

ROOTS OF THE CALUMET AND ARIZONA

A Short History of the Calumet and Arizona Company

Part II

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FORMATION OF THE CALUMET & ARIZONA MINING COMPANY

The property at this point had reached a state of progress where the original developers had envisioned the sale to an operating company. For this purpose, they formed the CALUMET & ARIZONA MINING COMPANY, naming it after their immediate area and the area of interest. It was formed with an initial capital stock authorization of \$2,500,000 with initial shares at a par value of \$10.00 each. The first 100,000 shares, were traded for the outstanding stock of the Lake Superior & Western Development Company. An additional 100,000 shares were sold for cash subscriptions at par value and 50,000 shares were retained to acquire additional properties of merit as opportunities arose. (see figure 12).

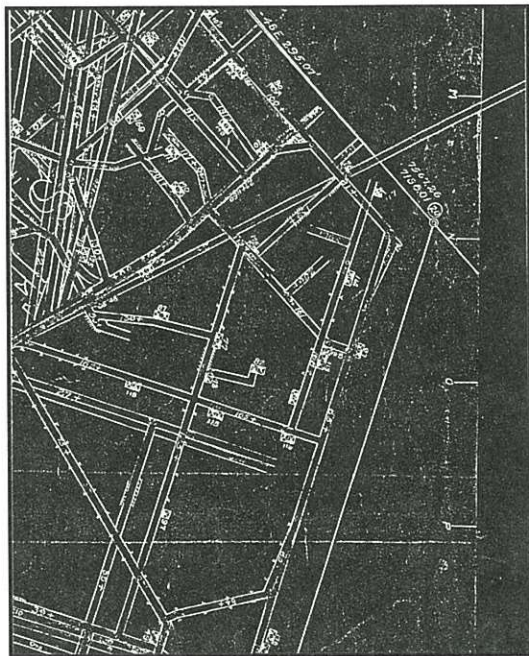


Figure 12. C&A Irish Mag Comp., 1916³⁷

This reproduction was taken from the 1916 Tax

Map of the Calumet & Arizona and shows a portion of the composite map from the Irish Mag Shaft drawn at a scale of one inch equal to fifty feet. The mine was mapped at this scale to allow accurate mapping of not only the workings on the levels, but also the workings for every floor at each eight and half feet of elevation between the 100 foot levels. The C&A mapped not only the workings but also the geology and assays on each level and each floor. It was this precise mapping that allowed them to maintain the close control that was needed to find and develop ore in the district. The originals of these maps were done on starched linen with colored inks.

Note also that the C&A defined the claim corners with a circular symbol which is referenced with a numeric value and north-south coordinates calculated to the nearest hundredth of a foot. This type of precision kept the C&A from mining into Copper Queen ground. The long crosscut leaving the Mag sideline was the result of cooperation between the two companies to share drainage, ventilation and access.

At this time the company controlled 150 acres of mineral lands and 480 acres of additional land. Seventy five men were working two shifts and the working shaft was down 1,256 feet on December 31, 1901.

Raising \$1,000,000 in Michigan in 1901 seemed formidable despite the encouraging ore reserves. A copper mine of this magnitude had not been floated for several years without support from the markets in Massachusetts. These markets controlled most of the American copper production. In March 1901, Briggs, Hoatson, Cole, Tener and d'Autremont went to Bisbee to reaffirm their faith in the venture. Thomas F. Cole examined the mine.

After reviewing the rich ore that was being developed Cole and the others wired their brokers in Michigan and Duluth to purchase all of the stock they could afford. They also encouraged their friends, relatives

and acquaintances to do the same. As a result of their enthusiasm, a large portion of the stock in the new company was acquired by wage earners in the Michigan copper and iron mines. This initial offering was over subscribed in its first day. The stock entered the market at a 200% premium over par.

