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Early mining is critical to understand how it set the stage for the tri-state district of Oklahoma, Kansas, and Missouri to become one of the world's foremost producers of lead and zinc ore from approximately 1880-1950. The particular geological deformation of this region led to prospecting and mining on a hyper-industrial level with the focal point being in and around the Picher-Cardin district of northeastern Oklahoma in Ottawa County.[1] From the initial discovery of lead and zinc ore through the industrial boom and output peak of 1929, the tri-state region saw the discovery, boom, mining techniques, and technological advancements in this dynamic and relatively short era of industry.

The lead and zinc boom however, cannot go without the mention of the Oklahoma oil boom which happened immediately prior. This initially brought in the "wildcatters" and prospectors.[2] Before lead and zinc were ascertained for their huge commercial value, only a few miles due west in Indian Territory, crude oil was struck in 1897.[3] This brought miners and frontiersmen into the area as well as a small influx of settlers. However, this was Indian land covered by a blanket of untamed prairie grass reaching six to seven feet in height. Furthermore, it was home to approximately sixty Indian nations.[4] To justify its forthright invasion by white settlers and prospectors, a land lease was secured from the Cherokee Nation to allow the building of oil derricks and subsequently drill for oil. Cudahy Oil was selected to develop the lease and

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[1] A.M. Gibson, Wilderness Bonanza: The Tri-State District of Missouri, Kansas and Oklahoma (Norman:University of Oklahoma Press, 1972), 81.

[2] Larry Johnson, *Tar Creek* (Norman: University of Oklahoma Press, 1932), 117.

[3] Ibid., 119.

[4] Ibid., 121.

drill within the vicinity of present-day Bartlesville, Oklahoma.[5] On April 15, 1897, the Oklahoma oil boom officially began. Almost simultaneously, the Quapaw Oil and Gas Company drilled unsuccessfully for oil approximately seventy miles east on Quapaw lands. However, what was found there would change the face of industrial mining history.

A Quapaw Indian man by the name of Maud Abrams agreed on oil drilling upon his land. What was about to be struck became a landmark discovery for the northeast Oklahoma zinc and lead district. "While digging a water well on the Maud Abrams farm due east of the family home, a heavy vein of lead ore was found."[6] After this breakthrough, the shaft that was sunk on Abrams' farm would soon become known as the Sunnyside Mine. This was the first yielding shaft sunk in the northeastern Oklahoma district. The camp came to known as Lincolnville—one of the first lead mining camps in the Oklahoma district sprang up around the mine. By 1903, approximately 1,200 individuals inhabited Lincolnville.[7] This boomtown harbored a sustainable and even growing population around the lead and zinc mining industry. However, this was not the first discovery of the mineral in Indian Territory.

> Since 1891, a small amount of lead and zinc had been mined about four miles southeast of Lincolnville and just south of the Quapaw Reservation boundary near present-day Peoria. Later Oklahoma discoveries occurred in 1904 just west of Quapaw and in 1907 at the rich Commerce field. Although Oklahoma was the last member to join the tri-state lead and zinc mining boom, it would become the greatest producer of all, and the Quapaw reservation would contain the mother lode with the discovery of the Picher field in 1915.[8]

After the acquisition of the Louisiana Purchase in 1803, small deposits of surface lead were discovered by frontier settlers throughout southwest Missouri. For the next fifty years

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[5] Ibid., 121.

[6] Johnson, *Tar Creek*, 122.

[7] Ibid., 122-23.

[8] Ibid., 122.

frontiersman, hunters, and miners visited and explored this western edge of the Ozark uplift and "returned with reports of wild beauty and natural resources including evidence of lead ore and its smelting by Indians and hunters. Indians, hunters, and trappers had smelted southwestern Missouri surface lead deposits in crude makeshift fires for decades."[9]

The first lead mine in southwest Missouri opened in 1848 by William Tingle in the mining camp of Leadville, about two miles west of Joplin.[10] Subsequently, the discovery of lead within the present limits of Joplin was made by prospector Daniel Campbell in 1849. From then on, hotbeds of surface ore were found all throughout Jasper County, Missouri. In 1851, mineral deposits were discovered at Minersville, now Oronogo, nine miles northeast of Joplin. Following the paramount discoveries within three years, new settlers began to flood the area and the mining market at a rapacious pace. Mining camp populations began to explode and "experimental" miners arrived almost weekly.[11] As more discoveries were made, mining camps and everything affiliated, especially lawlessness, ensued. However, these fledgling mining camps consisting of little more than shanties set the groundwork for industrial output on an unprecedented scale. Smelters and other businesses were also erected to support the growing population, advancing business, and infrastructure. At this time only surface or near-surface mining was performed. "The ore deposits ranged between surface outcroppings down to a depth of fifty to sixty feet and therefore were relatively easy to mine. They would be found from Wentworth through Joplin to Oronogo, a distance of twenty-five miles."[12]

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[9] Johnson, *Tar Creek*, 123.

