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Paleocene benthic foraminiferal biostratigraphy, paleoecology, and paleoceanography of the eastern Gulf Coastal Plain

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University of Cincinnati, 1987

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PALEOCENE BENTHIC FORAMINIFERAL BIOSTRATIGRAPHY, PALEOECOLOGY, AND PALEOCEANOGRAPHY OF THE EASTERN GULF COASTAL PLAIN

A dissertation submitted to the

Division of Graduate Studies and Research
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DOCTOR OF PHILOSOPHY

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I hereby recommend that the thesis prepared under my supervision by Richard H. Fluegeman, Jr.

entitled Paleocene Benthic Foraminiferal Biostratigraphy, Paleoecology, and Paleoceanography of the Eastern Gulf Coastal Plain

be accepted as fulfilling this part of the requirements for the degree of Doctor of Philosophy

Approved by:

ABSTRACT

A stratigraphic and paleontological analysis of 303 samples of Paleocene sediments of the eastern Gulf Coastal Plain of Mississippi, Alabama, and Georgia provided the basis for a geochronologic, quantitative paleoecologic, and paleoceanographic model.

One hundred fifty four samples bearing benthonic and planktonic foraminifera were studied; 166 benthonic foraminiferal species were identified and their biostratigraphic distribution yielded 4 biozones which were intergrated into the global time framework. This was achieved by correlating the benthonic foraminifera with the planktonic foraminifera in a few selected samples.

The 4 biozones are: the Eponides elevatus Zone (= Zone plb), the Alabamina midwayana Zone (= Zone Plc through lower P4), the Discorbis washburni Zone (= middle Zone P4) and the Alabamina westraliensis Zone (= upper Zone P4 through P6a). The use of benthic foraminifera in short distance correlation is an effective tool, particularly in the case of surface and subsurface sections which have a paucity of planktonic foraminifera.

Principal Component Analysis of the benthic foraminiferal fauna yielded six assemblages which when combined with two other qualitatively derived assemblages provide the basis for a paleoceanographic model of the Eastern Gulf Coastal Plain.

The presence of Subbotina trinidadensis and Planorotalites pseudomenardii as well as a paleolatitude ranging from 15°N (for the Campeche Shelf) to 25°N (for the coastal plain) emphasizes a paleoclimatic regime which is dominantly tropical. Thus it is inferred that normal marine waters were brought into the Gulf of Mexico by two major currents: 1. The easterly flowing Pacific counter current which when deflected by the southern most Gulf margin generated a minor cyclonic flow around the Campeche Shelf and 2. the west flowing equatorial current generated by the southern margin of the North Atlantic anticyclonic gyre which fed the central and northern Gulf.

Patterns of distribution in the benthic foraminiferal assemblages strongly suggest a

distribution which is controlled by 1. the character of the circulation, 2. water mass properties, 3. climate, and 4. subtle oscillations in sea level during the Paleocene.

Strandline displacements are thought to be directly related to subtle transgressive and regressive sea level movements. A well delineated quasi-cyclicity strongly suggestive of the 400,000 year cycles is identified along the refined sea level curve.

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PART I

PALEOCENE BENTHONIC FORAMINIFERAL
PALEONTOLOGY AND BIOSTRATIGRAPHY

INTRODUCTION

The Paleocene sediments of the eastern Gulf Coastal Plain of Georgia, Alabama, and Mississippi contain a rich and diverse foraminiferal fauna. Yet despite the abundance of foraminifera, the section is relatively poor in well preserved planktonic foraminifera. Benthic foraminiferal biozonations have been developed for use in the Gulf Coast (Kellough; 1959, 1965) but these cannot be directly related to the global geochronologic scale.

The difficulty in the eastern Gulf Coastal Plain is that samples containing planktonic foraminiferal assemblages are rare while samples containing only well preserved benthonic foraminiferal assemblages are common. Without the time control provided by the global geochronologic scale, much of this valuable paleontologic data cannot be utilized fully. In order to accomplish this, a biozonation based on benthonic foraminifera must be developed.

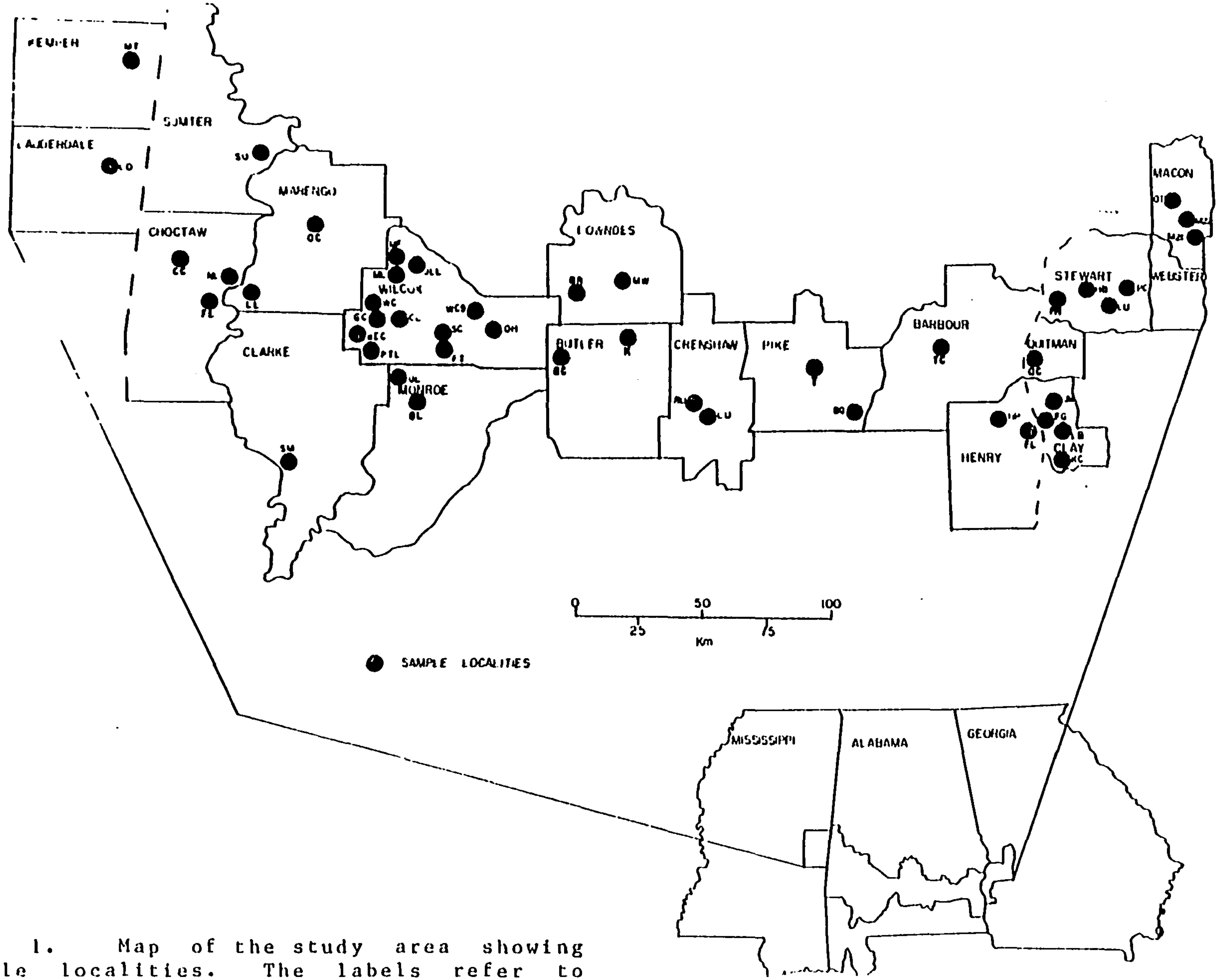
The approach taken to the problem in this study was to integrate the Paleocene stratigraphic units into the global geochronologic scale principally through the use of benthonic foraminiferal assemblages. A few selected assemblages containing both planktonic and benthonic foraminiferal assemblages provided an important stratigraphic control and facilitated correlation to the global geochronologic scale. The benthonic foraminiferal biostratigraphic zonation derived herein will enable correlation of sections without planktonic foraminifera to the global geochronologic scale. This will place many stratigraphic sections containing abundant benthonic foraminifera within a global time framework and make the paleoecologic data useful in studies of eustatic sea level.

METHODS OF STUDY

Field Methods

The selection of sampling localities for this study of benthonic foraminiferal biostratigraphy proceeded in three phases. First, those outcrops from previously published works on Paleocene foraminifera were selected for sampling. These outcrops provide the basic biostratigraphic framework for this study as well as an important historical link to the classic taxonomic work of Cushman (1951) in the study area. Second, important lithostratigraphic sections such as continuous outcrops and lithostratotypes were selected. Finally, small but potentially important exposures were located by field reconnaissance and sampled. In addition to samples collected in this manner, faunal slides from the Rainwater Collection were made available by W. A. Berggren of Woods Hole Oceanographic Institution. The Rainwater samples include classic localities in the Paleocene of Georgia and Alabama which are no longer accessible due to changes in river levels by hydroelectric projects in the region.

Field work for this study was conducted during the summer of 1932. Follow-up field studies were



TEXT-FIGURE 1. Map of the study area showing sample localities. The labels refer to localities in Appendix A.

conducted during 1984, 1985, and 1986. Where sections permitted, sampling was conducted at 1 meter intervals. Sample localities are shown in Text-Figure 1.

All samples collected were taken from at least 20 cm into the outcrop. This was in response to the observation that many outcrops studied by earlier workers did not produce foraminifera even though the sediments had the characteristics of open marine conditions. The theory is that this phenomenon is related to intense subtropical weathering of the sediments and not to paleoecological conditions. The sampling procedure employed was an attempt to minimize the effects of weathering on the assemblages. It has proven successful in recovering faunas from outcrops previously reported as unfossiliferous.

Laboratory Methods

After collection in the field, 154 samples were prepared for study in the following manner:

1. Approximately 200g of each sample was dried for 24 hours and then weighed. After this procedure, 100 ml of water were added to each beaker and samples were allowed to disaggregate for 24 hours. A 7% solution of hydrogen peroxide was then added to

enhance the cleaning of individual specimens.

2. The samples were then run through the 63 μ m sieve to separate the clay fraction. Both coarse and fine fractions were retained and dried.

3. After drying each coarse fraction was weighed and dry sieved into two components (250 μ m and 150-150 μ m). The 150-250 μ m fractions for each sample were split into equal parts. One part was examined for foraminifera, the other retained. The first 150-300 benthonic foraminifera tests were picked from each split and mounted on slides. All planktonic foraminifera encountered during this process were also mounted. The number of individuals collected is based on the work of Bremer, Briskin, and Berggren (1980) who studied the benthonic foraminiferal assemblages of the Pliocene-Pleistocene boundary stratotype at LeCastella, Italy and on the work of Wood, Miller, and Lohman (1985) who studied the benthonic foraminifera of the Eocene and Oligocene of Barbados.

4. All foraminifera were identified to species using the taxonomic scheme of Cushman (1951) with modifications of Kellough (1959) and Berggren and Aubert (1975). A species census was then recorded for each sample.

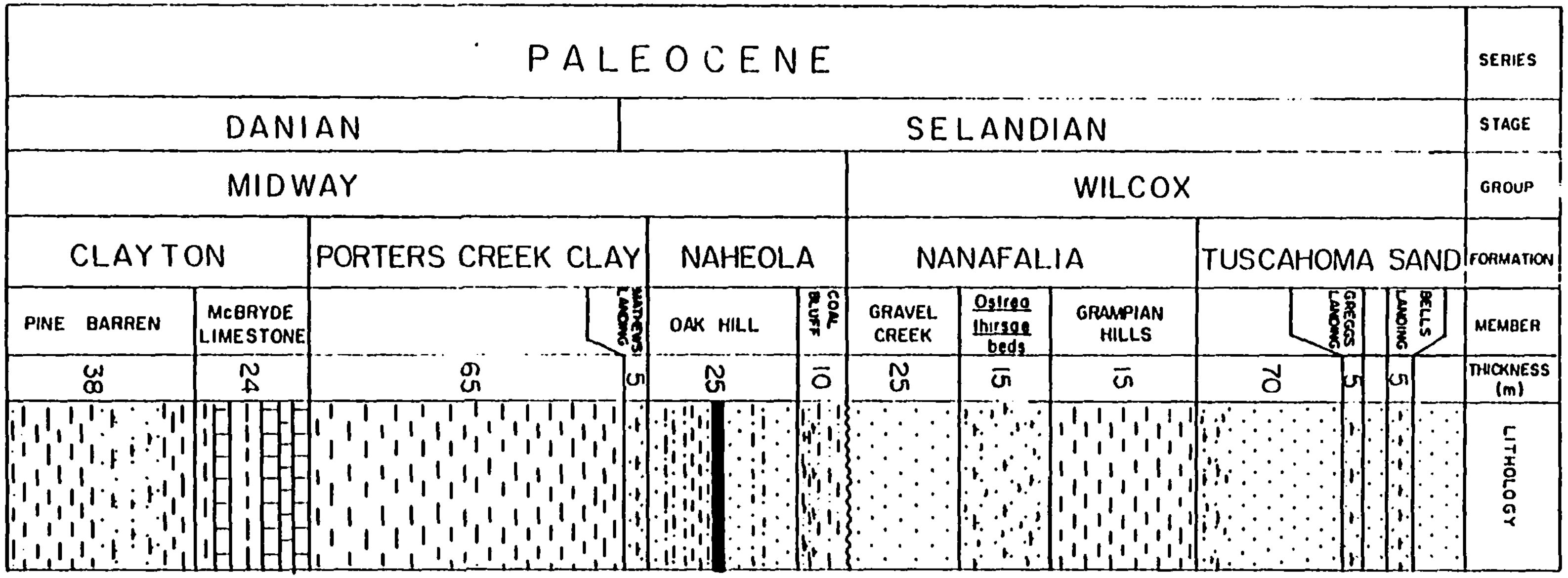
STRATIGRAPHY

Lithostratigraphy

The lithostratigraphic nomenclature and general lithologic characteristics of the Paleocene of the eastern Gulf Coastal Plain are shwon in Text-Figure 2. In general, the Paleocene sediments are all marine in nature. Exceptions to this are the Oak Hill Member of the Naheola Formation, the Gravel Creek Member of the Nanafalia Formation, the Baker Hill Formation, and the majority of the units in the Tuscahoma Sand.

Two major unconformities are present in the Paleocene section of the eastern Gulf Coast. Both are quite apparent from biostratigraphic studies and vary in duration from one region of the study area to another.

The first significant hiatus is present at the Cretaceous Paleocene boundary. This unconformity has been evaluated by numerous biostratigraphic investigations. Studies based on calcareous nannofossils by Worsley (1974), Thierstein (1981), and Hazel, Edwards, and Bybell (1984) and studies of planktonic foraminifera by Olsson (1970) and Mancini, Smith, and Russell (1983) have demonstrated that a hiatus of approximately 3.5 m.y. is present between the


PALEOCENE
SERIES
DANIAN
SELANDIAN
STAGE
MIDWAY
WILCOX
GROUP
CLAYTON
PORTERS CREEK CLAY
NAHEOLA
NANAFALIA
TUSCAHOMA SAND
FORMATION
PINE BARREN
McBRYDE LIMESTONE
MATHEWS LANDING
OAK HILL
COAL BLUFF
GRAVEL CREEK
Ostrea thirsae beds
GRAMPIAN HILLS
GREGGS LANDING
LANDING
BELLS
MEMBER
38
24
65
5
25
10
25
15
15
70
5
5
THICKNESS (m)
LITHOLOGY

Cretaceous and Paleocene in western Alabama and eastern Mississippi. Most of this interval of time is within the Cretaceous Period. Only the short interval of the Paleocene represented by the Eoglobigerina eugubina Zone is missing. In eastern Alabama and western Georgia, the amount of Paleocene section missing may be as great as that interval represented by the Eoglobigerina eugubina and Subbotina pseudobulloides Zones. The precise extent of the unconformity is unknown due to the lack of planktonic foraminifera. The presence of calcareous nannofossils of zone NP3 (Bybell, 1980) indicates a partial equivalence with the Subbotina pseudobulloides Zone.

Although the marine record in the study area is incomplete due to transgressive-regressive cycles, much of the time of non-marine conditions is represented by sediments (Examples: Baker Hill Formation; Oak Hill Member of the Naheola Formation). The major hiatus in the Paleocene section of western Alabama other than the basal boundary unconformity occurs between the Naheola and Nanafalia Formations. In western Alabama, a hiatus equivalent to the interval of time represented by calcareous nannofossil zone NP6 is present (Mancini, 1981, Gibson et al, 1982). This represents approximately 1 m.y. (Berggren et al, 1985). In eastern Alabama and western Georgia, a more pronounced hiatus in the Paleocene section is apparent. As in western Alabama, the stratigraphic record contains non-marine deposits through much of the intervals where biostratigraphic information is lacking. The major hiatus in eastern Alabama and western Georgia occurs between the base of the Nanafalia - Baker Hill Formations and the top of the Clayton Formation. Equivalents of the Porters Creek Clay and Naheola Formations are lacking in eastern Alabama. This hiatus is approximately equivalent to the Morozovella uncinata, Morozovella angulata, and Planorotalites pusilla pusilla planktonic foraminiferal zones and calcareous nannofossil zones NP4, NP5, and NP6. This represents approximately 3.4 m.y. One exception to this hiatus is a stratigraphic outlier, assigned by Gibson et al. (1980) to the Porters Creek Clay. The outlier is in Barbour County, Alabama, very near the Clayton Formation lithostratotype and contains planktonic foraminifera assignable to the Morozovella uncinata Zone and calcareous nannofossils of Zone NP4.

The Eocene-Paleocene contact in Alabama and western Georgia occurs between the Tuscahoma Formation and the Bashi Marl. Physically, this is a conformable contact where studied. The Bashi contains planktonic foraminifera of the Morzovella edgari Zone (Gibson, 1980, Mancini; 1982) but the underlying Tuscahoma is non-marine in origin. The uppermost marine beds in the Tuscahoma, the Bells Landing Marl Member do contain planktonic foraminifera of the *Morozovella velascoensis* Zone.

Planktonic Foraminiferal Biostratigraphy

The biostratigraphy of the Paleocene section in Alabama, Georgia, and Mississippi has been well studied over the last 25 years and great advances have been made. Correlation of the Paleocene stratigraphic section in the study area with the global chronostratigraphic scale has been facilitated using samples containing planktonic foraminifera.

In Alabama, sediments containing planktonic foraminifera of the *Eoglobigerina eugubina* Zone have not been identified by previous workers (Mancini, Smith, and Russell, 1983; Gibson *et al*. 1982; Hazel, Edwards, and Bybell, 1984; Worsley, 1974). Smit (1982) did report the equivalent of the *Eoglobigerina eugubina* Zone in samples of the Pine Barren Member of the Clayton Formation from Miller's Ferry, Wilcox County, Alabama. This assignment was based on the work of Olsson (1970) who recognized a thin foraminiferal grainstone at the base of the Paleocene section containing abundant fragments of *Guembelitria cretacea*. Smit (1982) associates abundances of *Guembelitria* *cretacea* only with the *Eoglobigerina eugubina* Zone and thus suggests that the basal portion of the Miller's Ferry Section is equivalent to the *Eoglobigerina eugubina* Zone.

Because of outcrop weathering the basal foraminiferal grainstone was not located at Miller's Ferry nor was it found at the Bragg's Section in Lowndes County, Alabama. The Cretaceous-Paleogene contact exposed near Scooba, Kemper County, Mississippi, does have a thin, poorly sorted, quartzose calcarenite in the section. It is quite apparent that this is not the same bed seen at Braggs as the bed underlying the calcarenite at Scooba marks the contact. It contains large clasts of the underlying Cretaceous Demopolis Chalk and a mixed Cretaceous-Paleocene benthonic foraminiferal fauna. Planktonic foraminifera obtained from this bed contain *Subbotina pseudobulloides* and by the definition of Stainforth *et al*. (1975) belongs to the *Subbotina pseudobulloides* Zone.

It is important to note that a small, triserial planktonic species was identified in the lowermost bed of the Paleocene at Scooba. It is abundant in the fine fraction of the sample and is assignable to *Guembelitria cretacea* after Olsson (1970). Based on this information, it is apparent that abundant specimens of *Guembelitria cretacea* need not indicate assignment to the *Eoglobigerina eugubina* Zone and that the assignment of the base of the Miller's Ferry section to this Zone by Smit (1982) is premature.

The oldest Paleocene sediments in the study area contain planktonic foraminifera of the *Subbotina pseudobulloides* Zone (P1b). This zone is present in the Pine Barren Member of the Clayton Formation in western Alabama and has been recognized in the Chalybeate Limestone of eastern Mississippi and in a subsurface section in western Georgia.

Sediments containing fossils of the *Subbotina trinidadensis* Zone have been recognized by Olsson (1970), Mancini (1981), and Kidd (1971). The McBryde Limestone Member of the Clayton Formation is placed within this zone but Olsson found sections of the Pine Barren Member in Dallas County, Alabama which should be placed within this zone. Olsson also found beds of the Porters Creek Clay in Marengo County which contained fossils characteristic of the *Subbotina trinidadensis* Zone. Kidd (1971) confirmed this age for the lower part of the Porters Creek Clay in his study of the Porters Creek in Butler County, Alabama. The pattern produced through these studies and confirmed in this study is one of decreasing age of lithofacies from west to east and at least a partial equivalency in age between the Clayton Formation and Porters Creek Clay.

The *Morozovella uncinata* Zone is recognized in western Alabama and eastern Mississippi within the Porters Creek Clay. Although, as discussed above, the lower part of the Porters Creek Clay may belong to the *Subbotina trinidadensis* Zone, the bulk of the Porters Creek Clay is placed within the *Morozovella uncinata* Zone. In eastern Alabama and western Georgia, planktonic foraminifera characteristic of the *Morozovella uncinata* Zone have not been identified. The Clayton Formation at its stratotype section in Barbour County, Alabama has been assigned by indirect means (the age of the overlying Porters Creek Outlier: *Morozovella angulata* Zone) to the *Morozovella uncinata* Zone by Gibson (1980) and Gibson *et al*. (1982). Although foraminifera were obtained from the Clayton lithostratotype during this investigation, no planktonic foraminifera were present in the assemblages.

The *Morozovella angulata* Zone is represented in western Alabama by the upper unit of the Porters Creek Clay, the Mathews Landing Marl Member. To the east, planktonic foraminifera collected by Gibson (1980) support an assignment of the Porters Creek outlier near Clayton, Barbour County, Alabama to the *Morozovella angulata* Zone.

The *Planorotalites pusilla pusilla* Zone is recognized only in western Alabama within the Coal Bluff Marl Member of the Naheola Formation. This assignment was first made by Berggren (1965a, 1965b). Mancini (1981) assigned the Coal Bluff Marl to the *Morozovella angulata* Zone but Gibson *et al*. (1982) and planktonic foraminifera collected in this study support the original conclusions of Berggren (1965a; 1965b). The lower member of the Naheola Formation, the Oak Hill has not yielded calcareous marine fossils.

The *Planorotalites pseudomenardii* Zone is recognized in western Alabama within the sediments of the "*Ostrea thirsae* beds" of the Nanafalia Formation. Also present within this zone are the lower marl beds of the Tuscahoma Sand (Oliver, 1979; Oliver and Mancini, 1981). Although it contains no calcareous fossils, the intervening Grampian Hills Member of the Nanafalia Formation lies within the interval of the *Planorotalites pseudomenardii* Zone. Although present in eastern Alabama and western Georgia, the "*Ostrea thirsae* beds" and the basal Tuscahoma marls do not contain planktonic foraminifera.

Sediments containing planktonic foraminifera characteristic of the *Morozovella velascoensis* Zone occur only in western Alabama and include the Bells Landing and Greggs Landing Marl Members of the

Tuscahoma Sand (Oliver, 1979; Mancini and Oliver, 1981).

The upper boundary of the Paleocene in the eastern Gulf Coast is difficult to place as the upper portion of the Tuscahoma Sand is non-marine in origin. The overlying Bashi Formation contains a planktonic assemblage characteristic of the Morozovella edgari Zone and is Eocene in age. For purposes of this investigation, the base of the Eocene is placed at the first occurrence of planktonic foraminifera of the Morozovella edgari Zone; i.e. the base of the Bashi Formation. This allows the same biostratigraphic datum to be applied throughout the study area.

PALEONTOLOGY OF BENTHIC FORAMINIFERA

Taxonomy

Detailed examination of the Paleocene benthonic foraminiferal assemblages obtained in this study has documented the occurrence of 166 species of benthonic foraminifera from the eastern Gulf Coastal Plain. The species are listed in Appendix B with the identification reference used. This compilation differs from other foraminiferal faunal lists from the Paleocene of the Gulf Coast in its comprehensive nature. No taxonomic problems were apparent during the course of this study, thus detailed systematic descriptions of the 166 species are not included.

Despite the high number of species encountered, (166 species) benthonic foraminiferal diversity in individual samples is lower. In some cases, certain species represent no more than 2% of the population in a sample. Others are locally abundant but occur only in a few isolated samples.

In general, the faunal assemblages obtained fit the description of the "Midway Fauna" of Berggren and Aubert (1975). Exceptions were noted in the six samples from the Salt Mountain Limestone (Locality SM, Text-Figure 1) and one sample from the upper part of the "*Ostrea thirsae* beds" at Gravel Creek (Locality GC, Text-Figure 1). The Salt Mountain samples contain numerous specimens of the large benthonic foraminifera Discocyclina blanpiedi and Pseudophragmina cookei. These species do not occur outside of the Salt Mountain Limestone and are considered to represent an influx of tropical faunal elements. The sample from the Gravel Creek locality is unique among all samples studied in that species of Bulimina, Siphogenerinoides, Loxostomum, Eouvigerina, and Bolivina are quantitatively dominant.

The geographic and stratigraphic occurrence of the 166 species was noted. Most of the species can and do occur throughout the Paleocene section. The Salt Mountain faunal assemblages and the assemblage from the Gravel Creek sample are restricted geographically but the species are not restricted stratigraphically. Several species are restricted stratigraphically and have a wide geographic distribution in the eastern Gulf Coast. These species provide a basis for a biozonation scheme.

Benthic Foraminiferal Biostratigraphy

The main objective in deriving this benthonic foraminiferal zonation was to calibrate it to existing planktonic zones. Such a calibration provides those sections which contain no planktonic foraminifera a means of correlation to the global geochronologic scale. In this study, particular attention was paid to the relationship between benthonic foraminiferal species occurrence and the established planktonic foraminiferal zonation. Four biozones have been identified in the study area, each defined by characteristic species and significant datums. The guidelines established by the North American Commission on Stratigraphic nomenclature (1983) were followed in erecting zones. Only the Acme Zone (based on species abundance) was considered inappropriate due to the iterative nature of abundance assemblage occurrences. The main chronostratigraphic control rests with those samples containing both diagnostic planktonic foraminifera and diverse benthonic assemblages.

The four biozones are defined and described herein from oldest to youngest.

Biozones

Eponides elevatus Taxon Range Zone

Definition: The total stratigraphic range of *Eponides elevatus*.

Age and Correlation: The *Eponides elevatus* Taxon Range Zone is Early Paleocene in age and correlates in Alabama with the *Subbotina pseudobulloides* Zone.

Stratotype: Section of Pine Barren and McBryde Limestone Members of the Clayton Formation between Wolf and Cedar Creeks along Butler County Route 11, Alabama.

Characteristics: The Eponides elevatus Taxon Range Zone is characterized by individuals of Eponides elevatus in association with abundant Anomalinoides midwayensis, lenticulinids, cibicidids, and some milliolids.

Remarks: The assemblages characteristic of the Eponides elevatus Taxon Range Zone occur consistently throughout Alabama in the lower part of the Paleocene section. In general, this zone is also restricted to a lithofacies, the Pine Barren Member of the Clayton Formation although individuals of Eponides elevatus have been collected from the Chalybeate Limestone Member of the Clayton Formation in Mississippi. Foraminifera of this assemblage have also been identified from the lower part of the Clayton lithostratotype section. The upper limit of this zone seems well defined since the last appearance datum of Eponides elevatus in Alabama occurs in an abundantly fossiliferrous marine section.

Beyond the study area, the _Eponides elevatus_ Taxon Range Zone appears to be valid in the Gulf Coast. Reported occurrences of _Eponides elevatus_ in Tennessee (Cushman; 1951, Herrick and Rima; 1968), Arkansas (Cushman; 1951), and Texas (Plummer; 1927, Cushman; 1951, and Kellough; 1959) are restricted to the basal portions of the respective Paleocene sections although precise biostratigraphic correlation is uncertain.

Alabamina midwayana Partial Range Zone

Definition: Interval of the range of _Alabamina midwayana_, from the last appearance of _Eponides elevatus_ to the last appearance of _Alabamina midwayana_.

Age and Correlation: The _Alabamina midwayana_ Partial Range Zone is late Danian and early Selandian in age and correlates in Alabama with the _Subbotina trinidadensis_, the _Morozovella uncinata_, the _Morozovella angulata_ and the _Planorotalites pusilla pusilla_ planktonic foraminifera zones.

Stratotype: Outcrop of Porters Creek Clay along State Highway 10, 3.2 km northwest of Oak Hill, Wilcox County, Alabama.

Characteristics: The _Alabamina midwayana_ Partial Range Zone is typified by diverse benthonic assemblages of which Alabamina midwayana is a conspicuous part. Associated benthonic foraminifera include anomalinids, polymorphinids, nodosarieds, and lenticulinids. Additionally, Pulsiphonina prima is also associated with assemblages characterizing this zone.

Remarks: The Alabamina midwayana Partial Range Zone is a very well defined zone in Alabama and throughout the Gulf Coast. It is distinguished from the earlier Eponides elevatus Taxon Range Zone by the absence of E. elevatus and the high overall diversity of the benthonic fauna. It differs from the later Discorbis washburni Taxon Range Zone by the absence of D. washburni and the absence of Alabamina westraliensis. This zone may have widespread regional significance as Alabamina midwayana is a common component of the Midway Fauna of Berggren and Aubert (1975) which has been identified worldwide.

Discorbis washburni Taxon Range Zone

Definition: Interval consisting of the total stratigraphic range of Discorbis washburni.

Age and Correlation: The Discorbis washburni Taxon Range Zone is Late Selandian (Thanetian) in age and correlates with all but the uppermost part of the Planorotalites pseudomenardii planktonic foraminiferal zone.

Stratotype: Outcrop of the "Ostrea thirsae beds" of the Nanafalia Formation along the Camden-Fatama Road (Wilcox County Route 39) 6.5 km south of Camden, Wilcox County, Alabama.

Characteristics: The Discorbis washburni Taxon Range Zone is characterized by the presence of Discorbis washburni and by an abundance of Anomalinoides umbonifera.

Remarks: In Alabama, the Discorbis washburni Taxon Range Zone, is the best defined of all the benthonic foraminiferal zones erected herein. The zone is restricted to the "Ostrea thirsae beds" thus making this benthonic foraminifera zone one of the easiest to recognize in Alabama.

The Discorbis washburni Taxon Range Zone however, may provide an example as to the limits of benthonic foraminiferal zones. The Salt Mountain Limestone is the same biostratigraphic age as the "Ostrea thirsae beds" of the Nanafalia Formation. Yet the benthonic assemblages are different in all samples of the Salt Mountain examined in this study.

The *Discorbis washburni* Taxon Range Zone is easily recognized in western Georgia and western Alabama (a distance of over 200 km). Yet along a north-south traverse of only 75 km, the *Discorbis washburni* Zone disappears southward in the Salt Mountain Limestone. This transect appears to cross a transition from the Midway Fauna of Berggren and Aubert (1975) to the Tethyan Carbonate Fauna described by Berggren (1974b). A separate zone for the Salt Mountain fauna was not established as only one out-crop of this unit is known and subsurface stratigraphic relationships are unclear. Additionally, as planktonic foraminifera are present in the Salt Mountain Limestone, there seems to be no need for a benthonic zonation.

Alabamina westraliensis Interval Zone

Definition: Interval of the range of *Alabamina westraliensis* from the last occurrence of *Discorbis washburni* to the last occurrence of *Alabamina westraliensis*.

Age and Correlation: The *Alabamina westraliensis* Interval Zone is Late Selandian in age and correlates with the upper part of the *Planorotalites pseudomenardii* Zone and all of the Morozovella velascoensis Zone in Alabama.

Stratotype: Outcrops of the Bells Landing Marl Member of the Tuscahoma Sand at the new Lower Peachtree Landing boat ramp along the Alabama River, Wilcox County, Alabama.

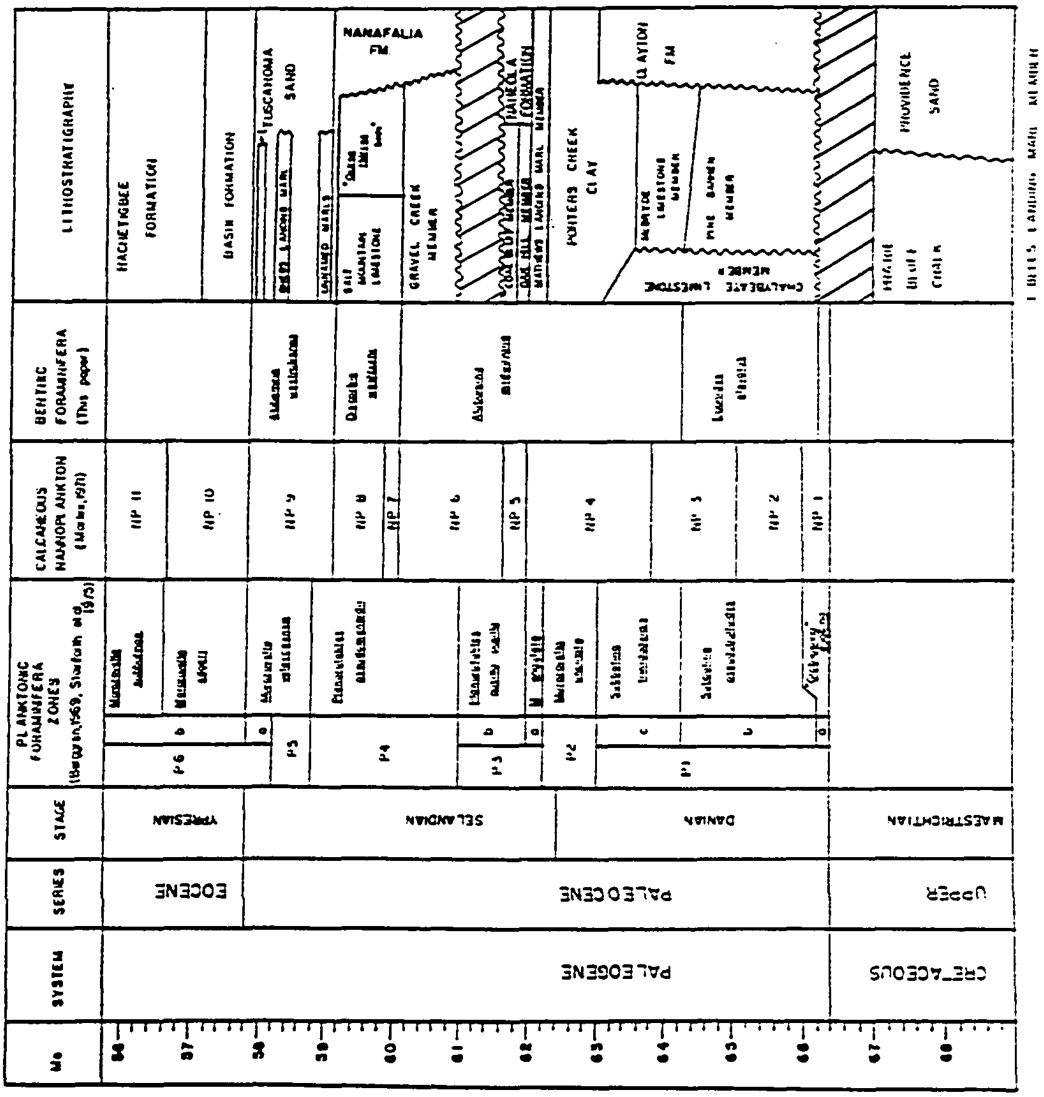
Characteristics: The Alabamina westraliensis Interval Zone is typified by the presence of Alabamina westraliensis in conjunction with associated anomalinids, lenticulinids, and cibicidids. The lack of Discorbis washburni in association with this assemblage is conspicuous and in all samples studied, indicates placement within this zone.

Remarks: The Alabamina westraliensis Interval Zone in Alabama occurs within the marl beds of the Tuscahoma Sand in Alabama. As the upper portion of the Tuscahoma is non-marine, the upper limit of this zone has not been studied. At present, the Alabamina westraliensis Interval Zone is not considered to extend into the Eocene. Samples of the Bashi Formation from western Alabama and eastern Georgia do not contain individuals assignable to Alabamina westraliensis.

This zone has been of use in this study in the separation of Nanafalia sediments from Tuscahoma sediments in subsurface sections.

Both units have similar lithologies and planktonic foraminifera are not always present. The *Alabamina westraliensis* Zone has been recognized in the subsurface sections.

All biostratigraphic and lithostratigraphic relationships are illustrated in Text-Figure 3.



TEXT-FIGURE 3. Geochronology of the Paleocene of the eastern Gulf Coastal Plain

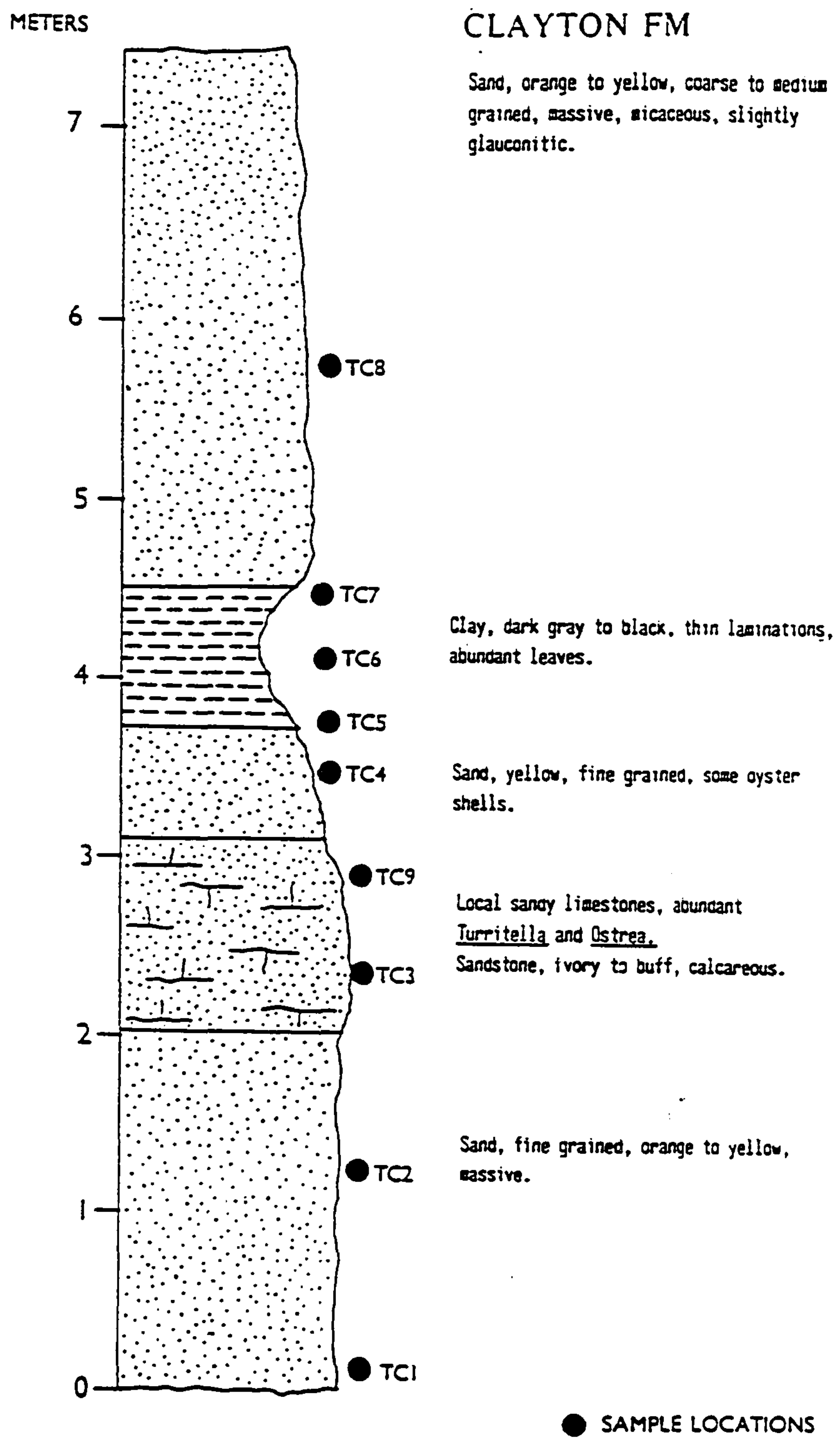
DISCUSSION

The proposed benthonic foraminiferal biozonation is designed to be used in conjunction with the existing planktonic foraminiferal biozonation. It is especially useful when employed as an alternative in those studied sections which do not contain microfossils of planktonic foraminifera or calcareous nannoplankton.

As a point of illustration of this, two measured sections from eastern Alabama will be discussed. The selected sections are the Clayton Formation lithostratotype section (Locality TC, Text-Figure 1), and the Franklin's Landing section of the Nanafalia Formation.

The Clayton Formation lithostratotype is located on the outskirts of the town of Clayton, Barbour County, Alabama. The section consists of calcareous sands with a thin unit of black clay referred to informally as the "Leaf Clay." The thickness measured in this study was 7.1 meters. Sampling was conducted at 1 meter intervals and where sharp lithologic changes were in evidence. Text-Figure 4 shows the measured section of the Clayton Formation lithostratotype and the location of nine samples.

CLAYTON LITHOSTRATOTYPE
Clayton, Barbour County, Alabama



TEXT-FIGURE 4. Measured section of the Clayton Formation Lithostratotype

The Clayton Formation is an important stratigraphic unit in the Gulf Coastal Plain, recognizable from western Georgia to southern Illinois. Yet, the precise age of the Clayton Formation at its type locality has not been determined. This is due not only to an absence of planktonic foraminifera and calcareous nannofossils but according to Gibson (1980), an absence of benthonic foraminifera as well.

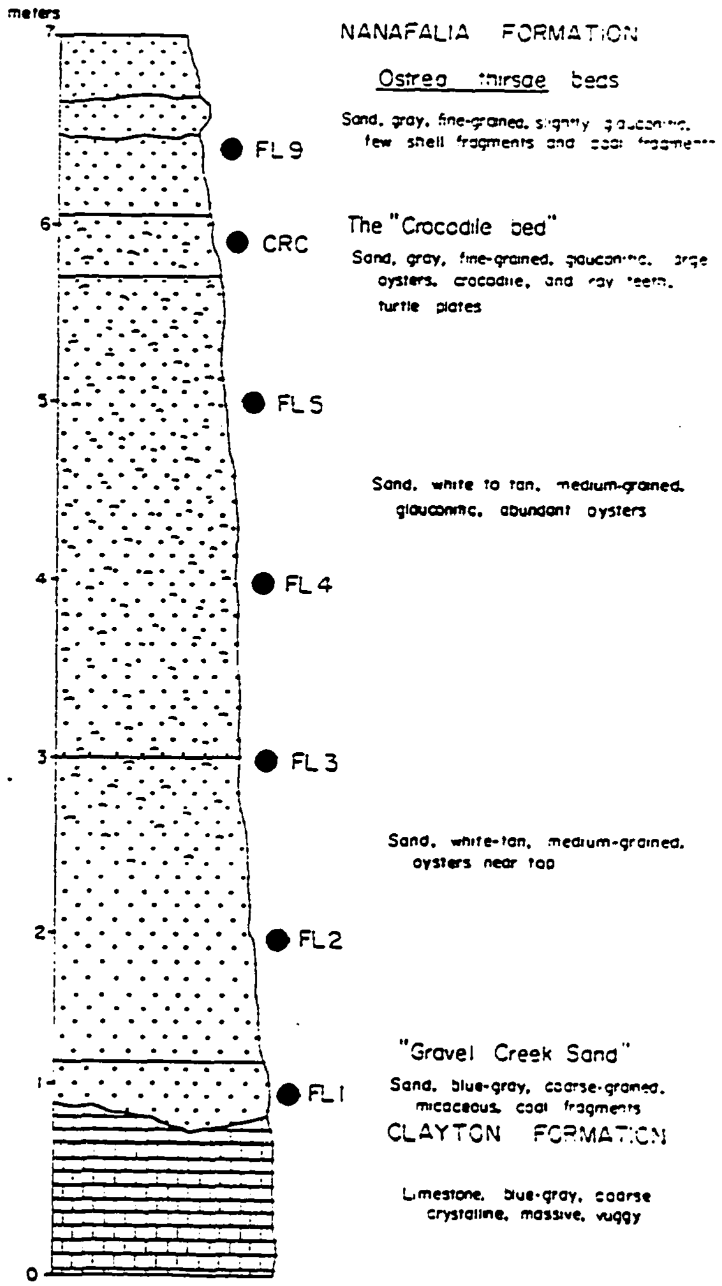
Five of the nine samples collected during this investigation did produce benthonic foraminifera. The samples containing benthonic foraminiferal assemblages were TC1, TC2, TC3, TC4, and TC9 (Text-Figure 4). All were from below the leaf clay and all contained Eponides elevatus. Using the benthonic foraminiferal biozonation, the Clayton Formation lithostratotype is equivalent in age to the Subbotina pseudobulloides Zone. This age is consistent with the lower part of the Clayton Formation from western Georgia to southern Illinois.

A second example is from the Nanafalia Formation at Franklin's Landing on the Chattahoochee River, Henry County, Alabama. From this section, abundant benthonic foraminifera have been collected but Gibson (1980) reported only non-diagnostic planktonic. No calcareous nannofossils have been described from this section. At this locality, the name "*Ostrea thirsae* beds" is used to designate the fossiliferous part of the Nanafalia Formation. This name was originally applied by Smith (1886) to beds in western Alabama and an important stratigraphic question is whether the "*Ostrea thirsae* beds" in eastern Alabama and western Georgia are the same age as similar beds in western Alabama.

All of the benthonic foraminiferal assemblages collected from the Nanafalia at Franklin's Landing are characteristic of the *Discorbis washburni* Zone. This correlates them directly with the "*Ostrea thirsae* beds" of western Alabama. The Franklin's Landing section is illustrated in Text-Figure 5.

The above example can be used to demonstrate a further use of the benthonic foraminiferal biozonation. Bybell (1980) collected calcareous nannofossils from the "*Ostrea thirsae* beds" of Clay County in western Georgia and from Choctaw County in western Alabama. Both assemblages indicated assignments to calcareous nannofossil zones NP7 and NP8 of Martini (1971). Without calcareous nannofossils, the most precise biostratigraphic assignment previously possible for the "*Ostrea thirsae* beds" was placement within the *Planorotalites pseudomenardii* planktonic foraminiferal biozone. This zone represents a duration of 2.1 Ma.

MEASURED SECTION
AT
FRANKLIN'S LANDING
HENRY COUNTY, ALABAMA



TEXT-FIGURE 5. Measured section at Franklin's Landing, Alabama

(Berggren *et al.*, 1985). All of the "*Ostrea thirsae* beds" sections which have produced calcareous nannofossils, however, are assignable to the *Discorbis washburni* Zone. In this case, the *Discorbis washburni* benthonic foraminiferal biozone is useful in refining the planktonic biozonation.

