Living on the Ledge

Life in Eastern Wisconsin

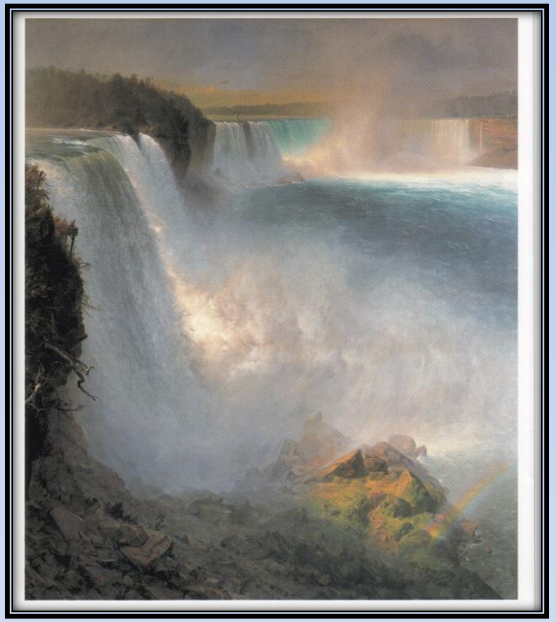
Outline

- Location of Niagara Escarpment Eastern U.S.
- General geology
- Locations of the escarpment in Wisconsin
- Neda Iron mine and early geologists
- Silurian Dolostone of Waukesha Co.- Lannon Stone , past and present quarries
- The Great Lakes Watershed

Niagara Falls NY – Rock falls caused by undercutting: notice the pile of broken rock at base of American falls.

Top Layer is equivalent to Waukesha/ Lannon Stone

You may have see Niagara Falls locally if you visited the Hudson River painters exhibit at MAM.

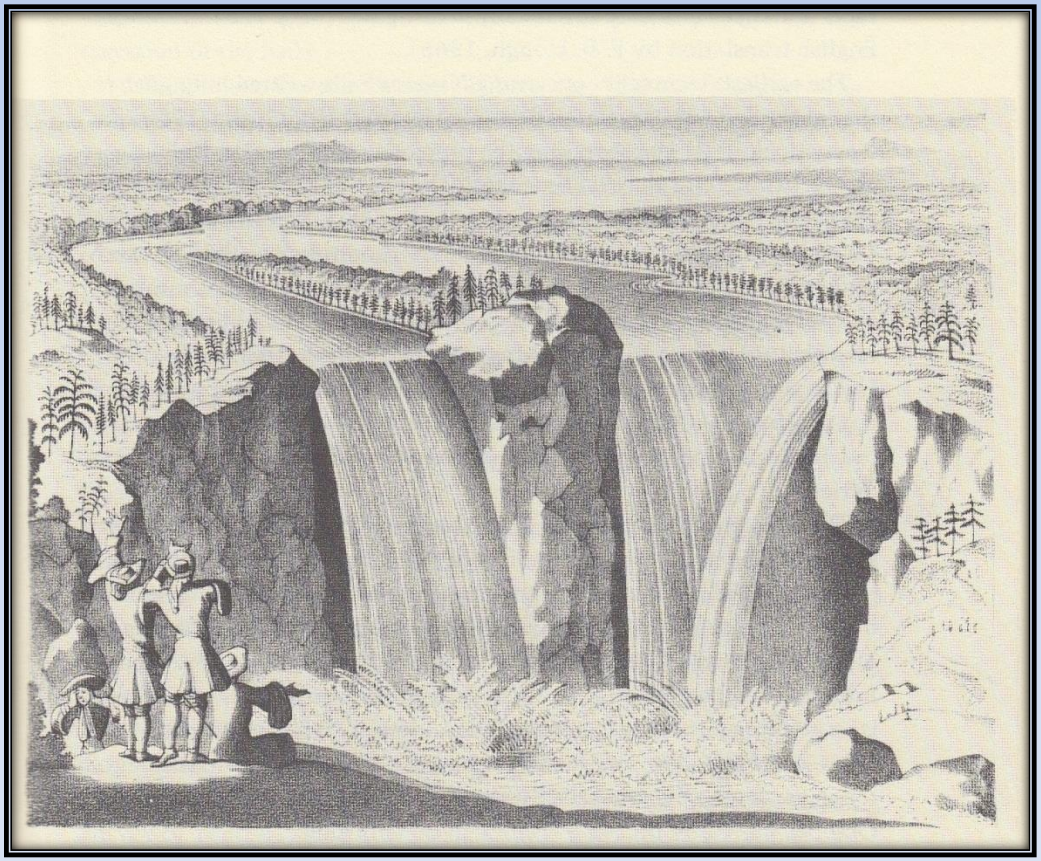


Fredrick Church 1867

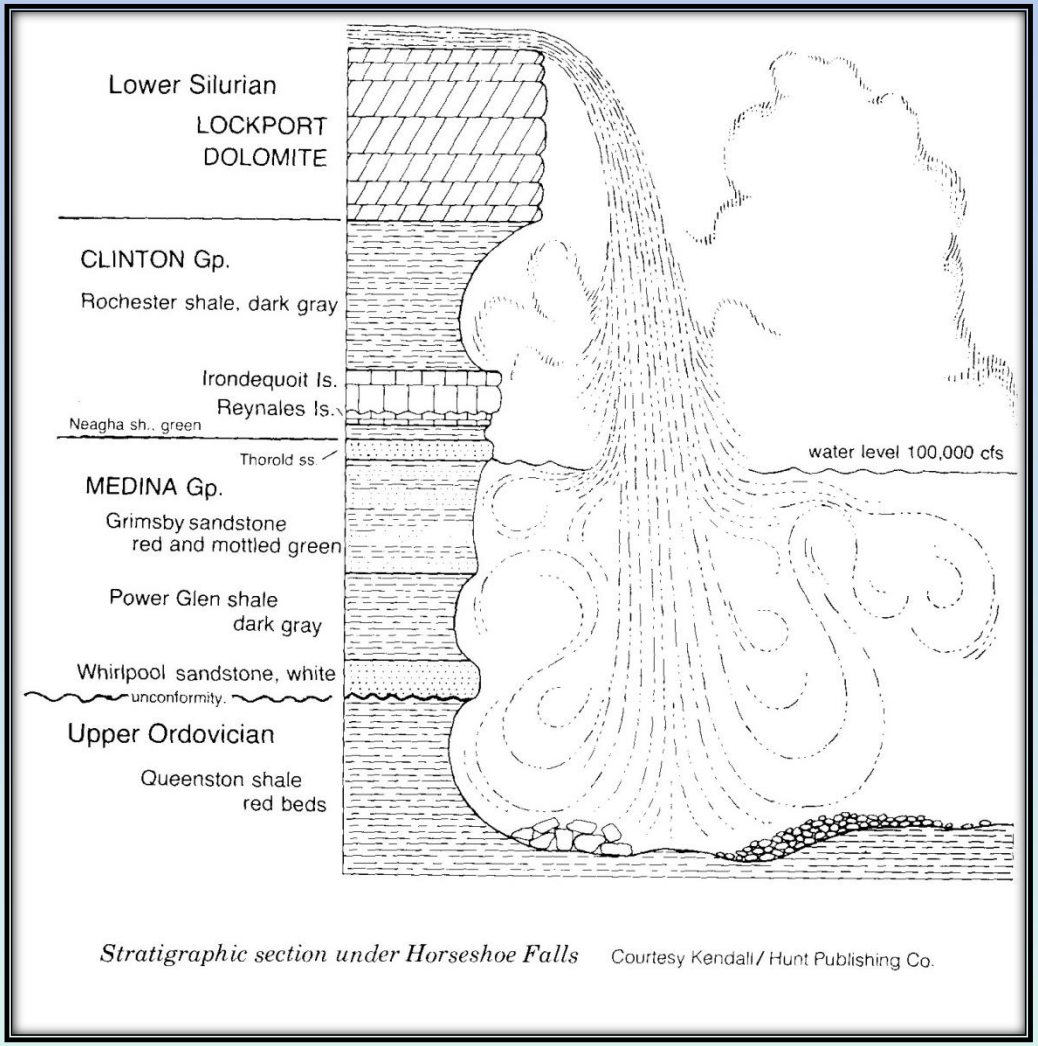
Fredrick Church 1857

Or you can see a bit of the Ledge as a table top while meditating with a bottle of Silurian Stout in my yard

Fr. Louis Hennepin
sketch of Niagara Falls 1698

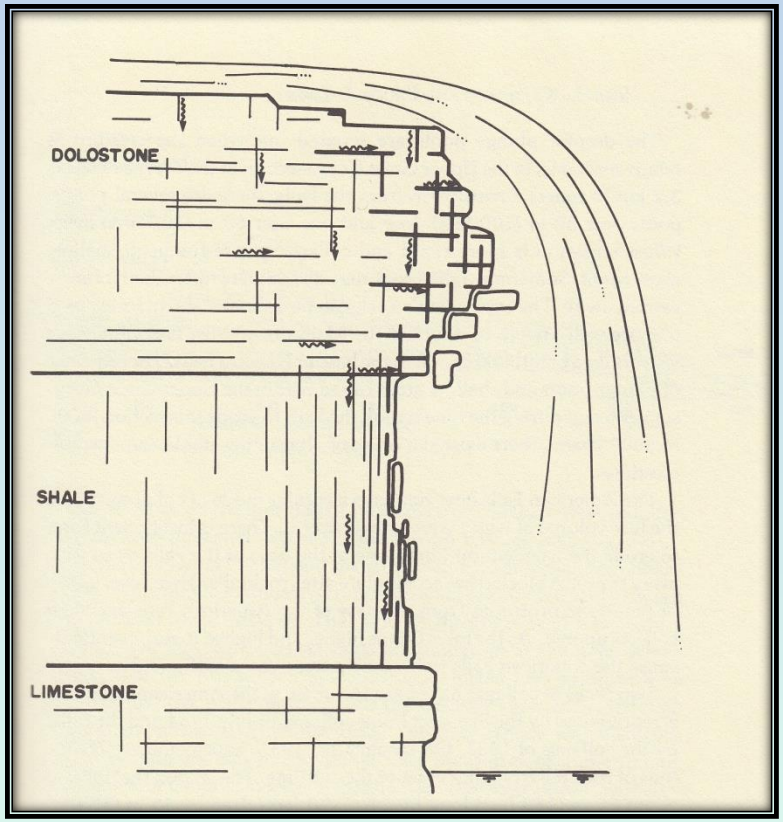


Niagara Falls - the equivalent stratigraphic section in N.Y. from which the correlation of the Neda to the Clinton Iron was incorrectly made



Stratigraphic section under Horseshoe Falls Courtesy Kendall/ Hunt Publishing Co.

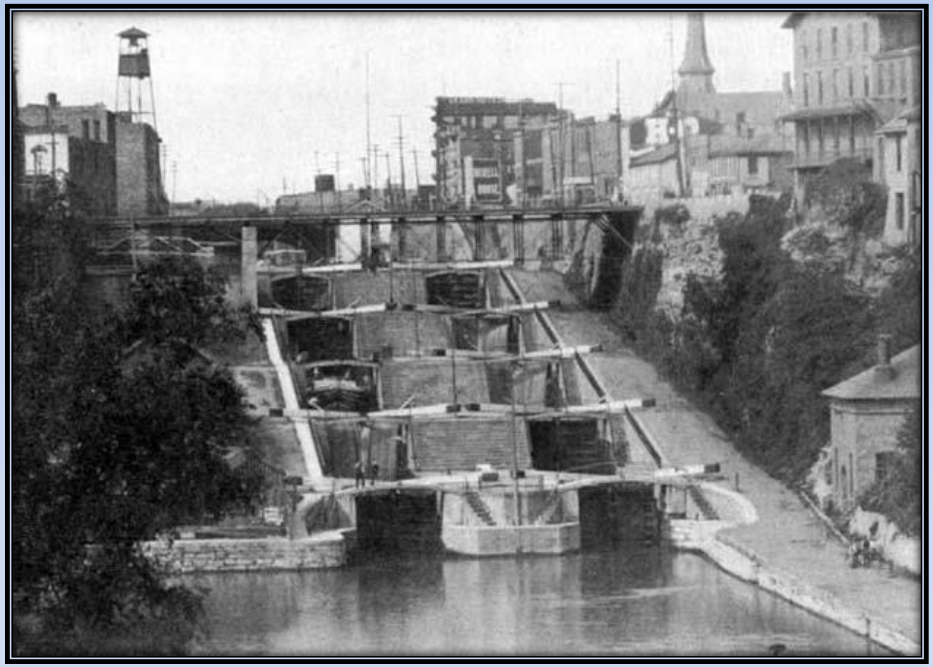
Waterfalls associated with the Niagara Escarpment all follow this pattern- resistant cap rock and soft shale underneath

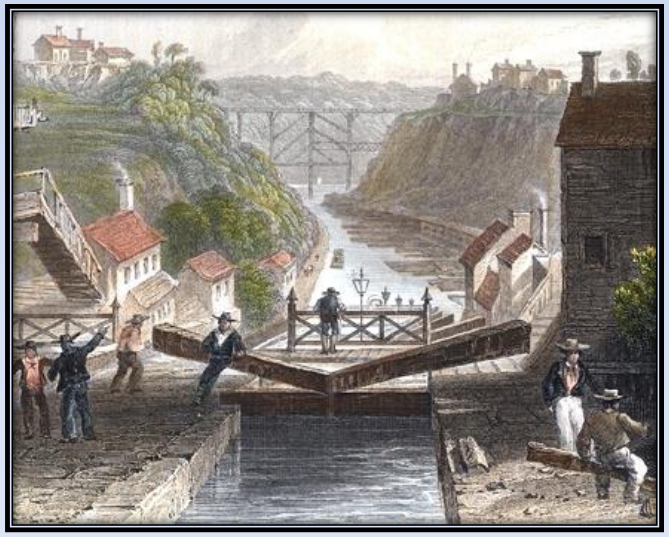


The “Ledge” of Western NY

The Niagara Escarpment

Erie Canal locks at Lockport NY





The Erie Canal that followed the lowland until it reached the Niagara Escarpment

The names of Silurian rocks in the Midwestern states change with location and sometimes with authors!

