"Don't Fail to Visit the Colorado Gold Mine": World's Columbian Exposition, Chicago, 1893

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In 1893, the World's Columbian Exposition was held in Chicago in Jackson Park along the shore of Lake Michigan. It was the greatest event of its time. Over 27 million people attended the fair to see the "wonders of today and the marvels of tomorrow," including the exhibits in the Mines and Mining Building.

This Exposition was the first world's fair at which mining was given a building of its own and placed on an equal footing with agriculture, manufacturing, and other industrial pursuits. In fact, the Mines and Mining Building occupied one of the best locations on the exposition grounds, in part because mining ranked third in value of production among the industries of the United States in 1893.

Every mining state, including Colorado, as well as foreign countries, had exhibits in the Mines and Mining Building. These exhibits included "minerals of every kind, ores, native metals, gems, and crystals; geological specimens; coal, coke, petroleum, natural gas, building stones, and quarry products; graphite, limestone, cement, and artificial stone; salts, sulphur, fertilizers, and mineral waters; the long catalogue of iron and steel, and of tin, and the new metal, aluminum; the extraction of gold, silver, and lead by various methods; mining machinery, tools and appliances; literature, models and reproductions."

Colorado was well represented in the Mines and Mining Building, as befit a state which in 1892 produced $5.5 million in gold and more than $30 million in silver, as well as sizeable amounts of base metals, coal, and other mineral resources. However, one of the most interesting Colorado mining exhibits was not located in the Mines and Mining Building.

It was located on the Midway Plaisance, a six hundred-foot wide by one mile-long strip of land that ran perpendicular to Lake Michigan, just south of the brand-new University of Chicago. The Colorado Gold Mine exhibit was a model illustrating the workings of the famous Saratoga Mine in Gilpin County. The exhibit was the brainchild of miner William Keast.

William Keast was born in Cornwall, England, in 1857. At about the age of twenty, he sailed to North America, where he spent short intervals in Quebec and Pennsylvania. He later made his way to the Rocky Mountains, where he settled in Central City, Gilpin County, Colorado. For the next thirteen years he worked as a gold miner, spending six and a half years in the Saratoga Mine.

He came to know every inch of the mine, as one of his jobs was to give tours to visitors and explain the workings of the mine. He realized that many of the visitors retained very little from the tour, mainly due to the strange surroundings of the mine and the nervousness they caused. This gave him the idea to construct a model of a gold mine to give the average person an idea of how an underground mine works without having to descend into a real mine. The Gold Mine exhibit, protected by patent and copyright, was displayed throughout the six-month run of the Columbian Exposition. Promotional cards distributed urged fair goers: "Don't Fail to Visit the Colorado Gold Mine, Midway Plaisance, World's Fair." Admission to the exhibit cost ten cents.

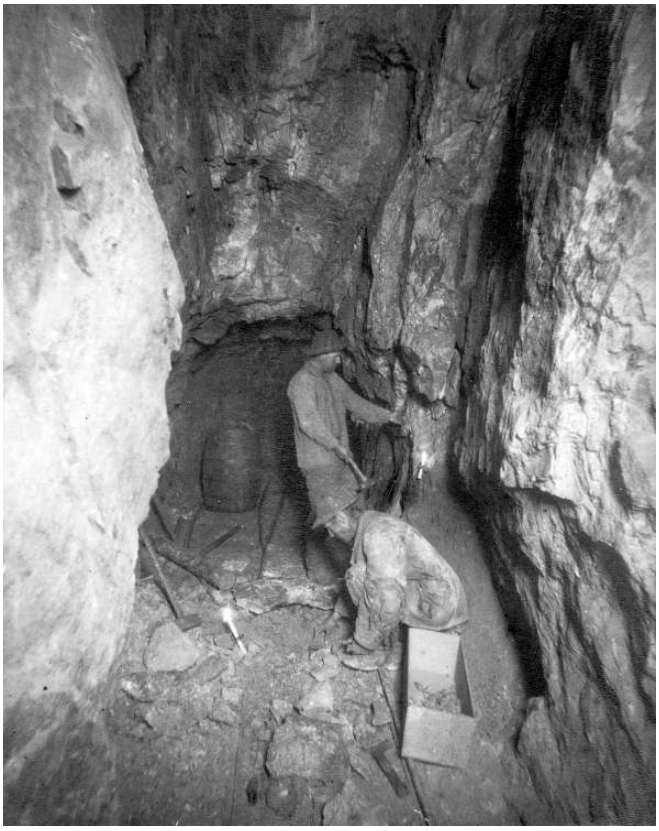
The Gold Mine, as seen in 1894 at the California Midwinter International Exhibition in San Francisco, is shown on page 3. A letter from G. M. Blake to the editor of the *Castle Rock Journal*, Castle Rock, Colorado, dated 21 February 1894, provides a concise description of the entire display at this fair:

