or volume, and that variation in sediment porosity probably is the major factor responsible for differences between organism counts based on equal-weight samples and those based on equal-volume samples.

Consideration of the diagenetic processes of compaction and cementation that affect organism abundance shows that, for sediments which have not been materially changed by processes like interstratal solution, replacement, and recrystallization, abundance counts from recent and ancient sediments are more comparable if clays and shales are reported on the basis of equal-weight samples, and unlithified and lithified sands are reported on the basis of equal-volume samples.

16. BIOSTRATIGRAPHIC AND PALEOLOGIC STUDY OF MIDWAY FORAMINIFERA ALONG TEHUACANA CREEK, LIMESTONE COUNTY, TEXAS, Gene Ross Kellough, University of Houston, Houston, Texas.

The Midway group of Texas, a predominantly shale, sandy shale, and sandy limestone section of Paleocene age, was deposited in an open sea whose depth fluctuated between very shallow and deep. This concept is based on a study of samples from Tehuacana Creek, Limestone County, in east-central Texas. The interval sampled extends upward for 278 feet from the Cretaceous-Paleocene contact. Lithologic examination revealed a complete cycle of deposition, with a basal glauconitic sand overlain successively by sandy shale, sandy limestone or calcareous sandstone, glauconitic sand, and shale.

The foraminiferal content indicates that the very lowest beds of the Midway (Littig member of Kincaid formation) are marine, not littoral, probably mid-neritic to outer neritic. Seemingly the unconformity between this section and the Cretaceous developed without the latter being exposed subaerially. Biostratigraphic and paleoecologic interpretation demonstrates that the shales and sandy shales of the lower part of the succeeding Pisgah member were deposited in water deeper than 200 meters. As the water became more shallow, sands and calcareous muds interbedded with sands of the upper Pisgah and Tehuacana member were deposited. This shallow-water environment favored an abundant growth of a few species of Foraminifera. The Mexia member (lower unit of Wills Point formation) represents a gradual return to a deeper-water environment characterized initially by a glauconitic sand followed by glauconitic muds and a rich fauna of both deep and shallow-water species. The dark pyritic muds of the upper part of the Mexia member were deposited in deep water (more than 200 meters). The fauna was rich in variety of genera and species of Foraminifera but poor in number of individuals.

The Midway group of Texas (Danian) has been included in the *Globigerina compressa-daubjergensis* zone by Loeblich and Tappan. An analysis of the distribution of Foraminifera showed that 4 zonules can be established at this locality. They are, from the base upward:

4. *Marginulina tuberculata* (Plummer) zonule
3. *Polymorphina cushmani* Plummer zonule
2. *Discorbis newmanae* Plummer zonule
1. *Alabamina midwayensis* Brotzen *limbata* (Plummer) zonule.

17. NEW LOG INTERPRETATION TECHNIQUES FOR GULF COAST, R. P. Burton, Schlumberger Well Surveying Corporation, Houston, Texas.

The fact that porosity can be measured accurately with the sonic log has prompted new procedures for estimating saturation, wherein data concerning the various permeable beds in a given well are compared.

1. In one approach a comparison is made of the values of the formation water resistivity computed from the resistivity log and from the sonic log. Actually, apparent formation water resistivities are calculated in assuming that all sands are wet. With the concept of continuity, this procedure makes possible a quick determination of zones of saturation in shaly sand and in cases where there are appreciable variations in formation water salinity with depth.

2. It has been found also that comparison of the apparent formation factor obtained from the sonic log with that computed from a short investigation resistivity log may reveal in many cases the presence of residual oil or gas and thus detect potentially productive formations. This procedure is valuable when true formation resistivity and the resistivity of the formation water are in doubt.

Although these two procedures permit only a qualitative interpretation of the log, they have the advantage of speed and simplicity. The quantitative interpretation that remains to be done can be performed very quickly since all the non-productive formations have been eliminated by the foregoing procedures. The first procedure is best adapted to formations of high porosity and in fresh mud. The second procedure works best in formations of low porosity and with little contrast between the mud and formation water resistivities. Examples illustrate the application of these two techniques in the Miocene, Frio, and Wilcox sections of the Gulf Coast.

18. GEOLOGY AND PETROLEUM DEVELOPMENT OF CONTINENTAL SHELF OF GULF OF MEXICO, Gordon I. Atwater, Atwater, Cowan and Associates, New Orleans, Louisiana.

The stratigraphic and structural framework of the Gulf of Mexico is described, with particular