collapse. They include an enormously thickened pile of rhyolite ash-flow tuff, equivalent to the youngest Bretz Series ash-flows, intruded and overlain by rhyolite flow domes and lavas. These rhyolites are overlain by a sequence of intermediate lava flows, flow breccia, and pyroclastic breccia constuting the Aurora Lavas. Tuffaceous lacustrine sediment covers most of the southern terrane and much of the ring-fracture system.

Hydrothermal alteration associated with mercury deposits at the old Bretz mine is clearly controlled by one of the ring faults, but uranium mineralization nearby is stratigraphically controlled and not directly associated with mercury. Uranium concentrations occur along several horizons, including (1) geologic contacts, unconformities, and redox boundaries in the Bretz Series; (2) a widespread horizon in the tuffaceous lake sediments; and (3) potentially commercial deposits along the flow boundaries and interflow breccias in the Aurora Lavas.

The control of uranium by solution channelways along stratigraphic boundaries and lack of crosscutting veins, except in local areas of the Aurora Lavas, suggests that supergene mechanisms were important in ore formation. However, a combination of hydrothermal and supergene processes is favored to explain all the features observed, with the uranium in the lacustrine sediments precipitated from surficial hot springs active during mineralization.

WALTON, ANTHONY W., TIMOTHY L. SALTER, and DALE ZETTERLUND, Univ. Kansas, Lawrence, KS

Postemplacement Uranium Mobility in Oligocene Ash Flow Tuff and Rhyolite Lavas from Hidalgo County, New Mexico

Investigations of the distribution of uranium and other trace and minor elements in a major welded ash flow tuff (the Gillespie Tuff) and in several rhyolite flow units (all Oligocene) included petrographic examination to detect characteristic textures produced during the process of crystallization, and comparison of the chemical composition of rocks of identical original composition, but crystallized by different processes. In all units investigated, unaltered vitrophyres were used to indicate initial content of uranium and elements.

The major process of crystallization in these rocks involved growth of spherulitic and large crystal units in a supercooled magma, beginning at temperatures 200°C below the liquids and continuing at lower degrees of supercooling. This is not strictly devitrification because it probably occurs above the glass-transition temperature. Several distinctly different textures probably result from different crystallization conditions. Vapor-phase crystallization is rare in the Gillespie Tuff. "Granophyric" texture is common in both lavas and the Gillespie Tuff. In other areas, rocks displaying this texture may have lost some uranium, suggesting that volcanic rocks in Hidalgo County may have released considerable amounts during crystallization.

WEISE, JAMES R., and DAVID V. LEMONE, Univ. Texas, El Paso, TX

Carbonate Stratigraphy of U-Bar Formation (Aptian-Albian) of Southeastern Big Hatchet Mountains, Hidalgo County, New Mexico

The U-Bar Formation (Aptian-Albian) consists of five members: they are (in ascending order) brown limestone, oyster limestone, limestone-shale, reef limestone, and suprareef limestone. These members crop out in the area southwest of the Big Hatchet Mountains, Hidalgo County, New Mexico. The U-Bar Formation is overlain by the Mojado Formation (Albian) and underlain by the Hell-to-Finish Formation (pre-Aptian). A composite stratigraphic section (3,115 ft; 950 m) southwest of the Big Hatchet Mountains has been compiled from measured sections at Pierce Tank and Hell-to-Finish Tank.

The brown limestone member contains thin-bedded, fine-grained, ledge-forming, silty, gypsiferous, dolomitic to oolitic limestones, arkosic sandstones and siltstones which weather red-brown to dusky red. The sparse fauna contains fragmented diminutive bivalves, *Ostrea*-type bivalves, and turritelloid-type gastropods.

The yellow-gray to red-brown oyster limestone member primarily contains thin-bedded, fine to medium-grained, clastic, silty limestones and covered shale intervals. Massive limestones, thin-bedded arkosic sandstones, and siltstones occur near the base and middle of the member. This richly fossiliferous member contains some limestones consisting almost entirely of small *Exogyra* and *Ostrea*-type bivalves. Also common are *Pecten*, turritelloid-type gastropods, and serpulid worm tubes which commonly encrust *Ostrea*-type bivalves.

The limestone-shale member contains thin to medium-bedded ledge-forming, fine-grained limestone. These pitted blue-gray to medium-gray weathering limestones contain a sparse fauna of turritelloid-type gastropods, small, thin-shelled bivalves, fragmented echinoid spines, and abundant *Orbitolina*, and large *Lunatia*-type gastropod steinkerns in the upper part of the member.

The reef limestone member is a massive, fine to medium-grained limestone. The light-gray weathering limestone contains fragmented *Ostrea*-type bivalves, rudists, and abundant orbitolinids at the base.

The suprareef limestone member (locally thin) is a medium-grained, clastic limestone, weathering light gray and containing abundant orbitolinids in the base and fragmented *Ostrea*-type bivalves above. The fossils commonly are iron-stained and weather in relief.

WOODWARD, LEE A., Univ. New Mexico, Albuquerque, NM

Structure of Thrust Belt in Southwestern New Mexico: Implications for Hydrocarbon Exploration

The Laramide thrust belt trends west-northwesterly through the southwestern corner of New Mexico and is characterized mainly by flat-lying thrusts and subordinate closely compressed overturned folds. Cenozoic volcanics and sediments cover much of the region and only scattered areas of preorogenic rocks are exposed. Deformed Paleozoic, Mesozoic, and lower Cenozoic strata are exposed in fault-block ranges separated by extensive basins filled with upper Cenozoic clastic debris.

Yielding on the thrust is northward and displacement ranges up to several miles. The regional distribution of thrusts indicates that the entire foldbelt in this region is underlain by thrusts even though considerable parts of the preorogenic sedimentary section may have escaped deformation locally.

Laramide thrusts and Cenozoic volcanism and block faulting make this area extremely difficult for hydrocarbon exploration; techniques used successfully in the Utah-Wyoming thrust belt appear to have little chance for success in New Mexico.