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A History of Midcontinent Mineral Discoveries

by

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Minerals were known by the Indians for hundreds of years before Columbus. They collected copper, galena, iron ore, quartz crystals, salt, and other minerals. They hammered native copper into plates, ornaments, and utensils, and used copper for a medium of exchange. Galena and iron ore were ground into powder by rubbing against stones, and the powder was mixed with clay and water to form colored paint. Many pieces of limonite (yellow), hematite (red), and galena (gray) have been found in burial mounds in the Mississippi River Valley and Arkansas River Valley. More than 1,500 pounds of round galena balls, some as large as 11 centimeters in diameter, were found at the Spiro burial mound in northern LeFlore County and at the Harlan Site in Cherokee County, Oklahoma, according to Brown (1976, p. 464-476) and Bell (1972, p. 234). Thin sheets of native copper, riveted together into plates and masks, have also been found at these sites, which date from 700 to 1400 A. D. Schockel (1916, p. 179) stated that the Indians used buckhorns for mining tools in their mines near Dubuque, Iowa. Quartz crystals of immense size were found in a burial mound on the Knapp Farm about 16 miles southeast of Little Rock, Arkansas (Herndon 1922, p. 42). As far back as 1000 A. D., salt was gathered at the Salt Slough about 4 miles west of DeQueen in Sevier County, Arkansas, and on the Saline River about 8 miles from Brownstown, according to Ernest Sibert, DeQueen archeologist (Mabry 1966, p. 11-12). Thus, the Indians knew where to find minerals.

The earliest explorers were guided to the mineral localities by the Indians. The Spanish were the first to explore the New World. In 1541, two expeditions traversed the interior of the United States. Francisco Vazquez Coronado travelled from Mexico City to the Grand Canyon and then to northern New Mexico. He visited the Palo Duro Canyon area of the Texas Panhandle, and then marched northward through the Beaver City area of the Oklahoma Panhandle, toward Great Bend,

Kansas. He took a side trip down the Cimarron River, visiting the salt plains in Woods County, Oklahoma (Winship, 1893, p. 510). He did not find gold and silver mines, but his expedition gave Spain claim over the southwestern United States.

Also in 1541, Hernando de Soto explored the area of the Mississippi River, going west of the river into Missouri and Arkansas. In July, 1541, de Soto sent Moreno and Silvera to the headwaters of the St. Francis River in southeastern Missouri, from where they brought back samples of galena, chalcopyrite, and salt, according to Shipp (1881, p. 417), Buel (1904, p. 246-247), and Goodspeed (1904, p. 33). De Soto correctly identified the metals as lead and copper ores. De Soto visited Hot Springs, Arkansas, and travelled west many miles before returning to the mouth of the Arkansas River, where he died. He did not find gold and silver mines, but his expedition gave Spain claim over the Mississippi Valley and area eastward.

In 1598, Santa Fe was established for Spain by Don Juan de Onate. He opened mines in New Mexico area and sent out expeditions (Beck and Haase, 1969, Map 16).

Thomas (1928) documents at least 17 Spanish expeditions in Oklahoma from 1601 to 1792. In 1650, Don Diego del Castillo prospected in the Wichita Mountains, Oklahoma, for 6 months, according to Thoburn (1916, p. 21). Wilson (1976, p. 111-113) disputes this, stating that in 1657 a Father Gilbert and 100 men dug a shaft 100 feet deep about 9 miles southwest of Mount Scott in the Wichita Mountains.

The French began to explore the Mississippi Valley in the 1600s. The Indians guided them to various places where the Spanish were said to have mined. Brule (1617), Medard Chouart des Groseilliers (1659-1660), and Pierre Esprit Radisson (1659-1660) lived in the Lake Superior - Lake Michigan area and had seen large sheets of native copper, up to one foot in length, carried by Huron and Algonquin Indians, according to Buel (1904, p. 590-591, 594, 604-605). In 1659, Radisson and Grossilliers first heard stories of lead ore being mined by the Illinois Indians in the Upper Mississippi Valley (Schockel, 1916, p. 179). In 1682-1685, Nicolas Perrot was probably the first Frenchman to see the mines, according to Buel (1904, p. 631, 636) and Schockel (1916, p.

