TIONS (MISSISSIPPIAN-PENNSYLVANIAN), PAYNE HILLS, MARATHON REGION, TEXAS

Boulders of sedimentary rock are present in shale units in the Tesnus and Dimple formations near the western margin of the Marathon uplift in the Payne Hills, a terrane underlain by imbricate thrust plates. Although, locally, boulders have been rolled along the thrusts as "ball bearings," a sedimentary origin as submarine-slope deposits for the beds is inferred because (1) most boulders are unlike rocks involved in thrusting, (2) boulders are not brecciated, and (3) many boulders do not occur along thrust faults.

Boulders range from 1 to 24 ft long and are unevenly distributed along strike. Large boulders lie with their long dimension in the plane of bedding of the host rock. The boulder-bearing unit in the Tesnus is from 5 to 50 ft above the base of the formation; that in the Dimple is about 100 ft above its base. Common boulders are light-colored dolosparite and dolomicrite, mottled, dark-green chert, and chert sharpstone conglomerate; a few boulders are limestone, sandstone, novaculite, and porphyry (Dimple Formation only). The chert resembles, but is not identical with, beds in the Caballos Novaculite, although the other rocks are unlike indigenous Paleozoic strata in the uplift. Early Ordovician, Silurian(?), and Middle Devonian conodonts occur in the carbonate boulders.

The boulders were derived from a positive, tectonic element northwest of the basin that was active intermittently throughout Paleozoic time. The lack of fine debris in the boulder beds suggests that the boulders rolled or slid into place and outdistanced finer detritus.

MCCAMMON, RICHARD B., Dept. Geol. Sci., Univ. Illinois Chicago, Chicago, Ill.

STATISTICAL ANALYSIS OF FLYSCH SEQUENCE REGARDED AS SERIES OF POINT EVENTS

Bed-thickness distributions of alternating coarse and fine layers in flysch sequences can be regarded as the realization of a stochastic point process. The study is similar to that of earthquakes, if the log thickness of the coarse layer is treated as earthquake magnitude and the linear thickness of the fine layer is considered as the waiting time between earthquake events. A set of 489 sandstone-shale couplets measured in a flysch sequence totalling 420 ft in thickness from the Upper Cretaceous Cedar District Formation in southwest British Columbia, demonstrates that the frequency-log-thickness diagram for the sandstone beds is similar to that observed for magnitude-frequency diagrams of present-day earthquakes. Sandstone beds greater than 2 in. in thickness are essentially Poisson distributed over the interval studied, whereas beds less than 2 in. are nonrandomly distributed. The lack of correlation in thickness between successive sandstone-shale, shale-sandstone, and shale-shale beds is indicative of a renewal rather than a Markov process. The process is nonstationary, however, in that the sandstone/shale ratio decreases systematically from a value of approximately 2 to a value of approximately 1, although the number of sandstone beds per unit thickness of shale essentially triples from older to younger strata. The data are consistent with the hypothesis of a progressively deepening basin and a progressively diminishing sand supply, with sand being delivered from more widely distributed source areas.

McCOY, FLOYD W., Harvard Univ. and Woods Hole Ocean. Inst., Woods Hole, Mass.

SEDIMENTATION AND SEDIMENT-MASS BALANCE IN EASTERN MEDITERRANEAN SEA

Detailed studies of cores taken in the eastern Mediterranean Sea by the Woods Hole Oceanographic Institution and other institutions have enabled lithologic and time-stratigraphic correlations to be made between these cores, thereby contributing to an understanding of the sedimentation history of this basin during the Quaternary. The deep-sea stratigraphic section is a complex sequence of sapropels, turbidites, oozes, volcanic ashes, detrital and biogenic sands, and detrital silt beds. Integrated sedimentation rates since the Pliocene have averaged 10-20 cm/10^3 years and ranged from less than 1 to more than 100 cm/10^3 years. Rates during the Quaternary are slightly less, although variations do occur, primarily as a result of glacial/nonglacial climatic controls. Patterns of sedimentation also have been affected by these climatic changes, with only relatively minor variations reflecting tectonism and changes in provenance.

Volumetrically, the Nile River system is and has been the largest contributor of detrital material. Additional detritus is derived from Anatolia and from the Aegean Sea, the latter contributing predominantly finer material. The other borderlands do not supply large amounts; eolian material from north Africa is noticeable, however. Variations of this detrital input and in carbonate deposition have occurred primarily in response to climatic changes during the Quaternary.

McDONALD, ROBERT E., Marvin Wolf Oil Properties, Denver, Colo.

BIG PINEY-LA BARGE PRODUCING COMPLEX, WYOMING

The Big Piney-La Barge complex has been the major gas producing area in Wyoming since 1957, and during the past 10 years it also has become a leading oil producing area. Recoverable natural gas is estimated at 3 Tcf and recoverable oil exceeds 100 million bbl.

The area is along the western margin of Wyoming's Green River basin, occupying a zone of transition between the overthrust belt and the basin. This position of transition typifies much of the depositional history for this part of Wyoming, whose stratigraphic record reflects both the influence of the craton on the east and the Cordilleran geosyncline on the west.

Productive reservoirs include the Triassic-Jurassic Nugget Sandstone, the Cretaceous Dakota, Frontier, and Mesaverde Formations, and sandstones of Paleocene age. Trapping mechanisms are diverse, and structural, structural-stratigraphic, and purely stratigraphic accumulations are represented.

Commencing in Late Triassic and extending into Early Jurassic time, the Nugget was deposited as a massive blanket of largely eolian sand. In Early Jurassic time, seas spread southward across the Cordilleran front and the Wyoming craton during a major marine pulse that deposited the Twin Creek Limestone on the west, and Gypsum Springs and Sundance Formations on the east. The Gypsum Springs appears to be recognizable, but the Twin Creek terminology is better applied at La Barge.

Jurassic time closed with continental deposition of the Morrison sequence. On the Wyoming shelf the transition from Jurassic to Cretaceous is commonly a straightforward transition from continental Morrison through transitional Lakota-Dakota and into marine Thermopolis Shale. La Barge appears to have been a hingeline in Early Cretaceous time and relations are not clear cut. All shelf units are recognizable and shelf terminology may be applied on the east side of the complex, but in a distance of 12 mi these units become nearly unrecognizable.

In early Paleocene time the platform underwent folding, thrusting, and erosion. The Hogsback thrust was moving eastward and the newly formed La Barge anticline was deformed further. North of the platform a major drainage system developed that flowed southward and southeastward through the Green River basin. As Paleocene progressed, the Hogsback thrust reached its present position and aggradation commenced across the Big Piney-La Barge area. Deposition was dominated by a coarse, commonly conglomeratic facies adjacent to the Hogsback thrust, which graded abruptly through an alluvial, piedmont, and small stream fluvial unit. This low-energy facies graded basinward into a high-energy fluvial and paludal facies