in his work on the Gault, Chapman (1891–1898) recognized many new species and accepted many set up by Continental authors. Interestingly, this preceded the disastrous 'discovery' of the supposed Cambrian foraminifera of the Malverns in 1900 which seemed to confirm all the prejudices of the 'English School'.

In Table 3, the updated names used in this work are in the left column and are arranged following the foraminiferal classification of Haynes (1981). The right column includes the equivalencies of the list of Hollis and Neaverson (1921). The species with an asterisk are those that are not included in the published list but were found in the slides. The 'p.p.' for some species is explained at the end of the table.

The agglutinated foraminifera are represented by two species of the Order Astrorhizida and 14 of the Order Lituolida. Of them, two species, *Thurammina* sp. and *Reophax* sp., have been left in open nomenclature and another, *Bigerina? asperula* (Chapman), with doubtful generic identification due to the bad preservation of the initial portion of the test in all the examined specimens. In addition, *Sagrina calcarata* (Berthelin) although on the list could not be identified because it is represented in the slide by two indeterminate fragments of agglutinated foraminifera only. The species *Ammodiscus millettianus* Chapman was misidentified by Hollis and Neaverson (1921) as in the slide there are only four fragments of organic carbonates.

The porcelaneous foraminifera, Order Miliolida, are represented by a significant number of specimens belonging to seven species. One of them, *Nubecularia? depressa* Chapman has been left with doubtful generic identification as it is not possible to see the initial portion of the test in the specimen of the collection. The specimen that Hollis and Neaverson named *Nubecularia tibia* (Parker & Jones) has been left in open nomenclature as only the last two free chambers are preserved.

The Order Nodosariida is the best, well-represented group. Sixty species have been identified (50 of the Superfamily Nodosariacea, three of the Superfamily Polymorphinacea and seven of the genus *Ramulina*). The specimens of *Lingulina nodosaria* Reuss, *Nodosaria (Dentalina) mucronata* (Neugeboren) and *Nodosaria prismatica* Reuss of the list are completely broken and badly preserved so they have been left as indeterminate fragments of *Lingulina*, *Dentalina* and *Nodosaria*, respectively. Six other species have been left in open nomenclature (*Dentalina* sp., *Fronicularia* sp., *Marginulina* sp., *Nodosaria* sp., *Planularia* sp. and *Ramulina* sp.).

The other groups represented are the Order Buliminida, Superfamily Cassidulinacea, the Order Robertinida, Superfamily Ceratobuliminacea, the Order Rotaliida, Superfamily Discorbacea, and the Order Globigerinida, Superfamily Hedbergellacea. Although only a few species have been identified in all these groups there are a significant number of specimens, especially in the case of the Hedbergellacea [*Hedbergella infracretacea* (Glaessner)] and Discorbacea [*Gavelinella intermedia* (Berthelin)].

The material under the names *Clavulina angularis* d'Orbigny, *Polymorphina communis* d'Orbigny, *Polymorphina sosoria* var. *cuspidata* Brady and the specimens of *Reophax scorpiurus* Montfort of the Buckinghamshire County Museum, are here considered as *incertae sedis*.

A brief and quick analysis of the composition of the assemblages in the Gault at Ford shows that in number of specimens, the dominant species is *Hedbergella infracretacea* (Glaessner). *Gavelinella intermedia* (Berthelin) is also abundant. Among the Nodosariida, *Vaginulina recta* Reuss and *Lenticulina gaultina* (Berthelin) are the commonest species. *Arenobulimina chapmani* Cushman, *Spiroplectinata annectens* (Parker & Jones)

Order Astorhizida

Superfamily Ammodiscacea

<i>Ammodiscus cretaceus</i> (Reuss, 1845) Pl. 1, fig. 2.	<i>p.p. Ammodiscus incertus</i> (d'Orbigny), 1
<i>Thuramina</i> sp. Pl. 1, fig. 1	<i>p.p. Thuramina albicans</i> Brady, 2 <i>Thuramina papillata</i> Brady*

Order Lituolida

Superfamily Lituolacea

<i>Bigerina</i> ? <i>asperula</i> (Chapman, 1896) Pl. 1, fig. 9.	<i>Sagrina asperula</i> Chapman
<i>Haplophragmoides nontontinoides</i> (Reuss, 1863) Pl. 1, fig. 3	<i>Discorbina rugosa</i> (d'Orbigny) <i>Haplophragmium acutidorsatum</i> Hantk.
<i>Reophax</i> sp. Pl. 1, fig. 18.	<i>p.p. Reophax scorpiurus</i> Montfort, 3 <i>p.p. Nodosaria (D.) consobrina</i> (Orb.), 4
<i>Textularia chapmani</i> Lalicker, 1935 Pl. 1, fig. 8.	<i>p.p. Textularia conica</i> d'Orbigny, 5 <i>p.p. Textularia praelonga</i> Reuss, 6
<i>Textularia minuta</i> Berthelin, 1880 Pl. 1, fig. 7.	<i>Textularia minuta</i> Berthelin
<i>Haplostiche</i> ? <i>sherborni</i> Chapman, 1892 Pl. 1, fig. 4.	<i>Haplostiche sherborni</i> Chapman

Superfamily Ataxophragmiacea

<i>Arenobulimina chapmani</i> Cushman, 1936 Pl. 1, fig. 17.	<i>Bulimina affinis</i> d'Orbigny <i>Bulimina obtusa</i> d'Orbigny <i>Bulimina orbigny</i> Reuss <i>Bulimina murchisoniana</i> d'Orbigny #
<i>Dorothia turris</i> (d'Orbigny, 1840) Pl. 1, fig. 6.	<i>Textularia trochus</i> d'Orbigny <i>Textularia turris</i> d'Orbigny <i>p.p. Textularia conica</i> d'Orbigny, 7
<i>Eggerellina mariae</i> Ten Dam, 1950 Pl. 1, fig. 16.	<i>Bulimina brevis</i> d'Orbigny
<i>Gaudryina dispansa</i> Chapman, 1892 Pl. 1, fig. 11.	not identified
<i>Gaudryina gradata</i> Berthelin, 1880 Pl. 1, fig. 12.	<i>Gaudryina rugosa</i> d'Orbigny <i>Textularia agglutinans</i> d'Orbigny <i>Textularia gramen</i> d'Orbigny* <i>p.p. Textularia praelonga</i> Reuss, 6
<i>Spiroplectinata annectens</i> (Parker & Jones, 1863) Pl. 1, fig. 5.	<i>Spiroplecta annectens</i> (Parker & Jones) <i>Spiroplecta complanata</i> (Reuss) <i>Textularia complanata</i> (Reuss)
<i>Tritaxia pyramidata</i> Reuss, 1863 Pl. 1, fig. 13.	<i>Tritaxia pyramidata</i> Reuss <i>Tritaxia tricarinata</i> Reuss <i>Verneuilina triquetra</i> (Münster)
<i>Trochammina concava</i> Chapman, 1892 Pl. 1, fig. 23a-c.	<i>Trochammina concava</i> Chapman*

