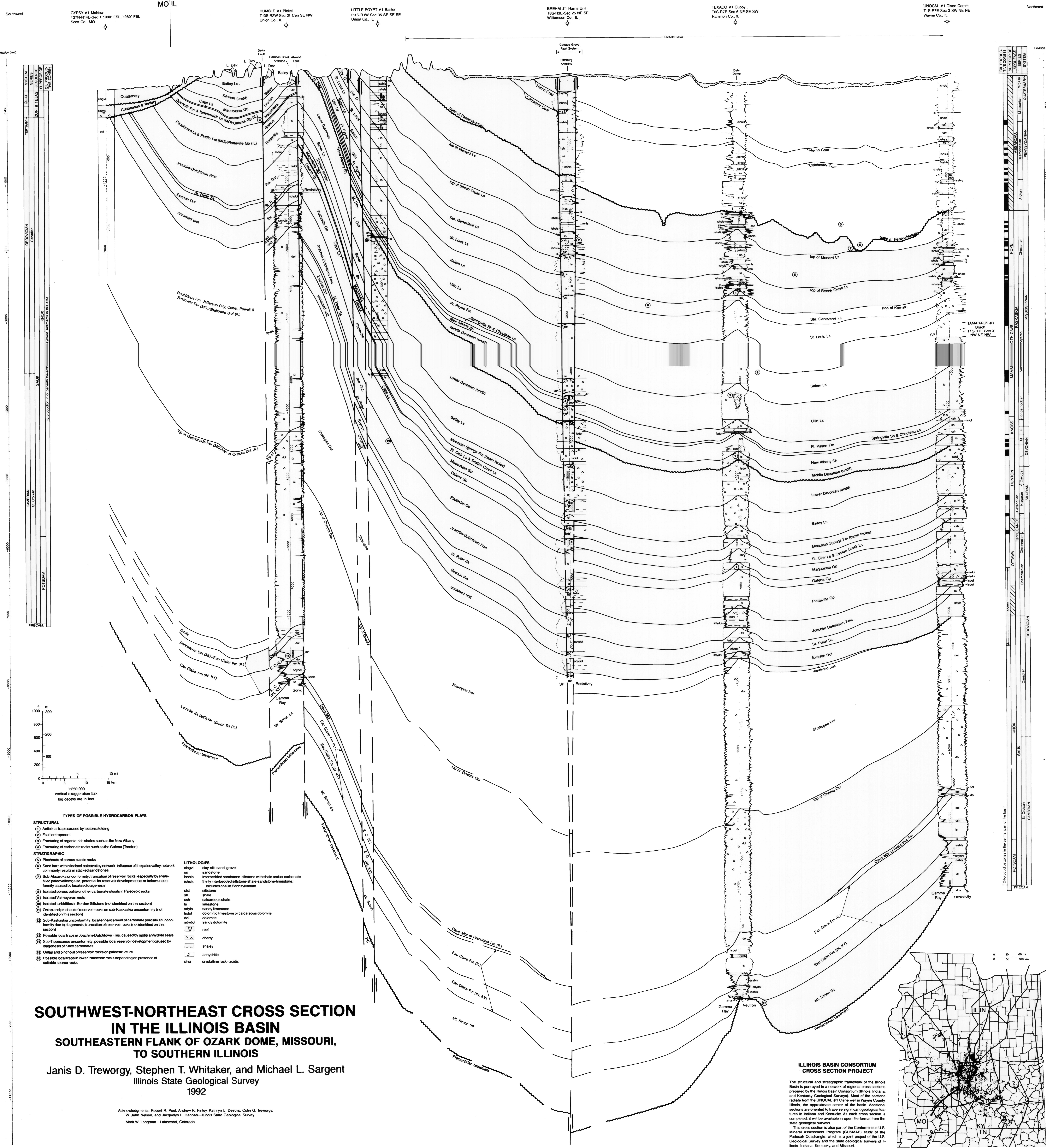


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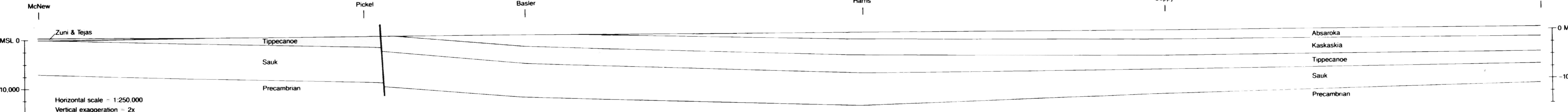


SOUTHWEST-NORTHEAST CROSS SECTION IN THE ILLINOIS BASIN SOUTHEASTERN FLANK OF OZARK DOME, MISSOURI, TO SOUTHERN ILLINOIS

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CROSS SECTION AT APPROXIMATELY 2:1 VERTICAL EXAGGERATION



STRATIGRAPHY
This series of regional cross sections presents the interpreted structural and stratigraphic framework of the Illinois Basin. Existing stratigraphic problems are apparent on these regional cross sections and are discussed below. Developing solutions for these problems, however, is beyond the present scope of this project.

Rather than introduce new terminology on the cross sections, we use the stratigraphic nomenclature used in the various states in several recent publications (Shawer 1985; Wilson et al. 1975; Howe 1961; McDowell et al. 1981; Adler et al. 1987).

