19. SOUTHEAST ATLANTIC DSDP LEG 40 PALEOGENE BENTHIC FORAMINIFERS

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INTRODUCTION

The closely spaced coring of most of the Leg 40 sites offered the opportunity to study Paleogene benthic foraminifers from an area where heretofore almost no information existed. There was also the opportunity to tie in the distribution of the benthic foraminifers with that of the planktonic foraminifers and the calcareous nannoplankton, and thus evaluate their stratigraphic and ecologic significance. Further, it became possible to compare the Cape Basin, Walvis Ridge, and Angola Basin benthic assemblages and to confront them with known age equivalent faunas from other areas, such as New Zealand, the Caribbean, the Gulf Coast, the Caucasus, and the Alpine Mediterranean region, in particular with the recently described fauna of the Possagno section in Northern Italy (Table 10). It was also important to find out whether the Cape Basin fauna shows distinct boreal, Austral/New Zealand province affinities, as do the planktonic foraminifers.

With the studies in this volume on the Neogene benthic foraminifers of Sites 360 and 362 by Cameron, on the Upper Cretaceous of Sites 363 and 364 by Beckmann, and on the Lower Cretaceous of Sites 363 and 364 by Scheibnerová, the inclusion of the Paleogene allows one to trace the benthic foraminifer distribution throughout those sections of all sites where these faunas occurred.

Paleogene benthic foraminifers were investigated from the following Leg 40 sites (Figure 1):

Site 360: Samples 26-1, 136-139 cm (lower Miocene-upper Oligocene to 50, CC (middle Eocene)

Site 361: Samples 1, CC (upper Eocene) to 11, CC (Paleocene)

Site 362A: Samples 2, CC (upper Oligocene to 12-1, 108-110 cm (lower Eocene)

Site 363: Samples 2, CC (upper Oligocene) to 17, CC (lower Paleocene)

Site 364: Samples 7, CC (middle Eocene) to 10, CC (lower Paleocene)

Much of the preparation for this study was done onboard ship on core-catcher samples. To obtain a more complete faunal picture, one or more additional samples were subsequently selected from each core of Sites 360, 363, and 364.

Core 9 of Site 363 straddles the Eocene-Oligocene boundary. It therefore received special attention. Across this boundary, a total of eight samples from Section 3 and the upper part of Section 4 were investigated to determine exactly the boundary on the basis of planktonic foraminifers. The boundary lies in Section 3 between 84 and 98 cm. The benthic foraminifers on this restricted interval (Section 3, and the upper part of Section 4 representing some 2.5 m) show numerous first and last occurrences and eight species were found restricted to it.

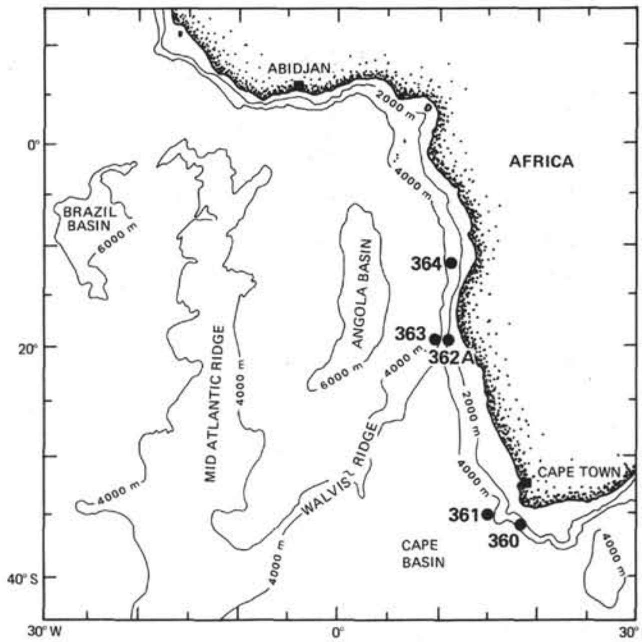


Figure 1. *Location of Leg 40 Sites 360-364.*

The taxa recognized in Sites 360, 361, 362A, 363, and 364 are plotted on Tables 1-5 where their ranges are also compared with planktonic foraminifer zones and ages. The ranges are also readily compared with the calcareous nannoplankton zones by means of the zonal correlation charts of the site chapters.

Table 6 shows the species present in all three basins, and Tables 7, 8, and 9 those restricted to the Cape Basin, Walvis Ridge, and Angola Basin, respectively. Tables 10 and 12 plot the species present in the Paleocene and those restricted to the Eocene and Oligocene.

A considerable amount of Paleogene sediments in the Leg 40 sites have been more or less strongly affected by calcium carbonate dissolution. How it affected the planktonic foraminifers at Sites 360, 361, 362A, 363, and 364 is shown by Toumarkine (this volume) on her fig. 2, 4, 6, 8, and 10.

It may be assumed that as bottom living forms the tests of the benthic foraminifers were not subject to

TABLE 1
Distribution of Lower Miocene to Middle Eocene Benthic Foraminifers in Site 360

LEG 40
SITE 360

DEPTH BELOW SEA FLOOR IN METERS	CORE	SECTION	INTERVAL (cm)	Alabamina dissonata	Ellipsoidimorphina subcompacta	Bigenerina sp.	Aragonia aragonensis	Chilostomella ovoidea	Glomospira charoides	Karreriella cubensis	Stilostomella verneuili	Pleurostomella nuttalli	Ammodiscus glabratus	Bathysiphon	Nuttallides truempyi gr.	Pullenia eocenica	Bulimina semicostata	Anomalina alazanensis spissiformis	Heterolepa ungeriana	Oridorsalis umbonatus gr.	Polymorphinidae	Heterolepa pygmea	Gyroidinoides soldanii	Nodosaria spp.	Eponides lotus	Dorothia biformis	"Lagena" spp.	Bolivinopsis spectabilis	Anomalina pompilioides	Karreriella subglabra	Bandyella beckmanni	Chrysalogonium tenuicostatum	Pullenia quinqueloba	Gyroidinoides planulata	Globocassidulina globosa	Uvigerina chirana	Dentalina spp.	Dorothia aff. beloides	Heterolepa grimsdalei	Ellipsoglandulina cf. labiata	Ellipsoidina ellipsoides	Pleurostomella incrassata	Lenticulina spp.	Stilostomella nuttalli	Stilostomella nuttalli gracillima	Anomalina capitata
393 - 402,5	26	1	136-139																			I	I	I					I	I																
			CC																	I	I		I	I				I		I					I											
412 - 421,5	27	1	56-58																		I														I											
			CC															I	I				I	I							I				I	I										I	I
431 - 440,5	28	1	87-89																I	I			I	I							I					I							I	I	I		
		3	bottom															I	I	I			I				I							I	I									I			
450 - 459,5	29	2	73-75																I	I			I				I						I								I	I					
			CC																I	I			I	I										I	I				I				I	I		
469 - 478,5	30	3	92-94																I	I							I							I	I											
			CC																I	I			I	I									I		I										I		
488 - 497,5	31		CC															I	I	I			I				I		I					I	I			I							I		
507 - 516,5	32	1	107-110															I	I	I			I	I					I						I											
			CC																I	I		I	I					I							I				I			I	I			
526 - 535,5	33	3	70-22																	I				I											I					I				I		I
			CC															I	I	I		I	I	I			I								I											
545 - 554,5	34	1	89-91																	I															I											
			CC															I	I	I			I	I			I	I					I	I	I			I						I		
564 - 573,5	35	2	134-136														I		I	I			I	I			I		I						I		I		I							
		3	11-14																I	I				I		I			I	I			I	I					I	I	I						
		3	32-33															I	I	I			I				I						I	I	I											
			CC													I	I		I	I				I															I						I	
573,5 - 583	36		CC												I	I	I		I	I	I	I	I				I	I		I				I	I		I					I		I		
592,5 - 602	37		CC												I	I				I			I	I			I			I					I		I							I		
611,5 - 621	38		CC										I	I	I	I				I			I	I			I								I		I							I		
630,5 - 640	39		CC									I			I	I				I			I				I						I	I	I	I	I						I			
649,5 - 659	40		CC								I		I	I	I	I							I	I			I		I	I		I			I	I	I		I			I	I	I		
668,5 - 678	41		131-132												I	I																	I		I								I	I		
			CC									I		I	I	I								I					I								I					I	I	I		
678 - 687,5	42	2	58-60								I			I	I	I				I		I		I					I	I		I	I					I						I	I		
			CC											I	I				I	I			I	I					I				I			I			I		I					
697 - 706,5	43	2	33-35											I		I		I	I										I																I	
			CC											I	I	I				I			I	I			I					I	I							I			I			
716 - 725,5	44	1	74-76							I					I	I				I							I		I											I					I	
			CC						I				I	I	I	I		I	I	I		I	I	I	I		I	I	I			I			I							I	I			
735 - 744,5	45	3	83-85						I				I	I	I	I				I			I	I					I				I		I				I								
			CC					I	I			I	I	I	I					I			I	I			I	I	I					I	I				I								
754 - 763,5	46		CC				I		I					I	I	I			I	I							I	I	I	I			I						I		I			I		
773 - 782,5	47	2	bottom							I	I	I		I	I					I			I	I	I		I	I	I	I		I	I			I	I	I	I	I	I	I	I	I	I	I
792 - 801,5	48		CC				I		I	I		I	I	I	I	I			I	I			I	I	I		I		I		I	I	I	I	I											
811 - 820,5	49		CC						I	I			I	I	I	I		I	I	I			I	I	I	I	I	I	I	I																
830 - 839,5	50		CC	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I																						

dissolution, but dissolution may have taken place during diagenesis of the sediments.

When evaluating the Paleogene benthic foraminifer species and their ranges presented in this paper, one has to keep in mind that the study is based on a rather limited amount of samples and sediment material.

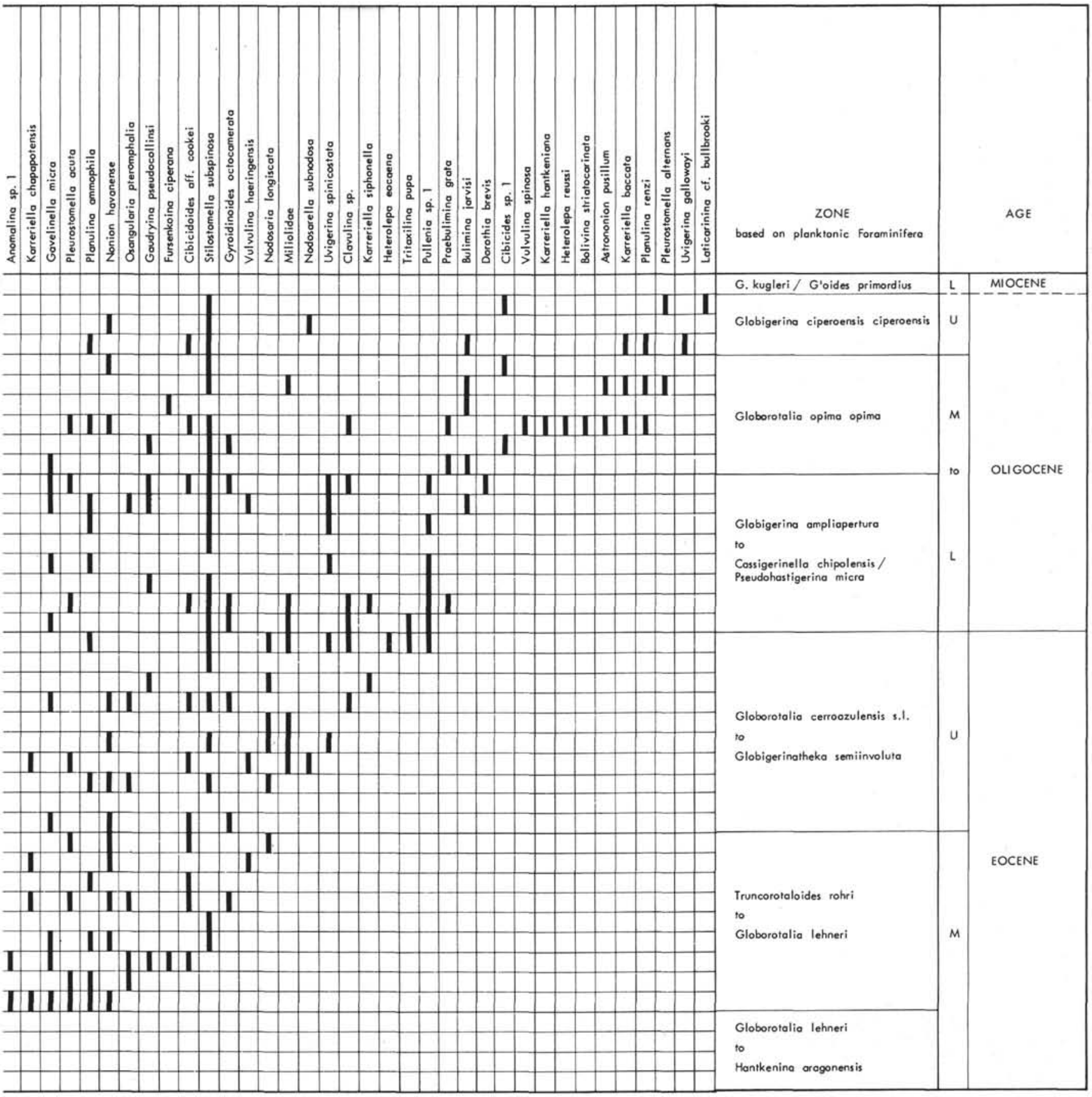
SOME OBSERVATIONS ON FAUNAL DISTRIBUTIONS

The benthic foraminifer fauna present in the Paleogene sections of Leg 40 contains species which are already well known from the literature. They are, e.g., recorded from the Lizard Springs and Navet formations of Trinidad, the Velasco Formation of Mexico, the Caucasus, Austria, and Northern Italy, and are thus very similar to those known from the Tethyan regions. Their presence in the southeast Atlantic is further proof for their worldwide distribution and stratigraphic significance.

Faunal assemblages of the kind presented in Leg 40 sediments were termed by Berggren and Aubert (1975) as "Velasco-type." In contrast to the continental shelf "Midway-type," they are deeper water faunas of the lower slope and abyssal plain.

