

Iowa's Ordovician

443 Ma
to
485 Ma

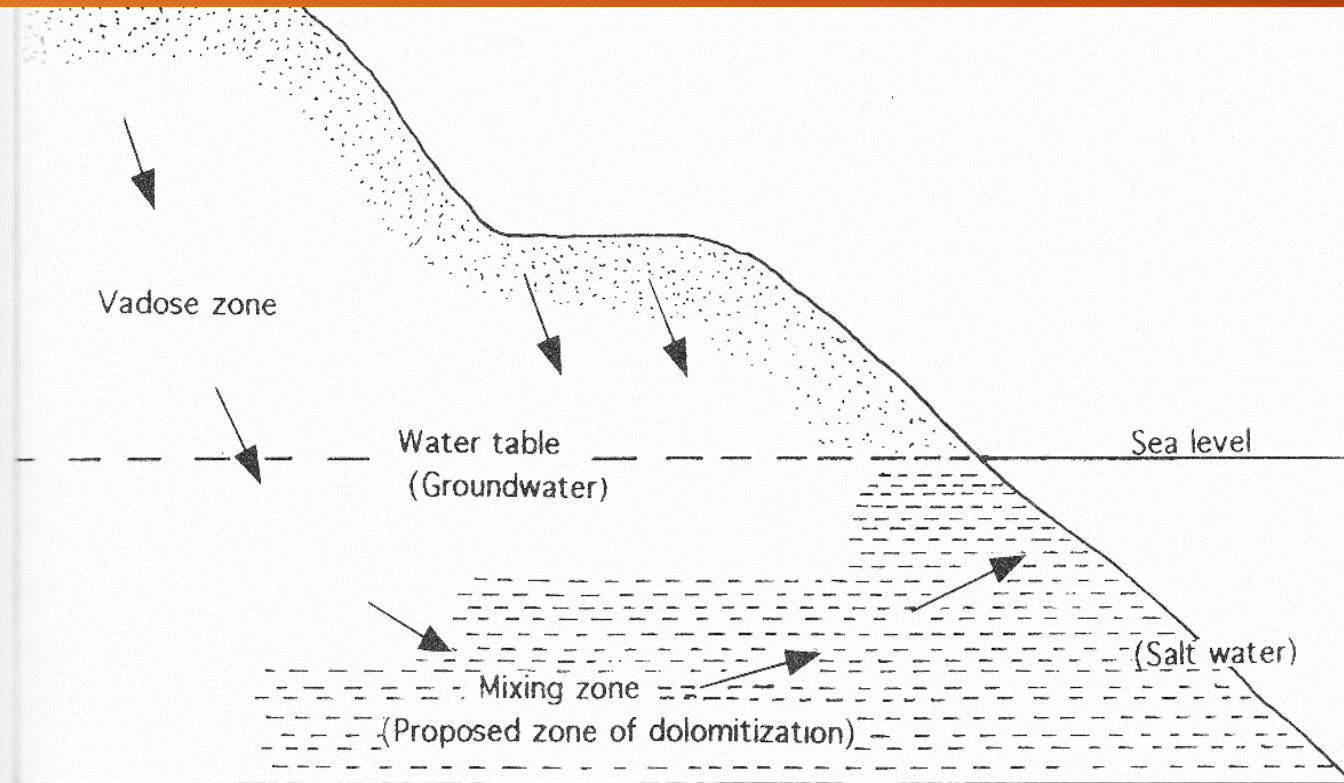
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Ordovician – Warm, Shallow Seas

443 Ma
to
485 Ma

- Early Ordovician – Again on the edge of a shallow sea depositing carbonate, sandy carbonate, and quartz sandstones (Prairie du Chien Group) before another series of weathering and erosion = Unconformity and deposition of the St. Peter S.S..
- Mid-Ordovician – Major sea transgression changed a sandy shallow sea to carbonate shelf. Ash layers appear in the Decorah and Dunleith Formations.
- Late Ordovician – Increasingly muddy depositional environments forming the carbonate-rich shale layers (e.g. the Maquoketa Shale).
- Towards the end of the Ordovician the seas regress and weathering and erosion begin again, creating an ???

