g16 Cretaceous inundation < Interior Seaway (From sea to which shining sea?) >

> 'Nature could not have made so disorderly a composition of the globe,' affirmed Joao de Barros, the Portuguese historian, who gives us our best account of Columbus' efforts to sell the king of Portugal on his project, 'as to give the element of water preponderance over the land, destined for life and the creation of souls.' —Daniel J. Boorstin, *The Discoverers*.[1]

The last great inundation the world occurred during the Cretaceous (***Figure g16.1***). North America was flooded to half its area by the Zuni epeiric sea.[2]

Part of the Zuni, called the *Cretaceous Interior Seaway*, divided North America into two lands. This persisted until Late Maastrichtian Epoch at the end of the Cretaceous Period. Its full flood stage had been reached earlier in the Late Cretaceous when in the Cordilleran forebasin, southward transgressing Arctic waters joined northward transgressing waters from the Gulf of Mexico. These onlaps began at the end of the Early Cretaceous. The Interior Cretaceous Seaway fluctuated in area due to sediment influxes from the west that episodically prograded the shore. Four genera of crabs (family Dakoticancridae), are known solely from the Late Cretaceous of North America. The Seaway sediments can be dated using ammonoids. Sharks cruised is waters. Widespread coal-bearing deposits record its east- and west-coastal plains. Numerous, radiometrically dated, ash beds (bentonites) that were deposited across both coastal plain and seaway environments, allow for exact correlations.

During the Lower Cretaceous, the western shore of the Cretaceous Interior Seaway had been several times prograded during the rise of the Zuni epeiric sea which otherwise fluctuated much in its level as is recorded in the oil-bearing Viking Formation of Albian age in central, south-central, and southeastern Alberta, and southwestern Saskatchewan. A correlative continuous with these to the south in the United States, is a shallow-marine unit consisting of several coarsening-upward, shelf-to-shoreface successions (parasequences, *see* Topic *j24*) that record progradations.

The western margin of North America during the Cretaceous was a magmatic arc. There, in the forearc basin and out to the (inferred) associated trench, accumulated the Cretaceous Great Valley Group (now erosionally exposed in the Klamath-Sierran mountains). This formation is a 16,000 m thick (eastward thinning) sequence of terrigenous deepsea-fan deposits of conglomerate, volcaniclastic sandstone, and mudstone.

The eastern and southern coastal plains, including the Florida peninsular, were submergent during the Cretaceous. Progradation of their shorelines was offset in an unsynchronized way by outward tilting and subsidence of the continental margin weighted down by a seaward-thickening wedge of intertonguing terrestrial and marine sediments. These Cretaceous sediments, and their fossils, crop out along their inner edge in land-facing cuesta escarpments in the present coastal plain. ❑

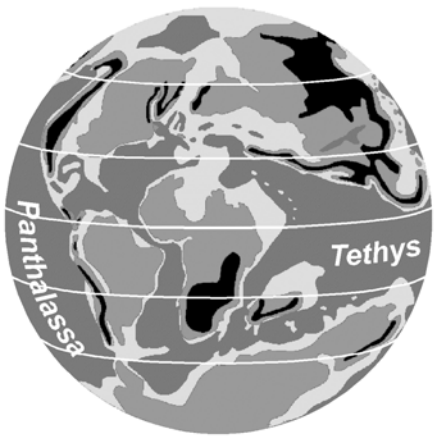

Figure g16.1 **Cretaceous paleogeography**
The challenge for paleoclimate interpretations is clear. For one thing, the circum-Antarctica oceanic circulation that allows for a mixing of ocean waters today would have been blocked by the Antarctic-Australia supercontinent. High salinities of ocean waters of a narrow Atlantic would have been likely. A wide Pacific ocean (Panthalassa) would have circulated water then (in the manner of the Atlantic circulation today into and out of the Carribean) in the great inlet that Eduard Suess called *Tethys* (name of the Greek sea goddess or Mistress of the Fishes) between island paleoIndia and Asia.[3] *Key*: oceans (dark gray), epeiric seas (pale gray), lowland (gray), mountains (black). Lats. shown are 0°, 30°, and 60°.