In addition to these two characteristic examples, there are many other potential applications using this zonation. Despite the successful correlations made in the eastern Gulf Coastal Plain, a cautionary approach must prevail when using benthonic foraminiferal biostratigraphy in general.

First, benthonic foraminiferal biostratigraphy is an effective tool in local correlation. It is especially important in the case of surface and subsurface sections which have undergone diagenetic changes. These changes may effect the faunal content of the samples and either destroy or greatly alter the planktonic microfossils.

Second, the benthonic foraminiferal biozonation should not be used alone when diagnostic planktonic microfossils are present. Although further work may refine the benthonic foraminiferal biozonation and improve its geochronologic control, both planktonic foraminifera and calcareous nannoplankton are better correlation tools due to the global recognition of biozones based on these groups.

Finally, it is anticipated that the benthonic foraminiferal biozonation will be extended beyond the eastern Gulf Coastal Plain into the Mississippi Embayment and the western Gulf Coastal plain.

CONCLUSIONS

1. The distribution of benthonic foraminifera in the Paleocene section of the eastern Gulf Coastal Plain is conducive to the development of a biostratigraphic zonation.

2. By employing assemblages containing both planktonic and benthonic foraminifera, the benthonic foraminiferal zonation can be correlated to the global geochronologic scale of Berggren et al. 1985).

3. The benthonic foraminiferal zonation provides time control on samples which contain paleoecologically significant assemblages but which do not contain planktonic microfossils.

4. The benthonic foraminiferal zonation can be applied throughout the eastern Gulf Coastal Plain and its utilization throughout the entire Gulf Coast region is anticipated.

PART II

PALEOCENE BENTHONIC FORAMINIFERAL PALEOECOLOGY AND PALEOCEANOGRAPHY OF THE EASTERN GULF COASTAL PLAIN

INTRODUCTION

The good preservation and abundance of microfossils from Paleocene rocks in the Gulf Coast region of the United States, particularly foraminifera, stimulated interest in local stratigraphic and taxonomic studies in the early twentieth century. Although there were many studies, none approached it with a broad regional point of view and thus many questions were left unresolved.

The first regional study of Paleocene foraminifera from Alabama was undertaken by Cushman (1951). His paper attempted to document stratigraphic occurrences of species and relate these occurrences to geographic position not only in Alabama but in the entire Gulf Coast. However, it was not representative because only 10 samples were examined and it was stratigraphically biased as only 3 of the 15 major lithofacies were sampled.

In this study, the approach is to look at the temporal and spatial distribution of benthonic foraminifera and through the application of quantitative methods attempt to resolve the complex population data into meaningful paleoecologic assemblages. By identifying the assemblages and determining their paleoecologic significance, a paleoceanographic history can be developed for the eastern Gulf Coastal Plain.

PALEONTOLOGY

Because benthonic foraminifera live at the bottom of the water column, they are particularly useful indicators of bottom water conditions. Streeter (1973) successfully demonstrated that the nature of the water mass rather than bathymetry was the most important controlling factor in the distribution of benthonic foraminifera assemblages in the North Atlantic. This was verified by Lohmann (1978) in his work on abyssal benthonic foraminifera from the South Atlantic.

The work of Berggren (1974a) on the Paleocene-Eocene benthonic foraminifera of Rockall Bank was significant in that it associated shallow water benthonic foraminiferal assemblages with the paleoecological parameters associated with increasing depth. He recognized three distinct assemblages representing three depositional environments -- the inner continental shelf, the outer continental shelf, and the upper continental slope. Subsequently, in a comprehensive study of Paleocene benthonic foraminifera, Berggren and Aubert (1975) recognized three broad, worldwide faunal assemblages. They are: the Tethyan, the Midway, and the Velasco. These were named after the typical areas where the specific assemblages were originally identified.

The Tethyan Fauna is characterized by the "larger foraminifera" such as Nummulites, Operculina, Miscellanea, Lockhartia, Alveolina, and Discocyclina. This fauna is considered to represent paleoecologic conditions of isolated carbonate platforms and shelves and water depths of less than 50 m.

The Midway Fauna, which was the main point of interest in their study (Berggren and Aubert, 1975), was described from the Gulf and Atlantic Coastal Plains of the United States. The Midway Fauna is characterized by species of genera such as Lenticulina, Cibicidoides, Anomalinoides, Nodosaria, Dentalinia, Vaginulopsis, and Alabamina. They interpreted the Midway Fauna as being associated with water depths of less than 200 m.

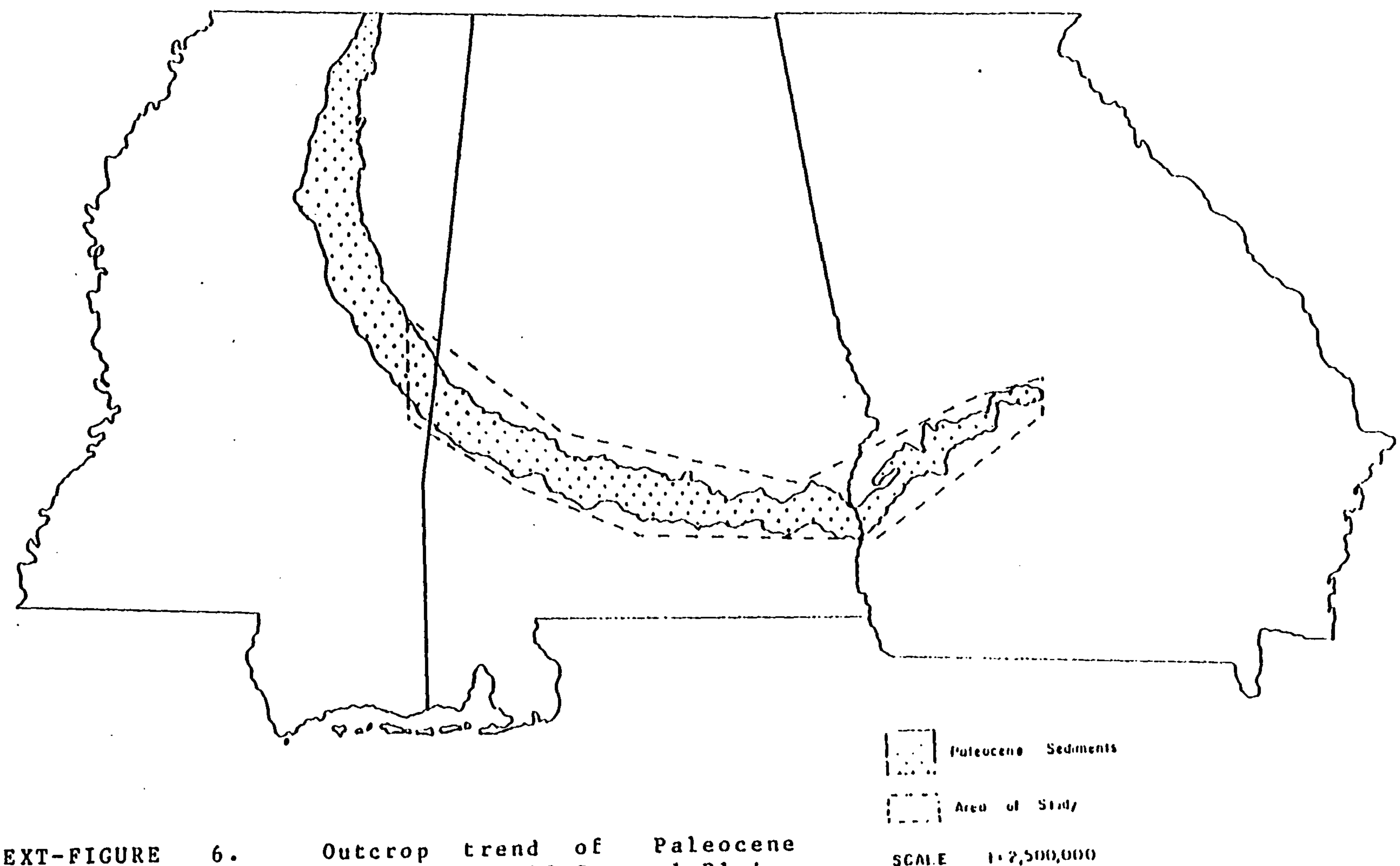
The Velasco Fauna is known primarily from the Velasco Formation of Mexico and is characterized by species such as Galvelinella rubignosa, G. velascoensis, G. beccariiformis, Nuttallides truempyi, and Nuttillinella florealis and a wide variety of agglutinated foraminifera. This assemblage represents deposition greater than 200 m and is associated with the continental slope - continental rise and abyssal plain environments.

Most of the foraminiferal assemblages found in the eastern Gulf Coast fall under the general classification of "Midway Fauna." However, in this study the observations are extended toward subtle paleoecologic changes indicative of variation in the environment.

AREA OF STUDY

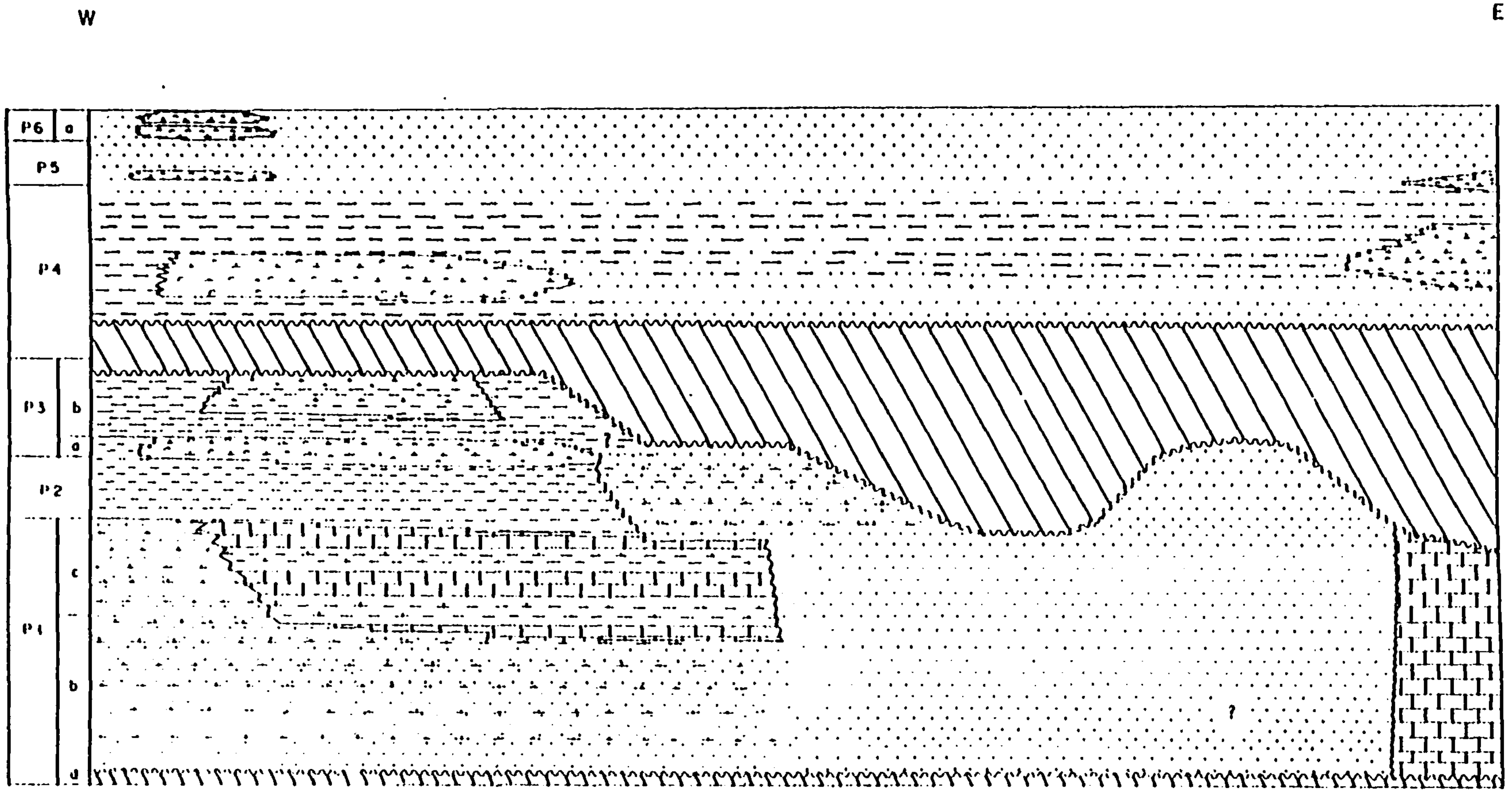
The area of interest in this study is the Paleocene section of the Eastern Gulf Coastal Plain. Paleocene sediments crop out in the study area along a trend from Americus, Georgia through Alabama to Meridian, Mississippi (Text-Figure 6). The total length of the outcrop belt in the study area is 450 km and is 50 km in width. The Paleocene sediments dip gently toward the Gulf of Mexico in this region. A few exceptions to this gentle regional dip do occur. Local solution in the Lower Paleocene limestone has resulted in collapse structures creating dips as great as 35° in overlying units in some areas. Another important exception to the regional dip occurs at Salt Mountain, Clarke County, Alabama. This locality is approximately 50 km south of the outcrop trend of the Paleocene described above. At this locality, the Jackson Fault has brought Paleocene rocks to the surface on the upthrown block. These rocks are assigned to the Salt Mountain Limestone and provide some insight on the downdip facies of the Paleocene rocks in the eastern Gulf Coastal Plain. Dips in this area were measured as high as 70°.

The lithostratigraphic nomenclature and general lithologies for each Paleocene unit in the eastern Gulf

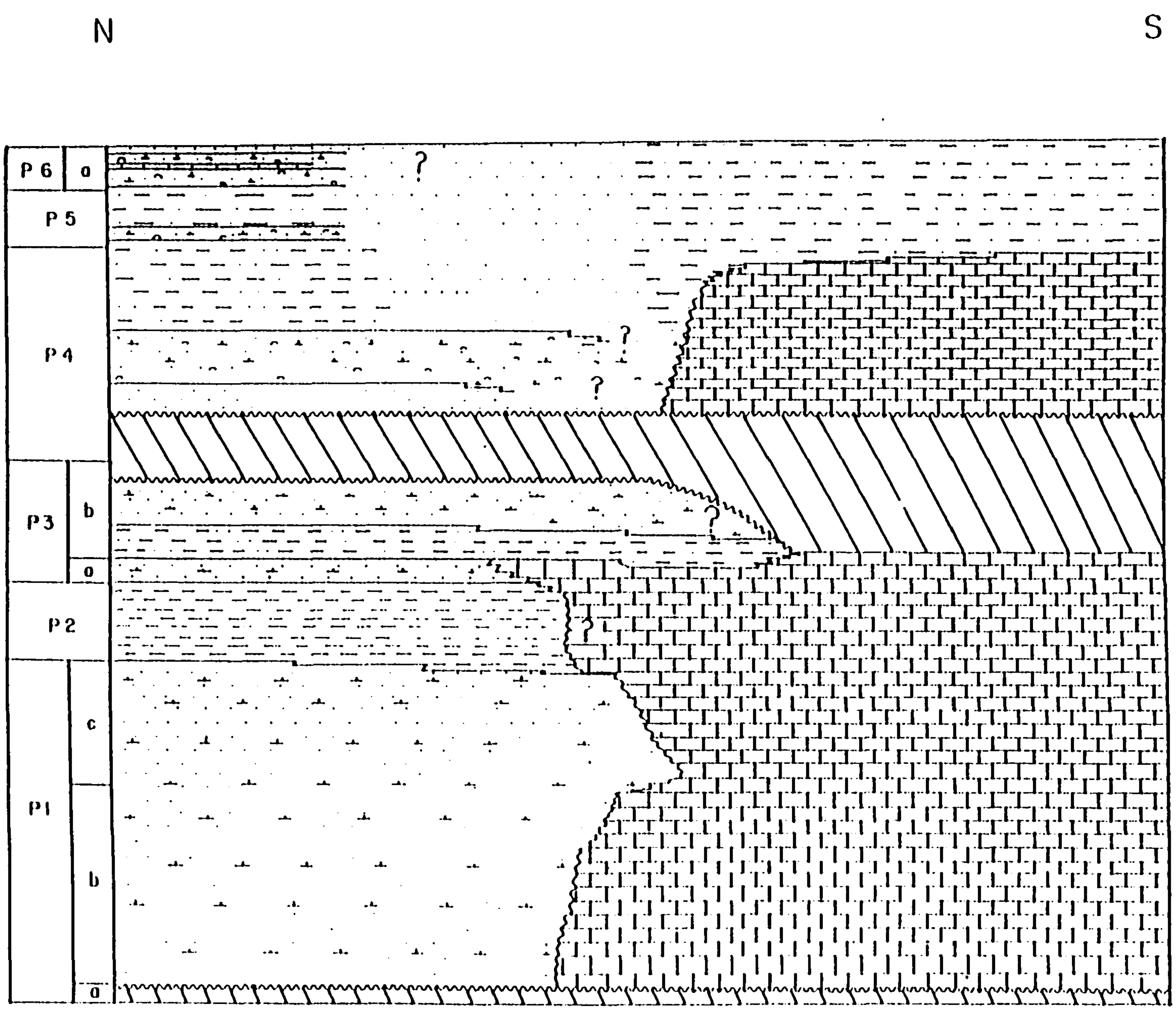


TEXT-FIGURE 6. Outcrop trend of Paleocene sediments in the eastern Gulf Coastal Plain

Coastal Plain is shown in Text-Figure 2. The lithofacies are quite variable within the study area. The lithofacies relationships of the Paleocene Series of the eastern Gulf Coastal Plain are shown in Text-Figure 7 and Text-Figure 8.



TEXT-FIGURE 7. East-West lithofacies relationships for the paleocene of the eastern Gulf Coastal Plain



TEXT-FIGURE 8. North-South lithofacies relationships for the Paleocene of the eastern Gulf Coastal Plain

METHODS OF STUDY

Methods of Preparation

The samples studied are those previously described in Part I. The methods of preparation are the same which are employed by Briskin, Fluegeman, and Berggren (in press).

Census data obtained from the studied samples was simplified using Q-mode principal components analysis. The computer routine FACTOR of the Statistical Package for the Social Sciences (SPSS) was employed to perform the calculations. The use of FACTOR as opposed to other programs has the advantages of being widely available to scientists on almost all computer hardware and of allowing the data file to be constructed and permanantly stored in a standard format, thus allowing future study and application of various statistical methods. It also permits an unlimited data matrix size and comparison to other data sets.

The use of principal components analysis provides two primary advantages in this study. First, the faunal census data can be simplified while most of the information on relative species abundances is preserved. Second, comparisons can be made to other faunal assemblages, especially the Midway Fauna of Berggren and Aubert (1975). Previous work employing principal components analysis in paleoecology includes Imbrie and Kipp (1971), Briskin and Berggren (1975), Haq and Lohman (1976), Lohman (1978), Bremer, Briskin, and Berggren (1980) and Wood, Miller, and Lohman (1985).

A detailed description of the mathematical procedures of Principal Components Analysis can be found in Davis (1973).

ANALYSIS OF FAUNA

Of the 253 samples studied, 154 produced some identifiable foraminiferal tests. Of these 154, 101 contained adequate populations for quantitative analysis.

One hundred sixty six benthonic foraminifera species have been identified from the Paleocene section of the eastern Gulf Coast in this study. No new species were identified in conjunction with this study and any taxonomic revisions used followed the conventions of previous investigators.

A detailed examination of the benthonic foraminiferal fauna resulted in the identification of two broad assemblages. Both assemblages occurred in a limited number of samples and as such, cannot be discerned using quantitative methods; and although the species present were not common enough to be dominant factors in population variance, the occurrence of these two assemblages were thought to be ecologically significant and worthy of consideration.

1. *Discocyclina* - *Pseudophragmina* Assemblage

The conspicuous occurrence of large orbitoid foraminifera distinguishes the samples of the Salt Mountain Limestone from others in the Paleocene section of the eastern Gulf Coast. The *Discocyclina-Pseudophragmina* Assemblage is characterized by the large foraminifera *Discocyclina blanpiedi* and *Pseudophragmina cookei* as well as numerous species not found in other samples of the eastern Gulf Coastal Plain such as *Marssonella oxycona* and *Discorbis rukasi*.

The *Discocyclina-Pseudophragmina* Assemblage occurs only in the Salt Mountain Limestone in the study area. The assemblage has been identified in six samples and the composition of this assemblage does vary. Three of the samples are from the lowermost part of the Salt Mountain Limestone and have abundant specimens of *Discocyclina blanpiedi*. *Discocyclina blanpiedi* is quantitatively dominant in two of the three samples. However, other faunal elements are present however, including many forms which characterize the typical Paleocene fauna of the Gulf Coast. In the three additional samples, a change in the population itself is observed. Although *Discocyclina blanpiedi* and *Pseudophragmina cookei* are still present and conspicuous, they are not the dominant faunal element. The dominant faunal elements include *Lenticulina midwayana*, and *Anomalinoides midwayensis*, which are two important faunal elements in the eastern Gulf Coastal Plain Paleocene section.

As most of the 20 m of Salt Mountain Limestone is massive, crystalline limestone, statistically significant populations could only be obtained from the poorly consolidated, chalky limestones at the base of the unit. Thin section studies at 1 m intervals show that the Discocyclina-Pseudophragmina assemblage is present through the lower three meters of the Salt Mountain Limestone. The assemblage cannot be recognized in the coral-ectoproct boundstones which characterize the majority of the Salt Mountain samples. The only foraminifera recognized in the boundstone thin sections appear to be isolated specimens of miliolids.

The Discocyclina-Pseudophragmina assemblage in the study area is characterized not by an entirely unique fauna but by rare faunal elements in association with elements of the typical Paleocene benthonic foraminifera fauna of the Gulf Coast. As there are benthonic foraminifera which are important faunal factors in the Paleocene of the Gulf Coast present in the Salt Mountain Limestone, these samples included in the quantitative analysis. The rare species reflect the influence of changing paleoecological conditions on the typical Paleocene benthonic foraminiferal fauna. Other occurrences of the Discocyclina-Pseudophragmina assemblage have been discovered in this study and by previous workers in the subsurface of Georgia, Florida, and Alabama. Samples examined from a core of the McMurry #1 Southern Kraft well in Baldwin County, Alabama, have produced a faunal assemblage with typical Paleocene faunal elements such as Lenticulina midwayana and Anomalinoides umbonifera but also a number of tests of Discocyclina blanpiedi. Cole and Herrick (1953) also discovered larger foraminifera in association with typical Paleocene benthonics from limestones encountered in six wells from southwestern Georgia.

All the above samples have foraminiferal faunas which are assigned to the Discocyclina-Pseudophragmina assemblage although in all cases, the data indicate that this assemblage is distinctive from the others because of the rare species. If these species are Tethyan, what do they represent? Berggren (1974b) has described a fauna characterized by larger foraminifera from Libya and Mali; later referred to as the Tethyan Carbonate Fauna by Berggren and Aubert (1975); this fauna does appear to be related to the one seen in the study area. The Discocyclina-Pseudophragmina assemblage also bears close resemblance to the foraminiferal fauna described by Vaughan (1945) from the Paleocene Scotland Formation of Barbados.

Although the Discocyclina-Pseudophragmina assemblage cannot be defined by quantitative analysis, it is thought to be an ecologically significant message on the assemblages of the eastern Gulf Coastal Plain; it is herein considered to represent the influence of Caribbean faunas in the Gulf Coastal Plain. The occurrence of this assemblage at Salt Mountain, Clarke County, Alabama is associated with transgressive events well recorded in the local sediments.

2. *Bulimina* Assemblage

A benthonic foraminifera assemblage was obtained from one sample of the "*Ostrea thirsae* beds" of the Nanafalia Formation. This sample is from the Grampian Hills region of Wilcox County, Alabama and was collected directly beneath the contact with the Grampian Hills Member of the Nanafalia Formation. (Sample GH-1; Appendix A).

The assemblage obtained is conspicuous in that *Bulimina ovata* is quantitatively dominant. Nearly as abundant is the species *Siphonogenerinoides eleganta*. This sample also marks a maximum abundance of the species *Eouvigerina excavata*. Together these three species comprise over 40% of the total fauna in this sample. Associated species include *Anomalinoides acutus*, *Anomalinoides umboniferus*, *Discorbis washburni*, *Gyroidinoides octocameratus*, *Pulsiphonina prima*, *Globulina gibba*, and *Cibicidoides alleni*. These species reflect the accepted Nanafalia fauna but the abundance of *Bulimina ovata* and *Siphogenerinoides eleganta* is unique to this particular sample.

The *Bulimina* assemblage is not a typical association of the Midway Fauna of Berggren and Aubert (1975). Although the abundance of *Bulimina ovata* suggests some similarity to the "Velasco Fauna" (Berggren and Aubert; 1975) it lacks many of the faunal elements which characterizes this fauna such as gavelinellids, *Nuttalides truempyi*, and species of *Gaudryina*, *Dorothia*, and *Tritaxia*. Also, the sudden abundance of *Bulimina ovata*, *Siphonogenerinoides eleganta*, and *Eouvigerina excavata*, species which in most samples comprise less than 3%, suggests that local ecology rather than regional factors may be responsible for this assemblage.

Quantitative Analysis

Principal Components Analysis of a large data set of the type collected during this study raises certain problems which must be addressed. Many of the 166 species occur in only one sample or alternatively may comprise a small percentage of the fauna (2% or less) in a particular sample.

In order to effectively derive information from the fauna, some reduction in the number of species must be undertaken. Imbrie and Kipp (1971) in their study of paleoecology of Pleistocene planktonic foraminifera eliminated all species which accounted for less than 2% of the fauna. In this investigation the reduction in number of species was undertaken by a statistical procedure. The method was to calculate the means and standard deviations for each species. Those species with a value of 0 for the standard deviation (and thus 0 variance) were eliminated. Results of these calculations are presented in Table 1. This procedure resulted in the reduction in the number of species considered from 166 to 110.

Principal Components Analysis

Results of principal components analysis are presented in Table 2. Ten principal components were extracted. It has been standard procedure to adhere to Kaiser's Rule when extracting principal components in most geological problems. However, Joereskog, Klovan, and Reyment (1976) have suggested that for complex geologic problems with large data sets and numerous variables, Kaiser's Rule may be inappropriate. As an alternative, they suggest extracting principal components until at least 90% of the total variance is accounted for. This can be used if communalities are high.

TABLE 1

Calculated means and standard deviations for each species studied.

SPECIES	MEAN	STANDARD DEVIATION
Adhaertia midwayensis	1.6250	1.0606
Alabamina midwayana	11.6250	11.6485
Alabamina westraliensis	10.6521	16.1188
Allomorphina paleocenica	3.2500	2.6299
Ammobaculites expansus	1.0000	0.0000
Ammobaculites paleocenicus	2.6666	0.5773
Ammocibicidoides pontoni	2.0000	0.0000
Ammomarginulina sp.	2.0000	0.0000
Anomalinoides acuta	19.9215	17.4526
Anomalinoides basilobata	2.0000	0.0000
Anomalinoides clemmentina	3.3333	1.5273
Anomalinoides midwayensis	19.8297	15.8035
Anomalinoides pseudowelleri	12.5500	13.9377
Anomalinoides umbonifera	22.9636	18.0943
Anomalinoides welleri	5.3333	4.5000
Bathysiphon eocenicus	4.0000	0.0000
Bolivina budensis	2.0000	1.0000
Bolivina midwayana	6.4285	6.0237
Bulimina midwayensis	1.5000	0.7071
Buliminella marylandica	20.5000	9.1923
Bulimina Kugleri	5.0000	4.2426
Bulimina ovata	7.9230	10.8509
Bulimina quadrata	4.5000	0.7071
Bulimina virginiana	5.2500	4.3493
Bullopora chapmani	2.0000	1.7320
Bullopora laevis	1.0000	0.0000
Ceratobulina perplexa	12.0000	15.3188
Chysalogonium arkansasanum	2.5000	2.3452
Chrysalogonium granti	3.4444	1.7400
Cibicidoides alleni	15.9655	12.5180
Cibicidoides blanpiedi	5.0000	2.2360
Cibicidoides browni	2.0000	1.4142
Cibicidoides howelli	8.8235	8.0640
Cibicidoides irenae	7.5000	10.5356
Cibicidoides madruguaensis	3.0000	0.0000
Cibicidina mariae	9.1111	8.4706
Cibicidoides praecursorius	5.0000	0.0000
Cibicidoides semiplectus	5.0000	2.8284
Cibicidoides vulgaris	9.4761	12.0317
Citharina plummoides	2.8333	2.5878
Cornuspira byramensis	2.0000	1.4142

TABLE 1 (contd.)

SPECIES	MEAN	STANDARD DEVIATION
Dentalina alabamensis	3.0000	2.1908
Dentalina colei	1.6923	1.1821
Dentalina communis	2.0000	0.0000
Dentalina eocenica	3.3333	2.2509
Dentalina fissicostata	1.0000	0.0000
Dentalina gardnerae	5.5000	7.8833
Dentalina inepta	1.9166	0.9003
Dentalina micronata	1.5000	0.7071
Dentalina obliquisuturata	1.0000	0.0000
Dentalina plummerae	6.5454	6.5324
Dentalina pomuligera	2.0000	1.4142
Dentalina soluta	2.0000	0.0000
Dentalina wilcoxensis	2.7142	2.1636
Discocyclina blanpiedi	17.0000	11.5758
Discorbis midwayensis	5.4285	6.0788
Discorbis rukasi	3.3333	1.5275
Discorbis washburni	14.7222	9.8983
Eggerella plummerae	1.0000	0.0000
Ellipsonodosaria paleocenicus	1.0000	0.0000
Ellipsonodosaria plummerae	1.5000	0.7071
Entosolenia apiculata	1.7500	0.9574
Eouvigerina excavata	5.5000	2.1213
Epistominoides midwayensis	3.2000	2.1679
Eponides elevatus	2.7777	1.9220
Eponides lotus	7.0222	6.7436
Eponides plummerae	3.9375	3.8378
Gavelinella danica	6.0000	4.2426
Fissurina aquiensis	1.5000	1.0000
Frondicularia archiaciana	2.0000	0.0000
Frondicularia frankei	2.6666	3.0550
Frondicularia herpersi	2.7500	1.2583
Frondicularia midwayensis	3.6666	3.0550
Gaudryina laevigata	14.3333	4.0414
Globulina gibba	7.2372	7.9488
Globulina rotundata	2.0000	0.0000
Guembelina midwayensis	1.0000	0.0000
Guttulina hantkeni	4.7272	3.7440
Guttulina problema	4.9200	5.7294
Guttulina wilcoxensis	2.8000	2.1679
Nonion grandiferum	5.8000	5.5407
Gyroidinoides lottensis	14.1818	19.8535
Gyroidinoides madrugaensis	17.0000	0.0000
Gyroidinoides octocameratus	5.3720	4.0415
Gyroidinoides subangulata	9.5217	7.2605

TABLE 1 (contd.)

SPECIES	MEAN	STANDARD DEVIATION
Lagena alternans	3.0000	0.0000
Lagena laevis	1.1500	2.9357
Lamarckina limbata	7.6666	8.9628
Lenticulina alabamensis	5.4000	5.6803
Lenticulina austriaca	22.0000	0.0000
Lenticulina degolyeri	16.6666	25.4230
Lenticulina inornatus	2.0000	0.0000
Lenticulina insulus	1.0000	0.0000
Lenticulina isidis	1.0000	0.0000
Lenticulina magnifica	4.0000	4.2426
Lenticulina midwayensis	11.0952	12.5643
Lenticulina pseudo-mamilligerus	15.000	0.0000
Lenticulina rosetta	3.8333	2.5878
Lenticulina toddae	5.1176	5.5439
Lenticulina turbinata	3.2000	2.1679
Lenticulina wilcoxensis	10.8333	11.2367
Lingulina wilcoxensis	8.2500	5.3150
Loxostomum applinae	2.0000	0.0000
Loxostomum plummerae	8.0000	0.0000
Marginulina bullata	1.6666	1.1547
Marginulina colligata	2.0000	0.0000
Vaginulopsis earlandi	1.0000	0.0000
Marginulina exima	1.0000	0.0000
Marginulina glabra	3.0000	1.7320
Marginulina subrecta	1.0000	0.0000
Marginulina tuberculata	1.0000	0.0000
Marginulopsis wilcoxensis	4.0000	2.6457
Marssonella oxycona	15.0000	9.0185
Nodosaria affnis	5.5625	6.0691
Nodosaria latejugata	6.5714	9.5007
Nodosaria paupercula	1.5000	0.7071
Nonionella aquiensis	3.9285	6.0187
Oolina acuticostata	2.6000	2.5099
Oolina morsei	2.1666	1.8348
Osangularia plummerae	10.3333	12.9421
Palmula mcglameryae	1.5000	0.7071
Palmula rugosa	1.0000	0.0000
Patellinoides sp.	2.0000	0.0000
Polymorphinella subcompressa	1.0000	0.0000
Polymorphina cushmani	3.6000	2.4585
Pseudoglandulina manifesta	2.5000	2.7386

TABLE 1 (contd.)

SPECIES	MEAN	STANDARD DEVIATION
Pseudoglandulina pygmaea	1.0000	0.0000
Pseudophragmina cookei	3.0000	0.0000
Pseudopolymorphina wilcoxensis	1.0000	0.0000
Pseudouvigerina naheolensis	1.5000	0.5773
Pulsiphonina prima	8.4571	7.0307
Pulsiphonina wilcoxensis	7.5000	6.4920
Pyrulina cylindroides	2.3000	1.1595
Quinqueloculina plummerae	1.4000	0.8432
Quinqueloculina vulgaris	2.0000	0.0000
Ramulina globulifera	1.0000	0.0000
Rotalia havanensis	2.0000	0.0000
Rotalia madrugaensis	1.0000	0.0000
Sigmomorphina wilcoxensis	1.5000	0.7071
Siphogenerinoides eleganta	9.8823	10.6705
Spirillina selseyensis	1.5714	0.7868
Spiroplectammina laevis	3.5000	3.1091
Spiroplactammina plummerae	2.2000	1.3038
Spiroplectammina wilcoxensis	1.0000	0.0000
Textilina lontensis	9.5000	4.9497
Textilina midwayana	2.4444	2.2809
Textilina plummerae	3.3333	2.5166
Triloculina laevigata	1.5000	0.7071
Triloculina nachitochensis	1.0000	0.0000
Tritaxia midwayensis	3.1667	4.8339
Vaginulopsis brantlyi	4.2105	3.2417
Vaginulopsis cretacea	5.0000	4.3589
Vaginulopsis exquisita	4.5000	4.9497
Vaginulopsis gracilis	5.0000	2.8284
Vaginulina midwayana	6.3333	12.0940
Valvulineria extensa	1.0000	0.0000
Fursenkonia wilcoxensis	1.0000	0.0000
Angulogerina wilcoxensis	1.0000	0.0000
Rectoglandulina aquiensis	1.0000	0.0000

TABLE 2

Factor loadings for studied samples on the first three derived principal components.

SAMPLE	PRINCIPAL COMPONENT I	PRINCIPAL COMPONENT II	PRINCIPAL COMPONENT III
LL1	.8593	.1592	-.2728
LL2	.9162	.1657	-.2164
GH1	.9107	.9986	-.1085
SM1	.8925	.0371	-.2743
SM2	.0294	-.0108	.1642
LL4	.8211	-.2336	.2945
LL5	.9946	.9974	-.0589
FL3	.7642	-.2401	.2381
FL4	.9956	-.1557	.9255
FL6	.0751	.0211	.0885
FL7	-.0274	-.0173	.1078
FL8	.0782	.2998	-.0854
TC1	-.0052	.0001	-.0032
TC2	.8479	.3457	.2769
TC4	.0654	-.0087	.0069
TC9	-.0255	.0384	.9686
BC1	.8432	.0882	.8838
BC2	.8433	.3821	.7593
BC3	.9894	.1593	.8895
BC4	.8396	.3822	.7592
BC5	-.0341	.0536	.9945
BC6	.8966	.3610	-.3171
JL1	.7805	.3821	.7112
JL2	.8051	.9996	.7593
SC3	.7301	-.1404	.9750
SC4	.7571	.7930	.9778
CC2	.7484	.8082	.7593
CC3	.7758	.8255	.9195
MF1	.9986	.9742	-.0241
NL1	.9254	.8738	-.0243
NL2	.9804	.3349	-.2024
OH1	.9979	-.1492	-.0063
ML1	.9984	.9986	.7861
LL6	.9849	-.0251	.8261
LL7	.9871	-.1319	.8741
SC5	.9773	-.1557	.9819
JL3	.0879	.9998	.0163
WC9	.9339	.9862	-.0736
SC1	.7726	.9743	.0971
MW1	.7697	.9844	.9976
MW2	.9944	.9644	-.1841

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT I	PRINCIPAL COMPONENT II	PRINCIPAL COMPONENT III
WC6	.7844	-.1696	.9941
WC7	.9973	.8141	-.0679
MT1	.9852	.9862	-.0199
CL3	.8362	.9766	.2048
SM3	.9954	-.1557	.9254
FG1	.6669	.8626	.9946
LL8	.9963	.6998	.0161
LL9	.7665	-.1012	.9954
FG2	.6486	-.0861	.9894
FG3	.9796	-.0808	.9269
LLA	.7668	.7407	.1928
LLB	.7671	.7406	.1923
LLC	.9941	-.0948	.8774
SU1	.9585	.9634	.8283
GL1	-.0005	.9161	.1106
PL1	.7642	-.2401	.2381
BL1	.9897	.8082	.0175
BL2	.8405	.1267	-.2145
K1A	.9991	.9211	-.0679
K1X	.8297	-.2488	.2449
K1B	.9899	.9744	-.1009
K1C	.9846	.9863	.6974
K1D	.9911	.9731	.8617
K1E	.7514	.9639	.9951
K1F	.7269	.2139	.9843
K1G	.9924	.1447	.8574
K1H	.9931	.9634	.9097
K2F	.8297	-.2487	.2449
K3A	.9984	.9976	.8938
K3B	.9893	.9845	.8869
K3C	.9902	.9211	-.0679
K3D	.9945	.9234	-.0681
K14	.7696	.8539	.9949
K15	.9951	.9881	.8617
K16	.9968	.9879	.7538
BR1	.0006	.9163	.1106
GC1	.8365	.0975	.7271
OC1	.8952	.9842	.7593
WS1	.8099	.7259	.1825
WS2	.7671	-.1756	.0822
CRC	.9854	.1383	.8774

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT I	PRINCIPAL COMPONENT II	PRINCIPAL COMPONENT III
SM4	.9861	-.0487	.8781
SM5	.8925	.0371	-.2743
SM6	.9799	-.0483	.8779
BEC1	.8447	.9994	-.2372
BEC2	.6677	.1011	.9971
PTL	.9846	.9941	-.0589
FT1	-.0245	.1068	-.0481
FT2	.9963	.9891	-.0589
FT3	.7798	.9853	.0101
FT4	-.0392	.9946	-.0124
FT5	.7798	.9876	.0102
FT6	.7616	.1779	-.0422
FT7	.7796	.9881	.0103
BC9	.9108	.9858	-.2222
BC10	.9113	.9841	-.2246
BC46	-.0703	.9861	.9486
BC47	-.0712	.9841	.9531

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT IV	PRINCIPAL COMPONENT V	PRINCIPAL COMPONENT VI
LL1	.3461	.7302	-.1793
LL2	.2413	.4241	-.1796
GH1	.1160	.3601	-.0024
SM1	-.2942	-.0251	.2857
SM2	.3977	-.2005	-.5738
LL4	.6964	.1932	-.5741
LL5	.4102	.5383	-.2882
FL3	.5601	.4992	-.5732
FL4	.9034	.4741	-.2881
FL6	.7077	-.5073	.3832
FL7	.2614	.1055	-.5736
FL8	.3085	-.7995	.6686
TC1	.3079	-.1863	.0948
TC2	-.2629	-.4842	.2856
TC4	.3746	-.4791	.2859
TC9	.5254	-.4269	.6685
BC1	.5259	-.5409	.0941
BC2	.8246	-.1472	.0947
BC3	.5263	-.5419	.0945
BC4	.7738	-.3060	.0001
BC5	.6764	-.1622	.3834
BC6	.9214	.0362	-.0851
JL1	.9879	-.2348	.3807
JL2	.9946	.6523	-.5731
SC3	.7535	.4741	-.0029
SC4	.9931	.6528	-.2884
CC2	.8913	.5469	.2861
CC3	.9242	.0386	.0954
MF1	.6831	.3284	-.0849
NL1	.2636	-.5422	.0944
NL2	.9849	.0391	.3833
OH1	.9926	.3245	.7747
ML1	.5372	.7463	.1063
LL6	.7783	.0633	.2867
LL7	.4921	.4739	-.2883
SC5	.5578	-.6219	.6691
JL3	.2839	.1504	.2014
WC9	.8537	.1731	.7743
SC1	.9912	.1576	.3806
MW1	.4260	.1591	.3803
MW2	.9901	-.2921	.6679

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT IV	PRINCIPAL COMPONENT V	PRINCIPAL COMPONENT VI
WC6	.9949	-.0341	.3808
WC7	.5826	.4297	.2016
MT1	.7817	.2771	.3801
CL3	.9034	.4752	-.2886
SM3	.6129	.9943	-.4675
FG1	.6623	.4744	-.0024
LL8	.5573	.8982	-.4674
LL9	.9565	.9953	-.7531
FG2	.9952	.9984	-.7533
FG3	-.2301	.8976	-.1818
LLA	-.2314	.8987	-.1821
LLB	.6623	.9963	-.1467
LLC	.9011	-.5334	.9542
SU1	-.2877	-.0739	-.0012
GL1	.5601	.4994	-.5744
PL1	.2741	.9974	-.4678
BL1	-.2739	.6579	-.4679
BL2	.5826	.4297	.2013
K1A	.2972	.0154	-.2884
K1X	.0112	.6324	-.1808
K1B	.2510	.9374	.3912
K1C	.6487	.6341	.3919
K1D	.7848	-.0994	-.0028
K1E	.9959	.2769	-.0841
K1F	.9903	.0546	-.2874
K1G	.8898	.0551	-.0028
K1H	.2972	.0159	-.2882
K2F	.9949	.4299	.2009
K3A	.8455	.9148	-.0846
K3B	.5826	.4308	.7748
K3C	.5839	.4312	.2015
K3D	.9991	.2229	.4893
K14	.6487	.6324	-.1826
K15	.6552	.5257	.3918
K16	-.2877	-.0731	-.0021
BR1	.8991	-.3394	-.2888
GC1	.9013	-.5329	.9542
OC1	.1488	.3937	.2866
WS1	.0576	.9708	-.1793
WS2	.9034	.3608	-.2879
CRC	.6623	.9941	-.4669

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT IV	PRINCIPAL COMPONENT V	PRINCIPAL COMPONENT VI
SM4	-.2942	-.0256	.2859
SM5	.6639	.9956	-.4681
SM6	-.2629	-.4849	.2857
BEC1	.1115	-.0085	-.2879
BEC2	-.0246	.7219	-.4691
PTL	.9976	.3854	-.5731
FT1	.5152	.5394	-.2896
FT2	-.2411	.5771	-.1796
FT3	.5138	.5386	-.2894
FT4	-.0923	.8563	.1063
FT5	-.1296	.5684	-.4677
FT6	-.0936	.8564	.1061
FT7	-.2415	.8571	.1072
BC9	-.0926	.8574	.5713
BC10	-.4441	-.0254	.5711
BC46	-.4562	-.0259	.5739
BC47	-.4146	.1976	.7738

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT VII	PRINCIPAL COMPONENT VIII	PRINCIPAL COMPONENT IX
LL1	.4615	-.1449	.2654
LL2	.2748	-.5442	.0605
GH1	-.0471	.9673	.8193
SM1	.3356	.1564	.6386
SM2	.3521	.0418	-.2059
LL4	.2088	.0422	-.2051
LL5	-.3827	.9684	.4462
FL3	.0636	.4413	.0012
FL4	.2191	.2411	.9905
FL6	.6497	-.1642	-.2056
FL7	.2068	.4421	.0014
FL8	.8067	.2769	-.0485
TC1	.9902	.2773	.1681
TC2	.1924	-.3991	.1673
TC4	.3007	-.7555	.5249
TC9	.9904	.0769	.7855
BC1	.8334	.2137	.5689
BC2	.6902	.2143	.5647
BC3	.8329	.2158	.5653
BC4	-.0349	-.7551	.3519
BC5	.3259	.5281	.0489
BC6	.9934	-.0874	.6143
JL1	.4206	.8389	.9917
JL2	-.1165	.2415	.6172
SC3	-.3842	.5453	.9938
SC4	-.5909	.5449	.9901
CC2	-.5911	.0269	.9904
CC3	.2674	.9919	.2413
MF1	.9907	.7571	.4578
NL1	.9901	.9692	.2177
NL2	.5063	-.0081	.0607
OH1	.6774	-.3027	.9664
ML1	.9938	-.9004	.7856
LL6	.1575	.5993	.7849
LL7	.2194	.2414	.9905
SC5	.2034	.5977	-.0244
JL3	.9947	.3583	.8310
WC9	.6779	-.4593	.7007
SC1	.4231	.6139	.7009
MW1	.2517	.7543	.9917
MW2	.6623	.0354	.5269

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT VII	PRINCIPAL COMPONENT VIII	PRINCIPAL COMPONENT IX
WC6	.6014	.3029	.9918
WC7	.9908	.4956	.6143
MT1	.6022	.6374	.3487
CL3	.2191	.2421	.9904
SM3	.0775	.0089	.7492
FG1	.1317	.8239	.9908
LL8	.6810	-.2164	.7259
LL9	.3452	-.2173	.3519
FG2	.3453	-.0639	.6179
FG3	.5932	.3663	.7714
LLA	.5941	.3668	.7721
LLB	.6812	-.0645	.9915
LLC	.5379	-.1387	.9921
SU1	.2748	.6674	.7729
GL1	.0637	.4429	.0015
PL1	.2579	.5224	.6621
BL1	.9901	.2963	.3737
BL2	.9912	.4957	.6148
K1A	.5444	.0413	.1673
K1X	.5598	.1812	.6139
K1B	.0268	-.1389	.9927
K1C	.3791	-.0969	.9654
K1D	-.0819	.0486	.7010
K1E	.9917	-.2436	.3029
K1F	.1854	-.3225	.5693
K1G	-.0822	.2049	.9654
K1H	.5451	.0415	.1699
K2F	.8842	.1394	.9641
K3A	.4033	.5378	.7988
K3B	.9906	.4953	.6147
K3C	.9909	.4944	.6159
K3D	.5214	-.5959	.5442
K14	.3798	-.0972	.9698
K15	.1727	-.3447	.9701
K16	.2753	.6677	.7694
BR1	.3289	-.0216	.5704
GC1	.5381	-.1387	.9938
OC1	-.4108	.2263	.3974
WS1	.3184	-.3041	.0022
WS2	.0407	.3784	.7751
CRC	.6809	-.0659	.9895

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT VII	PRINCIPAL COMPONENT VIII	PRINCIPAL COMPONENT IX
SM4	.3359	.1574	.6394
SM5	.6811	-.0644	.9915
SM6	.4818	-.3981	.1678
BEC1	-.2394	.8047	.1807
BEC2	.2222	.6601	.4463
PTL	-.2951	.2201	.1353
FT1	-.3829	.9615	.4474
FT2	.4619	-.3033	.0031
FT3	-.3817	.9601	.4443
FT4	-.1277	.0616	.1813
FT5	.2234	.5039	.1814
FT6	-.1269	.0631	.1831
FT7	.1398	.0634	-.2163
BC9	-.1263	.0622	.1822
BC10	.0687	.3831	.9903
BC46	.0689	.3819	.9915
BC47	.8548	-.1955	.9922

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT X
LL1	.3731
LL2	-.0128
GH1	-.2918
SM1	.1511
SM2	.3287
LL4	.0124
LL5	.0691
FL3	-.3415
FL4	-.1899
FL6	.3289
FL7	.0013
FL8	-.1732
TC1	-.2351
TC2	-.1066
TC4	.1058
TC9	.4796
BC1	.2006
BC2	-.1403
BC3	.2001
BC4	.3281
BC5	.0948
BC6	.2011
JL1	-.1279
JL2	.0329
SC3	-.0125
SC4	.2099
CC2	.2103
CC3	.2594
MF1	.8793
NL1	.2004
NL2	.3614
OH1	.0367
ML1	.1387
LL6	.1379
LL7	-.1896
SC5	.2265
JL3	.6566
WC9	-.3369
SC1	-.3364
MW1	-.2918
MW2	-.2354

TABLE 2 (contd.)