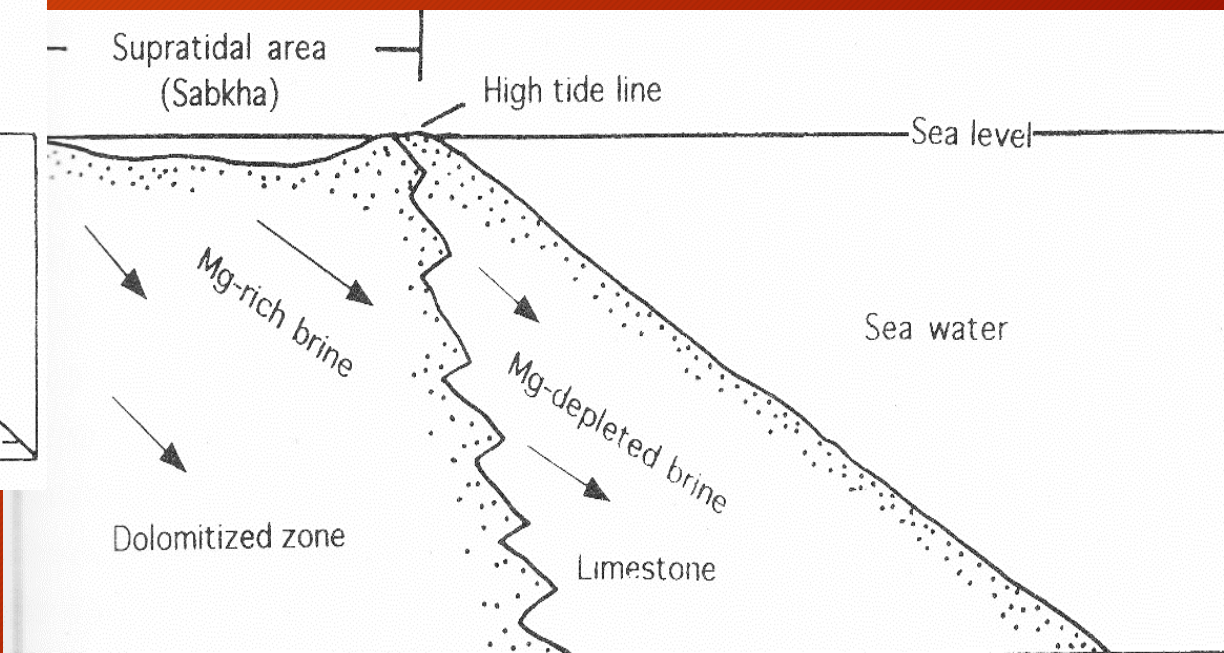
Process of Dolomitization



CaCO_3

Mg replaces some Ca

$\text{CaMg}(\text{CO}_3)_2$



6 Major Unconformities in Iowa

443 Ma
to
485 Ma

- Base of Cambrian
- Within Ordovician
- Base of Devonian
- Between the Mississippian and Pennsylvanian
- Between the Jurassic and Cretaceous
- Iowa does not have any exposed rocks dating to the Permian or Triassic

Ordovician stratigraphy

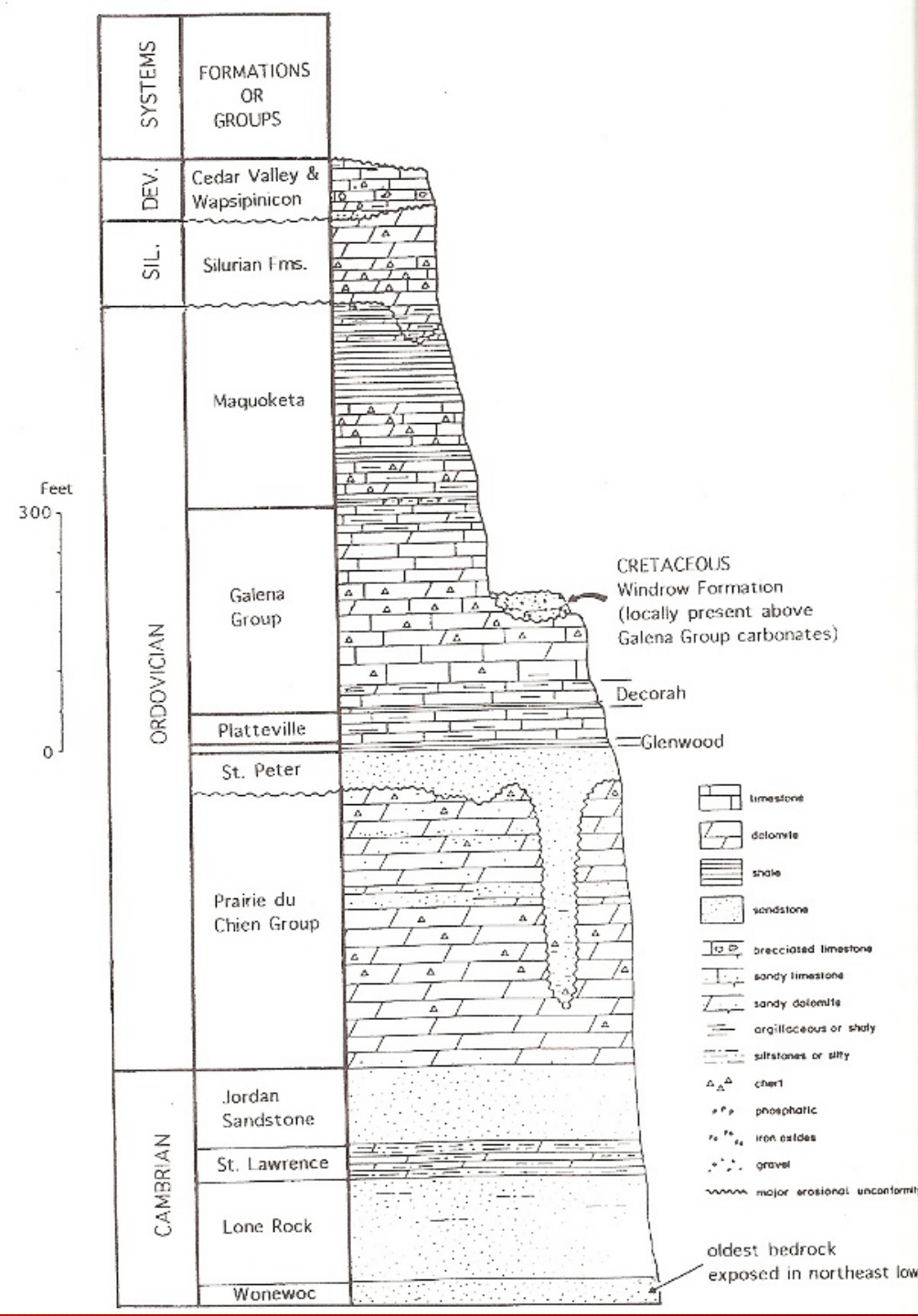
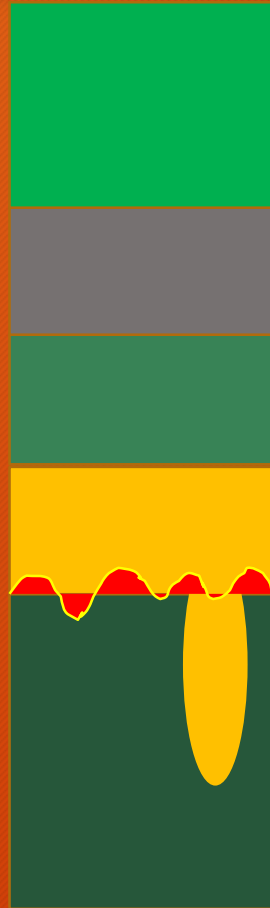
Maquoketa