[10] The First District Lead Mine Opened in 1848, Picher Collection, Box 1, Pittsburg State University Archive, Pittsburg, KS.

[11] Ibid.

[12] Johnson, *Tar Creek*, 125.

Although these small traces of lead ore had been discovered at or near the surface by settlers as early as the turn of the nineteenth century, no real investigation of their commercial value was made until 1870-1871. This was during the initial development and operating phase. Lead ore was the first element to be found with no initial mention of zinc. Since the 1830s, lead was sought after due to its metallic and industrious nature primarily for machinery and munitions. During the days of early prospecting in southwest Missouri, the lead ore found at or near the surface in shallow mines was typically accompanied by a less precious and metallic "shine" that was regarded as worthless. This "worthless shine" was categorized into two types and separated from the heavily sought-after lead. The dark variety was called "blackjack" and the lighter color was called "resin tiff." When early prospectors ran into this metallic substance, they assumed that the lead in that particular vein was exhausted.[13] This lead to the abandonment of that particular locale and resuming the hunt for near-surface lead deposits elsewhere. However, early in 1872, a man by the name of W.S. Mesplay recognized the material as zinc ore and shortly afterward published an article which attracted minor attention to the previously thought to be "played out" surface mines. Shortly after, Henry Blow, who was the superintendent of the Granby Mining and Smelting Company in Newton County, Missouri, made an unofficial and unscientific examination of the previously discarded zinc deposits. He believed these samples to be of some worth and with his ore intuition had some of the samples sent to St. Louis for scientific analysis. Due to the zinc samples' industrial potential and the satisfactory results, it interested Lee Taylor who was the head foreman of the Granby Mining and Smelting Company to mine for zinc ore.[14]

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[13] John R. Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas* (New York and London: The Scientific Publishing Company) 1895, 4-5.

[14] Ibid., 6

The mining of zinc from this district contrasted with its lead counterpart by initially varying in importance and time period. Initially, zinc (specifically the "blackjack" variety) was mined and sold between three and four dollars a ton to buyers who came to the mining camp centered around the Granby Mining and Smelting Company. By 1872, zinc ore along with lead ore, was increasing in demand. The first shipment of zinc ore was made in September of 1872 by business associates Patrick Murphy and E.D. Porter. Ten tons were loaded and shipped to Matthiesen and Hegler's Reduction Works in La Salle, Illinois in order to have the zinc samples officially tested and to ascertain its commercial value. The tests that were run on the zinc ore proved that this previously "worthless," foreign, discarded material found in close association with lead deposits of the district was a blende of high-grade zinc ore.[15] This analysis brought the commercial value of both lead and zinc to fruition and set the stage for a crazed prospecting and mining movement that exerted a firm grip on the tri-state region for nearly eighty years. An example of zinc prominence in the Missouri field is exemplified by a find three miles north of Carl Junction. Cuttings from a drill yielded an astonishing 14-21 percent sample.[16]

In 1872 small discoveries of lead were made in the southeast section of Cherokee County, Kansas both in Garden Township and within the vicinity of Baxter Springs. In April of 1876 the first major lead strike was discovered within the Kansas state line by accident. This was found when it was raised from the bottom of a shallow well in a bucket at the Harper farm. This initial strike was located about a mile northwest of the Quaker colony near Short Creek. This would be come to be fittingly known as the Bonanza mining camp. Even though this relatively rich strike was made, lead mining progressed very slowly due to the sparse nature of

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[15] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 6-7.

