

Although the conodont fauna of the Brassfield Limestone conforms in general with that of Zone-I, it appears to be transitional with the *celloni*-Zone fauna in southeastern Indiana, where the formation is younger than in its type area in east-central Kentucky. Correlation with the European sections is made more difficult because specimens assigned by Walliser to *Icriodina irregularis* and considered by him to be indicative of the upper part of Zone-I may in fact belong to *Scyphiodus*, a genus that is present in beds as young as the lower part of the Clinton Group in Ontario. A new platform-type genus derived from *Spathognathodus* is first recorded in the upper part of the Brassfield.

Above the Brassfield Limestone in its classic concept is another lithologic unit, tentatively assigned to the Brassfield, that has a mixed conodont fauna. The conodonts considered indigenous include *Icriodina irregularis*, *Hadrognathus stauognathoides*, *Carniodus* spp., *Spathognathodus celloni*, *Pterospathodus amorphognathoides*, and new species thought to belong high in the *celloni*-Zone. Overlap of *S. celloni* and *P. amorphognathoides* shows extension of the known range of one or both species. The conodonts of this zone are morphologically unstable, but the thinness of the unit and admixed material, including Ordovician specimens, do not allow recognition as yet of precise evolutionary development and zonation.

The conodonts in the basal part of the overlying Salamonie Dolomite belong in the *amorphognathoides*-Zone and include *Pterospathodus amorphognathoides* and *Ozarkodina gaertneri*. In Europe the upper terminations of these two species and *Carniodus* coincide, whereas in the Cincinnati arch area the two extend considerably above the highest level of *Carniodus*. These facts suggest that an unconformity is present in the Carnic Alps between the *amorphognathoides*- and *patula*-Zones. If so, most of the Salamonie above the lower beds that contain *Pterospathodus* may represent an unrecorded time interval, but it is possible that the absence of *Kockella patula* reflects provincialism.

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CONSOLIDATION CHARACTERISTICS OF SELECTED NORTH PACIFIC SEDIMENT CLAYS

A recent theoretical analogy of the consolidation process of clay-type sediments, with reference to their viscous resistance to compression, indicates that engineering properties other than rheology can be determined from the consolidation test. A consideration of the lithology of selected north Pacific sediment cores, correlated with consolidation and other soil-mechanics test results, verifies this conclusion. In this circumstance the pore fluid functions as a highly viscous media which controls the deformation of such sediments under load. A mathematical statement of this viscous resistance to compression is combined with a new stress equation to present a statement which adequately expresses the consolidation process. Interpretation of consolidation curves using this approach enables prediction of viscous resistance to shear. This resistance is controlled primarily by stress level and to a lesser degree by compositional factors. These studies are supported by the conclusions of other researchers of the mechanical behavior of such materials.

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SEDIMENTOLOGIC PROCESS ANALOGIES BETWEEN EARTH AND MOON

(No abstract submitted.)

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PALEO GEOGRAPHIC AND PALEO ECOLOGIC ANALYSIS OF PLANKTONIC FORAMINIFERA

Abundance studies of extinct planktonic Foraminifera are proving a fruitful method of paleogeographic and paleoecologic analysis. Population counts of species and genera in fossil faunal assemblages give approximate percentage figures for paleo-faunal studies. Comparison of population data between two or more stratigraphic sections can be used as an indication of paleo-faunal differentiation and can outline paleogeographic distribution of species. Abundance analysis based on faunal sequences appears to reveal patterns that are repeated within sections from the same faunal province.

Application of this method of analysis to planktonic foraminiferal faunas from Maestrichtian and Paleocene assemblage zones in selected sections of the Atlantic, Gulf, and Mediterranean regions indicates distinct paleogeographic and paleoecologic differentiation. Broad generic distributions are evident, whereas there are more distinct geographic limitations on species in the Maestrichtian and Paleocene. There also is some indication of possible geographic subspecies variation. The most marked differentiation occurs along lines of longitude with more favorable comparisons and less marked differences along lines of latitude. A greater number of genera and species are found in low latitudes than in high latitudes in rocks of the Maestrichtian and Paleocene.

Faunas from sediments deposited in shallow-water environments are characterized by a limited number of species. The species that do occur usually are the most abundant elements in the planktonic faunas found in sediments deposited in deeper-water environments.

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APPLICATION OF WATER-CLASSIFICATION METHODS TO WATERS FROM CARBONATE FORMATIONS

Many reports of formation-water analyses show determinations for only carbonate, bicarbonate, sulfate, chloride, calcium, magnesium, and sodium ions. An attempt to utilize these analyses has been made by using the methods of Palmer, Sulin, Schoeller, and Chebotarev to classify some waters from carbonate and other types of formations. The purpose of this study is to determine whether these methods effectively classify waters associated with petroleum formation and whether this information can be used in exploration or the identification of formations.

It was found that the more extensive water-classification methods of Sulin and Schoeller better classify waters associated with petroleum formation than the methods of Palmer and Chebotarev. In this study, waters that were classified by Sulin's method as chlo-