Many of the species listed on Table 6, present in the Cape Basin, on Walvis Ridge, and in the Angola Basin,

TABLE 1 – *Continued*



are common forms of no particular stratigraphic value. The extent of their long ranges may vary somewhat from site to site. To them belong *Bolivinopsis spectabilis*, *Gyroidinoides soldanii*, *Heterolepa ungeriana*, *Nonion havanense*, and *Oridorsalis umbonatus* l.s. Others, some of which are mentioned below, have shorter ranges and are considered good index fossils.

Marked differences exist between the Paleocene benthic assemblages of Sites 361, 363, and 364. The discussion below indicates that they are apparently not so much the result of the different latitudes (35°S, 19°S, and 11°S), but rather of variations in depth and possibly other ecological factors. The greatest number of species was found at Site 363 on Walvis Ridge, where many are restricted to this site. Though this can in part be explained by the greater number of Paleocene samples from this site, we consider shallower water to be a more important factor. Toumarkine (this volume) indicates much better preservation for Site 363 Paleocene planktonic foraminifers than at Sites 361 and 364. This is probably related to the shallower depth of Site 363 during Paleocene, and in turn allowed for the development of a rich benthic fauna.

The presence here of *Neoflabellina jarvisi* and *N. semireticulata* and their absence from the other sites, as

TABLE 2
Distribution of Eocene to Paleocene Benthic Foraminifers in Site 361

LEG 40 SITE 361

Depth Below Sea Floor in Meters	Core	Interval (cm)	Gavelinella dayi	Alabamina dissonata	Stilostomella nuttalli gracillima	Stainforthia ryani	Bathysiphon	Nuttallides truempyi gr.	Gavelinella beccariiformis	Gavelinella velascoensis	Pullenia coryelli	Gyroidinoides globosa	Anomalina alazanensis spissiformis	Tappanina selmensis	Cibicidoides aff. cookei	Pullenia sp. 1	Chrysalogonium tenuicostatum	Polymorphinidae	Lenticulina spp.	"Lagena" spp.	Nodosaria spp.	Oridorsalis umbonatus gr.	Stilostomella aff. elegantissima	Stilostomella verneuili	Bulimina impendens	Planulina ammophila	Anomalina pompilioides	Nodosaria sp.	Anomalina ? sp.	Heterolepa ungeriana	Bolivinopsis spectabilis	Nonion havanense	Nodosaria longiscata	Bulimina semicostata	Loxostomoides dupuyi
31,5 - 41,0	1	CC					X	X										X	X	X	X	X									X	X	X		
60 - 69,5	2	CC						X									X				X	X										X	X		
98 - 107,5	3	CC																																	
136 - 145,5	4	CC				X		X												X	X	X						X	X	X		X	X		
174 - 183,5	5	CC			X	X		X									X				X	X				X	X	X	X	X	X	X	X		
202,5 - 212	6	CC		X		X		X									X	X	X	X	X	X			X		X	X	X	X	X		X	X	X
231 - 240,5	7	CC						X											X		X	X	X	X	X	X	X	X	X	X	X	X	X		
250 - 259,5	8	CC	X					X					X	X	X	X	X	X	X	X	X	X													
259,5 - 269	9	CC																																	
269 - 278,5	10	CC				X		X	X	X	X	X																							
278,5 - 288	11	CC	X	X	X	X	X	X																											

TABLE 3
Distribution of Upper Oligocene to Lower Eocene Benthic Foraminifers in Hole 362A

LEG 40 SITE 362A

Depth Below Sea Floor in Meters	Core	Section	Interval (cm)	Clavulina cocoaensis	Gaudryina sp.	Bathysiphon	Anomalina capitata	Heterolepa ungeriana	Nodosaria spp.	Lenticulina spp.	Pleurostomella nuttalli	Gavelinella micra	Ellipsoglandulina labiata	Anomalina alazanensis spissiformis	Planulina ammophila	Nodosarella subnodosa	Nuttallides truempyi gr.	Dentalina spp.	Karreriella subglabra	Gyroidinoides soldanii	Oridorsalis umbonatus gr.	Plectina dalmatina	Aragonia aragonensis	Gaudryina pseudocollinsi	Stilostomella subspinosa	Ellipsodimorphina subcompacta	Glomospira charoides	Pullenia eocenica	Pullenia quinqueloba	Uvigerina biserialis	Vulvulina haeringensis	Pleurostomella incrassata	Osangularia pteromphalia	Bulimina jarvisi	Heterolepa eocaena	Anomalina pompilioides
796 - 805,5	2		CC					X	X	X				X	X						X													X	X	X
834 - 843,5	3		CC					X						X	X						X													X		
872 - 881,5	4		CC					X	X	X								X	X	X	X													X		
910 - 919,5	5		CC					X	X			X	X	X	X			X		X											X	X	X	X	X	X
929 - 938,5	6		CC			X	X	X	X	X	X	X		X	X		X	X		X	X							X	X	X	X	X	X	X	X	
948 - 957,5	7		CC			X		X	X	X		X		X	X			X	X	X	X							X	X	X	X	X	X	X		X
967 - 976,5	8		CC			X	X	X	X	X		X		X	X	X	X		X	X									X	X	X	X	X	X	X	X
995,5 - 1005	9		CC				X			X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
1024 - 1033,5	10		CC																																	
1062 - 1071,5	11	1	88-89					X	X	X	X					X	X	X	X	X	X															
1071,5- 1081	12	1	104-105				X	X		X	X	X	X	X	X																					
	12	1	108-110	X	X	X	X	X	X	X																										

TABLE 2 – *Continued*

Miliolidae	Praebulimina grata	Bulimina macilenta	Pleurostomella nuttalli	Heterolepa grimsdalei	Ellipsoglandulina multicostata	Stilostomella cf. stachei	Rectuvigerina elegans	Siphotextularia finlayi	Bulimina sp.	Uvigerina elongata	Bulimina alsatica	Bolivina antegressa gr.	Stilostomella subspinosa	Globocassidulina globosa	Stilostomella nuttalli aculeata	Pullenia eocenica	Pleurostomella incrassata	Karreriella chapapotensis	Bandyella beckmanni	Pullenia quinqueloba	Uvigerina cf. eocaena	Stilostomella cf. consobrina	Stilostomella nuttalli	Nonion sp.	Heterolepa eocaena	Dentalina sp.	Heterolepa pygmea	Dorothia brevis	Pleurostomella eocaena	AGE based on planktonic Foraminifera
				X	X	X								X		X	X	X					X	X	X	X	X	X	X	UPPER EOCENE
				X							X	X	X	X		X		X	X	X	X	X	X	X	X					
			X			X								X			X	X												MIDDLE EOCENE
	X	X					X	X	X	X	X	X	X	X	X	X														
X	X	X	X	X	X	X																								LOWER EOCENE
																														(*Globorotalia palmerae* equivalent)
																														LOWER EOCENE to
																														PALEOCENE

TABLE 3 – *Continued*

Pleurostomella obesa	Karreriella siphonella	Marssonella traubi	Miliolidae	"Lagena" spp.	Ammodiscus glabratus	Heterolepa grimsdalei	Uvigerina acutocostata	Stilostomella subspinosa	Alabamina dissonata	Pleurostomella acuta	Globocassidulina globosa	Gyroidinoides planulata	Bulimina tuxpamensis	Globocassidulina oblonga	Gyroidinoides subangulata	Bolivina antegressa angulata	Heterolepa reussi	Nonion havanense	Pullenia sp.	Uvigerina sp.	Tritaxilina pupa	Bigenerina sp.	Ellipsoidina ellipsoides	ZONE based on planktonic foraminifera		AGE
				X								X			X					X	X	X	X	Globigerina ciperoensis ciperoensis	U	OLIGOCENE
			X								X				X	X	X	X	X					Globorotalia opima opima	M	
			X	X								X				X	X							Globigerina ampliapertura		
		X								X			X	X	X									Cassigerinella chipolensis / Pseudohastigerina micra	L	
		X	X			X	X	X	X	X	X	X												Globorotalia cerroazulensis s.l.	U	EOCENE
	X	X	X	X	X	X																		Globigerinatheka semiinvoluta		
X	X	X	X	X																				Truncorotaloides rohri to	M	
																								Orbulinoides beckmanni		
																								Globorotalia lehneri to		
																								Globigerinatheka subconglobata subconglobata		
																								Globorotalia palmerae equivalent	L	

TABLE 4
Distribution of Upper Oligocene to Lower Paleocene Benthic Foraminifers in Site 363

LEG 40 SITE 363

DEPTH BELOW SEA FLOOR IN METERS	CORE	SECTION	INTERVAL (cm)	Pullenia jarvisi	Neoflabellina jarvisi	Coryphostoma cf. limonense	Charltonina florealis	Tritaxia trilatera	Gaudryina pyramidata	Marssonella nacatoensis	Tritaxilina cubensis	Remesella varians	Aragonia velascoensis	Gyroidinoides globosa	Eponides lotus	Pullenia coryelli	Gavelinella beccariiformis	Gavelinella rubiginosa	Bulimina trinitatensis	Nuttallides truempyi gr.	Lenticulina spp.	Polymorphinidae	"Lagena" spp.	Gyroidinoides subangulata	Nodosaria spp.	Dorothia brevis	Spiroplectammina dentata	Gavelinella velascoensis	Neoflabellina semireticulata	Nonion havanense	Dentalina spp.	Oridorsalis umbonatus gr.	Tritaxia aspera	Gavelinella dayi	Cibicidoides alleni	Praebulimina beaumonti	Spiroplectammina excolata	Orthomorphina rohri	Osangularia pteromphalia	Bulimina tuxpamensis	Anomalina sp. 1	Pullenia quinqueloba	Anomalina alazanensis spissiformis	Gyroidinoides soldanii	Bolivinopsis spectabilis	Bulimina semicostata	Stilostomella nuttalli gracillima	Anomalina pompilioides	Plectina dalmatina	Alabamina dissonata
50 - 59,5	2		CC																												x	x												x					x	
69 - 78,5	3	1	58-60																					x	x	x													x									x		
88 - 97,5	4		CC																				x	x							x		x											x	x				x		
107 - 116,5	5		CC																												x	x												x						
126 - 135,5	6		CC																	x				x							x												x			x			
164 - 173,5	8		CC																				x								x						x			x		x				x		
183 - 192,5	9	3	9-10																			x		x	x					x		x						x	x								x			
	9	3	58-60																				x								x						x				x	x	x					
	9	3	73-75																																		x				x	x			x			
	9	3	82-84																			x	x		x							x						x			x	x	x	x		x			
	9	3	98-100																x		x	x		x								x						x				x	x	x					
	9	3	105-107																										x		x						x					x						
	9	4	34-36																	x									x		x						x											x
	9	4	58-60																		x	x								x	x						x					x			x			
	9		CC																	x	x	x		x						x	x										x	x				x		
202 - 211,5	10	1	58-60																x		x				x												x					x			x	x		
	10	4	58-60															x	x		x																				x	x				x		
	10		CC															x	x	x		x		x							x						x			x	x	x		x				
221 - 230,5	11	1	58-60																x	x	x	x		x					x	x										x	x	x			x		x	
240 - 249,5	12	1	58-60																x	x											x						x			x				x	x	x		x
	12		CC																x	x											x						x				x			x			x	x
259 - 268,5	13	1	85-87																x	x											x						x				x			x	x			x
	13	4	58-60																	x		x							x											x			x				
	13		CC														x		x												x									x	x			x	x			
278 - 287,5	14	1	58-60																x	x											x													x		x	x	
	14	4	58-60														x		x	x	x								x		x									x	x			x	x			
	14		CC																												x							cf		x								
297 - 306,5	15	1	58-60													x	x	x	x	x	x	x		x					x	x	x							x					x		x					
	15	3	58-60											x	x	x	x			x	x								x	x			cf	x	x						x	x	x	x						
	15		CC			x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x		x			x		x	x	x	x	x	x					x										
306,5 - 316	16	1	131-133										x			x	x			x	x	x	x		x					x	x			cf	x	x														
	16		CC	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x		x		x		x		x	x	x	x	x	x	x											
316 - 325,5	17	1	87-89		x			x				x	x		x	x	x	x	x	x	x	x			x		x	x	x	x	x	x																		
	17		CC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																								

