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14. APTIAN-ALBIAN FORAMINIFERS FROM SITE 766, CUVIER ABYSSAL PLAIN, AND COMPARISON WITH COEVAL FAUNAS FROM THE AUSTRALIAN REGION[1]

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ABSTRACT

The distribution of 79 foraminiferal species is recorded among 23 samples taken from Cores 123-776A-16R through 123-766A-25R. The benthic species belong to the Ammodiscidae, Ammosphaeroidinidae, Spiroplectamminidae, Verneuilinidae, Tritaxiidae, Globotextulariidae, Eggerellidae, Ichthyolariidae, Nodosariidae, Vaginulinidae, Polymorphinidae, Glandulinidae, Bolivinidae, Turrilinidae, Fursenkoinidae, Pleurostomellidae, Patellinidae, Bagginidae, Quadrimorphinidae, Globorotalitidae, Osangulariidae, and Gavelinellidae families. The planktonic species belong to the Globigerinelloididae, Planomalinidae, Schackoinidae, Hedbergellidae, and Rotaliporidae families.

On the basis of foraminiferal biostratigraphy, the interval from Sections 123-766A-16R-3 through 123-766A-17R-3 has been placed confidently in the uppermost Albian (equivalent of the *Rotalipora appenninica* Zone of Caron, 1985). Below this, correlations are tentative because of the absence of commonly used zonal index species. The interval from lower Core 123-766A-17R to upper Core 123-766A-18R has been placed in the upper Albian; that from lower Core 123-766A-18R to Core 123-766A-21R has been included in the lower to middle Albian; and Cores 123-766A-24R and 123-766A-25R have been correlated with the upper Aptian.

The fauna is compared to that known from Aptian-Albian deposits in the Australian epeiric basins and at other sites along the western margin of the continent. These deposits were positioned at middle to high paleolatitudes in the Southern Hemisphere. The benthic assemblages from Site 766 belong to the *Marssonella* Association (of Haig, 1979) and are similar to those recorded elsewhere along the continental margin, but differ from those of the *Ammobaculites* Association (of Haig, 1979) within the epeiric basins. In overall aspect, the Australian fauna contains few genera not recorded elsewhere, but lacks many families present in Tethyan (low-latitude) faunas. Comparison of late Albian planktonic foraminifers known from along the continental margin indicates that assemblages from Site 766 are similar to those from the Papuan Basin at approximately the same paleolatitude, but are more diverse than those of the Naturaliste Plateau (approximately 10° of paleolatitude south of Site 766), where *Rotalipora* and *Planomalina* are absent. This suggests that a significant gradient in surface water temperature existed on the late Albian continental margin between Site 766 and the Naturaliste Plateau.

INTRODUCTION

Aptian-Albian time witnessed one of the most extensive marine transgressions to cross the Australian continent during the Phanerozoic. The deposits resulting from this incursion occur in the great intracratonic basins that cover vast areas of Australia and extend north to the Papuan Basin of New Guinea and west over the North West Shelf and the Exmouth and Naturaliste submarine plateaus (Frakes et al., 1987; Fig. 1). According to Veevers (1984, p. 218), this transgression may have resulted from a general continental subsidence of the order of 150 m, as well as a 105-m eustatic rise in sea level. The Aptian-Albian deposits may be grouped as part of the Post-Gondwana Rift Megasequence recognized by Home et al. (1990) in the Papuan Basin. In most basins, fine-grained siliciclastic successions occur, dominated by carbonaceous mudstone, and the Aptian deposits include mudstone having a high radiolarian content (Ludbrook, 1978). Carbonate sediment, composed largely of the skeletons of pelagic microorganisms, is present only along the outer western margin of the continent and on the adjacent submarine plateaus and abyssal plains (Apthorpe, 1979).

An extensive knowledge of the foraminifers present in Australian Aptian-Albian deposits provides a basis for interpreting oceanographic conditions that existed in the region. The pioneering works of Crespin (1944, 1953, 1963) were followed by comprehensive documentation of the fauna of the "Great Artesian Basin" by Ludbrook (1966—Eromanga Basin), Scheibnerová (1971a, 1971b, 1972, 1974a, 1976, 1986—Eromanga Basin), Playford et al. (1975—Carpentaria Basin), Haig and Barnbaum (1978—Surat Basin), and Haig (1979a, 1980, 1982—Surat, Eromanga, Carpentaria, and Laura basins). Part of the fauna of the Papuan Basin was described by Haig (1981) and Belford (1985) and further studies are being conducted by D. Lynch of the University of Western Australia. The fauna of the Western Australian marginal basins is less well documented. Herb (1974) and Scheibnerová (1978a) charted the distribution of species at Site 258 on the Naturaliste Plateau, and Quilty (1984) described several assemblages found among material dredged from Exmouth Plateau. The fauna from the onshore Carnarvon Basin is being studied by D. Haig, I. Copp, and G. Ellis of the University of Western Australia. Foraminifers from Aptian-Albian deposits on oceanic crust adjacent the western continental margin were recorded from the Perth Abyssal Plain (Scheibnerová, 1974b; Krasheninnikov, 1974a—DSDP Site 259), Cuvier Abyssal Plain (Scheibnerová, 1974b—DSDP Site 263), and the Gascoyne Abyssal Plain (Scheibnerová, 1974b; Krasheninnikov, 1974a—DSDP Site 260).

At Site 766 on the Cuvier Abyssal Plain (19°55.985'S; 110°27.130'E; Fig. 1), a cored interval of Aptian-Albian nannofossil ooze and chalk was recovered (Ludden, Gradstein, et al., 1990; Fig. 2). This interval is almost 100 m thick, and although core recovery was poor in the lower half, the upper 50 m provides a comprehensive stratigraphic record. Most of the sediment is of pelagic origin, but may include material transported downslope from the plateau margin to the east, as some graded units occur. The foraminiferal record from Hole 766A complements that from

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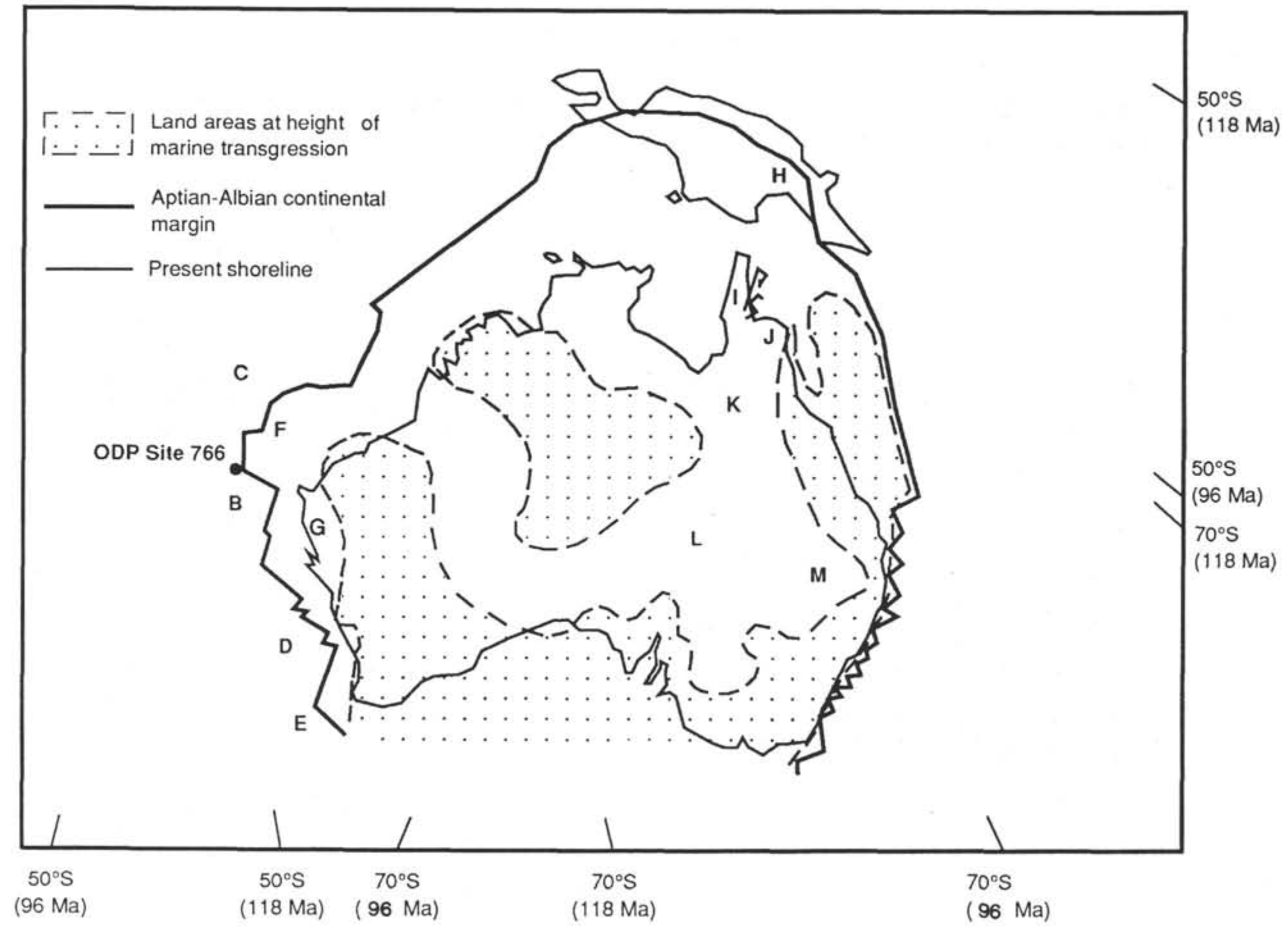

Figure 1. Reconstruction of Australian continent during the Aptian-Albian showing the locality of Site 766 and the maximum extent of the marine transgression across the continent (after Frakes et al., 1987). Paleolatitudes follow Veevers et al. (1991). Ogg et al. (this volume) suggest that paleolatitudes may be lower than shown here. Letters refer to the following localities recorded in Tables 5 through 9: **A.** Cuvier Abyssal Plain, Site 766, Cores 123-766A-16R through -25R (this study); **B.** Cuvier Abyssal Plain, DSDP Site 263, Cores 17 through 29 (Scheibnerová, 1974b); **C.** Gascoyne Abyssal Plain, DSDP Site 260, Cores 9 through 18 (Scheibnerová, 1974b); **D.** Perth Abyssal Plain, DSDP Site 259, Cores 11 through 17 (Scheibnerová, 1974b); **E.** Naturaliste Plateau, DSDP Site 258, Cores 15 through 20 (Scheibnerová, 1978a); **F.** Exmouth Plateau dredge samples (Quilty, 1984); **G.** Eastern Carnarvon Basin (Haig et al., unpubl. data); **H.** Papuan Basin (Haig, 1981; Belford, 1985); **I.** Northern Carpentaria Basin (Haig, 1979a, 1980, 1982); **J.** Laura Basin (Haig, 1979a, 1980, 1982); **K.** Southern Carpentaria Basin (Playford et al., 1975; Haig, 1979a, 1980, 1982); **L.** Eromanga Basin (Crespin, 1963; Ludbrook, 1966; Scheibnerová, 1976; Haig, 1979a, 1980, 1982); **M.** Surat Basin (Haig and Barnbaum, 1978; Haig, 1979a, 1980, 1982).

DSDP Site 263 (Veevers, Heirtzler, et al., 1974; Scheibnerová, 1974b), approximately 300 km to the south, and adds substantially to our knowledge of the fauna of the western continental margin (Tables 1 through 9).

The aims of this study are (1) to document the composition of foraminiferal assemblages from Aptian-Albian deposits at Site 766; (2) to compare the fauna with that known elsewhere in oceanic deposits along the western continental margin and from Australian marginal and epeiric basins ; and (3) to place the regional fauna in a global biogeographic context.

STRATIGRAPHIC DISTRIBUTION OF SPECIES AT SITE 766

Record of Species

The study is based on 23 samples taken from Cores 123-766A-16R to -25R in Hole 766A (Fig. 2). Each sample comprised 15 cm^3 of core material, which was disaggregated in boiling water and washed over a 63-µm mesh. A comprehensive suite of foraminifers was recovered from each sand-fraction residue. The preservation of material is generally good, and only one sample (123-766A-18R-2, 83–85 cm) displays the effects of severe dissolution. In this sample, only thick-shelled morphotypes have been preserved.

Species occurrences are charted in Tables 1 through 4. The foraminifers are classified under Orders recognized by Haynes (1981), and Families and Genera diagnosed by Loeblich and Tappan (1988). Complete species nomenclature is referenced in the "taxonomic record" (Appendix) and is provided below only for taxa not recorded among the studied material.

Order Astrorhizida

Only species of the Ammodiscidae were located (Table 1), and representatives of this family are rare and sporadically distributed. The few recovered specimens suggest that a variable plexus of morphotypes is represented, similar to those illustrated from earlier Cretaceous deposits by Bartenstein (1974) and that the classification of these among various genera (following the scheme of Loeblich and Tappan, 1988) misrepresents the specific diversity.

Order Lituolida

Species of the Ammosphaeroidinidae, Spiroplectamminidae, Verneuilinidae, Tritaxiidae, Globotextulariidae, and Eggerellidae

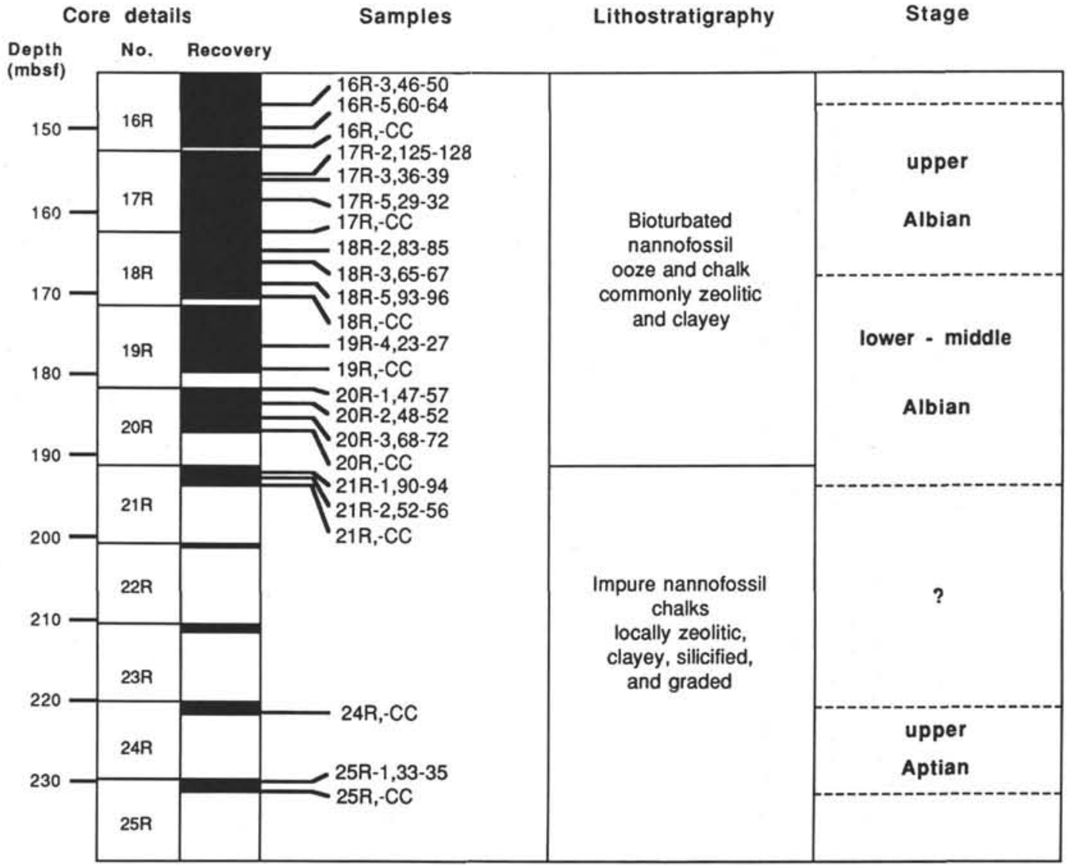

Figure 2. Positions of samples within Hole 766A, with lithostratigraphy and stage correlations.

families are recorded (Table 1). Some are common over a limited stratigraphic range, and several show morphoclinal interrelationships. All species are illustrated in Plates 1 and 2.

The Ammosphaeroidinidae family includes rare specimens attributed to *Ammosphaeroidina* that extend the range of this genus down to the mid-Cretaceous. *Heterantyx* cf. *cretosa* and *Spiroplectinella* cf. *gandolfii* are closely related species included in the Spiroplectamminidae; both are characterized by a prominent ridge between the adult chamber series, but differ in the nature of the test outline (Pl. 1, Figs. 5 through 7). Transitional forms between the species occur in Samples 123-766A-16R-5, 60–64 cm, through -17R-2, 125–128 cm, and suggest that *Spiroplectinella* arose from *Heterantyx*. The original record of *S. gandolfii* was from Cenomanian deposits in Morocco (Carbonnier, 1952), and other mid-Cretaceous occurrences of similar morphotypes include those of *Spiroplectammina cretosa* (Cushman) recorded by Moullade (1984) from the Atlantic Ocean and *Spiroplectammina* sp. described by Scheibnerová (1978b) from the South Atlantic.

