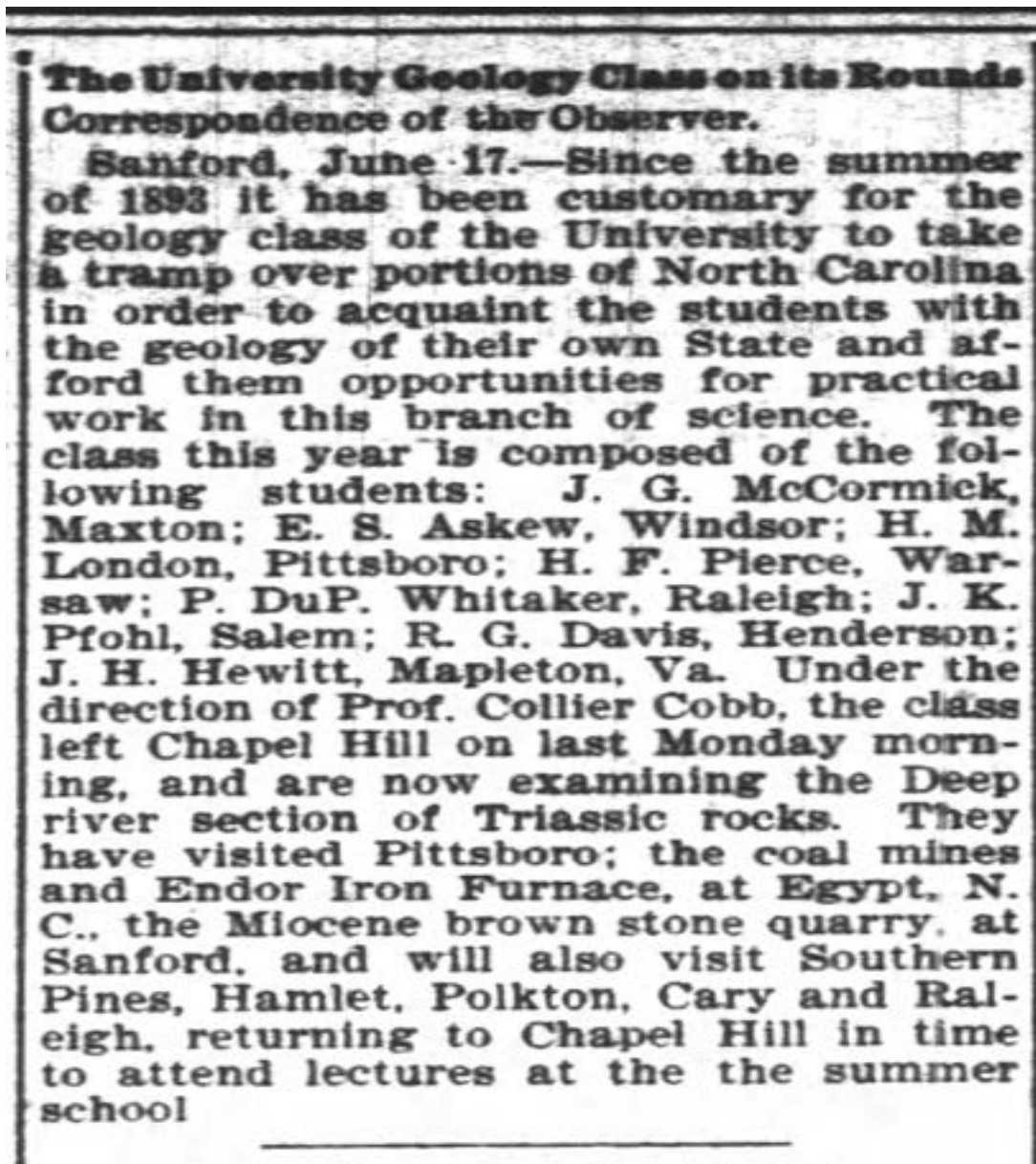


Outline of Chatham County Geology Supplement: Chatham County “Geologic Facts and Oddities”

This “Geologic Facts and Oddities” has been prepared to supplement the “*Outline of Chatham County Geology*” 2021. Short discussions are presented to answer questions posed by residents during rock identification sessions and a presentation of the “Outline” in April, May and June 2022 held at CCHA.

NOTE: Some field location information is presented herein. However no person should enter any property unless property owner permission (preferably written) is approved to enter and/or to collect samples.