> The exhibit covers about 3500 square feet. The exterior of the building represents the exterior of the mine. After entering the structure, the visitor will find himself in a tunnel, where can be seen the vein and ore bodies in their natural state, with miners at work on them with pick and shovel digging out the precious metals in its crudest form. Leaving the tunnel by way of a cross cut, the next point of interest is a chamber where is displayed all the paraphernalia of mining, with samples of the various ores. Here a practical miner delivers a short and interesting lecture on the subject of mines and mining, and all the various devices necessary for the operation of a mining plant. Equipped with information the visitor proceeds to inspect the shafts. One of these, the cage shaft, shows how the miner descends to his work underground; another, the pump shaft, contains the hydraulic apparatus used to pump out the matter that seeps into the bottom of the mine, while a third, called the prospect shaft, shows the first start that

William Keast, creator of the Gold Mine model. (Source: Art History, Midway Plaisance, and the World's Columbian Exposition.*)*

The Gold Mine exhibit at the California Midwinter International Exhibition, San Francisco, California, 1894. (Courtesy of the California History Room, California State Library, Sacramento.)

The Gold Mine exhibit at the California Midwinter International Exhibition, San Francisco, California, 1894. (Courtesy of William Lipsky.)



Miners stand and crouch in a tunnel of the Saratoga Mine in Central City, Colorado, in 1889. One man uses a hammer and chisel to break ore from the wall. (X-61100. Courtesy of the Western History and Genealogy Dept., Denver Public Library.)

