Geology of Morgan County, Missouri: History, Mystery, and Curiosities

Colossians 1

16 For in him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things have been created through him and for him.

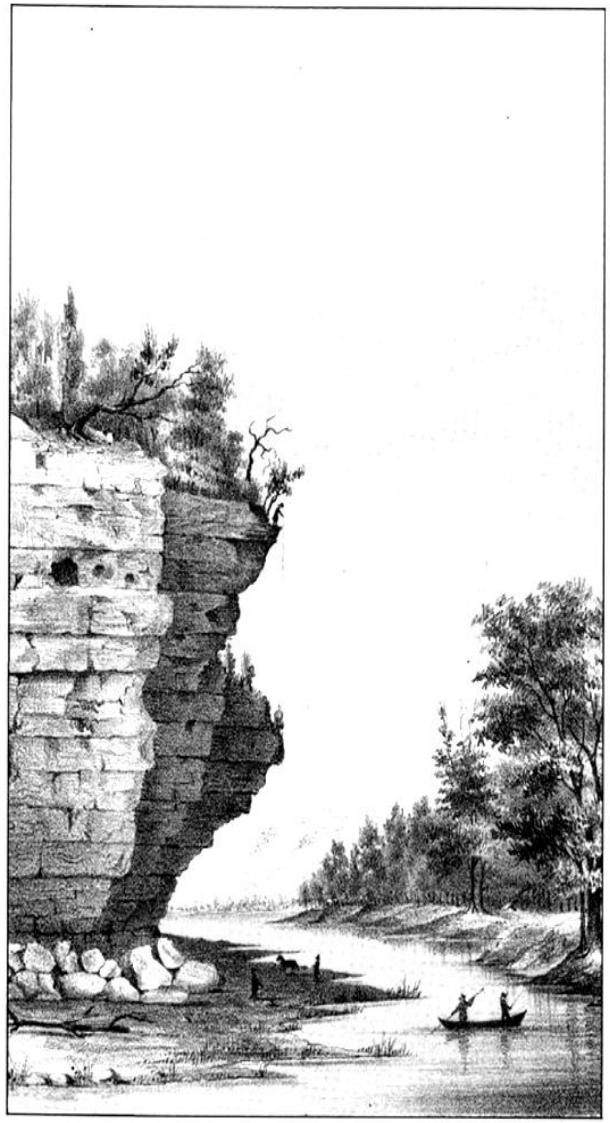


Figure 1

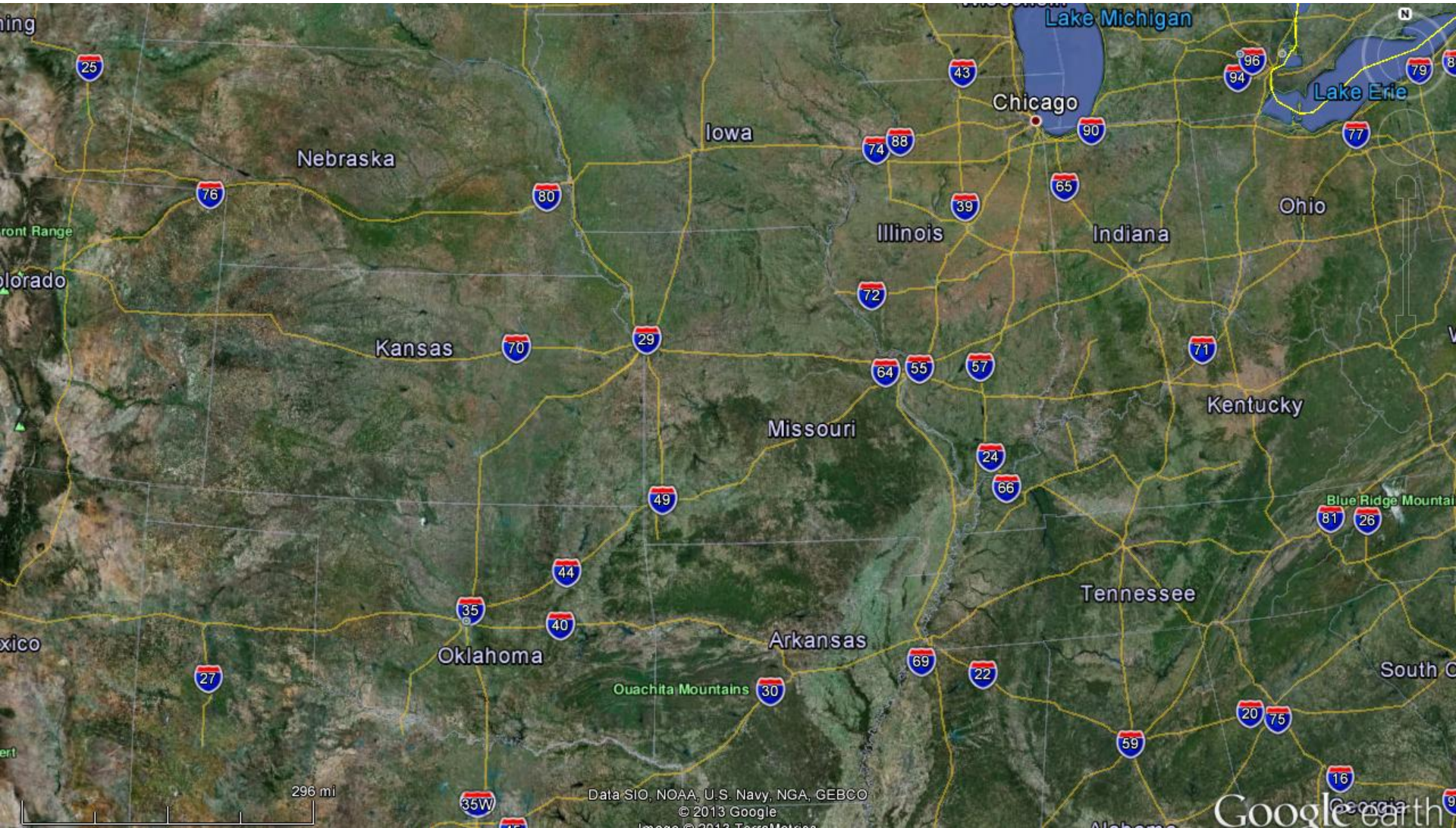
Missouri's natural attractions are a result of geologic processes that shaped the landscape. This view of a bluff on Gravois Creek in Morgan County is from Broadhead, 1873.

"Geologic Wonders and Curiosities of Missouri", Thomas Beveridge, 1990

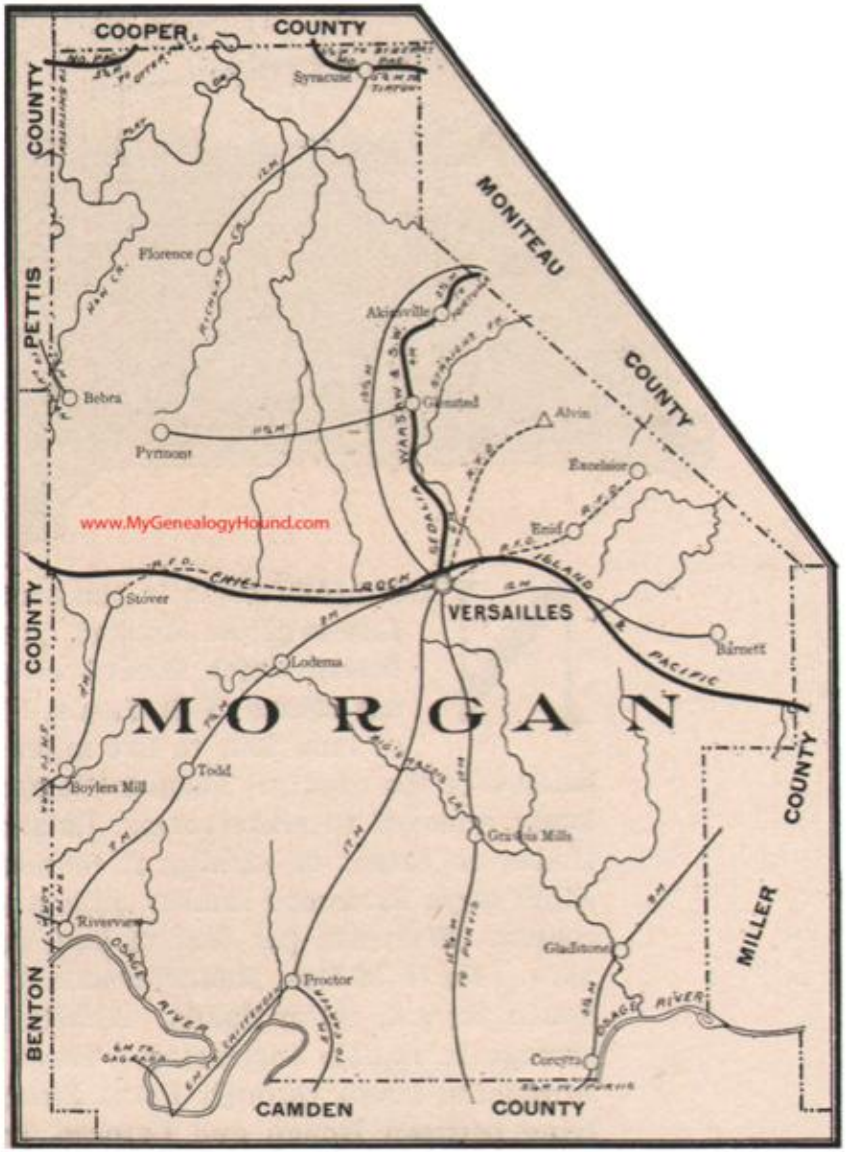
Gravois Creek south of Versailles

Missouri-WHAT does the word mean?

The word "Missouri" often has been construed to mean "muddy water" but the Smithsonian Institution Bureau of American Ethnology has stated it means "town of the large canoes," and authorities have said the Indian syllables from which the word comes mean "wooden canoe people" or "he of the big canoe."

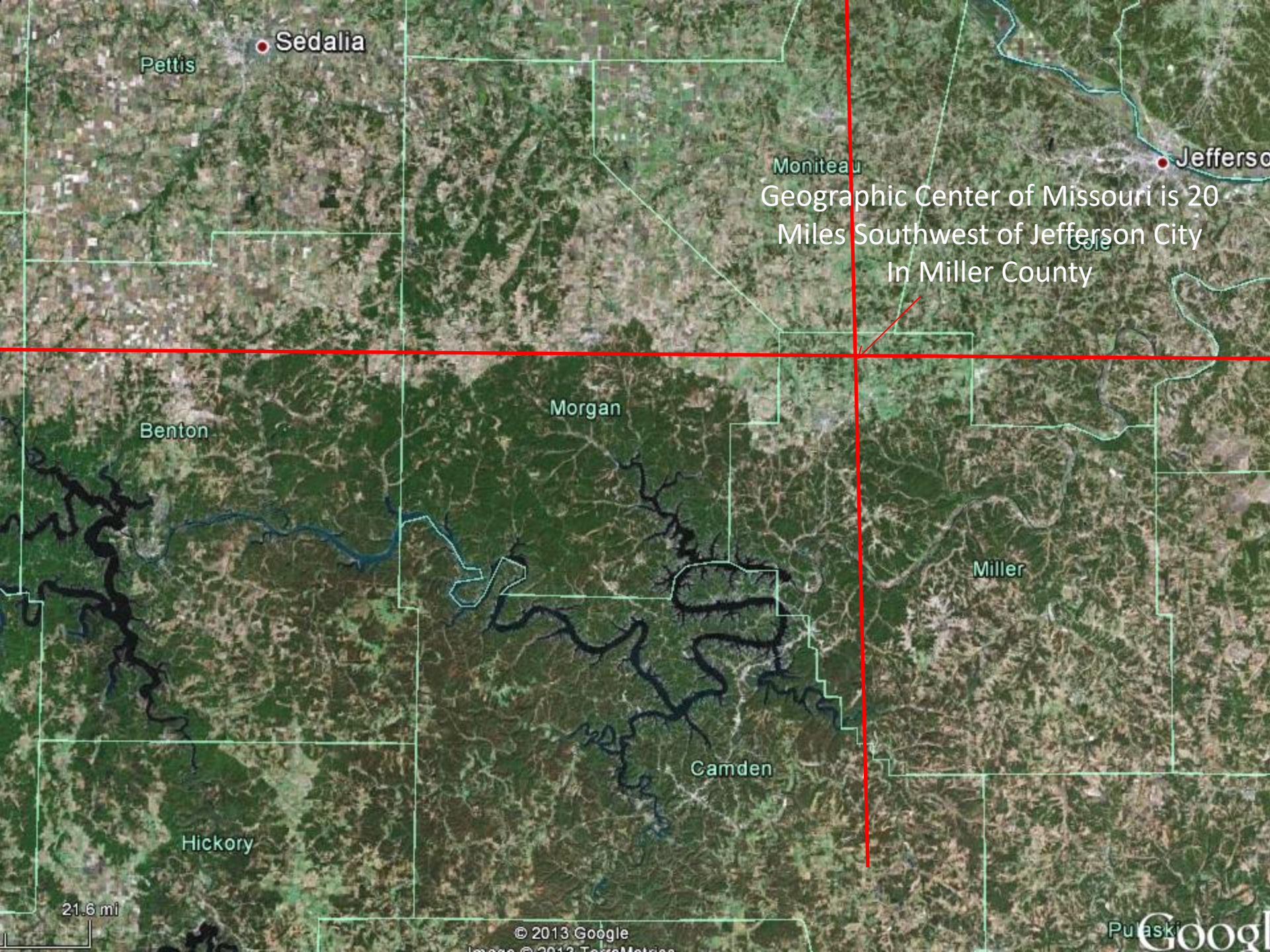


Morgan County, Missouri 1904 Map



Locations shown include: Akinsville, Alvin, Barnett, Bebra, Boylers Mill, Corcyra, Enid, Excelsior, Florence, Gladstone, Glensted, Gravois Mills, Lodema, Proctor, Pyrmont, Riverview, Stover, Syracuse, Todd, Versailles

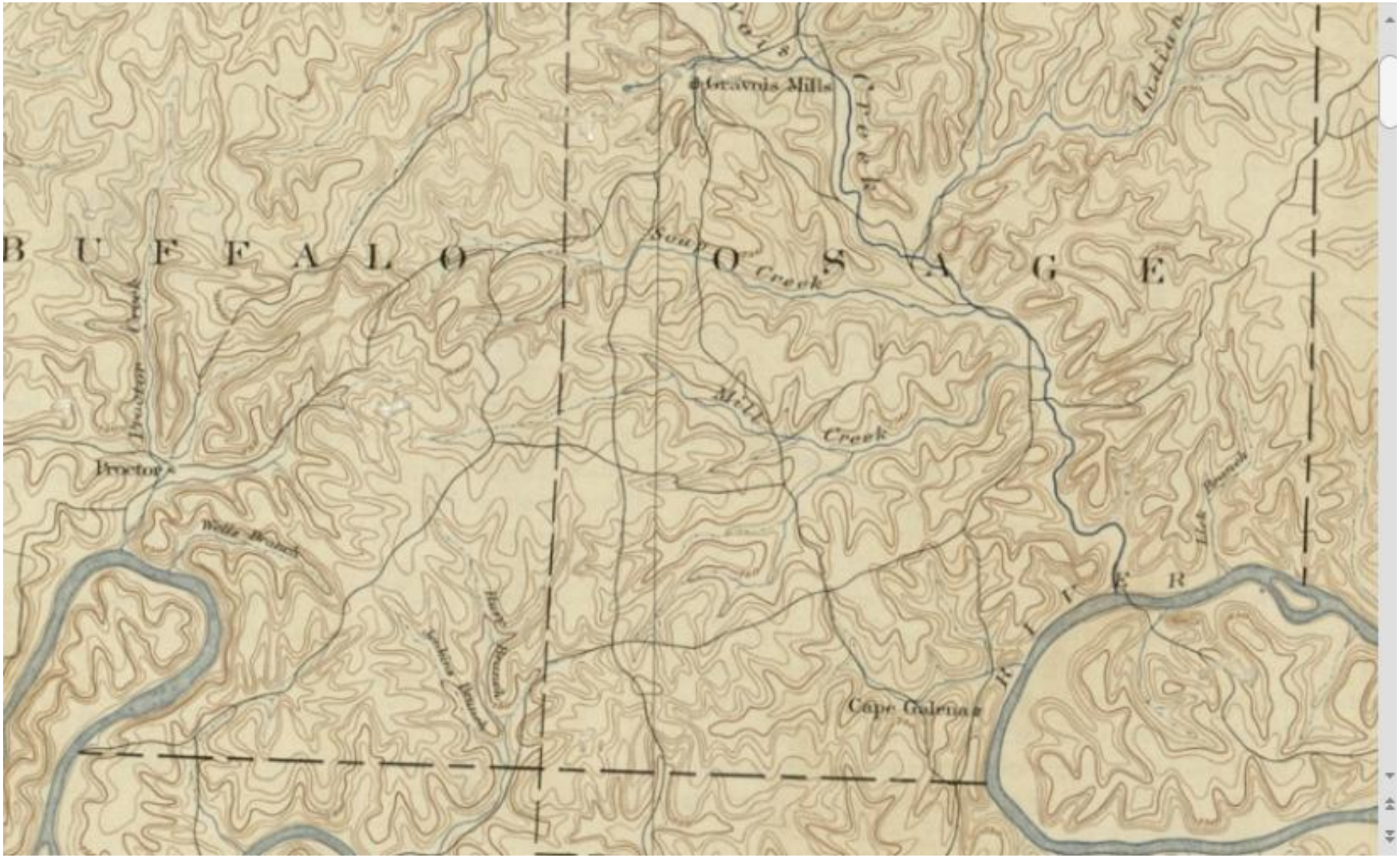

Where is Morgan County in Missouri?
The answer may surprise you!
Geographic Center of Missouri is 20 Miles Southwest of Jefferson City In Miller County
St. Louis
Missouri
124 mi
Image © 2013 TerraMetrics
© 2013 Google


Sedalia
Pettis
Moniteau
Jefferso
Geographic Center of Missouri is 20 Miles Southwest of Jefferson City In Miller County
Benton
Morgan
Miller
Camden
Hickory
21.6 mi
© 2013 Google

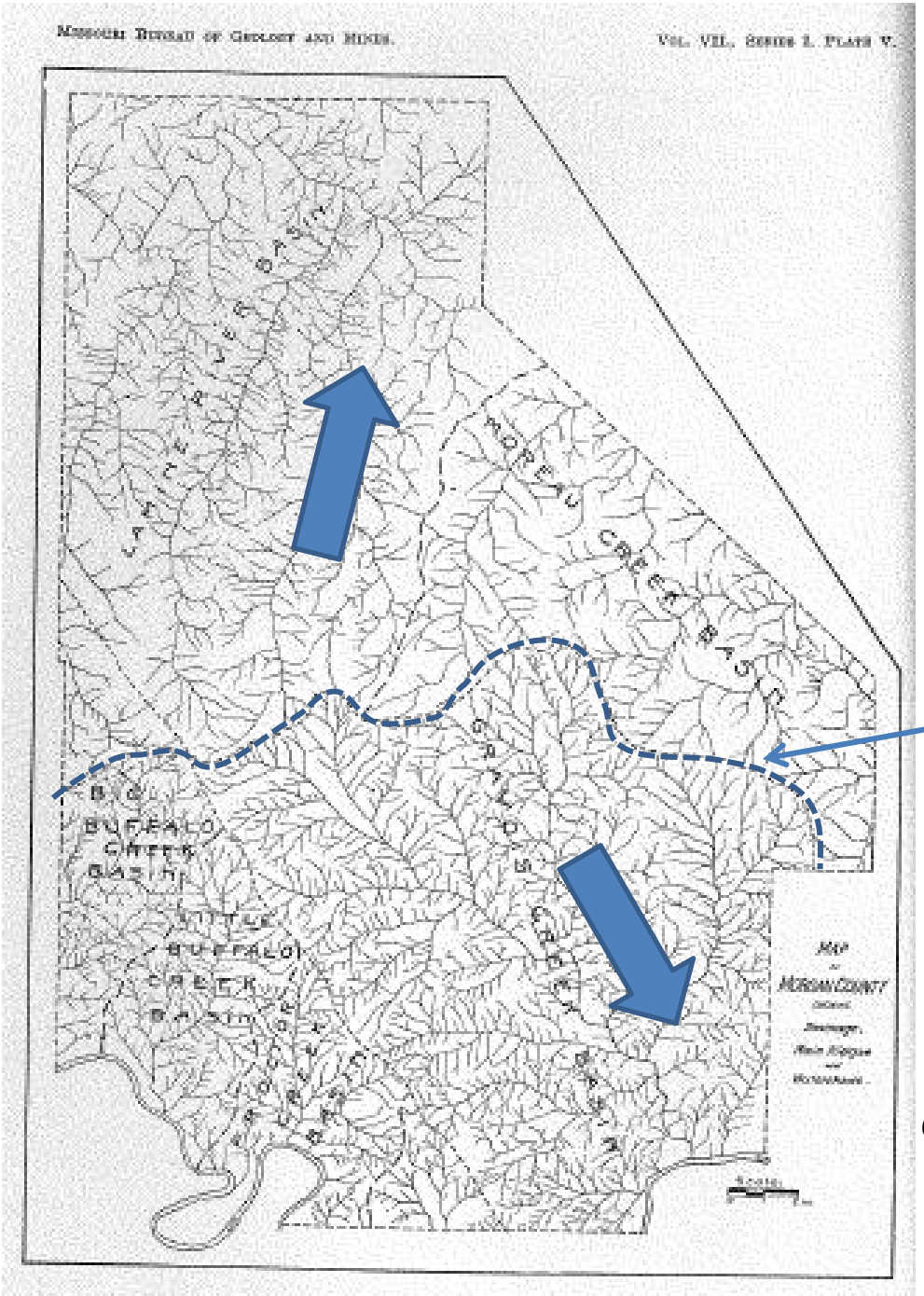
Topographic, Geologic and Hyrdologic Features of Morgan County, Mining, Geologic Curiosities and Mysteries

- Topography
- Minerals and Rocks
- Formations, Subsurface and Surface Geology
- Soils
- Water and Wells
- Karst (Caves, Springs, Natural Bridges-Tunnels, Sinkholes, Sinkhole Ponds, Losing Streams)
- Faults and Fractures
- Mines and Quarries (Mining History)
- Geologic Curiosities: Dry Sink, Chamberlin's Pit, Elephant Rocks (Graydon Sandstone Boulders), Wolf-Den Mine-Cave, Artisan Wells
- Geologic Mysteries: Mineral springs near Versailles, Attners Bluff Cave, Big Gravois Cave, Christmas Tree Cave, Wolf Cave, Lost Silver Mine

Topography (surface elevation)



Topographic map Morgan County, 1886

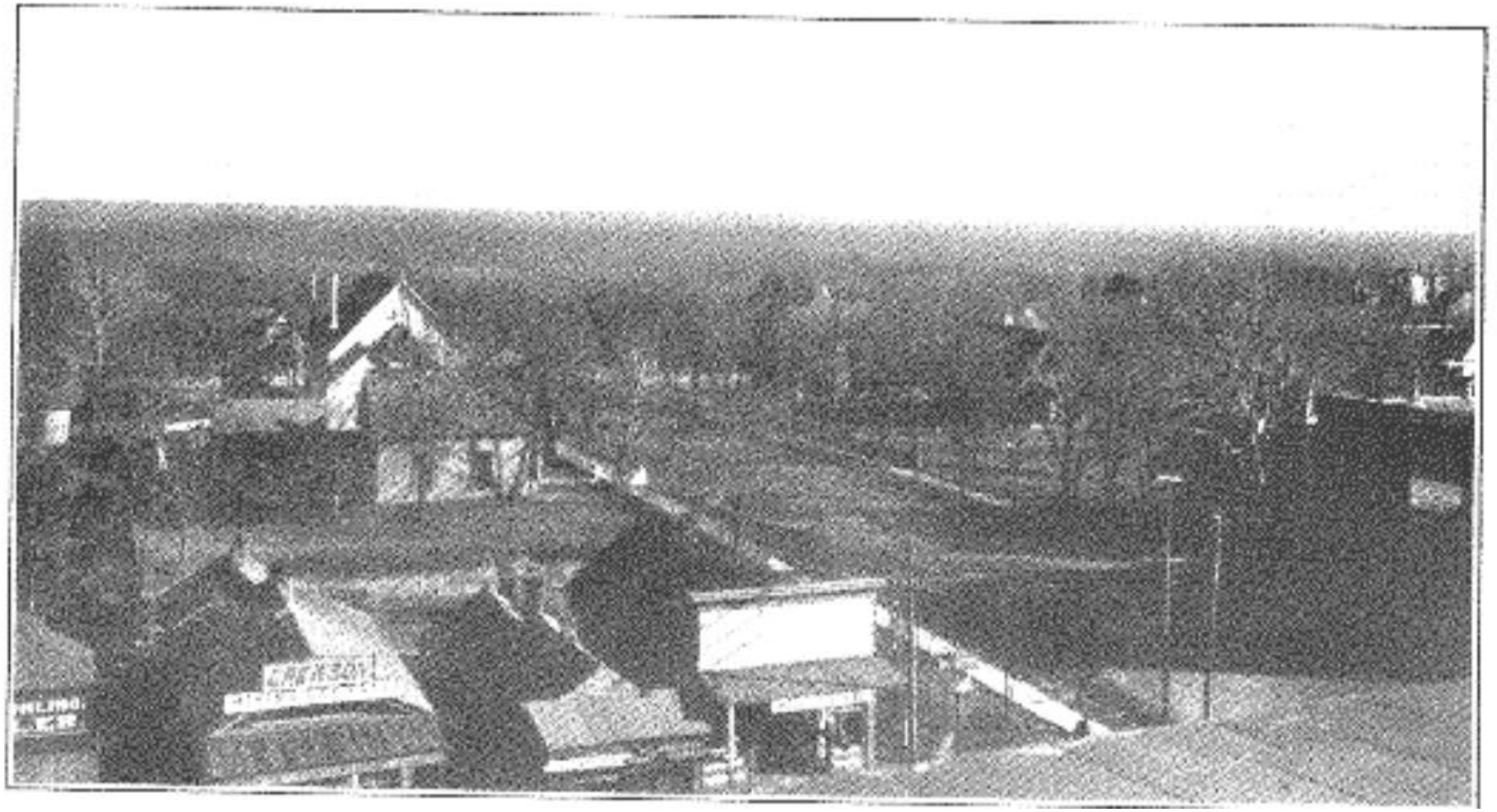


Topography generally higher to the north than to the south, although the south part of the county contains the topographic high and low

Drainage -all water in county eventually goes to the Missouri River

Topographic Divide- Along Highway 52 and Rock Island Rail Line

Geology of Morgan County ,p.8, Marbut, 1907



View from Versailles looking southeast, p.6,
Geology of Morgan County, Marbut, 1907

View from Versailles Elementary school looking southeast

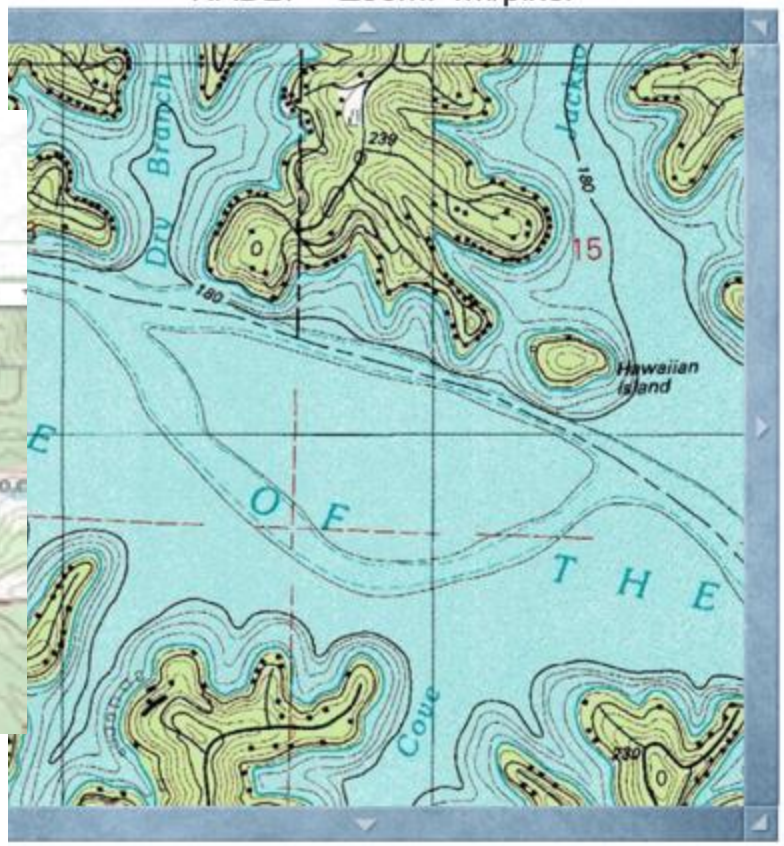
GENERAL VIEW OF GRASSY OPEN WOODLANDS.
Proctor Creek Basin.

