The First Kansas Lead Mines

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THE first lead ore mined in Kansas insofar as published records go was in Linn county. The mines were centered around Pleasanton in T. 21 and 22 S., R. 25 E., in the southeastern part of the county. The mines of this area are of special interest because the ore came from strata of Pennsylvanian age rather than from the Mississippian, the lead-bearing rocks of the Tri-State Lead and Zinc District; because most of the lead ore was distributed in a "circle" or "chimney" surrounded by undisturbed strata; and because the genesis of the ore is problematic.

The Ancient Digging

Ten and more years before Kansas became Kansas territory in 1854, mining for lead had been carried on about two miles southeast of Pleasanton. The evidence was found in a number of diggings or shallow pits surrounded by heaps of debris among which could be found particles of galena and crystals of sphalerite. Who the early miners were and just when the mining was done cannot be determined with absolute certainty. It is definitely known, however, that the mining antedates 1876, the date usually assigned to the commercial mining of the lead and zinc ores of Cherokee county, which is part of the Tri-State Lead and Zinc District, comprising parts of Missouri, Oklahoma, and Kansas and which constitutes one of the most important zinc and lead mining districts in the United States. The occurrence of galena in Cherokee county near Galena and in the vicinity of Baxter Springs at and before 1873 was known to some and anticipated by others.¹ No account, however, is extant indicating mining activity in Cherokee county until about 1876. As far as known, the mining near Pleasanton is the first venture for metals in Kansas. With a fair degree of certainty, it can be ascribed to the late 1830's or early 1840's, for in the spring of 1864, B. F. Mudge visited the site and found oak trees estimated to be at least 25 years old growing on the old mine dumps.²

A further clue to the date is found in a letter addressed to the

² B. F. Mudge, First Annual Report on the Geology of Kansas (Lawrence, 1866), p. 90.
editor of the Observer-Enterprise, a weekly newspaper published at Pleasanton, by A. R. Wayne, under date of September 20, 1926. According to Wayne, who came to Kansas in 1855 and who searched for lead on Mine creek in Linn county, the excavations were made by the French in the 1840's. Still another clue is to be found in the existence of a small town by the name of Potosi, in the mining area. The writer verified its location at the courthouse at Mound City, the county seat. It was in the S. E. 1/4, Sec. 5, T. 22 S., R. 25 E., the same legal description of the old mining site. The date recorded was May, 1844. This 1844 town of Potosi was apparently moved later to another location, a mile or so to the east along Mine creek. The new Potosi consisted of 320 acres and was laid out in 1856 by Proslavery men. The town, which existed until 1869, when Pleasanton was started, consisted of six houses and about 30 inhabitants. This Potosi Town Company was incorporated by a special act, approved February 20, 1857. From the circumstantial evidence presented, it is reasonable to conclude that the diggings southeast of Pleasanton date back at least to the early 1840's.

These mine works have been attributed by some to the Indians, who undoubtedly must have known of the presence of galena in the Pleasanton area; especially since, as stated by Wayne, crystals of galena were plentiful on the surface in the mining area years ago. It is debatable, however, whether the Indians were responsible. Mudge was of the opinion that the pits were not the work of the Indians, for he says “no one, knowing their [Indians'] habits of labor, and ignorance of the reduction of ores, will credit this report. The mining was undoubtedly the work of the early settlers of Missouri.” Indirect evidence points to the French, as they were the first white men to enter Linn county. This is indicated by the fact that Pleasanton and the mining area are in Potosi township, and that formerly one, if not two, towns by the name of Potosi existed in and close by the mining center.