The Verneuilinidae family includes species attributed to *Gaudryina* and *Pseudogaudryinella*. These are related to the *Gaudryina-Spiroplectinata* lineages outlined by Grabert (1959), but *Spiroplectinata*, with its compressed biserial stage and terminal aperture, is not represented here. The oldest assemblages contain specimens that have somewhat rectangular chamber margins in the adult stage and basal apertures (Pl. 1, Figs. 8 and 9). These are compared to *Gaudryina richteri*, but have a narrower and less flaring biserial stage. Within Sample 123-766A-21R-CC, morphotypes appear that have the aperture extending areally above the basal suture of the last chamber. In some of the specimens, the final chamber has a uniserial stance, is cylindrical, and has a terminal aperture (Pl. 1, Fig. 11); these have been identified as *Pseudogaudryinella* sp. A. Higher in the succession, *G.* aff. *richteri* and *Pseudogaudryinella* sp. A have been progressively replaced by *Pseudogaudryinella* sp. B (Pl. 1, Fig. 12), which has a more robust test and rounded margins, and *Pseudogaudryinella* sp. C (Pl. 1, Figs. 13, 14) having a more narrowly elongate test and a more extensive biserial stage with inflated chambers. Although it is positioned separately in the Family Tritaxiidae, *Tritaxia gaultina* may be related to the *Gaudryina-Pseudogaudryinella* Group. Rare specimens from Sample 123-766A-21R-CC seem to be transitional between *Pseudogaudryinella* sp. A and *T. gaultina*. The development of an internal siphon within *T. gaultina* has not been investigated here.

Intrachamber partitions are not clearly shown by the early forms attributed to *Remesella* sp. of the Globotextulariidae, but in Sample 123-766A-19R-4, 23–27 cm, and in higher assemblages, the partitions that partially subdivide the chamber interiors are distinct (Pl. 2, Fig. 2). This transition from simple to internally subdivided chambers is paralleled by that in the mid-Cretaceous *Arenobulimina-Voloshinoides* Complex outlined by Barnard and Banner (1980). The buliminellid type of trochospiral coiling in the early stage of *Remesella* sp. bears some resemblance to the coiling mode of *Arenobulimina*; however, *Remesella* differs in its biserial adult stage (Pl. 2, Fig. 1) and broadly arched aperture.

The Eggerellidae family is represented by rare *Dorothia* sp. and *Marssonella oxycona*.

Order Nodosariida

Species of the Ichthyolariidae, Nodosariidae, Vaginulinidae, Polymorphinidae, and Glandulinidae families are recorded (Table

Table 1. Distribution of species of Astrorhizida and Lituolida in Hole 766A (sample positions within the hole are shown in Fig. 2).

CORE	25R	25R	24R	21R	21R	21R	20R	20R	20R	20R	19R	19R	18R	18R	18R	18R	17R	17R	17R	17R	16R	16R	16R
SECTION	CC	1	CC	CC	2	1	CC	3	2	1	CC	4	CC	5	3	2	CC	5	3	2	CC	5	3
INTERVAL (cm from top of section)		33-35			52-56	90-94		68-72	48-52	47-57		23-27		93-96	65-67	83-85		29-32	36-39	125-128		60-64	46-50
ASTRORHIZIDA																							
Ammodiscidae																							
?Glomospirella sp.	...	...	...	...	...	...	...	...	...	...	R	...	R	...	...	...	R	...	...	...	R	...	...
Repmania corona	...	...	...	...	...	...	R	...	...	R	...	R	...	...	...	...	R	...	...	...	R	...	...
LITUOLIDA																							
Ammosphaeroidinidae																							
Ammosphaeroidina sp.	...	...	...	...	...	...	R	...	...	R	R	...	...	...	...	...	...	R	...	...	C	R	R
Spiroplectamminidae																							
Heterantyx cf. cretosa	...	...	...	...	...	...	...	...	...	...	...	...	R	C	R	...	C	R	C	R	R	R	...
Spiroplectinella cf. gandolfii	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	C	C	C
Verneuilinidae																							
Gaudryina aff. richteri	R	R	R	C	A	A	A	A	A	C	A	C	C	R	...	...	...	...	...	...	...	...	...
Pseudogaudryinella sp. A	...	...	...	C	R	C	R	C	R	R	C	A	R	R	R	...	...	...	...	...	...	...	...
Pseudogaudryinella sp. B	...	...	...	...	...	...	...	...	...	...	R	...	C	C	R	R	R	R	...	...	C	C	C
Pseudogaudryinella sp. C	...	...	...	...	...	...	...	...	...	...	...	R	R	A	C	R	R	C	C	C	C	C	A
Tritaxiidae																							
Tritaxia gaultina	...	...	...	?	...	R	C	...	...	...	R	R	C	R	R	C	C	R	C	R	C	C	C
Globotextulariidae																							
Remesella sp.	...	...	...	C	C	A	A	C	C	C	C	C	R	C	R	R	C	C	C	C	C	C	A
Eggerellidae																							
Dorothia sp.	...	...	...	R	R	R	R	...	R	R	...	...	...	...	...	...	...	R	...	...	R	R	...
Marssonella oxycona	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	...

Note: A = abundant; C = common; R = rare.

Table 2. Distribution of species of Nodosariida in Hole 766A (sample positions within the hole are shown in Fig. 2).

CORE	25R	25R	24R	21R	21R	21R	20R	20R	20R	20R	19R	19R	18R	18R	18R	18R	17R	17R	17R	17R	16R	16R	16R
SECTION	CC	1	CC	CC	2	1	CC	3	2	1	CC	4	CC	5	3	2	CC	5	3	2	CC	5	3
INTERVAL (cm from top of section)		33-35			52-56	90-94		68-72	48-52	47-57		23-27		93-96	65-67	83-85		29-32	36-39	125-128		60-64	46-50
Ichthyolariidae																							
Lingulonodosaria loryi	...	...	R	R	...	...	R	C	R	...	...	R	...	...	...	...	R	...	...	...	...	...	...
Lingulonodosaria nodosaria	...	R	...	...	R	...	...	C	R	...	R	R	R	R	R	...	R	R	...	...	...	R	R
Lingulonodosaria sp. A	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lingulonodosaria sp. B	R	R	...	R	...	R	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nodosariidae																							
?Frondicularia sp.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R
?Grigelis sp.	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Laevidentalina cylindroides	...	...	...	R	...	...	R	R	R	...	...	...	...	...	...	...	R	...	...	...	R	...	...
Laevidentalina gracilis	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Laevidentalina nana	...	R	...	C	R	R	C	R	R	...	C	C	R	R	...	R	R	R	R	R	R	R	...
Laevidentalina oligostegia	...	R	...	C	...	...	R	...	...	...	R	R	...	R	C	R	R	R	R	R	...	R	R
Lingulina buddencanyonensis	...	R	...	...	...	...	R	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lingulina sp.	...	...	...	R	R	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pseudonodosaria humilis	R	R	R	R	...	...	...	...	...	...	...	R	...	R	...	...	...	...	R	...	R	R	...
Pyramidulina obscura	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...
Pyramidulina sceptrum	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyramidulina sp.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R
Svenia cf. hamiltonensis	R	R	...	R	R	R	C	R	R	...	R	R	...	R	R	R	R	...	R	R	C	C	C
Vaginulinidae																							
Astacolus cf. scitula	...	...	...	C	C	C	C	C	R	...	C	C	C	C	...	...	...	...	...	...	...	...	...
Astacolus sp. A	...	...	...	...	...	...	...	...	...	...	R	...	...	R	...	...	...	...	R	...	...	...	...
Astacolus spp.	R	C	R	...	...	...	...	...	...	R	...	...	...	...	R	...	...	R	...	...	...	...	...
Citharina cf. petila	...	R	R	...	...	R	R	R	...	...	...	R	...	...	R	...	R	...	R	R	R	...	...
Citharina sp. A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	R	...	R	...
Citharina sp. B	...	...	...	R	...	...	R	...	...	...	...	R	R	R	...	...	...	...	...	...	R	...	R
Hemirobulina hamulus	...	...	...	...	...	...	R	...	...	...	R	...	...	R	...	...	...	R	...	...	...	...	...
Lenticulina spp.	C	A	A	C	C	C	C	A	C	R	C	C	C	R	C	C	C	R	C	R	R	C	C
Planularia bradyana	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...	...	...	R	C	C	R	C
Psilocitharella recta	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...	...
Saracenaria spinosa	R	R	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saracenaria triangularis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	...	...	R	...	...	...	...	R
Vaginulina sp.	...	R	...	...	...	...	R	R	...	...	...	...	...	...	...	...	R	...	R	R	C	R	R
Vaginulinopsis sp.	...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Polymorphinidae																							
Globulina prisca	...	...	...	R	...	...	R	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...	R
Ramulina spp.	...	...	R	R	...	...	C	...	...	...	R	...	...	...	...	...	R	...	R	...	R	...	R
Glandulinidae																							
Tricarinella excavata	...	...	...	...	...	...	R	...	...	...	...	R	...	...	...	...	R	...	...	...	...	...	...

Table 3. Distribution of species of Buliminida and Rotaliida in Hole 766A (sample positions within the hole are shown in Fig. 2).

CORE	25R	25R	24R	21R	21R	21R	20R	20R	20R	20R	19R	19R	18R	18R	18R	18R	17R	17R	17R	17R	16R	16R	16R
SECTION	CC	1	CC	CC	2	1	CC	3	2	1	CC	4	CC	5	3	2	CC	5	3	2	CC	5	3
INTERVAL (cm from top of section)		33-35			52-56	90-94		68-72	48-52	47-57		23-27		93-96	65-67	83-85		29-32	36-39	125-128		60-64	46-50
BULIMINIDA																							
Bolivinidae																							
Tappanina sp.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	C
Turrilinidae																							
Cuneus cf. ludbrookae	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	R
?Eurycheilostoma cf. hergottensis	R	C	...	R	C	R	R	C	R	...	R	R	R	C	C	A	...	C	R	...	...	R	R
Praebulimina cf. nannina	R	...	...	R	R	A	R	A	C	R	C	C	R	...	R	...	R	...	...	...	...	...	...
Fursenkoinidae																							
Coryphostoma sp.	C	R	C	A	C	C	C	A	C	R	C	A	C	C	R	...	A	C	R	R	C	R	C
Pleurostomellidae																							
Ellipsoglandulina sp.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	R	...
Ellipsoidella cf. cuneata	...	...	...	...	...	R	C	C	R	...	...	...	...	R	...	...	R	...	...	...	R	...	...
Pleurostomella aff. reussi	...	...	...	C	C	C	C	C	R	...	R	R	...	R	R	C	C	R	C	R	C	C	A
ROTALIIDA																							
Patellinidae																							
Hergottella sp.	...	C	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bagginidae																							
Serovaina gracillima	...	...	...	R	...	...	R	R	R	...	R	C	C	C	C	...	A	R	R	C	C	R	C
Serovaina infracretacea	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	R	A	C	R	C	C	C	A
Quadrimorphinidae																							
Quadrimorphina allomorphinoides	...	...	...	...	...	...	R	R	...	...	...	...	...	...	...	...	C	R	R	R	R	...	R
Globorotalitidae																							
Globorotalites aptiensis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	C	...
Osangulariidae																							
Charltonia cf. australis	...	...	...	...	...	...	C	C	R	...	...	R	...	...	...	...	C	...	R	...	C	R	...
Osangularia schloenbachi	...	...	...	A	A	A	A	A	A	A	A	A	C	A	A	R	A	A	C	R	C	C	A
Gavelinellidae																							
Berthelina intermedia	...	...	...	R	A	A	A	A	C	C	R	C	R	R	R	R	A	C	C	C	R	C	R
Gavelinella cf. andersoni	A	A	A	C	A	C	C	R	...	R	...	...	C	A	C	C	A	C	C	...	R	C	A
Gavelinella cf. indica	...	...	...	...	...	...	...	A	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gavelinella sp. A	...	...	C	C	C	A	A	C	C	C	R	...	...	...	...	...	...	...	...	...	...	...	...
Gavelinella sp. B	C	A	R	C	C	C	C	...	...	C	...	R	...	...	...	...	...	...	...	...	...	...	...
Scheibnerova protindica	...	...	...	...	...	...	...	...	...	...	...	...	A	C	C	R	A	A	C	C	C	C	A

Note: A = abundant; C = common; R = rare.

Table 4. Distribution of species of Globigerinida in Hole 766A (sample positions within the hole are shown in Fig. 2).

CORE	25R	25R	24R	21R	21R	21R	20R	20R	20R	20R	19R	19R	18R	18R	18R	18R	17R	17R	17R	17R	16R	16R	16R
SECTION	CC	1	CC	CC	2	1	CC	3	2	1	CC	4	CC	5	3	2	CC	5	3	2	CC	5	3
INTERVAL (cm from top of section)		33-35			52-56	90-94		68-72	48-52	47-57		23-27		93-96	65-67	83-85		29-32	36-39	125-128		60-64	46-50
Globigerinelloididae																							
Globigerinelloides aptiense	A		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Globigerinelloides cf. aptiense	C	R																					
Globigerinelloides cf. bentonensis	C	R	C	...	...	...	...	...	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Planomalinidae																							
Planomalina praebuxtorfi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	C	C	...	...	...
Planomalina buxtorfi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	C	C	A
Schackoinidae																							
Schackoina cenomana	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	...	C
Hedbergellidae																							
Clavihedbergella simplicissima	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	R	...	C	C	...
Clavihedbergella sp.	...	...	...	...	...	...	A	A	R	...	R	...	C	...	R	...	C	R	R	C	...	...	...
Hedbergella sp. cf. Blefuscuiana aptica	A	A	C	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Hedbergella cf. planispira	...	A	A	A	A	A	A	A	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Hedbergella planispira	...	...	...	...	...	...	...	...	A	A	A	A	A	A	C								
Hedbergella cf. punctata	...	?R	...	...	...	?R	...	...	...	...	...	R	R	R	C	...	A	A	C	A	C	A	A
Hedbergella trocoidea	...	...	...	C	...	...	C	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Hedbergella yezoana	...	...	...	...	...	...	...	...	...	...	C	C	A	A	A	R	A	A	C	A	...	...	A
Praeglobotruncana delrioensis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A	R	A
Rotaliporidae																							
Rotalipora appenninica	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	A
Rotalipora ticinensis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	R	A

Note: A = abundant; C = common; R = rare.

Table 5. Distribution of foraminiferal genera of Astrorhizida in confirmed Aptian-Albian deposits of the western margin submarine plateaus and abyssal plains and the Australian epeiric basins.

	WESTERN MARGIN						EPEIRIC BASINS						
	A	B	C	D	E	F	G	H	I	J	K	L	M
Bathysiphonidae													
Bathysiphon	..	X	?		?	..	..	X	X	X	..	X	..
Silicotubidae													
Silicotuba	..	..	..	..	..	..	..	..	X	X	X	X	X
Psammosphaeridae													
Psammosphaera	..	..	..	..	..	?	..	X	X	X	X	X	X
Saccamminidae													
Lagenammina	..	..	?	..	..	..	..	..	..	X	X	X	X
Placentammina	..	..	..	..	..	..	..	..	..	..	X	X	X
Hippocrepinidae													
? Hippocrepina	..	..	..	..	..	..	..	..	X	..	X	X	X
Ammodiscidae													
Ammodiscus	..	X	?	?	X	..	..	X	X	X	X	X	X
Glomospirella	?	?	?	?	..	?	..	X	X	X	X	X	..
Repmanina	X	..	..	..	..	..	..	..	..	..	..	..	..
Tolypammina	..	..	..	..	..	..	..	..	..	X	..	..	..

Note: Letters refer to the localities shown in Figure 1.

2). Selected species whose identifications are uncertain or whose stratigraphic ranges seem important are illustrated in Plate 2. Although more species are included here than for any other order, they are generally rare and scattered in distribution. An exception is *Astacolus* cf. *scitula*, which is characterized by thick, but flush, sutures and occurs over a limited stratigraphic range.

Order Buliminida

Species belonging to the Bolivinidae, Turrilinidae, Fursenkoinidae, and Pleurostomellidae families are recorded (Table 3). Representatives of the Buliminida found here are among the most primitive of the order, and taxonomic problems occur in several groups. All species are illustrated in Plates 3 and 4.

The Bolivinidae family is represented by *Tappanina* sp., which seems more primitive than *Tappanina laciniosa* Eicher and Worstell recorded by Scheibnerová (1978a, Pl. 2, Fig. 11) from the Naturaliste Plateau. The species has a less lobate outline than Scheibnerová's specimen and lacks the carinate truncated chamber margins of the Coniacian-type species *Tappanina selmensis* (Cushman). Eicher and Worstell (1970) showed large variation in ornament for *T. laciniosa* from the North American Cenomanian-Turonian that ranged from well-developed peripheral flanges to smooth chamber surfaces. As recognized here, the genus is assumed to include forms having biserial chambers with simple sutures, but variable ornament and chamber shape, and a high-arched aperture bordered on one side by a lip that extends internally as a simple tooth plate. This definition includes the Albian species attributed to *Bolivina* by Haig (1982). When the mid-Cretaceous bolivinids are better understood, we may find it meaningful to separate the Albian species from *Tappanina* on the basis of their less-truncate chamber shape.

