bonate sediments is poor in proteinaceous constituents and relatively depleted in aspartic acid.

Aspartic acid-rich protein and humic substances bind or complex with metal ions in proportion to the concentration of carboxyl groups present. Blockage of carboxyl groups to make them inactive destroys the ability of the OM to bind metal ions. Many, if not most, of the carboxyl groups available for metal-ion complexation in both calcified protein and aspartic acid-rich humic substances are on aspartic acid. Thus, this amino acid provides a significant portion of the metal-binding ability of the different types of OM.

Aspartic acid-rich OM is preferentially adsorbed by calcite compared to quartz. Again, the carboxyl group is the likely function to be involved in this adsorption. Blockage of carboxyl groups significantly reduces the ability of humic substances to adsorb to calcite. The similarity in geometry, charge, and composition enables the carboxylate anion ($-COO^-$) to substitute for the carbonate anion ($CO_3^=$) in complexing calcium ion or adsorbing to calcite surfaces.

Competition between organic and inorganic ions for dissolved species and surface adsorption sites is driven by the requirement of the system to remain electroneutral. Concentration variations in dissolved organic and inorganic ions in the pore waters brought about by bioturbation and organic and inorganic diagenesis result in variations in the tendency of OM to affect the chemistry of the system. Most of the $CaCO_3$ formed in the marine environment consists of skeletal material. This $CaCO_3$ contains proteinaceous OM that is thought to be involved in formation of the mineral phase (biological calcification). By analogy, naturally-occurring OM of somewhat similar composition and properties and with identical functional groups may also be involved in the precipitation of $CaCO_3$ in the sedimentary environment (geological calcification).

MOIOLA, R. J., and G. SHANMUGAM, Mobil Field Research Laboratory, Dallas, TX

Submarine Fan Sedimentation, Ouachita Mountains, Arkansas and Oklahoma

More than 10,000 m (33,000 ft) of interbedded sandstones and shales comprise the Upper Mississippian and Lower Pennsylvanian flysch succession (Stanley, Jackford, Johns Valley, Atoka) in the Ouachita Mountains of Arkansas and Oklahoma. Deposited primarily by turbidity current and hemipelagic processes in bathyal and abyssal water depths, these strata form major submarine fan complexes that prograded in a westerly direction along the axis of an elongate remnant ocean basin that was associated with the collision and suturing of the North American and African plates.

A longitudinal fan system is visualized as the depositional framework for these strata which were deposited in a setting analagous to the modern Bengal fan of the Indian Ocean. Facies analysis of the Jackfork Sandstone indicates that inner fan deposits are present in the vicinity of Little Rock, Arkansas; middle fan distributary channel and crevasse splay deposits occur at DeGray Dam, Arkansas; and outer fan depositional lobe deposits are present in southeastern Oklahoma. Basin plain equivalents are postulated to exist as far away as the Marathon region in west Texas.

Boulder-bearing units (olistostromes) with exotic clasts were shed laterally into the Ouachita basin, primarily from its northern margin. These olistostromes occur throughout the fan succession in all facies (i.e., inner, middle, and outer fan). This relationship may serve as a useful criterion for recognizing similar fan systems in the rock record.

MOLINA-CRUZ, ADOLFO, UNAM, Mexico City, Mexico

The Occurrence of *Cycladophora* (?) *davisiana* Ehrenberg in the Gulf of California

The ecological behavior of the radiolarian *Cycladophora* (?) *davisiana* (particularly in high latitudes) has produced a large interest among radiolarian specialists. This species has been considered an environmental indicator, as well as a potential interhemispheric stratigraphic marker.

The geographic and stratigraphic distribution of *C. davisiana* Ehrenberg in the Gulf of California is analyzed in the present study. In the southern part of the Gulf, particularly at the water front formed by the encounter of the California Current and the Gulf water itself, its relative abundance in the surface sediments is comparable to that reported in the Sea of Okhotsk. Below the influence of the water front indicated above, *C. davisiana* has a stratigraphic behavior similar to the one reported in high latitudes.

It was previously hypothesized that the high productivity of *C. davisiana* in high latitudes is favored by water freezing and subsequent ice melting. The Gulf of California has not experienced ice forming processes; thus in this study it is suggested that the productivity of *C. davisiana* is favored by the strong mixing created by the formation of some water fronts.

MONTGOMERY, JAMES A., Baylor Univ., Waco, TX

The Geomorphic Evolution of the Taylor Black Prairie Between the Trinity and Colorado Rivers

The Taylor Black Prairie is an interesting and complex area that has been, heretofore, relatively ignored as a distinct geomorphic unit. Therefore, the purpose of this study is to describe the region as it exists at the present time and to speculate on its overall evolutionary development.

Based on descriptive geomorphic variables including geology, landform morphology, soil type and distribution, surface gravure, vegetation type and distribution, and land use, the Taylor Black Prairie may be subdivided into three north-to-south trending geomorphic areas. These are, from west to east, the Lower Taylor Prairie, the Wolfe City scarp, and the Upper Taylor Prairie. There is also present, in the southern region of the study area, a relatively distinct small exposure of high gravels located between Little River and Brushy Creek. Because these gravels are geographically restricted within the study area, and because they are dissimilar petrologically from the Cretaceous strata upon which the north-to-south prairies are developed, they constitute a distinct geomorphic area.

The dominant active processes in the Taylor Black Prairie are soil erosion and mass wasting. These are acting under present climatic conditions to shape and modify and topography of this region.

The geomorphic evolution of the Taylor Black Prairie is related to the deposition of Tertiary Uvalde Gravel in the central Texas region. These sediments were carried by major rivers from the edge of the southern High Plains eastward through valleys entrenched in Paleozoic and Comanchean rocks. The less-resistant Gulfian and Tertiary rocks allowed valley widening, thus forming braided alluvial streams that deposited humid alluvial fans.