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BRIEF DESCRIPTION OF THE GEOLOGY OF THE COON VALLEY AREA

by

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Open-File Report 40-3
7 p.

[1940?]

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GEOLOGIC SECTION IN THE VICINITY OF COON VALLEY, WISCONSIN

	Recent	1'-35'	Recent residual and transported soils mixed with dolomite, chert and sandstone rubble, forming a mantle of variable thickness on upland and slope areas.
	Pleistocene	0-15'	Loess, extensively spread over area during period immediately following the glacial epoch (possibly also to some extent during the epoch), but now somewhat less extensive because of partial or complete removal by erosion.
	Pleistocene	20'+	Lacustrine deposits, laid down in dendritic Pleistocene lakes formed when the Mississippi River was dammed during the last glacial recession. The deposits are below 710-700 and are well exhibited in the larger valleys as prominent terrace segments. The material is largely silt, clay and sand.
ORDOVICIAN	St. Peter	5'-40'+	ST. PETER SANDSTONE---Massive, cross-laminated, fine to coarse-grained, quartz sandstone, unconformably overlying the Lower Magnesian dolomite. Outcrops chiefly as crags and pinnacles, and in some localities lies in old pre-St. Peter valleys cut into the Lower Magnesian sequence.
ORDOVICIAN	Lower Magnesian	15'+	NEW RICHMOND--SHAKOPEE SEQUENCE---Poorly sorted sandstone, greenish shales, and algal dolomites comprising the top members of the Lower Magnesian. Poorly exposed at one locality, but apparently present elsewhere as indicated by local abundance of chert-speckled sandstone and spongy chert.
ORDOVICIAN	Lower Magnesian	150+	ONEOTA DOLOMITE---Basal member of the Lower Magnesian, consisting of a series of dolomites of variable lithology. The sequence may be divided in descending order into the following: Crag or ledge forming unit; Quarry beds: Basal or sub-Quarry beds; and Transition beds. The contact with the underlying Jordan sandstone is difficult to determine exactly.
CAMBRIAN	Trempealeau	75'+	JORDAN SANDSTONE---Massive or laminated, fine to coarse-grained, quartz sandstone, prominently exposed in many crags, ledges and cliffs throughout the area.
CAMBRIAN	Trempealeau	48'+	LODI SHALE AND SANDSTONE---A sequence of fine-grained quartz sandstones and calcareous siltstones, rarely exposed.
CAMBRIAN	Trempealeau	7'+	ST. LAWRENCE DOLOMITE---A thin glauconitic, conglomeratic dolomite, rarely exposed.
CAMBRIAN	Franconia	190'+	FRANCONIA FORMATION---A sequence of glauconitic sandstones, arenaceous dolomites, and calcareous siltstones. Three upper members not well enough exposed to be determined exactly; basal Ironton member conspicuous in area because it lies near or at the top of prominent benches developed on the Franconia sequence.
CAMBRIAN	Dresbach	50'+	DRESBACH FORMATION---Only the upper member, the Galesville sandstone, was given any consideration. It outcrops extensively in the area in low bluffs along the major valleys.

Dresbach formation. The lowest rock exposed in the area, so far as observations were made, is the massive, cross-laminated, fine to coarse-grained Galesville sandstone member of the Dresbach formation. This sandstone is over 50 feet thick and is commonly exposed in cliffed terminations of prominent rock benches which are capped by the resistant Ironton sandstone member of the Franconia formation. Its top is frequently marked by springs. The only use to which the stone has been put, apparently, is as a source of sand for masonry work.

Franconia Formation. This sequence of glauconitic sandstones and shales, and quartz sandstones is exposed at numerous points throughout the area, though exposures are always meager unless they happen to be in shale pits. The total thickness, as determined approximately from a traverse up a spur in the NE$\frac{1}{4}$ NE$\frac{1}{4}$ Sec. 7, T.14N.,R.5W. (Geologic notes, pp. 348-353), is 190 feet. At the base is the Ironton sandstone, which is a firmly cemented, fossiliferous, fine to coarse-grained sandstone. It is at most 46$\frac{1}{2}$ feet thick, according to recent investigations, but more often is somewhat thinner. Because of its excellent cementation it nearly always is responsible for a rock bench. The shales and glauconitic sandstones of the Franconia have been quarried at some places for use as surfacing for town roads, and the material has proved satisfactory.

Trempealeau Formation. The St. Lawrence and Lodi are almost never exposed in the area, being concealed under a bench which is frequently developed on them. The Jordan sandstone, on the other hand, is commonly exposed in the many crags and cliffs of the area. In these the massive and laminated units form the foundation upon which rest the Transition beds of the Lower Magnesian. The top of the Jordan is taken where the first prominent dolomite influence comes in. The problem of the Cambro-Ordovician contact will be discussed again later. Judging from what few observations were made, little use has been made so far of any of the rocks included in the Trempealeau.

Lower Magnesian Dolomite Formation. In the area investigated, the Lower Magnesian consists of a sequence of dolomite units which retain recognizable lithological characteristics and thickness everywhere they were seen. In ascending order it is convenient to divide the sequence into the following units--Transition beds, Basal or Sub-quarry beds, Quarry beds, Upper Quarry beds, and Ledge forming or Crag forming beds. These units will be discussed in the order given.