Geology of Morgan County, Introduction, Marbut, 1907

- Topography

- High Pt 1181’/Low Pt 571’
- Range of 610’

USGS Map Name: Lake Ozark, MO Map MRC: 38092B6
Map Center: N38.21968° W92.69370° Datum: NAD27 Zoom: 4m/pixel



Morgan County High Point, Missouri

Elevation: 1181 feet, 360 meters

Elevation Info:	NAVD88 Elevation: 1181 ft / 360 m
Latitude/Longitude (WGS84)	38° 22' 6" N, 92° 58' 53" W 38.36821, -92.98133 (Dec Deg) 501631E 4246670N Zone 15 (UTM)

This peak has 1 other candidate high point areas:

Area	Elevation	Map Name	Map View
Area 2	1181	Stover	Center Map

Country	United States
State/Province	Missouri
County/Second Level Region	Morgan (Highest Point)

Links

Search Engines - search the web for "Morgan County High Point":

Wikipedia Search
Microsoft Bing Search
Google Search
Yahoo Search

Google Maps Dynamic Map

- Main Minerals/Rocks of Morgan County

- Minerals

- Dolomite-Ca $Mg(CO_3)_2$
- Calcite-$CaCO_3$
- Quartz-SiO_2
- Clays- complex: composed of aluminum, SiO_2 and water
- Barite (Tiff)-$BaSO_4$
- Sphalerite (Jack)-ZnS
- Galena (Lead ore)-PbS

- Rocks

- Dolomite Rock/Dolomite Mineral
- Limestone Rock/Calcite Mineral
- Sandstone Rock/Quartz Mineral
- Chert Rock/Quartz Mineral

Carbonate and silica minerals in Morgan County

Dolomite Crystals- $CaMg(C0_3)_2$

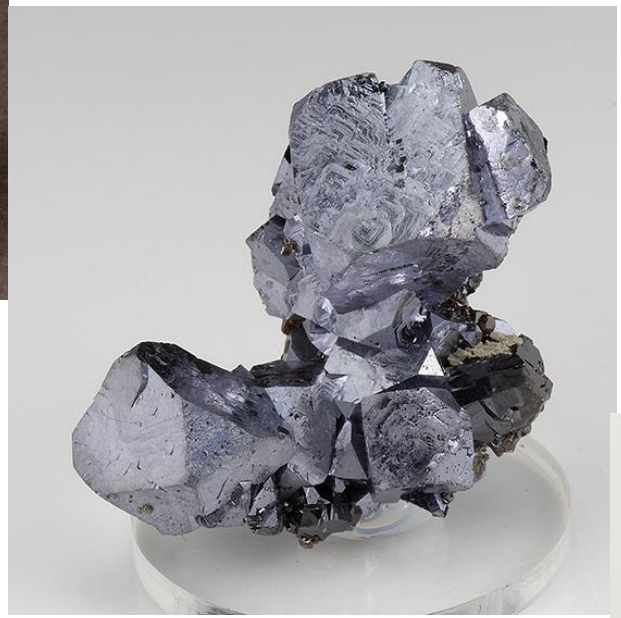
Calcite Crystals- $CaC0_3$

Quartz Crystals- SiO_2

Clays- complex: composed of aluminum, SiO2 and water

Mined sulfur minerals in Morgan County

Barite-Tiff ($BaSO_4$) –
Lamb Mine, Gravois Mills, Morgan County, Missouri. Tabular barite crystals are on a massive barite matrix. The Lamb Mine closed in the 1950's.



Galena -Lead ore (PbS)

Sphalerite- Jack (ZnS)

Other mined materials in Morgan County

Coal -Stover coal mine

Rock/stone -Siegel limestone quarry

Sand and gravel

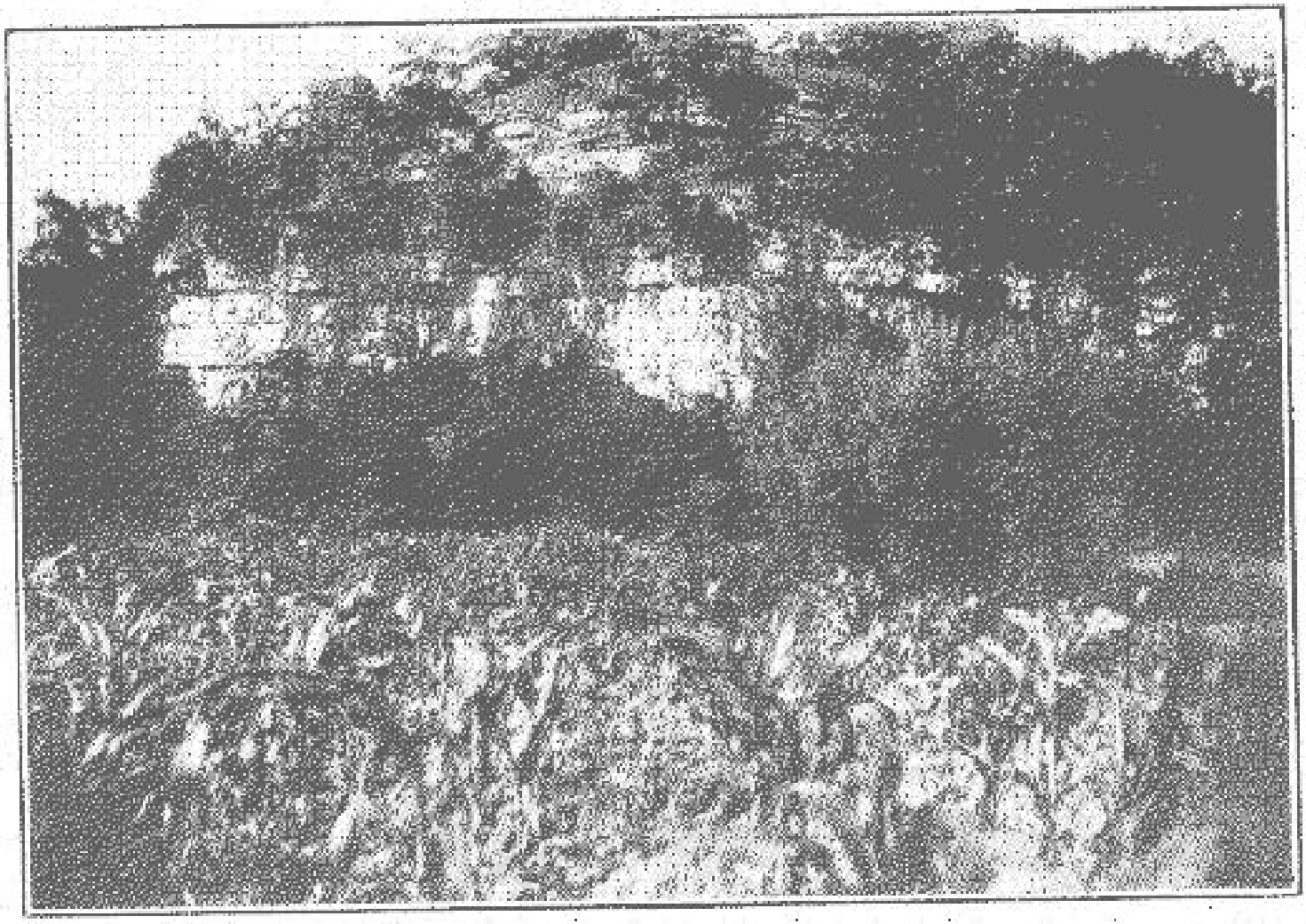
Surface Geology- Rocks in Morgan County

Gasconade Dolomite

Limestone and dolomite

Roubidoux Sandstone

Chert (Flint)

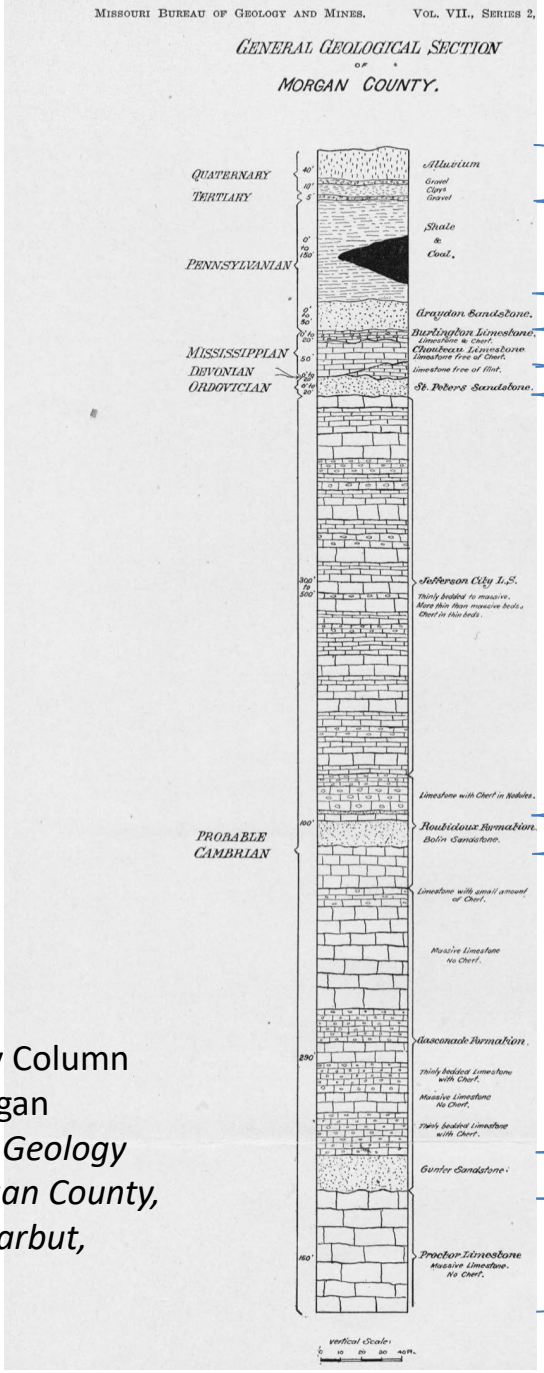


PROCTOR LIMESTONE CAPPED WITH GUNTER SANDSTONE.

Mouth of Proctor Creek.

Geology of Morgan County, p.25, Marbut, 1907

Suburface Geology- Rocks in Morgan County



Geology Column for Morgan County, *Geology of Morgan County, p.18, Marbut, 1907*

<u>Soil, clay, gravel, sand</u>

<u>Shale, coal</u> *(Stover Coal Mine)*

<u>Sandstone</u> *(Elephant rocks in south)*

<u>Limestone</u> *(located in northwest)*

<u>Sandstone</u> *(located in northwest)*

<u>Cherty dolomite</u>
(primary bed rock in north)

<u>Sandstone</u>
(forms ridge-tops in south)

<u>Cherty dolomite</u>
(location of most caves and springs, forms valleys in south)

<u>Sandstone</u> *(water well target in south and central)*

<u>Dolomite</u> *(oldest exposed rocks in southwest)*

GENERAL GEOLOGY. 19

The formations found in Morgan county numbered from the top downward are as follows:

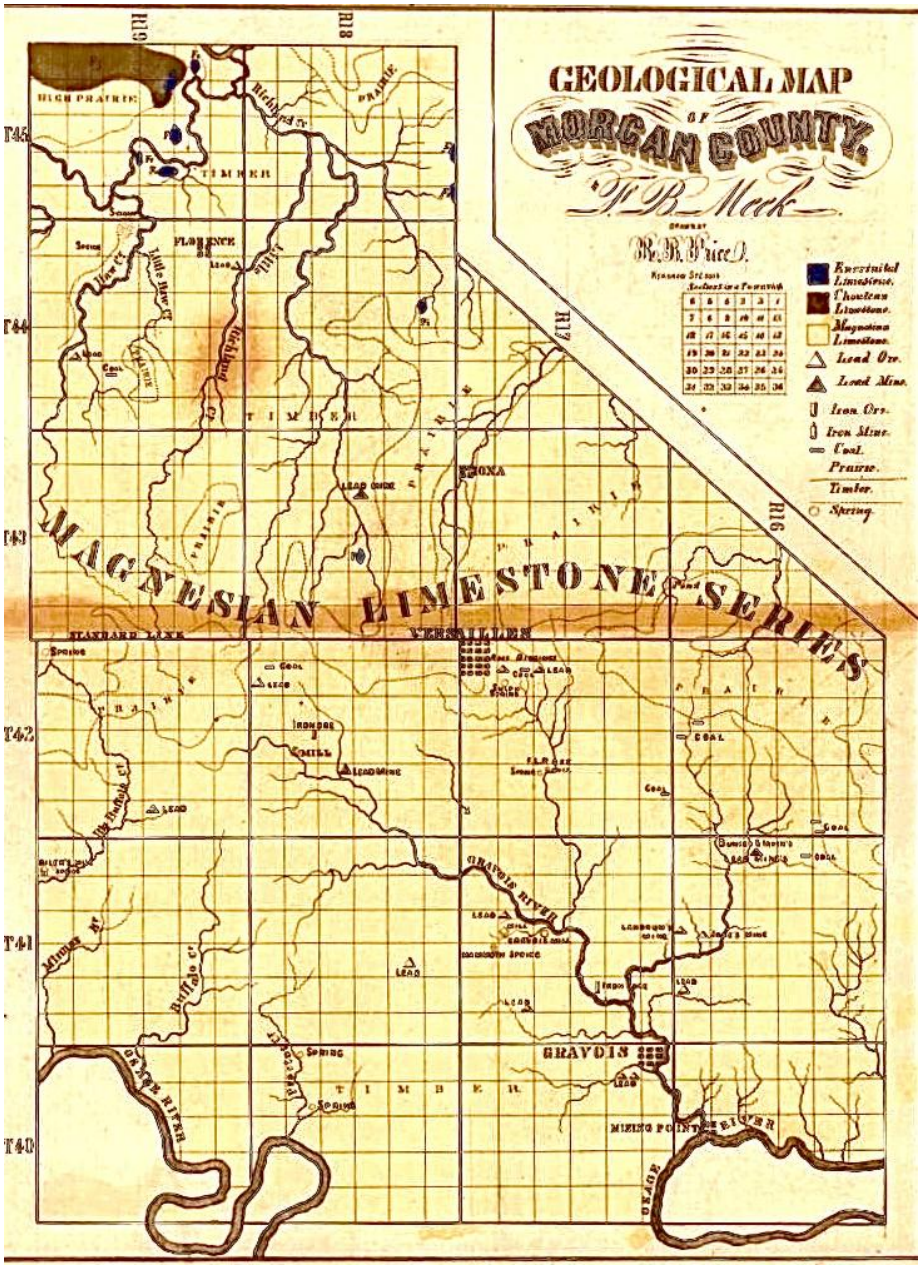
1. Modern Alluvium.
2. High level gravels.
3. Pleistocene clays.
4. Lafayette gravels.
5. Pennsylvanian shales and coal.
6. Graydon sandstone.
7. Burlington limestone.
8. Chouteau limestone.
9. Devonian limestone.
10. St. Peters sandstone.
11. Jefferson City formation.
12. Roubidoux formation.
13. Gasconade formation.
(Including Gunter sandstone.)
14. Proctor formation.

Cenozoic.	Recent.		Alluvium. High level gravels on Osage and LaMine.
	Pleistocene.		Surface clays.
	Tertiary (?)	Lafayette (?)	Upland gravels.
Paleozoic.	Carboniferous.	Pennsylvanian.	Shales, Coals.
			Sandstone.
		Mississippian.	Burlington limestone.
			Chouteau limestone.
	Devonian.	Devonian limestone.	Devonian limestone.
	Ordovician.	St. Peters.	Sandstone.
	Probable Upper Cambrian.	Jefferson City formation.	Magnesian limestone.
		Roubidoux formation.	Cotton rock. Bolin sandstone member. Cherty magnesian limestone and chert.
		Gasconade formation.	Massive crystalline magnesian limestone. Massive and thin bedded limestone and chert. Gunter sandstone member.
		Proctor.	Magnesian limestone.

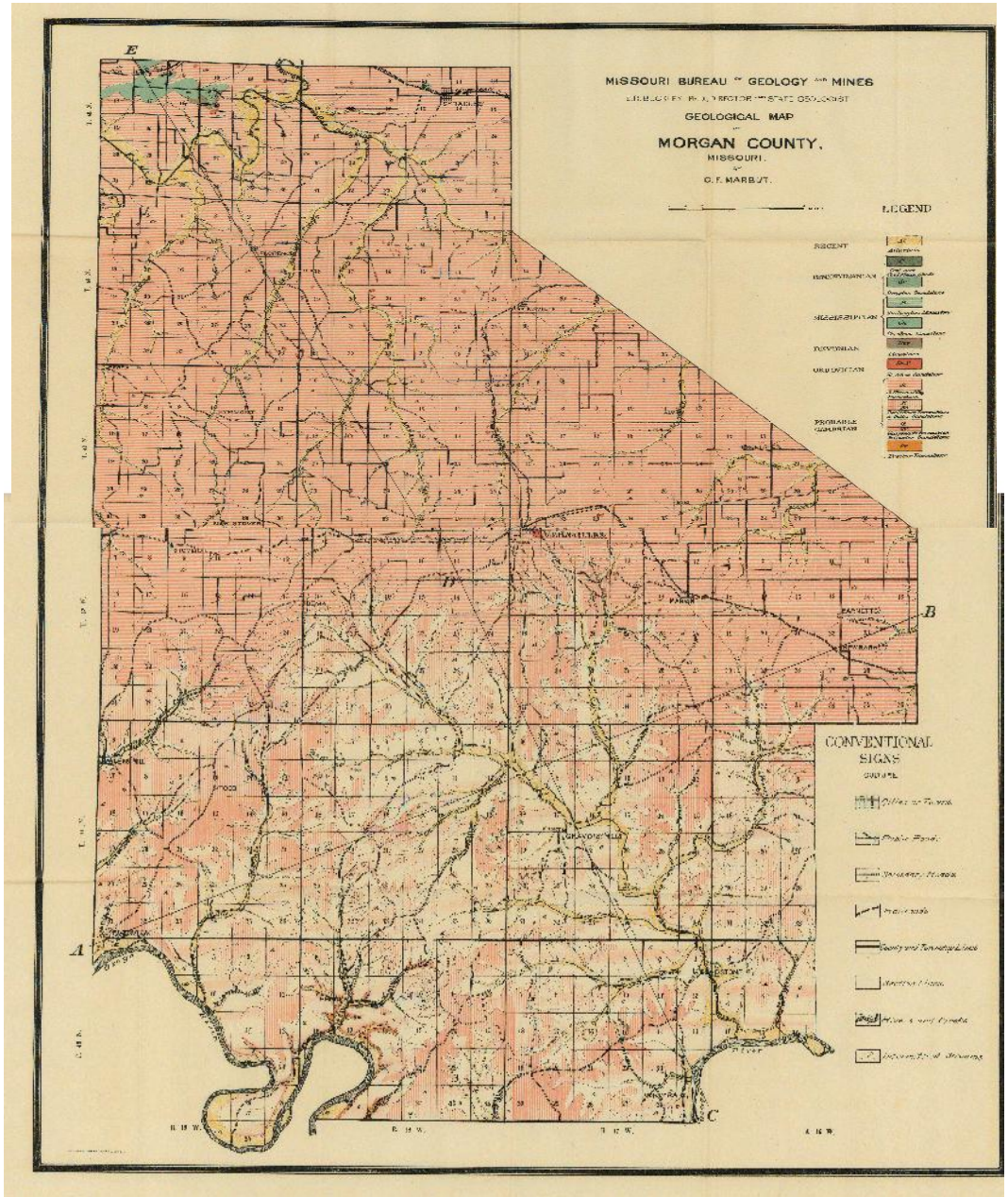
The rocks of Missouri petrologically are of three kinds. (1) Pre-Cambrian igneous, (2) a great series of lower and middle Palaeozoic limestones, magnesian limestones and dolomites, and a series of upper Palaeozoic shales, sandstones and limestones. Igneous rocks, limestones, shales and sandstones constitute the great body of Missouri rocks. They are not mixed indiscriminately

Mineral deposits of Morgan County Missouri, p.19 ,Mather, 1946

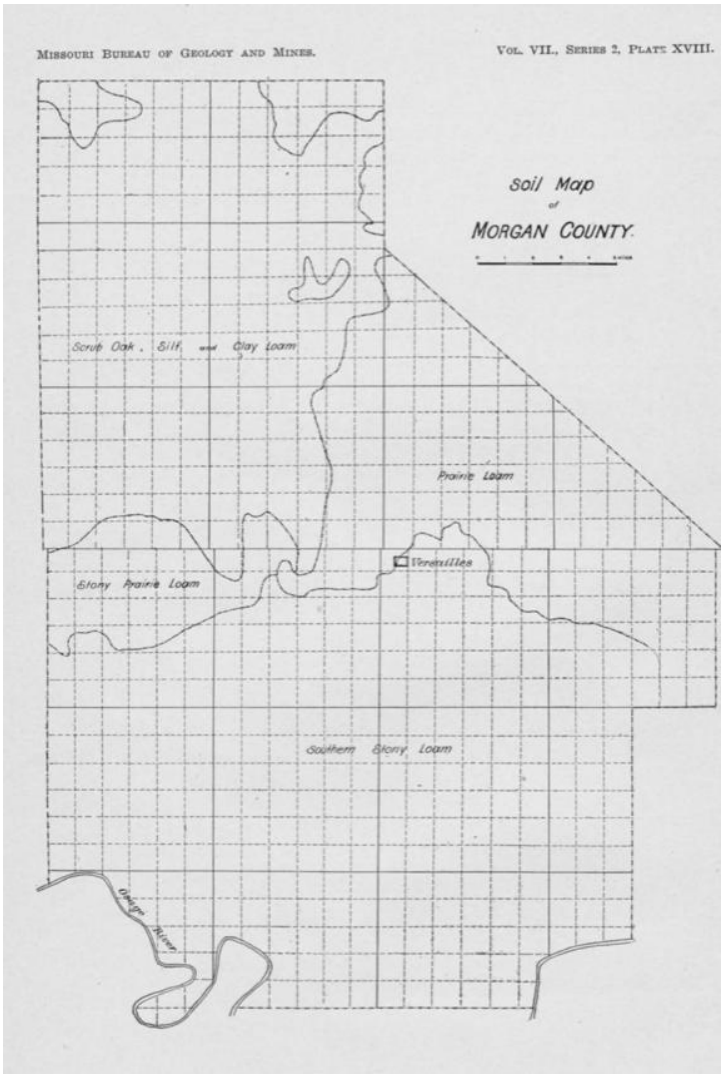
Geologic Map Morgan County 1857 (Meek)



Morgan County Surface Geologic Map 1907 (Marbut)



Generalized Soil Map of Morgan County



Geology of Morgan County, Plate XVIII, Marbut, 1907

Detail Diagram of Soil Development

4. Goss-Gravois Association

Extent of the association:
50 percent of the survey area

Composition:
Goss and similar soils—50 percent
Gravois and similar soils—46 percent
Minor soils—4 percent (Cedargap, Hartville, Rueter, and Winnipeg)

Landscape (fig. 5)**:**
Goss—narrow ridgetops and side slopes
Gravois—ridgetops and side slopes

Parent materials:
Loess and residuum

Slope range:
3 to 35 percent

Slope configuration:
Convex and complex

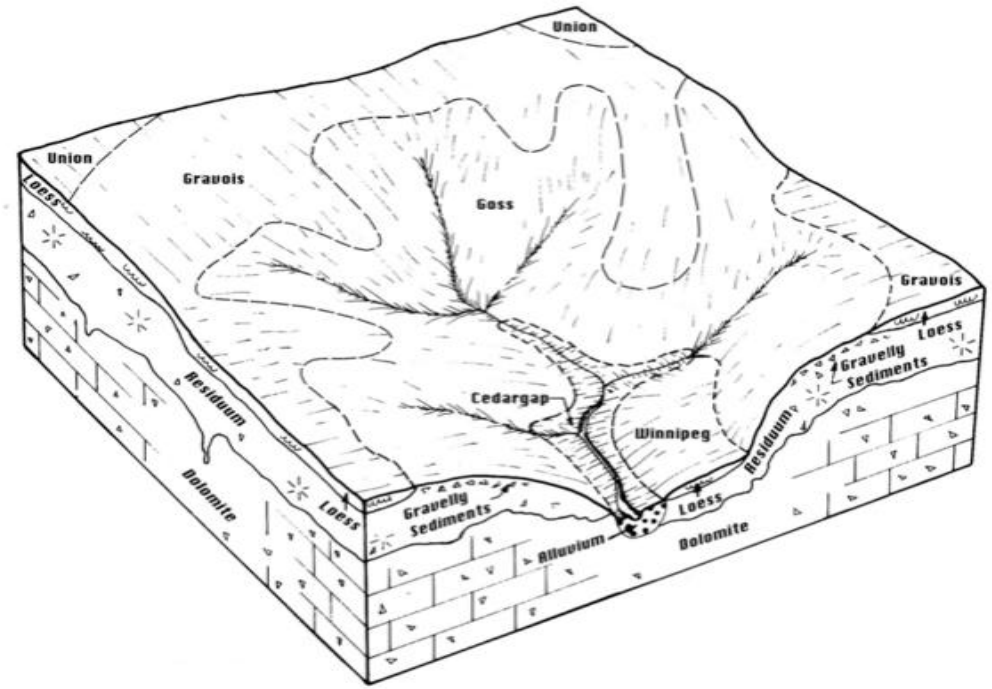
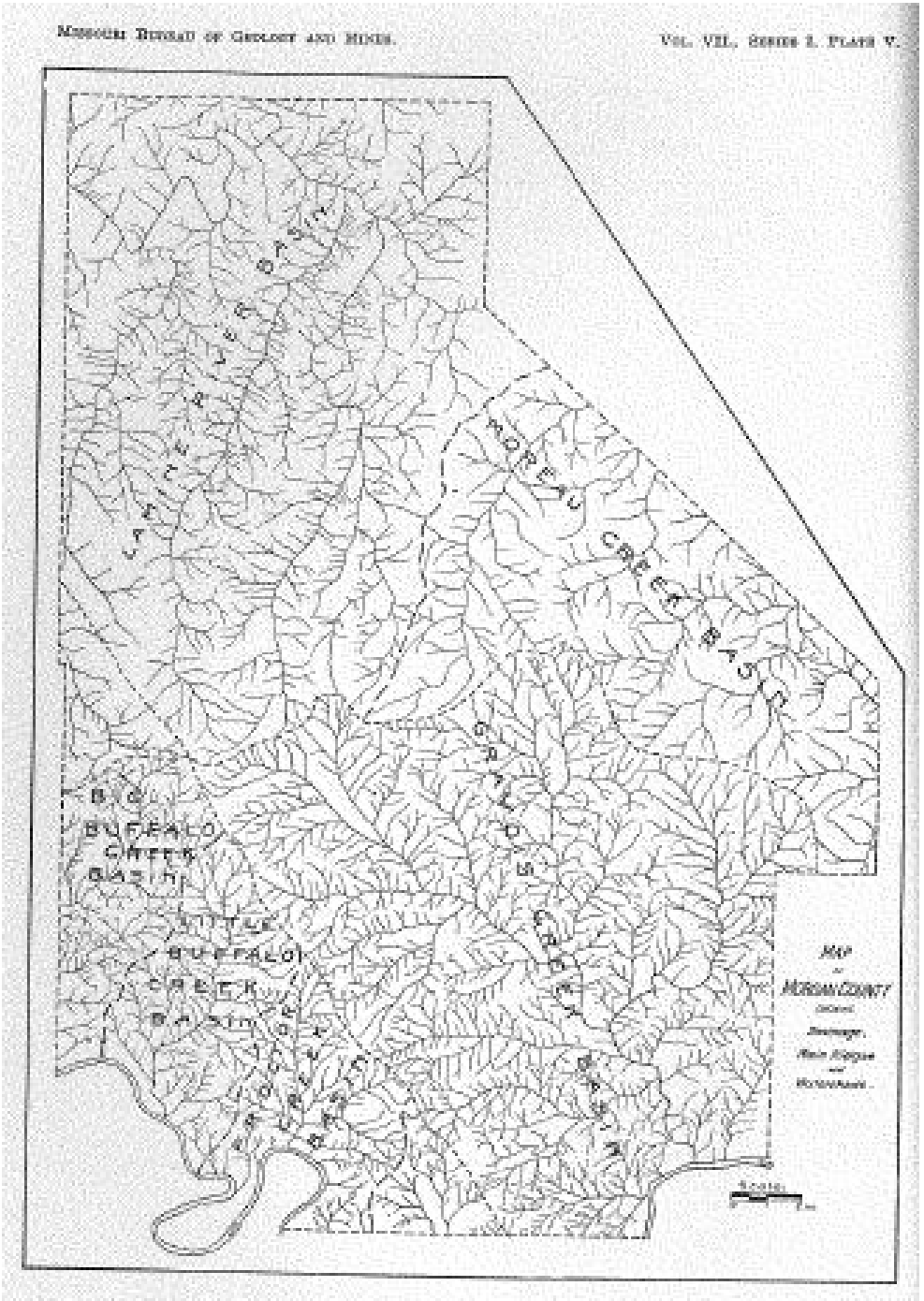


Figure 5.—Typical pattern of soils and parent material in the Goss-Gravois association.

