Eau Claire Formation, Galesville Sandstone, Ironton Sandstone, and Franconia Formation. The Davis Formation replaces the latter three where they cannot be differentiated. The age of the Potsdam ranges from pre-Dresbachian through Franconian. The Knox Supergroup consists in ascending order of predominantly carbonate rocks of the Potosi Dolomite, Oneota Dolomite, Shakopee Dolomite, and Everton Dolomite. The age of the Knox rocks ranges from Franconian through Whiterockian.

Cambrian sedimentation in pre-Dresbachian time is poorly known and may be restricted to fault-block basins. Terrigenous sand and mud were deposited in peritidal and shallow subtidal, predominantly marine, environments in the early Dresbachian. By the late Dresbachian, carbonate sand and mud, including oolite shoals, accumulated in the south, whereas marine terrigenous sand and mud were deposited in the north. In the Franconian, a bi-lobed delta complex, not yet well understood, dominated by terrigenous sand and mud, formed to the north, and the earlier shallow marine environment of carbonate deposition in the south expanded northward, so that by the end of the Franconian, pervasive carbonate deposition was extremely widespread.

The Oneota and Shakopee rocks were deposited in widespread shallow marine environments, and the record of marine sedimentation of Everton rocks is restricted to the southwestern part of the study area. Extensive post-Knox erosion has greatly reduced the original distribution of the Sauk Sequence, and rocks of the Chazyan are unconformably juxtaposed with rocks as old as Franconian. The distribution of rocks at the top of the Sauk and the consideration of the internal stratigraphy of the Sauk should influence future decisions for petroleum exploration, underground gas storage, and deep-injection liquid-waste disposal.

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Thickness and Quality of Springfield Coal Member, Gibson County, Indiana, as a Function of Differential Compaction of Precursor Sediments

The Springfield Coal Member is a time transgressive coal that formed during the Pennsylvanian on a delta platform within the slowly subsiding Illinois basin. In Gibson County, Indiana, the locations of the major Galatia channel and the minor Leslie Cemetery channel were determined by differential compaction of precursor sediments beneath this platform.

The Springfield coal is thick proximal to both channels, but proximal to the Galatia channel it is either a low-sulfur or a high-sulfur coal. It is a low-sulfur coal where it is underlain by a thin to moderately thick platform of shale with some sandstone and overlain by nonmarine shale. It is a high-sulfur coal where it is underlain by a thick platform of fluvial sandstone and overlain by brackish to marine rocks. Distal to both channels the coal is thin and high in sulfur. At distal locations the Springfield is underlain by a platform of either thick bay-fill sandstone or fluvial sandstone and overlain by brackish to marine shale and limestone.

Compaction of pre-Springfield delta sediments allowed for accumulation of thicker peat along the axis of more rapid local subsidence. Compaction of muddy parts of the delta platform proximal to the Galatia channel resulted in rapid subsidence and the deposition of nonmarine shale over the peat. In the areas underlain by bay-fill and fluvial sandstone where compaction was less, the peat became a relatively thin and high-sulfur coal.

Differences in coal thickness and quality in this 500 mi^2 (1,300 km^2) area of Gibson County can be explained largely by differential compaction and deltaic sedimentation.

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U.S. Geological Survey Investigations of Mississippi Embayment Area

Prior to about 1974, most of the work in the Mississippi embayment area by members of the U.S. Geological Survey was motivated by interest in the embayment's paleontologic aspects, stratigraphy, and economic resources, especially ground water. However, an excellent description of the effects of the New Madrid earthquake series was published on the centennial of that 1811-12 seismicity.

During World War II, combined efforts of the U.S. Geological Survey and the U.S. Bureau of Mines produced a wealth of information about the Little Rock pluton and the process of laterizing exposed nepheline syenite to form bauxite. That project, in a search for additional intrusive bodies at shallow depth, sponsored a reconnaissance aeromagnetic survey along the embayment edge from Little Rock, Arkansas, to Cairo, Illinois. Magnetic anomalies that were identified then are now known to be related to the series of buried plutons aligned along the northwestern margin of the upper Mississippi embayment graben. Later investigations assessed the geochemistry of the more mafic parts of the Little Rock pluton.

In 1974, U.S. Geological Survey effort, along with that of other federal agencies, state agencies, and academic institutions, was directed toward finding the cause of ongoing seismicity in the upper embayment and toward assessing the related potential effects on persons and property. Aeromagnetic, gravity, seismic reflection, seismic refraction, stress-field, surface-geologic, subsurface-geologic, geomorphic, and paleontologic investigations were completed, and many of the results have been published.

The purpose of this poster display is to summarize the more significant findings in this area related to (a) the rock sequence, lower crust to surface; (b) the major structural features, including a rift system; (c) the current state of stress; and (d) the present-day seismicity.

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Petrography and Thickness Variations of Brereton Limestone Member (Carbondale Formation, Middle Pennsylvanian)—An Important Roof-Rock in Part of Illinois Basin

The thickness and lithologic character of the Brereton Limestone Member are important factors in determining roof stability in underground mines in the Herrin (No. 6) Coal. Subsurface data from 216 electric logs or drill cores from two areas in the Illinois basin were used to construct isopach maps and fence diagrams of the Brereton Limestone. The Brereton Limestone is absent locally, and ranges from less than 0.1 to 19.5 ft (3 cm to 6 m) in thickness in most of the study area. Petrographic data from 159 thin sections or acetate peels from 48 drill cores permit recognition of 12 rock types in the Brereton: skeletal, foraminiferal, and algal lime mudstones; skeletal, sponge-spicule, and algal wackestones; skeletal and intraclastic packstones; skeletal and intraclastic grainstones; calcareous shale; and calcareous siltstone. All data are from two areas with a sandstone channel dividing them.

Area I shows a general overall thickening of the Brereton toward the sandstone channel but is characterized by mounds of lime mudstone and wackestone, some of which are capped by grainstones, suggesting shoaling. Area II is characterized by a general thickening of the Brereton away from the sandstone channel and generally an inverse relationship between the thickness of the Brereton and the underlying (Energy? and Anna) shales, but has a few carbonate mounds that were shoaling near the end of Brereton deposition. Lime mudstones and wackestones predominate, and some mound tops contain grainstones.

Thickness variations are depositional. Shallow, offshore marine Brereton facies suggest a "bank" depositional model, with irregular and local facies and thickness changes, rather than a "basin" model, with predictable offshore-onshore facies or thickness changes. Detailed petrologic and paleoecological analysis aimed at paleoenvironmental interpretations will probably be necessary to predict local variations in Brereton lithologic character and thickness in many areas.

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Petrology, Paleoecology, and Depositional Environments of a Micritic Limestone in Cave Hill Member of Kinkaid Formation (Mississippian, Chesterian), Southern Illinois

The Cave Hill Member of the Kinkaid Formation (Mississippian, Chesterian) contains a skeletal-lime mud buildup that is a thin lenticular unit which crops out in Johnson County in southern Illinois. The skeletal-lime mud buildup is characterized by a series of biofacies which are laterally correlatable throughout the buildup. These biofacies—the sponge spicule biofacies, the crinoid biofacies, the *Composita-Fenestella* biofacies, and the *Composita* biofacies—represent a series of different communities. In addition, a poorly fossiliferous lime mud facies is present. In the two lower biofacies, the sponge spicule and crinoid biofacies, the skeletal constituents are fragmented and abraded owing to bioturbation. The