TO MOVE A MOUNTAIN

Railroads and Mining in Bingham Canyon, Utah

by Don Strack

(An incomplete compilation of research notes and comments. Research continues…)

Introduction

Bingham Canyon is located about 23 miles southwest of downtown Salt Lake City. The canyon has been the a center of mineral mining activity since the early 1860s, when silver and gold were discovered. Copper was at first a nuisance when it was discovered in 1862, but was first mined in 1871 by James Woodman. *(to be continued…)*

"In August, 1849, Sanford and Thomas Bingham took a herd of horses and cattle belonging to the Binghams, Pres. Brigham Young and others up to the high land near the mouth of the main canyon opening into Salt Lake Valley from the west. They built a cabin about 1 1/2 miles below the mouth of the canyon on the north side of the creek, in which they lived while herding the stock during the winter of 1848–49, and also during the spring and summer of 1849, and perhaps during the winter of 1849–50. The locality was named Bingham honoring the Bingham families, after they had made their temporary home at the mouth of the canyon. Some prospecting for precious metal was done by the Bingham boys and several good prospects were discovered but not developed. When the people from the east side of the valley who had commenced a settlement between the two Cottonwood creeks entered Bingham Canyon on the west side of the valley to obtain poles and other fencing material, they found the two Binghams encamped in their little cabin. After the founding of Herriman in 1851 the early settlers of that little village used the region of country, both mountain and valley, near Bingham Canyon, as a herd ground."[1]

"A story is told that in the very early days of Utah part of the Church cattle were run in Bingham Canyon, under the direction of Thomas Bingham and his sons. Brother Bingham and his sons found some mineral ore and took it to President Young, who told them to say nothing of it, as he was afraid the people would desert their farms and seek gold. He also told the Bingham men that the news would create excitement and people in the east would rush to Utah. President Young was conscious of the fact that gold and other precious metals were plentiful in the nearby hills,

[1] Andrew Jenson, Encyclopedic History of the Church, p. 66

but he counseled the Bingham family to think nothing of it. Bingham Canyon received its name from this family who built a cabin in the hills and for some time made their home there."[2]

"Edwin Bingham, born May 5, 1832, the son of Erastus and Lucinda Gates Bingham, brought his family to Utah in 1847. The Bingham Brothers owned the site of Bingham Canyon and used the land for a grazing ground. The site was first called "Bingham's Herd House" and later "Bingham's Gulch." The Bingham boys, while herding their animals over the slopes of the hills, gathered pieces of ore and carried them to Brigham Young. In 1858 Edwin was called by President Young to take his family and move south, so this ended his connection with Bingham Canyon. He owned a large tract of land in Ogden, upon which he had built "Bingham's Fort." This was bought from him by Brigham Young for $3.00. A tract of land on 23rd and Adams Streets was sold for horses and a wagon, with which the family moved south. Another piece of land was sold for supplies for the trip."[3]

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Kate B. Carter tells of the Bingham Brothers in *Heart Throbs of the West, Vol. 5, p. 354:*

> Among the first pioneers to settle in the Second Ward was a group of people who were in the Ira Eldredge's Company and arrived in the Valley the 19th of September, 1847. They brought with them a herd of cattle, also horses and sheep. They drew their lots which were situated in the Northeast Block of the Second Ward, better known as Gallacher Block. Among this group were the Bingham Brothers who drove their cattle into a canyon southeast of the city, now Bingham Canyon. One brother Sandford, and his wife, Martha A. Lewis Bingham, spent their summers in the canyon and their winters with Martha's brother, John M. Lewis, who was living in the Second Ward. The Bingham Brothers went to Weber County where they continued with stockraising and dairying.

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[2] Kate B. Carter, Heart Throbs of the West, Vol. 2, p. 223

[3] Kate B. Carter, Heart Throbs of the West, Vol. 4, p. 322

[4] Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 16, p. 321

And again in *Heart Throbs of the West, Vol. 9, p. 234*, saying "Bingham brothers, sons of Thomas Bingham, were probably the first men to locate mineral ore in Bingham Canyon, but acting upon the advice of President Young, they did not file any claims or do any mining."

The first claim in Bingham Canyon to show copper ore was located prior to 1871 by James F. Woodman. This claim was the source of the first copper ore shipped from Utah. In 1871, Woodman sold his interest in the famous Emma mine in Little Cottonwood Canyon for a mere $110,000; he sold the Emma mine to the Walker Brothers, who later sold it for an amazing $5 million. Soon after selling the Emma, Woodman used the proceeds to marry, but upon his wife's early death in 1876, he and a friend, W. W. Chisholm, developed the Centennial-Eureka mine in the Tintic District. Later, Woodman returned to Bingham as the majority owner of the Winnamuck mine.[5]

In addition to the grazing of livestock in Bingham Canyon, the area was also a source of wood products in the form of both lumber and shingles. Even after the ore discoveries of 1863, there was at least one sawmill in the canyon, operated during 1866-1867 by Enoch B. Tripp, who also operated a lumber yard in Salt Lake City as part of his mercantile business.[6] An example from November 1853 is Martinet W. Merrill, who went into the canyon during the winter of 1853-1854, seven miles above its mouth, where he passed the winter in the splitting and making of shingles. He was working for Thomas Forsythe for $20.00 per month, plus shares of the profit from the shingles. At the time, shingles were selling for $8 per thousand. He was able to split 500 a day, making his venture a profitable one. By February 1854, Merrill was able to split 46,000 shingles from the forest stands in Bingham Canyon.[7]

Colonel Patrick Conner first arrived had arrived in Utah in September 1862 looking for a location to set up his new headquarters. Upon his return to Camp Ruby in Nevada, Conner reported to his superior officer in Washington that Utah and the Mormons were a "community of traitors, murderers, fanatics, and whores." On October 18, 1862, the marching column of California Volunteers, with Conner at the head, arrived in the Salt Lake Valley.[8] Throughout the following winter and spring of 1863, Conner and his men were busy protecting the Overland stage and mail route from imagined and real Indian threats. But during the summer of 1863, several men explored the canyons surrounding the Salt Lake Valley. But as the California Volunteers were exploring, so were others, and not necessarily looking for gold.

An account of the first mineral find in Bingham Canyon from *Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 1, pp. 216, 217:*

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[5] Orson F. Whitney, History of Utah, Vol. 4, p. 493

[6] Orson F. Whitney, History of Utah, Vol. 4, p. 491

[7] Andrew Jenson, LDS Biographical Encyclopedia, Vol. 1, p. 156; Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 20, p. 209

[8] Varley, Brigham and the Brigadier, pp. 49, 62

John Lowder's Find – In 1862, soon after Stephen S. Harding became Governor of Utah he sent John Lowder early pioneer of Parowan, Utah, who had recently been engaged in freighting with a six mule team from San Bernardino, California to Salt Lake City for Walker Brothers, to procure ten cords of maple wood from Bingham Canyon for his personal use. Mr. Lowder with James Briniger and two other men began building a road up the canyon in order to reach the timber. One Sunday morning, not wishing to engage in labor, the men strolled up what is known as Car Fork, a branch of the main canyon, hunting for game. In looking across the mountain they saw a place where the hillside had apparently broken off revealing a vein of galena or lead ore several rods long and about a foot wide. They were unable to get to the vein, but obtained samples from the canyon below where the earth had fallen from the mountain side.

The next day Mr. Lowder, while in the act of stooping for a drink in the creek in the main canyon, saw what appeared to be uneven strands of fine wire in the bed of the stream. Reaching in he drew a portion of it to the surface and found it to be a net-work of small wires of all lengths and sizes. On his next trip to Salt Lake City he took these samples—those taken from the side of the mountain and from the stream bed—with him. The lead samples were sent to the office of President Brigham Young where they remained for a number of years. The wire taken from the stream was taken to a goldsmith, Charles Smith by name, there being no assayer in Salt Lake City at that time. He made a test and pronounced it copper. He offered the sample back but Mr. Lowder said "if it is just copper, it is no use to me." Shortly after Mr. Smith was shot and killed in a dispute over water and it is not known what became of the samples of copper left with him.

Sometime after these events General Patrick E. Connor came into the Valley and some of his prospectors discovered that Bingham Canyon contained large deposits of copper. On the 17th of September 1863 the first recorded locations were made. At that time Mr. Lowder was away on a freighting expedition and when he returned all the ground that bore traces of copper in the West Mountain District had been located. - *Louella Dalton*

Kate B. Carter tells one version of the first discovery, in *Heart Throbs of the West, Vol. 6, p. 446*:

> [John Lowder's] parents were early converts to the Church and came to Utah and made their first home in the old Seventh Ward in Salt Lake City. In 1859 he married Emily Hodgetts in the Endowment House. He made his living the hard way; freighting with a six-mule team from Salt Lake City to San Bernardino, California. During 1860 and 1861 [when Lowder was 25 years old] he was a Pony Express rider between Salt Lake City and California.
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> In 1862, while he was logging in Bingham Canyon for Governor Harding, he found some copper material in the canyon stream in the territory now known as the West Mountain District. He did not realize the value of this material and went

> on freighting. Shortly afterwards, General Patrick E. Connor came to Utah and helped discover the copper in Bingham Canyon. This became the richest and largest open-cut copper mine in the world.
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> In the latter part of 1863 or the spring of '64 John Lowder moved his family to Parowan, in Iron County, and *in* 1864 they, with others, left Parowan to make a settlement on the Sevier River at Panguitch. He did not return to either Salt lake City or to Bingham Canton.

Another account of the discovery, from *Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p. 81*:

> Not long after the establishment of Fort Douglas by General Patrick Edward Connor and his California Volunteers, he became interested in prospecting for the precious metals in nearby canyons and mountains. Tullidge, in his History of Mining, states that a man named Ogilvie, while logging in Bingham Canyon, found a piece of ore which he sent to General Connor who had it assayed. The General organized a picnic party and proceeded to Bingham Canyon where he located the first mine which he named Jordan.

(See Appendix A for the full minutes of the organizational meeting of the first mining company in Utah, on September 17, 1863.)

In the November 1863 first issue of The Union Vedette, a small newspaper distributed to the soldiers at Fort Douglas, its editor, Charles H. Hempstead, Captain in the California Volunteers under the command of Patrick E. Connor, included the following circular letter from General Conner on the subject of mines and mining interests in Utah. In that letter, General Conner encouraged all interested parties to explore all of the "mountains and canyons in the Territory of Utah" to prospect for the rich veins of gold, silver, and copper and other minerals. He also stated that "the industrious and enterprising who may come hither, of efficient protection, accorded as it is by the laws and policy of the nation, and enforced, when necessary, by the military arm of the Government."[9]

A few months later, Connor himself sent a letter to the War Department in which he stated his policy toward the Mormons. This is the letter that contains the famous anti-Mormon line, calling the Mormons "disloyal and traitorous to the core"[10], an opinion that changed within six months after the church helped the Army through its first winter in the valley.

LDS Apostle Wilford Woodruff wrote to George Q. Cannon, on December 25, 1863.[11]

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[9] Orson F. Whitney, History of Utah, Vol. 2, p. 109; see also Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 6, p. 130. *(See Appendix B for the full text of the letter.)*

[10] Orson F. Whitney, History of Utah, Vol. 2, p. 109; see also Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 6, pp. 130, 131. *(See Appendix B for the full text of the letter.)*

[11] Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 6, p. 131

Dear Brother Cannon,

We now have a prospect of peace with the army during the winter. They would not give any contract for winter supplies to a "Mormon" but all their contracts have been given to Gentiles, and the consequence is that they are not supplied with either hay, wood, or flour; finding, however, winter upon them, and but a few days bread on hand, and not being able to procure it, they appealed to Bishop John Sharp for help, to save them from starvation. For flour they offered him $12.00 per hundred pounds. The bishop told them that if he helped them he would have to treat them as he did those in his ward—that was, to know, himself, what quantity of provisions they had on hand. The commissary flung open his stores to the bishop, and the latter found that they had but a few days provisions on hand; so the bishop with President Young's assistance will undertake to feed the army. Bread stuff will be very scarce in the Territory before another harvest. The army is trying to get out its own wood; but they find it "up and down hill business" to them broken legs and frozen limbs being the consequence.

It is evident from the tone of the foregoing documents that a portion of General Connor's plan for the reconstruction of Utah was to cause to be established here a military in lieu of a civil government, with .himself as the Caesar or Napoleon of the scene. Undoubtedly this was in his heart, and would have been in his hand, if he could have induced his superiors to see eye to eye with him at this critical juncture. As it was, he almost entirely ignored the Governor and the other civil authorities. He seemed to think that all that Utah needed for her redemption was an influx of Gentile miners and merchants, and an overwhelming military force, the latter to be commanded by himself. He even went so far as to threaten that "should violence be offered, or attempted to be offered to miners in the pursuit of their lawful occupation, the offender or offenders, one or many," would be "tried as public enemies, and punished to the utmost extent of martial law.

The fact is, Connor was a born soldier, fond of fighting, and with a penchant for military surroundings. He breathed freely amid the smoke of battle, but an atmosphere of peace was stifling to his lungs and nostrils. Having sought to take part in the war then raging in the East, and being denied that privilege, he was intensely disgusted, and did all that he could to solace himself for the disappointment experienced. What more natural than that having "enlisted to fight traitors" the doughty warrior should do all in his power to carry out his design, even if imagination had to create the "traitors" whom he was determined to fight! A little later the General became much more conservative, and a great deal of his anti-Mormon animus gave way. So much was this the case that a few years afterward, when President Young was on trial before Chief Justice McKean, General Connor volunteered to go bail for the Mormon leader in the sum of $100,000. His attitude in the summer of 1864 was due to the fact that he did not understand the Mormon people as he soon learned to understand them, and was imposed upon by men less honest and sincere in their opposition to the Saints.

> This much is due to General Connor, who, though not without faults, was the possessor of manly and sterling qualities.[12]

From Daughter of Utah Pioneers' *Our Pioneer Heritage, Vol. 6, p. 132:*

> Connor also discovered ore in Little Cottonwood Canyon and was later responsible for mining and smelting operations in Stockton, Utah. Small amounts of gold were found but in insufficient quantities to warrant extensive mining operations. The expenditures far exceeded the revenue.
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> Whitney says:
> From the Autumn of 1863 to the latter part of 1865, the period covered by the operations of General Connor and his fellow promoters, little had been accomplished though a great deal had been expended. Several claims were located; one or more smelting furnaces were erected in Rush Valley, but these enterprises failed.
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> On April 9, 1871, President Young expressed his viewpoint:
> We say to the Latter-day Saints, work for these capitalists, and work honestly and faithfully. I am acquainted with a good many of them, and as far as I know them, I do not know but every one is an honorable man. They are capitalists, they want to make money, and they want to make honestly and according to the principles of honest dealing. If they have means and are determined to risk it in opening mines you work for them by the day. Haul their ores, build their furnaces, and take your pay for it, and enter your lands, build houses, improve your farms, buy your stock, and make yourselves better off; but no lawing in the case.

The Daughters of Utah Pioneers tell the story of the of the 1863-1870 time period by citing Tullidge, as he presented the following story in 1886 in his *History of Salt Lake City*, on the beginning of gold and silver mining [13]:

> In the summer of 1864 the Jordan Mining Company was incorporated by General Connor under the laws of California and work by means of a tunnel was commenced on the mine at the cost of sixty dollars per foot. Blasting powder was at that time twenty-five dollars a keg.
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> The first smelting-furnace in the Territory was erected at Stockton in 1864 by General Connor. He, at this time, became aware of the importance of having the mineral interest developed to the fullest possible extent and induced a large number of his California friends to enter into the enterprise. The Rush Valley Smelting Company was organized at the same time by the military officers at Camp Douglas, and a furnace was built by them at Stockton.

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[12] Orson F. Whitney, History of Utah, Vol. 2, p. 112.

[13] Our Pioneer Heritage, Vol. 7, p. 84

General Connor followed with his second furnace on the reverberatory plan, with an inclined flue one hundred and fifty feet long. During the summer and fall of 1864 furnaces were built by the following parties in and around Stockton and Rush Valley (mining prospects innumerable having by that time been located in the neighborhood), viz: The St. James, Finherty, J. W. Gibson, Nichols and Brand, Hartnet, Davids and Company, and one cupola blast-furnace by Johnson, Monheim and Company. A cupelling furnace was also built by Stock and Weberling in the same year.

But the treatment of ores by smelting was a task new to these Californians and their experience in milling the gold ores of their state was of no service to them in this task. This disadvantage was increased by the fact that charcoal was not abundant, that rates of transportation were excessively high, and both the materials of which the furnaces were built and those used in the daily operations, were very expensive. These are circumstances which would tax the ability of the most experienced; and the Californians, unused to the work, failed entirely. A good deal of money was spent with no result, excepting the establishment of the fact that the ores were easy to treat. During this time of trial the usual history of new mining fields was repeated and companies which were organized with high hopes spent large sums and became bankrupt.

The Knickerbocker and Argenta Mining and Smelting Company was organized in New York to operate in Rush Valley, and expended about one hundred thousand dollars in the purchase of mines and the material for working them. But, owing to the impossibility of making medium and low-grade ores pay at such a distance from the market, the company lost their money and abandoned the enterprise. Thus, after two years of steady, earnest, hopeful toil—from the time of the first discovery in 1863 to the same month in 1865—the business of mining had to be suspended to await the advent of the “iron horse” which was to bring renewed vitality to the occupation of the miner.

With the failure to work the mines profitably came the disbanding of the volunteer troops in the latter part of 1865–6. Their places could now be filled by the regulars—the rebellion by this time having been suppressed—and, as the owners and locators (who were principally military men) could not subsist on non-paying mines, the question arose as to how their rights could be secured while they were seeking employment elsewhere. Their method of solving the difficulty has resulted in the greatest injury to the cause which had its rise in their energy and determination. They called miners' meetings and amended the bylaws of the district in such a manner as to make claims perpetually valid which had had a certain but very small amount of work done upon them. For the performance of this work a certificate was given by the district recorder. This certificate prohibited all subsequent relocation of the ground. In consequence of this provision the mines of Stockton long lay under a ban, and it is only since the wonderful discoveries made in neighboring canyons that mining has been

energetically resumed there. While the operations detailed above drew attention chiefly to the Rush Valley mines, discoveries were gradually becoming numerous in other districts.

Mr. Eli B. Kelsey, thoroughly breaking off from Mormonism, and believing that the hour had fully come to develop the mineral resources of the Territory, started out in the old missionary style to lecture upon Utah in the Atlantic and Pacific states in the summer of 1870. He wrote to the papers, spoke to "boards of trade," published a pamphlet and created quite an interest among capitalists, and was the means of sending into the mining district a hundred thousand dollars in the fall of 1870. The first of eastern capitalists who was converted was an enterprising merchant of New York, William M. Fliess, Esq., who joined Mr. Kelsey and advanced the 'working capital' required to develop some valuable mines. From that time capital has flowed into Utah, and wealth has been dug out of the mountains in such abundance—in proportion to the capital and labor employed—as to justify the hope that Utah will yet be the first mining country in the world.

Whitney, in 1893, relates his own version [14]:

One great result of the coming of the railway was the development of the local mining industry. From the fall of 1863, when General Connor and his associates made the pioneer movement in this direction, to the years 1868, 1869 and 1870, when Messrs. J. F. Woodman, Robert B. Chisholm, the Woodhulls, the Walkers and other capitalists became actively interested therein, but little practical work was done toward the opening of Utah's mines, notwithstanding the claims of those whose avowed purpose, in stating to the contrary, was, as has been shown, "to invite hither a large Gentile and loyal population," in order to reconstruct the Territory and overthrow the Mormon power. True, much money was expended by General Connor and his California friends, whom he persuaded to embark with him in this precarious enterprise, and among the first, if not the very first, smelting furnaces in Utah were erected by them in Rush Valley. There, after the original discovery in Bingham Canyon, many mining claims had been located. Other officers of Camp Douglas also formed companies and built furnaces in and around Stockton. But owing to inexperience in smelting ores, scarcity of charcoal and high rates of transportation, they soon became bankrupt. A company called the Knickerbocker and Argenta Mining and Smelting Company, organized in New York to operate in Rush Valley, met with no better success. Its projectors, after investing about one hundred thousand dollars in mines and materials with which to work them, finding it impossible in the absence of a railway to make them pay, despairingly abandoned the undertaking. It was now the latter part of 1865, and the mining movement rested to await the advent of the iron horse, when cheaper and speedier transportation, reduction in prices of materials and the influx of capital would solve the difficulties surrounding the struggling enterprise and place it on its feet as a profitable industry.

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[14] Orson F. Whitney, History of Utah, Vol. 2, p. 271

The Daughters of Utah Pioneers tell of Brigham Young's statements on mining in Utah [15]:

> During the fall of 1868 and in the spring of 1869 mining projects in Utah were proving to be highly remunerative. The driving of the Golden Spike at Promontory on May 10, 1869, and the building of the Utah Central Railroad in 1870 gave impetus to the mining industry. President Young then made the following statement, on April 9, 1871:
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> "We say to the Latter-day Saints, work for these capitalists, and work honestly and faithfully. I am acquainted with a good many of them, and as far as I know them, I do not know but every one is an honorable man. They are capitalists, they want to make money, and they want to make it honestly and according to the principles of honest dealing. If they have means and are determined to risk it in opening mines you work for them by the day. Haul their ores, build their furnaces, and take your pay for it, and enter your lands, build houses, improve your farms, buy your stock, and make yourselves better off; but no lawing in the case."
>
> "I will say still further with regard to our rich country here. Suppose there was no railroad across this continent, could you do anything with these mines? Not the least in the world. All this galena would not bear transportation were it not for that; and, take the mines from first to last, there is not enough silver and gold in the galena ore to pay for shipping were it not for the railroad. And then, were it not for this little railroad from Ogden to this city these Cottonwood mines would not pay, for you cannot cart the ore. Well, they want a little more help, and we want to build them a railroad, direct to Cottonwood so that they can make money."

From a letter written by Brigham Young to the Editor of the New York Herald April 10, 1873 [16]:

> "In Utah we have a fine country for stock raising and agriculture and abundance of minerals awaiting development, and we welcome all good citizens who love peace and good order to come and settle with us. It has been our policy from the first to promote the agricultural interests, seeing this was the foundation of all others, and we have been for years furnishing staple products to the surrounding states and territories, and we are now able to supply any demand likely to arise for grain, vegetables, etc., at the market prices, to those engaged in mining pursuits.
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> "We have iron ores and coal in rich abundance. We have called merchants in every department of business, but we lack capital, and there is no safer place to be

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[15] Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p. 86; also cited in Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 6, p. 132

[16] Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, pp. 86, 87

found in the United States, where property of almost every kind is less taxed and better protected—all reports to the contrary notwithstanding."

