

## Learning Series: Alabama's Rocks and Minerals – The “Super Sites”

# Franklin County

Comprising approximately 643 square miles, Franklin County lies in the northwestern area of the state, wholly within the Highland Rim physiographic section. It is bounded to the east by Lawrence County, to the south by Winston and Marion counties, to the west by Tishomingo and Itawamba counties, and to the north by Colbert County.

A portion of the William Bankhead National Forest is located on the southeastern border of the county. Cedar Creek, a tributary of the Tennessee River, flows through the north-central area of the county, and Bear Creek, also a tributary of the Tennessee River, flows through the southwestern corner of the county. Mud Creek, a tributary of the Luxapilla Creek, runs through the eastern half of the county.

As with most of Alabama during the nineteenth and early twentieth centuries, the economy in Franklin County revolved around cotton, corn, and livestock, but the county's early economic history also included mining operations along the banks of Cedar Creek near Russellville. According to Alabama Geological Survey bulletin 70, the first iron-ore furnace in the state was built on Cedar Creek in order to utilize the local brown iron ores. Cedar Creek Furnace became one of the leading centers of mining in the state and produced iron that was shipped to Mobile for use in the Mexican War, and later for the manufacture of munitions during the Civil War.



Franklin County is home to some of the most pristine outdoor attractions in the state. Bear Creek Lake is popular with fishermen, canoers and kayakers and is bordered by scenic rock cliffs and challenging Class I to IV rapids at its upper end. Bridge Canyon is home to Alabama's largest rock formation, a giant sandstone cliff embedded with quartz deposits that rises 285 feet. Located near Hodges in the northern area of the county, the canyon also contains caves, springs, waterfalls, and an 82-foot-long natural bridge. Dismals Canyon, a Registered National Natural Landmark, has been voted one of the country's most secluded and beautiful areas. The canyon includes waterfalls, more than 350 species of flora, and what are known colloquially as "dismalites," strange glowing insects called fungus gnats.

### **Super Site Selection Criteria**

Franklin County was selected as a Super Site for this series on the basis of information reported in *Rocks and Minerals of Alabama – A Guide for Alabama Rockhounds (Circular 38, 1966)*.

The guide identified two minerals—limonite-goethite and siderite—as being prominent. Both were found at two former mining sites in the Russellville area; one a couple miles east of Russellville off County Road 48 and the other a mile or so west of town off AL HWY 24.

### **Featured Rocks and Minerals**



**Limonite-goethite** –  $\text{FeO(OH)} \cdot \text{nH}_2\text{O}$  – hydrous oxide of iron.

Limonite is not a true mineral but an amorphous hydrous oxide of iron which often occurs with the mineral goethite, a crystalline oxide of iron. In fact, most limonite is made up of goethite. Individual minerals in limonite may form crystals, but limonite does not; although some specimens may show a fibrous or microcrystalline structure. Goethite, on the other hand, has a hard crystalline structure and is generally found in botryoidal, reinform, or stalactitic masses. That notwithstanding, when found in massive form goethite and limonite can be indistinguishable.

Sometimes called brown hematite or bog-iron ore, limonite is extremely common and often presents as a clay or mudstone in, or near, oxidized iron and other metal ore deposits. It forms the coloring matter in many soils and is also responsible for the coloring on the weathered surfaces of rocks. Additionally, ordinary rust is limonite.

The generic formula for limonite is frequently written as  $\text{FeO}(\text{OH}) \cdot n\text{H}_2\text{O}$ , although this is not entirely accurate as the ratio of oxide to hydroxide can vary quite widely. In its bright yellow form it sometimes called lemon rock or yellow iron ore. It also occurs in orange, reddish brown, and brownish black. Limonite has an earthy to dull luster and is an opaque mineral absent of cleavage, but with a crumbly fracture. It falls at 4.0 – 5.5 on the Mohs scale, and both limonite and goethite are distinguished from other iron ores by their yellowish-tan streak. Limonite has been known to pseudomorph other minerals such as pyrite.

Numerous small deposits of limonite are found in the Piedmont as large boulder-type or nodular pebble surface deposits called gossan. Extensive deposits occur in a narrow east-west belt in southeastern Alabama and along the Paleozoic-Coastal Plain contact in northwestern Alabama.

The principal use of limonite and goethite is as an iron ore; however, minor quantities of pure ground limonite are used a paint pigment. The yellow form produces yellow ochre, while darker forms produced more earthy tones. Roasting limonite produces red ochres, burnt umbers and siennas.

#### **Siderite – $\text{FeCO}_3$ – an iron carbonate mineral.**

The term “siderite” is derived from the Greek word “sideros”, meaning *iron*. Siderite forms mostly at shallow depths in sedimentary and hydrothermal environments, although it is also found in some igneous pegmatites.

A member of the hexagonal crystal system, siderite has a brittle tenacity and perfect cleavage in three directions. As such, crystals are commonly rhombohedral with curved faces, but other typical habits include the scalahedron, crusts, spherulites, concretions and complicated botryoidal masses. Fracture is uneven to conchoidal and the mineral falls around 3.75 – 4.25 on the Mohs scale. It occurs in a number of colors, including pale yellow to tan, grey, brown, green, red, and black; it is also sometimes nearly colorless. Appearing translucent to subtranslucent, it has a vitreous luster and can often be described as silky to pearly. It streaks white and will become magnetic when heated. Siderite also effervesces slightly in strong or warm acid.



Alabama siderite is widespread in sedimentary rocks in association with clay, shale and coal seams where it is usually massive and fine grained, sometimes concretionary. Siderite is often present in metallic mineral veins in limestone as a gangue mineral. It readily alters to hematite or limonite upon weathering.

Though siderite is a common mineral, attractive crystal specimens are sometimes hard to find. The most desirable are colorfully iridescent with a satiny, shimmering appearance. This iridescence is probably caused by a surface alteration to the iron oxide, goethite. It should be noted that further alteration of siderite crystals can result in pseudomorphs. The amorphous iron oxide, limonite, forms pseudomorphs that are complete replacements of siderite crystals.

Since it is 48% iron and contains no sulfur or phosphorus, siderite is a valuable iron mineral, but in the United States it is of little economic value because it isn't found in sufficient quantities.

#### **Additional Minerals of Franklin County**

In addition to limonite-goethite and siderite, the [www.mindat.org](http://www.mindat.org) website currently lists the presence of seven other mineral specimens in Franklin County: chromite, ‘feldspar group,’ gypsum, kaolinite, ‘olivine,’ quartz, and troilite.

Over 300 mines are on record in Franklin County. Most sites are clustered in and around Russellville, but locations range as far south as Phil Campbell and as far west as Red Bay.

#### **Sources:**

- <http://www.mindat.org/lsearch.php?from=nsearch&loc=alabama>
- <http://www.mindat.org/loc-65586.html>
- <http://encyclopediaofalabama.org/face/Article.jsp?id=h-1338>
- <http://en.wikipedia.org/>
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