more than 15 m (49 ft) of mudstone with thin sandstone interbeds. The thick-bedded sandstone beds in the lower part of the sequence are typically several tens of centimeters thick, graded, and display Bouma T_{a-b} or T_{a-b-c} intervals. Although many of these sandstone beds are visibly lenticular, the associated thin mudstone interbeds extend laterally across the exposure, unchanged in thickness or lithology. This thin-bedded transitional sequence consists of graded sandstone beds, 5 to 15 cm (2 to 6 in.) thick, that displays Bouma T_{b-c} intervals. The mudstone unit that caps the succession consists of bioturbated mudstone with thin (mostly less than 5 cm, 2 in.) sandstone interbeds. Paleocurrents in the upper and lower parts of the succession (predominantly as recorded in ripples and ripple bedding) trend dominantly southwest. The transitional sequence, however, displays a consistent 30° deflection of currents to the south; in addition, these strata are inclined slightly more steeply to the south than the beds above or below.

I interpret this overall fining-upward sequence as resulting from lateral migration of a channel within the submarine canyon. The thick-bedded sandstone beds represent deposition on the flank of the channel; the lenticularity of these beds suggests that they were not deposited by a pure turbidity current but were carried by additional (or other) mechanisms, such as fluidized flow. The mudstone interbeds reflect predominantly pelagic deposition in the intervals between sediment gravity flows. The thin-bedded sandstone sequence represents a levee facies deposited primarily from tractive currents associated with the gravity flows that spilled over the channel and were deflected slightly to the south by the slope on the outer side of the levee. The upper, predominantly mudstone part of the section was deposited as pelagic sediment interspersed with overbank flows that traveled down the general slope of the submarine-canyon floor. An erosional surface with 3 to 4 m (10 to 13 ft) of relief near the top of the thick-bedded sandstone, covered by a mudstone breccia talus, records an episode wherein the channel reversed its migration direction and locally eroded the upper channel-flank deposits.

CLIFTON, H. EDWARD, U.S. Geol. Survey, Menlo Park, CA, and RICHARD A. DAVIS, JR., Univ. South Florida, FL

Relative Role of Waves and Tides in Development of Transgressive and Regressive Coastal Sequences

Close examination of coastal morphology and related sediment bodies reveals that the commonly used terms "wave dominated" and "tide dominated" are in many places applied improperly. Such terminology provides little data that the geologist can use in establishing the various process parameters that prevailed in ancient coastal depositional environments. In addition to the absolute and relative size of waves and tides, it is also necessary to consider other factors which contribute to coastal morphology such as tidal prism, sediment availability, topographic relief, and rates of relative sea level change. Interaction of these factors may create a wide variety of stratigraphic sequences.

Several of these additional factors differ strikingly depending on whether or not the setting is one of shoreline progradation or marine transgression. In the absence of a delta, progradation generally leads to a simple, relatively straight shoreline, which tends to limit tidal currents to inlets, if present. Transgression caused by a relative rise in sea level may promote shoreline irregularity and embayment, and thus the potential for a larger tidal influence. Progradation occurs under conditions of ample sediment supply relative to the rate of sea level change, whereas transgression causes entrapment of sediment in coastal bays and rivers, thus reducing the amount of sediment available to the open marine setting.

Nondeltaic progradational deposits, accordingly, are likely to be considered wave dominated regardless of wave size or tidal range. Waves are more effective in distributing and reworking the sediment along a straight progradational coast than are tidal currents, and, in addition an ample amount of sand is available on the shoreface for this reworking. Shoreface deposits typically are the major component of a nearshore progradational sequence.

Transgressive deposits, however, are more likely to be considered tide-dominated even where wave size and regional tidal range are unchanged from those prevailing under conditions of progradation. Coastal irregularity creates refraction patterns that dissipate wave energy over broad areas, and so tidal flow within embayments becomes an important process. Most of the available sediment resides in these embayments and bears the stamp of reworking by tidal currents. Shoreface deposits are likely to be sporadically distributed and of inconsequential volume.