[16] New Mining Area Fails to Prove Up, Picher Collection, Box 1, Pittsburg State University Archive, Pittsburg, KS.

the lead veins in Kansas. Only a few rich deposits were found. In February of 1877 a more prominent discovery was made one mile southeast of the Bonanza site on the Nichols' farm adjacent to Short Creek. This was discovered by two young boys digging in the dirt next to the root of a tree.[17] This anecdote was a testament to just how protrusive and available lead ore was if it came to the ground surface. When word got around to the two men that developed the Bonanza Mine, they rushed to the Nichols' farm and under royalty, sank a shaft and "hit a pocket of high grade ore at fifteen feet." The Nichols' farm/Short Creek location was the deemed "The Discovery Mine" as announced on April 2, 1877, which subsequently gave rise to the mining boom in southeast Kansas.[18] Up to that point, both Missouri and Kansas were exploited for their mineral riches. By the turn of the twentieth century, there were approximately 500 operating mines in Missouri, 100 in Kansas, and a mere few in Oklahoma. However, what would be discovered in the northeastern Oklahoma field on native land would dwarf both richness and productivity of both Kansas and Missouri with the Picher strike of 1915.[19]

The focal point of the tri-state mining movement was the Miami-Picher zinc and lead district located in northeastern Oklahoma. This area of ultra-mineralized richness was deemed the hot zone and extended only 25-35 miles and included 60-70 square miles of heavily mineralized earth. Later, during the lead and zinc boom, this included the main mining camps of Picher, Cardin, Century, and Quapaw.[20] From approximately 1880-1930, the tri-state district was the most important zinc producing region not only in the United States, but the entire world.

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[17] Johnson, *Tar Creek*, 126.

[18] Ibid., 127.

[19] Ibid., 128.

[20] Samuel Weidman, *Miami-Picher Zinc-Lead District* (Norman: University of Oklahoma Press, 1932), 9.

From 1922 to 1932 production of metallic zinc from this region had ranged from 300,000 to 400,000 tons per year, constituting slightly over 70 percent of the zinc output for the United States. This region alone constituted 35 percent of the world's zinc output. Depending on the year, 65 to 75 percent of zinc ore was mined in Oklahoma, 25 to 35 percent was mined in Kansas, and 5 percent was mined in Missouri. Concerning zinc's counterpart, lead, the tri-state district comprises 15 percent of lead ore output and is only surpassed by southeast Missouri, Idaho, and Utah. According to Weidman, "the district is one of great interest not only because of its unusual richness in zinc and lead, but also because of various important aspects of geology concerning the structural relations, distribution, and origin of the ores."[21] Weidman's book is used as a progress report based on geological investigations throughout field study sessions from 1927, 1929, and 1930. Within this, Weidman divulges how the ore deposits originated. Within the book is a geologic map of Ottawa County, Oklahoma. This shows the different strata and types of rocks found in the county. Most of the ore deposits were found in the Cherokee shale and Mayes limestone. Boone and Mayes formations were the most prominent geologic formations especially in the Oklahoma zinc and lead district. The layers consisted of chert, sandstone, limestone, and shale. These layers were discovered in Weidman's field studies after wells were drilled from 35 to approximately 1,800 feet in depth. The most common depths when the zinc and lead ore were struck were between 100 and 300 feet.[22]

From 1873-1894 lead and zinc output was a combined 1,407, 832 tons sold for $27,722,858.[23] From then on, the price of these commodities skyrocketed. People began to rush

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[21] Weidman, *Miami-Picher Zinc-Lead District*, 10-11.

[22] Ibid., 4.

[23] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 8.

the area with dreams of making at least a small fortune. Many people discovered that shallow pit mining was much too strenuous to perform sustainably and left the industry as quickly as they rushed in. However, many independent miners did rise from living in rural squalor and were able to make a comfortable living or even become quite wealthy. This typically came about by developing a tract of land that happened to contain a very rich ore deposit. This system evolved into the lease or royalty system. In some instances during the days of early prospecting, a landowner would subdivide his tract of land into mining lots or claims of 200x200 feet which were all numbered consecutively from one to the full number of lots. The owner would then open a mining register and put his subjective regulations in "accordance with the provisions of an Act of the General Assembly" in that specific state. Conforming to the rules of the landowner, the miners then selected their lots or claims and prospected and developed their plot at their own expense. Both individual prospectors and companies alike took a lease for a number of years on a tract, developed it, and then subleased to individual miners/prospectors at an increased royalty fee. "By this plan, the poor man was enabled to prospect and mine on his own account, and in many instances has been very successful and made a snug little fortune even though he used the most primitive methods."[24]