From B. H. Roberts, In his *Comprehensive History of the Church*, B. H. Roberts relates the history of early mining in Utah, and feelings of both General Conner and Brigham Young about the activity [17]:Vol. 5, Chapter 124, pages 61-70

> Almost from the time of his advent into the territory, General Connor was convinced that there were extensive deposits of the precious minerals in Utah. That conviction found confirmation in the following manner: A man of the name of Ogilvie while logging in Bingham canon found a piece of ore which he sent to General Connor who had it assayed, and found that it contained the precious metals, gold and silver.[18]
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> A few days later a kind of pleasure or picnic party was organized composed of the officers of Camp Douglas and their wives, and a drive made to Bingham canon. While encamped here one of the ladies of the party found a piece of ore on the mountain side, the soldiers of the party prospected for the vein, found it, and staked off a mining claim.[19]
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> These two stories if blended no doubt mark the beginning of the history of mining for precious metals in Utah. Ogilvie and parties from Camp Douglas united in working the first gold and silver mining prospect in Utah, called "The Jordan," this in September, 1863.
>
> **Discovery Of Precious Metal Ores In Utah**
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> A few days after the Bingham picnic incident General Connor held a miners' meeting at Gardner's mill, on the Jordan, where the "mining laws" or rules drawn up by the general were adopted, and "Bishop Gardner elected recorder."[20] A

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[17] B. H. Roberts, *Comprehensive History of the Church*, Vol. 5, Chapter 124, pages 61-70

[18] B. H. Roberts note: Tullidge's Western Galaxy, March, 1888, article, Mines of the West, I. Utah Mines

[19] B. H. Roberts note: This story is by Stenhouse, who, ignoring or else not knowing the part Ogilvie took in the matter, gives the following account of the initial step of mining history in Utah: "A portion of the horses of the California volunteers had been sent to Bingham canon to graze, and with them a company of men as a guard. A picnic party of officers and their wives from Camp Douglas was improvised, and Bingham was selected, as the troops were there. During the rambles of the party on the mountain sides, this lady, who had a previous acquaintance with minerals in California, picked up a loose piece of ore. The volunteers immediately prospected for the vein and found it, stuck a stake in the ground, made their location, and front that hour Utah has been known to the world as a rich mining country." [Stenhouse, Rocky Mountain Saints, p. 713]. Bancroft says that Captain Heitz; and a party from Camp Douglas -- doubtless Stenhouse's picnic party -- made the discovery of the argentiferous ore in Bingham, in 1863. [Bancroft, History of Utah, p. 741]

[20] B. H. Roberts note: Tullidge's Western Galaxy for March, 1888, p. 1

mining district was organized and called the “West Mountain Mining District,” usually, though quite erroneously called the first mining district of Utah, but which in reality had been preceded by the Lincoln District, organized in 1861, in Beaver county.[21]

Later General Connor personally found silver bearing rock at the head of Little Cottonwood canon, which was the first known discovery of the precious metal in the great Wasatch range.[22]

Mining Industry Development - With Anti-Mormon Appendix

Naturally General Connor was enthusiastic over the confirmation which these discoveries gave of his conviction of the existence of precious metals in the mountains of Utah, and he hastened to make proclamation of the news to the world, at the same time inviting prospectors and miners to come to Utah to aid in the development of her mineral resources, and gave such orders to the volunteer troops in his military district as would allow them large opportunities for prospecting.[23]

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[21] B. H. Roberts note: While Tullidge puts the organization of the West Mountain Mining District as occurring “a day or two after” the Bingham canon picnic incident, [Western Galaxy, p. 1]. Bancroft says that the district was organized in December, 1863. [History of Utah, p. 741]. Mr. A. S. Kenner, author of Utah As It Is (1904), holds that there was a mining district organized in Utah at an earlier date than this. “As far hack as 1858,” he writes: “It became known that there were great veins and deposits of lead near the young town of Minersville, in Beaver county. It was deemed advisable to work them to some extent for the purpose of keeping the settlers in that and some other parts of the territory supplied with bullets.” etc. Work was begun on a fissure vein, that became known as the “Rollins Lead Mine”; and as work proceeded the “lead” grew harder, which experience taught those who worked the mine could come but from one circumstance--the presence of silver with the lead. There were no available means at hand for separating the metals, however, and the work “was not prosecuted to any great extent. Not only was the extraction of ores from the Old Rollins Lead Mine, as it was called, in 1858, the first mining done in Utah by civilized agencies, but the region of country in which it is situated became the first organized mining district in the territory; this was accomplished in 1861, the name “Lincoln” being given it, which name was also subsequently given to the old lead mine. It and the adjoining properties have since been worked systematically and thoroughly by capitalized companies representing other parts of the Union as well as Utah, and in the districts other locations have been made in later years until now (1904), there are fully 100 recorded claims. [Utah As It Is, p. 323; also Bancroft's Utah, p. 746, note 75, where the “Old Rollins Mine” is referred to as the first silver mine in Utah].

[22] B. H. Roberts note: Bancroft's History of Utah, p. 742. “The first shipment of ore from Utah was a carload of copper ore from Bingham canon, hauled to Uintah on the Union Pacific, and forwarded by the Walker Brothers to Baltimore, in June, 1868. In 1864 free gold was discovered in this district by a party of Californians returning from Montana to pass the winter in Salt Lake City. Between 1865 and 1872 the production of gold was estimated at $1,000,000, and up to 1882 the total product was 500,000 tons of ore and 100,000 of bullion, from which was extracted $1,500,000 in gold. $3,800,000 in silver, and $5,000,000 in lead.” The output of the precious metals in Utah for 1913 was, gold, $3,581,900; silver, $8,109,450. “Mining of true gold ores on a large scale is on the decline in Utah. In gold yield a steady decrease is noted, due largely to the closing of the Mercury gold mines. This loss has been partly made up, however, by the increase in gold from the copper ores;” [of which copper there was produced in 1913 to the value of $24,884,860]. [Report of V. C. Heikes, United States Geological Survey, 1913].

[23] B. H. Roberts note: This in the very first number of the Union Vedette: “The general commanding the district has the strongest evidence that the mountains and canons in the territory of Utah abound in rich veins of gold, silver, copper and other minerals, and for the purpose of opening up the country to a new, hardy, and industrious

Incidentally also (or was it his main purpose?) General Connor made this proposed mining development in Utah contribute to what he evidently regarded as his mission in the territory-viz., the subversion of the "Mormon" church authority "in temporal and civil affairs." Writing to Lieutenant Colonel R. C. Drum, Assistant Adjutant General, United States of America, San Francisco, under date of July 21st, 1864, General Connor said:

"Having had occasion recently to communicate with you by telegraph on the subject of the difficulties which have considerably excited the Mormon community for the past ten days, it is perhaps proper that I should report more fully by letter relative to the real causes which have rendered collision possible."

As set forth in former communications, my policy in this territory has been to invite hither a large Gentile and loyal population, sufficient by peaceful means and through the ballot box to overwhelm the Mormons by mere force of numbers, and thus wrest from the church- disloyal and traitorous to the core-the absolute and tyrannical control of temporal and civil affairs, or at least a population numerous enough to put a check on the Mormon authorities, and give countenance to those who are striving to loosen the bonds with which they have been so long oppressed. With this view I have bent every energy and means of which I was possessed, both personal and official, towards the discovery and development of the mining resources of the territory, using without stint the soldiers of my command, whenever and wherever it could be done without detriment to the public service."[24]

Assuming that there would be opposition by the "Mormon" church leaders to this program of mining for the precious metals, General Connor also thought it necessary to offer "protection" to prospectors and to "warn" those whom he suspected would make opposition to the opening of the mines, not to use violence; and threatened to try as public enemies those who attempted the use of violence in this matter, and to punish them to the utmost extent of martial law.[25]

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population, deems it important that prospecting for minerals should not only be untrammelled and unrestricted, but fostered by every proper means. The general also directs that every proper facility be extended to miners and others in developing the country; and that soldiers of the several posts be allowed to prospect for mines, when such course shall not interfere with the due and proper performance of their military duties. Commanders of posts, companies and detachments within the district are enjoined to execute to the fullest extent the spirit and letter of this circular communication.

[24] B. H. Roberts note: Connor's Report to Colonel Drum will be found complete in History of Salt Lake City, Tullidge, pp. 328-330.

[25] B. H. Roberts note: "The mines are thrown open to the hardy and industrious, and it is announced, that they will receive the amplest protection in life, property and rights, against aggression from whatsoever source, Indian or white. In giving assurance of entire protection to all who may come hither to prospect for mines, the undersigned wishes at this time most earnestly, and yet firmly, to warn all, whether permanent residents or not of this territory, that should violence be offered, or attempted to be offered to miners, in the pursuit of their lawful occupation, the offender or offenders, one or many, will be tried as public enemies, and punished to the utmost extent of martial

In this the general went beyond all that was in any way necessary, and assumed the tone and attitude of a military despot, seeking to supplant the civil by the military authority. His whole bearing at this time was one of extreme arrogance, and more likely to provoke than allay the opposition he anticipated.

Opposition Of Brigham Young To The Mining Industry

As already shown in earlier chapters of this History, Brigham Young was opposed to his people rushing to the gold mines of California in 1849, and also in the early years of the decade following. He held that such a course was foreign to their mission, since they had settled in the Great Basin to found a city and a commonwealth to which their coreligionists scattered in all the world, might be gathered and "become a great and a mighty people in the midst of the Rocky Mountains," in fulfillment of the prediction of their first prophet. President Young was equally and consistently opposed to any policy that would likely result in the Latter-day Saints being overwhelmed by incoming hordes of adventurers and semi-desperadoes of the surrounding western states and territories, attracted by the supposed opportunities for the sudden acquirement of wealth, which the opening of mines of the precious metals would give. And hence when ever reference was made to the existence of the precious metals in the mountains surrounding Salt Lake City-and such reference was common before the Connor days-Brigham Young discouraged the consideration of the subject, pointed out to his people the danger to them as a community that lurked in the opening of the mines at that time; and urged the postponement of such enterprises until a later day, when such dangers as then existed would not menace their community life; to a day when the Latter-day Saints would be sufficiently strong, numerically-notwithstanding the presence of a large non-"Mormon" population following mining or other pursuits-to give the dominant moral and spiritual tone to the community life that would result from and be characteristic of that high purpose that had brought them in the first instance to the Great Basin of the Rocky Mountains. Brigham Young had seen wave after wave of the gold seekers of [1849 and early 1850s] pass over the mountains and valleys occupied by his people, and they had survived as a community by accepting his counsel "not to follow after them." He had seen the evil effects of contact with the military command of Colonel Steptoe in 1855-6; and the more serious contact of his people with the army of the "Utah Expedition," and the demoralizing effect of the Camp Floyd period; is it any wonder that he and his associates in church leadership were opposed in the early [1860s] to the incoming of an adventurous, reckless, not to say lawless, mining population, such as then occupied the mining camps of the western states and territories? And yet, for all that, there was no justification for supposing that there would be any resort to violence on the part of the "Mormon" church leaders to prevent prospecting for the precious metals or

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law." [Circular issued from Camp Douglas, date of March 1st, 1864, a copy will be found in Tullidge's History of Salt Lake City, p. 327].

the opening of mines; and General Connor acted unworthy of himself and of his office by assuming the attitude of a petty military despot in the issuance of his circulars on prospecting and mining development in Utah.

At the very time that the first Connor excitement about opening the mines was at its height--September and October, 1863--Brigham Young said:

"If the Lord permits gold mines to be opened here he will overrule it for the good of his saints and the building up of his kingdom. We have a great many friends who are out of this church--who have not embraced the gospel. We have a great many friends, and if the Lord suffers gold to be discovered here, I shall be satisfied that it is for the purpose of embellishing and adorning this temple which we contemplate building, and we may use some of it as a circulating medium."[26]

And the harshest thing Brigham Young ever said of the Connor mining program was a criticism upon the injustice of the government furnishing the supplies for men engaged in prospecting for mines for their own personal advantage, and at the same time giving to the whole proceeding an anti-"Mormon" bias. This criticism appears in the discourse before quoted.[27]

Apart from this, the opposition to General Connor's mining program was confined to puncturing some of the wildly inflated reports respecting the existence of gold in great abundance in Utah; calling attention to the high cost of living, owing to

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[26] B. H. Roberts note: Discourse at conference in Salt Lake City, Oct. 9th, 1863, Journal of Discourses, vol. X, p. 253. Reference to the temple is of course to the temple in Salt Lake City.

[27] B. H. Roberts note: "I now wish to present a few questions to the congregation, for I think there is no harm in asking questions to elicit information. Do the government officials in Utah, civil and military, give aid and comfort to and foster persons whose design is to interrupt and disturb the peace of this people? and are they protected and encouraged in this ruinous design by the strong arm of military power, to do what they will, if they will only annoy and try to break up the `Mormon' community? Does the general government, or does it not, sustain this wicked plan? Is there in existence a corruption-fund, out of which government jobbers live and pay their traveling expenses while they are engaged in trying to get men and women to apostatize from the truth, to swell their ranks for damnation? Is this so, or is it not so? Those who understand the political trickeries and the political windings of the nation, can see at once that these are political questions. Who feeds and clothes and defrays the expenses of hundreds of men who are engaged patrolling the mountains and canons all around us in search of gold? Who finds supplies for those who are sent here to protect the two great interests--the mail and telegraph lines across the continent--while they are employed ranging over these mountains in search of gold? And who has paid for the great number of picks, shovels, spades and other mining tools that they have brought with them? Were they really sent here to protect the mail and telegraph lines, or to discover, if possible, rich diggings in our immediate vicinity, with a view to flood the country with just such a population as they desire, to destroy, if possible, the identity of the `Mormon' community, and every truth and virtue that remains? Who is it that calls us apostates from our government, deserters, traitors, rebels, secessionists? And who have expressed themselves as being unwilling that the "Mormons" should have in their possession a little powder and lead? Who have said that `Mormons' should not be permitted to hold in their possession firearms and ammunition? Did a government officer say this, one who was sent here to watch over and protect the interests of the community, without meddling or interfering with the domestic affairs of the people?" [Journal of Discourses, Vol. X, pp. 254-5. Discourse was delivered Oct. 9th, 1863].

the scarcity of staple necessaries of life in proportion to the population; and the great expense attending upon mining in Utah.[28]

President Young also urged the members of the church to remain true to the call of common-sense duty, that of building homes, making farms, planting orchards, establishing home manufacture, developing coal and iron mines-proceeding, in a word, along these more certain and substantial lines of founding a commonwealth, as was becoming in a people laying the foundation for a gathering place for tens of thousands of their coreligionists from every nation of the world. This course was represented as being better for Latter-day Saints than joining in the mad rush for the finding of the precious metals and for the questionable good of suddenly acquired riches.

There was evidently great need of holding a steady hand over the members of the church in respect of rushing into mining for the precious metals. President Young in a tabernacle sermon thus describes the effect Connor's first announcement had on some members of the "Mormon community:

"It is a fearful deception which all the world labors under, and many of this people, too, who profess to be not of the world, that gold is wealth. On the bare report that gold was discovered over in these west mountains, men left their thrashing machines, and their horses at large to eat up and tramble down and destroy the precious bounties of the earth. They at once sacrificed all at the glittering shrine of the popular idol, declaring they were now going to be rich, and would raise wheat no more. Should this feeling become universal on the discovery of gold mines in our immediate vicinity, nakedness, starvation, utter destitution and annihilation would be the inevitable lot of this people. Instead of its bringing to us wealth and independence, it would weld upon our necks chains of slavery.

And then alluding to the more substantial process of commonwealth founding, he said:

"Can you not see that gold and silver rank among the things that we are the least in want of? We want an abundance of wheat and fine flour, of wine and oil, and of every choice fruit that will grow in our climate; we want silk, wool, cotton, flax

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[28] B. H. Roberts note: See Deseret News editorial of March 2nd, 1864. Relative to the great expense in mining it may be said that blasting powder during the summer of 1864 was $25.00 per keg; twenty-four years later it cost less than one-sixth of that price. The first systematic work done in the Jordan Mine was by commencing a tunnel at a cost of sixty dollars per foot, which twenty-four years later could be done for ten dollars per foot. (See Western Galaxy, The Mines of the West, p. 1). At the Boise mines in the summer of 1863, flour was reported to be worth "$40 per hundred weight; salt, $35 and $40 per hundred weight; onions, $60 per hundred weight; butter, $1 per lb.; beans, $35 per hundred weight; bacon, $60 per hundred weight, and everything else in proportion." [See Boise correspondent of Deseret News, impression of Sept. 23rd, 1863]. Prices did not range that high in Utah, but the above affords some index to what would be the cost of living in the mining districts of the west in those early days of the mining industry.

and other textile substances of which cloth can be made; we want vegetables of various kinds to suit our constitutions and tastes, and the products of flocks and herds; we want the coal and the iron that are concealed in these ancient mountains, the lumber from our sawmills, and the rock from our quarries: these are some of the great staples to which kingdoms owe their existence, continuance, wealth, magnificence, splendor, glory and power; in which gold and silver serve as mere tinsel to give the finishing touch to all this greatness. The colossal wealth of the world is founded upon and sustained by the common staples of life."[29]

It was not difficult, of course, for General Connor to induce many of his California friends to join him in his mining schemes in Utah. He erected the first smelting furnace in the territory at Stockton, Tooele county, 1864; this was soon followed by a number of other furnaces of various kinds.

But the treatment of ores by smelting was a task new to these Californians, and their experience in milling the gold ores of their state was of no service to them in the task. This disadvantage was increased by the fact that charcoal was not abundant, that rates of transportation were excessively high, and both the materials of which the furnaces were built, and those used in the daily operations were very dear. The Californians, unused to the work failed entirely. A good deal of money was spent with no result, excepting the establishment of the fact that the ores were easy to treat. During this time of trial the usual history of new mining fields was repeated, and companies which were organized with high hopes spent large sums and became bankrupt. With the failure to work the mines profitably came the disbanding of the volunteer troops in the latter part of 1865-66.[30]

Happily for the views of the "Mormon" church leaders and for the interests of the Latter-day Saints, the mining industry developed gradually, and the discovery of gold was so meager — found chiefly in connection with the less precious but more abundant silver ores — that there was no mad rush of miners to overwhelm numerically the Latter-day Saints in Utah or disturb them in the steady march of their substantial — though slow — progress in empire — founding for a highly religious purpose — the assembling of their coreligionists of all nations — the gathering of a modern Israel to whom God would reveal a fullness of his truth, and through whom he would especially manifest his power to the world.

Transformation In The Attitude Of General Connor

An identification with the material interests of the territory, perhaps, also, a closer association with the business men of the "Mormon" church, seems finally to have lessened somewhat the former intense bitterness of General Connor towards the

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[29] B. H. Roberts note: Discourse of 25th Oct., 1863, in Deseret News of Nov. 18th, 1863

[30] B. H. Roberts note: Western Galaxy. Mines of the West, March, 1888, p. 2

> "Mormon" church leaders; and those who quote some passages of the general's reports and circulars in the first two years of his residence in Utah, as showing his distrust of the "Mormon" church —"disloyal and traitorous to the core," as he declared it at one time to be; and of the church leaders, whom he proclaimed to be tyrants, spiritual and temporal — will need to consider them in the light of his more conservative attitude in the later years of his residence in Utah.[31]
>
> There are good reasons for believing that this man of restless energy, and of such intense loyalty to his country that he could not tolerate a merely passive loyalty, to say nothing of indifference to, or opposition, even in sentiment, to the United States government in its struggle for existence-this soldier, both by instinct *and* training, in the early months of 1865, underwent, later, a radical change in his attitude towards the "Mormon church leaders and people.

The first mining claims in Bingham Canyon were filed in 1863, with the discovery of galena, a silver-bearing lead ore. The story varies depending on who tells it, but most agree that the galena was discovered and recognized for what it was by members of the U.S. Army's California Volunteers stationed at Fort Douglas, near Salt Lake City. These soldiers, because they came from the gold-rush region around Sacramento and Stockton, Calif., regularly ranged over the hills and canyons of northern Utah, looking for any mine-able ores.

Silver-bearing lead ore was discovered in Bingham Canyon in September 1863. The West Jordan claim was located.[32] The mining district was organized in December 1863 as the West Mountain Mining District and encompassed the entire range of the Oquirrh Mountains, from the southern shore of the Great Salt Lake on the north to Five Mile Pass near Camp Floyd on the south. The physical size of the district was reduced over time as other mining areas were developed in other locations within the Oquirrh Range, namely the Ophir District on the western slopes of the range.

The West Mountain Mining District was organized on September 17, 1863 by a group of military members, miners, and local business and church leaders in the Jordan Ward House.[33]

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[31] B. H. Roberts note: Later, the provost marshal of Salt Lake City in the summer of 1864, Captain Chas. H. Hempstead, "was Brigham Young's counselor and advocate in 1872; and that General Connor offered to go bail for Brigham Young in the sum of $100,000 when he was on trial (1870) in the court of Chief Justice, James B. McKean." [History of Salt Lake City, Tullidge, p. 330.]

[32] USGS Professional Paper 38, p. 98; Rickard, p. 15

[33] Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p. 81; Bailey, Old Reliable, p. 17.

Rickard, p. 15, published in 1919, states that the West Mountain Mining District was organized in December 1863: "On September 17, 1863, the discovery was located as the 'Jordan Lode,' which was the first mining location made in Utah. In the following December a mining district, the first in the Territory, was organized under the name of West Mountain, which is the English for the Indian word Oquirrh. It included the whole of the Oquirrh range."

Although the name "Jordan Silver Mining Co." was used in the original September 1863 organization of the mining district *(Bailey, p. 17)*, the actual company, the first formal mining company with interests in Bingham Canyon, was organized in California in 1864. *(Rickard, p. 16)* The corporate organization took place in California because Utah did not yet have incorporation laws.

The West Jordan Mining Company was organized in 1864 as the first mine of the district. However, the mine was inactive until late 1868, when the transcontinental railroad was available to provide cheaper transportation. *(USGS Professional Paper 38, p. 98)*

[COMMENT: Rickard, p. 16, states that according to Bancroft, "the first shipment of ore from Utah was a carload of copper ore from Bingham canyon, hauled to Uintah ["Utah" in the Boutwell report], on the Union Pacific, and forwarded by Walker Brothers to Baltimore in June 1868." In June 1868, Union Pacific tracks were somewhere in central Wyoming, so although the copper ore could have been shipped from Unitah in June 1868, this reference is likely a typographical error, and should read as June 1869.]

[COMMENT: On pages 168 and 169 of Jonathan Bliss' history of the Walker Brothers (Merchants and Miners in Utah, The Walker Brothers and Their Bank) *he discusses the walker Brothers' involvement in early Utah mining, adding that Brown & Son was the their agent for Union Pacific at Uintah, at least until the Utah Central was completed to Salt Lake City in January 1870.]*

In May 1864, the Vidette claim was located, and was the first claim in Bingham Canyon to show evidence of copper. *(USGS Professional Paper 38, p. 98)*

Also in 1864, gold was discovered in Bingham Canyon. Most of the high paying gold taken from Bingham Canyon came by placer mining methods. Over a million dollars in ores were taken out within the next six or seven years. *(Rickard, p. 16)*

Within six years the easy gold ran out, after producing over a million dollars. By the early 1870s the gold became, and remains today, a rich by-product of all the other mining activity in the district.