Galena

Platteville

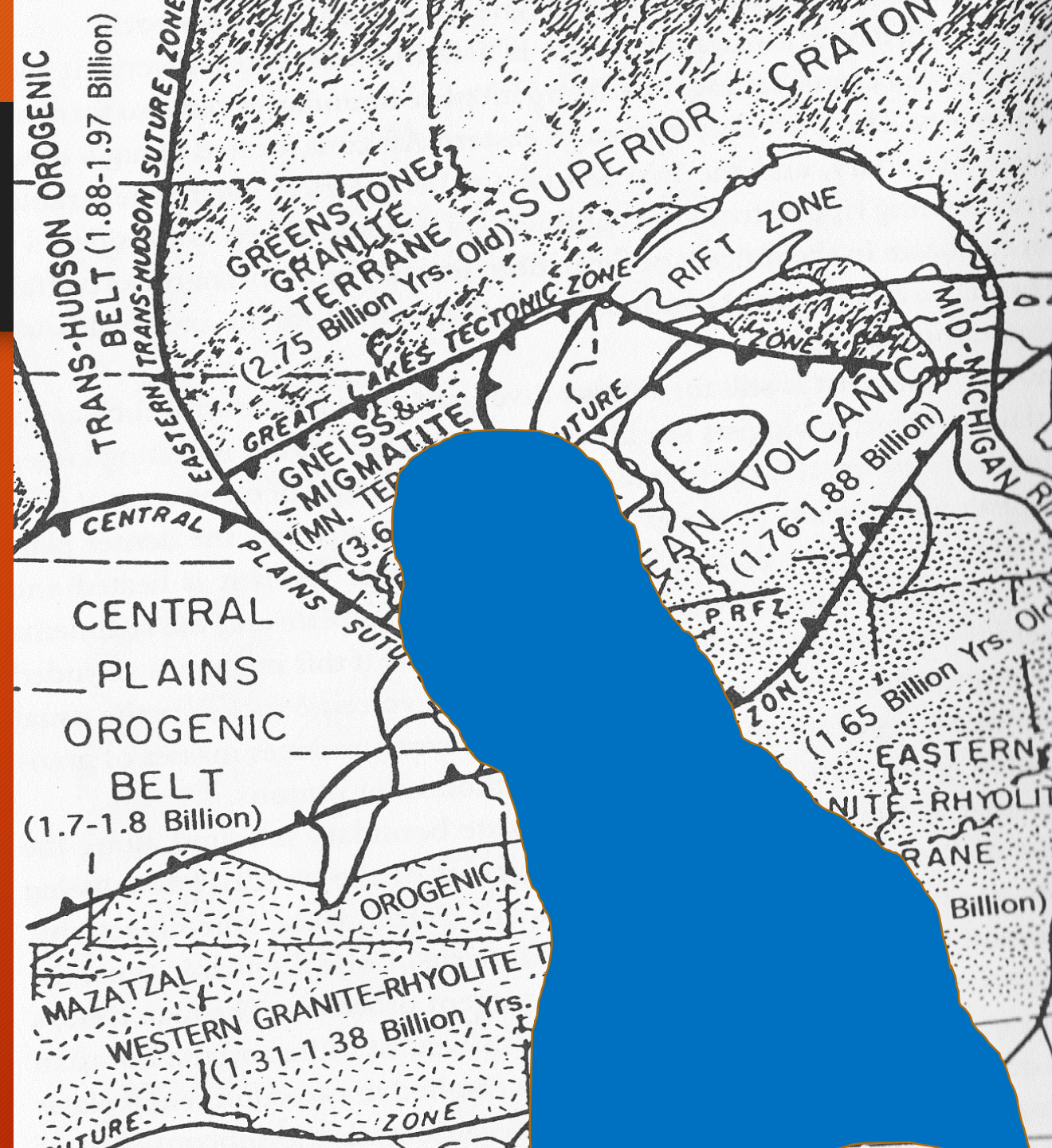
St. Peter

Prairie du Chien



St. Peter Formation

- Quartz Sandstone (super mature)
 - But, In NW Iowa the St. Peter contains a lot of shale from the then exposed Transcontinental Arch
- Well exposed in Pikes Peak St. Park
- An important economic resources for glass and fracking