179). Perrot had a trading post near Dubuque, Iowa, in 1690, where he noticed the Indians working their lead mines.

In 1673, Pere Jacques Marquette and Louis Joliet noted iron mines on the southeast side of the Wisconsin River, about 30 miles up from the mouth (Bue1, 1904, p. 327). In May, 1677, a Father Claude Allouez stated that the Kaskaskia Indians near Peoria, Illinois, found lumps of native copper in the Illinois River, and hammered these lumps into plates, ornaments, and utensils (Bue1, 1904, p. 451).

In 1682, on April 9, Robert Cavalier, Sieur de la Salle claimed Louisiana Territory for France. This claim included mining rights for all country west of the Mississippi River. La Salle died in 1687, and the rights were extended to others.

In 1683, the El Paso Presidio was established (Moorhead, 1975, p. 21). Mining began in that area in 1685.

By January 1700, many Frenchmen were going up and down the Mississippi River and its branches flowing from the west. The country was thoroughly explored with the hope of finding valuable minerals. On March 22, 1700, De Bienville and de St. Denis stated that there were no valuable minerals in the Cadodakis Country, northwest of Texarkana area, north of the Red River (Goodspeed, 1904, p. 117-127). In May 1700, a M. Sagan, a representative of the French minister Pontchartrain, traversed the entire Mississippi Valley and ascertained that gold mines existed in the country. The minister requested that M. Sagan be supplied with 24 pirogues and 100 Canadians for exploration of the Missouri River and its branches.

In June 1700, Andre Penicaut, at the Meramec River in South St. Louis, Missouri, mentioned that: "By way of this river the savages go to a lead mine located fifty leagues from the bank of the Mississippi"... "We found on the left the mouth of a very big river named the Missouri. The savages settled on the bank of the Missouri told us that twice a year the caravan of the Spaniards crosses the Missouri - namely, in the month of August, when the waters are low, and at Christmas upon the ice - when they go to the mines" (translated by McWilliams, 1953, p. 40-42). Referring to an

area farther up the Mississippi, near DuBuque, Iowa, McWilliams (1953, p. 45) translates: "We found lead mines to right and left which are to this day called Les Mines-a-Nicolas Peraut, from the name of the person who discovered them."

In 1703, about 20 Canadians attempted to look for mines from Illinois Country to New Mexico area, by way of the Missouri River (Goodspeed, 1904, p.128).

In 1707, Nicholas de Le Salle went up the Missouri with about 100 men, looking for mines in the Osage Country (Goodspeed, 1904, p. 129). This could have been the Joplin, Missouri District.

Concerning New Mexico, Goodspeed (1904, p. 129) mentioned that: "So much is heard from the Indians of the Spanish mines of copper, silver, and gold, that the French were eager to reach the mining country. It was even reported that the Spaniards used pack-mules to carry off the ore."

On September 14, 1712, Mr. Anthony Crozat, Marquis du Chatel, purchased the La Salle grant, to settle and exploit the Louisiana Territory. Crozat appointed Antoine Cadillac, Sieur de la Mothe (or La Motte) to be the governor-general of Louisiana Territory. La Motte was a mining engineer from the Ecole des Mines of Paris. In 1713, La Motte visited southeastern Missouri, according to Andre Penicaut (in McWilliams, 1953, p. 164); "Toward the end of the year M. de la Mothe came back from the Illinois with his detachment. All those who accompanied him on this journey told us that a very rich silver mine had been discovered. I have never learned the exact place where it is located or why there has been such a delay in opening it. Although the Company got the news along with several casks of ore taken from this mine to be assayed and afterwards sent fifty miners to Louisiana for this purpose - for all that, work has not begun on it yet." For 1714, Penicaut continues (McWilliams, 1953, p. 167-168): "Before leaving Mobile, M. de La Loire had been ordered by M. de La Mothe to go up to the Illinois and pay back the merchandise the Illinois had lent him to pay off the savages who had been with the party exploring for mines." June 15, 1715, Penicaut continues (McWilliams, 1953, p. 162): "Then came a letter from Cadillac, telling Bienville that Cadillac was on his way to the Illinois to test a silver mine located by voyagers. He had seen several samples taken from the mine."

