A Brief History Of Mining In Hinsdale County

Collected, Written and Edited
by
Milo Z. Morse
And
Faye Bielser

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A Compilation of Information about Geology and Mineralogy; Their Relation to the Mining History of Colorado, Hinsdale County and Lake City, Colorado

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Printed in the United States of America
FIRST EDITION

Printed By B&B Printers, Gunnison, Inc.
Gunnison, CO 81230

This book is dedicated to all the hardrock miners we have known and worked with in our lifetimes.

We truly appreciate the information they have passed on to us.

ACKNOWLEDGEMENTS

The authors wish to thank the following people without whose help this collection of information would not have been of the professional quality that it has become.

Paula Davis - Her assistance in the creation of tables incorporated into the text has been most valuable.

Millie Harmon - Her donation of many hours of proofreading has been extremely helpful.

Grant Houston and Joel Swank - Their knowledge of the history and the time-lines of the area has helped the authors report events as correctly as possible.

First National Bank of Lake City - Their provision of photocopy services is appreciated.

The authors would like to extend their thanks to **Joel and Celia Swank, Martin Davis, Wendell Fobare, Dean Mussatti, and Charles Hice** and family for their historical contributions.

A special thanks is offered to the families of **John Saville, Frank Mendenhall, and Clarence and Carolyn Wright.**

The authors also wish to thank those people in our past whose advice and education has helped us to bring forth this work.

Frank Mendenhall and Wayne Fobare outside the Portal of the Pride of America Mine.

PREFACE

Working with an extensive collection of historical material, the authors have attempted to create, through careful editing of excerpts from these sources, a chronology of events in the historical development of Hinsdale County and its story of mining.

We have tried to begin this compilation of information with a geographical description of the country, followed by the history of the area, and rounding it out with an extensive summary of the geology and minerals found in the area.

Milo Morse

Faye Bielser

Milo Morse (right) and Martin Davis below Blue Bird Mine.

Geography of the State and County

Colorado is situated between latitude 37 degrees and 41 degrees north, and longitude 102 degrees and 109 degrees west. Its average length east and west is 380 miles; its breadth north and south, 280 miles. As of 1897 there were fifty-six counties, although presently there are sixty-three as of this writing. A glance at a map of the United States shows its advantageous location. It occupies the central field of travel and traffic between the Atlantic and Pacific oceans, east and west, and between Mexico and British America, north and south.

Area

In a report to the Colorado State Bureau of Mines for the Year 1897, Harry A. Lee related the following:

The state has an area of 104,500 square miles. This statement conveys little conception of Colorado's area that is in excess of the combined areas of the states of New York, Maine, New Hampshire, Massachusetts, Connecticut, New Jersey and Maryland. Colorado could be divided into eighty counties, each larger than the state of Rhode Island. It exceeds the combined area of England, Ireland, Wales and Belgium, and is three and one-half times the size of Scotland. A report in the late 1870's stated, "Add to the above the fact that the natural resources of Colorado are commensurate to the resources of the states and provinces with which the area is compared, and future possibilities can be better imagined than expressed."

Hinsdale County, part of the "San Juan Country" lies in the southwestern part of the State, in what was known as the San Juan mining district. It is an irregular rectangle, broadened at the north end. Its extreme length from north to south is about 52 miles and it extreme width from east to west is 26 miles. Its area is 621,440 acres. The surface is nearly all mountainous, the altitude ranging from about 8,500 feet where Lake Fork branch of Gunnison River crosses the north boundary to more than 14,000 feet at some of the summits of some of the peaks in the San Juan Range near the central part. The county was organized in 1874 from parts of Conejos, Costilla and Lake Counties.

It was originally established by territorial legislation in 1874, but later legislative enactments have materially reduced original boundaries. As now constituted, it has an area of about 960 square miles. The adjoining counties are Gunnison, Ouray, San Miguel and Dolores on the north and west, Mineral on the east and Archuleta and La Plata on the south.

The county is quite mountainous. The Continental Divide enters the east boundary line about ten miles south of the northeast corner of the county, crosses in a southwesterly direction to the west boundary, then turns and recrosses the county in a southeasterly direction. Upon the eastern slope of this curve or elbow, the Rio Grande originates. The Uncompahgre range separates Hinsdale from Gunnison and Ouray Counties. Henson Creek, one of the main tributaries of the Lake Fork of the Gunnison, and other tributaries, drains the southern slope of the Uncompahgre range and the northern slope of a parallel range that stands between Henson Creek and the Lake Fork of the Gunnison. What are known as the San Juan Mountains flank the ranges on the west. The Rio Piedra, a tributary to the San Juan River and its branches, drains this range.

While the ranges are rugged, the intervening valleys are comparatively level and are traversed by good roads, some requiring 4-wheel drive, with fairly good grades that make the different sections easily accessible.

Lake City, the county seat and main business center, is located at the junction of Henson Creek and the Lake Fork of the Gunnison, in what may be termed an amphitheater. The main mining camps include Capitol City, Henson, Carson, Lake Shore, Tellurium and Sherman with many more secondary camps too numerous to mention at this time.

Population and Industries

The population was, and remains, distributed chiefly in the valleys near the borders of the mountains and, in the past, in the mining towns. In the mountain valleys are scattered ranches. A few prospectors lived in the mountains, and in the summer, cattlemen, sheepherders and forest rangers traveled nearly everywhere and often still do. Now, the summer population is greatly increased by tourists who come from the hot lowlands to enjoy the beauty and coolness of the mountains.

The chief industries of the region were once farming and stock raising, together with limited mining and lumbering, but this situation has changed. Care for an increasing number of tourists has become an important industry.

Sheep are raised in great numbers, commonly from 1,000 to 3,000 to a flock. The usual practice is to graze them in the higher mountains, in part above timberline, during a few months in the summer. They must be out before the first heavy snow in the fall and taken to lower areas for the winter. Great numbers of cattle also graze in the mountains during the summer, chiefly on the lower slopes. For many months in the winter they must be fed in the valleys

Climate

The effect of climate on the mining industry was fully appreciated by those who were engaged in mining operations in this region.

Climate in Colorado is as diverse as the topography, varying with the altitude and exposure, but the country is nearly everywhere so high that the summers are short and relatively cool and the winters long and severe. The climate of the lower lands is well-illustrated by that of the San Luis Valley, which has an altitude of a little over 7,500 feet and is rather arid; the precipitation is greatest in the summer. July and August have frequent thunderstorms and are the wettest months. June is commonly dry. The snowfall is light. The summer temperatures are moderate, the average for July and August being a little over 60 degrees. Temperatures as high as 100 degrees F. have been recorded, but the altitude is so great and the air so dry that it is comfortable in the shade even on the hottest day. The nights are always cool. The average temperature in January is from -13 to -20 degrees, but temperatures as low as -34 degrees have been recorded.

At the higher altitudes the summer temperatures are below average, but the winter temperatures may not be. The lowest temperatures are in mountain valleys or parks where the air drainage is poor. The highest night temperatures during cold spells occur at places where the wind is strong, usually below the larger canyons. The sky is nearly always clear, and the sunshine is much brighter than at lower altitudes. Extremes of temperature are therefore less trying because it is nearly always cool in the shade and the sun is unusually warming.

The summers are short, though longer in the lower parts of the region than in the higher parts. Frosts are not uncommon in June and September, and they have been recorded for every month of the year. The summer period without frost ranges from 48 to 178 days.

Due to the influence of the mountains, weather conditions are much more uniform from day to day than in most other places. Severe cold waves are comparatively rare.

The winds are usually light and blow toward the mountains in the afternoon. After sunset the wind subsides, but toward morning a light breeze blows from the mountains. At the summits of the mountains the prevailing winds are from the west and are frequently very strong.

Along the southern and western slopes of the mountains the precipitation is somewhat higher than elsewhere. It averages about 20 inches. In the mountains the precipitation is higher, reaching 40 inches or more, and more uniformly distributed throughout the year. In the higher mountains the winter snows remain throughout the year. Severe thunderstorms occur nearly every day throughout most of July and August. After the first real snowstorm they cease, and a month or more of clear weather without precipitation may be expected.

The timber-covered slopes do not extend above altitudes of 11,600 to 11,700 feet (timberline). Above timberline there is considerable permanent frost and the grass-covered slopes are excellent for grazing. Tunnels, even on south-facing slopes at altitudes of 12,000 feet and higher, become blocked by permanent ice unless precautions are taken to keep them well drained.

Topography

A knowledge of geography and physiography of the mountains, valleys and plains is helpful in understanding the problems of access, transportation and weather in an area or mining district.

Colorado is well known for its high mountains that dominate the western half of the state.

The Continental Divide, separating the east and west drainage, follows a winding course from north to southwest along and across the north and northwest-trending mountain ranges. Many of the mountain peaks over 14,000 feet in altitude are either east or west of the Continental Divide, and relatively few are on it. The topographic forms express the major structural arches and troughs, but deep canyons, glacial erosion, and in places extensive lava flows tend to obscure even strong mountain structures.

Altitude also is stressed because it is an excellent guide for estimating the climate and weather to be expected in the mining areas, most of which are in mountainous areas lacking weather stations.

The surface of this region is composed of igneous rocks, characterized by rugged deep canyons and plateaus underlain by volcanic and pre-Cambrian rocks; and the bordering lower land by Cretaceous and younger sediments, brought into a topography that is notable for its extreme roughness and irregularity. Viewing the country from Uncompahgre Peak, one is impressed by the approximate uniformity in the heights of the many high peaks of the San Juan Mountains and is led to conclude that these summits represent a formerly existing plateau, which has been dissected by deep erosion.