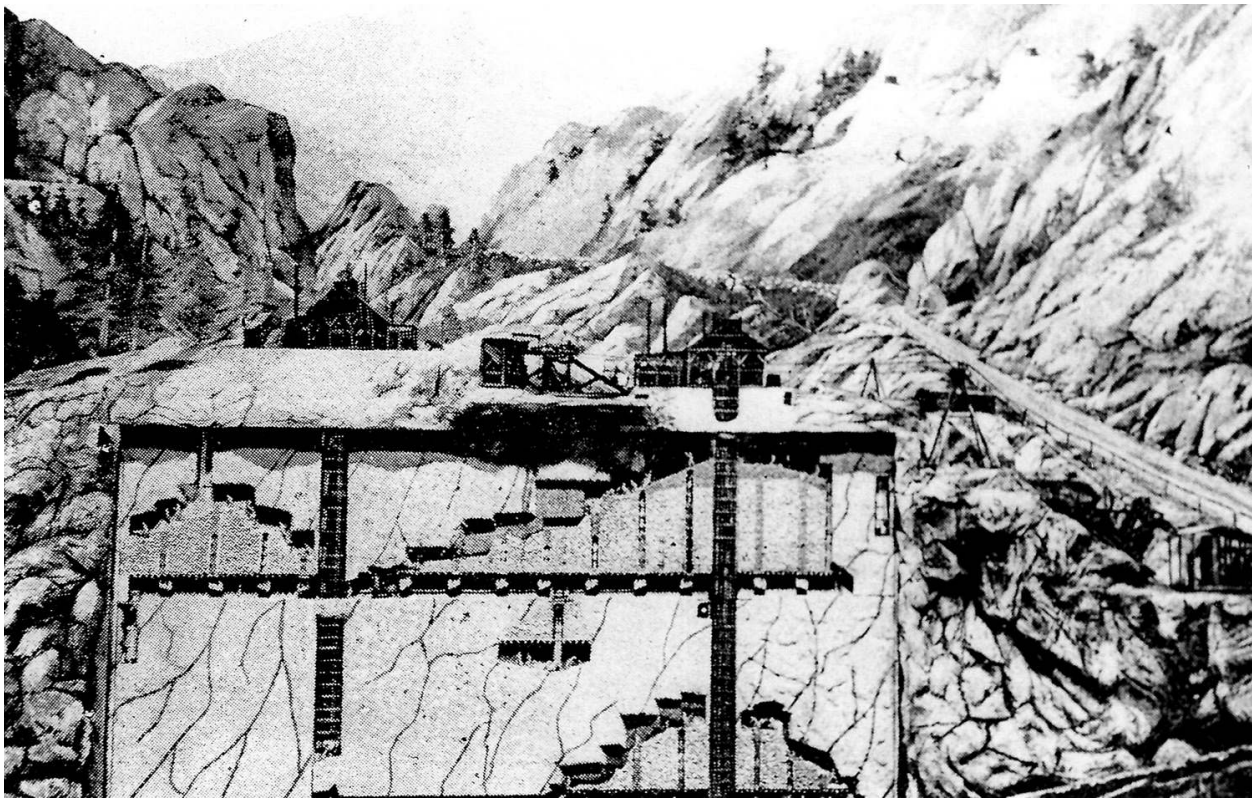
A miner prepares to dump ore into an ore cart in a narrow tunnel at the Saratoga mine in 1889. (X-61095. Courtesy of the Western History and Genealogy Dept., Denver Public Library.)

is made to discover what the prospects are of finding gold in any special direction or locality. From the bottom of three various shafts are run the levels, stopes and drifts, and in these different avenues are seen the miners at work with rock drills, picks, ore bars, etc. This part of the exhibit is in wax figures.

A tramway runs the entire length of the tunnel, on which a car is hauled by a burro. The car is fitted up with seats so ladies and their escorts can ride through the mine.

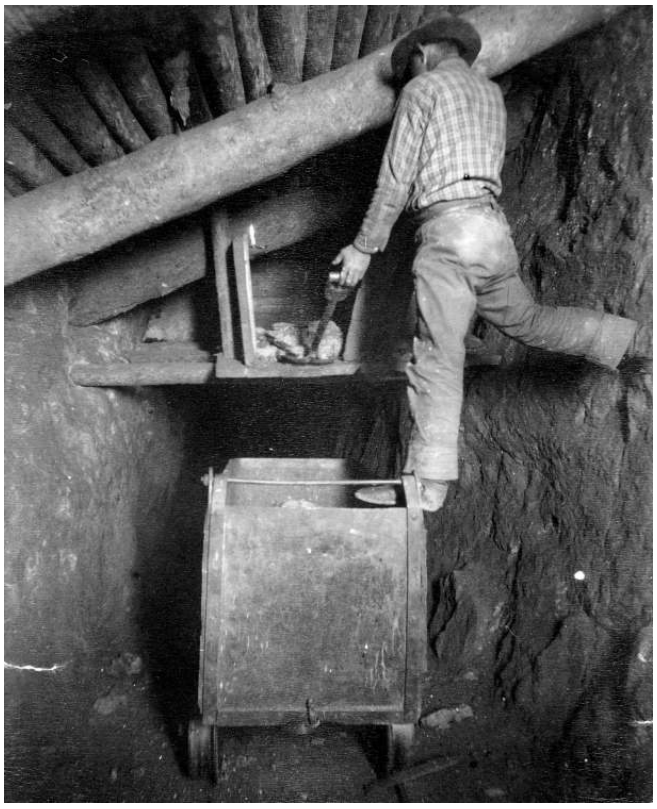
The model of the mine was inside the exhibit. It was automatic, being run by that new invention, electricity. It was a true representation of the Saratoga Mine; it showed a section of the mountain that was split in half from top to bottom so visitors could look into the mine to about seven hundred feet. The model only represented the top level and bottom level of the mine; the intervening five levels were not shown. The visitor was supposed to be standing on one side of the ore vein, or reef, which on the model was about three inches thick, in the real mine, six feet. The scale of the model was one-half inch to the foot.