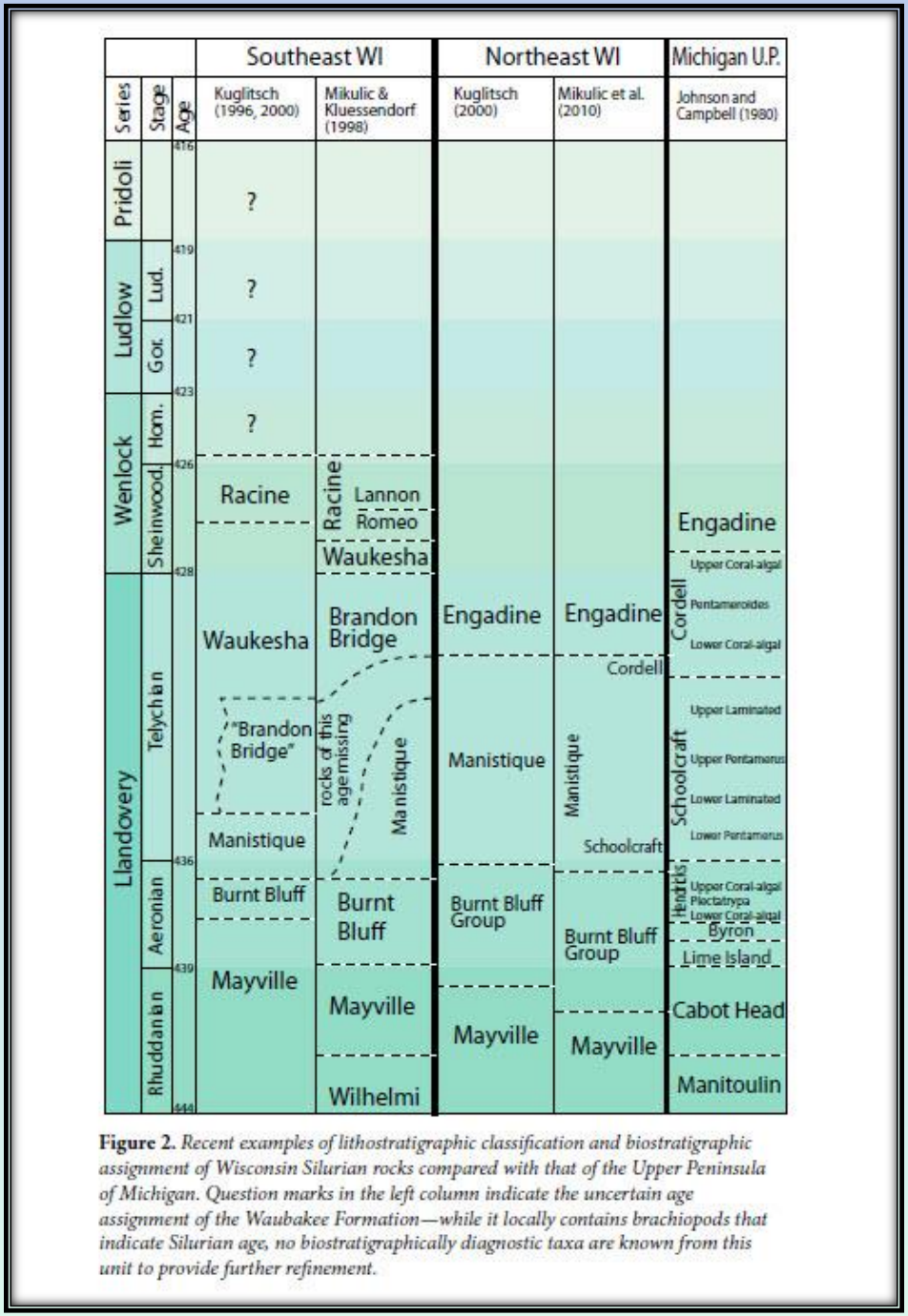
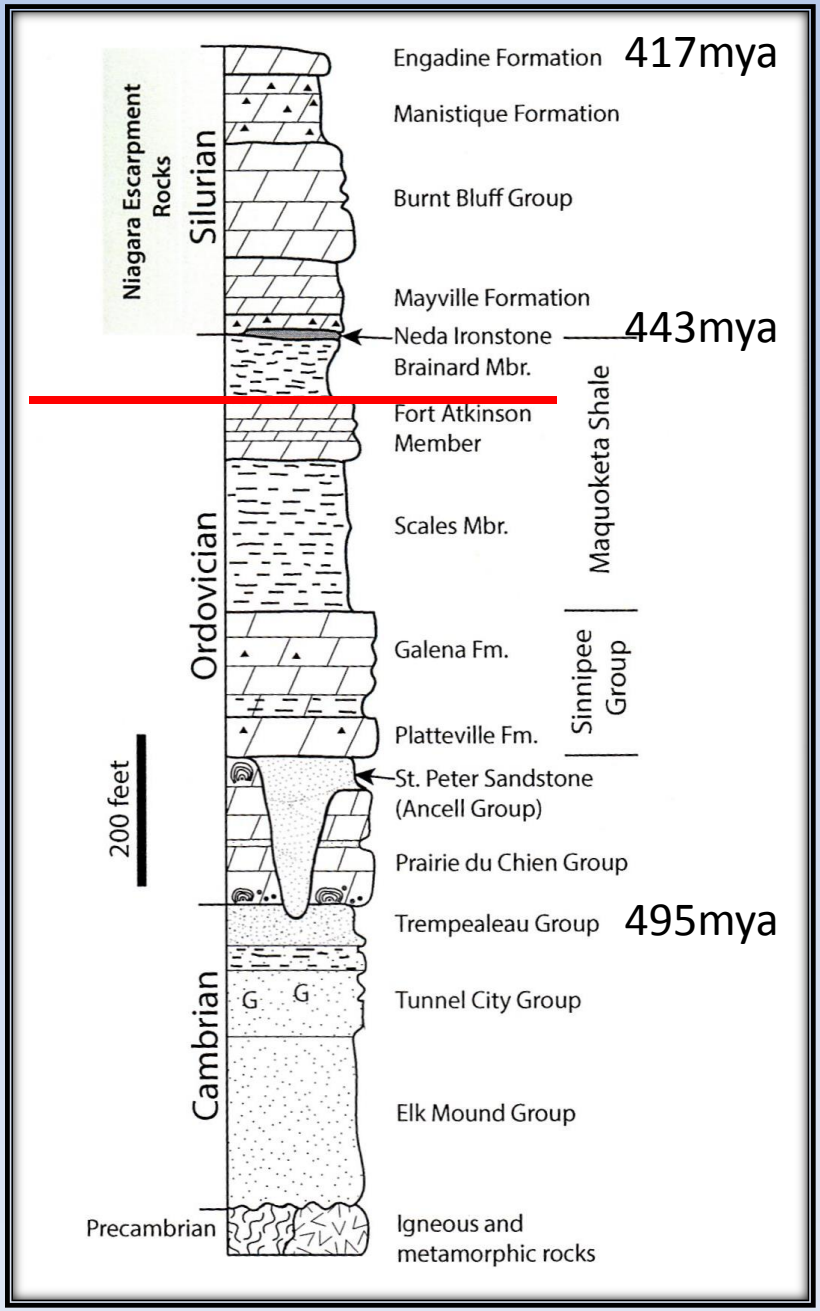
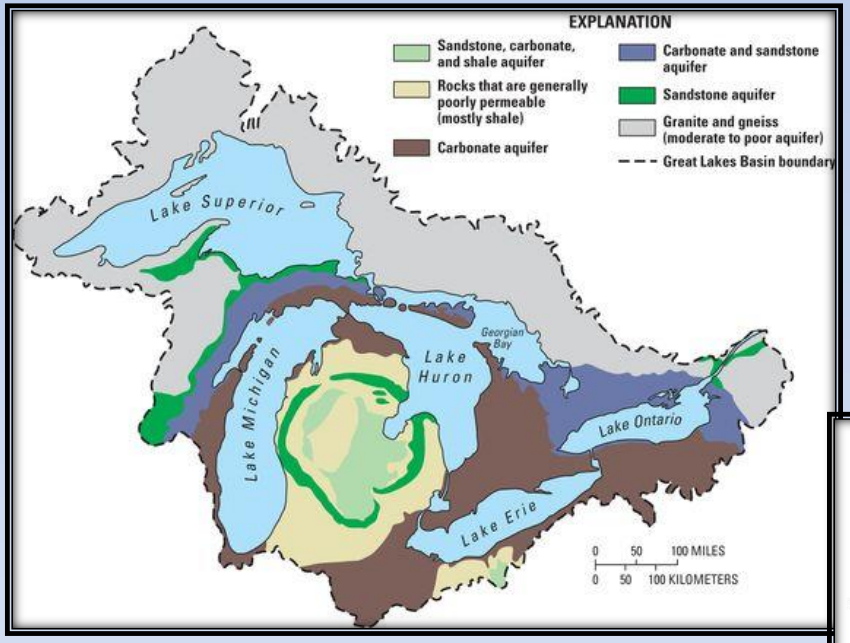


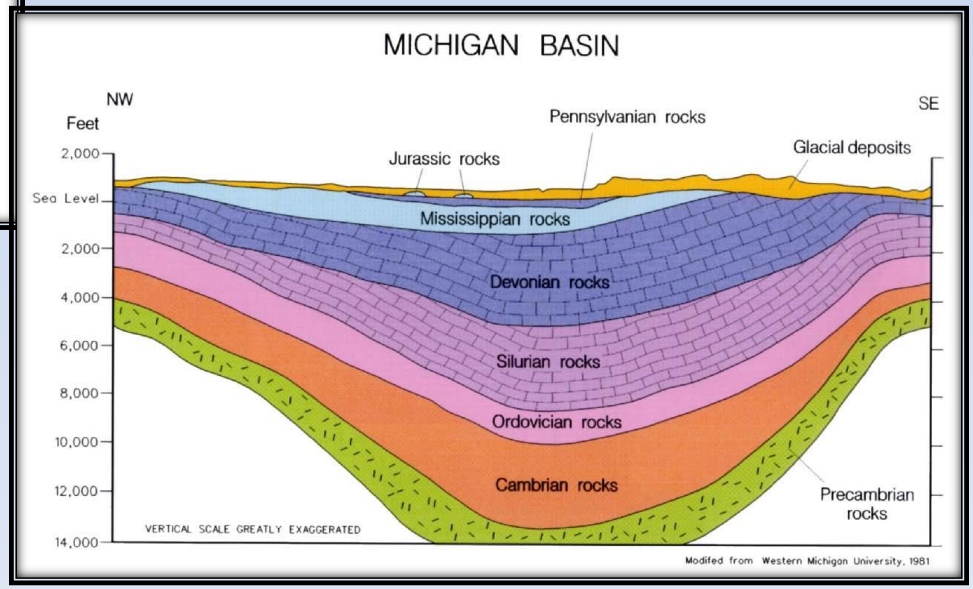
Figure 2. *Recent examples of lithostratigraphic classification and biostratigraphic assignment of Wisconsin Silurian rocks compared with that of the Upper Peninsula of Michigan. Question marks in the left column indicate the uncertain age assignment of the Waubakee Formation—while it locally contains brachiopods that indicate Silurian age, no biostratigraphically diagnostic taxa are known from this unit to provide further refinement.*

Stratigraphic column for rocks of Eastern Wisconsin. Note the Niagara Escarpment rocks at the top. The Escarpment is the result of resistant dolostone cap rock and soft shale rock below



The Michigan Basin- Showing outcrops of Silurian rocks





BEDROCK GEOLOGY OF WISCONSIN

UNIVERSITY OF WISCONSIN–EXTENSION
Geological and Natural History Survey

APRIL 1981
REVISED 2005

EXPLANATION

DEVONIAN

D — dolomite and shale

SILURIAN

Sd — dolomite

ORDOVICIAN

Om — Maquoketa Formation—shale and dolomite

Os — Sinnipee Group—dolomite with some limestone and shale

Osp — St. Peter Formation—sandstone with some limestone shale and conglomerate

Opc — Prairie du Chien Group—dolomite with some sandstone and shale

CAMBRIAN

€ — sandstone with some dolomite and shale

MIDDLE PROTEROZOIC

ss, v, t — Keweenawan rock—
ss, sandstone
v, basaltic to rhyolitic lava flows
t, gabbroic, anorthositic and granitic rock

g, a — Wolf River rock—
g, rapakivi granite, granite, and syenite
a, anorthosite and gabbro