The Turrilinidae family is represented by *Cuneus* sp., rare and confined to only the topmost samples, long-ranging *Praebulimina nannina*, and (?)*Eurycheilostoma* cf. *hergottensis*. Haig (1982, p. 47) tentatively transferred *Praebulimina hergottensis* to *Eurycheilostoma* on the basis of its trochospiral coiling in the juvenile stage and its very low and broad basal aperture. He also described a new species, *Eurycheilostoma moorei*, for low trochospiral morphotypes apparently evolved from *E. hergottensis*. In hindsight, the designation of these forms to *Eurycheilostoma* seems improbable, although one cannot completely dismiss this designation until the North American species of the genus are more completely described. *Eurycheilostoma* also was used by Sigal (1979, Pl. 3, Fig. 19) for a species similar to *P. hergottensis*.

Coryphostoma sp. is a persistent and generally common faunal component in all studied assemblages, except for Sample 123-766A-18R-2, 83–85 cm, where its absence is probably the result of dissolution. The species was recorded by Scheibnerová (1974b) from the Perth and Gascoyne Abyssal plains, and by Haig (1982) from the Laura, Carpentaria, and northeastern Eromanga basins in Queensland. Haig and Copp (unpubl. data) have also recorded the species from the Albian of the eastern Carnarvon Basin in western Australia. Among the Pleurostomellidae, the lowest occurrence of *Pleurostomella* aff. *reussi* in Sample 123-766A-21R-CC represents a significant stratigraphic level, as primitive *Pleurostomella* is not known elsewhere below the uppermost Aptian (Bettenstaedt and Spiegler, 1982). *Ellipsoidella* cf. *cuneata* first appears in the stratigraphic sequence a little higher than *Pleurostomella*, and rare *Ellipsoglandulina* sp. occurs within Samples 123-766A-16R-5, 60–64 cm, and -16R-CC. The material offers no new evidence about the evolutionary development of the pleurostomellid genera.

Order Rotaliida

A remarkable diversification among the Rotaliida occurred during the mid-Cretaceous and resulted in a significant modernization of the fauna. Species recovered at Site 766 belong to the Patellinidae, Bagginidae, Quadrimorphinidae, Globorotalitidae, Osangulariidae, and Gavelinellidae families (Table 3). All species are illustrated in Plates 3 and 4.

Poorly preserved patellinids occur only in Samples 123-766A-24R-CC and -25R-1, 33–35 cm, and are referred tentatively to *Hergottella*. They lack the spinose umbonate deposits known in typical *Hergottella* from the Great Artesian Basin (Ludbrook, 1966, p. 135,136, Pl. 13, Figs. 19 through 22, 27, and 28. Text-figs. 28 through 32; Haig, 1982, p. 40,41, Pl. 8, Figs. 1 through 4).

The species classed as *Serovaina* and included in the Bagginidae are similar to mid-Cretaceous types referred elsewhere to *Valvulineria* or *Gyroidinoides* (e.g., Ludbrook, 1966; Dailey, 1973; Scheibnerová, 1974b, 1978a, 1978b; Sliter, 1977, 1986; Gradstein, 1978; Basov et al., 1979; Dupeuble, 1979; Haig, 1981, 1982; Basov and Krasheninnikov, 1983; Moullade, 1984; Magniez and Sigal, 1985). However, the species lack an open umbilicus and well-developed umbilical flaps, features typical of the

Table 6. Distribution of foraminiferal genera of Lituolida in confirmed Aptian-Albian deposits of the western margin submarine plateaus and abyssal plains and the Australian epeiric basins.

	WESTERN MARGIN						EPEIRIC BASINS						
	A	B	C	D	E	F	G	H	I	J	K	L	M
Rzehakinidae													
Miliammina	..	?	..	..	..	..	..	..	X	X	X	X	X
Hormosinidae													
Reophax	..	..	..	..	..	?	..	X	X	X	X	X	X
Haplophragmoididae													
Haplophragmoides	..	X	?	..	X	?	..	X	X	X	X	X	X
Lituolidae													
Ammobaculites	..	?	..	..	?	..	..	X	X	X	X	X	X
Ammomarginulina	..	..	..	..	..	..	..	..	..	..	X	..	..
Flabellammina	..	..	..	..	..	..	..	..	X	..	X	X	X
Triplasia	..	..	..	..	..	..	..	..	..	..	..	X	..
Sculptobaculites	..	..	..	..	..	..	..	..	X	..	X	X	X
Ammosphaeroidinidae													
Ammosphaeroidina	X	..	..	..	..	..	..	..	..	..	..	..	..
Recurvoides	..	?	..	..	..	..	..	X	X	X	X	X	X
Spiroplectamminidae													
?Ammobaculoides	..	..	..	..	..	..	..	..	..	..	X	X	..
Heterantyx	X	..	..	?	..	?	..	..	..	..	..	..	..
Spiroplectammina	..	?	?	..	..	..	..	..	X	X	X	X	X
Spiroplectinella	X	..	..	..	?	..	..	X	..	..	..	..	..
Textulariopsidae													
Aaptotoichus	..	..	..	..	..	..	..	..	..	..	X	X	X
Bimonilina	..	..	..	..	?	..	..	..	X	X	X	X	X
Textulariopsis	..	?	..	..	..	..	..	X	X	X	X	X	X
Trochamminidae													
Trochammina	..	X	?	..	..	..	..	X	X	X	X	X	X
Prolixoplectidae													
?Eomarssonella	..	..	..	..	..	..	..	..	X	X	X	X	X
Verneuilinidae													
Gaudryina	X	..	?	?	?	?	..	..	..	..	..	..	..
Gaudryinella	..	..	..	..	..	..	..	X	..	..	..	..	..
Gaudryinopsis	..	..	..	..	..	..	..	X	X	X	X	X	X
Pseudogaudryinella	X	X	?	X	..	..	..	..	..	..	..	..	..
?Reophacella	..	..	..	..	..	..	..	..	..	X	..	..	..
Spiroplectinata	..	..	..	..	..	..	..	..	X	X	..	..	..
Uvigerinammina	..	..	..	..	..	..	..	X	..	..	..	..	..
Verneuilina	..	?	?	?	?	..	..	..	X	X	X	X	X
Verneuilinoides	..	?	..	?	..	..	..	X	X	..	X	X	X
Tritaxiidae													
Tritaxia	X	..	?	X	..	?	..	..	..	..	..	..	..
Globotextulariidae													
Remesella	X	X	?	X	..	?	..	..	..	..	..	..	..
Dictyopsellidae													
Andamookia								..	..	..	..	X	..
Eggerellidae													
Dorothia	X	..	?	?	..	?	..	..	..	..	..	..	..
Marssonella	X	..	..	..	?	?	..	..	X	X	..	..	..

Note: Letters refer to localities shown in Figure 1.

optically radial *Valvulineria* and the optically granular *Gyroidinoides*. The studied specimens have transparent external walls and septa and may belong within the Bagginidae family. The globose *Serovaina infracretacea* is the most abundant and persistent species present in the sampled interval.

The lowest record of *Osangularia schloenbachi* occurs in Sample 123-766A-21R-CC, where it is abundant and possibly transitional from the compressed *Gavelinella* cf. *andersoni*. *Osangularia schloenbachi* remains a dominant species in the higher samples. *Berthelina intermedia* also first appears in Sample 123-766A-21R-CC and is persistent in all higher samples. The species is represented here by morphotypes that generally have a flatter oral side than those described by Haig (1982, p. 66 and 67) from northern Queensland (recorded as *Anomalinoides intermedia*). According to the diagnoses of Loeblich and Tappan (1988), the distinction between *Anomalinoides* and *Berthelina* and their separation in different families may lie only in the presence of more developed apertural flaps in *Berthelina* and a more extensive aperture reaching well across the periphery in *Anomalinoides*.

Four species of *Gavelinella* are recorded; each is characterized by an evolute or partially evolute spiral side and an involute umbilical side, with apertural flaps partly obscuring the umbilicus. Despite these similarities, the species appear unrelated in terms of chamber shape and the development of sutures, and probably were derived along different phylogenetic lines. None of the species shows a close relationship to *Lingulogavelinella albiensis* Malapris or to any other members of the *Lingulogavelinella* lineage described by Malapris (1965) and Malapris-Bizouard (1967).

The long-ranging *Gavelinella* cf. *andersoni* was recorded as *Planulina* sp. by Haig (1981). This species is characterized by a very compressed test and thick, curved sutures. In the lower samples, a relationship may exist between this species and primitive *Osangularia schloenbachi*, with the latter species acquiring a more convex spiral side, a closed umbilicus, and a more confined aperture obliquely positioned at the base of the final chamber.

Gavelinella indica is confined to Samples 123-766A-20R-2, 48–52 cm, and -20R-3, 68–72 cm. The species was previously

Table 7. Distribution of foraminiferal genera of Miliolida and Nodosariida in confirmed Aptian-Albian deposits of the western margin submarine plateaus and abyssal plains and the Australian epeiric basins.

	WESTERN MARGIN						EPEIRIC BASINS						
	A	B	C	D	E	F	G	H	I	J	K	L	M
MILIOLIDA													
Hauerinidae													
Pseudosigmoilina	..	..	..	..	..	..	..	X	X	..	X	X	..
?Scythiloculina	..	?	..	..	..	..	..	..	..	..	..	X	X
NODOSARIIDA													
Ichthyolariidae													
Bojarkaella	..	..	..	..	..	..	..	..	..	..	..	X	X
Lingulonodosaria	X	?	..	..	..	?	..	X	X	X	X	X	X
Nodosariidae													
Dentalina	..	..	?	..	..	?	..	..	X	X	..	..	..
Frondicularia	?	?	?	X	..	..	..	X	X	X	..	X	..
?Grigelis	X	..	..	..	..	..	..	..	..	..	..	..	..
Laevidentalina	X	X	?	X	..	?	..	X	X	X	X	X	X
Lingulina	X	..	..	..	..	?	..	..	X	X	X	X	..
?Nodosaria	..	..	..	..	..	..	..	..	X	X	..	..	..
Pseudonodosaria	X	..	..	..	..	..	X	X	X	X	X	X	X
Pyramidulina	X	X	?	X	?	?	..	X	X	X	X	X	X
Svenia	X	..	?	X	..	..	..	..	..	X	X	X	X
Tristix	..	..	..	..	..	..	..	..	X	X	X	X	..
Vaginulinidae													
Astacolus	X	X	..	?	..	?	X	X	X	X	X	X	X
Citharina	X	?	..	..	?	..	X	X	X	X	X	X	X
?Ellipsocristellaria	..	..	..	..	..	..	..	..	..	X	..	..	..
Hemirobulina	X	X	..	?	..	?	X	X	X	X	..	X	X
Lenticulina	X	X	?	?	?	?	X	X	X	X	X	X	X
Marginulina	..	X	..	?	..	?	X	·X	X	X	X	X	X
Neoflabellina	..	..	..	?	..	..	..	..	..	..	..	..	..
Planularia	X	..	..	?	..	..	..	X	X	..	..	..	..
Psilocitharella	X	..	..	X	..	?	..	..	X	X	..	X	..
Saracenaria	X	X	..	..	..	?	X	X	X	X	X	X	X
Vaginulina	X	..	..	..	..	?	..	..	..	..	..	..	..
Vaginulinopsis	X	X	?	..	X	..	..	X	X	X	..	X	X
Lagenidae													
Reussoolina	..	..	..	..	..	?	..	X	X	X	X	X	X
Polymorphinidae													
Bullopora	..	..	..	..	..	..	..	..	X	X	..	X	..
Eoguttulina	..	X	..	?	..	..	..	..	..	X	..	..	..
Globulina	X	?	..	..	..	?	X	X	X	X	X	X	X
Pyrulinoides	..	..	..	..	..	?	..	..	..	X	..	..	..
Ramulina	X	..	..	X	..	..	..	X	X	X	..	X	..
Glandulinidae													
Tricarinella	X	..	..	X	..	..	..	X	X	X	..	X	..

Note: Letters refer to localities shown in Figure 1.

referred to *Orithostella* by Scheibnerová (1974b, 1978b) and Narayanan and Scheibnerová (1975), and to *Lingulogavelinella* by Haig (1982). In contrast to typical *Ortihostella*, the spiral (aboral) side is completely evolute and usually flat to slightly concave. The initial spiral whorls may be obscured by granulate umbonate deposits (Pl. 4, Fig. 3).

The distinctive *Gavelinella* sp. A has a compressed test; thick, backwardly sweeping sutures; and well-developed apertural flaps that form a stellate pattern over the umbilicus. It occurs commonly over a narrow stratigraphic range from Sample 123-766A-19R-CC to -24R-CC.

Gavelinella sp. B is found in the interval from Sample 123-766A-19R-4, 23–27 cm, to -25R-CC, and becomes rare and more scattered toward the top of its range. This species is similar to the form described by Haig (1982) as *Orithostella* sp. A, based on a convex spiral (aboral) side and a flat, umbilical (oral) side. In typical *Orithostella*, the aboral side is completely involute, whereas in *Gavelinella* sp. B, it is partially evolute, with the early whorls clearly visible.

Scheibnerova protindica was established by Quilty (1984) for specimens from Exmouth Plateau. In Hole 766A, the species occurs as a common element of the fauna from Samples 123-766A-16R-3, 46–50 cm, to -18R-CC. No direct ancestor for the species is apparent in studied assemblages. *Stensioina* sp. of Basov and Krasheninnikov (1983) may be synonymous with *S. protindica*.

Order Globigerinida

Planktonic foraminifers occur in all samples and include members of the Globigerinelloididae, Planomalinidae, Schackoinidae, Hedbergellidae, and Rotaliporidae families (Table 4). All species are illustrated in Plates 4 through 6.

The *Globigerinelloides* species are best represented in the lowest samples, although *Globigerinelloides* cf. *bentonensis* is scattered higher in the hole. Three species are separated from Sample 123-766A-25R-CC: robust *G.* cf. *bentonensis* similar to morphotypes described by Caron (1978), with fewer chambers per whorl than in the holotype; small compressed *Globigerinelloides aptiense*, with six chambers in the final whorl; and related *Globigerinelloides* cf. *aptiense*, with five chambers in the last whorl. The *Planomalina* lineage is represented by *Planomalina praebuxtorfi* in Samples 123-766A-17R-2, 125–128 cm, and -17R-3, 36–39 cm, and by *Planomalina buxtorfi* in the higher Samples 123-766A-16R-3, 46–50 cm, through -16R-CC. *Planomalina*

Table 8. Distribution of foraminiferal genera of Robertinida, Buliminida, and Rotaliida in confirmed Aptian-Albian deposits of the western margin submarine plateaus and abyssal plains and the Australian epeiric basins.

	WESTERN MARGIN						EPEIRIC BASINS						
	A	B	C	D	E	F	G	H	I	J	K	L	M
ROBERTINIDA													
Ceratobuliminidae													
Ceratolamarckina	..	..	..	..	..	..	..	..	..	..	..	X	..
Reinholdella	..	..	..	..	..	..	..	..	..	..	X	X	X
Epistominidae													
Epistomina	..	..	..	..	..	..	..	X	X	X	X	X	X
BULIMINIDA													
Bolivinidae													
Tappanina	X	..	..	..	..	..	..	..	..	..	X	X	..
Eouvigerinidae													
Eouvigerina	..	..	..	..	..	..	..	..	X	..	..	..	..
Turrilinidae													
Cuneus	X	..	..	..	..	..	..	..	X	..	X	..	..
Neobulimina	..	..	?	..	..	..	X	X	X	X	X	X	X
Praebulimina	X	..	X	?	..	?	..	X	..	..	..	..	..
Turrilina	..	..	..	..	..	..	..	..	X	X	X	X	..
?Eurycheilostoma	X	..	..	?	..	..	..	..	X	X	X	X	X
Siphogenerinoididae													
Orthokarstenia	..	..	..	..	..	..	..	X	X	X	..	X	..
Buliminellidae													
?Buliminella	..	..	..	..	..	..	..	X	X	..	X	X	..
Fursenkoinidae													
Cassidella	..	..	..	..	..	..	..	..	X	X	..	..	..
Coryphostoma	X	..	?	X	..	..	X	..	X	X	..	X	..
Pleurostomellidae													
Ellipsoglandulina	X	..	..	..	..	..	..	..	..	..	..	..	..
Ellipsoidella	X	..	..	?	..	..	..	X	X	..	..	..	..
Pleurostomella	X	..	..	?	?	?	..	X	X	X	..	X	..
ROTALIIDA													
Spirillinidae													
Turrispirillina	..	..	..	..	..	..	..	..	..	X	..	..	..
Patellinidae													
Hergottella	?	..	..	?	..	..	..	..	X	..	X	X	X
Patellinoides	..	..	..	..	..	..	..	X	..	X	X	X	X
Bagginidae													
Serovaina	X	..	?	X	X	X	..	X	X	X	X	X	X
Valvulinoides	..	..	..	..	..	X	X	..	X	X	X	X	..
Quadrimorphinidae													
Quadrimorphina	X	..	..	X	X	..	..	X	X	X	..	..	..
Globorotalitidae													
Globorotalites	X	..	..	X	?	..	..	X	..	..	..	..	..
Osangularidae													
Charltonina	X	..	..	..	X	..	..	..	..	..	..	..	..
Osangularia	X	..	?	X	?	?	..	X	..	X	..	..	..
Alabaminidae													
?Alabamina	..	..	..	..	..	X	..	..	..	..	..	X	X
Gavelinellidae													
Berthelina	X	..	?	X	X	?	X	X	X	X	..	X	..
Bilingulogavelinella	..	..	..	..	..	..	..	..	..	..	..	X	X
Gavelinella	X	..	?	X	..	X	X	X	X	X	X	X	X
Lingulogavelinella	..	..	?	..	X	..	..	X	X	X	X	X	X
Scheibnerova	X	..	..	..	X	X	..	..	..	..	..	..	..