Order Miliolida

Superfamily Nubeculariacea

<i>Cornuspira cretacea</i> (Reuss, 1845) Pl. 1, fig. 22.	<i>p.p. Ammodiscus incertus</i> (d'Orbigny), 1
<i>Nodobacularia nodulosa</i> (Chapman, 1891) Pl. 1, fig. 10.	<i>Nubecularia nodulosa</i> Chapman
<i>Nubecularia</i> ? <i>depressa</i> Chapman, 1891 Pl. 1, fig. 21.	<i>Nubecularia depressa</i> Chapman*
<i>Nubeculinella</i> ? sp. Pl. 1, fig. 15.	<i>Nubecularia tibia</i> (Jones & Parker)*

Superfamily Miliolacea

<i>Quinqueloculina antiqua</i> (Franke, 1928) Pl. 1, fig. 14.	<i>Miliolina ferussacii</i> (d'Orbigny) <i>Miliolina tricarinata</i> (d'Orbigny) <i>Miliolina venusta</i> (Karrer)
<i>Spiroloculina cretacea</i> Reuss, 1854 Pl. 1, fig. 20.	<i>Spiroloculina asperula</i> Karrer* <i>p.p. Spiroloculina nitida</i> d'Orbigny, 8
<i>Spiroloculina gaultina</i> (Ten Dam, 1950) Pl. 1, fig. 19.	<i>p.p. Spiroloculina nitida</i> d'Orbigny, 8

Order Nodosariida

Superfamily Nodosariacea

<i>Astaculus tripleura</i> Reuss, 1860 Pl. 2, fig. 1.	<i>Cristellaria latifrons</i> Brady* <i>Cristellaria tripleura</i> Reuss*
<i>Citharinella didyma</i> (Berthelin, 1880) Pl. 2, fig. 2.	<i>Flabellina didyma</i> (Berthelin)* <i>Frondicularia didyma</i> Berthelin* <i>Frondicularia perovata</i> Chapman

<i>Dentalina debilis</i> (Berthelin, 1880) Pl. 2, fig. 3.	<i>Marginulina debilis</i> Berthelin
<i>Dentalina distincta</i> Reuss, 1860 Pl. 2, fig. 4.	<i>Marginulina linearis</i> Reuss <i>Nodosaria (G.) cylindracea</i> Reuss <i>Nodosaria (D.) cylindroides</i> Reuss <i>Nodosaria (D.) hamulifera</i> Reuss <i>Nodosaria (D.) lornetana</i> (d'Orbigny) <i>Nodosaria (D.) soluta</i> (Reuss) <i>Nodosaria (D.) xiphoides</i> Reuss <i>p.p. N. (D.) communis</i> d'Orbigny, 9 <i>p.p. Nodosaria (D.) farcimen</i> Reuss, 10
<i>Dentalina gracilis</i> (d'Orbigny, 1840) Pl. 2, fig. 11.	<i>Nodosaria (D.) gracilis</i> (d'Orbigny) <i>p.p. N. (D.) consobrina</i> (d'Orbigny), 11
<i>Dentalina legumen</i> (Reuss, 1845) Pl. 2, fig. 8.	<i>Marginulina folkstoniensis</i> Chapman* <i>Nodosaria (D.) legumen</i> Reuss
<i>Dentalina pseudonana</i> Ten Dam, 1950 Pl. 2, fig. 10.	<i>Nodosaria (D.) roemeri</i> (Neugboren)
<i>Dentalina pulchella</i> (Chapman, 1893) Pl. 2, fig. 7.	<i>Nodosaria (D.) soluta</i> (Reuss) var. <i>pulchella</i> Chapman
<i>Dentalina</i> sp. aff. <i>D. intercellularis</i> (Brady, 1881) Pl. 2, fig. 13.	<i>Nodosaria (D.) intercellularis</i> Brady <i>Nodosaria (D.) raristriata</i> Chapman
<i>Dentalina</i> sp. Pl. 2, fig. 21.	<i>Nodosaria (D.) pauperata</i> d'Orbigny <i>p.p. Nodosaria (D.) farcimen</i> Reuss, 10
<i>Frondicularia denticulocarinata</i> Chapman, 1894 Pl. 2, fig. 14.	<i>Frondicularia denticulocarinata</i> Chapman
<i>Frondicularia gaultina</i> Reuss, 1860 Pl. 2, fig. 9.	<i>Frondicularia gaultina</i> Reuss
<i>Frondicularia pinnaeformis</i> Chapman, 1894 Pl. 2, fig. 6.	<i>Frondicularia fritschi</i> Reuss
<i>Frondicularia planifolia</i> Chapman, 1894 Pl. 2, fig. 5.	<i>Frondicularia cordai</i> Reuss <i>Frondicularia guesfatica</i> Reuss <i>Frondicularia microdisca</i> Reuss <i>Frondicularia parkeri</i> Reuss <i>Frondicularia planifolia</i> Chapman <i>Frondicularia ungeri</i> Reuss
<i>Frondicularia</i> sp. Pl. 2, fig. 12.	<i>Frondicularia</i> cf. <i>strigillata</i> Reuss
<i>Lagena apiculata</i> (Reuss, 1851) Pl. 2, fig. 16.	<i>Lagena apiculata</i> Reuss <i>Lagena apiculata</i> var. <i>emaciata</i> Reuss <i>p.p. Lagena hispida</i> Reuss, 12
<i>Lagena</i> aff. <i>hispida</i> Reuss, 1863 Pl. 2, fig. 15.	<i>Lagena gracillima</i> (Seguenza) <i>p.p. Lagena hispida</i> Reuss, 13
<i>Lenticulina circumcidanea</i> (Berthelin, 1880) Pl. 2, fig. 17.	<i>Cristellaria circumcidanea</i> Berthelin
<i>Lenticulina diademata</i> (Berthelin, 1880) Pl. 2, fig. 18.	<i>Cristellaria diademata</i> Berthelin
<i>Lenticulina gaultina</i> (Berthelin, 1880) Pl. 2, fig. 20.	<i>Cristellaria gaultina</i> Berthelin <i>Cristellaria gibba</i> d'Orbigny <i>Cristellaria mamilligera</i> Karrer* <i>Cristellaria rotulata</i> (Lamarck) <i>C. rotulata</i> (L.) var. <i>macrodiscus</i> Reuss <i>Cristellaria sternalis</i> Berthelin <i>Cristellaria turgidula</i> Reuss
<i>Lenticulina turgidula</i> (Reuss, 1863) Pl. 2, fig. 19.	<i>Cristellaria convergens</i> Bornemann <i>Cristellaria lobata</i> (Costa) <i>Cristellaria sulcifera</i> Reuss
<i>Lingulina loryi</i> Berthelin, 1880 Pl. 2, fig. 22.	<i>Frondicularia loryi</i> Berthelin
<i>Lingulina semiornata</i> Reuss, 1863 Pl. 2, fig. 23.	<i>Lingulina semiornata</i> Reuss
<i>Marginulina inaequalis</i> Reuss, 1860 Pl. 2, fig. 24.	<i>Cristellaria humilis</i> Reuss <i>Marginulina glabra</i> d'Orbigny <i>Marginulina inaequalis</i> Reuss
<i>Marginulina jonesi</i> (Reuss, 1863) Pl. 3, fig. 1.	<i>Marginulina aequivoca</i> Reuss <i>Marginulina jonesi</i> Reuss
<i>Marginulina linearis</i> (Reuss, 1863) Pl. 3, fig. 2.	<i>Cristellaria linearis</i> Reuss*
<i>Marginulina striatocostata</i> (Reuss, 1863) Pl. 3, fig. 3.	<i>Marginulina striatocostata</i> Reuss