In 1713-1715, Juchereau de Saint-Denis travelled along the Red River to Mexico, establishing trade with the Spanish.

Winslow (1894, p. 267-269) gives a history of lead mining in the Mississippi Valley. Goodspeed (1904, p. 144) mentions that: "During the latter part of the year 1714, Cadillac passed up the Mississippi and visited the Illinois, and later sent fifty miners to that quarter to commence mining operations. The present Missouri was embraced in the Illinois, and no doubt these men began work in what is now the southeastern portion of that state. Late in December, 1714, several Canadians arrived from the Illinois with specimens of mineral ore from southeastern Missouri. Upon an analysis under the direction of M. Cadillac, the ore was found to be lead with traces of silver. This seemed so encouraging that Cadillac himself resolved to visit that section for the purpose of ascertaining the extent of the deposit and accordingly set out for that section of Louisiana in January, 1715. It was reported that the mines were located about fourteen leagues to the westward of the Mississippi, and presumably to the westward of Kaskaskia. A French league was 2.6 miles. While there, M. Cadillac found considerable iron ore and a limited quantity of lead ore, but the silver, which he had hoped to find in paying quantities, was not present." (His mine was named Mine La Motte) (The mines were less than 25 feet deep). "However, this westward movement of exploration and mining led soon to the opening of mines higher up the Missouri and the Osage Rivers."

"From 1716 to 1717, the Mississippi and its tributaries were explored for hundreds of leagues, and the Missouri, all looking for mines" (Goodspeed, 1904, p. 145-146). In 1717 the Crozat grant was rescinded. On September 6, 1718, John Law acquired the Crozat grant and formed the Western Company, in charge of mining in Louisiana Territory.

In 1718, the San Antonio Presidio was established by the Spanish in Texas. There was no commercial mining in central or northern Texas, but the Spanish were worried about the French claiming this territory. In 1719, two French expeditions were sent out to Oklahoma, from Kaskaskia and New Orleans. A third party was sent to the lead mines of southeastern Missouri. Goodspeed (1904, p. 168) states: "In 1719, there again came down to New Orleans from Canada, M. Dutisnet (sometime written Dutistine, Dutisne, or Du Tisne), to enter the service of M. Crozat.

He exhibited samples of silver, which he claimed had been found in the Illinois country. He passed up the Mississippi, thence up the Missouri, or at least to its valley, to the country of the Osage, thence about a hundred miles up to the Panis or Pawnee, and thence more than a hundred miles farther to the prairie country of the Padoucas, or what is now the Kansas River region of Kansas. In all these regions M. Dutisnet explored and examined the mineral sections, but found nothing more valuable than lead and rock salt. He took possession of all the territory visited in the name of the King of France... Much of the country visited was mountainous, particularly in the country of the Osages, where many lead mines were found.”

Lewis (1932, p. 58) also documents the Claude Charles Du Tisne expedition, mentioning an Osage village, probably on the Neosho River in southeastern Kansas, and translating, states: "They have a lead mine twelve leagues from them, of which they do not know the use." They arrived at a Pawnee village on September 27, 1719, and erected the first white settlement in Oklahoma named Ferdinandina, located on the Arkansas River east and slightly north of Newkirk, Kay County (McRill, 1963). Du Tisne knew about the Great Salt Plains of Alfalfa County. "Two days from their village, in the west a quarter southwest, they have a marsh of hard salt."(Lewis, 1932, p. 58).