Note: Letters refer to localities shown in Figure 1.

buxtorfi (Pl. 5, Figs. 8 and 9) is represented by the double-keeled variant discussed by Belford (1985, p. 185).

Species of *Hedbergella* are the most common planktonic forms in most samples. *Hedbergella* sp. cf. *Blefuscuiana aptica*, *Hedbergella* cf. *planispira*, and *Hedbergella planispira* represent an evolving lineage through the lower and middle parts of the studied interval. All the species have granulate ornament and thus differ from species of the Praehedbergellidae Banner and Desai, 1988, which are smooth (Banner and Desai, 1988, p. 151). *Hedbergella* sp. cf. *B. aptica* has a high spire, four or five chambers in the final whorl, and distinct "perforation cones" (Pl. 5, Figs. 11 through 13). Within Sample 123-766A-25R-1, 33–35 cm, this species is transitional to low spired forms (*H.* cf. *planispira*), with five or six chambers in the final whorl and with the final chambers often deflected slightly toward the umbilical side. In Samples 123-766A-20R-2, 48–52 cm, and -20R-1, 47–57 cm, a gradation from *H.* cf. *planispira* to *H. planispira* occurs. The latter form possesses six or seven chambers in the final whorl and a flat spire. In previous literature, a variety of species was referred to *H. planispira*. The essential features of *H. planispira* are shown in Loeblich and Tappan's (1988, Pl. 495, Figs. 13 through 15) re-illustration of a topotype. This specimen has a flat spire, with six chambers in the final whorl; a thick test (with diameter:height ratio approximately 2:1); a diameter of approximately 0.23 mm;

Table 9. Distribution of foraminiferal genera of Globigerinida in confirmed Aptian-Albian deposits of the western margin submarine plateaus and abyssal plains and the Australian epeiric basins.

	WESTERN MARGIN						EPEIRIC BASINS						
	A	B	C	D	E	F	G	H	I	J	K	L	M
Globigerinelloididae													
Globigerinelloides	X	..	X	..	?	..	..	..	..	..	..	..	..
Planomalinidae													
Planomalina	X	..	..	..	..	X	..	X	..	..	..	..	..
Schackoinidae													
Schackoina	X	..	..	..	?	X	..	..	..	..	X	..	..
Hedbergellidae													
Hedbergella	X	..	X	X	X	X	X	X	X	X	X	X	X
Clavihedbergella		..	..	X	X	X	..	X	X	..	X	..	..
Praeglobotruncana	X	..	..	..	X	..	..	X	..	..	..	..	..
Favusellidae													
Favusella	..	..	..	..	..	..	..	X	..	..	..	..	..
Rotaliporidae													
Rotalipora	X	..	..	..	..	..	..	X	..	..	..	..	..

Note: Letters refer to localities shown in Figure 1.

granulate ornament on both the spiral and umbilical sides; and a wide deep umbilicus. These features are present in the Site 766 specimens and in those recorded by Playford et al. (1975) from the "Great Artesian Basin." The specimens identified from DSDP sites as *H. planispira* by Herb (1974), Gradstein (1978), Caron (1978), and Miles and Orr (1980) are not conspecific with the topotype figured by Loeblich and Tappan. These belong to an unrelated species referred here to *Hedbergella* cf. *punctata* (following the descriptions of Michael, 1972, and Playford et al., 1975). *Hedbergella* cf. *punctata* is abundant in Samples 123-766A-17R-CC to -16R-3, 46–50 cm; below this level, it is rare and scattered. The species is characterized by a very small (<0.2 mm diameter) flat trochospire having a smooth surface and large scattered pores, and seven chambers in the final whorl.

Although *Hedbergella trocoidea* is represented by typical specimens, its scattered distribution probably does not reflect the species complete stratigraphic range. Unornamented *Hedbergella yezoana* is the same species recorded by Playford et al. (1975) as *Hedbergella* sp. A , and by Herb (1974) as *Ticinella* sp. A. The species may be related to *Ticinella primula* Luterbacher, but lacks supplementary apertures. In Hole 766A, it occurs in Samples 123-766A-19R-CC through -16R-3, 46–50 cm.

Loeblich and Tappan (1988) placed *Clavihedbergella* in Family Rotaliporidae. Here, the species is considered to belong to the Hedbergellidae family because it lacks the supplementary sutural apertures typical of the Rotaliporidae. Two species are represented: small, smooth-shelled *Clavihedbergella* sp. seems a primitive species of the genus and has its lowest occurrence in Sample 123-766A-20R-CC; and the larger spinose *Clavihedbergella simplicissima* first appears higher in the succession in Sample 123-766A-17R-5, 29–32. Among the Sample 123-766A-16R-5, 60–64 cm, specimens are atypical morphotypes having six chambers in the final whorl.

The most advanced specimens of the Family Hedbergellidae encountered here are referred to *Praeglobotruncana delrioensis* and occur only in the uppermost samples (123-766A-16R-CC through -16R-3, 46–50 cm). Some of these specimens are very strongly ornamented with large pustules, which are variably concentrated around the periphery (Pl. 6, Figs. 5 and 6).

Rotalipora is represented by two species having concurrent ranges in Samples 123-766A-16R-5, 60–64 cm, and -16R-3, 46–50 cm. Both have strong keels on the spiral side, and ridges variously developed along the chamber margins and umbilical shoulders on the umbilical side. *Rotalipora appenninica* has an asymmetric test (more convex on umbilical side) with six or seven chambers in the final whorl and may, on the basis of periumbilical ridge development, be an advanced morphotype of the species, tending toward *R. greenhornensis* (Morrow) and resembling *Rotalipora globotruncanoides* Sigal (see Wonders, 1980, p. 127, 128). *Rotalipora ticinensis* also has stronger ornament than is typical for the species; it has seven or eight chambers in the final whorl, and the spiral side often is more convex than the umbilical side.

Implications for Chronostratigraphy

The chronostratigraphic subdivision of Hole 766A interval from Cores 123-766A-16R through -25R, based on foraminiferal biostratigraphy, is shown in Figure 2. Planktonic foraminiferal zones of wide application are applied only to Core 123-766A-16R and the upper part of Core 123-766A-17R. Here, the *Planomalina praebuxtorfi* Zone of Wonders (1980; = *Planomalina praebuxtorfi* Subzone of Leckie, 1984), defined by the total range of the nominate species, occupies Sections 123-766A-17R-2 and -17R-3; and the succeeding undifferentiated *Pseudothalmanninella ticinensis-Planomalina buxtorfi* and *Thalmanninella appenninica-Planomalina buxtorfi* zones of Wonders (1980) range through Sections 123-766A-16R-3 to 123-766A-16R-5, based on the occurrence of *P. buxtorfi*. The entire interval (Sections 123-766A-16R-3 to -17R-3) correlates with the *Rotalipora appenninica* Zone of Caron (1985) and with the *Stoliczkaia disparammonoid* Zone indicative of the upper Albian (Caron, 1985, Fig. 3). In Hole 766A, *Rotalipora* is confined to the upper part of this interval. The presence of advanced *Rotalipora appenninica* tending toward *Rotalipora globotruncanoides* suggests that the uppermost sample lies close to the Albian/Cenomanian boundary (Wonders, 1980).

The interval below Core 123-766A-17R is difficult to correlate precisely with standard chronostratigraphic divisions, because most of the commonly used zonal index species do not occur. The lowest samples from Cores 123-766A-24R and -25R are probably upper Aptian, based on (1) the abundance of *Hedbergella* sp. cf. *Blefuscuiana aptica* among the planktonic foraminifers, the occurrence in Core 123-766A-25R of *Globigerinelloides aptiensis*, and the first occurrence of abundant *Hedbergella* cf. *planispira* at the top of Core 123-766A-25R; and (2) the absence of benthic species such as *Berthelina intermedia, Osangularia schloenbachi*, and *Pleurostomella* aff. *reussi*. Unfortunately, no samples were taken from Cores 123-766A-22R and -23R because of poor core recovery in an apparently siliceous interval (? correlative of the upper Aptian-lower Albian Windalia Radiolarite of the Carnarvon Basin; Hocking 1988; and Ellis and Haig, unpubl. data).

The foraminiferal assemblages recovered from Core 123-766A-21R are markedly different from those of the lower cores. *Berthelina, Osangularia,* and *Pleurostomella* appear as common elements of the benthic fauna. The planktonic assemblages are dominated by *Hedbergella* cf. planispira and include scattered *Hedbergella trocoidea.* Because of the faunal contrast with the lower cores, Core 123-766A-21R is taken as basal Albian, although it cannot be correlated precisely. The development of *Hedbergella* assemblages in the interval ranging from Core 123-766A-21R upward to Core 123-766A-17R is broadly similar to that recorded in the "Great Artesian Basin" by Playford et al. (1975) and Haig (1979a). There, the lower and middle Albian assemblages are dominated by *Hedbergella planispira,* whereas the upper Albian fauna includes *Hedbergella* cf. *punctata, Hedbergella yezoana, Clavihedbergella* sp., and *Hedbergella delrioensis* (not recognized in Hole 766A). Therefore, the middle Albian/upper Albian boundary seems to lie somewhere within Core 123-766A-18R and has been arbitrarily placed between Sections 123-766A-18R-3 and -18R-5 on the basis of a decreased abundance of *H. planispira* up the sequence and a corresponding increased abundance of *H.* cf. *punctata.*

COMPARISON OF FAUNA

The Site 766 record described above adds significantly to our knowledge of the fauna in oceanic sediment bordering the western continental margin of Australia. It is now appropriate to review the known Australian fauna to clarify further the differences in composition among the assemblages that inhabited the shallow epeiric seas and those that lived along the continental margin. Global biogeographic relationships are apparent only when the Australian fauna is viewed in overall aspect. Haig (1979a, 1979b, 1980, 1982) described the ecological distribution of benthic species in the "Great Artesian Basin" by recognizing faunal associations (viz. *Ammobaculites* Association of the restricted epeiric sea, and the *Marssonella* Association of the open continental margin). Each association is characterized by different species. The most striking difference among the associations occurs in the composition of the agglutinated fauna: calcareous agglutinated types are absent from the *Ammobaculites* Association (even where diverse nodosariid, robertinid, buliminid, and rotaliid assemblages occur), whereas calcareous agglutinated foraminifers are common in the *Marssonella* Association. Within the *Ammobaculites* Association, different biofacies (characterized by different suites of species) reflect an increasing water depth: marginal marine *Ammobaculites australis* biofacies; inner sublittoral *Lingulogavelinella albiensis* biofacies; and outer sublittoral *Neobulimina albertensis* biofacies.

The Site 766 benthic assemblages belong to the *Marssonella* Association, as do the benthic assemblages described by Scheibnerová (1974b, 1978a) and Quilty (1984) from other localities on the western margin submarine plateaus and abyssal plains. Elsewhere in the Australian region, the *Marssonella* Association is known from Albian deposits of the Laura and northern Carpentaria basins (Haig, 1979a) and from part of the Albian succession in the Papuan Basin (Haig, 1981; Belford, 1985). The *Ammobaculties* Association is known from Aptian-Albian deposits of the Surat Eromanga and southern Carpentaria basins and from Aptian deposits of the Laura and northern Carpentaria basins (Haig, 1979a). *Ammobaculites* Association faunas containing some species more typical of the *Marssonella* Association occur in lower-middle Albian deposits of the northeastern Eromanga Basin (Haig, 1979a) and in middle Albian strata of the eastern Carnarvon Basin (Haig and Cop, unpubl. data).

Analysis of the Argo Abyssal Plain fauna of Aptian-Albian age recovered from Site 765 (Ludden, Gradstein, et al., 1990) is incomplete, and the faunal records are not included in the distribution tables. One hopes that assemblages from the Argo Abyssal Plain will clarify the nature of the abyssal fauna ("*Recurvoides* Association" of Haig, 1979) equivalent to that found by Krasheninnikov (1974b) in Upper Cretaceous strata at DSDP Site 261.

The generic classification outlined by Loeblich and Tappan is used here (Tables 5 through 9), in part to see whether the generic taxa provide a suitable basis for representing the differences in faunal diversity among regions on the continent. Tables 5 through 9 record the occurrences of genera based on species documented in published studies and our unpublished data. For ease of comparison, the regions have been grouped as (1) western margin submarine plateaus and abyssal plains and (2) epeiric basins. This comparison has been undertaken separately for each foraminiferal order.

Order Astrorhizida

Table 5 documents the genera known from the Australian region. The *Ammobaculites* Association in the epeiric basins contains a varied assortment of genera, with the species characterized by noncalcareous walls. Many of these species are remarkably similar to those known from coeval flysch deposits. This may reflect a similar adaptation to low-oxygen conditions in muddy environments independent of water depth.

In contrast to the rich diversity of the epeiric basin assemblages, the known western margin faunas contain a sporadic record of genera belonging mainly to the Ammodiscidae.

Order Lituolida

Table 6 charts the distribution of genera known from the Australian region. The most diverse assemblages occur within the *Ammobaculites* Association of the epeiric basins. Here, all species have noncalcareous walls. In contrast, most of the lituolids from the *Marssonella* Association have calcareous material incorporated in their tests. The generic classification emphasizes the difference among the faunal associations. Genera such as *Ammosphaeroidina, Heterantyx, Spiroplectinella,* calcareous *Textulariopsis, Gaudryina, Pseudogaudryinella, Spiroplectinata, Tritaxia, Remesella, Dorothia,* and *Marssonella* are confined to the *Marssonella* Association. The dominant genera of the *Ammobaculites* Association are *Miliammina, Reophax, Haplophragmoides, Ammobaculites, Sculptobaculites, Recurvoides, Spiroplectammina, Aaptotoichus, Bimonilina,* noncalcareous *Textulariopsis, Trochammina, (?)Eomarssonella* (recorded as *Riyadhella* by Haig, 1979a, 1980), *Gaudryinopsis, Verneuilina,* and *Verneuilinoides.* In terms of reflecting faunal diversity, this classification works, but may be improved by separating the calcareous and noncalcareous *Textulariopsis* into different genera.

Order Miliolida

Two genera are present in the epeiric basin faunas (Table 7). *Pseudosigmoilina* and *(?)Scythiloculina* occur in the *Ammobaculites* Association, whereas only *Pseudosigmoilina* is present in the *Marssonella* Association of northern Queensland. Mililiolids are recorded from only one site on the western margin, which suggests that the genera were confined mostly to shallower seas.

Order Nodosariida

Compared with the other foraminiferal orders, much more correspondence exists here between faunas of the western margin and the epeiric basins (Table 7), and between the *Ammobaculites* and *Marssonella* associations. Many of the species seem to have long stratigraphic ranges, and through time may have adapted progressively to a wide range of environmental conditions (this hypothesis should be tested, especially among Jurassic assemblages that contain the ancestral forms).

Genera mostly confined to the *Marssonella* Association include *Dentalina* (now circumscribed for costate species), *Frondicularia, Planularia* (with carinate periphery), *Psilocitharella*, and *Tricarinella* (as distinct from *Tristix*).

Order Robertiniida

Three genera are recorded from the *Ammobaculites* Association of the epeiric basins (Table 8). None are recorded from the *Marssonella* Association. This may be because of post-burial dissolution of the aragonite tests within permeable carbonate-rich sediments that contain many of the *Marssonella* Association assemblages, particularly along the western margin.

Order Buliminida

The Australian region contains a splendid record of primitive Buliminida (Table 8). The *Ammobaculites* Association is particularly rich in *Neobulimina* and *(?)Eurycheilostoma* and contains some of the earliest records of *Turrilina, Tappanina*, and a form resembling *Buliminella*. Genera more typical of the *Marssonella* Association include *Eouvigerina, Orthokarstenia, Cassidella, Coryphostoma, Ellipsoglandulina, Ellipsoidella*, and *Pleurostomella*.