Soil Survey of Morgan County, Missouri, USDA ,page 18, Wolf, 1995

Water and Wells: Rainfall

- 27,154 gallons fall on one acre after an inch of rainfall (226,464 lbs/acre or .62 gallons/sq-ft or 5.2 lbs/sq-ft).
- In a typical year, 695 million gallons of water fall on a section of land near the Lake of the Ozarks
- The weight of this water on a section of land is equivalent to 2.9 million Tons.
- Four wells in county drilled to granite



Drainage -all water in county eventually goes to the Missouri River

Geology of Morgan County ,p.8, Marbut, 1907

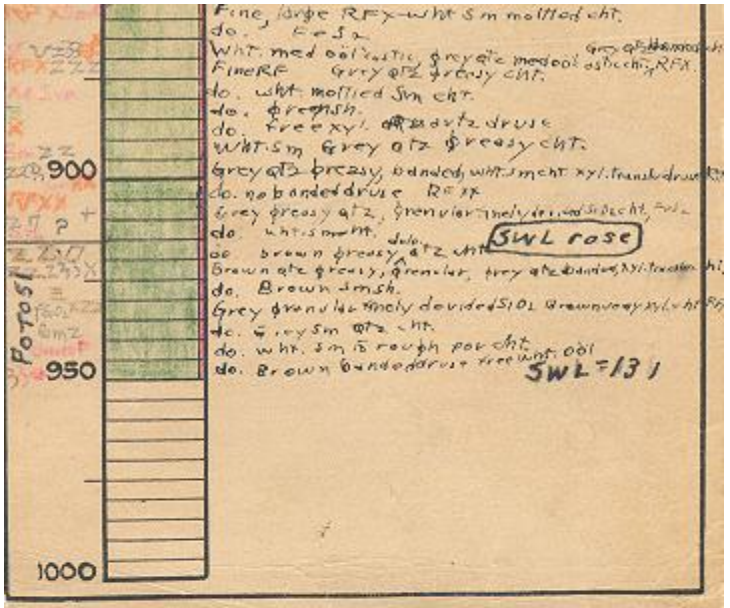
W. L. S. 34

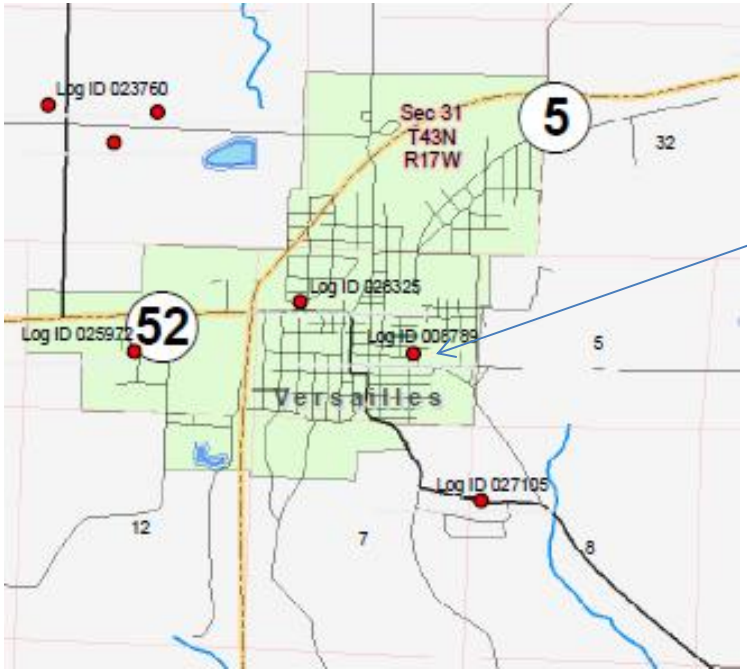
MISSOURI BUREAU OF GEOLOGY & MINES, ROLLA MO

MO SURVEY Nº	OWNER
8789	Versailles City Well
COUNTY: Morgan	FARM: (new #3) — WELL Nº: 2
T: 42 N. — R: 17W. — se cor lot 69	DRILLER: George Brainard
	DATE: 4/23/45-5/45
6 x	ELEVATION: 1022 P. A. — PRODUCTION: 200 GPM 69' D.D.
	SAMPLES STUDIED: R. S. Watson & J. Grohskopf

REMARKS: 347 ft. of O.D. 8.625 inch pipe grouted.

SWL 131





CHEMICAL WATER ANALYSIS
PARTS PER MILLION

T.D.S.	470.0	Alk.	280.0
Na	9.2	Cl	6.0
Mg	46.6	SO4	74.9
Ca	70.7	HCO3	341.5
Hard.	368.0	Fe	0.14
Analyst	S. B. H.		
Date	4-1-46	Remarks	

#20

CONFIDENTIAL

STATE OF MISSOURI
DIVISION OF
GEOLOGICAL SURVEY AND WATER RESOURCES

RELEASED

LOG NO. 28301

OWNER Gulf Mineral Resources

COUNTY Morgan

FARM

WELL NO. Lo-2A Lo-2

T 42N R 18W

DRILLER

DATE rcd 7-79 Comp 10-12-79

24

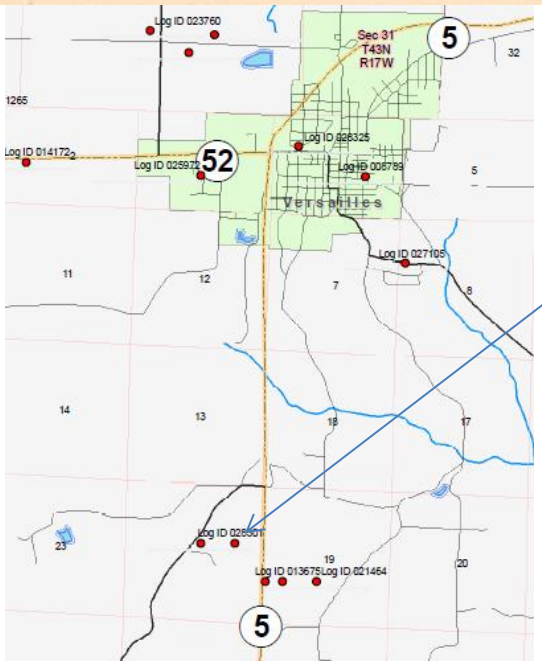
ELEV. 980

PROD. Mineral Test

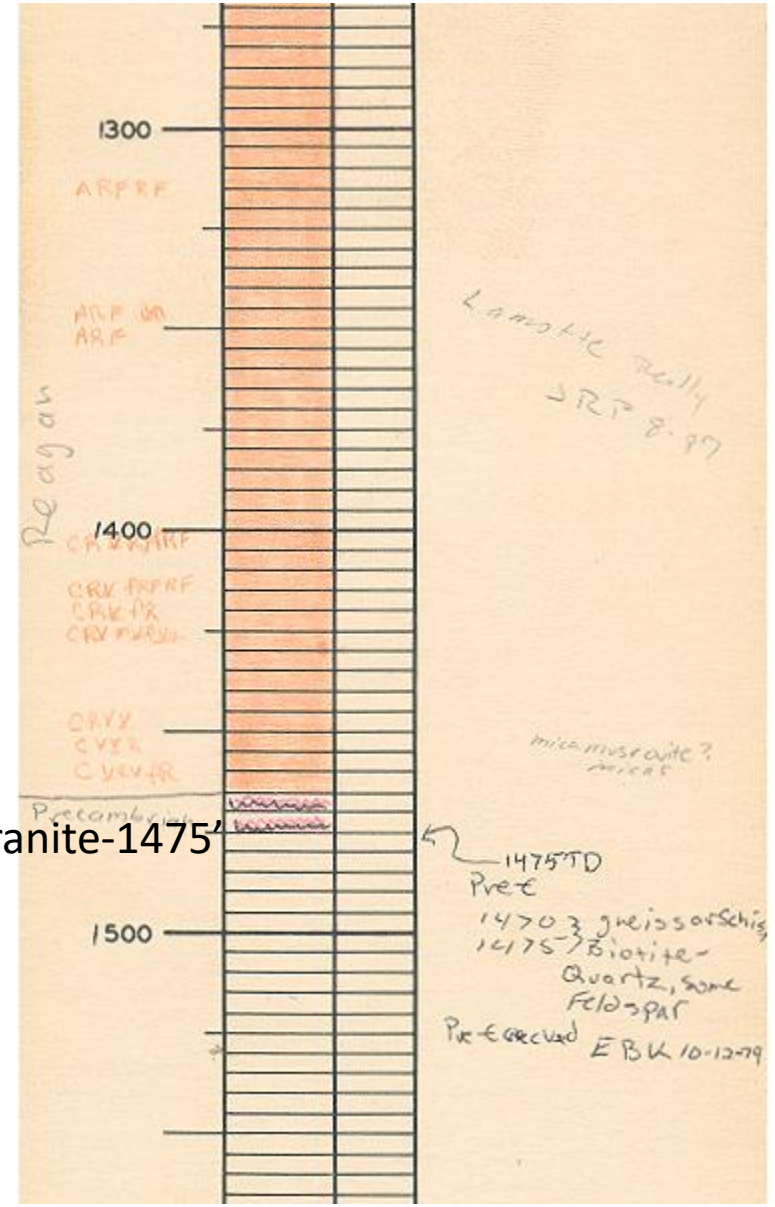
LOGGED BY J.R. Palmer 10-79

INDEX SHEET NO.

REMARKS SW, SW, NE



Granite-1475'

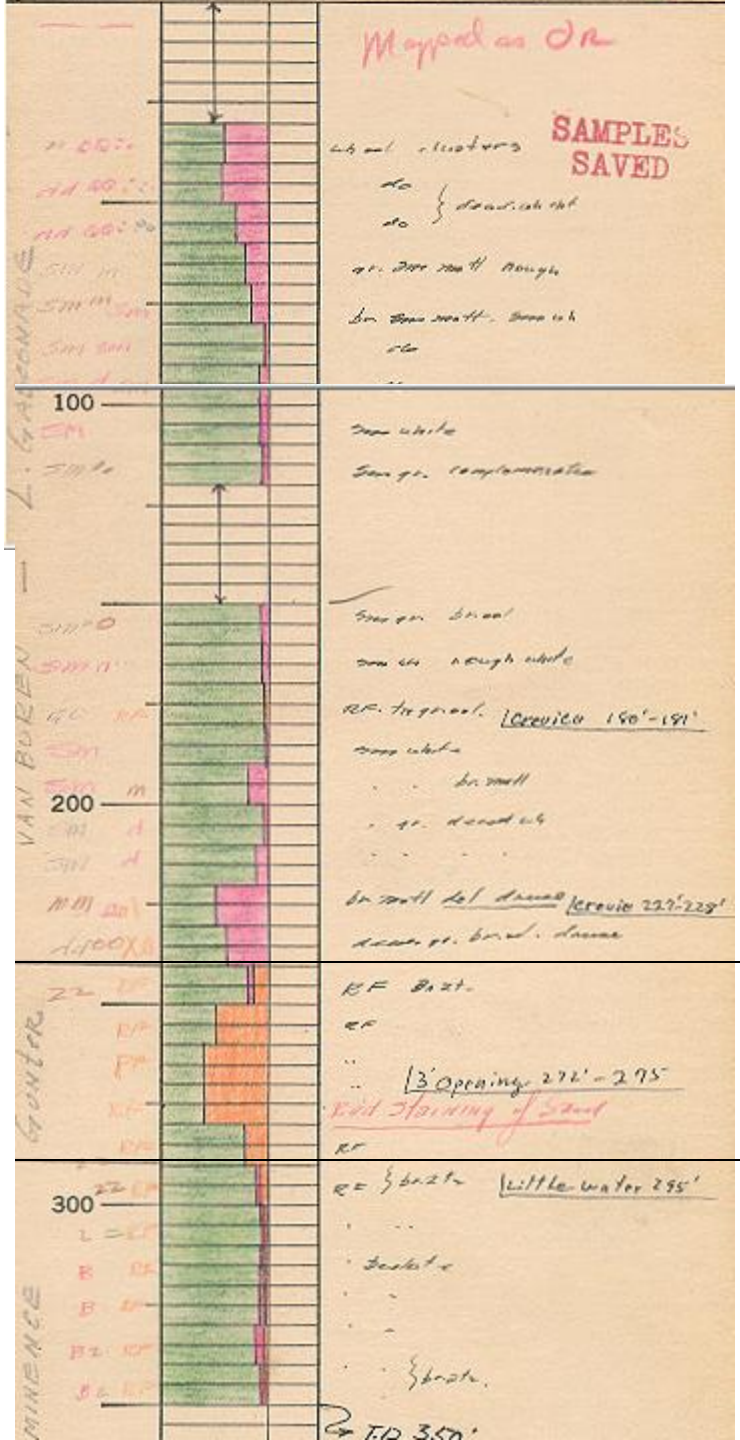


WR 575

STATE OF MISSOURI
DIVISION OF
GEOLOGICAL SURVEY AND WATER RESOURCES

LOG NO.	OWNER	
14,266	JAMES H. EDDY	
COUNTY	FARM	WELL NO.
MORGAN		2
T 40	R 17W	DRILLER RAYMOND VOGT
		DATE 10-7-47 10-18-47
	ELEV. 965 Anderson	PROD. Could not bail lower than 330'
	LOGGED BY M. Tracken 5-3-50	

REMARKS 4 Mi. W. of Junction #54 & #135 Hwy
34'of 8¾", 276'of 6¼" & 40'of 4⅞" Hole
35'of 6¼" casing. at 310' set 41'of 4⅞" Steel liner



Lower Gasconade >300’

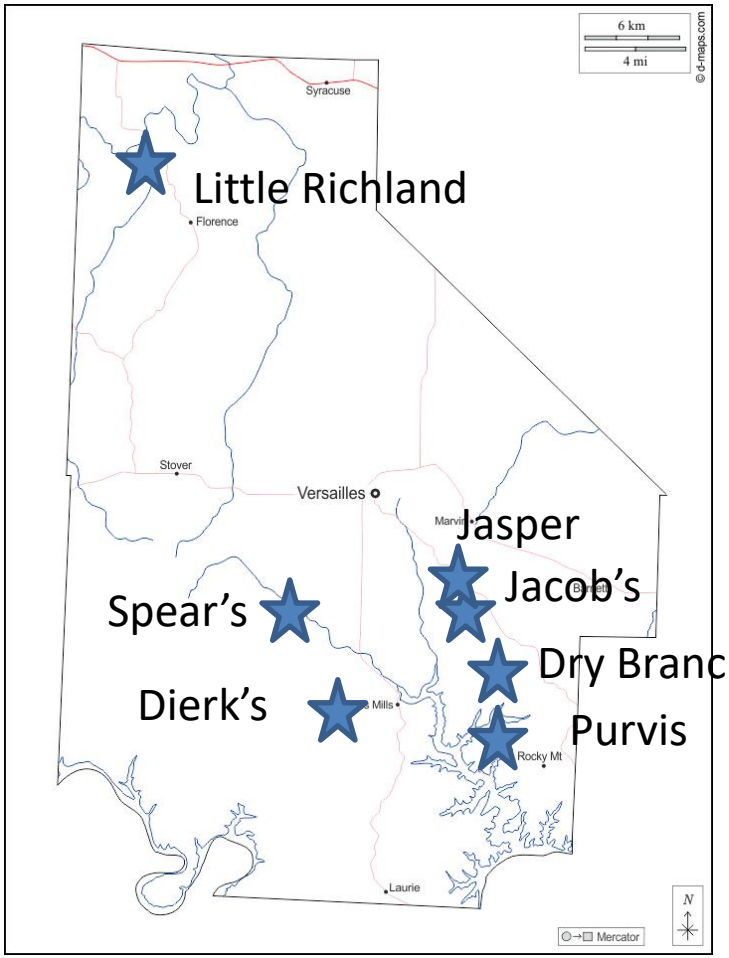
Gunter Sandstone -100’

Proctor or Eminence Dolomite - >125’

Caves

- 35 registered caves in Morgan County
- Longest cave is Jacob's at about ½ mile; Dry Branch is about ¼ mile long
- Deepest cave is Prairie Hollow at 140'
- Widest entrance-Dry Branch at 100'
- Tallest entrance-Spears at 50'
- Most caves are small at less than 100' in length
- Most caves are less than 100' from surface
- Most caves formed in Gasconade Dolomite

Cave Locations



Jacob's Cave

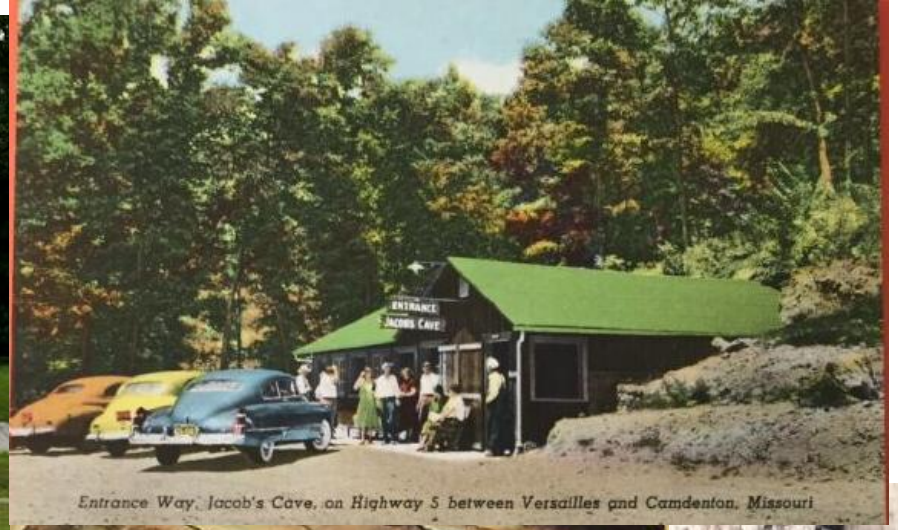

281
USGS
USGS
270
270
Jacobs
Cave
5
282
USGS
240
276
USGS
38-20.736N, 92-50.130W
USNG 15S WC 1437 4417
1000 ft
200 m

Jacob’s Cave

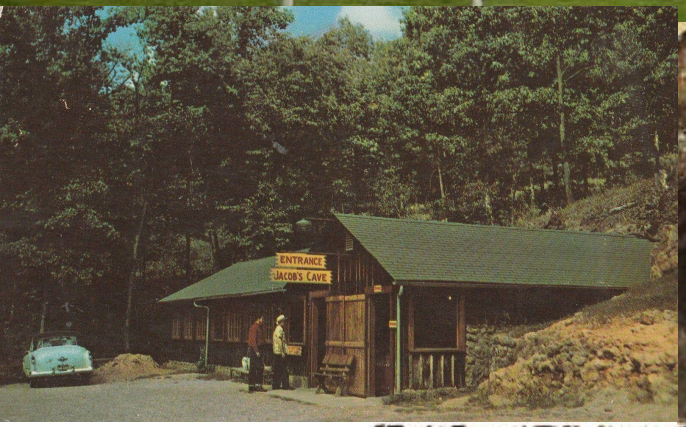
- **Jacob's Cave**

- The Jacob's Cave, seven miles south of Versailles, was first discovered by a miner *(Jacob Craycraft, August 8th 1865) (1)* who, in digging, opened out into a very large room. This had been explored half a mile without the end of it being discovered. (--*Hist. of Morgan Co*., p. 397 and *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*)
- "The Jacob's Cave was six miles or so south of Versailles. Jacob Craycraft discovered it in 1875 and explored back a half mile. Its extensive width, height, and constant temperature have made it usable as shelter, storage, picnics and outings." *Morgan County Missouri, 1833-1910, by Prudence Williams*

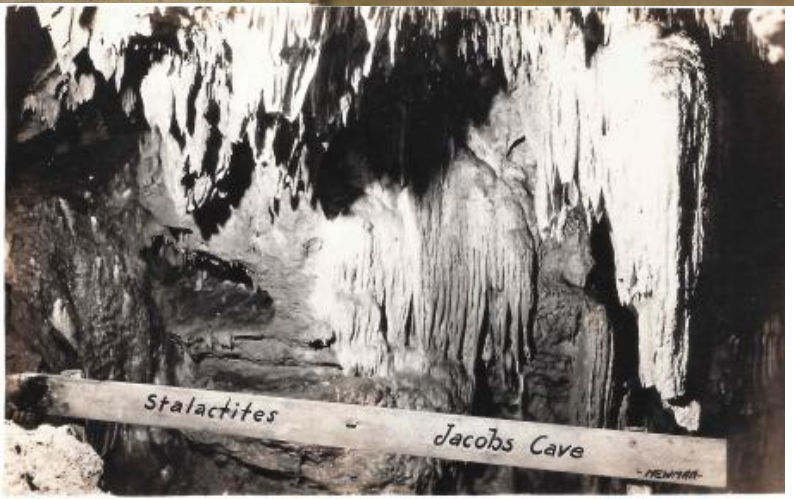
(1) History of Jacob's Cave http://www.jacobscave.com/jacobscavehistory.htm



Entrance Way, Jacob's Cave, on Highway 5 between Versailles and Camdenton, Missouri