The significance of the name Potosi is as follows: In Washington county, Missouri, less than 50 miles southwest of St. Louis is a town by the name of Potosi. Lead and zinc were mined by the French in Washington county as early as 1724 and at Potosi in

5. Pleasanton Observer-Enterprise, September 23, 1926.
the same county in 1763.\textsuperscript{8} Mining of lead is still carried on in this same general area; it is not only the most important lead mining district in Missouri, producing about 95 percent of all lead mined in that state, but it is foremost in lead production in the United States.\textsuperscript{9} It seems logical, therefore, to conclude that at least some of the early settlers of the Pleasanton and lead mining area of Linn county came from the lead-mining district of Potosi and vicinity in Washington county in eastern Missouri. That these early immigrants would apply names reminiscent of their former homes, and also pursue occupations formerly engaged in, is natural and to be expected. Furthermore, old settlers of Linn county described the original metal miners of the county as Frenchmen. It may be concluded, therefore, that these first lead miners were Frenchmen rather than Indians.

THE JUMBO LEAD MINE

The Jumbo lead mine is the present-day representative of the old diggings or pits. It is in the S. E. \frac{1}{4}, Sec. 5, T. 22 S., R. 25 E., about one mile east and one mile south of the southeast corner of Pleasanton (Fig. 1A). At present (1957), the mine is a circular, water-filled pit, 117 feet in diameter and from 50 to 80 feet deep, surrounded on all sides, except on the west, by heaps of debris from 10 to 15 feet high (Fig. 2A). The dump heaps, or mounds, are composed of rocks of various kinds including bituminous limestone (Fort Scott limestone formation), black shale, gray shale, sandstone, and coal. Scattered among the debris one may find today particles of galena and crystals of sphalerite, especially after rains have removed the finer clay and silt particles that ordinarily covered the ore fragments. Some lead ore has been mined, shipped, and sold from the mine. Just when the original shaft of the Jumbo mine was sunk is not known for certain. John Pellegrino reports that the old Jumbo mine was sunk to a depth of 250 feet, but gives no date.\textsuperscript{10} Erasmus Haworth states that a shaft was sunk 250 feet in 1873.\textsuperscript{11} Whether the two 250-foot shafts are one and the same is not clear. According to Mack Probasco (personal communication), a former owner of the mine, the Jumbo mine was sunk as

\textsuperscript{8} Arthur Winslow, Lead and Zinc Deposits, Missouri Geological Survey, v. 6 (1894), pp. 269, 270.
a double shaft 300 feet deep. This shaft was sunk around 1899 and was operated by two men named Dalton and Morrow, who named their shaft the Jumbo lead mine. The Dalton-Morrow Jumbo mine was either sunk originally to 300 feet or else is the deepened 250-foot shaft sunk in 1873. Good ore is reported to have been found in a drift which extended from the shaft in a northeasterly direction for a distance of 210 feet. An overflow of a near-by stream flooded the mine, resulting in its abandonment; however, not before some lead ore had been hoisted from the mine, shipped, and sold.

The Jumbo mine was next operated by a group of businessmen from Pleasanton, who, finding the venture unprofitable, soon lost interest and ceased mining. In 1924 Mack Probasco, with his brothers Burt and Ted, all drillers from Pleasanton, got possession of the mine and for the next 13 years “played” around, taking out some ore, but not enough to classify the enterprise a commercial success. The ore was hauled by team to a small smelter at Rich Hill, Mo., which was approximately five miles south and 18 miles east of the mine.

According to Probasco, the ore occurred in pockets, and also impregnated all types of rock that surrounded the shaft. When prospecting revealed the presence of the circle, shaft mining was abandoned and was replaced by surface mining. By means of a small drag line the shaft opening was converted into a circular pit from 20 to 25 feet deep and approximately 50 feet in diameter. In 1937 the Probasco brothers leased their Jumbo mine to a company consisting of M. A. Medler and a Dr. Roe of Pittsburg, and Van Cook of Joplin, Mo. The circular pit was deepened for another 50 feet by means of an 80-foot boom drag line. The Pittsburg company operated the mine for about one and one-half years and then ceased its mining activities for more lucrative investments in promoting oil development in Oklahoma. Before ceasing operations, the company drilled a prospect hole down to the Fort Scott limestone formation, which was considered lead bearing. About 1940 (Fig. 2B) the mine was leased to a group of men from Iowa who, after operating for a year and selling about five tons of ore, became involved in financial difficulties which resulted in bringing their activities to an end. Since then no further attempts have been made to work the Jumbo mine.
OTHER PLEASANTON AREA LEAD MINES