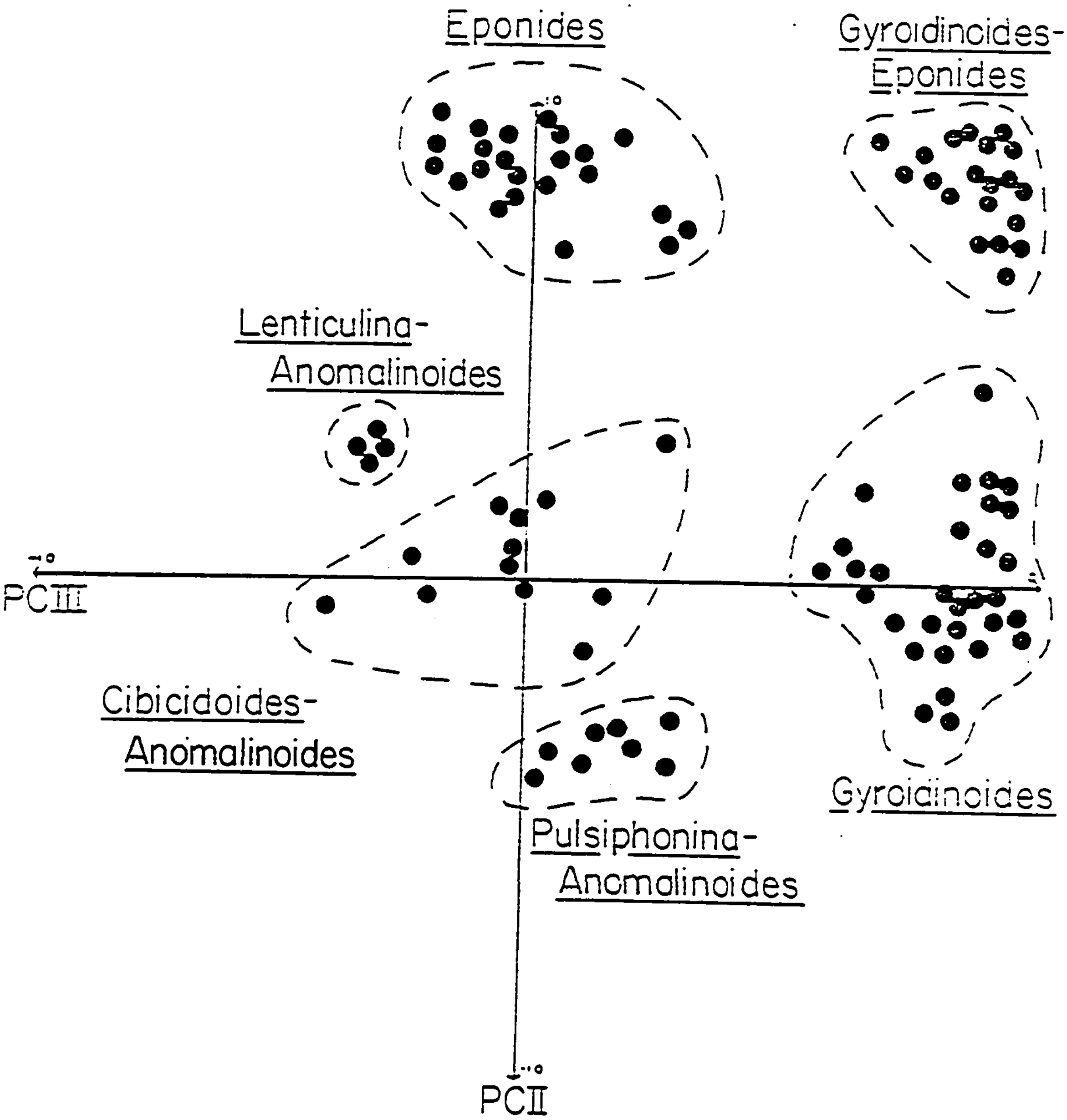
SAMPLE	PRINCIPAL COMPONENT X
WC6	.3163
WC7	.0381
MT1	-.3372
CL3	-.1899
SM3	-.1628
FG1	-.0139
LL8	-.5636
LL9	-.3424
FG2	.0324
FG3	-.3866
LLA	-.3854
LLB	-.1876
LLC	.4796
SU1	-.0457
GL1	-.3401
PL1	.2096
BL1	.1511
BL2	.0374
K1A	-.2356
K1X	.0384
K1B	-.2914
K1C	.0365
K1D	-.3378
K1E	-.5142
K1F	-.5140
K1G	-.3368
K1H	-.2346
K2F	.0361
K3A	-.0694
K3B	.0354
K3C	.0368
K3D	.1646
K14	.0369
K15	.0372
K16	-.0454
BR1	.6568
GC1	.6558
OC1	-.1622
WS1	-.3398
WS2	-.4687
CRC	-.1901

TABLE 2 (contd.)

SAMPLE	PRINCIPAL COMPONENT X
SM4	.1521
SM5	-.1879
SM6	-.1064
BEC1	-.1024
BEC2	.2718
PTL	-.6199
FT1	-.0698
FT2	.0024
FT3	-.0684
FT4	-.4426
FT5	-.2798
FT6	-.4436
FT7	-.6213
BC9	-.4422
BC10	.3288
BC46	.3282
BC47	-.0464

In this study, analysis was first performed using Kaiser's Rule. This analysis extracted 5 principal components which accounted for 62.6% of the total variance. These results were considered unacceptable for satisfactory interpretation of the fauna; and because the communalities were high (none lower than 0.88) another analysis was performed with the goal of extracting enough principal components to account for at least 90% of the total variance. The second analysis extracted 10 principal components which together account for 96.4% of the total variance.

A plot of the factor loadings for each of the 101 samples used in the statistical analysis along the second and third principal components axes is shown in Text-Figure 9. The second and third principal components were selected because the pattern of distribution of PC2 and PC3 were the only two which had recognizable paleoecologic significance. The various groups of samples within Text-Figure 9 each have unique faunal characteristics similar to those reported by Morozova (1960) and Berggren and Aubert (1975). The second and third principal components are thought to represent water mass characteristics. Streeter (1973), and Lohman (1978) demonstrated that water mass characteristics rather than simple bathymetry are the important limiting factors in benthonic foraminiferal


Eponides
Gyroidinoides-
Eponides
Lenticulina-
Anomalinoides
PCIII
Cibicidoides-
Anomalinoides
Pulsiphonina-
Anomalinoides
Gyroidinoides
PCII

distribution. Culver and Buzas (1983) arrived at a similar conclusion regarding modern Gulf of Mexico benthonic foraminifera distribution. Guided by these earlier studies, the results obtained are considered to represent paleoecologic assemblages controlled by variations in water mass temperature and salinity.

Discription of Quantitative Assemblages

In Text-Figure 9, a group of samples plotted near the intersection of the two principal components axes. This assemblage contains the species Anomalinoides midwayensis, Cibicidoides alleni, Alabamina midwayana, Nodosaria affinis, Globulina gibba, and Guttulina problema as common constituents.

A second group is characterized by the species Anomalinoides acutus and Pulsiphonina prima. These samples are characterized by strong negative loadings on Principal Component III.

A third group of samples is characterized high positive loadings on Principal Component II. The distinguishing faunal characteristics are a high percentage of Eponides lotus.

A fourth group of samples is characterized by high positive loadings on Principal Component III. The major distinguishing faunal characteristic of these samples is a high percentage of Gyroidinoides octocameratus.

A fifth significant group of samples is characterized by high positive factor loadings on both Principal Component II and Principal Component III. Examination of the fauna in these samples reveals a high diversity of species with relatively high percentages of Gyroidinoides octocameratus and Eponides lotus.

One small group of four samples is characterized by low negative loadings on Principal Component II and by low positive loadings on Principal Component III. These four samples all have low faunal diversity with Anomalinoides umboniferus being a quantitatively important species and with a high proportion of robust lenticulinids, mostly Lenticulina midwayana, but also Lenticulina wilcoxensis and Lenticulina irenae. Although represented in only four samples, this assemblage is considered ecologically significant because they factor together even though the four samples are from widely separated outcrops and are of different ages based on biostratigraphy.

The three remaining groups are each defined by a single species. One assemblage is characterized by Eponides lotus with high positive loading on Principal Component II. Another is characterized by

Gyroidinoides octocameratus with strong positive loading on Principal Component III. The third group is characterized by high percentages of both Eponides lotus and Gyroidinoides octocameratus. This group of samples has high positive loadings on both, Components II and III.

PALEOCEANOGRAPHY

A valid paleoceanographic model, of these Paleocene units must rely on three assumptions: first, it is assumed that the rate of rotation of the Earth is essentially the same as at the present (Wells, 1963). As the Earth's rotation defines the quasi-permanent cells in the atmosphere, a similar rate during the Paleocene makes the recent circulation pattern a valid analog for the Paleocene. Second, since the recent atmospheric circulation is accepted as a model for the Paleocene, it is assumed that there were three quasi-permanent atmospheric cells in the Paleocene. Third, a lowthermal gradient between the high and low latitudes is assumed for the Paleocene (Boersma and Premoli Silva, 1983). Accepting the paleolatitudes of the eastern Gulf Coastal Plain of Sclater _et al_. (1977), the paleocirculation can be inferred.

It has been asserted that the distribution of the benthonic foraminiferal assemblages recognized in this study is related to paleoecologic conditions associated with the distance from the coastline rather than with bathymetry per se. This variation is consistent with the work of Nowlin (1971) who observed that changes in temperature, salinity, and oxygen content occur away from shore in the surface mixed layer. These variations, especially those in salinity, are expected to have been even more extreme in the Paleocene. The eastern Gulf Coastal Plain occupied a paleolatitude of 25°N latitude (Sclater, 1977). This plus the presence of Subbotina trinidadensis and Planorotalites pseudomenardii suggest tropical paleoclimatic conditions. In tropical regions, high precipitation and runoff may cause very sharp changes in salinity toward shore.

While the pronounced changes in paleoecologic parameters near shore explain the distribution of some of the benthonic assemblages, these may not be sufficient to explain those assemblages associated with the middle to outer neritic zones. The Gyroidinoides, Gyroidinoides-Eponides, and Eponides assemblages all occur in sediments which were deposited far from shore. In order to explain their distribution, the influence of larger scale oceanographic processes in the Paleocene Gulf of Mexico must be considered.

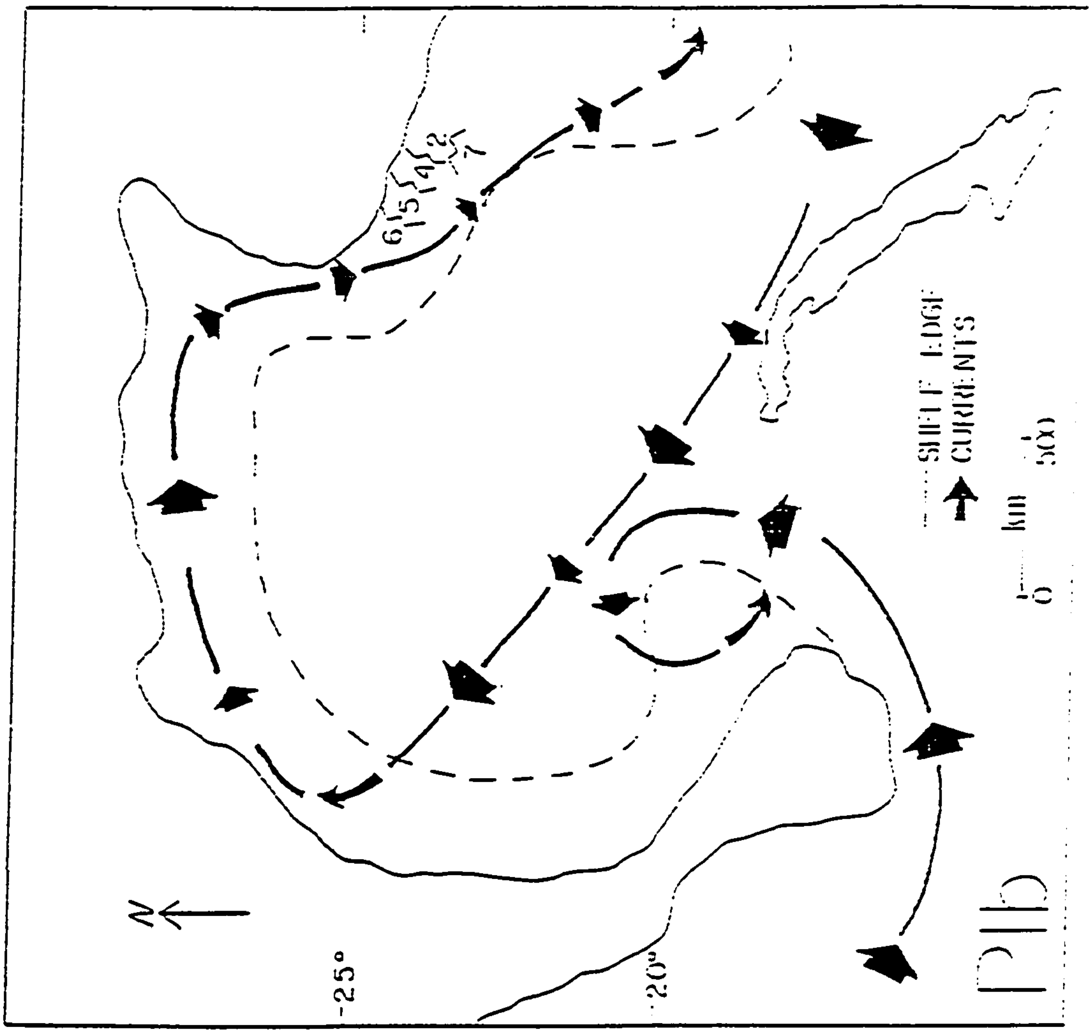
The influence of oceanic currents on shallow shelf paleoecology has not been fully investigated. Johnson (1978) suggested that oceanic currents induce strong interchange between shelf and oceanic waters. It is evident that a broader paleoceanographic mechanism is responsible for the variations in the assemblages. This is clearly exemplified by the distribution of the *Gyroidinoides*, *Gyroidinoides-Eponides*, and the *Eponides* assemblages.

Given tropical paleolatitudes for the Paleocene Gulf of Mexico (15°N for the Campeche Shelf, 25°N for the Coastal Plain (Sclater *et al.*, 1977) and using their paleogeographic reconstruction a paleocirculation model can be developed for the Gulf of Mexico. It is inferred that two major currents carried normal marine waters into the Gulf of Mexico. The easterly flowing Pacific countercurrent which when deflected by the southernmost Gulf margin generated a minor cyclonic flow around the Campeche Shelf and the west flowing equatorial current generated by the southern margin of the North Atlantic anticyclonic gyre which fed the central and northern Gulf.

A consequence of such a circulation model is the occurrence of a system of convergence in the west and northwest coastal areas which generated longshore currents flowing along the coastal area between Texas and Alabama; and an area of divergence created by the Eaterlies at 20°N latitude near the submerged Florida Shelf.

Keeping this model in mind, the *Gyroidinoides*, *Gyroidinoides-Eponides*, and the *Eponides* assemblage can each be associated with certain paleoecologic aspects of the paleocirculation. The *Eponides* assemblage is considered to represent conditions of the greatest distance from shore. This assemblage is associated with those waters generated by the convergence between Texas and Alabama and transported parallel to the Paleocene coastline. The *Eponides* assemblage probably indicates warm, saline, oxygen rich waters and its presence indicates the influence of the north Gulf circulation regime whereas the *Gyroidinoides* assemblage is considered to represent conditions associated with shelf waters distant from shore. The presence of the *Gyroidinoides*-*Eponides* assemblage probably is indicative of a zone of active, seasonal interchange between shelf and oceanic waters. Such an interchange has been documented for the present day Florida Current (Niiler, 1975).

The geologic record of this circulation system in the northern Gulf of Mexico during Paleocene time is reflected by the distribution of the benthonic foraminiferal assemblages. The position of the northern Gulf current is not static being displaced by subtle oscillations in sea level. Text-Figure 13 shows the circulation pattern during Zone Plb time. This is the time of maximum transgression in the Paleocene and is characterized by the northern Gulf current impinging

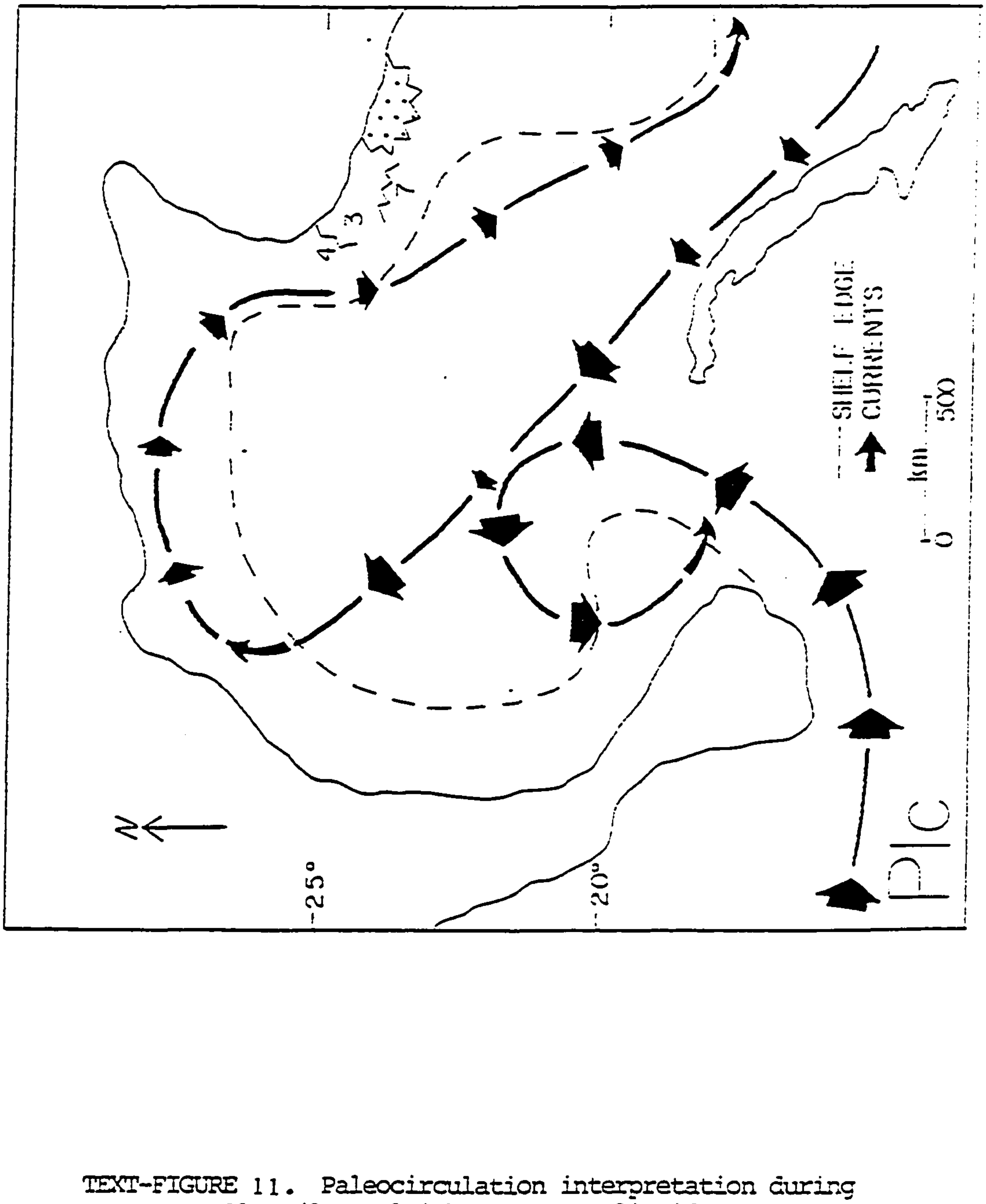


TEXT-FIGURE 10. Paleocirculation interpretation during Zone P1b. (2=*Cibicidoides*-*Anomalinoides*, 4 = *Gyroidinoides*, 5 = *Gyroidinoides*-*Eponides*, 6 = *Eponides*, 7 = *Discocyclina*-*Pseudophragmina*) far onto the shelf. Evidence for this in the study area is seen in the presence of the _Eponides_ assemblage in the western portion of the study area with a shelf assemblages such as the _Gyroidinoides_ and _Cibicidoides-Anomalinoides_ assemblages in the eastern portion.

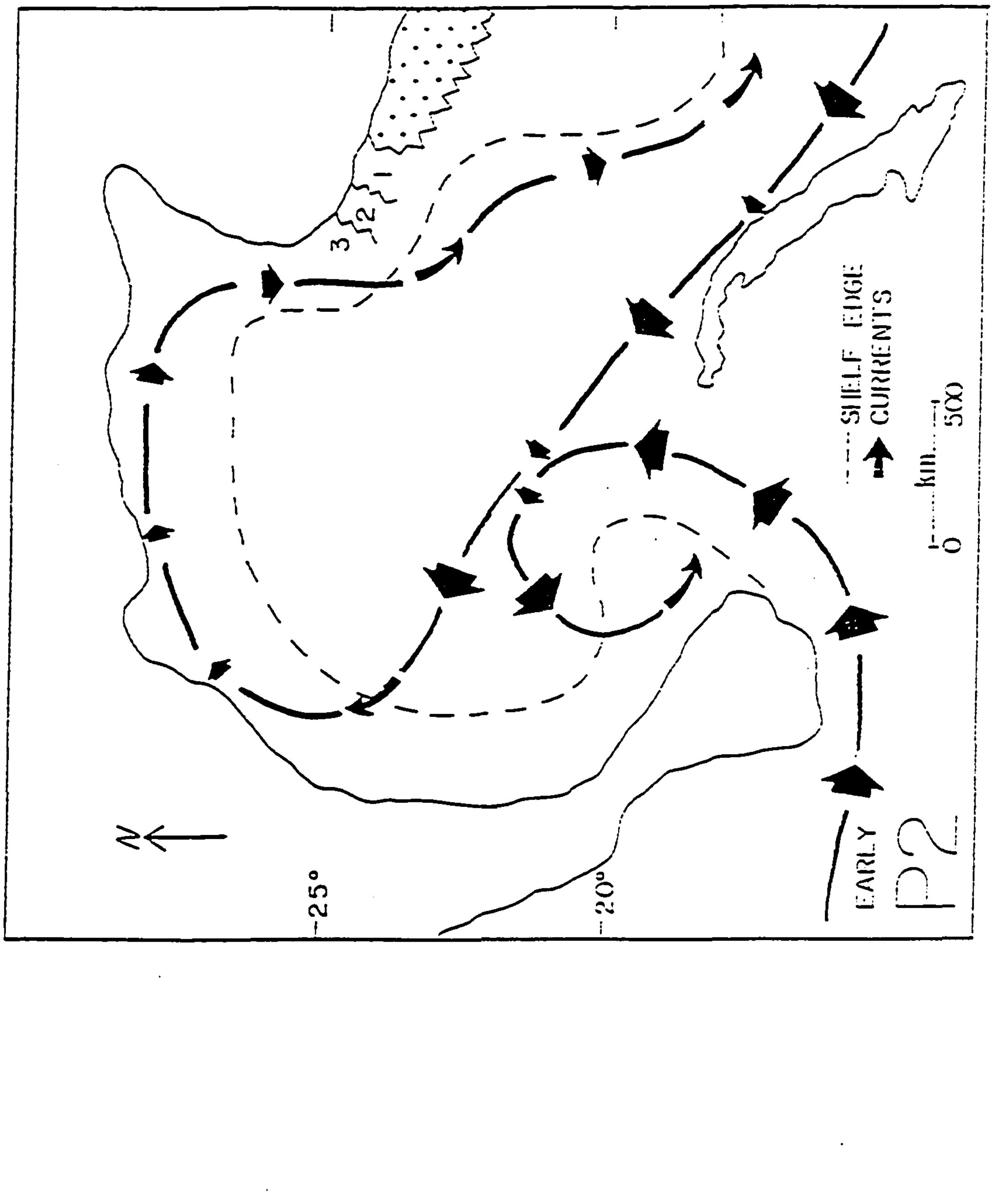
During Zone P1c time (Text-Figure 11), the Paleocene of the eastern Gulf Coastal Plain reflects regressive conditions. Falling sea level is inferred to have caused a seaward displacement of the northern Gulf current, suggested by the absence of the _Eponides_ and _Gyroidinoides-Eponides_ assemblages and the presence of the _Gyroidinoides_ assemblage.

During early Zone P2 time (Text-Figure 12) the regressive phase of sequence TA1.2A is at its maximum. The assemblages all show the influence of near shore paleoecologic conditions. No evidence of open continental shelf conditions (_Gyroidinoides_ assemblage) is present.

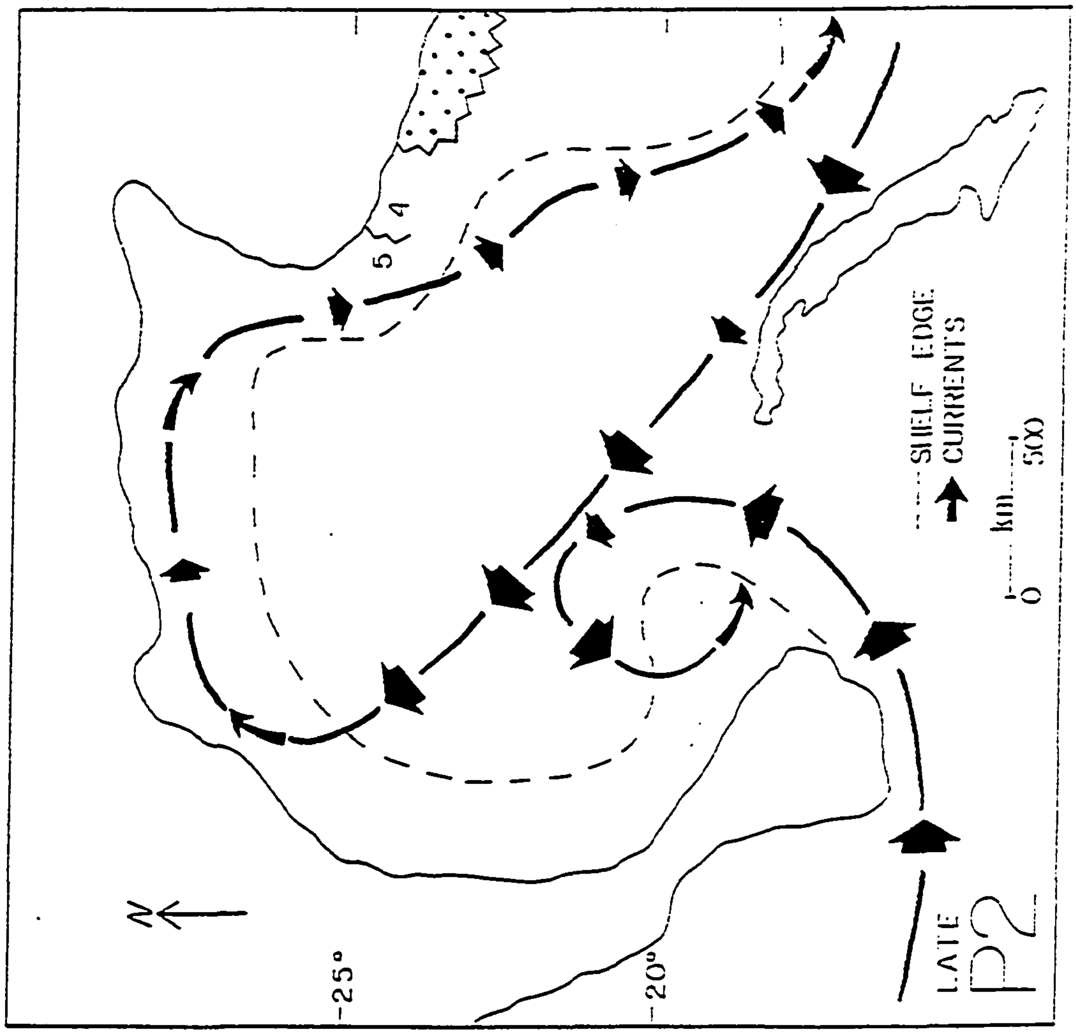
During late Zone P2 time (Text-Figure 13), the transgressive phase of sequence TA1.2B is evident by the presence of the _Gyroidinoides-Eponides_ assemblage in the western part of the study area and the _Gyroidinoides_ assemblage to the east. While not directly under the influence of oceanic circulation, the assemblages indicate an expanding northern Gulf



TEXT-FIGURE 11. Paleocirculation interpretation during Zone P1c. (3 = Pulsiphonina-Anomalinoides, 4 = Gyroidinoides, 7 = Discocyclina-Pseudophragmina)



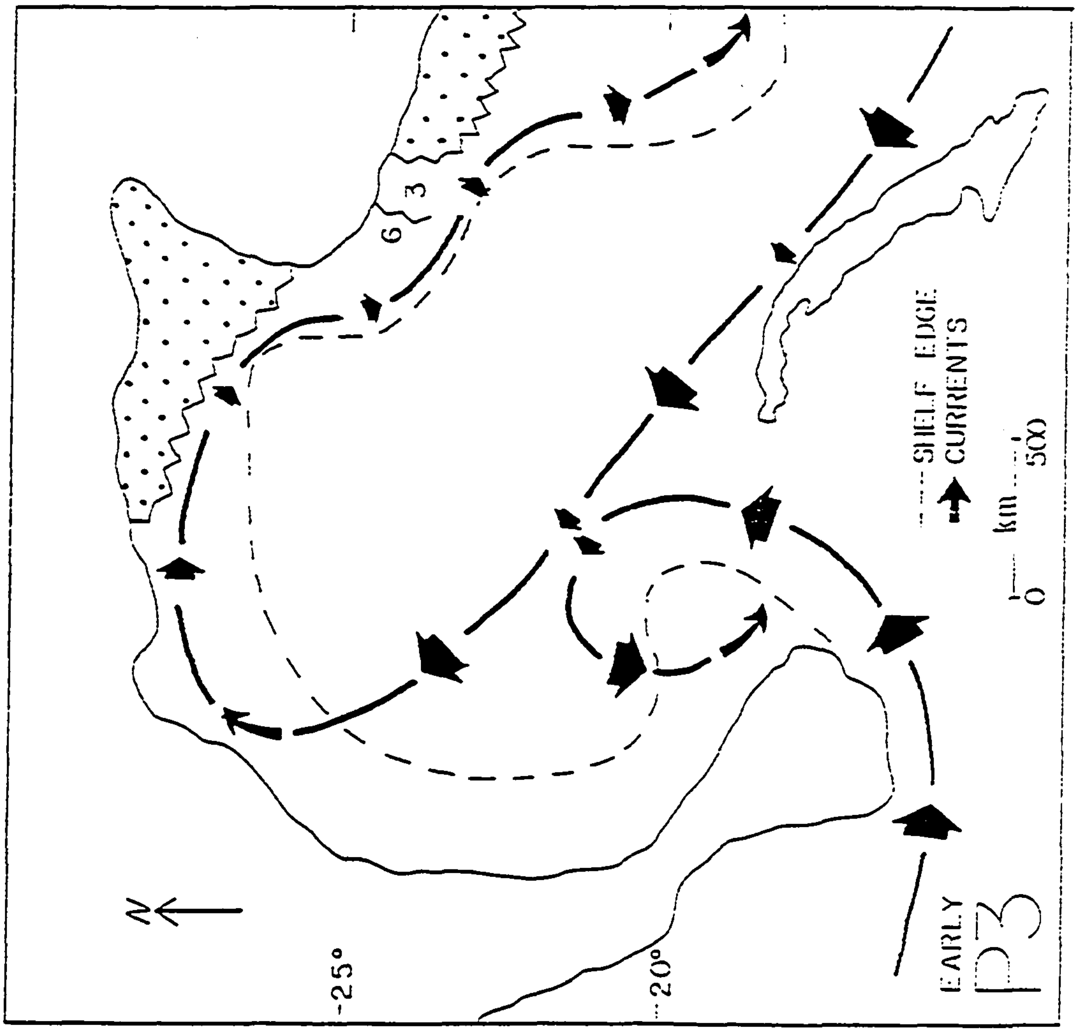
TEXT-FIGURE 12. Paleocirculation interpretation during early Zone P2. (1 = Lenticulina-Anomalinoides, 2 = Cibicidoides-Anomalinoides, 3 = Pulsiphonina-Anomalinoides).



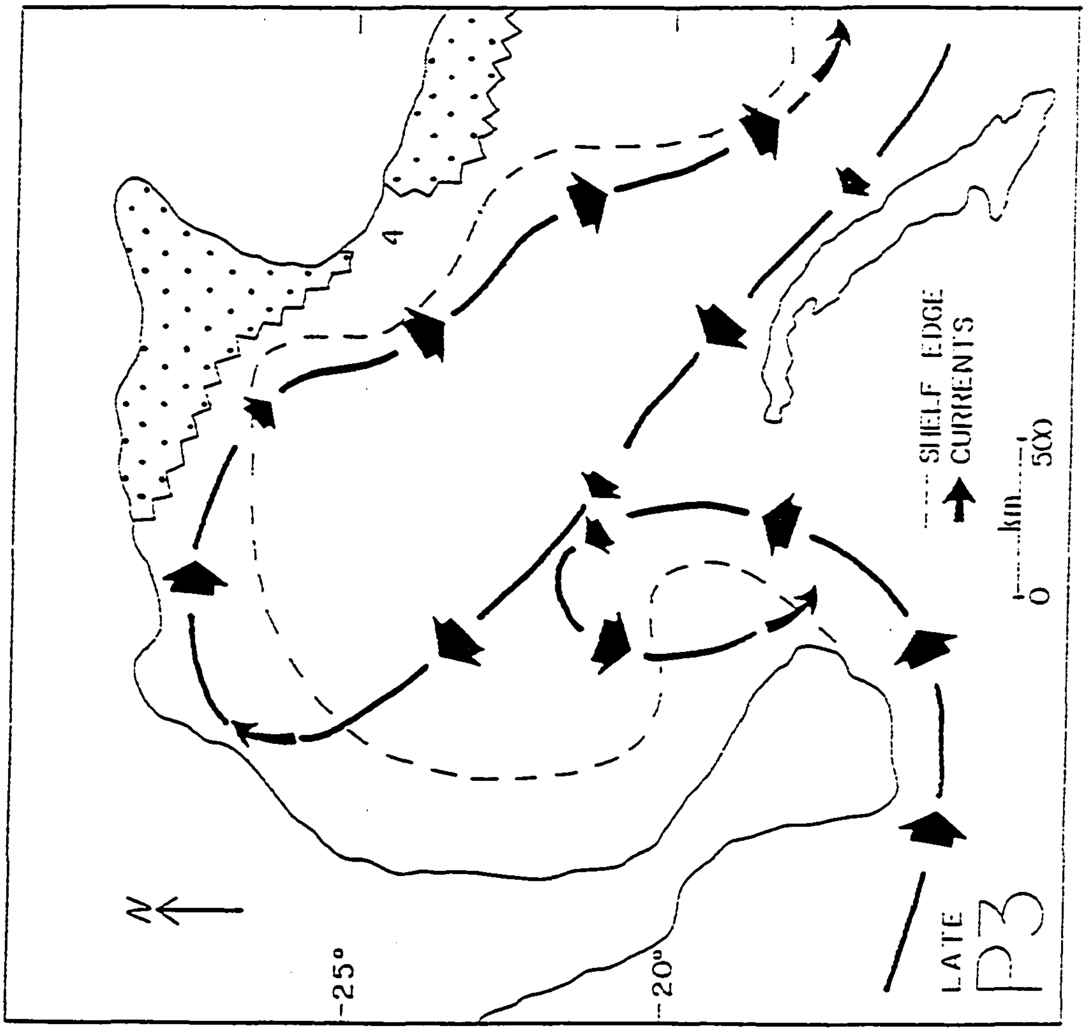
TEXT-FIGURE. 13. Paleocirculation interpretation during late Zone P2. (4 = Gyroidinoides, 5 = Gyroidinoides-Eponides) current. This marks the maximum transgression of sequence TA1.2B.

Early Zone P3 time (Text-Figure 14) shows a sharp change in conditions related to regression. Continental clastics have prograded in the Mississippi Embayment and in the eastern portion of the study area. The prograding clastic wedge in the Mississippi Embayment appears to have caused a deflection of the northern Gulf current. As a result, the benthonic foraminiferal assemblages indicate an increase in the oceanic influence by the presence of the Eponides assemblage in the western part of the study area. The presence of the Pulsiphonina-Anomalinoides assemblage indicates the influence of the continental clastic wedge to the east.

During late Zone P3 time (Text-Figure 15), further progradation of continental clastics caused increased deflection of the northern Gulf current. The result was a deflection of the current south of the study region. This is demonstrated by the fact that even though conditions were transgressive, the eastern Gulf Coastal Plain was under the influence of shelf waters, as indicated by the presence of the Gyroidinoides assemblage in all samples of this age.



TEXT-FIGURE 14. Paleocirculation interpretation during early Zone P3. (3 = Pulsiphonina-Anomalinoides, 6 = Eponides)

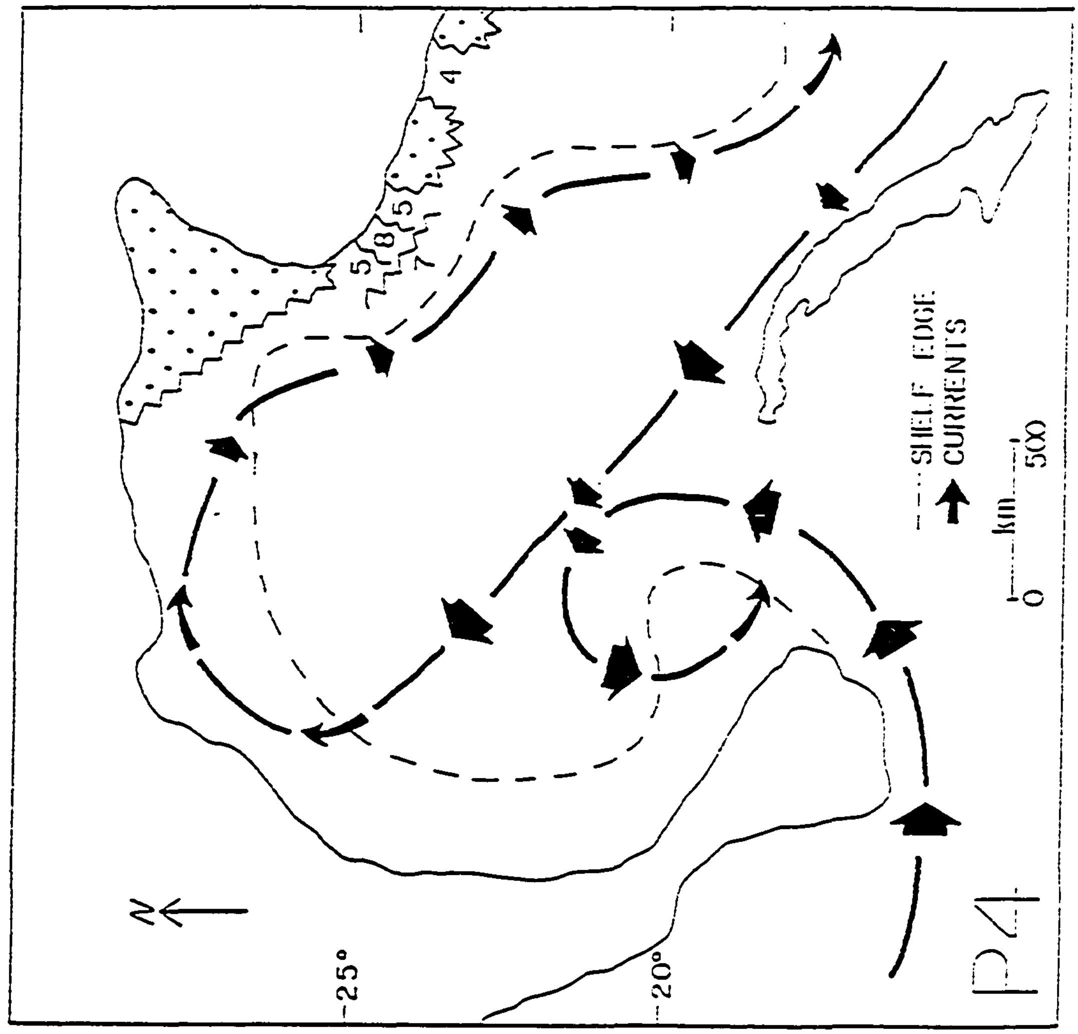


TEXT-FIGURE 15. Paleocirculation interpretation during late Zone P3. (4 = Gyroidinoides).

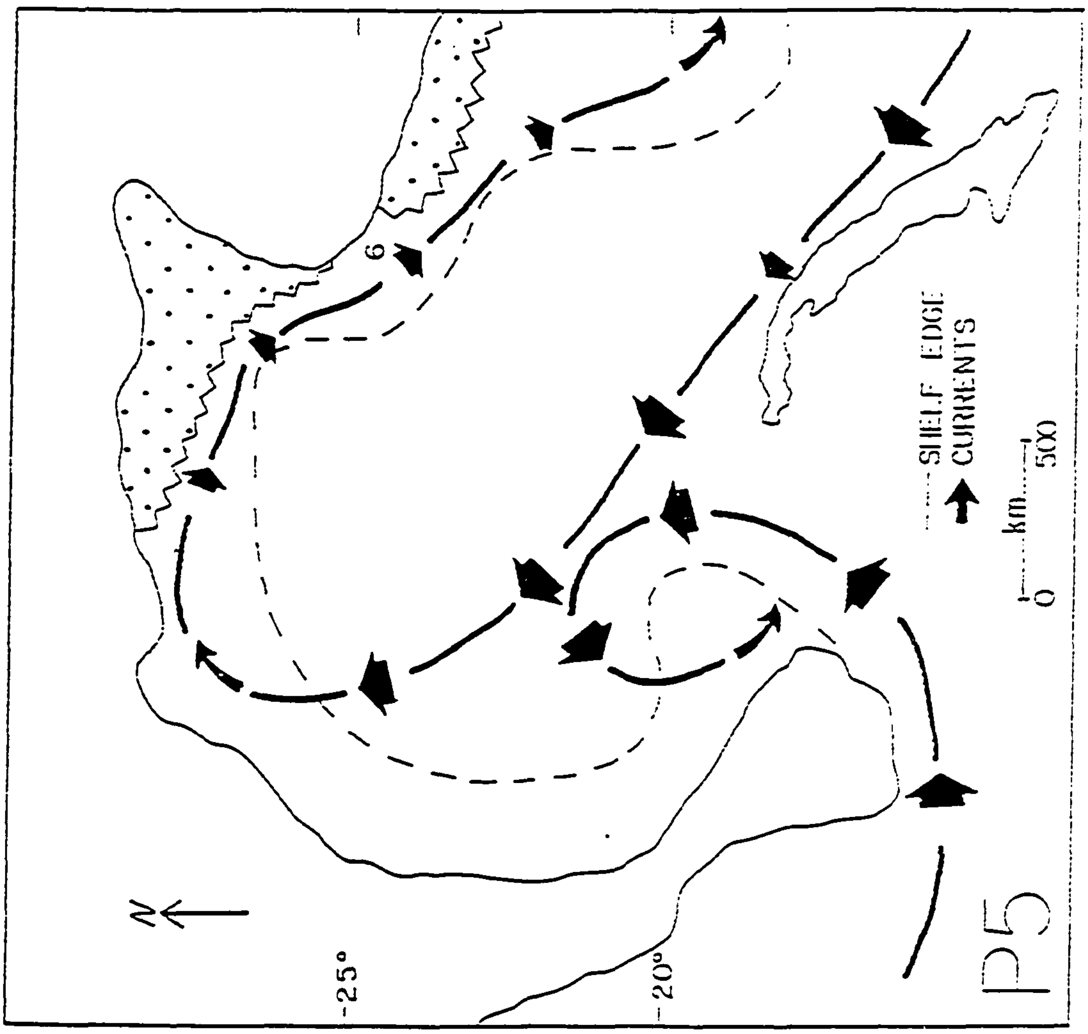
During Zone P4 time (Text-Figure 16), continued clastic progradation, especially in the western Gulf Coastal Plain caused a deflection in the northern Gulf current which placed the western part of the study under renewed influence of oceanic waters as evidenced by the Gyroidinoides-Eponides assemblage. Benthic foraminiferal assemblages obtained from the eastern portion of the study area contain the Gyroidinoides assemblage. This is consistent with the circulation model as the eastern part of the study area is much more distant from the northern Gulf current.

During Zone P5 and P6 time (Text-Figures 17 and 18), clastic wedge progradation placed the eastern Gulf Coastal Plain under the influence of oceanic waters. All samples collected from sediments of these ages contain the Eponides assemblage.

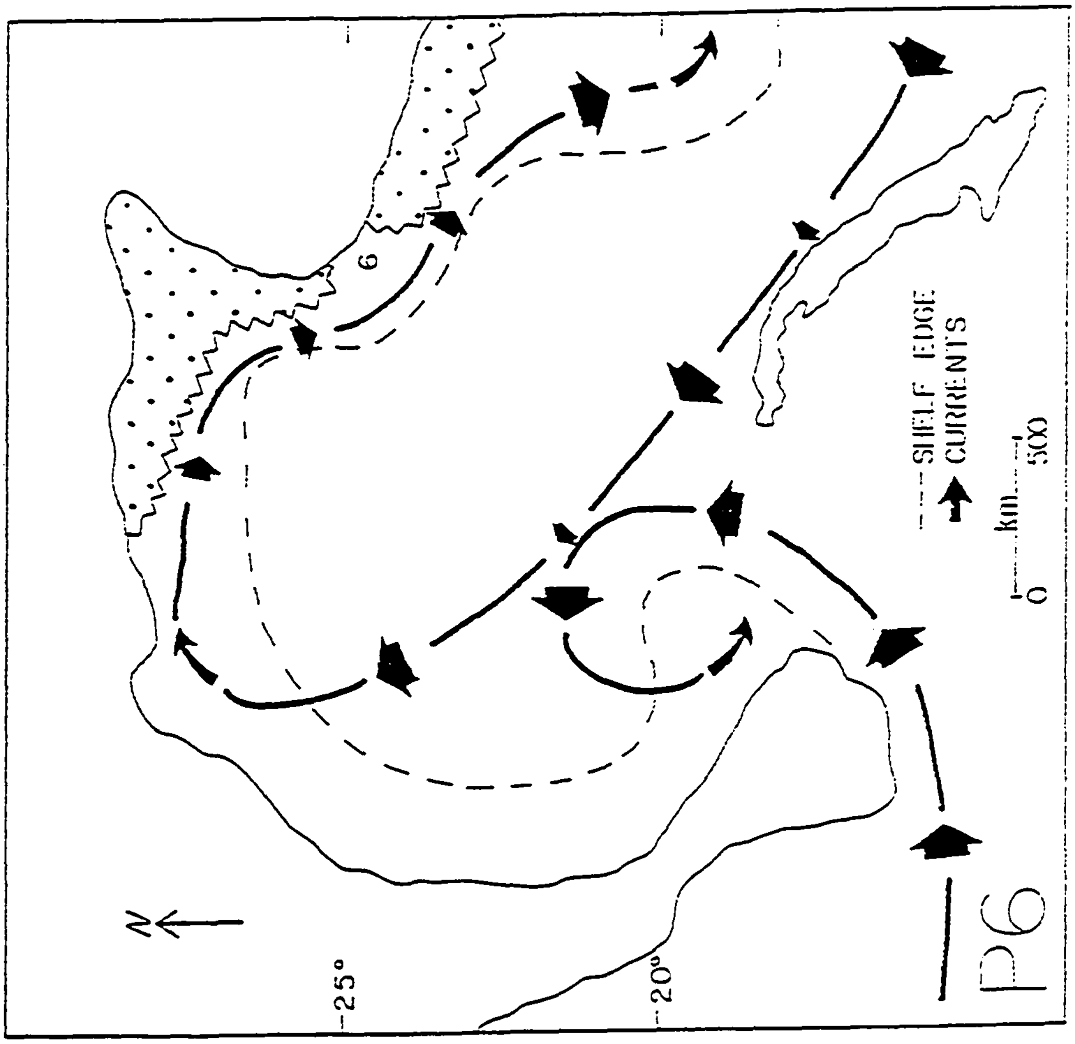
The preceding discussion demonstrates that the paleoecologic conditions associated with oceanic circulation exert a significant control on benthonic foraminiferal assemblages even in environments which are commonly associated with shallow water. It is suggested that the effects of oceanic circulation should not be ignored in any paleoecologic reconstruction.



