Geology of John Latsch State Park

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JOHN LATSCH State Park, established in 1925, includes an area of 350 acres along the Mississippi River bluffs 14 miles north of Winona. The most conspicuous features in the landscape are the three limestone bluffs and the lake formed by the Whitman Dam and Locks on the river. The bluffs, named Faith, Hope and Charity, rising nearly 450 feet above the highway, form a rim around the upland that borders the valley, and the presence of the dam causes the Mississippi River to flood its old floodplain thus forming a river-lake nearly two miles wide which extends upstream for a number of miles. A foot trail leads to the top of one of the bluffs and a 'lookout' at the end of the trail affords a broad, impressive, panoramic view of the Mississippi Valley.

The high bluffs are the ends of truncated spurs between deep gullies and their crests stand at the same general level as that of the plain which extends westward from the Mississippi Valley. The high vertical cliffs near the crests of the bluffs are composed of the same limestone beds that cap the bluffs from Red Wing southward to the Iowa-Minnesota state line. These approximately horizontal beds once extended across the river into Wisconsin and across the gullies in the Park from one side to the other. The present topography has been formed from a plain which has been deeply dissected by stream erosion.

The stream responsible for the present relief of more than 500 feet was the glacial Mississippi River that received tremendous volumes of water from Glacial Lake Duluth through the St. Croix Valley, from Lake Agassiz through Glacial River Warren in the Minnesota River Valley and from several smaller glacial lakes along the headwaters of the Mississippi River in north-central Minnesota. When these bodies of water were draining southward through the Mississippi Valley, the river cut a channel much deeper than that of the present stream. Drilling in the valley at the Dam and Locks has demonstrated that the floor of the stream was at one time more than 150 feet lower than at present. In other words, more than 150 feet of silt, sand and gravel have been deposited on the stream bed during post-glacial time.

The rocks exposed in and near the Park are of Cambrian and Ordovocian

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age. The oldest is the upper part of the Dresbach sandstone and this is overlain by the Ironton member of the Franconia formation. The contact between these two units is exposed in the Park and also along Highway 61 a short distance south of the Park. Most of the park area is covered with talus from the wall of the valley, but the upper part of the Jordon sandstone is exposed at the base of the limestone cliffs which cap the bluffs. This limestone is the Oneota formation which is a highly dolomitic (calcium and magnesium carbonate) rock locally eroded into a variety of forms by solution along fractures and irregular channels. Several of the massive beds in the lower part of the formation have become very porous with an open-spongy texture. This is a result of chemical weathering brought about by the difference in solubility of calcium and magnesium carbonates. The calcium carbonate is the more soluble and has been dissolved and carried away in solution, leaving a porous mass high in magnesium carbonate. Boulders of such weathered rock are numerous in many of the gullies along the Mississippi Valley. Its rustic appearance and its many pores are desirable characteristics in construction of rock gardens. Many landscape architects, both amateur and professional, have used it for that purpose.

A short distance back from the upper margin of the cliffs, the limestone is covered with a mantle of fine siliceous silt which was transported by the wind and deposited as dust. This material, known as loess, was washed from the debris in the glacier as the ice melted. After it had dried, it was whipped into the air by the wind and carried far beyond the margin of the ice sheet. Loess is non-stratified yellowish silt, intermediate in texture between clay and sand, and is composed of a variety of minerals including quartz, feldspar, hornblende, calcite, and many others. When exposed in the banks of gullies or in road cuts, the loess reveals the curious property of standing in vertical cliffs even though the material is not cemented together. Apparently the grains are sufficiently angular to interlock rather than roll or slide over each other as most sand grains do.

Several springs issue from the base of the talus slopes in the park. They represent the discharge of water that percolated down into the porous sandstone strata from higher levels and then flowed laterally toward the valley of the Mississippi River. The spring water is clear and cool and adds to the enjoyment of the local citizens and tourists who visit the park.