In addition to the Jumbo lead mine, other lead mines and prospect shafts and drill holes were sunk or drilled in its vicinity (Fig. 1B). In the spring of 1864 Mudge reported only the presence of the ancient diggings.\(^\text{12}\) Between Mudge's visit and the publication of his report in 1866, several small shafts had been sunk, and although some lead was obtained, the enterprise was not profitable. The mining area was also visited by G. C. Swallow and Hawn apparently a year after Mudge's visit, and the conclusion was reached that "whether these mines will prove productive, it is impossible to determine in the present stage of the work."\(^\text{13}\) In 1875 Mudge reported that various attempts had been made to mine lead and zinc ores in the Pleasanton area during the preceding 12 years but with little reward.

Between 1873 and 1875, about 30 openings had been made, and approximately 20 tons of ore had been raised near the town of Pleasanton, a few miles from the old Potosi diggings. A new shaft was under construction at the time of Mudge's visit to the Pleasanton area in 1875. Mudge, in company with a Mr. Darlow, one of the proprietors of the mine, descended the new shaft to a depth of 260 feet, where a horizontal drift had just been started. Commenting on this new mine, Mudge stated, "We await the result with much interest."\(^\text{14}\)

The discovery of lead and zinc ore in 1899 in the walls of an old shaft, which had been abandoned for years, renewed considerable excitement and interest in prospecting. According to Haworth, mining "companies were organized, grounds leased and subleased, and many prospecting shafts and drill holes begun. Some of the old shafts were opened and examined, and drifts driven out at different levels, with the result that a few thousand pounds of high-grade lead ore and a small amount of zinc ore were obtained."\(^\text{15}\) It is at this time that the Jumbo mine may have come into existence. Shafts and drill holes continued to be sunk or drilled for some years. The 1899 to 1904 lead boom resulted in the extraction of about 15 tons of lead ore and a small quantity of zinc ore, all of which was obtained from depths 65 to 85 feet and all of which was shipped to the Kansas City Argentine refinery for smelting.

\(^{14}\) Mudge, "Geology of Kansas," \textit{loc. cit.}
Prospecting for the ores continued, if not continuously at least intermittently. In 1916 the Nevada Mining Company sank a prospect shaft one and one-fourth miles east and one and one-fourth miles south of Pleasanton to a depth of 153 feet. This shaft, surrounded by a number of old shafts dating back to 1873, is known only because on May 30, 1916, two men working in the shaft were blown out of it and killed by a gas explosion. The two men, Walter Bray and Edward Riggs, were about 20 feet from the surface with an open carbide lamp, used for illumination, which ignited the escaping natural gas. A second explosion occurred in this same shaft on the following June 23. Two men, W. H. McClintock and E. A. Stockton, were cleaning up the debris caused by the first explosion. No one was fatally injured; McClintock was burned slightly and Stockton seriously. As in the first case, the cause was ignition of escaping natural gas. According to John Pellegrino, assistant commissioner of labor in charge of the Kansas Mine Inspection Department, who investigated the two explosions of the Nevada Mining Company's shaft, there were about ten prospect holes sunk in the vicinity of the Nevada shaft, ranging from 35 to 1,200 feet apart, and to a depth of 35 to 250 feet.¹⁶

That lead mining was still in progress in the Pleasanton area in 1940 is revealed by the report of State Coal Mine Inspector John Delplace for the year 1940. On July 27, 1940, Charles Jobes and George Dixon were pumping water out of the Linco Lead Company's mine. While sitting at the mouth of the mine, Jobes struck a match to light his cigarette. Escaping gas exploded which killed Jobes and injured Dixon.¹⁷ This mine, according to Delplace, was one-half mile east of Pleasanton.¹⁸ No record of lead mining in the Pleasanton area is extant since 1940.