TEXT-FIGURE 16. Paleocirculation interpretation during Zone P4. (4 = *Gyroidinoides*, 5 = *Gyroidinoides-Eponides*, 7 = *Discocyclina-Pseudophragmina*, 8 = *Bulimina*)



TEXT-FIGURE 17. Paleocirculation interpretation during Zone P5. (6 = Eponides).



TEXT-FIGURE 18. Paleocirculation interpretation during Zone P6. (6 = Eponides).

PALEOECOLOGY

The modern Gulf of Mexico provides an example for the construction of paleoecologic models. Culver and Buzas (1983) determined that water mass properties controlled the distribution of modern benthonic foraminiferal assemblages from the Gulf of Mexico. Thus, oceanographic parameters in the modern Gulf which are significant in developing paleoecologic models for the Paleocene are temperature, salinity, and oxygen content. Nowlin (1971) studied these three parameters in the Gulf of Mexico. He found that the base of the surface mixed layer was at approximately 100 meters of depth. In the surface mixed layer, temperature and salinity were found to vary with distance from shore and not depth. Thus surface valves in water less than 100 m in depth are those for the base of the water column. Temperature in the modern Gulf of Mexico was found to vary from around 18°C nearshore to 24°C offshore in the northern Gulf during January. For the same area during July the variation is from 28°C to 29°C from nearshore to offshore. An average annual temperature for the northern Gulf is 26°C. Salinity ranges from about 34 o/oo nearshore to about 36.25 o/oo offshore for the northern Gulf. Seasonal effects are not as obvious as with temperature. The average value of oxygen content is 4.6 ml/l. Variations from this mean develop locally in the surface mixed layer.

The variation of oceanographic parameters with the distance from shore in the modern Gulf of Mexico surface mixed layer is a point of comparison for the paleoecologic model presented here. As the geologic setting of the eastern Gulf Coastal Plain makes water depths greater than 100 m unlikely during the Paleocene, all benthonic foraminiferal assemblages obtained represent conditions of the surface mixed layer. Thus, changes in benthonic foraminiferal assemblages are interpreted to indicate changes related to distance from shore.

The analysis of the benthonic foraminifera faunas defines eight distinct assemblages. Six of these are derived through principal component methods and two were qualitatively defined. The paleoecologic message recorded by particular assemblages are further evaluated by comparing them to Paleocene benthonic foraminiferal assemblages of other workers (Morozova, 1960; Kellough, 1965; Berggren, 1974a, 1974b; and Berggren and Aubert, 1975). The work of Boersma and Premoli Silva (1983) on Paleocene planktonic foraminifera of the Atlantic Ocean is used in this study to provide temperature estimates of surface waters and temperature gradients in the water column. Samples which contain both planktonic and benthonic foraminifera provide reasonable estimates of paleotemperatures.

It is instructive to note that all assemblages consist of species whose percent distribution vary from sample to sample; but all are present in different samples. All species which characterize an assemblage may occur in other assemblages. It is the relative abundance of the species which varies and indicates changes in paleoecologic parameters. Each one of these assemblages represents sets of paleoecologic conditions prevailing at the base of the water column.

Description of Assemblages

Lenticulina - *Anomalinoides* Assemblage

This assemblage is characterized by a low species diversity and a great abundance of *Anomalinoides umboniferus*, *Ceratobulimina perplexa* and robust lenticulinids. In the four samples assigned to this assemblage, planktonic tests were few in number in the association.

The stratigraphic and geographic distribution of this assemblage is widespread. One sample is from the highly burrowed, glauconitic sandy clay of the McBryde Member of the Clayton Formation in Butler County, Alabama. The same assemblage appears higher in the same section, from the glauconitic, bioturbated sands of the Porters Creek Formation. The *Lenticulina-Anomalinoides* assemblage was also collected from the sandy, glauconitic chalk at the top of the Franklin's Landing beds of the Clayton Formation in the Chattahoochee Valley of eastern Alabama and western Georgia and from the massive, glauconitic sand from the upper "*Ostrea thirsae* beds" of the Nanafalia Formation at Lott's Landing, Marengo County, western Alabama.

All of the sample localities have differing lithologies and are of differing ages but there are several unifying characteristics. First, all of the samples come from highly bioturbated sediments. Second, all four of the samples come from glauconite rich sections. The above two phenomena point to a lack of strong current activity and to a slow sedimentation rate.

Examination of the glauconite shows most of the grains to be angular and unabraded indicating that much of the glauconite is authigenic in nature. Cloud (1955), in a summary of the conditions of formation of glauconite, defined the limits of this process using temperatures, salinities, and water depths. The conditions of formation were found to vary widely but two important factors were sedimentation rate and oxygen content of the water. A low rate of sedimentation and a reduced oxygen content at the base of the water column were considered conducive to the formation of authigenic glauconite. In the samples studied, evidence of reduced oxygen content at the sediment water interface is seen in the conspicuous absence of macroinvertebrate fossils which are very common in most sections of the Paleocene in the study area. Additionally, all of the burrows are horizontal or slightly inclined to bedding indicating deposit feeders as opposed to the vertical burrows of suspension feeders.

Assemblages similar to the Lenticulina - Anomalinoides assemblage were not noted in the Paleocene of Texas by Kellough (1965) or in the assemblages encountered at Rockall Bank by Berggren (1974a). Nogan (1964) observe an increase in the abundance of Anomalinoides unboniferus in certain assemblages from the Aquia Formation of Maryland and Virginia. The Anomalinoides umboniferus assemblages collected by Nogan had some similarities to the

Lenticulina - *Anomalinoides* assemblage recognized in this study, notably an increase in glauconite abundance and a decrease in benthonic foraminiferal diversity. Nogan also noted an increase in planktonic foraminifera abundance, in sharp contrast to the *Lenticulina* - *Anomalinoides* assemblage obtained in this study.

Nogan (1964) asserted that the high abundance of glauconite in association with *Anomalinoides umboniferus* represented poorly oxygenated water at the sediment-water interface and a low sedimentation rate. Nogan attributed the high planktonic percentage in association with his *Anomalinoides umboniferus* assemblages to a reduced clastic influence in this samples.

Although the basic paleoecologic parameters of Nogan (1964) for his *Anomalinoides umboniferus* assemblage are accepted here, it is apparent that the *Lenticulina* - *Anomalinoides* assemblage as recognized in the study area represents a somewhat different paleoecologic setting. The near total absence of planktonic foraminiferal tests in conjunction with a high percentage of terriginous sediment indicates that terriginous influence is greater in the samples containing the *Lenticulina* - *Anomalinoides* assemblage than in the Aquia Formation and possibly indicates deposition closer to the strandline than the *Anomalinoides umboniferus* assemblage from the Aquia. Nogan does not provide an estimate for depth of deposition for the *Anomalinoides umboniferus* assemblages of the Aquia Formation. Berggren and Aubert (1975) indicate that the depth of deposition for the Aquia may in fact be quite shallow (less than 90 m) despite the apparent high abundance of planktonic foraminifera. The high percentage of planktonic tests in the Aquia may be an error as *Globorotalia perclara*, the dominant "planktonic" species identified by Nogan (1964) from the Aquia, is not a planktonic but a benthonic species (Berggren and Aubert; 1975, p. 87).

Comparison of the fauna of the *Lenticulina* - *Anomalinoides* assemblage with the paleoecologic assemblages listed by Berggren and Aubert (1975) from the Paleocene of Texas indicates a strong affinity with the assemblage of the Lower Kerens Member of the Wills Points Formation. Based on sedimentologic criteria, Kellough (1965), estimated the depth of deposition of the Lower Kerens Member at 18 m. Although the Lower Kerens Member has a lower diversity than the *Lenticulina* - *Anomalinoides* assemblage in Alabama, both assemblages contain an abundance of *Ceratobulimina perplexa*. The lack of an agglutinated faunal component in Alabama may be related to the generally coarser grain size in Alabama than that seen in the Kerens Member. The coarser grain size and the lower species diversity, indicate a deposition near the strandline for the _Lenticulina_ - _Anomalinoides_ assemblage in Alabama.

The small number of samples containing the _Lenticulina_ - _Anomalinoides_ assemblage indicates that it may represent isolated conditions not normally associated with ecologic changes brought about by transgressive - regressive cycles. An accurate estimate of bottom paleotemperatures is not possible as none of the samples contain planktonic foraminifera from which to derive a paleotemperature gradient. The work of Boersma and Premoli Silva (1983) provides an estimate of surface temperatures in the Atlantic during Paleocene time. These estimates were extended into the Gulf of Mexico and are used here. As the _Lenticulina_ - _Anomalinoides_ is a shallow water assemblage, this may be an accurate estimate of bottom paleotemperatures and are projected to range from 14^{o}-16^{o}C as a reasonable value.

Cibicidoides - Anomalinoides Assemblage

The Cibicidoides - Anomalinoides assemblage represents what previous workers such as Berggren (1974a; 1974b) and Berggren and Aubert (1975) have defined as the typical Midway faunal assemblage. It is characterized by high percentages of Cibicidoides alleni, Anomalinoides midwayensis, Alabamina midwayana (and its descendant species Alabamina westraliensis past Zone P3 time), Globulina gibba, Guttulina problema, and Nodosaria affinis. Also associated with this assemblage is a moderate percentage of Lenticulina midwayana, Anomalinoides umboniferus, and Anomalinoides acutus. Also numerous subsidiary species are present.

The Cibicidoides - Anomalinoides assemblage occurs throughout the Paleocene section in the study area in varying lithologies and from various biostratigraphic horizons from the oldest to the youngest. Benthic foraminifera species diversities are moderate (about 20 species present) and planktonic - benthonic ratios are low (.02 or less).

The Cibicidoides - Anomalinoides assemblage bears strong resemblance to the Lenticulina - Anomalinoides assemblage previously discussed. There are many common faunal elements and some similarity in depositional characteristics of the sediments from which the samples were collected. The two assemblages differ in one striking aspect. What characterizes the Lenticulina - Anomalinoides assemblage is the dominance of a single species, Anomalinoides umboniferus, comprising as much as 75% of the entire assemblage. By contrast, the fauna of the Cibicidoides-Anomalinoides assemblage is characterized by a smaller range of species dominance and thus a higher species diversity.

Foraminiferal faunas similar to the Cibicidoides-Anomalinoides assemblage have been reported from many areas around the world. Especially important is the assemblage described from Deep Sea Drilling Project Site 117, Rockall Bank by Berggren (1974a). Rockall Bank has a well documented history of subsidence and thus it was possible for Berggren to assign water depth ranges to the benthonic foraminifera species he studied. Many of the species which characterize the Cibicidoides - Anomalinoides assemblage from the eastern Gulf Coastal Plain have a depth range from less than 1 m to over 100 m. Most range between 30 m and 50 m in depth. Alabamina midwayana has a depth range of less than 30 m at Rockall Bank while Cibicidoides alleni ranges from 10 m to over 200 m in depth.

A Cibicidoides - Anomalinoides assemblage was also recognized by Berggren (1974b) from the Sirte

Basin of Libya where the depth range of this assemblage is considered to be from approximately 50 m to nearly 200 m in depth. The assemblage in Libya is characterized by Cibicidoides alleni, Lenticulina midwayana, and Alabamina midwayensis as well as Anomalinoides acutus and Gavelinella danica, a species encountered only rarely in the study area.

The Cibicidoides - Anomalinoides assemblage as described from Site 117, Rockall Bank and from the Sirte Basin in Libya characterize the Midway Fauna as a whole. As recognized in the eastern Gulf Coastal Plain, the Cibicidoides - Anomalinoides assemblage only partially reflects the paleoecologic conditions represented by the Midway Fauna. Berggren and Aubert (1975) examined the Paleocene assemblages of Kellough (1965) and arrived at a depth approximation of 18 m for those assemblages with high percentages of both Cibicidoides alleni and Anomalinoides midwayensis. This is consistent with the observations in this study.

The sparse planktonic foraminifera fauna associated with the Cibicidoides - Anomalinoides assemblage does not contribute to an accurate estimate of bottom paleotemperatures. The planktonic foraminifera which are associated with the Cibicidoides - Anomalinoides assemblage indicate these species have an estimated paleotemperature range of 14^{o}-16^{o}C for mid-latitudes (Boersma and Promoli Silva; 1983).

The Cibicidoides - Anomalinoides assemblage differs from the Lenticulina - Anomalinoides assemblage by having a higher diversity of benthonic foraminifera species, a slightly higher representation of planktonic species, and occurring in samples less glauconitic in nature.

Pulsiphonina - Anomalinoides Assemblage

The Pulsiphonina - Anomalinoides assemblage is characterized by a high percentage of the species Pulsiphonina prima and Anomalinoides acutus. This assemblage is distributed throughout the eastern Gulf Coastal Plain and occurs at various stratigraphic intervals. The Pulsiphonina - Anomalinoides assemblage has a relatively high benthonic foraminifera species diversity (approximately 25 species) and a planktonic to benthonic ratio of .05.

The Pulsiphonina - Anomalinoides assemblage was identified by Berggren and Aubert (1975) and was interpreted by them to represent paleoecologic conditions equivalent to the Middle Continental Shelf.

The planktonic foraminiferal faunas associated with the _Pulsiphonina_ - _Anomalinoides_ assemblage are varied even though they are few in numbers. Species present include _"Subbotina"_ _pseudobulloides_, _Planorotalites_ _pseudomenardii_, _Morozovella_ _uncinata_, and _Morozovella_ _angulata_. These species indicate estimated paleotemperatures at the surface of between 12^{o} and $21^{o}C$ (Boersma and Premoli Silva; 1983). The low estimate is based on a minimum mid-latitude surface temperature indicated by _"Subbotina"_ _pseudobulloides_. This species does not occur alone in association with the _Pulsiphonina_ - _Anomalinoides_ assemblage and likely represents lower temperatures. A strong temperature gradient is associated with the high surface temperatures indicated by the morozovellids. Based on this, an estimate of bottom temperatures would be 12^{o} - $14^{o}C$. Although the classic interpretation of this assemblage is one of depth ranging between 18 m and 90 m, it is suggested here that this assemblage represents an increase in the distance from the strandline compared to the _Cibicidoides_ - _Anomalinoides_. This implies a decrease in the temperature and an increase in salinity.

Gyroidinoides Assemblage

The *Gyroidinoides* assemblage is characterized by high percentages of species of the genus *Gyroidinoides*, most commonly *Gyroidinoides octocameratus* but also *Gyroidinoides subangulatus*. This assemblage has a moderately high diversity of benthonic foraminifera (usually greater than 30 species). Planktonic foraminifera are a common associate with the *Gyroidinoides* assemblage with planktonic-benthonic ratios approaching 0.1 although some samples have a considerably lower value.

Benthonic foraminifera species associated with the *Gyroidinoides* assemblage include high percentages of *Anomalinoides acutus*, *Lenticulina midwayana*, *Cibicidoides alleni*, *Anomalinoides umboniferus*, and a moderate agglutinated foraminiferal component (as great as 5%).

An assemblage similar to the *Gyroidinoides* assemblage described here was identified by Berggren and Aubert (1975). The assemblage was from the Mexia Clay of Texas and was considered to represent depositional conditions of 90 m of depth. Upon examination of the samples in this study, it is apparent that there are many faunal similarities yet the *Gyroidinoides* assemblage lacks many species recorded by Berggren and Aubert, notably Osangularia expansa and species of the genus Eponides. Also, the presence of Alabamina midwayana and Alabamina westraliensis would seem to indicate deposition closer to shore than suggested by Berggren, 1974a.

The work of Morozova (1960) defined nine paleocoenoses of benthonic foraminifera from the Danian of the Crimea. Morozova's Rotaliidae paleocoenose is characterized by Gyroidinoides, Alabamina and Anomalinidae as well as other forms. Additionally, the percentage of planktonic foraminifera from Morozova's Rotaliidae paleocoenose is 10% or less. Temperature estimates for Morozova's Rotaliidae paleocoenose ranged from between 20°-30°C with estimated depths of deposition from 50-60 m.

The Gyroidinoides assemblage obtained from samples in this study bears a close faunal affinity to the Rotaliidae paleocenose of Morozova (1960), and the basic paleoecologic parameters defined by Morozova are accepted for the Gyroidinoides assemblage in the eastern Gulf Coastal Plain. The estimate of depth of deposition of 50-60 m is consistent with observed sedimentary characteristics. Morozova's paleotemperature estimate of 20°-30°C for the Rotaliidae, while probably accurate for the limestones of the Crimea, is considered too high for the Gyroidinoides assemblage.

Based on the work of Boersma and Premoli Silva (1983), the associated planktonic foraminifera provide an estimated bottom paleotemperature of 11°-15°C. An increase in salinity and a decrease in oxygen content compared to the Pulsiphonina - Anomalinoides assemblage is inferred by analogy to the modern Gulf of Mexico.

Gyroidinoides - Eponides Assemblage

The Gyroidinoides - Eponides assemblage is characterized by high percentages of species of Gyroidinoides and by species of Eponides, commonly Eponides lotus. Other associated species include Anomalinoides umboniferus, Anomalinoides midwayensis, Anomalinoides acutus, Cibicidoides alleni, Lenticulina midwayensis, and Osangularia expansa. This assemblage is characterized by high diversities of benthonic foraminifera and a planktonic-benthonic ratio of approximately 0.15. A moderate agglutinated faunal component is present.

The name of this assemblage implies that there are elements of the Gyroidinoides assemblage present. What distinguishes this assemblage is the presence of species of Eponides in approximately equal proportions with that of species of Gyroidinoides. This assemblage appears to be the benthonic foraminiferal assemblage described by Berggren and Aubert (1975) from the Mexia Clay of Texas. They considered this assemblage to represent depths of deposition of 90 m. Estimates of bottom paleotemperatures based on the work of Boersma and Premoli Silva (1983) are from 11^{o}-15^{o}C. As the bottom paleotemperature estimates seem similar to the *Gyroidinoides* assemblage, an increase in salinity and oxygen content is inferred.

Eponides Assemblage

The *Eponides* assemblage is characterized by high percentages of species of *Eponides*, notably *Eponides lotus*. Moderately high species diversities of benthonic foraminifera are present and include forms such as *Anomalinoides acutus*, *Lenticulina midwayana*, *Anomalinoides midwayensis*, *Anomalinoides umboniferus*, and *Pulsiphonina prima*. A moderate agglutinated faunal component is present. A reduced number of species of *Gyroidinoides* and *Alabamina* is detected in samples containing the *Eponides* assemblage. Also conspicuous is the increase in abundance of species of *Bulimina* and *Bolivina* (as much as 10% of the total fauna). The *Eponides* assemblage marks the only association in which the species *Gavelinella danica* was found in any of the samples studied. The planktonic - benthonic ratio is approximately 0.2 for all samples.

In all the previous studies of Paleocene benthonic foraminifera paleoecology, no one has reported or defined an assemblage analogous to the *Eponides* assemblage. The closest is the Buliminidea paleocoenose of Morozova (1960). Although one characteristic of the *Eponides* assemblage is an increase in the abundance of *Bulimina* and *Bolivina*, these do not dominate the *Eponides* assemblage.

Some estimate of depth of the *Eponides* assemblage can be gained by examination of the accessory species of this association. *Gavelinella danica*, a species rare in the Gulf Coastal Plain, occurs in five samples, all associated with the *Eponides* assemblage. Although considered rare (less than 2% of the population examined) it may provide some insight into depth of occurrence. Berggren and Aubert (1975) report that *Gavelinella danica* is abundant in sediments deposited at about 100 m of depth or greater. Additionally, species of the genus *Bulimina* occur in significant numbers in association with the *Eponides* assemblage. Morozova (1960) recognized a distinct Buliminidea paleocoenose. This paleocoenose was interpreted to represent a depth range of between 90-200 m. Although the *Eponides* assemblage is not precisely analogous to the Buliminidea paleocoenose, some similarity of paleoecologic conditions is suggested.

The paleoecologic conditions associated with the *Eponides* assemblage may represent somewhat different parameters than those indicated by the previously described assemblages. The *Eponides* assemblage has an estimated paleotemperature range of 11^{o}-$15^{o}C$ based on planktonic foraminifera (Boersma and Premoli Silva, 1983).

One major factor which varies between all three assemblages is the relative distance from strandline which then accounts for water mass and circulation control in their distribution. The *Eponides* assemblage occurs in 31 of the 101 samples analyzed. Upon closer examination, the majority of these samples are from the Clayton and Porters Creek Formations. Based on sedimentologic criteria, these two units show a minimum influence of a nearby coastline. Thus it would appear that the *Eponides* assemblage is representative of paleoecologic conditions distant from shore. As demonstrated by Nowlin (1971) oceanographic parameters such as temperature, salinity, and oxygen content vary with distance from shore for the surface mixed layer in the modern Gulf of Mexico. Given this, it is inferred that the *Eponides* assemblage represents paleoecologic conditions with more typically open marine salinities and a higher oxygen content related to convergence than those represented by the *Gyroidinoides* and *Gyroidinoides* - *Eponides* assemblage.

Bulimina Assemblage

The *Bulimina* assemblage is characterized by high percentages of species of *Bulimina*, *Siphogenerinoides*, *Loxostomum*, *Eouvigerina*, and *Bolivina*. A planktonic-benthonic ratio of 0.15 was calculated for the only sample containing this assemblage.

An assemblage dominated by *Bulimina*, *Loxostomum*, and *Bolivina* was described from the Paleocene of the Crimea by Morozova (1960). The Buliminidae paleocenose was considered to represent depths of 90-200 m. This depth range overlaps with the assigned depth range of the *Eponides* assemblage. This is not suprising as the plot of the factor loadings for the sample containing the *Bulimina* assemblage groups the sample with those containing the *Eponides* assemblage. Thus, although the conspicuous maximum of species of *Bulimina*, *Loxostomum*, *Siphogenerinoides*, and *Eouvigerina* is unique in the study area and seems to have been identified elsewhere (Morozova, 1960), the faunal elements of the *Eponides* assemblage are still strong and give statistical identity to the sample. Therefore, although the *Bulimina* assemblage appears to be a different association than the *Eponides* assemblage, it may be considered a special variant of the *Eponides* assemblage.

This does not mean, however, that the *Bulimina* assemblage can be ignored. Species of *Bulimina* and the other associated genera are common in the Paleocene section of the entire Gulf Coast although in small percentages of the population. The sudden rise in abundance of these genera indicates a change in paleoecologic conditions which were favorable to population growth of these species. Roag (1981) associates the *Bulimina* assemblage in the modern Gulf of Mexico with the oxygen minimum layer. Association of the Paleocene *Bulimina* assemblage with oxygen deficienty conditions is inferred.

The inferred oxygen deficient conditions represented by the *Bulimina* assemblage may be further verified from a study of the sediment in which the assemblage occurs. In the case of the Buliminidae paleocoenose of Morozova (1960), the assemblage was associated with marls, clays, and sandy clays associated with pyrite. Using the chemical classification of sedimentary environments of Berner (1981) and the modifications of this system by Maynard (1982), the presence of pyrite in the sediments indicates sulfate reduction by bacteria in an anoxic environment. In anoxic environments, increased sulfate was considered to be related to increased salinity by Maynard (1982). Contrasted to the *Eponides* assemblage of the eastern

Gulf Coast, which is not associated with pyrite rich sediments, the Buliminidae paleocoenose occupies a similar position from the strandline but is associated with waters with a lower oxygen content. The _Bulimina_ assemblage recognized here is associated with pyrite and is also associated with glauconite. The sediments are poorly laminated indicating bioturbation and are presently poor in organic matter. This indicates sufficient oxygen to support benthonic deposit feeders. Based on these criteria, the _Bulimina_ assemblage represents deposition with reduced but not totally deficient oxygen levels thus differing from the model of Maynard (1982).

Associated with the _Bulimina_ assemblage is an increase in the number of individuals of _Anomalinoides umboniferus_. This species was considered by Nogan (1964) to represent a decrease in the oxygen content of the bottom waters and is associated in the eastern Gulf Coast with the _Lenticulina_ - _Anomalinoides_ assemblage. Although the dominant paleoecological message of _A. umboniferus_ seen in the _Lenticulina_ - _Anomalinoides_ assemblage is not apparent in the _Bulimina_ assemblage, its increase in abundance is consistent with the interpretation of decreased oxygen content of the bottom water.

In the present Gulf of Mexico, the decrease in oxygen content in the Subtropical Underwater is associated with an increase in salinity (Nowlin; 1971). Both factors occur with increasing depth; an oxygen minimum and a salinity maximum for the Subtropical Underwater occurring at about 200 m. Although it is tempting to associate the Bulimina assemblage with increasing water depth, one would expect a more widespread occurrence of this assemblage if this were the case. As only one sample was identified with the Bulimina assemblage, it is considered to represent a local change in the chemistry of the bottom waters. Although the Bulimina assemblage may be characteristic of water depths approaching 200 m, further study of this assemblage is necessary in order to fully understand its paleoecologic significance.

Discocyclina - Pseudophragmina Assemblage

The characteristics and distribution of the Discocyclina-Pseudophragmina assemblage have already been discussed. Like the Bulimina assemblage, species which characterize the Discocyclina-Pseudophragmina assemblage are too rare, when the entire sample group is considered, to exert any significant influence on the statistical analysis. As a result, the six samples of the Salt Mountain Limestone, all of which are associated with the Discocyclina-Pseudophragmina assemblage, plot on the factor loadings with other assemblages.

The samples associated with Discocyclina-Pseudophragmina assemblage contain a typical Midway Fauna associated with the unique species of the Salt Mountain Limestone. This association was first recognized by Berggren (1974a) and reaffirmed by Berggren and Aubert (1975). In this study, the Discocyclina- Pseudophragmina assemblage is associated with a variety of assemblages characteristic of distance from the strandline. None of the Pseudophragmina samples were associated with assemblages characteristic of oceanic conditions and none were associated with the lower oxygen parameter characterized by the Lenticulina - Anomalinoides assemblage.

The benthonic foraminifera associated with the Discocyclina-Pseudophragmina assemblage are similar to those associated with previously defined assemblages. Yet some additional environmental factors must be operating. From the associated assemblages, one can infer that the Discocyclina-Pseudophragmina assemblage occurs over a wide depth range (0-60 m) and through the associated salinity and temperature ranges. The Discocyclina-Pseudophragmina assemblage is associated with water with a normal oxygen content.

As all samples of the Discocyclina-Pseudophragmina assemblage are from the Salt Mountain Limestone, there are many depositional similarities which occur. First, and most significant, is the lack of terriginous material in the samples. This indicates a lack of terrestrially derived clastics and an implied increase in water clarity. Second, all of the samples are associated with a prograding reef complex based on sedimentologic criteria. These factors place the Discocyclina- Pseudophragmina assemblage within a depositional framework from which paleoecologic conditions can be inferred.

Hallock (1985) has listed some of the important ecologic factors associated with large foraminifera. She states that larger foraminifera occur at various depths along the shelf and all are found in ecologically stable environments characterized by limited nutrient resources. Also, many large foraminifera possess algal symbionts and thus, need abundant sunlight to enable photosynthesis. Hallock (1985) states that reef environments characterize these conditions and that many recent larger foraminifera faunas have been reported to develop in association with reef environments.

The _Discocyclina- Pseudophragmina_ assemblage is related to two paleoecologic parameters not considered in the previously described benthonic foraminifera assemblages. Water clarity and the low availability of nutrients are here considered the significant variables in the development of this assemblage. As the _Discocyclina-Pseudophragmina_ assemblage occurs in association with other assemblages, the low availability of nutrients may not be as significant as the water clarity.

The stratigraphically upward disappearance of the _Discocyclina-Pseudophragmina_ assemblage in the Salt Mountain Limestone is thought to be related to progressively shallowing conditions associated with reef growth and a transition from low to high energy conditions.

Summary

The eight quantitatively defined benthonic foraminiferal assemblages recognized in this study are thought to reflect paleoecological and paleoceanographic parameters. Based on the results of this study and guided by the work of Streeter (1973), Briskin and Berggren (1975), Lohman (1978), Bremer, Briskin, and Berggren (1980), Boersma and Premoli Silva (1983) and the work of Nowlin (1971) in the Gulf of Mexico, it is concluded that the distribution of the assemblages correlates with paleoceanographic parameters and distance from the strandline in the region of the Gulf of Mexico during the Paleocene.

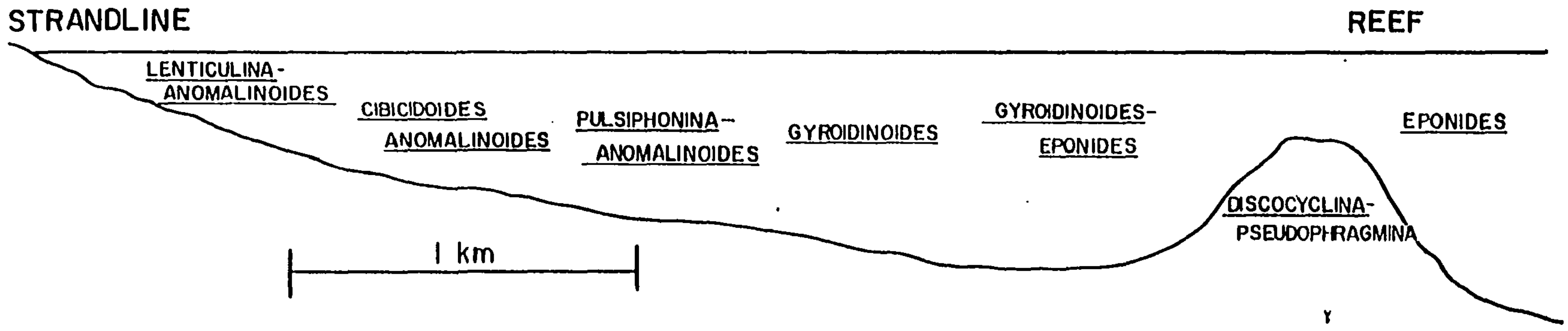
The paleoecologic and paleoceanographic parameters represented by the eight defined assemblages are presented in Table 3. An idealized diagram showing the position of the assemblages relative to the strandline is shown in Text-Figure 19.

TABLE 3

Summary of Paleoecologic-Paleoceanographic Setting for the Benthic Foraminiferal Assemblages from the Paleocene of the Eastern Gulf Coastal Plain

Assemblage	Paleoecologic & Paleoceanographic Conditions	Estimated Paleotemperature Range (Boersma and Premoli Silva, 1983)
Lenticulina-Anomalinoides	Nearshore Anoxic	$14^{\circ}-16^{\circ}C$
Cibicidoides - Anomalinoides	Nearshore Oxic	$14^{\circ}-16^{\circ}C$
Pulaiphonina-Anomalinoides	Middle Neritic	$12^{\circ}-14^{\circ}C$
Gyroidinoides	Outer Neritic, Oxic Shelf Waters	$11^{\circ}-15^{\circ}C$
Gyroidinoides - Eponides	Continental-Oceanic water Transition	$11^{\circ}-15^{\circ}C$
Eponides	Oxygen rich, Open Marine Salinities Oceanic Waters	$11^{\circ}-15^{\circ}C$
Discocyclina - Pseudophrogmina	Nutrient Poor, Clear Water	$12^{\circ}-21^{\circ}C$
Bulimina	Outer Neritic, Anoxic	$13^{\circ}-16^{\circ}C$

IDEALIZED DISTRIBUTION OF PALEOCENE BENTHIC FORAMINIFERAL ASSEMBLAGES



TEXT-FIGURE 19. Idealized diagram showing the relationship of Paleocene benthic foraminiferal assemblages in the eastern Gulf Coastal Plain

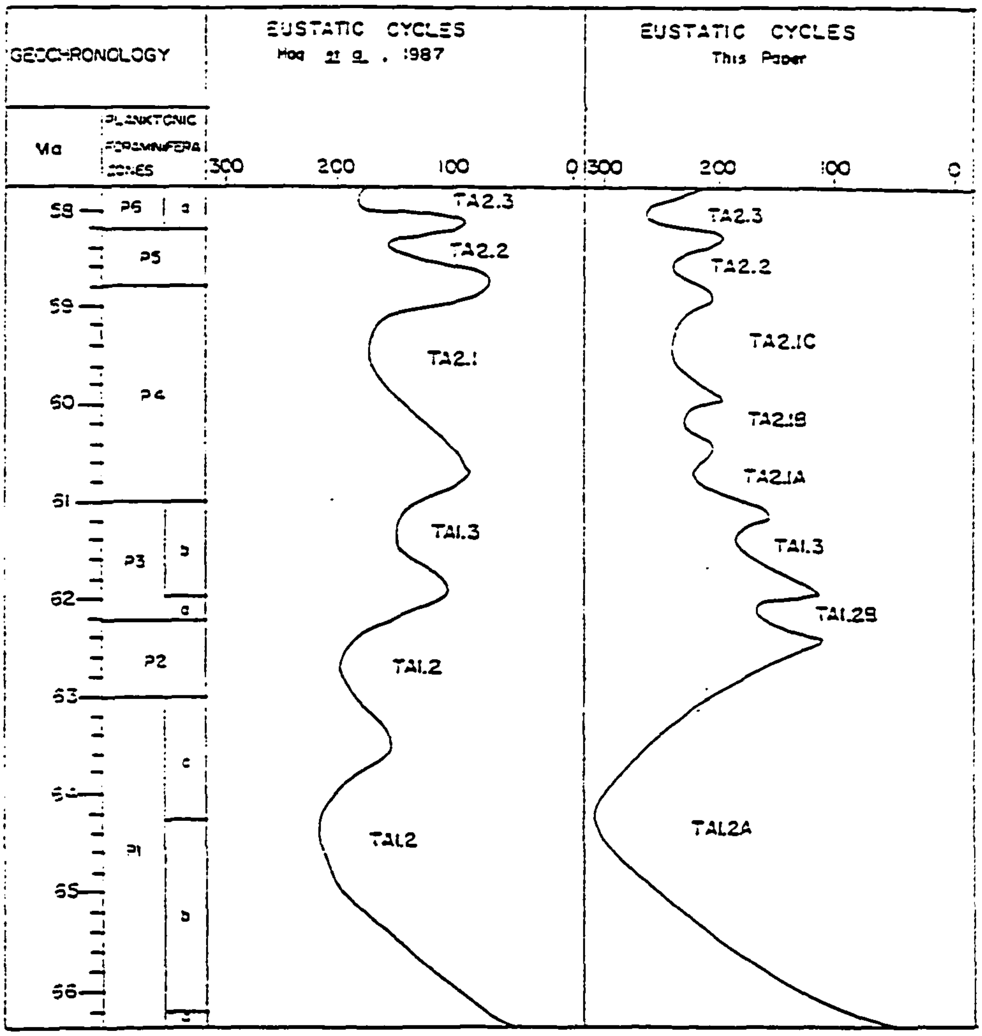
TRANSGRESSIVE-REGRESSIVE CYCLES

The recognition of transgressive-regressive cycles within the Paleocene section of the eastern Gulf Coast is based on the paleoecology of benthonic foraminiferal assemblages. The definition of Vail et al. (1974) for a eustatic cycle is used in this study. A eustatic cycle consists of a relative rise, stillstand, and fall of sea level on a global scale. Cycles recognized on a local scale will adhere to the same definition in this study.

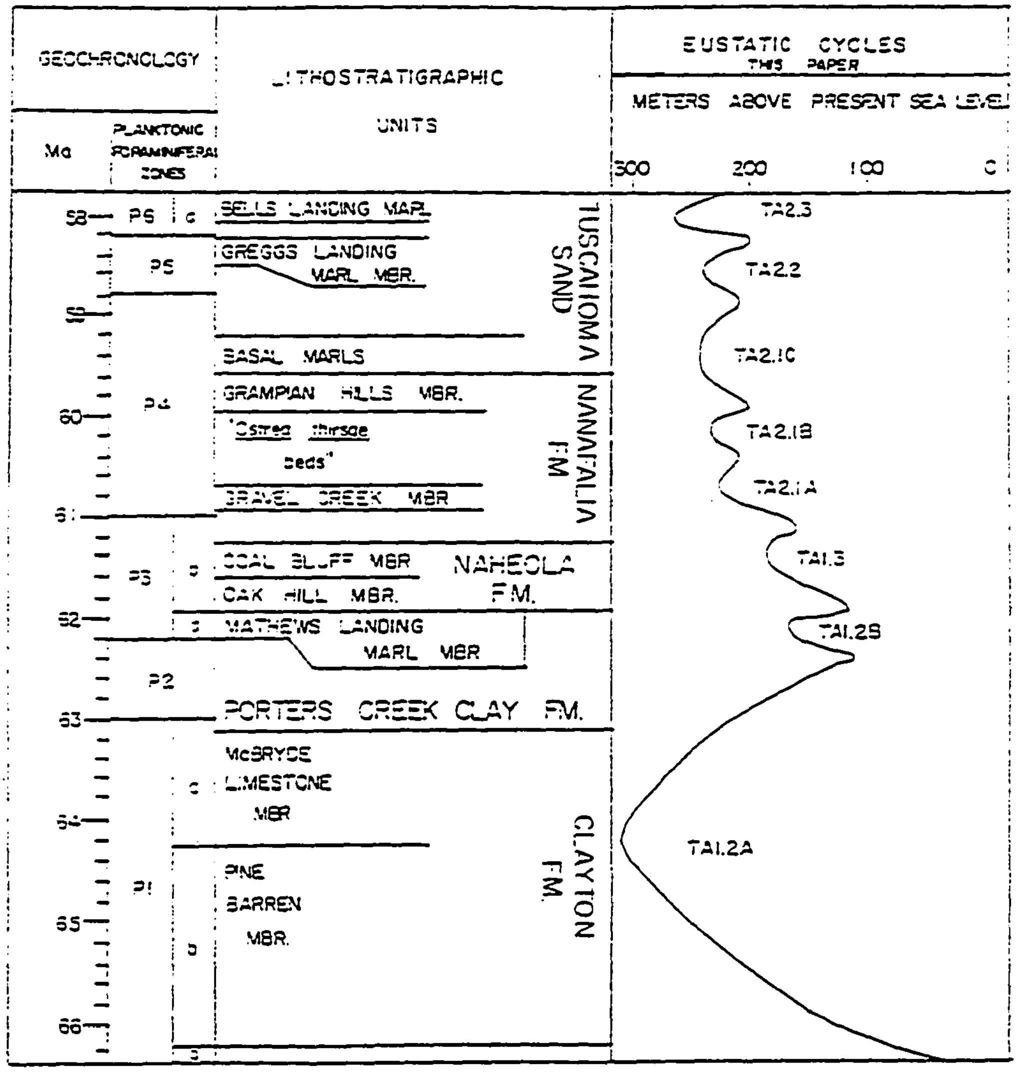
Vail, Mitchum, and Thompson (1977) recognized global transgressive-regressive cycles based on onlap-offlap seismic stratigraphic relationships. This has recently been revised by Haq, Hardenbol, and Vail (1987). In the Paleocene, Haq et al. (1987) distinguished two major eustatic cycles. The first cycle includes sediments assignable to planktonic foraminifera zones P1 through P3. The second cycle is represented by sediments assigned to planktonic foraminifera zones P3 through P6.

The transgressive-regressive cycles recognized in this study are correlated with the eustatic cycles of Haq, Hardenbol, and Vail (1987). The notation of Vail et al. (1977) for identifying cycles by symbols rather than geographic names is employed. All cycles recognized are third order cycles and sequences within cycles. Some modification to the cycles of Haq, Hardenbol, and Vail (1987) has been adopted in this study. These modifications are all the result of benthonic foraminiferal paleoecologic data. Text-Figure 20 shows the comparison of the eustatic sea level curve of Haq, Hardenbol, and Vail (1987) compared to the one derived in this study. Text-Figure 21 shows the relationship of the eustatic cycles to the lithostratigraphic units.

As the benthonic foraminiferal assemblages are associated with distance from shore, they become a valuable tool in recognizing transgressive-regressive cycles. In this study, the benthonic foraminiferal assemblages are related to the geochronologic scale of Berggren et al. (1985) through the use of planktonic foraminiferal biostratigraphy. Once placed within the geochronologic framework, the changes in benthonic foraminiferal assemblages can be noted with relationship to time. As each assemblage indicates different paleoceanographic conditions generally associated with the distance from the strandline, changes in these represent a change in the paleoceanographic system and strandline relative to the sample location. This change in the position of the strandline represents either transgressive or



TEXT-FIGURE 20. Comparison of Paleocene eustatic sea level curve developed in this study with that of Haq, Hardenbol, and Vail (1987)

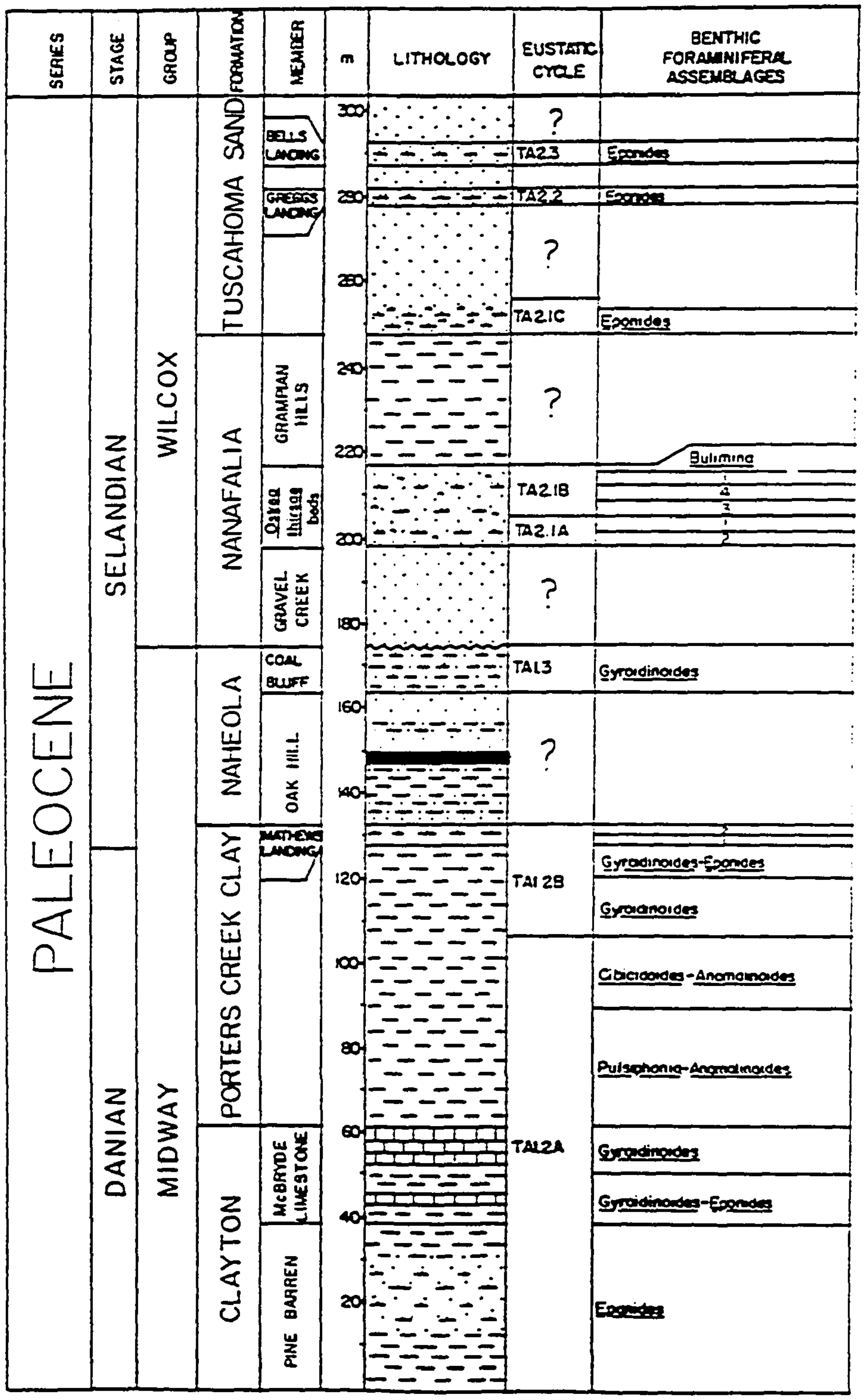


TEXT-FIGURE 21. Relationship of Paleocene lithostratigraphic units of the eastern Gulf Coastal Plain to eustatic cycles.

regressive events. By placing the paleoecologic data within the geochronologic framework, a duration of each transgressive-regressive sequence can be determined and a meaningful comparison can be made to the sequences of Haq et al. (1987). Paleoecologically controlled benthonic foraminiferal assemblages are a powerful tool in recognizing transgressive-regressive sequences within units with similar sedimentologic characteristics and will verify those cycles already defined by seismic stratigraphic methods.

In order to recognize relative changes in strandline position, a fixed geographic point is necessary. The particular geologic setting of the eastern Gulf Coastal Plain renders long, continuous stratigraphic sections rare. Additionally, core samples could not be used because of low benthonic foraminiferal population density. In Wilcox County, Alabama it is possible to construct a composite stratigraphic section which includes all the major marine transgressive-regressive sequences recognized (Text-Figure 22).

The Pine Barren Member of the Clayton Formation is the oldest Paleocene formation in the eastern Gulf Coast and is associated with transgressive-regressive cycle TA1.2 of Haq, Hardenbol, and Vail (1987). Samples



1. Eponides ASSEMBLAGE
2. Pulsiphonina-Anomalinoides ASSEMBLAGE
3. Gyroidinoides ASSEMBLAGE
4. Gyroidinoides-Eponides ASSEMBLAGE

TEXT-FIGURE 22. Composite measured stratigraphic section for Wilcox County, Alabama.

of the Pine Barren examined for this study all contained the same benthonic foraminiferal assemblage. This fauna was associated with the Eponides assemblage indicating depths of deposition far from shore. Even the two samples from directly above the disturbed layer at the Cretaceous-Paleogene boundary, one from the Pine Barren at the Braggs Section of Worsely (1974) and one from the Chalybeate Limestone from near Scooba, Mississippi, contained the Eponides assemblage.