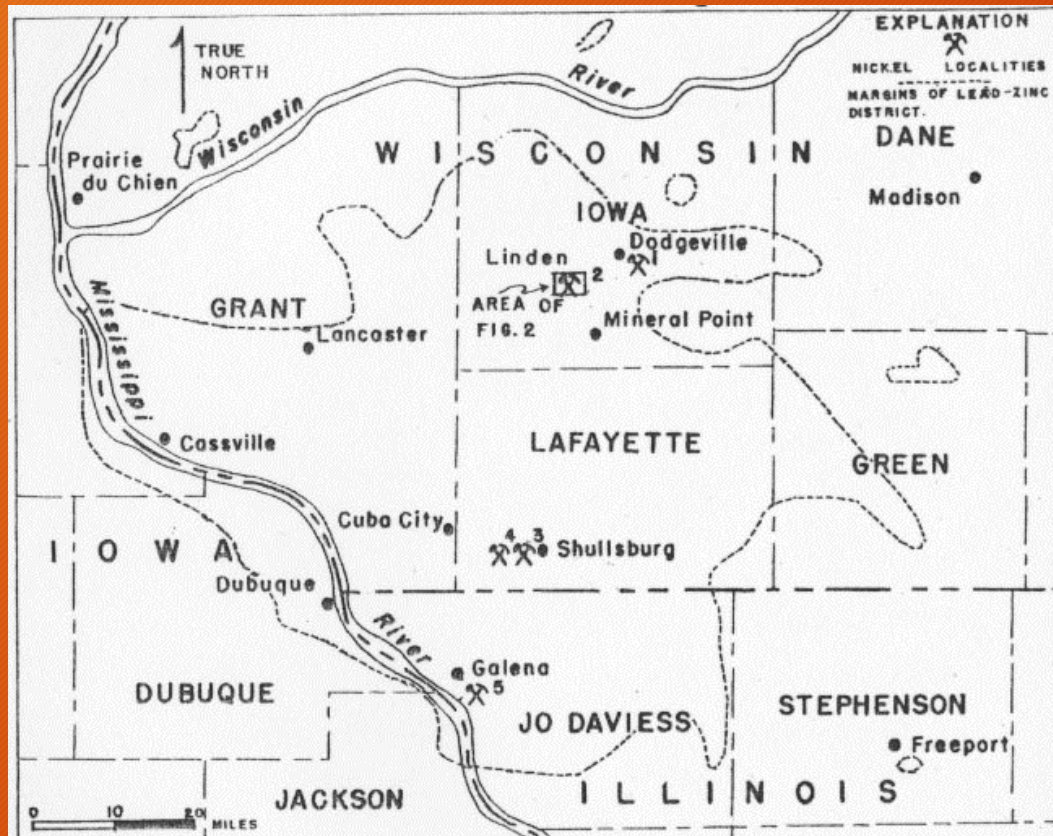


St. Peter Fm.

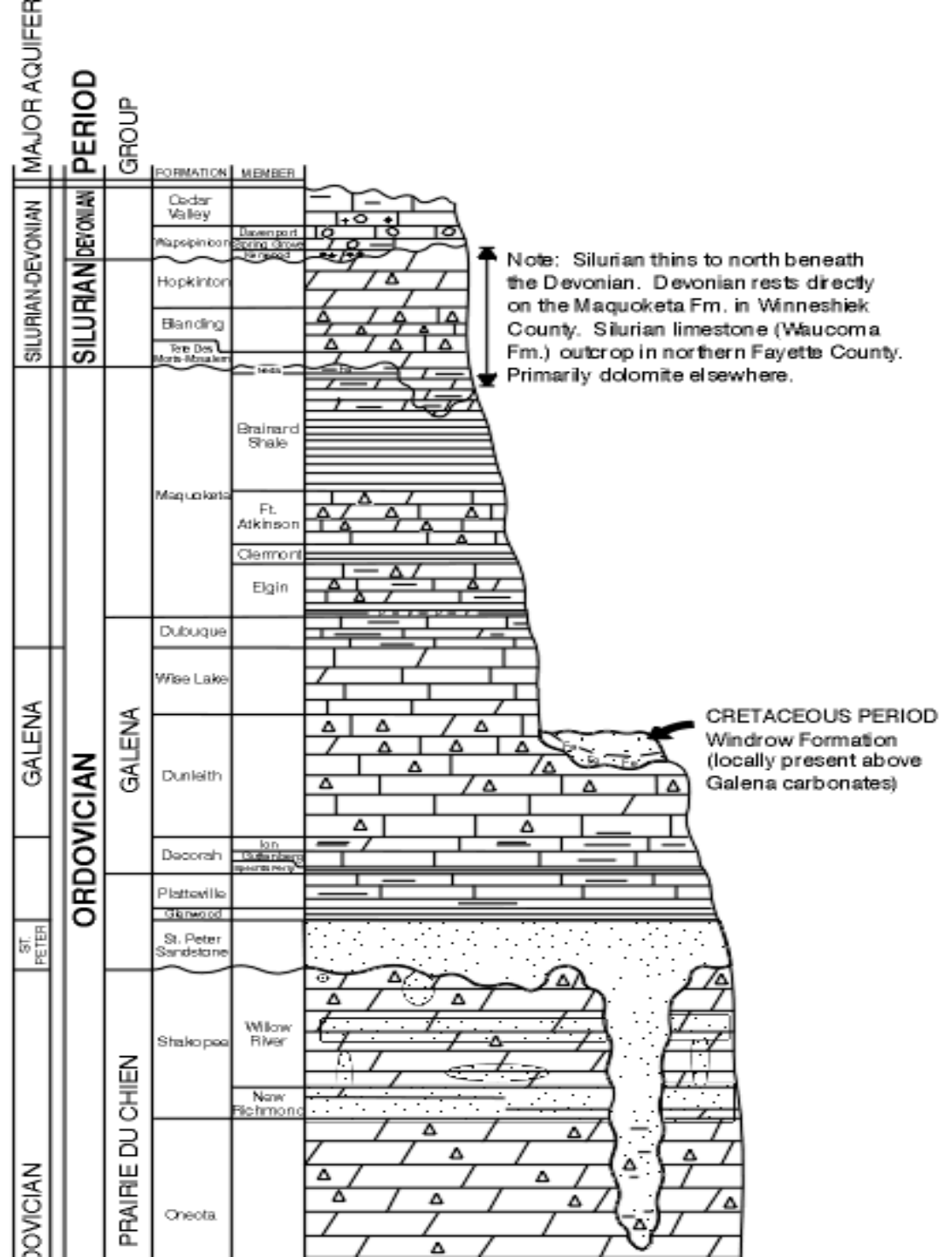
- 1960's served as a fall out shelter with supplies to meet the needs of 44,000 residents for two weeks