"The Wishing Well," Jacob's Cave
in the Lake of the Ozarks Country



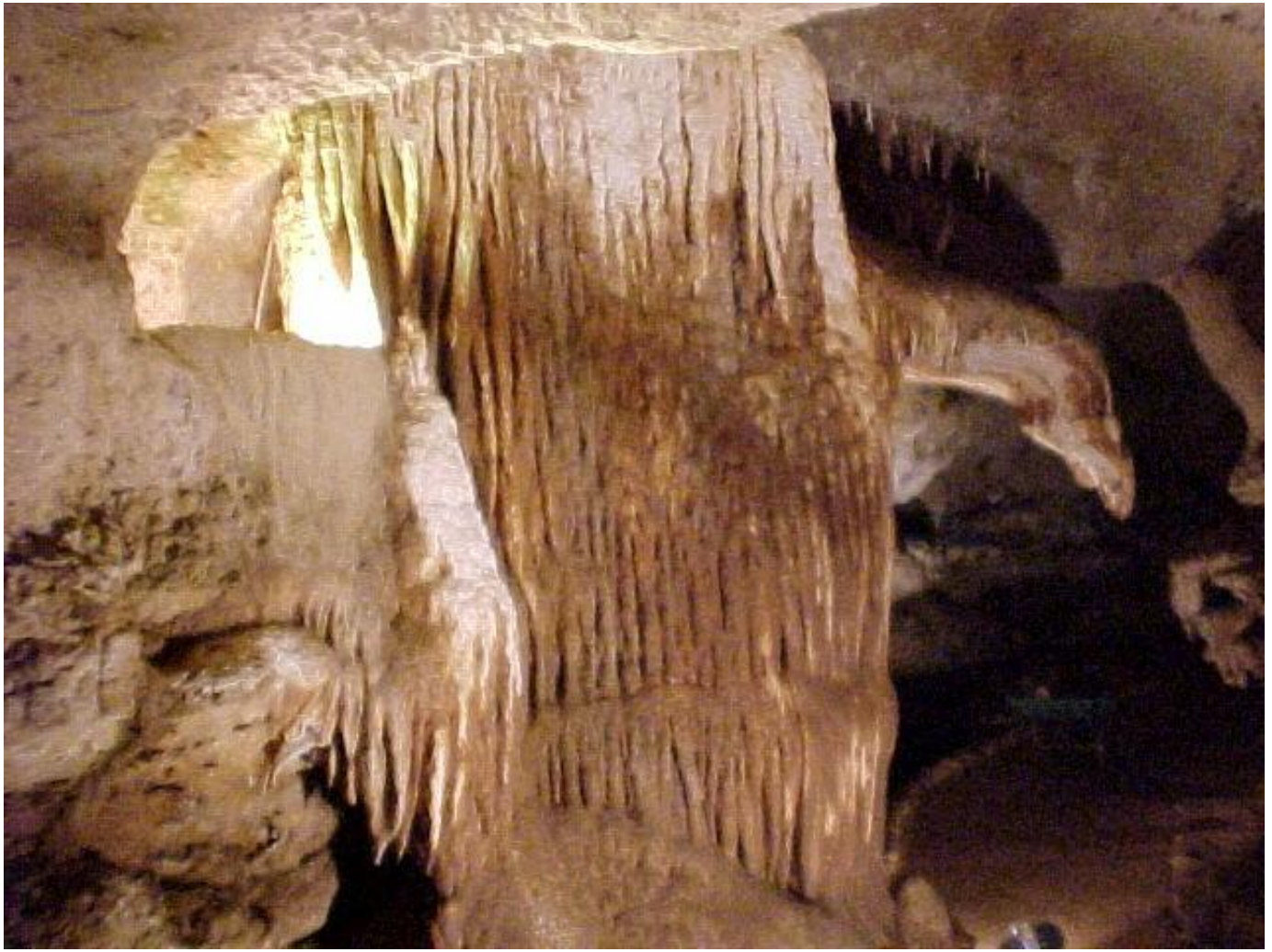
Jacob’s Cave- Entrance Pool

Pictures from Jacobscave.com

Jacob's Cave- Drapery

Pictures from Jacobscave.com

Jacob's Cave- Eagle's Wing



Pictures from Jacobscave.com

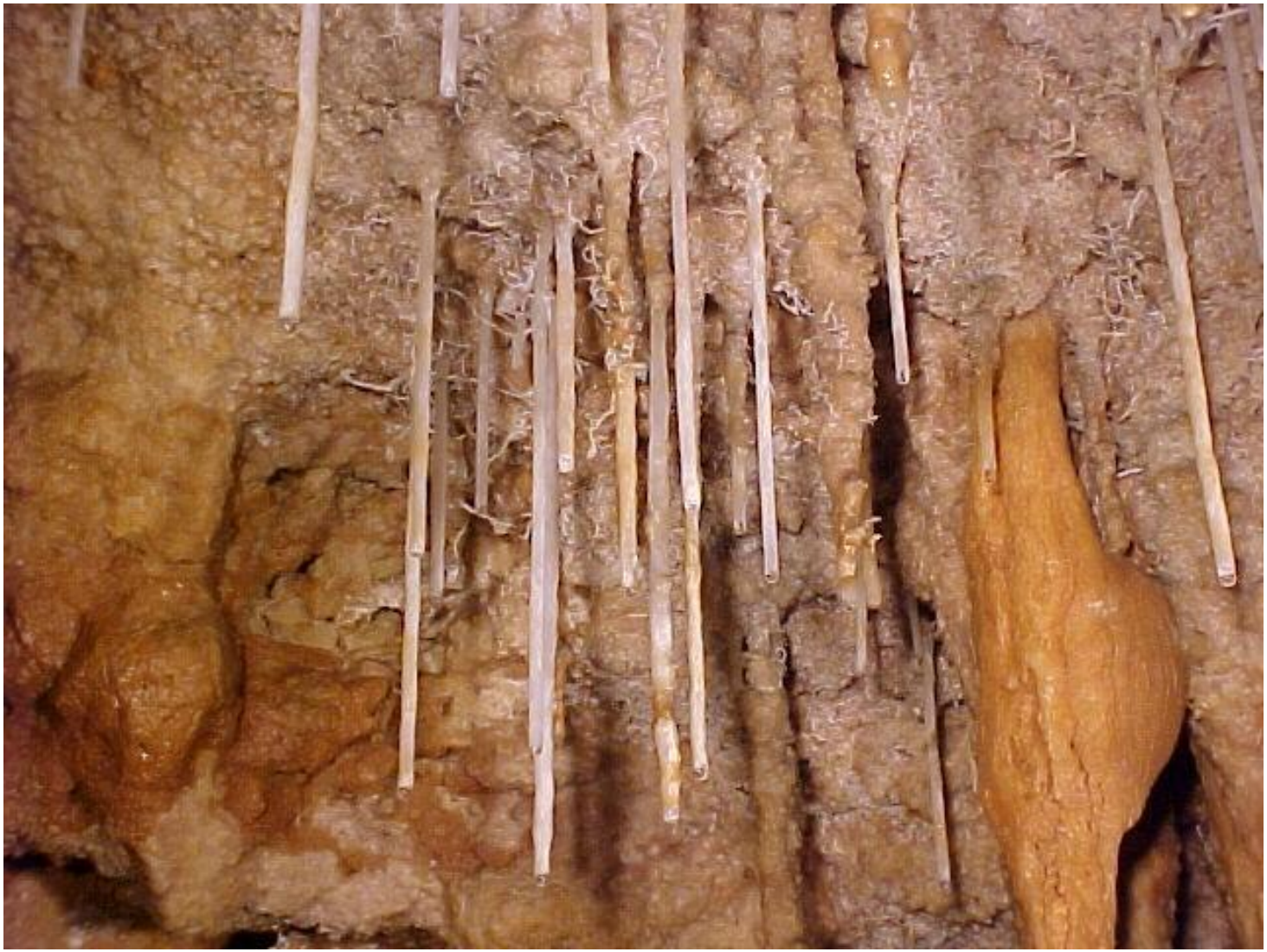
Jacob’s Cave- Elephant’s Head

Pictures from Jacobscave.com

Jacob’s Cave- Broken Column

Pictures from Jacobscave.com

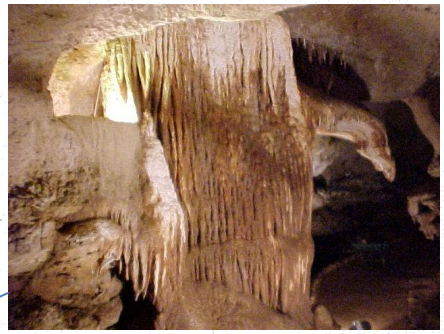
Jacob’s Cave- Soda Straws

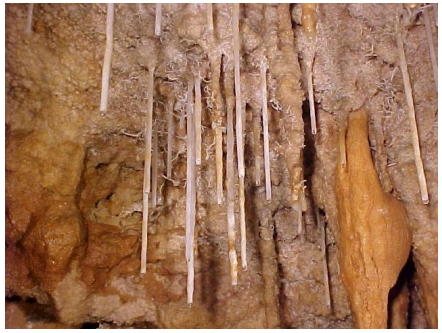


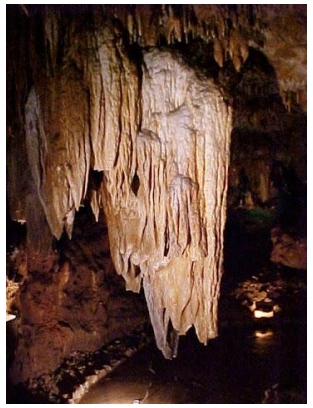
Pictures from Jacobscave.com

Jacob’s Cave- Soda Straw Helictitie

Pictures from Jacobscave.com





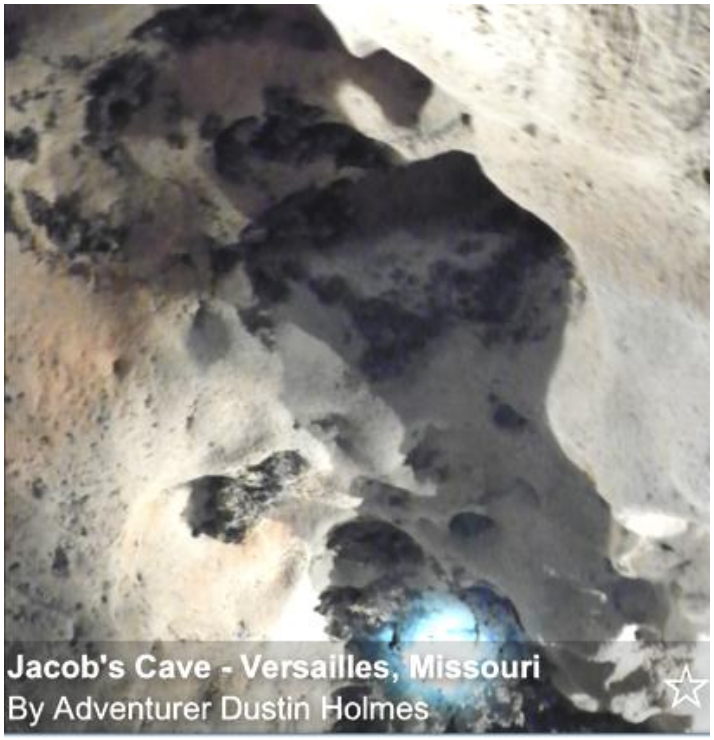


Pictures from Jacobscave.com


JACOB'S CAVE
MORGAN COUNTY
MAIN ENTRANCE

Jacob's Cave

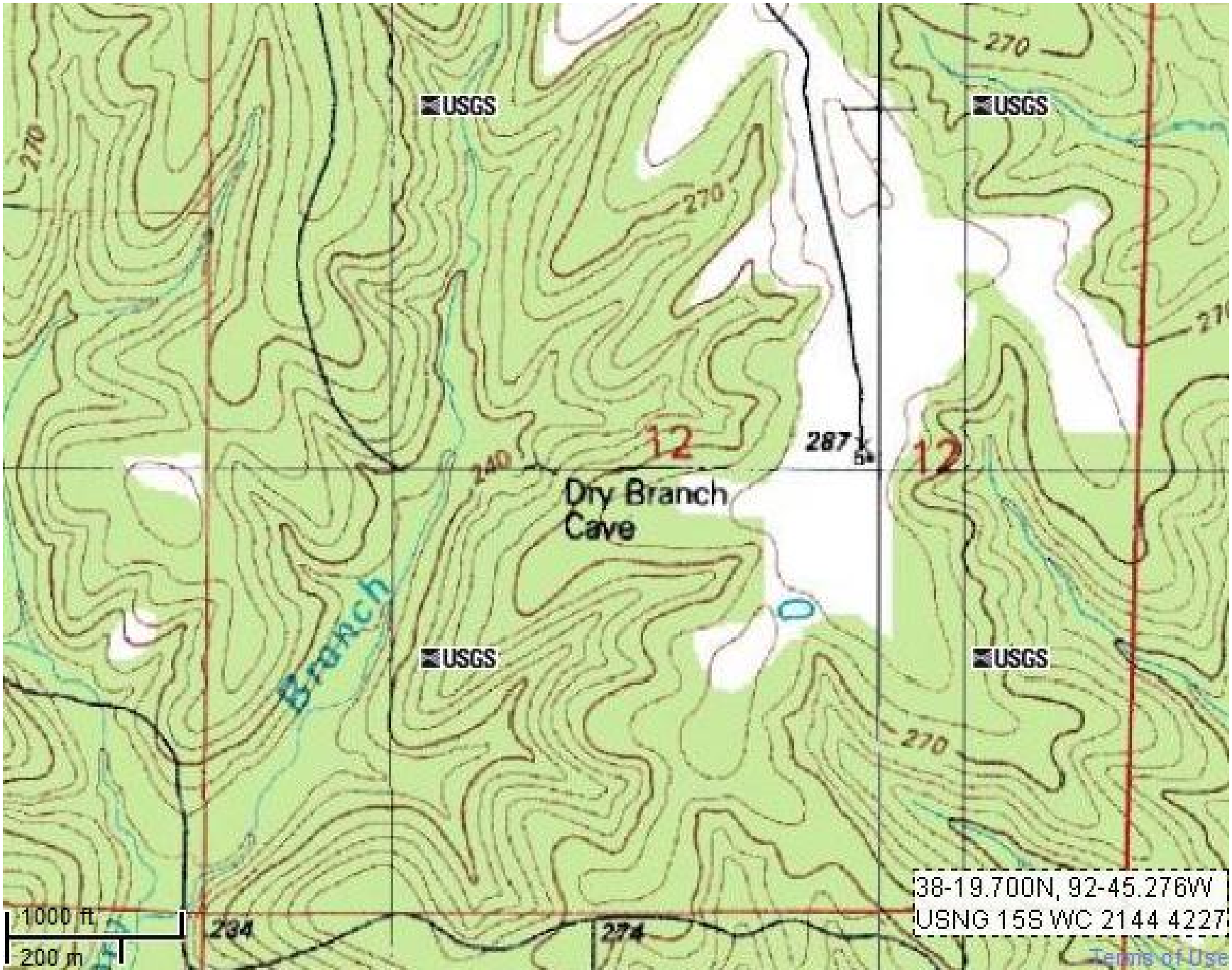
- Woolly Mammoth and Peccary remains
- Sponge Work in ceiling
- Maze cavern development
- Floating formations
- Evidence of earthquakes



Apples were once commonly stored in Ozark caves. Jacob's Cave in Morgan County was used for apple storage in the 1920s and 1930s. A news item in the *Eldon Advertiser* on October 12, 1933, reported: "The Versailles Orchards Company, operators and owners of one of the largest apple orchards in the state located south of Versailles, are storing a portion of their crop in Jacob's Cave. . . . About 1,500 bushel baskets have been placed in a part of the cavern and more will be put in later. The cave has a year 'round temperature of about 60 degrees and makes an ideal storage place for fruits."

"Missouri Caves in History and Legend," H. Dwight Weaver, 2008

Dry Branch Cave



Dry Branch Cave

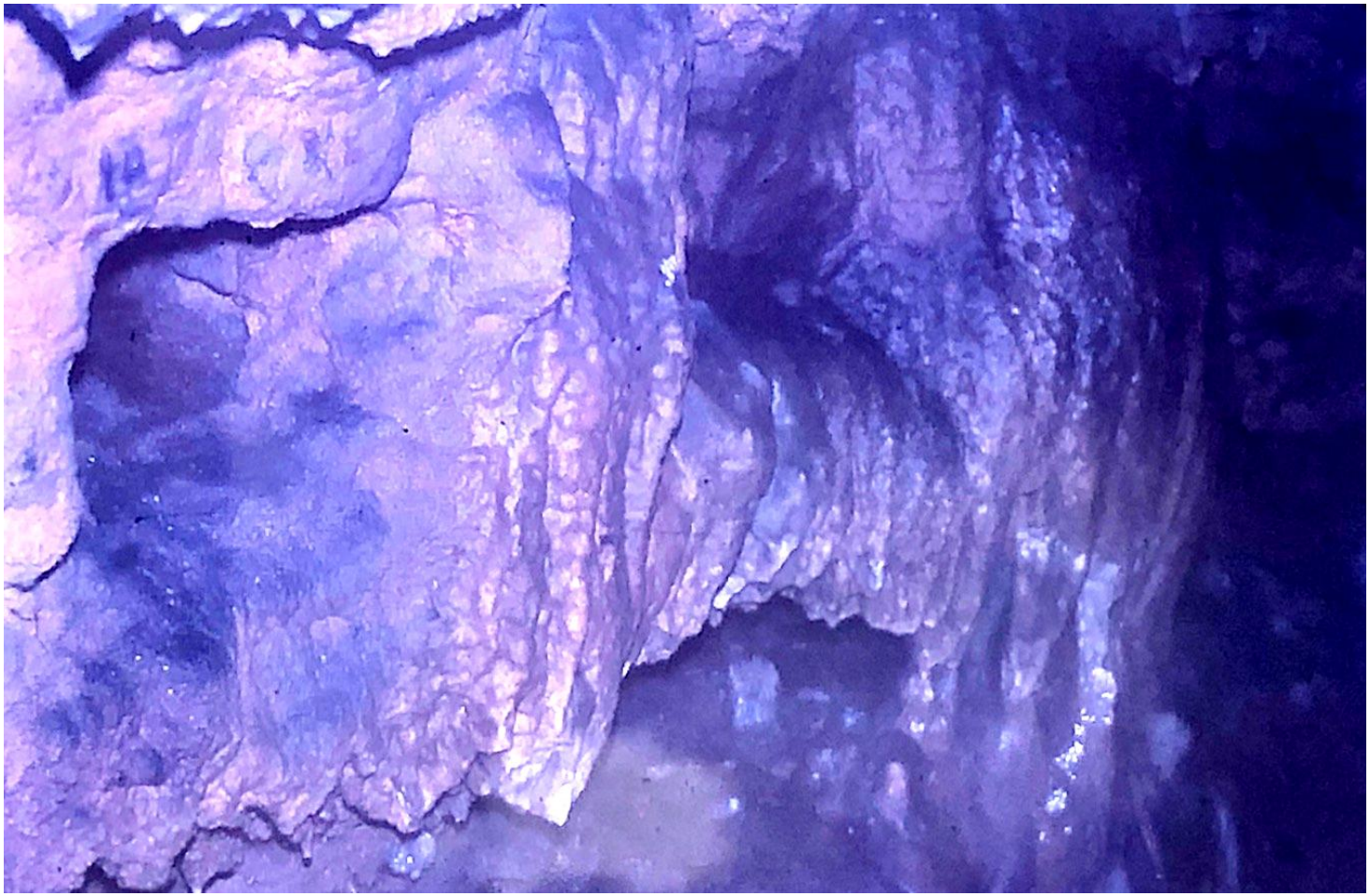
Dry Branch Cave

- **Dry Branch Cave (Price's Cave)**

- Price's Cave, southeast of Versailles eight miles, on Indian Creek (dry branch) enters on a level, in which one can ride a horse. This has been examined for more than a mile ... The cave appears to branch and run in different directions ... (--Ibid: p. 596.)
- Prices Cave southeast of Versailles, eight miles, on Indian Creek (dry branch), enters on a level, in which we can ride a horse. This has been examined for more than a mile, room after room appears, with some of the ceilings more than fifty feet high and between these rooms are some large and small openings. The cave appears to branch and run in different directions. Numerous fine specimens of stalagmites are found. *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*

Dry Branch Cave- Natural bridge

Dry Branch Cave- Drapery

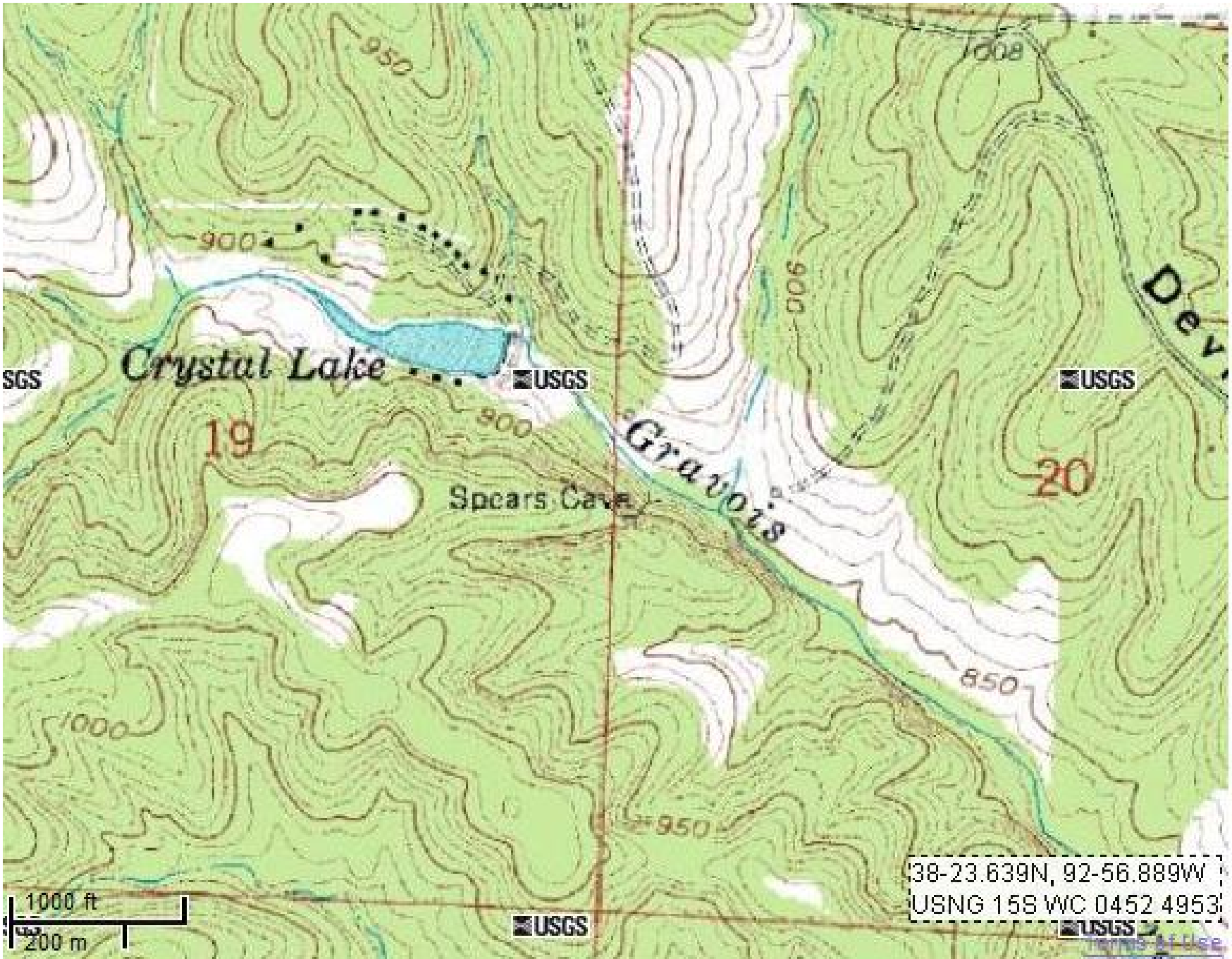


Dry Branch Cave- Drapery

Dry Branch Cave- Big room

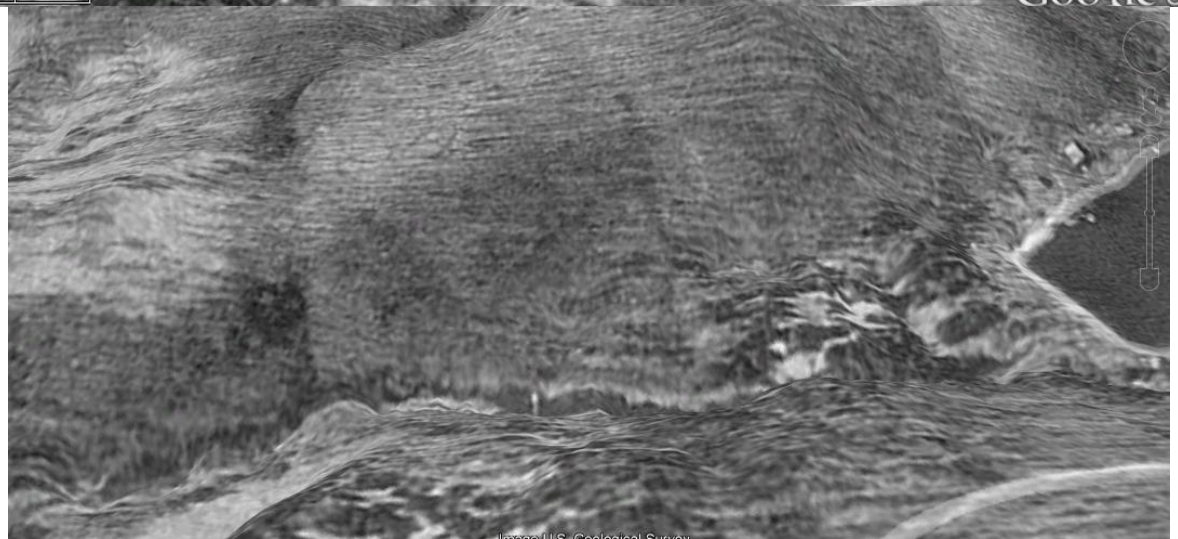
Dry Branch Cave- Junction room

Spear's Cave


Crystal Lake
19
20
Spears Cave
Gravois
950
900
1000
850
USGS
38-23.639N, 92-56.889W
USNG 15S WC 0452 4953
1000 ft
200 m

Spear’s Cave


2/22/1995
Crystal Lake
506 ft
Image U.S. Geological Survey
Google earth



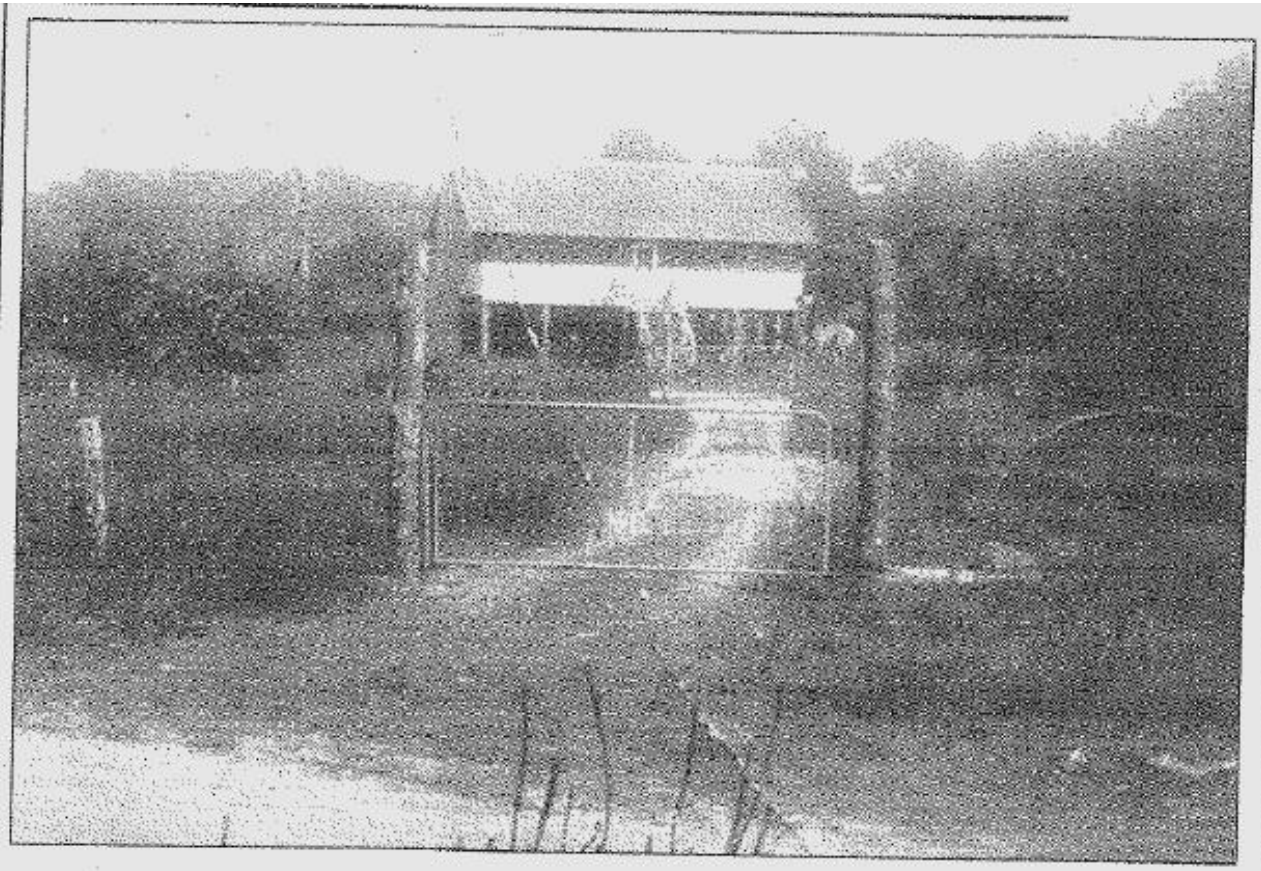


photo courtesy Morgan County Historical Museum

Spear's Mill

According to information on record at the Morgan County Historical Society Museum, Spear's Mill was once located approximately seven miles southwest of Versailles on one of the tributaries of the Gravois Creek. Situated near a cave, it was operated by Sam Spears after the death of his father. In addition to the mill's regular work, the grounds also were used for political speaking engagements, picnics and other parties. It was removed when owners from Sedalia purchased the property to build a camp for Boy and Girl Scouts.