LOWER PROTEROZOIC

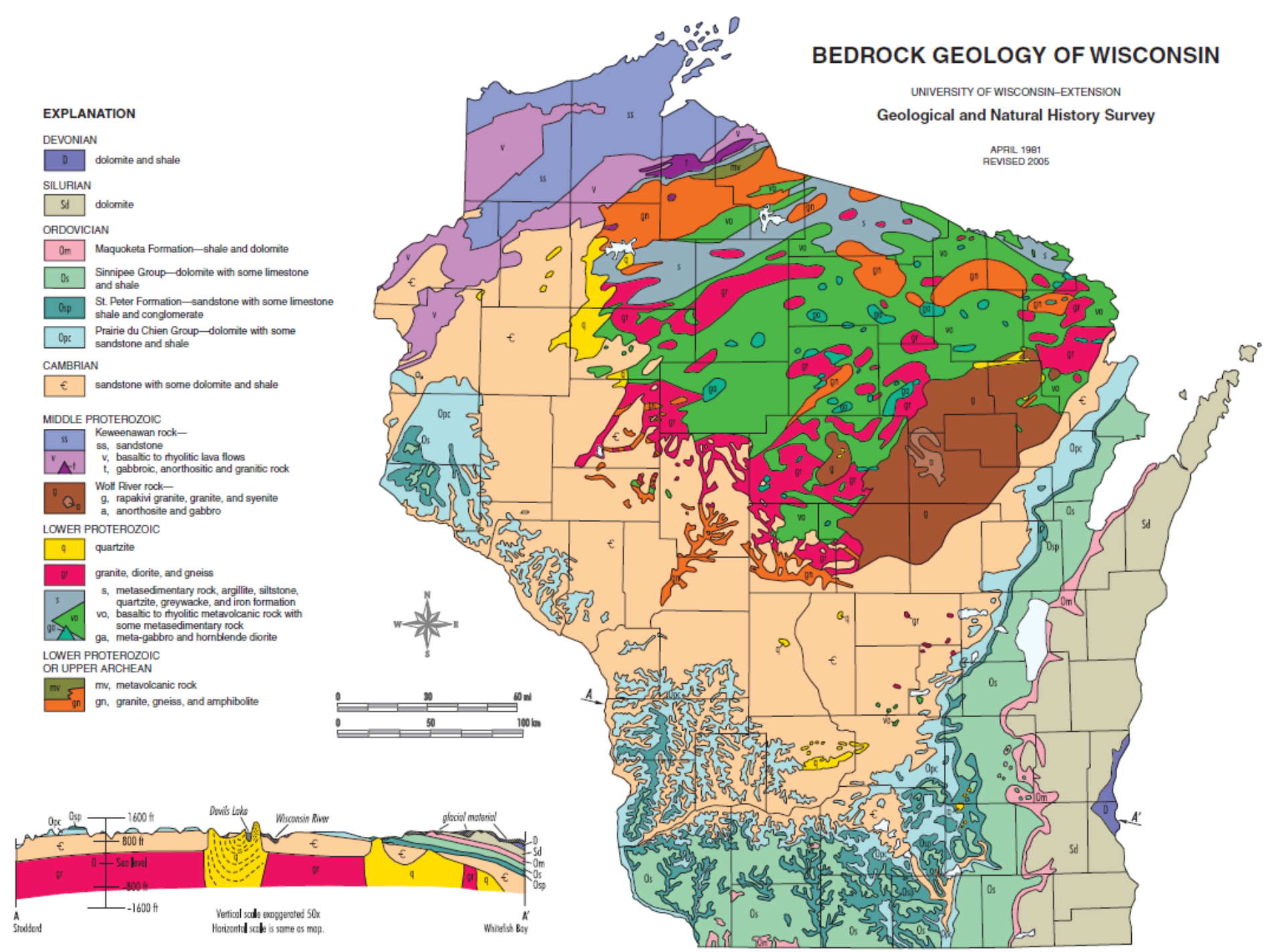
q — quartzite

gr — granite, diorite, and gneiss

s, vo, ga — s, metasedimentary rock, argillite, siltstone, quartzite, greywacke, and iron formation
vo, basaltic to rhyolitic metavolcanic rock with some metasedimentary rock
ga, meta-gabbro and hornblende diorite

LOWER PROTEROZOIC OR UPPER ARCHEAN

mv, gn — mv, metavolcanic rock
gn, granite, gneiss, and amphibolite



Location of major Silurian Outcrops in Eastern Wisconsin

Peninsula Park from both top and bottom

Ephraim

Sven’s Overlook

Door County – Fish Creek
Niagara Escarpment in the background

Door Co Shoreline

Cave Point near Jacksonport - Door Co

Cave Point - 2013

Cave Point - Door Co - 2013
during low lake levels

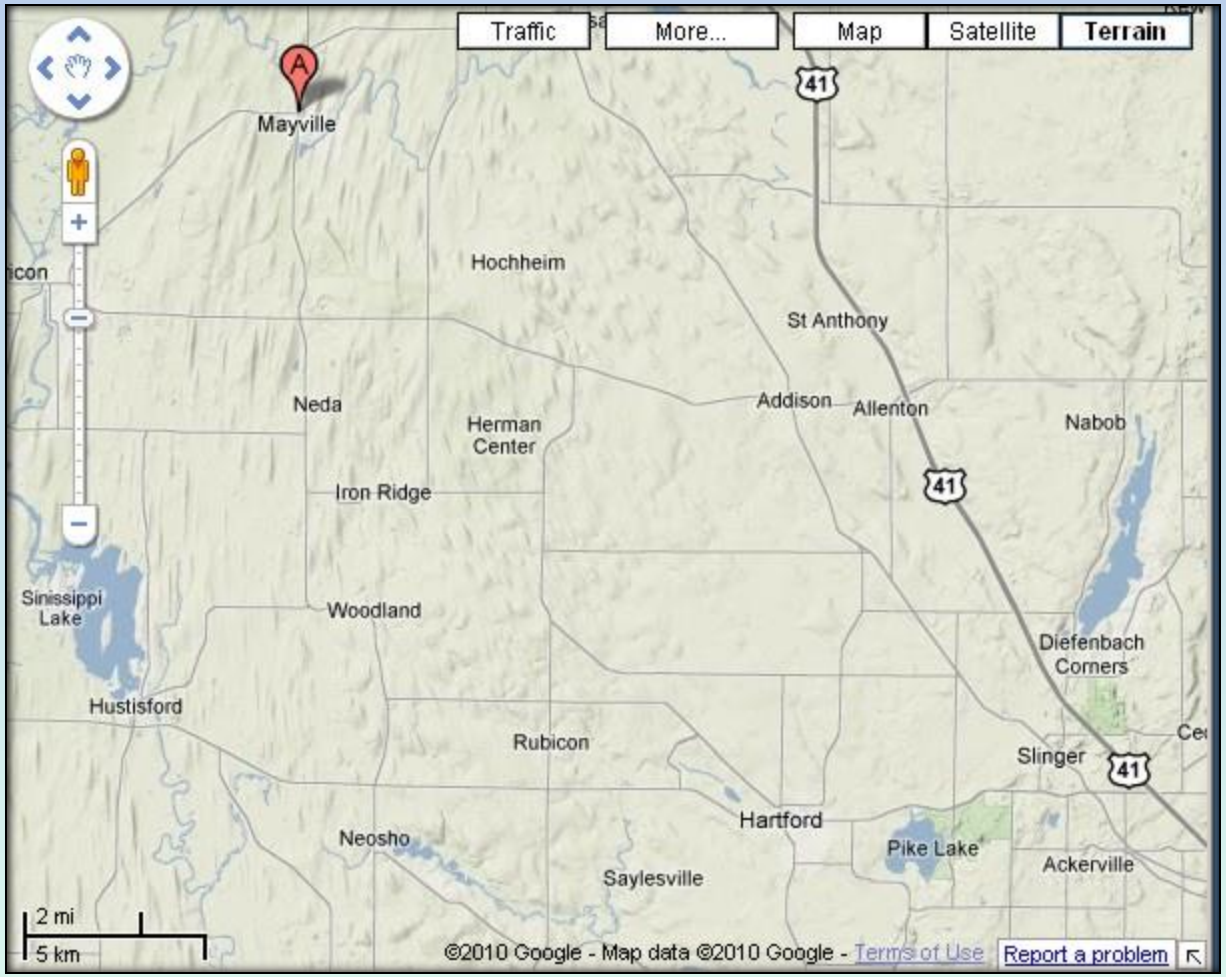
Jean Nicolet 1634 overlooking Green Bay WI while standing on the Ledge

Wequiock Falls
near
Green Bay WI.
Cap rock is
Niagara Dolomite,
underneath is
Maquoketa Shale:
The water drips
back under the cap
rock, erodes the
soft shale

Wequiock Falls – UWM students tempting fate

Views of the Ledge near Lomira Wi

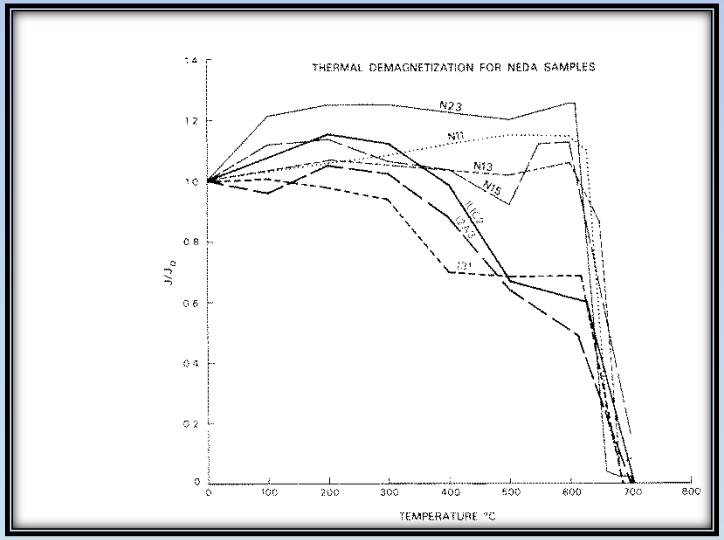
Mayville-Neda- Iron Ridge



UWM Geology Class at Neda – looking at one of the old mine entrances - Mayville Dolomite

Neda Ore at the base of the Mayville Dolomite

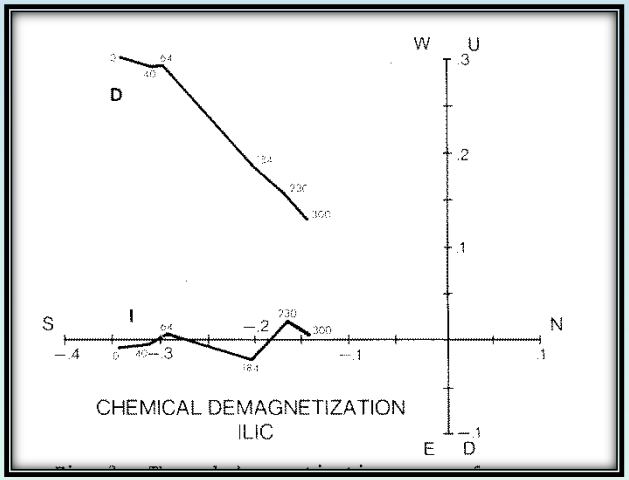
Paleomagnetism of Neda Formation



Magnetism carried by hematite,
rock is mostly goethite

Pole position is Permian not Ordovician

Dec 162, Inc -6.7, VGP S46.8, W52



Founder of Mayville and his son

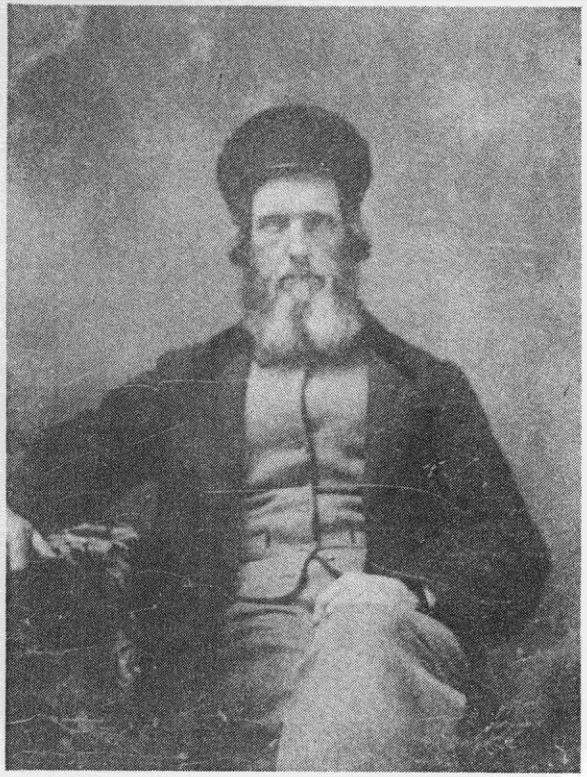


Figure 24: **CHESTER MAY**
[1791 - 1849] Father of Eli P. May
Discoverer of Wisconsin iron ore in 1845.

Figure 25: **ELI P. MAY**
[1825 - 1909] Youngest son of Chester May
Dug first iron ore, took it to Indiana in 1846.