Table 3. Left column: updated names used in this work. Right column: list of Hollis and Neaveison. Footnote explanations at end of table.

Table 3 continued

<i>Marginulina</i> sp. Pl. 3, fig. 4.	<i>Cristellaria exilis</i> Reuss
<i>Nodosaria</i> cf. <i>affinis</i> Reuss, 1845 Pl. 3, fig. 5.	<i>p.p. Nodosaria orthopleura</i> Reuss, 14
<i>Nodosaria</i> cf. <i>bambusa</i> Chapman, 1893 Pl. 3, fig. 8.	<i>Nodosaria bambusa</i> Chapman
<i>Nodosaria fontannesii</i> (Berthelin, 1880) Pl. 3, fig. 6.	<i>Nodosaria (D.) fontannesii</i> (Berthelin) <i>Nodosaria inflata</i> Reuss*
<i>Nodosaria obscura</i> Reuss, 1845 Pl. 3, fig. 10.	<i>Nodosaria (D.) obscura</i> Reuss
<i>Nodosaria orthopleura</i> Reuss, 1863 Pl. 3, fig. 7.	<i>Nodosaria tetragona</i> Reuss <i>p.p. Nodosaria orthopleura</i> Reuss, 14
<i>Nodosaria paupercula</i> Reuss, 1845 Pl. 3, fig. 13.	<i>Nodosaria (D.) paupercula</i> Reuss
<i>Nodosaria sceptrum</i> Reuss, 1863 Pl. 3, fig. 19.	<i>Nodosaria sceptrum</i> Reuss
<i>Nodosaria</i> sp. Pl. 3, fig. 9.	<i>Nodosaria (D.) tenuicosta</i> Reuss
<i>Planularia bradyana</i> (Chapman, 1894) Pl. 3, fig. 11.	<i>Cristellaria bradyana</i> Chapman <i>p.p. Cristellaria complanata</i> Reuss, 15
<i>Planularia</i> cf. <i>priceana</i> (Chapman, 1894) Pl. 3, fig. 14.	<i>Vaginulina priceana</i> Chapman
<i>Planularia vestita</i> (Berthelin, 1880) Pl. 3, fig. 15.	<i>Cristellaria bononiensis</i> Berthelin <i>Cristellaria vestita</i> Berthelin
<i>Planularia</i> sp. Pl. 3, fig. 16.	<i>p.p. Cristellaria complanata</i> Reuss, 16 <i>p.p. Cristellaria crepidula</i> (F. & M.), 17
<i>Pseudonodosaria mutabilis</i> (Reuss, 1863) Pl. 3, fig. 12.	<i>Nodosaria (G.) laevigata</i> d'Orbigny* <i>Nodosaria (G.) mutabilis</i> (Reuss) <i>Nodosaria calomorpha</i> Reuss <i>Nodosaria radícula</i> (L.) var. <i>jonesi</i> R. <i>Nodosaria (G.) humilis</i> Römer
<i>Saracenaria navicula</i> (d'Orbigny, 1840) Pl. 3, fig. 17.	<i>Cristellaria italica</i> (Defrance) <i>Cristellaria navicula</i> d'Orbigny
<i>Saracenaria triangularis</i> (d'Orbigny, 1840) Pl. 3, fig. 18.	<i>Cristellaria triangularis</i> d'Orbigny
<i>Tristix excavatum</i> (Reuss, 1863) Pl. 3, fig. 24.	<i>Rhabdognium excavatum</i> Reuss <i>Rhabdognium tricarinatum</i> (d'Orbigny)
<i>Tristix gaultina</i> Khan, 1950 Pl. 3, fig. 26.	not identified
<i>Vaginulina gaultina</i> Berthelin, 1880 Pl. 3, fig. 21.	<i>Vaginulina gaultina</i> Berthelin
<i>Vaginulina humilis</i> (Reuss, 1863) Pl. 3, fig. 23.	<i>Cristellaria scitula</i> Berthelin <i>Vaginulina biocheri</i> Berthelin <i>p.p. Cristellaria crepidula</i> (F. & M.), 17
<i>Vaginulina mediocarinata</i> Ten Dam, 1950 Pl. 3, fig. 22.	<i>Vaginulina recta</i> var. <i>tenuistriata</i> Chap.* <i>Vaginulina strigillata</i> (Reuss)
<i>Vaginulina parallela</i> (Reuss, 1863) Pl. 3, fig. 25.	<i>Cristellaria parallela</i> (Reuss) <i>Cristellaria trunculata</i> Berthelin
<i>Vaginulina recta</i> Reuss, 1863 Pl. 3, fig. 20.	<i>Vaginulina arguta</i> Reuss* <i>Vaginulina recta</i> Reuss <i>Vaginulina truncata</i> Reuss <i>V. truncata</i> var. <i>robusta</i> B. & C.*