The presence of the Eponides assemblage in the Pine Barren Member is not surprising as this unit is associated with transgressive-regressive cycle TA1.2A the major transgression of the Paleocene, and represents the maximum rise in sea level of the entire Cenozoic.

The McBryde Limestone Member, which overlies the Pine Barren Member, contains a much different association of benthonic foraminiferal assemblages. Samples collected from the lower portion of the McBryde Limestone contain the Gyroidinoides-Eponides assemblage indicating a closer proximity of the coastline than conditions represented by the Pine Barren Member. This trend continues through the middle and upper McBryde Limestone as samples from this part of the unit contain the Gyroidinoides assemblage indicating a close proximity of the shore.

The lower and middle portions of the Porters Creek Clay also show a continuation of the trend of a prograding coastline. Samples from the lowermost Porters Creek Clay contain a benthonic foraminiferal association assignable to the *Pulsiphonina* - *Anomalinoides* assemblage. Samples from the middle portion of the Porters Creek Clay contain a benthonic foraminiferal fauna characteristic of the *Cibicidoides*-*Anomalinoides* assemblage. The sequence of benthonic foraminiferal assemblages represents a change in paleoecologic conditions from outer neritic in the upper McBryde Limestone to inner neritic in the middle portion of the Porters Creek Clay.

In samples from the upper part of the Porters Creek Clay, the sudden appearance of the *Gyroidinoides* assemblages marks an increase in sea level. The record of this renewed transgression extends into the lower part of the Mathews Landing Marl Member of the Porters Creek Clay. The benthonic foraminiferal assemblages progress from the *Gyroidinoides* assemblage to the *Gyroidinoides*-*Eponides* assemblage in the upper part of the Porters Creek Clay, to the *Eponides* assemblage in the lower Mathews Landing Marl. The upper part of the Mathews Landing Marl has produced a benthonic foraminiferal fauna associated with the *Pulsiphonina*-

Anomalinoides assemblage, indicating a middle neritic environment. This record of transgression-regression is interpreted as being associated with Cycle TA1.2 of Haq, Hardenbol, and Vail (1987).

The above discussion is significant not only in that it identifies the record of two transgressive-regressive cycles but also that it occurs in what is essentially a conformable sequence. The basic transgressive-regressive cycles of Haq, Hardenbol, and Vail (1987) as discerned by seismic stratigraphy and outcrop and subsurface studies are upheld by the paleontologic criteria.

The benthonic foraminiferal assemblages present a modified view of each cycle. In cycle TA1.2A, the coastline began to prograde in Zone P1c and continued into Zone P2. This change in shoreline proximity demonstrated by benthonic foraminifera assemblages is supported by the association of coarse clastic facies of P1c and P2 in central Alabama. Also, coastline retrogression is indicated by the benthonic foraminiferal assemblages during late P2 into P3a. A progradation occurs in late P3a. This second transgresive-regressive cycle is associated with Cycle TA1.2B.

The Coal Bluff Marl Member of the Naheola Formation represents sequence TA1.3 as recognized in this study. With the absence of foraminifera from most Coal Bluff localities and the presence of charophytes, a shallow marine fauna was expected. Yet, when present the benthonic foraminiferal assemblage which characterizes the Coal Bluff is the Gyroidinoides assemblage.

Although seemingly inconsistent with sedimontologic indicators the benthonic foraminiferal assemblage found in the Coal Bluff is considered a true indicator of paleoecologic conditions. Such variations near shore are found in the complex situations associated with prograding deltaic complexes. On the present Mississippi Delta, foraminiferal assemblages from prodelta clays brought to the surface by diapirism indicate deposition under outer neritic conditions within 2 km of shore (Andersen, 1961). The Coal Bluff Marl, as one of the most complex and geographically restricted lithofacies in the eastern Gulf Coastal Plain, fits this model well. Based on the Gyroidinoides assemblage present, an estimate of maximum transgression for Sequence TA1.3 is 150 m above present sea level. Sequence TA2.1 of Haq, Hardenbol, and Vail (1987) is here divided into three distinct sequences based on benthonic foraminiferal assemblages.

Sequence TA2.1A is represented by the "*Ostrea thirsae* beds" in the eastern Gulf Coastal Plain. As the "*Ostrea thirsae* beds" form excellent outcrops and contain abundant benthonic foraminifera, a very good record of changes in depth exists for this unit.

Samples from the basal part of the "*Ostrea thirsae* beds" contain benthonic foraminifera characteristic of the *Anomalinoides*-*Pulsiphonina* assemblage. The conditions indicated by this assemblage are middle neritic. The benthonic foraminiferal associations encountered above the *Anomalinoides*-*Pulsiphonina* assemblage are assignable to the *Eponides* assemblage indicating paleoecologic conditions far from shore. Benthic foraminiferal assemblages indicate a prograding coastline follow the *Eponides* assemblage. The *Gyroidinoides* assemblage is present but is then succeeded by the *Gyroidinoides*-*Eponides* assemblage indicating a second rise in sea level. This second transgression is here assigned to Sequence TA2.1B (New Sequence). The *Eponides* assemblage is re-established toward the upper portion of the "*Ostrea thirsae* beds" indicating maximum transgression but it is succeeded by the *Gyroidinoides* assemblage in all studied sections. This indicates the regressive phase within sequence TA2.1B. In all but one section, the *Gyroidinoides* assemblage is the uppermost assemblage which was obtained. At Gravel Creek, the uppermost bed produced a benthonic foraminiferal assemblage assigned to the Bulimina assemblage. The paleoecologic parameters of this assemblage have been discussed (see Paleoecology Section) and any definite statement of depth based on the Bulimina assemblage must await further study.

The basal marl beds of the Tuscahoma Sand represent a third recognized sequence within Cycle TA2.1. The marl beds are thin and none are recognized throughout the entire study area. Although apparently representing minor transgressive pulses, the lower Tuscahoma marls were shown by Oliver (1979) and Oliver and Mancini (1981) to have a highly diverse benthonic foraminiferal fauna and a well developed planktonic foraminifera fauna. The faunas collected from the lower Tuscahoma in this study can all be associated with the Eponides assemblage indicating outer neritic conditions. A transgression of this magnitude is consistent with maximum estimates of depth by both Vail, Mitchum, and Thompson (1979) and Matthews (1984) for Cycle TA2.1C (approximately 225 m above present sea level).

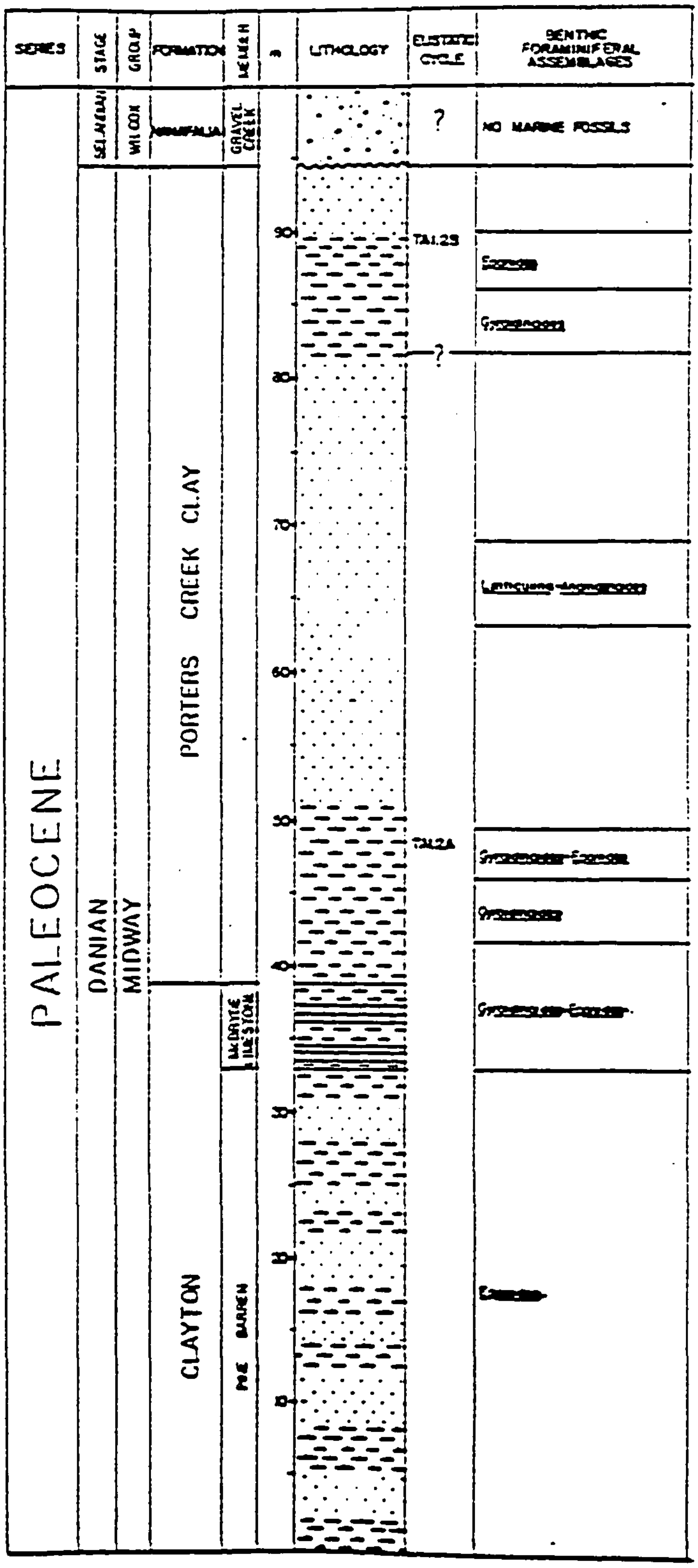
The next eustatic cycle of the Paleocene defined by Vail, Mitchum, and Thompson (1977) is Cycle

TA2.2 This cycle is represented in the composite section by the Greggs Landing Marl Member of the Tuscahoma Sand. All samples from the Greggs Landing Marl Member examined in this study contained benthonic foraminifera characteristic of the Eponides assemblage indicating paleoecologic conditions of the outer neritic. The final eustatic sequence of the Paleocene recognized by Haq, Hardenbol, and Vail (1987) is Sequence TA2.3. This is represented in the eastern Gulf Coastal Plain by the Bells Landing Marl Member of the Tuscahoma Sand. All of the Bells Landing samples contained benthonic foraminifera characteristic of the Eponides assemblage.

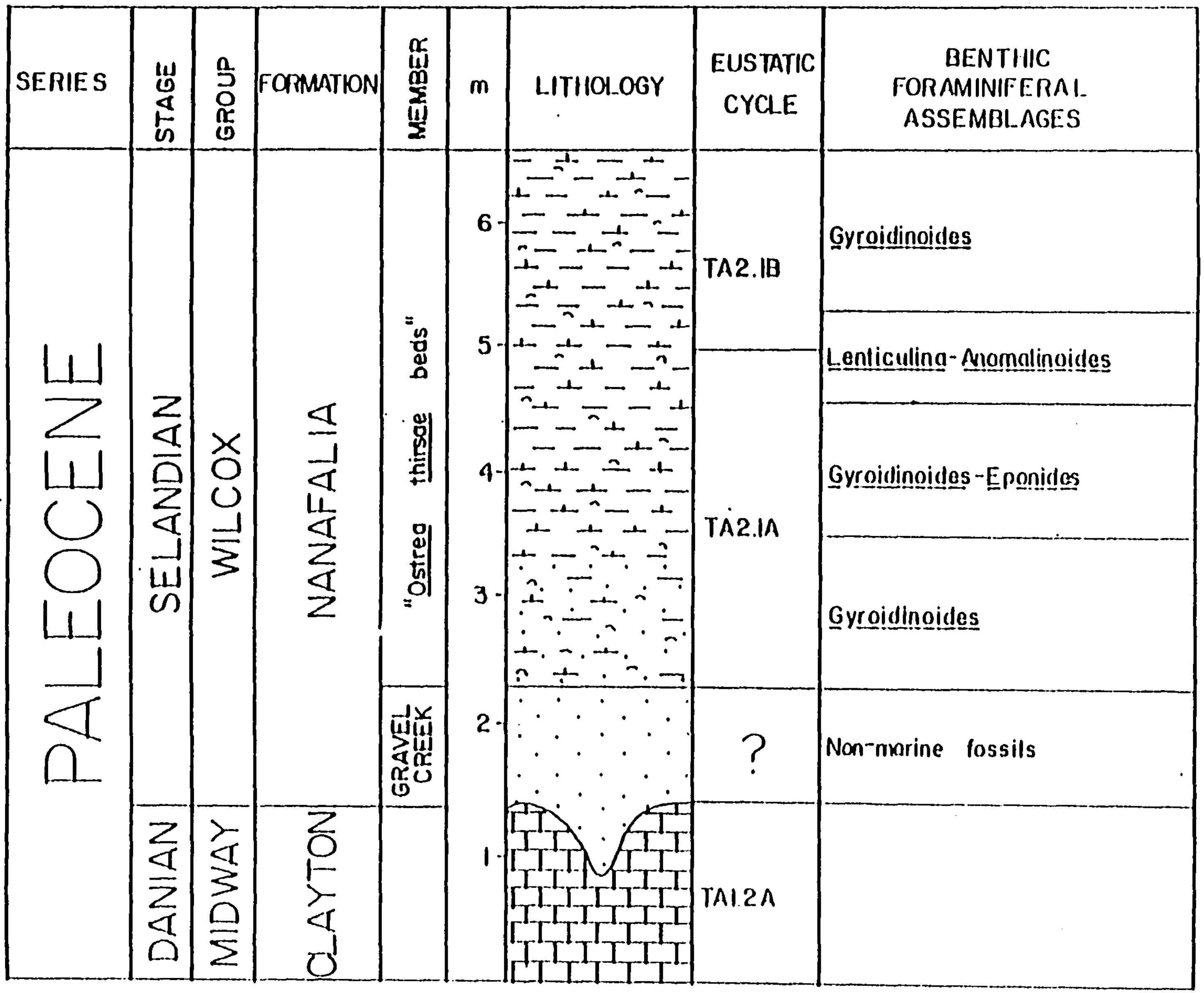
As one moves away from the composite stratigraphic section in Wilcox County, Alabama, the transgressive-regressive cycles are still recognizable. Although most of the samples examined are from small outcrops, none have produced assemblages inconsistent with the transgressive-regressive model developed for the eastern Gulf Coastal Plain. Two important measured sections provide further support to the model based on the composite stratigraphic section. Both of these measured sections are some distance from Wilcox County and did not contribute data for the composite stratigraphic section. One section is from Butler County, Alabama and contains the Pine Barren and

McBryde Members of the Clayton Formation and the coarse clastic facies of the Porters Creek Clay (Text-Figure 23). Only the transgressive-regressive cycles TA2.1A and TA2.1B are represented in this section. The other section is of the "*Ostrea thirsae* beds" from the Chattahoochee River Valley of Alabama and Georgia (Text-Figure 24).

The Butler County measured section is of interest because it contains a nearly unbroken sequence from the upper Pine Barren Member of the Clayton Formation through the Gravel Creek Member of the Nanafalia Formation. The Naheola Formation is not present at this locality. Fifty samples were collected and processed but only thirteen yielded significant numbers of benthonic foraminifera. Eight of these are at the base of the section and mark an excellent transition from the Pine Barren Member of the Clayton Formation through the Lower Porters Creek Clay. The record of benthonic foraminiferal assemblages shows the same transition from the *Eponides* assemblage in the Pine Barren through assemblages characteristic of a prograding coastline in the McBryde and lower Porters Creek Clay. In the middle part of the Porters Creek the massive sands which characterize the Porters Creek in Butler County contain few foraminiferal tests. Only



TEXT-FIGURE 23. Measured section from Butler County, Alabama



TEXT-FIGURE 24. Measured section from Franklin's Landing, Alabama.

one sample produced a significant fauna. The fauna is assignable to the *Lenticulina-Anomalinoides* assemblage. Although indicative of oxygen deficient conditions rather than distance from the strandline the *Lenticulina-Anomalinoides* assemblage is probably a shallow water assemblage equivalent to the *Cibicidoides-Anomalinoides* assemblage. This is then consistent with the transgressive-regressive cycle associated with the middle part of the Porters Creek in the composite stratigraphic section.

The upper part of the Porters Creek at the measured section in Butler County shows evidence of a retrograding coast with a sequence from the *Gyroidinoides* assemblage to the *Eponides* assemblage. This is a nearly identical sequence to that established in the composite section and indicates the same rise in sea level. This is related to Cycle TA1.2B of Haq, Hardenbol, and Vail (1987).

While the Clayton-Porters Creek measured section in Butler County, Alabama supports the validity of the transgressive-regressive model developed from the composite section for cycle TA1.2 the complex transgressive-regressive pattern for sequences TA2.1A and TA2.1B is not seen in eastern Alabama and western Georgia.

The measured section of the "*Ostrea thirsae* beds" from Franklin's Landing, Henry County, Alabama was sampled at 1 meter intervals. The benthonic foraminiferal fauna recovered from the "*Ostrea thirsae* beds" shows a much simpler picture of changes in sea level than is seen in western Alabama. The lowermost assemblage obtained from the "*Ostrea thirsae* beds" is assignable to the *Gyroidinoides* assemblage. This assemblage persists through the lower part of the unit until it is suceeded by the *Gyroidinoides*-*Eponides* assemblage indicating a retrograding shoreline. The *Gyroidinoides*-*Anomalinoides* assemblage. Although not used in the composite section, the middle part of the "*Ostrea thirsae* beds" at Lotts Landing, Marengo County, Alabama has also produced a sample containing the *Lenticulina*-*Anomalinoides* assemblage. The occurrence of this assemblage in the eastern and western parts of the study area may indicate that the conditions allowing the development of the *Lenticulina*-*Anomalinoides* assemblage are related to regional rather than local conditions. The *Lenticulina*-*Anomalinoides* assemblage is succeeded by the *Gyroidinoides* assemblage which persists throughout the upper part of the *Ostrea thirsae* beds" in eastern Alabama.

The results of the stratigraphic distribution of the benthonic foraminiferal assemblages support the global eustatic cycles of Haq, Hardenbol, and Vail (1987) and have provided some refinement as to the time of initiation of the cycles and the recognition of smaller sequences within cycles. Specifically, sequence TA1.2 of Haq _et al_. (1987) is represented in the eastern Gulf Coastal Plain by a much longer interval of time. Sequence TA1.2 of Haq _et al_. (1987) has its maximum transgression near the base of the _Morozovella trinidadensis_ Zone (approximately 64.2 m.y.b.p. on the geochronologic scale of Berggren _et al_., 1985). This maximum transgressive point was verified in this study. Haq _et al_. (1987) however shows the minimum sea level stand of this sequence as also occurring during the _Morozovella trinidadensis_ Zone. In this study, a gradual decrease in sea level during sequence TA1.2 was detected by examination of the benthonic foraminiferal assemblages. The minimum of sequence TA1.2A was determined to fall within the _Morozovella uncinata_ Zone. Haq _et al_. recognized a second transgressive pulse as a part of sequence TA1.2 during the _Morozovella uncinata_ Zone and continuing into the _Morozovella angulata_ Zone. While a transgressive-regressive cycle was recognized at this position, it was found to be of a much shorter duration based on the geochronologic scale of Berggren _et al_.

(1985). Although these two pulses were not considered significant enough by Haq _et al_. (1987) to warrant recognition as seperate sequences, the definition provided by benthonic foraminiferal studies shows them to be two very different sequences. They are designated as TA1.2A and TA1.2B are here recognized as sub-sequences of Sequence TA1.2 of Haq _et al_. (1987).

Sequence TA1.3 in this study is essentially the same as recognized by Haq _et al_. (1987) except that it can be resolved as a shorter duration sequence by using benthonic foraminifera. Sequence TA2.1 of Haq _et al_. (1987) occurring during the _Planorotallites pseudomenardii_ Zone was divided into three distrinct sub-sequences using benthonic foraminiferal assemblages. These sub-sequences are designated from oldest to youngest TA2.1A, TA2.1B, and TA2.1C. Sequences TA2.2 and TA2.3 were recognized in the eastern Gulf Coastal Plain as having the same characteristics as those recognized by Haq _et al_. (1987).

A duration of each complete transgressive-regressive cycle can be obtained by identification of the planktonic foraminifera present and by comparing the resulting biostratigraphic data to the global geochronologic scale of Berggren _et al_. (1985). The rates of transgression and regression vary with a mean rate between 400,000 and 500,000 years. Given time errors this rate is strongly suggestive of the 430,000 year cycle of Briskin and Berggren (1975), Briskin and Harrell (1980), Pisias and Moore (1981) and Berger (1980). The sequences which conform to this mean are TA1.2B, TA1.3, TA2.1A, TA2.1B, BA2.2 and TA2.3. TA1.2A is very different from other eustatic cycles in the Cenozoic as it is the only one which inundated the continental interior (Fenner, 1976). Sequence TA2.1C also does not conform to the quasi-cyclicity of 400,000-500,000 years. This sequence is recognized from only two locations however and thus the lack of conformity may be due to an insufficient number of samples.

The approximate duration of 400,000-500,000 years for the transgressive-regressive sequences is significant. Previously, Chappel (1973) had shown that excellent correlation existed between Pleistocene sea level curves and the Milankovitch curve of the Earth's insolation. Briskin and Berggren (1975) and Briskin and Harrell (1980) identified cycles of 430,000 years in the Quaternary record of the Atlantic and Pacific Oceans. Although the Paleocene has no evidence of glaciations (Miller et al., 1987; Savin, 1977), there may have been some control on sea level fluctuations due to perturbations in the Earth's orbit. The recent work of Schwarzacher (1987) suggests that depositional cycles in the Lower Carboniferous of northwestern Ireland, the Upper Jurassic of southern Germany, and the Upper Cretaceous and Middle Eocene near Gubbio, Italy show the influence of variations in the Earth's orbit as suggested by Milankovitch. All of the time intervals represented by these sections are ice free as is the Paleocene. It is here suggested that the delineated cycles recognized in the eastern Gulf Coastal Plain Paleocene may represent an external control on the depositional record.

CONCLUSIONS

1. The benthonic foraminiferal fauna of the Paleocene of the eastern Gulf Coastal Plain can be resolved by quantitative means into seven distinct assemblages.

2. The benthonic foraminiferal assemblages are each related to paleoecologic parameters associated with water mass conditions.

3. As the benthonic foraminiferal assemblages are associated with water mass conditions, they reflect changes which are controlled by the paleo-circulation regime of the Paleocene Gulf of Mexico.

4. The changes in benthonic foraminiferal assemblages in measured sections indicate changes in the position of the strandline through time.

5. From changes in the strandline, a refined eustatic sea level curve can be reconstructed.

6. Eustatic cycles of approximately 400,000 - 500,000 years can be resolved within the Paleocene section of the eastern Gulf Coastal Plain.

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APPENDIX A

APPENDIX A

The following is a list of samples studied in conjunction with this investigation. The symbol associated with each sample is the label used in the text. Locations are provided and the lithostratigraphic unit is identified.

GEORGIA

JM Outcrops across Johnny Moore Hill along County Road 92411, Caly County, Baker Hill and Tuscahoma Foramation. JM1 and JM2, Baker Hill Formation; JM3 and JM4, Lower Tuscahoma Sand; JM5 and JM6, Chlamys greggi beds of Tuscahoma Sand; JM7 through JM11, Tuscahoma Sand at 1 m intervals.

LB Outcrop along Georgia State Highway 39, 3.3 km south of Fort Gaines, Clay County. Outcrop is in the bank of Ledbetter Creek. Bashi Formation and Tuscahoma Sand. LB1 through LB3, upper Tuscahoma Sand; LB4 is Bashi Marl (Eocene).

KC Outcrop along Georgia State Highway 39 in bank of Kolomokee Creek, 12.9 km south of Fort Gaines, Clay County. Tuscahoma Sand.

FG Outcrop in the bank of Town Creek, Fort Gains, Clay County. "Ostrea thirsae beds" of the Nanafalia Formation.

ALABAMA

FL Measured section at Franklin's Landing on the Chattahoochee River, Henry County. Section includes the Clavton Limestone and Nanafalia Formation. Section is illustrated as Section 1.

TC Outcrops in railroad cut north of Barbour County Route 28 at the town of Clayton, Barbour County. This is the Clayton Formation lithostratotype. Section is illustraated as Section 2.

HP Outcrops exposed in roadcuts of Henry County Route 57 at the entrance to Highland Park. Exposure of the "Chlamys greggi beds".

T Roadcut 1.5 km north of Alabama State Route 15 on Needham-Loyton Road, Troy, Pike County. Clayton Formation.

BG Roadcut on U.S. Highway 231, 1.6 km south of Brundidge, Pike County. Baker Hill Formation.

BC Series of exposures along Butler County Route 11 northeast of Montery, Butler County. Section is between Wolf and Cedar Creeks. Illustrated as Section 3. Pine Barren and McBryde members of Clayton Formation, Porters Creek Formation, Gravel Creek Member of Nanafalia Formation.

K Series of exposures along Alabama State Route 263, Butler County. Outcrops are 8.6 km northwest of Greenville, Butler County. McBryde Limestone Member of the Clayton Formation and the Porters Creek Formation.

BR Section at Braggs, Lowdnes County Alabama. Exposure of the Cretaceous-Paleogene boundary. Pine Barren Member of the Clayton Formation.

MW Outcrops along Alabama State Highway 45, 12.5 km east of Mount Willig, Lowndes County. Pine Barren Member of the Clayton Formation.

JLL Small outcrop along road to Shell Creek Boat Landing off of Wilcox County route 28, 1 km west of the J. Lee Long Bridge, Wilcox County. Pine Barren and McBryde Limestone Members of the Clayton Formation. JLL1 and JLL2 are McBryde, JLL3 is from the Pine Barren.

OH Outcrop 3.2 km northwest of Oak Hill on Alabama State Highway 10, Wilcox County. Porters Creek Clay.

WC9 Outcrop on Alabama State Highway 10, 6.5 km northwest of Oak Hill, Wilcox County. Porters Creek Clay.

SC Shoal Creek Section. Outcrop of Coal Bluff Marl Member of the Naheola Formation, and Nanafalia Formation. Exposures along the Camden-Fatama Road (Wilcox County Route 39) 6 km south of Camden, Wilcox County.

MF Outcrops along Alabama State Highway 28, 2 km northwest of Millers Ferry, Wilcox County. Pine Barren Member of the Clayton Formation.

WC Outcrop along Alabama State Highway 96, 16 km north of Kimbrough, Wilcox County. Mathews Landing Marl Member of the Porters Creek Clay.

CL Outcrop along Alabama State Highway 10 at crossing of the Alabama River, Wilcox County. Mathews Landing Marl Member of the Porters Creek Clay.

BEC Outcrops along Wilcox County Route 1 at the crossing of Bear Creek. Sample BEC1 is a lower unnamed marl of the Tuscahoma Sand. BEC2 is from the Greggs Landing Member of the Tuscahoma Sand.

PTL Outcrops at the new Lower Peachtree Landing boat ramp along the Alabama River. Bells Landing Marl Member of the Tuscahoma Sand.

PL Sample from the old ferry road at Lower Peachtree Landing. Samples collected in this study were unfossiliferous. Sample PL1 is from the Rainwater Collection housed at the Woods Hole Oceanographic Institute. Greggs Landing Marl Member of the Tuscahoma Sand.

FT Outcrops along the Camden-Fatama Road (Wilcox County Route 39) at the town of Fatama. Lower marl unit of the Tuscahoma Sand.

ML Poorly exposed outcrop at Midway Landing on the Alabama River, 3.2 km south of the J. Lee Long Bridge. McBryde Limestone Member of the Clayton Formation.

SM Exposures on east side of Clarke County Route 15 at Salt Mountain. Section is 8.5 km south of Jackson, Clarke County. Illustrated as section 4. Salt Mountain Limestone.

GL H. N. Fisk Sample of the Greggs Landing Marl Member of the Tuscahoma Sand from Greggs Landing on the Alabama River, Monroe County. This is presently submerged.

BL H. N. Fisk sample from Bells Landing on the Alabama River, Monroe County. Bells Landing Marl Member of the Tuscahoma Sand.

LL Section of the "_Ostrea thirsae_ beds" at Lotts Landing on the Tombigbee River (eastern bank), Marengo County. "_Ostrea thirsae_ beds" of the Nanafalia Formation.

CC Outcrop of the Naheola Formation, along Alabama State Highway 17, 5 km north of Jachin, Choctaw County. Oak Hill Member (?) of the Naheola Formation.

NL Outcrops at Naheola Landing on the Tombigbee River, Choctaw County. Mathews Landing Marl Member of the Porters Creek Clay.

TL Sample from Tuscahoma Landing on the Tombigbee River, Choctaw County. Bells Landing Marl Member of the Tuscahoma Sand.

SU1 Outcrop in the bank of the Tombigbee River approximately 1 km south of the U.S. Highway 80 crossing, Sumter County. Porters Creek Clay.

GC Sample of the Coal Bluff Marl Member of the Naheola Formation, Wilcox County.

OC Outcrop along U.S. Highway 43, 2 km west of Octagon, Marengo County. Coal Bluff Marl Member of the Naheola Formation.

MISSISSIPPI

MT Outcrop along U.S. Highway 45, 1.6 km north of Scooba, Kemper County. Chalybeate Limestone. MT2 is from the disturbed layer at the Cretaceous-Paleogene boundary.

APPENDIX B

List of Benthic Foraminifera Encountered in the eastern Gulf Coastal Plain

	Identification References
Order FORAMINIFERIDA	
Suborder TEXTULARIINA	
Superfamily LITUOLACEA	
Family LITUOLIOAE	
Genus AMMOBACULITES Cushman, 1910	
Ammobaculites expansus (Plummer)	Cushman, 1951 U.S. Geol. Sur. Prof Paper 232, p. 4, pl. 1, fig. 5-7.
Ammobaculites midwayensis (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 4, pl. 1, fig. 8-12.
Ammobaculites paleocenicus (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 4, pl. 1, fig. 13-14.
Family TEXTULARIDAE	
Genus SPIROPLECTAMMINA Cushman, 1948	

	Identification Reference
Spiroplectammina plummerae (Cushman)	Cushman, 1951 U.S. Geol. Sur. Prof. Paper 232, p. 4, pl. 2, fig. 13-14.
Spiroplectammina laevis (Roemer) var. cretosa (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232 p. 6, pl. 1, fig 24.
Spiroplectommina wilcoxensis (Cushman & Ponton)	Nogan, 1964 Cushman Found. Forum. Res. Spec. Pub. 7, p. 21, pl. 1, fig. 4.
Genus TEXTILINA (Norvang, 1966)	
Textilina plummerae (Lalicker)	Berggrenn & Aubert, 1975, Paleogeog, Paleocoimat., Paleoecol. vol. 18, p. 141.
Textilina midwayana (Lalicker)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 7, pl. 1, fig. 28-30.
Textilina lontensis (Lalicker)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 572, pl. 78, fig. 2.

	Identification Reference
Family VERNEVILINAIDAE	
Genus GAUDRUINA D'Orbigny	
Gaudryina laevigata (Franke)	Toulmin, 1941, Jour. Paleont. vol. 15, p. 572, pl. 78,fig. 4-5.
Genus TRITAXIA Reuss	
Tritaxia midwayensis (Cushman)	Berggren & Aubert, 1875, Paleogeog. Paleoclimat. Paleoecol., vol. 18, p. 142.
Family VALVULINIDAE	
Genus EGGERELLA Cushman, 1943	
Eggerella plummerae (Toulmin)	Toulmin, 1941, Jour. Paleont. vol. 15, p. 572, pl. 78,fig. 6-8.
Genus MARSSONELLA Cushman, 1933	
Marssonella oxyona (Reuss)	Toulmin, 1941, Jour. Paleont. vol. 15, p. 572, pl. 78. fig. 12-13.
Suborder MILIOLINA	
Superfamily MILIOLACEA	

	Identification Reference
Family MILIOLIDAE	
Genus QUINQUELOCULINA d'Orbigny	
Quinqueloculina plummerae (Cushman and Todd)	Cushman and Todd, 1942, Cushman Lab. Foram. Res. Comtr. vol. 18, p. 25, pl. 5, fig. 2.
Quinqueloculina vulgaris (d'Orbigny)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 576, pl. 78, fig. 14.
Genus TRILOCULINA d'Orbigny	
Triloculina natchitochensis (Howe)	Howe, 1938, Louisiana Dept. Cons. Geol. Bull. 14, p. 38, pl. 3, fig. 3-4.
Triloculina laevigata (Bormanann)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 12, pl. 3, fig. 6-7.
Family OPTHALMIDIIDAE	
Genus CORNUSPIRA Schultze	
Cornuspira cf. *C. byramensis* (Cushman)	Cushman, U.S. Geol. Sur. Prof. Paper 232, p. 12, pl. 3, fig. 8-9.

	Identification Reference
Family TROCHAMMINIDAE	
Genus <u>AMMOCIBICIDES</u> Earland	
Ammocibicides pontoni (Earland)	Toulmin, 1941 Jour. Paleont., vol. 15, p. 576, pl. 78, fig. 16-17.
Family PLACOPSILINIDAE	
Genus <u>ADHAERENTIA</u> Plummer	
Adhaerentia midwayensis (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 12, pl. 3, fig. 11-13.
Superfamily NODOSARIACHEA	
Family NODOSARIIDAE	
Genus NODOSARIA Lamarck	
Nodosaria affnis (Reuss)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 23, pl. 7, fig. 3-6.
Nodosaria latejugata (Gumbel)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 23, pl. 7, fig. 1-2.

	Identification Reference
Nodosaria paupercula (Reuss)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 588, pl. 79, fig. 29-30.
Genus RECTOGLANDULINA Loeblich and Tappan, 1955	
Rectoglanulina aquiensis (Nogan)	Nogan, 1964, Cukshman Found. Foram. Res. Spec. Publ. 7, p. 25, pl. 1, fig. 24.
Rectoglandulina tenuistriata (Franke)	Olsson, 1960, Jour. Paleont., vol. 34, p. 23, pl. 3, fig. 26.
Genus CHRYSALOGONIUM Schubert	
Chrysalogonium granti (Plummer)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 589, pl. 79, fig. 34-35.
Chrysalogonium arkansasanum (Cushman & Todd)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 25, pl. 7, fig. 11-12.
Genus DENTALINA d'Orbigny	

	Identification Reference
Dentalina gardnerae (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 19, pl. 6, fig. 4-7.
Dentalina colei (Cushman & Dusenbury)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 19, pl. 6, fig. 8-10.
Dentalina plummerae (Chusman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 20, pl. 6, fig. 11-15.
Dentalina alabamensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 21, pl. 6, fig. 21-24.
Dentalina inepta (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 21, pl. 6, fig. 25.
Dentalina wilcoxensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 21, pl. 6, fig. 27-29.
Dentalina eocenica (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 22, pl. 6, fig. 30-33.

	Identification Reference
Dentalina cf. D. mucronata (Neugeboren)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 22, pl. 6, fig. 34-35.
Dentalina communis (d'Orbigny)	Toulmin, 1941, Jour. Paleont., p. 584, pl, 79, fig. 13.
Dentalina obliquisutrata (Stache)	Toulmin, 1944, Jour. Paleont., p. 586, pl. 79, fig. 18.
Dentalina cf. D. fissicostata (Gumbel)	Toulmin, 1941, Jour. Paleont., p. 587, pl. 79, fig. 21-22.
Dentalina soluta (Reuss)	Toulmin, 1941, Jour. Paleont., p. 587, pl. 79, fig. 23-24.
Dentalina cf. D. pomuligera (Stache)	Toulmin, 1941, Jour. Paleont., p. 586, pl. 79, fig. 19.
Dentalina vertebralis (Batsch)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 587, pl. 79, fig. 25.

Genus LAGENA Walker and Jacob, 1798

	Identification Reference
Lagena laevis (Montagu)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 593, pl. 80, fig. 7.
Lagena alternans (Terquem)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., v. 15, p. 109.

Genus *OOLINA* d'Orbigny, 1839

Oolina acuticostata (Reuss)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., v. 15, p. 110, pl. 10, fig. 7, 12.
Oolina morsei (Kline)	Kline, 1943, Mississippi Geol. Sur. Bull. 53, p. 48, pl. 4, fig. 17.

Genus *FRONDICULARIA* Defrance, 1824

Frondicularia archiaciana (d'Orbigny)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 592, pl. 80, fig. 4.
Frondicularia frankei (Cushman)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 592-593, pl. 80, fig. 5.

	Identification Reference
Frondicularia herpersi (McClean)	McClean, 1952, Acad. Nat. Sci.: Philadelphia, Notulae Nature no. 242, p. 8, pl. 3, fig. 8.
Frondicularia midwayensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 30, pl. 9, fig. 4-5.

Genus PALMULA Lea, 1833

Palmula mcglameryae (Toulmin)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 592, pl. 80, fig. 1-3.
Palmula rugosa (d'Orbigney)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 29, pl. 7, fig. 36-37.

Genus PSEUDOGLANDULINA Cushman, 1929

Pseudoglandulina manifesta (Reuss)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 29, pl. 7, fig. 16-17.

Genus CITHARINA Plummer, 1927

	Identification Reference
Citharina plumoides (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc., Trans. vol. 15, p. 104, pl. 8, fig. 3.

Genus LENTICULINA Lamarck, 1804

Lenticulina midwayana	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 13, pl. 3, fig. 14-17.
Lenticulina pseudo-mamilligerus (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 13, pl. 4, fig. 1-5.
Lenticulina turbinata (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 14, pl. 4, fig. 6-9.
Lenticulina degolyeri (Plummer)	Berggren and Aubert, 1975, Paleogeog. Paleoclimat. Paleoecol., vol. 18, p. 143.
Lenticulina alabamensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 15, pl. 4, fig. 15-16.

Lenticulina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 15, pl. 4, fig. 17.
Lenticulina rosetta (Gumbel)	Cushman, 1951, U.S. Geol. Sur. Paper 232, p. 16, pl. 4, fig. 20-21.
Lenticulina insulus (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 16, pl. 5, fig. 1-3.
Lenticulina inornatus (d'Orbigney)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 577, pl. 78, fig. 19, text-fig. 2B.
Lenticulina magnificus (Toulmin)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 578, pl. 78, fig. 22, text-fig. 2D.
Lenticulina austriaca (d'Orbigny)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 576, pl. 78, fig. 18, text-fig. 2A.
Lenticulina toddae (Cushman)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., v. 15, p. 106.

	Identification Reference
Lenticulina isidis (Schwager)	Toulmin, 1941, Jour. Paleont., v. 15, p. 518, pl. 78, fig. 20, text-fig. 2E.

Genus MARGINULINA d'Orbigny, 1826

Marginulina tuberculata (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 17, pl. 5, fig. 11-13.
Marginulina eximia (Neugeboren)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 17, pl. 5, fig. 18-19.
Marginulina subrecta (Franke)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 18, pl. 5, fig. 22.
Marginulina glabra (d'Orbigny)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 18, pl. 5, fig. 25-27.
Marginulina bullata (Reuss)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 581, pl. 79, fig. 1.

	Identification Reference
Marginulina colligata (Reuss)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 581, pl. 79, fig. 2-3.
Marginulina glabra (d'Orbigny)	Plummer, 1927, Texas Univ. Bull. 2644, p. 104, pl. 6, fig. 3a-d.

Genus MARGINULOPSIS Silvestri, 1904

Marginulopsis wilcoxensis (Toulmin)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 582, pl. 79, fig. 4-6.

Genus VAGINULINA d'Orbigny, 1826

Vaginulina gracilis (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 27, pl. 8, fig. 1-3.
Vaginulina plummoides (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 28, pl. 8, fig. 16-18.

Genus VAGINULOPSIS Silvestri, 1904

Species	Identidication Reference
Vaginulopsis exquisita (Toulmin)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 583, pl. 79, fig. 7.
Vaginulopsis brantlyi (Garret)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 583, pl. 79, fig. 8-10.
Vaginulopsis earlandi (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc., Trans., vol. 15, p. 108, pl. 9, fig. 6.
Vaginulopsis longiforma (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 108, pl. 5, fig. 2.
Vaginulopsis midwayana (Fox and Ross)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc., Trans., vol. 15, p. 108, pl. 5, fig. 1-3.

Genus PSEUDOGLANDULINA Cushman, 1929

Pseudoglandulina manifesta (Reuss)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 25, pl. 7, fig. 16-17.

	Identification Reference
Pseudoglandulina pygmaea (Reuss)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 26, pl. 7, fig. 20-22.
Genus LINGULINA d'Orbigny, 1826	
Lingulina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 27, pl. 7, fig. 24.
Family POLYMORPHINIDAE	
Genus GUTTULINA d'Orbigny, 1839	
Guttulina problema (d'Orbigny)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 82, pl. 9, fig. 15-18.
Guttulina hantkeni (Cushman and Ozawa)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 32, pl. 9, fig. 19-21.
Guttulina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 32, pl. 9, fig. 22.
Genus GLOBULINA d'Orbigny, 1839	

	Identification Reference
Globulina gibba (d'Orbigny)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 33, pl. 9, fig. 26-28.
Globulina rotundata (Borneman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 33, pl. 9, fig. 29-33.
Genus PYRULINA d'Orbigny, 1839	
Pyrulina cylindroides (Roemer)	Kline, 1943, Mississippi Geol. Sur. Bull. 53, p. 40, pl. 7, fig. 5.
Genus PSEUDOPOLYMORPHINA Cushman and Ozawa, 1928	
Pseudopolymorphina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 34, pl. 10, fig. 1.
Genus SIGMOMORPHINA Cushman and Ozawa, 1928	
Sigmomorphina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 34, pl. 10, fig. 2-3.

	Identification Reference
Polymorphina cushmani (Plummer)	Plummer, 1927, Texas Univ. Bull. 2644, p. 125, pl. 6, fig. 9; pl. 15, fig. 1.
Polymorphina sp.	
Genus POLYMORPHINELLA Cushman and Honzawa, 1936	
Polymorphinella subcompressa (Toulmin)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 596, pl. 80, fig. 19-20.
Genus BULLOPORA Queenstadt, 1856	
Bullopora laevis (Wickenden)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 36, pl. 10, fig. 18.
Bullopora chapmani (Plummer)	Plummer, 1927, Texas Univ. Bull. 2644, p. 128, pl. 10, fig. 19-22.
Genus RAMULINA Rupert Jones, 1875	
Ramulina globulifera (Brady)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 596, pl. 80, fig. 21.

	Identification Reference
Superfamily BULIMINACEA	
Family BOLIVITIDAE Cushman, 1927	
Genus BOLIVINA d'Orbigny, 1839	
Bolivina midwayensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 43, pl. 12, fig. 11-12.
Bolivina budensis (Hantken)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 43, pl. 12, fig. 11-12.
Genus LOXOSTOMOIDES Reiss, 1957	
Loxostomoides applinae (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 112, pl. 12, fig. 4.
Loxostomoides plummerae (Cushman)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 112, pl. 12, fig. 5.
Genus ANGULOGERINA Cushman, 1927	

	Identification Reference
Angulogerina wilcoxensis (Cushman and Ponton)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 44, pl. 12, fig. 27.

Family HETEROHELICIDAE

Genus GUEMBELINA Egger, 1899

Guembelina midwayensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 37, pl. 11, fig. 7-8.

Genus EOUVIGERINA Cushman, 1926

Eouvigerina excavata (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 38, pl. 11, fig. 12.

Genus PSEUDOUVIGERINA

Pseudouvigerina naheolensis (Cushman and Todd)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 39, pl. 11, fig. 13-15.

Genus SIPHOGENERINOIDES

Siphogenerinoides elegantus (Plummer)	Nogan, 1964, Cushman, Found Foram. Res. Spec. Pub. 7, p. 31.

	Identification Reference
Family BULIMINIDAE	
Genus BULIMINA d'Orbigny, 1826	
Bulimina midwayensis (Cushman and Parker)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 113, pl. 12, fig. 6.
Bulimina kugleri (Cushman and Kenz)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 41, pl. 11, fig. 24.
Bulimina ovata (d'Orbigny)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 32, pl. 2, fig. 19.
Bulimina virginiana	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 32, pl. 2, fig. 20.
Bulimina quadrata (Plummer)	Olsson, 1960, Jour. Paleont., vol. 34, p. 31-32, pl. 4, fig. 27.
Genus BULIMINELLA Cushman, 1911	

Taxon	Identification Reference
<u>Buliminella</u> <u>marylandica</u> (Nogan)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 31, pl. 2, fig. 18.
Genus <u>ENTOSOLENIA</u> Ehrenberg, 1848	
<u>Entosolenia</u> <u>apiculata</u> (Reuss)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 42, pl. 9, fig. 7.
Genus <u>FISSURINA</u> Reuss, 1850	
<u>Fissurina</u> <u>aquiensis</u> (Nogan)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 33, pl. 2, fig. 23-24.
Family ELLIPSONODOSARIDAE	
Genus <u>ELLIPSONODOSARIA</u> Silvestri, 1900	
<u>Ellipsonodosaria</u> <u>plummerae</u> (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 46, pl. 13, fig. 1-2.
<u>Ellipsonodosaria</u> <u>paleocenica</u> (Cushman and Todd)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 46, pl. 13, fig. 3-5.

	Identification Reference
Superfamily CASSIDULINACEA	
Family NONIONIDAE	
Genus NONIONELLA	
Nonionella aquiensis (Nogan)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, pl. 2, fig. 6-7.
Nonionella insecta (Schuager)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 116, pl. 12, fig. 11.
Genus NONION Montfort, 1808	
Nonion graniferum (Terquem)	Hansen, 1970, Gronlands, Geologiske Undersogelse Bull. no. 93, p. 97, pl. 11, fig. 1-2, pl. 26, fig. 1-2.
Family CAUCASINIDAE	
Genus FURSENKONIA Loeblich and Tappan, 1961	

	Identification Reference
Fursenkonia wilcoxensis (Cushman and Ponton)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 33, pl. 4, fig. 11.

Family ALABAMINIDAE, Hofker, 1951

Alabamina midwayana (Brotzen)	Kellough, 1965 Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 117, pl. 12, fig. 14-16.
Alabamina westraliensis (Parr)	McGowran, 1965, Proc. Ray. Soc. Victoria, vol. 79, p. 45, pl. 2, fig. 7, text-fig. 7.

Family OSANGULARIDAE
Loeblich and Tappan, 1964

Genus OSANGULARIA Brotzen, 1940

Osangulavia plaummerae (Brotzen)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 118, pl. 13, fig. 5.

Genus GYROIDINOIDES Brotzen, 1942

	Identification Reference
Gyroidinoides subangulata (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 118, pl. 13, fig. 3-4.
Gyroidinoides lottensis (Garret)	Garret, 1941, Jour. Paleont., vol. 15, p. 155, pl. 26, fig. 11.
Gyroidinoides octocameratus (Cushman and Hanna)	Nogan, 1964, Cushman Found., Foram. Res. Spec. Publ. 7, p. 35, pl. 3, fig. 3-5.
Gyroidinoides madrugaensis (Cushman and Bermudez)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 53, pl. 24, fig. 4-6.

Family ANOMALINIDAE Cushman, 1927

GenusANOMALINOIDES Brotzen, 1942

Anomalinoides acuta (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 116, pl. 15, fig. 6.

	Identification Reference
Anomalinoides clementiana (d'Orbigny)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 63, pl. 18, fig. 8-11.
Anomalinoides pseudowelleri (Olsson)	Olson, 1960, Jour. Paleont., vol. 34, p. 52, pl. 12, fig. 1-3.
Anomalinoides umbonifera (Schwager)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 42, pl. 6, fig. 16-21, pl. 7, fig. 1-3, text-fig. 13-16, table 3.
Anomalinoides midwayensis (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 117, pl. 15, fig. 7.
Anomalinoides welleri (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 117, pl. 15, fig. 5.