The Columbia claim was located in July 1864. *(USGS Professional Paper 38, p. 98; this claim was later part of the Ohio Copper group.)*

The Yosemite claim was located in January 1866. *(USGS Professional Paper 38, p. 98; this claim was later part of the Bingham Consolidated group.)*

This reference in Rickard likely comes from the USGS Professional Paper 38, which was published in 1905, quoting J. R. Murphy's "Mineral Resources of the Territory of Utah," itself published in 1872, saying, "In December following [the September 17, 1863 location of the West Jordan claim], the first mining district in the territory was formed and named 'West Mountain district.' "

The Woodhull brothers ship the first ore from Bingham Canyon in July 1869 -- 10 tons of copper ore from their Kingston Mine. *(Wegg, p. 35)*

Woodhull Bros. made the first shipment of copper ore, ten tons, from the Kingston mine, Bingham Canyon, on Saturday, July 31, 1869. *(Andrew Jenson, Church Chronology)*

The Spanish and Winnamuck mines were developed in 1870, and were the first real mining activity in the district. *(USGS Professional Paper 38, p. 82; Arrington: Abundance, p. 209)*

By 1871, there were 35 mines working in the district. *(Source??)*

"The Jordan mine is the oldest in the canyon and was purchased by J. W. Kerr & Company, who, in 1872, erected the Galena Smelter. Later the property was bought by Carson and Buzzo who constructed a 12-mile-long wooden flume, at a cost of $120,000, to furnish water power. After the Galena Silver Mining Company became the owners they built the Galena Smelters on the Jordan River and, in 1877, sold the property to the Jordan Mining and Milling Company." *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p.88)*

Soon after his return from an LDS church missions to Wales in June 1869, Elias Morris formed a partnership with Samuel L. Evans. Using Morris & Evans, Builders, as their company name they began the manufacture of fire brick and the construction of smelting furnaces. The new company built the Germania works, along with other smelters at Sandy, Bingham, Little Cottonwood, Flagstaff, East Canyon, Stockton and American Fork. They also erected the Ontario mill in Park City, which included the installation of the huge Cornish-style water pump at the Ontario mine itself. The company also did the stone foundations for the new Z.C.M.I. building and the Deseret National Bank in downtown Salt lake City, along with the basement story of the LDS Salt Lake temple. After the death of Evans, Morris carried on the business in his own name, Elias Morris & Sons. Under this company name, in 1891 and in partnership with Houlahan & Griffith, he completed the brickwork and cut-stone work of the Salt Lake City and County Building. *(Orson F. Whitney, History of Utah, Vol. 4, p. 488)*

"Other mines in this area were located and worked, among them the Neptune, Kempton, Wall Street, and the Damn Fool. The Utah mine was located by soldiers from Camp Douglas and the 1871 owners, Buel and Bateman, built a nearby smelter. This mine was sold to an English Company at a price said to have been in the neighborhood of $450,000. In 1879 T. R. Jones, a banker of Salt Lake City, purchased the property." *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p.89)*

"According to some the most famous mines in Lower Bingham Canyon were the Winnamuck and Tiewaukee. The first was discovered in 1867 by Mormon farmers who ran a tunnel through a rich vein. In the year of its discovery the mine was purchased by Bristol and Daggett for $15,000, and in 1871 smelting was begun. An English company purchased the Winnamuck in 1872 and it traded hands again in 1876 when an Amsterdam company took it over." *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p.89)*

"The West Mountain Mining District is situated on the eastern slope of the Oquirrh range. Its breadth from east to west is about twenty miles and its length is about thirty-five miles from north to south. The mines, however, are included in an area some five miles square. It was the first mining district organized in the territory and its first mine, the Jordan, was located Sept. 17, 1863. The records show that about 6500 locations have been made, but at the time of the visit probably not over 600 or 700 claims were held and but 63 were patented. There are no published maps of this district, so that a brief outline of the topography of the section in which claims have [p.90] been located may, perhaps, be of some assistance in making more clear the position of the groups and individual mines and works described. The trend of the Oquirrh range is north and south. The plain of the Jordan valley rises gradually to the base of the range, at which point its altitude is about 5400 feet. The crest of the range, about 8 miles from the foothills, is between 9,000 and 10,000 feet high. The mines are located within 3 miles of the summit and are scattered through four canyons opening into the Jordan valley. In order, beginning at the north, they are, Barney's Canyon, Bingham Canyon, Copper Gulch and Butterfield Canyon. Bingham Canyon, the principal one, and containing most of the mines, runs east and west for a few mills, then turns south and follows the trend of the range, with forks and side canyons extending nearly to its summit. On the north the canyon has the following branches: Freeman's Gulch, Markham's Gulch and Carr Fork and on the south Bear and Porcupine gulches. Carr Fork has as branches Cottonwood Fork and Sap Gulch on the north and Ross, Muddy, and Log forks on the south. Joining Butterfield Canyon on the north are Yosemite and Blackjack gulches. The great lead producing mines of the district are found in a large beaded vein or belt 2 miles in length. The district is connected with the outside world by the Bingham Canyon and Camp Floyd narrow gauge railroad, which begins at Wasatch Junction on the Utah Southern line and in 16 miles rises 1,603 feet. Beyond the station in the canyon the road is continued as a tramway for 3 miles and has branches to the principal mines. The freight charges over both tramway and railroad is from $1.25 to $3.00 per ton, depending on the quantity shipped. In the district there are about 20 hand and water power Cornish jigs, which are worked irregularly during the summer months by the owners of the smaller mines." *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p.90, citing D. B. Huntley in the 10th U. S. Census, taken in 1880)*

The following is a brief, chronological table showing the development of the district *(from Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 7, p.90)*:

1863	Discovered and organized 1864. Gold placers discovered.
1868–1873	Gold placers extensively worked 1871. Utah smelter built. Ran from 1871 to 1873 1871
Autumn 1873	Winnamuck shelter built.
December 1873	Completion of Bingham railroad.
1873	Concentration works erected by John Longmaid on the Utah mine. Demolished in 1876.
1875	Old Revere concentrating works built 1875–1878. Discovery of gold belt.
1876–78	Leaching commenced, continued two and one-half years.
1877–78	Old Telegraph leaching and concentration work on the Jordan River built
1878–79	New Revere concentrating works built.
1879	Sale of Old Telegraph property French company 1879. Experimental Jordan 10 stamp mill built

Mining activity increased considerably in about 1869/1870. Although the first mining companies were formed five years before, the district did not see serious mining work until transportation costs were reduced with the completion of the Union Pacific/Central Pacific transcontinental rail line in 1869. With the prospects of cheap transportation at hand, albeit fifty miles north in Ogden, as early as 1870 a surge of mining development came to the Bingham district. By September 1871 the district had thirty-five producing mines. Also in September 1871, the Utah Southern Railroad completed the construction of the first ten miles of its line, from Salt Lake City south to Sandy. The Utah Southern connected at Salt Lake City with the Utah Central Railroad, which had completed its line in January 1870, covering the forty miles between Ogden and Salt Lake City in just nine months.

On September 6, 1871, Utah Southern Railroad was completed to Sandy, where there were two smelters at that time, one of which was the Saturn Silver Mining Company, also the largest in the territory. The road was organized on February 5, 1871 and ground breaking was held at Salt Lake City on May 2. The construction of the road reached Draper, five miles south of Sandy, in December. *(Source??)*

During December 1872, a little over a year after the Utah Southern reached Sandy, the Bingham Canyon & Camp Floyd Railroad began construction of its line west from the Utah Southern at Sandy to the Bingham Canyon mines. The company was organized on September 10, 1872 specifically to build its narrow gauge railroad from Sandy to the mines in Bingham district.

On September 10, 1872, the Bingham Canyon & Camp Floyd Railroad was incorporated to build from Sandy, on the Utah Southern, to the West Mountain Mining District. *(Utah corporation files, index 4291)*

In December 1872, Bingham Canyon & Camp Floyd began construction of line at Sandy. *(Reeder, p. 152)*

The Bingham Canyon & Camp Floyd's original subscription of stock failed to generate enough cash. As construction finances began to run out, the original organizers looked to eastern financial markets to gain capital to continue construction of the line. They found Charles W. Scofield and his associates in New York City, and in June 1873, in return for him and his associates buying the road's construction bonds, Scofield took control of the road. *(Reeder, p. 155)*

As remembered by Hannah Settle Lapish, “Our family made a home in Lehi, Utah county from 1860 to 1868. When the rumor first reached us to the effect that a railroad would be built to Bingham Canyon, I invested in a piece of land on the line of the Utah Southern Railroad with money I had earned by selling sewing machines. On this land the Bingham Canyon Railroad Company located their depot and machine shop without first obtaining my permission to do so. I built a boarding house which became known as the Junction House and two cottages on the land. In 1876 my husband moved south to Salina, Sevier county, where he made his home. Being unable to effect a settlement with the railroad company for the use and occupancy of my ground, I commenced suit against the Bingham Railroad Company in 1879, which suit was continued

until 1881, when the court quieted my title and awarded me damages against the company." *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 4, p. 40)*

Utah Mining in 1873

(from Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 17, pp. 35-37, citing Salt Lake Herald, April 21, 1873, which itself cited the Mining Journal)

> "A letter from the Little Cottonwood Mining District dated April 21, to the Salt Lake Herald, states: The weather at this place for the past week has been all that we could desire. Under the influence of a warm sun and clear skies the snow has disappeared rapidly, and already many bare spots are visible on the hillsides; as a consequence the roads in some places are becoming very soft, yet notwithstanding the ore teams having difficult work, the Emma has shipped twenty-five tons per day during the week. Everything about this celebrated mine is getting in complete working order. They are arranging everything in a satisfactory manner for a successful season's work. The Flagstaff has shipped some thirty tons daily. Everything about the works of this mine also is going on satisfactorily. The Vallejo has again wheeled into line, and has shipped about one hundred and forty tons of ore. Other mines are represented as preparing for a heavy business this year."

(See Appendix C for a table of the smelters and stamp mills operating in Utah during 1873; both tables also coming from the same above source.)

The Bingham Canyon Railway was opened for traffic. Wed. October 22, 1873. *(Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 17, p. 6, "The Year 1873")*

On November 23, 1873, Bingham Canyon & Camp Floyd began formal operations. The last rail had been laid on November 22, 1873, with sufficient rails on hand by the 10th. *(Reeder p. 15, citing Salt Lake Tribune, November 10, 1873; and November 23, 1873; Ogden Junction, November 22, 1873)* Service began with a single locomotive. A second locomotive arrived the following January. *(Pitchard: Newspaper Notes, citing Salt Lake Herald, January 23, 1874)* The line was completed to the Winnamuck Mill, located about a mile below the actual town of Bingham Canyon. *(Pitchard: Newspaper Notes, citing Salt Lake Herald, November 23, 1873)* The Winnamuck Mill was processing ore from their own mine, along with most of the ores that were coming from the other mines in the camp. The concentrated ores were then being shipped to new smelters in Utah and back east.

With the completion of the railroad to a point below the actual town in November 1873, the major users of railroad services, such as Wells Fargo express, the stage lines, and the freight companies soon moved down to the railroad's terminus. Obviously with the business center of town moving out of town, the town fathers used their influence with the property owners who had prevented the railroad from obtaining the needed right of way and building right into the town itself. The extension into Bingham was completed a year later in November 1874. *(Reeder, p. 159, citing Salt Lake Herald, November 23, 1874)*

Work began on a two-mile extension of the BC&CF into Bingham in spring 1874. The new line was built at 5.6 percent grade and operated by mule power. It was built with a three-foot gauge and heavy ties to allow a locomotive, if one with enough power should become available. The intention of the extension was to gain access to the property of the Utah Mining Company. *(Reeder, p.160, citing Salt Lake Herald, June 16, 1874; November 25, 1874)*

In July 1874 work was begun on a mule powered tramway to the Jordan Mine of the Utah Mining Company, located about three miles further up the canyon above the town of Bingham. The steepness of the canyon (at about six percent) prevented the continuation of the Bingham Canyon & Camp Floyd narrow gauge railroad above Bingham, so to reduce the costs of construction, the mining companies pooled their resources and built the mule tramway using an average grade of 5.6 percent and a gauge narrower than the three-foot gauge used for the Bingham Canyon & Camp Floyd. *(Pitchard: Newspaper Notes, citing Salt Lake Herald, July 10, 1874)*

Because of delays caused by disputes of right-of-way over some of the mining claims, it was not until the following September of 1875 that the tramway was able to go into service. Besides moving the ores of the Utah Mining Company, the tramway was used to transport the ores of many of the other mines.

The tramway operated by gravity to move the loaded cars from the mines down to the Bingham Canyon & Camp Floyd station at Bingham, and mules were used to return the empty cars back to the mines to be loaded again. The mules were teamed together in groups of ten to twelve animals to return them back to the lower end of the tramway, where they were stabled.

As the mining industry was getting started in Utah, the smelter industry also grew to serve the growing mine production. When the Utah Southern Railroad was completed to Sandy in 1871, the town was the site of two smelters. One of which, owned by the Saturn Silver Mining Company, was the largest in the territory, processing fifty tons of concentrates per day.

Because of the growing production of the Bingham mines, along with other mines throughout the territory, in 1872 two smelters (the Germania and the Mingo) were built four miles north of Sandy, at Murray, again on the Utah Southern. *(Arrington: Abundance, p. 207)* With the construction of the Bingham Canyon & Camp Floyd, the Galena Silver Mining Company began construction, in late 1872, of a smelter near the Bingham Canyon & Camp Floyd's crossing of the Jordan River. *(Reeder, p. 152)*

It was reported in December 1874 that the Germania Works smelter was using coke made from Sanpete coal, which the smelter's superintendent said was equal to that imported from St. Louis. Utah imported over 7,000 tons of coke during 1873. *(Engineering and Mining Journal, December 5, 1874, p. 353)*

The Bingham Canyon & Camp Floyd had projected its entire line from Sandy to Bingham as a three-foot gauge railroad. However, construction of three miles of the BC&CF between the connection with Utah Southern at Sandy, and the Galena Smelter on the Jordan River, included a

third rail set to standard gauge for operation of standard gauge cars interchanged from the Utah Southern, to allow movement of coke and other materials in standard gauge cars. *(Reeder, p. 152)*

The Telegraph mine shipped its first ore in 1874. The mine was the first producing mine of the later United States Mining group. *(Wilson thesis, p. 4)*

In 1874 the Morgan/Hanauer smelter was also built in Murray, making the Salt Lake Valley one of the smelting centers of the west. *(Arrington: Abundance, p. 207)*

The Bingham Canyon & Camp Floyd was a paying railroad from the start, because of the high value of the traffic that it was moving. The Bingham canyon mines made up one the richest camps in the west. The silver and lead mines only became marginal after almost twenty-five years, in the mid 1890s. And much to the relief of Bingham's business owners, as the gold, silver, and lead ores became more costly to mine, copper development was becoming the focus of the mining operations.

During June 1875 Scofield, who had taken control of the Bingham Canyon & Camp Floyd two years before, also took control (by purchase of all stock) of the Wasatch and Jordan Valley Railroad. The Wasatch and Jordan Valley had been incorporated on October 24, 1872 to build a railroad from the Utah Southern at Sandy to the mines and granite quarries located in Little Cottonwood Canyon, opposite and across the Salt Lake Valley from Bingham Canyon.

Construction of the Wasatch & Jordan Valley started in November 1872 over a grade previously done by Utah Southern that previous summer. Rails were laid five miles to the Davenport Smelter and the granite quarries at the mouth of the canyon by April 1873, with the line being completed to the terminal at Fairfield Flats by September. By September 1875 Scofield had also completed an eight mile mule-tramway to Alta.

(RESEARCH: Check out The Ogden Junction newspaper for a description of the Bingham mines in its September 25, 1875 issue, on page 5.)

Service began on a two-mile, 5.6 percent grade, mule tramway to Utah Mining Company mine during the summer of 1875. Construction began in June 1874, with delays because of disputes over right of way over located mining claims. *(Reeder, p.161, citing Salt Lake Tribune, July 16, 1875; September 1, 1875; Salt Lake Herald, August 12, 1875)*

By early 1879 both the Bingham Canyon & Camp Floyd and the Wasatch & Jordan Valley roads were being operated as one, sharing the same Superintendent and General Manager. On April 29, 1879 the Bingham Canyon & Camp Floyd was merged with its sister road, forming a new Wasatch & Jordan Valley Railroad. *(Articles of Association, Wasatch & Jordan Valley Railroad, part of file for D&RGW, Utah Index Number 15038, November 15, 1920; Reeder, p. 189)* Because of some of local concern of local railroads being taken over by out of state interests, and possibly out of mere habit, the line to Bingham Canyon was still regularly referred to as the Bingham Canyon & Camp Floyd. None of the available documents acknowledge the Bingham Canyon & Camp Floyd at any time after April 1879.

The original Wasatch & Jordan Valley was incorporated October 24, 1872 to build a line from Sandy to the mines located in Little Cottonwood canyon. Construction started in November 1872 over a grade previously started by Utah Southern in summer 1872 and rails were laid five miles to the Davenport smelter and the granite quarries at the mouth of the canyon by April 1873. The line was completed to its terminal at Fairfield Flats at the mouth of Little Cottonwood Canyon by September 1873. Scofield took control of the railroad in June 1875 and completed an eight-mile mule tramway to Alta by September 1875. *(Reeder, pp. 170-189)*

Fire among the wooden frame buildings in Bingham was a constant threat. On a Sunday, November 7, 1880, the town was partly destroyed by fire. It happened again on August 19, 1895, when there was reported that there had been $200,000 in fire damage. *(Andrew Jenson, Church Chronology)*

Even though the mines in Bingham and Little Cottonwood canyons were successful nearly from the start, the traffic levels from the diminishing mining activity weren't adequate for the newly merged Wasatch & Jordan Valley and the line was forced into foreclosure in August 1881. The property was purchased by Denver & Rio Grande Western interests on December 31, 1881. *(Reeder, p. 192)*

The Denver & Rio Grande Western Railway was organized in Utah on July 21, 1881 to build the projected Utah lines of General Palmer's Denver & Rio Grande Railway. Numerous lines throughout the territory were surveyed and filed on. However, to speed up completion of the line to Salt Lake City, and to ensure profitable traffic once it got there, the Denver & Rio Grande Western purchased all three of Scofield's railroad properties; the combined Bingham Canyon & Camp Floyd and Wasatch and Jordan Valley lines, and the Utah and Pleasant Valley. The Utah and Pleasant Valley had been built over the 52 miles from Springville south to the Winter Quarters coal mines located west of present-day Helper.

The first Denver & Rio Grande Western train came into Salt Lake City on June 13, 1882. *(Reeder, p. 387)*

Denver & Rio Grande Western completed narrow gauge line from Ogden to Denver on March 30, 1883. They had constructed from Colorado line to Tucker; bought the Utah and Pleasant Valley from Tucker to Springville; and constructed from Springville to Ogden, connecting with the Wasatch and Jordan Valley and the Bingham Canyon and Camp Floyd at Bingham Junction. *(Reeder, p. 387)*

The Denver & Rio Grande Western was completed to Salt Lake City in June 1882 and service began to Ogden the following May. In August 1886 the Denver & Rio Grande Western became totally independent from the Denver & Rio Grande, and its controlling interests in Colorado.

By 1889 the traffic on the Denver & Rio Grande Western had increased so that the management of the road made a decision to widen the gauge of the line to match the standard gauge of its eastern and western connections. To finance the widening of the gauge on the Utah lines, in July 1889 the Denver & Rio Grande Western was reorganized as the Rio Grande Western Railway.

The actual conversion of gauges was in progress between March and November 1890, with various portions being operated as standard gauge as they were completed. On June 2, 1890, Rio Grande Western ran its first standard gauge train into Bingham. Rio Grande Western completed the conversion of all of its lines, between Ogden and Grand Junction, Colorado on June 10, 1890. However, the first standard gauge train operating through from Denver didn't arrive in Salt Lake City until the following November, because of delays in the construction of standard gauge lines in Colorado.

The Spanish group of mines in Bingham was located in 1885. The group was later part of the United States Mining group of claims. *(Wilson thesis, p. 4)*

The Hanauer smelter completely destroyed by fire on January 16, 1885. The fire was caused by an overturned slag pot. *(Engineering and Mining Journal, January 24, 1885, p. 60)* On March 11, 1885, the smelter was restarted. The smelter rebuilt smelter had a larger capacity. *(Engineering and Mining Journal, March 7, 1885, p. 198)*

By the 1890s, there were twenty-one mining companies instead of the thirty-five companies in 1871, and these mines were mainly consolidations of many of the early claims, such as the Jordan, Brooklyn, Telegraph, Galena, and Yosemite properties. (The Telegraph group, later controlled by the United Sates Mining company, was first located in 1873. *(Wilson thesis, p. 3)*) These twenty-one mining companies were producing almost three times the tonnage of ore, and all of the ore needed rail transportation.

Denver & Rio Grande Western was reorganized as Rio Grande Western Railway on July 21, 1889, to finance the conversion to standard gauge. *(Utah corporation files, index 565)*

During the early 1890s, the Rio Grande Western mule tramway extended to the Jordan and Galena mines. *(Spendlove, p. 29)*

On June 2, 1890, Rio Grande Western operated its first standard gauge train into Bingham. *(Salt Lake Daily Tribune, June 3, 1890)*

On June 10, 1890, Rio Grande Western completed its conversion to standard gauge between Ogden and Grand Junction. *(Johnson, p. 62)*

During 1892, there were 21 producing mines in West Mountain Mining District, including the Jordan, Brooklyn, Telegraph, Galena, Petro, and Yosemite properties. *(Arrington: Abundance, p. 209)*

In 1895, the Dalton & Lark Gold, Silver & Lead Mining Company was organized to consolidate 16 claims (155 acres), including the Dalton, Lark, Brooklyn and Keystone properties. These mines had become inactive because of water drainage problems. The new company built a four mile horse tramway to connect the Dalton and Lark mines with the Rio Grande Western at Lead Mine station. *(Salt Lake Mining Review, October 30, 1899, p. 5; "hardly four years ago")*

Bingham Gold Mining Co., bought the Commercial mine in 1895. The mine was located in Galena Gulch above the Old Jordan. *(USGS Professional Paper 38, pp. 245, 255)*

Highland Boy Gold Mining Company organized in October 1896 as the U.S. subsidiary of Utah Consolidated Gold Mines, Ltd. of London. Between 1898 and 1900, they ship the majority of the copper from Bingham district, as sulfide ores. By 1901, the mine was the "chief" producer of copper in the Bingham District. *(USGS Professional Paper 38, pp. 265, 268)*

(RESEARCH: Develop a description of the differences between low grade porphyry ores, medium grade sulfide ores, and high grade carbonate ores.)

In November 1896, Utah Consolidated began development work in Highland Boy mine and soon discovered that the ore body contained 25 percent copper. *(Hansen, p. 268)*

Utah Consolidated shipped 5,000 tons of copper sulfide ore from the Highland Boy mine in December 1896. All of this ore production resulted from development work (developing access tunnels) rather than actual mining operation. *(USGS Professional Paper 38, p. 85)*

In 1897, Utah Consolidated constructed a 12,500 foot aerial tramway from its Highland Boy mine down to the Rio Grande Western station at Bingham. *(Mines & Minerals, October 1907, p. 106)*

In May 1897, Utah Consolidated's Highland Boy mine ships first copper ore. *(Hansen, p. 268)*

Boston Consolidated Mining Company organized in November 1898 as the U.S. subsidiary of Boston Consolidated Copper & Gold Mining Company, Ltd. of London. This new company was organized to consolidate 51 claims (350 acres) and develop them as a porphyry property. *(USGS Professional Paper 38, p. 281)* During the year from October 1899 to October 1900 the company drove 2,811 feet of development tunnels. *(Engineering and Mining Journal, December 29, 1900, p. 762)*

United States Mining Company was organized on April 10, 1899 to consolidate the Jordan and Galena (24 claims), Niagara (23 claims), and Telegraph (15 claims) properties, located in Galena Gulch and Bear Gulch. The Niagara group was purchased from the Niagara Mining & Smelting Co., which had been working the former Spanish group. *(USGS Professional Paper 38, p. 233; Wegg, p. 37; Wilson thesis, p. 4)* No ore was shipped until January 1, 1903; all work was done in development and overhaul of the underground workings and overhaul and improvement of the surface workings. The improvements included construction of an 11,400 foot long aerial tramway, with a capacity of 50 tons per hour, from Bear Gulch to the Rio Grande Western at Bingham. *(Engineering and Mining Journal, February 11, 1904, p. 121)*

(RESEARCH: When was the U. S. aerial tramway built?)