The average difference in elevation between the stream beds and the ridges separating them is about 2,000 feet, but in some places the divide between two forks of the same small stream rises to heights of 3,000 feet or more above the bottom of the gulch. The lowest altitude is slightly over 8,000 feet above sea level, and the elevation of Uncompahgre Peak, not over twelve miles distant, is 14,306 feet.

The region in general is drained toward the north, but the principal mining area is traversed by an eastward-flowing stream called Henson Creek, which, in the lower part of its course, runs through a deep, picturesque canyon, discharging into the Lake Fork of the Gunnison River at Lake City. The Lake Fork discharges into Blue Mesa Reservoir near the former town of Sapinero (now under water). The Gunnison River empties into the Colorado River at Grand Junction, Colorado.

Geology

Most of the published reports dealing with the geology of the volcanic rocks of the San Juan Mountains have described small areas around mining camps. In such studies the volcanic rocks are separated into much smaller units than those used in this report. However, it is not possible to recognize features of the volcanism from the study of small areas.

As outgrowths of the San Juan studies, many bulletins and papers have appeared. Seven folios of the Geological Survey Atlas of the United States describing the area have been published, the most important being by Knowlton, 1923-1924, who gave a detailed description of the flora from different collections of the San Juan volcanic rocks, thus establishing the age of these rocks.

The Lake City district is a small part of the volcanic San Juan region. Geologically, it is particularly allied to the adjacent portion of the San Cristobal quadrangle on the south, which has been recently surveyed, and to the Silverton quadrangle and Ouray quadrangle on the southwest and west, respectively. For this reason the geology of the San Juan region, as a whole will first be briefly discussed, especially the important relations of the rock formations that occur in the Lake City area.

Engineer City –

For a short time, Engineer City boasted of being the largest city in Colorado without a Saloon. In 1875, prospectors were too busy attempting to locate a rich silver lode to waste their time in a Saloon.

Town of Crookesville, located 1 mile south of Lake City

A BRIEF HISTORY OF MINING IN COLORADO

The record of the mining industry has been one of steady increase of production from the first discoveries to the present day. While the territory embraced within the present state boundaries marked the scene of several exploring parties of earlier date, not until the year 1858 was the white population strong enough to establish a settlement. The inhabitants even at this late date were mainly Indians of various tribes. White hunters and trappers were sparsely scattered over this section and had plied their vocations to advantage for years. Later the prospectors in search of precious metals joined them. In 1858 credence was given to earlier rumors by a small party of prospectors, who reported the discovery of gold in paying quantities. The result of this report was the concentration of the white inhabitants in sufficient numbers to establish the first mining camp. This camp was located near the present site of the city of Denver, and called Montana.

The development of the gold deposits soon demonstrated the same to be of little value under the economic conditions existing at that time. The prospectors began to disband, and the search for gold was continued in the more mountainous sections.

At this time Colorado was far inland, and communication was only possible by wagons "crossing the plains." In this manner the reports of the gold discoveries were conveyed to the eastern states; the value increasing, and in difficulties to be overcome decreasing, with repetition, time and distance. The people of the eastern states, still suffering from the financial crash of 1857, were ready to grasp at any opportunity for lost fortunes, so the inflated reports of gold in Colorado were accepted as received. This was productive of a tide of immigration which soon made the "Pike's Peak Country" famous.

On January 7, 1859, George A. Jackson discovered gold in paying quantities at a point near the present site of Idaho Springs. Following this, discoveries that yielded fair returns were made in several sections, and the mining industry in Colorado was launched.

In February of 1861, Colorado was organized as a territory, with an estimated population of 65,000. The wisdom of this act of Congress was considered questionable even as late as 1870. This year marked the advent of a railroad and was practically the first assurance of a permanent industrial establishment in Colorado.

Aided by railroad connection, the development was more rapid. In 1876, the territory of Colorado was admitted into the Union as a state.

While the record of mining in Colorado has been one of increases in production, the product has been variable. The early mining was for gold alone. The demand for "pay placer beds," under primitive conditions, exceeded the supply. The lodes or veins were discovered to carry gold values, and the oxidized ores near the surface found to yield a profit. Silver at that time was considered detrimental.

The opening of gold-bearing veins soon developed the necessity for mills. Their introduction followed with variable success. The establishment and successful operation of the Boston and Colorado Smelting Works at Black Hawk in 1868, marks one of the most important events in Colorado history. Silver and copper began to have some intrinsic value. A new era in the state's mining progress was opened. Ores that were considered worthless prior to the establishment of this plant became precious metals under new conditions. Increased activities in mining followed. Silver became a commodity to be sought after rather than avoided.

Following the arrival of the railroad in 1870, reputed rich finds of gold and silver in the San Juan section were discovered in 1872, and the existence of lead carbonates, carrying silver, was found in Leadville, in 1874. An era of building railroads and reduction works began, which reached a climax in 1879. By this time the army of prospectors had stopped the search for gold and turned their attention to the discovery of lead-silver properties. In an incredibly short time the mines yielded silver in excess of gold, and the state stood at the head of the list as a producer of silver.

From 1879 until 1889 the search for silver mines continued. Through adverse legislation the market price of silver declined until the demand for new silver mines was practically at a minimum. Prospectors again turned their attention to a search for gold. As a result, Colorado stands the recognized leader for gold production in 1897.

The transition of the state's production of precious metals from gold to silver, and later from silver to gold, is not only a tribute to the limitless resources of the state, but also to her citizens. It not only demonstrates the ability of both to meet the demand, but to take the lead in supplying the metal demanded. The chief mining products at that time were lead, zinc, silver, gold and copper.

Fanny Fern Mine

Milo Morse, Pride of America Mine, Sept. 1967

John Saville, Pride of America Mine, Sept. 1967

MINING IN THE HINSDALE COUNTY AREA

The first valid mineral locations were made in 1874. A rush of prospectors and rapid progress followed the reputed finds until 1879. The history of the county in 1879 and 1880 is common to all those in the state that are located at great distance from markets and generally inaccessible. In 1889 the Denver and Rio Grande Railroad connected a branch line into Lake City. It left the main line at Sapinero and followed the Lake Fork up the canyon. Following the establishment of transportation facilities, many that owned property returned. Old properties were reopened and new ones located.

The development and production increased from 1889 to 1893. The current price of lead and silver during that year had a depressing effect, and this district, with many others, suffered. The readjustment to new conditions was more rapid here than in some sections of the state, doubtlessly aided by the gold values existing in ores mined.

The principal mining of the county was confined to the northern part, the remainder being little explored. The county is made up almost entirely of the eruptive rocks of several lava flows, aggregating a thickness of 6,000 to 8,000 feet, common to the San Juan region, and generally termed trachytes or porphyritic-trachytes. While porphyritic-trachyte is a broad term and covers a large range of possible rocks, it is for all practical purposes near enough correct at this time, where detail must be eliminated.

This lava mass, when viewed along cliff exposures, presents a stratified appearance, with the strata barely tilted from the horizontal. The dominating veins of the county are true fissures that cut the county nearly vertically. They traverse the county at all points of the compass, but the main fissures seem to occur more abundantly in a north/south direction. As a rule the veins are strong and well defined and the outcrop in places can be seen for long distances. The vein filling is generally of the comb or ribbon structure, lying against a selvage or gouge. Adjoining the "ore streaks" the fissure is often filled with a brecciated material more or less charged with precious metals, showing gradual ore deposition from aqueous solutions and later movements of the wall rock. The ore occurs in shoots, and one of the strong points in this section is the strength and persistency of the shoots.

Common to all sections, the fissures, veins, ore occurrence and ores differ not only in different districts, but also in mines near each other, and nothing beyond the conditions most general can be stated. The demand for a "true fissure vein," "smooth walls," "a gouge" and "ore in streaks, near one wall so that the pay ore could be mined easily and with little loss," was easily supplied in this section.

The chief ores of the county were lead, copper, iron and zinc in form of sulfides, carrying gold and silver in combination. Telluride in the form of petzite could be found in some districts. Gold and silver in native form were found frequently and the high grade silver ores were often in form of gray copper, brittle and ruby silver. A portion of the ores occurred so that they could be removed and shipped direct to reduction works, but the main portion had to be concentrated before shipment.

Tellurides in the form of petzite occur on Hotchkiss Mountain. The main associate minerals are zinc, lead, iron and copper in sulfide form. The composition of petzite is 25.5% gold, 40% silver and 34.5% other components.

The Report to the State Bureau of Mines for the year 1897 stated that "during the past year this section has shown renewed energy, several power plants have been added and a number of new locations made. A number of the properties, rated among the best in the district, still remain idle for reasons best known to the owners."

Hinsdale County is divided into mining districts, which here, as in other mining regions, have rather indefinite boundaries. As outlined by the legislative act of 1893, this part of Hinsdale County contains six districts: Galena, Park, Lake, Sherman, Carson and Cimarron.

However, virtually all old records and reports speak of Hinsdale County's division into five mining districts: Lake, Galena, Park, Sherman and Carson. A sixth, the Cimarron Mining District, was in existence, but rarely mentioned because of a lack of mining activity in that area. The Silver Jack Lode Claim and the Roscoe Conkling Lode Claim are the two claims that remain in the district today

The Lake District embraces the northeastern portion of the county. It extends about three miles west and nine miles south of Lake City. The name doubtless came from Lake San Cristobal, four miles from Lake City on the Lake Fork of the Gunnison. This body of water fills a narrow valley between rather rugged mountains and is one of the most beautiful spots in the state. This district was the first one to attract attention to the San Juan country.

Named for the presence of considerable quantities of the mineral of that name in the earlier exploited areas, the Galena Districts extends westward along Henson Creek to the Ouray and San Juan County lines. The area covered in this report is mostly in the Galena Mining District, but does include portions of other mining districts.

As described in an 1897 report to the Bureau of Mines, the Galena District lies in the northwestern section of the county and lies west of the Lake District. As indicated by the name, this district contained large led producers.