Charlotte *Observer* Newspaper dated June 17, 1893 account of a University of North Carolina geology field trip to points in and around Chatham County.

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Chatham County and “Chapel Hill Grit”

References: Soil Survey of Chatham County, North Carolina, 1937, pgs. 44-48; Soil Survey of Chatham County, North Carolina, 2006, pgs. 383-387. Both surveys Natural Resource Conservation Service (NRCS) and U. S. Dept of Agriculture (USDA),.

Numerous people asked about “Chapel Hill Grit.” The “Grit” forms part of the soils formed over bedrock by weathering and erosion. The following short discussion is summarized from the two soil surveys cited above. First we must introduce general geology and soil information and then the “Grit.”

The "Carolina Slate Belt" geology underlies roughly 72 percent of Chatham County. Rock consists of metavolcanic and granitic and granodiorite plutons. The Sanford and Deep River Basins are underlain by sedimentary and metasedimentary rocks locally crosscut by Jurassic dikes. The igneous volcanic and plutonic rocks are approximately 650 to 570 million years before present (mybp).

Soil types vary widely due the local variation in type, composition, and distribution of the rocks from which they formed. Both the 1937 and 2006 USDA Chatham County soil surveys present an overview discussion of County geology and a comprehensive list and discussion of soil types.

Weathering processes decompose rock and minerals into clay and leach trace elements forming the soil profile. As a general rule weathering forms soil from the surface for several feet, then transitions into highly weathered/disintegrated rock from roughly 4 to 10 feet or deeper in depth. Weathering-resistant minerals such as quartz tend to remain as residual soil strata. Weathering oxidizes rock minerals forming clay minerals. This coloring results in a characteristic soil orange/red brown and/or mottled color appearance.

As a general rule "slightly weathered" bedrock depths range can vary from a few feet to more than 20 feet deep depending upon location. This transitions to "fresh" or unweathered bedrock at deeper depths.

Northeastern Chatham County is underlain in part by the Fearington granite and granodiorite plutonic rocks. These rocks weather to a coarse residual soil typically a light brownish orange to orange colored mixed sandy to fine gravelly layer. "Chapel Hill Grit" appears to form primarily from the underlying granite and granodiorite rocks. Soil types in this area that contain this residual sandy and gravelly soil/strata are locally termed the “Chapel Hill Grit.” The “Grit” is locally used for driveway, garden paths and other surficial fill use.

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An example of "Chapel Hill Grit" formed from decomposed and weathered plutonic rock (granite/granodiorite) in the northeastern part of the County. Note that it contains highly weathered rock fragments and well as fine to coarse sand and fine gravel sized particles.

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The “Worthless Land” Bennett Flatwoods and “Devil’s Tramping Ground” Southwest Chatham County

References:

- *"Map Shewing the Routes of the Central and Cape Fear and Yadkin Railroads"* 1852. University of North Carolina, Wilson Library Map Collection web site: <https://library.unc.edu/wilson/digital-collections/>
- Devil's Tramping Ground YouTube video and short discussion; UNC-TV Science link- <https://www.youtube.com/watch?v=ZVTQgsPMqk8>
- Hadley, W., H, Horton, D., G and Strowd, N. C., 1976, *Chatham County 1771-1971*: Edwards Brothers, Inc. Lillington, NC, pgs. 183-185.
- Phillips Ed. S, *"The Old Anson Road"*, Chatham Record Newspaper, 3 Jan. 1935.
- Weston, M. C., *"Night at the Devil's Tramping Ground"*: Chatham Magazine, Sept./Oct. 2023, pgs. 44-46.
- Additional information courtesy of Jim and Beverly Wiggins and Wanda Pender.