In August and September, 1719, Jean-Baptiste Benard, Sieur de La Harpe, crossed the Ouachita Mountains of southeastern Oklahoma. He built a fort on the Red River about 11 miles from the Oklahoma border, named Fort St. Louis de Carloretto. He found quartz crystals, coal, and marcasite and saw azurite, malachite, and salt that the Touacara Indians possessed. He did not find gold or silver mines. Wedel (1971) gives a biography of La Harpe; Margry (1888), Lewis (1924b), and Smith (1959) give his itinerary; Miroir and others (1973) and Wedel (1978) give information on the fort. La Harpe sent a group west up the Red River, under M. Du Rivage, who visited the Quidehais Indians at Spanish Fort (in Jefferson County, Oklahoma). Farther up the river up the North Fork in the Wichitas, probably at Devils Canyon, according to Smith (1959, p. 377-379) "The Cancy composed a very populous village on the banks of the Red River at sixty leagues from the place where M. Du Rivage was... the Spaniards were established at the village of the Cancy... they were working at taking a very heavy material from the earth... one could go up the Red River in high waters to within three days journey of these nations ... that ought to make known of what importance it is to maintain the posts established on the Red River, particularly this one of the

Nassonites, which is situated by land from the Cancy Nation, at whose abode the Spaniards mine for gold, only 120 leagues of very fine country." La Harpe confirmed previous accounts of this country in 1700 by Saint-Denis and Jean Baptiste Le Moyne, Sieur de Bienville, II.

In 1719, John Law sent Phillip Francois D'Renault to work the mines in southeastern Missouri. He had 200 miners and 500 slaves. In 1720, Law went broke, and the Royal Indian Company took over the Law grant.

In 1722, La Harpe ascended the Arkansas River on another expedition, passing Little Rock on April 9 and ending near Fowler, Arkansas, on April 19. He did not find metallic mines but did notice slate quarries, gypsum mines, and an iron mine as documented by Lewis (1924a, p. 260; 1932, p. 76-82).

"In the autumn of 1723, it is known that the Missouri River and its various branches, up probably as far as the mouth of the Platte River in Nebraska, were thoroughly explored by the French miners under Phillip Francois D'Renault. He came with two hundred Frenchmen and three hundred slaves to Fort Chartres, whence they spread out over the west as far as they could do in safety, and opened many lead and other mines in the present state of Missouri." (Goodspeed, 1904, p. 177). Most of the mines were south of the Missouri River.

From 1739 to 1747, Lewis (1932, p. 91-98) states: "The Marquis of Vaudreuil was named governor to succeed de Bienville in 1742; he revived, or attempted to revive interest in discovery and working of mines. This had long been a favorite object which the French government had always kept in view. Since the days of La Harpe there had been interest in mines in the Arkansas Country, but the working of these mines could not be encouraged because the colony could not support itself...The French had from time to time explored the Missouri River, at first with the hope that it might prove to be the chief channel to the western sea ... The French also believed that silver mines existed on a southern branch of the river."

In October, 1773, J. Gagnard travelled up the Red River, and while at the Caddo village northwest of Texarkana, he mentioned (after Bolton, 1914, vol. 2, p. 83-84): "On the twenty-third I arrived at

the village of the Great Cados, who are thirty leagues distant from the Petit Cados ... During the eighty-four days which I stayed with the Great Cados I observed nothing except they told me that there was a silver mine twelve leagues from the Cados toward the northeast, and another on the Cayaminchy River, fifty leagues from the Cados toward the northwest."

On April 30, 1803, the Louisiana Territory was purchased from France by the United States. On August 15, 1803, John Sibley, the Indian agent in charge of the Red River area, wrote a letter which was published in a Philadelphia newspaper (*The Aurora*) on January 24, 1804, p. 2. Sibley (1804) described the Red River region and the old 1719 Fort St. Louis de Carloretto northwest of Texarkana, near Clear Lake, mentioning: "Also quarries of free stone, lime, flint, slate, grit, and almost every kind of stone ... I am well acquainted with an elderly French gentleman (Francis Grappe) who was born there ... From him I have had an accurate description of that country. He says there are to his certain knowledge, three silver mines, as rich as any in Mexico, from which he has taken ore and had it proved. He likewise described to me a quarry of slate, that is on the bank of the river, from which slates may be taken seven or eight feet square, perfectly true, and half an inch thick, and that the source is inexhaustible."