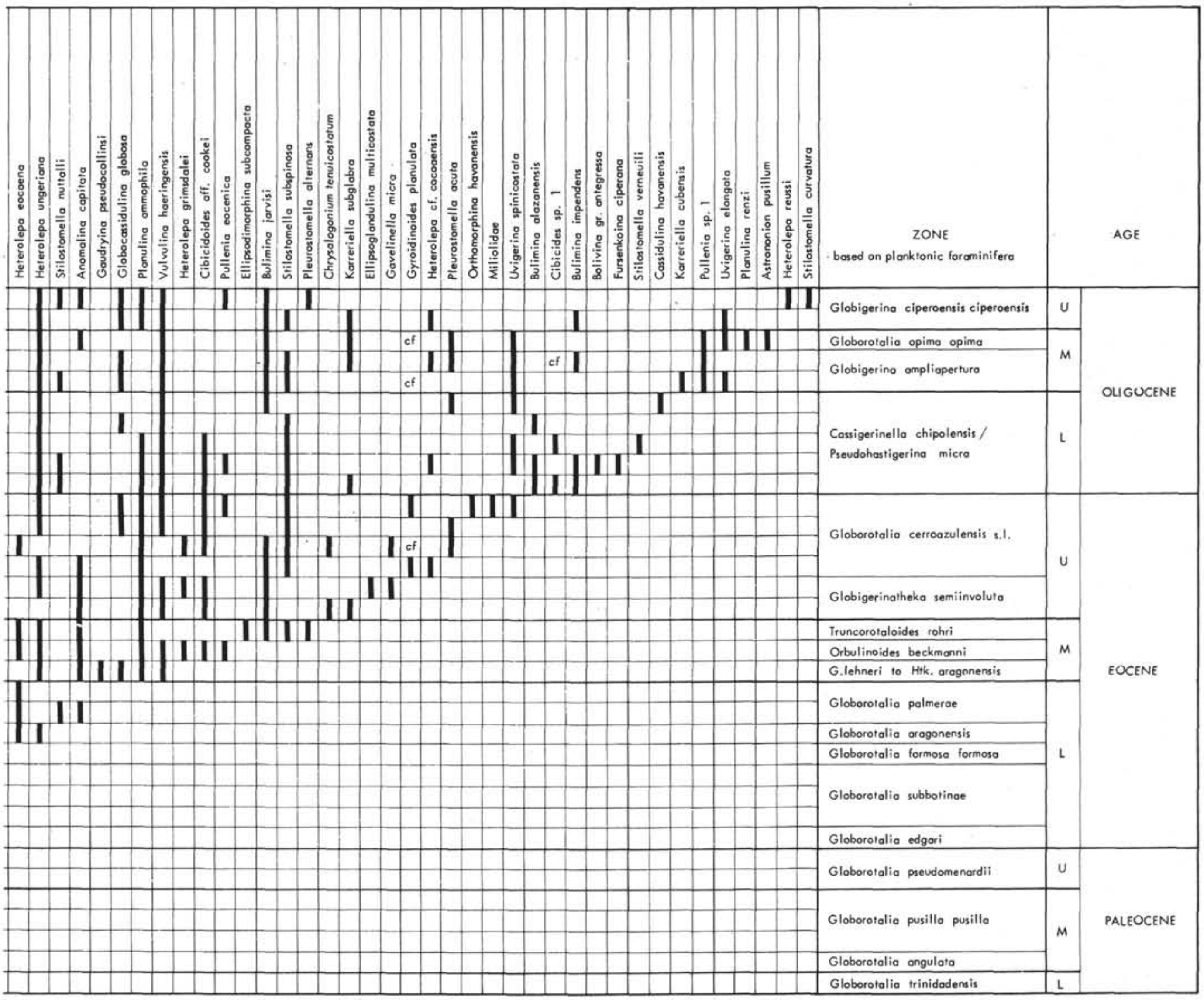
well as the diversity of the higher evolved arenaceous species further support this supposition. The absence of nodosariids and polymorphinids in the Paleocene of Site 361 and the scarce benthic population indicates that Site 361 was deeper than Sites 363 and 364. The two species *Aragonia velascoensis* and *A. ouezzanensis* found in the Paleocene are restricted to Sites 363 and 364, respectively, and therefore seem to have different ecological distributions.

The Eocene and Oligocene assemblages are less characteristic than those of the Paleocene. They are largely composed of long-ranging species which are of little or no stratigraphic significance. *Alabamina dissonata* can be considered an Eocene marker since the same range is also recorded in the Caribbean. Its presence in the Paleocene Sample 361-11, CC can be disregarded because this sample contains nannofossil evidence for contamination from above. Other characteristic Eocene species are *Uvigerina chirana* and *Plectina dalmatina*, known in the literature also as *P. eocenica*. The first appearance of *Heterolepa grimsdalei* seems to be a good middle Eocene indicator. Sample 361-6, CC, which also contains this species, is (Table 2) referred to the uppermost lower Eocene *Globorotalia palmerae* Zone equivalent. However, nannoplankton evidence places this in the *Discoaster sublodoensis* Zone which could either be uppermost lower or lowermost middle Eocene. The widely known group of *Nuttallides truempyi* does not cross the Eocene/Oligocene boundary. Of some interest in the Cape Basin Eocene could be the presence of the New Zealand species *Dorothia biformis* and *Siphotextularia finlayi.*

Planulina renzi and *Karreriella hantkeniana* are species restricted to the Oligocene of Leg 40 sites. They can be considered to be good stratigraphic markers in this interval. The first appears in the *Globorotalia opima opima* Zone of Sites 360 and 363. It is also present in the Caribbean Oligocene, and both species are found in the Oligocene of Northern Italy. *Astrononion pusillum*, a rare but characteristic species of New Zealand, occurs in the Oligocene of Sites 360 and 363.

Two species are described as new: *Stainforthia ryani*, which is fairly common in the middle Eocene of the Cape Basin Site 361 and *Bandyella beckmanni* which

TABLE 4 – *Continued*



ranges in Sites 360, 361, and 364 from the Paleocene to the upper Eocene. Recent representatives of *Stainforthia* are recorded from Antarctica and Sweden. The genus thus may be considered to indicate cold to temperate waters.

ANNOTATED SPECIES LIST

Alabamina dissonata (Cushman and Renz)
(Plate 4, Figures 10, 11)

Pulvinulinella atlantisae Cushman, var. *dissonata* Cushman and Renz, 1948, Cushman Lab. Foram. Res., Spec. Publ. 24, p. 35, pl. 7, fig. 11, 12. Scarce at all sites.

Ammodiscus glabratus Cushman and Jarvis
(Plate 1, Figure 1)

Ammodiscus glabratus Cushman and Jarvis, 1928, Contrib. Cushman Lab. Foram. Res., v. 4, p. 86, pl. 12, fig. 6. Rather common at Site 360; rare at Site 362A.

Anomalina alazanensis spissiformis Cushman and Stainforth
(Plate 5, Figures 12, 13)

Anomalina alazanensis Nuttall, var. *spissiformis* Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec. Publ. 14, p. 71, pl. 14, fig. 5. Fairly common at Sites 360, 362A, and 363; rare at Sites 361 and 364.

Anomalina capitata (Guembel)
(Plate 5, Figures 7, 8)

Rotalia capitata Guembel, 1868, Abh. K. Bayer, Akad. Wiss., II Cl. v. 10, II Abt., p. 653, pl. 2, fig. 92. Rather scarce at Sites 360, 362A, and 363.

Anomalina pompilioides semicribrata Beckmann
(Plate 5, Figures 5, 6)

Anomalina pompilioides Galloway and Heminway, var. *semicribrata* Beckmann, 1953, Ecolog. Geol. Helv., v. 46, p. 400, pl. 27, fig. 3, text-fig. 24, 25. Tabulated in the range charts as *A. pompiliodes*. Fairly common at Sites 360 and 363; scarce at Sites 361, 362A, and 364.

Anomalina? sp. 1
(Plate 5, Figures 14, 15)

Tabulated in the range charts either as *Anomalina* sp. 1 or *Anomalina*? sp. This indetermined species is scarce at Sites 360, 361, 363, and 364.

Aragonia aragonensis (Nuttall)
(Plate 3, Figure 20)

Textularia aragonensis Nuttall, 1930, J. Paleontol., v. 4, p. 280, pl. 23, fig. 16. Rare at Sites 360 and 362A.

TABLE 5
Distribution of Middle Eocene to Lower Paleocene Benthic Foraminifers in Site 364

LEG 40 SITE 364: Depth Below Sea Floor in Meters	Core	Section	Interval (cm)	Spiroplectammina dentata	Nonion havanense	Tritaxia amorpha	"Lenticulina" spp.	Pullenia sp. 1	Charltonina florealis	Gavelinella beccariiformis	Polymorphinidae	Dorothia beloides	Eponides lotus	"Lagena" spp.	Nuttallides truempyi gr.	Dentalina spp.	Osangularia plummerae	Bolivinopsis spectabilis	Aragonia ouezzanensis	Pullenia coryelli	Gyroidinoides globosa	Nodosaria spp.	Oridorsalis umbonatus	Nodosaria limbata tumidata	Gavelinella dayi	Bulimina trinitatensis
245 - 254,5	7		CC											X	X								X			
283 - 292,5	8		bottom												X							X	X			
321 - 330,5	9	1	53–55										cf										X			
	9		CC									X											X			
349,5 - 359	10	1	58–60						X	X	X	X	X		X				X	X	X					X
	10	4	58–60			X	X	X	X	X	X		X		X			X	X	X	X	X				X
	10	4	56–62			X	X	X	X	X	X	X		X	X			X	X	X	X	X		X	X	X
	10	5	58–60				X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X			
	10		CC	X	X	X	X	X	X	X	X	X	X	X	X	X										

Aragonia ouezzanensis (Rey)
(Plate 3, Figure 22)

Bolivinoides ouezzanensis Rey, 1955, Bull. Soc. Geol. France, 6, v. 4, p. 210, pl. 12, fig. 2. Scarce at Site 364.

Aragonia velascoensis (Cushman)
(Plate 3, Figure 21)

Textularia velascoensis (Cushman) 1925, Contrib. Cushman Lab. Foram. Res., v. 1, p. 18, pl. 3, fig. 1. Rather common at Site 363.

Astrononion pusillum Hornibrook

Astrononion pussillum Hornibrook, 1961, New Zealand Geol. Surv. Paleontol. Bull., v. 34 (1), p. 96, pl. 12, fig. 229, 236. Very rare at Sites 360 and 363.

Bandyella beckmanni Proto Decima and Bolli, n. sp.
(Plate 3, Figure 12)

Virgulina sp. ind. Beckmann, 1953, Ecolog. Geol. Helv., v. 46, p. 367, pl. 21, fig. 14, 15.

Test small, short, spindle-shaped. Initial part frequently pointed, rounded in some specimens. Chambers triserially arranged similar to *Bulimina*, rapidly increasing, inflated and overlapping. Sutures depressed. Aperture subterminal, slightly eccentric, *Pleurostomella*-like. It differs from the similar *Bulimina* (*Desinobulimina*) *salisburgensis* Hillebrandt, from the Paleocene of Austria, in having a complete triserial arrangement and more inflated chambers.

The new species is placed in *Bandyella* because this is the only genus that includes a triserial chamber arrangement and a *Pleurostomella*-like aperture. It lacks, however, the biserial and uniserial final stage characteristic for *Bandyella*.

Rare at Sites 360, 361, and 364, from the Paleocene to the upper Eocene.

Dimension of holotype: 0.8 mm.

Type locality: Angola Basin, South Atlantic, 11°34'S, 11°58'E.

Type sample: DSDP Leg 40, Site 364, Core 10, Section 1, 58-60 cm.

Type stratum: Middle Paleocene, *Heliolithus kleinpelli* Zone.

Name: The species is named for Jean-Pierre Beckmann, Geological Institute ETH, Zürich.

Depository: Museum of Natural History, Basel, No. C 33881.

Bolivina antegressa Subbotina
(Plate 2, Figure 2)

Bolivina antegressa Subbotina, 1953, VNIGRI, Trudy, n.s., Sbornik 6, p. 226, pl. 10, fig. 11-16. Scarce at Sites 361, 362A, and 363.

Bolivina striatocarinata Cushman

Bolivina striatocarinata Cushman, 1936, Cushman Lab. Foram. Res. Spec. Publ., 6, p. 51, pl. 7, fig. 14. Very rare at Site 360.

Bolivinopsis spectabilis (Grzyvowski)
(Plate 1, Figure 3)

Spiroplecta spectabilis Grzybowski, 1898, Akad. Univej. Krakowie, Wydr. Mat.-Przyr., Rozpr. 33, p. 293, pl. 12, fig. 12. Rather common at Sites 360, 361, 363, and 364.

TABLE 5 – *Continued*

Tritaxia convergens	Bulimina velascoensis	Bandyella beckmanni	Anomalina sp. 1	Ellipsodimorphina subcompacta	Anomalina alazanensis spissiformis	Gaudryina pyramidata	Tritaxilina pupa	Karreriella chapapotensis	Alabamina dissonata	Praebulimina beaumonti	Pleurostomella nuttalli	Gyroidinoides soldanii	Globocassidulina globosa	Heterolepa grimsdalei	Heterolepa ungeriana	ZONE based on planktonic Foraminifera	AGE
		X		X		X	X	X	X	X	X	X	X	X	X		MIDDLE EOCENE
				X		X										Globorotalia formosa formosa	LOWER EOCENE
					X											Globorotalia subbotinae	
			X	X												Globorotalia velascoensis	UPPER PALEOCENE
	X	X															
X	X															Globorotalia angulata	MIDDLE PALEOCENE
																Globorotalia trinidadensis	LOWER PALEOCENE

Bulimina alazanensis Cushman
(Plate 2, Figure 10)

Bulimina alazanensis Cushman, 1927, J. Paleontol., v. 1, p. 161, pl. 25, fig. 4. Fairly common at Site 363 in the lower Oligocene.

Bulimina alsatica Cushman and Parker

Bulimina alsatica Cushman and Parker, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 39, pl. 4, fig. 6, 7. Rare at Site 361.

Bulimina impendens Parker and Bermudez
(Plate 2, Figures 11, 12)

Bulimina impendens Parker and Bermudez, 1937, J. Paleontol., v. 11, p. 514, pl. 58, fig. 7, 8. Rather common at Site 363.

Bulimina jarvisi Cushman and Parker
(Plate 2, Figure 13)

Bulimina jarvisi Cushman and Parker, 1936, Contrib. Cushman Lab. Foram. Res., v. 12, p. 29, pl. 7, fig. 1. Common at Sites 360, 362A, and 363.

Bulimina macilenta Cushman and Parker

Bulimina macilenta Cushman and Parker, 1947, USGS Prof. Paper 210-D, p. 98, pl. 23, fig. 2, 3. Rare at Site 361.

Bulimina semicostata Nuttall
(Plate 2, Figure 14)

Bulimina semicostata Nuttall, 1930, J. Paleontol., v. 4, p. 285, pl. 23, fig. 15, 16. Common at Sites 360 and 363, rare at Site 361.

Bulimina trinitatensis Cushman and Jarvis
(Plate 2, Figures 15, 16)

Bulimina trinitatensis Cushman and Jarvis, 1928, Contrib. Cushman Lab., v. 4, p. 102, pl. 14, fig. 12. Common at Site 363, rare at Site 364.

Bulimina tuxpamensis Cole

Bulimina tuxpamensis Cole, 1928, Am. Paleontol. Bull., v. 14, p. 212, pl. 1, fig. 23. Rare at Sites 362A and 363.

Bulimina velascoensis (Cushman)

Gaudryina velascoensis Cushman, 1925, Contrib. Cushman Lab. Foram. Res., v. 1, p. 20, pl. 3, fig. 7. Rare at Site 364.

Cassidulina havanensis Cushman and Bermudez
(Plate 3, Figure 19)

Cassidulina havanensis Cushman and Bermudez, 1936, Contrib. Cushman Lab. Foram. Res., v. 12, p. 36, pl. 6, fig. 11. Rare at Site 363.

Charltonia florealis (White)
(Plate 4, Figures 17, 18)

Gyroidina florealis White, 1928, J. Paleont., v. 2, p. 293, pl. 40, fig. 3. Fairly common at Sites 363 and 364.