Order Rotaliida

Table 8 is a record of genera known from the Australian region. *Serovaina* and *Gavelinella*, which include dominant species at Site 766, occur in all regions and are spread throughout the *Marssonella* and *Ammobaculites* associations. *Quadrimorphina, Osangularia*, and *Berthelina* are widely represented only in the *Marssonella* Association. The occurrence of rare *Globorotalites* in western margin deposits and in the northern Papuan Basin suggests that this genus was confined to deep bathyal conditions in the Australian region. *Scheibnerova* and *Charltonina* are confined to the western margin, although these small forms may have been overlooked elsewhere, especially among poorly preserved material such as occurs in the Papuan Basin. *Lingulogavelinella* and *Bilingulogavelinella* are best represented within the *Ammobaculites* Association of the epeiric basins.

Order Globigerinida

The record of planktonic genera (Table 9) shows an apparent marked reduction in faunal diversity existing among regions near the continental margin and those farther within the epeiric basins. However, care is needed in this comparison because marked changes in planktonic diversity occurred during Aptian-Albian time in this region. The most diverse faunas are from uppermost Albian deposits along the western margin and in the Papuan Basin; these are compared in more detail later in the text. Uppermost Albian deposits in the Laura, Carpentaria, Eromanga, and Surat basins record a regressive marine phase and lack planktonic foraminifers.

Implications for Global Biogeography

During the Early Cretaceous, the Australian region lay at middle to high paleolatitudes in the Southern Hemisphere, higher than 35°S, at least for the Berriasian through Aptian, according to the reconstructions of Ogg et al. (this volume). Because of the high-latitude position of the Australian continent and the nature of the fine siliciclastic sediment that accumulated within the epeiric seas, it may be that three main environmental factors influenced foraminiferal diversity in this region: cool water temperatures (emphasized by Scheibnerová, 1986); hyposalinity in the epeiric seas (emphasized by Haig, 1979a); and low oxygen levels in the stagnant, silled, bottom waters of the shallow epeiric seas.

Haig (1979b) outlined the broad global distribution patterns of the *Ammobaculites* and *Marssonella* associations during the mid-Cretaceous (based on an analysis of species later published by Haig, 1980, 1982). The *Ammobaculites* Association is represented mainly in the epeiric basins of Australia, western Siberia, and western interior North America by markedly similar faunas; whereas the *Marssonella* Association is well known from most continents in marginal basins that had open access to the ocean. The *Marssonella* Association is more variable in terms of generic diversity among regions.

Australian genera rarely recorded elsewhere in Aptian-Albian strata include the dictyopsellid *Andamookia* (known only from the *Ammobaculites* Association of the southern Eromanga Basin), the patellinid *Hergottella* (from both the *Ammobaculites* and *Marssonella* associations), the eouvigerinid *Eouvigerina* (from the *Marssonella* Association), the fursenkoinids *Cassidella* and *Coryphostoma* (from the *Marssonella* Association); the gavelinellids *Bilingulogavelinella* (from the *Ammobaculites* Association), and *Scheibnerova* (from the *Marssonella* Association).

Families that are missing from the Australian fauna, but are recorded elsewhere from Aptian-Albian deposits, include Mayncinidae, Nezzazatidae, Barkerinidae, Charentiidae, Coscinophragmatidae, Cyclolinidae, Cyclamminidae, Ataxophragmiidae, Cuneolinidae, Dicyclinidae, Pfenderinidae, Orbitolinidae, Chrysalidinidae, Involutinidae, Alveolinidae, Conorboididae, Heteroheliicidae, Caucasinidae, Conorbinidae, Cibicididae, Chilostomellidae, and Karreriidae. Many of these represent "larger" complex foraminifers from shelf carbonate deposits of the warm-water Tethyan belt (Dilley, 1971).

The absence of Ataxophragmiidae from the Australian fauna is interesting because of its common occurrence in Boreal assemblages (Price, 1975; Barnard and Banner, 1980). Planktonic *Ticinella* (Rotaliporidae) also has not been definitely identified from the Australian material, although closely related *Hedbergella* species are abundant. The record of *Ticinella multiloculata* by Quilty (1984, Fig. 3D) was not confirmed by his illustration of only the dorsal (spiral) side; and *Ticinella* was not recorded by Herb (1974) from the Naturaliste Plateau DSDP Site 258. However, at DSDP Site 257 in the Wharton Basin to the northwest, Herb (1974, p. 753, Pl. 2, Fig. 17) noted one specimen that had a supplementary aperture on the final chamber that is typical of *Ticinella*.

Thus, the Australian fauna contains few genera that are not recorded elsewhere, but lacks a multitude of Tethyan families found in the paleoequatorial belt. This decrease in diversity from the equatorial region south probably reflects a temperature gradient (as Scheibnerová, 1970, 1986; Dilley, 1971; and Haig, 1979b; deduced). A relative measure of this gradient, at least for the latest Albian, may be obtained by comparing planktonic assemblages found along the continental margin from the Papuan Basin in the north, through Site 766 (at 5° farther south, according to reconstructions of Veevers et al., 1991), to DSDP Site 258 on the Naturaliste Plateau, approximately 10° south of Site 766. The late Albian fauna of the Papuan Basin is almost identical to that from Site 766, but contains rare *Favusella* not present in western margin assemblages. *Favusella* apparently has an aragonitic wall (Banner and Desai, 1988) that makes it more vulnerable to dissolution than other planktonic foraminifers having calcitic tests, and its distribution must be viewed with caution when making biogeographic comparisons, such as those of Koutsoukos et al. (1989). A uniform planktonic fauna having abundant *Planomalina, Rotalipora, Praeglobotruncana, Clavihedbergella*, and *Hedbergella* (but not *Ticinella*) may have occupied the latitudinal range between the Papuan Basin and Site 766 during the latest Albian. To the south, a marked decrease in species diversity accompanies the 10° paleolatitude difference between Sites 766 and 258. The Site 258 fauna, associated with nannoplankton of the upper Albian *Eiffellithus turriseiffeli* Zone (Thierstein, 1974), contains only rare *Praeglobotruncana delrioensis, Clavihedbergella simplicissima, Hedbergella delrioensis,* and "*Hedbergella planispira*"; *Rotalipora* and *Planomalina* are absent (Herb, 1974). This faunal change probably was the result of a marked decrease in surface-water temperatures along the western continental margin between Site 766 and the Naturaliste Plateau.

CONCLUSIONS

The foraminifers recovered from Core 123-766A-25R through Section 123-766A-16R-3 suggest that this portion of Hole 766A ranges from the upper Aptian to the uppermost Albian and is coeval with deposits that accumulated on the Australian continent during an extensive marine transgression. The benthic assemblages from Site 766 belong to the *Marssonella* Association and are similar to those recorded elsewhere along the continental margin, but differ from assemblages found within more restricted parts of the epeiric basins (viz., the *Ammobaculites* Association). In a global comparison, the Australian fauna contains few genera not recorded elsewhere, but lacks many families present in Tethyan (equatorial) faunas. Three main environmental factors apparently influenced foraminiferal diversity in the Australian region: (1) cool water temperatures, (2) hyposalinity in the epeiric seas, and (3) low oxygen levels in the stagnant, silled, bottom waters of the shallow epeiric seas. Comparison of late Albian planktonic foraminifers known from along the continental margin indicates that a significant gradient in surface-water temperature existed over a 10° latitudinal range between Cuvier Abyssal Plain Site 766 and Naturaliste Plateau Site 258 on the late Albian continental margin.

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APPENDIX
Taxonomic List

Foraminifers recorded from Site 766 are classified here under the Orders recognized by Haynes (1981), and the families and genera diagnosed by Loeblich and Tappan (1988). For each named species, the original nomenclature is cited (following Ellis and Messina, 1945, et seq.), and for several species, references to significant taxonomic revisions are given. Published illustrated records of the species from confirmed Aptian-Albian deposits in the Australian region also are listed.

Order ASTRORHIZIDA
Family AMMODISCIDAE
Genus *GLOMOSPIRELLA*
?Glomospirella sp.

Glomospira gordialis Parker and Jones; Scheibnerová, 1974b, Pl. 1, Fig. 3. Perth Abyssal Plain, Albian.

Genus *REPMANIA*
Repmania corona (Cushman and Jarvis, 1928)

Glomospira charoides (Jones and Parker) var. *corona* Cushman and Jarvis, 1928, p. 89, Pl. 12, Figs. 9–11.

Order LITUOLIDA
Family AMMOSPHAEROIDINIDAE
Genus *AMMOSPHAEROIDINA*
Ammosphaeroidina sp.

Family SPIROPLECTAMMINIDAE
Genus *HETERANTYX*
Heterantyx cf. *cretosa* (ten Dam, 1950)

cf. *Spiroplectammina rectangularis* ten Dam var. *cretosa* ten Dam, 1950, p. 11, Pl. 1, Fig. 9.
?*Spirobolivina australis* Scheibnerová, 1974b, p. 713, Pl. 4, Fig. 4, Pl. 9, Fig. 14. Perth Abyssal Plain, Albian.

Genus *SPIROPLECTINELLA*
Spiroplectinella cf. *gandolfii* (Carbonnier, 1952)

cf. *Spiroplectammina gandolfii* Carbonnier, 1952, p. 112, Pl. 5, Figs. 2a–2b.
Textularia sp. B; Haig, 1981, Pl. 1, Figs. 22–23. Papuan Basin, upper Albian.

Family VERNEUILINIDAE
Genus *GAUDRYINA*
Gaudryina aff. *richteri* Grabert, 1959

aff. *Gaudryina richteri* Grabert, 1959, p. 12, Pl. 1, Figs 1a–2c, Pl. 3, Figs. 46–47.

Genus *PSEUDOGAUDRYINELLA*
Pseudogaudryinella sp. A

Migros sp. ; Scheibnerová, 1974b, p. 710, Pl. 1, Fig. 24, Pl. 9, Fig. 13; Perth and Gascoyne abyssal plains, Albian.

Pseudogaudryinella sp. B
Pseudogaudryinella sp. C

Family TRITAXIIDAE
Genus *TRITAXIA*
Tritaxia gaultina (Morozova, 1948)

Clavulina gaultina Morozova, 1948, p. 36, Pl. 1, Fig. 4.
Clavulina gabonica Le Calvez et al.; Scheibnerová, 1974b, p. 711. Pl. 2, Figs. 5-8, 9; Perth Abyssal Plain, Albian.

Family GLOBOTEXTULARIIDAE
Genus *REMESELLA*
Remesella sp.

Matanzia sp., Scheibnerová, 1974b, p. 711, Pl. 9, Figs. 15a, 15b. Perth Abyssal Plain, Albian.
?*Dorothia* sp., Scheibnerová, 1974b, p. 710, Pl. 2, Figs. 1–3. Perth Abyssal Plain, Albian.
?*Eggerella* sp., Scheibnerová, 1974b, p. 710, Pl. 2, Fig. 4. Perth Abyssal Plain, Albian.

Family EGGERELLIDAE
Genus *DOROTHIA*
Dorothia sp.

Genus *MARSSONELLA*
Marssonella oxycona (Reuss, 1860)

Gaudryina oxycona Reuss, 1860, p. 229, Pl. 12, Figs. 3a–3c.
Marssonella oxycona (Reuss); Haig, 1980, p. 126, Pl. 8, Fig. 19; northern Carpentaria Basin, upper Albian.
Marssonella oxycona (Reuss); Haig, 1981, Pl. 1, Fig. 32; Papuan Basin, Albian–Cenomanian.

Order NODOSARIIDA
Family ICHTHYOLARIIDAE
Genus *LINGULONDOSARIA*
Lingulonodosaria loryi (Berthelin)

Frondicularia loryi Berthelin 1880, p. 60, Pl. 4, Figs. 5a, 5b.
Lingulina loryi (Berthelin); Haig, 1982, p. 18, Pl. 3, Fig. 17; Laura Basin and northern Carpentaria Basin, Albian.

Lingulonodosaria nodosaria (Reuss)

Lingulina nodosaria Reuss, 1863, p. 59, Pl. 5, Figs. 12a, 12b.
Lingulina nodosaria Reuss; Haig, 1981, Pl. 2, Fig. 27; Papuan Basin, Albian–cenomanian.
Lingulina nodosaria Reuss; Haig, 1982, p. 19, Pl. 3, Figs. 19, 20; "Great Artesian Basin," Aptian-Albian (see for other Australian records).

Lingulonodosaria sp. A
Lingulonodosaria sp. B

Family NODOSARIIDAE
Genus *FRONDICULARIA*
?*Frondicularia* sp.

Genus *GRIGELIS*
?*Grigelis* sp.

Genus *LAEVIDENTALINA*
Laevidentalina cylindroides (Reuss, 1860)

Dentalina cylindroides Reuss, 1860, p. 185, Pl. 1, Fig. 8.
Dentalina cylindroides Reuss; Haig, 1981, Pl. 2, Fig. 11; Papuan Basin, upper Albian–Cenomanian.
Dentalina cylindroides Reuss; Haig, 1982, p. 6, Pl. 2, Figs. 19, 20; Laura and northern Carpentaria basins, Albian.

Laevidentalina gracilis (d'Orbigny, 1840)

Nodosaria (Dentalina) gracilis d'Orbigny, 1840, p. 14, Pl. 1, Fig. 5.
Dentalina gracilis Orbigny; Haig, 1982, p. 7, Pl. 1, Figs. 11,12; Laura Basin, Albian.

Laevidentalina nana (Reuss, 1863)

Nodosaria (Dentalina) nana Reuss, 1863, p. 39, Pl. 2, Figs. 10,18.

Laevidentalina oligostegia (Reuss, 1845)

Nodosaria (Dentalina) oligostegia Reuss, 1845, p. 27, Pl. 13, Figs. 19,20.
Dentalina oligostegia Reuss; Haig, 1982, p. 8, Pl. 1, Figs. 8–10; Laura, northern Carpentaria, and northern Eromanga basins, Albian (see for other Australian records).

Genus *LINGULINA*
Lingulina buddencanyonensis Dailey, 1970

Lingulina buddencanyonensis Dailey, 1970, p. 106, Pl. 12, Fig. 3.
Lingulina buddencanyonensis Dailey; Haig, 1982, p. 17, Pl. 3, Fig. 18; "Great Artesian Basin," Aptian-Albian.

Lingulina sp.

Genus *PSEUDONODOSARIA*
Pseudonodosaria humilis (Roemer, 1841)

Nodosaria humilis Roemer, 1841, p. 95, Pl. 15, Fig. 6.
Pseudonodosaria humilis (Roemer); Haig, 1981, Pl. 2, Fig. 16; Papuan Basin, upper Albian–Cenomanian.
Pseudonodosaria humilis (Roemer); Haig, 1982, p. 15,16, Pl. 3, Figs. 4,5; "Great Artesian Basin," Aptian-Albian (see for other Australian records).

Genus *PYRAMIDULINA*
Pyramidulina obscura (Reuss, 1845)

Nodosaria (Nodosaria) obscura Reuss, 1845, p. 26, Pl. 13, Figs. 7–9.
Nodosaria obscura Reuss; Haig, 1981, Pl. 2, Fig. 8; Papuan Basin, upper Albian–Cenomanian.
Nodosaria obscura Reuss; Haig, 1982, p. 13, Pl. 2, Figs. 39–43; "Great Artesian Basin," Aptian-Albian (see for other Australian records).

Pyramidulina sceptrum (Reuss, 1863)

Nodosaria (Nodosaria) sceptrum Reuss, p. 37, Pl. 2, Figs. 3a, 3b.
Nodosaria sceptrum Reuss; Haig, 1981, Pl. 2, Fig. 7; Papuan Basin, upper Albian–Cenomanian.
Nodosaria sceptrum Reuss; Haig, 1982, p. 14, Pl. 2, Figs. 29–32; "Great Artesian Basin," Albian (see for other Australian records).

Pyramidulina sp.

Genus *SVENIA*
Svenia cf. *hamiltonensis* (Ludbrook, 1966)

cf. *Dentalina hamiltonensis* Ludbrook, 1966, p. 112,113, Pl. 8, Fig. 5; Eromanga Basin, Aptian-Albian (see other records from Australia listed by Haig, 1982, p. 7).

Family VAGINULINIDAE
Genus *ASTACOLUS*
Astacolus cf. *scitula* (Berthelin, 1880)

cf. *Cristellaria scitula* Berthelin, 1880, p. 54, Pl. 3, Figs. 3a–3c.
cf. *Astacolus scitula* (Berthelin); Haig, 1982, p. 20, Pl. 4, Figs. 5–7. Laura and northern Carpentaria basins, Albian.

Astacolus sp. A
Astacolus spp.

Genus *CITHARINA*
Citharina cf. *petila* Eicher and Worstell, 1970

cf. *Citharina petila* Eicher and Worstell, 1970, p. 284, Pl. 2, Figs. 20,21.
cf. *Citharina petila* Eicher and Worstell; Haig, 1982, p. 30,31, Pl. 6, Figs. 7-10; "Great Artesian Basin," Albian.

Citharina sp. A

cf. *Citharina* sp., Haig, 1981, Pl. 2, Fig. 29; Papuan Basin, upper Albian—Cenomanian.