Henson Creek was the principal stream and originates at or near Engineer Mountain. This stream flows through a narrow valley and the mountains rise abruptly on either side. The valley grade is easy and the drive to Capitol City, ten miles west of Lake City, is delightful. On both sides of Henson Creek, mines of more or less importance occurred. They were well developed and known to be valuable; though well equipped, they were not operated for several years prior to the turn of the century. Several new enterprises had been launched in the late 1880's in this district and two new 100-ton concentration plants were erected. The capital and known ability of those creating these enterprises left no doubt of ultimate success. This conviction did more to arouse interest and re-establish confidence than anything that occurred in previous years in Hinsdale County. All property owners on Capitol, Sheep, Gravel, Sunshine, Dolly Varden, Lime and Excelsior Mountain were well pleased with conditions, and reported more active prospecting during 1897 than for years past.

The Lake District, so called from its proximity to Lake San Cristobal, embraces the north and east portions of Hinsdale County. It extends southward from Lake City and westward along the Lake Fork valley.

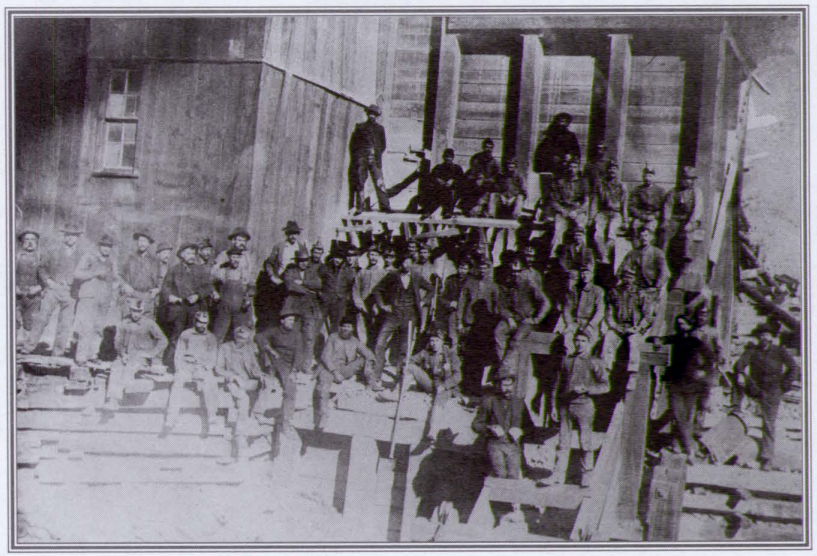
The Cimarron District, at the extreme northwest corner of Hinsdale County, originally consisted of eight claims, two of which were patented together, making a total of six claims in actuality. Four of these claims were eventually traded to the United States Forest Service, leaving the two afore-mentioned claims still in existence today.

The Galena and Lake Districts were the two principal producers of the county. This was due largely to their development and accessibility. The Burrows Park, Sherman and Carson districts each possessed distinctive merit, equal in many respects, but less developed than their more fortunate neighbors.

The county records for the year 1897 showed 8,144 lode claims, 126 mill sites, 100 placer claims, 302 patented lode claims, 20 patented placer claims, 26 patented mill sites duly recorded.

During 1897 an average of 493 men were employed in mining and 108 mines and prospects were operated.

In an effort to boost interest in Hinsdale County and to bring new businesses to the area, one reporter wrote, "in point of scenic attractions, Hinsdale County had few equals among other counties of the state. From point of natural resources it possesses a vast amount of undeveloped territory, the value of which has been and is being daily demonstrated. While high-grade ores exist, the main values lie in stock requiring treatment prior to shipment. This requires capital, and money judiciously expended will bring satisfactory returns."



Workers pose for a group photo in front of an unidentified mine.

Gunnison Street, Lake City, CO.

Historical Background of the Lake City Area

The history of the Lake City mining region is one of passage back and forth from general depression to excessive activity that has rendered its existence a little more eventful than that of the neighboring towns of the San Juan Mountains. These variations have been due to several causes, but chiefly to the extreme richness of a few of the ore bodies discovered and the poverty of the rest. The periodical discoveries of new ore bodies of promising appearance were immediately followed by great inrushes of all types of people, whose presence made the country thrive for a time. Similar variant conditions prevailed to a greater or lesser extent in almost all mining centers, but in few places in Colorado were they so pronounced as in the Lake City area.

A member of one of the Fremont expeditions may have been the first to discover the precious metal in what would become the Lake City area. However, no one, not even the explorer, was ever again able to locate the place or even the stream where the first small amount of gold was found. There is no documented proof that this ever took place.

In 1860, John Baker is said to have come through the valley and discovered ore here. He went on to explore the area called Baker's Park, now the site of Silverton, Colorado.

On August 27, 1871, with the discovery of the Ute and Ulay veins by Henry Henson, along with Joel K. Mullin, Albert Meade and Charles Godwin, the history of Lake City began. Subsequently, Henson Creek and the townsite of Henson, located just above the present site of the Ute/Ulay mine complex were named for Henry Henson. A native Kentuckian, he arrived in Colorado in 1860 and after being involved in the silver discoveries in the Lake City area, went on to pursue a political career in Colorado.

In 1872, a party led by Col. Nugent and his son, Capt. B. F. Nugent were reported to have made a discovery of ore in the valley where Lake City would soon come into existence. .

At that time, all of the land, which is now known as the "San Juan Country", belonged to the Native Americans. The reports of mineral wealth brought many prospectors into the region, and the Native Americans indigenous to the region became extremely irritated at the frequent encroachments on their domain. Finally, in May of 1873, to avert open hostilities, the Brunot Agreement, not a treaty as commonly thought, was drawn up and ratified by the Senate. As part of the agreement, a strip of land sixty miles wide and seventy-five miles long (almost one-quarter of the entire Ute Indian Reservation as it existed according to the Treaty of 1868), was ceded to the United States Government by the Utes.

Otto Mears, "The Pathfinder of the San Juans," a prominent financier, explorer and road builder, hearing of the discovery of precious metals here, became interested in the Lake City area. He commissioned Enos T. Hotchkiss to survey and build a toll road from Saguache, Colorado to the valley of the Lake Fork a month after the signing of the Brunot Agreement. Hotchkiss completed the Saguache and San Juan Toll Road in August of 1874. While surveying for this project, Hotchkiss located the rich ore deposits at the north end of Lake San Cristobal. This discovery stimulated the first widespread interest in the region near what would become Lake City. Anticipating a

rapid development, Bartholf, Finley, Sparling and others laid out the Lake City townsite and entered it in the Land Office at Del Norte before the end of 1874. In 1874 reduction works were erected in the area and a third stamp mill was built in the Summit mining district.

Hotchkiss staked a claim on a rich tellurium vein, naming the claim after himself. The claim and mine, now known as the Golden Fleece, is located on Hotchkiss Mountain. News of the strike spread rapidly and Lake City soon became a center of activity.

In September of the next year, Henry Finley, F. Newton Bogue and William T. Ring formed the Lake City Town Company, largely financed by Otto Mears and his associates. The company purchased townsite land and held it in readiness for sale to settlers as they arrived.

Mears recognized the need to develop good transportation routes as a means of building up the region. With that in mind, he commissioned Hotchkiss to supervise the construction of another, more direct toll road to the valley. Hotchkiss completed this, the Antelope Springs and Lake City Toll Road, during the summer of 1875. This soon became the principal route to the San Juan mining region. Within a few years, Mears' toll roads linked every part of the San Juan country and were supplemented by railroad lines, which he financed and built.

Mears also understood the value of publicity in promoting regional developments. Consequently, he decided to finance the establishment of a small local newspaper at Lake City to supply interested readers and potential settlers with information on mining activity and to provide local news for the town's residents. He expected this paper to advertise the region effectively, and at less cost than advertisements in eastern newspapers. During the spring of 1875, he convinced Harry M. Woods and Clark L. Peyton to inaugurate the Lake City paper the Silver World. The first issue appeared on June 19, 1875, gladly proclaiming the results of a special election held earlier that year. Lake City became the county seat of Hinsdale County, it being removed from San Juan City to Lake City where it has remained to this day.

Throughout the early history of Lake City, Woods and Peyton sought above all else, to provide ". . .full and complete reports from this and adjacent mining districts." During their first three years as editors, they devoted over two-thirds of the space in their four-page weekly Silver World to mining news and advertisements by local merchants. Their paper included little advertising of national products until 1881, and none during its first three years of existence. Editorially, Woods and Peyton stressed the potential riches of the new mining area, emphasized the desirability of Lake City as a home, and promoted the civic improvements, which they felt to be necessary.

Capitol City School house with the Capitol City Daily Stage Coach parked in front.

Hinsdale County and Lake City quickly became important in Colorado's mining industry, as indicated by the following excerpts from *COLORADO, Its Gold and Silver Mines by Frank Fossett, published in 1879*. The first is from the Tourist's Guide section of the book.

Lake City is the county seat of Hinsdale, and its main town. For some time it has been the most populous place in the San Juan country, although Silverton is gaining somewhat at present. This place grew rapidly in 1876-7, following the development of many silver veins. The Crooke Concentrating and Smelting Works, and those of the Ocean Wave Company are located here, and handle large amounts of ore in the summer and fall months. There is also a chlorination and lixiviation mill. Lake City contains a population of 1,500, with the usual newspaper, bank, and collection of business houses. The situation is wild and romantic, beside the Lake Fork of the Gunnison and Henson creek, and surrounded by lofty mountains. Elevation, 8,530 feet. Distance to Alamosa, 116 miles, and daily stages thereto. Stages to Silverton, 32 miles, and to Ouray, 80 miles, in the warmer months. Ouray can be reached on horseback by a ride over the mountains of thirty miles. Denver is distant 366 miles by Alamosa and 335 miles by Saguache and Canon.