Galena Group

- Dunleith, Wise Lake, and Dubuque Formations

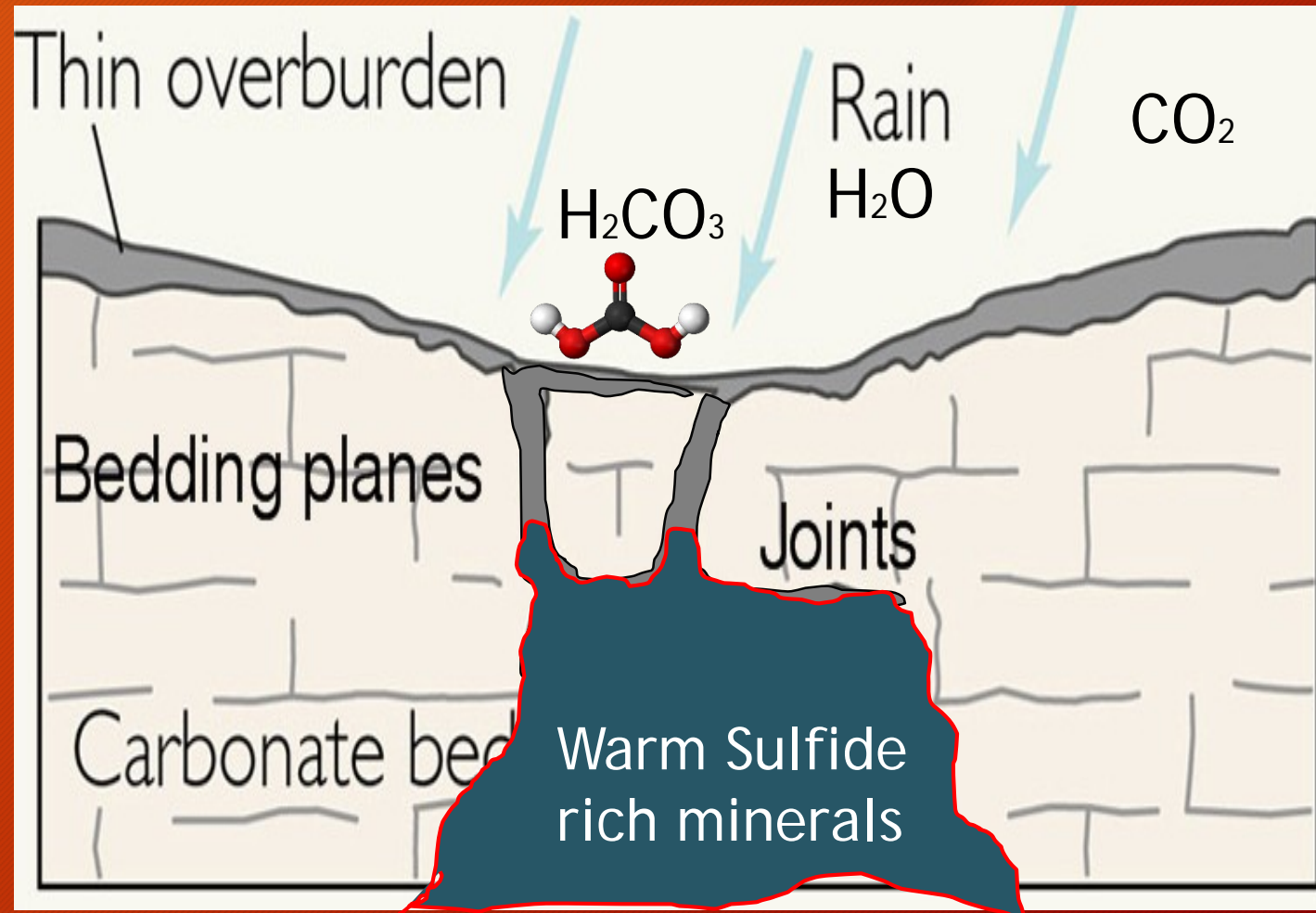


Upper Mississippi Valley Zinc and Lead District



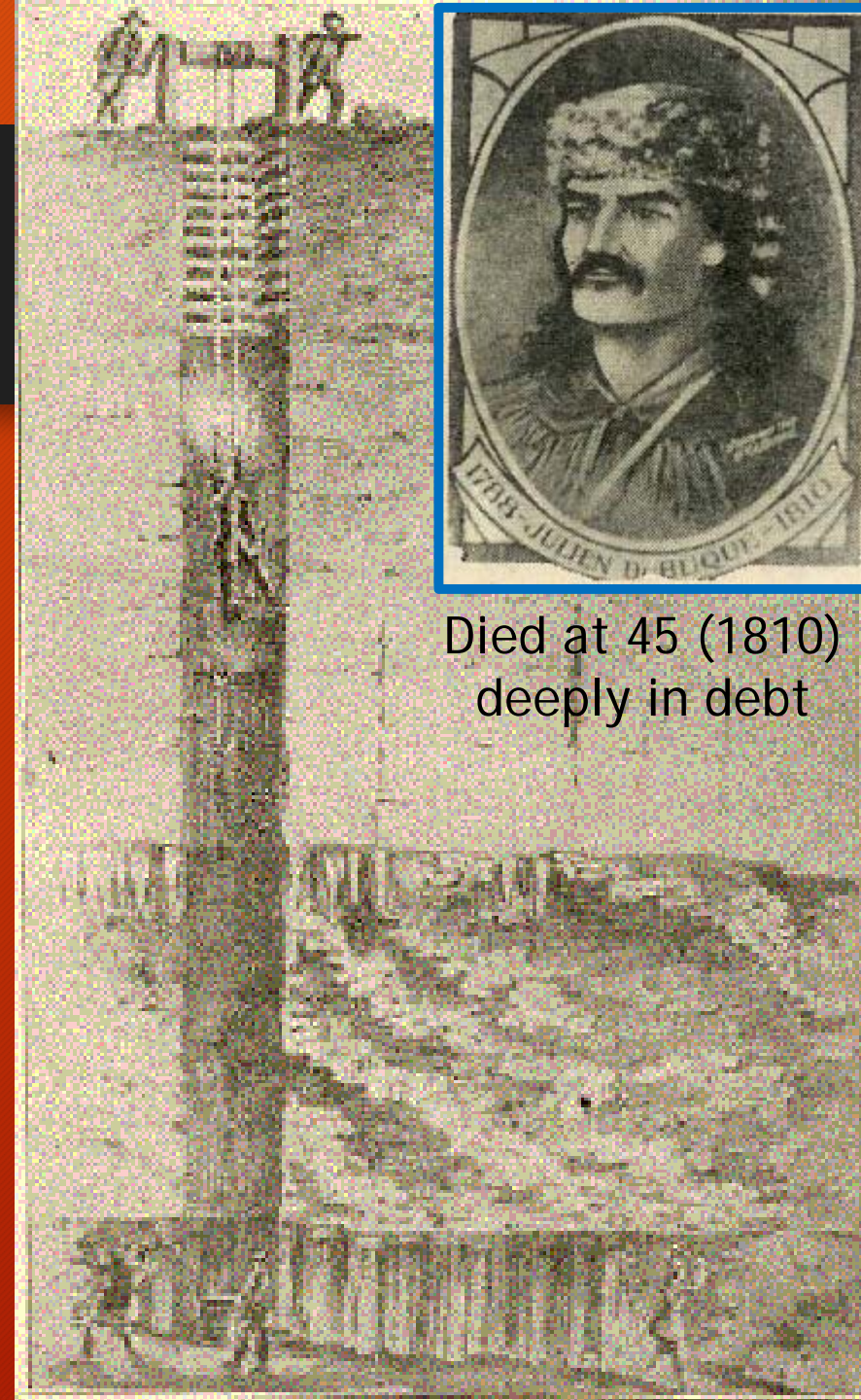
How does Galena & Zinc form in Limestone?