Superfamily Polymorphinacea

<i>Globulina lacrima</i> (Reuss, 1845) fistulose form Pl. 4, fig. 1.	<i>Polymorphina gibba</i> d'Orbigny* <i>p.p. Polymorphina fusiformis</i> (Röm.), 18
<i>Pyrulina</i> aff. <i>bucculenta</i> (Berthelin, 1880) fistulose form Pl. 4, fig. 3.	<i>Polymorphina lactea</i> (Walker)* <i>Polymorphina sosoria</i> Reuss* <i>p.p. Polymorphina fusiformis</i> (Röm.), 18
<i>Pyrulina obtusa</i> (Reuss, 1863) Pl. 4, fig. 4.	<i>Polymorphina angusta</i> Egger* <i>Polymorphina compressa</i> d'Orbigny* <i>p.p. Polymorphina fusiformis</i> (Röm.), 18

Form Genera

<i>Ramulina aculeata</i> (d'Orbigny, 1840) Pl. 4, fig. 9.	<i>Nodosaria hispida</i> d'Orbigny <i>p.p. Ramulina globulifera</i> Brady/ <i>R. aculeata</i> Wright, 19, 20
<i>Ramulina aptiensis</i> Bartenstein & Brand, 1951 Pl. 4, fig. 2.	<i>p.p. Ramulina globulifera</i> Brady, 19, 21 <i>p.p. Ramulina aculeata</i> Wright
<i>Ramulina fusiformis</i> Khan, 1950 Pl. 4, fig. 5.	<i>p.p. Ramulina globulifera</i> Brady, 19, 22 <i>p.p. Ramulina aculeata</i> Wright

<i>Ramulina</i> aff. <i>globo-tubulosa</i> Cushman, 1938 Pl. 4, fig. 7.	<i>p.p. Ramulina globulifera</i> Brady, 19, 21 <i>p.p. Ramulina aculeata</i> Wright
<i>Ramulina</i> aff. <i>laevis</i> Jones, 1875 Pl. 4, fig. 10.	<i>p.p. Ramulina globulifera</i> Brady, 19, 21 <i>p.p. Ramulina aculeata</i> Wright
<i>Ramulina muricatina</i> Loeblich & Tappan, 1949 Pl. 4, fig. 11.	<i>p.p. Ramulina globulifera</i> Brady, 19, 23 <i>p.p. Ramulina aculeata</i> Wright
<i>Ramulina</i> sp. Pl. 4, fig. 8.	<i>Lagena globosa</i> (Montague) <i>p.p. Thurammina albicans</i> Brady, 24

Suborder Buliminida

Superfamily Cassidulinacea

<i>Pleurostomella barroisi</i> Berthelin, 1880 Pl. 4, fig. 6.	<i>Pleurostomella obtusa</i> Berthelin <i>p.p. Nodosaria (D.) communis</i> d'Orb. 9 <i>p.p. Nodosaria (D.) farcimen</i> Reuss, 10
<i>Pleurostomella reussi</i> Berthelin, 1880 Pl. 4, fig. 12.	<i>Pleurostomella alternans</i> Schwager

Order Robertinida

Superfamily Ceratobuliminacea

<i>Epistomina</i> aff. <i>ornata</i> (Roemer, 1841) Pl. 4, fig. 15a-c.	<i>Pulvinulina elegans</i> (d'Orbigny)
<i>Epistomina spinulifera</i> (Reuss, 1863) Pl. 4, fig. 14a-c.	<i>Pulvinulina spinulifera</i> (Reuss)
<i>Hoeglundina chapmani</i> (Ten Dam, 1948) Pl. 4, fig. 13a-c.	<i>Pulvinulina caracolla</i> (Römer) <i>Pulvinulina reticulata</i> Reuss*

Order Rotaliida

Superfamily Discorbacea

<i>Gavelinella intermedia</i> (Berthelin, 1880) Pl. 4, fig. 16a-c.	<i>Anomalina ammonoides</i> (Reuss) <i>Anomalina rudis</i> (Reuss)* <i>Haplophragmium nonioninoides</i> Reuss*
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Order Globigerinida

Superfamily Hedbergellacea

<i>Hedbergella infracretacea</i> (Glaessner, 1937) Pl. 4, fig. 17a-c.	<i>Globigerina aequilateralis</i> Brady* <i>Globigerina cretacea</i> d'Orbigny
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1 Only *p.p. Ammodiscus incertus* (Reuss) of MM (UWA). In the slide there are three specimens, one of *Ammodiscus incertus* (Reuss), and two of *Cornuspira cretacea* (Reuss). 2 non *Thurammina albicans* Brady of NHM. 3 non *Reophax scorpiurus* Montfort of BCM. In the slide there are three specimens placed as *incertae sedis* in this work. 4 Only *Nodosaria (D.) consobrina* (d'Orbigny) of NHM. 5 non *Textularia conica* d'Orbigny of BCM. The specimens of BCM under this name belong to *Dorothia turris* (d'Orbigny). 6 The specimens of *Textularia praelonga* Reuss of BCM belong to *Textularia chapmani* Lalicker and not to *Gaudryina gradata* Berthelin as the ones of MM (UWA). 7 Only *Textularia conica* d'Orbigny of BCM. 8 *p.p. Spiroloculina nitida* d'Orbigny in the three collections. 9 This species was only found in MM (UWA). One of the specimens belongs to *Dentalina distincta* Reuss, and the other two belong to *Pleurostomella barroisi* Berthelin. 10 Of the three specimens included in the set of MM (UWA) under this name, one belongs to *Dentalina distincta* Reuss, the other to *Dentalina* sp. and the last one to *Pleurostomella barroisi* Berthelin. 11 non *Nodosaria (D.) consobrina* (d'Orbigny) of NHM. 12 In the slide of BCM there is one specimen of *Lagena apiculata* (Reuss) and another that is an ostracod caparace. Also *Lagena hispida* Reuss of NHM. 13 non *Lagena hispida* Reuss of BCM and NHM. 14 Of the specimens included under this name in the slides of MM (UWA), two belong to *Nodosaria* cf. *affinis* Reuss and four to *Nodosaria orthopleura* Reuss. 15 Only *Cristellaria complanata* Reuss of BCM. 16 non *Cristellaria complanata* Reuss of BCM. 17 The two specimens under this name of the set of BCM belong to different species, one to *Planularia* sp. and the other to *Vaginulina humilis* (Reuss). 18 The slide of *Polymorphina fusiformis* (Roemer) of MM (UWA) has twelve specimens. Of them, two belong to *Globulina lacrima* (Reuss), three to *Pyrulina* aff. *bucculenta* (Berthelin) and seven to *Pyrulina obtusa* (Reuss). 19 Specimens belonging to *Ramulina* have been founded in the sets of BCM and MM (UWA). In the two sets the species names in the slides are *R. aculeata* Wright and *R. globulifera* Brady. The specimens are not properly arranged so it is not possible to know which specimens belong to each species in the view of Hollis and Neaverson. 20 Six specimens of BCM and four specimens of MM (UWA). 21 One specimen of MM (UWA). 22 Two specimens of BCM and five of MM (UWA). 23 Two specimens of BCM and seven of MM (UWA). 24 Only *Thurammina albicans* Brady of NHM. # Abnormal specimen. * Not in original list.