The authors have continued with another selection from the same work, describing the mineralogical characteristics of the area and additional pertinent information:

Hinsdale County is the most easterly of the important silver districts of San Juan. Its metropolis is Lake City, dating from 1874-75, located at the junction of Henson Creek with the Lake Fork of the Gunnison. Here are two smelting works in operation - Crooke & Co. and the Ocean Wave - the Crooke concentrating works and a chlorination and lixiviation mill - the latter not run steadily. The location of the town is grand and beautiful and resembles that of Georgetown. There are numberless silver lodes in the lofty mountains that rise almost perpendicularly for a half-mile or a mile on every side - many of them worked extensively.

Promising as were the numerous discoveries of the San Juan country in 1873-4-5, they were generally of no immediate benefit to their owners, on account of the distance from an ore market, wagon roads or railways. The region labored under peculiar disadvantages. It was made up of almost inaccessible mountain ranges, and at that time was so remote from railways that capitalists and mill men were not inclined to investigate its mineral wealth. The pioneers who had been making discoveries of rich veins were too poor to build works for the extraction of the precious metals, and it cost too much to get ore to market to admit of attempting it, unless it was wonderfully rich and money was at hand to defray shipping expenses.

This was the condition of affairs when the Crooke brothers - the first eastern capitalists that showed their appreciation of the region by putting their money into it - began to buy mines and erect mills. They were conducting a smelting business in New York city, and inspection and contact with its ores begat that confidence in its worth that subsequent experience has in no wise abated. The results of their investments in the Little Annie and Golden Queen mines and mills in the Summit Mountain old district induced hem to look further.

An investigation of the Lake City silver district caused them to erect a concentrating mill there. This separated the silver-bearing mineral from the gangue or waste rock of the ore. The miner then had his value in one ton of concentrates instead of having it distributed among five or ten tons as before. This was an important item where it cost more to get ore to a market than it did to treat it after it reached there.

The Ute and Ule [Ulay] mines were purchased late in 1878 and the new owners then erected quarters for workmen and shaft and ore houses for the mine. The next spring contracts were left for sinking shafts and running drifts, and for the construction of works for the treatment of the ore. The stack furnace was not completed till near the close of the season, but 2,000 tons of ore had been mined and concentrated, and the dressed ore sent to New York. It yielded a net profit of twelve dollars per ton. The smelting works were completed so that reduction, parting and refining began in July, 1878. Up to this time Crooke & Co. had expended over $400,000 on their mines, works, and other property of this locality.

The Ute mine is situated well up on a mountain, and the Ule is located at the foot of the same. The patented surface ground of each is 1,500 feet long by 300 wide, and both are in Galena mining district near Lake City. Up to the time when these mines were purchased, the Ute mine had produced 250 tons from a shaft thirty feet deep, and the Ulay 200 tons from a shaft twenty feet deep. The ore is galena and gray copper in the Ute vein, and is richer in the lower workings than near the surface. Beginning with 20 ounces of silver per ton, it has increased to from 40 to 90. The percentage of lead is about forty. In the mine are large and heavy masses of gray copper. There are three or four shafts connected by levels, embracing many hundreds of feet of workings altogether. The Ute has from 30 inches to 7 feet of vein matter, regular well defined walls, a northeast and southwest direction, and a northwest dip; average yield of all ore reduced, 25 ounces of silver and from $4 to $5 per ton in gold and 40 per cent of lead. Later returns raise the silver to 65 ounces a ton, and reduce the lead to 30 per cent; 50 tons daily can probably be mined when steam hoisting works and pumps are used. The ore reserves are large.

The Ule has the same direction and dip as the Ute. The ore is galena and gray copper, and carries from $5 to $10 in gold, from $40 to $550 in silver per ton, and forty per cent lead. In shaft number one the vein is five feet wide, and in drift number two from thirty to sixty inches. It is proposed to run drift number two clear under the mountain and as far as the vein goes, and to cross by a tunnel 300 feet over to the Ute which would be cut at a depth of 1,000 feet. Both mines would then have drainage and an ore channel. About 400 tons of ore came from shaft number one in sinking.

The works and mill site have the finest water power in the State, and, owing to the location, one thousand horse power can be made available. The Crooke Mining and Smelting Company, owning these mines and works, is officered by president, John N. Goodwin, ex-governor of Arizona; vice-president, Thomas F. Mason; secretary and treasurer, W. Hart Smith; and the above and Lewis Crooke, E. J. Granger, William Spence, and S. W. Hill, trustees.

The Dolly Varden lode is on Hensen Creek, and carries a very rich vein, often four to ten inches. During the year 1878 considerable ore was sold that yielded from $225 to $1,100 a ton. It was sold last fall to ex-governor Henry Cooke, of Washington, James L. Hill, Major Hurlbert, and J. R. Magruder, who are pushing work thereon. The George Washington Lode has ore worth hundreds of dollars. Among other lodes of note are the Big Casino, Belle of the East, Belle of the West, Coral, East Boston, Little Chief.

The accompanying tables will give an idea of the characteristics of Hinsdale county lodes. Such statements, however, do not always show the comparative size and value, as one lode may carry its ore in bunches, pockets, or short chimneys, while another is continuous vertically and horizontally, and consequently carries vastly more ore and money in the aggregate. More than this, the richest veins do not insure the largest products or profits; quantity of mineral plays an equally important part. Most figures for yields per ton on both Hinsdale and Ouray counties refers to ore after being assorted, and not just as it lays in the vein.

Reports of new discoveries in the San Juan region did spread widely, and immigrants came to the valley in increasing numbers. The Silver World, in the issue of October 2, 1875, observed that "The influx of strangers is astonishing, not an hour passes but our streets are thronged with new faces; and every day sees some new families who have pitched their tents in our midst." By November of 1875, the town had sixty-seven completed buildings and about 400 inhabitants. In the May 17, 1877 issue of The Rocky Mountain News, the correspondent for the Lake City area estimated that the population was about 1,000, with another 2,000 encamped along the near-by creeks. During that summer, six to twelve wagons a day paid the $3.00 toll over Mears' Saguache and San Juan Toll Road and arrived in Lake City. Many came to Lake City on the Otto Mears and Express Company that transported passengers and freight alike over his toll roads. Others came on Barlow and Sanderson's stagecoaches, which began tri-weekly service to Lake City in 1875. The Capitol City Daily Stage, bringing passengers to the county seat from Capitol City, points west, and other settlements along Henson Creek, came into existence after the founding of Capitol City. While some newcomers continued to live in tents, most erected houses within a short time. At the end of its second year, Lake City could claim over 2,000 residents and 1,000 buildings and homes, as reported in The Rocky Mountain News edition of May 17, 1878.

Probably the most talked-of find during this period was that of the Golden Wonder, located in Dead Man Gulch, so named because of five men who were killed and partially eaten on the site by their companion and misguided leader, Alfred Packer, in the winter of 1874. Packer had been hired to lead a group of prospectors to the gold fields of the Breckenridge, Colorado area, but had taken a wrong turn and ended up marooned north of Lake San Cristobal.

R. W. Raymond, in a report for 1874 mentioned the Lake District of the San Juan country and the discovery of the Hotchkiss lode of tellurides of gold and silver. In his report for 1875, he reported that the:

"Lake district includes all the locations made in Hinsdale County, except the mines situated in Burrows Park at the extreme head of the Lake Fork of the Gunnison, which constitutes what is known as 'Adams' or "Park" district. . . .

"The only mines that have been worked to a considerable extent in the country are the Hotchkiss in Lake district; the Silver Wing in Eureka district (San Juan County), and the Highland Mary, Aspen, Prospector and Little Giant in the Animas district (San Juan County).

"The Hotchkiss, located by Enos T. Hotchkiss, is the best developed mine in the San Juan country. The strike of the vein is northeast and southwest; the vein matter is 60 feet thick, and it was only in the latter part of February that what is considered the true ore zone was found. There are two tunnels, 50 and 80 feet long, respectively, which give access to the vein. The ore consists of tellurides, containing in value about equal proportions of gold and silver. Specimen assays range from $17,000 to $20,000 per ton; 18 tons of ore shipped averaged $1,318.61; 75 tons remain on the dump, valued at $150 per ton."

Development was continued and new discoveries were made almost daily. The first boom attained its climax in 1876, coinciding with the opening up of the Ocean Wave Group and the continued production of the Hotchkiss and the Ute/Ulay mines. During the spring, the erection of a concentrator was begun and ground was broken for a smelter at the falls just above the city6. Soon afterwards, the reaction and lull so characteristic of the region began.

During the next three years, work was continued on the Ute/Ulay and the Ocean Wave properties; the Excelsior mine was located in April of 1878, and the Crooke and Ocean Wave smelters were completed.

The year 1880 marked the beginning of the biggest boom in the Lake City region. A great deal of work was done on the Palmetto group, which lies just west of the Lake City quadrangle. The St. Louis, Capital, Czar, Silver Chord, Young America, Yellow Medicine, Pride of America, Vermont, Red Rover and many other properties near Capitol City were being worked with varying results.

H. C. Burchard stated in his report to the Government in 1881 that Crooke & Co., at Lake City, did most of the smelting in San Juan in 1880. This second boom period reached its climax near the close of 1881. In that same year, construction ceased on the spur from Sapinero to Lake City, because the Denver & Rio Grande Railroad developed financial difficulties.

In his report of the following year, he reported that for 1881:

"The chief metallurgical works are those of the Crooke Mining & Smelting Co. The production for 1882 was 600 tons of lead and 75,000 ounces of silver.

"The Polar Star, Ute and Ulay mines have, up to the present time, almost entirely supplied Crooke's works to their full capacity.