United States Mining Company completed its smelter in Midvale in November 1902. *(Hansen, p. 274)*

American Smelting & Refining Company (ASARCO) was organized in April 1899 to consolidate the nationwide smelting interests of Standard Oil of New Jersey, known as "the Rockefeller crowd." *(Source??)*

In early 1902, ASARCO completed its new lead smelter at Murray, adjacent to site of former Germania smelter. Construction had begun in 1901. *(USGS Professional Paper 38, p. 386)*

American Smelting & Refining Company was incorporated on May 1, 1899. The new smelting company's holdings in Utah included the Germania, Pennsylvania, Hanauer, and Ibex smelters. *(Salt Lake Mining Review, May 15, 1899, p. 7)*

Utah Consolidated completed its copper smelter in Murray during May 1899. Construction had begun in August 1898. Utah Consolidated was controlled by Rockefeller interests. *(Salt Lake Mining Review, May 30, 1899)*

The Copper Belt Railway was built in 1900 to replace the pioneer mule-powered tramway that was completed in 1875 to serve the early transportation needs of the Bingham mining camp, and which had played a major role in the development of Bingham Canyon as one of the most important mining districts in the American West. The completion of the Copper Belt's line made the movement of the ore more economical, keeping the costs of the mining operations low enough so that many marginal mines were able to remain in production.

The seeds for the organization and construction of the Copper Belt railroad got their start in 1895 when the Bingham Gold Mining Company bought the "old" Commercial claim, in Galena Gulch above the Old Jordan claim. The new owners of the Commercial mine soon found that the gold ore was playing out and that they were finding more and more of the copper ore that so many of the other mines in the district were also being "bothered" with. In late 1896, the Highland Boy mine of the Utah Consolidated Gold Mines, Ltd., in another part of Bingham canyon, had begun shipping large quantities of copper ore. The owners of the Commercial mine found that their mine was in the same geologic formation and that they had copper ore reserves equal to those of the Utah Consolidated company.

In December 1898 the Bingham Gold Mining Company was reorganized as the Bingham Copper & Gold Mining Company by its majority owner, William Bayley of Los Angeles. Bayley took control of the company to develop the mine into a paying property by developing the copper sulfide copper ores of the former Commercial mine. The development work was started at a new opening at the head of Copper Center Gulch. *(USGS Professional Paper 38, p. 255)* The Bingham Copper & Gold Mining Company was the first of the mining company consolidations that would the main force in the development of the Bingham as one of the richest and most productive mining districts in the United States.

(RESEARCH: Check Los Angeles newspapers of the period for possible reference to Bayley's activities. Also, check Salt Lake Tribune for coverage, since this was before the Salt Lake Mining Review began publication.)

Bayley and his associates had decided that the mine needed to be expanded for it to become an important copper producer. The financing became available because of the organization of the new company allowed them to begin development of a new opening for the mine at the upper end of Copper Center Gulch, across the ridge north from the old opening in Galena Gulch.

Expansion of the company included control of the entire copper production process, from the mine to semi-finished copper product from the smelter, ready for refining on the east coast. In the first major step in this expansion project, in October 1899, less than a year after the Bingham Copper & Gold Mining Company was organized, the new company began construction on a copper smelter. The site selected for the smelter was Midvale, adjacent to the Rio Grande Western's mainline between Salt Lake City and Grand Junction, Colorado.

The mining of copper requires the handling of larger quantities of ore. The old mule tramway had been working just fine for the low quantities of high value gold and silver ores that it was being used for at that time. But the expanded operations of the new Bingham Copper & Gold Mining Company would be needing something more efficient than the tramway.

In 1900, Bayley and one of his associates, J. G. Jacobs (already involved in the Salt Lake & Mercur Railroad), negotiated with Rio Grande Western for a lease of the right-of-way of the old 3.5 mile mule tramway between Bingham and the Old Jordan & Galena Mine. *(Spendlove, p. 30)* Jacobs became involved because of his experience with his Salt Lake & Mercur Railroad, which was serving the gold mining camp of Mercur, also in the Oquirrh range, but ten miles to the south. Jacobs announced that he would rebuild the Bingham tramway to operate the same as his Salt Lake & Mercur, using a Shay locomotive over standard gauge track, with steep grades and tight curves.

The contract to rebuild the old mule tramway was given to Utah Construction Company, as one of that company's first efforts. Work began in early November 1900. *(Engineering News, July 24, 1902, p. 59 states that construction began on November 1, 1900; Bingham Bulletin of February 15, 1901 states that construction began on December 1, 1900; D&RGW's corporate history for the ICC valuation project, published in Volume 26 of the ICC Valuation Reports, p. 927; 26 Val Rep 927; contract to Utah Construction in ICC Valuation Reports, Volume 26, p. 928; 26 Val Rep 928)* By December, the construction company had 150 men working on the contract for the building of what was called the "Upper Bingham Railroad". The mining company announced that it would soon be shipping 200 tons per day over the new line. *(Engineering and Mining Journal, December 29, 1900, p. 770)*

Bingham Copper & Gold Mining Company had started construction on its Midvale smelter in October 1899. Construction was completed in January 1901, with test runs begun on January 15th. Full production began on January 31st. The new railroad was not yet complete, so the mining company was shipping ore from the mine to the smelter in what was called "a steady stream of wagons". To get the smelter into full production, in addition to their own ore, the mining company used custom ores from the Grand Central and the Tesora mines in Tintic, along with reprocessing the slag dumps from the old smelters at Stockton. Pending completion of the company's Copper Belt rail line, the mine began shipping its sulfide copper ore to the smelter by wagon and team. *(USGS Professional Paper 38, p. 254)*

As the mule tramway reconstruction was nearing completion, the local press took to calling it the "Copper Belt line", and the name stuck. The new rail line was completed in February 1901, and was built on the roadbed of the old mule tramway for 1.75 miles of its 2.9 mile length. The upper terminus was about 600 feet northeast of Bingham Copper & Gold's Commercial mine, at 6,915 foot elevation. Maximum grades were 3.7 percent on the lower portion and 7 percent on the upper portion, with a 7.4 percent grade on the coal spur to the Commercial mine. The lower end of the line, at Bingham, had curves up to 34 degrees while the upper part had 40 degree curves. *(Engineering News, July 24, 1902, p. 59)*

The lower terminus was at the Rio Grande Western station at Bingham, elevation 5,890 feet. The Copper Belt line was laid with 52-pound rails and was operated with a 50-ton Shay locomotive, leased from Jacob's Salt Lake & Mercur. The capacity of the locomotive was three empties up and three loads down, using special built 50-ton capacity all-steel gondolas. *(Engineering News, July 24, 1902, p. 59)* Almost all rail cars to this time were made entirely of wood. On February 14th, the Copper Belt Railroad moved its first car of ore. *(Bingham Bulletin, February 15, 1901)*

To finance additional expansion, on April 24, 1901 the Bingham Copper & Gold Mining Company was reorganized as the Bingham Consolidated Mining & Smelting Company. The expansion included the purchase of the Dalton & Lark mining properties. With the reorganization, the new Bingham Consolidated company also announced that they would formally purchase the interests of the "Copper Belt Railroad". *(Engineering and Mining Journal, May 4, 1901, p. 572; USGS Professional Paper 38, p. 99)*

To give a brief history of the Dalton & Lark mines, these properties were first brought together in 1895 with the organization of the Dalton & Lark Gold, Silver & Lead Mining Company. The company was organized to consolidate sixteen mining claims, on 155 acres, that made up the Dalton, Lark, Brooklyn and Keystone (earlier called the Yosemite) properties.

The mines of the Dalton & Lark company had become inactive in 1899 because of water drainage problems. Prior to the end of mining operations, the Dalton & Lark company had built a four mile horse tramway. This tramway was built along the eastern slope of the Oquirrh Mountains, outside of Bingham Canyon, to connect the Dalton & Lark mines with the Rio Grande Western at Lead Mine station, at the mouth of Bingham Canyon.

When Bayley and Jacobs took the lease on the Rio Grande Western tramway in 1900, they had intended to operate the new standard gauge line as a carrier for all of the mines in the district. Much of the traffic was to come from Bayley's Commercial mine, but Jacobs and Bayley were also figuring on additional traffic from the newly formed United States Mining Co.'s Old Jordan, Galena, Telegraph, and Niagara mines. The U.S. company, however, built its own aerial tramway for its transportation needs.

As already mentioned, the United States company had been organized in April 1899 to consolidate 62 mining claims. As the United States Mining company developed their properties, they decided that an aerial tramway would better suit their needs. The company soon completed their aerial 11,400 foot tramway between their mines in Galena Gulch and the Rio Grande

Western's Bingham station, with operating costs that were about two-thirds those of using the new Copper Belt rail line; with the resulting loss of traffic to the railroad.

The consolidation that formed the new Bingham Consolidated company also saw Bayley lose his control of the company. In early May 1901 an agreement was reached between the new owners of the Bingham Consolidated properties and William Bayley, who along with Jacobs, held the lease on the Copper Belt railroad's roadbed. Bayley, who had also arranged for the actual construction of rebuilding the old tramway, would buy out Jacobs' interest in the lease and would in turn sell the lease on the roadbed and the lease of the former Salt Lake & Mercur locomotive to the Bingham Consolidated company.

On May 18, 1901 the Copper Belt Railway was incorporated by the owners of the Bingham Consolidated Mining & Smelting Company. Controlling interest in the company was turned over to William Bayley in return for his lease of the tramway and locomotive, formerly Salt Lake & Mercur number 7. Jacobs was also named as a director of the new railway company. J. G. Jacobs, of the SL&M, was also a director of the new railway company. *(Utah corporation files, index 3147)* The end result was that although the Copper Belt Railway owned the lease on the right of way of the former mule tramway, and the lease of the locomotive, Bayley, who also controlled the mining company, controlled the Copper Belt.

By the fall of 1901 the development work on reopening the Dalton & Lark properties was nearing completion. In October 1901, in order to provide dependable transportation to the Dalton & Lark, Yosemite, and Brooklyn properties, the Bingham Consolidated company began construction on what would later become Rio Grande Western's Dalton & Lark Branch.

During January 1902 Bingham Consolidated completed construction of the 3.6 mile “Dalton & Lark Railroad” as a connection between the portal of its Dalton & Lark Drain Tunnel and the Rio Grande Western's Bingham branch. The new line was to replace the four mile horse tramway that had been built by the mine’s previous owners in the late 1890s between the old Dalton & Lark mine, and Lead Mine station on the Rio Grande Western. The new line was built with 3.6 percent grades using 56-pound rail, and was operated with Shay locomotives. *(Engineering and Mining Journal, July 24, 1902, p. 59; Hansen, p. 273)*

Pending completion of the Drain Tunnel itself, “within five years”, the ore was to be brought down from the mine (1,000 feet above the Drain Tunnel portal) by way of a new four mile, 24 inch gauge electric line. This “temporary” electric would be built with five percent grades and operated with ten-ton electric locomotives.

Both the new Dalton & Lark line and the Copper Belt line were built under the supervision of Rio Grande Western engineers and were operated by the “railroad department” of the Bingham Consolidated Mining & Smelting Company.

The first shipment of copper ore from the Dalton & Lark mine wasn't until 1903. It took Bingham Consolidated over two years to develop the property and to drain the water that had accumulated in the mines after they were shut down in 1899. With the shipment of ore actually beginning, in November 1903 Bingham Consolidated sold the Dalton & Lark line to Rio Grande

Western. *(Interstate Commerce Commission Reports, Volume 26, p. 809; 26 ICC 809; the sale was dated November 3, 1903.)*

The expansion of operations for Bingham Consolidated brought other changes. In May 1902, a year after the Copper Belt was brought under the mining company's control, the smelter was expanded to allow the production of lead. *(Hansen, p. 273)* In 1903, Bingham Consolidated began shipping copper sulfide ores from its former Brooklyn property. *(USGS Professional Paper 38, p. 381)*

In 1903 the Copper Belt Railway built a couple extensions to get the ore traffic of other mining companies in the canyon. The new construction included a spur to Boston Consolidated mine and the Yampa Consolidated mine, both in Carr Fork, along with another spur to the Yampa Consolidated's smelter. *(1909 Bingham Commercial Club Souvenir booklet)* The Yampa Consolidated Mining Co., had been organized in April 1901 as a consolidation of Yampa mine and seven other properties, all located on the north slope of Carr Fork. *(USGS Professional Paper 38, p. 382)* The Yampa smelter was completed in December 1903 and was located on the north slope of the canyon, about a quarter mile below Rio Grande Western's Bingham station. *(USGS Professional Paper 38, p. 302)* The spur to the Yampa smelter crossed the canyon just above the Bingham station and continued along the north slope to the smelter.

The new Copper Belt spur for Boston Consolidated was built after the mining company signed a two-year smelting contract to supply the Bingham Consolidated smelter in Midvale with 200 tons of ore per day. By October 1903, Boston Con was shipping as much as 500 tons per day from the Carr Fork mine. The mine was shipping 4,000 tons by February 1904. *(USGS Professional Paper 38, p. 381)* Considering that the average rail car at this time had a 30-ton capacity, 500 tons per day would have been about 16 carloads per day, and 4,000 tons per month would have been a total of about 133 cars per month, or just four carloads per day, averaged out over the month. This ore was all moving over the Copper Belt line to Bingham, then by RGW to Midvale.

The Boston Consolidated Mining Company had been organized in November 1898 to develop a copper producing property from 51 mining claims located in the upper portion of Carr Fork, with all of the copper coming from sulfide ores. Boston Con was involved in development work until late 1903 when they went into actual production. Up to that time, they had been shipping some sulfide copper ore taken as part of their development work. With the Bingham Consolidated smelting contract in 1903 they were ready for full production.

Another company, Utah Consolidated Mining Company, was also shipping large quantities of ore in 1903, from their Highland Boy mine, also in Carr Fork. Utah Consolidated Mining Company was a 1903 reorganization of a British company of the same name. The British company had been organized in October 1896 to develop the Highland Boy mine in Carr Fork as a gold and silver property. The Highland Boy mine had been first located in 1873. However, no work was done on the claim, other than assessment work, until 1896 when the British Utah Consolidated company began its development of the property. *(USGS Professional Paper 38, p. 265)* At the time of the 1903 reorganization, the new Utah Consolidated Mining Company of

New Jersey property consisted of 31 claims on 239 acres, mostly along north slope of Carr Fork. *(Wegg, p. 73)*

But within two years the mine was mostly shipping sulfide copper ores. In 1897, three years before the Copper Belt was built, and to overcome the lack of cheap transportation, Utah Consolidated constructed a 12,500 foot long aerial tramway between the Highland Boy mine and the Rio Grande station at Bingham.

In September 1899 a study had been made of the copper producing potential some of the mining properties in Bingham Canyon. The study showed that there existed vast reserves of very low grade copper ore throughout the canyon. That low grade ore is called porphyry ore, and the study showed that the ore averaged 1.5 to 2 percent copper. This compared to the sulfide ore being processed at the time, with an average content of about 15 to 20 percent. The Boston Consolidated company, the Bingham Consolidated company, the Yampa Consolidated company, and the Utah Consolidated company were all shipping this higher grade sulfide copper ore, in addition to whatever higher value silver and lead carbonate (very high grade) ores that they could.

The mining engineer that had done the 1899 study, Daniel C. Jackling, also put into his report that this low grade ore could be processed at a profit, if the ore could be mined in quantities greater than was possible with the then current underground techniques.

The method that Jackling proposed was to use steam shovels to strip off the surface overburden, and then to also remove the actual ore itself with shovels, a process called open cut mining. The overburden would be moved in trains to other locations for disposal. The ore would then be moved by train to mills that would be designed and constructed to have the capacity to process the large amounts of ore needed to be profitable.

After shopping his proposal around to several potential investors, Jackling was finally able to organize his Utah Copper Company in July 1903, for the purpose of mining the low grade copper ore using his proposed, and as yet untried new methods. Utah Copper Company was formally incorporated on June 4, 1903, in Colorado. *(Arrington: Richest Hole, p. 38)* In August 1903 Utah Copper began construction of an experimental concentrator mill located at the mouth of Dry Fork Gulch, about two and a half miles down canyon from their mine, and about a mile and a half down canyon from Rio Grande Western's Bingham station. The new mill would have a daily capacity of accepting 300 tons of unprocessed low grade copper ore. *(Arrington: Richest Hole, p. 39)* The Copperton Mill, as the new mill was called, was built to test the new methods required to concentrate the low grade ore down to the 30 percent level that could be handled by the smelters.

In November, within three months of the start of construction of the experimental mill in August, Utah Copper began underground development of the mining property that was the basis for the formation of the company. *(Rickard, p. 47; Arrington: Richest Hole, p. 40, says that the development work began in September)* The Utah Copper mine was located very near the Copper Belt's route in Bingham Canyon, about a mile above the Rio Grande's Bingham station.

Utah Copper completed their Copperton mill in April 1904, and commenced operations in September, shipping its low grade ore from the mine to the Copperton mill, by way of the Copper Belt and the Rio Grande Western. *(Arrington: Richest Hole, p. 39; Kennecott's own Historical Index says that operations commenced on July 1, 1904)* At the same time, on April 29, 1904, Utah Copper was reorganized as a New Jersey corporation. This new company was organized to provide the finances necessary for further expansion of both mining operations, and milling operations, assuming that the experimental mill at Copperton would be successful. *(Kennecott Historical Index)* Until June 1907, all of the ore came from the underground mine. The concentrates from the Copperton mill were shipped to the Bingham Consolidated smelter at Midvale, by way of the RGW.

All of this growth of mining activity in Bingham Canyon brought with it the companion growth in the canyon's population. To better serve the canyon's residents, and to gain the benefits of having its own government, the City of Bingham Canyon was incorporated in March 1904. *(Kennecott Historical Index)* This would allow the city to tax its citizens and make necessary improvements. With the mostly male population, having a town organization would also allow the concerned residents to have their own police force.

With the sudden increase in traffic, the Copper Belt needed more locomotives. Additional power came in 1904 in the form of two more Shay locomotives, numbered as 2 (delivered in January) and 3 (delivered in April). *(Koch, Shay locomotive builder's list)* The new traffic began to tax the capacity of the Copper Belt. As an example, during October 1904 the Copper Belt handled 35,000 tons of ore, more than 1,000 tons per day. *(Salt Lake Mining Review, November 15, 1904, p. 31)* The ore was coming mostly from the sulfide mines, but Utah Copper's porphyry ore was becoming an important source of traffic.

On January 1, 1905 the Denver & Rio Grande Railroad (not the hometown Rio Grande Western) purchased William Bayley's interest in the Copper Belt Railway and took over the operations of the railroad. *(Interstate Commerce Commission Reports, Volume 26, p. 927; 26 ICC 927)* The acquisition of the Copper Belt by the D&RG was part of George Gould's expansion plans to rebuild the rail empire of his robber baron father, Jay Gould, but which had fallen apart following the elder Gould's death in December 1892. The story of George Gould's expansion of the Denver & Rio Grande and his goal of the west coast has been told by others. When viewed in the context of Gould's plans for the Denver & Rio Grande, that road's control of the Copper Belt, comes as no surprise, since the Copper Belt was the originating carrier for all but two of the district's biggest producers: Bingham Consolidated, Boston Consolidated, Utah Copper, and Yampa Consolidated. The two other mine consolidations, Utah Consolidated and United States Mining, used aerial tramways from their mines down to loading tipples at RGW's Bingham station. In May 1901 the Denver & Rio Grande (in Colorado) had taken control of the Rio Grande Western (in Utah), and began operating the two roads as one system, so even these two users of aerial tramways depended on RGW to get their ores out of the canyon and to the smelters.

The traffic levels from the Bingham mines continued to increase so that in November 1905 the Copper Belt purchased another locomotive, Shay number 4. Still more power came when Shay

number 5 was received in December 1906. Ownership of all five Copper Belt Shay locomotives passed to Denver & Rio Grande in 1908 with the consolidation which formed that company.

(QUESTION: Where and how were these former Copper Belt Shay locomotives used after the completion of the RGW's Low Grade line in 1907, and Utah Copper's own Bingham & Garfield in 1911, and until their retirement in 1926?)

Utah Copper Expansion

The year 1905 was one of great expansion for the mines and mining companies in Bingham Canyon, especially for Utah Copper and Boston Consolidated. Utah Copper's experimental Copperton mill was proving Jackling's theory of economies of scale, and the copper company was looking to build a large mill at a location outside of Bingham Canyon. Several things seemed to happen at the same time, and were likely all dependent on each other. During 1905, Utah Copper announced that it would build a mill on the south shore of Great Salt Lake, and American Smelting & Refining Company announced that they would build a smelter at a nearby location. The benefits for this location were twofold; first, there was plenty of fresh water from wells and springs that flowed into the lake. Second, there was ready railroad transportation to get the finished smelter product to market.

The expansion of Utah Copper's operation came from the Guggenheims, who also held majority interest in Standard Oil. One of their investment vehicles, the Guggenheim Exploration Company, provided the funding for Utah Copper to build its new mill at Magna, and the reorganization of Utah Copper in April 1904 was the result of the influx of Guggenheim money. The Guggenheims were also the majority owners of American Smelting & Refining (ASARCO), who had bought majority interests in most of the Salt Lake Valley smelters, wanting to consolidate the smelting operations in one large location to benefit from economies of scale that such an operation would provide. To tie their two new properties together, i.e., funding the expansion of Utah Copper, and consolidating the Utah smelters into a new large smelter at Garfield, Utah Copper signed a 20-year contract with ASARCO that would both guarantee a market for Utah Copper mining operations, and through their new mill at Magna, provide copper concentrates for the new Garfield smelter. *(Arrington: Richest Hole, p. 46)* Construction on the new Utah Copper mill began in November 1905. *(Engineering and Mining Journal, March 17, 1906, p. 534; see also Arrington: Richest Hole, p. 50)* Construction of the smelter began in same year. *(Arrington: Richest Hole, p. 47)* To formally get the new smelter organized and under construction, the Garfield Smelting Company was incorporated on November 17, 1905, as a subsidiary of the American Smelting & Refining Co. *(Utah corporation files, index 5411)* The smelter began operations in August 1906. *(Arrington: Richest Hole, p. 47)*

Along the same lines as their developments in Utah with Utah Copper, in 1906, the same Guggenheim interests backed the organization and development of Kennecott Mines Co., in Alaska. The Kennecott company would later become the Guggenheim vehicle for all of their mineral interests. *(Kennecott Historical Index)* In 1911, Kennecott Mines Co., began actual copper ore mining operations at its mine in Alaska. The mine had been in development since 1906 awaiting completion of the Copper River & Northwestern Railway, also owned by the same interests. The railroad was completed in 1911. *(Source??)*

Also in 1906, in an unusual example of cooperation, ASARCO, Utah Copper, and Boston Consolidated organized the Garfield Improvement Company to build the Garfield town site for the workers at their mills and smelter. Three-fifths was owned by ASARCO, with one fifth each owned by Utah Copper and Boston Consolidated. The three companies also organized the Garfield Water Company to develop and supply water to their mills and smelter and to the new town site. *(Arrington: Richest Hole, pp. 47, 50)*

(Insert discussion of smelter suit in Salt Lake valley)

Utah Consolidated closed its smelter in January 1908. *(Mining Science, January 2, 1908, p. 29)*

After the settlement of the smelter suit in 1907, in which several area farmers sued the smelters at Midvale and Murray over crop damage from sulfuric acid emissions, the smelters either closed or changed their operations. United States Mining Company closed the copper portion of its Midvale smelter and Bingham Consolidated closed its Midvale smelter completely due to smoke litigation (sulfur fumes from smelting of copper sulfide ores). *(Hansen, p. 274; Kennecott Historical Index)*

For the United States company, the changes were so extensive that they organized a new company to fund the changes in its Midvale smelter. The new company, named United States Smelting Company, was organized on March 7, 1907 as a new subsidiary of the larger United States Smelting, Refining & Mining Co. *(Utah corporation files, index 4172)*

Ground was broken on Utah Copper's new Magna Mill during mid 1905, and all necessary concrete foundations were in by late in the year. Contracts for the steel structures were let in late December, and actual construction began during the first week of March 1906. *(Engineering and Mining Journal, Volume 81, January 6, 1906, p. 24, ground was broken "several months ago"; March 17, 1906, p. 534, item dated March 9, 1906, construction to commence "this week")* Full operation began in November 1908. *(Rickard, p. 51)*

Although Boston Con beat Utah Copper in having its steam shovel for open cut mining delivered in December 1905, Utah Copper had intended using shovels for its own open-cut mining of low grade ore right from the start. In January 1906, Engineering and Mining Journal, a national mining trade publication reported that Utah Copper had ordered its first three shovels, and later that month they reported that the first shovel was shipped from the factory in mid month. It was expected to arrive in Utah by February 1st. *(Engineering and Mining Journal, Volume 81, January 6, 1906, p. 24; January 27, 1906, p. 198, item dated January 17)* However, the local Salt Lake Mining Review reported in April 1907 that Utah Copper had ordered its first shovel, a standard gauge 95-ton model from Vulcan, for open-cut mining operations. The shovel was ordered from S. G. Shaw & Co., of Denver, along with three Davenport locomotives, and fifty K&J-brand dump cars. *(Salt Lake Mining Review, April 30, 1906, p. 30; June 15, 1906, p. 32)* The specifics of the later report adds to its credibility. The records of Utah Copper's later parent company, Kennecott, show that a second shovel, a second-hand model also from Vulcan, was added in December 1906. *(Kennecott Historical Index)* In July 1906, the Mining Review reported that Utah Copper had ordered an additional single locomotive from S. G. Shaw & Co.