Chrysalogonium tenuicostatum Cushman and Bermudez
(Plate 1, Figure 16)

Chrysalogonium tenuicostatum Cushman and Bermudez, 1936, Contrib. Cushman Lab. Foram. Res., v. 12, p. 27, pl. 5, fig. 3-5. Scarce at Sites 360, 361, and 363.

TABLE 6
Species Present in Cape Basin, Walvis Ridge and Angola Basin

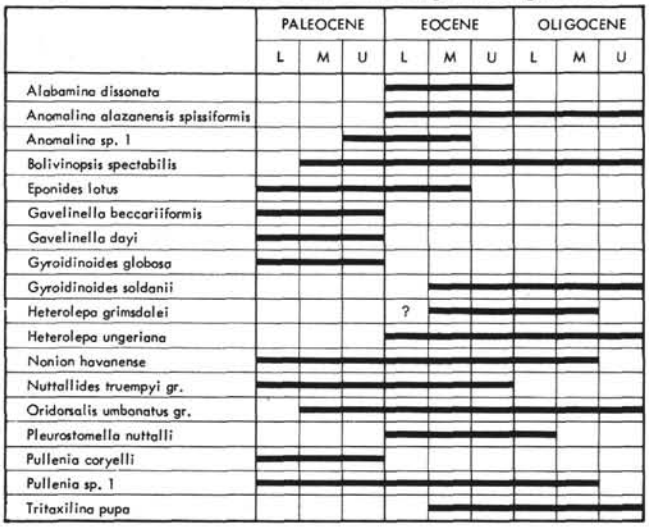


TABLE 7
Species Restricted to the Cape Basin

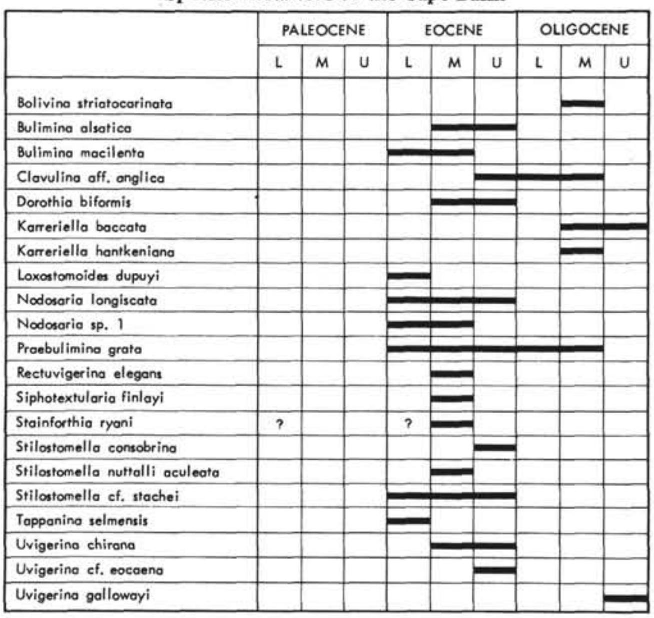


TABLE 8
Species Restricted to the Walvis Ridge

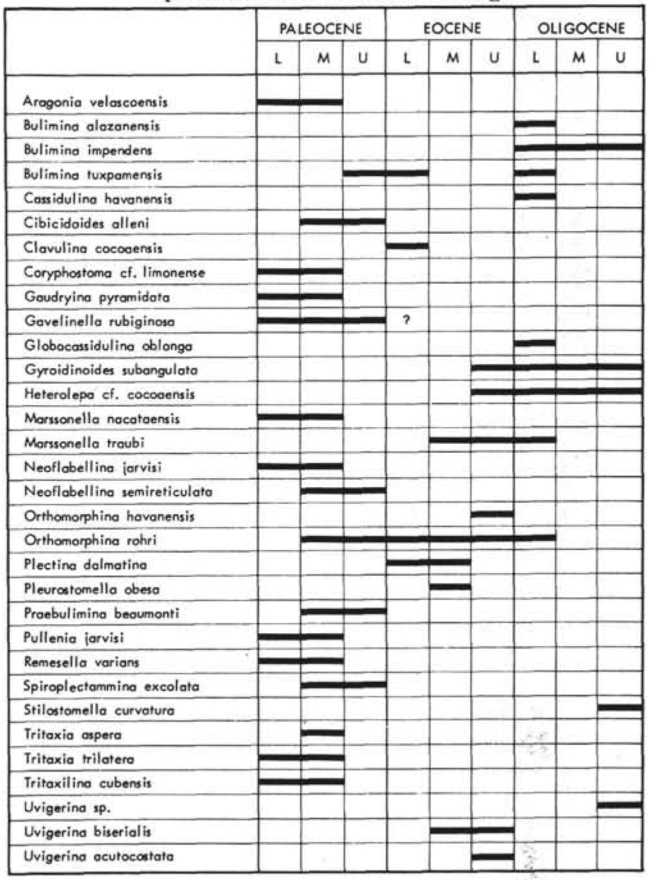
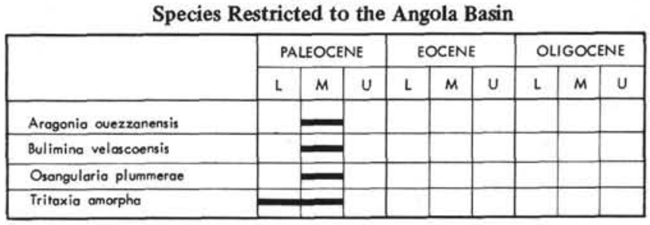


TABLE 9
Species Restricted to the Angola Basin



Cibicidoides alleni (Plummer)
(Plate 5, Figures 18, 19)

Truncatulina alleni Plummer, 1926, Texas Univ. Bull. 2644, p. 144, pl. 10, fig. 4. Scarce at Site 363.

Cibicidoides aff. cookei (Cushman and Garrett)
(Plate 5, Figures 16, 17)

Cibicides cookei Cushman and Garrett, 1938, Contrib. Cushman Lab. Foram. Res., v. 14, p. 65, pl. 11, fig. 3. Rather common at Sites 360 and 363, scarce at Sites 361 and 362A.

Clavulina aff. anglica (Cushman)
(Plate 1, Figure 11)

Pseudoclavulina anglica Cushman, 1936, Cushman Lab. Foram. Res., Spec. Publ., 6, p. 18, pl. 3, fig. 5. Scarce at Site 360, tabulated in the range chart as *Clavulina* sp.

Clavulina cocoaensis (Cushman)
(Plate 1, Figure 12)

Pseudoclavulina cocoaensis Cushman, 1936, Cushman Lab. Foram. Res., Spec. Publ., 6, p. 18, pl. 3, fig. 6. Rare at Site 362A.

Coryphostoma cf. limonense (Cushman)
(Plate 2, Figure 1)

cf. *Bolivina incrassata* Reuss, var. *limonensis* Cushman, 1926, Contrib. Cushman Lab. Foram. Res., v. 2, p. 19, pl. 2, fig. 2. Scarce at Site 363.

Dorothia beloides Hillebrandt
(Plate 1, Figure 10)

Dorothia beloides Hillebrandt, 1962, Bayer. Ak. Wiss. Mat.-Nat. Kl. Abh. N.F., Heft 108, p. 39, pl. 2, fig. 8-14; pl. 15, fig. 12,13, text-fig. 3. Rather scarce at Sites 360 and 364.

Dorothia biformis Finlay

Dorothia biformis Finlay, 1939, Roy. Soc. New Zealand Trans. Proc., v. 69, p. 313, pl. 25, fig. 26-28. Rare at Site 360.

Dorothia brevis Cushman and Stainforth

Dorothia brevis Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec. Publ. 14, p. 18, pl. 2, fig. 5. Rare at Sites 360, 361, and 363.

TABLE 10
Species Present in the Paleocene of the Cape Basin, Walvis Ridge, and Angola Basin[a]

		CAPE BASIN	WALVIS RIDGE	ANGOLA BASIN	OTHER LOCALITIES					
		Site 361	Site 363	Site 364	C	L	M	P	R	V
Aragonia ouezzanensis	*			—					•	
Aragonia velascoensis	*		—					•	•	•
Bulimina trinitatensis			—	—		•		•	•	
Bulimina velascoensis				—	•				•	•
Charltonina florealis	*		—	—		•			•	•
Cibicidoides alleni			—				•	•	•	
Coryphostoma cf. limonense	*		—			•		•	•	
Dentalina spp.			—	—						
Dorothia beloides	+			—					•	
Dorothia brevis	+		—							
Eponides lotus	+		—	—	•	•		•	•	•
Gaudryina pyramidata	*		—			•			•	•
Gavelinella beccariiformis	*	—	—	—	•	•		•	•	•
Gavelinella dayi		—	—	—		•		•	•	•
Gavelinella rubiginosa	+		—							
Gavelinella velascoensis	*	—	—					•	•	•
Gyroidinoides globosa	*	—	—	—		•			•	
Lagena spp.			—	—						
Lenticulina spp.			—	—						
Marssonella nacataensis			—			•			•	•
Neoflabellina jarvisi			—		•	•		•	•	
Neoflabellina semireticulata			—			•		•	•	
Nodosaria spp.			—	—						
Nuttallides truempyi	+	—	—	—	•	•		•	•	
Osangularia plummerae				—			•		•	
Polymorphinidae			—	—						
Praebulimina beaumonti	*		—			•			•	
Pullenia coryelli	*	—	—	—		•		•	•	•
Pullenia jarvisi			—			•		•	•	
Pullenia sp. 1	+			—						
Remesella varians			—		•	•		•	•	
Stainforthia ryani	+	?								
Spiroplectammina dentata	*		—	—	•	•		•	•	
Spiroplectammina excolata			—			•		•	•	•
Tritaxia amorpha				—		•		•		•
Tritaxia aspera			—			•		•		•
Tritaxia trilatera	*		—			•		•		•
Tritaxilina cubensis			—					•		

[a]The letters in the column to the right indicates that the specie is present also in the Caucasus (C), Lizard Springs Foramtion of Trinidad (L), Midway Formation (M), Passagno Section in Italy (P), Reichenhall and Salzburg basins in Austria (R), and in Velasco Formation (V). An asterisk indicates that the species is also present in the Upper Cretaceous of Leg 40, a cross that the species continues into the Eocene of Leg 40.

Ellipsodimorphina subcompacta Liebus
(Plate 3, Figure 14)

Ellipsodimorphina subcompacta Liebus, 1922, Lotos (Prag), v. 70, p. 57, pl. 2, fig. 13. Scarce at Sites 360, 362A, 363, and 364.

Ellipsoglandulina labiata (Schwager)

Glandulina labiata Schwager, 1866, Novara-Exped., Geol. Theîl, v. 2, p. 237, pl. 6, fig. 77. Scarce at Sites 360 and 362A.

Ellipsoglandulina multicostata (Galloway and Morrey)
(Plate 3, Figures 16, 17)

Daucina multicostata Galloway and Morrey, 1929, Am. Paleontol. Bull., v. 15, 55, p. 42, pl. 6, fig. 13. Rare at Sites 361 and 363.

Ellipsoidina ellipsoides Seguenza
(Plate 3, Figure 15)

Ellipsoidina ellipsoides Seguenza, 1859, Eco Peloritano, Messina, ser. 2, anno 5, fasc. 9, pl. 12, fig. 1-3. Scarce at Site 360, rare at Site 362A.

Eponides lotus (Schwager)
(Plate 3, Figures 3, 4)

Pulvinulina lotus Schwager, 1883, Paleontogr., v. 30, Abh. 1. Scarce at Sites 360, 363, and 364.

TABLE 11
Species Restricted to the Eocene of Leg 40

	CAPE BASIN		WALVIS RIDGE		ANGOLA BASIN
	Site 360	Site 361	Site 362A	Site 363	Site 364
Ammodiscus glabratus	—		—		
Aragonia aragonensis	—		—		
Bulimina alsatica		—			
Bulimina macilenta		—			
Chrysalogonium tenuicostatum	—	—		—	
Clavulina cocoaensis			—		
Dorothia biformis	—				
Ellipsodimorphina subcompacta	—		—	—	—
Ellipsoglandulina multicostata		—		—	
Glomospira charoides	—		—		
Karreriella chapapotensis	—	—			—
Loxostomoides dupuyi		—			
Nodosaria longiscata	—	—			
Nodosaria sp. 1		—			
Orthomorphina havanensis				—	
Plectina dalmatina			—	—	
Pleurostomella obesa			—		
Rectuvigerina elegans		—			
Siphotextularia finlayi		—			
Stilostomella consobrina		—			
Stilostomella nuttalli aculeata		—			
Stilostomella cf. stachei		—			
Tappanina selmensis		—			
Uvigerina chirana	—				
Uvigerina eocaena		—			
Uvigerina biserialis			—		
Uvigerina acutocostata			—		

Fursenkoina ciperana (Cushman and Stainforth)

Virgulina ciperana Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec, Publ., 14, p. 46, pl. 7, fig. 10. Rare at Sites 360 and 363.

Gaudryina pseudocollinsi Cushman and Stainforth
(Plate 1, Figure 7)

Gaudryina pseudocollinsi Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec. Publ., 14, p. 17, pl. 2, fig. 1-3. Rare at Sites 360, 362A, and 363.

Gaudryina pyramidata Cushman
(Plate 1, Figure 6)

Gaudryina laevigata Franke, var. *pyramidata* Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 587, pl. 16, fig. 8. Rare at Site 363.

Gavelinella beccariiformis (White)
(Plate 6, Figures 3, 4)

Rotalia beccariiformis White, 1928, J. Paleontol., v. 2, p. 287, pl. 39, fig. 2-4. Rare at Site 361, common at Sites 363 and 364.

Gavelinella dayi (White)
(Plate 6, Figures 1, 2)

Planulina dayi White, 1928, J. Paleontol., v. 2, p. 300, pl. 41, fig. 3. Rare at Sites 361 and 364, rather common at Site 363.

Gavelinella micra (Bermudez)
(Plate 6, Figures 5, 6)

Cibicides micrus Bermudez, 1949, Cushman Lab. Foram. Res., Spec. Publ., 25, p. 302, pl. 24, fig. 34-36. Rather common at Sites 360 and 362A.