"The Palmetto has a 15-stamp mill, capable of handling 25 tons of ore per day. There have been sent to the mill 400 tons of ore which yielded $28,000 worth of silver."

In Burchard's report for the calendar year 1882, he says of the districts in Hinsdale County:

"Galena district comprises, as the name indicates, veins of principally argentiferous lead ores (sulphide and sulphate of lead), generally accompanied by auriferous copper and iron pyrites, gray copper, zinc blende and quartz.

"The best representatives of veins of the above character are the Ute and Ulay mines, on Henson Creek, 31/2 miles west of Lake City. . . The mine shaft on the Ulay has reached a depth of 410 feet. During last year, extensive concentration works have been erected at the openings on the Ulay, which have proved a complete success. Their capacity is 150 tons of ore per day, affording also a good opportunity for treatment of similar ores from foreign mines.

"In connection with these mines are the smelting works near Granite Falls, 1 mile south of Lake City, with a capacity of 35-40 tons per day. The property is owned by the Crooke Mining & Smelting Co. (Ltd.), of London. . . . The mines have been worked for the greater part of the year and have produced over 8,100 tons of ore, of which 3,750 tons have been treated at the works. . . .

"In the Ocean Wave the vein is about 31/2 feet wide, with 10-12 inches of splendid mineral, principally gray copper and galena. Up to the year 1880 the total product of this mine, treated at the Ocean Wave works, was 110,000 ounces. Since that time mine and works have been idle. . . .

"On Engineer Mountain, at the headwaters of Henson Creek, most of the large fissure veins carry high-grade silver ores consisting of ruby silver, antimonial silver, gray copper and iron and copper pyrites impregnated through vein matter. The best developed mine is the Palmetto. . . . During the first half of last year [1881] 600 tons of ore were extracted and treated at the Palmetto works by the amalgamation process, yielding $18,480.

"But chief among the Engineer Mountain properties is the Frank Hough mine, which was discovered early last January. . . The ore is a copper ore, copper pyrites and iron pyrites. The ore occurs in solid, large and irregular bodies, often separated and intersected by small and large talcish and chloritish fissures traversing in every direction. The average value of the ore at present exposed is from 50 to 60 ounces of silver, a tract to 1 ounce of gold, and about 20 to 28% of copper per ton. Sixty tons of ore were shipped late last year, with an average value of about $125 per ton. . .

"Lake City is the central point of Lake District; all the prominent mines are within a radius of 4 miles."

Following is an excerpt from the Report of the Director Of The Mint upon the Production of the Precious Metals in the United States during the calendar year 1883; Washington Government Printing Office, published in 1884.

The year 1883 has been a dull one for Hinsdale County, even considering that a gain of $100,000.00 was made over 1882.

Galena district.- Crooke's Mining and Smelting Company properties, consisting of the famous Ute and Ulay, situated on Henson Creek, 31/2 miles from Lake City, are the most extensively developed mines in the San Juan. The total linear feet of development on the Ulay is 4,000 feet. The Ute has 3,000 feet, and recently a rich body of ore was uncovered, averaging 20 feet in width. It is not a cave mine, but is making a cave where the ore is extracted. These mines are producing 1,000 tons of ore per month. These two mines were located in 1874 by a group of four men, but credit for discovery was attributed to Henry Henson. In 1876, these were purchased by the Crooke Brothers. A smelter was then erected for the treatment of the ore, and during the past year

concentrators of a capacity of 150 tons per day were erected. The first-grade ore goes to the smelter, the concentrates to Pueblo and Denver. The property is now owned by the Crooke Mining and Smelting Company (Limited), of London. The Pueblo smelter purchased $100,000 in concentrates from this company during 1883.

The Compromise lode, the northeastern extension of the Ute, has not been worked beyond its necessary assessment. The width of the mineral body is from 2 to 6 feet. The ore is similar to that in the Ute at the same depth. Developments amount in all to about 200 feet. None of the veins farther west on Henson Creek have been worked beyond the annual assessment, although many show a good grade of mineral and in veins of good width.

The Ocean Wave, 81/2 miles west of Lake City, still remains unproductive; the property is well developed, having three levels of 150, 200, and 450 feet in length, with considerable stoping ground. The vein is about 31/2 feet wide, pay streak about 10 inches.

The Big Casino and Pride of America have made some advancement towards productiveness, having shipped 234 tons of ore that averaged 45 ounces silver, 55 per cent lead. The vein is 7 feet wide, pay streak 3 feet. Character of ore is galena and gray copper.

Farther west, along Henson Creek, in the vicinity of Capitol City, are a large number of promising prospects, many of which are being developed in such a manner as to soon become mines, most notable of which are the Moro, Moro No. 2, Victor, Vermont, Capitol City Mining & Smelting Company, Morning Star, Silver Chord, Silver Chord Extension, and Independence.

The Capitol City Silver Mining Company has been working the Lily vein that has produced about 400 tons of ore, 47 tons only having been shipped. This company owns the Lily, Capitol City, and Capitol City Extension; the ore of these veins consists of galena, zinc-blende, iron, and copper pyrites; width of vein about 5 feet, pay streak about 20 inches.

The Lily is developed by a shaft of 110 feet connected at the bottom by a drift of 250 feet.

The Capitol City is developed by a shaft of 137 feet, at the bottom of which is a drift of 20 feet.

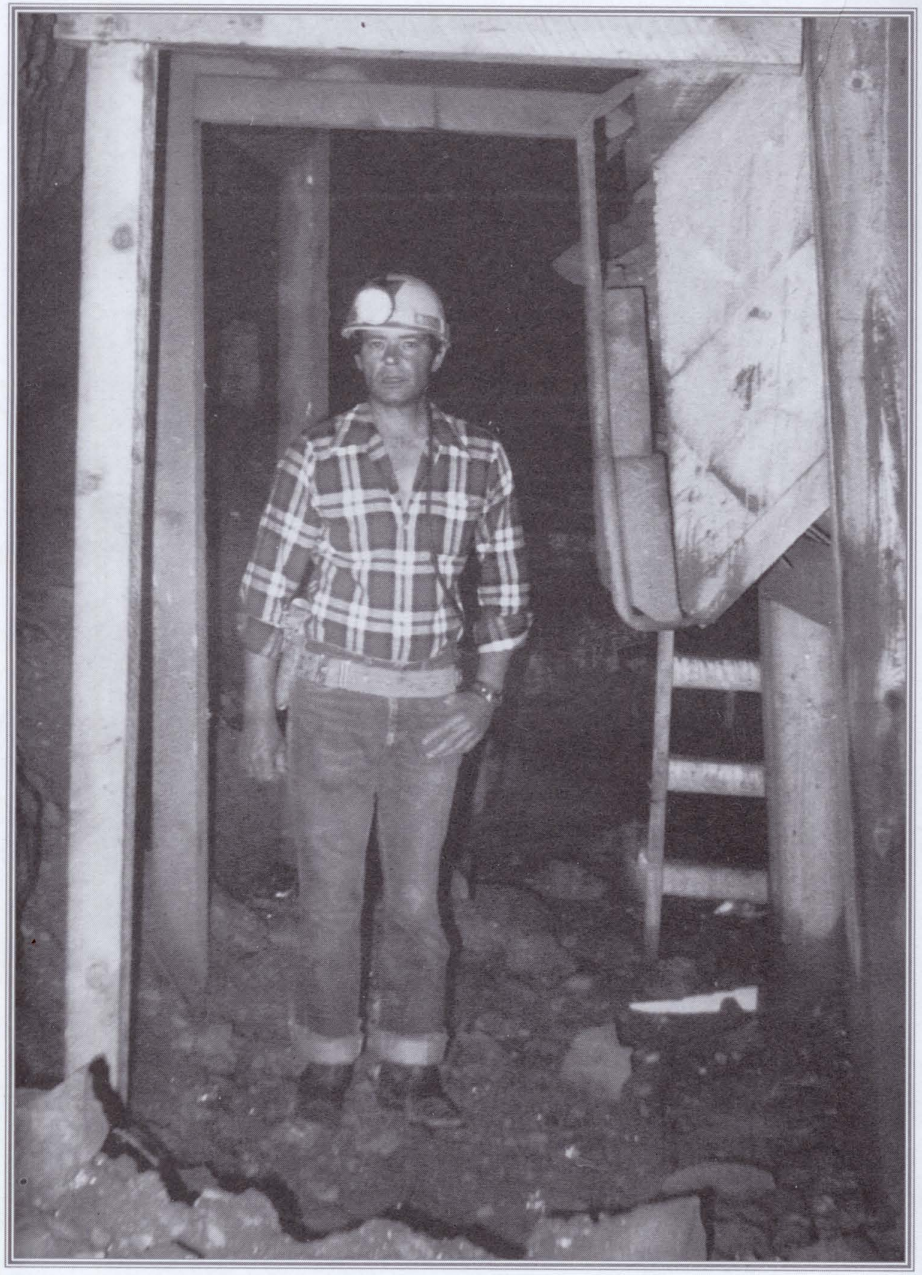
The Silver Chord has a shaft of 90 feet, with 30 feet of drifts. The vein is 4 feetwide, pay streak 12 to 18 inches, consisting of gray copper, galena, and iron pyrites.

The Silver Chord Extension has a crosscut of 157 feet; the shaft is 120 feet, with 200 feet of drifts. The width of vein and character of vein filling are similar to the Silver Chord.

The Moro, 1 mile west of Capitol City, on Capital Mountain, has 400 feet development in shafts and drifts. The ore-body is quite extensive, and will probably average 3 feet in width.

The Moro No. 2 is an extension of the Moro, possessing about the same width of vein and the same character of vein filling.

Farther west, and on the north side of Henson Creek, is Galena Mountain. The Independence, on this mountain, has been placed in good condition for producing.



John Saville inside the Pride of America Mine.