The "Worthless Land" Bennett Flatwoods

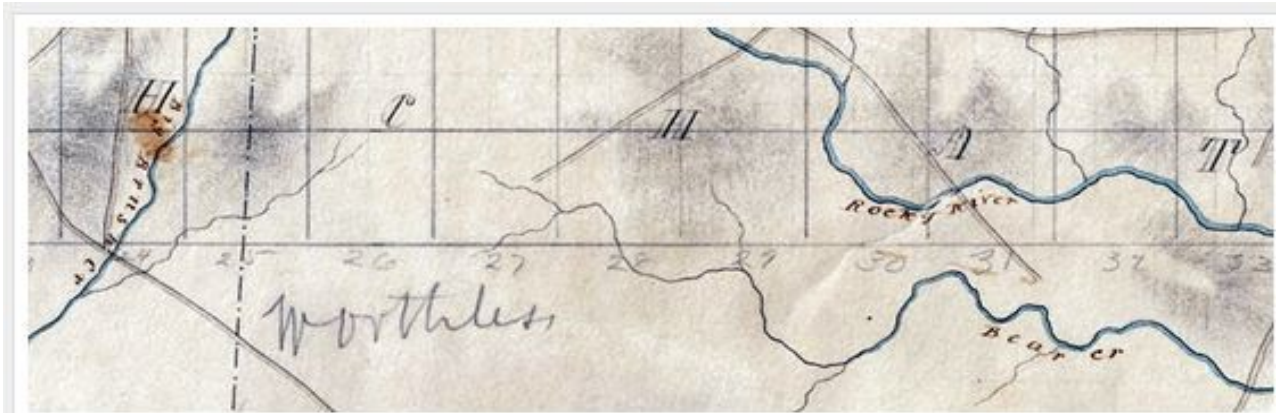
The *"Map Shewing the Routes of the Central and Cape Fear and Yadkin Railroads"* dated 1852 was prepared by W. Schlater. This survey was conducted for a potential route for the Central and Cape Fear and Yadkin Railroad west of Raleigh. This "direct" line from Raleigh to Salisbury roughly along the route of US Hwy 64. South of the current location of Siler City in southwest Chatham Count, is a pencil notation “worthless land” on the proposed Railroad Route Map.

We do not know who marked "worthless land" on the map or what it meant. Was that land worthless for the railroad or did it refer to something else? When the North Carolina Railroad was constructed over 20 years later, it followed a more northerly alignment, leading to the development of towns such as Burlington and High Point. The “worthless land” in southwest Chatham County was bypassed.

This region also contains the "Devils Tramping Ground" and a small peak known as Paul Beck Hill. This area was the site of a paleo-Indian rhyolite quarry and numerous camps. The area had been heavily timbered and a timber railroad was built in the mid-1800's. Mr. Tim Sweeney owns a portion of this land for habitat and rare biota conservation and preservation. The open glade-like environment still protects rare and locally unusual plant species, as well as to improve conditions with a longleaf pine restoration project on 3000 acres.

Mr. Sweeney noted the “worthless land” area is now known as the Bennett Flatwoods "where ancient volcanic ash deposits create water-impermeable soils unsuitable for agriculture, and promoted the growth of longleaf pine and scrubby oak trees." He has taken numerous photos in the area, see this link; <https://www.flickr.com/photos/timsweeneynature/albums/72157632278868267>

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The “worthless land” notation in southwest Chatham County between the Rocky and Deep rivers, noted on this enlargement of the *“Map Shewing the Routes of the Central and Cape Fear and Yadkin Railroads, 1852”* (UNC Wilson Library Map Collection).



“Map Shewing the Routes of the Central and Cape Fear and Yadkin Railroads, 1852” (entire map sheet). Arrow points to “worthless land” note on Map (UNC Wilson Library Map Collection).

A speculation is that pioneer farmers could not farm the land possibly due to soil impermeability, thin and trace element-poor soil or other reasons. Hence considered “worthless” people moved on to other available land.

Phillips (1935) mentions that water “analyzed from this section” states salt” is abundant in (some?) water wells”. A speculation is that this might mean that subsurface water has a high Total Dissolved Solids (TDS). A high TDS in well water might create a bitter taste and/or “salty”. No other information was cited.

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Devil's Tramping Ground

The Devil's Tramping Ground, located near Harper's Crossroads in Bear Creek, pertains to small circular area of bare ground devoid of plant life. It has been alleged that nothing has grown within the roughly diameter 40-foot ring for perhaps two hundred years or longer.



Visitors to Devils Tramping Ground circa late 1800s photo courtesy William and Sandy Jarrell.



The Devil's Tramping Ground photo circa 2008? Note fire pit and trash.

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Legends reported over the last two hundred years include reports of supernatural events and the "Prince of Darkness" walking about the bare ground contemplating evil deeds. Apparently an early land description dating from the late 1700s(?) refers to this site as "poisoned land."

The "Tramping Ground circle" below is reputed have an effect on compasses. It has been used for campfires by visitors at the "Ground." A North Carolina Department of Agriculture soil chemical test was conducted in 2008 on a soil sample taken in the circle. Results are inconclusive and repeated fires may have influenced soil chemistry results. Vegetation appears around, but not within, the circle as seen in the photograph.