On April 10, 1805, John Sibley wrote an account of the Red River region to General Henry Dearborn, relying upon accounts by Mr. Francis Grappe and a Mr. Brevel, who were born at the old Fort St. Louis de Carloretto in the mid-1700s (Sibley, 1805, p. 729-730): "We arrive at a river that falls in on the right side, which is called by the Indians Kiomitchie, and by the French La Riviere la Mine, or Mine River, which is about one hundred and fifty yards wide, the water clear and good, and is boatable about sixty miles to the silver mine, which is on the bank of the river, and the ore appears in large quantities, but the richness of it is not known. The Indians inform of their discovering another, about a year ago, on a creek that empties into the Kiomitchie, about three miles from its mouth, the ore of which, they say, resembles the other. The bottom land of this river is not wide, but rich; the adjoining high lands are rich, well timbered, well watered and situated. Above the mine the current of the river is too strong for boats to ascend it, the country being hilly. . . . On a branch of the Arkansas... the Indians find salt rock." With reference to Spanish Fort or Panis Town or Towiache Town, about 15 miles south of Ringling, Oklahoma, Mr. Brevel (Sibley, 1805, p. 730) related: "About 40 years ago, I sat off on foot from the Panis Nation ... After traveling for

several days over a country of this description, the country became more broken, the hills rising into mountains, amongst which, we saw a great deal of rock salt, and an ore, the Indians said was my ..treasure; which I afterwards learnt was silver... we often heard a noise .. which was the blowing of the mines... common in all parts of Spanish America".

From October 1804 to January 1805, William Dunbar and a Dr. Hunter ascended the Ouachita River in Arkansas, reporting quartz, silver, pyrite, iron, slate, salt, lignite, and honestones, some of which were mined about 1773 (Dunbar and Hunter, 1805). The expedition ended at Hot Springs, Arkansas. Concerning the Ouachitas (they noted on November 24, 1804, p.735), "They arrived at the confluence of the Lesser Missouri with the Ouachita... It is said, that the stream of the Little Missouri, some distance from its mouth, flows over a bright, splendid bed of mineral, of a yellowish white color, (most probably martial pyrites) that, thirty years ago, several of the inhabitants, hunters, worked upon this mine, and sent a quantity of the ore to the government at New Orleans, and they were prohibited from working any more.... They... on the 28th, fell in with an old Dutch hunter and his party... This man has resided forty years on the Ouachita and before that period has been up the Arkansas River ... This man confirms the accounts of silver being abundant up that river; he has not been so high as to see it himself, but says he received a silver pin from a hunter, who assured him that he himself collected the virgin silver from the rock, out of which he made the spinglette, by hammering it out. The tribe of Osages live higher up than this position." (From DeRoche Creek to Bayou Creek in Hot Spring County, Arkansas, they noted on November 30, 1804, p. 736) ..."Their latitude to be 34°11'37" north .. another saline or salt lick... Indications of iron were frequent, and fragments of poor ore were common, but no rich ore of that or any other metal was found ... Above the Isle de Mallon ... the rocks, in grain, resemble free stone, and are hard enough to be used as hand-millstones, to which purpose they are frequently applied ... Below Bear Island, they passed a stratum of free-stone, fifty feet thick, under which is a quarry of imperfect slate, in perpendicular layers ... About a league from the river, and a little above the slate quarry, is a plain... 'Prairie de Champignole' ... some salt licks are found near it." About 15 miles southeast of Hot Springs, the Ouachita crosses the Arkansas Novaculite, in a series of falls, called the chutes. "About four miles below the 'chutes' (falls) they... found the latitude 34°29'25.5"...rocks and stones, hard and flinty, and often resembling turkey oil stones; of thic kind was a promontory, which came in from the right hand a little below the chutes. In the afternoon of