Billy Burke mucking and tramming, Pride of America Mine.

Billy Burke drilling on the face of Pride of America vein with Wendall Fobarc watching.

A contract was made recently for 2,000 tons of ore with the Mingo smelter of Salt Lake City and great improvements on the surface and underground workings. On the surface, in addition to the necessary machinery and ore houses, a chute of 1,700 feet was built to be used in place of a tramway. The drift has been pushed to 275 feet, and the shaft will be sunk deeper when new drifts will be run. The ore is mainly a heavy galena, and runs about 40 ounces silver.

The Morning Star, on the lower end of Galena Mountain, has come to the front as a producer during the year. The ore is a heavy galena; averages $60 per ton. About 500 tons are now on the dump. This property is worked by two tunnels; the upper tunnel, 7 by 8 feet, is 170 feet in length; the lower tunnel is 260 feet, with a shaft from the bottom of lower tunnel 30 feet deep. The ore is low grade, and but a small amount has been shipped during the year.

In this vicinity, in Schafer and Horseshoe Basin, will be found very many promising prospects that possess veins from 2 to 6 feet, the pay-streak showing a good grade of mineral. Passing west to the headwaters of Henson Creek is Engineer Mountain. The veins are large fissures, carrying high grade silver ores, consisting of ruby silver, antimonial silver, gray copper, copper and iron pyrites impregnated through the vein matter. The Palmetto, probably the best developed mine in this section, has been non-productive during the year. During 1879 this mine came into prominence, and was then one of the most profitable and productive. This claim, together with the Ruby Queen and First National, are owned by a Philadelphia company. The vein of the Palmetto is from 10 to 30 inches wide, and carries ruby, brittle, and wire silver in a black-stained quartz. The Polar Star Mine, an extension of the Palmetto, has been steadily developed, and a large quantity of the ore extracted has been treated at Crooke's smelter. The ore is similar to the Palmetto.

The Frank Hough has been the chief producer of this section, having shipped about 800 tons of ore. Contradictory theories have been advanced respecting the character of the formation of this mine. One of the professors of the Golden School of Mines, who inspected the mine, says that it is undoubtedly a fissure vein. Mining experts declare it to be a contact or blanket deposit. Development has not been sufficient on this property to prove the nature of the formation. The managers have seen fit to work only in ore bodies. For 30 or 40 feet from the surface no ore body is disclosed by any of the drifts. Then in each drift to the south as far down as they are run and for 30 feet from the shaft is a continuous body of ore, varying, as a matter of course, in grade, but most of which is sufficiently high to mine and treat at a good profit, the general character being galena, gray copper, and so-called sulphurets. The drift to the west at a depth of 200 feet cuts through an ore-body 50 feet from the shaft; the other open drifts in the same direction not being in so far show the ore-body as continuing at the breast of each. This would naturally give rise to the opinion that the shaft is at the corner of a rectangular body of ore 30 by 50 feet. To prove this position, however, it would be necessary to drift in a southwesterly direction 60 feet and find ore throughout and to drift some distance northeast and find none. While the development on the Frank Hough is all-sufficient to show it to be a good mine, it is wholly insufficient to speak positively of the true formation. A 40-foot winze was completed at the 260 foot level, and a drift commenced towards the ore-body. This body has been pitching away from the main shaft, and on this drift will largely depend the future work of development. It will also determine the

question of drifting in a southwest direction.

The Michigan vein of Alpine Creek has a vein 41/2 feet in width. There is a streak of concentrating ore of nearly solid gray copper, from 5 to 12 inches wide, on the hanging wall, while the balance of the vein is sulphurets of silver in small pockets, iron, copper, and crystallized quartz. Twenty tons of this was concentrated at Crooke's into 6 tons of concentrate that was worth $175 per ton. The property is being systematically developed, the shaft being 60 feet deep, with 70 feet of drifting.

Farther up Alpine Creek are numerous claims, none of which have produced bullion, nor possessing any considerable amount of development; the ores being "dry ores," are low grade, and require concentrating.

Park district has many veins that are wide and of a fair grade, but beyond the annual assessment very little work has been done. Among the most promising looking properties are the Illinois Boy, the property of the White Cross Mining and Milling Company, the Champion, Grand Republic, Cashier, Inez, Earl, and Red Robin.

Sherman district, with the exception of Camp Carson, has made but little advancement in the development of its mines. The Black Wonder, near the town of Sherman, is probably the best developed mine in the district, and during the year very little has been done toward making the property a producer. The Black Wonder, Black Wonder No. 2, and George Washington belong to the Black Wonder Consolidated Mining Company. On the Black Wonder is a cross-cut tunnel 250 feet in length, with two drifts 50 and 150 feet and a shaft 70 feet. The Black Wonder No. 2 has a shaft 30 feet deep and a tunnel 35 feet. The George Washington vein has two drifts, 80 and 150 feet in length. The veins are wide, but the pay-streaks are narrow. No ore has been shipped from these properties for three years.

On the North Fork of Cottonwood Creek are the Vermont and Vermont Extension, two claims that have been extensively worked during the past year and some ore shipped. The developments consist of a shaft 65 feet and 540 feet of tunneling. Width of vein is 6 feet between walls. The vein filling is galena, gray copper, and native silver. The ore averages 150 ounces silver per ton and 30 per cent lead.

The Irish World, on the south fork of Cottonwood Creek, has a large vein of gray copper, copper pyrites, and zinc-blende, carrying about 120 ounces silver. The development consists of a cross-cut tunnel 135 feet, with 30 feet yet to go to cut the vein. At Camp Carson, a new mining camp some 5 miles from Sherman, on Lost Trail Creek, are some very promising looking claims, many of which are undergoing considerable development work.

Lake district.-The Belle of the West, about 3 miles south of Lake City, is one of the best developed mines in this district. Nearly 200 tons of ore were extracted while in development, which was worth $12,000. No stoping has been done and probably never will be until a railroad reaches Lake City or adequate market secured. The vein averages about 2 feet, composed of quartz, galena, iron sulphurets, and gray copper. The Belle of the East, adjoining the Belle of the West, and parallel, has not been working during the year beyond the necessary assessment work. The ore is similar to that of the Belle of the West, and the width of vein is about the same; water has been the cause of this property being non-productive, but a small amount of capital will place this in a productive state.

The Mountain Chief has been developed considerably during the year, but the ore is sacked and stored, not shipped. The vein filling is similar to that of the Belle of the West and the vein is about 20 inches wide.

The Saint Paul Sulphuret Consolidated Mining Company is a finely developed property, but has not produced bullion during the year. There are three shafts, 45, 125, and 200 feet, respectively. Drifts are run from the bottom of each of these, but the ore being so scattered, no stoping has been done. The character of the ore is gray copper, galena, and zinc-blende.

The Golden Fleece is the modern name for the claim, formerly known as the Hotchkiss, which during 1874-'75 produced tellurium in large quantities. The vein of this property was lost, but during November of 1883, was found, and the owners now expect to work a large force of men during the coming year.

The Plutarch has been undergoing a systematic course of development, new levels have been run upon the vein, the old working cleaned out, and the property put in good condition. The ore streak varies in width but will average 6 inches. Machinery will be placed upon this property during the coming year, and it will be thoroughly prospected.

The Mayflower has been worked in a limited manner, but no ore extracted. The ore is gray copper and zinc-blende, running about 200 ounces silver; the width of vein is 20 inches. This vein will be worked by a tunnel of 180 feet.

Among the properties in this vicinity that show mineral, but on which only assessment work was done, are the Silver Coin, Nellie M., Monte Queen, Highland Mary, Dolphin [sometimes referred to as the Dauphin], Goshen, Minstrel Boy, Mount Morris, and Pomeroy. The production of this county for 1883 is estimated to have been: gold, $20,000; silver, $250,000; total, $270,000. The production of silver in the previous year was only $80,000, showing a large increase in 1883.

Burchard's report for 1884 relayed the following information:

"Hinsdale County's output has fallen off considerably. . . with the closing of the Crooke's Mining & Smelting Co., the largest producer of the county, after but three months of production. . . .

"The Frank Hough mine has been one of the main factors in swelling the output of the county."

The production of the Frank Hough mine amounted to 700 tons valued at $52,500. In the fall of 1885, the Ute/Ulay shut down and for four years, Lake City was practically dead. In 1887, considerable ore was shipped from the Ulay, Vermont, and Yellow Medicine properties. The shipments from the Yellow Medicine fell off perceptibly in 1885, but the Ulay and Vermont continued to ship large quantities of ore. The Gallic was discovered during this period and later made a few shipments. In 1889, the branch railroad was completed and soon afterward very rich ore was reported from the Golden Fleece. A single car of petzite ore from this mine is said to have yielded $50,000. The extreme richness of this ore stimulated mining throughout the region for about ten years. The total output of the Golden Fleece mine has been $1,400,000. In 1890, some twenty mines in the Lake City quadrangle were shipping ore. During 1891, the Ute and Ulay alone produced over $400,000 and the total production from these mines has been $12,000.000.

Rich Silver Ore Vein, Pride of America Mine

The following is a portion of a report concerning Hinsdale County, taken from the Report of the State of Colorado Bureau of Mines, Denver U.S.A. for the year 1897:

HINSDALE COUNTY

Production for 1897

Gold - 8, 136 oz. @ $20.97 (Per oz.) Total = $168.171.12

Silver - 243.437 oz. @ $ .5965 (Per oz.) Total = $145,210.17

Copper - 8,085 lbs. @ $ .105 (Per lb.) Total = $848.93

Lead - 5,550,058 lbs. @ $ 3.38 (Per cwt.) Total = $187,591.9

TOTAL - $501,822.18

A listing of some of the working mills at that time is follows:

MILLS NAME	LOCATION	CHARACTER	DAILY CAPACITY
Yellow Medicine	Capitol City	Rolls and Table Buddle	100 tons
Ute and Ulay	Near Lake City	Rolls, jigs, tables	550 tons
Hidden Treasure	Henson Creek	Rolls, jigs, tables	100 tons
Ocean Wave	Lake City	Experimental	40 tons
Shaffer	LakeCity	Samplings works	30 tons

"In point of scenic attractions, Hinsdale County has few equals among other counties in the state. From point of natural resources it possesses a vast amount of undeveloped territory, the value of which has been and is being daily demonstrated. While high grade ores exist, the main values lie in stock requiring treatment prior to shipment. This requires capital, and money judiciously expended will bring satisfactory returns."