Gavelinella rubiginosa (Cushman)
(Plate 6, Figures 7, 8)

Anomalina rubiginosa Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 607, pl. 21, fig. 6. Rather common at Site 363.

TABLE 12
Species Restricted to the Oligocene of Leg 40

	CAPE BASIN	WALVIS RIDGE	
	Site 360	Site 362 A	Site 363
Astrononion pusillum	—		—
Bolivina striatocarinata	—		
Bulimina alazanensis			—
Bulimina impendens			—
Cassidulina havanensis			—
Cibicides sp. 1	—		—
Globocassidulina oblonga		—	
Heterolepa reussi	—	—	—
Karreriella baccata	—		
Karreriella hantkeniana	—		
Planulina renzi	—		—
Stilostomella curvatura			—
Uvigerina sp.		—	
Uvigerina gallowayi	—		

Gavelinella velascoensis (Cushman)

Anomalina velascoensis Cushman, 1925, Contrib. Cushman Lab. Foram. Res., v. 1, p. 21, pl. 3, fig. 3. Rare at Sites 361 and 363.

Globocassidulina globosa (Hantken)
(Plate 3, Figures 23, 24)

Cassidulina globosa Hantken, 1875, Ungar. Geol. Anst., Mitt. Jb., v. 4, p. 64, pl. 16, fig. 2. Rather common at Sites 360, 361, 362A, and 363.

Globocassidulina oblonga (Reuss)

Cassidulina oblonga Reuss, 1850, K. Akad. Wiss., Math.-Nat. Cl., Denkschr., v. 1, p. 376, pl. 48, fig. 5, 6.

Glomospira charoides (Jones and Parker)
(Plate 1, Figure 2)

Trochammina squamata Jones and Parker, var. *charoides* Jones and Parker, 1860, Quart. J. Geol. Soc. London, v. 16, p. 304. Scarce at Sites 360 and 362A.

Gyroidinoides globosa (Hagenow)
(Plate 4, Figures 19, 20)

Nonionina globosa Hagenow, 1842, N. Jb. Min., p. 574. Rather common at Sites 361, 363, and 364.

Gyroidinoides octocamerata (Cushman and Hanna)
(Plate 5, Figures 3, 4)

Gyroidina soldanii d'Orbigny, var. *octocamerata* Cushman and Hanna, 1927, Calif. Acad. Sci. Proc., S. 4, v. 16, p. 223, pl. 14, fig. 16-18. Rather common at Site 360.

Gyroidinoides planulata (Cushman and Renz)
(Plate 4, Figures 13, 14)

Gyroidina planulata Cushman and Renz, 1941, Contrib. Cushman Lab. Foram. Res., v. 17, p. 23, pl. 4, fig. 1. Rather common at Sites 360, 362A, and 363.

Gyroidinoides soldanii (d'Orbigny)
(Plate 5, Figures 1, 2)

Rotalina soldanii d'Orbigny, 1826, Ann. Sc. Nat. s. 1, v. 7, p. 278. Common at all sites.

Gyroidinoides subangulata (Plummer)

Rotalia soldanii (d'Orbigny) var. *subangulata* Plummer, 1926, Univ. Texas Bull., 2644, p. 154, pl. 12, fig. 1. Scarce at Sites 362A and 363.

Heterolepa cf. cocoaensis (Cushman)

cf. *Eponides cocoaensis* Cushman, 1928, Contrib. Cushman Lab. Foram. Res., v. 4, p. 73, pl. 10, fig. 2. Scarce at Site 363.

Heterolepa eocaena (Guembel)
(Plate 6, Figures 14, 15)

Rotalia eocaena Guembel, 1868, Abh. K. Bayer. Akad. Wiss., II cl., v. 10, II Abt., p. 650, pl. 2, fig. 87. Rare at Sites 360 and 361; common at Sites 362A and 363.

Heterolepa grimsdalei (Nuttall)
(Plate 6, Figures 16, 17)

Cibicides grimsdalei Nuttall, 1930, J. Paleontol., v. 4, p. 291, pl. 25, fig. 7, 8, 11. Common at Site 360; scarce at Sites 361, 362A, 363, and 364.

Heterolepa pygmea (Hantken)
(Plate 6, Figure 13)

Pulvinulina pygmea Hantken, 1875, Ungar. Geol. Anst. Mitt. Jb., v. 4, n. 1, p. 78, pl. 10, fig. 8. Scarce at Sites 360, 361, 362A.

Heterolepa reussi (Silvestri)
(Plate 6, Figures 9-12)

Truncatulina dutemplei d'Orbigny, var. *reussi* Silvestri, 1906, Riv. 5, Paleontol., v. 12, p. 33. Rare at Sites 360, 362A, and 363.

Heterolepa ungeriana (d'Orbigny)
(Plate 6, Figures 18, 19)

Rotalina ungeriana d'Orbigny, 1864, Foram. Bassin Tert. Vienne, p. 157, pl. 8, fig. 16-18. Common at all sites.

Karreriella baccata (Schwager)

Gaudryina baccata Schwager, 1866, Novara Exped., Geol. Theil., v. 2, p. 200, pl. 4, fig. 12. Scarce at Site 360.

Karreriella chapapotensis (Cole)

Textularia chapapotensis Cole, 1928, Am. Paleontol. Bull., v. 14, n. 53, p. 6, pl. 2, fig. 9. Scarce at Sites 360, 361, and 364.

Karreriella cubensis Cushman and Bermudez

Karreriella cubensis Cushman and Bermudez, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 4, pl. 1, fig. 18, 19. Scarce at Sites 360, 361, and 363.

Karreriella hantkeniana Cushman

Karreriella hantkeniana Cushman, 1936, Cushman Lab. Foram. Res., Spec. Publ., 6, p. 36, pl. 5, fig. 19. Rare at Site 360.

Karreriella siphonella (Reuss)

Gaudryina siphonella Reuss, 1851, Z. Deut. Geol. Ges., v. 3, p. 78, pl. 5, fig. 40-42. Rare at Sites 360 and 362A.

Karreriella subglabra (Guembel)
(Plate 1, Figure 9)

Gaudryina subglara Guembel, 1868, Abh. K. Bayer Akad. Wiss., II cl., v. 10, II. Abt. p. 602, pl. 1, fig. 4. Rather common at Sites 360, 362A, and 363.

Laticarinina cf. bullbrooki Cushman and Todd

cf. *Laticarinina bullbrooki* Cushman and Todd, 1942, Contrib. Cushman Lab. Foram. Res., v. 18, p. 19, pl. 4, fig. 8, 9. Very rare at Site 360.

Loxostomoides dupuyi (Colom)
(Plate 2, Figures 3, 4)

Rectobolivina dupuyi Colom, 1954, Inst. Geol. Min. España, Bol., v. 66, p. 181, pl. 7, fig. 5-10. Rare at Site 361.

Marssonella nacataensis (White)
(Plate 1, Figure 15)

Textularia nacataensis White, 1929, J. Paleontol., v. 2, p. 31, pl. 4, fig. 2. Scarce at Site 363.

Marssonella traubi Hagn.

Marssonella traubi Hagn, 1956, Palaeontographica, Abt. A, v. 107, p. 118, pl. 9, fig. 20, text-fig. 5, 6. Scarce at Site 362A.

Neoflabellina jarvisi (Cushman)

Flabellina jarvisi Cushman, 1935, Contrib. Cushman Lab. Foram. Res., v. 11, p. 85, pl. 13, fig. 7, 8. Rare at Site 363.

Neoflabellina semireticulata (Cushman and Jarvis)
(Plate 1, Figure 18)

Flabellina semireticulata Cushman and Jarvis, 1928, Contrib. Cushman Lab. Foram. Res., v. 4, p. 98, pl. 13, fig. 14. Scarce at Site 363.

Nodosarella subnodosa (Guppy)
(Plate 3, Figure 18)

Ellipsoidina subnodosa Guppy, 1894, Proc. Zod. Soc. London, p. 650, pl. 41, fig. 12. Rare at Sites 360 and 362A.

Nodosaria longiscata d'Orbigny

Nodosaria longiscata d'Orbigny, 1846, Foram. Bassin Tert. Vienne, p. 32, pl. 7, fig. 10-12. Rather common at Sites 360 and 361.

Nonion havanense Cushman and Bermudez
(Plate 4, Figures 1, 2)

Nonion havanense Cushman and Bermudez, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 19, pl. 2, fig. 13, 14. Rather common at all sites.

Nutallides truempyi (Nuttall)
(Plate 3, Figures 1, 2)

Eponides truempyi Nuttall, 1930, J. Paleontol., v. 4, p. 287, pl. 24, fig. 9, 13, 14. Common at all sites.

Oridorsalis umbonatus (Reuss)

Rotalina umbonata Reuss, 1851, Z. Deut. Geol. Ges., v. 3, p. 75, pl. 5, fig. 35. Common at all sites.

Orthomorphina havanensis (Cushman and Bermudez)

Nodogenerina havanensis Cushman and Bermudez, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 14, pl. 1, fig. 47, 48.

Orthomorphina rohri (Cushman and Stainforth)
(Plate 1, Figure 17)

Nodogenerina rohri Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec, Publ., 14, p. 39, pl. 5, fig. 26. Rare at Site 363.

Osangularia pteromphalia (Guembel)
(Plate 4, Figures 15, 16)

Rotalia pteromphalia Guembel, 1868, Abh. K. Bayer. Akad. Wiss., II cl. v. 10, II Abt. p. 651, pl. 2, fig. 88. Rather common at Sites 360, 362A, and 363.

Osangularia plummerae Brotzen

Osangularia plummerae Brotzen, 1940, Sver. Geol. Unders., Avh., s.c., n. 435, p. 30, pl. 10, fig. 1, 2. Rare at Sites 364.

Planulina ammophila (Guembel)
(Plate 3, Figures 5, 6)

Rotalia ammophila Guembel, 1868, Abh, k. Bayer. Akad. Wiss., II Cl., v. 10, II Abt., p. 652, pl. 2. Rather common at Sites 360, 361 and 362A.

Planulina renzi Cushman and Stainforth
(Plate 3, Figure7)

Planulina renzi Cushman and Stainforth, 1945, Cushman Lab. Foram. Res., Spec. Publ., 14, p. 72, pl. 15, fig. 1. Rare at Sites 360 and 363.

Plectina dalmatina (Schubert)
(Plate 1, Figure 13)

Gaudryina dalmatina Schubert, 1911, in Liebus, Sitz. Akad. Wiss. Wien, v. 120, p. 75, pl. 3, fig. 5, text-fig. 4. Scarce at Sites 362A and 363.

Pleurostomella acuta Hantken
(Plate 3, Figure 9)

Pleurostomella acuta Hantken, 1875, Ungar. Geol. Anst., Mitt. Jb., v. 4, n. 1, p. 44, pl. 13, fig. 18. Rather common at Sites 360, 362A, and 363.

Pleurostomella alternans Schwager
(Plate 3, Figure 10)

Pleurostomella alternans Schwager, 1966, Novara Exped., Geol. Theil., v. 2, p. 238, pl. 6, fig. 79-80. Rare at Sites 360 and 363.

Pleurostomella incrassata Hantken
(Plate 3, Figure 11)

Pleutostomella incrassata Hantken, 1884, Math. u. naturw. Ber. Ung. v. 2, p. 146, pl. 1, fig. 4, 7. Rather common at Sites 360, 361, and 362A.

Pleurostomella nuttalli Cushman and Siegfus
(Plate 3, Figure 13)

Pleurostomella nuttalli Cushman and Siegfus, 1939, Contrib. Cushman Lab. Foram. Res., v. 15, p. 29, pl. 6, fig. 17, 18. Rather common at all sites.

Pleurostomella obesa Cushman and Bermudez

Pleurostomella obesa Cushman and Bermudez, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 16, pl. 1, fig. 61. Rare at Site 362A.

Praebulimina beaumonti (Cushman and Renz)
(Plate 1, Figure 19)

Buliminella beaumonti Cushman and Renz, 1946, Cushman Lab. Foram. Res., Spec. Publ., 18, p. 36, pl. 6, fig. 7. Scarce at Sites 363 and 364.

Praebulimina grata (Parker and Bermudez)
(Plate 1, Figure 20)

Bulimenella grata Parker and Bermudez, 1937, J. Paleontol., v. 11, p. 515, pl. 59, fig. 6. Scarce at Sites 360 and 36l.

Pullenia coryelli White
(Plate 4, Figures 3, 4)

Pullenia coryelli White, 1929, J. Paleontol. v. 3, p. 56, pl. 5, fig. 22. Scarce at Sites 361, 363, and 364.

Pullenia eocenica Cushman and Siegfus
(Plate 4, Figures 7, 8)

Pullenia eocenica Cushman and Siegfus, 1939, Contrib. Cushman Lab. Foram. Res., v. 15, p. 31, pl. 7, fig. 1. Rather common at Sites 360, 316, 362A, and 363.

Pullenia jarvisi Cushman

Pullenia jarvisi Cushman, 1936, Contrib. Cushman Lab. Foram. Res. v. 12, p. 77, pl. 13, fig. 6. Rare at Site 363.

Pullenia quinqueloba (Reuss)
(Plate 4, Figure 9)

Nonionina quinqueloba Reuss, 1851, Z. Deut. Geol. Ges., v. 3. Rather common at Sites 360, 362A, and 363, rare at Site 361.

Pullenia sp. 1
(Plate 4, Figures 5, 6)

This indetermined species is present at all sites. Rather common at Sites 360, 363, and 364; rare at Sites 361 and 362A. Tabulated as *Pullenia* sp. in Table 3.

Rectuvigerina elegans (Hantken)

Dimorphina elegans Hantken, 1875, Ungar. Geol. Anst. Mitt. Jb., v. 4, p. 63, pl. 7, fig. 9. Rare at Site 361.

Remesella varians (Glaessner)
(Plate 1, Figure 14)

Textulariella ? varians Glaessner, 1937, Probl. Paleontol., v. 2, 3, p. 366, pl. 2, fig. 15. Rather common at Site 363.

Siphotextularia finlayi Hornibrook

Siphotextularia finlayi Hornibrook, 1961, New Zealand Geol. Surv. Paleontol. Bull., v. 34 (1), p. 23, pl. 2, fig. 21, 26. Rare at Site 361.