		(1)	(2)	(3)
U P P E R	U P P E R	<i>M. inflatum</i>	<i>auritus</i>	5
			<i>varicosum</i>	
A L B I A N	G A U L T	<i>M. inflatum</i>	<i>orbigny</i>	4a
			<i>cristatum</i>	
M. A L B I A N	L. G A U L T	<i>E. lautus</i>	<i>daviesi</i>	4
			<i>nitidus</i>	

Fig. 2. Owen's (1971, 1973, 1975) Standard ammonite zonation (columns 1 and 2) and Hart's (1973) foraminiferal zonation (column 3) at the Middle–Upper Albian boundary. Note that Hart includes the *cristatum* Subzone in the *lautus* rather than the *inflatum* Zone.

and *Tritaxia pyramidata* Reuss are the best represented among the agglutinated foraminifera and *Quinqueloculina antiqua* (Franke) and *Spiroloculina cretacea* Reuss are the commonest species of the porcelaneous group.

DISCUSSION: AGE OF THE ASSEMBLAGES

Many of the species recorded in the Phosphatic Nodule Bed of the Gault at Ford are also present in the Chapman Collection of the Gault of Folkestone (England) which has been examined in the Natural History Museum during the course of the present work (see Chapman, 1891–1898). Hollis and Neaverson (1921) pointed out that the relative abundances of the different groups were not the same for these two geographical areas. However, Walters (1958, Unpublished Ph.D. Thesis, U.C.W. Aberystwyth) studying the foraminifera from several outcrops in Southeast England, including Folkestone, shows similar relative abundances to those at Ford. These apparently contradictory results could be due to different approaches in the procedures used to pick and count the specimens.

The recorded assemblages at Ford, which are dominated by the superfamily Nodosariacea, do not seem to be typical of the Middle Albian because in that interval the dominant group is the Superfamily Robertinacea (e.g. Hart & Carter, 1975; Hart *et al.*, 1981, 1989). At the same time they are not quite the same as the typical assemblages of the Upper Albian because in the upper part of the Gault Clay Formation, the fauna totally changes and becomes dominated by agglutinated taxa although nodosarids and gavelinellids are quite numerous (Hart, 1990; Talwar, 1990, Unpublished M.Sc. Thesis, U.C.W. Aberystwyth; Toogood, 1973, Unpublished M.Sc. Thesis, U.C.W. Aberystwyth).

However, looking at the stratigraphical distribution of foraminifera as seen in several key sections of southern and eastern England, Northern Ireland, northwestern Scotland and the North Sea Basin (Carter & Hart, 1977; Hart, 1973, 1990; Hart *et al.*, 1981, 1989, 1990) it is apparent that some of the species recorded in the Gault at Ford, such as *Haplostiche?* *sherborni* Chapman, *Eggerellina mariae* Ten Dam, *Tritaxia pyramidata* Reuss, *Textularia chapmani* Lalicker, *Quinqueloculina antiqua* (Franke), *Frondicularia pinnaeformis* Chapman and *Vaginulina mediocarinata* Ten Dam, are indicative of the Upper Albian.

The presence of *Frondicularia pinnaeformis* Chapman, an important zonal indicator in the Upper Albian (Carter & Hart, 1977), in association with the typical Upper Albian *Arenobulimina chapmani* Cushman, *Nodobaculularia nodulosa* (Chapman) and poorly developed specimens of *Epistomina spinulifera* (Reuss), characteristic of the lower Gault Clay (Hart & Carter, 1975; Carter & Hart, 1977; Price, 1977), points to the possibility of the Phosphatic Nodule Bed being in the *Epistomina spinulifera*/*Frondicularia pinnaeformis* Concurrent Range Zone (Zone 4a) of the benthonic zonal scheme of Carter & Hart (1977). However, the presence of *Eggerellina mariae* Ten Dam could indicate at least the *Frondicularia pinnaeformis* Assemblage Zone (Zone 5) of the same authors.

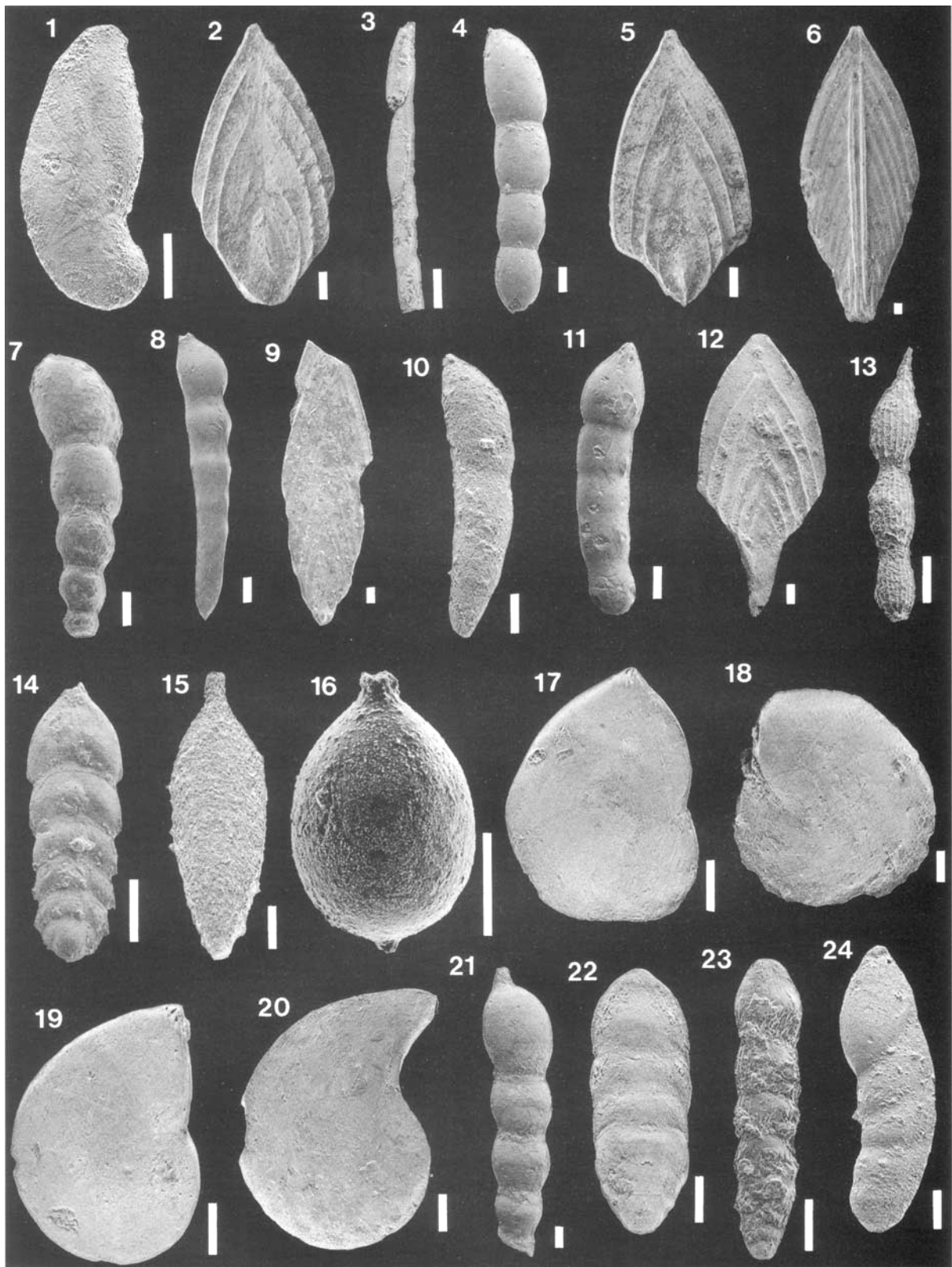
So, according to the benthonic zonal scheme proposed by Hart (1973) and Carter & Hart (1977) it is most probable that the foraminifera of Ford were recovered from the uppermost lower Gault Clay–lower part of the upper Gault Clay, Zones 4a–5 (from the uppermost Middle Albian to the lower part of the Upper Albian), equivalent to the uppermost *Euhoplites lautus* Zone (*cristatum* Subzone) to lower part of *Mortoniceras inflatum* Zone (*orbigny-varicosum*–lowest *auritus?* Subzones) of the Albian ammonite zonation (see Fig. 2).