- **Spear's Cave (Cave Mills)**

- On the headwaters of the Gravois, southwest of Versailles is a cave called Cave Mills, (1889). (--Ibid: p. 396.)
- "On the head waters of the Gravois, southwest of Versailles, is a cave, called Cave Mils, about a quarter of a mile long, that forms a perfect tunnel through the hill, with a natural and ample opening at each end. It is walled, roofed and floored; the roof at the entrance of the creek is about thirty feet above the floor. In entering at this point there is seen a fine spring. One is impressed in looking at this, probably the most ancient tunnel in the world, with the idea that the prehistoric races built railroads and tunneled the mountains." *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*

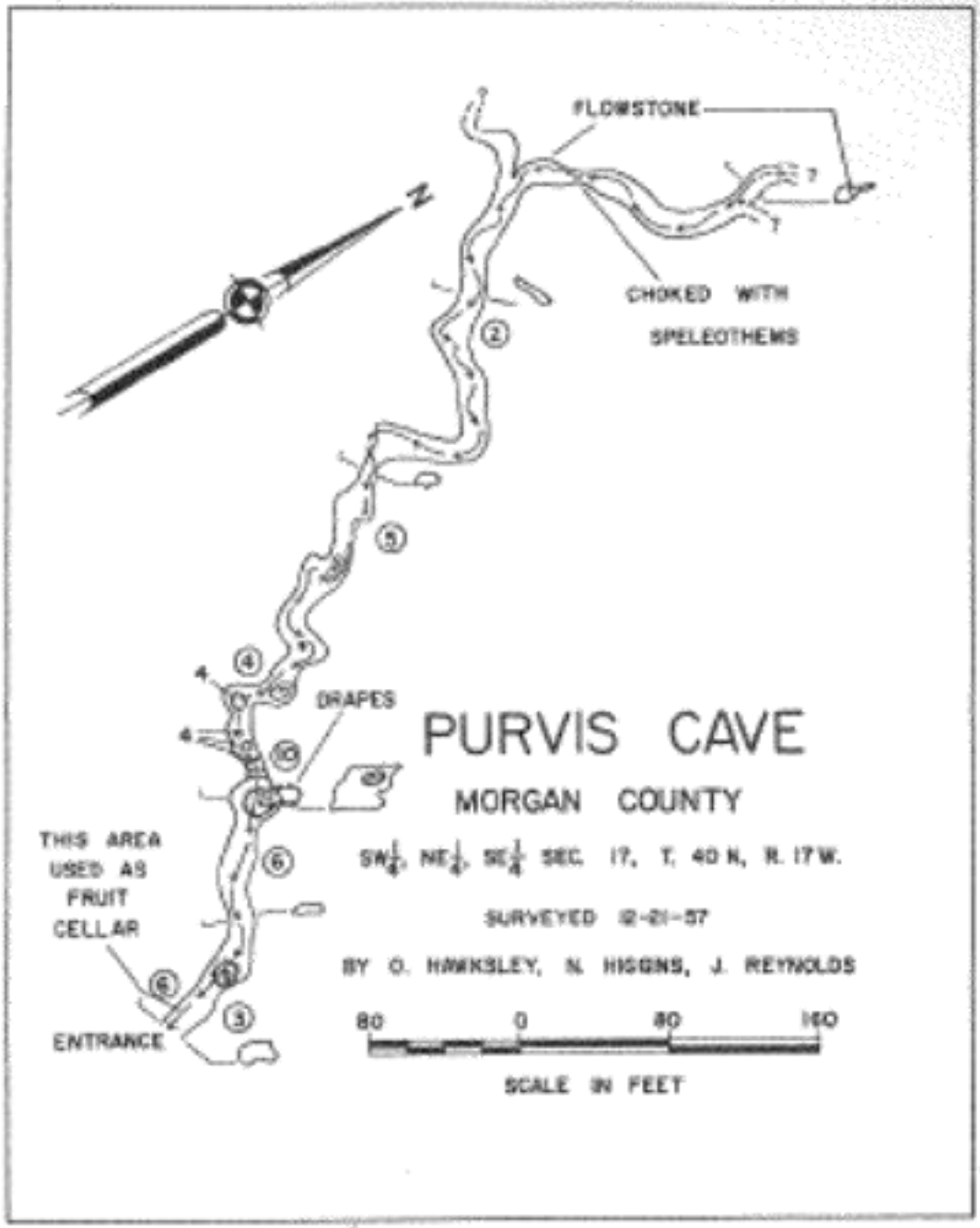
Purvis (Dunaway's) Cave

Purvis Cave entrance

- **Purvis Cave**

- Purvis Cave, on Mill Creek, in Sec. 17, Twp. 40 N, R. 17 W, has a fine entrance ... It also seems to branch in different directions. In it have been found bear-dens and evidence that at one time the Indians have occupied parts of it. (--*Hist. of Morgan Co*., p. 397.)
- Purvis Cave on Mill Creek in section 18, township 40, range 16, has a fine entrance. It has been explored between two and three miles. It also seems to branch in different directions. In it have been found bear dens and evidence that at one time the Indians occupied parts of it. Lead has been found in this cave in considerable quantities. *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*
- "Purvis Cave is located in a Karst area with numerous sinks and sinkhole ponds. Several years ago a sinkhole pond owned by a farmer living near Purvis Cave collapsed, revealing a "bottomless" well reported to have been 80 feet deep. A man is reported to have gone down into the well, but there is no record of what he found and the opening has again been plugged and a pond exists in the sink." *Oz Hawksley, Missouri Speleology, pp.51-53, Vol.3, #3, 1961*

Purvis Cave



Oz Hawksley, Missouri Speleology, pp.52, Vol.3, #3, 1961

Dierk's Cave (Spring)

020 Numerical Designation

PRIMARY NAME Dierks Cave

COUNTY Morgan QUADRANGLE Proctor Creek 7½

LOCATION: NE¼ NW¼ SECTION 22, T. 41 N., R. 18 W

92° 54 ' 00 " West Longitude, 38 ° 18 ' 30 " North Latitude

SECONDARY NAME(S) _____, _____

_____, _____

OWNER'S NAME Bill Dierks DATE 4-3-71

OWNER'S ADDRESS RFD 2, Versailles, MO

SURVEYED BY LOCC CMMC DATE 4-3-71

SPECIAL REMARKS A spring, explorable only in dry period

THIS REPORT BY Mark and Morris Hall % LOCC CMMC DATE 4-6-71

DIRECTIONS FOR REACHING CAVE AND DESCRIPTION OF CAVE

Call: 378-4452
378-4374
372-5190

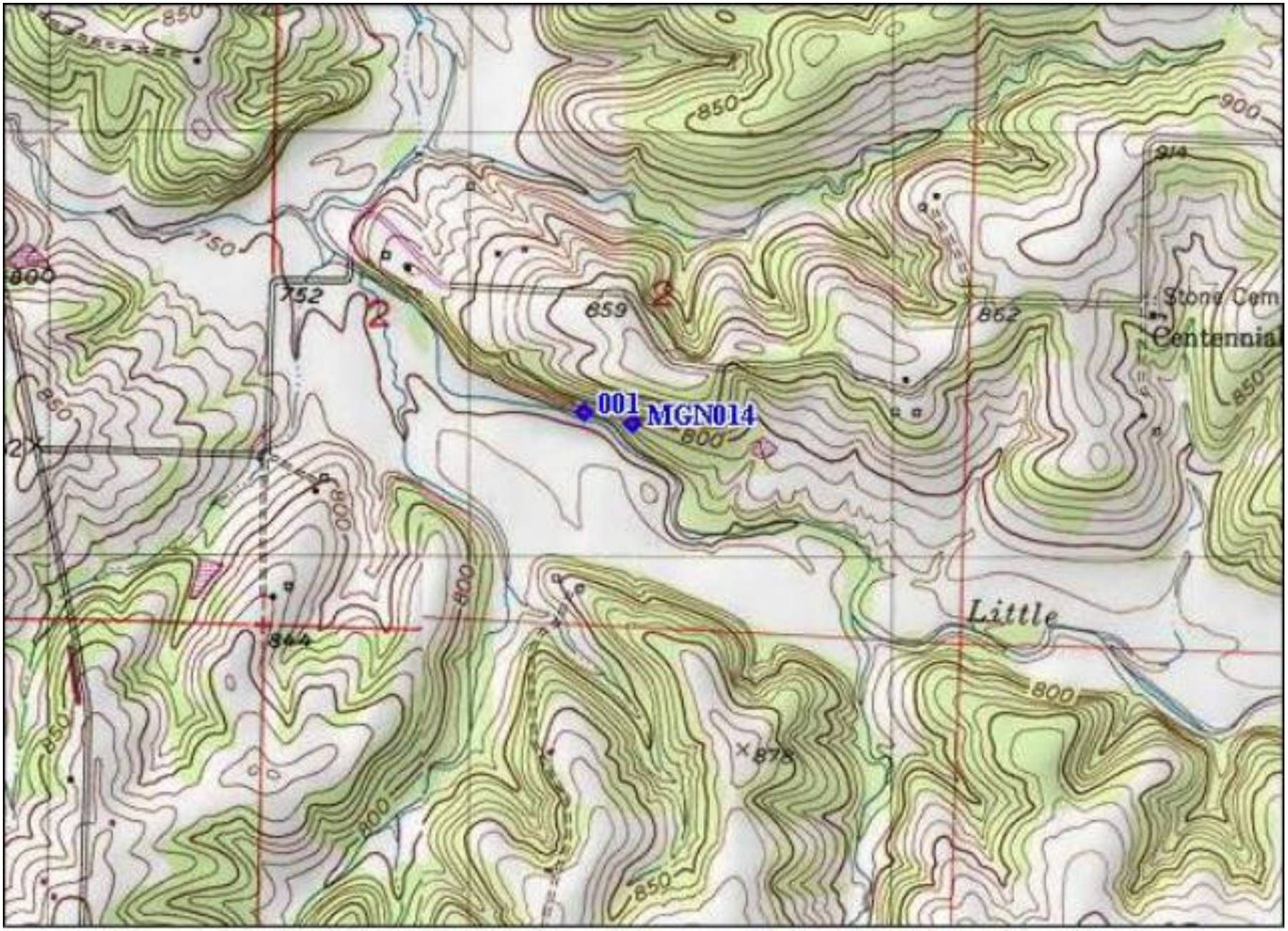
Take Route J west from Highway 5 about 2 miles. Third road to right. As you cross a bridge the road is immediately to right. About 2 miles on gravel road, there's a farm with large barn and cement silo. Cave is behind this barn, and there is a pond in front of cave.

All season spring flows from cave. 3 by 3 opening. About 75' long and 12-15' wide. Ceiling 4' at highest point. Good spongework and formations. Cave ends in deep water pit. Undoubtly a lot more cave beyond this. Floor is rock, clay and cold water.

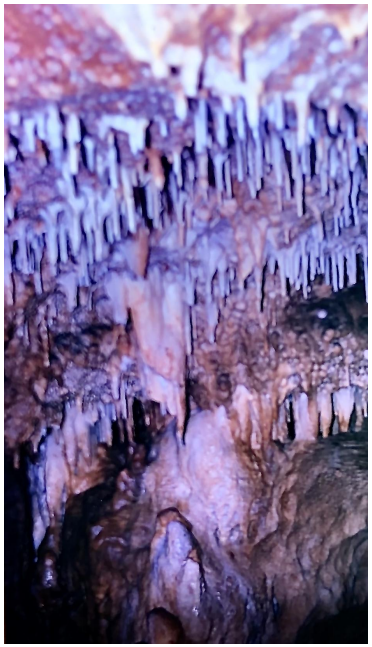
(Also see Wolf Den Cave).

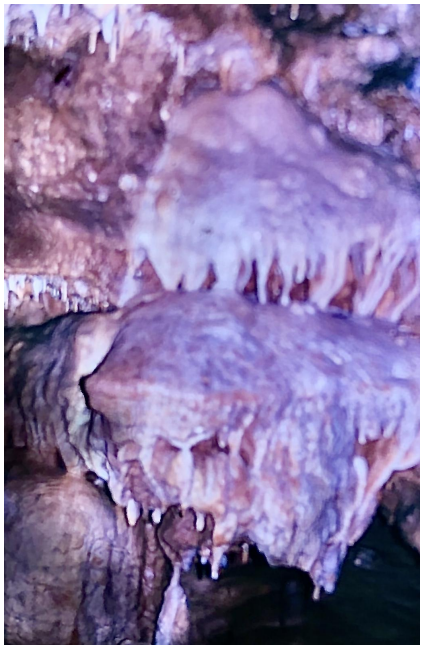
Dierk's Cave

Little Richland Cave



Jasper Cave





Springs

- 5 large springs in Morgan County (>100 gallons/minute)
- Flow rates for these springs:
  - Troutdale 5.31 cubic ft/sec (2,383 gallons/minute) (1)
  - Boyler's Mill 1.80 cubic ft/sec (808 gallons/minute) (1)
  - Welpman 1 cubic ft/sec (450 gallons/minute) (Welpman Springs website)
  - James Mill .7 cubic ft/sec (314 gallons/minute) (1)
  - Lake Placid .35 cubic ft/sec (150 gallons/minute) estimated
- Numerous smaller springs including Dierk's, Seven Springs on Old YMCA camp, Hudson Spring near Boyler's Mill, etc.

(1) *Springs of Missouri, by Jerry Vineyard and Gerald L. Feder, 1974*

Two types of Springs in Morgan County: Water-filled cave and seep

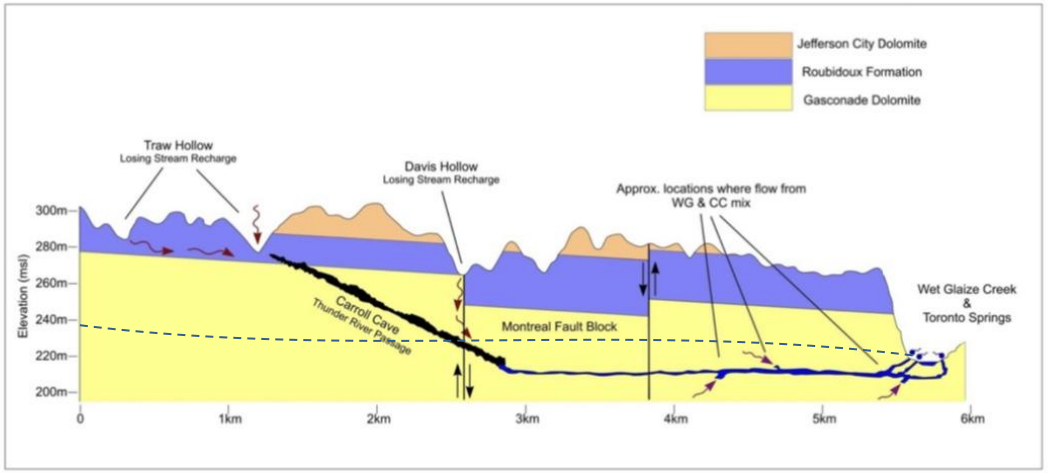
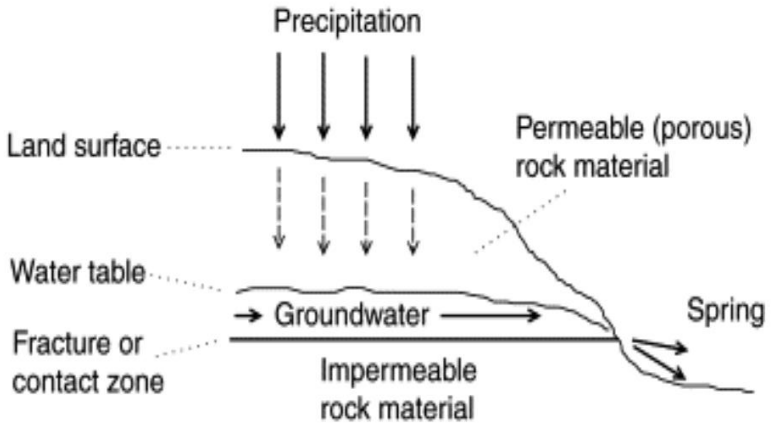
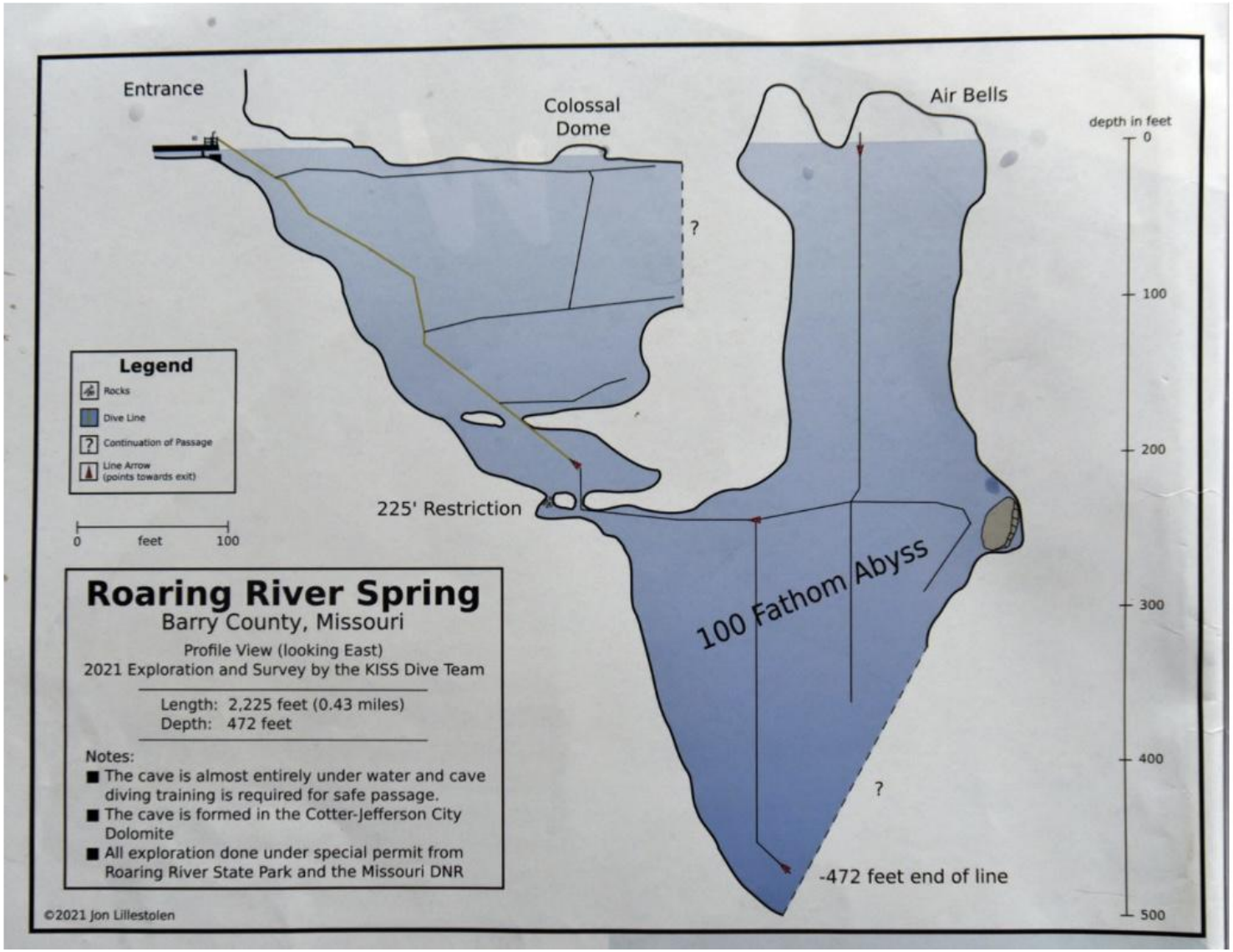


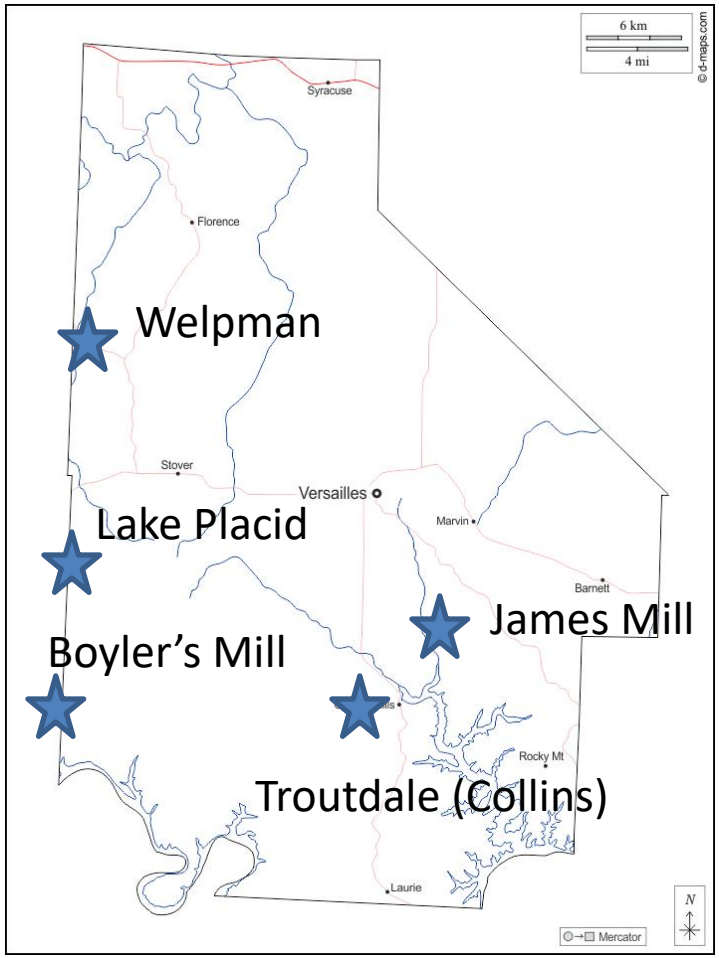
Figure 8. Simplified profile of the study area from Traw Hollow through Carroll Cave (CC) to the mixing zones with Wet Glaize Creek (WG) and resurgence at Toronto Springs. Profile is looking to the northwest, left side of the profile is south (Miller et al., 2015).



Deepest Spring in United States



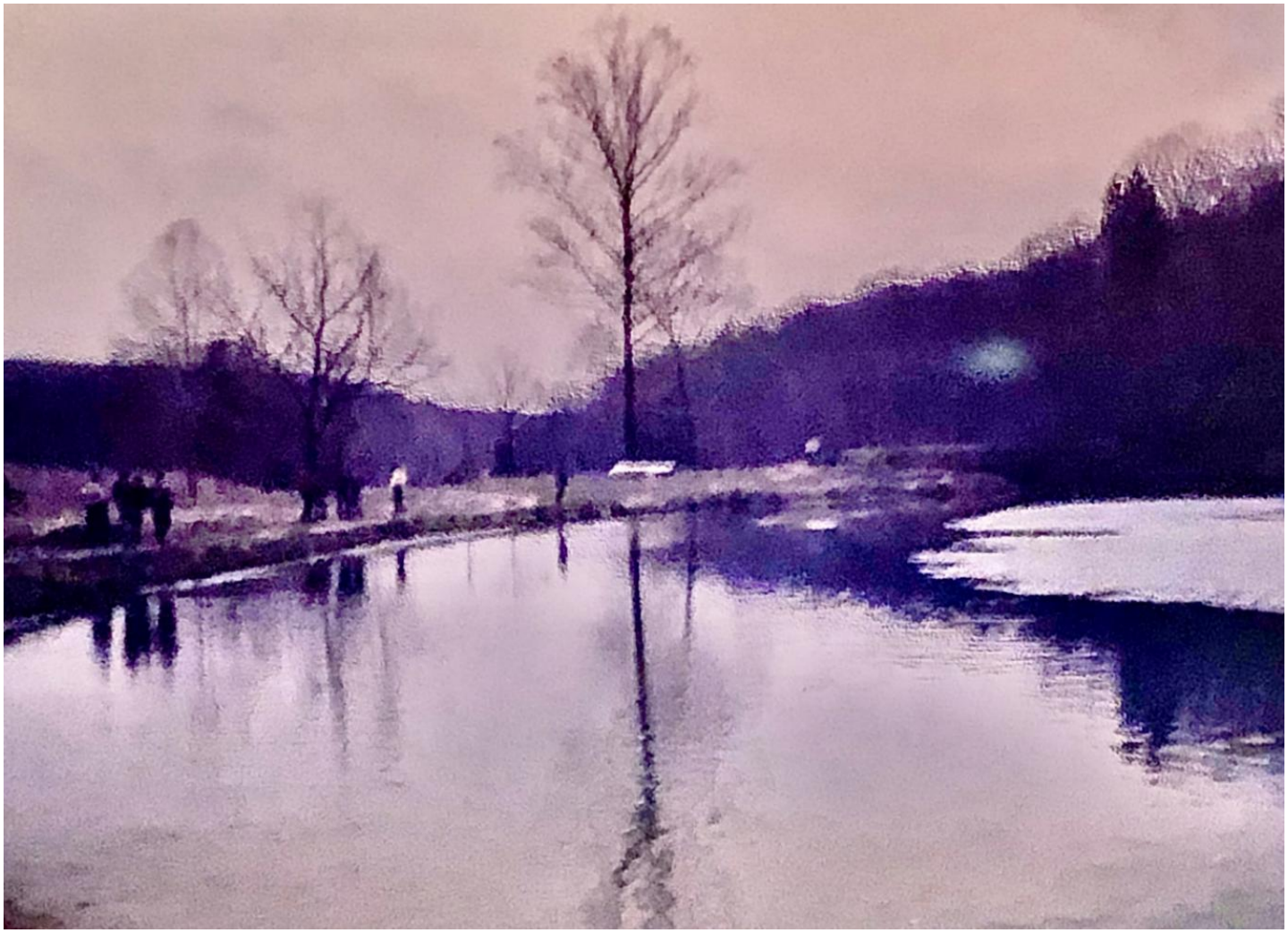
Large Spring Locations



Troutdale (Collins) Spring

Troutdale (Collins) Spring

Spring Branch- Troutdale (Collins) Spring



Troutdale (Collins) Spring

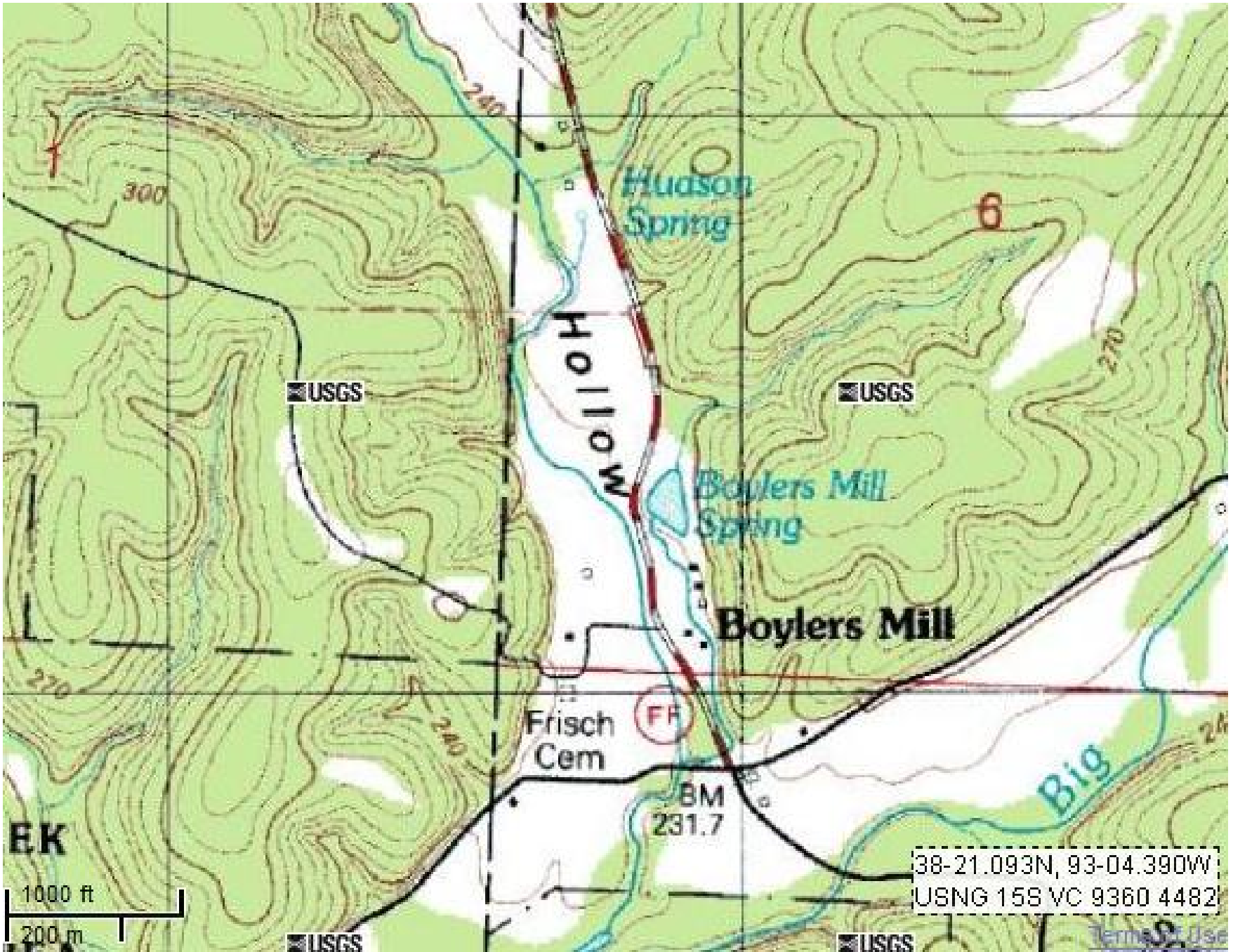
Tyndall Effect –Blue color caused by dissolved calcium carbonate in spring water

Flour suspended in water appears to be blue because only scattered light reaches the viewer and blue light is scattered by the flour particles more strongly than red.