The model took nearly five years to construct, and contained real gold and quartz. The top level of the model showed men at work, stoping and working out the vein. Cars ran out to ore chutes, where they were filled and returned to one of the two shafts in the model. From there the ore was hoisted to the surface. The bottom level of the model showed men drifting, cross-cutting, and drilling, as well as pumps working. Surface features included the shaft houses, the blacksmith shop, the powder magazine, the miners' boarding house, the Hallidie ropeway, the stamp mill, the water flumes, the mine dump, and the ore bins.



Model of the Saratoga mine inside the Colorado Gold Mine exhibit. (Courtesy of William Lipsky.)

View of miners in a cage as they are lowered into the shaft of the Saratoga Mine, in 1889. (X-61094. Courtesy of the Western History and Genealogy Dept., Denver Public Library.)



A miner shovels ore from a raised ore chute into a cart on track at the Saratoga Mine, 1889. (X-61093. Courtesy of the Western History and Genealogy Dept., Denver Public Library.)

Everything worked at the push of a button, from the robot miners to the compressed-air drills.

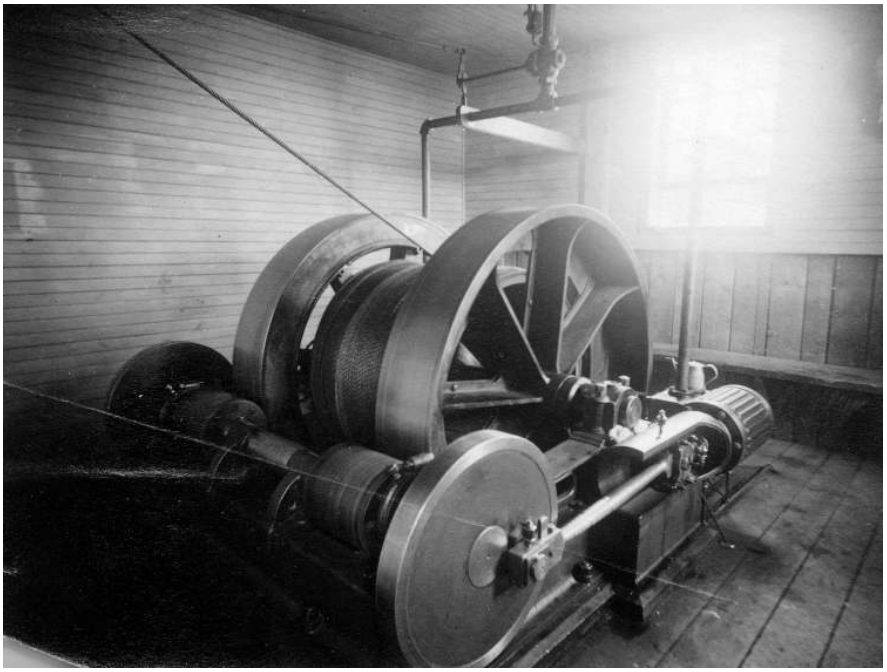
Before the model appeared in Chicago, it went on view for the first time in 1892 in Central City, where it was a great success. It was then displayed at mining camps around Colorado. The model was so huge that Keast had to hire six railcars to transport it from place to place. Professor M. C. Ihlseng, who took his class from the Colorado School of Mines to view the model, wrote to Keast on 18 December 1892: "I cannot speak too highly of the skill and ingenuity displayed in the construction of the same. In the various operations of mining the veins are displayed with an accuracy that is unquestioned, and the several details connected with the execution of the idea merit encomium from all who examine the model."