Spiroplectammina dentata (Alth)
(Plate 1, Figure 4)

Textularia dentata Alth, 1850, Natw. Abh., Wien, v. 3, p. 262, pl. 13, fig. 13. Scarce at Sites 363 and 364.

Spiroplectammina excolata (Cushman)

Textularia excolata Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 585, pl. 15, fig. 9. Rare at Site 363.

Stainforthia ryani Proto Decima and Bolli, n. sp.
(Plate 2, Figures 17, 18)

Test small, stout, spindle-shaped. Circular in transverse section, tapering at both ends, with the greatest width in about the middle of the test. Aperture loop-shaped, bordered by a narrow lip, terminal. Wall hyaline, finely perforate, surface smooth. Sutures distinct, depressed. Chambers inflated, overlapping, early stage triserial, biserial in the adult portion. The initial pointed end can have a distinct spine. Rather common in the middle Eocene of DSDP Leg 40 Site 361.

Dimension of holotype: (Plate 2, Figure 17): 0.35 mm.

Dimension of figured paratype: (Plate 2, Figure 18): 0.3 mm.

Type locality: Cape Basin, South Atlantic, 35°04'S, 15°27'E.

Type sample: DSDP Leg 40 Site 361, Core 6, core catcher.

Type stratum: Middle Eocene, *Discoaster sublodoensis* Zone.

Name: The species is named for William B. F. Ryan, DSDP Leg 40 co-chief scientist; Lamont-Doherty Geological Observatory, Palisades, New York.

Depository: Natural History Museum, Basel, No. C 33864 (Holotype), C 33865 (Paratype).

Stilostomella cf. consobrina (d'Orbigny)

cf. *Dentalina consobrina* d'Orbigny, 1846, Foram Bassin Tert. Vienne, p. 46, pl. 2, fig. 1-3. Rare at Site 361.

Stilostomella curvatura (Cushman)
(Plate 2, Figures 8, 9)

Ellipsonodosaria curvatura Cushman, 1939, Contrib. Cushman Lab. Foram. Res., v. 15, p. 71, pl. 12, fig. 6. Rare at Site 363.

Stilostomella nuttalli (Cushman and Jarvis)
(Plate 2, Figures 6, 7)

Ellipsonodosaria nuttalli Cushman and Jarvis, 1934, Contrib. Cushman Lab. Foram. Res., v. 10, p. 72, pl. 10, fig. 6. Rather common at Sites 360, 361, and 363.

Stilostomella nuttalli aculeata (Cushman and Renz)

Ellipsonodosaria nuttalli Cushman and Jarvis var. *aculeata* Cushman and Renz, 1948, Cushman Lab. Foram. Res., Spec. Publ., 24, p. 32, pl. 6, fig. 10. Rare at Site 361.

Stilostomella nuttalli gracillima (Cushman and Jarvis)

Ellipsonodosaria nuttalli Cushman and Jarvis var. *gracillima* Cushman and Jarvis, 1934, Contrib. Cushman Lab. Foram. Res., v. 10, p. 72, pl. 10, fig. 7. Rather common at sites 360 and 363; rare at Sites 361 and 364.

Stilostomella cf. stachei (Chapman)

cf. *Nodosaria stachei* Chapman, 1926, New Zealand, Geol. Surv. Paleontol. Bull., v. 11, p. 53, pl. 3, fig. 16. Rare at Site 361.

Stilostomella subspinosa (Cushman)

Ellipsonodosaria subspinosa Cushman, 1943, Contrib. Cushman Lab. Foram. Res., v. 19, p. 92, pl. 16, fig. 6, 7. Rather common at Sites 360 and 363; rare at Sites 361 and 362A.

Stilostomella verneuili (d'Orbigny)

Dentalina verneuili d'Orbigny, 1846, Foram. Bassin Tert. Vienne, p. 48, pl. 2, fig. 7, 8. Rather common at Site 360; rare at Sites 361 and 363.

Tappanina selmensis (Cushman)
(Plate 2, Figure 5)

Bolivinita selmensis Cushman, 1933, Contrib. Cushman Lab. Foram. Res., v. 9, p. 58, pl. 7, fig. 3, 4. Common in a single lower Eocene sample of Site 361.

Tritaxia amorpha (Cushman)

Clavulina amorpha Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 589, pl. 17, fig. 5. Rare at Site 364.

Tritaxia aspera (Cushman)

Clavulina trilatera Cushman, var. *aspera* Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 589, pl. 17, fig. 3. Rare at Site 363.

Tritaxia trilatera (Cushman)

Clavulina trilatera Cushman, 1926, Am. Assoc. Petrol. Geol. Bull., v. 10, p. 588, pl. 17, fig. 2. Scarce at Site 363.

Tritaxilina cubensis Cushman and Bermudez

Tritaxilina cubensis Cushman and Bermudez, 1936, Contrib. Cushman Lab. Foram. Res., v. 12, pl. 10, fig. 25, 26. Rare at Site 363.

Tritaxilina pupa (Guembel)

Gaudryina pupa Guembel, 1868, Abh. K. Bayer. Akad. Wiss., II cl., v. 19, II Abt., p. 602, pl. 18, fig. 8-15. Rare at Sites 360, 362A, and 364.

Uvigerina acutocostata (Hagn)

Hopkinsina acuto-costata Hagn, 1956, Palaeontographica, Abt. A, v. 107, p. 151, pl. 13, fig. 13. Rare at Site 362A.

Uvigerina biscrialis Cushman and Edwards

Uvigerina biscrialis Cushman and Edwards, 1937, Contrib. Cushman Lab. Foram. Res., v. 13, p. 59, pl. 8, fig. 11, 12. Rare at Site 362A.

Uvigerina chirana Cushman and Stone
(Plate 2, Figure 22)

Uvigerina chirana Cushman and Stone, 1947, Cushman Lab. Foram. Res., Spec. Publ., 20, p. 17, pl. 2, fig. 25. Scarce at Site 360.

Uvigerina elongata Cole
(Plate 2, Figures 20, 21)

Uvigerina elongata Cole, 1927, Am. Paleontol. Bull, v. 14, p. 26, pl. 4, fig. 2, 3. Scarce at Sites 361 and 363.

Uvigerina cf. eocaena Guembel

cf. *Uvigerina eocaena* Guembel, 1868, Abh. k. Bayer. Akad. Wiss., II cl., v. 10, II Abt., p. 645, pl. 2, fig. 78. Rare at Site 361.

Uvigerina aff. gallowayi Cushman
(Plate 2, Figure 23)

Uvigerina gallowayi Cushman, 1929. Contrib. Cushman Lab. Foram. Res., v. 5, p. 94, pl. 13, fig. 33, 34. Rare at Site 360.

Uvigerina spinicostata Cushman and Jarvis
(Plate 2, Figure 19)

Uvigerina spinicostata Cushman and Jarvis, 1929, Contrib. Cushman Lab. Foram. Res., v. 5, p. 12, pl. 3, fig. 9, 10. Rather common at Sites 360 and 363.

Vulvulina haeringensis (Guembel)
(Plate 1, Figure 5)

Venilina haeringensis Guembel, 1868, Abh. K. Bayer, Akad. Wiss., II cl. v. 10, II Abt., p. 649, pl. 2, fig. 84. Rather common at Sites 360, 362A, and 363.

DEPOSITORY OF SPECIMENS

The specimens figured on Plates 1 to 6 are deposited at the Museum of Natural History, Basel, under the Numbers C 33829 to 33948.

ACKNOWLEDGMENTS

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PLATE 1

Figure 1	*Ammodiscus glabratus* Cushman and Jarvis. ×40; Site 360, Sample 45-3, 83-85 cm; C 33829.
Figure 2	*Glomospira charoides* (Jones and Parker). ×100; Site 360, Sample 49, CC; C 33830.
Figure 3	*Bolivinopsis spectabilis* (Grzybowski). ×40; Site 360, Sample 36, CC; C 33831.
Figure 4	*Spiroplectammina dentata* (Alth). ×60; Site 364, Sample 10, CC; C 33832.
Figure 5	*Vulvulina haeringensis* (Guembel). ×30; Site 363, Sample 2, CC; C 33833.
Figure 6	*Gaudryina pyramidata* Cushman. ×35; Site 363, Sample 16, CC; C 33834.
Figure 7	*Gaudryina pseudocollinsi* Cushman and Stainforth. ×40; Site 360, Sample 34-1, 89-91 cm; C 33835.
Figure 8	*Tritaxia trilatera* (Cushman). ×50; Site 363, Sample 16, CC; C 33836.
Figure 9	*Karreriella subglabra* (Guembel). ×70; Site 360, Sample 40, CC; C 33837.
Figure 10	*Dorothia beloides* Hillebrandt. ×80; Site 364, Sample 10-5, 58-60 cm; C 33838.
Figure 11	*Clavulina* aff. *anglica* (Cushman). ×50; Site 360, Sample 36, CC; C 33839.
Figure 12	*Clavulina cocoaensis* (Cushman). ×40; Site 362, Sample 12-1, 108-110 cm; C 33840.
Figure 13	*Plectina dalmatina* (Schubert). ×50; Site 362A, Sample 9, CC; C 33841.
Figure 14	*Remesella varians* (Glaessner). ×60; Site 363, Sample 16, CC; C 33842.
Figure 15	*Marssonella nacataensis* (White). ×40; Site 363, Sample 15, CC; C 33843.
Figure 16	*Crysalogonium tenuicostatum* Cushman and Bermudez. ×40; Site 361, Sample 8, CC; C 33844.
Figure 17	*Orthomorphina rohri* (Cushman and Stainforth). ×80; Site 363, Sample 16, CC; C 33845.
Figure 18	*Neoflabellina semireticulata* (Cushman and Jarvis). ×60; Site 363, Sample 16, CC; C 33846.
Figure 19	*Praebulimina beaumonti* (Cushman and Renz). ×60; Site 363, Sample 16, CC; C 33847.
Figure 20	*Praebulimina grata* (Parker and Bermudez). ×100; Site 363, Sample 2, CC; C 33848.