- **Gravois Mills** *"French for debris or gravel"*

- It is a post-office 8 miles south of Versailles. (--*Gazetteer of Mo*., p. 392.)
- It is located on the stream of the same name, from which it was named. (--*How Missouri Counties, Towns, and Streams Were Named*, p. 334.)
- It was platted and made a village January 22, 1884, by James Brothers. It had a population of 30; it contained one general store, one grocery and one drug store and a blacksmith shop. Near the village were the Gravois Mills, water-power, flour and saw, and a short distance above the mills was a woolen factory, which was started in 1870 by James brothers ... (--*Hist. of Morgan Co*., p. 434.)

Boyler's Mill Spring



Boyler's Mill Spring

Boyler's 'Other' Mill, Morgan County, MO

Boyler's Mill, Morgan County, MO

- **Boyler's Mill**

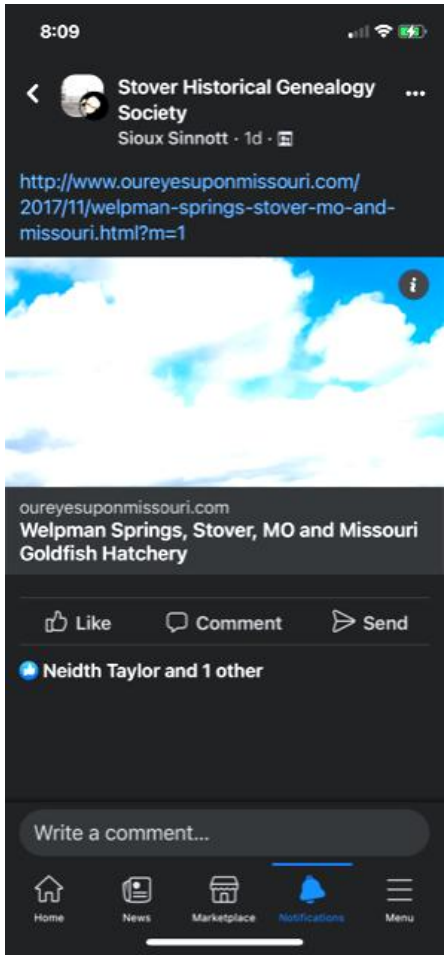
- Boyler's Mill was a post-office west, southwest of Versailles. (--*Gazetteer of Mo*., p. 392.)
- It was near the Benton County line, 2 miles from Zora, Benton Co. (--*The State of Mo., in 1904*, p. 457.)
- Boyler's Mill, named in honor of James Byler and the name was changed by the Post Office Department in naming the post-office. (--*How Missouri Counties, Towns and Streams Were Named*, p. 334.)
- It contained a water flour-mill, a post-office and store. (--*Hist. of Morgan Co*., p. 435.)
- It was located at Sec. 6, Twp. 41 N, R. 19 W, on Highway FF, near the Benton Co. line.

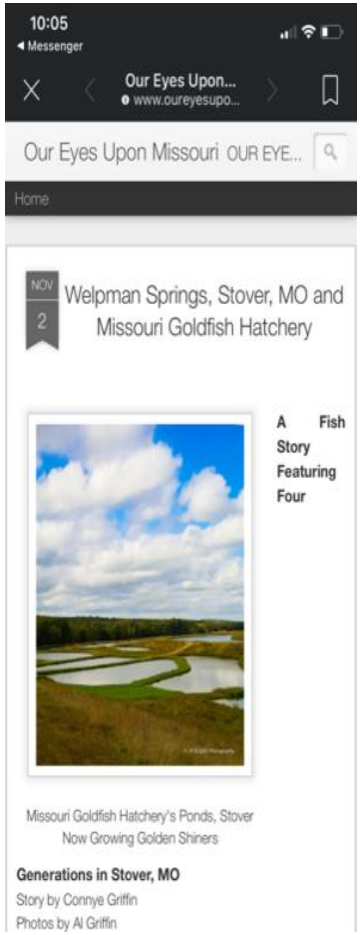
Welpman Springs

Welpman Springs

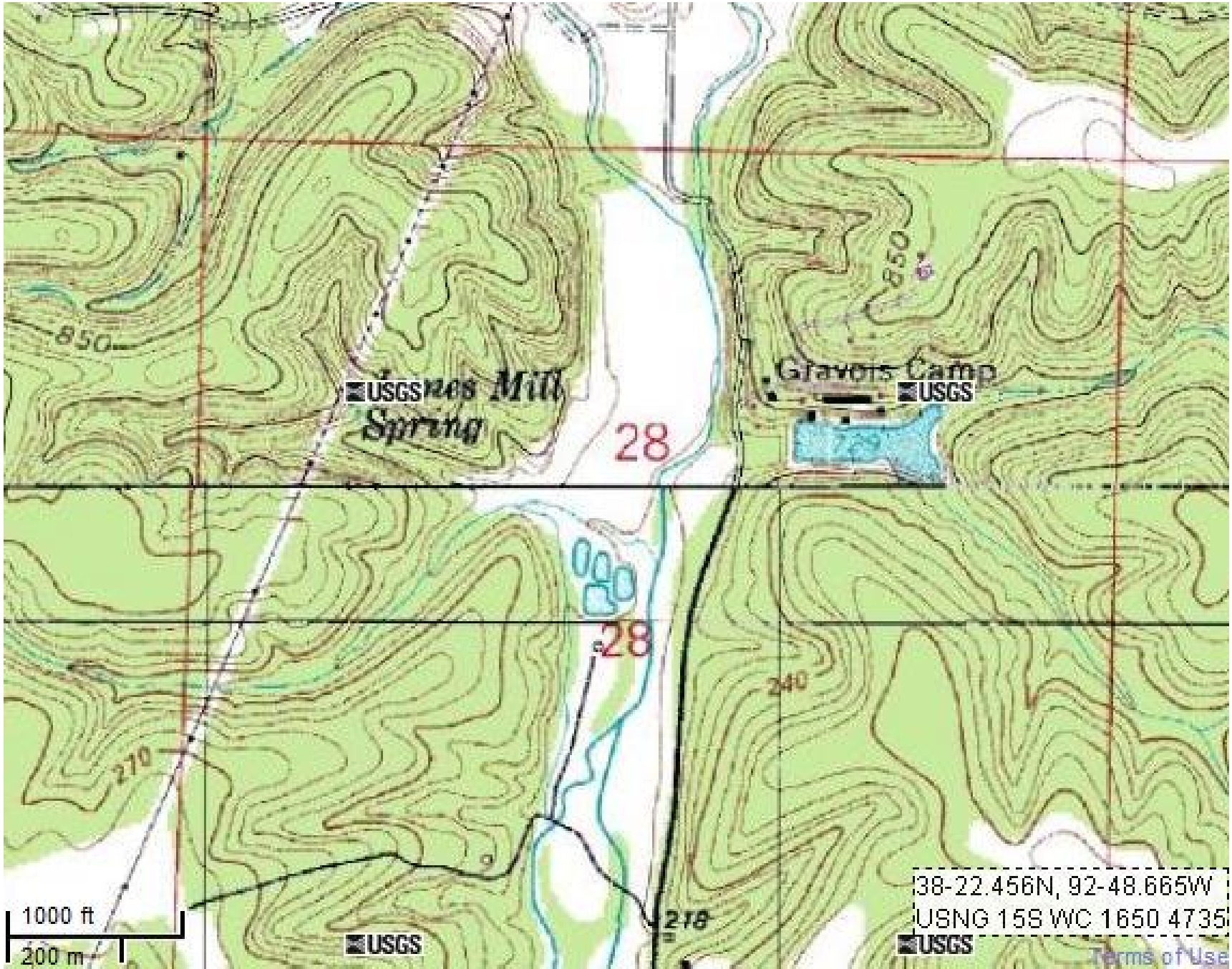
https://welpmansprings.weebly.com/

Welpman Springs



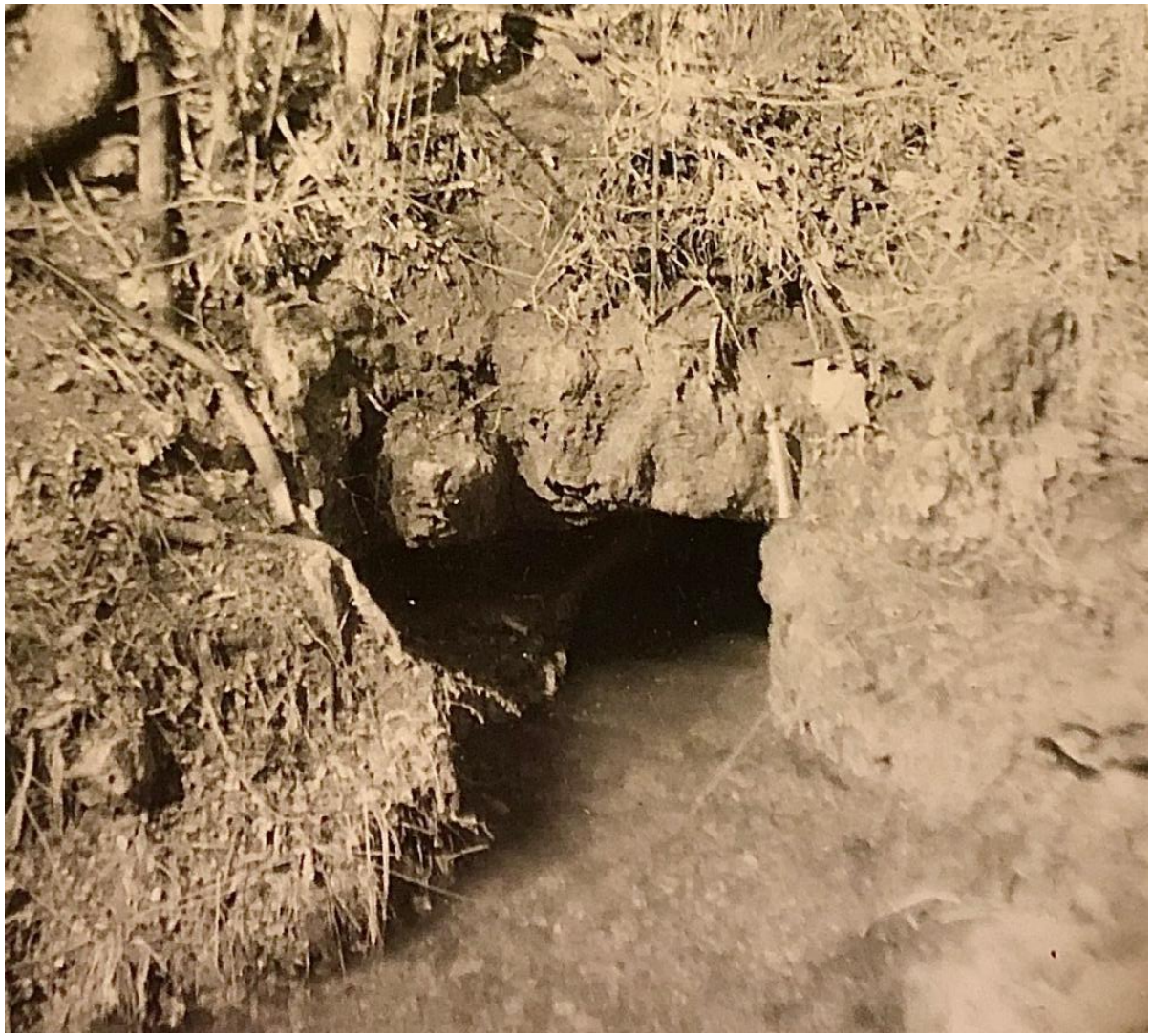


James Mill Spring



James Mill Spring

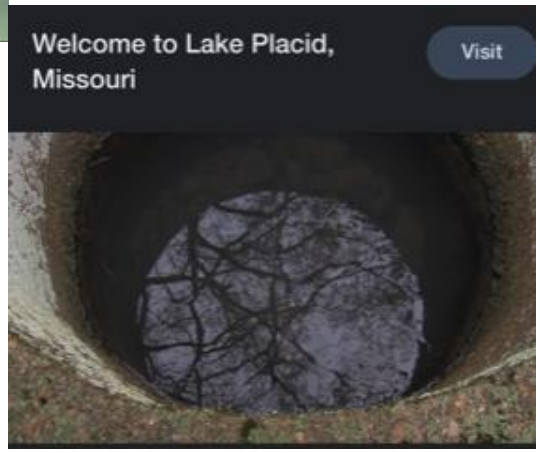
James Mill Spring



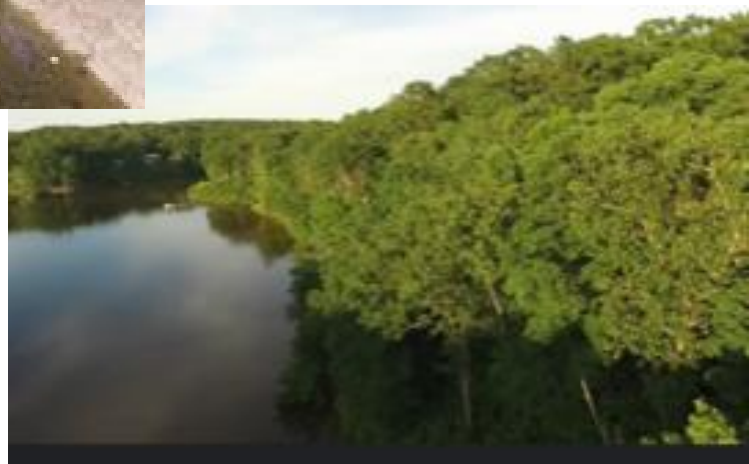
Lake Placid Spring

Lake Placid Spring

http://55020698.weebly.com



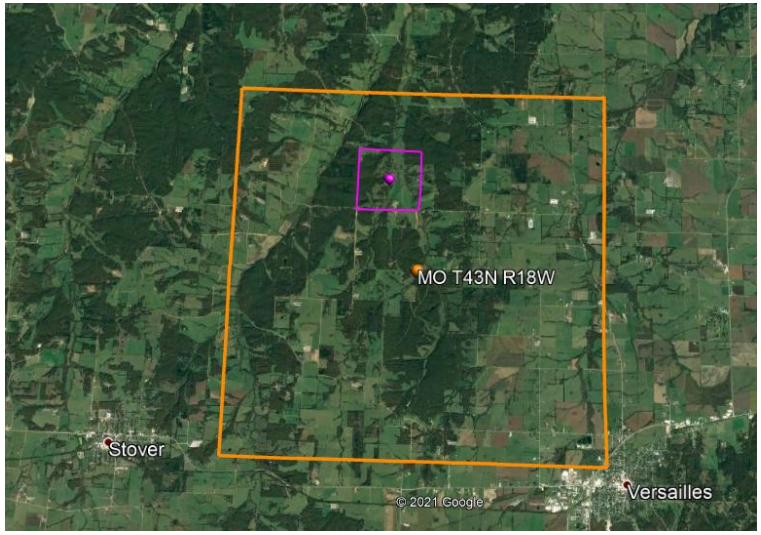
Lake Placid



https://youtu.be/7ev9wRfkAa0

Unnamed Sulphur Spring

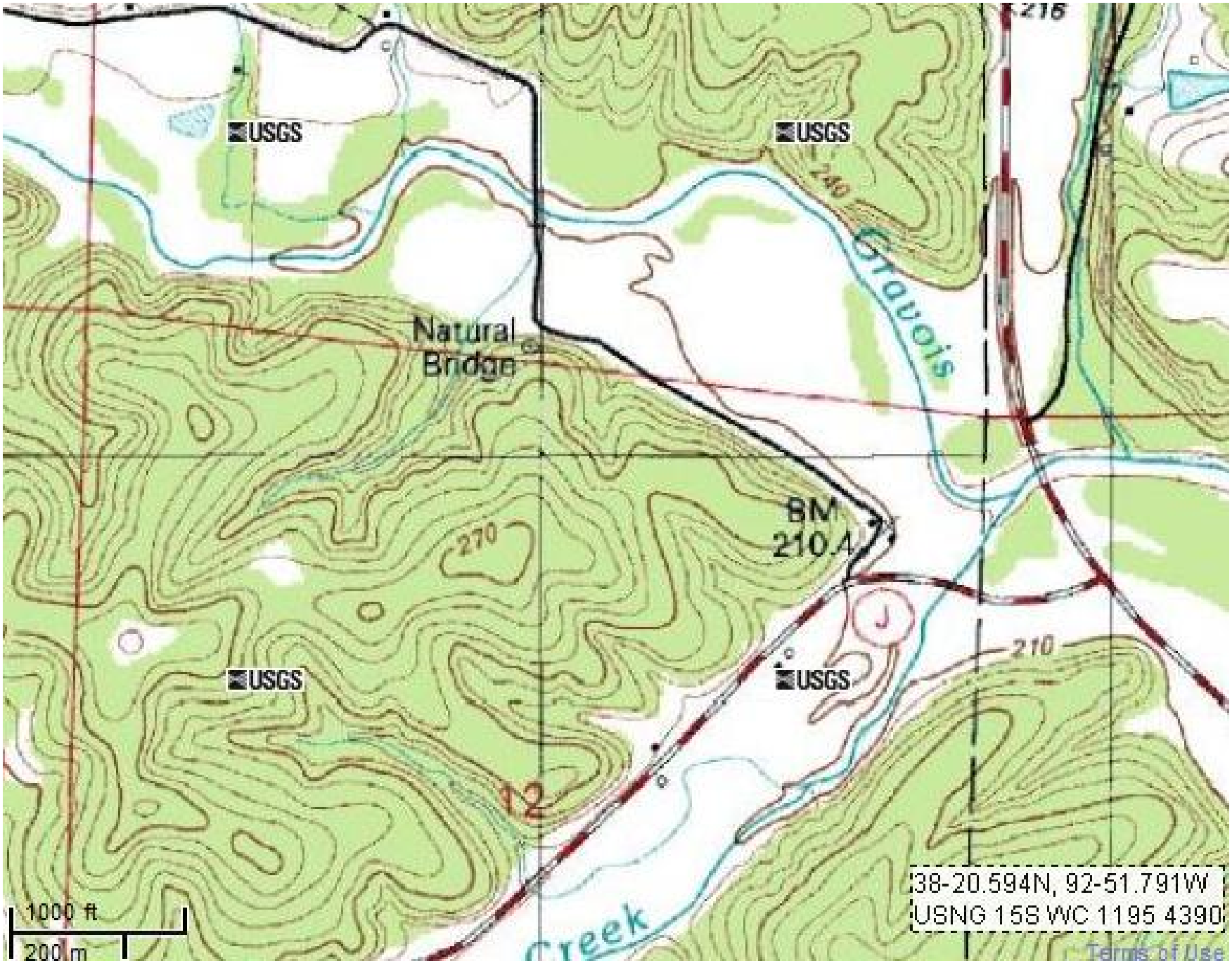
F.B. Meek: “I met with no mineral springs of much strength in any part of Morgan County, though i saw in Sec.9, T43, R18, a large spring slightly impregnated with sulphur. It boils up in a nearly circular marshy spot, and affords a considerable quantity of clear water, with a temperature of 57deg. After leaving the county, I also heard of a Sulphur spring near Versailles, but not knowing of its existence when near there, did not visit it.”



Sulphur spring northwest of Versailles

Reports of the geological survey of the State of Missouri -1855-1871, Broadhead, Meek, et. al., pages 137-138.

Natural Bridge



Natural Bridge

Natural Bridge

Natural Bridge

Gravois Mills Natural Bridge, Morgan County, Missouri

Photo by Jay Wilbur

- Natural Bridge

- Natural Bridge located on Gravois Creek off of “J” road
- “West of Gravois Mills, near the old Zwanzig Mill, a narrow strip arches over a deep ravine between two steep hills and is known as the Natural Bridge. It was high enough to give goose bumps to anyone squeamish about heights. Folks would venture on to it for the thrill. Pete Silvey lived near and was young around the turn of the century. He must have been feeling his oats one day when he was there with others, for they said he blindfolded his mule and road across the bridge.” *Morgan County Missouri, 1833-1910, by Prudence Williams*

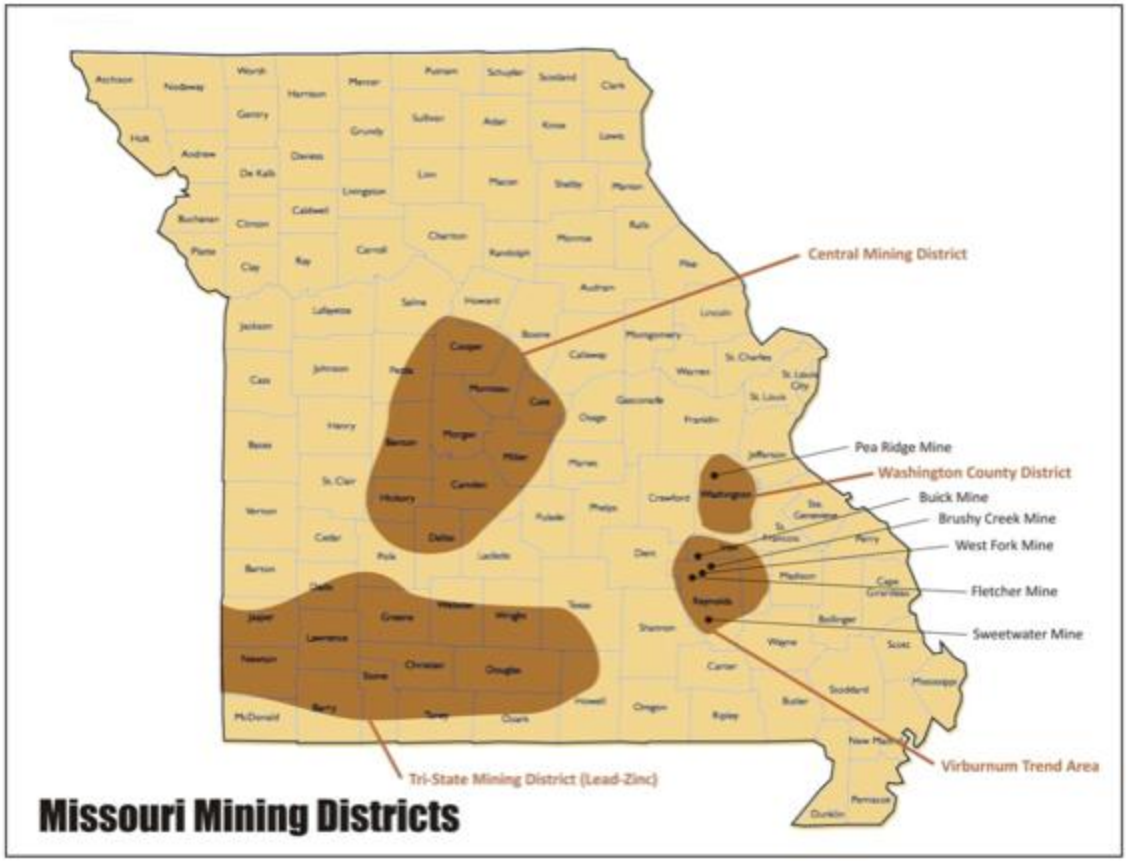
Sinkhole Pond – Highway 135

Losing Stream-Prairie Hollow

Faults and Fractures-West side of Proctor Anticline

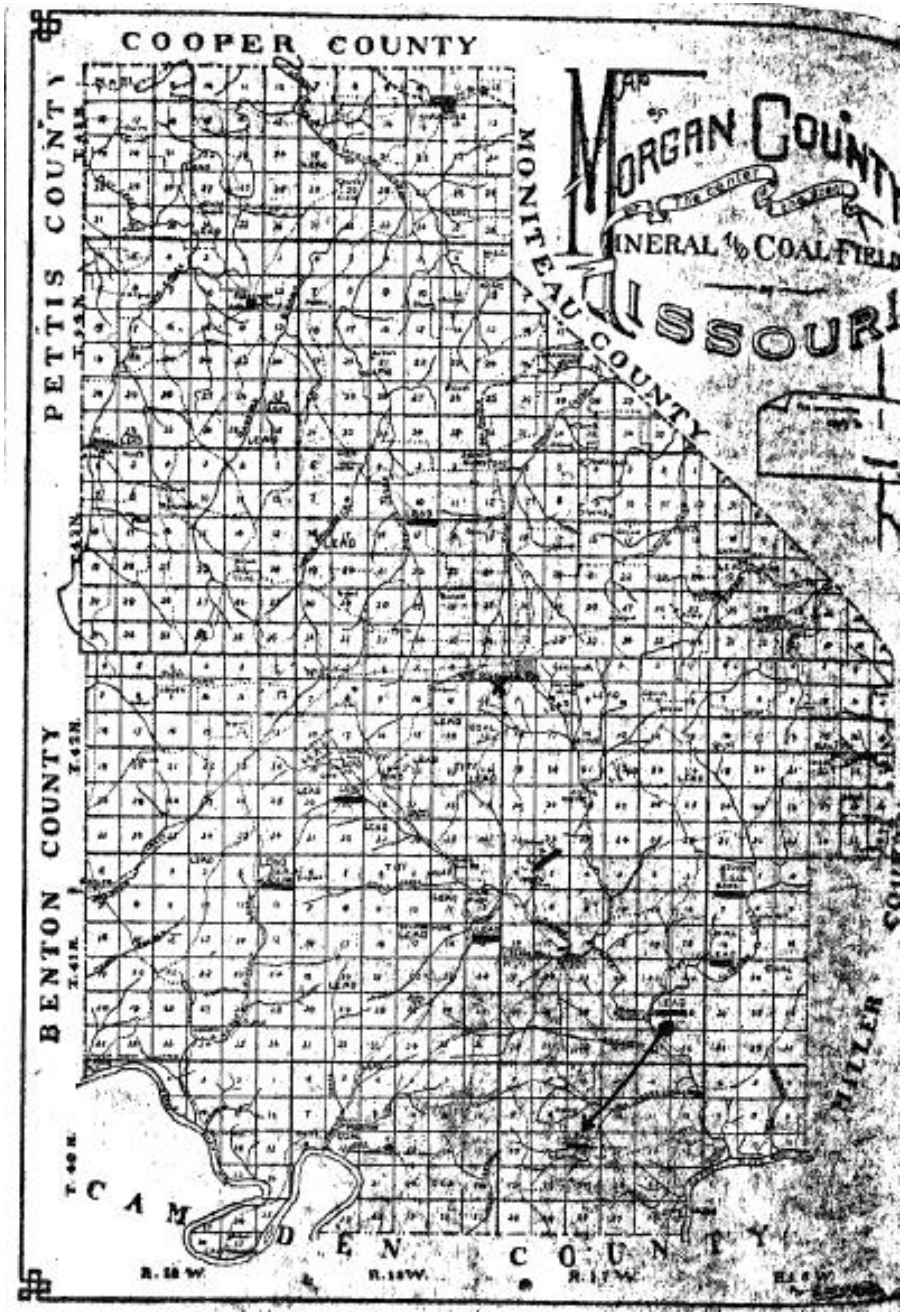
Mining in Morgan County

- Historically over 200 active mines
- Most historical mining was for barite, galena and sphalerite, but coal, iron and silver mined
- Most mining occurred in late 1800's and early 1900's with few mines working after WWII
- Mining in the county could have been as early as the late 1700's associated with Spanish and Osage Indian cooperation in the southwest part of the county
- Rock-crushed stone, sand and gravel actively mined today