the 3rd of December, they reached the chutes ... A small distance above the Bayou de Saline ... the French hunters have denominated 'La Cascade' ... The stone in the bed of the river.. was of the hardest flint, or of a quality resembling the Turkey oil-stone ... To the Fourche of Calfat (Caulker's Creek) where the voyage terminates ... they arrived at Ellis's camp, a small distance below the ... Fourche au Calfat .. on the 6th of December .. to the hot springs: the distance being about three leagues... It is said, that mountains of more than five times the elevation of these hills, are to be seen in the northwest, towards the source of the Ouachita. One of them is called the Glass, Crystal, or Shining Mountain, from the vast number of hexagonal prisms of very transparent and colorless crystal, which are found on its surface: they are generally surmounted by pyramids at one end, rarely on both... on January 20, 1805... Dunbar met the old hunter again... This man informed him, that, at the place called the Mine, on the Little Missouri, there is a smoke which ascends perpetually from a particular place, and that the vapor is sometimes insupportable. The river, or a branch of it, passes over a bed of mineral, which, from the descriptions given, is no doubt martial pyrites. In a creek or branch of the Fourche a Luke (three leagues above Ellis's camp), there is found, on the beaches, and in the cliffs, a great number of globular bodies, some as large, or larger, than a man's head; which, when broken, exhibit the appearance of gold, silver, and precious stone, most probably, pyrites and chrystalized spar. And at the 'Fourche des glaises a Paul' (higher up the river than Fourche a Luke), near the river, there is a cliff full of hexagonal prisms, terminated by pyramids, which appear to grow out of the rock; they are from six to eight inches in length, and some of them an inch in diameter. There are beds of pyrites found in several small creeks communicating with the Ouachita; but it appears that the mineral indications are greatest on the Little Missouri, because, as before noted, some of the hunters actually worked on them, and sent a parcel of the ore to New Orleans. It is the belief here, that the mineral contained precious metal, but that the Spanish Government did not choose that a mine should be opened so near to the British settlements. An express prohibition was issued against working these mines." On January 22, 1805, Dunbar arrived at Catahoola where a Frenchman named Hebrard related (p. 741): ... "In the neighborhood of the hot springs, but higher up, among the mountains, and upon the Little Missouri, during the summer season, explosions are very frequently heard, proceeding from under the ground. And, not rarely, a curious phenomenon is seen, which is termed the blowing of the mountains; it is confined elastic gas, forcing a passage through the side or top of a hill, driving before it a great quantity of earth or mineral matter. During the winter season the explosions and

blowing of the mountains entirely cease, from whence we may conclude that the cause is comparatively superficial, being brought into action by the increased heat of the more direct rays of the summer sun ... Mr. Dunbar met with an American...He says he has found silver on the Ouachita, thirty leagues above the hot springs, so rich, that three pounds of it yielded one pound of silver; and that this was found in a cave”.

In 1804, Moses Austin wrote a history of the mines in southeastern Missouri. He was a mining engineer from Virginia and had worked the lead mines in the 1700s, coming to Missouri in 1797. He commented that there was a region farther west with lead: "Valuable lead mines have been likewise discovered, about two hundred miles up the river Merrimak: some of the mineral I have seen, which is of good quality."(Austin, 1804). Perhaps this is a reference to the Joplin District in Missouri.

In 1805, Morse (p. 764) stated: "Above the natchitiches dwell the Cadoaquiehos Indians. Near one of their villages is a rich silver mine. The silver lies in a stone of chestnut color. Farther north is another silver mine. Lead ore is also found in different places; also iron ore, pit coal, marble, slate, and plaster of Paris."

In 1806, Dr. Joseph Macrery, of Natchez, described Hot Springs, Arkansas, mentioning minerals from Magnet Cove, and granite and feldspar elsewhere.

In 1807, Lieutenant James Biddle Wilkinson, on the Pike Expedition, mentioned: "I was informed by the Indians that the country to the northwest of the Osage village, abounds with valuable lead mines, but I could make no discovery of any body of mineral." (Coues, 1895, vol. 2, p. 561; Jackson, 1966, vol. 2, p. 19). This was probably another reference to the Joplin District of Missouri.