The Phillips (1935) "Old Anson Road" newspaper article briefly discusses the "Devils Tramping Ground along with local history and geology-related items. A brief discussion of the "Ground" mentions associated "strange grass" within(?) a 15 yard radius "barren area." As noted above the area is known for many rare and locally unusual plant species.

The 2023 Chatham Magazine article "*Night at the Devil's Tramping Ground*" describes a "limited study" at the site. The investigators documented their work and used some detection equipment attempting to record a possible disturbance. This article mentioned article previous reports of the odd nature of the location and ground. A short video about the Devil's Tramping Ground" is available at the link in the References above (Hadley et al, 1976: UNC-TV video).

Field		Applied		Recommendati																	
Sample	Last	Mo	Yr	Crop or Year	Lime	N	P ₂ O ₅	K ₂ O	Mg	S	Cu	Zn	B	Mn	See Note						
TBSC1	Lawn			1st	No Crop					0											
				2nd						0											
Test Results																					
Soil	HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	Mn-I	Mn-AI(1)	Mn-AI(2)	Zn-I	Zn-AI	Cu-I	S-I	SS-I	NO ₃ -	NH ₄ -	Na
MIN	0.6	1.17	8.8	92.0	0.7	6.5	25	88	75.0	12.0	163			1420	1420	73	135	33.00			0.2

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THE OLD ANSON ROAD

By ED. S. PHILLIPS

The Old Anson Road in Chatham county was surveyed and cut out by Cornwallis and his men from England during the Revolutionary War. It ran in a northeast direction from Bennett to Hillsboro and in a southwest direction from Bennett to Anson county, crossed the Pee Dee river at or near Stand Back Ferry, crossed Fork Creek at John Beck's place in Randolph county, then came on down and crossed Deep River at Waddells Ferry, extending into Chatham county through the village of Bennett. The Bennett high school building touch this old road. Fanning and his Tories used this road in their effort to help Cornwallis and his men in the Revolutionary War. W. S. Gardner, of Bennett, says that his great grand father and a number of other citizens of this section lay out all night at Waddells Ferry waiting for Fanning and his Tories to come along. Fanning and his men crossed the Ferry about day break and they had a running fight with the Patriots for six or eight miles. Two men were killed in the fight near Mt. Olive church.

Signs of the Old Anson Road can still be seen in the Bennett section, although it was cut out more than 155 years ago. This old road was a path into a treasure of natural resources in this county.

The road passed through Bennett less than a mile northeast of Buffalo Wallows. This place called Buffalo Wallows is where Buffalo, deer, sheep, cows and other live stock once congregated to lick salt from the ground. Signs can be seen now at Buffa-

lo Wallows where the buffalo bit off the top of small trees, for the trees are now grown and show that they were topped when they were small. It has been said that a large number of families of the Bennett section obtained all of their salt for family use from Buffalo Wallows during the Revolutionary period.

The Lead Mine Hill and Devils Tramping ground are located near the Old Anson Road. Isaac H. Dunlap owns the tract of land which contain Lead Mine Hill. The late Jeff Purvis and other former citizens mined lead from this hill for their own as well as commercial use. They used a chisle to cut the lead. Devils Tramping ground is near Blue Rock, two miles east of Bennett. The old B. & W. railroad onced ran through here. There are about twenty-five or more acres of land in Blue Rock hill which is pure solid blue rock. Devils Tramping ground is a round ring where a kind of grass grows that has never been seen anywhere else. It is a queer sort of a grass, with no other kind of weeds, grass or bushes growing near it. This ring is thirteen yards across and forty yards around. There are signs of cross paths in this ring. Along the old road three miles from Bennett toward Siler City is where Anthony Beck, famed blacksmith of his day, once lived. You can still see the signs where his shop was located.

Through this western section of Chatham county a great many kinds of metal have been found by inspectors. The water which has been analyzed from the wells of this section shows that salt is abundant.

This article was published Chatham Record Newspaper January 3, 1935 discussing points of interest in the County.

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Gold in Chatham County

References:

- *Map of Chatham County Historic Mines*, March 2022: Chatham County Planning Department.
- Jackson, L. W. *Map of Cane Creek Gold Mines Chatham County, North Carolina, circa 1877*; State Archives of North Carolina <https://dc.lib.unc.edu/cdm/ref/collection/ncmaps/id/2384>
- *Gold in North Carolina, undated pamphlet*; North Carolina Geological Survey.