(Salt Lake Mining Review, Volume 8, Number 7 (July 15, 1906), p. 32) By the end of 1908, Utah Copper was operating eight shovels and 17 locomotives in their open-cut operations. *(Kennecott Historical Index)*

The first use of steam shovels for open cut mining purposes in Utah was at the Cactus Mine in Beaver County, where one machine was used to strip capping from the ore bodies. *(Engineering and Mining Journal, Volume 81, March 3, 1906, p. 436)* To observe successful use of open-cut mining methods, in April 1906 Utah Copper's Jackling and Gemmell traveled to iron mines in Minnesota. Their September 1899 report showed that open-cut methods were intended from the start, but the purchase of the shovels was delayed due to costs of construction of the experimental Copperton mill. *(Rickard, p. 47; Arrington: Richest Hole, pp. 40, 52)*

Open-cut operations began on the canyon slope directly above the opening to Utah Copper's underground mine. The trackage at the level of the underground mine became the 'A-Level,' the starting point for the method of designating the 50 to 75-feet levels for open-cut operations. Utah Copper steam shovel open-cut operations begin in August 1906 on C-Level and D-Level, between 100 and 150 feet above the mine opening. Open-cut operations began with second-hand equipment, consisting of two Marion shovels, four small Davenport standard gauge locomotives, and several wooden six-yard dump cars. *(Arrington: Richest Hole, p. 52)* During the spring of 1907, Utah Copper completed the survey to extend the C-level line to the east side of Main Canyon, and a new timber trestle was built to reach the new extension. *(Kennecott Historical Index)* This new line was needed to connect the new Low Grade Line to other existing trackage.

A large portion of underground mining is done using the stoping method, which is the removal of ores from the ore body, and building a scaffolding of wood timbers to support mine roof and provide a working platform for the miners as they continue to remove ore from the face of the ore body. The structure of wood timbers is called a "stope."

During February 1906, open cut mining had yet to start, and all copper ore from Utah Copper's Bingham mine is being mined by stoping methods. Prior to November 1904 all ore was taken in development work, with the Copperton mill having been placed into operation in April 1904. *(Engineering and Mining Journal, Volume 81, February 10, 1906, p. 289; Rickard, on page 47, states that all ore taken previous to March 1907 was in development work.)*

By September 1906, Utah Copper was working 165 men in both underground and open cut operations. *(Engineering and Mining Journal, September 8, 1906, pp. 435, 436)* In January 1907, Utah Copper stopped development work on its underground mine, with enough ore having been blocked out to last for several years. *(Arrington: Richest Hole, p. 53)*

In a further expansion move, in September 1907 Utah Copper enlarged the openings to the main haulage tunnels of its underground mine to allow standard gauge gondolas to be moved inside loaded from the ore bins inside the mine. *(Engineering and Mining Journal, September 7, 1907, p. 437)* Just a year earlier, Utah Copper had been using five-ton, 500 volt electric locomotives on 24 inch gauge track, hauling the ore in 2-1/2 ton side dump cars to the ore bins on the route of the Copper Belt railroad. *(Engineering and Mining Journal, September 8, 1906, pp. 435, 436)* By the end of 1907, Utah Copper was taking a third of its ore from the underground mine. *(Mines &*

Minerals, January 1908, p. 262) Easier loading of standard gauge cars directly in the Utah Copper underground mine would further stretch the Copper Belt to its operational limits.

Also in September 1907, and because of lack of space in the Main Canyon, Utah Copper began grading down canyon for a new dump line, to be located above Rio Grande Western's new "Low Grade Line." Rio Grande Western had offered 7 cents per ton to remove the waste over its own line. *(Engineering and Mining Journal, September 7, 1907, p. 437)*

Boston Consolidated expansion

Boston Consolidated had been working the higher grade sulfide ores in its mine in upper Carr Fork, but they too had discovered low-grade porphyry ores, very similar to those being worked by Utah Copper. In January 1905, the Boston company announced that they would begin working their porphyry property, and in June, they announced that they would build a concentrating mill adjacent to the new ASARCO smelter. This mill would use a different method than the one selected by Utah Copper to concentrate its low-grade copper ore. The final location was selected in November. *(Mines & Minerals, May 1908, pp. 453, 455)*

As part of its 1905 expansion, Boston Consolidated began planning for open-cut mining of its own porphyry property. In July, the company sent representatives to iron mines in upper Wisconsin, and to the Sun Rise iron mine in Wyoming to investigate open cut mining by steam shovel. In December, they received their first steam shovel, after having ordered it just a month before. Although the shovel arrived in December, getting it shipped up to the site of the open-cut operations, and getting it properly assembled took almost six months, and shovel operations finally began on June 24, 1906. In February 1906, at the same time Utah Copper was just installing their first shovel, Boston Con ordered its second steam shovel, along with five locomotives and forty cars. They also began surveys for a two-mile rail line that would connect the steam shovel porphyry levels of mine with the Copper Belt line. Construction of the new line, located at the top of Carr Fork, was delayed by winter weather. *(Mines & Minerals, May 1908, p. 454; Engineering and Mining Journal, Volume 81, March 3, 1906, p. 436, item dated February 24)* In July, they ordered from the S. G. Shaw Co., of Denver, another forty cars. these would be of seven-ton capacity. *(Salt Lake Mining Review, Volume 8, number 7 (July 15, 1906), p. 32)*

To test their own proposed method of concentrating the low grade copper ore, during the autumn of 1905, Boston Con built a small 20-ton experimental mill. The mill went into operation during early 1906. *(Mines & Minerals, May 1908)* On April 14, 1906, the company broke ground for its new concentrating mill at Garfield. The national press saw this as a good opportunity to compare the methods of reduction to be used by the two companies: Utah copper would be using roller mills to crush the ore and Boston Consolidated would be using stamp mills. *(Engineering and Mining Journal, Volume 81, April 21, 1906, p. 724, item dated April 14)*

The mill of the Boston Consolidated company was not placed into operation until January 1908. The company had chosen the site, about two miles west of the Utah Copper Magna mill, in July 1905. But because of construction delays caused by the sudden demand in San Francisco for structural steel and other construction materials to rebuild from the April 1906 earthquake and fire, Boston Con was not able to complete its new mill as rapidly as did Utah Copper.

In May 1907, Boston Con was using four steam shovels, with five-yard dippers, and nine small narrow gauge steam locomotives in its porphyry operations to mine and ship as much as 750 tons per day. The company was also still shipping from its underground sulfide mine. In addition to moving Boston Con's 750 tons, the Copper belt line was being kept busy with the other producers in the district, including (in Carr Fork) the Utah Consolidated's Highland Boy mine, the Utah Apex mine, and the Bingham-New Haven mine; and (in Main Canyon) Utah Copper, Ohio Copper, and Bingham Consolidated. U. S. Mining was using its aerial tramway to move its ores down to a loading bin on the RGW Bingham Branch at Bingham. *(Mining & Scientific Press, May 11, 1907, p. 597)* Of the producers in Carr Fork, the Bingham-New Haven Copper & Gold Mining Company had been organized in October 1902 to consolidate the Zelnora, Morning Star, and Frisco properties, located along north slope of Carr Fork. *(USGS Professional Paper 38, p. 383)* Utah Apex Mining Company had been organized five months earlier, in May 1902, in Maine to consolidate 33 claims (254 acres), also on Carr Fork's north slope. *(Wegg, p. 77)*

In a 1907 mortgage to fund its continued expansion, Boston Con listed four 90-ton steam shovels, one 90-ton Shay standard gauge steam locomotive, two 25-ton narrow gauge steam locomotives, nine 17-ton narrow gauge steam locomotives, two 40-horsepower electric narrow gauge locomotives used in its underground mine, 200 four-yard narrow gauge dump cars, 4,000 feet of standard gauge track, 5-1/2 miles of narrow gauge track, including underground trackage, and one locomotive roundhouse. *(Source?)* In September 1907, a contemporary trade publication, Mines & Minerals, stated that Boston Con was using four of the five shovels they owned (four Marions and one Vulcan, all being 90-ton shovels with five-yard dippers). Boston Con was also using ten 18-ton Porter locomotives (each pulling trains of 10 to 12 four-yard capacity cars) and two 28-ton Porter locomotives (each pulling trains of 15 to 20 four-yard capacity cars). *("Mining at Bingham, Utah," Mines & Minerals, Volume 28, September/October 1907, p. 90; photo of Boston Consolidated on page 92; photo of Utah Copper on page 92; photo of Bingham canyon on page 92)*

The Boston Consolidated's open cut mine was located at the top of Carr Fork and reached around the mountain high above the workings of the Utah Copper company's mine at the bottom of the main canyon. In 1903 the Copper Belt had built a connection to the Boston company's sulfide ore bins located high in Carr Fork, above Highland Boy, using a system of torturous switchbacks. To ship the large quantities of ore from the porphyry mine that would be needed to keep the new mill in operation, in November 1907, Boston Consolidated completed a gravity tramway and ore storage bin. The 2,100 foot long tramway designed and built by S. B. Stine & Co., Oseola Mills, Pa., at an average 27 percent grade with three 400-ton wooden storage bins located at the top (open cut mine) and at two intermediate (underground mine) levels. The tramway consisted of two parallel pairs of tracks, with counter-balancing skipcars of 12-ton capacity each, giving the tramway a 300 tons per hour total capacity. At the bottom, the skips fed a 3,000-ton storage bin, 36 feet in diameter and 40 feet high.

At the same time, in late 1907 to allow movement of its copper ores to RGW's new Low Grade line, Boston Consolidated completed a one-mile rail connection between the new Copper Belt Junction (where the upper end of the new Low Grade Line connected with the Copper Belt) and the ore bin of the new gravity tramway. The cost of the connection, which included a tunnel, was

$22,842. *(Mines & Minerals, May 1908, p. 455; Mining Scientific Press, April 17, 1909, p. 553; Mines & Minerals, December 1909, p. 264)*

With its new rail connection completed, and its new gravity tramway and storage bin in place, the new expanded Boston Con's operations began. Although Boston Con's open-cut shovel operations began in June 1906, they were involved in testing, development of the new method, and removal of overburden to get at the ore itself. The first ore was mined by the new open-cut operations on January 13, 1908, and on January 27, the new concentrator mill at Garfield (later referred to as the Arthur Mill, was placed into operation. *(1908 Boston Consolidated directors report)*

Boston Consolidated was dependent on the Rio Grande to furnish the needed switching to keep empty cars at its ore bin at the base of the gravity tramway, and to move the loaded ore cars over to the assembly yard at Cuprum. The switching fees Rio Grande charged were steadily increasing, so in 1909 that Boston Consolidated purchased a second-hand Shay locomotive, one that had been built as number 10 for the Clarion River Railway of Hallton, Pa. With the merger of the two mining companies in 1910, and the completion of the Bingham & Garfield in 1911, (which served as the common carrier in the canyon), Boston Con's Shay was no longer needed. In 1913 the locomotive was sold. *(Koch, Shay locomotive builder's list, serial number 461)*

RGW Low Grade Line

The expansion of Utah Copper to feed the new Magna mill, along with the likewise expansion of Boston Consolidated, would need a much better transportation system to get the very large quantities of low-grade copper from Utah Copper's Bingham mine, out of Bingham Canyon and 16 miles north to the new Magna mill. At the center of all this was the Rio Grande Western, and its Copper Belt connection at Bingham. With the Copper Belt being the only way to get Utah Copper ore out of the canyon, it was obvious that it would immediately be a serious bottle neck in the transportation process.

The construction of Rio Grande's Bingham Low Grade Line was in response to the need for higher capacity rail transportation in the booming Bingham Mining District. Both Utah Copper and Boston Consolidated were building mills outside of the district and both would soon be needing transportation facilities to move the projected vast quantities of low grade copper ore.

The Copper Belt Railroad, then in use, was both too steep, with 7 percent grades, and was not constructed to allow movement of the tonnage needed to keep the two companies mills in operation.

The Low Grade Line was surveyed starting in late July 1905. *(Salt Lake Mining Review, July 30, 1905, p. 31)* Utah Construction Company began the grading work in April 1906. *(1909 Bingham Commercial Club Souvenir booklet)* In September 1906 the shovels of the construction company struck copper ore while excavating for the new line. *(Salt Lake Mining Review, September 15, 1906, p. 39)*

The construction of the new line included a new assembly yard called Cuprum, located high on the south slope of the canyon, about 200 feet above the Rio Grande Western's depot for the town of Bingham. The new Low Grade Line connected with the Copper Belt's line about a mile further up the canyon, at Copper Belt Junction, just up-canyon from the surface workings and ore bins of the Utah Copper Company. The grade of the new line was kept low by building south along the east slope of the Oquirrh Range, outside of Bingham Canyon, and gaining elevation by looping back north, using a spectacular horseshoe curve, thereby entering the canyon about 500 feet higher than the Bingham Branch at the same point. The abandoned roadbed of the loop is still visible in aerial photographs of the area today.

Rio Grande Western's new Low Grade Line was about 13 miles in length, between the lower end at Lo line Junction and the upper end at Copper Belt Junction. This compared to less than six miles for the combined RGW Bingham Branch and (by this time) D&RG's Copper Belt Railway that the new line replaced between the same two stations.

The first ore train operated over the new Low Grade Line on January 2, 1907. *(Salt Lake Mining Review, October 30, 1911, p. 18)* The line was not formally completed and turned over to the operating department until February. *(Mines & Minerals, May 1908, p. 454)*

(COMMENT: Other sources [26 ICC 809; Arrington: Richest Hole, p. 55; Utah Copper 1906 Annual Report] mistakenly state that the line was completed in April 1906, the date construction started.)

As part of the same expansion of railroad line capacity that saw the construction of the Low Grade Line, in August 1905 Rio Grande Western began work on the construction of a new branch to Garfield, to serve the new Utah Copper concentration mill, and the new ASARCO smelter. *(Salt Lake Mining Review, August 15, 1905, p. 31)* The new line would be built from a connection with the Bingham Branch at a new station called Garfield Junction (later Welby), and continue northwest to the new smelter site at Garfield, and was completed in November. *(Salt Lake Mining Review, October 31, 1911, p. 18)*

The new Garfield Branch (sometimes called the Garfield Beach Extension) connected with the Bingham Branch at a new station called Garfield Junction, later renamed Welby after A. E. Welby, the General Superintendent of the combined Rio Grande Western/Denver & Rio Grande system. The 16 mile Garfield Branch was completed to the new smelter site in November 1905 and work on the expansion project was stopped for the winter. Construction resumed the following April, with the grading work on the Low Grade Line.

In an agreement dated January 22, 1906 between Rio Grande Western on one side and Utah Copper, Boston Consolidated, and American Smelting & Refining on the other side, the railroad agreed to provide for the movement of ores and concentrates between the mines at Bingham and the mills and smelter at Garfield. *(Source?)*

On April 19, 1907 Utah Copper shipped its first train of low grade copper ore to its new Magna mill, by way of the new Low Grade Line and the new Garfield Branch. (Kennecott Historical Index) Work on Utah Copper's new 6,000-ton capacity concentrator mill, located on the new

Garfield Branch at Magna, had began in November 1905 and the mill was placed into partial operation in June 1907. *(Rickard, p. 51)* The mill was formally completed and placed into full production in November 1908.

As already mentioned, Utah Copper's expansion included the start of open cut mining, using steam shovels to strip waste from above the low grade copper ore. That stripping operation would produce large amounts of waste rock, which had to be disposed of. In the initial proposal, Jackling had suggested that the various side canyons and gulches would be filled with the waste material. But Utah Copper only controlled a small number of empty gulches in the immediate vicinity of its mine. To give itself more room, Utah Copper made arrangements for surface rights to other property in the canyon, both above its mine, and further down canyon. To gain access to the down canyon property, they made surveys for a rail line that it would build. Rio Grande Western had offered to transport the waste rock themselves, but Utah Copper objected to the RGW's price of 7 cents per ton.

Copper Belt operations

Copper Belt Junction soon became a very busy point on the Copper Belt. A switching yard was constructed there to relieve some of the congestion. In later years this same yard was expanded to become Utah Copper's "A" Yard and was the starting point for the copper company's system for assigning a letter designation to each of the levels of its open cut mine. Still later when the copper company converted to a numbering system that reflected the elevation (in feet) of each level, the "A" level became the 6340 level.

Even though the Low Grade Line took most of the traffic, the Copper Belt still was kept in operation moving ores from the other mines down to the Rio Grande's Bingham station, along with ore for Utah Copper's Copperton Mill, which was still in operation. Even with most of the traffic going over the newly completed line, the tonnage moving over the Copper Belt was affecting the condition of the track. Derailments were starting to become regular events.

There were at least two spectacular derailments. The close proximity of homes and businesses just below the Copper Belt's line made for a great potential for damage should a train leave the tracks and fall down the hillside into any part of the town. And that is exactly what happened on February 12, 1912 with the derailment of one of the Copper Belt's Shays. The locomotive crashed through a shoe store and a lady's dry goods store, with one of the locomotive's trucks stopping across the street, standing on end against a telephone pole. The location was such that the locomotive's boiler could not be moved back up to the tracks. Instead it was loaded onto a wagon and freighted slowly down Bingham Canyon's main street, behind a team of 28 horses, to the Rio Grande Western's Bingham station where it was loaded on to a waiting flat car for a trip to the Copper Belt's locomotive shop to be re-mated with the locomotives frame and truck assemblies.

In another derailment, the Copper Belt's locomotive rolled only a short distance from the tracks, demolishing a laundry. The locomotive's boiler settled close enough to the tracks to be winched back up and loaded onto a flat car.

Bingham & Garfield Railway

Almost as soon as the mining companies began shipment of their ores to their respective mills, they started having troubles with the Rio Grande Western management, and the road's ability to move the copper ore out of the canyon.. The mining companies wanted to move as much ore as possible and they wanted Rio Grande Western to buy more locomotives and cars and increase the capacity of the rail lines between the mines in Bingham Canyon and the mills at Garfield.

Rio Grande Western was reluctant to make the improvements, so on August 28, 1907 Utah Copper organized the Bingham Central Railway to build a new rail line between Bingham and Salt Lake City. The new railroad would also serve the adjacent smelting and mining districts. The projected line was said to include the construction of long tunnel. All of the officers were also officers of Utah Copper, including A. C. Ellis, Jr., who was president of both the railroad and the copper company. The projected road would connect with the newly completed lines of the San Pedro, Los Angeles & Salt Lake, and the Western Pacific at Salt Lake City. Then, either the San Pedro or the WP would move the ore trains over their own lines along the south shore of Great Salt Lake to Utah Copper's new mill at Garfield. *(Utah corporation files, index 6542; Railway Gazette, Volume 43, number 10, September 6, 1907, p. 277; Railway Gazette, Volume 44, number 19, May 8, 1908, p. 655)*

Utah Copper was unable to reach an agreement over the level of service which the San Pedro could provide in combination with the Bingham Central, so in July 1908 Utah Copper organized the Bingham & Garfield Railway. *(Utah corporation files, index 7037; organized on July 8, 1908)*

Utah Copper incorporated the Bingham & Garfield to give themselves full control over the movement of their own ores between their mine at Bingham and their mills and the smelter at Garfield. However, the most important reason the Utah Copper organized the Bingham & Garfield was that Utah Copper, as a corporation, did not have the power of eminent domain (the power to condemn property for the common good) -- an advantage that a railroad corporation does have.

The surveys and construction of the Bingham & Garfield began as soon as the road was incorporated in 1908.

Utah Construction Company was awarded the contract for construction of the new railroad on March 30, 1910, and work began on April 22nd. *(Kennecott Historical Index; Salt Lake Mining Review, July 30, 1914, p. 15)* Possibly to take advantage of the eminent domain clause of B&G's common carrier charter, on April 1, 1910, all of Utah Copper's mine trackage (over 25 miles) was transferred to the B&G subsidiary, then leased back to Utah Copper. *(Interstate Commerce Commission Reports, Volume 106, p. 452 [106 ICC 452])*

By November 1910, the Bingham & Garfield was about 70 percent graded, with the main line between Magna and the Garfield smelter being about 90 percent graded. All track materials were on hand, and track laying would begin shortly. *(Salt Lake Mining Review, November 15, 1910, p. 37)* The grading for Bingham & Garfield was complete by June 1911, with the track laid across the Dry Fork bridge on July 14, 1911. The grading for the Bingham yard was completed by the

end of July. The locomotives also arrived at the end of July. *(Salt Lake Mining Review, August 14, 1911, p. 18)*

On September 14, 1911, Bingham & Garfield operated its first train, using new 2-8-8-0 Mallet number 100 and 41 new 60-ton hopper-bottom ore cars. At the beginning of operations, the Bingham & Garfield was truly a common carrier as there were approximately 25 other mines producing ore in Bingham canyon, and the Bingham & Garfield provided switching services between the mines and the Rio Grande Western at both Bingham and Cuprum, high on the south canyon wall. *(Kennecott Historical Index)* By the end of 1917 the Bingham & Garfield was moving an average of 32,019 tons of copper ore per day.

Because the line had to connect with Utah Copper's mine trackage, the Bingham & Garfield's depot at Bingham was considerably lower than the line's actual trackage in its Bingham yard. To allow passengers access from the rail line down to the town's streets, in 1911, B&G built a twin track inclined tramway from their street-level Bingham depot up to their Bingham yard (and Utah Copper's mine office). The site of the Bingham & Garfield depot was later taken by the Gemmell recreation building. *(Kennecott Historical Index)*

Merger of Utah Copper and Boston Consolidated

The 1910 merger was the result of the intense competition between the two mining giants in Bingham Canyon. The workings of the Boston Consolidated were high above those of Utah Copper and there were continuing safety problems with the control of loose materials and slides from above. Both companies wanted to expand their operations but each was hindered by the other. Jackling was quoted as saying "I knew that either they would take us or we would have to take them".

During early 1906, preliminary talks were started, but mid March, the talks broke off because the two parties could not agree on the tonnage of ore reserves that each company had available. the talks had been between Samuel Newhouse for Boston Consolidated, and Daniel Guggenheim, president of American Smelting Securities, which held controlling interest in Utah Copper. *(Engineering and Mining Journal, Volume 81, March 31, 1906, p. 630, item dated March 24, 1906)*

By 1909, the initial success of Boston Con's open-cut operations was dimming. The company found that the high iron content of the ore it was taking by open-cut operations made the difficult to concentrate, and the costs were too high. The company announced that they would end their open-cut operations, but continue to mine both sulfide and porphyry ores from their underground operations. *(1909 Boston Consolidated annual report)*

On March 1, 1910 the Boston Consolidated Mining Company was merged with the Utah Copper Company, with two and a half shares of Boston stock being traded for each share of Utah stock. *(Source??)*

After the merger of Utah Copper and Boston Consolidated, and with the completion of the Bingham & Garfield, the traffic levels for the Rio Grande in Bingham Canyon were greatly reduced.

