blage in the Ensenada de la Broa; (2) a transitional miliolid-*Elphidium* facies over much of the inner bay area; (3) an *Archaias* high-energy biofacies in the eastern part of the bay associated with coarse sediment, relatively stable salinity values, and a rather high oxygen content; (4) a *Discorbis-Vertebralina* low-energy biofacies in the western part of the bay in areas of mostly mud matrix; and (5) a reef-front facies composed of *Amphistegina lessonii, Asterigerina carinata,* and *Rotorbinella rosea* which are associated with coarse well-sorted sediments, strong currents, and a high oxygen content. Planktonic Foraminifera do not occur in the platform biofacies.

Deep-water cores off the Batabano platform show high percentages of displaced platform Foraminifera within the benthic faunas, more than 80 per cent planktonic Foraminifera in deeper-water cores, foraminiferal numbers of several thousand, and rare reworked Miocene Foraminifera.

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VELA UNIFORM AS OF EARLY 1963

For the past three years, VELA UNIFORM has been underway as a major national effort directed toward achieving a reliable system for detecting, locating, and identifying nuclear explosions underground. A brief review is made of the more interesting technical developments of importance to the practicing earth scientist. Such developments include improved knowledge of variations in the earth's crust and upper mantle, distribution of seismic noise near and below the earth's surface, ocean-bottom seismometry, advanced seismic array processing, and on-site inspection techniques, both aerial and surface. A brief film of some of the major physical facilities sponsored by VELA UNIFORM is also shown.

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RECENT MEANDER BELT DEPOSITS OF THE BRAZOS RIVER: AN ALLUVIAL "SAND" MODEL

Point bar deposits of the Brazos River near Richmond, Texas, appear to be typical of an alluvial meandering stream of this size. They are the principal meander belt deposits and consist of a sequence of silt and fine sand grading downward to coarse sand and gravel. A typical section may be subdivided into four generalized zones, each characterized by a particular class of sedimentary structure: (1) small ripple (or small scale) cross-bedding, (2) horizontal lamination, (3) giant ripple (or medium scale) cross-bedding, and (4) poor bedding. The section is an offlap sequence deposited within the channel or the depositional (convex) bank area as the stream meandered laterally toward the erosional or caving (concave) bank. The average thickness of the total section is 55 feet, which is equal to the average maximum depths of the river during flood stages.

Natural levee sediments deposited along the flood stage bank are 5 feet or less in thickness and are difficult to distinguish from the uppermost point bar sediments.

As the stream meanders within its belt, it produces a suite of deposits, consisting of sediments characteristic of point bars, natural levees, and fills of abandoned channels and oxbow lakes. The widths of the belts and related deposits, which are approximately 1.5 miles and 18–20 times the width of the stream, appear to be controlled primarily by the radius of curvature (600–2,400 feet) of the meanders.

Abandoned channel fills consist principally of laminated and bedded clay and silt. They are tortuous or arcuate in ground plan, a few hundred feet wide, and their cross sections are roughly U-shape. The deposits range from a few feet to approximately 40 feet thick and usually occupy positions within the upper two-thirds of the compounded point bar sections.

Flood basins within the alluvial plain of the Brazos are adjacent to the meander belts and are topographically lower, approximately 5 feet, than the uppermost point bar and natural levee sediments. The flood basin deposits are laminated and poorly stratified sandy clay and silt containing numerous soil zones and calcareous and ferruginous nodules.

During the Late Recent standing sea-level stage, approximately the past 3,500–5,000 years, the Brazos has developed and abandoned several meander belts within its alluvial plain, which is approximately 7 miles wide near Richmond. Most belt trends are approximately at right angles to the regional depositional strike. Cross-bedding directions and grain orientation conform with various river current directions, and most are aligned closely with the trends of the depositional banks of the individual point bar deposits.

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INTRODUCTION: WHY A SYMPOSIUM ON CONTINENTAL SHELVES AND SLOPES?

Criticism of two kinds often is leveled at research symposia held in conjunction with annual meetings—lack of timeliness and lack of substance. Our premise in organizing this Research Symposium has been that its topic should be of current interest and be concerned with fundamental geologic problems; likewise, new data should be presented and interpreted.

An informal summary of fourteen alternative topics for this Research Symposium was circulated among a large number of geologists with a representative range of practical to theoretical interests. The topic being discussed was favored by the majority in a ratio of two to one. Every effort has been made to locate and invite the participation of all those workers who currently are investigating facets of these problems. All of the speakers are from the various oceanographic institutes. The absence of representatives from the petroleum industry as participants in this Symposium is not due to any lack of invitations.

Off-shore petroleum exploration is one of the most important and competitive spheres of petroleum exploration today. The importance of such marine exploration promises to become even greater in the future. The major part of this exploration will be confined to continental shelves and slopes. Likewise, the major part of land-based petroleum exploration occurs within sediments that were deposited in so-called shelf or slope environments. Any better understanding of the entire geologic framework of continental shelves and slopes will assist materially in petroleum exploration.

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PATTERNED SEDIMENTATION OF PENNSYLVANIAN AND PERMIAN MARINE STRATA IN PART OF THE CORDILLERAN AREA

Repetitive to cyclic sedimentary patterns characterize many sequences of marine rocks of Pennsylvanian and Permian age in parts of eastern Nevada and western Utah. The assemblages accumulated in different (at