It must be noted that Hart's treatment of the ammonite zones differs slightly from that of Owen (1971, 1973, 1975) in that the *cristatum* Subzone is placed in the *lautus* Zone, i.e. the Middle Albian rather than the Upper Albian. Hart (1973, p. 272) comments, in relation to the Copt Point section at Folkstone, 'The *cristatum* Subzone contains a distinctive bed of rounded nodules ... which represents a non-sequence marking the Lower–Upper Gault boundary (although the top of the *cristatum* Subzone is some 30 cms above this level)'. The Ford section is therefore quite similar both lithologically and faunally to the Folkstone section.

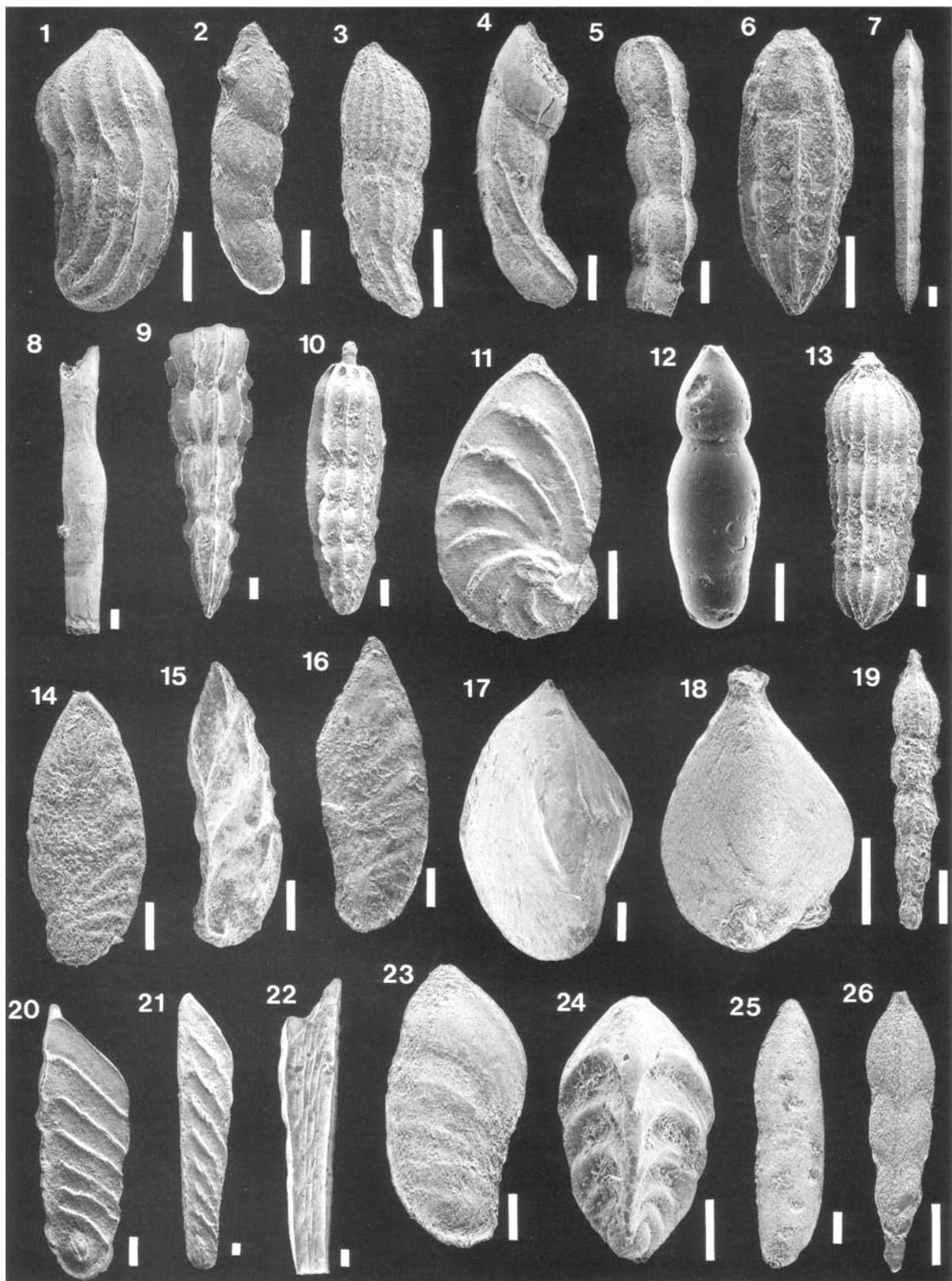
Although Hart (1973) states that his faunal scheme, 'can, unfortunately, only be described as being of local application,' the type Albian at L'Aube, again shows a similar, major faunal change over the Middle–Upper Albian boundary (lower–upper Gault boundary). Here, as at Folkstone, the passage to the Upper Albian is marked by the appearance of *Arenobulimina chapmani* Cushman and *Frondicularia pinnaeformis* Chapman and their overlap with *Epistomina spinulifera* (Reuss) (see table 3 of Magniez-Jannin, 1975).