H. N. Higginbotham, president of the Columbian Exposition, seconded Ihlseng's opnion, writing to Keast that "your idea of illustrating the business of mining was well carried out. The experienced miner, and those wishing to learn how the business of mining is carried on, must have enjoyed viewing your model, for the necessary machinery, as well as the men, were all shown at work; the entire exhibit was very satisfactory."

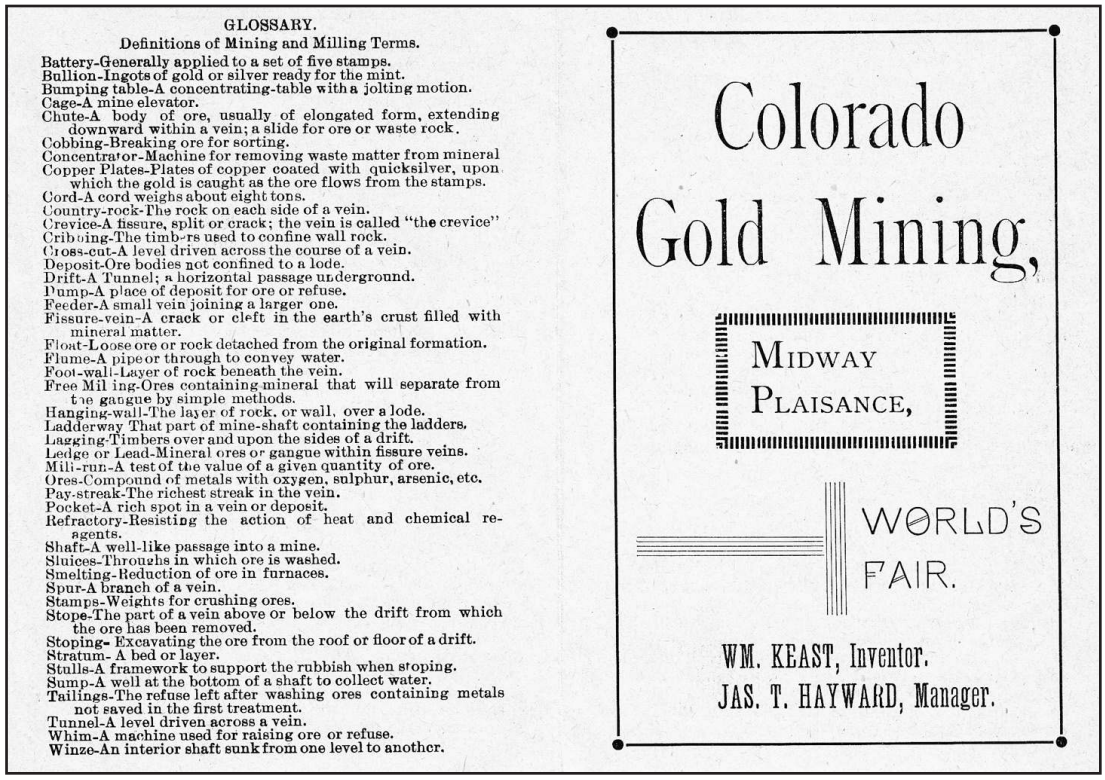
The public concurred. One female visitor to the exhibit exclaimed: "Well, I declare. I owe everything I have in the world to a mine, and this is the first time I really ever understood how they are worked." Another viewer was astonished by all of the activity in the model: "The Mine is alive like an Ant's Nest with hundreds of figures all hard at work at the various tasks needed for the extraction of the precious metal."

In a bit of self-promotion, the brochure for the model's appearance at the Columbian Exposition termed it "the most wonderful piece of mechanism ever placed on exhibition." A promotional flyer from Arizona handed out at the Columbian Exposition encouraged visitors to see the exhibit. "It is a most perfect model, to the finest detail, and is in constant operation, miners at work sinking, drifting, stoping and upraising; hoists and pumps running, etc." The flyer went on to say that the exhibit "is very instructive and should not be overlooked."

After the Columbian Exposition, the model traveled to San Francisco for the California Midwinter International Exhibition in 1894, and was



Interior view of the Saratoga mine shaft house near Central City, Colorado, 1889. The machinery includes the hoist and side crank engines. (X-60666. Courtesy of the Western History and Genealogy Dept., Denver Public Library.)