Most of the ore was going by the Bingham & Garfield and the other mines were also making changes to reduce their transportation costs.

Utah Copper purchased more equipment in 1910, including eight shovels, 12 standard gauge locomotives, and 80 12-cubic yard all-steel dump cars. *(Source??)*

Some of the Utah Copper ore continued going to their original mill at Copperton. But that mill was closed and dismantled in August 1910. *(Rickard, p. 51; Arrington: Richest Hole, p. 40; the mill was formally closed on August 1, 1910)* The mill had been built to have a 300 ton per day capacity. By the time that it was closed, the Copperton Mill had been expanded to the point that Denver & Rio Grande was delivering 1,000 tons per day. When the mill was closed, its machinery was installed in Utah Copper's Arthur Mill, formerly the Boston Consolidated mill, about a mile west of the company's Magna Mill. The 1,000 tons per day that Denver & Rio Grande had been moving to the Copperton Mill then began moving over the Bingham & Garfield to the mills at Magna.

Between 1908 and 1911, while the Bingham & Garfield was being built, the traffic patterns from the mines in the canyon were changing. The three large smelters that had been built in Salt Lake Valley, starting in 1899, were the subject of a suit brought in 1905 by farmers over crop damages from air pollution in the agricultural areas surrounding the smelters. The settlement of the suit called for the mining companies to stop processing copper sulfide ores at their Salt Lake Valley smelters.

Rail traffic on the Bingham Branch increased to its capacity after the Yampa smelter at Bingham burned in 1909. *(Kennecott Historical Index)* The Yampa smelter had been the earlier destination for sulphide ores, but these ores now had to be moved to the Garfield smelter, located on the Garfield Branch. The increased traffic on the Bingham Branch, along with the ore trains coming off the Low Grade Line was causing a bottle neck at Loline Junction. To relieve some of the congestion, the railroad added a second track from there down to Welby in 1910. Additional traffic was also coming to the Bingham Branch from the Lark Branch, which Rio Grande Western had purchased in November 1903.

Ohio Copper Company and the RGW Lark Branch

In 1901, the Bingham Consolidated company, as the reason for its Dalton & Lark Railroad, had projected the construction of the Dalton & Lark Drainage Tunnel. Although the tunnel was never completed, the idea for a tunnel between the mines in Bingham Canyon and the east slope of the Oquirrhs, outside of the canyon, did not die. The Ohio Copper company was organized in October 1903 to work 120 acres of mining claims that included the Columbia and Erie claims in Bingham Canyon. Having discovered the same low grade copper ore that both Utah Copper and Boston Consolidated were taking from their mines, the Ohio company began working the

Columbia mine's copper-bearing ores in pioneering What Cheer and All's Well claims. *(USGS Professional Paper 38, p. 381; Arrington: Richest Hole, pp. 87, 88)*

Ohio Copper decided against the open-cut mining methods used by Utah Copper. Due to their unique location within the ore veins, the Ohio company saw that the best way for them to process their ore was to transport it by way of a tunnel from the company's underground mine to a concentrator mill which they would build at Lark, on the east slope outside the canyon, located on the Lark Branch of the Rio Grande Western.

In August 1907 Ohio Copper was reorganized to finance the construction of the Lark mill. At the time the company projected that it would be shipping between 1,500 and 2,000 tons of copper per day. *(Wegg, p. 75)* Early in 1908 the tunnel was completed and in June 1908 the Lark mill went into partial production, with a stated daily capacity of 3,000 tons. *(Salt Lake Mining Review, May 15, 1908, p. 33)* The first section was formally completed in 1909. *(USGS Professional Paper 111)* The mill's third, and last, section was completed in April 1913 and the mill went into full production, by which time, Ohio Copper had produced 690,001 pounds of copper from 71,225 tons of ore processed (9.7 pounds of copper per ton of ore). *(Engineering and Mining Journal, June 7, 1913, p. 1172)* Ohio Copper began calling the tunnel the Mascotte Tunnel, for one of the company's organizing directors.

There was another tunnel from Bingham out to a mill. In December 1909, Utah Metal Mining began work on tunnel from Carr Fork, west through and under the Oquirrh Mountains to the International smelter. Utah Metal Mining Company had been organized in 1909 to consolidate the Bingham Central Mining Co., Bingham Standard Copper Co., and Bingham Mining Co. properties. By the end of 1912, the 11,490 foot Bingham-Tooele Tunnel of the Utah Metal Mines Company was 92 percent complete. Work had been delayed at the Bingham end by the strike in September. Cost of the tunnel work was about $16.45 per foot. *(Engineering and Mining Journal, March 1, 1913, p. 496)* The tunnel was completed in June 1913. *(Wegg, p. 52)*

International Smelter

The International Smelter near Tooele was completed in February 1912. First furnace "blown in" on the 29th. *(Engineering and Mining Journal, January 11, 1913, p. 87)*

Further expansion of operations

During 1911, 74 percent of all Utah Copper ore was mined by steam shovels in the open cut mine, 4 percent came from the Utah Copper underground mine, and 22 percent came from the former Boston underground porphyry mine. *(Kennecott Historical Index)* In October 1911, Utah Copper equipment consisted of 25 steam shovels, 53 locomotives, and 408 cars. *(Salt Lake Mining Review, October 30, 1911, p. 19)*

(QUESTION: What percentage, if any, was coming from the underground Boston sulfide mine?)

A strike was called by the Western Federation of Miners on September 17, 1912 for all underground miners, for an increase of 50 cents per day. To replace the striking workers, on

October 9, Utah Copper and Utah Consolidated brought in strikebreakers and most producers were back in reduced production by mid October. The strike resulted in Utah Copper closing the underground workings of its original mine due to costs (76 cents per ton) being much higher than open cut mining (35 cents per ton). Work resumed in November in the former Boston mine, with costs of 66 cents per ton. *(Engineering and Mining Journal, May 17, 1913, p. 1008; Rickard, p. 48)* The strike ended on December 1, 1912 when Utah Copper raised wages of surface labor to $2.20 for a 10-hour shift (an increase of 20 cents), "as long as copper stays above 17 cents". *(Engineering and Mining Journal, January 11, 1913, p. 87)*

During 1912, Utah Copper removed 4,835,479 cubic yards of overburden, and during the same period, the company mined and shipped 28,720,234 tons of copper ore. *(Wegg, p. 89)* The company was taking 78 percent of ore from the open cut mine, 18 percent from the former Boston underground mine and 4 percent from the original Utah underground mine. *(Engineering and Mining Journal, May 17, 1913, p. 1008; Wegg, p. 93)*

The 1913 Utah Copper annual report shows the following Bingham & Garfield equipment: four Mallet locomotives; eight heavy switcher locomotives; one light switcher locomotive; 375 steel hopper bottom ore cars; 75 steel concentrate cars; and 50 general service hopper bottom gondolas.

Utah Copper production for 1913 saw an increase in mill production of 41 percent, over the same period in 1912. Most of the increase came from converting the former Boston Consolidated Arthur mill to match the methods used at Utah Copper's own Magna mill. During 1913 both mills were processing 24,000 tons of ore daily, with 14,000 tons going to Magna and 10,000 tons going to Arthur. Arthur managed an 81 percent increase, from 1,860,521 tons in 1912 to 3,376,692 tons in 1913. Magna's 19 percent increase resulted in 4,142,700 tons in 1913 compared to 3,454,800 tons in 1912. Also the grade of the ore being mined was going down; 1912 saw 1.36 percent ore (18 pounds of copper per ton of ore mined) and production for 1913 was from 1.25 percent ore (16 pounds of copper per ton of ore mined). *(Wegg, pp. 43,45)* Ore production for 1913 had 91 percent of the ore coming from the open cut operations at a cost of 29 cents per ton. The cost of underground mining, in the former Boston mine, was 69 cents per ton. *(Engineering and Mining Journal, August 8, 1914, p. 270)*

In April 1913, the Bingham Consolidated company connected their Yosemite shaft with Ohio Copper's Mascotte Tunnel. *(Engineering and Mining Journal, April 19, 1913, p. 828; the work was completed on April 6, 1913.)* By this time the Ohio Copper tunnel had been greatly improved and was the home of a high production, three-mile long, double-track, electrified mining railroad that had been christened the "Bingham Central Railroad". During this time, the Ohio Copper company alone was shipping over 65,000 tons of copper ore per month to their Lark concentrator mill, by way of the Mascotte Tunnel. *(Wegg, p. 48)*

Bingham Consolidated was selling its ore to both American Smelting at Garfield, and to International Smelting at Tooele. Its own smelter had been closed, and in March 1913, they had sold the facility to Utah Junk Co. *(Engineering and Mining Journal, March 29, 1913, p. 679)*

Other smelters operating in 1913 included the American Smelting & Refining plants at Garfield and Murray, the International plant at Tooele, and the United States Smelting & Refining plant at Midvale.

Equipment in 1913 at the American Smelting & Refining copper smelter at Garfield (owned by Garfield Smelting Company, a subsidiary of American Smelters Securities) included: 16 miles of standard gauge track; five 6-ton general Electric locomotives; three 3-ton general Electric locomotives; four other General Electric locomotives; one Browning 15-ton locomotive crane; two bay City 15-ton locomotive cranes; two American 26-ton saddle tank locomotives; and one American 45-ton saddle tank locomotive. *(Wegg, p. 114)*

Equipment in 1913 at the International smelter in Tooele included four 12-ton electric locomotives. *(Wegg, p. 111)* Utah Consolidated shipped 181,077 tons of 1.98 percent copper ore during 1913 from the Highland Boy mine to the International smelter, via their aerial tramway. *(Wegg, p. 46)*

Equipment in 1913 at the United States smelter at Midvale included: four 10-ton electric locomotives used at the lead blast furnace, possibly operating on 6-foot gauge track. *(Wegg, p. 109)* United States Mining shipped 78,165 tons of lead ore to their Midvale lead smelter during 1913, along with shipping 123,757 tons of copper ore to the other smelters. *(Wegg, p. 49)*

Although ores from Bingham were the focus of smelters by this time, other metal ores were coming to the smelters from other mining districts, and were mainly used to balance the metallurgy of the smelting process. The Salt Lake & Alta Railroad was completed between Sandy and Wasatch, at the mouth of Little Cottonwood canyon in November 1913, to transport the Alta district ores to the smelters. *(Wegg, p. 69)*

In 1914 United States Mining stopped using their aerial tramway between their mine in Galena Gulch and the Rio Grande station at Bingham. With the Bingham Consolidated's connection with Ohio Copper's tunnel, Bingham Consolidated sold its Niagara Tunnel to the United States Mining company to use as their main haulage tunnel. The new United States operation used three 8-ton Porter compressed air locomotives to deliver the ore to ore bins located outside the former Niagara portal, where the company built new machine shops, power plant, and compressor house. *(Wilson thesis, p. 28)* The new ore bins were served by the Bingham & Garfield as part of its common carrier service to all of the mines in Bingham Canyon, further reducing the ore traffic for Denver & Rio Grande.

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Outline *(being converted to narrative format)***:**

1914: Utah Metal Mining Company took control of Bingham-New Haven Copper and Gold Mining Company located on north slope of Carr Fork. *(Source??)*

March 31, 1914: Underground work on Utah Copper's former Boston mine was stopped because enough capping had been removed to allow both mills to be furnished solely from the open cut methods. *(Rickard, p. 48)*

September 1914: Bingham & Garfield was shut down, until April 27, 1915, for lack of traffic. Copper was selling at 18.5 cents per pound, the highest price since 1907. *(Eastern Utah Advocate, April 30, 1915, p. 1)*

(QUESTION: Is Utah Copper shut down also? Because of World War One?)

November 1914: Utah Metal Mining Company was reorganized as Utah Metal & Tunnel Company. *(Engineering and Mining Journal, November 14, 1914, p. 896)*

(QUESTION: Did the costs of construction of the Bingham-Tooele tunnel force Utah Metal Mining into bankruptcy?)

1914: Utah Copper took 98 percent of its ore from the open cut operations. Bingham & Garfield moved 4,829,877 tons of ore, 2 percent (100,466 tons) of which was ore from other companies. *(Engineering and Mining Journal, May 8, 1915, p. 824)*

1915: Utah Consolidated purchased the adjacent (to the north) Bingham Copper Boy property. *(Engineering and Mining Journal, May 27, 1916, p. 945)*

1915: Transportation of copper ore for Utah Copper was by way of the Denver & Rio Grande and by its own Bingham & Garfield. Other companies were using Utah Consolidated's tramway to the International smelter, and the underground Bingham Central Railway, by way of the three-mile Mascotte Tunnel to Lark. *(Wegg, p. 68)*

September 1915: Utah Copper ordered six "6-wheel locomotives" from the Pittsburg Works of the American Locomotive Company. *(Source??)*

March 1916: Utah Copper sent a representative to Montana to study Butte, Anaconda and Pacific, and Milwaukee Road electrification. *(Salt Lake Mining Review, April 15, 1916, p. 33)*

July 1916: "Directors of Bingham & Garfield considering electrification". *(Salt Lake Mining Review, July 30, 1916, p. 32)*

August 1916: Bingham & Garfield received an order of 100-ton ore cars. *(Salt Lake Mining Review, August 15, 1916, p. 33)*

January 1917: Bingham & Garfield increased its stock to $10 Million to finance electrification. *(Salt Lake Mining Review, January 15, 1917, p. 56)* Board of Directors was to make a decision of electrification. Construction would not start for at least six months due to unavailability of electrical components from General Electric. *(Salt Lake Mining Review, January 30, 1917, p. 34)*

January 1, 1917: Ohio Copper Mining Company was reorganized as Ohio Copper Company to assume the debt of the costs of construction of the Mascotte Tunnel, called the "Bingham Central Railway". The property had been operated under lease since June 1915 by the General Exploration Company, a company organized for the purpose by the plant manager, who remained in the position after the reorganization. *(Engineering and Mining Journal, October 28, 1916, p. 806; September 23, 1916, p. 566; January 27, 1917, p. 182)*

April 1917: Utah Copper purchased the last of the Wall claims, ending a long series of court battles over the rights to the claims that made up the original Utah Copper property in 1903. *(Engineering and Mining Journal, April 28, 1917, p. 769)*

September 1917: A 2,000-ton leaching plant was completed at Magna to recover copper from very low grade (less than 1 percent) ore. Construction started in August 1916. *(Kennecott notes; Engineering and Mining Journal, July 1, 1916, p. 71)*

October 1917: New crusher installed at Arthur. *(Kennecott Historical Index)*

November 1917: Bingham & Garfield hauled an average of 32,019 tons of copper ore per day. *(Kennecott Historical Index)*

1918: A new Wellman-Seaver-Morgan single car dumper was installed at Arthur. The mill had originally been equipped with a 10,000-ton steel ore bin fed by bottom dumping ore cars. *(Rickard, p. 53) (Kennecott's Historical Index says that the dumper was a "Hullett Single".)*

1918: Bingham & Garfield under federal USRA control from January 1, 1918 to April 9, 1918. *(Source??)*

January 1918: Operations of new Magna leaching plant begin. *(Kennecott notes)*

January 22, 1918: United States Smelting, Refining, and Mining Company was organized to take over United States Mining Company and United States Smelting Company. *(Utah corporation files, index 13150)*

January 15, 1919: First operation of new car dumper at Arthur. *(Kennecott Historical Index)*

February 26, 1919: Magna mill was closed because of drop in copper demand after World War One. The mill had been working full time since opening in 1908 and needed maintenance. Shut down lasted over 2-1/2 years, until November 10, 1922. *(Arrington: Richest Hole, p. 70; Parsons I, p. 87)*

May 28, 1920: An agreement was signed for the operation of Utah Copper ore trains over the

Bingham & Garfield, by Bingham & Garfield crews. *(Kennecott Historical Index)*

September 1, 1920: Bingham & Garfield was removed from interstate commerce. Utah Copper purchased all Bingham & Garfield equipment at a cost of $1.3 Million. This action was taken because of an ICC ruling that half of all Bingham & Garfield earnings over 6 percent profit should be contributed to a fund controlled by the ICC for the advantage of other railroads in the region. *(Kennecott Historical Index)* The mainline trackage agreement for Utah Copper to operate over Bingham & Garfield, using its own crews and equipment, was signed on May 20, 1920. *(Kennecott notes)*

February 1921: Magna leaching plant was closed. It had been in operation from January 1918 to February 1919 and again since May 1920. *(Kennecott notes)*

April 2, 1921: Bingham Canyon mine was shut down. *(Kennecott Historical Index)*

April 4, 1921: Arthur mill was shut down. *(Kennecott Historical Index)*

December 3, 1921: All passenger service over the Bingham & Garfield was discontinued. From 1911 to 1921 the B&G carried 2,442,726 passengers. *(Kennecott Historical Index)*

1922: First electric shovels were tested at Bingham: two Marion Model 92 shovels with treads and 4-1/2 yard dippers. *(USGS Bulletin 398, p. 184)* Electric shovels had been used in other parts of the world as early as 1914 (an electric Bucyrus Model 100-C having been used in Sweden). *(Engineering and Mining Journal, October 31, 1914, p. 767)*

April 1, 1922: Bingham Canyon mine operations resume. *(Kennecott Historical Index)*

April 4, 1922: Arthur mill operation resumes. *(Kennecott Historical Index)*

July 1922: Modernization of Magna mill began. *(Kennecott Historical Index)*

November 1922: Magna mill was reopened. *(Kennecott Historical Index)*

1923: A test precipitation plant was built in the bottom of the pit to recover the dissolved copper in drain water which collected at the bottom of the pit. *(Arrington: Richest Hole, p. 74)*

1923: Steam shovels were remodeled by placing them on three caterpillar treads, one on each side at front, and a third in center at rear. *(Bureau of Mines IC 6234)*

1923: Wellman-Seaver-Morgan Twin car dumper was installed at the Magna mill. Magna had originally been equipped with a 25,000-ton wooden ore bin with three tracks dumping into it. Cars being dumped were either wood or steel and either center-bottom dump or side-bottom dump. Bottom dumping was becoming a problem due to large boulders and wet ore freezing during the winter. The new twin car dumper was capable of dumping 720 cars (48,000 tons) per day. *(Kennecott Historical Index)*

1923: Two electric shovels and 17 steam shovels were placed on caterpillar treads. Treads had been in use on shovels in other mines in country since 1920. *(Kennecott Historical Index)*

March 1923: Utah Construction Company began excavation for the new car dumper at Magna. *(Mining and Metallurgy, August 1925, p. 447)*

September 1923: First new electric shovel purchased. *(Bureau of Mines Bulletin 273, pp. 2,3)*

November 12, 1923: First new electric shovel (number 22, a Marion Model 92), of eight purchased new, was placed in service at the north end of K-Level. Fifteen steam shovels had been converted to electric at the Bingham shops. *(Kennecott Historical Index)*

December 1923: Magna car dumper yard was completed and the new car dumper was placed into service. *(Kennecott notes)*

1924: A small precipitation plant was built at Copperton to extract copper from waste dump runoff. *(Arrington: Richest Hole, p. 74)*

June 16, 1924: Two 70-ton, 600 volts DC electric locomotives arrive for use at the new Magna and Arthur dumper yards. *(Kennecott notes)*

September 1924: The Magna and Arthur dumper yards were electrified, using 600 volts DC, and the two 70-ton locomotives go into service, one at Magna on September 8th and the other at Arthur on September 10th. *(Source??) (COMMENT: The two locomotives were purchased second-hand from Manufacturer's Railway in St. Louis.)*

July 1925: Six new electric shovels arrive. Three steam shovels converted to electric. The decision was made to electrify all remaining shovels. *(Bureau of Mines Bulletin 273, p. 3)*

On September 21, 1925 Denver & Rio Grande Western sold the Copper Belt Branch, the Yampa Branch, and the upper (in-canyon) portion of the Low Grade Line to the Bingham & Garfield Railway. *(D&RGW Agreement 4163 and Deed U-3267)* The location of the three lines were interfering with the expansion of Utah Copper's open pit mine. The copper company wanted the freedom to move the trackage around to suit the operations of the mine. The Rio Grande retained its yard and depot at Bingham and 3.3 miles of the Low Grade Line outside of the canyon, which they renamed the Bingham Branch Extension. That portion of the line was being used to serve the loading bins of the Congor and Midas mines and was later abandoned in 1931. By the time of the 1925 sale the Copper Belt Branch was thoroughly intermixed with the trackage of the copper company. The Yampa Branch had not been operated since 1913 and had seen very little traffic since the Yampa Smelter was destroyed by fire in 1909. Most of the other mines were owned by the larger companies but were being worked by leasers. Their ore bins would be served by the Bingham & Garfield, as a common carrier.

The five Shay locomotives purchased by the Denver & Rio Grande along with the Copper Belt Railway had been kept working on the branches in the canyon, above Loline Junction. With the sale of the three branches with steep grades and sharp curves in 1925, Denver & Rio Grande

would likely have moved the Shays from their former Copper Belt location at Bingham down to the roundhouse and facilities at Welby. Three of the Shays, road numbers 1, 2, and 4, were sold for scrap within a year and a half. The two others, numbers 3 and 5, were kept in service for another eight and ten years respectively, when they too were sold and cut up for scrap.

By 1926 Utah Copper was shipping 50,000 tons per day over the Bingham & Garfield Railway, compared to the 35,000 tons that the Copper Belt had shipped during the entire month of October 1904.