In the days of early mining, miners and prospectors looked for a "place to light." This was typically done in a little development in a part of the tract lease that had not been drilled or prospected. This had the potential to open up a new ore body that may prolong the life of the mine for several years and thus made it an exceptional profit maker. By 1929, it was nearly impossible to drill with prospect rigs. Near the Howe mine, where high ore recovery was being made, one particular drift was opened to about 65 feet in height, with "good lead ore still on the

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[24] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 9.

roof and side limits of the deposits have not yet been found." The recovery from this drift was b quite substantial yielding 10-20 percent zinc. Additionally, new strikes were found all over the area. On the Wildcat Tract, 3.5 miles northeast of Diamond, Missouri, 5 drill holes were put down in an area suspected of high ore recovery. Three of these drill holes hit ore bodies and two were extremely rich. On the Wildcat Tract, "the ore came in at 167 feet and continued for twenty feet and good shines continued to about 200 feet in depth. The cuttings for a ten foot section showed assays from 10-20 percent zinc blende. "This particular body of zinc ore was high grade which was found in a dark blue flint formation under a heavy lime cap."[25]

The actual prospecting and mining process evolved greatly through the tri-state lead and zinc mining revolution. Small shafts were dug with hand tools either 3.5x4 feet or 4x5 feet. The individual prospector would then "gouge around after what ore he could find above water level and in this way would sink a number of pits and shafts. On many of the old tracts of land around Joplin, Webb City, Carterville, and Galena the surface of the ground is completely covered with old dump piles."[26] Early in the mining process, shallow surface mines were generally confined to a small area. Three miles north of Carl Junction, cuttings from a drill yielded an astonishing 14-21 percent zinc.[27] This was just a single testament to how rich the Missouri district was. The men that became interested in leasing mining lands to prospectors typically had a large acreage under lease at a low royalty. Other companies would then seek leases within the vicinity. This was exemplified by the Playter brothers of Joplin, Missouri. In March of 1929, they began to

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[25] Howe Mine Making High Ore Recovery, Picher Collection, Box 1, Pittsburg State University Archive, Pittsburg, KS.

[26] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 10-11.

[27] New Mining Area Fails to Prove Up, Picher Collection, Box 1, Pittsburg State University Archive, Pittsburg, KS.

drill land where strikes were made numbers of years prior but then abandoned. They initially sank seventeen holes that struck rich ore bodies in both lead and zinc, but did not further develop their find due to a short-term but serious depression in the ore market about the time the drilling was done. That was a new sub district between the mining fields of Duenweg and Granby in Newton County, Missouri. This land rich in lead and zinc ore was in level prairie country, which was one of the best farming tracts within Newton County.[28]

At the turn of the twentieth century, the first zinc ore that was shipped came from the large chunks or boulders found associated with lead. This required little separation, but as the demand and price increased, the miners and operators commenced mining for zinc ore. All material from the mine was then washed. At first, it was dumped over a coarse screen called a "grizzly" that separated the course particulates from the fine. The part that had passed through the screen was then washed in a sluice box where much of the fine ore was lost. This process was very slow and tedious. As technology advanced, small operators used a hand jig which was a "wooden tank about 5x6 feet and three feet deep." This graduated to bucking hammers and Blake crushers and other mechanisms to extract the ore.[29] Although still relatively primitive, miners dug mines and manually extracted ore from depths as deep as 150-200 feet. These types of shafts were "sunk" after a rich ore body was found. Even through the 1920s and 1930s, early prospectors would sink a shaft where they thought an ore body would lie, drill until a substantial ore body was hit, assess the ore recovery percentage, and mine with unbridled fervor until the vein ran out. Shaft cuttings were assessed from the drifts and varied in richness. The assayed percentage varied between lead and zinc and constituted as low as less than one percent and as

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[28] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 10.

[29] Holibaugh, *The Lead and Zinc Mining Industry of Southwest Missouri and Southeast Kansas*, 12-13.

high as twenty-one percent of the drill sample. Whether the sought after ore body was proved to be a large commercial body or just an inconsequential deposit could not be formally determined until a considerable amount of deeper drilling was done. This early phase attracted visitors and miners from all walks of life to lease the land.