PLATE 1

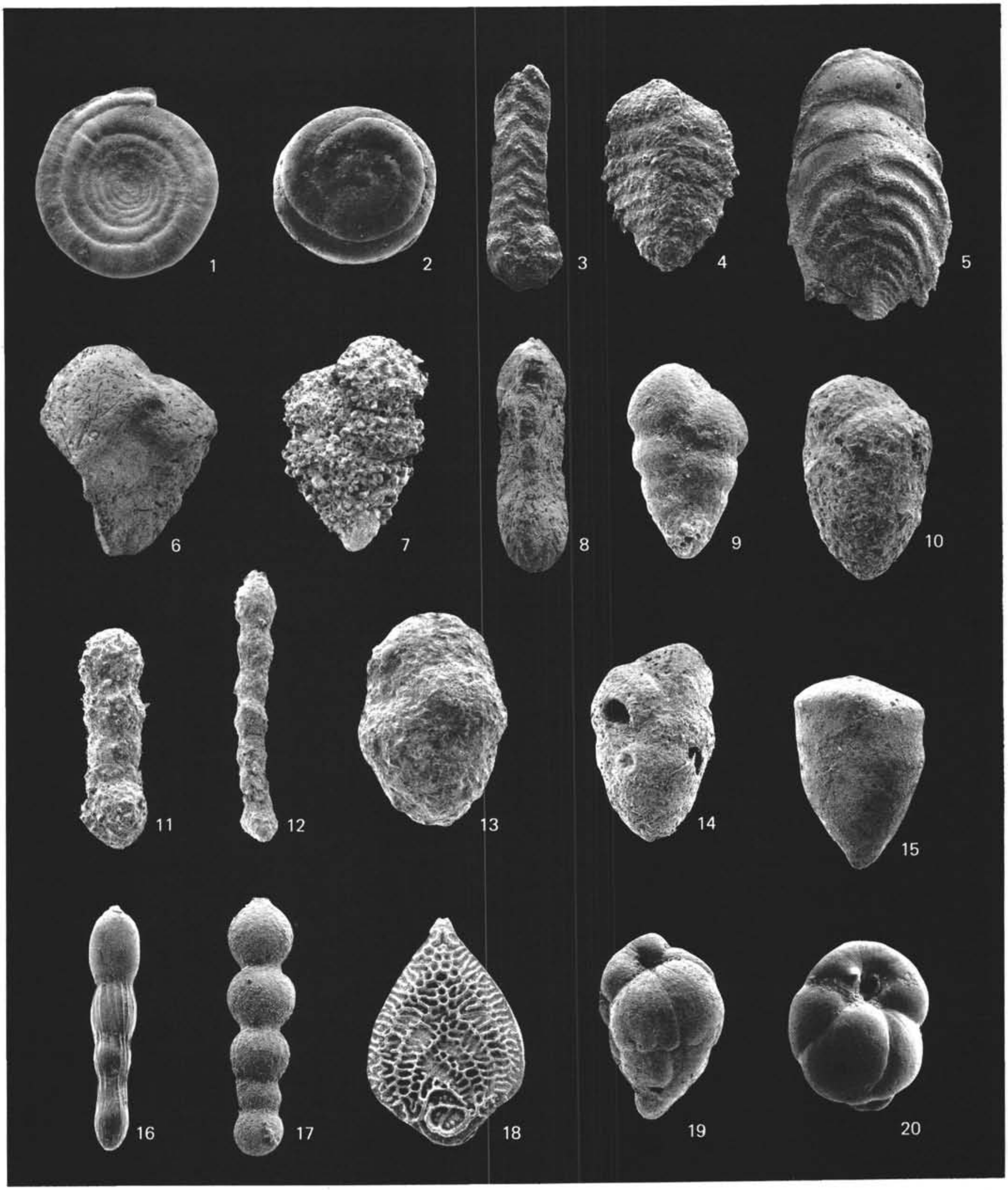

PLATE 2

Figure 1	*Coryphostoma* cf. *limonense* (Cushman). ×80; Site 363, Sample 16, CC; C 33849.
Figure 2	*Bolivina antegressa* Subbotina. ×140; Site 361, Sample 2, CC; C 33850.
Figure 3	*Loxostomoides dupuyi* (Colom). ×50; Site 361, Sample 6, CC; C 33851.
Figure 4	Detail of Figure 3. ×500.
Figure 5	*Tappanina selmensis* (Cushman). ×140; Site 361, Sample 8, CC; C 33852.
Figure 6	*Stilostomella nuttalli* (Cushman and Jarvis). ×12; Site 364, Sample 302, 58-60 cm; C 33853.
Figure 7	*Stilostomella nuttalli* (Cushman and Jarvis). ×25; Site 363, Sample 2, CC; C 33854.
Figure 8	*Stilostomella curvatura* (Cushman). ×20; Site 353, Sample 2, CC; C 33855.
Figure 9	*Stilostomella curvatura* (Cushman). ×30; Site 353, Sample 2, CC; C 33856.
Figure 10	*Bulimina alazanensis* Cushman. ×80; Site 363, Sample 9-3, 73-75 cm; C 33857.
Figure 11	*Bulimina impendens* Parker and Bermudez. ×100; Site 360, Sample 32, CC; C 33858.
Figure 12	*Bulimina impendens* Parker and Bermudez. ×100; Site 361, Sample 6, CC; C 33859.
Figure 13	*Bulimina jarvisi* Cushman and Parker. ×70; Site 360, Sample 32-1, 107-110 cm; C 33860.
Figure 14	*Bulimina semicostata* Nuttall. ×100; Site 361, Sample 6, CC; C 33861.
Figure 15	*Bulimina trinitatensis* Cushman and Jarvis. Specimen without costae. ×100; Site 363, Sample 17, CC; C 33862.
Figure 16	*Bulimina trinitatensis* Cushman and Jarvis. ×80; Site 363, Sample 16, CC; C 33863.
Figure 17	*Stainforthia ryani* Proto Decima and Bolli, n. sp., Holotype. ×120; Site 361, Sample 6, CC; C 33864.
Figure 18	*Stainforthia ryani* Proto Decima and Bolli, n. sp., Paratype. ×140; Site 361, Sample 6, CC; C 33865.
Figure 19	*Uvigerina spinicostata* Cushman and Jarvis. ×100; Site 363, Sample 5, CC; C 33866.
Figure 20	*Uvigerina elongata* Cole. ×60; Site 363, Sample 6, CC; C33867.
Figure 21	Detail of Figure 20. ×250.
Figure 22	*Uvigerina chirana* Cushman and Stone. ×70; Site 360, Sample 42, CC; C 33868.
Figure 23	*Uvigerina* aff. *gallowayi* Cushman. ×80; Site 360, Sample 27, CC; C 33869.

PLATE 2

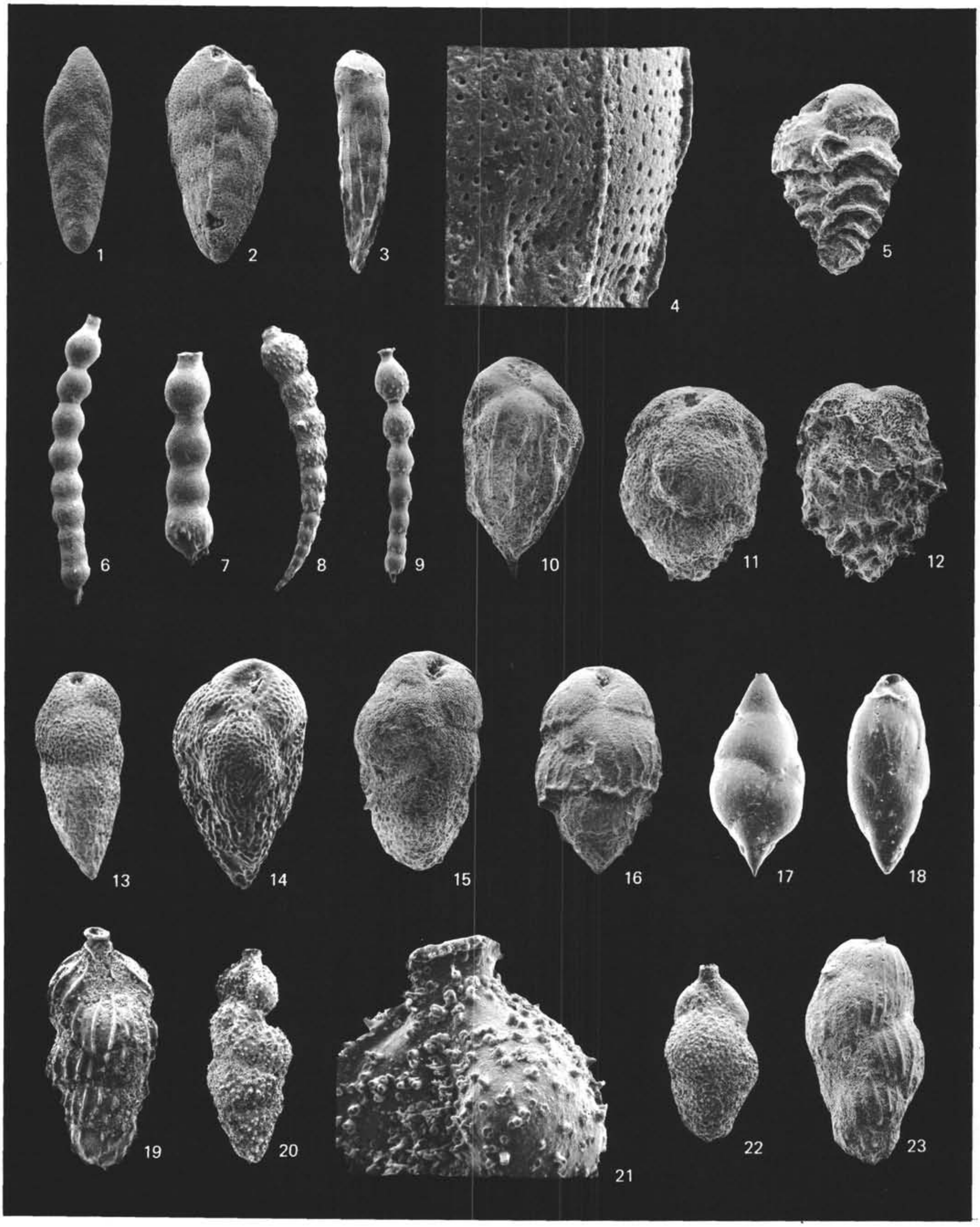

PLATE 3

Figure 1	*Nuttallides truempyi* (Nuttall), spiral view. ×60; Site 360, Sample 50, CC; C 33870.
Figure 2	*Nuttallides truempyi* (Nuttall), umbilical view. ×50; Site 360, Sample 50, CC; C 33871.
Figure 3	*Eponides lotus* (Schwager), spiral view. ×80; Site 363, Sample 16, CC; C 33872.
Figure 4	*Eponides lotus* (Schwager), umbilical view. ×90; Site 364, Sample 10, CC; C 33873.
Figure 5	*Planulina ammophila* (Guembel), spiral view. ×50; Site 360, Sample 32-1, 107-110 cm; C 33874.
Figure 6	*Planulina ammophila* (Guembel), umbilical view. ×60; Site 360, Sample 32-1, 107-110 cm; C 33875.
Figure 7	*Planulina renzi* Cushman and Stainforth, spiral view. ×80; Site 360, Sample 29, CC; C 33876.
Figure 8	*Cibicides* sp. 1, spiral view. ×100; Site 360, Sample 26, CC; C 33877.
Figure 9	*Pleurostomella acuta* Hantken. ×80; Site 360, Sample 34, CC; C 33878.
Figure 10	*Pleurostomella alternans* Schwager. ×40; Site 363, Sample 2, CC; C 33879.
Figure 11	*Pleurostomella incrassata* Hankten. ×100; Site 360, Sample 40, CC; C 33880.
Figure 12	*Bandyella beckmanni* Proto Decima and Bolli, n. sp., Holotype. ×50; Site 364, Sample 10-1, 58-60 cm; C 33881.
Figure 13	*Pleurostomella nuttalli* Cushman and Siegfus. ×50; Site 360, Sample 29, CC; C 33882.
Figure 14	*Ellipsodimorphina subcompacta* Liebus. ×50; Site 360, Sample 50, CC; C 33883.
Figure 15	*Ellipsoidina ellipsoides* Seguenza. ×80; Site 360, Sample 29-2, 73-75 cm; C 33884.
Figure 16	*Ellipsoglandulina multicostata* (Galloway and Morrey). ×80; Site 361, Sample 1, CC; C 33885.
Figure 17	Detail of Figure 16. ×500.
Figure 18	*Nodosarella subnodosa* (Guppy). ×40; Site 360, Sample 27-1, 56-58 cm; C 33886.
Figure 19	*Cassidulina havanensis* Cushman and Bermudez. ×100; Site 363, Sample 8, CC; C 33887.
Figure 20	*Aragonia aragonensis* (Nuttall). ×100; Site 360, Sample 48, CC; C 33888.
Figure 21	*Aragonia velascoensis* (Cushman). ×60; Site 363, Sample 16, CC; C 33889.
Figure 22	*Aragonia ouezzanensis* (Rey). ×50; Site 364, Sample 10-1, 58-60 cm; C 33890.
Figure 23	*Globocassidulina globosa* (Hantken). ×100; Site 361, Sample 1, CC; C 33891.
Figure 24	*Globocassidulina globosa* (Hantken). ×50; Site 363, Sample 2, CC; C 33892.

PLATE 3

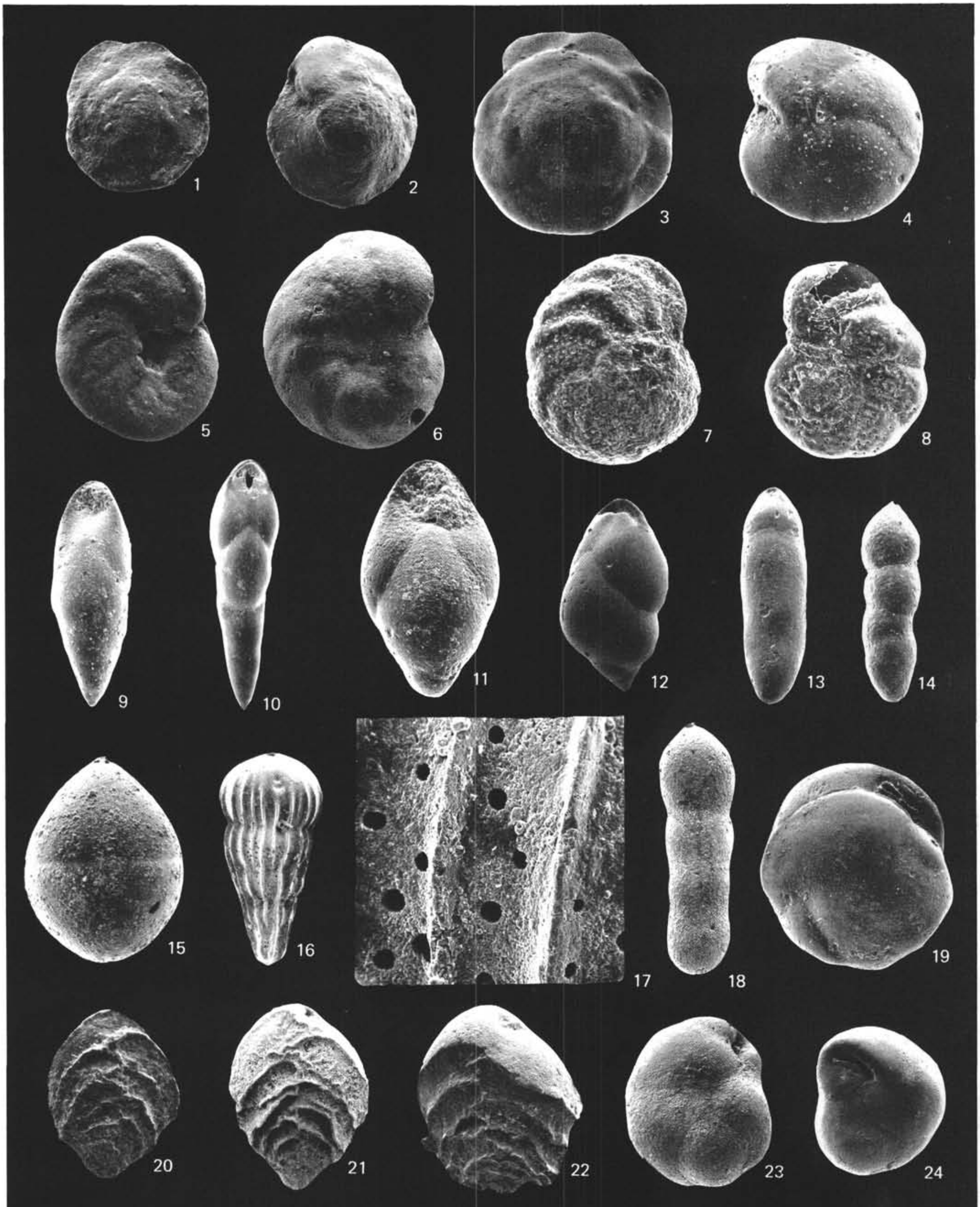

PLATE 4

Figure 1	*Nonion havanense* Cushman and Bermudez. ×100; Site 363, Sample 15-3, 58-60 cm; C 33893.
Figure 2	*Nonion havanense* Cushman and Bermudez. ×100; Site 363, Sample 15-3, 58-60 cm; C 33894.
Figure 3	*Pullenia coryelli* White. ×100; Site 363, Sample 16, CC; C 33895.
Figure 4	*Pullenia coryelli* White. ×100; Site 363, Sample 16, CC; C 33896.
Figure 5	*Pullenia* sp. 1. ×100; Site 363, Sample 6, CC; C 33897.
Figure 6	*Pullenia* sp. 1. ×100; Site 363, Sample 6, CC; C 33898.
Figure 7	*Pullenia eocenica* Cushman and Siegfus. ×100; Site 360, Sample 50, CC; C 33899.
Figure 8	*Pullenia eocenica* Cushman and Siegfus. ×100; Site 360, Sample 50, CC; C 33900.
Figure 9	*Pullenia quinqueloba* (Reuss). ×120; Site 363, Sample 9-3, 82-84 cm; C 33901.
Figure 10	*Alabamina dissonata* (Cushman and Renz), spiral view. ×100; Site 364, Sample 7, CC; C 33902.
Figure 11	*Alabamina dissonata* (Cushman and Renz), umbilical view. ×100; Site 364, Sample 7, CC; C 33903.
Figure 12	*Gyroidinoides subangulata* (Plummer), spiral view. ×80; Site 362A, Sample 2, CC; C 33904.
Figure 13	*Gyroidinoides planulata* (Cushman and Renz), spiral view. ×80; Site 360, Sample 29, CC; CC 33905.
Figure 14	*Gyroidinoides planulata* (Cushman and Renz), umbilical view. ×100; Site 360, Sample 29, CC; C 33906.
Figure 15	*Osangularia pteromphalia* (Guembel), spiral view. ×50; Site 363, Sample 10-4, 58-60 cm; C 33907.
Figure 16	*Osangularia pteromphalia* (Guembel), umbilical view. ×50; Site 363, Sample 10-4, 58-60 cm; C 33908.
Figure 17	*Charltonina florealis* (White), spiral view. ×40; Site 363, Sample 15, CC; C 33909.
Figure 18	*Charltonina florealis* (White), umbilical view. ×35; Site 363, Sample 15, CC; C 33910.
Figure 19	*Gyroidinoides globosa* (Hagenow), spiral view. ×60; Site 363, Sample 15, CC; C 33911.
Figure 20	*Gyroidinoides globosa* (Hagenow), apertural view. ×60; Site 363, Sample 15, CC; C 33912.

