

rocks exposed within the valley of the Skunk River. There are three operational quarries within the quadrangle that were observed during field mapping activities. Subsurface information was mostly derived from the analysis of water well cutting samples reposited at the Iowa Geological Survey (IGS) Lithologic and stratigraphic information from these samples is stored in the online GeoSam database of the IGS. Geologic information from 15 outcrops and more than 180 private and public wells within the Mount Pleasant Quadrangle and the surrounding area were used for bedrock geologic mapping purposes.

exposed in the Mississippi River Valley between Burlington, Iowa and southern Illinois. Therefore, the bedrock exposures in southeastern Iowa take on a special significance as they comprise part of the historic "body stratotype" on which the concept of the Mississippian System was defined and based (Witzke et al., 2002). The Mississippian had been primarily a North American chronostratigraphic label roughly synonymous with the Lower Carboniferous of the Old World. After approval by the Subcommission on Carboniferous Stratigraphy in 1999 and ratification by the International Union of Geological Sciences and the International Commission on Stratigraphy in 2000, the Carboniferous System was officially subdivided into the lower and upper subsystems, the Mississippian and Pennsylvanian, respectively. As such, the Mississippian now has meaning and application as a major subdivision of geologic time not only in North America, but as a globally defined subsystem. The bedrock strata seen in the Mount Pleasant Quadrangle and surrounding area provide a significant historical reference for the Mississippian

previous workers. Owen (1852) and Hall (1857) were the first to recognize that the abundant bedrock exposures in southeastern Iowa likely correlated with those observed farther down the Mississippi River Valley. Decades later, Van Tuyl (1923) took on the ambitious task of correlating all of the Mississippian units across Iowa. Many of their lithologic interpretations were valuable; however, the correlations were, and continue to be, subject to revision as later workers attempted to piece the Mississippian into the global stratigraphic framework. Harris and Parker (1964) provided inspirational insights into the structural context of southeastern Iowa by identifying a series of northwest-southeast trending anticlines that were later found to be superimposed on the larger northeast-southwest trending structural feature known as the Mississippi Arch (Witzke et al., 1990). Many questions remain regarding the stratigraphic correlations within the Mississippian such as whether the "St. Louis" Formation in Iowa truly belongs in the St. Louis Formation or should some of the upper members be reassigned to the Ste. Genevieve Formation; whether the Prospect Hill Formation is an offshoot of the Hannibal Formation of Missouri and Illinois; and whether the McCraney Formation is correlative to the McCraney in Illinois or if it should become a new stratigraphic interval (as proposed by Witzke et al., 2002). In an effort to address the question regarding the "St. Louis" Formation, detrital zircon analyses from sandstone samples collected near the mapping area were processed with the help of Emily Finzel (Assistant Professor of Geology at the University of Iowa (UI)). The geochronologic data provided by the detrital zircon analyses were not able to differentiate the sandstone units within the "St. Louis" Formation, however, further study of the geochemistry and lithology of these sandstones may provide the evidence needed to identify whether these units belong in the St. Louis proper or in the Ste. Genevieve. Clarification of the issue regarding the Prospect Hill and McCraney formations is being carried out with the help of Brad Cramer (Assistant Professor of Geology at the UI), Brittany Stolfus (UI student), and James "Jed" Day (Professor of Geology at Illinois State University). Samples collected from locations southeast of the mapping area as well as at other locations in eastern Illinois and northeastern Missouri for conodonts and carbon isotopes have provided valuable bio- and chemostratigraphic information. Preliminary results suggest that the Prospect Hill and McCraney formations in Iowa may correlate with the Hannibal Formation of Missouri and Illinois. Further study will commence with additional sampling of surface exposures as well as core

Although the Mississippian bedrock in southeastern Iowa is no longer a widely used aquifer due to low yields and locally poor water quality, many of the bedrock units are highly desirable sources of aggregate, thus necessitating the continued effort to gain a better understanding of the local and regional

to early Chesterian (about 355 – 330 million years ago) and Devonian strata of Famennian age (about 370 – 360 million years ago) (Ogg et al., 2008). Famennian strata are represented by brown, organic rich shales of the Grassy Creek Formation overlain by gray-green silty shales of the Saverton Shale Formation and capped by the English River Formation siltstone. The thick shale packages represent major transgressive-regressive cycles of deposition in a stratified seaway (Witzke, 1987). Kinderhookian strata represent a sequence of interbedded carbonates and siltstones that unconformably underlie the Burlington Formation (early Osagean) within the mapping area. The Burlington, Keokuk, and Warsaw formations (collectively the Augusta Group of Witzke et al., 2010) represent a relatively conformable package of marine rocks deposited during the Osagean transgressive-regressive (T-R) cycle. Interpreted as part of the central middle shelf of the Osagean sea that transgressed toward the northwest and the Transcontinental Arch, the Burlington Formation rocks were deposited across a vast subtidal epicontinental shelf that stretched from Illinois and Iowa into central Kansas and Oklahoma (Lane, 1978; Witzke et al., 1990). The Keokuk and Warsaw formations represent the regressive phase of the Osagean T-R cycle punctuated by a stark unconformity below the overlying Pella or "St. Louis" formations, regionally displaying up to 40 m (130 ft) of erosional relief (Witzke et al., 2002). For a more detailed description of the lithologic units and further discussion of mapping methodologies, please refer to the

Hall, J., 1857: Observations upon the Carboniferous limestones of the Mississippi Valley. American Journal of Science, v. 23, p. 187-203. Harris Jr., S.E. and Parker, M.C., 1964: Stratigraphy of the Osage Series in Southeastern Iowa, Iowa Geological Survey Report of Lane, H.R., 1978: The Burlington Shelf (Mississippian, north-central United States). Geologica et Palaeontologica v. 12, p. 165-176. Owen, D.D., 1852: Report of a Geological Survey of Wisconsin, Iowa, and Minnesota; and incidentally of a portion of Nebraska territory.

Van Tuyl, F.M., 1923: The stratigraphy of the Mississippian formations of Iowa. Iowa Geological Survey, Annual Report, v. 30, p. 33-

scanned and modified from the Mount Pleasant 7.5' Topographic Quadrangle map, published by The US Geological Survey in 2015

GEOLOGIC CROSS-SECTION A-A'

