the Viscaino Desert of Baja California, a distance of 400 miles, the eastern extent of the Upper Cretaceous Rosario Formation can be plotted with the edge of a ruler. At several points the exhumed coast line is well exposed. In some places marine strata buttress directly against precipitous bedrock slopes. In other localities they intermingle with deltas of conglomerate which built from narrow gorges incised in the bedrock coast.

Westward from this paleocoast the Rosario thickens considerably in a short distance. At times, relatively deep water must have extended almost to the shore. The steep and straight paleocoast appears to have coincided with a hinge line, suggesting fault control. This tectonic line has continued to be active throughout the Cenozoic. Faults of Pleistocene age parallel the modern coast in several places.

GERARD, ROBERT, Lamont Geological Observatory of Columbia University, Palisades, New York

J.O.I.D.E.S. OCEAN DRILLING ON CONTINENTAL MARGIN OFF FLORIDA

Most of the Tertiary section was sampled in six core holes drilled along a transect across the continental shelf, slope, and Blake plateau east of Jacksonville, Florida. Water depths at the drill sites ranged from 25 to 1,032 meters and penetrations into the bottom from 120 to 320 meters. Continuous coring was attempted at most of the sites, using a wire-line core barrel. Core recovery averaged 36 per cent overall, with best recovery (46%) in the soft formations offshore, and concentrate the magnetite and other heavy minerals as laminations and layers at depth in the beach. The magnetite concentration high on the beach reflects the superiority of onshore wave energy over other types of wave energy.

The magnetite and ilmenite in the sand at Malaga Cove are believed to have been transported from the western San Gabriel Mountains to Santa Monica Bay when the Los Angeles River channel followed the present course of Ballona Creek. The minerals were carried southward along the coast by predominant littoral movement in this direction and concentrated by wave action on the beach at Malaga Cove.

HERRON, ROBERT F., Edgerton, Germeshausen and Grier, Inc., Santa Barbara, California

SUB-BOTTOM INVESTIGATION TECHNIQUES
(No abstract submitted.)

HSU, K. JINGHWA, University of California, Riverside, California

STRUCTURAL EVOLUTION OF SANTA LUCIA RANGE, CALIFORNIA

The rocks of the Santa Lucia Range are divisible into a bedrock complex and a superjacent series, separated by a major unconformity which represents early Late Cretaceous deformation ("Santa Lucia orogeny"). Décollement tectonics, involving gravity sliding of the Franciscan rocks over carbonate rocks of the Gabilan mesa, played an important role in the deformation of the bedrock complex during Late Jurassic and middle Cretaceous times (Hsu, 1965). The superjacent rocks were deformed by wrench faulting, and by folding during several Cenozoic orogenic episodes. Thrust faults have been observed in wrench-fault zones. Local changes from wrench to thrust faulting are related to slight changes in the magnitude of the vertical and horizontal principal stresses. These thrusts should not be confused with the décollement tectonics which affected only the bedrock complex.

The Franciscan-Recent succession of the region is illustrated and discussed. The stratigraphy of the superjacent sediments is based on the work of previous investigators. The stratigraphy of the bedrock complex is based mainly on the writer's structural interpretations.

Although the Franciscan rocks were deformed during late Mesozoic and denuded during early Tertiary, they furnished very little debris to the Cretaceous and early Tertiary sedimentary formations of California,