In recent years many writers have presented various measures dealing with the relative concentration or variety of species in biologic communities. The results of these studies suggest a high degree of order in community structure. This order is expressed by a regular arrangement of population elements into a definite hierarchal pattern characterized by dominants in association with a progressively diminishing number of subsidiary species. In populations of high diversity, differences between the numerical census of dominant and subsidiary species is low. Low-diversity populations have low variety, and census differences between dominants and subsidiaries are great. Various explanations have been proposed to account for these differences as well as the order in biotic communities. The responsible agents have been most frequently characterized as being the results of adjustments caused by intra- and interspecific competition, successional development, and trophic relationships. The writer believes that these processes are important ultimately only when the ecologically defining factors within the environment are limited to little variation.

Foraminiferal diversity distributions in the eastern Gulf of Mexico are offered to support the contention that population complexity is primarily a function of variability in environmental conditions. Maximum diversity is confined to the continental slopes, and isodiversity contours from the edge of the shelf seaward follow bathymetric contours. Isodiversities on the continental shelf are variable and register bottom topography and the net effect of prevailing current and wave forces.

Statistical error plotted for the calculated species diversities is below 10 per cent. Because population variety is limited by the degree of variability in the mechanical and non-mechanical ecologic factors characterizing the environment, diversity plotted in relation to depth alone shows no correlation.

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EARLY DIAGENESIS AND MASS PROPERTIES OF SILICEOUS OOZES

Three piston cores, 22–26 m. long were taken in a relatively undisturbed condition during 1964 in the southern Pacific Ocean in about 5,200 meters of water by the U.S.N.S. *Eltanin*. All were of approximately the same siliceous-ooze lithology. Shear-strength (cohesion) measurements were made at those depths in all of the cores where samples were taken for measurement of water content, texture, mineralogy, and geochemistry. Similar measurements were made on a 6-m. core of calcareous ooze from 4,000 m. of water for comparison. Statistical analysis of 13 variables of the grouped data from the long cores shows that 41.60 per cent of the variation in cohesion is accounted for by the following, in order of their relative importance as ranked in multiple regression: depth in core (20.88%), $CaCO_3$ content (9.0%), silt content (3.07%), water content (5.16%), sand content (1.62%), and sorting (1.87%). In the calcareous ooze, core cohesion varies only as depth (63.91%) and the ratio chlorite: illite (24.19%). All cores show a decrease in water content and an increase in cohesion with depth. The siliceous ooze shows a progressive degeneration in its matted texture with depth, which is attributed to the solution of opaline tests and an attendant growth of the following authigenic minerals, as identified by X-ray diffraction: K-feldspar (microcline, orthoclase, and anorthoclase); Na-feldspar (albite and oligoclase); quartz; amphibole; phillipsite; clinoptilolite; dahlite (?); and wilkeite(?) and montmorillonite.

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LOCAL AND INTERREGIONAL DISTRIBUTION OF LATE PALEOZOIC CEPHALOPODS

Despite the ability of cephalopods to move freely through the sea, their geographic distribution patterns tend to be restricted. Many genera but few species were widely distributed in the past. In fact, it is by means of distribution patterns at the generic level that most interregional correlations based on cephalopods are made.

Carboniferous ammonoids common to strata on both sides of the Atlantic Ocean in the Northern Hemisphere include: *Protocanites lyoni* (Meek and Worthen) in the late Kinderhookian and late Tournaisian; *Goniatites crenistria* Phillips in the late Meramecan and late Viséan; *G. granosus* Portlock and *Neoglyphioceras subcirculare* (Miller) in the early Chesterian and late Viséan; *Eumorphoceras bisulcatum* Girty, *Anthracoceras paucilobum* (Phillips), and *Delepinoceras bressoni* Ruzhentsev in the late Chesterian and early Namurian; *Branneroceras branneri* (Smith) in the Morrowan, middle Namurian, and Bashkirian; and *Politoceras politum* (Shumard) in the Desmoinesian and Westphalian C. These few species constitute the principal "pegs" on which the correlation framework is hung. Apparent lack of species common to both sides of the Atlantic in Late Pennsylvanian and Permian deposits may result from more complicated sutures, which make differentiation in these ammonoids easier to establish.

Nautiloids generally tend to have greater stratigraphic ranges than ammonoids, but some were just as restricted stratigraphically and equally distributed geographically as some ammonoids. A few coleoids also had moderately extensive geographic ranges.

Factors that probably influenced cephalopod distribution include swimming and feeding habits, reproduction, buoyancy, sea-water properties (pH, salinity, other chemical features of the sea water, and prevailing currents), physical barriers, and type of bottom.

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PHYSICAL TECHNIQUES OF CORRELATION APPLIED TO UPPER ORDOVICIAN ROCKS OF SOUTHEASTERN INDIANA[1]

For more than 60 years, formations of Late Ordovician age in southeastern Indiana have been identified on the basis of the contained fossils. Unpredictable variability of the rocks has been given as the reason that lithologic criteria were not used. It is true that individual beds are not persistent laterally, but groups of beds can be traced by using electric and other geophysical logs, quantitative insoluble-residue logs, and

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