1926: Capacity of Magna and Arthur mills were raised to 50,000 tons per day. *(Kennecott Historical Index)*

1926: Construction of "model" townsite of Copperton was begun. *(Kennecott Historical Index)*

late April 1926: Utah Copper ordered two locomotives for motive power tests in the Bingham Canyon mine, to be delivered within 90 days; one was to be a 60-ton oil-electric at a cost of $65,000 (road number 600) and the other was to be a 75-ton combination trolley electric/battery electric at a cost of $50,000 (road number 700) *(Source??)*

July 1926: An ALCo-General Electric-Ingersoll Rand 60-ton oil-electric locomotive number 600 was received. (construction serial number 10028/16680) *(builder's data)*

May 16, 1927: First electric locomotive, number 700 (GE construction serial number 10258), was put into service on the K-Level dump line and comparative steam/diesel/electric tests were begun. Electric power to the locomotive was 750 volts DC and came from portable towers of the same design as those being used for the 550 volts DC for the electric shovels. *(Kennecott Historical Index)*

1928: The conversion of the 90-ton shovels from the steam railroad type with 3-1/2 cubic yard buckets to electric with caterpillar treads and 4-1/2 cubic yard buckets had allowed a 68 percent increase in productivity, from 2,350 tons to 3,966 tons per shovel per day. Twenty three all-electric shovels were in service, eight using AC controllers and fifteen others using DC controllers. *(Kennecott Historical Index)*

June 1928: Utah Copper announced that they would replace their steam railroad locomotives with combination electric trolley and battery locomotives, some of which would be built with an additional cable reel for "extension cord" operation. *(Kennecott Historical Index)*

September 1928: The first of the new electric locomotives arrived. The first to arrive was number 702. Apparently number 701 was wrecked en route and Utah Copper never replaced it. *(Source??)*

1929: Precipitation plant at Copperton was replaced by a more modern one of greater capacity. *(Arrington: Richest Hole, p. 74)*

June 1929: United States Mining (USSR&M) purchased the Bingham Mines group. *(Wilson*

thesis, p. 5)

September 23, 1929: Electric locomotives placed in service in Bingham & Garfield Bingham yard as switchers. *(Kennecott Historical Index)*

October 1929: Last (number 741) of the initial 40 (road numbers 701-741) electric locomotives was received. *(Kennecott Historical Index)*

December 19, 1929: Central Traffic Control (CTC) was placed in service at the pit. Forty-one (41) 85-ton electric locomotives are in service. *(Kennecott Historical Index)*

1930: Sixty miles of track were in service in the pit with an average daily production of 40,000 tons of ore and 30,000 cubic yards of waste removed. *(Kennecott Historical Index)*

January 25, 1930: Arthur mill was shut down for rehabilitation. All ore was then treated at Magna. The Arthur remained closed until September 1936. *(Kennecott Historical Index)*

March 1930: Grading work was begun at Arthur to raise the dumper yard to the level of the car dumper. The project was completed in May. Up to this time the dumper was about ten feet above the tracks of the dumper yard and an electric pusher "mule" was used to push the ore cars up to the dumper. The "electric mule" cable car pusher had become troublesome in the winter and could not handle the desired increased dumping rate. The cost of the project was $100,000 and it allowed for increased daily capacity of 500 cars, or 40,000 tons. *(Source??)*

1933: Bingham Canyon mine and Magna mill operations were at one-fifth of capacity, with staggered shifts to retain as many workers as possible. *(Arrington: Richest Hole, p. 71)*

April 1, 1935: Ore Delivery Department (Utah Copper's operation of the Bingham & Garfield) was placed under the administration of the Department of Mills. *(Kennecott Historical Index)*

September 1, 1936: Arthur mill reopened, after being shut down for nearly six years. The Arthur foundry reopened in October 1932, after closing in January 1932. *(Kennecott Historical Index)*

November 10, 1936: Utah Copper Company was sold to Kennecott Copper Corporation. Kennecott had organized a new Utah Copper Company in Delaware, as a subsidiary, on November 6, 1936 for the purpose. The original Utah Copper Company had been organized in New Jersey in 1904. On April 29, 1915 Kennecott Copper Corporation had been organized in New York to acquire the worldwide Guggenheim copper interests, including all of the interests of Kennecott Mines Company in Alaska (including its Copper River and Northwestern Railroad) and 25 percent interest in Utah Copper Company in Utah, along with 96 percent interest in Braden Copper Company in Chile. In 1923 Kennecott Copper Corporation acquired 77 percent control of Utah Copper Company and by 1925 Kennecott had acquired 95 percent interest in Utah Copper. *(Arrington: Richest Hole, p. 68; Kennecott Historical Index)*

1937: Ohio Copper Company sold all of its surface rights and minerals rights to Kennecott. Ohio retained its dumps and leaching plant at Lark, which were later sold to United States

Smelting, Refining and Mining Company in 1950. *(Arrington: Richest Hole, p. 88)*

February 1937: A second order of electric locomotives (road numbers 742-760) began to arrive, with delivery continuing through October. This second order was delivered as 85-ton locomotives. During 1937 the other 41 locomotives, delivered as 75-ton units, were reballasted to 85 tons. For operations in the pit, two locomotives are needed for each shovel in service. Each locomotive handled a train of twelve (12) empty cars. *(Kennecott Historical Index)*

December 1937: Seventy five (75) miles of track had been electrified. *(Kennecott Historical Index)*

June 16, 1938: Bingham Canyon mine and both mills were completely shut down, after operating at one-fifth capacity for almost five years. *(Kennecott Historical Index)*

August 1, 1938: Bingham Canyon mine and both mills operations resume. *(Kennecott Historical Index)*

February 4, 1939: Copperton vehicular tunnel was opened for traffic. The 6,975 tunnel had been completed in December 1938 and was built at a cost of $1.4 Million. The tunnel rose from 6,100 feet elevation at Bingham to 6,600 feet at Copperfield, at a 6.4 percent grade. Utah Construction Company had begun construction in March 1937 and made a perfect hole-through on February 19, 1938. The old county highway in the bottom of the canyon was closed and the tunnel was deeded to Salt Lake County as its replacement. The tunnel was used by about 850 cars that first day and could accommodate 1,100 cars per day. *(Source??)*

mid February 1939: A fill was begun to connect the east and west sides of C-Level, across the old county highway. Auto traffic was now using the new Copperfield vehicular tunnel. *(Kennecott Historical Index)*

1940: Utah Copper waste trains began filling Carr Fork with waste. *(Kennecott Historical Index)*

May 1940: Ore Delivery Department became Ore Haulage Department. *(Kennecott Historical Index)*

September 1940: American Institute of Mining Engineers (AIME) met in national convention at Salt Lake City, Utah. *(Mining and Metallurgy, Vol 21 [1940])*

late 1940: During late 1940 Utah Copper was the largest producer of non-ferrous metals in the United States, with a daily ore production of 70,000 tons -- having to remove 90,000 tons of waste to get at that ore. Utah Copper employed 4,300 persons, including those working for the Bingham & Garfield. The total tonnage mined to January 1, 1940 was 641,268,375 tons, of which a little less than half (295,648,575 tons) was copper ore. there were twenty-one levels on the mine's west side, and twelve levels on the east side, along with three sub-levels, below the A-level. the bottom level of the mine was at 6,190 feet elevation. the electric shovels in the mine were loading 6,300 tons in each eight-hour shift. The new full-rotation shovels, using five-cubic

yard dippers, were loading up to 10,000 tons per shift. Waste rock was being hauled in trains of eight to ten, thirty-cubic yard dump cars. There was a total of 166 miles of standard gauge railroad track in the Utah Copper operation: 98 miles of mine tracks; 33 miles of mainline to the mills; and 35 miles of yard, loading, storage, and side-tracks. *(Mining and Metallurgy, Volume 21, December 1940, p. 550)*

May 1941: Construction of the 100,000 kilowatt Central Power Station began. *(Arrington: Richest Hole, p. 75)*

1941: Switchback from M-Level down to G-Level was completed. *(Kennecott notes)*

late 1941: Dry Fork was completely filled with waste. *(Kennecott Historical Index)*

In early November 1941 a record was set when on one single day the Bingham & Garfield moved 105,000 tons of ore to the mills. Of the 1,150 cars of ore shipped in that single 24 hour period; 667 cars went to Magna and 483 cars went to Arthur. At the time, in November 1941, the United States was producing thirty percent of world's copper and Bingham was producing one-third of the United States' production. *(Salt Lake Tribune, November 9, 1941)*

March 1942: Four new 90-ton electric locomotives arrived (road numbers 761-764). An additional 100-ton electric locomotive (road number 600) arrived, set up for 600 volts DC, and was put into service at the mill car dumpers. The additional locomotive allowed higher dumper production by doing away with dumping delays due to shift changes and the dumpers being idle while the dumper locomotive went after another cut of cars. *(Kennecott Historical Index)*

July 1942: Bingham & Garfield received its first diesel-electric locomotive, an American Model S-2, road number 800 (ALCo construction serial number 69908). The locomotive was transferred to Kennecott's Chino, New Mexico operation in 1949, after the arrival of RS-2 number 902. *(Ardinger locomotive roster)*

December 1942: Bingham & Garfield received a Baldwin Model VO1000, road number 801 (Baldwin construction serial number 64731). The unit was transferred to Kennecott's Nevada operation in 1944. *(Ardinger locomotive roster)*

February 1943: Bingham & Garfield received a second Baldwin VO1000, road number 803 (Baldwin construction serial number 64743). Transferred to Nevada in 1948. *(Ardinger locomotive roster)*

March 1943: Bingham & Garfield received a unique, one-only 128-ton GE center-cab locomotive, road number 802 (GE construction serial number 15634). Later changed to road number 900. *(Ardinger locomotive roster)*

June 1943: The cross-canyon connection was completed (at the site of the old Yampa Smelter) between the new 6040-Tunnel and the new Ore Haulage Central Yard, near Dry Fork. Two short tunnels are built through the fill to cross over the highway and the Denver & Rio Grande Western line. *(Kennecott Historical Index)*

1944: There were 120.2 miles of track in the pit and the canyon. *(Kennecott Historical Index)*

1944: The 6040-Tunnel was completed; 3,975 feet long. *(Kennecott Historical Index)*

March 24, 1944: Central Power Station at Magna went into service at a cost of $8 Million. The boilers could use either natural gas or coal. *(Kennecott Historical Index)*

May 8, 1946: Construction of new Copperton low line began. *(Kennecott Historical Index)*

1947: Central Power Station was expanded to 110,000 kilowatts. *(Arrington: Richest Hole, p. 75) (QUESTION: To furnish electricity for the new Copperton Low line?)*

January 1, 1947: Utah Copper Company became the Utah Copper Division of Kennecott Copper Corporation. *(Kennecott Historical Index)*

March 1947: The CC line was completed, for connection to the new Copperton low line. *(Kennecott Historical Index)*

October 22, 1947: Ore Haulage employees went on strike. *(Kennecott Historical Index) (QUESTION: Because of the new electric operation, which needed fewer employees?)*

November 6, 1947: Ore Haulage strike ends. *(Kennecott Historical Index)*

1948: Construction began on the Garfield Refinery. *(Kennecott Historical Index)*

Operations of the Copperton Low Line began on April 1, 1948. *(Strack, 1983 research notes)*

April 30, 1948: Bingham & Garfield operations cease. *(Kennecott Historical Index)*

May 2, 1948: New Copperton low line began operation. The maximum grade for the new line was 1.35 percent while the maximum grade of the Bingham & Garfield was 2.5 percent. The lower gradient of the new line allowed longer trains and therefore more ore to be delivered to the mills. Seven 3,000 hp electric locomotives were purchased for service on the new Copperton line; enough to operate the low line trains and to provide locomotives for the car dumpers at the two mills. To allow the new locomotives to be used on the car dumpers, the dumper yards at Magna and Arthur were converted from 600 volts DC to 3,000 volts DC (the same as the Copperton low line) and the three 85-ton (numbers 737, 738, 740) and single 100-ton (number 600) were reassigned to the Bingham pit. Number 600 was renumbered to 765 upon reassignment. *(Source??)*

October 1948: A new 1500 hp diesel-electric locomotive, road number 901, was purchased. (Baldwin Model DRS6-4-1500, Baldwin construction serial number 73474) The locomotive was built by Baldwin in March as a demonstrator and Kennecott "bought it on the spot" after seeing a demonstration of the unit on the Western Pacific at Tooele. *(Dolzall, pp.86,87)*

December 13, 1949: The new 1500 hp diesel-electric locomotive, road number 902, was placed into service at the Magna yard. (ALCo Model RS-2, ALCo construction serial number 77563) *(Source??)*

September 1, 1950: First cathodes are pulled from acid bath at refinery for melt down. *(Kennecott Historical Index)*

October 2, 1950: First shipment of finished copper was made from the refinery. *(Kennecott Historical Index)*

June 30, 1951: Bingham & Garfield was "liquidated", corporation dissolved. *(Kennecott Historical Index)*

July 1951: Utah Construction Company finishes work on refinery. *(Kennecott Historical Index)*

March 1952: Four new 125-ton locomotives (numbers 800-803) arrive, to handle the projected increase in tonnage because of the new 5840-Tunnel going into service, (later numbers 866-869, and finally numbers 766-769). *(Kennecott Historical Index)*

August 1952: The 5840-Tunnel in completed and placed in service. The tunnel was 7,000 feet long. Tracklaying in the tunnel began in January and was completed in March. *(Kennecott Historical Index)*

December 1952: A new 1500 hp diesel-electric locomotive, road number 903, arrived (EMD Model SD7, construction serial number 17411) *(Ardinger locomotive roster)*

December 30, 1952: Wreck in Magna yard involving Denver & Rio Grande Western GP7 number 5112, with its train, and Kennecott Baldwin number 901 and Alco number 902, with their train, resulted in $52,600.00 damage to Kennecott equipment. The permanent result from this wreck was that number 901 was retrucked with four-wheel "B" trucks replacing its original six wheel "A-1-A" trucks. *(Kennecott Historical Index)*

1953: 5,605 tons of concentrate from Magna and Arthur were shipped to Kennecott's smelter in McGill, Nevada due to a one and a half day, and another five day strike at the American Smelting and Refining Company (ASARCO) smelter at Garfield, Utah. *(Kennecott Historical Index)*

March 26, 1953: First ore and waste trains operate through the new 5840-Tunnel. *(Kennecott Historical Index)*

October 1953: Two tunnels are completed on the H-Dump line. *(Kennecott Historical Index)*

November 3, 1953: Work began on moving the G-Level bridge in Carr Fork. *(Kennecott Historical Index)*

Statistics for the Ore Haulage "Copperton low line" for 1954 show that the average locomotive made 1,237.9 trips; the average train was 64.46 cars long; and total tonnage for the year was 41,078,212 tons. 311,924,300 tons had been hauled since start up in May 1948. *(Strack, 1983 research notes)*

February 14, 1954: Moving of the G-Level bridge was completed. *(Kennecott Historical Index)*

August 1954: Switchback from K-Level down to the H-Level was completed. *(Kennecott Historical Index)*

1955: Eighty percent of all ore mined was moved through the 6040 and 5840-Tunnels. *(Kennecott Historical Index)*

1955: Three (3) Marion Model 151-M and two Bucyrus-Erie Model 190-B electric shovels were placed into service. *(Kennecott Historical Index)*

November 1955: Four new 125-ton electric locomotives were placed into service. *(Kennecott Historical Index) (COMMENT: Road numbers 804-807, later numbers 870-873, finally numbers 770-773)*

1956: Thirty (30) 40 cubic yard waste dump cars were purchased. *(Kennecott Historical Index)*

April 28, 1956: Ore Haulage has Sperry Rail Service test its rails. *(Kennecott Historical Index)*

July 1956: Morrison-Knudsen Construction Company began work on two connections across Carr Fork to allow removal of the old Bingham & Garfield Carr Fork bridge; one to connect the 6340-Level (old A-Level) and Bingham yard, and the other to connect the Apex yard and the D-Dump line. *(Kennecott Historical Index)*

September 1956: Utah Construction Company was awarded the contract to build the new 5490-Tunnel. Construction of the tunnel was planned as early as 1947, to further reduce costs of hauling the ore uphill, out of the pit, only to move it downhill, out of the canyon, to the mills. *(Kennecott Historical Index)*

October 8, 1956: The observation platform for the public at Copperfield was closed and work to dismantle it began on October 21, 1956. *(Kennecott Historical Index)*

January 17, 1957: First waste train used 5840-Tunnel. *(Kennescope, February 1957)*

early 1957: The new 6340-Level (old A-Level) connection was completed. *(Kennecott Historical Index)*

Work was began to dismantle the Carr Fork bridge in April 1957. *(Strack, 1983 research notes)*

April 1957: The D-Level bridge across Carr Fork was dismantled. *(Kennecott Historical Index)*

May 17, 1957: The new, temporary public observation platform above Carr Fork was removed. *(Kennecott Historical Index)*

June 16, 1957: The switchback between the new 5840-Yard and the 5790-Level was completed. *(Kennecott Historical Index)*

1958: During the year, Utah Construction Company made 8,875 feet of progress on the new 5490-Tunnel. *(Kennecott Historical Index)*

1958: Seventy five percent of all ore mined came from below the 6340-Level. Seventeen percent of ore mined moves through the 6040-Tunnel with forty percent moving through the 5840-Tunnel. *(Kennecott Historical Index)*

The removal of the Carr Fork bridge and the A-Level machine shops was completed in May 1958. *(Strack, 1983 research notes)*

June 1, 1958: Notices were given to residents, renters, and lessors in Copperfield, Upper Main Canyon, and Carr Fork and Highland Boy to vacate their dwellings by August 1, 1958. *(Kennecott Historical Index)*

October 1, 1958: Kennecott purchased the Robbe Precipitation Plant at Copperton. For the previous twenty-two and a half years Kennecott had been leasing the plant from a private owner. *(Kennecott Historical Index)*

January 1, 1959: Kennecott Copper Corporation purchased the Garfield smelter of American Smelting and Refining Company (ASARCO) *(Source??)*

February 1959: The new 5490-Tunnel was completed at a cost of $12 Million. The tunnel is 18,000 feet long. *(Arrington: Richest Hole, p. 72)*

1960: Central Power Station was expanded to 175,000 kilowatts, to furnish power to the smelter. *(Kennecott Historical Index)*

1961: There were 38 shovels working 33 ore shovel shifts and 33 waste shovel shifts per day. Most shovels were served by 3 trains per shift, using the 75 pit locomotives with 258 40 cubic yard waste dump cars and 825 100-ton ore cars. *(Kennecott Historical Index)*

1961: 270,000 tons of waste was removed to mine 90,000 tons of ore needed for the mills. *(Arrington: Richest Hole, p. 72)*

May 7, 1961: First ore train used the new 5490-Tunnel, seven weeks after "breakthrough" of the tunnel into the pit. The train was loaded with ore that had been stockpiled from the excavation in the pit for the tunnel portal. *(Kennecott Historical Index)*

May 27, 1961: The first train of ore from other levels in the pit moves through the new 5490-Tunnel to Copperton. The track had been connected (using a spiral excavation) with the track of the 5640-Level on May 21st, and electrified on May 25th. *(Kennecott Historical Index)*

1962: Kennecott acquired rights of United States Smelting, Refining and Mining Company on their 7,400 acres located in Bingham canyon, including their Lark concentrator. *(Arrington: Richest Hole, p. 72)*

1962: Operation of precipitation plant produced 20 million pounds of copper, about 5 percent of 1962 production. *(Arrington: Richest Hole, p. 74)*

February 1963: Ore Haulage began ore car construction program, using jigs and all welded construction. *(Kennecott Historical Index)*

February 23, 1963: Announcement of $100 Million expansion project, to be completed by early 1967:
- truck haulage to replace rail haulage
- expansion of precipitation plant
- construction of Bonneville crusher
- construction of nine mile rail line to serve new crusher
- additional rail locomotives and cars
- modernization of smelter

(Source??)

March 1963: A new 2400 hp diesel-electric locomotive, road number 904, arrived (EMD Model SD24, construction serial number 28170) *(Ardinger locomotive roster)*

fall 1963: Truck haulage began in upper levels of mine, with removal of rails as truck haulage progressed. *(Kennecott Historical Index)*

late 1963: New haulage truck maintenance shop built at Yosemite Gulch, above former location of Copperfield. *(Kennecott Historical Index)*

February 1965: Bechtel Corporation was awarded contract to build new $4 Million precipitation plant at Copperton. *(Kennescope, March/April 1965)*

March 1965: Seventy-nine haulage trucks were on the property. *(Kennescope, March/April 1965)*

March 1965: Track and electrification are removed down to the E-Level on the east side. Ore from the west side above the E-Level will hauled down the new Carr Fork haulage road to a reload point. *(Kennescope, March/April 1965)*

March 1965: Western Knapp Engineering Company was at work on the site of the new Bonneville crusher. *(Kennescope, March/April 1965)*

March 1966: New waste dump car repair shop was built at Dry Fork, replacing the one above the mine office. *(Kennescope, March/April 1966)*

March 1966: Proler Steel Corporation began construction of scrap metal de-tinning plant at junction of old Bingham highway and Lark highway. The plant will furnish scrap iron to new precipitation plant. *(Kennecott Historical Index)*

June 1966: Two 70-ton diesel-electric locomotives were transferred from Nevada to operate as switchers at the new precipitation plant at Copperton. *(Kennecott Historical Index)*

September 1966: New Bonneville crusher was placed into partial operation. *(Kennescope, September/October 1966)*

November 22, 1971: Town of Bingham "ceases to exist". *(Deseret News, March 26, 1985)*

May 1973: Fourteen diesel-electric locomotives are leased for service on waste trains. Eight from Union Pacific, four from Denver & Rio Grande Western, and two from ATSF. The lease ends upon arrival of the new high cabs in February 1977. *(Source??)*

January 4, 1977: A new 2300 hp diesel-electric, road number 905, received (EMD Model GP39-2, construction serial number 756151-1). *(Ore Haulage logbook)*

January 8, 1977: A new 1500 hp diesel-electric, road number 906, received (EMD Model MP15AC, construction serial number 756152-1). *(Ore Haulage logbook)*

January 21, 1977: RS-2 number 902 transferred to mine. *(Ore Haulage logbook)*

February 11, 1977: First of eleven (numbers 779-789) new 2,300 hp diesel-electric locomotives arrive. They were built with raised cabs to allow better visibility for the crews. *(Source??)*

Baldwin number 901 was transferred to the mine on April 20, 1977. *(Strack, 1983 research notes)*

June 6, 1978: Nevada RS-2 number 102 transferred to mine. *(Ore Haulage logbook)*

October 12, 1978: Nevada RS-2 number 108 transferred to mine. *(Ore Haulage logbook)*

November 17, 1978: First of second order of ten additional high cab GP39-2s arrive. (number 790-799) *(Source??)*

December 4, 1978: First road trip was made with SD40-2s. *(Ore Haulage logbook)*

December 20, 1978: Ore Haulage electrics, road numbers 401-407, sent to mine. *(Ore Haulage logbook)*

December 27, 1978: Three new 1500 hp diesel-electric locomotives, road numbers 120, 121, and 122, were received. They were built with special extended-width cabs (13 inches wider) and enter service as the dumper locomotives within a week; first shift was on January 3, 1979. *(COMMENT: EMD Model MP15AC, construction serial numbers 776128-1 to 3).*

1979: The production for 1979 could be the best since 1974. *(Deseret News, May 2, 1978, p. E7)*

1979: Kennecott Copper Corporation changes name to Kennecott Corporation and organizes Kennecott Minerals Company for its mining operations. *(Source??)*

January 12, 1979: Electric power was cut off to the Ore Haulage catenary; dumpers and road trains are completely dieselized. *(Ore haulage logbook)*

September 1979: Wasatch Electric completed removal of the overhead catenary on the Copperton low line. The project had been started in March. *(Interview with Bruce Morrison, 1979)*

1979: 38 million tons of ore mined in 1979 by Utah Copper Division of Kennecott Copper Corporation. 160 million tons of overburden removed. 12 pounds of copper per ton of ore. 206,000 tons of copper produced; 120,000 tons of copper produced in 1978. New smelter went on line in 1977-1978. *(Salt Lake Tribune, March 2, 1980)*

May 6, 1980: Kennecott Copper Corporation changed name to Kennecott Corporation at its 65th annual stockholder's meeting. *(Deseret News, May 7, 1980, p. B1; Salt Lake Tribune, May 7, 1980, p. B7)*

July 1, 1980: Operations shut down due to strike. *(Ore Haulage logbook)*

September 1980: Work began on the North Ore Shoot Extension, mining ore for the production of copper, gold, silver, and molybdenum. A study completed in 1980 projected that the Bingham Mine would have to convert partially to underground operations and build new concentrators. *(Salt Lake Tribune, March 18, 1981, p. C7)*

September 9, 1980: Strike over, operations start up. *(Ore Haulage logbook)*

September 10, 1980: 71-day, 10-week strike ends; workers return for morning shift. Strike began on July 1, 1980; 40,000 workers from 11 companies in 9 states; Kennecott was the largest company. Other strikes: 8 months in 1967; 29 days in 1971; 6 days in 1974; 19 days in 1977. *(Deseret News, September 10, 1980, p. B8; Salt Lake Tribune, September 10, 1980, p. B1)*

October 14, 1980: The first units of the third order of seven high cab GP39-2 locomotives arrive at Dry Fork shops. *(COMMENT: Road numbers 705-711) (Interview with Mike Minor, 1983)*

November 1980: Kennecott is nation's largest copper producer. *(Deseret News, November 11, 1980, p. A6)*

November 1980: Kennecott to use headframe to mine North Ore Shoot. *(Salt Lake Tribune, November 19, 1980, p. C7)*

