

indicates that the site of volcanic activity shifted during time. A growing orogenic source area shed terrigenous sediment into the basin and onto the Trenton ramp. Initially, these muddy influxes came from the north and from the south, but terrigenous mud eventually swamped the entire ramp and carbonate sedimentation then came to an end. Trenton Limestones have only minor intergranular porosity because of abundant mud matrix and cementation. The only significant contribution to porosity is in fractures. Thus, wells with Trenton shows are characterized by high initial potential that decreases rapidly.

PEES, SAMUEL T., Consulting Petroleum Geologist, Meadville, PA

#### Early Days Along Oil Creek, Pennsylvania (1859-1865)

Beginning in late August 1859, with the success of the Drake well at 69.5 ft, early oil exploration concentrated along Oil Creek in the stretch between Titusville and Oil City, but other areas in northwest Pennsylvania also saw discoveries. Tributaries to the creek had their share of activity. Pioneer, Benninghoff, Cherry, and Wildcat Runs were famous names. Wildcat became the standard word for a rank exploratory well. The 1859 (and later) oil boom rivaled and usually surpassed the excitement of the 1849 gold rush in California according to some adventurers who saw both.

A proliferation of oil strikes in the narrow valley included wells such as the Noble and Delamater ("Golly, ain't that well spittin' oil?"), which produced over 700,000 bbl in 21 months, Buckeye well (1,000 b/d and the first oil from the creek to be exported abroad), the Maple Shade (never stopped flowing even when it burned) and the Phillips well (4,000 b/d). These wells were among a multitude of phenomenal gushers. Most wells had a total depth of less than 500 ft, some less than 200 ft. The drillers, operators, investors, and brokers learned of the local sequence of Upper Devonian Venango sands (First, Second, Third Stray or Gray, and Third) and described their trends as veins or streaks. These beach, bar, and near-shore deposits abruptly pinched out, leaving one wildcatter with a few barrels and a neighboring well with initial gauges in the hundreds or thousands.

This study traces the early major oil strikes down Oil Creek and describes the geology of the shallow sands that they tapped. Period photographs and steel engravings of the 1860s are compared to a photographic essay of the creek as it is today. Many of the famous wells are still there. Oil Creek is a shrine to the unique personality of the oilman and the titan industry, which at the outset, had to cope with rugged conditions and seemingly capricious sands.

PETERSON, REX M., Peterson & Associates, Inc., Lincoln, NE

#### Mapping Paleostuctures from Time-Related Aeromagnetic Lineaments and Photolineaments

A classification of aeromagnetic lineaments has been adapted for use with photolineaments mapped from Landsat and aerial photographs. William Dean Gibbons, a Texas geophysicist, recently defined sets of structurally high, linear, aeromagnetic anomalies for each Phanerozoic period; e.g., N19°W and N71°E for the Cambrian. Assuming that many of these aeromagnetic trends had drag-fold origins, a Cambrian model of a wrench system with drag folds and N19°W and N71°E would have the primary stress direction at N64°W, primary first-order wrench at N86°E, and complementary first-order wrench at N34°W. This model was tested on several Cambrian (Knox) oil fields in Kentucky by mapping dense sets of N34°W, N19°W, N86°E, and N71°E lineaments from aerial photographs and interpreting drag folds from the lineaments. Comparing structural contour maps on the Knox with Cambrian drag-fold maps indicates that drag-fold maps are an approximation of structural contour maps with clusters of drag folds corresponding to closed highs. Similar trials on Kentucky oil fields in the Ordovician also gave encouraging results, indicating that the method has potential in exploration. Several porosity and permeability trends were also identified from time-related lineaments for the Knox and various Ordovician reservoirs.

This procedure for mapping paleostructure has been further tested in the Mid-Continent on structures formed during various periods from the Cambrian to Cretaceous and is being used, with Landsat, for regional exploration and, with aerial photographs, for detailed studies. A current project involves exploration for Pennsylvanian and Permian paleostructures in the Denver-Julesburg basin.

POAG, C. WYLIE, U.S. Geol. Survey, Woods Hole, MA

#### Depositional Supersequences Among Cenozoic Strata of U.S. Atlantic Continental Margin

Integration of outcrop, borehole, and seismic reflection stratigraphy reveals the broad-scale depositional framework of Cenozoic strata of the U.S. Atlantic margin. The principal feature of the framework is a series of depositional supersequences bounded by interregional erosional unconformities that can be traced from coastal plain outcrops to the continental rise. The Atlantic continental margin is divided into five depositional areas: the Salisbury, Albemarle, and Charleston embayments; a composite of the entire Atlantic coastal plain; and a composite of the Atlantic shelf and slope. The major depositional episodes are early and middle Eocene in all depositional areas, late Eocene in all areas except the Albemarle embayment, early Oligocene on the composite shelf and slope, late Oligocene in all depositional areas but minor in the Salisbury embayment, and early, middle, late Miocene and Pliocene in all areas.

Paleoenvironmental and paleo-oceanographic analyses of the sediments and associated fossil assemblages indicate that alternation of major depositional and erosional episodes is controlled chiefly by the relative position of sea level. Thus, the supersequences correlate with the supercycles of the Vail sea level model. The bounding unconformities, in turn, correlate with the major global unconformities of the Vail model. Local variations among such things as terrigenous sediment supply, subsidence rates, and the position of major geostrophic currents, however, may accentuate or diminish the sea level effects.

POHN, HOWARD A., U.S. Geol. Survey, Reston, VA

#### Proposed Model for Interaction Between Basement Structures and Folds in Cover Rocks of Central and Southern Appalachians

Field studies, analysis of side-looking airborne-radar data, and examination of proprietary seismic reflection profiles suggest that, although the Eastern Overthrust belt tectonic regime is thin-skinned, the fold plunges, wavelengths, and frequencies appear to be controlled primarily by a Precambrian basement fault system.

Field studies have shown that thrust faults generally predate or are contemporaneous with associated folds. Thus, the proximity of faults controls, to a large degree, the wavelength of the associated folds. In addition, because faults converge downward toward the major décollements, the shorter the distance between the decollement and the ground surface, the more numerous the faults and, consequently, the narrower the associated fold wavelength. Changed decollement levels, in turn, appear to be related to basement faults.

Abrupt changes in wavelength of folds along strike appear to indicate the presence of cross-strike (lateral) ramps that connect décollements at different stratigraphic levels. The position of lateral ramps appears to be controlled in turn by cross-strike faults in the Precambrian basement, as seen on proprietary seismic data.

A map of Mesozoic basins in the eastern United States shows that Precambrian highs between basins and east-west border faults are aligned with lateral ramps. Mesozoic reactivation is therefore indicated. Later reactivation is suggested by the fact that more than 35% of recent earthquakes are coincident with lateral ramps.

Many lateral ramps can be extrapolated seaward and are exactly coincident in strike and nearly coincident in spacing with transform faults. It is hypothesized that the basement faults acted as zones of least resistance along which modern transform faults developed during episodes of seafloor spreading.

RENDINA, M. A., and WAYNE D. MARTIN, Miami Univ., Oxford, OH

#### Provenance of Selected Sandstones and Mud Rocks of Dunkard Group (Upper Pennsylvanian-Permian) in Ohio, West Virginia, and Pennsylvania

A standard QFL count and a special count of quartz grains indicate that the Dunkard sandstones are rich in quartz and sedimentary and metasedimentary lithic fragments, but poor in feldspar and igneous lithic fragments. Plots of the Dunkard detrital mode on provenance diagrams