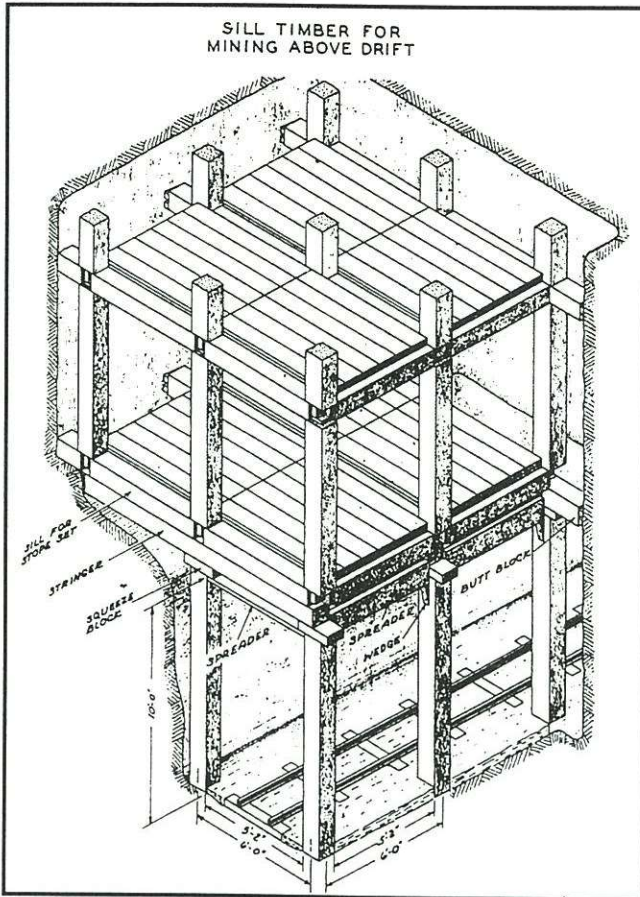


Figure 13. Sill Timber, 1968³⁸

Illustrated here is a typical design for a square set stope for the Copper Queen Branch of Phelps Dodge Corporation. It has changed little since the Calumet & Arizona brought it into the camp in the early 1900's.

In next year these funds would be spent to add production facilities to the mine in Bisbee and to build a 300 ton-per-day copper smelter in Douglas, Arizona. Douglas was 25 miles from the mine, but it was a more favorable site for the smelting facility. There was abundant water and the site was near the Copper Queen Smelter and close to the Copper Queen's El Paso and Southwestern

Railroad. The Copper Queen smelter had already set a precedent for smelter operations in the area.

In the Directors' Report for March 1st to December 31, 1902²⁵ Charles Briggs, president of the company, proudly stated that the first furnace at the Douglas Reduction Works was blown in November 15th, 1902. Production from then until the 31st of December was 2,066,647 pounds of copper, with gold and silver averaging \$8.00 per ton. By the end of 1903 assets of the C&A had grown to \$1,758,613 and \$400,000 was paid in dividends.²⁶ A view of Bisbee's Main Street in 1904 (Figure 3) shows the prosperity brought on by the C&A, the Copper Queen, and several other active companies in the district.

COPPER QUEEN FRIENDSHIP

A competitive friendship existed between the Copper Queen and the C&A from the very beginning. This was demonstrated by C&A's announcement that they had contracted with Phelps Dodge & Co. to sell the C&A copper. Further, they had contracted with the Copper Queen's El Paso and Southwestern Railroad for shipping of their ores to Douglas and then shipping their anodes from Douglas to the port of Galveston, Texas. From Galveston, the anodes were shipped to the Nichols Chemical Company of New York where they were electrolytically refined. As a further demonstration of cooperation, Douglas refused to apply the law of apex and instead arranged for a vertical sideline agreement between the two companies.

Without the cooperation of the Copper Queen, C&A may not have been successful with it, C&A was extremely successful. Over the 30-year life of the C&A the original investors received over \$164.00 in dividends for their initial \$10 per share investment price. In the merger of 1932, every shareholder of the C&A received seven shares

of Phelps Dodge Corporation stock for every three shares of C&A and a cash bonus.



Figure 14. C&A Certificate, 1923

This is a photo copy of a Calumet and Arizona Mining Company stock certificate of March 29, 1923. It was issued to Tucker, Bartholomew & Co. for six shares of Capital Stock. Note that by this time the company was registered under the laws of the state of Arizona.

COUSIN JACK TECHNOLOGY

C&A's real contribution to mining in Bisbee, However, was the great advance in technology that the Cousin Jacks and their experienced management team brought with them. This contribution included their detailed geological mapping techniques, ingenious methods of timbering, advanced engineering and equipment that had been perfected in Michigan's copper and iron country.