December 1980: Kennecott Corporation to form a partnership with Mitsubishi for Chino Mines Division. Mitsubishi to acquire a one-third interest in Chino. Chino produced 62,000 tons of copper in 1979, compared to Utah Copper Division production of 206,000 tons of copper in same year. *(Salt Lake Tribune, December 23, 1980, p. C6)* Mitsubishi's one-third interest in Chino is $116 million, to pay for modernization. One-third of copper production to go to Mitsubishi. No change in name, all 1,800 employees will remain as Kennecott Minerals Company. *(Salt Lake Tribune, March 3, 1981, p. B6)* Agreement giving Mitsubishi one-third interest in Chino was signed on March 2, 1981. *(Deseret News, March 2, 1981, p. D7)*

January 8, 1981: Kennecott formally withdrew its bid to buy 49 percent of Curtis-Wright. *(Salt Lake Tribune, January 9, 1981, p. B7)*

June 4, 1981: Standard Oil Company of Ohio (SOHIO) bought Kennecott Minerals Company (KMC); British Petroleum (BP) owns 53 percent of SOHIO; British government owns 25 percent of BP, Bank of England owns 20 percent. *(Salt Lake Tribune, September 24, 1981, p. B1)* SOHIO paid $62.00 per share. *(Salt Lake Tribune, September 20, 1981, p. D10)* $1.77 billion takeover of Kennecott by SOHIO. *(Salt Lake Tribune, March 27, 1981, p. C2)* SOHIO made announcement of takeover on Thursday March 12, 1981. *(Salt Lake Tribune, March 15, 1981, p. D12)* Merger of SOHIO and Kennecott first proposed on March 18, 1981, when a notice was filed with the Anti-Trust Division of the U.S. Justice Department. *(Salt Lake Tribune, March 26, 1981, p. G11)* SOHIO traded 25 percent of itself for BP's Alaska North Slope holdings in 1969. By 1980 BP had purchased 53 percent interest in SOHIO. *(Salt Lake Tribune, March 17, 1981, p. D3)* SOHIO was largest producer of crude oil in United States, at 9 percent of all U.S. production - more than half of the Alaska North Slope. Kennecott shareholders voted on May 5, 1981. *(Salt Lake Tribune, May 2, 1981, p. C5)* Kennecott shareholders approve sale. Sale not final until Federal Trade Commission reviews proposed merger. *(Salt Lake Tribune, May 6, 1981, p. C10)* Federal Trade Commission approved merger of SOHIO and Kennecott on June 2, 1981. *(Salt Lake Tribune, June 3, 1981, p. C10)* SOHIO formally acquired Kennecott on June 4, 1981, after approval by Kennecott shareholders. *(Salt Lake Tribune, July 31, 1981, p. B11)*

October 1981: Modernization of ore haulage and pit crusher planned, along with a new concentrator site. New smelter began operations in spring 1978. *(Salt Lake Tribune, October 30, 1981, p. B1)*

December 1981: Visitor Center at Bingham Mine closed, to be replaced by a new one, to be built later. Bingham Mine has been listed as a National Historic Site since 1972. *(Salt Lake Tribune, May 27, 1981, p. D3)*

1981: Production for the Bingham Mine, at 223,123 tons of copper, is 60 percent of all Kennecott Copper's 1981 production of 372,213 tons of copper. *(Salt Lake Tribune, April 6, 1982, p. B8)*

February 9, 1982: Smelter GP39-2s number 1 and 2 arrive. *(Ore Haulage logbook)*

July 1, 1982: 910 employees laid off. Lay-offs began on February 12, 1982, with a total so far of 2,000 employees laid off. *(Deseret News, July 1, 1982, p. B1)*

fall 1982: Truck haulage replaces rail haulage from 5440-Level (one level below 5490-Tunnel) down to the 5190-Level. *(Source??)*

December 1982: Four 1500 hp locomotives arrive (numbers 714-717), for service as switchers, to replace retired electrics. *(Source??)*

1982: Due to a glut in the copper market, Kennecott has had a $48 million loss during this first quarter. Kennecott began 1982 with 7,300 workers. Ray Mines Division was shut down on May 2, 1982, and was cut to just care and maintenance on August 15, 1982. *(Salt Lake Tribune, July 1, 1982, p. A1)*

September 1982: Copper selling in range of 55 cents per pound in recent months, compared to $1.80 per pound in February 1980. *(Deseret News, September 1982, p. B1)*

1983: Kennecott Minerals Company became Kennecott, (an operating company of SOHIO) *(Source??)*

In 1983, the entire mine was converted to shovel and truck mining. Rail haulage was used for reload only, at the 6040, 5840, and 5490-Tunnel levels. The last rail and shovel mining took place between the 5540 and 5990 levels. Prior to the end of 1983 there were 42 truck haulage levels, 36 above the 5990-Level and 6 below the 5490-Level. The 11 rail haulage levels were between the 5490-Level and the 6040-Level. By this time there was very little ore left above the 6040-Level and all operations were concerned with removal of waste to allow ore mining in the lower levels. *(Strack, 1983 research notes)*

Kennecott closed its 17.5 Mw coal-fired generating station because of financial losses. In the meantime, Kennecott could purchase power from Utah Power and Light at a reduced rate. The generating station's 100 employees remained working for maintenance purposes. *(Coal Age, Volume, number 6, June 1983, p. 33, "Coal in Brief, Plant Closed")*

August 1983: Kennecott's $400 million modernization program depends on proposed property breaks by Utah State Legislature. *(Deseret News, August 30, 1983, p. B1)*

The last waste train was operated on September 19, 1983. *(Strack, 1983 research notes)*

September 19, 1983: Switcher number 704 was transferred to Ore Haulage. Renumbered to 123 on 13 January 1984. *(from Kennecott records at Dry Fork shops and at Magna engine house)*

In November 1983, two pit high cab locomotives (number 784 and 786) were transferred to Ore Haulage (as number 910 and 911) *(Strack, 1983 research notes)*

July 1, 1984: Kennecott laid off 1,795 workers on July 1, 1984. *(Deseret News, July 13, 1984, p. B1)* 2,000 workers (two-thirds of workforce) were laid off. *(Deseret News, March 26, 1985)*

July 1, 1984: Ore Haulage Department was shut down and the organization was dissolved. Ore trains will be operated by the mine crews. *(Ore haulage logbook)*

On September 4, 1984, former Ore Haulage crews transferred to the mine began the operation of ore trains to Bonneville crusher, using mine locomotives. Trains are moving 35,000 tons per day, using 400 ore cars. *(Strack, 1984 research notes)*

During October 1984, it took about 1,200 to 1,400 cars of copper ore to produce about 20 cars of concentrate for the smelter. Kennecott's Chino operation was sending about 10 cars of concentrate per day to the Utah smelter. *(Strack, 1984 research notes)*

January 1985: Utah legislature exempted Kennecott from paying sales tax on purchases of machinery to replace old equipment and equipment needed to expand operations. *(Deseret News, March 26, 1985)*

January 6, 1985: Kennecott laid off 100 more workers, leaving just 2,200 workers remaining of a peak in 1980 of 7,300. *(Salt Lake Tribune, January 1, 1985, p. C7)*

April 30, 1985: Bingham Canyon Mine operations are shut down. *(Source??)*

August 1985: Magna, Arthur, and Bonneville Mill operations are shut down. *(Source??)*

February 1986: Actual construction and site preparation begins on new $400 million modernization program. *(Deseret News, August 2, 1988, p. D7)*

September 1986: Bingham Canyon Mine resumes operations. *(Source??)*

January 1987: Bonneville crusher and Magna concentrators resume operations. *(Source??)*

July 1987: Smelter turns out first cathode of Utah copper, after reopening of mine. *(Source??)*

1988: British Petroleum, parent company of BP Minerals America (owner of Bingham Mine), is 21.68 percent owned by the government of Kuwait. They bought the interest after the October 1987 world wide stock market crash, at the urging of the British government. The British had just offered the stock of BP to the open market and the crash was causing it to lose value. *(Wall Street Journal, August 10, 1988, p. 13)*

September 23, 1988: New $400 million modernization completed, and six-inch ribbon of copper is cut in formal ceremony. Bingham Mine of Kennecott Utah Copper is owned by BP Minerals America. Ore is dumped into a primary crusher in bottom of pit, passed out of the pit by way of an new conveyor belt running through the old 5490 railroad tunnel, to the new Copperton crusher, crushed to a fine powder, added to water and sent via a new six-inch, 17-mile pipeline to the Garfield smelter. *(Deseret News, September 23, 1988, p. D7)*

June 1989: World-wide mineral interests of British Petroleum sold to RTZ Corporation (including BP Minerals America's Kennecott Utah Copper) for $4.4 billion. The name of BP Minerals America, Kennecott Utah Copper was changed to Kennecott Corporation on or about July 5, 1989. *(Salt Lake Tribune, July 6, 1989, p. C1)* Negotiations for sale first announced in late December 1988. *(Salt Lake Tribune, December 24, 1988, p. B3; Deseret News, January 3, 1989, p. A1) (RESEARCH: Get exact date of sale, and exact date of name change.)*

March 1992: Kennecott Copper now a unit of RTZ Corporation (England). It is reported that a new smelter will be built with a completion set for 1995. At present, 40 percent of the mine's output is exported for processing. The new smelter will change the amount shipped out for processing. *(Locomotive Notes II, Issue 160 [July 1992, published late April 1992], p. 4, see also Wall Street Journal, 12 March 1992)*

Appendix A

Minutes of the First Mining Company

(from Our Pioneer Heritage, Vol. 7, pp. 81-83)

At a meeting of the quartz miners of West Mountain Quartz Mining District held at Jordan Ward House, Salt Lake Valley, on September 17, 1863, the following bylaws were passed:

Article No. I. This District shall include that portion of territory situated in the Territory of Utah and bounded as follows: Commencing at the confluence of the River Jordan with Great Salt Lake and running thence in southerly direction along the east bank of said River Jordan to its point of exit from Utah Lake and running thence along the west margin of said Lake Utah to the 40th degree of north latitude (Greenwich) to the 114th degree of longitude (Greenwich) thence along said 114th degree of west longitude to the 41st degree [p.82] of north latitude to Great Salt Lake, thence along the margin of said lake in a south-easterly direction to the place of beginning.

Article No. 2. The extent of a claim on any quartz lead or vein shall be two hundred feet to the claims with all its dips, angles and variations.

Article No. 3. No person shall be permitted to hold more than one claim by location on any one vein—by purchase can hold any number of shares.

Article No. 4. All claims located must have a notice posted upon them stating the number of shares, the probable course claimed and also recorded in the books of the district recorder within ten days.

Article No. 5. Each company must do one faithful day's work on their claims each month after the first day of April, 1864. A failure to do so the claims will be jumpable, provided, however, that if the company is prevented by local insurrection or rebellion from working, a failure to do so will not forfeit their claim.

Article No. 6. The discoverer of a vein of quartz containing gold, silver, copper, or other valuable metals or minerals, will be entitled to locate two shares.

Article No. 7. There shall be a district recorder elected from among the miners of the district, whose duty it shall be to record all claims presented for the purpose, giving the name of each location or owner, and receive as compensation a sum not exceeding one dollar per location or owner. His term of office shall be one year, or until his successor is chosen.

Article No. 8. These laws will apply to locations of claims on veins of coal, iron, or other metals or minerals in this district.

Archibald Gardner was elected District Recorder of West Mountain District for one year from the date above written.

Archibald Gardner, President
G. W. Carleton, Secretary

The undersigned members of the Jordan Silver Mining Company, claim for mining purposes, one share of two hundred feet each and one additional claim of two hundred feet for the original discoverer, George B. Ogilvie, on this lead of mineral ore with all its dips, spurs and angles beginning at the stake situated one hundred feet northeast of Gardner's shanty in Bingham Kanyon in West Mountain and running five thousand two hundred feet in a westerly direction along the side of said mountain on a line with Bingham Kanyon and intend to work the same according to the mining laws of this mining district:

Archibald Gardner	1 share	M.G. Lewis	1 share
George B. Ogilvie	2	Alex Bexted (Beckstead)	1
Alex Ogilvie	1	James Timothy	1
P. E. Connor	1	Sam'l Egbert	1
R. C. Drum	1	G.W. Carleton	1
Wm. Hickman	1	Nell Anderson	1
Robert K. Reid	1	Edwd. McCarry	1
John Harcastle	1	M.J. Jenkins	1
C. J. Sprague	1	H.O. Pratt	1
Thomas Bexted (Beckstead)	1	Robert Pollock	1
James Brineget	1	Daniel McLean	1
Henry Bexted (Beckstead)	1	N.B. Eldredge	1
Hugh O'Donnell	1		

Appendix B

Letter from General Patrick Conner to all troops at Fort Douglas:

HEADQUARTERS, DISTRICT OF UTAH,
GREAT SALT LAKE CITY, U. T. November, 14, 1863,

Colonel:

The General commanding the district has the strongest evidence that the mountains and canyons in the Territory of Utah abound in rich veins of gold, silver, copper and other minerals, and for the purpose of opening up the country to a new, hardy, and industrious population, deems it important that prospecting for minerals should not only be untrammelled and unrestricted, but fostered by every proper means. In order that such discoveries may be early and reliably made, the General announces that miners and prospecting parties will receive the fullest protection from the military forces in this district, in the pursuit of their avocations; provided, always, that private rights are not infringed upon. The mountains and their now hidden mineral wealth, are the sole property of the nation, whose beneficent policy has ever been to extend the broadest privileges to her citizens, and, with open hand, invite all to seek, prospect and possess the wonderful riches of her wide-spread domain.

To the end that this policy may be fully carried out in Utah, the General commanding assures the industrious and enterprising who may come hither, of efficient protection, accorded as it is by the laws and policy of the nation, and enforced, when necessary, by the military arm of the Government.

The General in thus setting forth the spirit of our free institutions for the information of commanders of posts within the district, also directs that every proper facility be extended to miners and others in developing the country; and that soldiers of the several posts be allowed to prospect for mines, when such course shall not interfere with the due and proper performance of their military duties.

Commanders of posts, companies and detachments within the district are enjoined to execute to the fullest extent the spirit and letter of this circular communication, and report, from time to time, to these head-quarters the progress made in the development of the Territory, in the vicinity of their respective posts or stations.

By command of Brig.-Gen. Connor:
CHAS. H. HEMPSTEAD,
Capt. C. S. and A. A. A. Gen'l.

Letter from General Patrick Conner to the War Department in Washington, D.C.:

HEADQUARTERS DISTRICT OF UTAH,
CAMP DOUGLAS, UTAH TERRITORY,
Near Great Salt Lake City, July 21st, 1864.

Colonel:

Having had occasion recently to communicate with you by telegraph on the subject of the difficulties which have considerably excited the Mormon community for the past ten days, it is perhaps proper that I should report more fully by letter relative to the real causes which have rendered collision possible.

As set forth in former communications, my policy in this Territory has been to invite hither a large Gentile and loyal population, sufficient by peaceful means and through the ballot-box to overwhelm the Mormons by mere force of numbers, and thus wrest from the Church—disloyal and traitorous to the core—the absolute and tyrannical control of temporal and civil affairs, or at least a population numerous enough to put a check on the Mormon authorities, and give countenance to those who are striving to loosen the bonds with which they have been so long oppressed. With this view, I have bent every energy and means of which I was possessed, both personal and official, towards the discovery and development of the mining resources of the Territory, using without stint the soldiers of my command, whenever and wherever it could be done without detriment to the public service. These exertions have, in a remarkably short period, been productive of the happiest results and more than commensurate with my anticipations. Mines of undoubted richness have been discovered, their fame is spreading east and west, voyageurs for other mining countries have been induced by the discoveries already made to tarry here, and the number of miners of the Territory are steadily and rapidly increasing. With them, and to supply their wants, merchants and traders are flocking into Great Salt Lake City, which by its activity, increased number of Gentile stores and workshops, and the appearance of its thronged and busy streets, presents a most remarkable contrast to the Salt Lake of one year ago. Despite the counsel, threats, and obstacles of the Church, the movement is going on with giant strides.

This policy on my part, if not at first understood, is now fully appreciated in its startling effect, by Brigham Young and his coterie. His every effort, covert and open, having proved unequal to the task of checking the transformation so rapidly going on in what he regards as his own exclusive domain, he and his Apostles have grown desperate. No stone is left unturned by them to rouse the people to resistance against the policy, even if it should provoke hostility against a government he hates and daily reviles. It is unquestionably his desire to provoke me into some act savoring of persecution, or by the dexterous use of which he can induce his deluded followers into an outbreak, which would deter miners and others from coming to the Territory. Hence he and his chief men make their

tabernacles and places of worship resound each Sabbath with the most outrageous abuse of all that pertains to the Government and the Union—hence do their prayers ascend loudly from the housetops for a continuance of the war till the hated Union shall be sunk—hence the persistent attempt to depreciate the national currency and institute a "gold basis" in preference to "Lincoln skins," as treasury notes are denominated in Sabbath day harangues. *(Whitney adds here that General Connor was evidently laboring under the impression that he was still in California. The people of the Golden State repudiated at first the Government "greenbacks," but Utah and her citizens never did.)*

Hence it was that the establishment of a provost guard in the city was made the pretext for rousing the Mormon people to excitement and armed assembling, by the most ridiculous stories of persecution and outrage on their rights, while the fanatical spirit of the people, and the inborn hatred of our institutions and Government were effectually appealed to, to promote discord and provoke trouble. I am fully satisfied that nothing but the firmness and determination with which their demonstrations were met, at every point, prevented a collision, and the least appearance of vacillation on my part would surely have precipitated a conflict. I feel that it is not presumptuous in me to say that in view of what has already been accomplished in Utah, that the work marked out can and will be effectually and thoroughly consummated if the policy indicated be pursued and I am sustained in my measures at department headquarters. I am fully impressed with the opinion that peace is essential to the solving of the problem, but at the same time conscious that peace can only be maintained by the presence of force and a fixed determination to crush out at once any interference with the rights of the Government by persons of high or low degree. While the exercise of prudence in inaugurating measures is essential to success, it should not be forgotten that the display of power and the exhibition of reliance on oneself have the most salutary restraining effect on men of weak minds and criminal intent. Deeply as Brigham Young hates our Government, malignant and traitorous as are his designs against it, inimical as he is against the policy here progressing of opening the mines to a Gentile populace, and desperate as he is in his fast-waning fortunes, he will pause ere he inaugurates a strife, so long as the military forces in the Territory are sufficiently numerous to hold him and his deluded followers in check. The situation of affairs in Utah is clear to my own mind, and, without presumption, I have no fear for the result, if sustained by the department commander as indicated in this and former communications. Desirous as I am of conforming strictly to the wishes and judgment of the Major-General commanding the department, and having thus fully set forth my views and the facts bearing on the case, I beg leave respectfully to ask from the department commander an expression of opinion as to the policy of the course pursued, and such suggestions or instructions as he may deem proper, as a guide in the future.

Very respectfully, your obedient servant,
P. EDW. CONNOR,
Brig.-Genl U. S. Vol. Commanding District.

Appendix C

Smelters and stamp mills in Utah in 1873

(from Daughters of Utah Pioneers, Our Pioneer Heritage, Vol. 17, pp. 35-37, citing Salt Lake Herald, April 21, 1873, which itself cited the Mining Journal)

Smelters operating in 1873		
Alger Reduction Works	Corinne	built in 1871; Henry Sanger, proprietor.
Badger State Works	On State Road, south of Salt Lake City	built in the spring of 1871; one blast; capacity fifteen tons per day; ores treated from Little Cottonwood, Parley's Park and Bingham canyon; Robins, Mackinson & Jones, Lessees.
Flagstaff Silver Mining Company, Ltd.	mouth of Little Cottonwood Canyon	incorporated in London, capital $300,000; built by Buel & Batemen in [p.36] 1870; working Flagstaff ore. Three furnaces; two running; the third expected to start soon. The latter is a hot-blast furnace, and of equal capacity with the other two.
Gilbertson & Berry's	Deep Creek	built 1872; one furnace; thirty tons bullion sent to Salt Lake City averaged $93 silver per ton.
Monitor Furnace	Union Fort mouth of Little Cottonwood	built in 1871; T. R. Scheuner, proprietor; patent force blast smelting furnace, capacity 10 to 15 tons per day.
Ophir Mining and Smelting Works	East Canyon	incorporated in Utah; one furnace completed July 4th, 1871; one building; capacity fifteen to twenty tons per day.
Ophir Upper Smelting Works	East Canyon	built by Mr. Raymond in the fall of 1870; two cupola blast, capacity twenty-five tons per day.
Register Smelting and Refining Co.	Ogden	one furnace; built in fall of 1871.
Saturn Mining Company, (Limited)	Sandy Station, on U.S.R.	fifteen miles south of Salt Lake City; incorporated in England; capital $175,000; has three cupola blast furnaces, six feet Sturtevant blower, No. 9; thirty horse-power engine; capacity twenty tons per day each furnace; two in constant operation; engine and furnaces under one roof; cost of furnaces and buildings $20,000.
Sultana Smelting Works	American Fork Canyon	three furnaces, capacity eighty-five tons per day—Two of thirty tons and one of twenty-

		five tons, two built in 1871.
Tintic Smelting Company	Diamond City	completed, October 1871; built by Hopkins, Parsons & Co., two furnaces; capacity, twenty tons per day.
Utah Mining and Smelting Company	East Canyon	incorporated in London, England; capital stock $500,000; steam jet furnace, completed June, 1872; capacity fifteen tons.
Utah Silver Mining Company, (Limited,)	Bingham Canyon	incorporated in London; two furnaces, one of the capacity of 15 tons per day, the other 30 tons per day and two roasters each 35 feet long.
Utah Smelting and Milling Company	Homansville, Tintic	incorporated in Utah; capital $30,000; completed June 1871; two furnaces; capacity twenty tons per day each.
W. & M. Robins' Smelting Works	On State road	seven and a half miles south of Salt Lake, at Little Cottonwood Creek, completed May, 1871; has one calciner: capacity fifty tons per day for high grade ores; also one reverberatory.
Wahsatch Silver-Lead Works	Situated at South Cottonwood	seven miles from Salt Lake City, on Utah Southern R.R. One reverberatory, two blast. Capacity 50 tons per day. Built last year. Commenced operations this winter.
Warm Springs Smelting Works	Salt Lake City	built in 1870; one blast and reverberatory; capacity twenty tons per day.
Waterman Smelting Works	Stockton	two cupolas and blast, capacity 14 tons each per day, completed May, 1871.
Wellington Mining & Smelting Company	Little Cottonwood	one furnace, capacity eight tons per day; built by Jones & Pardee, sold to Wellington Co., incorporated in San Francisco, January, 1872.
Winamuck Company	Bingham Canyon	two furnaces, capacity eight tons per day each; erected by a company from New Haven, Connecticut; Daggett and Bristol, Superintendents.

Stamp Mills operating in 1873	
Brevort Mill	East Canyon; steam battery; capacity ten to twelve tons per day, custom ore.
Camp Floyd Silver Mining Co., Ltd	Incorporated in London, England, capital, L120,000; twenty stamp mill, thirty tons per day capacity; power and machinery for thirty stamps; a forty ton Aiken roasting furnace.
Chicago Company Mill	Ohio District, near Sevier River; steam battery, capacity six to eight tons per day.
Eureka Mining Company of Utah	Homansville, Tintic District; incorporated in Utah, Capital $500,000; twelve stamp, capacity twenty-four tons per day.
Pioneer Mill	Walker Bros., East Canyon, fifteen stamps, power for twenty-five;

	capacity, twenty-five tons per day, dry crushing; erected July, 1871.
Wyoming Silver Mining Company, of Cincinnati, Ohio	Homansville, East Tintic; 10 stamps with arrangements for 15 additional stamps; furnished with a Stedtefeldt furnace, said to be the first one erected in the territory; capacity of 40 tons per day.

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