**Geology of the Pleasanton Lead Mining Area**

The surface rocks of the Jumbo lead mine and surrounding area are the Nowata shales of the Marmaton group, Pennsylvanian in age (Fig. 1C). Many of the prospect holes and shafts penetrated the Fort Scott limestone formation, which was reached at a depth of approximately 180 feet and which constitutes the base of the Marmaton group. Some of the shafts and drill holes bottomed in what is now classified as the Cabaniss subgroup of the Cherokee

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shale\textsuperscript{19} at a depth of about 135 feet below the base of the Black-jack creek limestone member, the basal strata of the Fort Scott limestone formation (Fig. 1C). The rocks encountered by the drill or shafts were black to gray shales, gray to reddish sandstones, brown to white limestone, and coal.

**Occurrence of the Ores**

The discovery of galena in the Pleasanton area was undoubtedly due to the finding of specimens at the surface, presumably by the Indians, who informed the early settlers of their discovery. Wayne stated that in the early days when he searched for lead on Mine creek, and northeast of the Jumbo mine, there was plenty of lead to be picked up on top of the ground about one-fourth of a mile from the mine.\textsuperscript{20} Mack Probasco and Roy Cook, two drillers from Pleasanton, who drilled many of the prospect holes in the area, reported to the writer that galena and sphalerite, especially the former, occurred in all the rocks penetrated in drilling from the grass roots down to the bottom of the holes or shafts, which reached depths in some cases from 250 to 315 feet. Specimens at hand containing galena crystals are identified as belonging to the Fort Scott limestone formation, which is reached approximately at 180 feet beneath the surface at the mining site.

According to Swallow the “lead [galena] is found as small crystals in the mass of the shales, or in thin sheets between the laminae of the shales and sandstones.”\textsuperscript{21} Hawn states that the lead or galena occurs in fissures in sandstone.\textsuperscript{22} Haworth, reporting on the occurrence of the Pleasanton lead, states that the “ore occurs in a soft shale, the Pleasanton shales. In most cases it is beautifully crystallized, affording magnificent museum specimens.”\textsuperscript{23} Further describing the ore, Haworth states that “the galena was of a high grade of purity, was not weathered or oxidized in the least, and produced brilliant surfaces on the crystalline faces, approximating in brilliancy fresh cleavage surfaces.”\textsuperscript{24} Galena specimens in the writer’s possession and reported by Probasco as coming from the Jumbo mine show dull to semidull, well-crystallized galena, some of which also displays striations or slickensides as well as etching or the effects of solution (Fig. 3).


\textsuperscript{20} Pleasanton Observer-Enterprise, September 23, 1920.

\textsuperscript{21} Swallow, *op. cit.*, p. 58.


\textsuperscript{24} Haworth, et al., *Special Report on Lead and Zinc*, p. 70.
R. L. Snow, a farmer and strip-pit coal mining operator living close to the lead mining center, reported to the writer that the ore occurred in pockets and that some of the galena removed weighed several hundred pounds. Probasco likewise reported the finding of masses of galena weighing from 50 to 60 pounds and some as much as 150 pounds. Many pieces obtained weighed from 5 to 15 pounds. The largest single unit of pure galena seen and measured by the writer, and reported to have been obtained from the Jumbo mine, measured three and one-half by three and one-half by five inches and weighed approximately 16 pounds. Several smaller specimens at hand weigh three pounds and under. All specimens, when broken into, display bright shiny crystals or cleavage faces.

Prospecting revealed the presence of ore, but of greater importance was the discovery that the greatest quantity of ore was found in or restricted to a circular area whose diameter had been enlarged to approximately 120 feet (Fig. 2A). According to Probasco, drilling in the circular area was much easier than outside of it. Not only were the rocks softer but they were also broken, displaced, and occurred as brecciated masses. On the west wall of the circle or chimney, according to Probasco, the shale was very slick, shiny, from five to six feet thick, and its standing in a vertical position indicated movement within the circular area. That some movement did take place is attested by the fact that several specimens of ore and rock in the writer's possession clearly show perfectly flat and smooth planes cutting across limestone and galena alike and bearing striations or slickensides on their surfaces (Fig. 3A). On the reverse sides of the specimens the surfaces are uneven, owing to protruding crystals of galena, slickensides are absent, and effects of solution are evident by the fretwork nature of the limestone (Fig. 3B).