One of C&A's first priorities was to establish a detailed system of geological mapping. This included preparing an accurate base map of all the claim boundaries at a scale that would be easy to read and maintain. This turned out to be one inch equal to 50 feet (See Figure 12). The Copper Queen was mapped at a scale of one inch equals 200 feet (See Figure 11), which was inadequate for accurate mapping.

These base maps were duplicated for each level in the shaft and for each elevation of eight and one half feet above the levels. Most of the levels in the district were

established at 100-foot intervals. Workings and geology as they were developed in the mine were carefully plotted on each level and floor map. Assays from samples showing the copper values were added to these maps by the engineers and geologists. The Copper Queen quickly copied these practices.

The Spray Shaft was one of the Copper Queen's most modern shafts, yet its usefulness was limited by a hoist (See Figure 2) that did not allow continued sinking of the shaft.

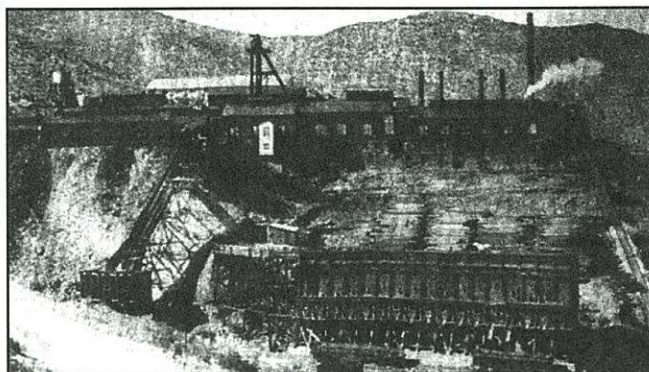


Figure 15. C&A's Irish Mag, 1912, Pay Dirt

The Irish Mag and surface works. This was the property that turned Calumet & Arizona Mining Company into a major copper producer. The C&A used some of the income from this mine to locate and acquire thousands of acres of claims in the Warren Mining District and cut off the Copper Queen from entering the south end of the district.³⁹

Both the Copper Queen and the C&A were using mule haulage in the first few years of the century (See Figure 4&5). The C&A, however, brought in electric haulage from Michigan's copper country as soon as possible (See Figure 6). This system was promptly copied by the Copper Queen.

As soon as money was available from the operation of the Irish Mag, the C&A started forming other exploration and development companies. Among these was the Junction Development Company (See Figure 7), Calumet and Pittsburg Mining, Lake

Superior and Pittsburg, Pittsburg and Duluth and the Superior & Pittsburg Copper Company.

As soon as these companies had developed ore reserves they were merged into the C&A and the C&A was reorganized to purchase and accommodate the new property. This was normally accomplished by issuing shares of C&A stock for the new company.

Beginning in Cornwall, the Cousin Jacks had developed extensive dewatering pumps to remove water from the underground workings. In the Warren Mining District, the C&A quickly developed a major pumping system for the district in the Junction Shaft (See Figure 8). In this effort, they drained not only their own workings, but also the workings of the Copper Queen, Shattuck and Denn mines.

Also from the Cornish experience, the C&A brought in extensive air moving equipment to provide ventilation to their lower workings. The fan shown in Figure 9 is typical of the ventilation equipment used in Bisbee during this period.

Cousin Jacks claimed to be the developers of square set mining (See Figures 10 and 13). The first use of this method of supporting heavy ground was in Nevada's Comstock in 1860. This method was adapted, perfected and modified to accommodate the heavy sulfide ground in Bisbee. Although it is a very slow and expensive method of mining, it insures safe and accurate extraction of the ore with little dilution. This is desirable with very high grade ores.²⁷

The C&A was also a pioneer in providing for its employees. Very early in its history, the C&A set up hospitalization and medical care for its employees. This practice was started by the Copper Queen and soon turned into competition between the two companies to provide good medical services for their employees and their families. Although Bisbee was a remote western mining town, it provided some of the best hospitals available

in the Arizona Territory.

Safety was always a goal of the C&A as well as the Copper Queen. Both companies developed strong safety programs at very early stages in their development. The Copper Queen authored and printed extensive instruction manuals for miners and mine workers. Today these manuals are highly prized as collectors items.

The C&A also provided its employees with housing and recreational opportunities. In 1903 they formed the Warren Company and started building the Warren Townsite. To provide transportation throughout the district the Warren Company also built the trolley car system.