Deltas constitute a potential exception to the foregoing generalization. Many deltas are dominated by riverine processes and little influenced by either waves or tides. Moreover, deltas that form in areas of extreme tidal range can generate a complex shoreline during progradation and thereby mimic the embayed coast. Such tide-dominated deltas, however, typically form in areas of broader irregularity of coastline. Sufficient progradation may smooth this larger scale coastal configuration and thereby diminish the tidal influence.

CLOFT, HARRIET S., Placid Oil Co., Anchorage, AK

Stratigraphy and Sedimentology of Ledge Sandstone in Arctic National Wildlife Refuge Northeastern Alaska

Data collected from four measured sections of the Ledge Sandstone member of the Ivishak Formation are presented. These sections are located in the Arctic National Wildlife Refuge (ANWR) in northeastern Alaska. The Ledge Sandstone is the time equivalent of the Ivishak sandstones that form the reservoir in the Prudhoe Bay field, east of the study area. The ANWR region is of interest for oil and gas exploration owing to the numerous oil seeps on the coastal plain and surficial expression of possible subsurface antiforms.

The Ledge Sandstone in ANWR consists primarily of a massive, thickly bedded, very fine to fine-grained, well-sorted quartz sandstone. Thin beds of silt occur locally. Rare conglomeratic and pebbly zones are found within the unit. Porosity is negligible in the Ledge, owing to siliceous cementation. Bedding planes, where discernible, are predominantly planar with some low-angle cross-bedding. The bases of beds typically contain load features.

The thick sandstones are separated by thin siltstone intervals ranging from less than an inch to several feet in thickness. Although the thicker siltstones appear laterally continuous, the thinner beds generally are lenticular over short distances (10 to 20 ft; 3 to 6 m). Cementation of the siltstone appears sporadic, varying laterally and vertically within the unit. Burrowing is extensive in the siltstone intervals. Typically, burrowing cannot be detected in the sandstones because of the obliteration by lithification and diagenetic processes. Fossils are sparse throughout the unit, even in the poorly lithified silts. Some bivalve shells have been preserved intact, but lack any distinct orientation.

These data are consistent with a shallow marine environment, within wave base. This contrasts with the nonmarine conglomerates and sandstones of Prudhoe Bay. Time-equivalent units to the south and west consist primarily of cherts and shales of probable deep marine origin, with some arkosic sandstones and dolomites occurring in NPRA. Thus a paleoshoreline is probably located somewhat north of the measured sections.

COCHRAN, JAMES R., and MICHAEL S. STECKLER, Lamont-Doherty Geol. Observatory of Columbia Univ., Palisades, NY

Effects of a Finite Length Rifting Event on Development of Sedimentary Basins and Continental Margins

Most thermo-mechanical models for the development of sedimentary basins and continental margins assume that the rifting responsible for the formation of the basin occurred instantaneously and that the post-rift development of the basin has been examined. We have examined the effects of a finite rifting time on the development of sedimentary basins using an analytic technique which allows an arbitrary rifting history in both time and space and which considers the effects of both horizontal and vertical heat transfer. We are able to calculate the thermal structure of the lithosphere throughout the rifting event and thus trace the history of the surface heat flow and uplift/subsidence over the developing basin.

Lateral heat flow, which was not included in previous studies of the effects of finite rifting times, has a very significant effect on the subsidence history, distribution of sediments, and temperature history. In particular, for a rifting event as short as 10 m.y., the post-rift subsidence is increased by as much as 20%. This will significantly decrease the subsidence rates in the post-rift stage and implies that inferences concerning the structure, development, and thermal history of the basin derived from simply fitting "β-curves" to the backstripped subsidence can be grossly in error.

In addition, the lateral heat flow will effect the stratigraphy along the margin of the basin. The timing and extent of onlap sequences around the edges of the basin due to flexure are greatly influenced by the length of the rifting event, as is the width of the coastal plain along a rifted continental margin.

COLEMAN, JAMES L., JR., Amoco Production Co., New Orleans, LA

Stratigraphy and Depositional Environments of Vicksburgian Oligocene of Northern Gulf Coastal Plain

The Vicksburg Group (Oligocene) is a predominantly carbonate unit that extends in a narrow belt from Rosefield, Louisiana, to western Florida. East of the LaSalle arch (eastern Louisiana) the carbonates of the Vicksburg Group are continental shelf in origin and display a sedimentary strike of approximately east-west.