In 1811-1813, John Maley explored the Red River up to the Wichitas, mentioning possible gold diggings in Devils Canyon, according to Wilson (1976, p. 83-84).

In 1818, Henry Schoolcraft, an Indian agent, visited the Joplin District. He mined and smelted lead. He noted shallow mines and crude log furnaces, presumably used by Indians and hunters, as noted by Gibson (1972, p. 17). Schoolcraft (1819, p. 60-61) also noted lead ore at Bull Shoals and on Trimble's Plantation on the White River in Marion County, Arkansas, and on the Strawberry River in Lawrence County, Arkansas, confirmed by McKnight (1935, p. 3).

In 1821, L. Bringier published a 32-page article on the geology and archeology of Arkansas and Missouri areas. On a trip in 1812, he had seen burrstones, cinnabar, coal, copper, iron ore, kaolin, lead ore, magnetite, pyrite, salt, schist, slate, and talc.

In 1834-1835, Mr. George William Featherstonhaugh journeyed through Missouri and Arkansas, giving a report to the United States Congress. He mentioned coal, copper, feldspar, galena, gypsum, hornblende, iron ore, lead ore, limestone, magnetite, manganese ore, mica, Mine Lamotte, novaculite, oilstones, pyrite, quarries, quartz crystals, salt, syenite, tourmaline, travertine, and zinc ore.

In 1842, Dr. W. Byrd Powell presented a 22-page report on Fourche Cove to the Natural History Society of Arkansas. He mentions feldspar, granite, grauwacke, greenstone, hornblende, and mica.

In 1846, Dr. Charles Upham Shepard gave a report on some Arkansas minerals, mentioning arkansite, basalt, celestite, elaeolite, gold, gypsum, itacolumite, mica, ozarkite, pyroxene, schorlomite, steatite, syenite, thorium, titanium, trachyte, and yttrium.

In 1851, Dr. George Engelmann published on the region between Little Rock and Hot Springs, Arkansas. He mentions iron ore, kaolin, magnetite, mica, slate, and syenite.

In 1852, Mr. Joshua Barney gave a 59-page report on the region between St. Louis, Missouri and Fulton, Arkansas. He mentions granite and pimple mounds.

In 1858-1860, David Dale Owen and others published two reports, a total of 689 pages, covering each county of Arkansas. Many lead, zinc, iron, and manganese mines had been opened, but they

do not say when they started. They mention agate, amber, black marble, blende, braunite, buhrstones, button ore, cadmium, calamine, clay, coal, copper, galena, iron, lead, limestone, limonite, manganese, marble, marionite, marl, psilomelane, pyrite, pyrolusite, quartz veins, salt, selenite, silver, smithsonite, talc, tufa, wad, and zinc. Also, actinolite, albite, aragonite, arkansite, augite, basalt, bitumen, brookite, chalcedony, chalk, chert, chlorite, coke, elaeolite, epidote, feldspar, garnets, gold, granite, graphite, greenstone, gypsum, honestones, hornblende, iodine, kaolin, labradorite, lignite, magnetite, mica, greenstone (Murfreeseboro), nitre, novaculite, pisolite ore, pyroxene, quartz crystals, schorlomite, slate, syenite, trachyte, and whetstones.