- Space is created, through karst processes
- Warm sulfide-rich solutions migrate upwards and infiltrate the new space
- Sulfide minerals precipitate out of solution and along the edges of these new spaces
- The Mississippi cuts its channel into the landscape and lowers the water table
- Exposing the sulfide minerals, creating Iron sulfide, Lead sulfide, and Zinc sulfides



Lead and Zinc Mining 1788-1810

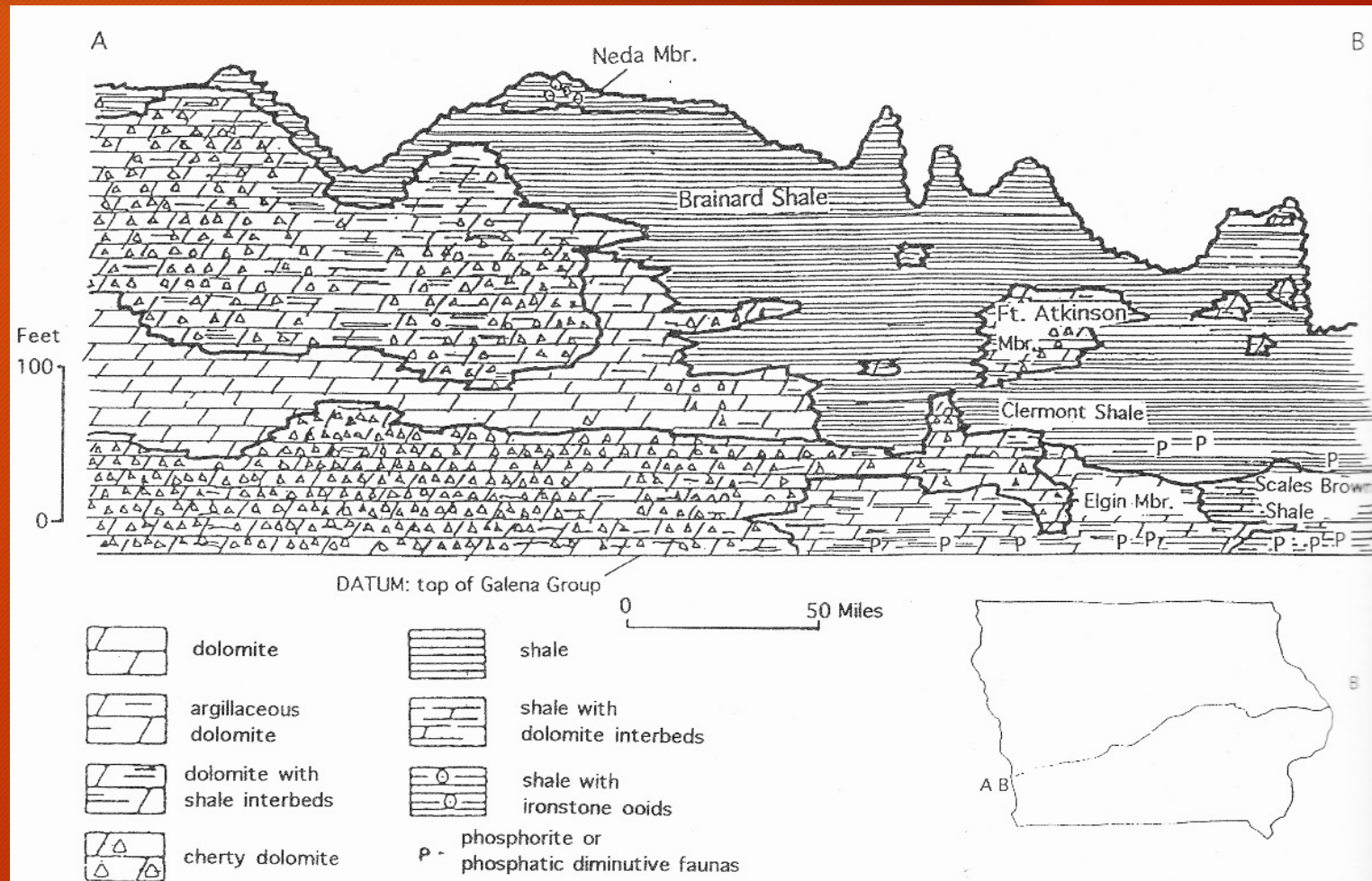
- Spain ruled Iowa via the Treaty of Paris (1763) as a product of the French and Indian War (1756-1763)
- Julien Dubuque became friends with the local Meskwaki, eventually marrying Potosa and entering their culture as *Little Night*.
- Julien, identified the mineral resources and with the Meskwaki's permission began mining
- Julien, requested ownership/confirmation of his land from the Spain, and it was granted in 1796. 'The Mines of Spain'