Lead & Zinc Mining in Joplin, MO - circa 1910. Two miners in the background examine the roof of the mine. From: Historic Joplin, "Men and Dust", http://www.historicjoplin.org/?tag=tri-state-mining-district

Areas Highlighted were visited in 1973- Map from Versailles Leader Statesman, September 9th, 1896



Inventory Lead and zinc production= 1830-1893

Period	Lead Ore		Zinc Ore	
	Tons	Value	Tons	Value
1830 to 1849	100	$4,000		
1850 to 1859	50	2,000		
1860 to 1869	200	12,000		
1870 to 1879	3,000	150,000		
1880 to 1893	200	8,600	60	$1,320
Totals	3,550	$176,600	60	$1,320

Mineral deposits of Morgan County Missouri, p.35 ,Mather, 1946

Different Mining Methods

Blasting-Shaft/Tunnel-Winch

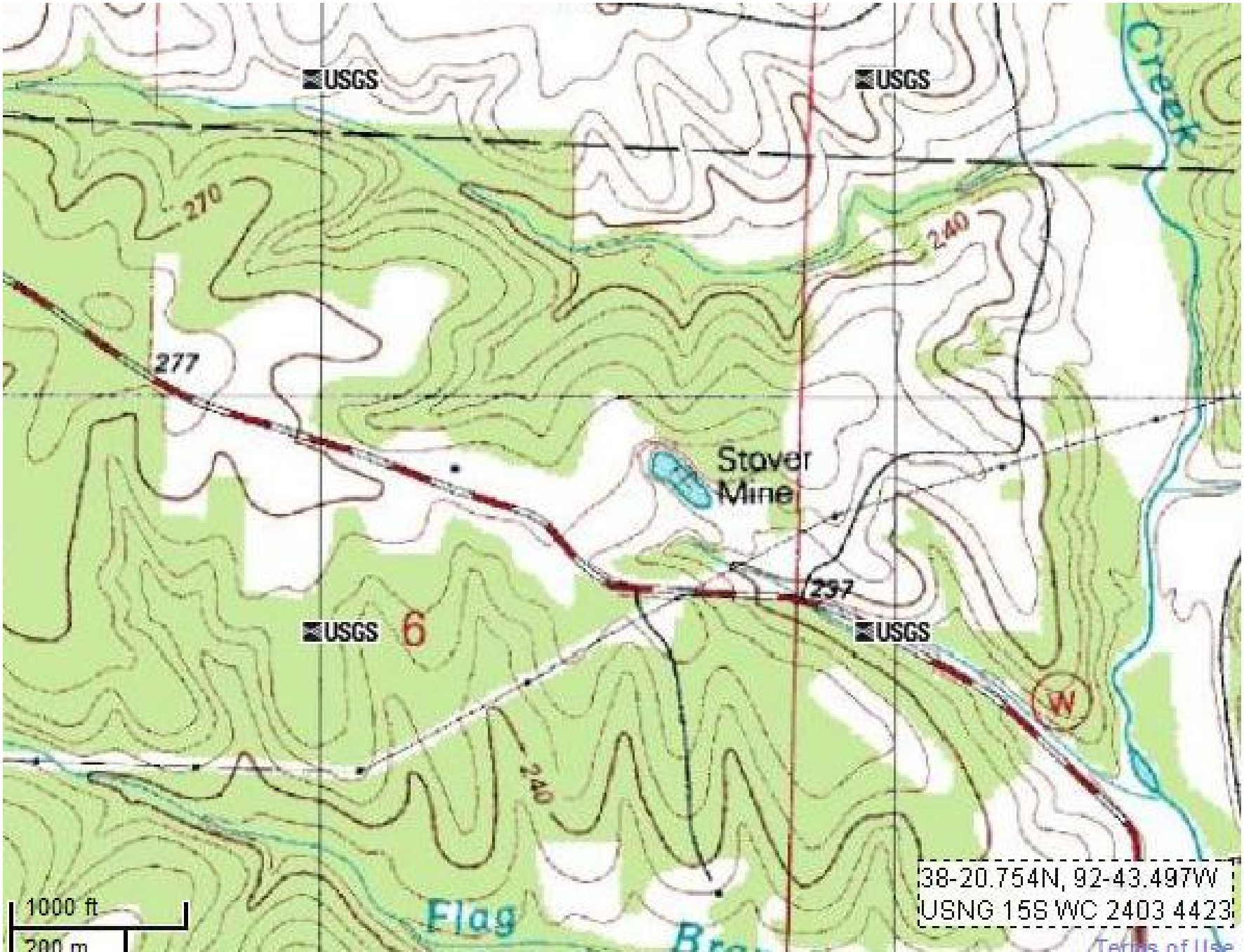
Bucket and windlass mining,
Unnamed Morgan County mine, 1903

Digging, Blasting-Pit/Tunnel

Hubbard and Moore Coal Mine,
Morgan County, 1903

Open Pit Mining Method-Old Barite Mining Pit near Jacob's Cave

Stover Coal Mine



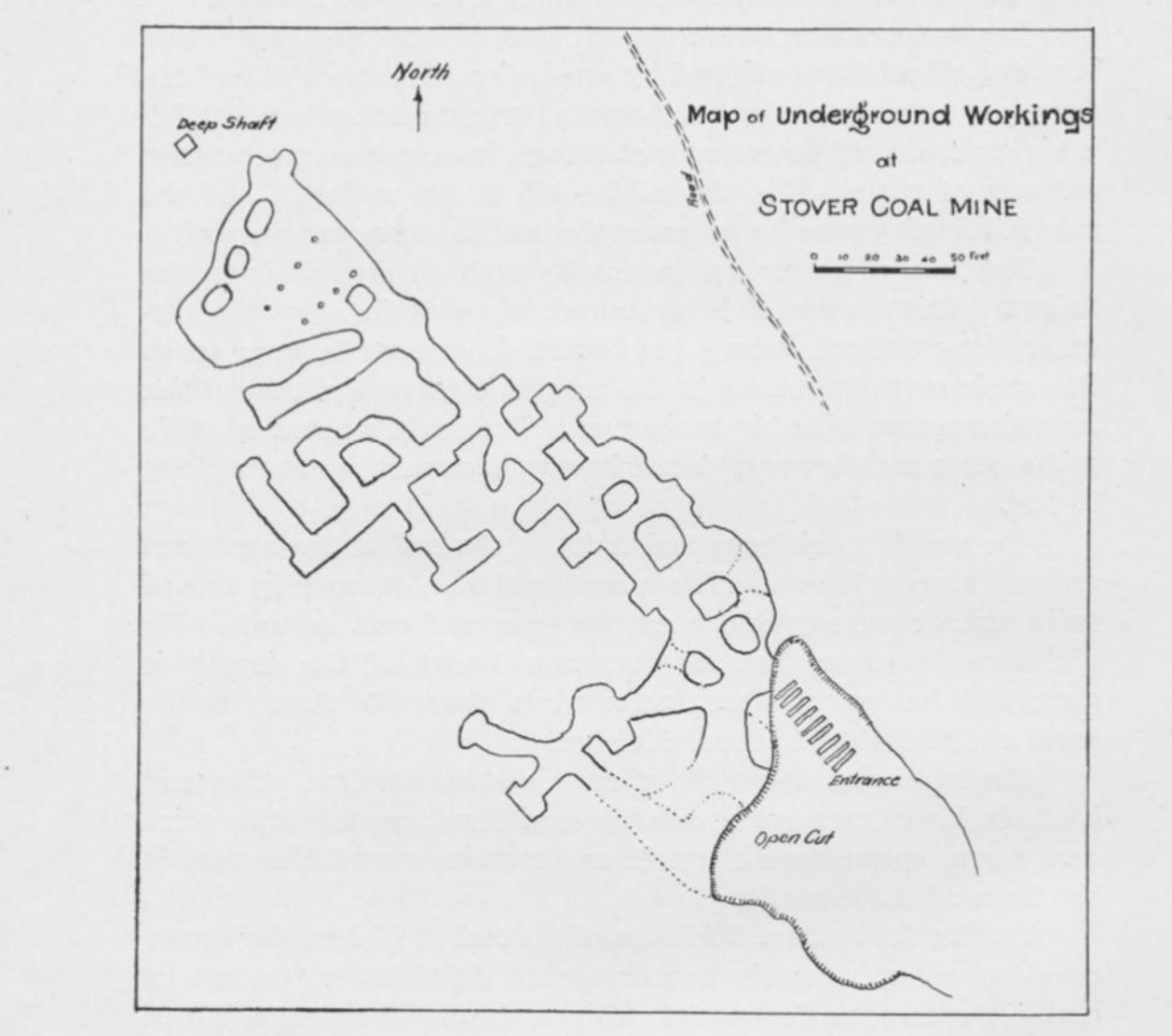
Stover Coal Mine

Entrance to Stover Coal Mine-*Geology of Morgan County, p.81 ,Marbut, 1907*

Looking Across County route W in south Morgan County to the Stover Coal Mine. Note the high tailings, *Hall and Hurley, Main Mines of Morgan County, 1973*

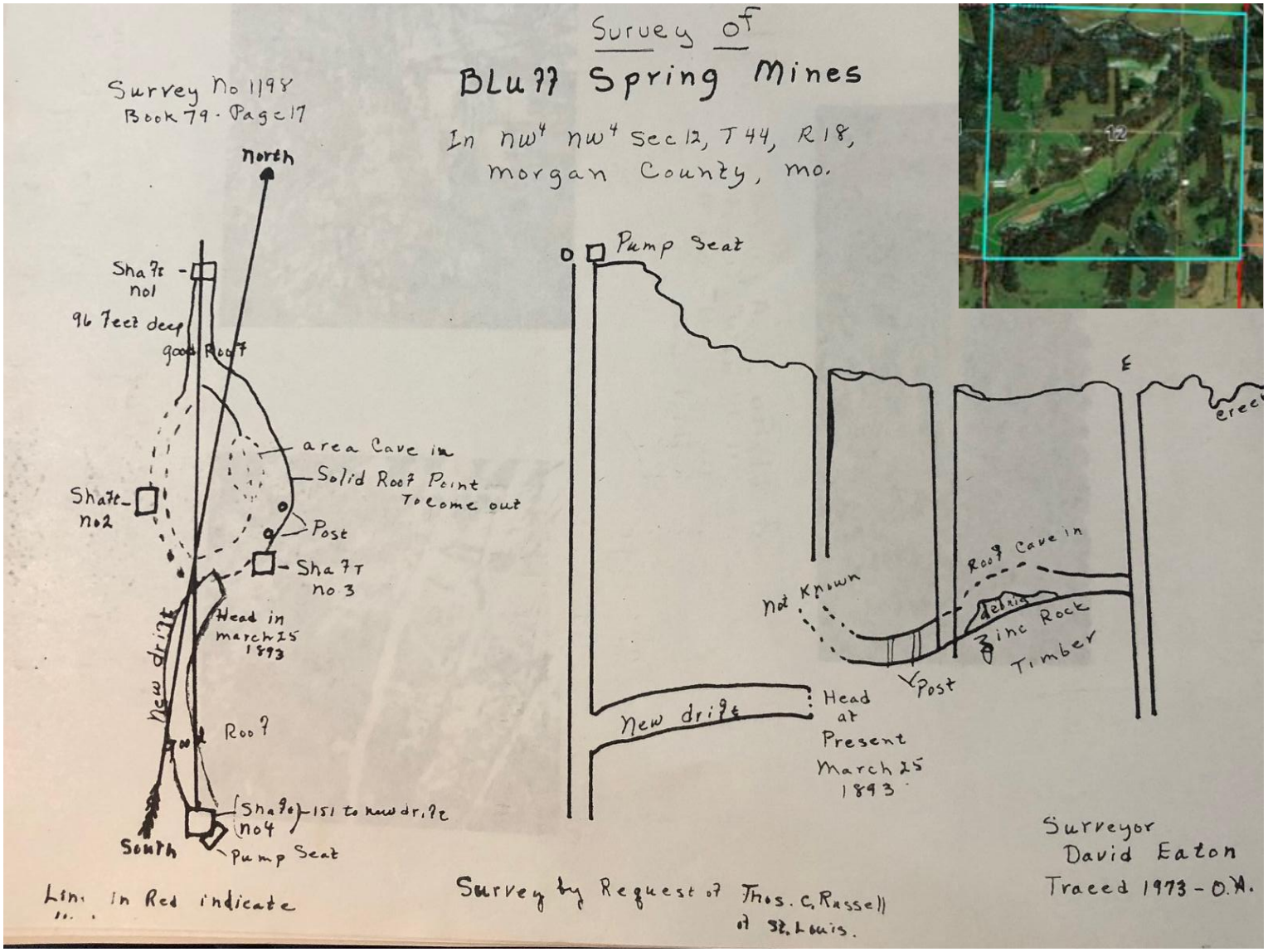
Looking across to East Bank of the Stover Coal Bank, *Hall and Hurley, Main Mines of Morgan County, 1973*

Stover Coal Mine -Underground tunnel map



Geology of Morgan County, Marbut, 1907

Map and Cross-section Bluff Springs Zinc Mines



If in 1891 you wanted to go into the mining business, here's an article that you might have been interested in:

For Sale or Lease
That splendid piece of mineral land from which the Bluff Springs Mining Co. took about $112,000. worth of zinc ore some three years ago. For further information apply to owner, L. W. Guild, 39th and Harrison St., Kansas City, Mo.[40]

Here's another article that deals with a transaction of a mineral deposit:

The Quisenbury Coal Mines were sold at an assignee's sale on Friday, May 29th. Three hundred and fifty dollars was the price paid for the lease and machinery.[41]

Here is an article telling about a company that planned to travel to Morgan County because it was starting mining operations here:

A Mining Company organized at Leesburg, Missouri, is to travel to the Morgan County area to start developing of the mineral wealth here. The Company has already bought several hundred acres specifically for the mining of coal, graphite, and kayolin.[42]

This article tells of a mining expert coming to the County:

J. K. Gooding, a mining expert and financier, is planning to make a trip as to assess the mineral wealth in Morgan Co.[43]

Almost all of the articles taken from local newspapers were found in the Morgan County Historical Society's files. At this time, we would like to thank all the members of the Morgan County Historical Society, especially Mrs. Omega Hutchison and Mrs. Gerald Yarnell, for their help in all phases of our research. Without their assistance this report would not have been possible.

---

40 Versailles Leader, Jan. 3, 1891, Vol. 1.

41 Versailles Leader, June 11, 1896, p 8, col. 1.

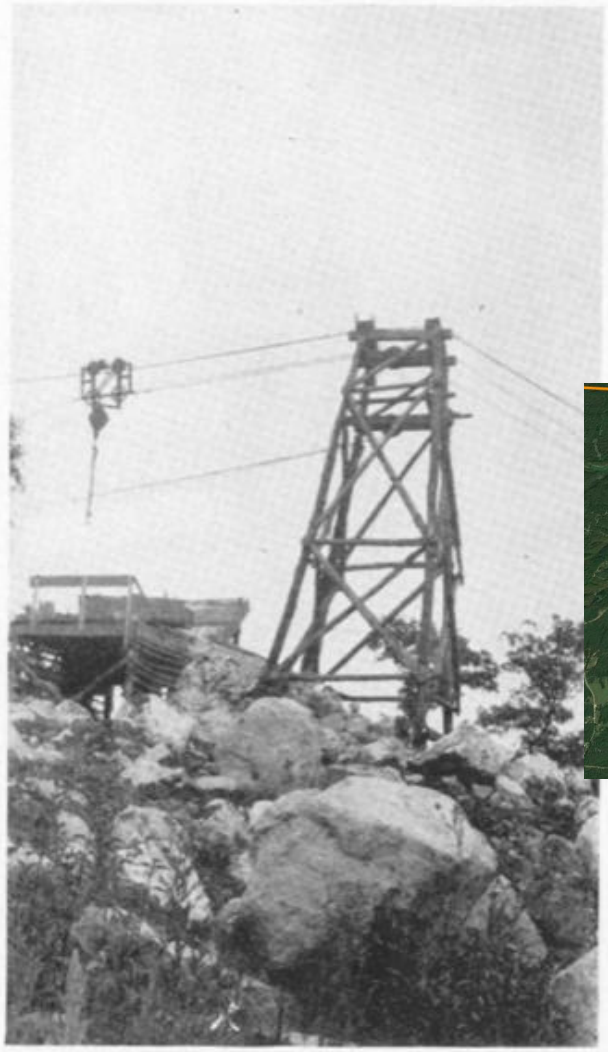
42 Versailles Leader, March 16, 1905.

43 Versailles Leader, March 28, 1896.

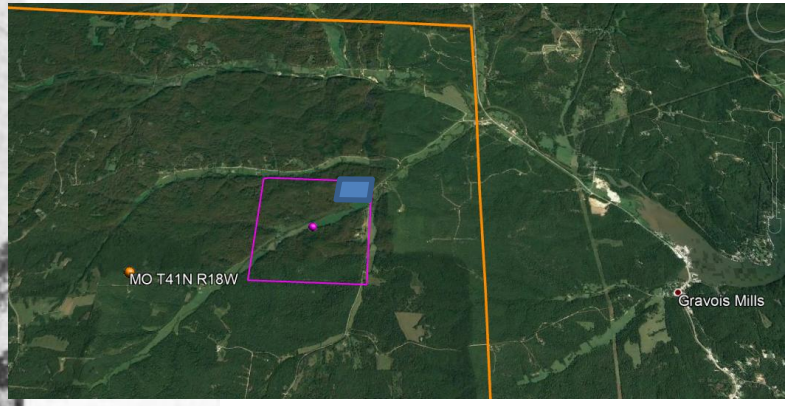
Hall and Hurley, Main Mines of Morgan County, 1973

Newell Mine (barite, lead) surface workings

PLATE II



B. NEWELL MINE, NE¼ NE¼ SEC. 14, T. 41 N., R. 18 W. TRAVELING CRANE AND LOADING FACILITIES FOR TRUCKS.



Mineral deposits of Morgan County Missouri, p.125 ,Mather, 1946

Iron-hematite (FeO2)

IRON ORE.

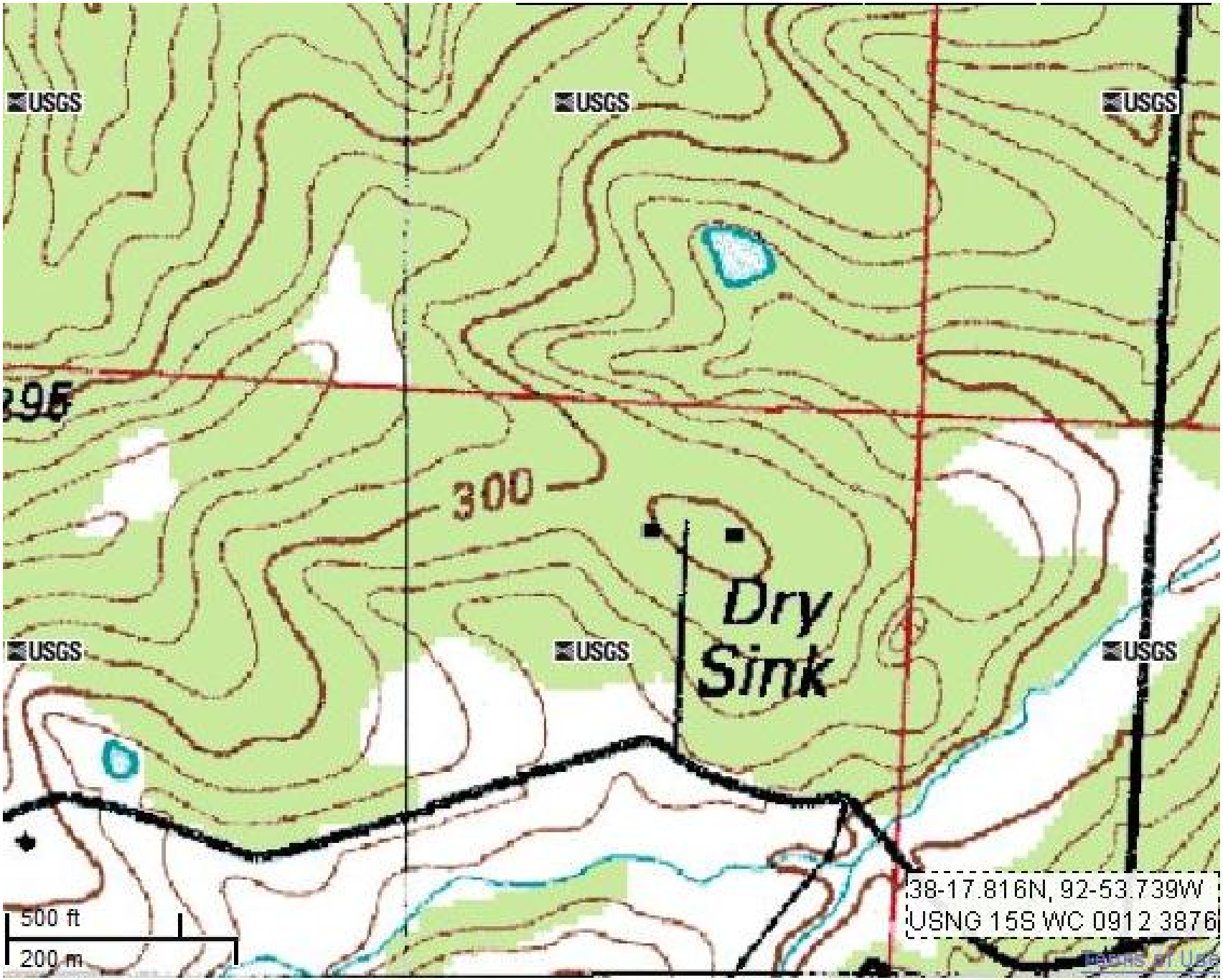
I only met with Iron ore in notable quantities at one locality in this county. This was in the north-west quarter of the south-west quarter Sec. 27, T. 41, R. 17, where large bodies of the "pipe-stem " variety of brown Hematite were seen along a slope about 100 feet above the Gravois. These masses, some of which would measure 8 or 10 feet in diameter, appear-at least many of them- to be in situ, the columns being in a vertical position. I could not determine its extent, the larger bodies of it extending beneath the loose surface materials. Considerable quantities of heavy spar were associated with it. I think. it occurs in the Third Magnesian Limestone.

Reports of the geological survey of the State of Missouri - 1855-1871, Broadhead, Meek, et. al., page 156.

Quarry south of Versailles

- Geologic Curiosities (Dry Sink, Chamberlin's Pit, Elephant Rocks (Graydon Sandstone Boulders), Wolf-Den Mine-Cave, Artesian Wells)

Dry Sink

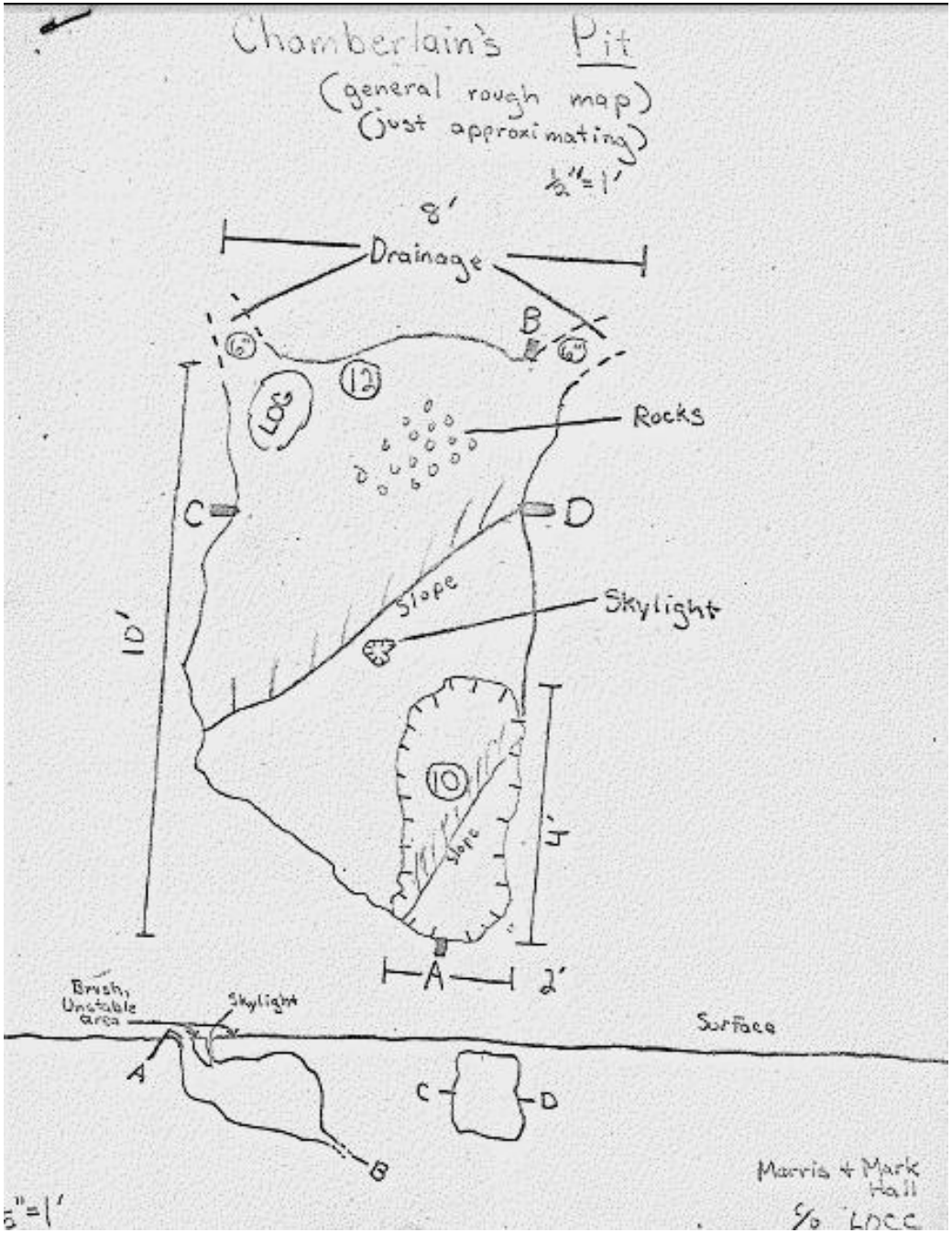

USGS
USGS
USGS
300
Dry
Sink
USGS
USGS
USGS
38-17.816N, 92-53.739W
USNG 15S WC 0912 3876
500 ft
200 m

Dry Sink

Dry Sink

Dry Sink

Chamberlin's Pit



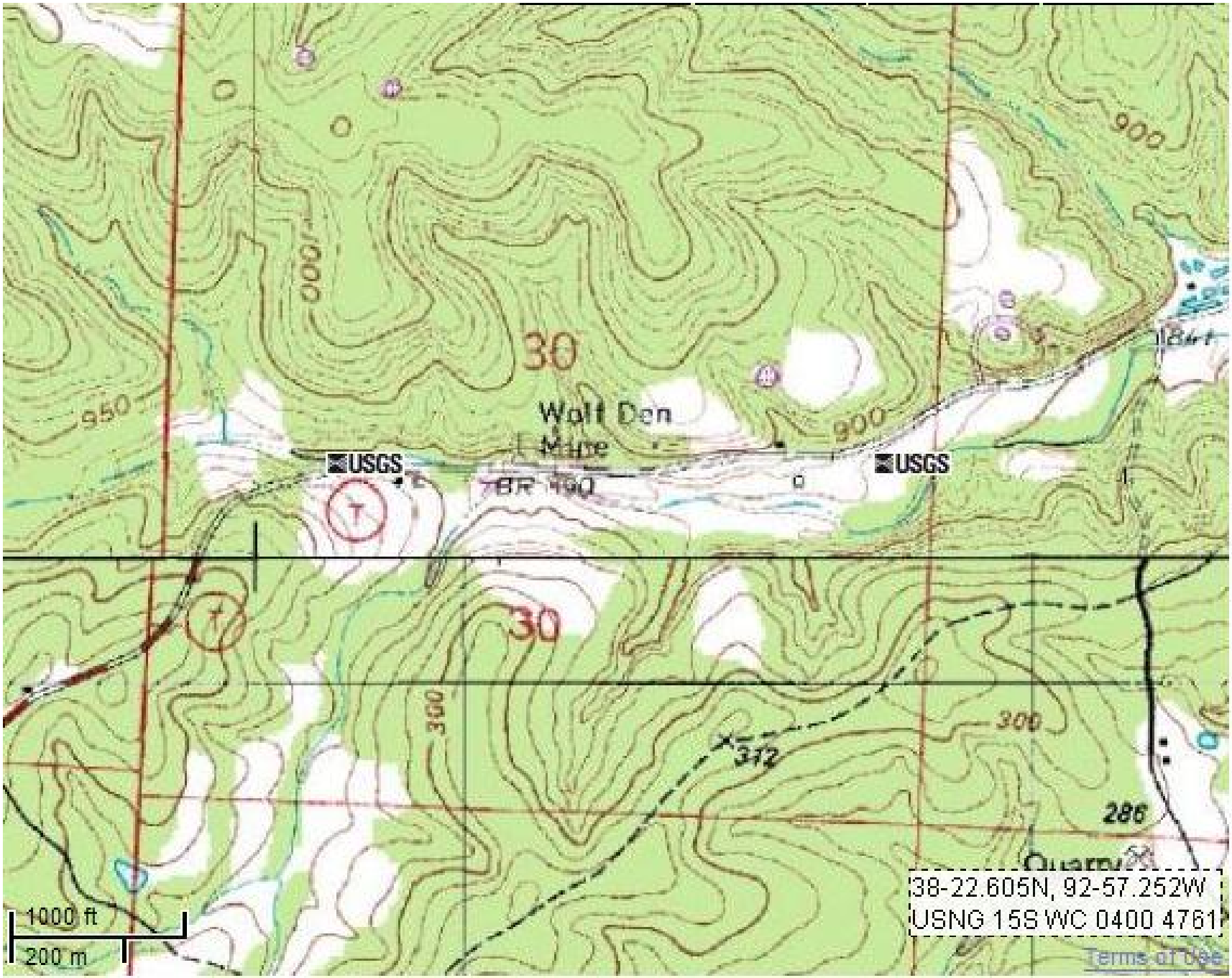
- Elephant Rocks

- Elephant Rocks-scattered along Brushy and Mill Creek Valleys-one set down “O” Road east of Laurie
- “Further south, near Mill Creek, a large stone formation is known as the Elephant Rocks. The mammoth bald monsters are objects of curiosity. Osage Indians were thought to have spent time there, since the Osage Trace was just over the hill and into the valley below.” *Morgan County Missouri, 1833-1910, by Prudence Williams*