Milwaukee founder Byron Kilbourn was also in this mining business and responsible for bringing Increase Lapham to Wisconsin initially as a surveyor in the Milwaukee area

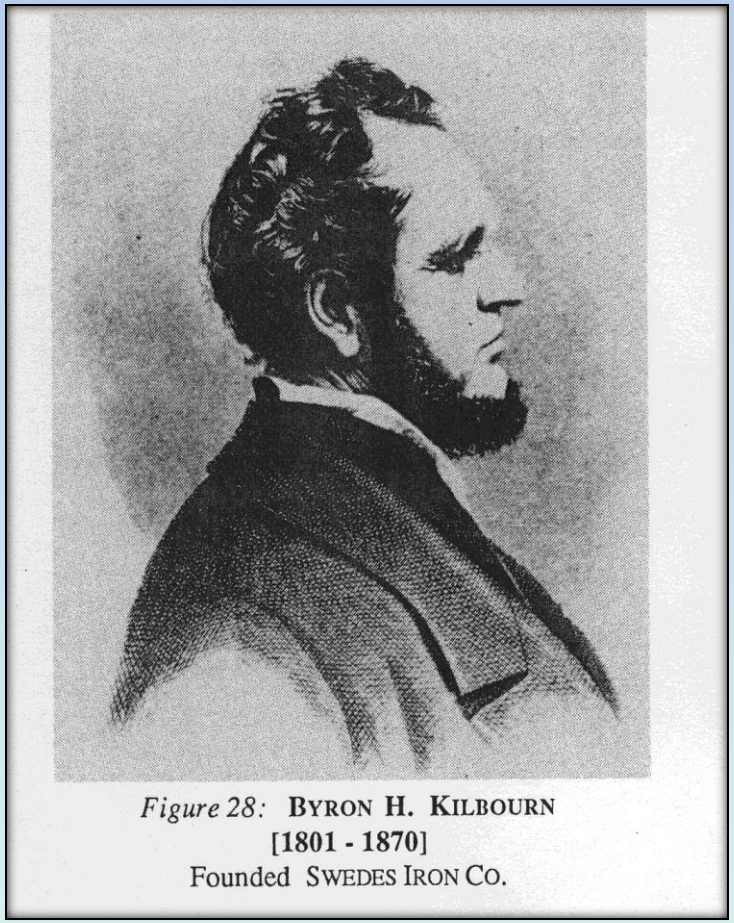
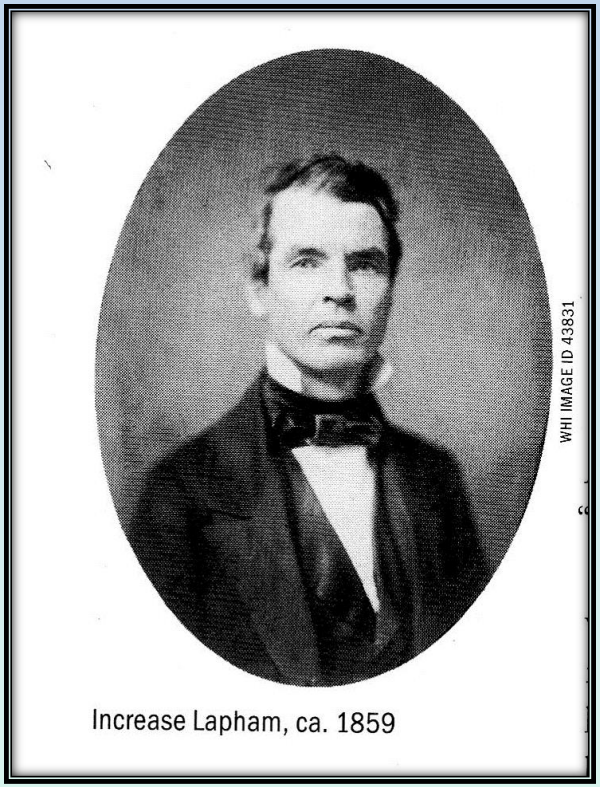
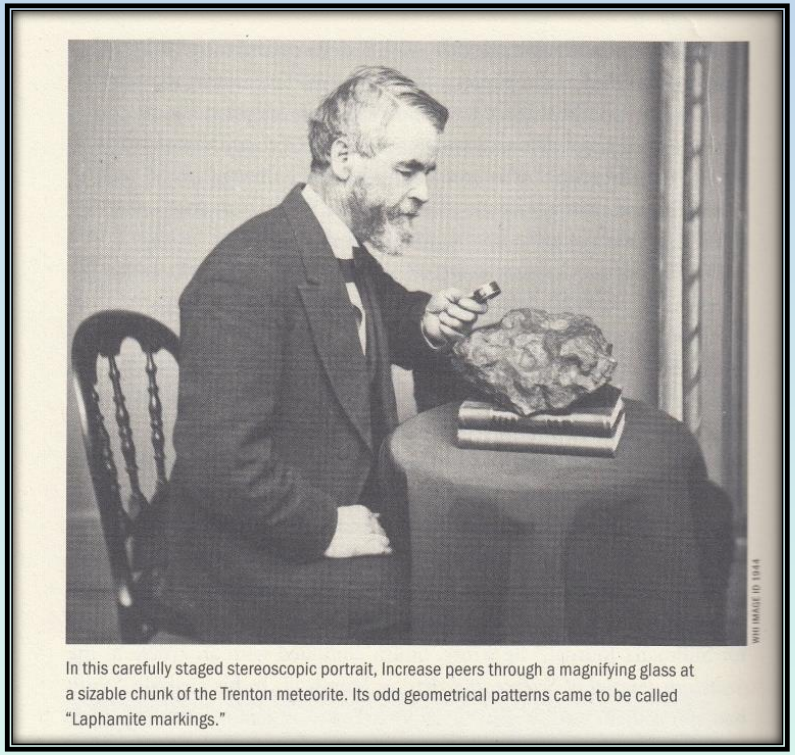


Figure 28: BYRON H. KILBOURN
[1801 - 1870]
Founded SWEDES IRON CO.

Increase Lapham
1811 to 1875
State Geologist that directed the 4 volume Geology of Wisconsin 1879 and started the National Weather Bureau



Increase Lapham, ca. 1859


In this carefully staged stereoscopic portrait, Increase peers through a magnifying glass at a sizable chunk of the Trenton meteorite. Its odd geometrical patterns came to be called "Laphamite markings."

Working the mine (1910)

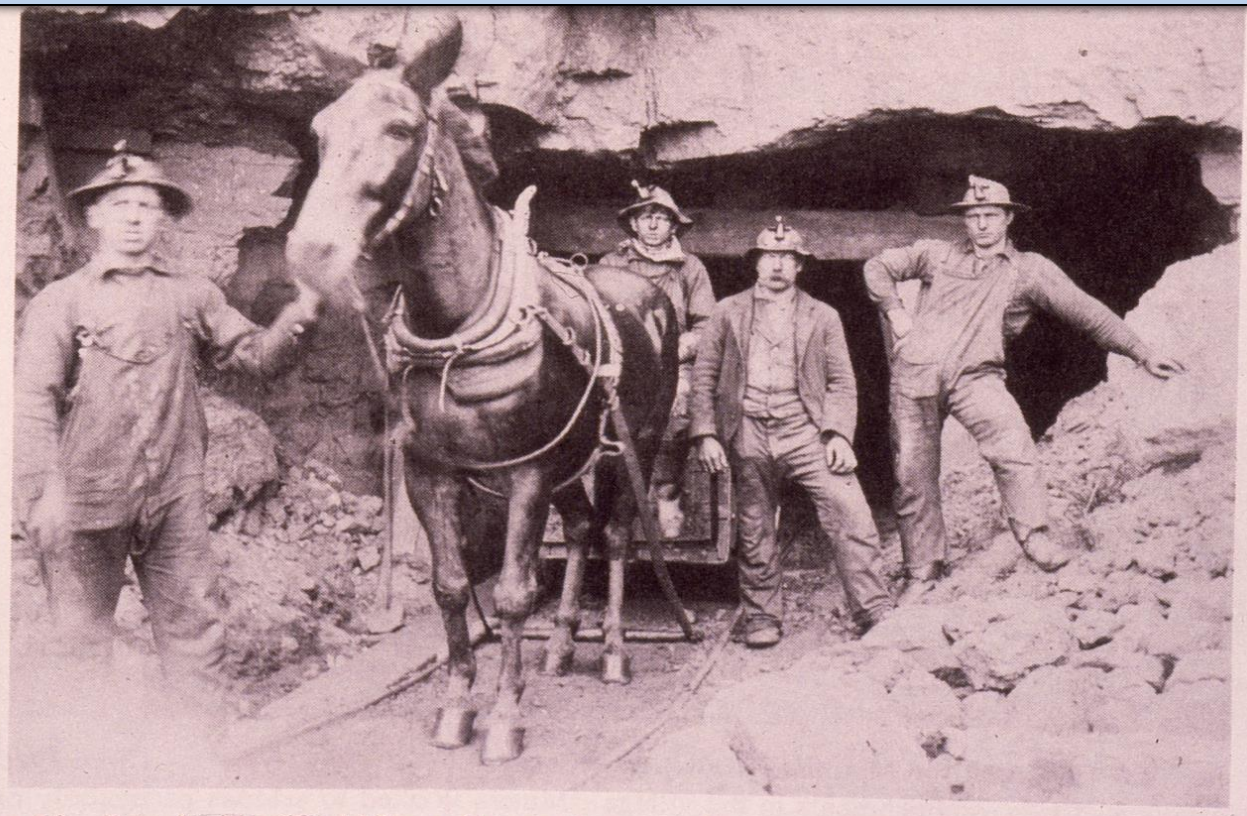


Figure 68: Four Unidentified Miners Emerge from the IRON RIDGE MINE *- Circa 1910*
Their trustworthy mule pulls a carload of iron ore. On the men's hats, notice the carbide lamps which provided a miner's only illumination while he worked in the mine.

Mining the open face at Neda

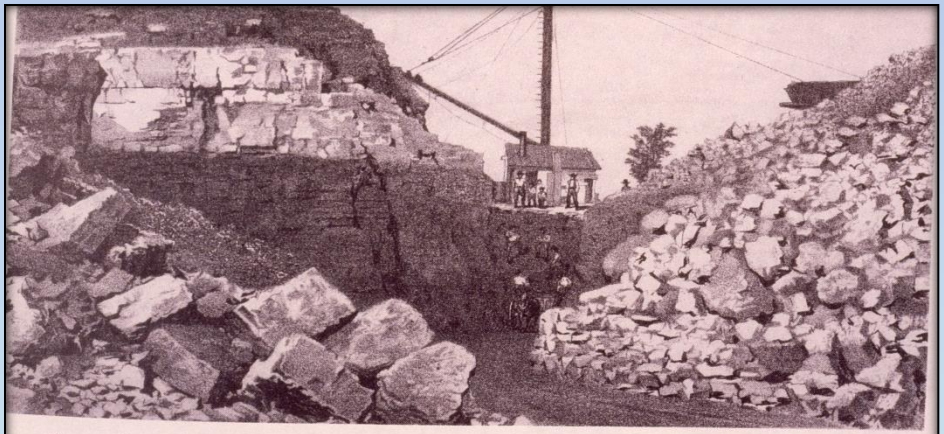


Figure 60: The IRON RIDGE MINE *- Circa 1873*
This mine was located at [Old] Iron Ridge, now Neda, Wisconsin. For a time, the community was also called Iron Mountain. Mining began in this area in 1849, as an open pit operation. Then the SWEDES IRON CO. opened the IRON RIDGE MINE in 1864. It was operated by the OLIVER IRON MINING CO. from 1902-1914. A total of at least 684,734 tons of ore were removed from the IRON RIDGE MINE between 1849 and 1914. *Records from early years are lost, so the actual total would be slightly higher.*

1871

1911

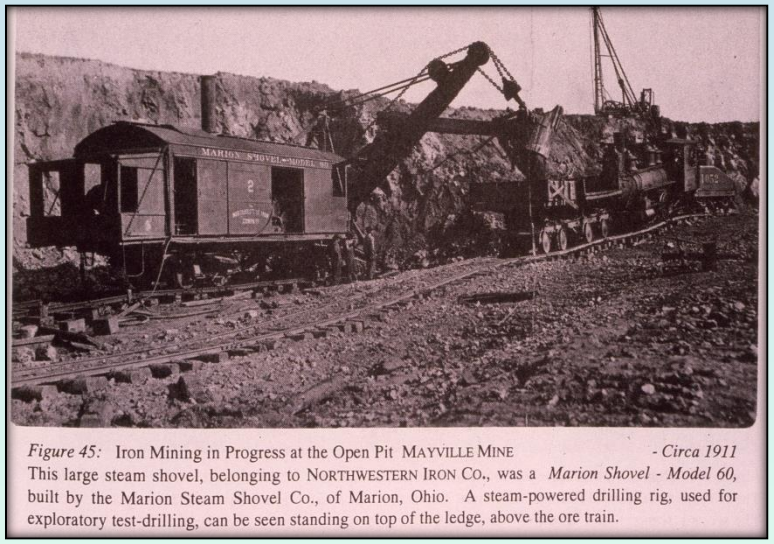
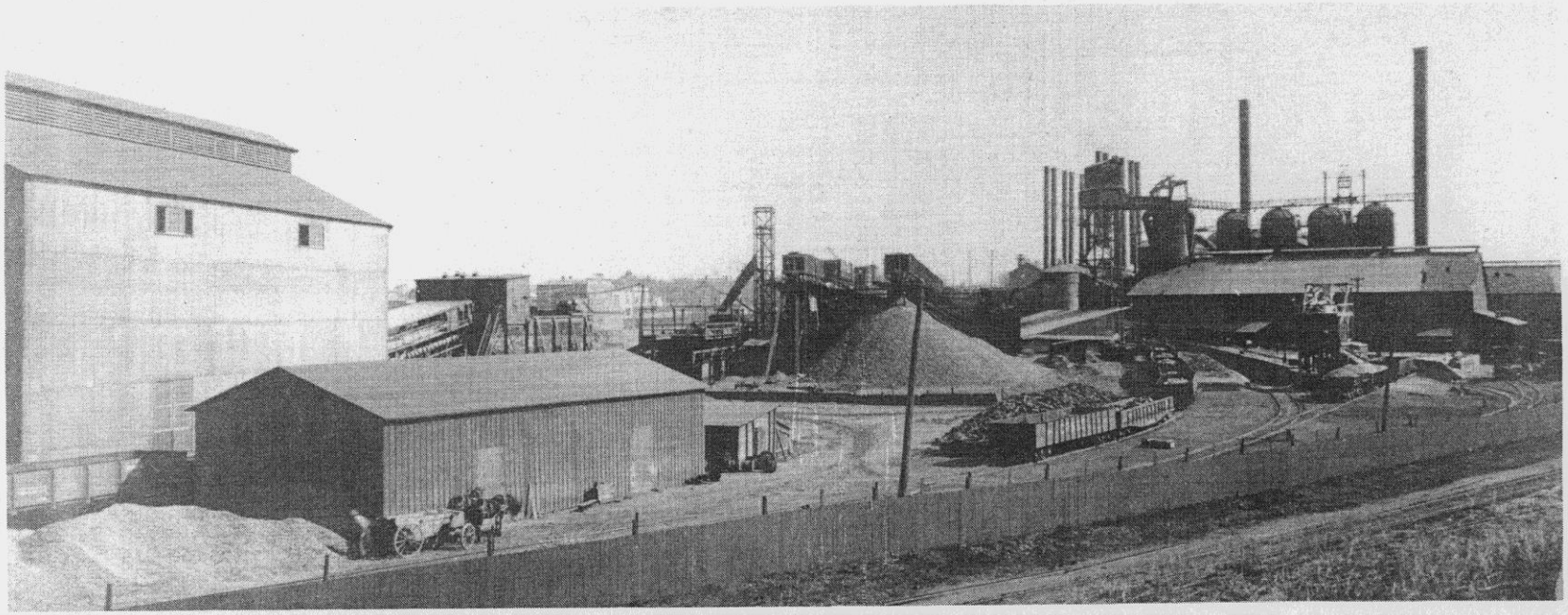


Figure 45: Iron Mining in Progress at the Open Pit MAYVILLE MINE *- Circa 1911*
This large steam shovel, belonging to NORTHWESTERN IRON CO., was a *Marion Shovel - Model 60,* built by the Marion Steam Shovel Co., of Marion, Ohio. A steam-powered drilling rig, used for exploratory test-drilling, can be seen standing on top of the ledge, above the ore train.

