

## THE AGE OF THE LASALLE ANTICLINE\*

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The LaSalle anticline has been described in various papers throughout the last century, but the most thorough and comprehensive investigation was made by G. H. Cady whose results were published in Bulletin 36 of the Illinois State Geological Survey in 1920. The more recent study of numerous sets of additional well cuttings has added a great deal to our information on the age of folding of the LaSalle anticline.

Cady gives the history of the deformation in LaSalle County as follows:<sup>1</sup>

1. Deformation during or after "Lower Magnesian" time, the nature and extent of which is not fully understood.

2. Slight deformation during or after St. Peter time, along the axis of the anticline causing an unconformity between it and the overlying Platteville dolomite.

3. Deformation some time after Silurian and probably after Devonian deposition.

4. Deformation during and after Pennsylvanian time.

The "Lower Magnesian" consists of the Shakopee, New Richmond, and Oneota formations. A study of the thickness of the Shakopee and New Richmond formations shows no thinning over the crest of the LaSalle anticline, but there is a thinning over a cross-fold that extends in a northeasterly direction from a point south of Peru through Ottawa. There is also thinning and complete removal of the Shakopee and New Richmond formations over the Kankakee Arch. Consequently, it appears that the LaSalle anticline was not present in pre-St. Peter time.

The cross-fold appears to have moved recurrently during Maquoketa and Silurian time, and possibly during or at the close of St. Peter time. If such post-St. Peter pre-Platteville movement took place, the Glenwood and lower Platteville beds might be absent from this zone and would be related to this structure rather than to the LaSalle anticline. This

would better explain the fact that Glenwood beds are found in considerable thicknesses to the north and south of the Ottawa area.

The conclusion that the LaSalle anticline was not formed in Ordovician time is supported by the fact that there is no thinning of the Galena-Platteville formations toward the anticline, except where they have been affected by post-Silurian pre-Pennsylvanian and later erosion (Fig. 1). The distribution and thickness of the Glenwood formation is not related to the LaSalle anticline. Also, shoreline facies along the flanks of the structure have not been noted in formations below the Pennsylvanian in the LaSalle County area.

The question may be raised as to the possible Silurian or Devonian age of the structure. This possibility, however, is discounted by the fact that well records show the Devonian and Silurian strata to be thicker on the crest of the anticline in Crawford County than west of the anticline in southern Effingham County.