Citharina sp. B

Citharina sp. B of Haig, 1982, p. 33, Pl. 6, Figs. 18,19; Laura and northern Carpentaria basins, Albian.

Genus *HEMIROBULINA*
Hemirobulina hamulus (Chapman, 1894)

Marginulina hamulus Chapman, 1894, p. 161, Pl. 4, Figs. 13a, 13b.
Marginulina hamulus Chapman; Haig, 1981, Pl. 2, Fig. 20; Papuan Basin, upper Albian—Cenomanian.
Marginulina hamulus Chapman; Haig, 1982, p. 25, Pl. 5, Figs. 7,8; "Great Artesian Basin," Aptian-Albian (see for other Australian records).

Genus *LENTICULINA*
Lenticulina spp.

Genus *PLANULARIA*
Planularia bradyana (Chapman, 1894)

Cristellaria bradyana Chapman, 1894, p. 654, Pl.10, Figs. 13a, 13b.
Planularia bradyana (Chapman); Haig, 1981, Pl. 2, Fig. 13; Papuan Basin, upper Albian–Cenomanian.
Planularia bradyana (Chapman); Haig, 1982, p. 21, Pl. 4, Figs. 8–11; northern Carpentaria Basin, upper Albian (see for other Australian records).

Genus *PSILOCITHARELLA*
Psilocitharella recta (Reuss, 1863)

Vaginulina recta Reuss, 1863, p. 48, Pl. 3, Figs. 14–15b.
Citharina recta (Reuss); Haig, 1982, p. 31,32, Pl. 6, Figs. 31–34; Laura, northern Carpentaria, and northern Eromanga basins, Albian.

Genus *SARACENARIA*
Saracenaria spinosa Eichenberg, 1935

Saracenaria spinosa Eichenberg, 1935, p. 10, Pl. 4, Figs. 5a–5c.

Saracenaria triangularis (d'Orbigny, 1840)

Cristellaria triangularis d'Orbigny, 1840, p. 27, Pl. 2, Figs. 21–22.

Genus *VAGINULINA*
Vaginulina sp.

Genus *VAGINULINOPSIS*
Vaginulinopsis sp.

Family POLYMORPHINIDAE
Genus *GLOBULINA*
Globulina prisca Reuss, 1863

Polymorphina (Globulina) prisca Reuss, 1863, p. 79, Pl. 9, Figs. 8a, 8b.
Globulina lacrima Reuss; Haig, 1981, Pl. 2, Fig. 25; Papuan Basin, upper Albian–Cenomanian.
Globulina prisca Reuss; Haig, 1982, p. 35, Pl. 7, Fig. 7; Laura, northern Carpentaria, and northern Eromanga basins, Albian.

Genus *RAMULINA*
Ramulina spp.

Family GLANDULINIDAE
Genus *TRICARINELLA*
Tricarinella excavata (Reuss, 1863)

Rhabdogonium excavatum Reuss, 1863, p. 91, Pl. 12, Figs. 8a–8c.
Tristix excavata (Reuss); Haig, 1981, Pl. 2, Fig. 26; Papuan Basin, upper Albian–Cenomanian.
Tristix excavata (Reuss); Haig, 1982, p. 38, Pl. 7, Figs. 16,17; "Great Artesian Basin," Albian (see for other Australian records).

Order BULIMINIDA
Family BOLIVINIDAE
Genus *TAPPANINA*
Tappanina sp.

Family TURRILINIDAE
Genus *CUNEUS*
Cuneus cf. *ludbrookae* (Haig, 1982)

cf. *Neobulimina ludbrookae* Haig, 1982, p. 50–52, Pl. 10, Figs. 1–7, Pl. 16, Fig. 4; Carpentaria Basin, upper Albian.

Genus *EURYCHEILOSTOMA*
?*Eurycheilostoma* cf. *hergottensis* (Ludbrook, 1966)

cf. *Praebulimina hergottensis* Ludbrook, 1966, p. 132,133, Pl. 10, Fig. 21; Eromanga Basin, Aptian.
?*Neobulimina australiana* Ludbrook; Scheibnerová, 1974c, p. 712, Pl. 4, Figs. 1,2; Pl. 10, Figs. 10,11; Perth Abyssal Plain, Albian (not *Neobulimina australiana* Lubrook = *Neobulimina albertensis* of Haig, 1982, p. 48, Pl. 9, Figs. 10–20).
cf. *Eurycheilostoma hergottensis* (Ludbrook); Haig, 1982, p. 47, Pl. 10, Figs. 11,12; Pl. 11, Figs. 1–3, Pl. 16, Fig. 3; "Great Artesian Basin," Aptian.

Genus *PRAEBULIMINA*
Praebulimina cf. *nannina* (Tappan, 1940)

cf. *Bulimina nannina* Tappan, 1940, p. 116, Pl. 19, Figs. 4a, 4b.
Praebulimina sp., Haig, 1981, Pl. 3, Figs. 3,4; Papuan Basin, Albian-Cenomanian.

Family FURSENKOINIDAE
Genus *CORYPHOSTOMA*
Coryphostoma sp.

Coryphostoma sp. A, Haig, 1982, p. 62, 63, Pl. 12, Figs. 19–22; Laura, northern Carpentaria, and northern Eromanga basins, Albian (see for other Australian records).

Family PLEUROSTOMELLIDAE
Genus *ELLIPSOGLANDULINA*
Ellipsoglandulina sp.

Genus *ELLIPSODELLA*
Ellipsoidella cf. *cuneata* (Loeblich and Tappan, 1946)

cf. *Nodosarella cuneata* Loeblich and Tappan, 1946, p. 255, Pl. 37, Figs. 9a,9b.
Ellipsoidella sp. cf. *E. cuneata* (Loeblich and Tappan); Haig, 1982, p. 59, Pl. 12, Figs. 9–11; northern Carpentaria Basin, upper Albian.

Genus *PLEUROSTOMELLA*
Pleurostomella aff. *reussi* Berthelin, 1880

aff. *Pleurostomella reussi* Berthelin, 1880, p. 28, Pl. 1, Figs. 10–12.
aff. *Pleurostomella reussi* Berthelin; Haig, 1981, Pl. 3, Fig. 8; Papuan Basin, Albian.
aff. *Pleurostomella reussi* Berthelin; Haig, 1982, p. 59–61, Pl. 12, Figs. 1–8; Laura, northern Carpentaria, and northern Eromanga basins, Albian (see for other Australian records).

Order ROTALIIDA
Family PATELLINIDAE
Genus *HERGOTTELLA*
Hergottella sp.

Family BAGGINIDAE
Genus *SEROVAINA*
Serovaina gracillima (ten Dam, 1947)

Valvulineria gracillima ten Dam, 1947, p. 27, Text-figs. 4a–4c.
Valvulineria sp. A, Haig, 1982, p. 58, Pl. 12, Figs. 31,32; northern Carpentaria Basin, upper Albian.
?*Valvulineria loetterlei* (Tappan); Quilty, 1984, p. 233, Fig. 4A; Exmouth Plateau, upper Albian.

Serovaina infracretacea (Morozova, 1948)

Gyroidina nitida Reuss var. *infracretacea* Morozova, 1948, p. 40, Pl. 2, Figs. 12–14.
Gyroidinoides cf. *primitiva* Hofker; Scheibnerová, 1974b, p. 714, Pl. 5, Figs. 10–12, Pl. 11, Figs. 6a–6c; Perth and Gascoyne Abyssal plains, Albian.
Valvulineria loetterlei Tappan; Scheibnerová,1978a, p. 138, Pl. 3, Figs. 5,6; Naturaliste Plateau, Albian.
Valvulineria crespinae Ludbrook; Haig, 1981, Pl. 3, Figs. 10,11; Papuan Basin, upper Albian–Cenomanian.

Family QUADRIMORPHINIDAE
Genus *QUADRIMORPHINA*
Quadrimorphina allomorphinoides (Reuss, 1860)

Valvulina allomorphinoides Reuss, 1860, p. 223, Pl. X, Figs. XX.
Conorboides minutissima (Tappan); Haig, 1981, Pl. 2, Figs. 32–33; Papuan Basin, upper Albian–Cenomanian.
Conorboides minutissima (Tappan); Haig, 1982, p. 43, Pl. 9, Figs. 6–9; Laura and northern Carpentaria basins, Albian (see for other Australian records).

Family GLOBOROTALITIDAE
Genus *GLOBOROTALITES*
Globorotalites aptiensis Bettenstaedt, 1952

Globorotalites bartensteini Bettenstaedt subsp. *aptiensis* Bettenstaedt, 1952, p. 282, 278, Pl. 3, Figs. 32a–32c, Pl. 4, Figs. 59–72.
Globorotalites sp., Haig, 1982, Pl. 3, Figs. 14,15; Papuan Basin, (?)upper Albian or Cenomanian.

Family OSANGULARIIDAE
Genus *CHARLTONINA*
Charltonina cf. *australis* Scheibnerová, 1978

cf. *Charltonina australis* Scheibnerová, 1978a, p. 140, pl. 5, Figs. 2–5.

Genus *OSANGULARIA*
Osangularia schloenbachi (Reuss, 1863)

Rotalia schloenbachi Reuss, 1863, p. 84, Pl. 10, Fig. 5 (revised as *Osangularia schloenbachi* by Crittenden, 1983, p. 40–64).
Osangularia utaturensis (Sastry and Sastri); Scheibnerová, 1974b, p. 714, Pl. 4, Figs. 27,28; Pl. 5, Figs. 1–9; Pl. 11, Figs. 4a–5c; Perth and Gascoyne abyssal plains, Albian.
Osangularia utaturensis (Sastry and Sastri); Haig, 1981, Pl. 3, Figs. 18,19; Papuan Basin, upper Albian–Cenomanian.
Osangularia sp. A, Haig, 1982, p. 64, Pl. 13, Figs. 16,17; Laura Basin, Albian.

Family GAVELINELLIDAE
Genus *BERTHELINA*
Berthelina intermedia (Berthelin, 1880)

Anomalina intermedia Berthelin, 1880, p. 67, Pl. 4, Figs. 14a, 14b.
Anomalinoides intermedia (Berthelin); Haig, 1981, Pl. 3, Fig. 21; Papuan Basin, upper Albian–Cenomanian.
Anomalinoides intermedia (Berthelin); Haig, 1982, p. 66,67, Pl. 13, Figs. 1–3; Laura, northern Carpentaria, and eastern Eromanga basins, Albian (see for other Australian records).

Genus *GAVELINELLA*
Gavelinella cf. *andersoni* (Church, 1968)

cf. *Planulina andersoni* Church, 1968, p. 567, Pl. 8, Figs. 7a–7c.
Planulina sp., Haig, 1981, Pl. 3, Figs. 12,13; Papuan Basin, upper Albian.

Gavelinella cf. *indica* (Scheibnerová, 1974)

cf. *Orithostella indica* Scheibnerová, 1974b, p. 715, Pl. 7, Figs. 4, 8–13; Pl. 8, Figs. 1–9; Pl. 11, Figs. 9a–9c; Perth Abyssal Plain, Albian.
Lingulogavelinella indica (Scheibnerová); Haig, 1982, p. 74, 75, Pl. 13, Figs. 18–20; Laura and northern Carpentaria basins, upper part of lower Albian–lower part of middle Albian.

Gavelinella sp. A

?*Planulina* sp., Quilty, 1984, p. 236–237, Figs, 6A, 6B; Exmouth Plateau, upper Albian.

Gavelinella sp. B

Orithostella sp. A, Haig, 1982, p. 75, Pl. 3, Figs. 9–11; Laura and northern Carpentaria basins, Albian.

Genus *SCHEIBNEROVA*
Scheibnerova protindica Quilty, 1984

?*Globotruncana* sp., Scheibnerová, 1978a, Pl. 7, Figs. 10–12; Naturaliste Plateau, upper Albian.
Scheibnerova protindica Quilty, 1984, p. 234, Figs. 5A–5K; Exmouth Plateau, upper Albian.

Order GLOBIGERINIDA
Family GLOBIGERINELLOIDIDAE
Genus *GLOBIGERINELLOIDES*
Globigerinelloides aptiense Longoria, 1974

Globigerinelloides aptiense Longoria, 1974, p. 79,80, Pl. 4, Figs. 9,10; Pl. 8, Figs. 4–6, 17, 18.

Globigerinelloides cf. *aptiense* Longoria, 1974

cf. *Globigerinelloides aptiense* Longoria, 1974, p. 79,80, Pl. 4, Figs. 9,10; Pl. 8, Figs. 4–6, 17,18.

Globigerinelloides cf. *bentonensis* (Morrow, 1934)

Anomalina bentonensis Morrow, 1934, p. 201, Pl. 30, Fig. 4.
Globigerinelloides bentonensis (Morrow); Krasheninnikov, 1974a, p. 665,666, Pl. 2, Figs. 12–13; Gascoyne Abyssal Plain, Albian.

Family PLANOMALINIDAE
Genus *PLANOMALINA*
Planomalina praebuxtorfi Wonders, 1975

Planomalina praebuxtorfi Wonders, 1975, p. 90,91, Pl. 1, Figs. 1a–2c; Text-fig. 4, Figs. 2a, 2b.

Planomalina buxtorfi (Gandolfi, 1942)

Planulina buxtorfi Gandolfi, 1942, p. 103, Pl. 3, Figs. 7a–7c (emended by Wonders, 1975, p. 91,92).
Planomalina buxtorfi (Gandolfi); Haig, 1981, Pl. 3, Figs. 26,32; Papuan Basin, upper Albian.
Planomalina buxtorfi (Gandolfi); Quilty, 1984, p. 231,232, Fig. 3A; Exmouth Plateau, upper Albian.
Planomalina buxtorfi (Gandolfi); Belford, 1985, p. 185, Figs. 3, 4–11; Papuan Basin, upper Albian.

Family SCHACKOINIDAE
Genus *SCHACKOINA*
Schackoina cenomana (Schacko, 1897)

Siderolina cenomana Schacko, 1897, p. 166, Pl. 4, Figs. 3–5.
Schackoina cenomana (Schacko); Playford et al., 1975, Fig. 2, Nos. 1–4; Carpentaria Basin, upper Albian.

Family HEDBERGELLIDAE
Genus *CLAVIHEDBERGELLA*
Clavihedbergella simplicissima (Magné and Sigal, 1954)

Hastigerinella simplicissima Magné and Sigal, 1954, p. 487, Pl. 14, Figs. 11a–11c.
Hedbergella simplicissima Magné and Sigal; Herb, 1974, p. 752,753, Pl. 3, Figs. 9–13; Naturaliste Plateau, upper Albian.
Clavihedbergella simplicissima (Magné and Sigal); Quilty, 1984, p. 233, Fig. 3C; Exmouth Plateau, upper Albian.
Hedbergella simplicissima (Magné and Sigal); Belford, 1985, p. 185, Fig. 2, Nos. 28–33.

Clavihedbergella sp.

Hedbergella amabilis Loeblich and Tappan; Playford et al., 1975, Fig. 3, Nos. 7–9; northern Carpentaria Basin, upper Albian (smooth walled; not *H. amabilis* Loeblich and Tappan, 1961 = *Hastigerinella simplicissima* Magné and Sigal, 1954)

Genus *HEDBERGELLA*

Hedbergella sp. cf. *Blefuscuiana aptica* (Agalarova in Dzhafarov et al., 1951)

cf. *Globigerina aptica* Agalarova in Dzhafarov et al., 1951, p. 49, Pl. 8, Figs. 9–11.
cf. *Blefusciana aptica* (Agalarova); Banner and Desai, 1988, p. 160, Pl. 5, Figs. 4–7.
Blefuscuiana cf. *aptica* (Agalarova); Banner and Desai, 1988, Pl. 3, Figs. 4–5.

Hedbergella planispira (Tappan, 1940)

Globigerina planispira Tappan, 1940, p. 122, Pl. 19, Figs. 12a–12c (see also illustrations of topotype by Loeblich and Tappan, 1988, Pl. 495, Figs. 13–15; and scanning electron micrographs of Banner and Desai, 1988, Pl. 3, Figs. 8a–9).
Hedbergella globigerinellinoides (Subbotina); Krasheninnikov, 1974a, p. 665, Pl. 1, Figs. 13–15; Perth Abyssal Plain, Albian.
Hedbergella planispira (Tappan); Playford et al., 1975, Fig. 3, Nos. 10,11; "Great Artesian Basin," lower-middle Albian.

Hedbergella cf. *planispira* (Tappan, 1940)

cf. *Globigerina planispira* Tappan, 1940, p. 122, Pl. 19, Figs. 12a–12c.

Hedbergella cf. *punctata* Michael, 1972

cf. *Hedbergella*(?) *punctata* Michael, 1972, p. 212, Pl. 3, Figs. 1–3, Pl. 7, Figs. 1,2.
Hedbergella punctata Michael; Playford et al., 1975, Fig. 2, Nos. 6–9; "Great Artesian Basin," upper Albian.
Hedbergella planispira (Tappan); Herb, 1974, p. 752, Pl. 3, Figs. 1–8; Naturaliste Plateau, upper Albian.
?*Hedbergella planispira* (Tappan); Belford, 1985, p. 185, Fig. 2, 22–27; Papuan Basin, upper Albian (not *Globigerina planispira* Tappan).