Northwestern Iron Co, Mayville
Circa 1914-1918

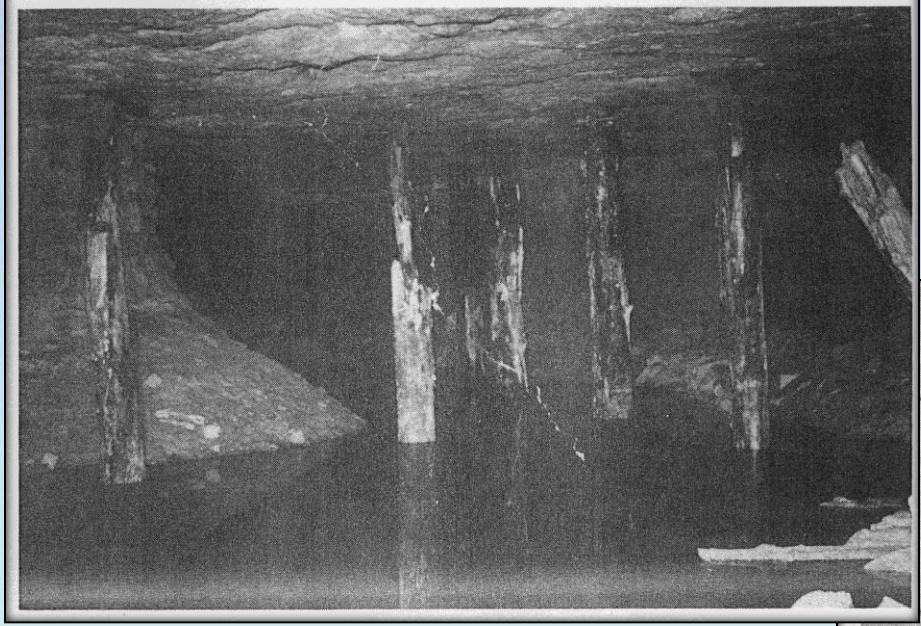
Figure 200: Panorama of NORTHWESTERN IRON CO. *Circa 1914 - 1918*

This view is much like *Figure 199,* but expands to the left to show the pig machine casting building, which measured 56 feet by 100 feet. The walls were 40 feet high. Ends of the casting conveyors can be seen protruding from the south end of the building. *This equipment was installed in 1914.* The smaller wood frame building, known as the "brick work house," was where brick was prepared. A worker appears to be loading sand into a dump wagon pulled by horses, just north of the "brick house." Piles of pig iron wait to be loaded into railroad gondola cars in the center foreground of the picture. A wooden fence surrounded the Iron Company property at this time.



Neda underground about 1960

Figure 84: Inside the IRON RIDGE MINE *- Late 1960's*
This tunnel, partly filled with water, is typical of the southeastern part of the mine. Timbers are badly decayed, after being in place for over ninety years, without replacement.



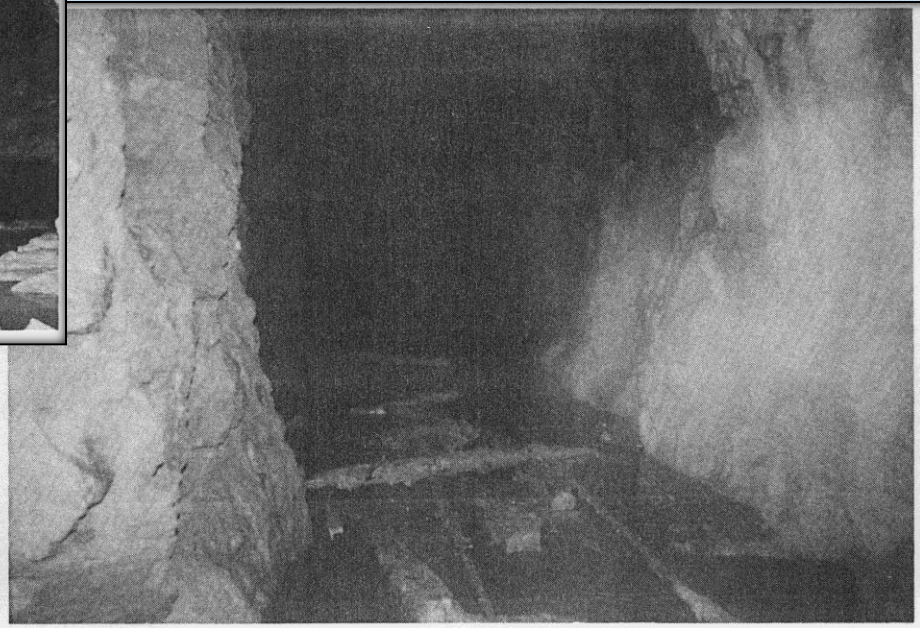
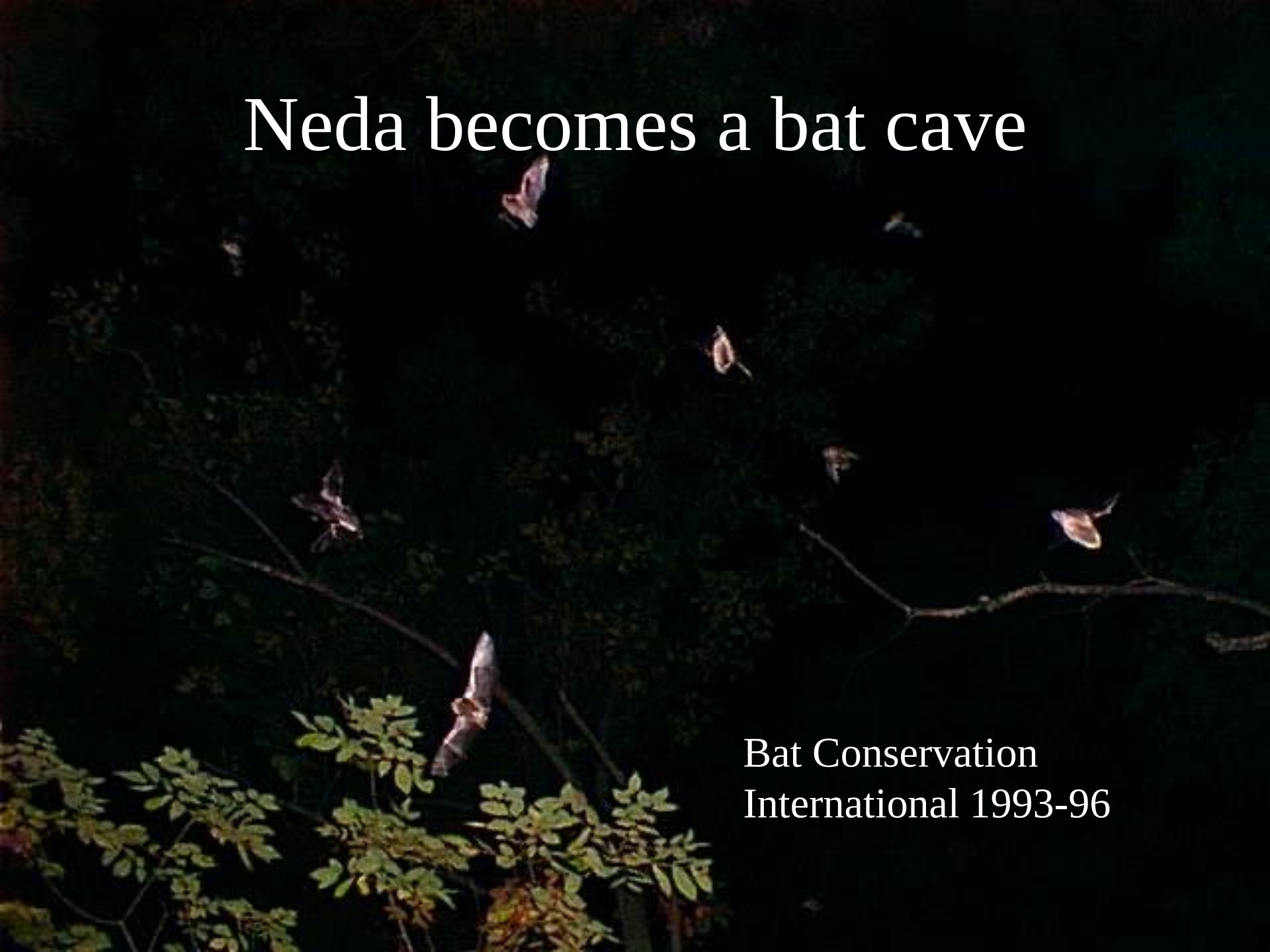


Figure 83: Inside the IRON RIDGE MINE *- Late 1960's*
One of the many tunnels in the mine, this one still has rails in place. Notice some fallen timbers.

The Neda Mine site along the Niagara Escarpment today

Neda becomes a bat cave



Bat Conservation International 1993-96

Bats at Neda 75,000+
One of the top 12 bat condos in the country

Batman and Robin?