Gold occurs in North Carolina however most gold mines and producers occur west of Chatham County (for example in Mecklenburg and Cabarrus Counties). Gold mined from the North Carolina supplied the US Mint coinage from roughly the late 1790s into the early 1800s.

Chatham County is underlain by widespread Neoproterozoic aged volcanic and plutonic rocks. These rocks usually have mineralized hydrothermal fluids associated with them when intruded or erupted. These hydrothermal fluids may contain and deposit various metallic elements including gold, silver, copper, zinc, lead and other metals.

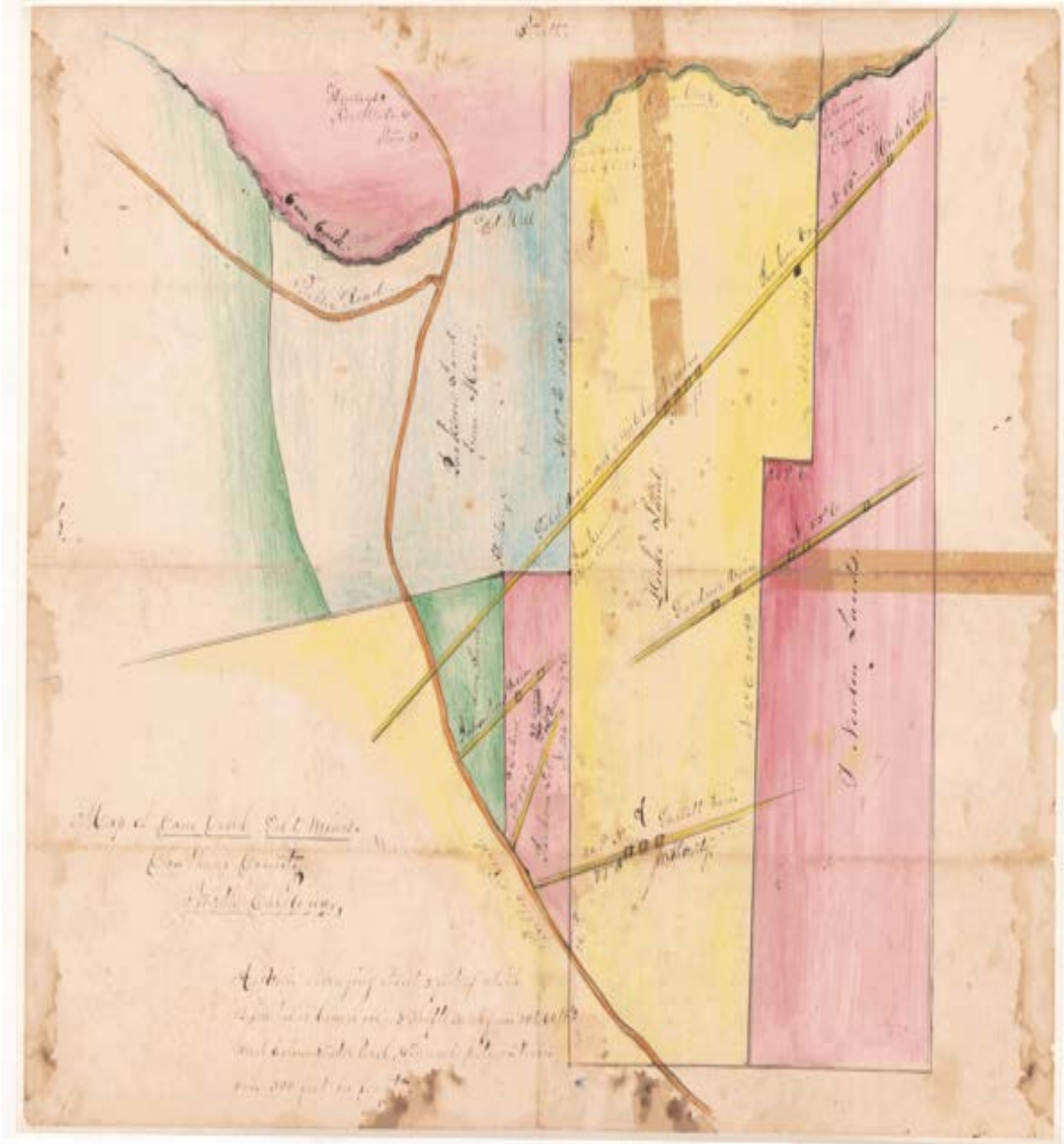
If geochemical conditions are favorable these metals may be deposited within the rock, along fault lines, fractures in association with quartz veins. The metals may form ore deposits large enough for mining production. Locations where trace amounts of metals occur are usually termed "prospects" but are not economic to mine. If a location is suspected to contain large ore bodies an extensive subsurface exploration program proceeds. This work defines an ore body lateral and vertical extent to prove mining is worth the economic effort.