PLATE 4

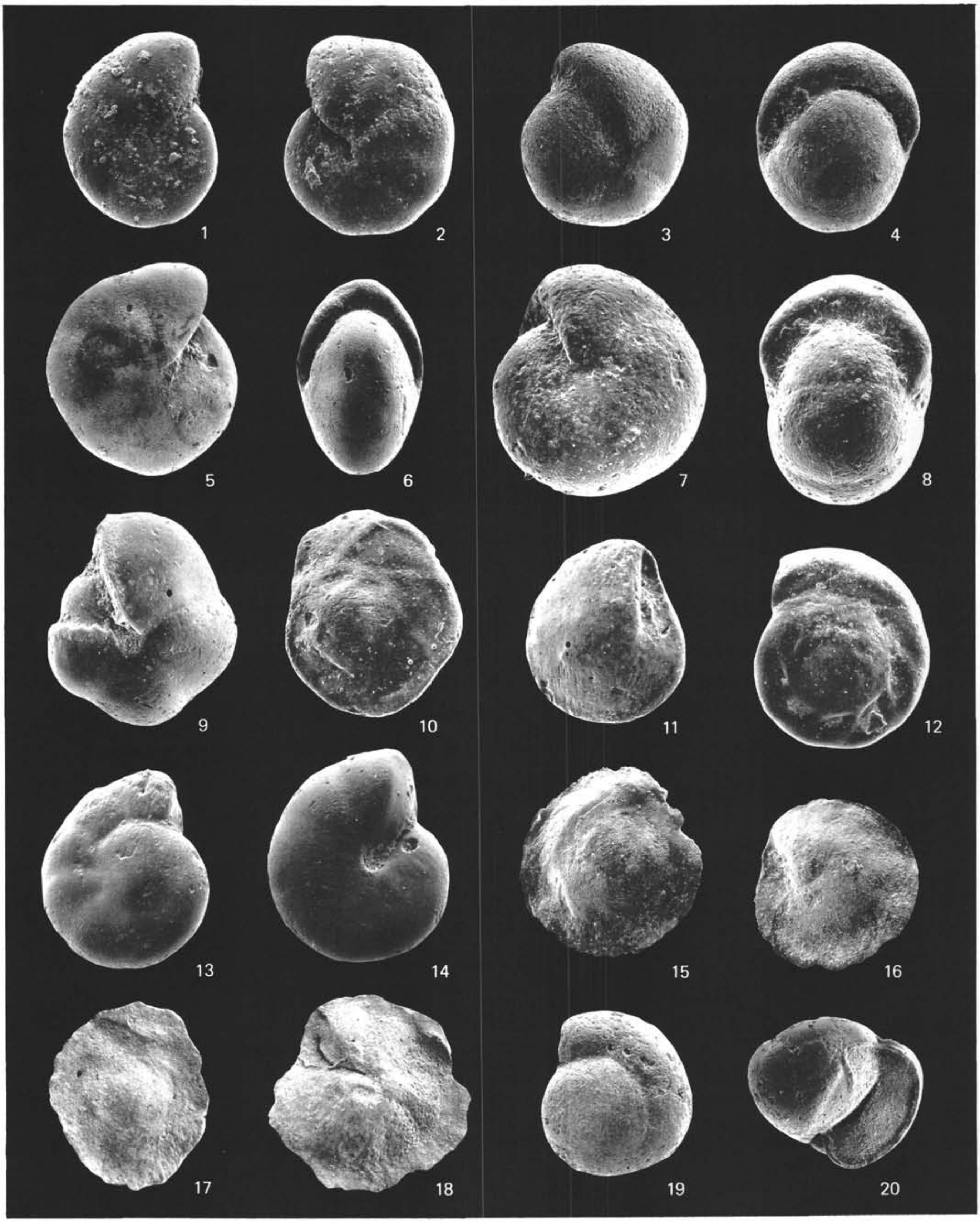

PLATE 5

Figure 1	*Gyroidinoides soldanii* (d'Orbigny), spiral view. ×100; Site 363, Sample 4, CC; C 33913.
Figure 2	*Gyroidinoides soldanii* (d'Orbigny), spiral view. ×100; Site 363, Sample 4, CC; C 33914.
Figure 3	*Gyroidinoides octocamerata* (Cushman and Hanna), spiral view. ×70; Site 360, Sample 35-2, 134-136 cm; C 33915.
Figure 4	*Gyroidinoides octocamerata* (Cushman and Hanna), umbilical view. ×70; Site 360, Sample 35-2, 134-136 cm; C 33916.
Figure 5	*Anomalina pompilioides semicribrata* Beckmann, spiral view. ×60; Site 360, Sample 47-2 (bottom); C 33917.
Figure 6	*Anomalina pompilioides semicribrata* Beckmann, umbilical view. ×60; Site 360, Sample 47-2 (bottom); C 33918.
Figure 7	*Anomalina capitata* (Guembel), spiral view. ×60; Site 360, Sample 47-2 (bottom); C 33919.
Figure 8	*Anomalina capitata* (Guembel), umbilical view. ×60; Site 360, Sample 47-2 (bottom); C 33920.
Figure 9	*Anomalina praeacuta* Vasilenko, spiral view. ×120; Site 361, Sample 8, CC; C 33921.
Figure 10	Detail of Figure 9. ×500.
Figure 11	*Anomalina praeacuta* Vasilenko, umbilical view. ×120; Site 361, Sample 8, CC; C 33922.
Figure 12	*Anomalina alazanensis spissiformis* Cushman and Stainforth, spiral view. ×70; Site 360, Sample 27, CC; C 33923.
Figure 13	*Anomalina alazanensis spissiformis* Cushman and Stainforth, umbilical view. ×70; Site 360, Sample 27, CC; C 33924.
Figure 14	*Anomalina*? sp. 1, side view. ×180; Site 361, Sample 4, CC; C 33925.
Figure 15	*Anomalina*? sp. 1, umbilical view. ×180; Site 361, Sample 4, CC; C 33926.
Figure 16	*Cibicidoides* aff. *cookei* (Cushman and Garrett), spiral view. ×60; Site 363, Sample 9-3, 105-107 cm; C 33927.
Figure 17	*Cibicidoides* aff. *cookei* (Cushman and Garrett), umbilical view. ×60; Site 363, Sample 9-3, 105-107 cm; C 33928.
Figure 18	*Cibicidoides alleni* (Plummer), spiral view. ×70; Site 363, Sample 16, CC; C 33929.
Figure 19	*Cibicidoides alleni* (Plummer), umbilical view. ×60; Site 363, Sample 15-3, 58-60 cm; C 33930.

PLATE 5

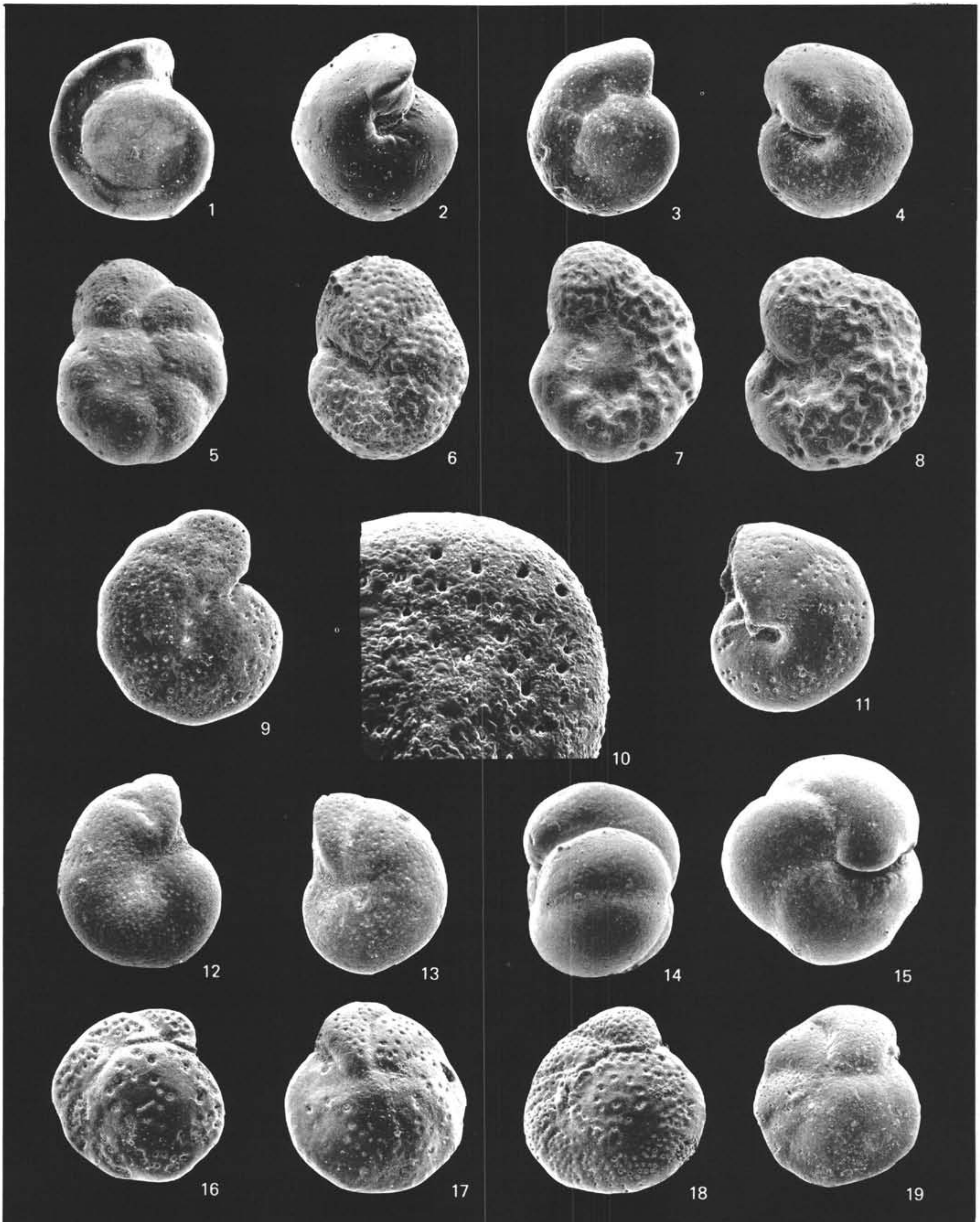

PLATE 6

Figure 1	*Gavelinella dayi* (White), spiral view. ×40; Site 363, Sample 16, CC; C 33931.
Figure 2	*Gavelinella dayi* (White), umbilical view. ×40; Site 363, Sample 16, CC; C 33932.
Figure 3	*Gavelinella beccariiformis* (White), spiral view. ×60; Site 363, Sample 16, CC; C 33933.
Figure 4	*Gavelinella beccariiformis* (White), umbilical view. ×60; Site 363, Sample 16, CC; C 33934.
Figure 5	*Gavelinella micra* (Bermudez), spiral view. ×80; Site 363, Sample 5, CC; C 33935.
Figure 6	*Gavelinella micra* (Bermudez), umbilical view. ×80; Site 363, Sample 5, CC; C 33936.
Figure 7	*Gavelinella rubiginosa* (Cushman), spiral view. ×80; Site 363, Sample 15, CC; C 33937.
Figure 8	*Gavelinella rubiginosa* (Cushman), umbilical view. ×60; Site 363, Sample 15, CC; C 33938.
Figure 9	*Heterolepa reussi* (Silvestri), spiral view. ×50; Site 363, Sample 2, CC; C 33939.
Figure 10	Detail of Figure 11, showing one of the large, conical-shaped parasite holes. On lower left is a group of the irregularly distributed pores. ×250.
Figure 11	*Heterolepa reussi* (Silvestri), umbilical view. ×50; Site 363, Sample 2, CC; C 33940.
Figure 12	*Heterolepa reussi* (Silvestri),spiral view. view. ×50; Site 362A, Sample 4, CC; C 33941.
Figure 13 .	*Heterolepa pygmea* (Hantken), spiral view. ×120; Site 360, Sample 44, CC; C 33942.
Figure 14	*Heterolepa eocaena* (Guembel), spiral view. ×30; Site 363A, Sample 2, CC; C 33943.
Figure 15	*Heterolepa eocaena* (Guembel), umbilical view. ×45; Site 362A, Sample 2, CC; C 33944.
Figure 16	*Heterolepa grimsdalei* (Nuttall), umbilical view. ×50; Site 362A, Sample 7, CC; C 33945.
Figure 17	*Heterolepa grimsdalei* (Nuttall), spiral view. ×50; Site 362A, Sample 7, CC; C 33946.
Figure 18	*Heterolepa ungeriana* (d'Orbigny), spiral view. ×50; Site 363, Sample 10-4, 58-60 cm; C 33947.
Figure 19	*Heterolepa ungeriana* (d'Orbigny), spiral view. ×50; Site 363, Sample 10-4, 58-60 cm; C 33948.

PLATE 6