Genus CIBICIDOIDES Thalmann, 1939

	Identification Reference
Cibicidoides alleni (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 120, pl. 5, fig. 3.
Cibicidoides howelli (Toulmin)	Nogan, 1954, Cushman Found. Foram. Res. Spec. Publ. 7, p. 46, pl. 7, fig. 7-9.
Cibicidoides vulgaris (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 120, pl. 15, fig. 4.
Cibicidoides praecursorium (Schwager)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 65, pl. 19, fig. 1-6.
Cibicidoides newmanae (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 65, pl. 19, fig. 12-14.
Cibicidoides blanpiedi (Toulmin)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 67, pl. 20, fig. 1-5.

	Identification Reference
Cibicidoides browni (Kline)	Kline, 1943, Mississippi Geol. Sur. Bull. 53, p. 62, pl. 7, fig. 18-20.
Cibicidoides semiplectus (Schwager)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 67, pl. 20, fig. 10.
Cibicidoides irenae (Van Bellen)	Nogan, 1964, Cushman Found. Foram. Res. Spec. Publ. 7, p. 46, pl. 7, fig. 10-12.
Cibicidoides madrugaensis (Cushman and Bermudez)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 68, pl. 21, fig. 1-3.
Genus GAVELINELLA Brotzen, 1942	
Gavelinella danica (Brotzen)	Berggren, 1974, Micropaleontology, pl. 6, fig. 1-6.
Genus PULSIPHONINA Brotzen, 1948	
Pulsiphonina prima (Plummer)	Olsson, 1960, Jour. Paleont., vol. 34, p. 39, pl. 7, fig. 1-3.

	Identification Reference
Pulsiphonina wilcoxensis (Cushman)	Toulmin, 1941, Jour. Paleont., vol. 15, p. 605, pl. 81, fig. 15-16.

Superfamily DISCORBACEA

Family DISCORBIDAE

Genus DISCORBIS Lamarck, 1804

Discorbis washburni (Garret)	Garret, 1941, Jour. Paleont., vol. 15, p. 155, pl. 26, fig. 10.
Discorbis midwayensis (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 48, pl. 13, fig. 20.
Discorbis rukasi (Howe)	Toulmin, 1941, Jour. Paleont., vol. 15, pl. 80, fig. 35-36.

Genus PATELLINOIDES Heron-Allen and Earland, 1932

Patellinoides sp.	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 48, pl. 13, fig. 19.

	Identification Reference
Genus VALVULINERIA Cushman, 1926	
Valvulineria extensa (Cushman and Bermodez)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 50, pl. 23, fig. 6-8.
Genus EPONIDES	
Eponides elevatus (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 52, pl. 14, fig. 18-19.
Eponides lotus (Schwager)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 52, pl. 14, fig. 21.
Eponides plummerae (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 52, pl. 14, fig. 20, 22.
Eponides vanbelleni (Van den Bold)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 52, pl. 20, fig. 11-13; pl. 23, fig. 10.
Genus EPISTOMINOIDES Plummer, 1934	
Epistominoides midwayensis (Plummer)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 58, pl. 16, fig. 15-16.

	Identification Reference
Genus <u>GANCRIS</u> Montfort, 1808	
<u>Cancris</u> <u>mauryae</u> (Cushman and Renz)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 56, pl. 15, fig. 6.
Family CHILOSTOMELLIDAE	
Genus <u>ALLOMORPHINA</u> Reuss, 1850	
<u>Allomorphine</u> <u>paleocenica</u> (Cushman)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 56, pl. 15, fig. 6.
Superfamily ROTALIACEA	
Family DISCOCYCLINIDAE Vaughn and Cole, 1940	
Genus <u>PSEUDOPHRAGMINA</u> Douville, 1923	
<u>Pseudophragmina</u> <u>cookei</u> (Vaughn)	Vaughn, 1936, Jour. Paleont., vol. 10, p. 256, pl. 42, fig. 1-6.
Family ORBITOIDEA Schubert, 1920	
Genus <u>LEPIDOCYCLINA</u>	
<u>Discocyclina</u> <u>blanpiedi</u> (Vaughn)	Vaughn, 1936, Jour. Paleont., vol. 10, p. 254, pl. 41, fig. 1-7.

	Identification Reference
Family ROTALIDAE	
Genus <u>ROTALIA</u> Lamayck, 1804	
<u>Rotalia havanensis</u> (Cushman and Bermudez)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 55, pl. 15, fig. 11.
<u>Rotalia madrugaensis</u> (Cushmand and Bermudez)	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 55, pl. 15, fig. 12.
Superfamily SPIRILLINACEA	
Family SPIRILLINIDAE	
Genus <u>SPIRILLINA</u> Ehrenberg, 1843	
<u>Spirillina selseyensis</u>	Cushman, 1951, U.S. Geol. Sur. Prof. Paper 232, p. 47, pl. 13, fig. 13-14.
Superfamily ROBERTINACEA Reuss 1850	
Family CERATOBULIMIDAE Cushman, 1927	
Genus <u>CERATOBULIMINA</u> Toula, 1915	

	Identification Reference
Ceratobulimina perplexa (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 119, pl. 14, fig. 8-9.

Genus LAMARCKINA Berthelin, 1881

Lamarckina rugulosa (Plummer)	Kellough, 1965, Gulf Coast Assoc. Geol. Soc. Trans., vol. 15, p. 119, pl. 14, fig. 1.

APPENDIX C

APPENDIX C

Results of Routine FACTOR

```
  1 0        TITLE FACTOR ANALYSIS OF PALEOCENE FORAMS:AL,GA,MISS
  2 0        FILE HANDLE FORAM/NAME='FORAM.DAT'
  3 0        FILE TYPE GROUPED FILE=FORAM RECORD=4RECID 7-9 CASE=ID 1-3(A
  4 0         MISSING=NOWARN ORDERED=NO
  5 1        RECORD TYPE 1
  6 1        DATA LIST  /SPEC1 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC1        1     12    14        F           3    0

END OF DATALIST TABLE.

  7 1        RECORD TYPE 2
  8 1        DATA LIST  /SPEC2 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC2        1     12    14        F           3    0

END OF DATALIST TABLE.

  9 1        RECORD TYPE 3
 10 1        DATA LIST  /SPEC3 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC3        1     12     14        F           3    0

END OF DATALIST TABLE.

  11  1          RECORD TYPE 4
  12  1          DATA LIST  /SPEC4 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC4        1     12     14        F           3    0

END OF DATALIST TABLE.

  13  1          RECORD TYPE 5
  14  1          DATA LIST  /SPEC5 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC5        1     12     14        F           3    0

END OF DATALIST TABLE.

  15  1          RECORD TYPE 7
  16  1          DATA LIST  /SPEC7 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC7        1     12     14        F           3    0

END OF DATALIST TABLE.

  17  1          RECORD TYPE 8
  18  1          DATA LIST  /SPEC8 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC. START    END        FORMAT  WIDTH  DEC

          SPEC3        1     12     14        F           3    0
```

```
END OF DATALIST TABLE.

  19  1          RECORD TYPE 9
  20  1          DATA LIST  /SPEC9 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC9        1     12    14         F          3    0

END OF DATALIST TABLE.

  21  1          RECORD TYPE 10
  22  1          DATA LIST  /SPEC10 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC10       1     12    14         F          3    0

END OF DATALIST TABLE.

  23  1          RECORD TYPE 11
  24  1          DATA LIST  /SPEC11 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC11       1     12    14         F          3    0

END OF DATALIST TABLE.

  25  1          RECORD TYPE 12
  26  1          DATA LIST  /SPEC12 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC12       1     12    14         F          3    0

END OF DATALIST TABLE.

  27  1          RECORD TYPE 13
  28  1          DATA LIST  /SPEC13 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC13       1     12    14        F           3    0

END OF DATALIST TABLE.

  29  1          RECORD TYPE 14
  30  1          DATA LIST  /SPEC14 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC14       1     12    14        F           3    0

END OF DATALIST TABLE.

  31  1          RECORD TYPE 15
  32  1          DATA LIST  /SPEC15 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC15       1     12    14        F           3    0

END OF DATALIST TABLE.

  33  1          RECORD TYPE 16
  34  1          DATA LIST  /SPEC16 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC16       1     12    14        F           3    0

END OF DATALIST TABLE.

  35  1          RECORD TYPE 17
  36  1          DATA LIST  /SPEC17 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC17       1     12    14        F           3    0
```

```
END OF DATALIST TABLE.

  37  1          RECORD TYPE 18
  38  1          DATA LIST  /SPEC18 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC18       1     12     14          F          3    0

END OF DATALIST TABLE.

  39  1          RECORD TYPE 19
  40  1          DATA LIST  /SPEC19 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC19       1     12     14          F          3    0

END OF DATALIST TABLE.

  41  1          RECORD TYPE 20
  42  1          DATA LIST  /SPEC20 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC20       1     12     14          F          3    0

END OF DATALIST TABLE.

  43  1          RECORD TYPE 22
  44  1          DATA LIST  /SPEC22 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC22       1     12     14          F          3    0

END OF DATALIST TABLE.

  45  1          RECORD TYPE 23
  46  1          DATA LIST  /SPEC23 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

         SPEC23      1     12     14       F         3     0

END OF DATALIST TABLE.

  47  1          RECORD TYPE 24
  48  1          DATA LIST  /SPEC24 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

         SPEC24      1     12     14       F         3     0

END OF DATALIST TABLE.

  49  1          RECORD TYPE 26
  50  1          DATA LIST  /SPEC26 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

         SPEC26      1     12     14       F         3     0

END OF DATALIST TABLE.

  51  1          RECORD TYPE 27
  52  1          DATA LIST  /SPEC27 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

         SPEC27      1     12     14       F         3     0

END OF DATALIST TABLE.

  53  1          RECORD TYPE 28
  54  1          DATA LIST  /SPEC28 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

         SPEC28      1     12     14       F         3     0
```

```
END OF DATALIST TABLE.

  55  1          RECORD TYPE 29
  56  1          DATA LIST  /SPEC29 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC29       1     12     14         F          3     0

END OF DATALIST TABLE.

  57  1          RECORD TYPE 31
  58  1          DATA LIST  /SPEC31 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC31       1     12     14         F          3     0

END OF DATALIST TABLE.

  59  1          RECORD TYPE 32
  60  1          DATA LIST  /SPEC32 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC32       1     12     14         F          3     0

END OF DATALIST TABLE.

  61  1          RECORD TYPE 33
  62  1          DATA LIST  /SPEC33 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC33       1     12     14         F          3     0

END OF DATALIST TABLE.

  63  1          RECORD TYPE 34
  64  1          DATA LIST  /SPEC34 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC34       1     12     14         F           3    0

END OF DATALIST TABLE.

  65  1          RECORD TYPE 35
  66  1          DATA LIST  /SPEC35 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC35       1     12     14         F           3    0

END OF DATALIST TABLE.

  67  1          RECORD TYPE 36
  68  1          DATA LIST  /SPEC36 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC36       1     12     14         F           3    0

END OF DATALIST TABLE.

  69  1          RECORD TYPE 37
  70  1          DATA LIST  /SPEC37 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC37       1     12     14         F           3    0

END OF DATALIST TABLE.

  71  1          RECORD TYPE 38
  72  1          DATA LIST  /SPEC38 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC38       1     12     14         F           3    0
```

```
END OF DATALIST TABLE.

  73  1          RECORD TYPE 39
  74  1          DATA LIST  /SPEC39 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

         SPEC39       1     12    14        F           3    0

END OF DATALIST TABLE.

  75  1          RECORD TYPE 40
  76  1          DATA LIST  /SPEC40 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

         SPEC40       1     12    14        F           3    0

END OF DATALIST TABLE.

  77  1          RECORD TYPE 41
  78  1          DATA LIST  /SPEC41 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

         SPEC41       1     12    14        F           3    0

END OF DATALIST TABLE.

  79  1          RECORD TYPE 42
  80  1          DATA LIST  /SPEC42 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

         SPEC42       1     12    14        F           3    0

END OF DATALIST TABLE.

  81  1          RECORD TYPE 43
  82  1          DATA LIST  /SPEC43 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC43      1     12      14         F          3    0

END OF DATALIST TABLE.

  83  1           RECORD TYPE 44
  84  1           DATA LIST  /SPEC44 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC44      1     12      14         F          3    0

END OF DATALIST TABLE.

  85  1           RECORD TYPE 46
  86  1           DATA LIST  /SPEC46 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC46      1     12      14         F          3    0

END OF DATALIST TABLE.

  87  1           RECORD TYPE 47
  88  1           DATA LIST  /SPEC47 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC47      1     12      14         F          3    0

END OF DATALIST TABLE.

  89  1           RECORD TYPE 48
  90  1           DATA LIST  /SPEC48 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC48      1     12      14         F          3    0
```

```
END OF DATALIST TABLE.

  91  1          RECORD TYPE 49
  92  1          DATA LIST  /SPEC49 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

         SPEC49       1     12     14         F          3    0

END OF DATALIST TABLE.

  93  1          RECORD TYPE 50
  94  1          DATA LIST  /SPEC50 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

         SPEC50       1     12     14         F          3    0

END OF DATALIST TABLE.

  95  1          RECORD TYPE 51
  96  1          DATA LIST  /SPEC51 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

         SPEC51       1     12     14         F          3    0

END OF DATALIST TABLE.

  97  1          RECORD TYPE 52
  98  1          DATA LIST  /SPEC52 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

         VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

         SPEC52       1     12     14         F          3    0

END OF DATALIST TABLE.

  99  1          RECORD TYPE 53
 100  1          DATA LIST  /SPEC53 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC53       1     12    14        F           3    0

END OF DATALIST TABLE.

 101  1          RECORD TYPE 54
 102  1          DATA LIST  /SPEC54 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC54       1     12    14        F           3    0

END OF DATALIST TABLE.

 103  1          RECORD TYPE 55
 104  1          DATA LIST  /SPEC55 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC55       1     12    14        F           3    0

END OF DATALIST TABLE.

 105  1          RECORD TYPE 56
 106  1          DATA LIST  /SPEC56 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC56       1     12    14        F           3    0

END OF DATALIST TABLE.

 107  1          RECORD TYPE 57
 108  1          DATA LIST  /SPEC57 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC57       1     12    14        F           3    0
```

```
END OF DATALIST TABLE.

 109  1          RECORD TYPE 58
 110  1          DATA LIST  /SPEC58 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC58       1     12    14        F          3     0

END OF DATALIST TABLE.

 111  1          RECORD TYPE 60
 112  1          DATA LIST  /SPEC60 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC60       1     12    14        F          3     0

END OF DATALIST TABLE.

 113  1          RECORD TYPE 61
 114  1          DATA LIST  /SPEC61 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC61       1     12    14        F          3     0

END OF DATALIST TABLE.

 115  1          RECORD TYPE 62
 116  1          DATA LIST  /SPEC62 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC62       1     12    14        F          3     0

END OF DATALIST TABLE.

 117  1          RECORD TYPE 63
 118  1          DATA LIST  /SPEC63 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC63       1     12    14         F          3    0

END OF DATALIST TABLE.

 119  1          RECORD TYPE 64
 120  1          DATA LIST  /SPEC64 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC64       1     12    14         F          3    0

END OF DATALIST TABLE.

 121  1          RECORD TYPE 65
 122  1          DATA LIST  /SPEC65 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC65       1     12    14         F          3    0

END OF DATALIST TABLE.

 123  1          RECORD TYPE 66
 124  1          DATA LIST  /SPEC66 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC66       1     12    14         F          3    0

END OF DATALIST TABLE.

 125  1          RECORD TYPE 67
 126  1          DATA LIST  /SPEC67 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC67       1     12    14         F          3    0
```

```
END OF DATALIST TABLE.

 127  1          RECORD TYPE 68
 128  1          DATA LIST  /SPEC68 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC68       1     12    14        F           3    0

END OF DATALIST TABLE.

 129  1          RECORD TYPE 69
 130  1          DATA LIST  /SPEC69 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC69       1     12    14        F           3    0

END OF DATALIST TABLE.

 131  1          RECORD TYPE 70
 132  1          DATA LIST  /SPEC70 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC70       1     12    14        F           3    0

END OF DATALIST TABLE.

 133  1          RECORD TYPE 71
 134  1          DATA LIST  /SPEC71 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC71       1     12    14        F           3    0

END OF DATALIST TABLE.

 135  1          RECORD TYPE 72
 136  1          DATA LIST  /SPEC72 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM    .

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC72        1     12     14        F           3    0

END OF DATALIST TABLE.

 137  1          RECORD TYPE 73
 138  1          DATA LIST  /SPEC73 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM    .

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC73        1     12     14        F           3    0

END OF DATALIST TABLE.

 139  1          RECORD TYPE 74
 140  1          DATA LIST  /SPEC74 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM    .

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC74        1     12     14        F           3    0

END OF DATALIST TABLE.

 141  1          RECORD TYPE 75
 142  1          DATA LIST  /SPEC75 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM    .

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC75        1     12     14        F           3    0

END OF DATALIST TABLE.

 143  1          RECORD TYPE 76
 144  1          DATA LIST  /SPEC76 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM    .

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC76        1     12     14        F           3    0
```

```
END OF DATALIST TABLE.

 145  1          RECORD TYPE 77
 146  1          DATA LIST  /SPEC77 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC77       1     12     14         F           3    0

END OF DATALIST TABLE.

 147  1          RECORD TYPE 78
 148  1          DATA LIST  /SPEC78 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC78       1     12     14         F           3    0

END OF DATALIST TABLE.

 149  1          RECORD TYPE 79
 150  1          DATA LIST  /SPEC79 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC79       1     12     14         F           3    0

END OF DATALIST TABLE.

 151  1          RECORD TYPE 80
 152  1          DATA LIST  /SPEC80 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

           VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

           SPEC80       1     12     14         F           3    0

END OF DATALIST TABLE.

 153  1          RECORD TYPE 81
 154  1          DATA LIST  /SPEC81 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC81       1     12     14        F           3    0

END OF DATALIST TABLE.

 155  1           RECORD TYPE 82
 156  1           DATA LIST  /SPEC82 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC82       1     12     14        F           3    0

END OF DATALIST TABLE.

 157  1           RECORD TYPE 83
 158  1           DATA LIST  /SPEC83 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC83       1     12     14        F           3    0

END OF DATALIST TABLE.

 159  1           RECORD TYPE 84
 160  1           DATA LIST  /SPEC84 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC84       1     12     14        F           3    0

END OF DATALIST TABLE.

 161  1           RECORD TYPE 85
 162  1           DATA LIST  /SPEC85 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC85       1     12     14        F           3    0
```

```
END OF DATALIST TABLE.

 163  1          RECORD TYPE 86
 164  1          DATA LIST  /SPEC86 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC86       1     12     14        F           3    0

END OF DATALIST TABLE.

 165  1          RECORD TYPE 87
 166  1          DATA LIST  /SPEC87 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC87       1     12     14        F           3    0

END OF DATALIST TABLE.

 167  1          RECORD TYPE 88
 168  1          DATA LIST  /SPEC88 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC88       1     12     14        F           3    0

END OF DATALIST TABLE.

 169  1          RECORD TYPE 89
 170  1          DATA LIST  /SPEC89 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC89       1     12     14        F           3    0

END OF DATALIST TABLE.

 171  1          RECORD TYPE 90
 172  1          DATA LIST  /SPEC90 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE    REC   START    END        FORMAT  WIDTH  DEC

          SPEC90        1      12     14        F           3    0

END OF DATALIST TABLE.

 173  1          RECORD TYPE 91
 174  1          DATA LIST  /SPEC91 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE    REC   START    END        FORMAT  WIDTH  DEC

          SPEC91        1      12     14        F           3    0

END OF DATALIST TABLE.

 175  1          RECORD TYPE 93
 176  1          DATA LIST  /SPEC93 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE    REC   START    END        FORMAT  WIDTH  DEC

          SPEC93        1      12     14        F           3    0

END OF DATALIST TABLE.

 177  1          RECORD TYPE 94
 178  1          DATA LIST  /SPEC94 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE    REC   START    END        FORMAT  WIDTH  DEC

          SPEC94        1      12     14        F           3    0

END OF DATALIST TABLE.

 179  1          RECORD TYPE 95
 180  1          DATA LIST  /SPEC95 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE    REC   START    END        FORMAT  WIDTH  DEC

          SPEC95        1      12     14        F           3    0
```

```
END OF DATALIST TABLE.

 181  1          RECORD TYPE 96
 182  1          DATA LIST  /SPEC96 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC96       1     12     14        F           3    0

END OF DATALIST TABLE.

 183  1          RECORD TYPE 97
 184  1          DATA LIST  /SPEC97 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC97       1     12     14        F           3    0

END OF DATALIST TABLE.

 185  1          RECORD TYPE 98
 186  1          DATA LIST  /SPEC98 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC98       1     12     14        F           3    0

END OF DATALIST TABLE.

 187  1          RECORD TYPE 99
 188  1          DATA LIST  /SPEC99 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC99       1     12     14        F           3    0

END OF DATALIST TABLE.

 189  1          RECORD TYPE 100
 190  1          DATA LIST  /SPEC100 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC100      1     12     14        F          3     0

END OF DATALIST TABLE.

 191  1          RECORD TYPE 101
 192  1          DATA LIST  /SPEC101 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC101      1     12     14        F          3     0

END OF DATALIST TABLE.

 193  1          RECORD TYPE 102
 194  1          DATA LIST  /SPEC102 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC102      1     12     14        F          3     0

END OF DATALIST TABLE.

 195  1          RECORD TYPE 103
 196  1          DATA LIST  /SPEC103 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC103      1     12     14        F          3     0

END OF DATALIST TABLE.

 197  1          RECORD TYPE 104
 198  1          DATA LIST  /SPEC104 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC104      1     12     14        F          3     0
```

```
END OF DATALIST TABLE.

 199  1          RECORD TYPE 105
 200  1          DATA LIST  /SPEC105 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC105     1     12      14         F          3     0

END OF DATALIST TABLE.

 201  1          RECORD TYPE 106
 202  1          DATA LIST  /SPEC106 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC106     1     12      14         F          3     0

END OF DATALIST TABLE.

 203  1          RECORD TYPE 107
 204  1          DATA LIST  /SPEC107 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC107     1     12      14         F          3     0

END OF DATALIST TABLE.

 205  1          RECORD TYPE 108
 206  1          DATA LIST  /SPEC108 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC108     1     12      14         F          3     0

END OF DATALIST TABLE.

 207  1          RECORD TYPE 109
 208  1          DATA LIST  /SPEC109 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC109	1	12	14	F	3	0

END OF DATALIST TABLE.

```
 209  1          RECORD TYPE 110
 210  1          DATA LIST  /SPEC110 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC110	1	12	14	F	3	0

END OF DATALIST TABLE.

```
 211  1          RECORD TYPE 111
 212  1          DATA LIST  /SPEC111 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC111	1	12	14	F	3	0

END OF DATALIST TABLE.

```
 213  1          RECORD TYPE 112
 214  1          DATA LIST  /SPEC112 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC112	1	12	14	F	3	0

END OF DATALIST TABLE.

```
 215  1          RECORD TYPE 113
 216  1          DATA LIST  /SPEC113 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC113	1	12	14	F	3	0

```
END OF DATALIST TABLE.

 217  1         RECORD TYPE 114
 218  1         DATA LIST  /SPEC114 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC114      1     12.    14         F          3    0

END OF DATALIST TABLE.

 219  1         RECORD TYPE 115
 220  1         DATA LIST  /SPEC115 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC115      1     12     14         F          3    0

END OF DATALIST TABLE.

 221  1         RECORD TYPE 116
 222  1         DATA LIST  /SPEC116 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC116      1     12     14         F          3    0

END OF DATALIST TABLE.

 223  1         RECORD TYPE 118
 224  1         DATA LIST  /SPEC118 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC118      1     12     14         F          3    0

END OF DATALIST TABLE.

 225  1         RECORD TYPE 119
 226  1         DATA LIST  /SPEC119 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC119     1     12     14        F          3    0

END OF DATALIST TABLE.

 227  1          RECORD TYPE 120
 228  1          DATA LIST  /SPEC120 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC120     1     12     14        F          3    0

END OF DATALIST TABLE.

 229  1          RECORD TYPE 121
 230  1          DATA LIST  /SPEC121 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC121     1     12     14        F          3    0

END OF DATALIST TABLE.

 231  1          RECORD TYPE 122
 232  1          DATA LIST  /SPEC122 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC122     1     12     14        F          3    0

END OF DATALIST TABLE.

 233  1          RECORD TYPE 123
 234  1          DATA LIST  /SPEC123 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC123     1     12     14        F          3    0
```

```
END OF DATALIST TABLE.

 235  1          RECORD TYPE 124
 236  1          DATA LIST  /SPEC124 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC124      1     12      14         F          3    0

END OF DATALIST TABLE.

 237  1          RECORD TYPE 125
 238  1          DATA LIST  /SPEC125 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC125      1     12      14         F          3    0

END OF DATALIST TABLE.

 239  1          RECORD TYPE 127
 240  1          DATA LIST  /SPEC127 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC127      1     12      14         F          3    0

END OF DATALIST TABLE.

 241  1          RECORD TYPE 128
 242  1          DATA LIST  /SPEC128 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC128      1     12      14         F          3    0

END OF DATALIST TABLE.

 243  1          RECORD TYPE 129
 244  1          DATA LIST  /SPEC129 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC129     1     12     14        F           3    0

END OF DATALIST TABLE.

 245  1          RECORD TYPE 130
 246  1          DATA LIST  /SPEC130 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC130     1     12     14        F           3    0

END OF DATALIST TABLE.

 247  1          RECORD TYPE 131
 248  1          DATA LIST  /SPEC131 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC131     1     12     14        F           3    0

END OF DATALIST TABLE.

 249  1          RECORD TYPE 132
 250  1          DATA LIST  /SPEC132 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC132     1     12     14        F           3    0

END OF DATALIST TABLE.

 251  1          RECORD TYPE 133
 252  1          DATA LIST  /SPEC133 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC133     1     12     14        F           3    0
```

```
END OF DATALIST TABLE.

 253  1          RECORD TYPE 134
 254  1          DATA LIST  /SPEC134 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC134      1     12     14         F          3     0

END OF DATALIST TABLE.

 255  1          RECORD TYPE 137
 256  1          DATA LIST  /SPEC137 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC137      1     12     14         F          3     0

END OF DATALIST TABLE.

 257  1          RECORD TYPE 138
 258  1          DATA LIST  /SPEC138 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC138      1     12     14         F          3     0

END OF DATALIST TABLE.

 259  1          RECORD TYPE 139
 260  1          DATA LIST  /SPEC139 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END         FORMAT  WIDTH  DEC

          SPEC139      1     12     14         F          3     0

END OF DATALIST TABLE.

 261  1          RECORD TYPE 140
 262  1          DATA LIST  /SPEC140 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC140     1     12     14          F          3    0

END OF DATALIST TABLE.

 263  1          RECORD TYPE 142
 264  1          DATA LIST  /SPEC142 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC142     1     12     14          F          3    0

END OF DATALIST TABLE.

 265  1          RECORD TYPE 143
 266  1          DATA LIST  /SPEC143 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC143     1     12     14          F          3    0

END OF DATALIST TABLE.

 267  1          RECORD TYPE 145
 268  1          DATA LIST  /SPEC145 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC145     1     12     14          F          3    0

END OF DATALIST TABLE.

 269  1          RECORD TYPE 146
 270  1          DATA LIST  /SPEC146 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC146     1     12     14          F          3    0
```

```
END OF DATALIST TABLE.

 271  1          RECORD TYPE 147
 272  1          DATA LIST  /SPEC147 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC147      1     12     14         F          3    0

END OF DATALIST TABLE.

 273  1          RECORD TYPE 148
 274  1          DATA LIST  /SPEC148 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC148      1     12     14         F          3    0

END OF DATALIST TABLE.

 275  1          RECORD TYPE 149
 276  1          DATA LIST  /SPEC149 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC149      1     12     14         F          3    0

END OF DATALIST TABLE.

 277  1          RECORD TYPE 150
 278  1          DATA LIST  /SPEC150 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC150      1     12     14         F          3    0

END OF DATALIST TABLE.

 279  1          RECORD TYPE 151
 280  1          DATA LIST  /SPEC151 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC151	1	12	14	F	3	0

END OF DATALIST TABLE.

```
281  1          RECORD TYPE 152
282  1          DATA LIST  /SPEC152 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC152	1	12	14	F	3	0

END OF DATALIST TABLE.

```
283  1          RECORD TYPE 153
284  1          DATA LIST  /SPEC153 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC153	1	12	14	F	3	0

END OF DATALIST TABLE.

```
285  1          RECORD TYPE 154
286  1          DATA LIST  /SPEC154 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC154	1	12	14	F	3	0

END OF DATALIST TABLE.

```
287  1          RECORD TYPE 155
288  1          DATA LIST  /SPEC155 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC155	1	12	14	F	3	0

END OF DATALIST TABLE.

```
289  1          RECORD TYPE 156
290  1          DATA LIST  /SPEC156 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC156	1	12	14	F	3	0

END OF DATALIST TABLE.

```
291  1          RECORD TYPE 157
292  1          DATA LIST  /SPEC157 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC157	1	12	14	F	3	0

END OF DATALIST TABLE.

```
293  1          RECORD TYPE 158
294  1          DATA LIST  /SPEC158 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC158	1	12	14	F	3	0

END OF DATALIST TABLE.

```
295  1          RECORD TYPE 159
296  1          DATA LIST  /SPEC159 12-14
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE FORAM .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
SPEC159	1	12	14	F	3	0

END OF DATALIST TABLE.

```
297  1          RECORD TYPE 160
298  1          DATA LIST  /SPEC160 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC160     1    12      14         F        3     0

END OF DATALIST TABLE.

 299  1          RECORD TYPE 161
 300  1          DATA LIST  /SPEC161 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC161     1    12      14         F        3     0

END OF DATALIST TABLE.

 301  1          RECORD TYPE 162
 302  1          DATA LIST  /SPEC162 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC162     1    12      14         F        3     0

END OF DATALIST TABLE.

 303  1          RECORD TYPE 163
 304  1          DATA LIST  /SPEC163 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC163     1    12      14         F        3     0

END OF DATALIST TABLE.

 305  1          RECORD TYPE 164
 306  1          DATA LIST  /SPEC164 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM   .

          VARIABLE   REC  START   END        FORMAT  WIDTH  DEC

          SPEC164     1    12      14         F        3     0
```

```
END OF DATALIST TABLE.

 307  1          RECORD TYPE 165
 308  1          DATA LIST  /SPEC165 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC165     1     12      14        F         3     0

END OF DATALIST TABLE.

 309  1          RECORD TYPE 166
 310  1          DATA LIST  /SPEC166 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC166     1     12      14        F         3     0

END OF DATALIST TABLE.

 311  1          RECORD TYPE 167
 312  1          DATA LIST  /SPEC167 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC167     1     12      14        F         3     0

END OF DATALIST TABLE.

 313  1          RECORD TYPE 168
 314  1          DATA LIST  /SPEC168 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START    END        FORMAT  WIDTH  DEC

          SPEC168     1     12      14        F         3     0

END OF DATALIST TABLE.

 315  1          RECORD TYPE 169
 316  1          DATA LIST  /SPEC169 12-14
```

```
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC169     1     12     14        F         3     0

END OF DATALIST TABLE.

 317  1           RECORD TYPE 170
 318  1           DATA LIST  /SPEC170 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC170     1     12     14        F         3     0

END OF DATALIST TABLE.

 319  1           RECORD TYPE 171
 320  1           DATA LIST  /SPEC171 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC171     1     12     14        F         3     0

END OF DATALIST TABLE.

 321  1           RECORD TYPE 172
 322  1           DATA LIST  /SPEC172 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC172     1     12     14        F         3     0

END OF DATALIST TABLE.

 323  1           RECORD TYPE 173
 324  1           DATA LIST  /SPEC173 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE   REC  START   END       FORMAT  WIDTH  DEC

          SPEC173     1     12     14        F         3     0
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END OF DATALIST TABLE.

 325  1          RECORD TYPE 175
 326  1          DATA LIST  /SPEC175 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC175      1     12     14          F         3     0

END OF DATALIST TABLE.

 327  1          RECORD TYPE 176
 328  1          DATA LIST  /SPEC176 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC176      1     12     14          F         3     0

END OF DATALIST TABLE.

 329  1          RECORD TYPE 177
 330  1          DATA LIST  /SPEC177 12-14

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE FORAM

          VARIABLE    REC  START    END        FORMAT  WIDTH  DEC

          SPEC177      1     12     14          F         3     0

END OF DATALIST TABLE.

 331  1          END FILE TYPE
 332  0          FACTOR VARIABLES=SPEC1 TO SPEC177/
 333  0           MISSING=PAIRWISE/
 334  0           WIDTH=80/
 335  0           PRINT=ALL/
 336  0           FORMAT=SORT BLANK(.1)/
 337  0           PLOT=EIGEN/
 338  0           EXTRACTION=PC/
 339  0           ROTATION=VARIMAX/
 340  0           SAVE=REG (ALL FSULS)/
```

F A C T O R   A N A L Y S I S

ANALYSIS NUMBER 1 PAIRWISE DELETION OF CASES WITH MISSING VALUES

	MEAN	STD DEV	CASES	LABEL
SPEC1	1.62500	1.06066	8	
SPEC2	11.57576	11.64858	33	
SPEC3	10.65217	16.18812	23	
SPEC4	3.25000	2.62996	4	
SPEC5	1.00000	.00000	1	
SPEC7	2.66667	.57735	3	
SPEC8	2.00000	.00000	1	
SPEC9	2.00000	.00000	1	
SPEC10	19.92157	17.45261	51	
SPEC11	2.00000	.00000	2	
SPEC12	3.33333	1.52753	3	
SPEC13	19.82979	15.80358	47	
SPEC14	12.55000	13.93774	20	
SPEC15	22.96364	18.09437	55	
SPEC16	5.33333	4.50000	9	
SPEC17	4.00000	.00000	1	
SPEC18	2.00000	1.00000	3	
SPEC19	6.42857	6.02376	7	
SPEC20	1.50000	.70711	2	
SPEC22	20.50000	9.19239	2	
SPEC23	5.00000	4.24264	6	
SPEC24	7.92308	10.85097	13	
SPEC26	4.50000	.70711	2	
SPEC27	5.25000	4.34933	4	
SPEC28	2.00000	1.73205	3	
SPEC29	1.00000	.00000	2	
SPEC31	12.00000	15.31883	7	
SPEC32	2.50000	2.34521	6	
SPEC33	3.44444	1.74005	9	
SPEC34	15.96552	12.51801	58	
SPEC35	5.00000	2.23607	5	
SPEC36	2.00000	1.41421	2	
SPEC37	8.82353	8.06408	17	
SPEC38	7.50000	10.53565	12	
SPEC39	3.00000	.00000	1	
SPEC40	9.11111	8.47063	18	
SPEC41	5.00000	.00000	1	
SPEC42	5.00000	2.82843	2	
SPEC43	9.47619	12.03170	21	
SPEC44	2.83333	2.58785	12	
SPEC46	2.00000	1.41421	2	
SPEC47	3.00000	2.19089	6	
SPEC48	1.69231	1.18213	13	
SPEC49	2.00000	.00000	1	

------------ F A C T O R   A N A L Y S I S ------------

	MEAN	STD DEV	CASES	LABEL
SPEC50	3.33333	2.25093	6	
SPEC51	1.00000	.00000	1	
SPEC52	5.50000	7.88334	18	
SPEC53	1.91667	.90034	12	
SPEC54	1.50000	.70711	2	
SPEC55	1.00000	.00000	2	
SPEC56	6.54545	6.53244	11	
SPEC57	2.00000	1.41421	2	
SPEC58	2.00000	.00000	1	
SPEC60	2.71429	2.16364	14	
SPEC61	17.00000	11.57584	4	
SPEC62	5.42857	6.07885	7	
SPEC63	3.33333	1.52753	3	
SPEC64	14.72222	9.89834	18	
SPEC65	1.00000	.00000	2	
SPEC66	1.00000	.00000	1	
SPEC67	1.50000	.70711	2	
SPEC68	1.75000	.95743	4	
SPEC69	5.50000	2.12132	2	
SPEC70	3.20000	2.16795	5	
SPEC71	2.77778	1.92209	9	
SPEC72	7.02222	6.74365	45	
SPEC73	3.93750	3.83786	16	
SPEC74	6.00000	4.24264	2	
SPEC75	1.50000	1.00000	4	
SPEC76	2.00000	.00000	1	
SPEC77	2.66667	1.15470	3	
~~SPEC78~~	~~2.75000~~	~~1.25831~~	~~4~~	
SPEC79	3.66667	3.05505	3	
SPEC80	14.33333	4.04145	3	
SPEC81	7.23729	7.94884	59	
SPEC82	2.00000	.00000	1	
SPEC83	1.00000	.00000	3	
SPEC84	4.72727	3.74409	11	
SPEC85	4.92000	5.72946	25	
SPEC86	2.80000	2.16795	5	
SPEC87	5.80000	5.54076	5	
SPEC88	14.18182	19.85355	11	
SPEC89	17.00000	.00000	1	
SPEC90	5.37209	4.04159	43	
SPEC91	9.52174	7.26054	23	
SPEC93	3.00000	.00000	1	
SPEC94	2.25000	2.93571	20	
SPEC95	7.66667	8.96289	3	
SPEC96	5.40000	5.68038	10	
SPEC97	22.00000	.00000	1	
SPEC98	16.66667	25.42309	3	
SPEC99	2.00000	.00000	1	

------------ F A C T O R   A N A L Y S I S ------------

	MEAN	STD DEV	CASES	LABEL
SPEC100	1.00000	.00000	3	
SPEC101	1.00000	.00000	1	
SPEC102	4.00000	4.24264	2	
SPEC103	11.09524	12.56430	63	
SPEC104	15.00000	.00000	1	
SPEC105	3.83333	2.58785	12	
SPEC106	5.11765	5.54394	17	
SPEC107	3.20000	2.16795	5	
SPEC108	10.83333	11.23676	18	
SPEC109	8.25000	5.31507	4	
SPEC110	2.00000	.00000	1	
SPEC111	8.00000	.00000	1	
SPEC112	1.66667	1.15470	3	
SPEC113	2.00000	.00000	1	
SPEC114	1.00000	.00000	3	
SPEC115	1.00000	.00000	2	
SPEC116	3.00000	1.73205	3	
SPEC118	1.00000	.00000	2	
SPEC119	.00000	.00000	0	
SPEC120	1.00000	.00000	1	
SPEC121	4.00000	2.64575	3	
SPEC122	15.00000	9.01850	4	
SPEC123	5.56250	6.06916	32	
SPEC124	6.57143	9.50072	14	
SPEC125	1.50000	.70711	2	
SPEC127	3.92857	6.01874	14	
SPEC128	3.61111	3.16486	18	
SPEC129	2.60000	2.50998	5	
SPEC130	2.16667	1.83485	6	
SPEC131	10.33333	12.94218	9	
SPEC132	1.50000	.70711	2	
SPEC133	1.00000	.00000	1	
SPEC134	2.00000	.00000	2	
SPEC137	1.00000	.00000	1	
SPEC138	3.60000	2.45855	10	
SPEC139	2.50000	2.73861	6	
SPEC140	1.00000	.00000	4	
SPEC142	3.00000	.00000	1	
SPEC143	1.00000	.00000	2	
SPEC145	1.50000	.57735	4	
SPEC146	8.45714	7.03078	35	
SPEC147	7.50000	6.49208	18	
SPEC148	2.30000	1.15950	10	
SPEC149	1.40000	.84327	10	
SPEC150	2.00000	.00000	1	
SPEC151	1.00000	.00000	1	
SPEC152	1.00000	.00000	2	
SPEC153	1.00000	.00000	2	

------------ FACTOR ANALYSIS -----------

	MEAN	STD DEV	CASES	LABEL
SPEC154	1.50000	.70711	2	
SPEC155	9.88235	10.67053	17	
SPEC156	1.57143	.78680	7	
SPEC157	3.50000	3.10913	4	
SPEC158	2.20000	1.30384	5	
SPEC159	1.00000	.00000	1	
SPEC160	9.50000	4.94975	2	
SPEC161	2.44444	2.28092	18	
SPEC162	3.33333	2.51661	3	
SPEC163	1.50000	.70711	2	
SPEC164	1.00000	.00000	1	
SPEC165	3.16667	4.83391	6	
SPEC166	4.21053	3.24172	19	
SPEC167	5.00000	4.35890	3	
SPEC168	4.50000	4.94975	2	
SPEC169	5.00000	2.82843	2	
SPEC170	6.15385	6.25628	13	
SPEC171	12.00000	.00000	1	
SPEC172	6.33333	12.09408	6	
SPEC173	1.00000	.00000	1	
SPEC175	1.00000	.00000	1	
SPEC176	4.00000	.00000	1	
SPEC177	1.00000	.00000	1	

CORRELATION MATRIX:

	SPEC1	SPEC2	SPEC3	SPEC4	SPEC5	SPEC7	SPEC8
SPEC1	1.00000						
SPEC2	-0.42760	1.00000					
SPEC3	.	.	1.00000				
SPEC4	.	-0.75593	.	1.00000			
SPEC5	.	.	.	.	1.00000		
SPEC7	.	.66577	.	.	.	1.00000	
SPEC8	.	.	.	.	.	.	1.00000
SPEC9	.	.	.	.	.	.	.
SPEC10	.10127	.08269	-0.31711	1.00000	.	.95161	.
SPEC11	.	.	.	.	.	.	.
SPEC12	.	.34393	.	.	.	.	.
SPEC13	-0.56977	.00214	.93118	.97435	.	.43637	.
SPEC14	.	-0.40494	.21862	-1.00000	.	.	.
SPEC15	-0.05241	.02059	-0.24858	.81994	.	.	.
SPEC16	.	-0.47032	-0.06391	.	.	.	.
SPEC17	.	.	.	.	.	.	.
SPEC18	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC1	SPEC2	SPEC3	SPEC4	SPEC5	SPEC7	SPEC8
SPEC19	.	-0.55012	.	.	.	-1.00000	.
SPEC20	.	.	.	.	.	.	.
SPEC22	.	.	.	.	.	.	.
SPEC23	1.00000	-0.12861	.	.	.	.	.
SPEC24	.	-1.00000	.17917	.	.	.	.
SPEC26	.	.	.	.	.	.	.
SPEC27	.	.	.	.	.	.	.
SPEC28	.	.	.	.	.	.	.
SPEC29	.	.	.	.	.	.	.
SPEC31	.	.41931	1.00000	.	.	.	.
SPEC32	1.00000	-0.48133	.	.	.	1.00000	.
SPEC33	.	.75593	.	-1.00000	.	.	.
SPEC34	-0.60268	-0.29103	.00045	.86966	.	.97073	.
SPEC35	.	.	1.00000	.	.	.	.
SPEC36	.	-1.00000	.	.	.	.	.
SPEC37	.	-0.35274	-0.37902	.	.	.	.
SPEC38	.	.59238	-0.29851	.	.	.	.
SPEC39	.	.	.	.	.	.	.
SPEC40	.	.49607	-0.50000	.	.	1.00000	.
SPEC41	.	.	.	.	.	.	.
SPEC42	.	.	.	.	.	.	.
SPEC43	-0.74485	-0.41349	.	1.00000	.	.	.
SPEC44	.	-0.44925	.	.	.	.	.
SPEC46	.	.	.	.	.	.	.
SPEC47	.	.	.	1.00000	.	.	.
SPEC48	1.00000	-0.50130	.	.	.	1.00000	.
SPEC49	.	.	.	.	.	.	.
SPEC50	.	-0.06850	.	-1.00000	.	.	.
SPEC51	.	.	.	.	.	.	.
SPEC52	.57735	-0.13154	.	.35921	.	1.00000	.
SPEC53	.	-0.43388	.	.	.	.	.
SPEC54	.	.	.	.	.	.	.
SPEC55	.	.	.	.	.	.	.
SPEC56	.69338	-0.22951	.	-1.00000	.	1.00000	.
SPEC57	.	.	-1.00000	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	.	-0.52125	.	1.00000	.	.	.
SPEC61	.	.	.81326	.	.	.	.
SPEC62	.	-0.27312	.	.	.	.	.
SPEC63	.	.	.74875	.	.	.	.
SPEC64	.	.	.32670	.	.	.	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	-1.00000	.	.	.	.	.
SPEC68	.	-0.03846	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	-0.58273	.	.	.	.	.
SPEC71	-1.00000	-0.27197	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC1	SPEC2	SPEC3	SPEC4	SPEC5	SPEC7	SPEC8
SPEC72	.16744	.07956	-0.26343	.60766	.	.	.
SPEC73	-0.17408	-0.47506	-1.00000	.	.	.	.
SPEC74	.	-1.00000	.	.	.	.	.
SPEC75	.	.	-0.24024	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	-0.79241	.	.	.	.
SPEC78	.	.	.	1.00000	.	.	.
SPEC79	.	.	1.00000	.	.	.	.
SPEC80	.	.	.50940	.	.	.	.
SPEC81	-0.42008	-0.13076	.93748	.	.	.	.
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	-0.70632	.	.	.	.	.
SPEC85	-1.00000	-0.36250	.69921	.	.	.	.
SPEC86	.	-1.00000	.	.	.	.	.
SPEC87	.	-1.00000	-1.00000	.	.	.	.
SPEC88	.	.	.67900	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	.26711	.01504	-0.04938	-1.00000	.	-0.80296	.
SPEC91	-1.00000	.12563	.	.91620	.	.	.
SPEC93	.	.	.	.	.	.	.
SPEC94	.	-0.41823	.07091	-1.00000	.	.	.
SPEC95	.	-0.63990	.	.	.	.	.
SPEC96	.	.03496	.	.	.	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	-0.66880	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	1.00000	.	.	.	.
SPEC103	.56408	.17101	-0.19059	-0.15554	.	-1.00000	.
SPEC104	.	.	.	.	.	.	.
SPEC105	.77778	.14247	.	.	.	-1.00000	.
SPEC106	.	-0.01916	-1.00000	.	.	.	.
SPEC107	.	1.00000	.	.	.	.	.
SPEC108	.	-0.85169	1.00000	1.00000	.	.	.
SPEC109	.	.	.	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	-0.79241	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	-1.00000	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	-1.00000	.	.	.	.

- - - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - - -

	SPEC1	SPEC2	SPEC3	SPEC4	SPEC5	SPEC7	SPEC8
SPEC122	.	.	.44925	.	.	.	.
SPEC123	.	-0.23120	.26914	-0.62862	.	.	.
SPEC124	.	-0.99340	.14669	.	.	.	.
SPEC125	.	.	-1.00000	.	.	.	.
SPEC127	.	-0.31632	.99864	.	.	.	.
SPEC128	1.00000	.	-0.17577	.	.	.	.
SPEC129	.	1.00000	.	.	.	.	.
SPEC130	.	.	.	.	.	.	.
SPEC131	1.00000	-0.57580	1.00000	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	-0.68182	.	.	.	.	.
SPEC139	.	.	.	-1.00000	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	1.00000	.	.	.	.	.
SPEC146	.97073	-0.02030	.	.48538	.	.	.
SPEC147	.	.	.29125	.	.	.	.
SPEC148	.	-0.32013	.	.	.	.	.
SPEC149	.	-0.36228	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	-0.50672	-1.00000	1.00000	.	.	.
SPEC156	.	-0.42144	.	.	.	.	.
SPEC157	.	1.00000	.	1.00000	.	.	.
SPEC158	.	.66400	.	.	.	1.00000	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	1.00000	.	.	.	.
SPEC161	-0.50000	-0.50164	-0.67436	.	.	.	.
SPEC162	.	-1.00000	.	.	.	.	.
SPEC163	.	1.00000	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	1.00000	-0.42569	.	-1.00000	.	.	.
SPEC166	.	-0.56877	-0.02949	1.00000	.	.	.
SPEC167	.	1.00000	.	-1.00000	.	.	.
SPEC168	.	.	-1.00000	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	-0.05763	.	-1.00000	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	-0.91273	.	.	.	-1.00000	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.