GLOSSARY.

Definitions of Mining and Milling Terms.

Battery-Generally applied to a set of five stamps.
Bullion-Ingots of gold or silver ready for the mint.
Bumping table-A concentrating-table with a jolting motion.
Cage-A mine elevator.
Chute-A body of ore, usually of elongated form, extending downward within a vein; a slide for ore or waste rock.
Cobbing-Breaking ore for sorting.
Concentrator-Machine for removing waste matter from mineral
Copper Plates-Plates of copper coated with quicksilver, upon which the gold is caught as the ore flows from the stamps.
Cord-A cord weighs about eight tons.
Country-rock-The rock on each side of a vein.
Crevice-A fissure, split or crack; the vein is called "the crevice"
Cribbing-The timbers used to confine wall rock.
Cross-cut-A level driven across the course of a vein.
Deposit-Ore bodies not confined to a lode.
Drift-A Tunnel; a horizontal passage underground.
Dump-A place of deposit for ore or refuse.
Feeder-A small vein joining a larger one.
Fissure-vein-A crack or cleft in the earth's crust filled with mineral matter.
Float-Loose ore or rock detached from the original formation.
Flume-A pipe or through to convey water.
Foot-wall-Layer of rock beneath the vein.
Free Milling-Ores containing mineral that will separate from the gangue by simple methods.
Hanging-wall-The layer of rock, or wall, over a lode.
Ladderway That part of mine-shaft containing the ladders.
Lagging-Timbers over and upon the sides of a drift.
Ledge or Lead-Mineral ores or gangue within fissure veins.
Mill-run-A test of the value of a given quantity of ore.
Ores-Compound of metals with oxygen, sulphur, arsenic, etc.
Pay-streak-The richest streak in the vein.
Pocket-A rich spot in a vein or deposit.
Refractory-Resisting the action of heat and chemical reagents.
Shaft-A well-like passage into a mine.
Sluices-Throughs in which ore is washed.
Smelting-Reduction of ore in furnaces.
Spur-A branch of a vein.
Stamps-Weights for crushing ores.
Stope-The part of a vein above or below the drift from which the ore has been removed.
Stoping-Excavating the ore from the roof or floor of a drift.
Stratum-A bed or layer.
Stulls-A framework to support the rubbish when stoping.
Sump-A well at the bottom of a shaft to collect water.
Tailings-The refuse left after washing ores containing metals not saved in the first treatment.
Tunnel-A level driven across a vein.
Whim-A machine used for raising ore or refuse.
Winze-An interior shaft sunk from one level to another.

Colorado
Gold Mining,

MIDWAY
PLAISANCE,

WORLD'S
FAIR.

WM. KEAST, Inventor.
JAS. T. HAYWARD, Manager.

A brochure from the Gold Mine exhibit on the Midway Plaisance, World's Columbian Exposition, 1893. (Authors' collection.)

COLORADO GOLD MINING.

The most wonderful piece of mechanism ever placed on exhibition.

Endorsed by the Denver Mining Exchange, Colorado, State School of Mines and thousands of others.

There are more different and distinct movements shown in this work, than in any automatic piece that was ever made. It was invented by Wm. Keast, a miner, who worked upon it for four and one-half years before he was able to complete it.

You can get a better idea of the underground workings of a mine by examining this model than if you spend a month in a mine.

The model is run by electricity.

The scenery shown is not in the vicinity of the mine, but is merely used as it is familiar to most all who have ever visited Colorado. The Mount in the rear is the Mount of the Holy Cross, and the pass going up the mountains on which the horses and burros are seen is copied after Ute pass.

Photographs of the mine on sale. This is the only Photo ever taken which shows the entire underground workings of a mine.

Protected by patent and copyright.

TABLE OF WEIGHTS AND MEASURES.

A ton of gold or silver contains 29,166,66 ounces.

A ton of gold is worth $602,875.