Glaciers and Niagara Escarpment

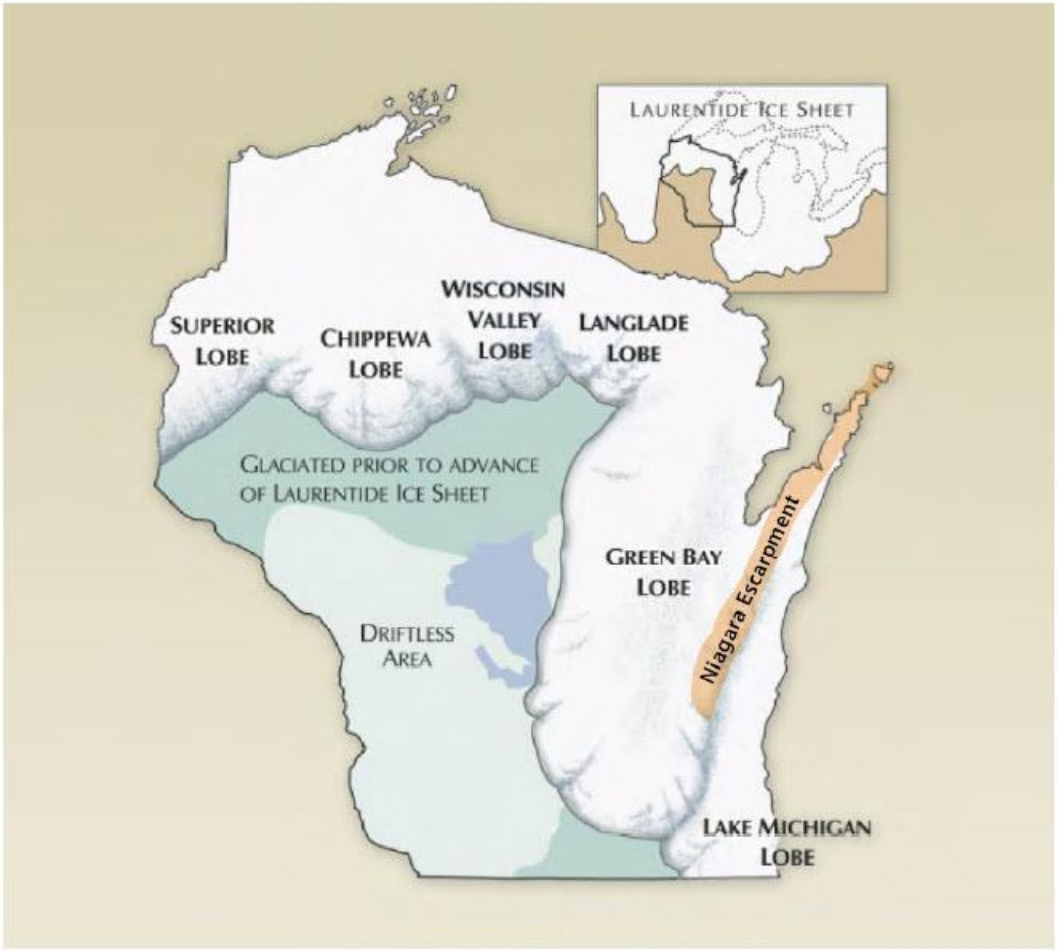
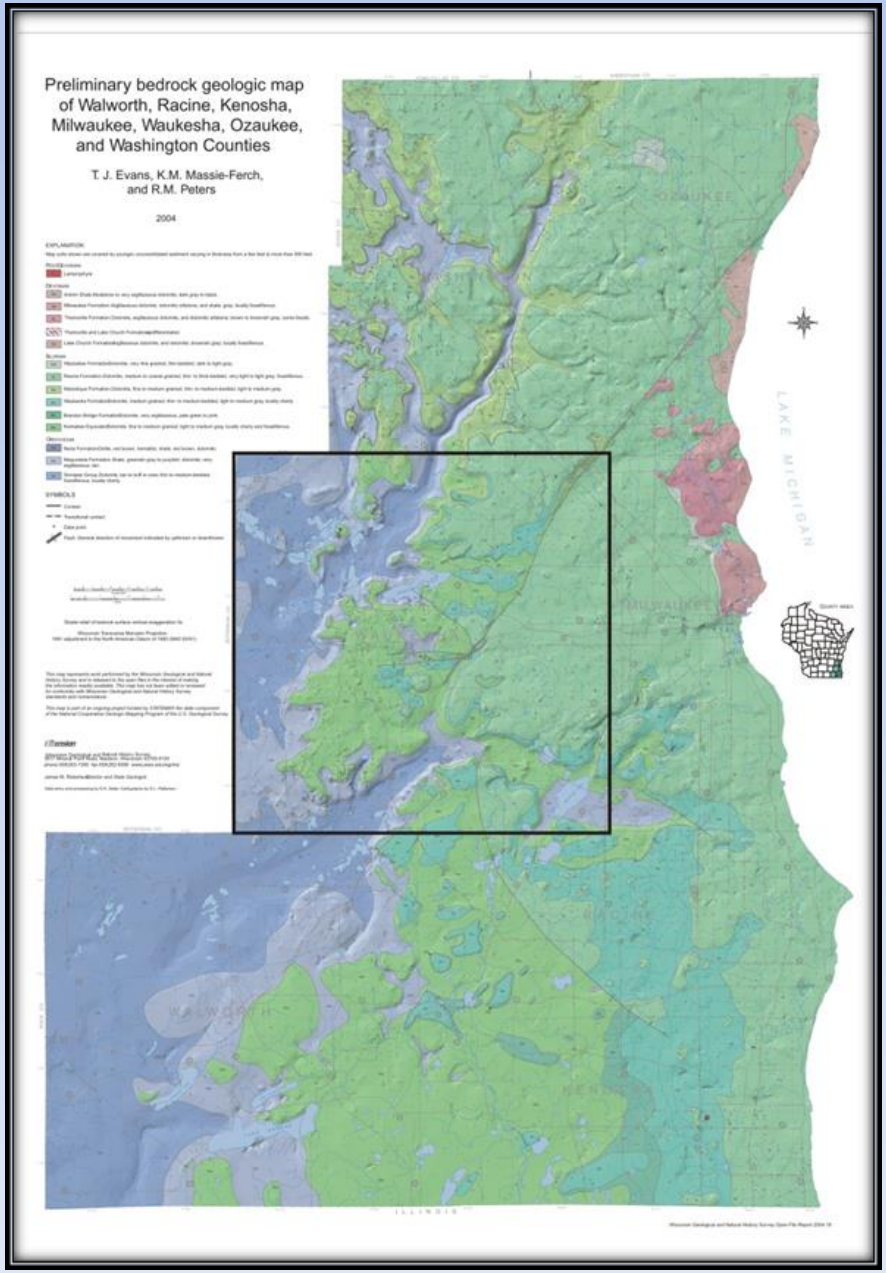


Figure 14. *Position of Niagara Escarpment relative to glacial ice lobes from the Late Wisconsin Glaciation. Map courtesy of Wisconsin Geological and Natural History Survey.*

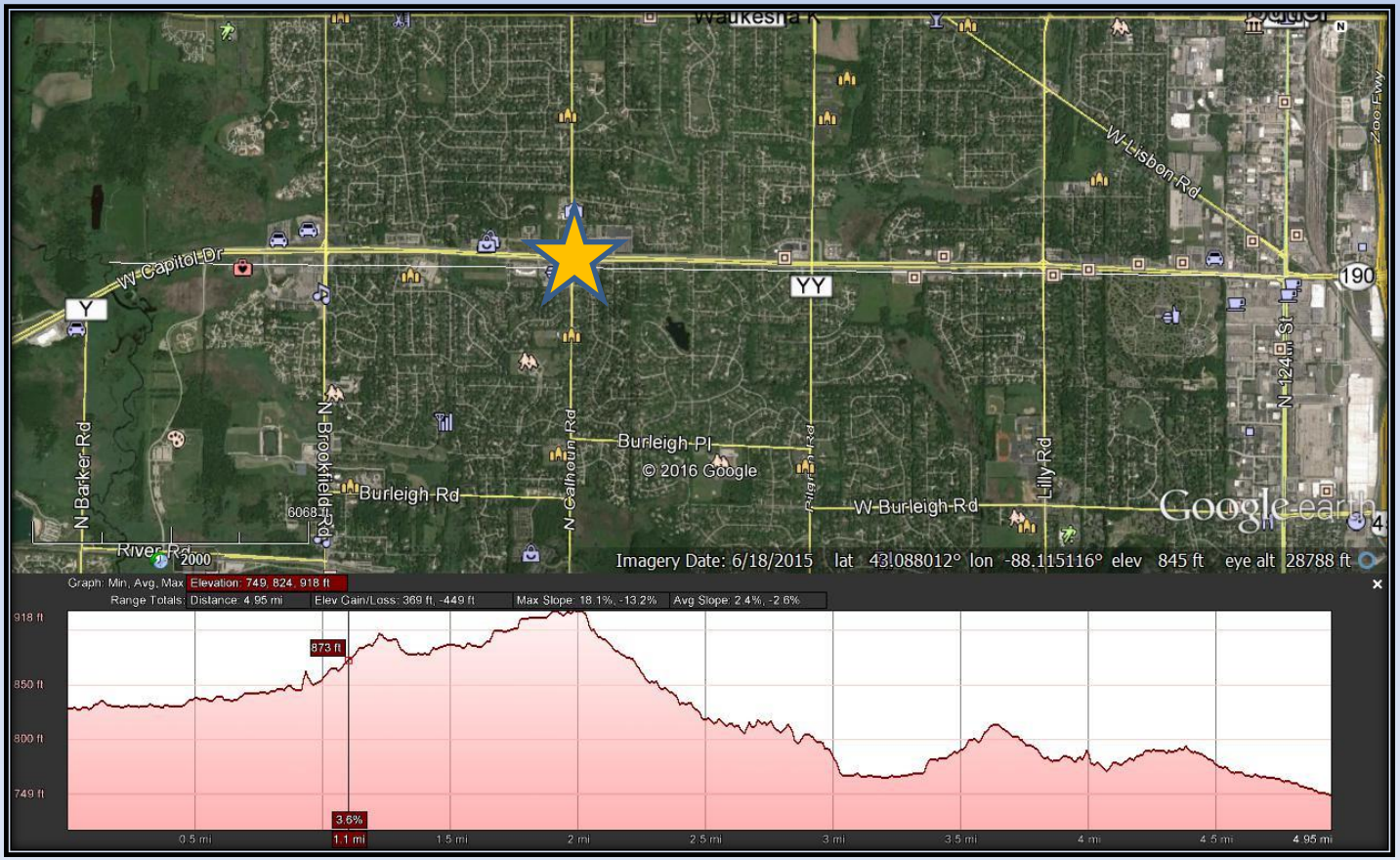
Silurian in Walworth, Racine Waukesha Ozaukee and Washington Co.



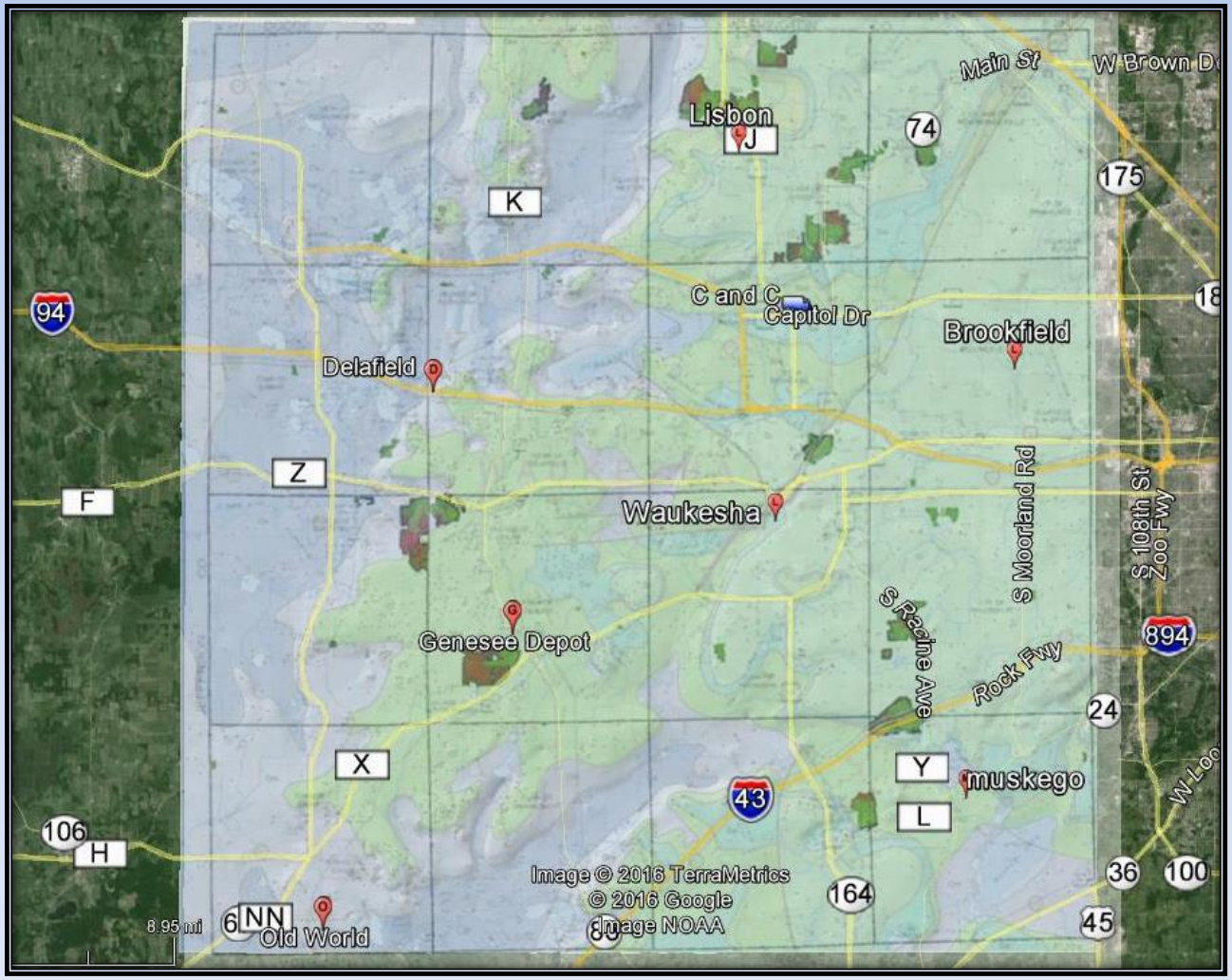
Bedrock Surface of Waukesha Co.
The green colors are the Dolostone

Topography of Waukesha Co
Mostly glacial deposits

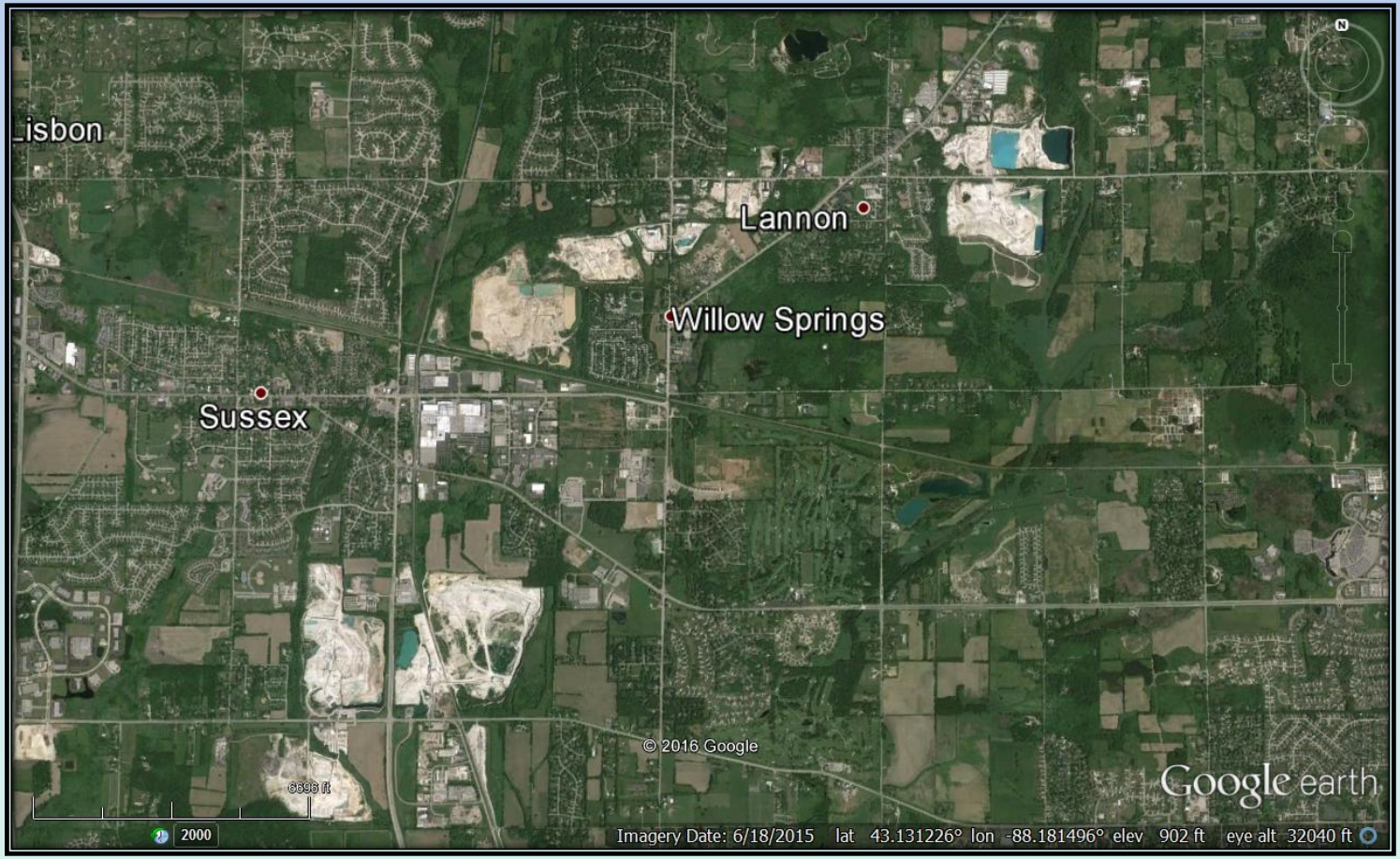
Capital and Calhoun
Cross section showing elevation