Hedbergella trocoidea (Gandolfi, 1942)

Anomalina lorneiana (d'Orbigny) var. *trocoidea* Gandolfi, 1942, p. 98, Pl. 2, Fig. 1; Pl. 4, Figs. 2,3; Pl. 13, Figs. 2–5.
Hedbergella trocoidea Gandolfi; Krasheninnikov, 1974a, p. 665, Pl. 2, Figs. 4–6; Gascoyne Abyssal Plain, Albian.

Hedbergella yezoana Takayanagi and Iwamoto, 1962

Hedbergella yezoana Takayanagi and Iwamoto, 1962, p. 191,192, Pl. 28, Figs. 1–2.
Hedbergella sp. A, Playford et al., 1975, p. 343,344, Fig.2, Nos. 10–12; Carpentaria Basin, upper Albian.
Hedbergella yezoana Takayanagi and Iwamoto; Miles and Orr, 1980, p. 799, Pl. 4, Figs. 1–3.

Genus *PRAEGLOBOTRUNCANA*

Praeglobotruncana delrioensis (Plummer, 1931)

Globorotalia delrioensis Plummer, 1931, p. 199, Pl. 13, Fig. 2.
Praeglobotruncana delrioensis (Plummer); Herb, 1974, p. 753, Pl. 3. Fig. 14, Text-figs. 5,6; Naturaliste Plateau, upper Albian.
Praeglobotruncana delrioensis (Plummer); Belford, 1985, p. 187, Figs. 2, 34–42; Papuan Basin, upper Albian.

Family ROTALIPORIDAE

Genus *ROTALIPORA*

Rotalipora appenninica (Renz, 1936)

Globotruncana appenninica Renz, 1936, p. 14, Fig. 2.
Rotalipora appenninica (Renz); Belford, 1985, p. 187, Fig. 3, 12–17; Papuan Basin, upper Albian.

Rotalipora ticinensis (Gandolfi, 1942)

Globotruncana ticinensis Gandolfi, 1942, p. 113, Pl. 2, Fig. 3; Pl. 4, Figs. 10,11.
Rotalipora ticinensis (Gandolfi); Belford, 1985, p. 187, Fig. 3, 18–24; Papuan Basin, upper Albian.

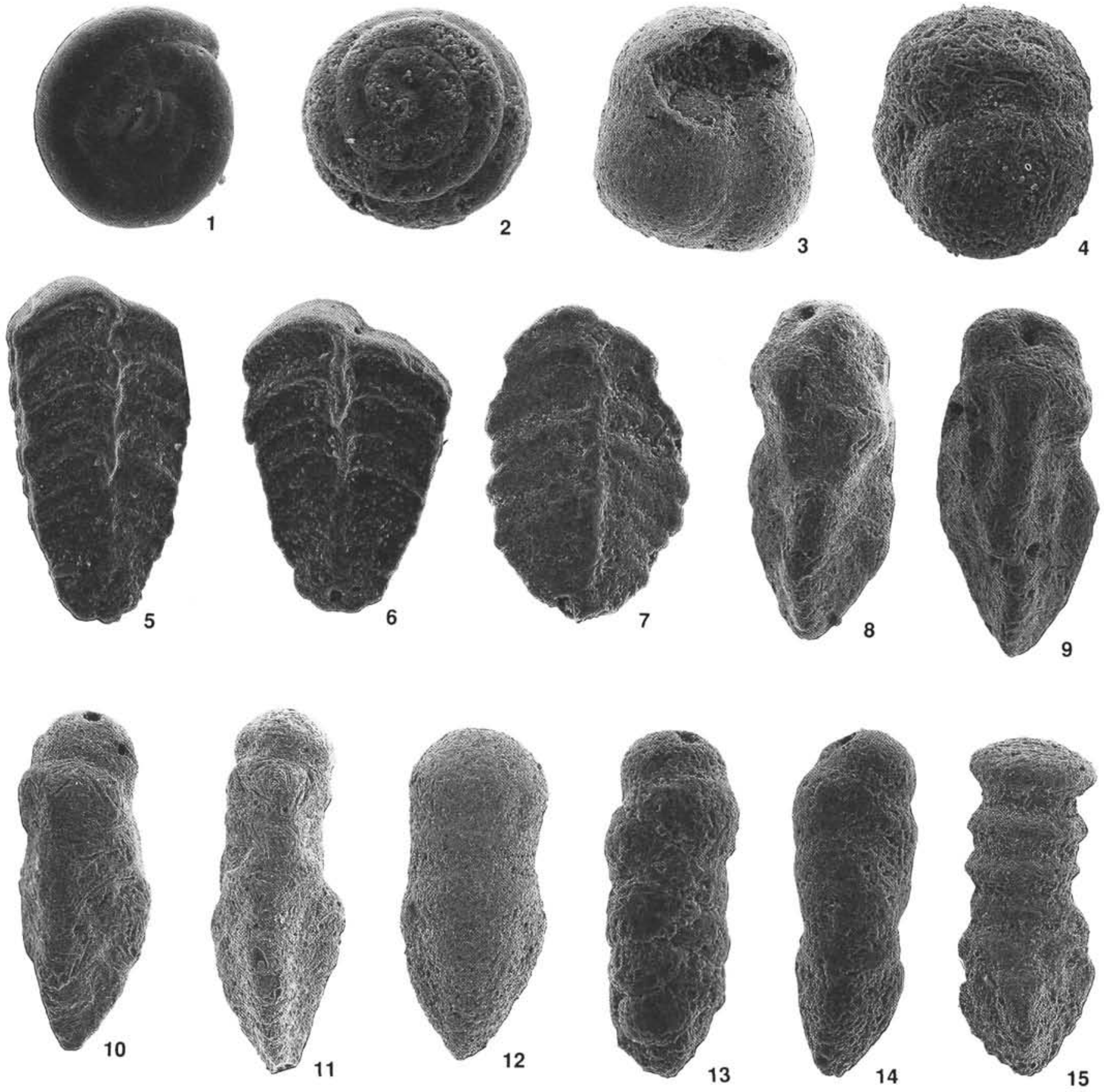

Plate 1. **1.** ?*Glomospirella* sp., Sample 123-766A-19R-CC, ×160. **2.** *Repmania corona* (Cushman and Jarvis), Sample 123-766A-19R-4, 23–27 cm, ×170. **3,4.** *Ammosphaeroidina* sp., (3) Sample 123-766A-17R-5, 29–32 cm, ×85, (4) Sample 123-766A-20R-CC, ×90. **5,6.** *Heterantyx* cf. *cretosa* (ten Dam), (5) Sample 123-766A-17R-CC, ×120, (6) Sample 123-766A-17R-CC, ×135. **7.** *Spiroplectinella* cf. *gandolfii* (Carbonnier), Sample 123-766A-16R-3, 46–50 cm, ×100. **8,9.** *Gaudryina* aff. *richteri* Grabert, (8) Sample 123-766A-20R-3, 68–72 cm, ×90, (9) Sample 123-766A-20R-3, 68–72 cm, ×80. **10,11.** *Pseudogaudryinella* sp. A, (10) Sample 123-766A-20R-3, 68–72 cm, ×60, (11) Sample 123-766A-20R-3, 68–72 cm, ×50. **12.** *Pseudogaudryinella* sp. B, Sample 123-766A-17R-5, 29–32 cm, ×50. **13,14.** *Pseudogaudryinella* sp. C, (13) Sample 123-766A-16R-3, 46–50 cm, ×100, (14) Sample 123-766A-16R-3, 46–50 cm, ×75. **15.** *Tritaxia gaultina* (Morozova), Sample 123-766A-17R-5, 29–32 cm, ×60.

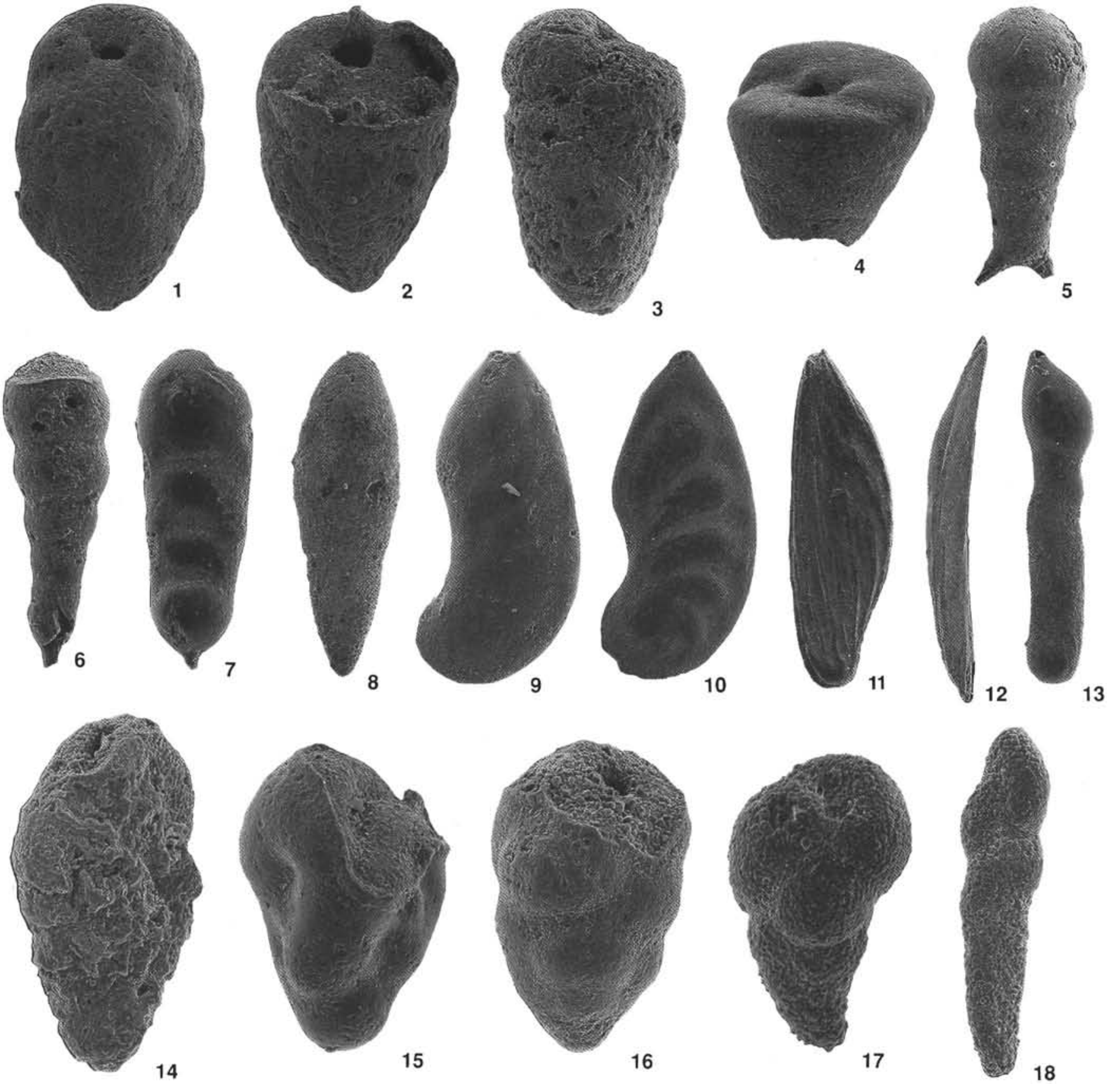

Plate 2. **1,2.** *Remesella* sp., (1) Sample 123-766A-16R-5, 60–64 cm, ×70, (2) Sample 123-766A-16R-5, 60–64 cm, ×75. **3.** *Dorothia* sp., Sample 123-766A-16R-5, 60–64 cm, ×65. **4.** *Marssonella oxycona* (Reuss), Sample 123-766A-16R-5, 60–64 cm, ×150. **5,6.** *Lingulonodosaria* sp. B, (5) Sample 123-766A-21R-CC, ×145, (6) Sample 123-766A-25R-CC, ×165. **7.** *Lingulonodosaria* sp. A, Sample 123-766A-21R-1, 90–94 cm, ×135. **8.** *Lingulina* sp., Sample 123-766A-21R-CC, ×150. **9.** *Astacolus* cf. *scitula* (Berthelin), Sample 123-766A-20R-3, 68–72 cm, ×100. **10.** *Astacolus* sp. A, Sample 123-766A-18R-5, 93–96 cm, ×90. **11.** *Citharina* sp. A, Sample 123-766A-17R-3, 36–39 cm, ×60. **12.** *Citharina* sp. B, Sample 123-766A-21R-CC, ×85. **13.** *Vaginulina* sp., Sample 123-766A-20R-3, 68–72 cm, ×85. **14.** *Tappanina* sp., Sample 123-766A-16R-3, 46–50 cm, ×270. **15.** *Cuneus* cf. *ludbrookae* (Haig), Sample 123-766A-16R-3, 46–50 cm, ×220. **16.** (?)*Eurycheilostoma* cf. *hergottensis* (Ludbrook), Sample 123-766A-18R-3, 65–67 cm, ×235. **17.** *Praebulimina* cf. *nannina* (Tappan), Sample 123-766A-20R-3, 68–72 cm, ×225. **18.** *Coryphostoma* sp., Sample 123-766A-20R-3, 68–72 cm, ×130.

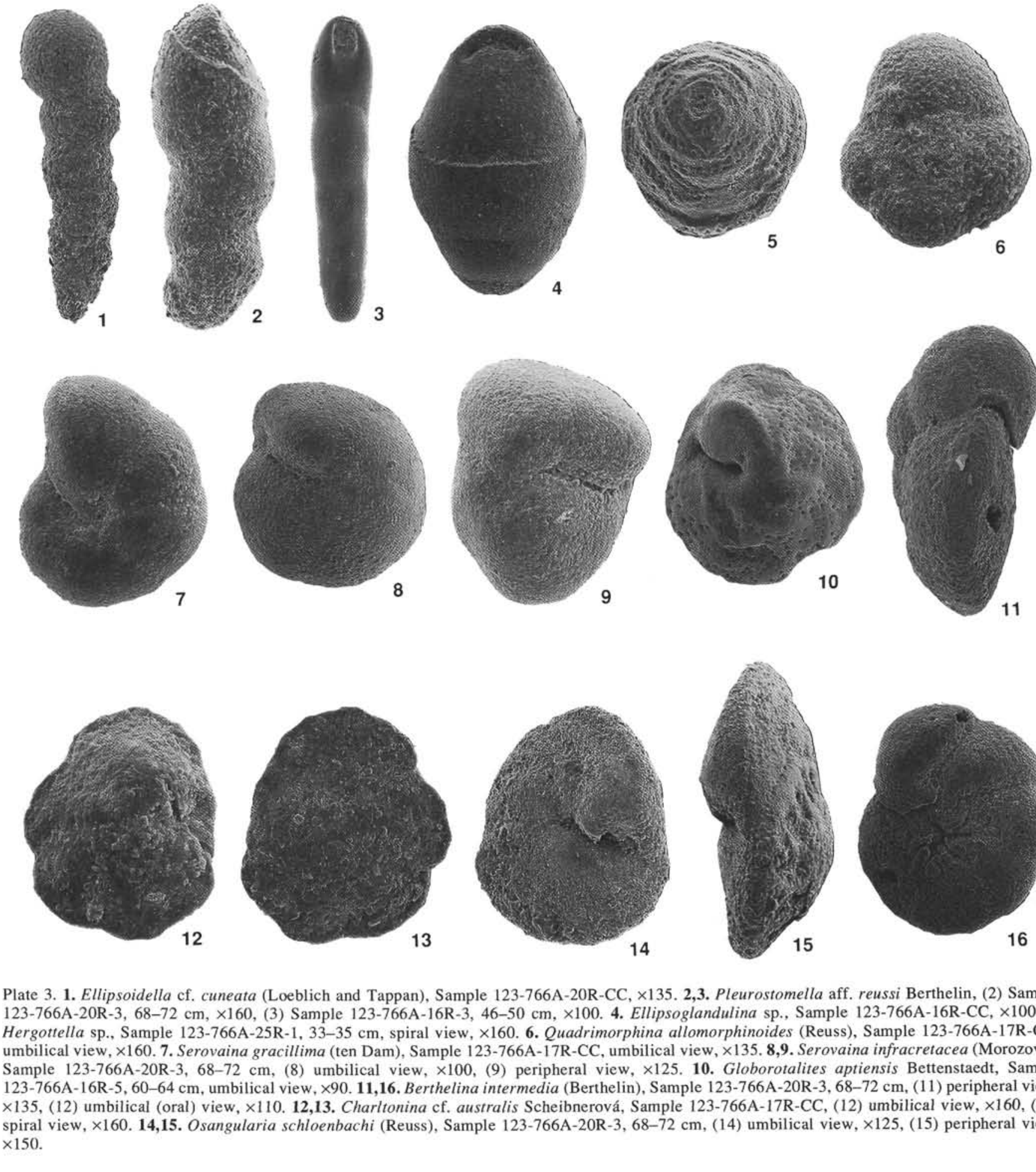

Plate 3. **1.** *Ellipsoidella* cf. *cuneata* (Loeblich and Tappan), Sample 123-766A-20R-CC, ×135. **2,3.** *Pleurostomella* aff. *reussi* Berthelin, (2) Sample 123-766A-20R-3, 68–72 cm, ×160, (3) Sample 123-766A-16R-3, 46–50 cm, ×100. **4.** *Ellipsoglandulina* sp., Sample 123-766A-16R-CC, ×100. **5.** *Hergottella* sp., Sample 123-766A-25R-1, 33–35 cm, spiral view, ×160. **6.** *Quadrimorphina allomorphinoides* (Reuss), Sample 123-766A-17R-CC, umbilical view, ×160. **7.** *Serovaina gracillima* (ten Dam), Sample 123-766A-17R-CC, umbilical view, ×135. **8,9.** *Serovaina infracretacea* (Morozova), Sample 123-766A-20R-3, 68–72 cm, (8) umbilical view, ×100, (9) peripheral view, ×125. **10.** *Globorotalites aptiensis* Bettenstaedt, Sample 123-766A-16R-5, 60–64 cm, umbilical view, ×90. **11,16.** *Berthelina intermedia* (Berthelin), Sample 123-766A-20R-3, 68–72 cm, (11) peripheral view, ×135, (12) umbilical (oral) view, ×110. **12,13.** *Charltonina* cf. *australis* Scheibnerová, Sample 123-766A-17R-CC, (12) umbilical view, ×160, (13) spiral view, ×160. **14,15.** *Osangularia schloenbachi* (Reuss), Sample 123-766A-20R-3, 68–72 cm, (14) umbilical view, ×125, (15) peripheral view, ×150.

