least one species, and at least one species of olenid trilobites.

The bounding faunal discontinuities of trilobite biomeres probably resulted from repeated migrations onto the craton of a slowly evolving extracratonic basic stock, each migration replacing the major cratonic nonagnostid trilobites. Following each migration there was an initial burst of adaptive evolution (stage one) as the eugeosynclinal trilobites evolved rapidly under strong selection pressure imposed by their new cratonic environment. Stage two represents the attainment by a few genera of fairly complete adjustment to the environment. Stage three represents maximum adjustment to and utilization of the environment. The extinction of many long-ranging species near the end of stage three and the peculiar but characteristic composition of stage four suggest that stage four represents the last stand of the established trilobites of the biomere prior to their replacement by a new migration of extracratonic trilobites.

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MIDDLE GLEN ROSE (LOWER CRETACEOUS) DEPOSITS OF CENTRAL TEXAS: A DEPOSITIONAL MODEL OF SHALLOW-WATER CARBONATE SHELF

A 35–50-ft sequence of fine-grained middle Glen Rose carbonates, present in an extensive outcrop area (± 5,000 sq mi) south of the Llano uplift, contains a variety of sedimentary features resulting from relatively mild dynamic forces acting on a broad, low-relief shelf.

This distinctive rock sequence includes the following deposits in ascending order: (1) stromatolitic and rippled beds of probable intertidal origin, (2) very fossiliferous burrowed calcareous mudstone (*Salenia texana* beds), (3) an iron-stained *Corbula martinae* bed, and (4) collapse breccias resulting from vadose solution of two gypsum beds. Widespread sedimentary features confined to "key beds" include oscillation ripple marks, asymmetric current ripple marks, stromatolites, and pholad borings. Mudcracks and dinosaur tracks occur locally along diastems.

Current action was most intense on the San Marcos platform, a promontory extending from the Llano uplift, as indicated by thinner beds, the absence of one and perhaps both gypsum beds, and large asymmetric ripple marks on the *Corbula* bed. Southwesterly, the *Corbula* bed thickens and grades from shell grainstone to calcareous mudstone with indigenous *Corbula*. Within the basal beds, a consistent northwest-southwest alignment of oscillation ripple marks, present along 100 mi of outcrop, is a probable result of wind disturbance of very shallow water. The dominant currents flowed southwestward, as implied by the areal configuration of a sandstone-shale lens within the calcareous mudstone interval, and may have been driven by prevailing northeast winds.

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FACIES AND FAUNAL RELATIONS IN PENNSYLVANIAN MISSOURIAN ROCKS ALONG OKLAHOMA-KANSAS BOUNDARY

The transitional belt between Missourian rocks of Kansas and Oklahoma is characterized by complex facies and faunal relations and traditionally has been a subject of controversy. In contrast to the laterally persistent limestone beds of Kansas which terminate north of the state boundary as algal buildups, limestone beds of the transitional belt are local and consist of thin calcarenite and calcilutite, thick oölitic beds, and algal buildups. Where fossiliferous, intervening shale beds are dominated by crinoids and mollusks. Stratigraphic evidence indicates that the Hogshooter and Dewey Limestones of Oklahoma are not equivalent to the Dennis and Drum Limestones of Kansas. In Oklahoma the Iola Limestone disappears a few miles south of the state boundary. On the basis of crinoid evolution, the Iola interval farther south is considered to be above the Avant Limestone.

Lower Missourian *Apographiocrinus* typically has ornate surface markings which progressively disappear in evolution. *Apographiocrinus arcuatus* from the Avant Limestone retains some markings, whereas *A. typicalis* from slightly higher strata is essentially devoid of surface pustules. The latter species is from the Iola Limestone near the state line and the Wann Formation on the south. Two algal buildups are identified in the Avant. The Wann Formation consists of shale, sandstone, and several lenticular limestone beds. The limestone, previously referred to the Birch Creek Limestone, is known to occupy several stratigraphic positions. A Lansing unit, informally termed the "Tyro oölite," is present in southern Kansas and northern Oklahoma and bears *Cibolocrinus conicus, Apographiocrinus typicalis,* and other forms characteristic of Kansas Lansing limestones.

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CAROLINA CRETACEOUS: PETROGRAPHIC RECONNAISSANCE OF A GRADED SHELF

More than 140 samples were collected from the transgressive marine strata of the Carolina Cretaceous in order to assess the hypothesis that they were deposited on a size-graded shelf whose sediments were transported by storm-generated wind-drift currents. Calculations of size parameters revealed only a varying ratio of sand (tractive load) to silt and clay (suspensive load worked in by bioturbulation). However, examination of the shapes of the cumulative curves permitted classification of sediments into an evolutionary sequence of nearshore sand, proximal shelf sand, distal shelf sand, and shelf mud. A scatter of modal diameter *versus* distance from the Cretaceous shoreline has an upper limiting value of 3.5 ϕ, a spread of 1.0–3.5 ϕ at distance zero, but an essentially constant value of 3.5 ϕ for the seaward margin of the outcrop zone. The scatter appears to consist of nearshore and shelf segments, perhaps resulting from two distinct dispersal mechanisms. Detailed study of basal (nearshore), central, and upper (offshore) Peedee outcrops shows that the spread of values for nearshore modes corresponds to the presence in the nearshore outcrops of well-defined, size-graded strata of probable storm-current genesis. "Offshore" outcrops are fine grained, more homogeneous, and do not have well-defined meteorologic stratification.

A model is proposed whereby resuspension of bottom sediments by storms results in textural differentiation of nearshore sediment, and its movement seaward to replace sediment lost through deposition or bypass-