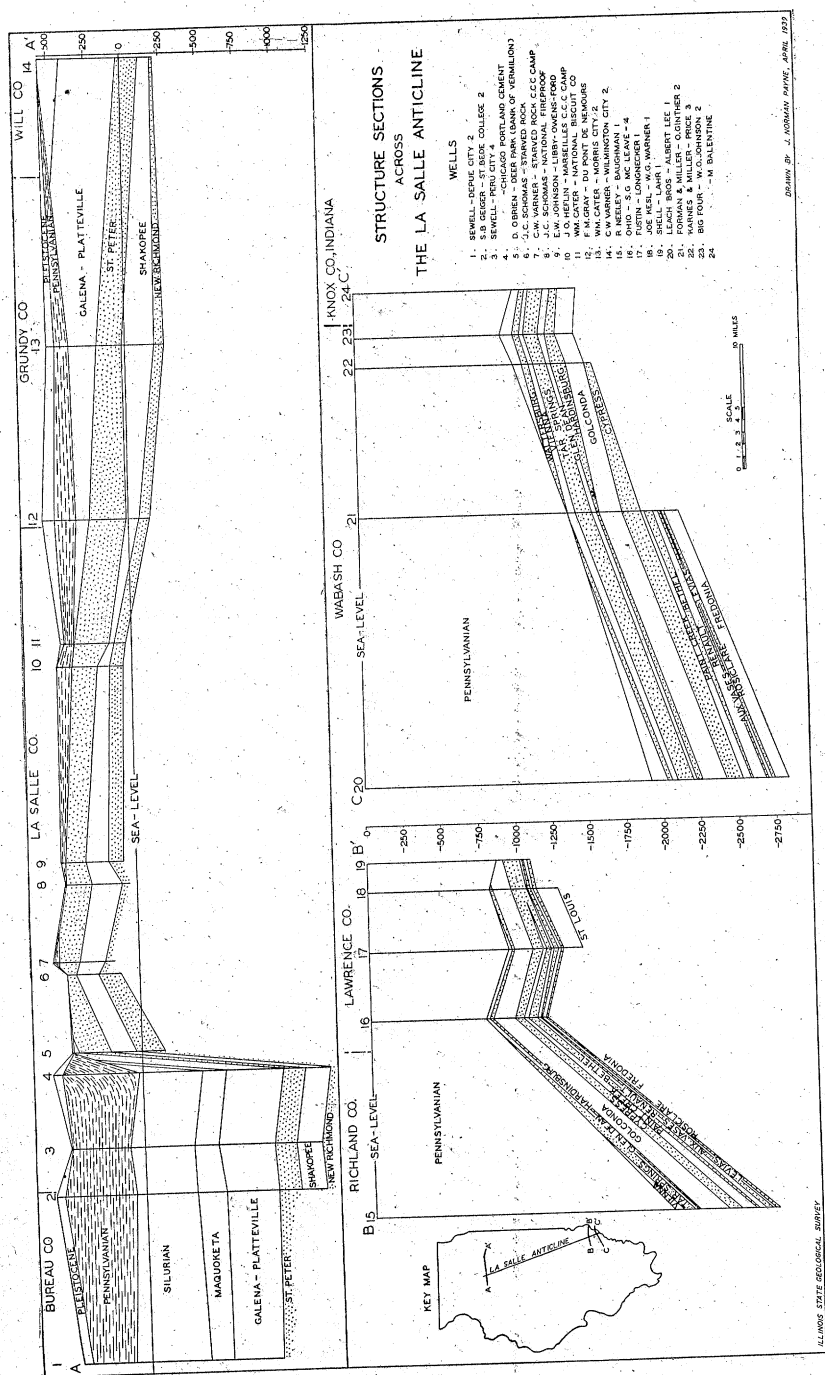
Lower Mississippian and Chester strata, where unaffected by post-Chester pre-Pennsylvanian erosion, bear no relation to the anticline but instead show a progressive thinning toward the eastern edge of the Illinois basin.

The cross-section AA' is drawn from Depue eastward to Wilmington. The divergence in dip between the Pennsylvanian and the older formations and the overlap of the Silurian by the Pennsylvanian strata show that the first major deformation was certainly post-Silurian. As a result of the first movement the minimum differential elevation in this area was 900 feet.

In the vicinity of Tuscola in Douglas County the minimum differential elevation caused by the first movement was about 1400 feet for here the Pennsylvanian sediments overlap Mississippian formations from the Chester down to the lower Osage.

<sup>1</sup> Cady, G. H. The Structure of the LaSalle Anticline, Ill. Geol. Survey Bull. 36, pp. 171-177 (1920).

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Cross-section BB' taken from south of Olney eastward through Lawrence County shows definitely that the initial movement took place in post-Chester pre-Pennsylvanian time for 400 feet of strata were eroded from the crest of the structure and the Pennsylvanian sediments were deposited overlapping Chester beds from the Menard-Vienna to the Glen Dean.

Cross-section CC' from Edwards County, Illinois, to Knox County, Indiana, shows a distinct flattening of the western flank of the fold and a decrease in the magnitude of the initial deformation, the minimum differential elevation being about 250 feet.

Later deformation of the LaSalle anticline took place during and after Pennsylvanian time. Additional detailed work on Pennsylvanian stratigraphy will show whether the maximum deformation of the Pennsylvanian beds took place during or after the close of the period.

It is concluded that the initial deformation took place in post-Chester pre-Pennsylvanian time, and that the area of maximum deformation moved progressively southward from the LaSalle area, with the maximum differential elevation occurring in the first pre-Pennsylvanian movement in LaSalle and Douglas counties, and after Pennsylvanian deposition had begun in Lawrence and Wabash counties.

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