

## The Magnesian Limestone of Iowa As a Building Stone

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**THE MAGNESIAN LIMESTONE OF IOWA AS A BUILDING STONE.**

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BY J. E. GRIFFITH, LATE LIEUTENANT U. S. ENGINEER CORPS,  
NOW IN CHARGE OF STONE AND LOCK WORK  
OF SHIP CANAL AT KEOKUK.

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THE magnesian limestone belongs to the subcarboniferous age, and occurs between the Keokuk and Saint Louis groups of ordinary limestone, each occupying its respective place, but oftentimes running the one into the other, rendering the line of separation in such cases exceedingly difficult to draw. The general characteristics of this class of stone are similar everywhere.

In Iowa, this rock is found in various places—the heaviest beds occurring in Lee, Johnson, and Mahaska counties—in greater quantities, however, in the first named.

As a building stone, the magnesian limestone excels on account of its weight, toughness, and durability, rendering it capable of standing great pressures and changes in the elements. Weighing, as it does, from 165 to 170 pounds to the cubic foot, its stability is undoubtedly superior to any other of the limestone formations, for weight gives proof of stability and firmness when speaking of stone of any one class, as limestone. The test for weight and other properties were made at Rock Island Arsenal in 1867. Although soft when first quarried, this class of stone becomes very hard and difficult to dress.

In reference to some of its peculiarities, I might here say that in all places where this rock has been opened, there is considerable difference in color and structure in the several strata, and in the same stratum at different localities, varying from a light gray to a dark buff (sometimes streaked in various colors), and from a homogeneous, sandy texture, rather soft when first taken from the bed, to a hard, compact, and coarse structure.

These variations, however, do not appear to affect the durability of the rock in any degree. In 1849, a considerable quantity of this stone was taken out of the Belfast quarry, in Lee county, for the construction of the lock at the above named place, some of which was dressed at that time, and has been exposed ever since to the action of the atmosphere, water, and ice, yet retaining, to-day, the sharpest edges and tool marks. Many cases can be mentioned of magnesian limestone lying in wet places, or half imbedded in mud, which have withstood atmospheric and other influences.

In Paris, France, this stone is one of the most common and reliable of foundation and building stones — many examples existing of buildings hundreds of years old. Castles, centuries old, in Europe, remain as monuments of the durability of this class of limestone.

From experience, I can testify to its worth. The selection of the stone for the three locks of the Des Moines rapids ship canal was entrusted to a competent board of United States engineers. They had at their command every means of testing different classes of stones found in the west. Their decision, approved by the chief engineer United States army, was in favor of the magnesian limestone. Occurring, as it does, in great quantities in this immediate neighborhood, abundant facilities have been offered me for a thorough examination of its relative worth as compared with other building stone.

It can be obtained in blocks of any dimensions and shape — blocks being used on these works containing four cubic yards, weighing from eight to nine tons. It quarries and dresses easily — an ordinary workman can give a bush hammer dressing to one or more cubic yards per day.

Combining, then, its great strength, toughness, and durability, together with the cheapness with which it can be quarried and dressed, it cannot but occur to any disinterested mind that it is a superior building stone.

In the lock works here, the water line is ever varying; consequently the air, water, and ice alternately have opportuni-

ties to influence the face of the stones in the wall. The fact, then, that this, of all our western stones, was selected by a board of engineers appointed by the secretary of war, for the construction of the *only* locks in the Mississippi river, is a fair evidence of the worth of the stone. The state of Illinois thought enough of this stone to use it in its capitol building.

A sample of stone sent here from Johnson county, I find, corresponds with the Lee county stone. The Lee and Johnson county stones offer far superior inducements to any other in the state, on account of thickness of strata and amount of quantities, and I can safely recommend its use for any building purposes, whether in air or water.

*in*

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MEMORIAL OF REV. G. D. A. HEBARD.

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GEORGE DIAH ALONZO HEBARD, the sixth son and eighth child of Diah and Sarah Avrill Hebard, was born at Brookfield, Orange county, Vermont, September 6th, 1831. The Hebards had all been tillers of the soil as far back as the sixth generation from the subject of this memoir, and his great-great-great grandfather, John Hebard, with two brothers, came from England soon after the Pilgrim Fathers. From these have sprung a multitude of descendants, who are scattered the continent over, spelling their patronymic, for the most part, Hibbard. The names of the immediate line with which we have to do in this sketch, were John Hebard (the great-great-great grandfather, mentioned above), Nathaniel, his son, Zebulon, his grandson, and Zebulon again, his great-grandson, and the grandfather of the subject of this sketch, who settled with his family, at an early day, in the township of Randolph, Orange county, Vermont, on a large farm of several hundred acres. By industry and economy, he was

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