SYLVESTER, ARTHUR G., Univ. of California, A.A.P.G. Distinguished Lecturer

Wrench Fault Tectonics

Relations among basin formation, sedimentation, and uplift in response to wrench faulting are well documented, especially in California, and together with rock and clay-model laboratory studies, the California examples provide

considerable insight into the mechanics of wrench-fault tectonics in both space and time.

Wrench faults are produced in both pure and simple shear deformation, but it is the unique nature of strain in simple shear which leads to the characteristic *en enchelon* arrangement of related folds and faults, structures which constitute the principal traps for hydrocarbons along wrench faults in many parts of the world.

Coalescing and rotated fractures combine within the length of the fault zone to form a braided arrangement of faults around lozenge-shaped, uplifted, and down-dropped blocks. Whether an uplift or basin develops depends on the bending geometry of the fault segments and the sense of slip across the wrench-fault zone itself. Adjacent highlands along such tectonically active zones may shed great volumes of generally coarse sediment into these equally tectonically active basins, and such basins are typified by unusually thick sequences of coarse clastic sediments stacked in a shingled or Venetian-blind-like arrangement.

The structure along the edges of the uplifted blocks may be complicated in detail, involving the geometrical interplay of steeply and gently inclined strata together with variable components of dip and strike separation on faults of diverse attitudes. It is along these complicated fault-block margins, however, where favorable traps for hydrocarbons can be anticipated and have yet to be explored in many areas.