As early as 1865, Swallow associated earth movements with the occurrence of the Pleasanton lead ores, for he states, "There are evidences that the strata have been disturbed, tilted and fractured at this and various other localities between Potosi and Fort Scott. The sandstones and shales have a strong dip to the southeast. They probably form an anticlinal axis on the ridge to the west of the mine, where lead has also been found in the soil." At the time when Swallow made his observations the presence of the circle or chimney-like lead-bearing area was not known or suspected. Swallow's keen observations relate to the local and regional structure of the strata of eastern Kansas extending from the Pleasanton area.

southward through Bourbon county into Crawford county rather than to the local and now-known chimney-like area.

Outcrops of rock in the immediate vicinity of the Jumbo mine are scarce because of the flat topography and hence the attitude of the strata are not readily discernible. Currently, in the vertical west wall of the water-filled pit of the Jumbo mine, just about at the water level, the rock could be seen dipping to the south (Fig. 2C). Whether the actual dip is to the south, southeast, or southwest could not be determined, as there was no way to get to the exposure for close examination. Swallow may have observed the very steeply dipping strata in a small stream bed just north of the northwest corner of Pleasanton (Fig. 1) and at a number of other localities in southern Linn county. Haworth, on the other hand, was aware of the chimney or circle. In discussing the Pleasanton lead mine area, Haworth stated that the exact nature of the disturbance could not be determined and expressed the opinion that since there were no marks found on the surface “it is certain that there was no considerable vertical displacement” and that the regularity in the stratification of the entire surrounding area “precludes the idea of any considerable disturbance.”

According to Roy Cook, driller from Pleasanton, several other chimney-like areas containing lead and zinc ore occur in eastern Linn county. Ore, mainly sphalerite, was taken from one of the circles or chimney discovered by Cook in 1945, while stripping coal. The pit, now the site of a pond about 200 feet in diameter and surrounded on the east, south, and west sides by strip-mine spoil banks, is in the N. W. corner Sec. 11, T. 23 S., R. 25 E., about three miles east of Prescott and seven miles southeast of Pleasanton. The coal, Mulberry, just above the Pawnee Limestone is 32 inches thick and 17 feet below the surface. The circle was discovered when stripping for the coal, and revealed the fact that all strata were dipping into a circular area. Based upon prospecting, mining operations were started by excavating the circular area by means of a drag line. The pit was deepened for a total of 30 feet down to the horizon of the Pawnee limestone. Sphalerite with some galena impregnated the rocks, mainly sandstone, from seven feet beneath the surface down to the bottom of the pit. Cook described the rocks removed as being in a shattered state and boulder-like in character.

ORIGIN OF THE CIRCLES OR CHIMNEYS

Several explanations have been given for the origin of the circles or chimneys. Hawn, without discussing any details concerning the disturbed lead-bearing area near Pleasanton, was of the opinion that the circle was of plutonic origin.28 No evidence of igneous origin is present, however, in the area, and hence the plutonic hypothesis is no longer tenable. The best and perhaps the only explanation of the areas is the one associated with the formation of sinkholes as described by Siebenthal for the Joplin or Tri-State Lead and Zinc District. According to Siebenthal, the circles are the result of the dropping down of the areas owing to solution of the underlying strata in sinkholes developed in the Mississippian rocks. It is now fairly well accepted that the Pennsylvanian strata of the general Ozark region, which includes the Tri-State Lead and Zinc District, were deposited upon the karst or solutional surface developed upon the Mississippian rocks.