CONCLUSION

At the end of 1904, the C&A was well on its way to becoming a major copper producer. In the first decades of the 20th century it became an aggressive and interesting company. It had a serious scrape with organized labor and played a major role in the Deportation of the IWW (Wobblies) in 1917. In the depth of the great depression of the 1930's it contributed it's assets to the survival of Phelps Dodge Corporation through a merger of assets, technologies and management.

While the C&A was being organized over a bar in Red Jacket Michigan, John C. Greenway, a 1895 Yale athlete was set to lead a charge up Cuba's San Juan Hill for Teddy Roosevelt "Splendid Little War". In 1910, after joining the C&A he lead the company to charge into new mines in New Mexico, Ajo and other Arizona deposits with new technologies that he helped to develop in the Minnesota Iron Ranges. Greenway married late in life to the widow of a fellow Rough Rider. She became the first woman congressman from Arizona.

Always the soldier, Greenway served in World War I to gain the rank of Colonel and

was decorated with high honors. His name has been given to American Legion Posts and Arizona landmarks. His likeness is enshrined in the nations capital with Father Kino as representatives of the state of Arizona.

Many long faces in Michigan's copper country watched the investment they once scorned support many rich and famous lifestyles as the western copper rolled out and dividends rolled in.

C&A's positive effect on the Phelps Dodge's balance sheet was felt until the Ajo pit was shut down in the 1980's.

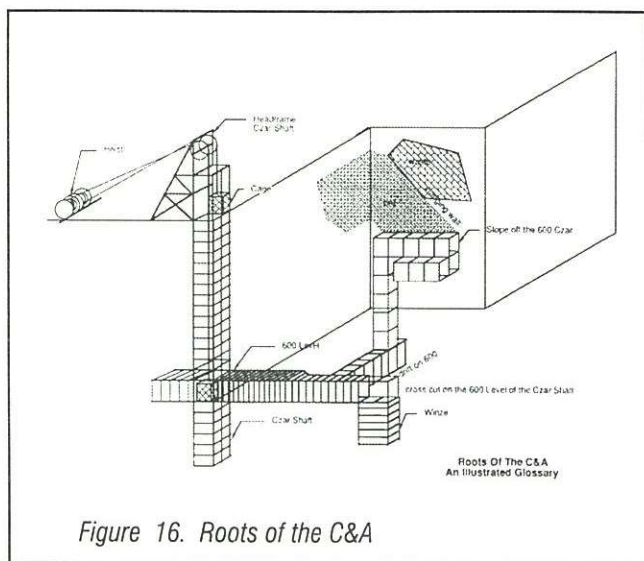


Figure 16. Roots of the C&A

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- 4) **Embrey, P. G. and R. F. Symes,** *Minerals of Cornwall and Devon,* British Museum London and the Mineralogical Record Inc., Tucson Arizona, 1987, p. 20.
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- 6) **Joralemon, Ira B.,** *Copper, The Encompassing Story of Mankind's First Metal,* Howell North Books, Berkeley, CA, 1973, pp. 133142
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- 10) **Joralemon,** 1973, p. 120125.
- 11) Ibid. p. 142, Joralemon originally accused Dr. Douglas in his earlier book, Romantic Copper, of turning down the United Verde Mine that later paid out \$100,000,000 to Senator William A. Clark of Montana. Joralemon made the referenced quote in a footnote in his chapter on Bisbee. He was one of the many top notch geologists who worked for the Calumet in both Bisbee and Ajo. The association was also a good one for Joralemon. The reputation that he gained for his work with this very successful company helped him find important work later.
- 12) **Coggin, H. Mason., Frank Murphy,** *An Arizona Gold Miner, History of Mining in Arizona, Vol II,* Ed. M. Canty & M. Greeley, Mining Club of the Southwest, Tucson, 1992, p. 109. Indicates that Senator Clark bought the Jerome property shortly after Douglas insult for a price between \$200,000 and \$250,000. This price may have been too steep for the conservative Douglas.
- 13) **Douglas 1912,** p.546 Douglas apparently did not remember Daly's first name in 1912. The name Jim was taken from Rock to Riches, (Dunning, H. Charles and Edward H. Peplow Jr. Southwest Publishing, Phoenix, AZ 1959) p. 104. Dunning did not cite a previous author and it is not likely that he knew Mr. Daly since they were not contemporaries. Many authors have used the spelling Daley.
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