Field Conferance November 11 - 14, 1974
Structures in the Cumberland
Overthrust Block

Structures in the Cumberland overthrust block were examined by Eugene Rader in the company of Dr. Ralph Miller, U. S. Geological Survey, Reston, VA.; and Dr. William Chapple and Mr. David Wiltschko, Brown University, Providence, Rhode Island.

The field excursion began in Kingsport, Tenn. and traveled west to Caryville, Tenn. Along the route (U. S. Highways 11 W, 25 E, 25 W, and Tenn. Highway 63) Dr. Miller provided a running commentary on the geology. At Sharp Gap, Pioneer Quadrangle, Tenn. the Jackshoro fault zone, which bounds the Cumberland block on the southwest, was examined. Members of the steeply dipping Hance and Lee formations were observed in contact with the flat lying Hance Formation.

The excursion continued north on Interstate 77 to Jellico, Tenn. South of Jellico the Pine Mountain fault is well exposed along the east side of the highway on Pine Mountain. The Chattanooga Shale is faulted on to the Hance and Mingo formations. The Grainger and Newman formations are well exposed in the upper sheet.

The final stop of the first day was in Cumberland Gap. The Greenbrier Limestone was examined. Below the Greenbrier is the eastern most expression of the Fort Payne chert (15' thick). Below the Fort Payne the Price is well exposed.

A normal fault (Cudjos Cave fault) places the Chattanogga in contast with the Greenbrier Limestone.

The second day was spent examining the Hagan section on the L & N Railroad. Rocks from the upper Knox to the Rose Hill were examined. In the afternoon stops were made in Martin Creek, Possum Hollow, Dean, and Four Mile fensters. Martin Creek fenster: Observed Copper Ridge dolomite faulted on Maynardville dolomite, 8 to 10 feet of gouge, Chestnut Ridge fault. Maynardville faulted over Hancock, Wilson fault, no gouge.

Possum Hollow fenster: Pine Mountain fault along Possum Hollow Creek, Maynardville over Hancock.

Edds Mill: Observed numerous high angle reverse faults in Maynardville.

Dean fenster: Chestnut Ridge and Fugate faults, folds in the Trenton.

Four Mile fenster: same as Dean fenster.

The Ben Hur fault was examined about 1 mile north of Deep Springs (Big Stone Gap quad.) where Mascot dolomite is faulted over Trenton limestone.

The third day began with an examination of folds in the Trenton and Eggleston formation along the railroad east of Dryden (Keokee quad.). The Trenton is intricately folded in the hanging wall of the Ben Hur fault. In one fold bentonite from the Eggleston forms the core of an anticline.

One mile southwest of Big Stone Gap an overturned slice

of Silurian and Devonian rocks is between the Williams Cove and Pine Mountain faults. All contacts within the slice are faulted.

At Little Stone Gap the section from the Chattanooga to the Hinton was examined. A fault is present in the middle of the Greenbrier.

One-half mile south of Irondale the type locality of the Wildcat Valley Sandstone was examined.

The Hunter Valley fault was examined south of Duffield school on U. S. Highway 23. The Rutledge Limestone is thrust over the Chattanooga Shale.

At Speers Ferry a good Knox section is exposed along U. S. Highway 23.

Between Speers Ferry and Gate City excellent mud cracks are preserved in the Moccasin Formation.

The excursion ended in Kingsport.

In discussions with Drs. Miller and Chapple the role of high fluid pressures in the development of the large overthrusts in the Cumberland block was stressed. The Pine Mountain fault occurs in four stratigraphic positions: (1) near the base of the Rome Formation; (2) at or near the Maynardville Limestone - Conasauga Shale contact; (3) within the Rockwood and Sequatchie formations; and (4) near the base of the Chattanooga Shale. Dr. Miller believes that the large displacement overthrust faults are the result of gravity sliding facilitated by high fluid pressures. The Powell Valley

anticline is considered to be a later development. Dr. Chapple suggested that early development of the anticline may have been responsible for the ramping of the fault. Dr. Miller's ideas are presented in a paper in the American Journel of Science, 1973, vol. 273-A, p. 353-371: "Where and why of Pine Mountain and other major faults planes, Virginia, Kentucky, and Tennessee."

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