In accounting for the ore-bearing circles of the Joplin area, C. E. Siebenthal postulated that the circles were formed before the Pennsylvanian Cherokee shale was eroded from the Joplin region. Continued solution resulted in the formation of new sinks and the collapse of the old sinkhole roofs, thereby causing the overlying Pennsylvanian rocks to drop down. The ensuing displacement resulted in the shattering and general brecciating of the overlying rocks, rendering them accessible to circulating artesian or surface waters and thereby affording favorable sites for the deposition of the metallic ores. Siebenthal was of the opinion that the Linn county circles are analogous in origin to the Tri-State Lead and Zinc District circles and that the Pleasanton circle also reaches to the Mississippian limestones.29

That sinkholes in the subsurface in Kansas are not uncommon has been recorded recently by D. F. Merriam and W. R. Atkinson30 and also by R. F. Walters.31 The sinkholes in eastern Kansas described by Merriam and Atkinson include strata of Simpson age (Ordovician), especially the St. Peter sandstone, which have been deposited as fill in sinkholes developed on an eroded surface of dolomite and limestone of the Arbuckle group. The sinkholes described by Walters have been developed on the Arbuckle on and along the flanks of the central Kansas uplift in Barton county.

Figure A, opposite page: Site of first lead mine in Kansas. Circular water-filled Jumbo lead mine, 117 feet diameter, 80 feet deep and 15 to 20 feet below general elevation of surrounding country. View taken in July, 1957.

Figure B: Last of mining equipment, Jumbo lead mine. Water-filled pit visible between machinery and dump heap in background. View taken in November, 1951.

Figure C: West bank of Jumbo lead mine pit showing southward dipping beds.
Left: Specimen of galena (lead ore) and limestone from Jumbo lead mine. Note the smooth slickensided surface cutting galena and limestone alike, evidence of faulting or rock movement.

Right: Reverse side of specimen shown in A. Note irregular surface and the effects of solution in the limestone shown by the numerous holes and fretwork.
AGE OF ORE DEPOSITS

The Pleasanton lead ores are unique in that they occur in rocks of Pennsylvanian age (Figs. 1, 6), whereas the ores in southeastern Cherokee county and in the rest of the Tri-State Lead and Zinc District of adjoining Missouri and Oklahoma are obtained from the Boone formation of Mississippian age. The deepest prospect hole for lead, 315 feet, in the Pleasanton area, tested rock to a depth of approximately 135 feet beneath the Fort Scott limestone formation or approximately to the mineral formation in the Cabaniss subgroup of the Cherokee group (Fig. 1C).

On the basis of the sinkhole explanation, metallic ores may reasonably be expected to occur in rocks down to the normal lead and zinc bearing Boone formation of the Tri-State Lead and Zinc District, or an additional 400 to 450 feet below the deepest lead-bearing prospect hole drilled in the area. Since lead and zinc are found in Pennsylvanian rocks involving strata of the Nowata shale formation, Marmaton group, a clue as to the time of ore deposition of the Tri-State Lead and Zinc District is suggested. On the assumption that the Pleasanton and Preston lead and zinc ores in the circles or chimneys of Linn county are related to the ores in the Tri-State Lead and Zinc District, ore deposition in the Tri-State district must be dated at least as post-Nowata in age.

ORIGIN OF THE ORES

The source of the ores and the method of their deposition, whether by ascending artesian waters or by the downward movement of surface or normal ground water, is still a controversial problem. Siebenthal, who has probably made the most exhaustive study of the lead and zinc deposits of the Tri-State Lead and Zinc District, is of the opinion that the source of the ores is Cambrian and Ordovician limestone of the Ozark region and that the ores have reached their present position by ascending artesian waters. Haworth and others, on the other hand, believed that the source of the ores was the Pennsylvanian Cherokee strata and that descending ground water was accountable for the deposition and concentration of the metals in the underlying Mississippian strata. As no new data concerning the occurrence of the Pleasanton ores is available from what was known previously, a discussion of the ore genesis is not germane to the purposes of this historical sketch.

32. Siebenthal, op. cit., pp. 41, 42.

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