----------- FACTOR ANALYSIS -----------

	SPEC1	SPEC2	SPEC3	SPEC4	SPEC5	SPEC7	SPEC8
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC9	SPEC10	SPEC11	SPEC12	SPEC13	SPEC14	SPEC15
SPEC9	1.00000						
SPEC10	.	1.00000					
SPEC11	.	.	1.00000				
SPEC12	.	-0.80796	.	1.00000			
SPEC13	.	.16395	.	.83863	1.00000		
SPEC14	.	-0.42749	.	.	.45131	1.00000	
SPEC15	.	.55496	.	.	.30606	-0.02182	1.00000
SPEC16	.	.36390	.	.	.55878	.	.63342
SPEC17	.	.	.	.	.	.	.
SPEC18	.	.	.	.	.	.	-0.76799
SPEC19	.	-0.49845	.	.	-0.46969	-1.00000	.00371
SPEC20	.	1.00000	.	.	.	.	.
SPEC22	.	-1.00000	.	.	-1.00000	.	1.00000
SPEC23	.	.02035	.	.	-0.03128	1.00000	.
SPEC24	.	.60100	.	.	.55301	.41070	.37770
SPEC26	.	1.00000	.	.	1.00000	.	-1.00000
SPEC27	.	-0.45780	.	.	1.00000	.	-0.46080
SPEC28	.	-1.00000	.	.	.00000	.	.
SPEC29	.	.	.	.	.	.	.
SPEC31	.	-0.44986	.	.	-0.33829	.	-0.22467
SPEC32	.	-0.26133	.	.	.19754	.	-0.71423
SPEC33	.	-0.28460	.	.	-0.28855	.02470	-0.65959
SPEC34	.	.06451	.	.68568	.18754	.30848	-0.01756
SPEC35	.	.	.	.	-1.00000	.	1.00000
SPEC36	.	-1.00000	.	.	1.00000	.	1.00000
SPEC37	.	-0.43096	.	-1.00000	-0.38049	.93487	-0.08666
SPEC38	.	.18719	.	.	.84197	1.00000	-0.03984
SPEC39	.	.	.	.	.	.	.
SPEC40	.	.33586	.	-1.00000	.15721	-0.17422	.01508
SPEC41	.	.	.	.	.	.	.
SPEC42	.	-1.00000	.	.	.	.	.
SPEC43	.	-0.06355	.	.	.05902	.84447	-0.13287
SPEC44	.	-0.43964	.	.	-0.17704	-0.24261	-0.02227
SPEC46	.	.	.	.	.	.	.
SPEC47	.	.33731	.	.	.33182	-0.92303	-0.71395
SPEC48	.	.11367	.	.	-0.34638	.	-0.76982
SPEC49	.	.	.	.	.	.	.
SPEC50	.	-0.22259	.	.	-0.26020	.50364	.12514
SPEC51	.	.	.	.	.	.	.
SPEC52	.	.56944	.	.	-0.04010	.24459	.19696
SPEC53	.	.22662	.	.	.49117	.55768	-0.19992
SPEC54	.	.	.	.	.	.	1.00000

F A C T O R   A N A L Y S I S

	SPEC9	SPEC10	SPEC11	SPEC12	SPEC13	SPEC14	SPEC15
SPEC55	.	.	.	.	.	.	.
SPEC56	.	.34254	.	-1.00000	-0.13412	-1.00000	-0.41432
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	.	.15757	.	.	.10743	-0.04569	.10401
SPEC61	.	-1.00000	.	.	.	.	1.00000
SPEC62	.	.32308	.	-1.00000	-0.17176	.	-1.00000
SPEC63	.	-1.00000	.	.	.	.	.
SPEC64	.	-0.09624	.	.	.33780	.98032	.24312
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	-1.00000	.	.
SPEC68	.	-1.00000	.	.	.	.	.
SPEC69	.	1.00000	.	.	.	.	1.00000
SPEC70	.	.48256	.	.	-0.38791	.	.
SPEC71	.	-0.42877	.	.	-0.43593	.	.83863
SPEC72	.	-0.23498	.	.	.15932	-0.25793	-0.15293
SPEC73	.	-0.25780	.	-0.18898	-0.17344	.	-0.28901
SPEC74	.	1.00000	.	.	-1.00000	.	.
SPEC75	.	.29140	.	.	.	.	-0.66461
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	.	.	.	.	.
SPEC78	.	.90784	.	.	.46300	-1.00000	-0.31311
SPEC79	.	-1.00000	.	.	1.00000	.	.68268
SPEC80	.	1.00000	.	.	.	.	.
SPEC81	.	-0.07120	.	-1.00000	.13662	.31313	-0.07754
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	.72558	.	.	.18826	.59041	.34830
SPEC85	.	-0.26411	.	.	-0.05543	.11817	.03453
SPEC86	.	.47722	.	.	1.00000	1.00000	.22934
SPEC87	.	-0.24938	.	.	.52271	-0.99587	-0.71632
SPEC88	.	.03385	.	.	.	.44216	-0.51962
SPEC89	.	.	.	.	.	.	.
SPEC90	.	-0.33306	.	1.00000	.08787	.37189	-0.08159
SPEC91	.	-0.19555	.	-1.00000	.23422	.48192	.77038
SPEC93	.	.	.	.	.	.	.
SPEC94	.	-0.17815	.	.	.66145	.25876	-0.06406
SPEC95	.	1.00000	.	.	-0.08742	.	-1.00000
SPEC96	.	.09114	.	.	-0.01761	.66290	.09431
SPEC97	.	.	.	.	.	.	.
SPEC98	.	1.00000	.	.	.	1.00000	-1.00000
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	-1.00000	.	.	.	.	.
SPEC103	.	.45608	.	-0.61859	-0.09367	-0.27330	.54650
SPEC104	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC9	SPEC10	SPEC11	SPEC12	SPEC13	SPEC14	SPEC15
SPEC105	.	-0.05247	.	.	-0.46474	-1.00000	-0.82813
SPEC106	.	.06165	.	.	.02774	.04697	.20453
SPEC107	.	.99018	.	.	-0.48225	-0.02876	-0.73634
SPEC108	.	.61477	.	.	-0.03710	-0.34411	.19927
SPEC109	.	.99216	.	.	.41931	-1.00000	.44315
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	1.00000	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	-1.00000	.	.	1.00000	.	-1.00000
SPEC122	.	.61963	.	.	1.00000	.	1.00000
SPEC123	.	-0.22713	.	1.00000	.03457	-0.50750	.07638
SPEC124	.	-0.31637	.	.	-0.25110	-0.18898	-0.12542
SPEC125	.	1.00000	.	.	.	.	.
SPEC127	.	.59575	.	.	-0.41080	-0.18603	-0.18295
SPEC128	.	.16287	.	.	.	.50000	.18974
SPEC129	.	1.00000	.	.	-0.06324	1.00000	.47429
SPEC130	.	1.00000	.	.	.21482	.79702	.48884
SPEC131	.	-0.88263	.	.	-0.06196	.92857	-0.07591
SPEC132	.	.	.	.	.	.	-1.00000
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.26553	.	.	.57772	.55864	.53630
SPEC139	.	.86541	.	.	.47222	-0.42459	-0.66396
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	1.00000	.	.	-1.00000	.	.
SPEC146	.	-0.02813	.	.94491	.65867	.49318	.32143
SPEC147	.	-0.29648	.	.	.	.86558	-0.20250
SPEC148	.	.03909	.	.	.02517	1.00000	.00000
SPEC149	.	.21933	.	.	-0.52017	1.00000	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	-1.00000	.	.
SPEC155	.	-0.03641	.	-1.00000	.16522	.76943	.02536
SPEC156	.	-0.59034	.	.	.67212	.59008	-0.06566
SPEC157	.	.50000	.	.	.05701	.74918	-0.02854
SPEC158	.	.92534	.	.	-0.86603	.	-0.32194

FACTOR ANALYSIS

	SPEC9	SPEC10	SPEC11	SPEC12	SPEC13	SPEC14	SPEC15
SPEC159	.	.	.	.	.	.	.
SPEC160	.	-1.00000	.	.	.	.	.
SPEC161	.	.55679	.	.	.20679	-0.82870	.52829
SPEC162	.	-0.88589	.	.	-1.00000	.	.59604
SPEC163	.	.	.	.	-1.00000	.	-1.00000
SPEC164	.	.	.	.	.	.	.
SPEC165	.	1.00000	.	.	-0.45246	.	-0.65722
SPEC166	.	-0.49486	.	.	.48098	.13497	-0.23153
SPEC167	.	-1.00000	.	.	-1.00000	-0.90113	-0.89446
SPEC168	.	.	.	.	.	.	.
SPEC169	.	1.00000	.	.	.	.	.
SPEC170	.	-0.34032	.	.	-0.48258	-0.40702	-0.39973
SPEC171	.	.	.	.	.	.	.
SPEC172	.	-0.21887	.	.	.19707	.	-1.00000
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC16	SPEC17	SPEC18	SPEC19	SPEC20	SPEC22	SPEC23
SPEC16	1.00000						
SPEC17	.	1.00000					
SPEC18	.	.	1.00000				
SPEC19	.	.	.	1.00000			
SPEC20	.	.	.	.	1.00000		
SPEC22	.	.	.	1.00000	.	1.00000	
SPEC23	.	.	.	.	.	.	1.00000
SPEC24	.	.	-0.50000	.	.	.	.
SPEC26	.	.	.	-1.00000	.	-1.00000	.
SPEC27	.	.	.	.	.	.	.
SPEC28	.	.	.	.	.	.	.
SPEC29	.	.	.	.	.	.	.
SPEC31	.	.	.	.	.	.	.
SPEC32	.	.	.	.	.	.	.
SPEC33	.	.	.	-0.92447	.	-1.00000	.
SPEC34	-0.13212	.	.88250	.82379	-1.00000	-1.00000	.82274
SPEC35	.	.	.	.	.	.	.
SPEC36	.	.	.	.	.	.	.
SPEC37	-1.00000	.	.	.	.	.	.87372
SPEC38	.35724	.	.	.	.	.	.
SPEC39	.	.	.	.	.	.	.
SPEC40	-0.46804	.	.	-0.43965	.	-1.00000	-1.00000
SPEC41	.	.	.	.	.	.	.
SPEC42	.	.	.	.	.	.	.
SPEC43	.	.	.	-0.10583	.	-1.00000	-0.80296
SPEC44	.	.	.	-0.74875	.	-1.00000	.

FACTOR ANALYSIS

	SPEC16	SPEC17	SPEC18	SPEC19	SPEC20	SPEC22	SPEC23
SPEC46	.	.	.	.	.	.	.
SPEC47	.	.	.	.	.	.	.
SPEC48	.	.	1.00000	-1.00000	.	.	.
SPEC49	.	.	.	.	.	.	.
SPEC50	.	.	.	.	.	.	.
SPEC51	.	.	.	.	.	.	.
SPEC52	1.00000	.	.	-0.52523	.	.	1.00000
SPEC53	.	.	.	-1.00000	.	.	.
SPEC54	.	.	1.00000	.	.	.	.
SPEC55	.	.	.	.	.	.	.
SPEC56	.04025	.	.	.	.	.	-0.61859
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	.	.	.	-0.54909	.	-1.00000	.
SPEC61	.	.	.	.	.	.	.
SPEC62	.	.	.	-1.00000	.	.	.
SPEC63	.	.	.	.	.	.	.
SPEC64	-0.36892	.	-1.00000	.	.	.	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	.	.	.
SPEC68	.	.	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	.	.	.	.	.	.
SPEC71	.	.	.	.	.	.	-1.00000
SPEC72	-0.44023	.	-1.00000	.05379	.	-1.00000	.46018
SPEC73	.	.	.	.	.	.	-0.80296
SPEC74	.	.	.	.	.	.	.
SPEC75	-1.00000	.	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	.	.	.	.	.
SPEC78	.	.	.	.	.	.	.
SPEC79	.	.	.	.	.	.	.
SPEC80	.	.	.	.	.	.	.
SPEC81	-0.31287	.	.39736	.15766	-1.00000	1.00000	.13740
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	.	.	-0.10989	.	-1.00000	.
SPEC85	.	.	.	-0.09449	.	-1.00000	.
SPEC86	.	.	.	.	.	.	.
SPEC87	.	.	.	.	.	.	.
SPEC88	.	.	.00000	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	-0.47495	.	-1.00000	-0.29710	.	1.00000	-0.41703
SPEC91	.	.	.	.80296	.	.	-0.08859
SPEC93	.	.	.	.	.	.	.
SPEC94	.	.	.	.88736	.	.	.
SPEC95	.	.	.	.	.	.	.

----------- FACTOR ANALYSIS -----------

	SPEC16	SPEC17	SPEC18	SPEC19	SPEC20	SPEC22	SPEC23
SPEC96	.	.	.	-1.00000	.	-1.00000	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	.03067	.	-0.61859	.89449	-1.00000	1.00000	.33934
SPEC104	.	.	.	.	.	.	.
SPEC105	.	.	.	.27235	.	.	-0.47949
SPEC106	.	.	.	.99834	.	1.00000	.
SPEC107	.	.	.	.	.	.	.
SPEC108	.	.	-1.00000	.	.	.	.
SPEC109	.	.	.	1.00000	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	.	.	-0.55442	-1.00000	.	.	.
SPEC124	.	.	.	.	.	.	.
SPEC125	.	.	.	.	.	.	.
SPEC127	.	.	.	.	.	.	.
SPEC128	-0.53990	.	-0.39736	.	.	.	.
SPEC129	.	.	.	.	.	.	.
SPEC130	.	.	.	1.00000	.	.	.
SPEC131	.	.	.	.	.	.	-0.44353
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	-0.05764	.	-1.00000	.
SPEC139	.	.	.	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	.57656	.	.	-0.09418	.	.	-0.13412
SPEC147	.93889	.	.97812	.	.	.	.
SPEC148	.	.	.	1.00000	.	.	.
SPEC149	.	.	.	.	.	.	.95632

F A C T O R   A N A L Y S I S

	SPEC16	SPEC17	SPEC18	SPEC19	SPEC20	SPEC22	SPEC23
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	-1.00000	.	.	.47932	-1.00000	-1.00000	.
SPEC156	.	.	.	.	.	.	-1.00000
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	1.00000	.	1.00000	1.00000	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	1.00000
SPEC166	-0.75593	.	.	.	.	.	.
SPEC167	.	.	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	1.00000	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC24	SPEC26	SPEC27	SPEC28	SPEC29	SPEC31	SPEC32
SPEC24	1.00000						
SPEC26	.	1.00000					
SPEC27	1.00000	.	1.00000				
SPEC28	.	.	.	1.00000			
SPEC29	.	.	.	.	1.00000		
SPEC31	.99283	.	.	.	.	1.00000	
SPEC32	.	.	.	.	.	.	1.00000
SPEC33	.	1.00000	.	.	.	.	.
SPEC34	-0.55456	1.00000	.61413	1.00000	.	-0.70236	.71415
SPEC35	.	.	.	.	.	.	.
SPEC36	.	.	.	.	.	.	.
SPEC37	.	.	.13207	.	.	.	-1.00000
SPEC38	.	.	.	.	.	.	.97409
SPEC39	.	.	.	.	.	.	.
SPEC40	-1.00000	1.00000	.	.	.	-1.00000	.98432
SPEC41	.	.	.	.	.	.	.
SPEC42	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC24	SPEC26	SPEC27	SPEC28	SPEC29	SPEC31	SPEC32
SPEC43	.	1.00000	.	.	.	-1.00000	-1.00000
SPEC44	.	1.00000	.	.	.	.	.
SPEC46	.	.	.	.	.	.	.
SPEC47	.	.	.	.	.	.	.
SPEC48	.94491	.	.	.	.	.99977	1.00000
SPEC49	.	.	.	.	.	.	.
SPEC50	.	.	.	.	.	.	.
SPEC51	.	.	.	.	.	.	.
SPEC52	.	.	.	.	.	.	.00000
SPEC53	.	.	.	.	.	.	.
SPEC54	1.00000	.	.	.	.	.	.
SPEC55	.	.	.	.	.	.	.
SPEC56	.	.	.	.	.	.	.22039
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	-1.00000	1.00000	.	.	.	.	.94491
SPEC61	.	.	.	.	.	.	.
SPEC62	.	.	.	.	.	.	.
SPEC63	.	.	.	.	.	.	.
SPEC64	.54855	.	.	.	.	-1.00000	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	.	.	.
SPEC68	.	.	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	.	.	.	.	.	.
SPEC71	.	.	.	.	.	.	.
SPEC72	.08916	1.00000	.87808	1.00000	.	.94870	.98375
SPEC73	1.00000	.	.	.	.	-1.00000	-0.50000
SPEC74	.	.	.	.	.	.	.
SPEC75	.	.	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	.	.	.	.	.
SPEC78	.	.	.	.	.	.	.
SPEC79	1.00000	.	.	.	.	.	.
SPEC80	.	.	.	.	.	.	.
SPEC81	.29472	-1.00000	-0.23839	1.00000	.	.52922	.98432
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	1.00000	.	.	.	.	.
SPEC85	.86603	1.00000	.	.	.	.	1.00000
SPEC86	.69338	.	.	.	.	.	.
SPEC87	.	.	.	.	.	.	.
SPEC88	-0.04912	.	-1.00000	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	1.00000	-1.00000	.	1.00000	.	.56299	-0.36564
SPEC91	1.00000	.	.	.	.	.99076	.01855
SPEC93	.	.	.	.	.	.	.

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	SPEC24	SPEC26	SPEC27	SPEC28	SPEC29	SPEC31	SPEC32
SPEC94	.77460	.	.86603	.	.	.	1.00000
SPEC95	.	.	.	.	.	.	.
SPEC96	.	1.00000	.	.	.	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	.00918	-1.00000	-0.24019	1.00000	.	.31606	.58554
SPEC104	.	.	.	.	.	.	.
SPEC105	.	.	.	.	.	.	.00000
SPEC106	1.00000	-1.00000	.	.	.	.	.
SPEC107	.	.	.	.	.	.	.
SPEC108	.87927	.	.	.	.	.	.
SPEC109	.	.	.	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	.27601	.	-0.22641	.	.	.99977	1.00000
SPEC124	-0.13932	.	.	.	.	1.00000	.
SPEC125	.	.	.	.	.	.	.
SPEC127	-0.47238	.	-1.00000	.	.	.	.
SPEC128	.16415	.	1.00000	.	.	.77708	.
SPEC129	.	.	.	.	.	.	1.00000
SPEC130	.	.	.	.	.	.	.
SPEC131	.	.	.	.	.	1.00000	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	1.00000	.	.	.	.	.
SPEC139	.	.	.	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	-0.96586	.	1.00000	-0.31701	.	.	.90780
SPEC147	-0.15179	.	1.00000	.	.	.94589	.

------------ FACTOR ANALYSIS ------------

	SPEC24	SPEC26	SPEC27	SPEC28	SPEC29	SPEC31	SPEC32
SPEC148	.	.	.	.	.	.	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.99938	1.00000	.	1.00000	.	.	-1.00000
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	1.00000
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	-0.50000	.	.	.	.	.84856	-0.86603
SPEC162	.	.	1.00000	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.
SPEC166	.97073	.	.	.	.	.	.
SPEC167	.	.	.	.	.	.	.
SPEC168	-1.00000	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	-1.00000	.	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.99957
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC33	SPEC34	SPEC35	SPEC36	SPEC37	SPEC38	SPEC39
SPEC33	1.00000						
SPEC34	-0.25415	1.00000					
SPEC35	.	-1.00000	1.00000				
SPEC36	.	1.00000	.	1.00000			
SPEC37	.	.05004	-0.75593	.	1.00000		
SPEC38	.	.48875	.	.	-0.28301	1.00000	
SPEC39	.	.	.	.	.	.	1.00000
SPEC40	-0.03940	.09651	.	.	.	.85375	.
SPEC41	.	.	.	.	.	.	.
SPEC42	.	.	.	.	.	.	.
SPEC43	.74885	.14846	.	.	.89508	1.00000	.
SPEC44	.77893	-0.45997	.	.	.93586	.	.
SPEC46	.	1.00000	.	.	.	.	.
SPEC47	.18898	.37640	.	.	.	.	.
SPEC48	.	-0.12617	.	.	-1.00000	-1.00000	.

SPEC50	.97622	-0.82948	.	.	-1.00000	.	.
SPEC51	.	.	.	.	.	.	.
SPEC52	-0.07945	.03349	1.00000	.	.98059	-1.00000	.
SPEC53	.77440	.30371	.	.	-0.78190	.	.
SPEC54	.	1.00000	.	.	.	.	.
SPEC55	.	.	.	.	.	.	.
SPEC56	1.00000	.12557	.	-1.00000	-0.39736	-0.17271	.
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	.29627	.39968	.	.	-1.00000	1.00000	.
SPEC61	.	1.00000	.79021	.	-1.00000	.	.
SPEC62	.	-0.90870	.	.	-0.56844	-1.00000	.
SPEC63	.	1.00000	1.00000	.	-1.00000	.	.
SPEC64	.	.00090	.	.	.	-0.20465	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	1.00000	.	.
SPEC68	.	1.00000	.	.	.	.	.
SPEC69	.	-1.00000	.	.	.	.	.
SPEC70	.	.10976	.	.	-0.25545	.	.
SPEC71	.	.85101	.	.	1.00000	.75593	.
SPEC72	.31425	-0.08201	.	.	.45636	.46999	.
SPEC73	.	.48223	-1.00000	.	.74495	-1.00000	.
SPEC74	.	.	.	.	.	-1.00000	.
SPEC75	.	.97860	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	-1.00000	.	1.00000	.	.
SPEC78	-1.00000	.33190	.	.	.	.	.
SPEC79	.	.	.	.	.	.	.
SPEC80	.	-1.00000	1.00000	.	-1.00000	.	.
SPEC81	-0.57538	.06460	.	.	-0.23540	.01667	.
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.14937	.80682	.	.	.36544	.	.
SPEC85	.24174	.21223	.	.	.52211	1.00000	.
SPEC86	.	.73197	.	.	.	.	.
SPEC87	.	.11573	.	.	.	.41931	.
SPEC88	.	-0.60967	.	.	-1.00000	1.00000	.
SPEC89	.	.	.	.	.	.	.
SPEC90	.37679	-0.10666	.	.	.53012	-0.00291	.
SPEC91	-0.49468	-0.34990	.	.	.44550	-0.01505	.
SPEC93	.	.	.	.	.	.	.
SPEC94	.11173	.00726	-1.00000	.	-0.25125	.94491	.
SPEC95	.	1.00000	.	.	-1.00000	.	.
SPEC96	.19763	.03212	.	.	-1.00000	.	.
SPEC97	.	.	.	.	.	.	.
[illegible]	.	-1.00000	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC33	SPEC34	SPEC35	SPEC36	SPEC37	SPEC38	SPEC3.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	1.00000	.	.	.	.	.
SPEC103	-0.53077	.00470	-1.00000	.	-0.09172	.25990	.
SPEC104	.	.	.	.	.	.	.
SPEC105	.	-0.12321	.	.	-0.46617	-0.99627	.
SPEC106	-0.25020	-0.47465	.	.	.15021	1.00000	.
SPEC107	.	-0.79786	.	.	1.00000	.	.
SPEC108	.21890	-0.22491	.	.	1.00000	.	.
SPEC109	-1.00000	.61763	.	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	-1.00000	.	1.00000	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	1.00000	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	1.00000	.	.	1.00000	.	.
SPEC122	.	-0.94820	1.00000	.	.34996	.	.
SPEC123	.30262	-0.36117	1.00000	.	-0.20028	.96039	.
SPEC124	.	-0.59160	-1.00000	.	1.00000	-1.00000	.
SPEC125	.	-1.00000	.	.	.	.	.
SPEC127	.02787	.72106	.	.	-0.40455	.	.
SPEC128	.	-0.42715	.	.	.30952	1.00000	.
SPEC129	-1.00000	.89681	.	.	-1.00000	1.00000	.
SPEC130	-0.67363	.87237	.	.	.	.	.
SPEC131	.	-0.64782	1.00000	.	.21438	.	.
SPEC132	.	1.00000	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.41597	.56049	.	.	1.00000	.	.
SPEC139	.13245	-0.00493	.	.	-1.00000	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	-0.55923	.	.	.	.	.
SPEC146	-0.50956	-0.00611	.	.	-0.19811	.92406	.
SPEC147	.	.59473	.	.	-0.94491	.	.
SPEC148	-1.00000	.07346	.	.	-0.65465	.	.
SPEC149	.	.62007	.	.	-0.26029	-1.00000	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.

----------- F A C T O R   A N A L Y S I S -----------

	SPEC33	SPEC34	SPEC35	SPEC36	SPEC37	SPEC38	SPEC39
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.53446	.05252	.	.	.99718	-0.14286	.
SPEC156	-1.00000	.47937	.	.	.75593	.	.
SPEC157	.85808	-0.54088	.	.	.	.	.
SPEC158	.	.00000	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	1.00000	.	.	.	.	.
SPEC161	.98198	.12671	.	.	.91766	.76495	.
SPEC162	.	1.00000	.	.	1.00000	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	-0.22460	.	.	.	-0.43355	.
SPEC166	-1.00000	.52192	.99054	.	.33622	.32862	.
SPEC167	.91766	-0.95413	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	1.00000	.	.	.	.	.
SPEC170	.13374	-0.29330	.	.	.85392	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.05907	.	.	-1.00000	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC40	SPEC41	SPEC42	SPEC43	SPEC44	SPEC46	SPEC47
SPEC40	1.00000						
SPEC41	.	1.00000					
SPEC42	.	.	1.00000				
SPEC43	-0.32537	.	.	1.00000			
SPEC44	-0.19386	.	.	.69401	1.00000		
SPEC46	.	.	.	.	.	1.00000	
SPEC47	.09996	.	.	1.00000	-0.88192	.	1.00000
SPEC48	.	.	.	-1.00000	.	.	.
SPEC49	.	.	.	.	.	.	.
SPEC50	-1.00000	.	.	.66342	.95084	.	-1.00000
SPEC51	.	.	.	.	.	.	.
SPEC52	.23776	.	.	.89126	.40109	.	.94491
SPEC53	.30305	.	.	.64501	.34348	.	1.00000
SPEC54	.	.	.	.	.	.	.
SPEC55	.	.	.	.	.	.	.
SPEC56	-0.22443	.	.	.00000	-1.00000	.	1.00000
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	.93280	.	.	.63813	-0.04767	.	.12726
SPEC61	.	.	.	.	.	.	.

------------ FACTOR ANALYSIS ------------

	SPEC40	SPEC41	SPEC42	SPEC43	SPEC44	SPEC46	SPEC47
SPEC62	-1.00000	.	.	.	.	.	.
SPEC63	.	.	.	.	.	.	.
SPEC64	.14239	.	-1.00000	.	.	.	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	.	.	.
SPEC68	.	.	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	.	.	.08220	.	.	.
SPEC71	-0.53031	.	.	1.00000	.	.	.
SPEC72	.44714	.	.	.39379	-0.44385	.	.74283
SPEC73	-0.18163	.	.	.39573	.	.	.
SPEC74	.	.	.	.	.	.	.
SPEC75	-1.00000	.	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	.	.	.	.	.
SPEC78	-1.00000	.	.	.	-0.66227	.	.84856
SPEC79	.	.	.	.	.	.	.
SPEC80	.	.	.	.	.	.	.
SPEC81	.22444	.	.	-0.07133	-0.08288	.	.16424
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.51689	.	.	-0.28155	-0.26844	.	-0.43355
SPEC85	.35755	.	.	.22628	.36778	.	.93326
SPEC86	.	.	.	-1.00000	.	.	.
SPEC87	.	.	.	.	-1.00000	.	1.00000
SPEC88	.	.	.	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	-0.36990	.	.	.64002	.54524	.	-1.00000
SPEC91	.31390	.	.	-0.07931	.64304	.	-0.47526
SPEC93	.	.	.	.	.	.	.
SPEC94	-0.06380	.	.	-0.25638	-0.10297	.	-0.58791
SPEC95	.	.	.	.	.	.	.
SPEC96	.32927	.	.	-0.03354	-0.40026	.	1.00000
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	-0.19436	.	-1.00000	-0.15183	-0.22482	.	.75424
SPEC104	.	.	.	.	.	.	.
SPEC105	-1.00000	.	.	-0.25503	.	.	.
SPEC106	-0.46039	.	.	-0.04072	.38699	.	-1.00000
SPEC107	.	.	.	.95110	-0.33333	.	.
SPEC108	.52693	.	.	.32424	.55226	.	[illegible]
SPEC109	.	.	.	-1.00000	-1.00000	.	.
SPEC110	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC40	SPEC41	SPEC42	SPEC43	SPEC44	SPEC46	SPEC47
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	-0.19623	.	-1.00000	-0.11439	-0.20127	.	.85470
SPEC124	1.00000	.	.	.	.	1.00000	.
SPEC125	.	.	.	.	.	.	.
SPEC127	.72440	.	.	-0.32733	-0.32066	.	-0.50000
SPEC128	-0.38622	.	.	.	.	.	.
SPEC129	.87626	.	.	1.00000	-0.50000	.	.
SPEC130	.62510	.	.	-0.22297	-0.95405	.	.
SPEC131	.	.	.	-0.68077	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.00675	.	.	.71096	.27229	.	.
SPEC139	-0.33884	.	.	1.00000	-0.15617	.	.95863
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	-0.02582	.	.	-0.18672	-0.60334	.	.35964
SPEC147	-0.82199	.	.	.	.	.	.
SPEC148	-1.00000	.	.	-0.10502	-1.00000	.	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.07880	.	.	.91943	.40473	.	-0.06153
SPEC156	.	.	.	.	.	.	.
SPEC157	0.99107	.	.	1.00000	.92097	.	1.00000
SPEC158	1.00000	.	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.07352	.	.	-0.07048	.79241	.	.
SPEC162	.	.	.	1.00000	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC40	SPEC41	SPEC42	SPEC43	SPEC44	SPEC46	SPEC47
SPEC165	.	.	.	-0.68443	.	.	.
SPEC166	.	.	-1.00000	.18637	.	.	.
SPEC167	.	.	.	.	.	.	-1.00000
SPEC168	.	.	.	.	.	.	.
SPEC169	1.00000	.	.	.	.	.	.
SPEC170	-0.21453	.	.	.49532	-0.70964	.	-0.92857
SPEC171	.	.	.	.	.	.	.
SPEC172	1.00000	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC48	SPEC49	SPEC50	SPEC51	SPEC52	SPEC53	SPEC54
SPEC48	1.00000						
SPEC49	.	1.00000					
SPEC50	.	.	1.00000				
SPEC51	.	.	.	1.00000			
SPEC52	.	.	.05493	.	1.00000		
SPEC53	.	.	.95059	.	-0.12920	1.00000	
SPEC54	1.00000	.	.	.	.	.	1.00000
SPEC55	.	.	.	.	.	.	.
SPEC56	1.00000	.	.	.	.88408	.	.
SPEC57	.	.	.	.	.	.	.
SPEC58	.	.	.	.	.	.	.
SPEC60	-0.33333	.	-1.00000	.	.69105	.72786	.
SPEC61	.	.	.	.	.	.	.
SPEC62	.	.	.	.	.	.	.
SPEC63	.	.	.	.	.	.	.
SPEC64	-0.27054	.	.	.	.	.	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	.	.	.	.	.	.
SPEC68	.	.	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	.	.	.	-1.00000	.	.
SPEC71	.	.	.	.	.	.	.
SPEC72	.15577	.	-0.44219	.	-0.03115	.24776	.
SPEC73	-1.00000	.	.	.	-0.02942	.	.
SPEC74	.	.	.	.	.	.	.
SPEC75	.	.	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	.	.	.	.	.
SPEC78	.	.	-1.00000	.	.	1.00000	.
SPEC79	.	.	.	.	.	.	.
SPEC80	.	.	.	.	.	.	.

------------ FACTOR ANALYSIS ------------

	SPEC48	SPEC49	SPEC50	SPEC51	SPEC52	SPEC53	SPEC54
SPEC81	.36425	.	.32768	.	.04681	.09921	1.00000
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	.	-0.50000	.	.03274	.47923	.
SPEC85	.	.	.21392	.	.41498	.45418	.
SPEC86	.	.	.	.	.	.	.
SPEC87	.	.	.	.	.	.	.
SPEC88	.99878	.	.	.	.	.	1.00000
SPEC89	.	.	.	.	.	.	.
SPEC90	-0.30305	.	.72298	.	-0.29326	.36213	.
SPEC91	.50000	.	.53028	.	-0.19743	-0.17419	.
SPEC93	.	.	.	.	.	.	.
SPEC94	.	.	.03166	.	-0.19834	-0.15152	.
SPEC95	.	.	.	.	.	.	.
SPEC96	1.00000	.	1.00000	.	.99054	.57437	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	-0.40773	.	-0.28618	.	-0.09483	-0.38169	1.00000
SPEC104	.	.	.	.	.	.	.
SPEC105	.50000	.	.	.	.74813	.	.
SPEC106	.	.	.59396	.	-0.29940	.57156	.
SPEC107	.	.	-0.47140	.	1.00000	.	.
SPEC108	1.00000	.	.83431	.	.92271	.42237	.
SPEC109	.	.	.	.	-1.00000	-1.00000	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	.30983	.	-0.58528	.	-0.11063	-0.00449	1.00000
SPEC124	.99597	.	.	.	.	.	.
SPEC125	.	.	.	.	.	.	.
SPEC127	.	.	-0.76277	.	.73829	.07603	.
SPEC128	.16116	.	.	.	.	.	1.00000
SPEC129	.	.	1.00000	.	.	.49237	.
SPEC130	.	.	.	.	.	-0.12666	.
SPEC131	.	.	.	.	.55074	.	.

----------- F A C T O R   A N A L Y S I S -----------

	SPEC48	SPEC49	SPEC50	SPEC51	SPEC52	SPEC53	SPEC54
SPEC132	1.00000	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	1.00000	.	-0.11126	.87104	.
SPEC139	.	.	.75593	.	.	.51450	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	-1.00000	.
SPEC146	-1.00000	.	-0.67761	.	.03279	-0.07704	.
SPEC147	.91766	.	.	.	.	.	1.00000
SPEC148	.	.	.	.	.	.00000	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.	.95208	.	-0.33832	.55290	.
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.94842	.	.	.96077	.
SPEC158	.	.	.	.	1.00000	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	-0.50000	.	1.00000	.	-0.19245	.86603	.
SPEC162	.	.	.	.	1.00000	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	1.00000	.	.	.	1.00000	.	.
SPEC166	.	.	-0.60999	.	-0.49872	.24019	.
SPEC167	.	.	1.00000	.	-0.99340	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.	-0.63479	.	-0.46826	-0.17363	.
SPEC171	.	.	.	.	.	.	.
SPEC172	-0.50000	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC55	SPEC56	SPEC57	SPEC58	SPEC60	SPEC61	SPEC62
SPEC55	1.00000						
SPEC56	.	1.00000					
SPEC57	.	.	1.00000				

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	SPEC55	SPEC56	SPEC57	SPEC58	SPEC60	SPEC61	SPEC62
SPEC58	.	.	.	1.00000			
SPEC60	.	.58065	.	.	1.00000		
SPEC61	.	.	1.00000	.	.	1.00000	
SPEC62	.	.	.	.	.	.	1.00000
SPEC63	.	.	1.00000	.	.	.99464	.
SPEC64	.	.	.	.	1.00000	.	.
SPEC65	.	.	.	.	.	.	.
SPEC66	.	.	.	.	.	.	.
SPEC67	.	1.00000	.	.	.	.	.
SPEC68	.	.	.	.	.	.	.
SPEC69	.	.	.	.	.	.	.
SPEC70	.	.	.	.	.	.	-1.00000
SPEC71	.	.95059	.	.	.	.	-0.98261
SPEC72	.	-0.07338	.	.	.45997	.	-1.00000
SPEC73	.	.38499	.	.	.	.	-0.72058
SPEC74	.	.	.	.	.	.	.
SPEC75	.	.	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	.	.	1.00000	.	.	-0.28947	.
SPEC78	.	1.00000	.	.	.86603	.	.
SPEC79	.	.	.	.	.	.	.
SPEC80	.	.	-1.00000	.	.	-0.08647	.
SPEC81	.	.17303	1.00000	.	.18290	1.00000	.27958
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	-1.00000	.	.	.72761	.	.
SPEC85	.	.	1.00000	.	.49068	1.00000	.
SPEC86	.	.	.	.	.	.	.
SPEC87	.	1.00000	.	.	1.00000	.	.
SPEC88	.	.	.	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	.	-0.09105	.	.	-0.70186	.	.91766
SPEC91	.	-0.50308	.	.	-0.09872	.	-0.85954
SPEC93	.	.	.	.	.	.	.
SPEC94	.	-0.40409	.	.	-0.06648	-1.00000	1.00000
SPEC95	.	.	.	.	.	.	.
SPEC96	.	.	.	.	.54664	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	1.00000	.
SPEC103	.	.20160	.	.	.36428	1.00000	-0.61260
SPEC104	.	.	.	.	.	.	.
SPEC105	.	.05241	.	.	.	.	.70999
SPEC106	.	.	.	.	-0.37420	.	.
SPEC107	.	.	.	.	-1.00000	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC55	SPEC56	SPEC57	SPEC58	SPEC60	SPEC61	SPEC62
SPEC108	.	-1.00000	.	.	.61361	.	.
SPEC109	.	.	.	.	-0.50000	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	1.00000	.	.	-0.28947	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	1.00000	.	.	1.00000	.
SPEC122	.	.	1.00000	.	.	.88523	.
SPEC123	.	-0.01828	.	.	.17001	.	.86603
SPEC124	.	.	1.00000	.	1.00000	-0.28947	.
SPEC125	.	.	.	.	.	-1.00000	.
SPEC127	.	-1.00000	.	.	.75731	.	.
SPEC128	.	.	.	.	.	1.00000	.
SPEC129	.	1.00000	.	.	.71477	.	.
SPEC130	.	.	.	.	.57166	.	.
SPEC131	.	.	.	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	.	.73406	.	.
SPEC139	.	1.00000	.	.	.25820	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	.	-0.19722	.	.	.11556	.	-0.70344
SPEC147	.	.	.	.	-1.00000	.	.
SPEC148	.	.	.	.	-1.00000	.	-1.00000
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.02641	.	.	.34999	.	.
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.	.	-1.00000	.	.
SPEC158	.	1.00000	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	1.00000	.
SPEC161	.	.	.	.	.17408	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC55	SPEC56	SPEC57	SPEC58	SPEC60	SPEC61	SPEC62
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	1.00000	.	.	.	.	.
SPEC166	.	-0.86603	.	.	-0.74706	.72467	.
SPEC167	.	1.00000	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	1.00000	.	.	.	.	.
SPEC170	.	1.00000	.	.	-0.27946	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	1.00000	.	.	1.00000	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC63	SPEC64	SPEC65	SPEC66	SPEC67	SPEC68	SPEC69
SPEC63	1.00000						
SPEC64	.	1.00000					
SPEC65	.	.	1.00000				
SPEC66	.	.	.	1.00000			
SPEC67	.	.	.	.	1.00000		
SPEC68	.	.	.	.	.	1.00000	
SPEC69	.	.	.	.	.	.	1.00000
SPEC70	.	.	.	.	.	.	.
SPEC71	.	.	.	.	.	-1.00000	.
SPEC72	.	.01717	.	.	.	1.00000	1.00000
SPEC73	.	.85624	.	.	1.00000	1.00000	1.00000
SPEC74	.	.	.	.	.	.	.
SPEC75	.	-0.27735	.	.	.	.	.
SPEC76	.	.	.	.	.	.	.
SPEC77	-0.18898	.	.	.	.	.	.
SPEC78	.	.	.	.	.	.	.
SPEC79	.	-1.00000	.	.	.	.	.
SPEC80	-0.18898	.	.	.	.	.	.
SPEC81	1.00000	.32432	.	.	.	-1.00000	.
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.
SPEC84	.	.	.	.	.	.	.
SPEC85	1.00000	-0.99622	.	.	.	.	.
SPEC86	.	-1.00000	.	.	.	.	.
SPEC87	.	-1.00000	.	.	.	.	.
SPEC88	.	.05221	.	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	.	.37961	.	.	-1.00000	.	.
SPEC91	.	.	.	.	.	.39736	.

----------- FACTOR ANALYSIS -----------

	SPEC63	SPEC64	SPEC65	SPEC66	SPEC67	SPEC68	SPEC69
SPEC93	.	.	.	.	.	.	.
SPEC94	-1.00000	.	.	.	.	.	.
SPEC95	.	.	.	.	.	.	.
SPEC96	.	.	.	.	.	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	1.00000	.	.	.	.	.	.
SPEC103	.	.07529	.	.	-1.00000	.62862	1.00000
SPEC104	.	.	.	.	.	.	.
SPEC105	.	.	.	.	.	-1.00000	.
SPEC106	.	-0.40536	.	.	.	.	.
SPEC107	.	.	.	.	.	.	.
SPEC108	.	-0.22934	.	.	.	.	.
SPEC109	.	.	.	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	-0.18898	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	1.00000	.	.	.	.	.	.
SPEC122	.92857	.	.	.	.	.	.
SPEC123	.	-0.01743	.	.	1.00000	.	.
SPEC124	-0.18898	-0.04330	.	.	.	.	.
SPEC125	-1.00000	.	.	.	.	.	.
SPEC127	.	.	.	.	.	.	.
SPEC128	1.00000	.13914	.	.	.	.	.
SPEC129	.	.	.	.	.	.	.
SPEC130	.	.	.	.	.	.	.
SPEC131	.	.	.	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	.	.	.	.
SPEC139	.	.	.	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	.	-0.88685	.	.	1.00000	1.00000	1.00000

------------ F A C T O R   A N A L Y S I S ------------

	SPEC63	SPEC64	SPEC65	SPEC66	SPEC67	SPEC68	SPEC69
SPEC147	.	-0.16500	.	.	.	.	.
SPEC148	.	.	.	.	.	.	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.60928	.	.	.	.	.
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	1.00000	.	.	.	.	.	.
SPEC161	.	-0.26715	.	.	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.
SPEC166	.94491	.49163	.	.	.	1.00000	.
SPEC167	.	.	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC70	SPEC71	SPEC72	SPEC73	SPEC74	SPEC75	SPEC76
SPEC70	1.00000						
SPEC71	1.00000	1.00000					
SPEC72	.83496	.36115	1.00000				
SPEC73	.	-1.00000	-0.24584	1.00000			
SPEC74	.	.	-1.00000	.	1.00000		
SPEC75	.	.	.	.	.	1.00000	
SPEC76	.	.	.	.	.	.	1.00000
SPEC77	.	.	.	.	.	.	.
SPEC78	.	.	.97073	.	.	.	.
SPEC79	.	.	1.00000	-1.00000	.	.	.
SPEC80	.	.	.	.	.	.	.
SPEC81	-0.96975	.12517	.01158	.28729	.	.	.
SPEC82	.	.	.	.	.	.	.
SPEC83	.	.	.	.	.	.	.

FACTOR ANALYSIS

	SPEC70	SPEC71	SPEC72	SPEC73	SPEC74	SPEC75	SPEC76
SPEC84	.	.	-0.08011	.	.	.	.
SPEC85	-1.00000	.	-0.02440	-1.00000	.	.	.
SPEC86	.	.	.56500	.	.	.	.
SPEC87	.	.	.61059	.	.	.	.
SPEC88	.	.	-0.19047	.	.	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	-0.35921	.96161	.08738	-0.42744	.	.67648	.
SPEC91	-0.91823	-0.08448	.18508	-0.70978	-1.00000	.	.
SPEC93	.	.	.	.	.	.	.
SPEC94	.	.	.19377	.97333	.	.	.
SPEC95	.	.	-0.84227	1.00000	.	.	.
SPEC96	.99718	.	.52083	.	.	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	.	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	.31120	.66406	-0.14665	-0.07646	-1.00000	.48831	.
SPEC104	.	.	.	.	.	.	.
SPEC105	.	-1.00000	.60754	.23131	.	.	.
SPEC106	.	.	-0.01620	-0.50000	.	.	.
SPEC107	.	.	.14665	.	.	.	.
SPEC108	.	.	.33657	.	.	.	.
SPEC109	.	.	.10355	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	-1.00000	-1.00000	.43389	-0.42276	.	.	.
SPEC124	.	.	.77314	-1.00000	.	.	.
SPEC125	.	.	.	.	.	.	.
SPEC127	.	.	-0.44539	.	.	.	.
SPEC128	.	.	.61574	.99340	.	.	.
SPEC129	.	.	-0.07410	.	.	.	.
SPEC130	.	.	-0.07485	.	.	.	.
SPEC131	.	.	-0.05028	-0.12298	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.

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	SPEC70	SPEC71	SPEC72	SPEC73	SPEC74	SPEC75	SPEC76
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.45512	.	.	.	.
SPEC139	.	.	.74639	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	-1.00000	.	.	.	.
SPEC146	-0.75593	-0.52017	.51515	-0.17253	.	.	.
SPEC147	.	.	-0.08455	.97945	.	.	.
SPEC148	.	.	-0.28440	1.00000	.	.	.
SPEC149	.	1.00000	-0.35338	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	1.00000	-0.08495	.95993	.	.	.
SPEC156	.	.	-0.15462	1.00000	.	.	.
SPEC157	.	.	-0.27735	.	.	.	.
SPEC158	.	.	-0.31837	-0.98198	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.	-0.50000	.05891	.74491	.	.	.
SPEC162	.	.	1.00000	.	.	.	.
SPEC163	.	.	-1.00000	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	-0.03341	.00000	.	.	.
SPEC166	.	-1.00000	.58911	.	.	.	.
SPEC167	.	.	.91090	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	1.00000	.	.	.	.
SPEC170	.	.	.76031	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	1.00000	1.00000	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC77	SPEC78	SPEC79	SPEC80	SPEC81	SPEC82	SPEC83
SPEC77	1.00000						
SPEC78	.	1.00000					
SPEC79	.	.	1.00000				
SPEC80	-0.92857	.	.	1.00000			
SPEC81	1.00000	-0.27735	1.00000	-1.00000	1.00000		
SPEC82	.	.	.	.	.	1.00000	

- - - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - - -

	SPEC77	SPEC78	SPEC79	SPEC80	SPEC81	SPEC82	SPEC83
SPEC83	.	.	.	.	.	.	1.00000
SPEC84	.	-0.18898	.	.	.30922	.	.
SPEC85	1.00000	.92857	.	-1.00000	.29716	.	.
SPEC86	.	.	.	.	.64625	.	.
SPEC87	.	1.00000	.	.	-0.14409	.	.
SPEC88	.	.	.	.	.75793	.	.
SPEC89	.	.	.	.	.	.	.
SPEC90	.	.	.	.	.29005	.	.
SPEC91	.	-1.00000	.	.	.61133	.	.
SPEC93	.	.	.	.	.	.	.
SPEC94	1.00000	-0.94491	.	-1.00000	.36149	.	.
SPEC95	.	.	.	.	.75813	.	.
SPEC96	.	.	.	.	-0.34226	.	.
SPEC97	.	.	.	.	.	.	.
SPEC98	.	.	.	.	-0.59085	.	.
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	-1.00000	.	.	.
SPEC103	.	.49727	1.00000	.	-0.17372	.	.
SPEC104	.	.	.	.	.	.	.
SPEC105	.	.	.	.	.02350	.	.
SPEC106	.	.	.	.	.01874	.	.
SPEC107	.	.50000	.	.	-0.50000	.	.
SPEC108	.	.53439	.	.	.14884	.	.
SPEC109	.	.	.	.	.53277	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	1.00000	.	.	-0.92857	1.00000	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	1.00000	.	.	-1.00000	1.00000	.	.
SPEC122	.18898	.	.	-0.53995	.67193	.	.
SPEC123	.	.57656	.	.	.03286	.	.
SPEC124	1.00000	.	-1.00000	-0.92857	-0.11183	.	.
SPEC125	.	.	.	1.00000	.	.	.
SPEC127	.	-1.00000	.	.	.50423	.	.
SPEC128	.	.	.	-1.00000	-0.20555	.	.
SPEC129	.	.	.	.	.34359	.	.
SPEC130	.	.	.	.	.54433	.	.
SPEC131	.	.	.	.	.55511	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.