Transition Beds

The basal unit of the Lower Magnesian dolomite is called the Transition beds because the included strata are transitional from the Jordan sandstone below to the dense dolomites of the Basal beds above. The sequence consists of thin quartz sandstones, thin dense and fine-granular dolomites, algal layers, green speckled beds, dolomite-bound quartz sandstones and green shales. There is great litholo gical variation in the sequence from place to place, but the thickness remains relatively constant for the area, varying from 25 to 33 feet. The base of the unit is taken where the first prominent dolomite influence appears above the laminated and concretionary Jordan sandstone, and the top where the amount of clastic quartz becomes negligible. The rock in the unit frequently weathers to a horizontally ribbed condition because of the differential resistance of the individual layers. The sequence is too variable and of too poor quality to be of any use for road materials purposes. Localities where the unit may be seen well developed are listed under part 4, "Brief Geolggical Report on the Colored Geological Map of Vernon County".

Basal or Sub-quarry Beds

In nearly all sections the Transition beds are succeeded upward by a sequence of dense, fairly hard and tough, fine-grained or granular dolomites, which tend to become somewhat thin bedded. The lower part of the sequence is often rather weak and cherty. In the large road cut along the relocation of USH 14, east of Coon Valley, these beds are rotten and cherty. The upper part of the unit consists of hard and tough dolomite, in thin layers separated by thin films and lenticular bands of greenish sandy shale. There is more or less of clastic quartz throughout the unit but little in the dense dolomite layers. The thickness is rather uniform, ranging from about 18 feet to as much as 25 feet. In some instances these beds have been quarried for both building stone, for which purpose they are poorly suited, and for road materials, for which they are excellently suited. Good development of the upper hard beds of the sequence may be seen at Locations 30 and 74.

Quarry Beds

Dozens of small quarries, seldom over two hundred yards in volume, have been opened in the past in a 15-20 foot unit which is called the Quarry beds for obvious reasons. The rock is buff, fairly soft and weak, granular, even textured, massive dolomite, tending to become thin bedded in the upper portion and grading in transition into the overlying Upper Quarry beds. The rock is quite homogeneous and can be obtained in large blocks which are readily shaped because of the granular nature of the stone. Because of its nature the rock has been widely used for dimension stone, and has also been burned for lime. It is too soft for use on roads because it powders readily, but the quality which renders it unfit for roads makes it ideal for agricultural limestone. Attention should be called to the fact, however, that in nearly all exposures there is a considerable amount of clastic quartz, and this will cut down the precentage shown by an analysis. This sand will not affect the action of the dolomite to any extent.

Upper Quarry Beds

Immediately overlying the massive, granular Quarry beds is a 10-15 foot sequence of gray to buff, fairly hard and tough, fine-granular, fairly thin bedded dolomite layers which grade downward into typical quarry rock. This sequence is the cap rock in many of the small quarries from which the granular rock has been excavated. It is overlaid by a heavy algal bed which marks the base of the thick ledge forming unit. The strata in this unit are of high enough quality to be used as surfacing for town and county roads.

Ledge forming or Crag forming Beds

The most prominent unit of the Lower Magnesian dolomite in the area investigated is the thick, massively bedded, cavernous-weathering, cherty dolomite which comes to the top of the Lower Magnesian sequence and forms crags, pinnacles and cliffs on the noses of many of the narrow spurs throughout the region. The rock is hard and tough in the main but contains many irregular masses of porous granular dolomite which when they weather out cause the rock to have a very cavernous appearance. The unit is known to have a thickness of at least 65 feet and probably is as much as 100 feet in total thickness. It has been used rather extensively as surfacing for state, county, and town roads and has proved very satisfactory. It is the only unit in the Lower Magnesian of the Coon Valley area which is of sufficiently high quality for concrete aggregate. The massive beds of the unit form the caprock which is responsible for the markedly flat-topped plateau developed around 1200 feet in the area. The cherty content takes three forms--kidney-shaped nodules which appear to be primary in origin; irregular ramifications made by incipient silification and having a reticulated structure when weathered free from the dolomite; and silicified algal colonies, some of which resemble a bowl. The last named are frequently included in the rubble but were never seen in place.

New Richmond--Shakopee Sequence. This sequence is exposed at only one place in the area--N$\frac{1}{2}$ N$\frac{1}{2}$ NW$\frac{1}{4}$ of Sec. 26, T.14N.,R.5W. (Negative notes, pp. 236-239), and hence deserves no further discussion. The abundance of spongy chert and chert-speckled sandstone leads to the conclusion that the sequence may once have been widespread over the area.

St. Peter Sandstone. St. Peter sandstone was encountered in several localities in the area investigated. In sections 14, 23, and 26, there area a number of outcrops some of which may be valley fillings. Valley fillings of the sandstone were also found in sections 2, 3, 10, and 11, T.14N.,R.6W., where the formation is as much as 50 feet and more thick. There are good reasons to believe that in pre-St. Peter time there had been enough erosion of the Shakopee and Oneota to have developed considerable relief in the area.

Quaternary Deposits. The more recent deposits in the area include three types of materials, none of which were examined in any detail. First, the conspicuous terrace segments in the major valleys expose sands and silts which were deposited in dendritic lakes during the waning of the Pleistocene glaciers. These lakes were formed when the Mississippi became flooded by the melt waters from the disappearing glacial ice. Second, loess covers much of the area in the form of a mantle of variable thickness depending upon the location. Much of it has been washed off the hillsides and spur noses into the adjacent valleys where it has become mixed with the alluvium. Third, the most recently formed alluvial deposits which are confined to the gullies and ravines. The story of these deposits is closely linked with the whole problem of soil erosion, and their history will shed much light on certain phases of the erosion problem.