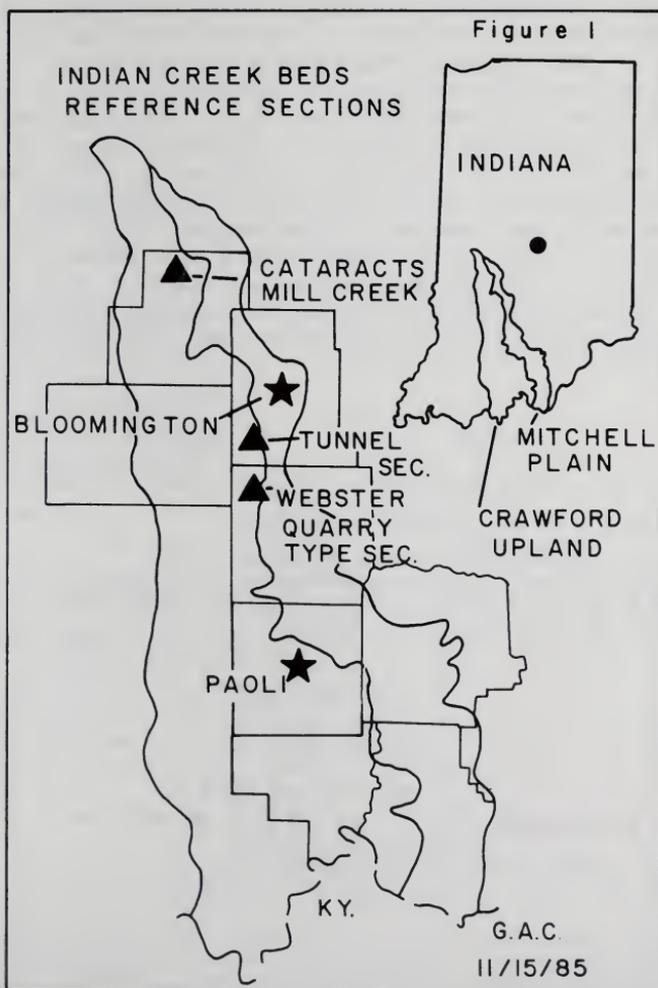


**Type Section for Indian Creek Limestone Beds in the
Ste. Genevieve Formation of South Central Indiana.**

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Introduction

Indian Creek Limestone Beds is introduced as a new name in rock-unit stratigraphy designated for the lower half of the Levias Member within the Ste. Genevieve Formation at Indiana exposures. This name is selected for the exposures in streams, caverns, and quarries in the karsted headlands of Indian Creek throughout Monroe and Lawrence Counties. The abandoned Webster Quarry 3.5 miles southwest of Springville in Lawrence County is designated type section exposure for the Indian Creek Beds, Figure 1. The



thin even bedding, distinctive lithographic texture, and fracture habit contrast this unit from the overlying oolitic and bioclastic beds, and from the subjacent sandy oolitic and dolostone beds.

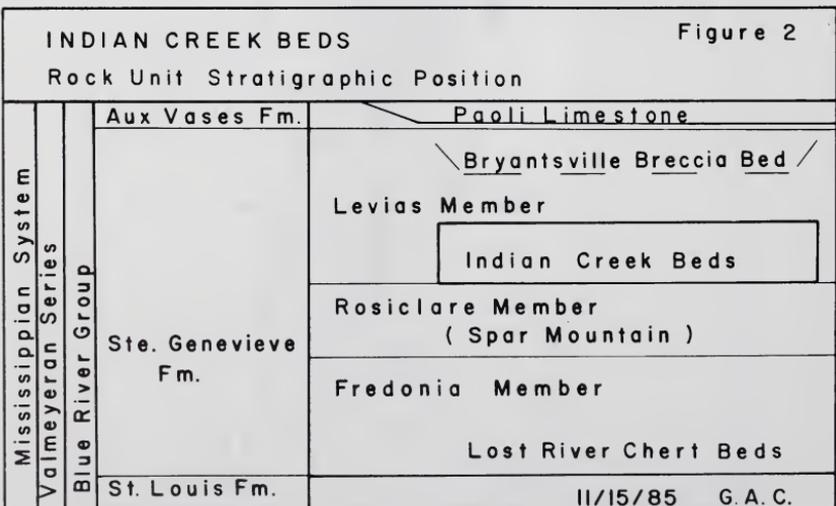
The present investigation with fieldwork in 1982 through 1985 revisited previously published Ste. Genevieve exposures throughout the Crawford Upland and Mitchell Plain physiographies of Indiana, C. A. Malott (1922, p. 59-256). This region extends 95 miles from Owen to Harrison Countys in Indiana. More than 30 new measured sections have been completed in related investigations to further reveal the Indian Creek Beds and their variations of stratigraphic expression.