One gold ore prospect is located in northern part of the County according to the County Planning Historic Mines Location Map. No gold mines or widespread gold production are known or reported in the County. The State Archives web site has the following notation discussing the Cane Creek Gold Mines Map:

- "A vein averaging about 3 feet of which 12 inches is brown ore. 3 shafts sunk from 50 to 60 ft. and below water level, & Tunnels between them over 300 feet in length." The map portrays an area along Cane Creek in Chatham County and shows the locations of veins of gold ore and mine shafts along the veins. Individual tracts of land are platted and their metes and bounds are recorded on the map. This area was in Alamance and Chatham County when the map was produced, but is entirely in Alamance County now."

Apparently gold was not present in economic quantities to warrant more widespread prospecting or exploration mining activity at this location.

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Map of Cane Creek Gold Mines Chatham County, North Carolina, circa 1877 showing prospecting gold bearing vein trends. The area included parts of Alamance and Chatham County at the time this map was produced.

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"Sheep Rock"

Reference:

- Crutchfield Crossroads Geologic Map, Chatham County, NC: Bradley, P. J., Hanna, H. D. and Peach, B. T. North Carolina Geological Survey 7.5 minute Quadrangle, Open File Report 2017-10.
- NC Geologic Maps available at <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/north-carolina-geological-survey/ncgs-maps/how-to-order-maps-publications>.

Chatham County is underlain by the Neoproterozoic Hyco Formation that is composed of complex igneous geology. These very old rocks include some intrusive and extrusive pyroclastic volcanic rocks. Numerous eruptions built up layers in the Hyco of hard rock. These are resistant to erosion and weathering. A rock outcrop off Sheep Rock Road is thought to have the appearance of a sheep head and is locally called "Sheep Rock."

Sheep Rock and vicinity are geologically mapped as dacite, pyroclastic volcanic rocks tuffs, welded and non-tuffs and volcanic conglomerates. These rocks are folded and faulted and have been subjected to low grade metamorphism. Bradley (et al, 2017) report "rock exposures may occur as resistant finned-shaped outcrops that occur locally outside of drainages" (refer to the Crutchfield Crossroads Geologic Map for more detailed information).

All rocks ultimately undergo surface weathering (chemically and mechanically decomposing rock) and erosion (transporting broken and weathered rock from its original location). Rocks can weather and erode at different rates depending upon rock type, climate and composition.

This differential erosion process forms "rolling hills" and stream cut valley topography seen in the County. These resistant higher hill top rock outcrops tend to have surrounding rock eroded away and depending upon rock lithology form the finned shaped rock outcrops. Sheep Rock is interpreted as an example of such pyroclastic volcanic resistant rock. Differential erosion can be seen throughout the County. Other "fin-shaped outcrops" as well as boulder covered hilltops in the Pittsboro and Fearington Village areas.

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"Sheep Rock" on private property off Sheep Rock Road, northern Chatham County (photo courtesy Jim and Bev Wiggins).

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"Blue Stone" (Soapstone)

References:

- *Blue Stone Soapstone Quarry*, Summer 1984: North Carolina Archaeological Society, vol. 1, no. 1. (See also North Carolina Office of State Archaeology web site for general information on "blue stone" in the State).
- Stuckley, J. L., 1928, *The Pyrophyllite Deposits of North Carolina with a More Detailed Account of the Geology of the Deep River Region*: Bulletin Number 37 North Carolina Department of Conservation and Development, Raleigh, 62 pages with map.
- Wilson, W. F. and Carpenter, A. 1975 (rev. 1981), *Region J Geology: A Guide for North Carolina Resource Development and Land Use Planning, Regional Geology Series 1*: North Carolina Geological Survey Section, North Carolina Dept. of Natural Resources and Community Development.
- *Geologic Map of Chatham County and Surrounding Areas, NC*, Final Nov. 2022: Map compiled by Bradley, P. J., North Carolina Geological Survey Open File Report 2022-03.
- Phillips Ed. S, "The Old Anson Road", Chatham Record Newspaper, 3 Jan. 1935.

