
PERMIAN BASIN/MID-CONTINENT EXPLORATIONISTS

Permian Basin and Mid-Continent Exploration Meeting Tuesday, May 21, 1991 6:00 p.m. - Westin Oaks

The May dinner meeting of the Houston Geological Society, Permian Basin and Mid-Continent group, will feature T. Matthew Laroche. He will present a paper entitled "Late Paleozoic-Age Joint Sets in the Marathon Thrust Belt, West Texas." Reservations must be made by Friday, May 17, by calling Margaret at Houston Geological Society (785-6402) before noon. Dinner is \$20.00 for HGS members and \$22.00 for non-members; no-shows will be billed.

LATE PALEOZOIC-AGE JOINT SETS IN THE MARATHON THRUST BELT, WEST TEXAS

Joints are the most commonly observed structure in exposures of the Caballos, Tesnus, and Haymond Formations of the Marathon Thrust Belt. Furthermore, these joints originated as mode 1 (opening mode) fractures as shown by the presence of hackle and vein-fill, and the lack of positive shear indicators (breccia, slickensides, gouge, offset markers, etc.). Two joint trends predominate: cross-fold joints, paralleling the tectonic transport direction of the thrust belt, and strike joints, which parallel the strike of bedding. Both joint sets originated early in the history of the thrust belt. Cross-fold joints formed prior to folding since they are rotated about syn-thrust fold axes. In addition, they were induced by overpressuring resulting from tectonic compaction. Evidence of tectonic compaction is revealed in shaly intervals by the sporadic, but regional, occurrence of a pencil structure which formed sub-parallel to fold axes. In addition, such tectonic compaction imparted, in more brittle beds, a subtle, but regional, planar fabric oriented perpendicular to tectonic transport. Strike joints later opened parallel to this tectonic fabric during late Paleozoic uplift and release of the remote stresses which caused thrusting. The opening mode origin of these joint sets, coupled with their orientation, make their initiation incompatible with a Laramide or Basin and Range origin. Thus, any pre-Laramide migrating, hydrocarbon-bearing fluids necessarily utilized these mode 1 pathways into potential reservoirs of the Caballos, Tesnus, or Haymond Formations. Similarly, preferred production pathways in present oil and gas fields should likewise parallel these trends.