Bedrock with mineral potential overlay
Possible resources dolostone and sand and gravel



Lannon – Sussex quarry area



These quarries have been in existence as far back as 1850 or older

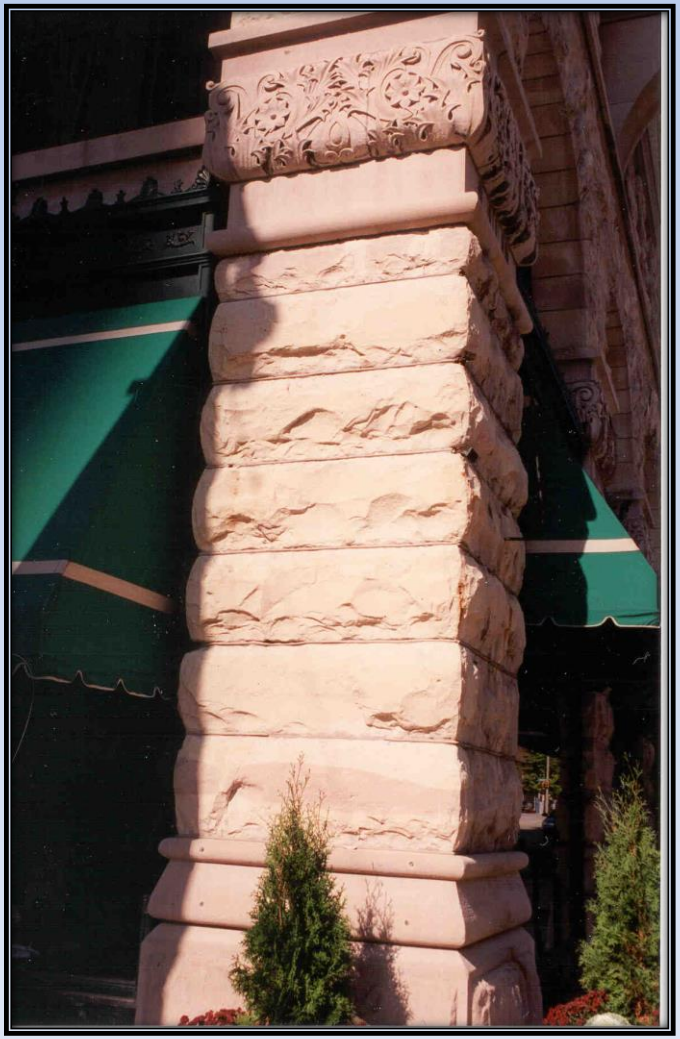
Halquist Quarry

Lemke Quarry- Dolostone

Lannon Stone is found all over SE Wisconsin

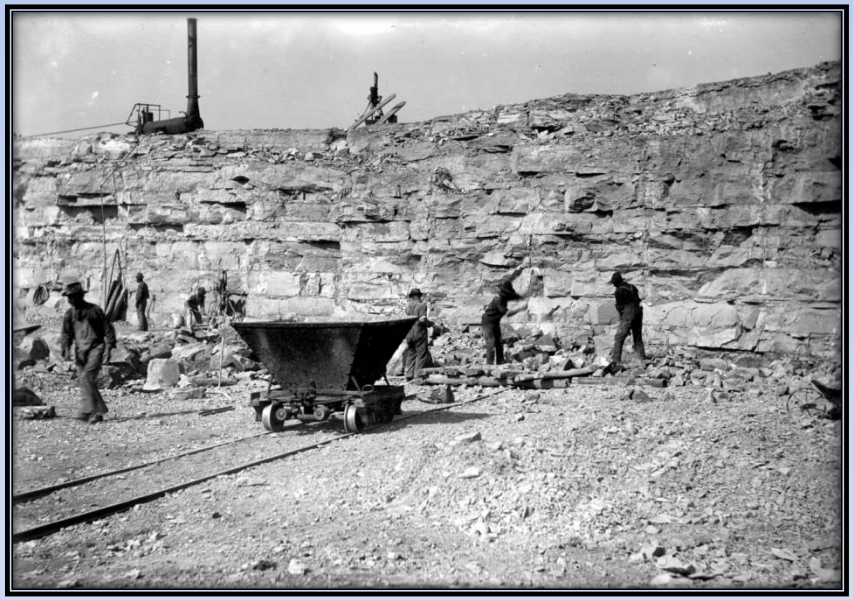
More Lannon Stone homes both for the rich and not so rich

Phister Hotel Wawatosa limestone
The Wawatosa Limestone has thicker bedding



Wauwatosa “Limestone” in Waukesha

Story Bros. Quarry was near the present Miller Park

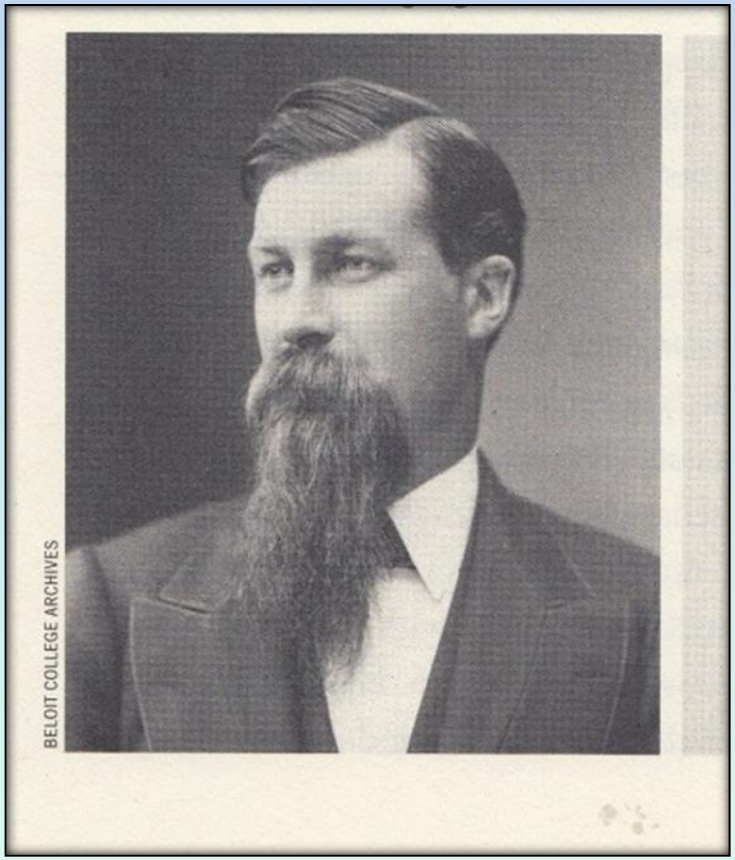


Significant early writing about the Niagara "Limestone"

Geology of Wisconsin 1873-1877 Vol II, Part II Geology of Eastern Wisconsin, pp 95-247
T.C. Chamberlin

On the Building and Ornamental Stones of Wisconsin
Ernest Buckley 1896
Wisconsin geological and Natural History Bulletin #4

T.C. Chamberlin, Author of 4 volume Geology of Wisconsin, 1879: State Geologist, President of UW

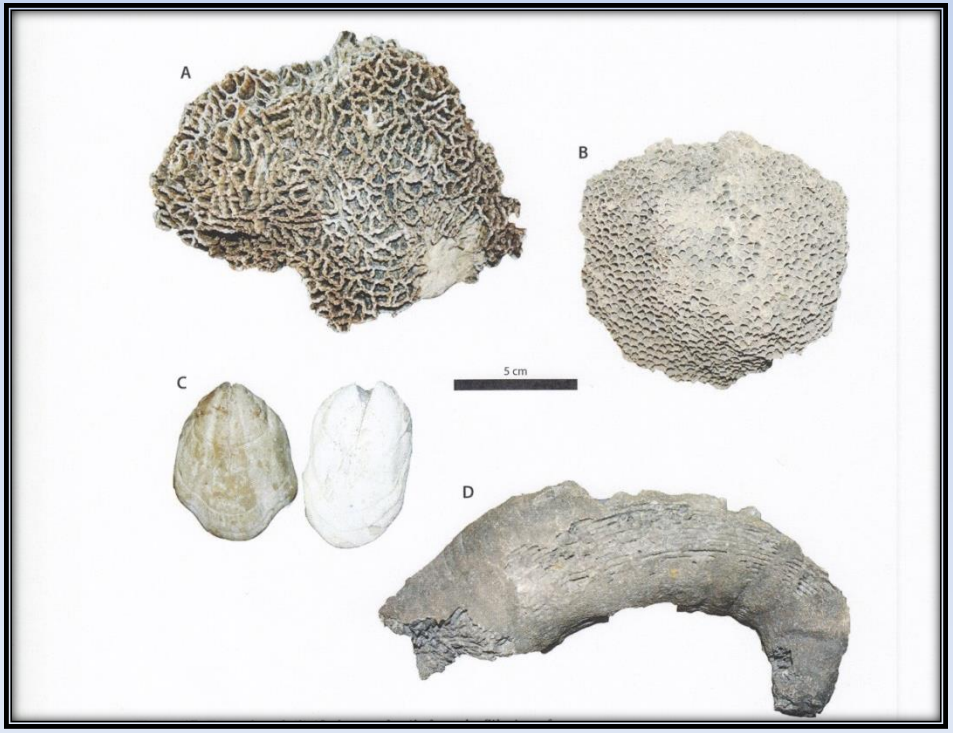


Chapter 6 (Buckley)
Limestone-the Niagara Formation
Pages 295- 347
Quarry locations

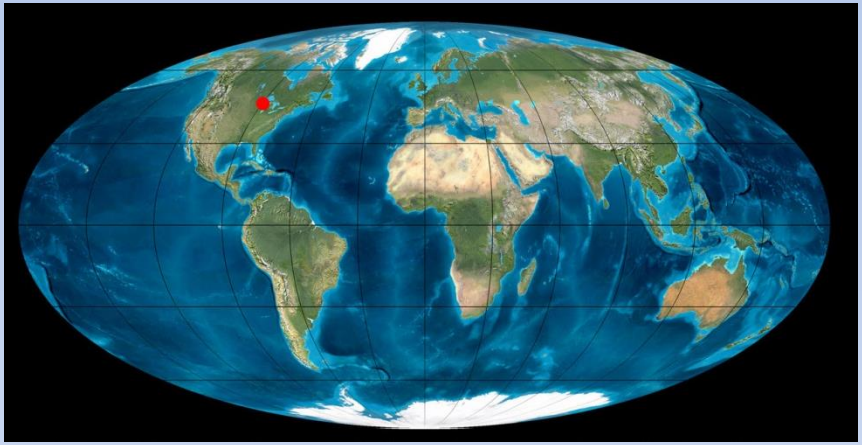
Wawatosa
Waukesha
Genesee area
Lannon area
Templeton area
Pewaukee area
Burlington area
Racine
Cedarburg area
Port Washington

Grimms and Brillion
Mayville area
Knowles area
Marblehead area
Hamilton area
Sheboygan area
Sheboygan Falls area
Peebles area
Kewaunee area
Sturgeon Bay area

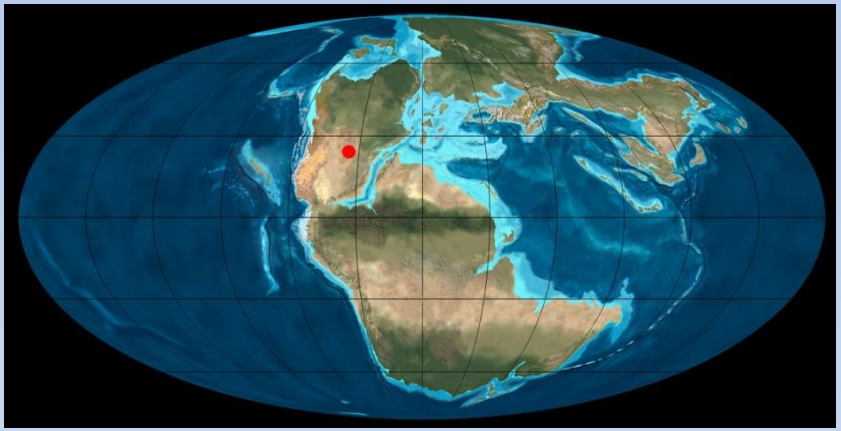
Some Typical Fossils of the Silurian in Wisconsin
A real love of Increase Lapham
These life forms are representative of shallow marine environments in tropical waters such as coral reefs