Died at 45 (1810)
deeply in debt

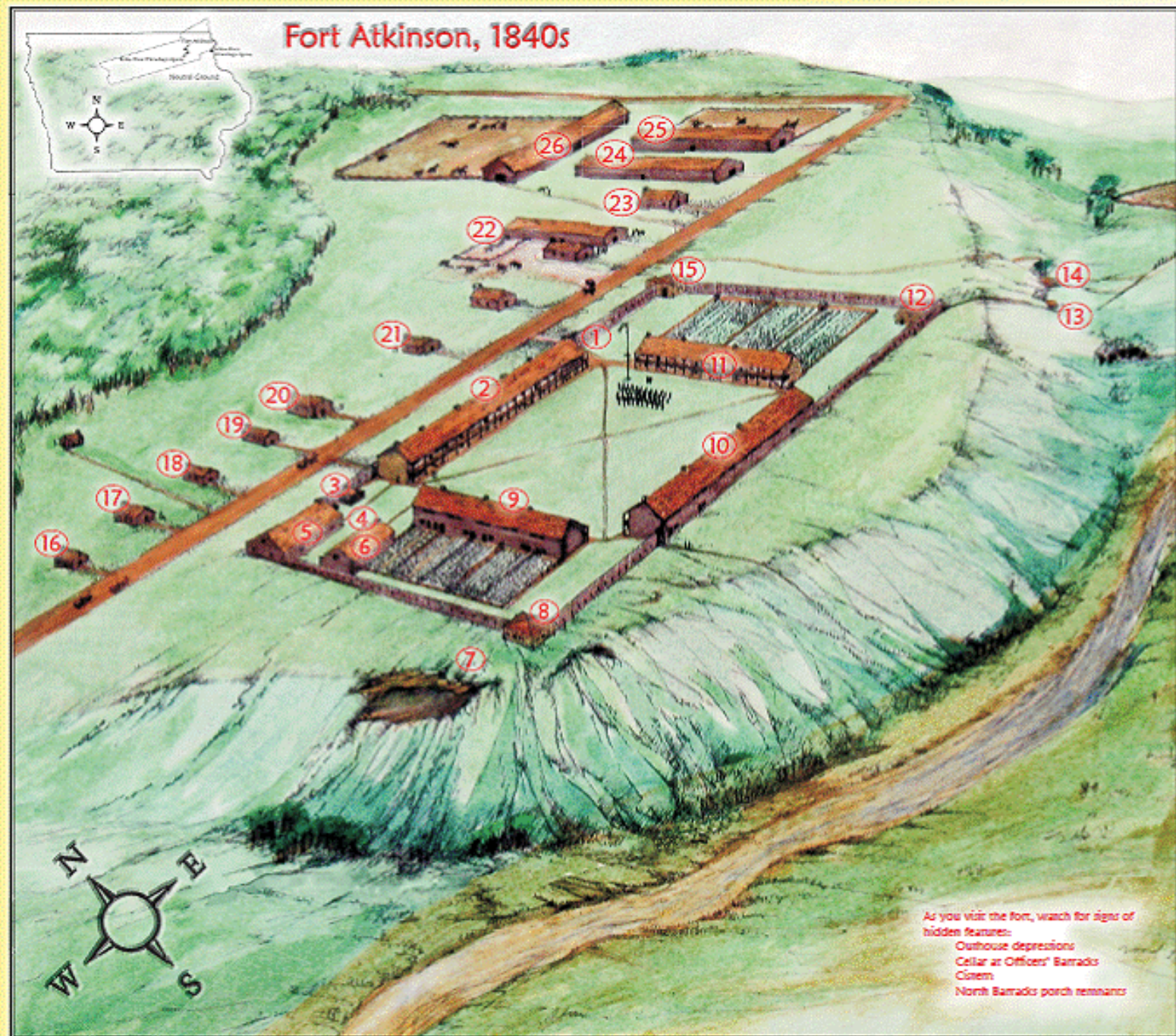
Maquoketa Formation

- Thick impermeable shale
- Large caverns were excavated under Johnson and Polk counties to seasonally store liquefied petroleum gas
- Enables the pipeline industry to store their product so that they can meet demand during the winter



Maquoketa Formation

- Fort Atkinson Member
- Cherty dolostone
- Important fort built to protect the Winebagos from the Sioux, Sauk and Meskwaki.



Brochure created by Charles Haury-Artz and Angela R. Collins of the University of Iowa's Office of the State Archaeologist. Additional images from the State Historical Society of Iowa Museum and Lu'neve Becker. Partial funding from the Fort Atkinson Historical Preservation Commission through a Winnebago County Community Foundation grant.

Watercolor by Deanne Wirtman.



