The Burlington Formation

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The Burlington Formation is a marine limestone, found in rock layers laid down during the Mississippian Period (325-360 million years ago). The Mississippian Period was relatively short-lasting only 35 million years-and its fossil record is almost entirely marine (Thompson, 1982). This is due to the flooding of North America called the Kaskaskia transgression which began during the Devonian Period (380-450 million years ago). This was interrupted at the end of the Devonian Period by partial regression, but deposition continued uninterrupted into the Mississippian Period. The Kaskaskia Sea reached its greatest extent about the middle of the Mississippian Period, and late Mississippian sedimentary rocks of the basins mark its recession. This recession also marks the boundary between the Mississippian and Pennsylvanian Periods in the North America (Clark and Stern, 1960).

The Mississippi Valley was covered by this clear, shallow, warm inland sea that advanced from the south. During this period, limestone was deposited to a total thickness of more than 2,000 feet in some areas. These limestone deposits occur almost continuously from Iowa to Alabama. The high bluff along the Mississippi River north of St. Louis are typical of this deposit (Shourd and Wegenek, 1969).

The Kaskaskia Sea extended from the west, eastward into the Mississippi Valley. The Early Mississippian marine deposits are far thicker in the west and they seem to represent a much longer record of the limestone deposition than anywhere else on the continent(Moore, 1958). From Kansas, eastward to the Ohio Valley, the Early Mississippian deposits are relatively thin and lithologically somewhat variable. The prevailing lack of course sediments indicates that the adjacent lands were low. Shifting seas, oscillating sea level, and instability of the sa floor at the close of the Devonian time and the beginning of the Mississippian resulted in seqyebces if rock units that are complexly interlayered and vary from one to another. As a result, geologists have found it difficlut to make precise correlations between regions. Some beds with definite characteristics in one locality are considerably different even a short distance away. Also, some beds lack distinctive fossils, and some have no fossils, making age determinations difficult(Unklesbay and Vineyard, 1992). Thompson(1986) has completely revised the Mississippian succession with new definitions of some old units and the introduction of the newly named ones.

Throughout most of the midcontinent, the Mississippian is divided into four series--the Kinderhook, Osage, Meramec and Chester. In the Mississippian of Missouri, the oldest. Kinderhook is followed by a thick limestone section comprising the Osagean Series. The Burlington Limestone is its most prominet formation. It was recognized in the mid-1800's and named by James Hall (Moore, 1928) for its occurrence in the bluffs along the Mississippi Valley at Burlington, Iowa, to include the beds which had been called the "Encrinital group of the Burlington" and the reddish brown Encrintal group of Hannibal."

Present in nearly all major Mississippian outcrop regions in Missouri, the Burlington Limestone is widespread throughout the midcontinent region. It is known from Iowa to northwestern Arkansas and from wester Illinois to western Kansas. It ispresent throughout Missouri, except in the Ozark uplift, where it has been removed by erosion. Differentiation of the Burlington with the overlaying, lithologically similar Keokuk Limestone is often difficult or impossible, so the sequence ofOsagean limestones is sometimes identified as "Burlington-Keokuk Limestone" (Thompson, 1986).

In Missouri, the Burlington appears at the surface in Lewis and Knox counties, covers the larger portion of Shelby and Marion counties, and is exposed in numberous places in Monroe, Ralls, Pike, Lincoln and St. Charles counties. On the south side of the Missouri River, the formation is found in the vicinity of St. Louis and southward into Jefferson, Ste. Genevieve and Perry counties. North of the Missouri River, the Burlington forms an almost continuous south-facing escarpment. The outcrop of the Burlington in Varren, Montgomery, Callaway and Boone counties is irregular, and there aren numerousoutliers. The formation makes high bluffs along both sides of the Missouri River a short distance west of Jefferson City, extending up-stream to a point 2-3 miles south of Glascow in western Howard County, and is found in numberous other areas within the state (Moore, 1928).

As observed in most exposures, the Burlington Limestone is unusually course-grained, crystalline,crinoidal limestone. Its texture is sufficiently distinctive and persistent to permit recognition of the formation commonly on this basis alone. The Burlington Limestone is made of almost entirely on the remains of various fossils, by far the most important of which are crinoids. Some portions of the Burlington, however, are not so evidently crinoidal, as for example, the so-called "white ledge" quarried in the northeastern part of Missouri. Parts of the Burlington formation also consist of thin, uneven cherty beds and cherty nodules (Moore, 1928).

A large proportion of the crinoid species are restricted to the Burlington Formation. the crinoids began to assume a front rank in the beginning of the Osage, as shown by the rich crinoid faunas of the Fern Glen and other beds. The Burlington contains a record of the continuation and acceleration of crinoidal development; the clear, shallow waters of the Mississippi Valley being apparently a region of maximum differentiation and dispersal of crinoids exhibit evolution along several lines-species of Burlington age being broadly distinguished from those of the Keokuk and both of these from Warsaw types.

The Osage epoch marks the culmination of the great division of the crinoids known as the Camerata, and it is remarkable that immediately following this maximum deployment the group vanished.

Crinoids flourished because they were filter feeders, and most of the particles in the clear oceans would have been bits of food. They also needed warm water to produce their elaborate skeletons, since warm water can hold more dissolved calcium carbonate than cold, making it easier to precipitate (Thompson, 1982).

One can imagine the crinoids growing in extensive marine meadows, rippling in the waves on their long, thin, graceful columns, like garden flowers in the wind. On rare occasions, they were preserved whole, flattened to the bottom by a storm and quickly covered with lime mud. Unfortunately, the organic matter conection the plates and columnals of the stem nearly always rotted in the water and plates were scattered and sorted by the waves to form crinoidal limestones (Clark and Stearn, 1960).

The Burlington contains more species of crinoids than any other fomration in the Mississippi Valley. About 260 species have been identified, some of which may be descriptions studied only casually. Brachiopods are next in abundance. About 110 species have been identified. Bryozoa are abundant but only a few speicies have been recognized. Blastoids are more abundant in the Burlington than any other formation in Missouri. Thirty-three species have been listed, mostly in northeast Missouri near Louisiana (Branson, 1944). Colonial corals declined in some areas, but solitary corals were diversified and abundant. Gastropods, pelecypods and cephalopods are rare. Sharks greatly increased ther numbers and variety, which may have contributed to the decline of the trilobites, (Shroud and Wagenek, 1969(, as only a ffew specimens of trilobites have been found. Shark's teeth are widely distributed, but rare. About 100 species have been described from the Burlington of the Mississippi Valley, but of these, not more than 20 are known from the Burlington of Missouri.

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