Cordial acknowledgment is accorded to Richard Powell and John Bassett of Geoscience Research Associates, and to Henry Gray of the Indiana Geological Survey who have provided suggestions and guidance which have benefited this investigation.

History of Nomenclature

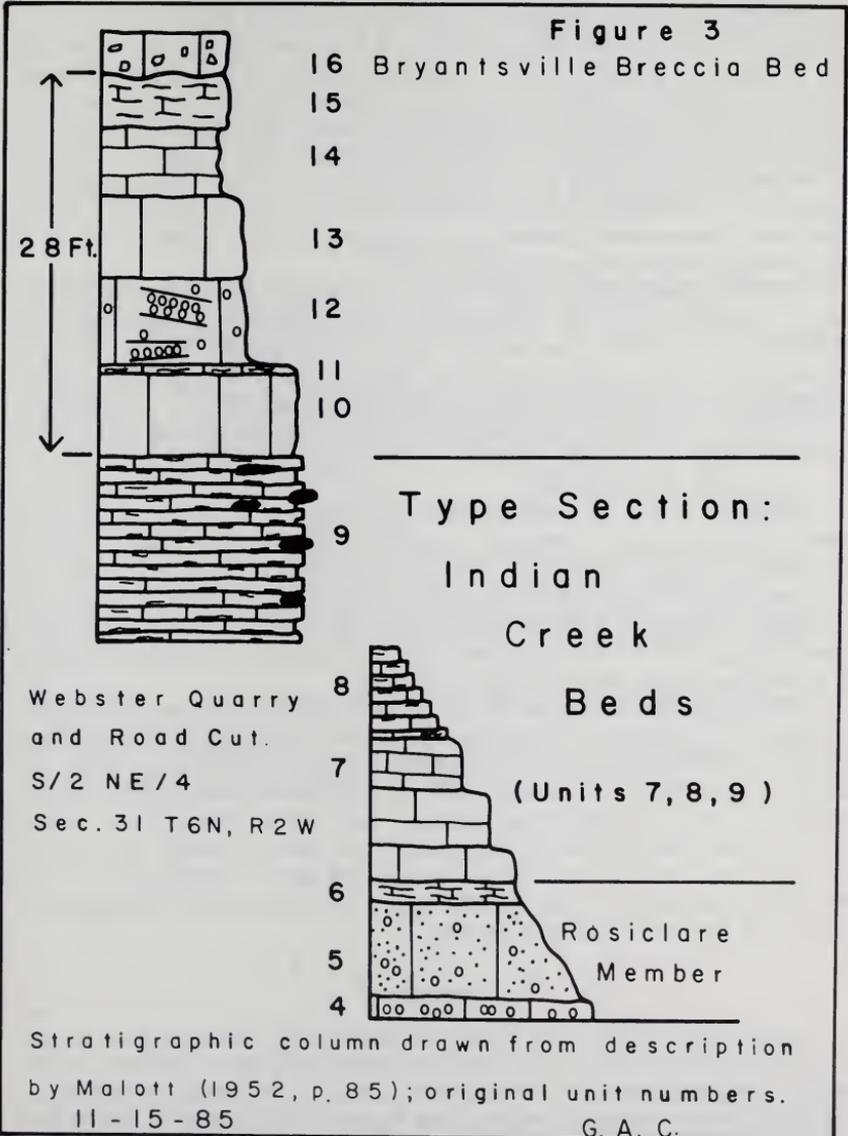
The middle Mississippian Ste. Genevieve Formation is continuous throughout the eastern flank of the Illinois Basin extending across southwestern Indiana as a major oil productive carbonate unit, Figure 2. C. A. Malott divided the Ste. Genevieve Limestone of Indiana exposures (1946, p. 322-326) at the cataracts on Mill Creek in Owen County. The names Levias, Rosiclare, and Fredonia became the divisions in conformity with the Illinois standard section then. A major field reconnaissance describing the Ste. Genevieve exposures in Indiana was accomplished by C. A. Malott (1952, p. 1-105) and T. Perry and N. Smith (1958, p. 1-110) prior to an episode of refinement of the Mississippian column and correlation adjustments proceeding from sophistication of carbonate systems models and improved correlation control across the Basin.