In the late nineties the mining activity in the region almost reached a boom. Much work was done upon other properties in the vicinity of the Golden Fleece and some ore was shipped. The Golden Fleece Extension, Lake View, Black Crooke, Contention, and others were operated.

The famous Hidden Treasure Mine was located on Henson Creek, 3 miles above Lake City. The settlement of Treasureville, where most of the miners lived while working at the mine, was named after the Hidden Treasure.

The Hidden Treasure was discovered by Musgrove and Mullins in 1874. Very little work was done until 1890, when Patrick C. McCarthy, Phil Harrington and George Fry obtained the title at a tax sale. At that time, they were employed at the Ute/Ulay mines in supervisory capacities. Production at the Hidden Treasure was very high from 1897 to 1930, when a decline in metal prices forced a curtailment of production. The Hidden Treasure Mine produced $1,200,000.00 in ore during the years from 1897 to 1930.

Hidden Treasure Mill, Office, Bank and the Town of Treasureville

General Features of the San Juan Mountains

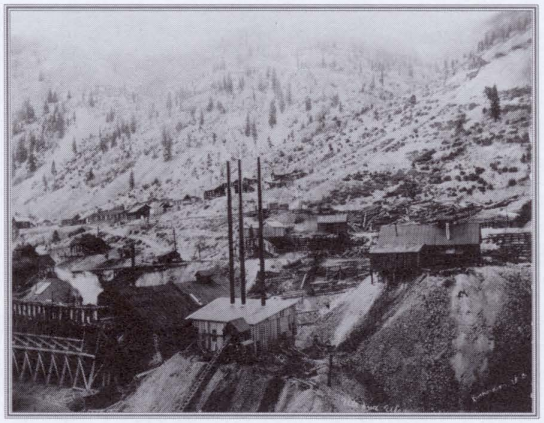
The San Juan Mountains consist chiefly of surface volcanic rocks or of intrusive igneous masses, which now cover an irregular area of more than 3,000 square miles. This volcanic area extends from San Luis Park (commonly referred to as the San Luis Valley) on the east to an irregular and abrupt western mountain front in the Telluride quadrangle. On the north the volcanic rocks reach out beyond the mountainous district proper, the lower lava flows capping long low ridges between southerly tributaries of Gunnison River, some extending to the edge of Black Canyon. The southern border of the volcanic district runs from the Telluride quadrangle somewhat southeast and a broad arm crosses into New Mexico.

It is evident that the lava flows once extended far beyond their present limits on all sides except the east. The eruptions occurred during the whole of Tertiary time, when a great many different kinds of lava were poured out, building up a huge volcanic plateau. Eruptive activity was not continuous during the Tertiary period, but was broken by long intervals of quiet, during which extensive erosion materially changed the topography of the volcanic pile.

In the survey of the San Juan region, it is easier perhaps, to describe the rocks of the principal eruptive periods in groups or series, rather than to emphasize the occurrence of special rock varieties. This method will be followed herein.

The Earliest Eruptions

The commencement of volcanic activity was clearly later than the disposition of the Upper Cretaceous coal measures of southwestern Colorado, but somewhat earlier than any of the recognized Tertiary formations of the region. This is shown by the Animas formation, which overlies the coal measures of Durango and which consists largely of the pebbles and gravel of andesitic volcanic rocks. These beds carry fossil plants and scanty vertebrate remains which proved them to be of the same age as the Denver formation at the base of the Front Range-that is, early Eocene or uppermost Cretaceous. The source of the volcanic materials of the Animas formation is not yet known.



Ute and Ulay Mine Site and Town of Henson in background.

Rock Formations

The scope of this report will not permit the detailed description of the rock formations of the San Juan Mountains. However, a brief description follows:

San Juan Tuff - The San Juan tuff has a maximum observed thickness of 3,000 feet and forms notable deposits in the Ouray and Telluride quadrangles, though it appears in all other surveyed areas on the border of the volcanic district. It occurs in typical form in the Cimarron and Blue Creek valleys of the Lake City quadrangle.

The source of the andesitic rocks of the San Juan tuff was a mystery previous to the survey of the Lake City quadrangle. It now appears probable that a portion of the older volcanic mass from which those tuffs were derived occurs in the valley of Lake Fork a few miles below the mouth of Henson Creek.

Silverton Volcanic Series - The group of lavas succeeding the San Juan tuff are known as the Silverton volcanic series, as they have their greatest development in the Silverton quadrangle. These rocks are of special importance in the area treated in this report. They consist of an alternation of andesites, latites and rhyolites, in both flows and fragmental beds.

Picayune Volcanic Group - The earliest of these lavas, first observed in the Silverton quadrangle, is a dark augite/andesite occurring in relatively small exposures in the Animas Valley and its minor tributary, Picayune Gulch.

Eureka Rhyolite - Among the more siliceous varieties of rock in the Picayune group is a rhyolitic lava which became more and more abundant until it was finally poured out in a thick flow or succession of flows. These appear to have buried the older complex of Picayune rocks and now form a prominent and persistent element of the Silverton volcanic series. This rock is called the Eureka rhyolite. It may generally be described as a flow breccia, for it characteristically carries many small fragments of rhyolite and other rocks. Gray or pinkish exposures of it are continuous for several miles in the canyon of Henson Creek above Lake City.

Burns Latite - The extensive flows of Eureka rhyolite were followed by eruptions of several varieties of latite lavas and tuffs more or less in alternation. Two finely-grained tuffs, especially, are widely distributed in the Silverton quadrangle, one below and the other above the principal lava flows. This aggregation of flows and tuffs is called the Burns latite, from Burns Gulch, a branch of the Animas near Picayune Gulch. The rocks of this material occurring in the Lake City area are all tuffs.

Pyroxene Andesite - The Burns latite is succeeded by dark fine-grained pyroxene andesite in a complex of flows and fragmental beds reaching a maximum thickness of nearly 3,000 feet in the central part of the Silverton quadrangle. These rocks are closely related to some of the Picayune lavas but have distinguishing characters. Massive flows of pyroxene andesite of this upper part of the Silverton volcanic series are present on the north side of Henson Creek near Capitol City, but they decrease in thickness eastward and disappear entirely west of Nellie Creek.

Henson Tuff - The uppermost member of the Silverton volcanic series is a greenish-gray Andesitic tuff, named Henson tuff, from its notable occurrence on North Fork of Henson Creek, in the Ouray quadrangle. Its development in the Lake City area is very subordinate.

Potosi Volcanic Series - The long Silverton epoch of eruption was followed by a quiet time, during which erosion was very active; and then began another great succession of volcanic outbursts, producing lava flows and conglomerate deposits alternately. These lavas appear to have covered a larger area than the earlier ones. They are mainly latite and rhyolite, with some andesite, all of types different from the preceding ones, and preserved in much less altered condition. These rocks are called the potosi volcanic series because of their typical exposure and notable thickness and variety in Potosi Peak, Silverton quadrangle. They cap certain ridges north of Henson Creek and occupy much of the Lake City quadrangle farther north. Uncompahgre Peak presents a fine section of Potosi flows.

Hinsdale Volcanic Series - The western San Juan region exhibits no lavas more recent than those of the Potosi volcanic series, but in portions of the region a later succession of eruptions took place, producing a series of lavas differing notably from the products of earlier eruptions. It is plain that much erosion of the Potosi volcanic series occurred before the extrusion of these later magmas, which, so far as known, closed the long sequence of lavas in the San Juan region.

This newly recognized series of lavas range from a rhyolite very rich in quartz and alkali feldspar but poor in calcic feldspar and in all ferromagnesian minerals to a normal olivine plagioclase basalt. Between these two extremes are lavas of several types possessing some characteristics distinguishing them from earlier lavas.

Rocks of this recent series have not been described in earlier reports. It has been suggested that they be called the Hinsdale volcanic series because of their important occurrences in Hinsdale County, with Lake City as the county seat.

The Hinsdale is, like the Potosi and Silverton volcanic series, a set of lavas representing one of the major divisions of the San Juan volcanic history rather than a petrographic group. It is too early to sharply define its limits.

Nearly all the rocks of the Lake City area belong to the Silverton volcanic series, the great intermediate member of the Tertiary volcanic complex. No earlier formation occurs here, and only subordinate representatives of the later Potosi and Hinsdale volcanic series occur in the district. Intrusive masses are numerous, but though these are obviously younger than the rocks that they penetrate, their exact age relations are nowhere clear.

The canyon of Henson Creek, which is the most prominent topographic feature of the area, presents an excellent section, albeit not complete, of the prevailing somber rocks of the Silverton series. On its southern side the lowest (oldest) member of the series, the Picayune group predominates. On its northern side several higher (younger) members are well shown. The general northerly dip of the lavas and tuffs affords proof that the center of eruption during the Silverton epoch of volcanic action was south of the Lake City area.

The various rocks of the Silverton series do not extend far northward beyond Henson Valley nor eastward beyond Lake Fork. This limitation is due to great erosion in the epoch preceding their eruption. The San Juan tuff, and perhaps earlier massive volcanic rocks, once existed where the Silverton lavas of Henson Creek now are. By their erosion, a steep southward-facing slope or cliff was produced near Capitol City in the bed of a southerly branch of Henson Creek, where it enters east of the Moro mill.

