upper biofacies, the *Composita* and *Composita-Fenestella* biofacies, contain more distinct and well-preserved grains. Brachiopods, such as *Composita,* and bryozoans, such as *Fenestella* and *Archimedes,* are present as whole specimens, some in life position. The thicker, upper biofacies probably accumulated as a result of the baffling action of fenestrate bryozoans.

Some of these biofacies display distinct zoning or concentration of shelly material interpreted to be the result of intermittent storm waves and suggesting that the depth of deposition was below normal wave base not yet below storm wave base. The skeletal-lime mud buildup indicates deposition on a shallow sloping shelf of the Chester sea. The quiet water marine conditions were favorable for a localized concentration of fauna, some of which had been abraded by bioturbation, and which were intermittently affected or concentrated by storm waves not yet largely fragmented or abraded.

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Early Paleozoic Sedimentation in Reelfoot Rift

Analysis of subsurface data from deep tests drilled in the northern Mississippi embayment and southern Mid-Continent suggests that earliest Paleozoic sedimentation was dominated by the tectonic evolution of the Reelfoot rift.

Throughout most of the Mid-Continent, the Upper Cambrian Lamotte (Mt. Simon) Sandstone rests nonconformably on Precambrian basement and is overlain by the Bonneterre (Eau Claire) Formation. However, in the area of the Reelfoot rift, both the Lamotte and Bonneterre grade into thick, basinal shales that locally display evidence of episodic deposition of coarse clastics, perhaps on submarine fans.

Moreover, two major sedimentary units are present beneath the Lamotte-Bonneterre basinal facies within the Reelfoot rift. Immediately underlying the Lamotte-Bonneterre shale is a carbonate stratum (probably dolomite) that thickens to more than 1,000 ft (300 m) along the axis of the basin in eastern Arkansas. Underlying this carbonate is a detrital unit that grades from arkosic sandstone near the northern terminus of the basin to a basinal shale southward. This basinal shale is at least several hundred feet thick near the axis of the basin. These two strata occupy the stratigraphic position of the Conasauga (Middle Cambrian) and Rome (Lower Cambrian) Formations of the southern Appalachians.

The axial and transverse distribution of these strata suggests that the Reelfoot evolved as paired grabens or half grabens during the Early and Middle Cambrian. Subsequently, the Reelfoot remained the axis for more widespread subsidence and sedimentation throughout much of the Paleozoic.

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Association of Coal Metamorphism and Hydrothermal Mineralization in Rough Creek Fault Zone and Fluorspar District, Western Kentucky

The ambient coal rank (metamorphism) of the Carboniferous coals in the Western Kentucky coalfield ranges from high volatile A bituminous (vitrinite maximum reflectance up to 0.75% R_{max}) in the Webster syncline (Webster and southern Union Counties) to high volatile C bituminous (0.45 to 0.60% R_{max}) over most of the remainder of the area. Anomalous patterns of metamorphism, however, have been noted in coals recovered from cores and mines in fault blocks of the Rough Creek fault zone and Fluorspar District.

Coals in Gil-30 borehole (Rough Creek faults, Bordley Quadrangle, Union County) vary with no regard for vertical position, from high volatile C (0.55% R_{max}) to high volatile A (0.89% R_{max}) bituminous. Examination of the upper Sturgis Formation (Missourian/Virgilian) coals revealed that the higher rank (generally above 0.75% R_{max}) coals had vein mineral assemblages of sphalerite, twinned calcite, and ferroan dolomite. Lower rank coals had only untwinned calcite. Several sites in Webster County contain various coals (Well [No. 8] to Coiltown [No. 14]) with vitrinite reflectances up to 0.83% R_{max} and associated sphalerite mineralization. Mississippian and Lower Pennsylvanian (Caseyville Formation Gentry coal) coals in the mineralized Fluorspar District have ranks to nearly medium volatile bituminous (1.03% R_{max}). Rank varies between fault blocks and, in places, shows unexpected vertical trends. The regional rank trend exhibited by the fault zones is generally higher rank than the surrounding areas. Sphalerite mineralization in itself is not unique within Illinois basin coals, but if it was partly responsible for the metamorphism of these coals, then the fluid temperature must have been higher within the above mentioned fault complexes.

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Stratigraphic Correlations of Seelyville, De Koven, and Davis Coals (Desmoinesian) of Illinois Basin Coalfield

The Seelyville, De Koven, and Davis Coal Members (Spoon and Staunton Formations, Illinois and Indiana) or beds (Carbondale Formation, western Kentucky) presently are considered stratigraphically separate seams of restricted regional extent in the basin. Recent subsurface investigation reveals that the De Koven and Davis Coals are splits of the Seelyville Coal. A 170-mi-long (275-km) cross section, with an average of one well per mile, links the type Seelyville of west-central Indiana with the type Davis (Western Kentucky No. 6) and De Koven (Western Kentucky No. 7) Coals of western Kentucky. Geophysical logs formed the basis of the correlations. In its type area, the Seelyville Coal contains several partings of shale, one of which is fairly continuous but variable in thickness, ranging from less than 1 in. (2.5 cm) to more than 20 ft (6 m). Southward, this parting continues as a clastic wedge (more than 100 ft, 30 m, thick in some places) that separates the De Koven Coal (above) from the Davis Coal (below) in their area of outcrop in southeastern Illinois.

Knowledge that these coals are equivalent rather than separate seams should increase understanding of previously mapped resources, and facilitate mapping of additional resources in the future.

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New Burnside "Anticline"—Part of Fluorspar Area Fault Complex?

Field mapping in the Abbott Formation and examination of topographic lineaments in the Creal Springs, Stonefort, Eddyville, and Harrisburg Quadrangles (southeastern Illinois) reveal the New Burnside "anticline" and its northeastern extension, the Stonefort "anticline" to be a single, extensively faulted structure. Interpretation of this evidence also leads to the conclusion that this is a fault-block structure rather than an anticline. Trending northeast-southwest, the structure seems to be the northwesternmost extent of the Fluorspar Area fault complex. We found evidence for two episodes of faulting. The first involved northeast-trending, high-angle faults similar to those in the known Fluorspar complex to the southeast. Faults on the northeast (Stonefort "anticline") step down toward the center of the structure, forming a graben. Vertical movement also occurred to the southwest (New Burnside "anticline"), but the structure in this vicinity is a horst with some blocks tilted. As with other faults in the Fluorspar complex, horizontal slickensides are present locally. The second episode of movement occurred along northwest-southeast-trending strike-slip faults that offset the northeast-trending high-angle faults. This second phase of faulting may correspond with previously reported reactivation of northwest-trending faults elsewhere in the Fluorspar Area fault complex.

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Aux Vases–Renault–Yankeetown Depositional Sequence in Comparison to Other Chesterian Depositional Sequences

The major Chesterian sandstone units from the Bethel to the Degonia have a thick, lower progradational part. This is typically overlain by a sequence of thin-bedded sandstone, siltstone, and shale-bearing thin, in-situ coals and rooted zones wherever the underlying sandstone is thick. Overlying these coals and rooted zones is a much thinner transgressive