H. Gray, R. Jenkins, and R. Weidman (1960, p. 48) established the Blue River Group assigning the Ste. Genevieve Limestone to the middle. N. Smith (Shaver, et al. 1970, p. 143-144) discussed the dual and conflicting uses of the terms Levias, Rosiclare, and Fredonia and their rank as Members in the Ste. Genevieve Formation of Indiana.



Description

The abandoned Webster quarry (S/2 NE/4 Sec. 31, T6N R2W) in Lawrence County is herein designated type section for the Indian Creek Beds. The rock units serialized nos. 7, 8, and 9, (Fig. 3) from C. A. Malott's original description (1952, p. 85) comprising a total thickness of 27.5 feet are identified as the type exposure. The terms lithographic, silty, and dense as Malott applied them are sufficient to recognize the Beds. The top is located 28 feet below the base of the Bryantsville Breccia Bed at the quarry. The massive granular unit 10 overlying the Indian Creek Beds marks a



gradational transition to the oolitic beds above. The base of the Indian Creek Beds is below the level of the quarry floor and exposed along the roadside east of the quarry at an altimeter elevation of 581 feet msl. The base of the Beds rest conformably on a calcareous shale, unit 6, marking the contact with the Rosiclare Member below.

The Indian Creek Beds are thin and evenly bedded in units 8 and 9, with beds ranging 0.2 to 0.9 feet thick. This lithographic limestone has a homogenous matrix of cryptocrystalline micrite composed of translucent calcite or aragonite crystals. The white color is yellow stained from the clay intercalations (less than $\frac{1}{4}$ inch thick), black from organic carbon, or tan from the terra rosa regolith. Green stains surround small vugs and fractures filled with chloritic clays. Sparse birdseye structures and nests of productid brachiopods and gastropods are common in the Beds. Few stylolites are present in the Indian Creek Beds in the quarry. Stratified nodular chert in the Beds was not described by Malott (1952, p. 86) who remarked of units 7, 8, and 9 resembling the "rubblestone" of the Spencer Quarry in Owen County; thus making a correlation of the Beds based on the lithological characteristics. The term rubblestone as applied to the lithographic beds was adopted from Sweitzer (Collet, 1876, 315, 329-330). It was used by Malott (1952, p. 1-105) in reference to beds now named Indian Creek Beds and more frequently another stratigraphic position above in the Bryantsville Breccia Bed where a lithographic limestone host to the breccia appears rubbly as a result of algal laminations and subaerial laminated crust.

The "Old Tunnel Section" (NW/4 Sec. 35, T8N R2W) in Monroe County described by C. A. Malott (1952, p. 57) is an excellent reference exposure for the Indian Creek Beds. Malott's unit 2 is in the Beds and further investigation measured 14 feet of lithographic limestone with the top of the Beds coincident with the tunnel ceiling. Although much debris fills the tunnel it clearly was excavated within the entire thickness of the Indian Creek Beds for a distance of 150 feet. Numerous stylolites in the Indian Creek Beds and in the oolitic beds above were described by Malott and previously by J. Beede (1915, p. 208-209).

The upper falls of the cataracts on Mill Creek (SE/4 NW/4 NE/4 Sec. 35, T12N R4W) in Owen County is a reference exposure described by C. A. Malott (1952, p. 33) where he divided the Ste. Genevieve Limestone (1946, p. 322-326). Although the Beds are generally recognizable at the cataracts thickness is only 6 feet, Malott's unit 7, (1952, p. 33). Several miles southwest the Beds are closer to 30 feet with individual beds averaging 0.9 to 1.2 feet in thickness. Some older churches and government buildings in Spencer are constructed of Indian Creek Beds.