By late 1929 the Hartley Mill, located in close proximity to Baxter Springs, Kansas, was using more advanced technology to extract the lead and zinc ore from the rock strata. A thirty-six inch crusher was used which was capable of grinding 1500 tons of mine ore per ten hour day. A picking system was also put in place and eliminated about a third of the ore waste. Dirt was hauled in 4.5 ton ore cars which constituted fifty tons to the train load. This was then dumped into the crusher pit automatically as the cars passed over the pit. From this formidable ore crusher, the mill dirt was hoisted to the picking room where the waste rock was picked out and discarded. The ore was then sent for further processing at the mill to extract finer particulates of rock and other impurities.[30] These techniques led to safer prospecting and mining due to more advanced mechanization of extracting the ore. However, respiratory diseases such as tuberculosis and silicosis still heavily afflicted miners that worked in the drifts, or shafts, for extended periods of time. This was from breathing in rock dust and led to a substantially shorter life span. Later mining legislation mandated hosing down the inside of the drifts to settle the dust.[31]

Lead and zinc mining alike was a very high risk and gritty occupation that made safety amidst relatively primitive mining methods difficult to achieve. Another issue that the miners

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[30] Commission of Labor and Industry, Annual Report of Coal and Metal Mine Inspection and Mine Rescue Departments, Picher Collection: Box 77, Pittsburg State University Archive, Pittsburg, KS.

[31] Markowitz, Gerald and David Rosner, "The Street of Walking Death: Silicosis Health, and Labor in the Tri-State Region, 1900-1950," The Journal of American History 77, no. 2 (1990): 538.

were forced to cope with were the infrequent but ever-present danger of cave-ins and collapses. Undermining the surface layers often led to sinkholes and cave-ins. As primitive mining became more mechanized and understood, concessions were made to counteract the collapses and uphold the structural integrity of the drifts. Large columns were kept in place to support the roofs of the shafts.

> Once the shaft was complete, drifts or tunnels were cut into the sides of the enlarged area around the platform at the bottom of the shaft. Most drifts expanded into large underground rooms with pillars of un-mined rock and ore left in place to support the roof of the cavern, usually about 15% of the ore body. A pull drift connected the shaft with the room or drift containing the ore body or connected one ore body with another. The location and amount of ore determined the shape, width, and height of the room, or stope as it was called. Typically, pillars supporting the roof would be twenty to fifty feet in diameter and thirty to one hundred feet apart.[32]

According to the Commission of Labor and Industry and the Annual Report of Coal and Metal Mine Inspection and Mine Rescue Departments in 1929, both lead and zinc output topped its peak production. Figures from James Sherwood, who was the Chief Mine Inspector for the state of Kansas in 1929, reported a total of 46 metal mines producing 192,738.5 tons of zinc and 36,705.5 tons of lead. These mines gave employment to 3,372 men. These men worked an average of 193 days during the year in 1929. To extract much of the mine ore, 3,225,345 pounds of dynamite was consumed by the mines. In 1929 alone, these mines reported 12 fatal accidents, 138 lost-time accidents, and 367 no-time-lost accidents. This was clearly an abrasive, high-risk, and dangerous occupation. In the same year, 68 inspections/investigations were made. These consisted of accident investigations (7), special inspections (18), and general inspections (43). During these inspections, a total of 4,099 miles were traveled.[33] Although statistical figures never superseded the output of 1929 due to the decline of the industry and economic depression,

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[32] Johnson, *Tar Creek*, 167.

[33] Commission of Labor and Industry, Picher Collection, Box 77.

nineteen years later in 1948, production was still formidable. According to the American Mining Congress in January of 1948, the greater Picher district was still producing 49,536 tons of lead, followed by Kansas with 41,760 tons, and finally Missouri with 17,600 tons. Concerning zinc output, the production of zinc concentrates in the tri-state district totaled about 202,300 tons and lead concentrates consisting of 32,044 tons in 1947 compared with 258,705 and 30, 650 tons, respectively in 1946. In 1946, this number still accounted for twenty four percent of the national zinc output.[34]

The days of early mining and prospecting was a crucial development in setting the scene for the tri-state mining boom at the turn of the last century. These early days of prospecting transformed non-industrialized and largely independent surface mining operations into an economic super industry and put Kansas, Missouri, and Oklahoma on the world stage with their production of lead and zinc ore. Although it was the last field to be discovered and exploited, the Picher field in northeastern Oklahoma experienced its boom, peak, and decline as well as its assertion as one of the most concentrated zinc and lead districts in the world.

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[34]American Mining Congress, Accident Prevention, Picher Collection: Box 80, Pittsburg State University Archive, Pittsburg, KS.

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