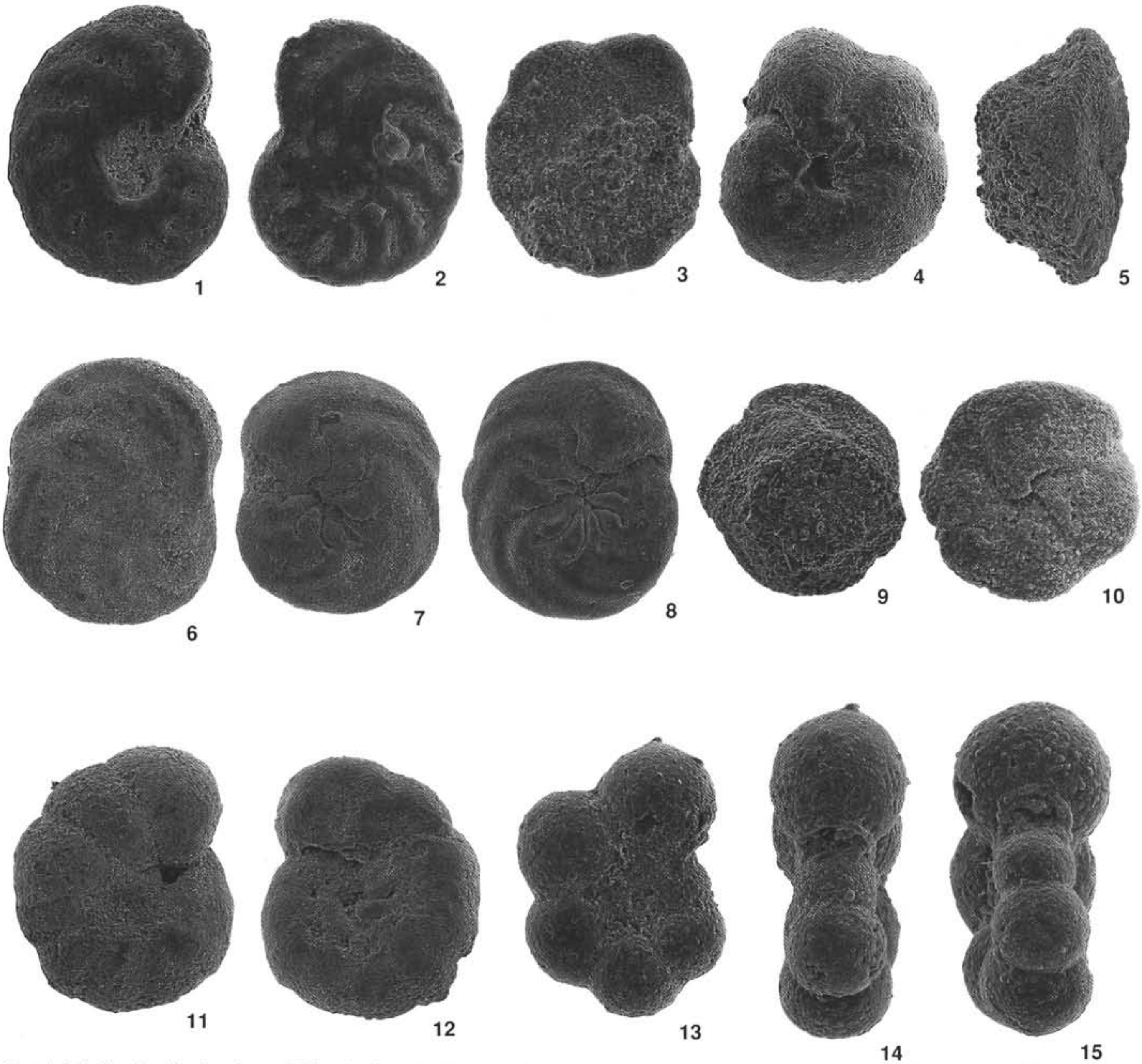

Plate 4. **1,2.** *Gavelinella* cf. *andersoni* (Church), Sample 123-766A-18R-5, 93–96 cm, (1) umbilical view, ×180, (2) spiral view, ×175. **3,4.** *Gavelinella* cf. *indica* (Scheibnerová), Sample 123-766A-20R-3, 68–72 cm, (3) spiral view, ×130, (4) umbilical view, ×130. **5,9,10.** *Scheibnerova protindica* Quilty, Sample 123-766A-17R-CC, (5) peripheral view, ×165, (9) spiral view, ×140, (10) umbilical view, ×150. **6,7,8.** *Gavelinella* sp. A, (6,7) Sample 123-766A-20R-3, 68–72 cm, (6) spiral view, ×70, (7) umbilical view, ×65, (8) Sample 123-766A-20R-3, 68–72 cm, umbilical view, ×70. **11,12.** *Gavelinella* sp. B, Sample 123-766A-21R-2, 52–56 cm, (11) spiral view, ×70, (12) umbilical view, ×70. **13,14,15.** *Globigerinelloides aptiense* Longoria, (13,14) Sample 123-766A-25R-CC, (13) lateral view, ×250, (14) peripheral view, ×300, (15) Sample 123-766A-25R-CC, peripheral view, ×375.

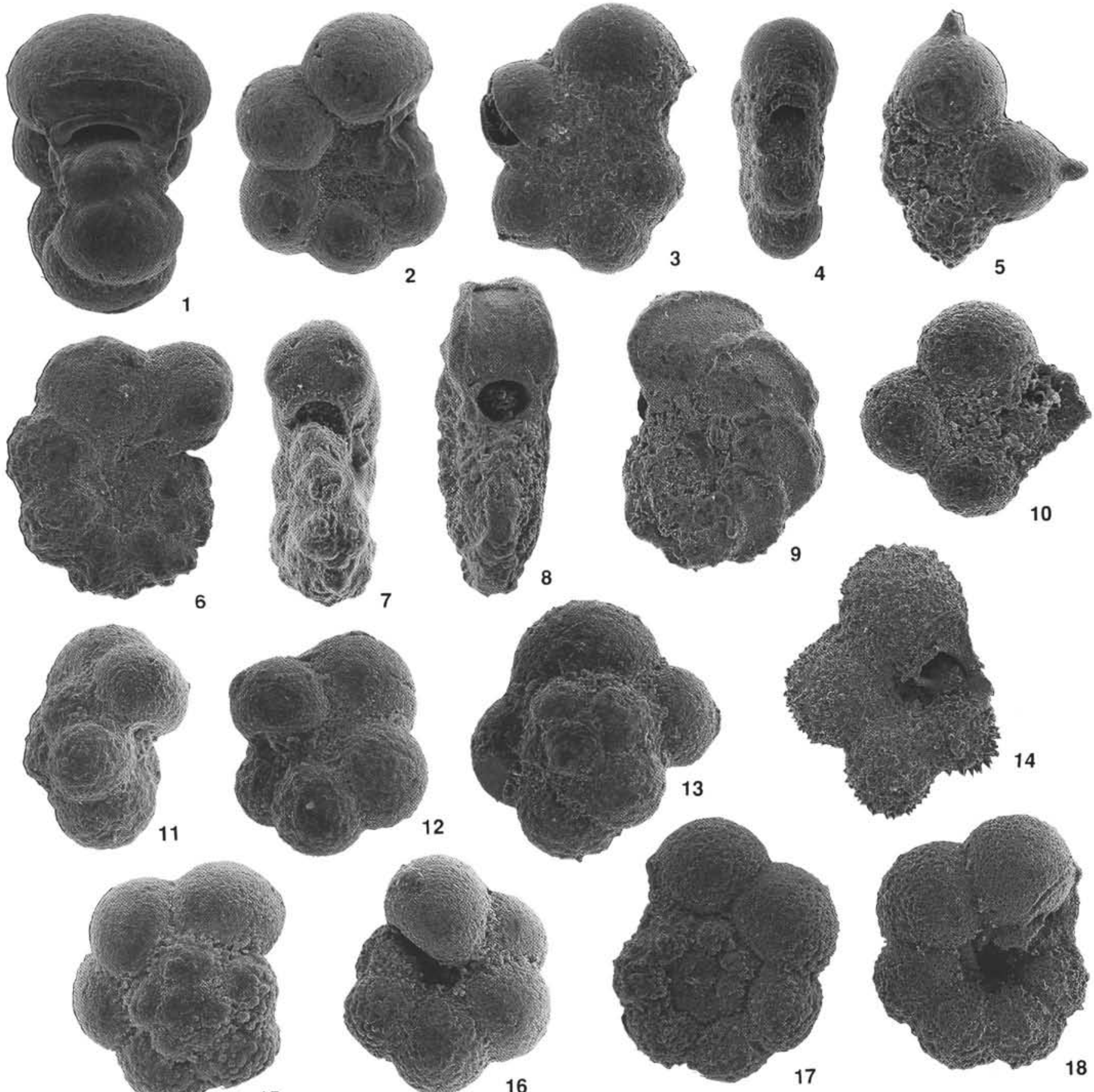

Plate 5. **1,2.** *Globigerinelloides* cf. *bentonensis* (Morrow), Sample 123-766A-24R-CC, (1) peripheral view, ×150, (2) lateral view, ×160. **3,4.** *Globigerinelloides* cf. *aptiense* Longoria, Sample 123-766A-25R-CC, (3) lateral view, ×225, (4) peripheral view, ×205. **5.** *Schackoina cenomana* (Schacko), Sample 123-766A-16R-3, 46–50 cm, ×280. **6,7.** *Planomalina praebuxtorfi* Wonders, Sample 123-766A-17R-2, 125–128 cm, (6) lateral view, ×205, (7) peripheral view, ×215. **8,9.** *Planomalina buxtorfi* (Gandolfi), Sample 123-766A-16R-3, 46–50 cm, (8) peripheral view, ×110, (9) lateral view, ×100. **10.** *Clavihedbergella* sp., Sample 123-766A-19R-CC, ×305. **11–13.** *Hedbergella* cf. *Blefuscuiana aptica* (Agalarova), Sample 123-766A-25R-CC, (11) peripheral view, ×225, (12) umbilical view, ×210, (13) spiral view, ×210. **14.** *Clavihedbergella simplicissima* (Magné and Sigal), Sample 123-766A-16R-CC, umbilical view, ×135. **15,16.** *Hedbergella* cf. *planispira* (Tappan), Sample 123-766A-24R-CC, (15) spiral view, ×220, (16) umbilical view, ×210. **17,18.** *Hedbergella planispira* (Tappan), Sample 123-766A-19R-CC, (17) spiral view, ×175, (18) umbilical view, ×175.

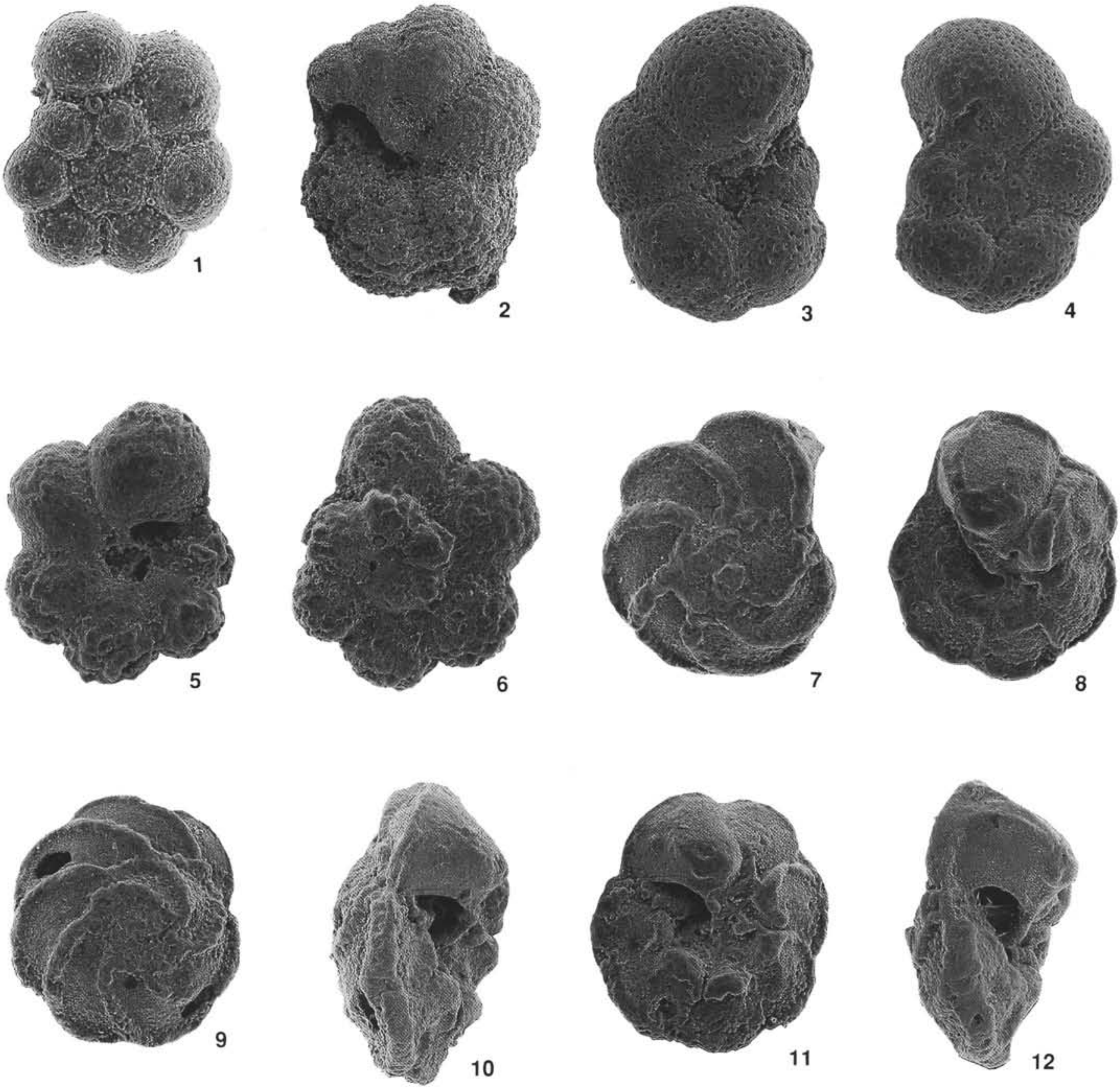

Plate 6. **1.** *Hedbergella* cf. *punctata* Michael, Sample 123-766A-17R-CC, spiral view, ×255. **2.** *Hedbergella trocoidea* (Gandolfi), Sample 123-766A-21R-CC, umbilical view, ×100. **3,4.** *Hedbergella yezoana* Takayanagi and Iwamoto, Sample 123-766A-16R-3, 46–50 cm, (3) umbilical view, ×170, (4) spiral view, ×160. **5,6.** *Praeglobotruncana delrioensis* (Plummer), Sample 123-766A-16R-3, 46–50 cm, (5) umbilical view, ×135, (6) spiral view, ×135. **7,8,12.** *Rotalipora appenninica* (Renz), Sample 123-766A-16R-3, 46–50 cm, (7) spiral view, ×65, (8) umbilical view, ×60, (12) peripheral view, ×65. **9,10,11.** *Rotalipora ticinensis* (Gandolfi), Sample 123-766A-16R-3, 46–50 cm, (9) spiral view, ×85, (10) peripheral view, ×105, (11) umbilical view, ×90.