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A Deep-to-Shallow Transition in the Fort Payne Formation (Lower Mississippian), Kentucky Highway 61, Cumberland County, Kentucky

David L. Meyer
University of Cincinnati

Paul E. Potter
University of Cincinnati

Jennifer L. Thies
University of Cincinnati

William I. Ausich
The Ohio State University

Stephen A. Leslie
The Ohio State University

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A DEEP-TO-SHALLOW TRANSITION IN THE FORT PAYNE FORMATION (LOWER MISSISSIPPIAN), KENTUCKY HIGHWAY 61, CUMBERLAND COUNTY, KENTUCKY

INTRODUCTION

The Fort Payne Formation of the Cumberland Saddle region of south-central Kentucky and north-central Tennessee is part of a vast marine sedimentation system that extended over much of North America during the Early Mississippian Period; broadly similar facies reached from Georgia through Tennessee and Kentucky, into northwestern Mexico and the northern Rockies (Pryor and Sable, 1974). Throughout North America the Fort-Payne and its equivalent overly a black shale (in Kentucky called the Chattanooga Shale) and underthick carbonates (in Kentucky, the Warsaw Formation and younger middle Mississippian limestone). It is south of Burying Hill, Ky., on Kentucky Highway 61, a complete section of the Fort Payne from the Chattanooga Shale equivalent up through the upper Fort Payne is exposed. This location is some 270 miles south of Nashville, Tenn., and 140 miles north of Nashville, Tenn. The Fort Payne is approximately 270 feet thick in this section and is composed of basinal wackestones mounds; distinct, fossiliferous, grain-shelly wackestones with mounds; dolomitic crossbedded packstones; argillaceous dolostones, the most common lithology in the Fort Payne; and a dark, organic-rich shale, which caps a persistent incised-vanishing point and paleo-estuarine unit.

PALEONTOLOGY AND AGE

The abundance of crinoid calyces increases upward in the Fort Payne along Kentucky Highway 61, although specimens with arms or the stalk attached are very rare. This mode of preservation suggests that most of the crinoids were not interred in the mud but eroded into the marine sediments before final burial. More abundant carbonates with intimately interbedded calyces, such as Agaricocrinus, Alocancravus, Eryocrinus, and Macrornocerus, occur most frequently in and above the wackestone mounds, but in a few instances they are preserved as partial calyces or isolated plates. Crinoid fossils are present only in the upper part of the Kentucky Highway 61 section, and some are preserved as partial calyces or isolated plates. In the upper Fort Payne, near the Kentucky Highway 61 section, there is a well-preserved horizon of crinoid calyces along Lake Cumberland. Although the wackestone mound facies at the Kentucky Highway 61 section has not yet been described, the well-preserved calyces are interbedded in sheet-like packstones in the Fort Payne along Lake Cumberland to the east (Meyer and others, 1989). These taphonomic features, as well as the faunal composition of the Fort Payne strata lying above the wackestone mounds, are similar to those in abutting shelly facies in the For MAK no Payne along Lake Cumberland in the east (Meyer and others, 1980). These features suggest that the packstones are interpreted as debris flows deposited on the margins of crinoidal banks in a progressing basinal slope. Although the wackestone mound facies at the Kentucky Highway 61 section has not yet been described, the presence of well-preserved crinoid calyces suggests that higher stage of the Fort Payne were deposited near the living crinoid populations.

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