"Blue stone" and/or "soapstone" has various industrial and ornamental uses including grave markers. Grave marker use was reported by some people to have been "widespread" in parts of Chatham County in the 18th and 19th century. People commented that the rock was "easy to work or carve" and available to retrieve and/or quarry from local sources. When these rocks are exposed and weathered/decomposed might locally form some trace element poor soils.

Pyrophyllite rock is relatively wide spread in the "Carolina Slate Belt" with occurrences in central and western Chatham County and near Deep River (see Stuckley Index map page 11). Stuckley (1928, pg. 12) presents a short history of the pyrophyllite deposits, related rocks and locations and early uses:

- "One of the earliest reports that gave any information regarding the geology of that portion of the slate belt [Carolina Slate Belt] in which the pyrophyllite deposits are found was a descriptive list of rocks and minerals from North Carolina published by Denison Olmstead in 1822. In this list he described novaculite, slate, hornstone, whetstone, and talc and soapstone from several counties, including Orange and Chatham." He stated that the talc and soapstone were extensively used for building and ornamental purposes, and added that Indian utensils of the same materials were common.

Wilson and Carpenter (1975; 1981, page 10) report that "...ultramafic rocks are primarily black to green soapstone, serpentinite, actinolite-chlorite rocks which consist chiefly of talc, antigorite, chlorite, actinolite and carbonate..." These rocks

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have been metamorphically altered by tectonics and hydrothermal fluids. Talc and pyrophyllite are soft rocks that may be carved or sculpted into various sizes and forms mentioned above.

It is speculated that talc, pyrophyllite or similar metamorphosed rock was commonly called "blue stone" by people who locally quarried and used it.



Blue stone example William Smith grave marker in P36.1.

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"White Flint"

References:

- Asheboro *Courier-Tribune* feature "The Rock Store a solid reminder of days gone by": Sept. 26, 2016.
- "Quartz, Chert and Flint": University of Pittsburgh Department of Geology and Planetary Science
- "Flint and Chert": *The Quartz Page*. <http://www.quartzpage.de/flint.html>
- "Chert": <https://geologyscience.com/rocks/sedimentary-rocks/chert/>
- *Geologic Map of Chatham County and Surrounding Areas, NC*, Final Nov. 2022: Map compiled by Bradley, P. J., North Carolina Geological Survey Open File Report 2022-03.

People inquired about "white flint" used as a building material in Chatham County. The *Courier-Tribune* news article referenced above discusses an example use in the "Rock Store" in Asheboro. This structure was built in 1911-1913 by James "Dink" Cheek used "white flint". The reporter correctly notes this is also known as "quartz."

Mineral Quartz is hard with a Mohs Mineral Hardness of 7. Chert and Flint are microcrystalline varieties of Quartz. Igneous quartz occurrence is widespread in the County as quartz veins crosscutting County rocks. Chert and Flint quartz variations may appear similar with minor compositional differences. Microcrystalline chert and flint may be white, milky white, or grayish in color and typically has a conchoidal fracture that is smooth that does not "cleave" to a straight surface. These rocks also may have red orange or rusty-colored iron oxide weathering traces and stains in fractures.

Flint and chert can be worked to fine cutting edges. Both flint and chert can strike a spark to start fires, and usually flint is used to spark the powder charge in flintlock muskets and rifles. Quartz, flint and chert are durable and weathering resistant.

There are numerous quartz outcrops mapped in Chatham County (Bradley 2022) so local sources were available to people. Quartz may occur as large blocky pieces (such as from a large vein source) and quarried to rough size for a building material. Hence the "Rock Store" building and grave marker photos below likely uses mostly quartz and/or chert and flint quartz varieties.

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"The Rock Store" located at 1412 Old Liberty Road Asheboro, NC, constructed 1911-1913, an example of using "white flint" for building.



Example of "white flint" boulder used in the "The Rock Store" construction. Note curving and rough surface and iron oxide weathering stains. The "white flint" is a variety of Quartz (Photo credit Asheboro *Courier-Tribune*).

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Quartz "white flint" used to build a grave marker, Union Grove in AME J88.1.