ACKNOWLEDGEMENTS

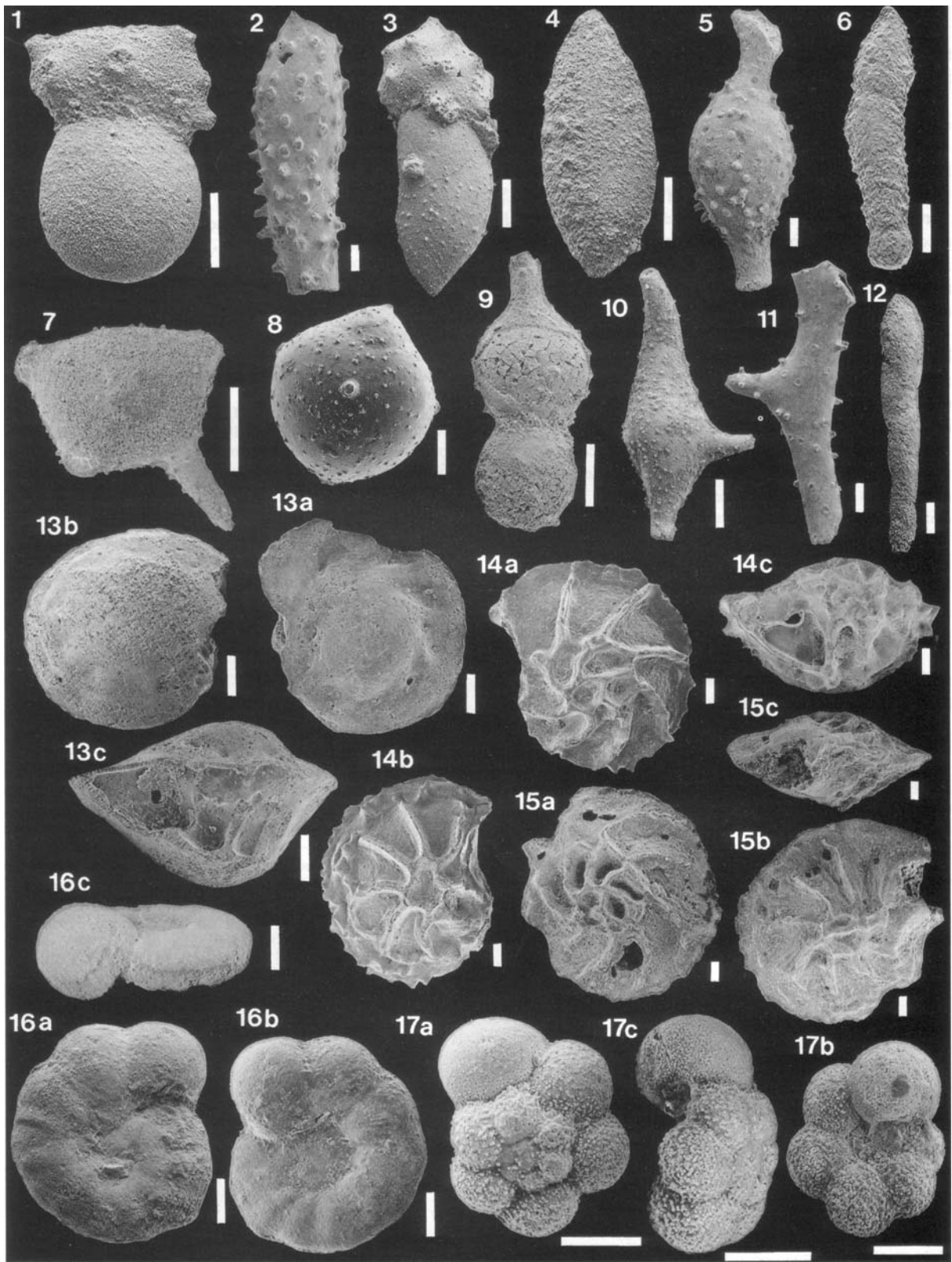
The help of Ms K. M. Hawkins of the Buckinghamshire County Museum (Aylesbury), who arranged the loan of the Hollis and Neaverson's set of specimens from that Museum and also offered helpful information on the site of the phosphatic nodules



Explanation of Plate 2. Hollis and Neaverson Collection of the Gault of Ford (Buckinghamshire, England). Unless specified, all the specimens are from the Micropalaeontological Museum, University of Wales (Aberystwyth). Scale bars 100 μ m. **Fig. 1.** *Astacolus tripleura* Reuss, 1860, AYBCM. 1920.38.97.4, Buckinghamshire County Museum (Aylesbury). **Fig. 2.** *Citharinella didyma* (Berthelin, 1880), JH.389.26.20. **Fig. 3.** *Dentalina debilis* (Berthelin, 1880), JH.389.28.21. **Fig. 4.** *Dentalina distincta* Reuss, 1860, JH.389.20.23. **Fig. 5.** *Fronicularia planifolia* Chapman, 1894, JH.389.24.31. **Fig. 6.** *Fronicularia pinnaeformis* Chapman, 1894, JH.389.26.30. **Fig. 7.** *Dentalina pulchella* (Chapman, 1893), AYBCM.1920.38.41.2, Buckinghamshire County Museum (Aylesbury). **Fig. 8.** *Dentalina legumen* (Reuss, 1845), JH.389.19.24. **Fig. 9.** *Fronicularia gaultina* Reuss, 1860, AYBCM.1920.38.61.4, Buckinghamshire County Museum (Aylesbury). **Fig. 10.** *Dentalina pseudonana* Ten Dam, 1950, JH.389.20.25. **Fig. 11.** *Dentalina gracilis* (d'Orbigny, 1840), AYBCM.1920.38.50.2, Buckinghamshire County Museum (Aylesbury). **Fig. 12.** *Fronicularia* sp., JH.389.26.32. **Fig. 13.** *Dentalina* sp. aff. *D. intercellularis* (Brady, 1881), JH.389.19.26. **Fig. 14.** *Fronicularia denticulocarinata* Chapman, 1894, JH.389.25.28. **Fig. 15.** *Lagena* aff. *hispidula* Reuss, 1863, AYBCM.1920.38.33.1, Buckinghamshire County Museum (Aylesbury). **Fig. 16.** *Lagena apiculata* (Reuss, 1851), P23140, Natural History Museum (London). **Fig. 17.** *Lenticulina circumcidanea* (Berthelin, 1880), JH.389.35.34. **Fig. 18.** *Lenticulina diademata* (Berthelin, 1880), JH.389.34.35. **Fig. 19.** *Lenticulina turgidula* (Reuss, 1863), JH.389.32.38. **Fig. 20.** *Lenticulina gaultina* (Berthelin, 1880), JH.389.35.37. **Fig. 21.** *Dentalina* sp., JH.389.19.27. **Fig. 22.** *Lingulina loryi* Berthelin, 1880, JH.389.24.29. **Fig. 23.** *Lingulina semiornata* Reuss, 1863, JH.389.23.39. **Fig. 24.** *Marginulina inaequalis* Reuss, 1860, JH.389.28.40.