Although most deposits were being exploited in Arkansas, there were some yet to be discovered. Howard (1987) lists 267 minerals that have been found in Arkansas. Stroud and others (1969) presented a 418-page book on the mineral resources of Arkansas. The lead-zinc deposits were first worked about 1818 or before, according to Schoolcraft (1819). In the Ouachita Mountains, lead was first mined about 1820 to 1842, according to Mabry (1966). Manganese was first mined in northern Arkansas in 1849, and in the Ouachitas in 1885, according to Day (1885), Weeks (1886, 1887, 1888, 1890, 1892, 1893a, 1893b, 1894), Penrose (1891), Birkinbine (1901, 1902), Miser (1917), and Stroud and others (1981). Stibnite or antimony sulphide was first noted about 1873 in the Ouachitas of Arkansas, according to Williams (1875), Dunnington (1878), Waite (1880), Day (1892), Hess (1908), Schriver (1917), Mitchell (1922), Miser and Purdue (1929), Hall (1940), Thoenen (1944), Scull (1959), Pittenger (1974), Pittenger and Konig (1979), and Howard (1979). Cinnabar was first mined about 1931 in the Ouachitas of Arkansas, according to Weigel (1931), Branner (1932), and Clardy and Bush (1976). Bauxite was first noted by J. C. Branner (1891), although pisolitic ore was noted by Owen and others (1860). Other references are Packard (1893), Hunt (1893), J. C. Branner (1897), Pratt (1901), G. C. Branner (1933), and Bramlette (1936). Nickel in the Ouachita Mountains of Arkansas was noted by Day (1888, 1890). Titanium minerals were known from Magnet Cove since 1804. Fryklund and Holbrook (1950) is an excellent reference to these minerals. Diamonds were found south of Murfreeseboro in 1906, in a volcanic plug in Ouachita rocks, overlain by Cretaceous rocks. The rock was called greenstone by Powell (1842), and Owen and others (1860) and although a shaft was sunk into the greenstone, no diamonds were found. Early references by Kunz and Washington (1907a,b,c) are followed by at least 105 articles to 1998.

In Oklahoma, from 1850-1854, red-bed copper deposits were noted and worked by Marcy (1853-1854, 1856, 1866) and Marcy and McClellan (1854). One copper mine near Creta, Oklahoma, was commercial. Fay (2000) lists about 400 references to these beds.

In Oklahoma and adjacent parts of New Mexico and Colorado, from 1884 to 1925, many Triassic copper mines were opened in the Black Mesa country. Henderson (1926), Soule (1956), and Fay (1983) give a bibliography and geology.

In the Tri-State area of Oklahoma, Kansas, and Missouri, the lead-zinc mines were opened in 1838 in the Joplin District. The Peoria District in Oklahoma was opened in 1889. The Picher District in Oklahoma and Kansas was opened in 1908 and mined until 1940. Wilson (1976, p. 249) stated that the Peoria District was worked by Indians. A shaft about 300 feet deep was found, with many arrow heads and flint chips around the top. Many hundreds of publications have been written about the area. See Winslow (1894), Bain and others (1901), Siebenthal (1908, 1915), Snider (1912), Wright (1913), Weidman and others (1932), Fowler and Lyden (1932), Brichta and Perkins (1955), Brockie and others (1968), McKnight and Fischer (1970), Gibson (1972), and Cathles and Smith (1983).

In Oklahoma in the Wichita Mountains, many hundred prospects were opened from 1901 to 1912, but nothing except some lead, zinc, and copper was found. Bain (1904), DeBarr (1904), and Woodruff (1904) give early accounts and Snider (1912) gives a later account of this area. Titanium occurs in ilmenite sands on some of the creeks, according to Chase (1952) and Hahn and Fine (1960). Zircons have been found in pegmatite dikes, according to Anderson (1946), Johnson (1955), and Al-Shaieb (1978).

In the Ouachita Mountains of Oklahoma, manganese, lead, zinc, and copper prospects were opened since 1880, according to Penrose (1891), Miser (1917), and Honess (1923). The Buffalo Creek mines may have been worked much earlier.

In the Arbuckle Mountains of Oklahoma, zinc deposits were worked from 1904 to 1918, according to Gould (1910), Snider (1911), Kranak (1978), and Fay (1981).

For a summary of metallic resources of Oklahoma, see Fay and Brockie (2002), which includes a 150-entry bibliography.

In summary, the Indians noted many minerals for hundreds of years before Columbus, and they guided the early explorers to these areas. The Spanish were the first to explore the Midcontinent in 1541. The French followed in the late 1600s. The Americans followed in the early 1800s, developing many areas after 1830. There still could be areas of minerals that have been overlooked.

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