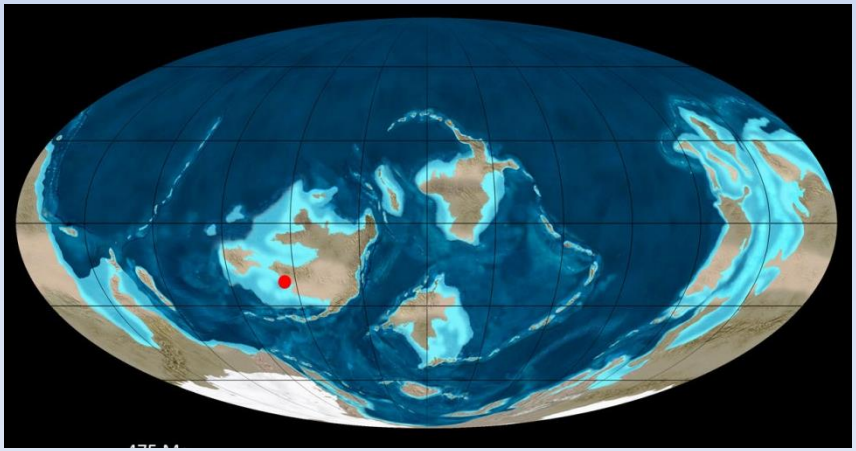
Wisconsin as it wandered the world



Today



200Ma

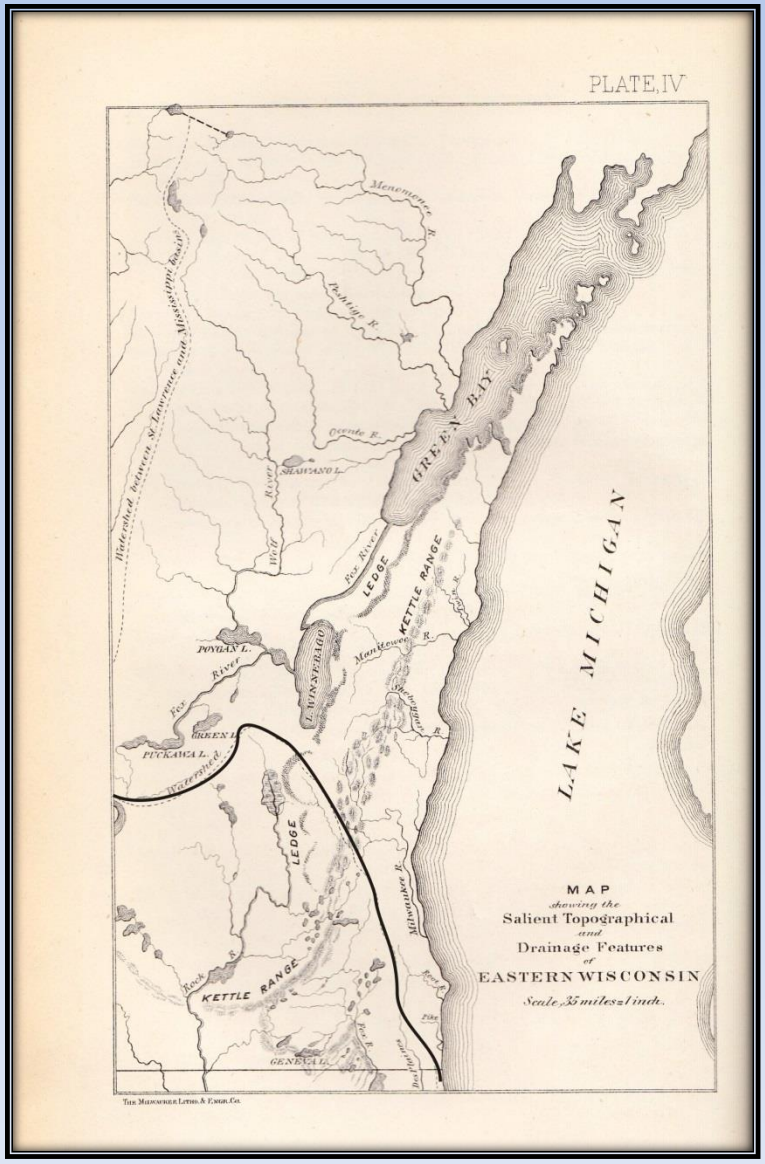


475 Ma

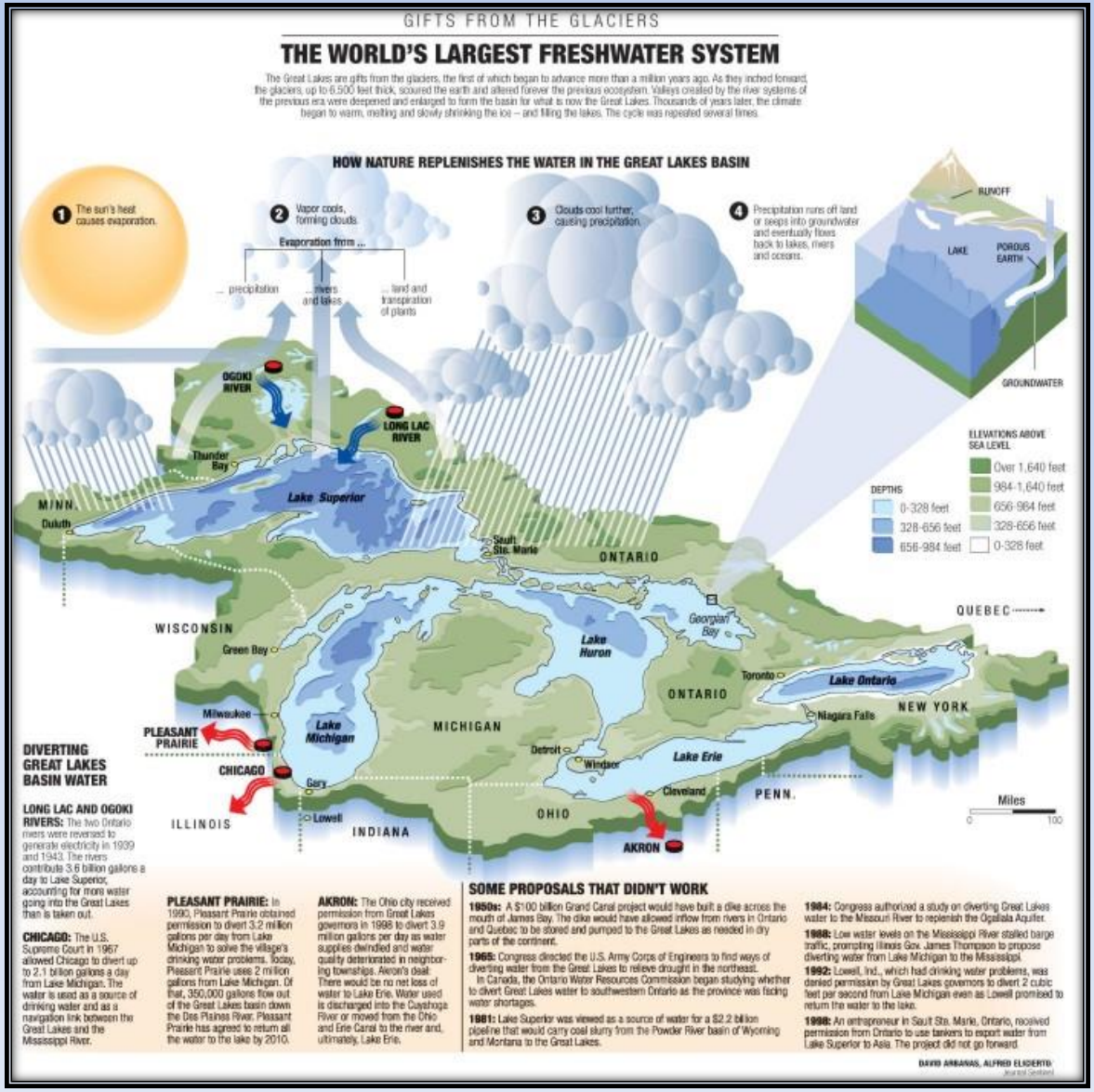
And then there is the water issue!

Chamberlin Geology of Wisconsin 1879.

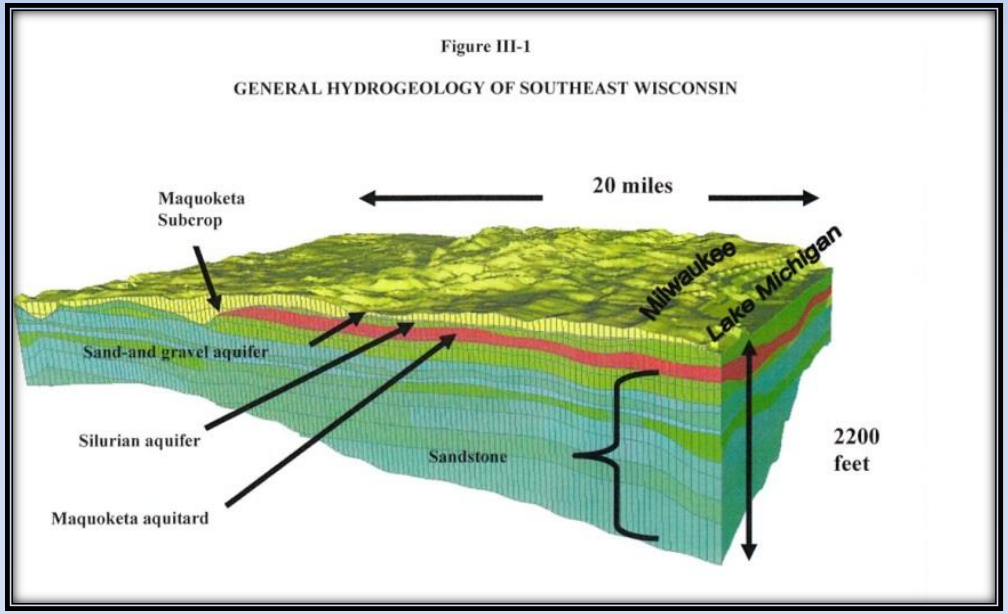
Note the drainage divide

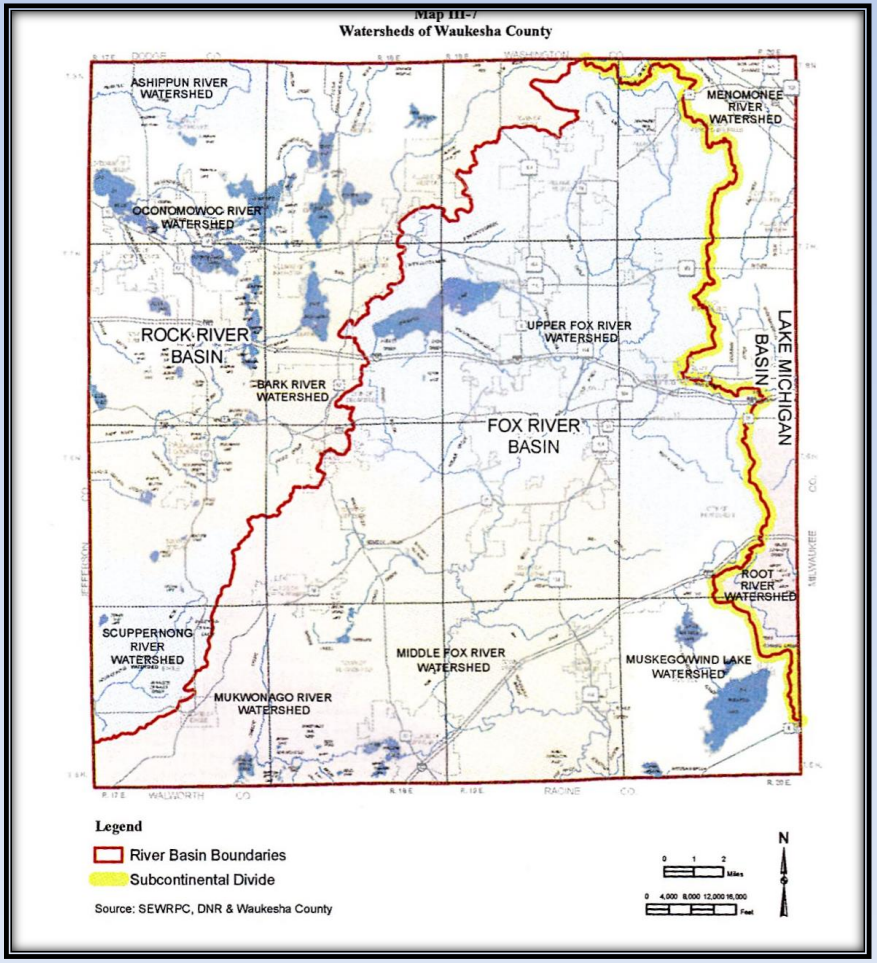


Great lakes Watershed



The Water Divide





Enjoy the Ledge ..as you dine in downtown Waukesha – so much Silurian to see!

Or sip Silurian Stout in Door Co. as you watch the sunset over the escarpment of Peninsula Park.

The End