Elephant Rocks (Graydon Sandstone)

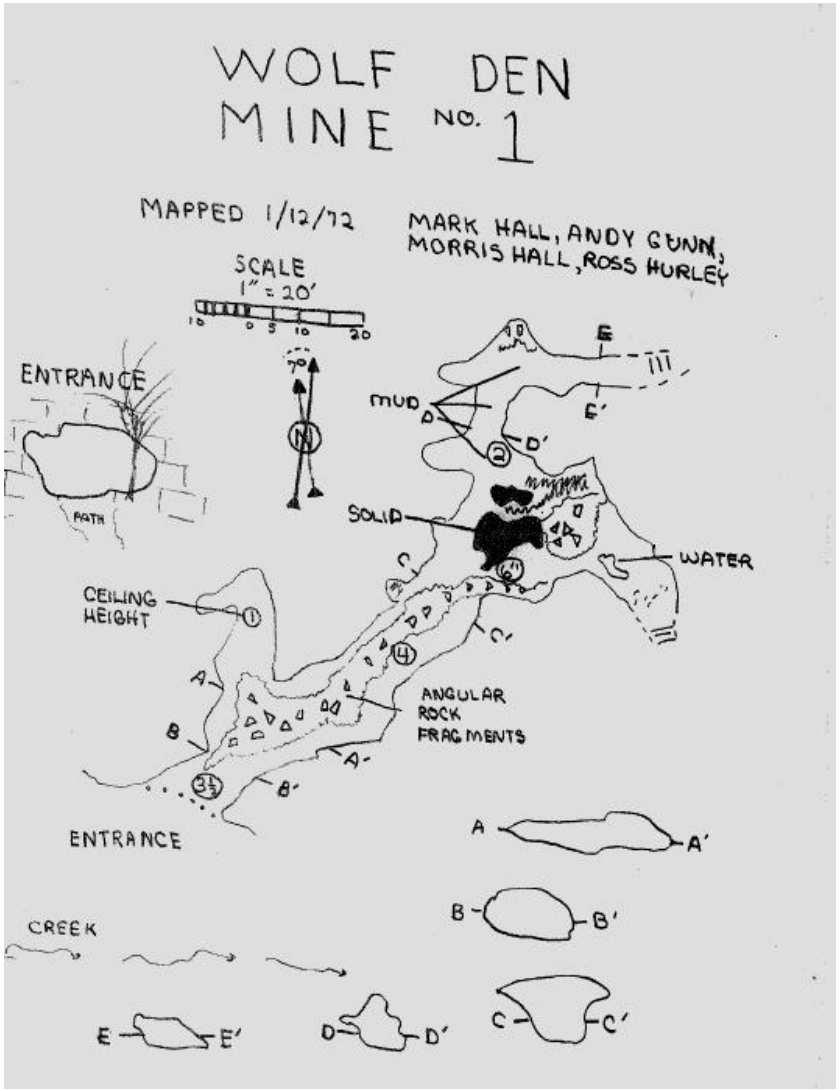
Geology of Morgan County, p.53, Marbut, 1907

Wolf Den Mine (Cave) #1



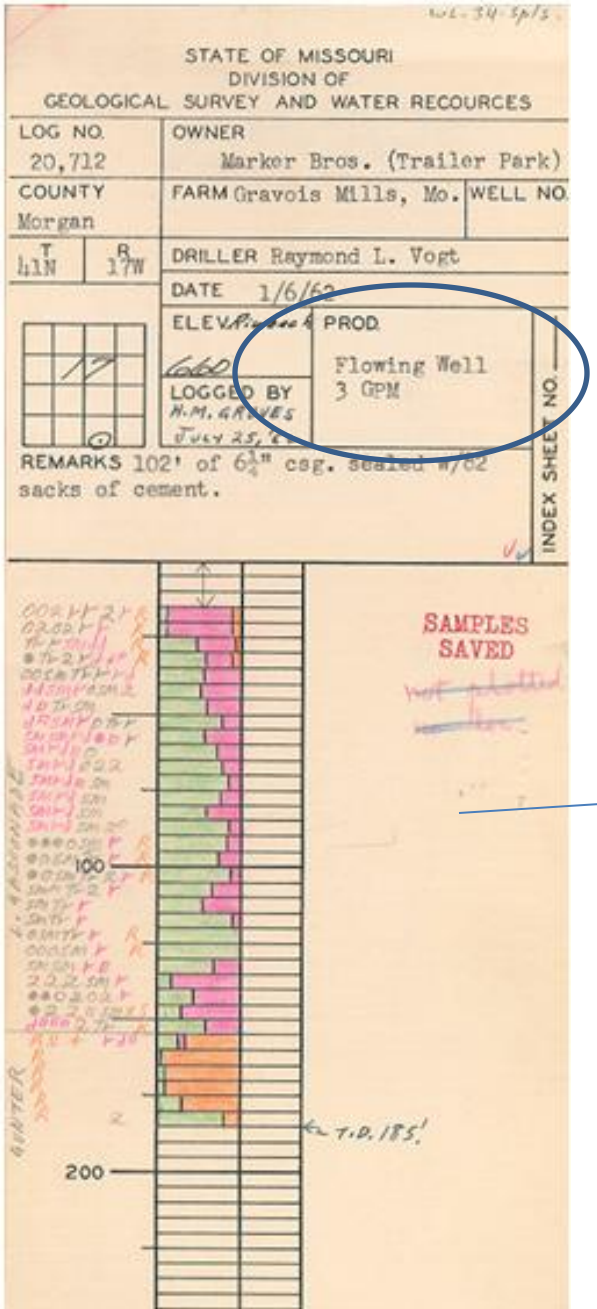
Wolf Den Mine (Cave) #1

Above Wolf Den Mine at filled in vertical shaft that was used to remove lead and barite, *Hall and Hurley, Main Mines of Morgan County, 1973*



Entrance to Wolf Den Mine # 1, Map of mine (to right)
Hall and Hurley, Main Mines of Morgan County, 1973

Artisan Wells



STATE OF MISSOURI
DIVISION OF
GEOLOGICAL SURVEY AND WATER RECOURCES

LOG NO. 20,712	OWNER Marker Bros. (Trailer Park)	
COUNTY Morgan	FARM Gravois Mills, Mo.	WELL NO.
T 41N R 17W	DRILLER Raymond L. Vogt	
	DATE 1/6/62	
	ELEV. 660 PROD. Flowing Well 3 GPM	
	LOGGED BY H.M. GRAVES July 25, '62	

REMARKS 102' of 6¼" csg. Sealed w/62 sacks of cement.

INDEX SHEET NO.

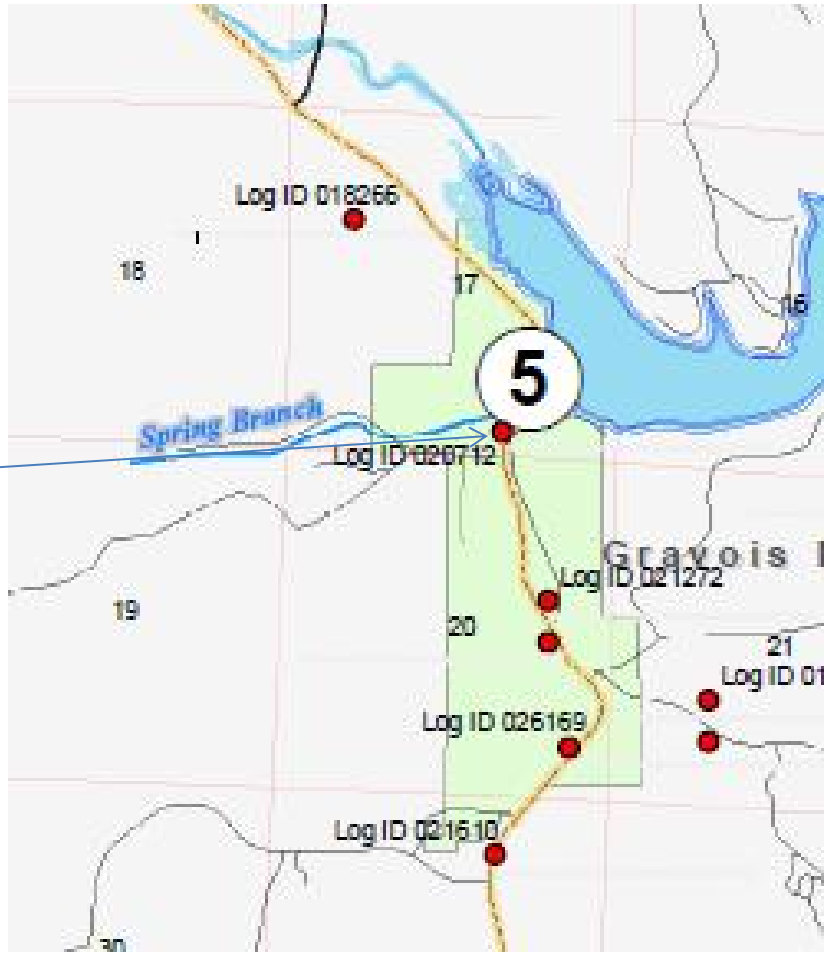
SAMPLES SAVED

100

200

T.D. 185'

WINTER



MORGAN COUNTY.

FORTUNA DISTRICT.

In Morgan County and near Fortuna, Moniteau County, in T. 44, R. 17, according to the statement of Mr. E. A. Pettibone, there are about 20 flowing wells. These were all prospect holes sunk by lead and zinc mining companies. The water is obtained from flint beds at the base of the Burlington limestone. None of these wells are utilized, but they demonstrate the existence of another interesting artesian district. Their catchment area is to the southeast, and the rocks of

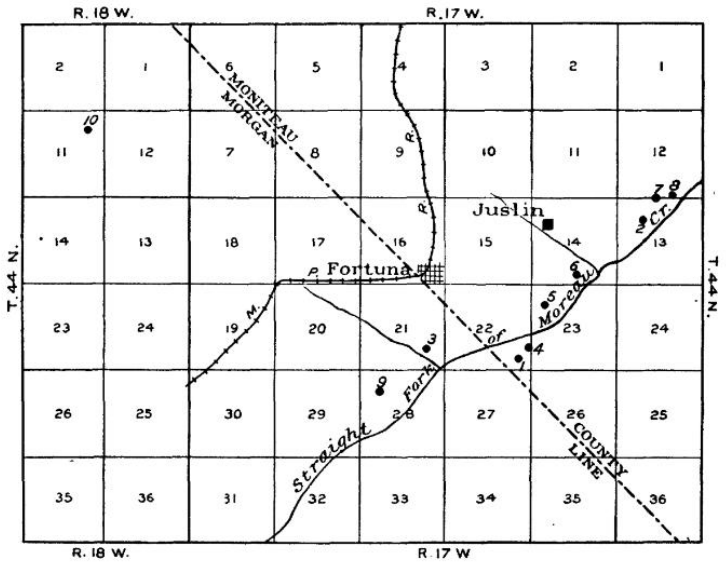


FIG. 3.—Group of artesian wells on Straight Fork of Moreau Creek, near Fortuna.

this region dip to the northwest along the western slope of the Ozark dome. The wells all lie along the valley of Straight Fork of Moreau Creek and may be located by means of the accompanying sketch map (fig. 3).

No. 1, the Singer well, and No. 2, on the Hutchinson tract, are 200 feet deep. The water was struck at a depth of about 140 feet, and the flow is strong. No. 3 is a group of three wells on the Capellar & Osier tract, each 200 feet deep, with a flow of water rising from a depth of 133 feet. No. 4 is a group of four wells on the Woodyard and Parkersburg Lead and Zinc Company's tract, all 200 feet deep, with water reached at about 40 feet. No. 5 is a group of four wells on the Missouri Lead and Zinc Mining Company's tract, each 200 feet deep, with a flow struck at 100 feet. No. 6 is a well on the Dug Hayes propert

200 feet deep, with flowing water reached at 40 feet. No. 7 is a well on the Newkirk tract, 200 feet deep, with flowing water reached between 156 and 160 feet. No. 8 is a well on the Dug Hayes tract No. 2, 200 feet deep, with flowing water at 120 feet. No. 9 is a well 100 feet deep, sunk by Milton McDaniel about 15 feet above the bed of a little draw and 40 feet above the middle branch of Moreau River. This is the farthest well to the south and has a barometric altitude of 869 feet, the altitude of Fortuna being 959 feet. The water in all these wells is clear, cold, and hard, typical of the Burlington limestone. The temperature of those tested is 59° F., with an air temperature of about 80° F.

Near Fortuna is a well owned by the Mary M. Mining Company and drilled by Charles E. Miller. The following log was received from Messrs. M. L. Fuller and S. Sanford:

Log of well of Mary M. Mining Company, near Fortuna, Moniteau County.

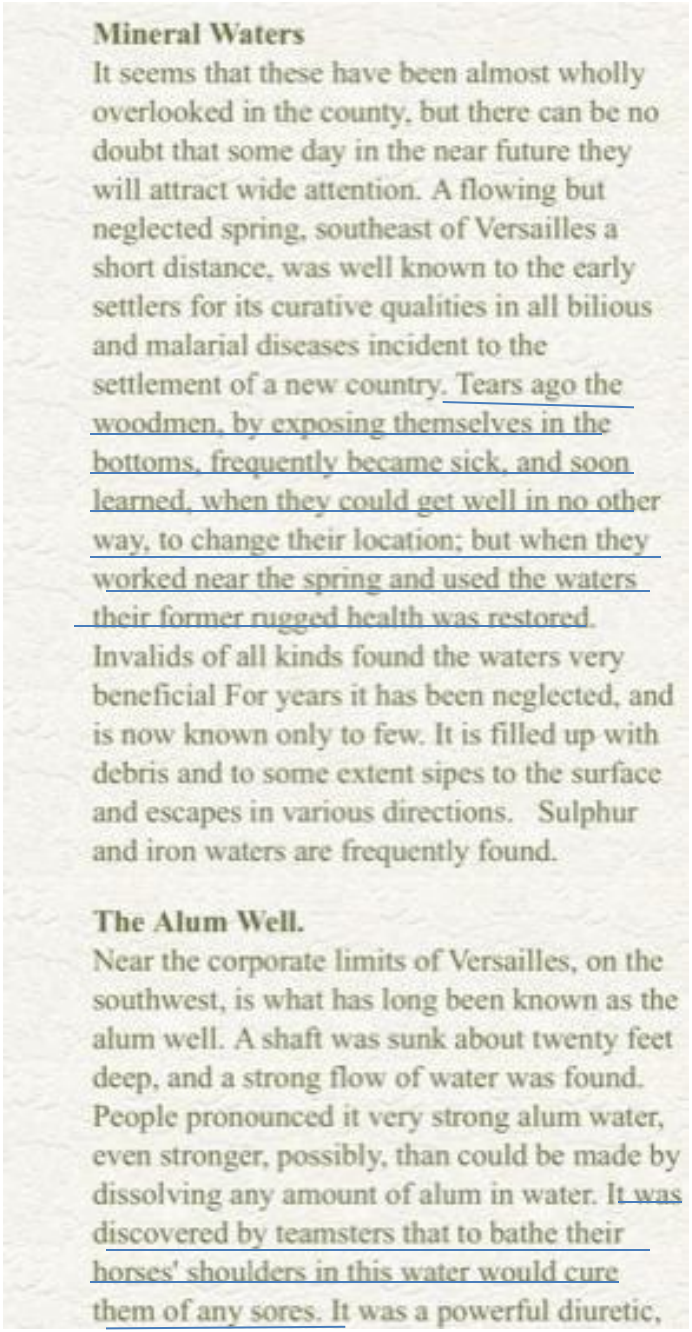
	Thickness.	Depth.
	Feet.	*Feet.*
Soil and clay	10	10
Rock	15	25
Limestone	25	50
Magnesia limestone	10	60
Magnesia limestone and mundic	10	70
Limestone, pink spar, and mundic	10	80
Limestone and flint	10	90
Limestone and flint, jack shines	10	100
Limestone, pink spar, jack shines	10	110
Limestone, black flint, very good jack and lead	11	121
Limestone, black flint, very good jack and betts	14	135
Limestone, white flint, small shines	15	150
Limestone, black flint, jack shines	10	160
All pink spar	6	166
Pink spar and black flint	15	181
Limestone and pink spar	5	186
Limestone, jack shines	5	191
Limestone and flint, jack prospect	20	211

This well is probably all in the Jefferson City limestone.

BLUFF SPRING AND GLENSTEAD.

Mr. J. F. Todd states that there is a strong flowing well in an old prospect hole in the NE ¼, sec. 11, T. 44, R. 18, in Morgan County, within a quarter of a mile of the Bluff Spring mines; also another a mile east and a quarter of a mile north of Glenstead, Morgan County, in sec. 6, T. 43, R. 17. Neither of these two wells was visited.

- Geologic Mysteries- Mineral Springs near Versailles, Attners Bluff Cave, Big Gravois Cave, Christmas Tree Cave, Wolf Cave, Lost Silver Mine



Mineral Waters

It seems that these have been almost wholly overlooked in the county, but there can be no doubt that some day in the near future they will attract wide attention. A flowing but neglected spring, southeast of Versailles a short distance, was well known to the early settlers for its curative qualities in all bilious and malarial diseases incident to the settlement of a new country. Tears ago the woodmen, by exposing themselves in the bottoms, frequently became sick, and soon learned, when they could get well in no other way, to change their location; but when they worked near the spring and used the waters their former rugged health was restored. Invalids of all kinds found the waters very beneficial For years it has been neglected, and is now known only to few. It is filled up with debris and to some extent sipes to the surface and escapes in various directions. Sulphur and iron waters are frequently found.

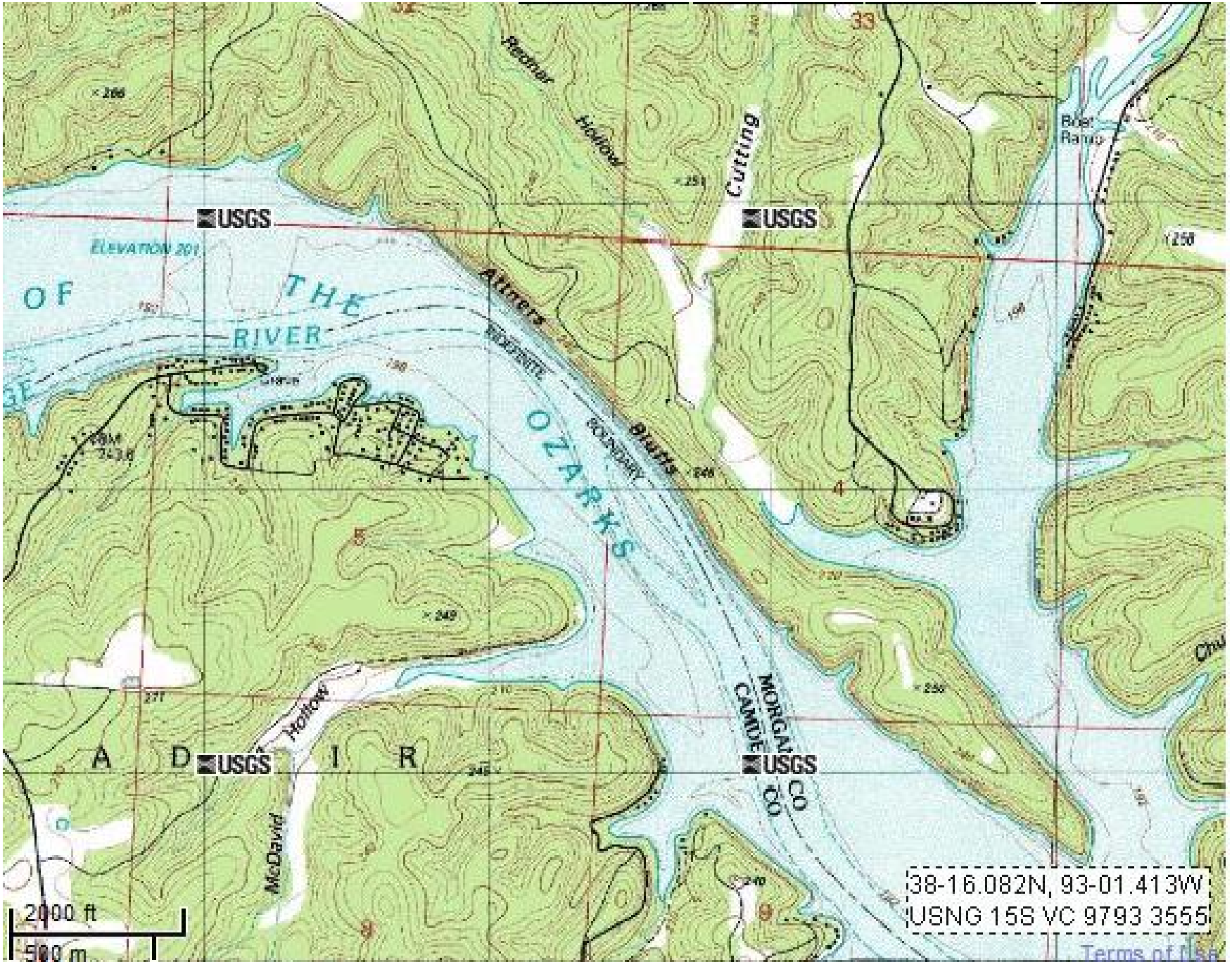
The Alum Well.

Near the corporate limits of Versailles, on the southwest, is what has long been known as the alum well. A shaft was sunk about twenty feet deep, and a strong flow of water was found. People pronounced it very strong alum water, even stronger, possibly, than could be made by dissolving any amount of alum in water. It was discovered by teamsters that to bathe their horses' shoulders in this water would cure them of any sores. It was a powerful diuretic,

Mineral Springs near Versailles

History of Cole, Moniteau, Morgan, Benton, Miller, Maries and Osage Counties, Missouri, Chicago, IL: Godspeed Publishing, 1889

Attners Bluff Cave



Attners Bluff Cave

- **Big Gravois Cave**

- At the mouth of the Big Gravois is a cave with an opening of fifty feet. This runs back about 300 yards. From the hill is an opening down to the cave, through which voices below can be heard.--*Hist. of Morgan Co*., p. 391 and *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*)

- **Christmas Tree Cave**

- “Another now-flooded cave exists in the hill mass of the Golden Beach area facing Twin Bays (8 mile mark on the Gravois Arm). Through the years following impoundment of the lake waters, various persons have thrust discarded Christmas trees into the cave opening to provide a year ‘round haven for fish…” *UNKNOWN Author*


Gravois Mills
Rocky Mt
Twin Islands
Twin Islands
8840 ft
© 2013 Google
Village o

- **Wolf Cave**

- East of Versailles, and about a quarter of a mile from Martin's Coal-pit is Wolf Cave. It has never been investigated. (--*Hist. of Morgan Co*., p. 396.)
- “East of Versailles, and about a quarter of a mile from Maritn's coal-pit, is Wolf Cave. It has never been investigated. It opens nearly perpendicular, and a tree has slid into the hole and leans at an easy angle' wolves formerly made their entrance and exit by means of the tree. In former times, innumerable tracks of these animals could be seen about this opening.” *A HISTORY OF MORGAN COUNTY AND SOME OF ITS PEOPLE BY A.G. BAKER, Editor of the VERSAILLES STATESMAN*

We would like to close this report with two articles taken from the Versailles Leader. The researchers hope this paper has been a pleasure to read. We hope that this can be a guide for future reference, and that one may gain a better understanding of the mining that did take place in the Great Morgan County Area.

E. F. Barnes, an Old Colorado Miner is here inspecting mines in Morgan County. Work has been temporarily suspended at the Bebra Lead Mines.

A. M. Swope and Cornelius Payne of North Missouri were in the County last week looking over mineral and coal fields of Morgan County.

Campbell and Knistey who are working the Moreland mines are yet sinking the main shaft. They took out mineral every day last week and the yield continues good.

Drilling at Grandby Mining Co. mines twelve miles southwest of town which has been suspended two weeks on account of drill becoming suspended has been resumed and will be pushed to two hundred feet.[44]

A silver mine has been rediscovered at the mouth of Proctor Creek. It was finally located due to the old furnace in the Osage River bottom. This furnace is thought to be almost sixty years old and of Spanish origin. Because of this, a lapse of sixty years is between the old discovery and the new.[45]

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[44] Versailles Leader, April 2, 1902.

[45] Versailles Leader, Aug. 27, 1896, col. 1.

Hall and Hurley, Main Mines of Morgan County, 1973