FACTOR ANALYSIS

	SPEC77	SPEC78	SPEC79	SPEC80	SPEC81	SPEC82	SPEC83
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	.	.51944	.	.
SPEC139	.	.66285	.	.	-0.04522	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	-0.99934	.	.
SPEC146	.	.99891	1.00000	.	.17928	.	.
SPEC147	.	.	.	.	.10045	.	.
SPEC148	.	.	.	.	.12362	.	.
SPEC149	.	.	.	.	.15681	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	1.00000	.	.
SPEC155	.	-0.57656	.	.	.35845	.	.
SPEC156	.	.	.	.	-0.06943	.	.
SPEC157	.	1.00000	.	.	-0.04964	.	.
SPEC158	.	.	.	.	1.00000	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	-1.00000	.	.	.
SPEC161	.	.	.	.	-0.03435	.	.
SPEC162	.	.	.	.	-0.78306	.	.
SPEC163	.	.	.	.	-1.00000	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	-0.57735	.	.
SPEC166	-0.50000	.	.	.14286	.22173	.	.
SPEC167	.	-1.00000	.	.	.	.	.
SPEC168	.	.	.	.	1.00000	.	.
SPEC169	.	.	.	.	1.00000	.	.
SPEC170	.	-1.00000	.	.	-0.41484	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.98584	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC84	SPEC85	SPEC86	SPEC87	SPEC88	SPEC89	SPEC90
SPEC84	1.00000						
SPEC85	.40608	1.00000					
SPEC86	.	.	1.00000				
SPEC87	-1.00000	.	.	1.00000			
SPEC88	.	.	.	.	1.00000		

F A C T O R   A N A L Y S I S

	SPEC84	SPEC85	SPEC86	SPEC87	SPEC88	SPEC89	SPEC90
SPEC89	.	.	.	.	.	1.00000	
SPEC90	-0.26922	.18147	-1.00000	-1.00000	-0.32854	.	1.00000
SPEC91	.06618	.34660	1.00000	-1.00000	.	.	.09998
SPEC93	.	.	.	.	.	.	.
SPEC94	-0.01272	-0.36429	1.00000	.21678	1.00000	.	.46301
SPEC95	.	.	.	.	.	.	.
SPEC96	.89582	.13077	.	.	.	.	-0.37471
SPEC97	.	.	.	.	.	.	.
SPEC98	.	-0.43315	.	.	.	.	-1.00000
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.
SPEC103	-0.43050	-0.25739	.11059	-0.17462	-0.22846	.	-0.09226
SPEC104	.	.	.	.	.	.	.
SPEC105	.	-0.94491	.	.	.	.	.49176
SPEC106	.32801	.78515	1.00000	-0.16531	1.00000	.	.14839
SPEC107	-0.98974	-0.43355	.	.	.	.	-0.80296
SPEC108	.17989	-0.00247	.63128	-1.00000	.33322	.	.03542
SPEC109	1.00000	-0.44215	.	.	.	.	.38019
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	1.00000	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	-0.21678	.	.	.	.	1.00000
SPEC122	.	1.00000	.	.	.	.	.
SPEC123	-0.19216	-0.09908	.14592	1.00000	.84767	.	-0.13007
SPEC124	.	-0.08040	1.00000	.	.	.	-0.04910
SPEC125	.	.	.	.	.	.	.
SPEC127	.91566	.87518	.	-1.00000	.99966	.	-0.37661
SPEC128	.	-0.69338	-0.50000	.	.10132	.	.29707
SPEC129	.94679	.90417	.	.	.	.	-0.41421
SPEC130	.79702	.67726	.	.	.	.	-0.44573
SPEC131	.	.	.	.	.	.	-0.35099
SPEC132	.	.	.	.	.	.	-1.00000
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.73366	.66066	.	.	.	.	.59361
SPEC139	-0.31955	-0.08335	.	1.00000	.	.	.86747
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC84	SPEC85	SPEC86	SPEC87	SPEC88	SPEC89	SPEC90
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	-1.00000
SPEC146	.07217	-0.12407	.	.59308	-1.00000	.	-0.17302
SPEC147	.	.86603	-0.86603	.	.15653	.	-0.51381
SPEC148	-1.00000	.00000	.	.	.	.	.05643
SPEC149	.	.	.	.	.	.	-0.35210
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.87899	.31664	1.00000	-0.47522	1.00000	.	.51159
SPEC156	.	1.00000	.	.	.	.	-0.16000
SPEC157	-1.00000	.99863	.	.	.	.	.52520
SPEC158	.	.	.	.	.	.	-1.00000
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.	.38665	.	.	-0.86603	.	-0.19616
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	-0.05804
SPEC166	.39192	.46728	.	.	.	.	.33777
SPEC167	.	.	.	.	.	.	-1.00000
SPEC168	.	1.00000	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	-0.30708	.14109	.	.	.	.	-0.01079
SPEC171	.	.	.	.	.	.	.
SPEC172	.	1.00000	.	.	.	.	.81650
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC91	SPEC93	SPEC94	SPEC95	SPEC96	SPEC97	SPEC98
SPEC91	1.00000						
SPEC93	.	1.00000					
SPEC94	.10813	.	1.00000				
SPEC95	-1.00000	.	.	1.00000			
SPEC96	0.47585	.	.95781	.	1.00000		
SPEC97	.	.	.	.	.	1.00000	
SPEC98	.	.	.	.	.	.	1.00000
SPEC99	.	.	.	.	.	.	.
SPEC100	.	.	.	.	.	.	.
SPEC101	.	.	.	.	.	.	.
SPEC102	.	.	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC91	SPEC93	SPEC94	SPEC95	SPEC96	SPEC97	SPEC98
SPEC103	-0.00661	.	-0.13445	-0.66146	-0.32485	.	-0.32222
SPEC104	.	.	.	.	.	.	.
SPEC105	-0.52775	.	1.00000	.	.	.	.
SPEC106	.56280	.	.26089	.	-0.26453	.	.
SPEC107	-1.00000	.	.	.	1.00000	.	.
SPEC108	.05513	.	-0.20359	.	-0.27847	.	.
SPEC109	1.00000	.	.	.	.	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	1.00000	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	-1.00000	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	1.00000	.	.	.	.
SPEC122	.	.	-0.09078	.	.	.	.
SPEC123	-0.06043	.	.06717	.	-0.55011	.	1.00000
SPEC124	.	.	1.00000	.	.	.	-1.00000
SPEC125	.	.	.	.	.	.	.
SPEC127	-0.32617	.	-0.08509	.	.98584	.	.
SPEC128	.	.	-0.40964	.	.	.	1.00000
SPEC129	-0.11471	.	-0.03394	.	1.00000	.	.
SPEC130	1.00000	.	1.00000	.	.65465	.	.
SPEC131	-0.11125	.	.	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.43499	.	.60351	.	.54630	.	.
SPEC139	-0.92155	.	.05930	.	-0.59030	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	.35459	.	.36819	-1.00000	.55337	.	.
SPEC147	.	.	-0.15959	.	.	.	-1.00000
SPEC148	.19180	.	.	.	-1.00000	.	.
SPEC149	-0.12172	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.82167	.	-0.07469	.	.40705	.	.
SPEC156	-0.77067	.	.	.	1.00000	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC91	SPEC93	SPEC94	SPEC95	SPEC96	SPEC97	SPEC98
SPEC157	-1.00000	.	-0.95492	.	-1.00000	.	.
SPEC158	1.00000	.	-1.00000	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	-0.33359	.	-0.36406	.	-1.00000	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.38125	.	.	.	.	.	.
SPEC166	.47293	.	-0.12272	.	.	.	.
SPEC167	.	.	1.00000	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	-1.00000	.	.	.	.	.	.
SPEC170	.27521	.	.17439	.	.94491	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.29946	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC99	SPEC100	SPEC101	SPEC102	SPEC103	SPEC104	SPEC105
SPEC99	1.00000						
SPEC100	.	1.00000					
SPEC101	.	.	1.00000				
SPEC102	.	.	.	1.00000			
SPEC103	.	.	.	.	1.00000		
SPEC104	.	.	.	.	.	1.00000	
SPEC105	.	.	.	.	.55805	.	1.00000
SPEC106	.	.	.	.	.24693	.	.
SPEC107	.	.	.	.	.93048	.	.
SPEC108	.	.	.	.	.18055	.	.
SPEC109	.	.	.	.	.52440	.	.
SPEC110	.	.	.	.	.	.	.
SPEC111	.	.	.	.	.	.	.
SPEC112	.	.	.	.	.	.	.
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	-1.00000	.	.
SPEC122	.	.	.	1.00000	.	.	.
SPEC123	.	.	.	.	.07089	.	.

------------ FACTOR ANALYSIS ------------

	SPEC99	SPEC100	SPEC101	SPEC102	SPEC103	SPEC104	SPEC105
SPEC124	.	.	.	.	-0.28744	.	.
SPEC125	.	.	.	-1.00000	.	.	.
SPEC127	.	.	.	.	-0.14873	.	.
SPEC128	.	.	.	1.00000	-0.24534	.	.
SPEC129	.	.	.	.	-0.48095	.	.
SPEC130	.	.	.	.	.35869	.	.
SPEC131	.	.	.	.	-0.25331	.	.22532
SPEC132	.	.	.	.	-1.00000	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	.	-0.25832	.	.
SPEC139	.	.	.	.	.89978	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	-0.57735	.	.
SPEC146	.	.	.	.	.20063	.	-0.51724
SPEC147	.	.	.	.	.13059	.	.
SPEC148	.	.	.	.	.00000	.	.62862
SPEC149	.	.	.	.	-0.17549	.	-0.86603
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.	.	.	-0.24727	.	.
SPEC156	.	.	.	.	-0.40110	.	-1.00000
SPEC157	.	.	.	.	.38125	.	.
SPEC158	.	.	.	.	-0.53333	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	1.00000	.	.	.
SPEC161	.	.	.	.	.90519	.	.43147
SPEC162	.	.	.	.	-1.00000	.	.
SPEC163	.	.	.	.	.	.	1.00000
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	-0.31199	.	1.00000
SPEC166	.	.	.	1.00000	-0.34604	.	.
SPEC167	.	.	.	.	-0.80296	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	1.00000	.	.
SPEC170	.	.	.	.	-0.27673	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.91843	.	1.00000
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC106	SPEC107	SPEC108	SPEC109	SPEC110	SPEC111	SPEC112
SPEC106	1.00000						
SPEC107	-0.93326	1.00000					
SPEC108	.15120	-0.47782	1.00000				
SPEC109	1.00000	.	.	1.00000			
SPEC110	.	.	.	.	1.00000		
SPEC111	.	.	.	.	.	1.00000	
SPEC112	.	.	.	.	.	.	1.00000
SPEC113	.	.	.	.	.	.	.
SPEC114	.	.	.	.	.	.	.
SPEC115	.	.	.	.	.	.	.
SPEC116	.	.	.	.	.	.	.
SPEC118	.	.	.	.	.	.	.
SPEC119	.	.	.	.	.	.	.
SPEC120	.	.	.	.	.	.	.
SPEC121	.	.	.	.	.	.	1.00000
SPEC122	.	.	.	.	.	.	.18898
SPEC123	.00495	-0.25820	.56907	.	.	.	.
SPEC124	.	.	1.00000	.	.	.	1.00000
SPEC125	.	.	.	.	.	.	.
SPEC127	-0.08492	1.00000	-0.42739	.	.	.	.
SPEC128	.	.	-0.13992	.	.	.	.
SPEC129	.26783	.	-0.73455	.	.	.	.
SPEC130	.29203	.	-0.97482	1.00000	.	.	.
SPEC131	-0.86603	.	.	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.73793	1.00000	.34241	1.00000	.	.	.
SPEC139	.78773	.	.07742	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	-1.00000	.	.	.	.
SPEC146	.04814	-0.21899	-0.50625	.31917	.	.	.
SPEC147	1.00000	.	-0.25027	.	.	.	.
SPEC148	.22549	.	.	.	.	.	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.21216	.	.21574	1.00000	.	.	.
SPEC156	.32733	.	-1.00000	.	.	.	.
SPEC157	.23281	.	.88477	.	.	.	.
SPEC158	.	.	.	.	.	.	.

F A C T O R   A N A L Y S I S

	SPEC106	SPEC107	SPEC108	SPEC109	SPEC110	SPEC111	SPEC112
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.05952	.	.50406	.	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	1.00000	.	.	.	.	.	.
SPEC166	.18040	-1.00000	1.00000	.	.	.	-0.50000
SPEC167	.	.	-1.00000	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	-0.22776	-0.29277	-0.75468	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC113	SPEC114	SPEC115	SPEC116	SPEC118	SPEC119	SPEC120
SPEC113	1.00000						
SPEC114	.	1.00000					
SPEC115	.	.	1.00000				
SPEC116	.	.	.	1.00000			
SPEC118	.	.	.	.	1.00000		
SPEC119	.	.	.	.	.	1.00000	
SPEC120	.	.	.	.	.	.	1.00000
SPEC121	.	.	.	.	.	.	.
SPEC122	.	.	.	.	.	.	.
SPEC123	.	.	.	.	.	.	.
SPEC124	.	.	.	.	.	.	.
SPEC125	.	.	.	.	.	.	.
SPEC127	.	.	.	.	.	.	.
SPEC128	.	.	.	.	.	.	.
SPEC129	.	.	.	.	.	.	.
SPEC130	.	.	.	.	.	.	.
SPEC131	.	.	.	.	.	.	.
SPEC132	.	.	.	.	.	.	.
SPEC133	.	.	.	.	.	.	.
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	.	.	.	.	.
SPEC139	.	.	.	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.

------------ F A C T O R   A N A L Y S I S ------------

	SPEC113	SPEC114	SPEC115	SPEC116	SPEC118	SPEC119	SPEC120
SPEC145	.	.	.	.	.	.	.
SPEC146	.	.	.	.	.	.	.
SPEC147	.	.	.	.	.	.	.
SPEC148	.	.	.	.	.	.	.
SPEC149	.	.	.	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.	.	.	.	.	.
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.	.	.	.	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.
SPEC166	.	.	.	.	.	.	.
SPEC167	.	.	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC121	SPEC122	SPEC123	SPEC124	SPEC125	SPEC127	SPEC128
SPEC121	1.00000						
SPEC122	1.00000	1.00000					
SPEC123	.	.	1.00000				
SPEC124	1.00000	.18898	.95432	1.00000			
SPEC125	.	-1.00000	.	.	1.00000		
SPEC127	.	.	.67164	.	.	1.00000	
SPEC128	.	1.00000	.24426	.05100	-1.00000	-0.08805	1.00000
SPEC129	.	.	.06312	.	.	.87039	.
SPEC130	.	.	.	.	.	1.00000	.
SPEC131	.	.	.	-1.00000	.	.	.
SPEC132	.	.	-1.00000	.	.	.	.
SPEC133	.	.	.	.	.	.	.

- - - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - - -

	SPEC121	SPEC122	SPEC123	SPEC124	SPEC125	SPEC127	SPEC128
SPEC134	.	.	.	.	.	.	.
SPEC137	.	.	.	.	.	.	.
SPEC138	.	.	-0.28921	.	.	.30151	.
SPEC139	.	.	.97427	.	.	-0.40618	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	.	.	.44911	.84132	.	-0.33840	1.00000
SPEC147	.	.	.14645	-0.50000	.	-0.13561	-0.21527
SPEC148	.	.	-0.49936	.	.	-0.75593	.
SPEC149	.	.	.	.	.	1.00000	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.	.	-0.39615	.	.	.44424	-1.00000
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	-0.91026	.	.	-0.62862	.
SPEC158	.	.	.	-1.00000	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	1.00000	.	.	-1.00000	.	1.00000
SPEC161	.	.	-0.69179	-1.00000	.	-0.62862	-0.52223
SPEC162	.	.	-1.00000	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	-1.00000	.	.	.	.
SPEC166	.	.75593	.13195	.44410	-1.00000	-0.75634	.62222
SPEC167	.	.	.99518	.	.	.	.
SPEC168	.	.	.	-1.00000	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.	.60186	.	.	.29277	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	1.00000	.	-1.00000	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC129	SPEC130	SPEC131	SPEC132	SPEC133	SPEC134	SPEC137
SPEC129	1.00000						
SPEC130	.98783	1.00000					
SPEC131	.	.	1.00000				
SPEC132	.	.	.	1.00000			
SPEC133	.	.	.	.	1.00000		

F A C T O R   A N A L Y S I S

	SPEC129	SPEC130	SPEC131	SPEC132	SPEC133	SPEC134	SPEC137
SPEC134	.	.	.	.	.	1.00000	
SPEC137	.	.	.	.	.	.	1.00000
SPEC138	.	.23055	.	.	.	.	.
SPEC139	-1.00000	.	.	.	.	.	.
SPEC140	.	.	.	.	.	.	.
SPEC142	.	.	.	.	.	.	.
SPEC143	.	.	.	.	.	.	.
SPEC145	.	.	.	.	.	.	.
SPEC146	-0.08583	.73570	.89165	.	.	.	.
SPEC147	.	.	.	.	.	.	.
SPEC148	.	1.00000	1.00000	.	.	.	.
SPEC149	.	.	1.00000	.	.	.	.
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.36544	.13065	.	.	.	.	.
SPEC156	.	.	.	.	.	.	.
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	.
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.15554	.00000	.80028	.	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	1.00000	.	.	.	.
SPEC166	.	.	.	.	.	.	.
SPEC167	.	.	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	-1.00000	.	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	-1.00000	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC138	SPEC139	SPEC140	SPEC142	SPEC143	SPEC145	SPEC146
SPEC138	1.00000						
SPEC139	.	1.00000					
SPEC140	.	.	1.00000				
SPEC142	.	.	.	1.00000			
SPEC143	.	.	.	.	1.00000		

- - - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - - -

	SPEC138	SPEC139	SPEC140	SPEC142	SPEC143	SPEC145	SPEC146
SPEC145	.	.	.	.	.	1.00000	
SPEC146	-0.08667	.53169	.	.	.	.99662	1.00000
SPEC147	.	.	.	.	.	.	.
SPEC148	-1.00000	.	.	.	.	.	-0.09547
SPEC149	.	.	.	.	.	.	-0.11043
SPEC150	.	.	.	.	.	.	.
SPEC151	.	.	.	.	.	.	.
SPEC152	.	.	.	.	.	.	.
SPEC153	.	.	.	.	.	.	.
SPEC154	.	.	.	.	.	.	.
SPEC155	.87745	-0.48027	.	.	.	-0.91028	-0.12804
SPEC156	.	.	.	.	.	.	.04307
SPEC157	1.00000	-0.86603	.	.	.	.	-0.73971
SPEC158	.	.	.	.	.	.	-1.00000
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.	-1.00000	.	.	.	-1.00000	-0.28968
SPEC162	.	.	.	.	.	.	-1.00000
SPEC163	.	.	.	.	.	.	-1.00000
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.86667
SPEC166	1.00000	.	.	.	.	.	.69746
SPEC167	.	1.00000	.	.	.	.	-1.00000
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	1.00000
SPEC170	.33041	.00000	.	.	.	.	.10410
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.87874
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC147	SPEC148	SPEC149	SPEC150	SPEC151	SPEC152	SPEC153
SPEC147	1.00000						
SPEC148	.	1.00000					
SPEC149	.	-1.00000	1.00000				
SPEC150	.	.	.	1.00000			
SPEC151	.	.	.	.	1.00000		
SPEC152	.	.	.	.	.	1.00000	
SPEC153	.	.	.	.	.	.	1.00000
SPEC154	.	.	.	.	.	.	.
SPEC155	.	-1.00000	.	.	.	.	.
SPEC156	.	-1.00000	-1.00000	.	.	.	.
SPEC157	.	.	.	.	.	.	.
SPEC158	.	.	.	.	.	.	.

- - - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - - -

	SPEC147	SPEC148	SPEC149	SPEC150	SPEC151	SPEC152	SPEC153
SPEC159	.	.	.	.	.	.	.
SPEC160	.	.	.	.	.	.	.
SPEC161	.08978	1.00000	.	.	.	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.
SPEC166	-0.57498	.	.	.	.	.	.
SPEC167	.	.	.	.	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	.35921	.	.	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	-1.00000	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC154	SPEC155	SPEC156	SPEC157	SPEC158	SPEC159	SPEC160
SPEC154	1.00000						
SPEC155	.	1.00000					
SPEC156	.	.	1.00000				
SPEC157	.	.97400	.	1.00000			
SPEC158	.	1.00000	.	.	1.00000		
SPEC159	.	.	.	.	.	1.00000	
SPEC160	.	.	.	.	.	.	1.00000
SPEC161	.	-0.27929	.	1.00000	-1.00000	.	.
SPEC162	.	.	.	.	.	.	.
SPEC163	.	.	.	.	.	.	.
SPEC164	.	.	.	.	.	.	.
SPEC165	.	.	.	.	.	.	.
SPEC166	.	1.00000	.	.	.	.	1.00000
SPEC167	.	-1.00000	.	-1.00000	.	.	.
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	.	-0.56052	.	-0.89001	.	.	.
SPEC171	.	.	.	.	.	.	.
SPEC172	.	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

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------------ F A C T O R A N A L Y S I S ------------

	SPEC161	SPEC162	SPEC163	SPEC164	SPEC165	SPEC166	SPEC167
SPEC161	1.00000						
SPEC162	.	1.00000					
SPEC163	.	.	1.00000				
SPEC164	.	.	.	1.00000			
SPEC165	-0.43355	.	.	.	1.00000		
SPEC166	.	.	.	.	.	1.00000	
SPEC167	.	.	.	.	.	-1.00000	1.00000
SPEC168	.	.	.	.	.	.	.
SPEC169	.	.	.	.	.	.	.
SPEC170	-0.39736	.	.	.	.	.18673	.99373
SPEC171	.	.	.	.	.	.	.
SPEC172	-1.00000	.	.	.	.	.	.
SPEC173	.	.	.	.	.	.	.
SPEC175	.	.	.	.	.	.	.
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC168	SPEC169	SPEC170	SPEC171	SPEC172	SPEC173	SPEC175
SPEC168	1.00000						
SPEC169	.	1.00000					
SPEC170	.	.	1.00000				
SPEC171	.	.	.	1.00000			
SPEC172	.	.	.	.	1.00000		
SPEC173	.	.	.	.	.	1.00000	
SPEC175	.	.	.	.	.	.	1.00000
SPEC176	.	.	.	.	.	.	.
SPEC177	.	.	.	.	.	.	.

	SPEC176	SPEC177
SPEC176	1.00000	
SPEC177	.	1.00000

- - - - - - - - - - - - F A C T O R A N A L Y S I S - - - - - - - - - - - -

ANALYSIS NUMBER 1

	MEAN	STD DEV	CASES	LABEL
SPEC10	19.92157	13.62820	51	
SPEC13	19.82979	11.83661	47	
SPEC15	22.96364	14.68363	55	
SPEC34	15.96552	10.43676	33	
SPEC72	7.02222	4.93936	45	
SPEC81	7.23729	6.68515	59	
SPEC2	11.57576	7.27681	33	
SPEC90	5.37209	2.89248	43	
SPEC123	5.56250	3.73166	32	
SPEC146	8.45714	4.52727	35	
SPEC85	4.92000	3.09965	25	

CORRELATION MATRIX:

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72	SPEC81	SPEC2
SPEC10	1.00000						
SPEC13	.06820	1.00000					
SPEC15	.44880	.11387	1.00000				
SPEC34	.04523	.16035	-0.01415	1.00000			
SPEC72	-0.14084	.07791	-0.11019	-0.04960	1.00000		
SPEC81	-0.05351	.12591	-0.05441	.05811	.01235	1.00000	
SPEC2	.02033	.00477	.03974	-0.16234	.02996	-0.07369	1.00000
SPEC90	-0.21721	.05549	-0.05913	-0.07913	.04459	.15775	.06296
SPEC123	-0.07303	.00972	.01337	-0.10029	.19920	.02895	-0.01248
SPEC146	-0.01936	.37356	.14062	-0.00004	.35236	.14505	.00277
SPEC85	-0.12154	-0.03161	.03962	.13211	.01576	.09564	-0.07408

	SPEC90	SPEC123	SPEC146	SPEC85
SPEC90	1.00000			
SPEC123	-0.06947	1.00000		
SPEC146	-0.03174	.10404	1.00000	
SPEC85	.14343	-0.03954	-0.07332	1.00000

DETERMINANT OF CORRELATION MATRIX = .3795344

------------ FACTOR ANALYSIS ------------

INVERSE OF CORRELATION MATRIX:

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC10	1.07630				
SPEC13	-0.08521	1.23479			
SPEC15	-0.01491	-0.04355	1.34494		
SPEC34	-0.04799	-0.21140	.03201	1.10747	
SPEC72	.03951	.05245	.18513	.02195	1.24307
SPEC81	-0.03905	-0.06189	.10714	-0.04595	.08597
SPEC2	-0.01924	-0.02939	-0.03369	.15723	-0.03461
SPEC90	.26914	-0.14115	-0.08404	.12556	-0.09722
SPEC123	.10901	-0.00636	-0.37997	.10927	-0.23450
SPEC146	.15658	-0.47353	-0.27280	.05670	-0.48529
SPEC85	.15156	.04560	-0.12029	-0.15623	-0.05195

	SPEC81	SPEC2	SPEC90	SPEC123	SPEC146
SPEC81	1.09975				
SPEC2	.07565	1.04350			
SPEC90	-0.01573	-0.07640	1.16613		
SPEC123	-0.07205	.02708	.11898	1.07209	
SPEC146	-0.09205	.00596	.21056	-0.00555	1.44415
SPEC85	-0.06520	.05092	-0.12510	.00205	.10225

	SPEC85
SPEC85	1.09042

BARTLETT TEST OF SPHERICITY = 1.45320, SIGNIFICANCE = 1.00000

THERE ARE [illegible] (04.0%) OFF-DIAGONAL ELEMENTS OF AIC MATRIX > 0.09

ANTI-IMAGE COVARIANCE MATRIX:

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC10	.72470				
SPEC13	[illegible]	[illegible]			
SPEC15	[illegible]	-0.0[illegible]41	.74055		
SPEC34	-0.0[illegible]07	-0.1345[illegible]	.07502	.[illegible]0295	

- - - - - - - - - - - - FACTOR ANALYSIS - - - - - - - - - - - -

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC72	.02214	.33424	.11100	.01598	.80643
SPEC81	-0.0[illegible]	-0.04587	.07240	-0.03772	.06303
SPEC82	-0.01340	-0.07291	-0.02400	.17609	-0.02675
SPEC90	.16777	-0.0[illegible]	-0.05356	.09730	-0.06723
SPEC123	.07[illegible]	-0.00571	-0.05543	.09199	-0.15302
SPEC146	.07940	-0.20554	-0.14045	.03545	-0.27090
SPEC65	.10175	.03424	-0.06278	-0.13057	-0.03377

	SPEC81	SPEC82	SPEC90	SPEC123	SPEC146
SPEC81	.90917				
SPEC82	.06540	.99131			
SPEC90	-0.17067	-0.0[illegible]73	.95754		
SPEC123	-0.04414	.07420	.09517	.93270	
SPEC146	-0.12720	.03394	.12522	-0.00358	.69244
SPEC65	-0.07170	.05226	-0.09771	.00177	.06553

	SPEC65
SPEC65	.92555

ANTI-IMAGE CORRELATION MATRIX:

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72	SPEC81	SPEC82
SPEC10	.50500						
SPEC13	-0.06537	.50099					
SPEC15	-0.4[illegible]	-0.03403	.46441				
SPEC34	-0.07[illegible]	-0.11077	.04311	.47402			
SPEC72	.00005	.04279	.14330	.01873	.50796		
SPEC81	-0.0[illegible]1	-0.00011	.0[illegible]	-0.04163	.37351	.49061	
SPEC82	-0.01[illegible]	-0.02544	-0.00[illegible]	.14531	-0.0[illegible]	.07061	.54074
SPEC90	.01[illegible]	-0.11742	-0.06711	.11055	-0.0[illegible]	-0.19595	-0.05926
SPEC123	.0[illegible]	-0.00728	-0.0[illegible]57	.10024	-0.17730	-0.04793	.02563
SPEC146	.11247	-0.03432	-0.14574	.04493	-0.36244	-0.16332	.00730
SPEC65	.[illegible]	.[illegible]	-0.0[illegible]	-0.14231	-0.0444[illegible]	-0.0781	.05545

	SPEC90	SPEC123	SPEC146	SPEC65
SPEC90	.4[illegible]1			
SPEC123	.13641	.51587		
SPEC146	.15277	-0.03440	.47062	

------------ FACTOR ANALYSIS ------------

	SPEC90	SPEC123	SPEC146	SPEC85
SPEC85	-0.10967	.00190	.03186	.49179

1-TAILED SIG. OF CORRELATION MATRIX:

' . ' IS PRINTED FOR DIAGONAL ELEMENTS.

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC10	.				
SPEC13	.31720	.			
SPEC15	.00048	.22300	.		
SPEC34	.37618	.14031	.45916	.	
SPEC72	.16213	.30135	.21162	.35580	.
SPEC31	.35459	.19953	.34659	.33241	.46791
SPEC2	.44355	.43733	.38665	.11171	.42255
SPEC90	.06288	.35553	.33402	.27732	.38559
SPEC123	.29314	.47419	.45998	.22691	.09478
SPEC146	.44636	.00425	.15291	.49989	.00871
SPEC85	.19775	.41646	.47203	.16143	.45909

	SPEC31	SPEC2	SPEC90	SPEC123	SPEC146
SPEC31	.				
SPEC2	.23937	.			
SPEC90	.37737	.36790	.		
SPEC123	.41355	.47251	.32900	.	
SPEC146	.13651	.49390	.30115	.25545	.
SPEC85	.23559	.34121	.17606	.47934	.33775

	SPEC85
SPEC85	.

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EXTRACTION 1 FOR ANALYSIS 1, PRINCIPAL-COMPONENTS ANALYSIS (PC)

INITIAL STATISTICS:

VARIABLE	COMMUNALITY	*	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
SPEC10	1.00000	*	1	1.67135	15.2	15.2
SPEC13	1.00000	*	2	1.65575	15.1	30.3
SPEC15	1.00000	*	3	1.37762	12.5	42.7
SPEC34	1.00000	*	4	1.16477	10.6	53.3
SPEC72	1.00000	*	5	1.01716	9.2	62.5
SPEC81	1.00000	*	6	.92535	8.4	71.0
SPEC3	1.00000	*	7	.80139	7.3	78.3
SPEC90	1.00000	*	8	.75223	6.8	85.1
SPEC123	1.00000	*	9	.68627	6.2	91.4
SPEC146	1.00000	*	10	.55721	5.0	96.4
SPEC85	1.00000	*	11	.39739	3.6	100.0

PC EXTRACTED 10 FACTORS.

FACTOR MATRIX:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
SPEC72	.84675		-0.22558	-0.14999	
SPEC146	.61585	.33477			-0.11400
SPEC15	-0.20364	.66067		.29371	.39372
SPEC10	-0.44011	.63671		.10500	.15377
SPEC13	.47[illegible]	.51611	.29104	.13636	-0.30627
SPEC34		.11740	.64066	-0.39922	-0.17329
SPEC90	.2[illegible]	-[illegible]	.71[illegible]	.63754	
SPEC3			-0.41414	.57143	-0.20133
SPEC123	.22[illegible]		-0.37[illegible]	-0.24111	.57714
SPEC85	.10[illegible]	-0.[illegible]	[illegible]		.35155
SPEC81	.40067		.41537	.36142	.10557

- - - - - - - - - - - - FACTOR ANALYSIS - - - - - - - - - - -

	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
SPEC72	.27767	-0.26763	.22597	.39735	.17702
SPEC146		-0.17869	.13683	-0.21662	-0.27901
SPEC15		-0.14325			-0.34399
SPEC10			.15624	.26555	.37381
SPEC13		.14521	-0.39936	-0.20576	.32650
SPEC34	.28562	.33366		.37314	-0.22273
SPEC93		-0.18017	-0.35625	.35192	
SPEC2	.38703	.53454	.27516		
SPEC120	-0.17935	.46166	-0.30115		
SPEC35	.[illegible]		.15349	-0.31411	.15653
SPEC61	-0.37353	.23629	.44116		

FINAL STATISTICS:

VARIABLE	COMMUNALITY	*	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
		*				
SPEC10	.97477	*	1	1.67135	15.2	15.2
SPEC13	.97393	*	2	1.65675	15.1	30.3
SPEC15	.92253	*	3	1.37262	12.5	42.7
SPEC34	.99871	*	4	1.16477	10.6	53.3
SPEC72	.95697	*	5	1.01716	9.2	62.6
SPEC61	.77061	*	6	.92535	8.4	71.0
SPEC2	.99997	*	7	.90129	7.3	78.3
SPEC93	.95736	*	8	.75273	6.8	85.1
SPEC120	.99[illegible]	*	9	.63627	6.0	91.4
SPEC146	.88177	*	10	.55321	5.0	96.4
SPEC35	.99[illegible]	*				

REPRODUCED CORRELATION MATRIX:

	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC10	.[illegible]*	-[illegible]	-[illegible]	.03959	-0.03538
SPEC13	.11131	.97393*	.34551	-0.00586	.03349
SPEC15	.[illegible]	.[illegible]	.92255*	-0.01012	.05647
SPEC34	.[illegible]	.1[illegible]	-0.00433	.99871*	-0.00745
SPEC72	-[illegible]	.[illegible]	-0.16[illegible]	-0.04214	.95697*

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	SPEC10	SPEC13	SPEC15	SPEC34	SPEC72
SPEC81	-0.02140	.13654	-0.08323	.06242	-0.01254
SPEC2	.01356	.00569	.04135	-0.16254	.05114
SPEC90	-0.26544	.03465	-0.00501	-0.06567	.08207
SPEC123	-0.10122	.00073	.03335	-0.10341	.21722
SPEC146	-0.11077	.42904	.23713	-0.01234	.42389
SPEC95	-0.13922	-0.07096	.02846	.12972	.02959

	SPEC81	SPEC2	SPEC90	SPEC123	SPEC146
SPEC10	-0.13203	.00152	.04823	.02319	.09141
SPEC13	.01937	-0.00092	-0.02917	-0.01402	-0.05529
SPEC15	[illegible]	-0.07161	-0.05097	-0.00449	-0.09651
SPEC34	-0.00471	.00020	.03649	.03312	.01233
SPEC72	.02489	-0.00118	-0.03743	-0.01302	-0.07103
SPEC81	.98561*	-0.00065	-0.02169	-0.01042	-0.04109
SPEC2	[illegible]	.99997*	.00103	.00050	.00195
SPEC90	[illegible]	.06193	.96736*	.01569	.06166
SPEC123	.03937	-0.01290	-0.03517	.99245*	.02974
SPEC146	[illegible]	.00761	-0.14360	.17431	.88777*
SPEC95	.10367	-0.07446	.13339	-0.01532	-0.09613

	SPEC95
SPEC10	.01778
SPEC13	-0.01076
SPEC15	-0.01874
SPEC34	.00723
SPEC72	[illegible]
SPEC81	-0.00793
SPEC2	[illegible]
SPEC90	.01234
SPEC123	[illegible]
SPEC146	[illegible]
SPEC95	[illegible]*

THE LOWER LEFT TRIANGLE CONTAINS THE REPRODUCED CORRELATION MATRIX; THE DIAGONAL, COMMUNALITIES; AND THE UPPER RIGHT TRIANGLE, RESIDUALS BETWEEN THE OBSERVED CORRELATIONS AND THE REPRODUCED CORRELATIONS.

THERE ARE [illegible] ([illegible] %) RESIDUALS (ABOVE DIAGONAL) THAT ARE > 0.05

------------ F A C T O R   A N A L Y S I S ------------

VARIMAX ROTATION 1 FOR EXTRACTION 1 IN ANALYSIS 1 - KAISER NORMALIZATION.

VARIMAX CONVERGED IN 1[illegible] ITERATIONS.

ROTATED FACTOR MATRIX:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
SPEC10	.[illegible]		-0.22483	.12046	
SPEC15	.79167	-0.22201	.13023		-0.12596
SPEC72		.94277			
SPEC93			.96176		.11114
SPEC13				.95967	
SPEC61			.10791		.97933
SPEC85					
SPEC146		.[illegible]	-0.17449	.26526	.17137
SPEC123		.19625			
SPEC2					
SPEC74					

	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
SPEC10	-0.105[illegible]	-0.[illegible]7[illegible]			
SPEC15		.[illegible]			
SPEC72		.[illegible]	.1[illegible]		
SPEC93					
SPEC13		.1[illegible]			
SPEC61					
SPEC85	.[illegible]				

----------- FACTOR ANALYSIS -----------

	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
SPEC14[illegible]		.9[illegible]007			
SPEC10[illegible]			.95693		
SPEC2				.99476	
SPEC34					.96670

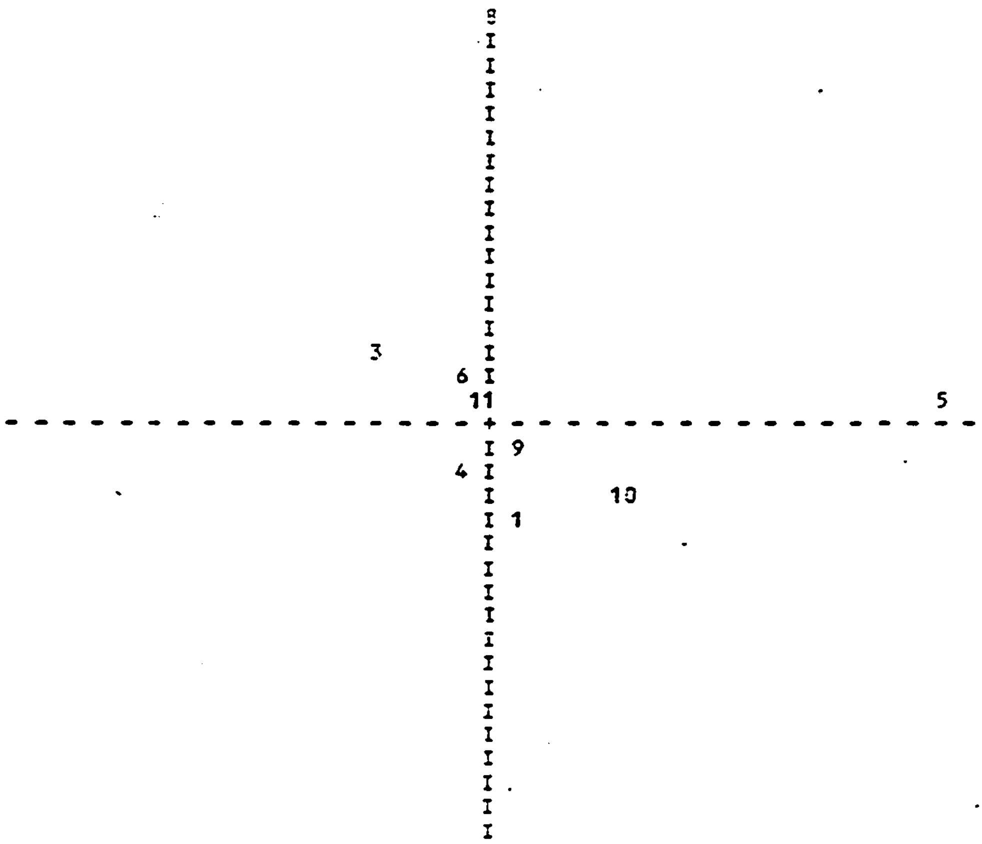
FACTOR TRANSFORMATION MATRIX:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
FACTOR 1	-0.441[illegible]7	.50[illegible]10	.21964	.34647	.32340
FACTOR 2	.59[illegible]	.[illegible]	-0.22600	.41204	-0.01456
FACTOR 3	.3[illegible]1	-0.[illegible]5	.15955	.24194	.35277
FACTOR 4	.[illegible]	-0.16700	.6124[illegible]	.10824	.2278[illegible]
FACTOR 5	.3[illegible]	.05755	.09674	-0.35436	.[illegible]
FACTOR 6	-[illegible]	.[illegible]	.0034[illegible]	.04693	-0.60602
FACTOR 7	-0.12[illegible]	-0.294[illegible]1	-0.2113[illegible]	.16239	.23067
FACTOR 8	.0[illegible]1[illegible]	.30540	-0.44990	-0.42822	.53126
FACTOR 9	.[illegible]	.4[illegible]7[illegible]	.4[illegible]	-0.74593	.[illegible]3952
FACTOR 10	.11[illegible]	.3049[illegible]	-0.1[illegible]9[illegible]	.50567	.37422

	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
FACTOR 1	.1[illegible]	.4[illegible]	.25607	-0.03052	.00024
FACTOR 2	-0.0[illegible]	.40[illegible]	.07294	.02227	.09150
FACTOR 3	.3[illegible]	-0.[illegible]	-0.32540	-0.35380	.54751
FACTOR 4	.[illegible]	.[illegible]747	-0.71[illegible]76	.53157	-0.36704
FACTOR 5	.5[illegible]1	-0.0[illegible]343	.5[illegible]	-0.19749	-0.17334
FACTOR 6	.01[illegible]	.07305	-0.17[illegible]	.39792	.29[illegible]44
FACTOR 7	-0.[illegible]	-0.2[illegible]	.[illegible]	.3[illegible]1[illegible]	.[illegible]
FACTOR 8	.[illegible]	.[illegible]	-0.3[illegible]7[illegible]	.[illegible]9[illegible]	-0.00001
FACTOR 9	-0.[illegible]	-0.31271	.0[illegible]17[illegible]	.00441	.44926
FACTOR 10	.1[illegible]	-[illegible]	-0.0[illegible]	-0.0[illegible]453	-0.00[illegible]10

------------ F A C T O R   A N A L Y S I S ------------

HORIZONTAL FACTOR 2   VERTICAL FACTOR 3



SYMBOL	VARIABLE	COORDINATES	SYMBOL	VARIABLE	COORDINATES
1	SPEC10	(.05240,-0.22480)	2	SPEC13	(.00646, .05642)
3	SPEC15	(-0.22281, .13027)	4	SPEC34	(-0.01524,-0.04951)
5	SPEC72	(.94273, .05231)	6	SPEC81	(-0.01713, .10731)
7	SPEC2	(.01473, .03213)	8	SPEC90	(.04722, .96176)
9	SPEC13?	(.13655,-0.04607)	10	SPEC146	(.29390,-0.12449)
11	SPEC55	(.01554, .06377)			

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FACTOR SCORE COEFFICIENT MATRIX:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
SPEC10	.5[illegible]	.32[illegible]	-0.15131	.17837	.16[illegible]1
SPEC17	-0.0[illegible]	-0.07910	.01522	1.01345	-0.0[illegible]67
SPEC15	.51[illegible]	-0.[illegible]	.77775	-0.27546	-0.15[illegible]
SPEC34	-0.03[illegible]	.0235[illegible]	.04982	-0.09130	-0.0166[illegible]
SPEC72	.1373[illegible]	.96547	.36355	-0.09026	-0.04200
SPEC31	.03[illegible]	-0.03[illegible]72	-0.04733	-0.09514	.99627
SPEC2	-0.0[illegible]	-0.01[illegible]	-0.04173	-0.00791	.04074
SPEC90	.37677	.06034	.95425	.02806	-0.0395[illegible]
SPEC123	.01357	-0.05235	.00752	.03612	.00917
SPEC144	-0.09[illegible]	.04373	-0.11777	-0.00237	.05[illegible]7
SPEC35	.11[illegible]	.03171	-0.11177	.06202	-0.01233

	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
SPEC10	-0.0[illegible]	-1.50345	-0.0[illegible]475	-0.01795	-0.0[illegible]575
SPEC17	.0431[illegible]	-0.13715	.03078	-0.00917	-0.07550
SPEC15	.07354	.55662	.11738	-0.00625	.07031
SPEC34	-0.07400	.02045	.04927	.07755	1.0759[illegible]
SPEC72	.[illegible]	-0.[illegible]7[illegible]7	-0.04700	-0.01299	.03946
SPEC31	-0.0225[illegible]	.03474	.00722	.03812	-0.00975
SPEC2	.02[illegible]	-0.03551	.00971	1.01594	.0734[illegible]
SPEC90	-0.09327	-0.07715	.03415	-0.03[illegible]13	.0332[illegible]
SPEC123	-0.14[illegible]	-0.10040	1.00395	.01043	.04304
SPEC144	-0.02530	.01367	-0.10631	-0.00330	-0.02308
SPEC35	1.01000	-0.04067	-0.02135	.02959	-0.03534

COVARIANCE MATRIX FOR ESTIMATED REGRESSION FACTOR SCORES:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
FACTOR 1	1.00000				
FACTOR 2	.00000	1.00000			
FACTOR 3	.00000	.00000	1.00000		
FACTOR 4	.00000	.00000	.00000	1.00000	
FACTOR 5	.00000	.00000	.00000	.00000	1.00000
FACTOR 6	.00000	.00000	.00000	.00000	.00000
FACTOR 7	.00000	.00000	.00000	.00000	.00000
FACTOR 8	.00000	.00000	.00000	.00000	.00000
FACTOR 9	.00000	.00000	.00000	.00000	.00000
FACTOR 10	.00000	.00000	.00000	.00000	.00000

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- - - - - - - - - - - -   F A C T O R   A N A L Y S I S   - - - - - - - - - - - -


                     FACTOR  6     FACTOR  7     FACTOR  8     FACTOR  9     FACTOR 10

FACTOR   6          1.00000
FACTOR   7           .00000       1.00000
FACTOR   8           .00000        .00000       1.00000
FACTOR   9           .00000        .00000        .00000       1.00000
FACTOR  10           .00000        .00000        .00000        .00000       1.00000


 10 PC  EXACT  FACTOR SCORES WILL BE SAVED WITH ROOTNAME: FSULS

FOLLOWING FACTOR SCORES WILL BE ADDED TO THE ACTIVE FILE:

  NAME           LABEL

FSULS1         REGR FACTOR SCORE   1 FOR ANALYSIS    1
FSULS2         REGR FACTOR SCORE   2 FOR ANALYSIS    1
FSULS3         REGR FACTOR SCORE   3 FOR ANALYSIS    1
FSULS4         REGR FACTOR SCORE   4 FOR ANALYSIS    1
FSULS5         REGR FACTOR SCORE   5 FOR ANALYSIS    1
FSULS6         REGR FACTOR SCORE   6 FOR ANALYSIS    1
FSULS7         REGR FACTOR SCORE   7 FOR ANALYSIS    1
FSULS8         REGR FACTOR SCORE   8 FOR ANALYSIS    1
FSULS9         REGR FACTOR SCORE   9 FOR ANALYSIS    1
FSULS10        REGR FACTOR SCORE  10 FOR ANALYSIS    1
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