The carbonate formations of the Vicksburg Group are demonstrated to be facies of one another and to constitute a single sedimentary cycle. The outcrop belt strikes west-northwest across the sedimentary strike displaying changes in the lithofacies of the group.

The formational division of the Vicksburg Group established by Cooke in 1918 and others is clarified, and the scope of the Byram and Glendon Formations is revised to conform to the lithofacies of their types localities. The Byram Formation is redefined to include the silty sands and wackestones of a regressive carbonate shelf/destructional bank facies. The Glendon Formation is restricted to include only the skeletal grainstones and coarse sands of a carbonate shoal/shoreline. The Marianna Formation includes mudstones of an algal mud shelf bottom and silty sands of a back-bank facies. The Mint Spring Formation consists of silty sands of a destructional delta environment and includes those glauconite sands that overlie the prodelta clays of the Forest Hill Formation. The Rosefield Formation is probably a chenier plain silty clay with a coquina beach zone of fossils common to the Byram Formation.

Penecontemporaneous or post-Vicksburg erosion on the crest of the Wiggins uplift apparently restricted or removed possible Vicksburgian coral-algal reef or nummulitic bank sediments. Limited subsurface data show that a nummulitic bank did develop on the north flank of the uplift. This bank migrated northward as the Marianna back-bank area shoaled and produced the *Nummulites-Lepidocyclina* grainstone/sand of the Glendon Formation at its type locality.

COLLINS, TIMOTHY M., Univ. Maryland, Silver Spring, MD

Systematics and Paleoecology of Silicified Gastropoda of Tonoloway Formation (Upper Silurian) at Pinto, Maryland

The silicified gastropod fauna from the excellent Tonoloway reference section at Pinto in western Maryland has been studied by means of specimens obtained by etching bulk samples in hydrochloric acid. Of the four published gastropod taxa from this locality, three are placed in synonymy and one, based on an indeterminate internal mold, is restricted to its type. In addition to the aforementioned taxa, a new genus and species of Bellerophontacea in the subfamily Carinaropsinae and two species of Holopeid gastropods were recovered and described. Sedimentary and petrographic data suggest a low-intertidal to shallow-subtidal, soft-bottom, carbonate substrate environment for the gastropod-bearing beds sampled. This interpretation is supported by data from several studies of the paleoecology of Paleozoic gastropods which are systematically related and morphologically similar to the taxa recovered in this study.

CONOLLY, JOHN R., Sydney Oil Co. Ltd., Sydney, Australia

Potential Oil Corridor Bisects Australian Continent

New oil discoveries, coupled with intensified exploration in the past four years, suggest that several of Australia's major onshore basins can be linked to form a potential oil corridor which will span the continent. The huge Canning basin forms the western part of the corridor and lies adjacent to fields in the Amadeus and Pedirka basins in central Australia which merge with the oil provinces of the central Eromanga and Cooper basins which are linked, in turn, to the eastern Surat basin. Some narrow basement arches separate and form the only barriers to a zone which crosses the Great Inland deserts of the continent. Eventually this zone could support a network of pipelines and other facilities to provide the infrastructure required for easier economic development of remote outback regions. Parts of the infrastructure are now being developed or already exist such as the pipelines from Moomba to Sydney and Adelaide. As new oil discoveries, such as those at Blina in the Canning basin and in Jackson in the Eromanga basin, are made, this infrastructure will grow along the potential corridor and away from it to coastal waters. The corridor owes its origin in the main part to the geometry of ancient basic tectonics and subsequent sedimentation patterns. For instance, Ordovician oil-rich sequences linked the Canning and Amadeus basins, whereas Jurassic oil reservoirs cross the remainder of the eastern half of the corridor. Potential new discoveries are predicted for sequences which range in age from upper Proterozic to Neocomian and these can be reviewed within the corridor. Devonian reef trends flank the northern Canning