The United States money standard for gold and silver is 900 parts pure metal and 100 parts of alloy in 1,000 parts of coin.

The value of an ounce of pure gold is $20.67,183; 23.22 grains of pure gold equals $1.

The term karat when used to distinguish fineness of gold means one-twenty-fourth; pure gold is 24 karat gold.

A cubic foot of gold weighs 1,203 pounds, and is worth about $300,000.

COLORADO GOLD MINING

The Automatic Model is modeled after the Saratoga Mine, located in Gilpin County, Colorado.

This Model represents the mountain being cut in two, leaving the mine on the foot wall of the vein so that you can stand back and look at the entire underground workings.

It is as true a representation of the underground workings as is possible to be made. The mineral and rock being taken from the mine and placed upon the model in the exact shape that it lies in the earth. The mine proper is seven hundred feet deep, there being seven levels, each one hundred feet apart.

The Model only shows the top level, and the bottom level. The other five levels not shown are worked on the same principle that the first level is worked upon. This mine has two shafts. In shaft No. 1 is a bucket, a ladder way and a pump. And in shaft No. 2 is a large cage for hoisting and lowering the cars.

The top level shows men at work stoping and working out the vein. The cars are run out in the level, stopped under the ore chutes, filled and then run back to the shaft and hoisted to the surface. Men are at work sinking a winze down to level No. 2, from which they hoist the ore and waste rock by means of a windlass. In this level can be seen men doing all kinds of work done in a mine.

In the bottom level can be seen men drifting, cross-cutting, drilling with air drills, cars being run to different parts of the mine, pumps at work, the bucket in shaft being hoisted to the surface and men commencing an upward stope, etc.

On the surface you will see the Shaft Houses, the Blacksmith Shop, the Powder Magazine, the Miner's boarding-house, the Common Sense Whim, the Hallidie Ropeway, the Stamp Mill, the Water Flumes piles of Wood used for timbering the mine, the Dump, the Ore Bins, and all other necessary buildings and appliances to successfully operate a mine.

visited there by thousands of people. It was the only exhibit of its class awarded a gold medal. The director general of the Midwinter Exposition, M. H. DeYoung, wrote to Keast on 11 July 1894 that the Colorado mine model would serve as "an object lesson for the uninstructed, which will be remembered with pleasure by those who, for the first time in their lives, have had shown to them so clearly how the precious metals are extracted from the earth, the ore reduced in a quartz mill, the pulp amalgamated and the auriferous products prepared for the mint."

Based on this success, Keast decided to take the model to Europe later in 1894, where it was exhibited at the Exposition Internationale d'Anvers in Antwerp, Belgium. Later European showings occurred at the Royal Aquarium in London, England, in 1895; the Cardiff Industrial and Fine Art Exhibition in Wales, in 1896; the Imperial Victorian Exhibition at the Crystal Palace in London, England, in 1897; and at the Glasgow International Exposition in Scotland, also in 1897.

The model returned to the United States in 1898, showing at the Trans-Mississippi International Exposition in Omaha, Nebraska, in 1898, and at the Greater American Exposition, again in Omaha, in 1899. Later in 1899, the model went back on display in London at the Greater Britain Exhibition. The subterranean mining exhibition in the Trocadero Palace at the Paris Exposition of 1900 became the site of yet another European showing of the Colorado Gold Mine model.

The model's last known display was in the Mining Building at the Louisiana Purchase Ex-

A view inside the Colorado Gold Mine exhibit, California Midwinter International Exposition, San Francisco, 1894. (Courtesy of William Lipsky.)

Colorado Gold Mine

MINING BUILDING

AT THE

LOUISIANA PURCHASE EXPOSITION

A MINE IN ACTUAL OPERATION, SHOWING COMPLETE SURFACE AND UNDERGROUND WORKINGS TO PERFECTION.

Beautiful. Wonderful. Interesting. Instructive.

THE BUSY SCENES IN AND AROUND A COLORADO GOLD MINE TRANSPORTED TO THE LOUISIANA PURCHASE EXPOSITION.