Subsurface reference sections for the Indian Creek Beds are found in the following cores in the collections of the Indiana Geological Survey. SDH No. 155, Leininger farm, (SW/4 NW/4 NE/4, Sec. 7, T8N R2W) in Monroe County; depth 168 to 180 feet below a surface of 905 feet msl. SDH No. 330, Munsen farm, (150°NL 845°EL NE SW Sec. 22, T7N R2W) in Monroe County; depth 104 to 122 feet below a surface of 883 feet msl. Corehole #S-3 from Martin County State Forest (SW SW SE, Sec. 24, T3N R3W) drilled in 1953, has the Indian Creek Beds at a depth of 402 to 419 feet below a surface of 791 feet msl. The base of the unit rest upon a bed of calcite sand at the top of the Rosiclare Member.

Correlation

Tentatively the Indian Creek Beds are considered equivalent to the lower portion of the Karnak Member of the Ste. Genevieve Formation in Illinois (Swann, 1963, p. 28-29). This correlation is favored on the assumption that the Indian Creek Beds rest upon the Rosiclare Member in Indiana which is generally accepted as the correct Spar Mountain equivalent in Illinois. Precise paleontological observation is beyond the focus

of this investigation, however a review of Malott (1952) and Perry and Smith (1958) finds the Indian Creek Beds within the range of *Platycrinus penicillus* and below the range of *Talerocrinus*. Difficulty in correlating the Basin Valmeyeran formations with the Indiana out-crops arises from the subtlety of Valmeyeran unconformities and complex lithofacies relationships in models composed of a few simple lithotypes. Reference horizons are either thin and discontinuous or in the case of the Paoli Limestone have not been conclusively correlated.

Recognition and mapping of the Indian Creek Beds in Indiana is an effort to establish a reliable reference horizon in the Ste. Genevieve Formation which will be recognized in the subsurface allowing progress to be made with the Aux Vases and Renault Formations. Altimeter structure mapping along the Indian Creek Beds out-crops in Monroe County resulted in prediction of that horizon in an exploratory oil test at Solsberry in Greene County. A fair correspondence between drill cuttings and Schlumberger Induction log signatures suggests the Indian Creek Beds are present farther into the Basin in Indiana and possibly are interbedded with dolomitic micrite facies. Extension of the Indian Creek Beds to the Basin center is not anticipated. Area restriction may be limited pending interpretation that the Beds were chemically precipitated at a relatively rapid rate in low energy shallow water conditions.

Literature Cited

1. Beede, J.W., 1915. Geology of the Bloomington Quadrangle: Indiana Dept. Geology and Nat. Resources, Ann. Rept. 39, p. 190-312, 4 pls.
2. Collett, J., 1876. Geology of Owen County: 7th. Ann. Rept. of the Geological Survey of Indiana, p. 601.
3. Gray, H., Jenkins, R., and Weidman, R., 1960. Geology of the Huron area, south-central Indiana: Indiana Geol. Survey Bull. 20, 78 p., 2 pls., 4 figs., 7 tables.
4. Malott, C. A., 1922. The physiography of Indiana: Handbook of Indiana geology, Indiana Dept. Conserv. Pub. 21, pt. 2, p. 59-256, 3 pls., 51 figs.
5. Malott, C. A., 1946. The geology of Cataract Falls, Owen County, Indiana: Jour. Geology, v. 54, p. 322-326, 2 figs.
6. Malott, C. A., 1952. Stratigraphy of the Ste. Genevieve and Chester formations of southern Indiana: Ann Arbor, Mich., Edwards Letter Shop, 105 p.
7. Perry, T. and Smith, N., 1958. The Meramec-Chester and intra-Chester boundaries and associated strata in Indiana: Indiana Geol. Surv. Bull. 12, 110 p., 6 pls., 1 fig.
8. Shaver, R. et al., 1970. Compendium of rock-unit stratigraphy in Indiana: Ind. Geol. Surv. Bull. 43., 229 p.
9. Swann, D., 1963. Classification of Genevievean and Chesterian (late Mississippian) rock of Illinois: Illinois Geol. Surv. Rept. Inv. 216, 91 p., 1 pl., 23 figs.