Explanation of Plate 3. Hollis and Neaverson Collection of the Gault of Ford (Buckinghamshire, England). Unless specified, all the specimens are from the Micropalaeontological Museum, University of Wales (Aberystwyth). Scale bars 100 μ m. Fig. 1. *Marginulina jonesi* (Reuss, 1863), JH.389.28.41. Fig. 2. *Marginulina linearis* (Reuss, 1863), AYBCM.1920.38.38.84.1, Buckinghamshire County Museum (Aylesbury). Fig. 3. *Marginulina striatocostata* (Reuss, 1863), JH.389.28.42. Fig. 4. *Marginulina* sp., JH.389.31.43. Fig. 5. *Nodosaria* cf. *affinis* Reuss, 1845, JH.389.21.44. Fig. 6. *Nodosaria fontanesi* (Berthelin, 1880), JH.389.21.46. Fig. 7. *Nodosaria orthopleura* Reuss, 1863, JH.389.21.48. Fig. 8. *Nodosaria* cf. *bambusa* Chapman, 1893, JH.389.21.45. Fig. 9. *Nodosaria* sp., AYBCM.1920.38.35.3, Buckinghamshire County Museum (Aylesbury). Fig. 10. *Nodosaria obscura* Reuss, 1845, JH.389.22.47. Fig. 11. *Planularia bradyana* (Chapman, 1894), JH.389.32.51. Fig. 12. *Pseudonodosaria mutabilis* (Reuss, 1863), P23103, Natural History Museum (London). Fig. 13. *Nodosaria paupercula* Reuss, 1845, JH.389.22.49. Fig. 14. *Planularia* cf. *priceana* (Chapman, 1894), JH.389.30.52. Fig. 15. *Planularia vestita* (Berthelin, 1880), JH.389.33.53. Fig. 16. *Planularia* sp., JH.389.32.54. Fig. 17. *Saracenaria navicula* (d'Orbigny, 1840), JH.389.31.56. Fig. 18. *Saracenaria triangularis* (d'Orbigny, 1840), JH.389.31.57. Fig. 19. *Nodosaria sceptrum* Reuss, 1863, JH.389.22.50. Fig. 20. *Vaginulina recta* Reuss, 1863, JH.389.29.64. Fig. 21. *Vaginulina gaultina* Berthelin, 1880, JH.389.30.60. Fig. 22. *Vaginulina mediocarinata* Ten Dam, 1950, JH.389.30.62. Fig. 23. *Vaginulina humilis* (Reuss, 1863), JH.389.32.61. Fig. 24. *Tristix excavatum* (Reuss, 1863), JH.389.27.58. Fig. 25. *Vaginulina parallela* (Reuss, 1863), JH.389.32.63. Fig. 26. *Tristix gaultina* Khan, 1950, JH.389.28.59.



Explanation of Plate 4. Hollis and Neaverson Collection of the Gault of Ford (Buckinghamshire, England). Unless specified, all the specimens are from the Micropalaeontological Museum, University of Wales (Aberystwyth). Scale bars 100 μm . **Fig. 1.** *Globulina lacrima* (Reuss, 1845), fistulose form, JH.389.37.65. **Fig. 2.** *Ramulina aptiensis* Bartenstein & Brand, 1951, JH.389.39.69. **Fig. 3.** *Pyrulina* aff. *bucculenta* (Berthelin, 1880), fistulose form, JH.389.37.66. **Fig. 4.** *Pyrulina obtusa* (Reuss, 1863), JH.389.37.67. **Fig. 5.** *Ramulina fusiformis* Khan, 1950, JH.389.39.70. **Fig. 6.** *Pleurostomella barroisi* Berthelin, 1880, JH.389.16.75. **Fig. 7.** *Ramulina* aff. *globo-tubulosa* Cushman, 1938, JH.389.39.71. **Fig. 8.** *Ramulina* sp., P23189, Natural History Museum (London). **Fig. 9.** *Ramulina aculeata* (d'Orbigny, 1840), JH.389.21.68. **Fig. 10.** *Ramulina* aff. *laevis* Jones, 1875, JH.389.39.72. **Fig. 11.** *Ramulina muricatina* Loeblich & Tappan, 1949, JH.389.39.73. **Fig. 12.** *Pleurostomella reussi* Berthelin, 1880, JH.389.16.76. **Fig. 13.** *Hoeglundina chapmani* (Ten Dam, 1948), JH.389.42.79, (a) dorsal view, (b) ventral view, (c) lateral view. **Fig. 14.** *Epistomina spinulifera* (Reuss, 1863), JH.389.43.78, (a) dorsal view, (b) ventral view, (c) lateral view. **Fig. 15.** *Epistomina* aff. *ornata* (Roemer, 1841), JH.389.42.77, (a) dorsal view, (b) ventral view, (c) lateral view. **Fig. 16.** *Gavelinella intermedia* (Berthelin, 1880), JH.389.41.80, (a) dorsal view, (b) ventral view, (c) lateral view. **Fig. 17.** *Hedbergella infracretacea* (Glaessner, 1937), JH.389.40.81, (a) dorsal view, (b) ventral view, (c) lateral view.

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NB. Unfortunately, although it is clear that Neaverson was Science Master in Aylesbury Grammar School in the early 1920s and went on to become Lecturer and Senior Lecturer at Liverpool, the dates when he entered and left these institutions are as yet unknown.

Please note that the Aberystwyth Theses mentioned in the text can be obtained on loan from Hugh Owen Library (University of Wales, Aberystwyth). Also photocopies from the National Library of Wales (Aberystwyth).

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