HOW the precious metal is found, mined and separated from the ore, represented true to life. Electro-Automatic Machinery that was a wonder at the World's Fair, Antwerp, Belgium; and the Omaha Expositions. Awarded Medals and Diplomas. A spectacle of beauty, action and interest for men, women and children.

Endorsed by the Colorado State School of Mines, State School of Mines of Missouri, Columbia University, N. Y., and the leading mining men of the world.

JAS. T. HAYWARD,
Manager.

From a brochure for the Gold Mine exhibit in the Mining Building, Louisiana Purchase Exposition, St. Louis, 1904. (Authors' collection.)

KEY TO GOLD MINE.

1 Shaft House of No. 2 shaft, machinery in operation.
2 Ore-bin, the ore being put into the buckets of the rope-way and carried to the stamp mill.
3 The Blacksmith's shop, where the drills are sharpened.
4 Powder house for storing powder.
5 Wood pile used for timbering the mine.
6 Hallidie ropeway that is used for transporting ore from the mine to the quartz mill, over gulches and mountains.
7 Common-sense whim used by miners in making explorations before putting up expensive machinery.
8 No. 1 Shaft house, where the pumps, air compressor and hoisting machinery are seen in operation, with the quartz bucket going up and down the shaft.
9 Stamp mill, where the quartz is crushed and washed over the amalgamating plates and the free gold is caught.
10 Miners' boarding house; washing on the line.
11 First level in the mine, run along the course of the vein to enable the ore to be transported to the shaft and thence to the surface.
12 Virgin ground of vein.
13 Surface quartz of vein.
14 Smaller veins or leaders running into big vein.
15 The mineral streak of the vein, or the richest part, extending to depths unknown.
16 Waste, or refuse rock of vein.
17 Mineral chutes, where the ore passes through the waste rock to the cars below.
18 The stull timbers that hold up the waste rock in the levels.
19 Lagging. Small timbers placed crosswise on the stulls.
20 Men overhead stoping the vein out.
21 Men sinking a winze and working an underhand stope through which the ore is hoisted to the level with a windlass.
22 Compressed air drill in operation. Miners sinking a shaft to meet men working similarly below in an upraise to make connections for air.
23 Bottom or lower level of the mine that is driven for the same purpose as level No. 1.
24 Sump or deepest part of the mine, to which all the water drains.
25 Bottom pump in operation, throwing water to the second pump at level No. 1.
26 Second pump shows the plunger throwing water to the surface.
27 Cross cut showing the miners at work prospecting for other veins.
28 Miners extending the level between the two walls that enclose the vein.
29 Men sinking a winze for ventilating purposes.
30 Air pipes that carry the compressed air to the different parts of the mine.
31 Air receiver, into which the air is compressed to be used to operate the drills.
32 Ladderways, used in case of accident to machinery.
33 Water flume, used in carrying water to the stamps.
34 Pumpman watching the pumps.
35 Burro train going up the Ute Pass, the original route to Leadville and the interior portion of the state, before railways were built; over its windings thousands of gold seekers have passed in their mad search for wealth. The burro is the only animal in the world that carries three times its weight.
36 Mount of the Holy Cross is a peak in the northern Saguache range. This famous mountain bears a crown of snow on its bosom, formed by deposits in an upright and transverse canon. The upright of the canon is fifteen hundred feet, and the arms about seven hundred feet in length; elevation is 14,276 feet.

position of 1904, in St. Louis, Missouri. In 1903, Keast moved to Portsmouth, England, having made enough money from the model that he was able to buy a business there. Keast remained in the area until his death in 1936 in the village of Horndean, eight miles north of Portsmouth.

Linda Jones provides some information on the fate of Keast's model in *The Colorado Gambler*. "The unique model burned in a house fire and [Keast] built another, taking five years this time, but . . . [his great-grandson, David Keast] reports the second also burned, in 1936." Fire, the scourge of mining camps, also claimed this "really marvelous piece of mechanism," which was a significant piece of the history of Colorado mining and of the history of the Columbian Exposition.

Acknowledgements

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