Bonneton-Eau Claire
The Bonneton Formation (Cambrian) in Missouri is a predominantly carbonate unit. The Eau Claire Formation, as defined in Wisconsin and used in northern Illinois, is a siliciclastic unit (Buschbach 1975). The Eau Claire becomes predominantly carbonate southward into the Illinois Basin (Buschbach 1975), and is laterally equivalent to the Bonneton Formation in southeastern Missouri. The Eau Claire and Bonneton are separated from overlying carbonates by the Davis, a shaly carbonate in southern Illinois. The Davis is a member of the Franciscan Formation in Illinois and the basal formation of the Elvins Group in Missouri. The Davis loses its siliciclastic component eastward beyond central southern Illinois, thereby making it difficult to pick the top of the Eau Claire. The lower portion of the Eau Claire in Illinois is also a carbonate, but its relationship to the Eau Claire in Missouri is uncertain. The Gasconade in Missouri is a basal member of the Roubidoux Formation with the New Richmond Sandstone of west-central and northern Illinois. In

Canadian Series
Strata of the Canadian Series (Ordovician) are restricted to the subsurface in southern Illinois and western Kentucky but they crop out along the eastern flank of the Ozark Dome in Missouri. In Missouri these strata are subdivided into six formations. In ascending order, they are the Gasconade Dolomite, including the Garter Sandstone Member at its base, the Roubidoux Formation, and the Jefferson City, Cotter, Powell, and Smithville Dolomites (Thompson 1961; Adler 1987). In Kentucky the Garter through the Cotter Formations are recognized, although the Garter in Kentucky is considered a separate formation (Shawer 1985; McDowell et al. 1981). The Powell and Smithville are not recognized in Kentucky. If present in Kentucky, these strata are included in either the unnamed argillaceous unit, mentioned below, or the Cotter Dolomite.

In southern Illinois, the strata of the Canadian Series are assigned to the Prairie du Rocher Group (Blair 1966, p. 18; Wilmar and Buschbach 1975), formally subdivided into three formations. In ascending order, they are the Garter Sandstone and the Onondaga and Shawnee Dolomites. The Garter has a patchy distribution, and where it is absent, its position is recognizable in outcrops and core only by occasional sand grains near the base of the Onondaga.

The Gasconade of Kentucky and Missouri is equivalent to the Onondaga of Illinois, except that in Missouri, the Gasconade includes the Garter as a basal member. The Roubidoux

Unnamed Argillaceous Dolomite Overlying Shawnee
A shaly or argillaceous dolomite unit, previously unrecognized as distinct from and overlying the Shawnee Dolomite, is present only in wells in the southeastern part of Illinois and adjacent parts of western Kentucky and possibly southeastern Indiana. It is present in the Pickett well (230 ft), Union County, Illinois; the Strach well (706 ft), Pope County, Illinois; and the Davis well (461 ft), Christian County, Kentucky. It is present, although thin, as far north as the Cuppy well, Hamilton County, Illinois. The unit is absent in the Stephens well, Caldwell County, Kentucky, and the Duncan well, Webster County, Kentucky, even though these wells are located in the Roubidoux Graben. Also in the Stephens and Duncan wells, the Shawnee equivalent is anomalously thin, which suggests that these two wells penetrate "hard" shaly dolomite and eroded during the major drop in sea level that resulted in formation of the sub-Tippesaukee unconformity. The unnamed shaly dolomite unit may have been deposited prior to back-up and eroded from these structurally high areas, in which case the unit is part of the Saak Sequence. Alternatively, the southernmost part of the basin, including the areas of the Pickett, Strach, Davis, and adjacent wells, may have remained submerged and thereby experienced continuous deposition when the shallower parts of the basin, including the uplifted "hard" blocks, were subaerially exposed. The unnamed shaly dolomite may represent that continuous deposition. The shaliness may reflect an initial (lower Tippesaukee Sequence) influx of clay and silt from the basin margins; that event was followed by deposition of sandstones. By this scenario the unnamed shaly dolomite is part of the Tippesaukee Sequence.

Joachim-Dutchtown
We did not differentiate the Joachim and Dutchtown Formations (Ordovician). Winslow (1984, p. 331, 352) and McDowell (1987, p. 12) defined the Joachim as a dolomite in its type area and the Dutchtown as primarily a limestone. In the subsurface, however, both units may be dolomite and/or limestone. Freely eliminating the most distinguishing characteristic, the lower part of the combined unit is generally shaly, as evidenced by higher readings on the gamma ray logs, but this criterion has not been used in the past as a distinction between the units.

Marmorens Cave Group
Carbonates of the Marmorens Cave Group (Mississippian) are difficult to subdivide, since the contacts between the formations are gradational. More work and more core data are needed to work out the facies relations of this carbonate group. In these cross sections, we have attempted to correlate the formations basinwide as they have been defined in the past and to add those who use their subdivisions.

STRUCTURE
The structural configuration between the wells was taken primarily from available regional structure maps: the base of the Beech Creek in Illinois by Bristol (1967), the base of the New Albany in Illinois by Culp et al. (1981), the base of the New Albany in Kentucky (Shawer 1985) and in Missouri by Culp et al. (1981), the base of the Galena in Illinois by Bristol and Buschbach (1973), and the base of the Roubidoux in Missouri by McCracken (1971). Other data,

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