General Henry Atkinson



Ho-Chunk Chief Yellow Thunder

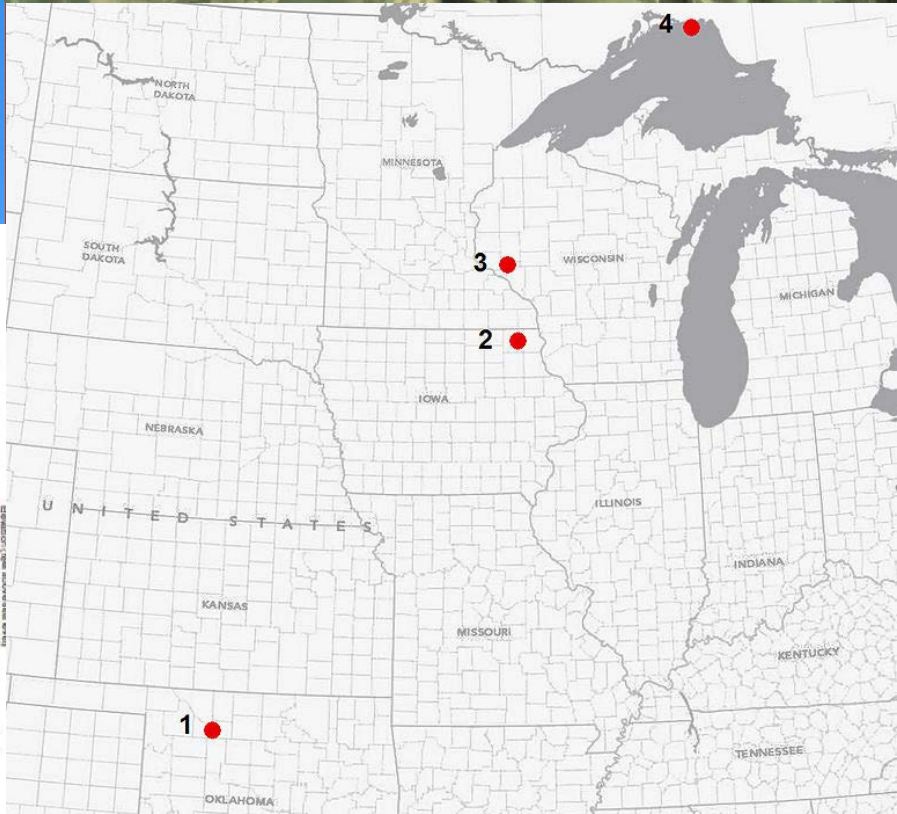
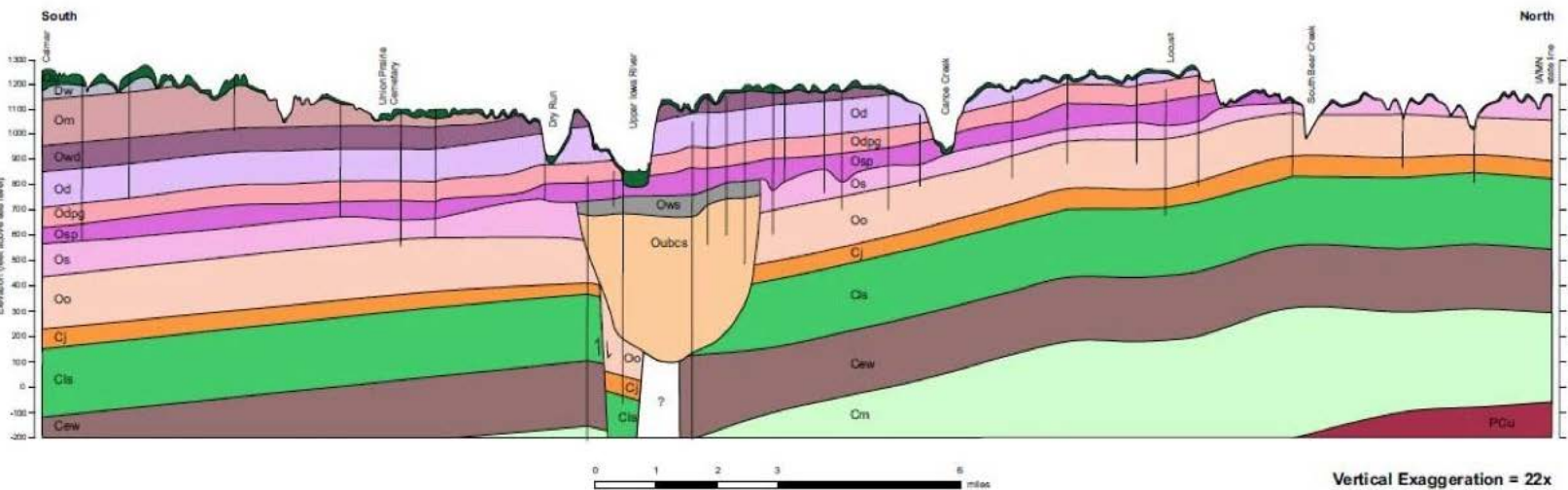
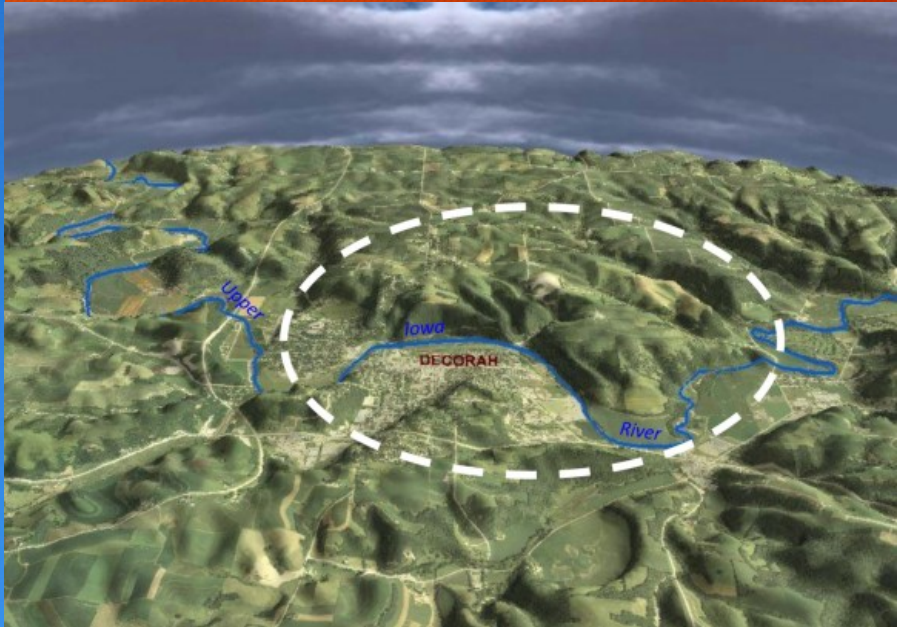


Captain C.V. Sumner, Commander of Fort Atkinson



Ho-Chunk Chief Winneshiek

Decorah Structure



Ordovician Life: Warm shallow seas = ☺ Life

443 Ma
to
485 Ma

- Brachiopods
- Bryozoans
- Corals
- Receptaculites
- Mollusks
- Worms
- Arthropods
- Echinoderms
- Graptolites
- Conodonts



Unique life from the impact structure