This granite is on the north side of a fault of undetermined throw and the exposure is but a few yards in diameter. It is one and one-half miles from this point south to the large fault block of granite, the greater part of which lies north of Whitecross at the head of the Lake Fork.

Quartzite that resembles the pre-Cambrian rocks of the Uncompahgre Canyon at Ouray occurs in a small exposure, surrounded by volcanic rocks at an elevation of 11,800 feet, a little more than a mile southeast of Capitol City. The exposure is insufficient to show whether this quartzite is a large block included in the volcanics, or a pinnacle of an underlying quartzite topography, but it is clear that rocks other than granite make up the pre-volcanic complex of this vicinity.

Intrusive Rocks

The intrusive rocks are not intimately related to the ore deposits and will be mentioned only briefly. Some of the types occur in more important masses in the areas north or south. The various kinds of intrusives may be conveniently grouped under the following headings:

Rhyolite -The most widely distributed type in this group is a rhyolite that is very abundant south of Henson Creek in bodies of various sizes and shapes, cutting the Picayune volcanic group.

This rhyolite is a grayish porphyry exhibiting phenocrysts of orthoclase, and quartz with a few biotite flakes, in a felsitic groundmass. In some places the rock has a strongly marked fluidal texture and in others it is massive.

Quartz Latite - In the hills east of Lake City and in Deadman Gulch are several sheets of a fine-grained quartz latite, which cut the Burns latite tuff irregularly. This rock is gray in color, with small crystals of plagioclase, sanidine, biotite and quartz in a subordinate groundmass. Tongues of the groundmass contain the quartz crystals, after the fashion of the rhyolite south of Henson Creek, but the rock contains much plagioclase, is rich in biotite, and carries a little hornblende. It is called quartz latite porphyry.

Another rock of this kind, nearly identical in character with certain flows of the Potosi volcanic series, occurs as a sheet or sill injected above, below, or within the Henson tuff, in the area between North Fork of Henson Creek and Nellie Creek. In some places it is 200 to 300 feet thick. It extends north two miles from Broken Hill, reappearing at the head of Cimarron Creek, southwest of Uncompahgre Peak.

This rock is gray, with prominent biotite crystals, and is more compact than the usual Potosi flows, but it shows fluidal texture in some places and may present an intrusion during the Potosi epoch of a magma, which reached the surface elsewhere in the vicinity.

Andesite - A sheet of dark fine-grained andesite cuts obliquely across the Burns latite tuff in the face of the hill east of Lake City. The rock carries hornblende in abundance, with some augite and biotite, all greatly altered. No other mass of this character occurs in the area described in this report.

Quartz Monzonite Porphyry - In the ridge west of Capitol City there occurs a branching intrusive body of much more coarsely crystalline texture than is exhibited by any other intrusive. It cuts the Eureka rhyolite and is probably more extensive, for landslide and glacial debris obscures its outcrops greatly.

Genesis of Minerals

It has for some time been recognized that different associations of minerals form under different conditions of temperature and pressure. Those formed under high temperature and pressure are in extreme instances entirely different from those formed under low temperature and pressure. In mineral formation, this may be regarded as a measure of the vertical depth at which ore formation has occurred. In other words, the earth's crust in any given locality may be divided into zones of depth. Within the vertical range of each zone, characteristic temperature and pressure may be assumed to have existed. The mineral contents of the veins of any region will then express in some degree the depth at which the minerals formed.

In comparing the different districts of the San Juan Mountains with the Lake City District, an attempt has been made to classify the minerals constituting the ore deposits of the districts above mentioned into groups, each of which is characteristic of a particular zone.

Mineralogical Similarity

Disregarding for the moment the contact metamorphic deposits, the veins of the San Juan region exhibit a fairly close mineralogical similarity in their most common primary constituents. They are characterized chiefly by pyrite, argentiferous galena, sphalerite and tetrahedrite, with a gangue composed largely of quartz with subordinate rhodochrosite and other carbonates.

Mineralogy

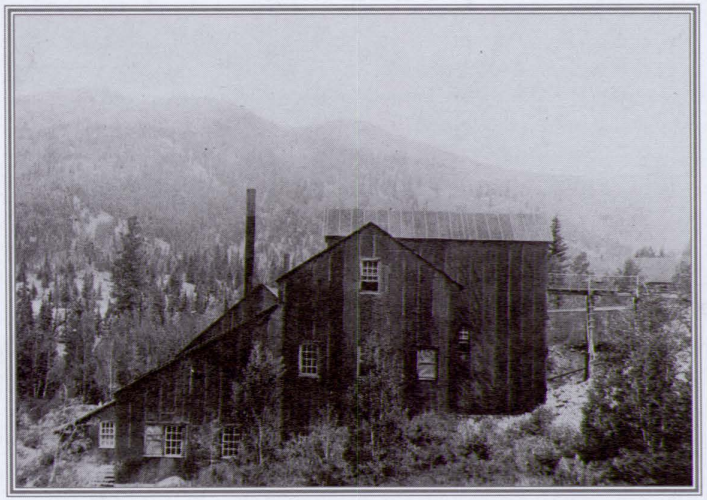
The mineral species of the Lake City district are either primary or secondary. The primary minerals are:

(1) Minerals formed at shallow or moderate depths - Sericite, Hinsdalite, Jasperoid, Barite, Rhodochrosite, Tetrahedrite (Bismuth Compounds).

(2) Persistent minerals common to all depths - Quartz, Calcite, Fluorite, Chalcopyrite, Galena, Sphalerite, Stibnite, Tellurides, Pyrite.

The secondary minerals are comprised of minerals that are a result of oxidation processes - Kaolinite, Limonite, Hematite, Native Silver, Gold, Copper, Malachite, Azurite, Cerussite, Anglesite, Chalcanthite, Pyrargyrite and Argentite.

No minerals characteristic of the deeper zones appear in the Lake City lodes. Therefore, the latter were probably formed at moderate depths below the surface. In other words, the covering of superincumbent rock has been lighter in this region than in the adjacent Silverton and Telluride districts.



Golden Fleece Mill

The following is taken from the Report to the Director of the Mint upon the Production of the Precious Metals in the United States during 1883.

The mineralogy of the Lake City District has been compiled to show the mineral relations among the districts of the San Juan region. The list of minerals has been made as complete as the conditions would permit, but it is probable that it would have shown much greater variety if all parts of the lodes had been accessible. It is impossible to divide the lodes into groups separated by absolutely sharp and characteristic mineralogical differences. They may, however, be divided, according to the relative abundance of their component minerals, into three fairly distinct types:

Tetrahedrite-Rhodochrosite Group - The tetrahedrite-rhodochrosite group of veins comprises those whose ores consist of dominant galena and argentiferous tetrahedrite with considerable sphalerite and some pyrite in a gangue composed chiefly of quartz, rhodochrosite and barite. The distinctive or diagnostic minerals in this group of veins show a preponderance of tetrahedrite, rhodochrosite and abundant barite. Pyrite is usually subordinate in quantity. Chalcopyrite is also subordinate. Gold values are invariably low and the veins produce chiefly lead and silver. Copper is a by-product. Zinc is not generally present in paying quantities and unless saved in the mill is objectionable. The enriched primary ore in these veins varies in silver value in accordance with the proportion of the presence of silver-bearing tetrahedrite. The gold seems more closely associated with the pyrite than any other mineral. Local increases in chalcopyrite sometimes render the copper values important. The mines whose ores fall into this class are the following: the Belle of the West, the Black Crooke, the Casino, the Contention, the Hidden Treasure, the Lellie, the Missouri Favorite (now known as the Silver Leaf), the Ocean Wave, the Pride of America, the Silver Chord Extension, the Ute/Ulay, the Vermont and the Wave of the Ocean.

Quartz-Galena-Sphalerite Group - The veins of the quartz-galena-sphalerite group are characterized by dominant galena and sphalerite with usually subordinate chalcopyrite in a quartz gangue. Barite is either absent entirely or very low in quantity. It is, however, sufficiently abundant to yield with argentiferous galena, the rich secondary minerals which have enabled the mines to produce silver as their most important product. Gold values are a little more important than in veins of the tetrahedrite-rhodochrosite type and seem to be associated with larger quantities of pyrite present in the veins of this group. Copper and lead are both important products, and in some mines the sphalerite itself is sufficiently abundant to yield profitable returns.

Two or three of the mines of the tetrahedrite-rhodochrosite and quartz-galena-sphalerite groups show transitions one toward another. The Silver Chord Extension mine, though located in the midst of the series of coordinate lodes belonging to the quartz-galena-sphalerite type, shows all of the characteristics of the tetrahedrite series. Again, the Ute vein, the most productive vein in the region, shows affinities toward the quartz-galena-sphalerite type in the Ute ground, but farther north in the Hidden Treasure ground, is distinctly a member of the tetrahedrite series. In other mines some shoots show affinities toward one group and the other shoots in the same vein show affinities toward the other group. It is obvious that the sharp line of demarcation exists between the two groups, and it is, therefore, possible that they belong to a single period of mineralization and were contemporaneous in their origin.

Telluride Group - This group consists of veins containing tellurides disseminated through a finely grained quartz gangue (Golden Fleece), with subordinate galena, sphalerite, pyrite, chalcopyrite, tetrahedrite, hinsdalite and barite. If it were not for the tellurides it would be impossible to distinguish these veins from those of the normal tetrahedrite group; but as the tellurides are entirely absent in the other vein types, they set the former sharply apart. The presence in the Golden Fleece of hinsdalite associated closely with tellurides gives to this vein a somewhat unique character. Neither the telluride nor the hinsdalite are believed to be sufficient enough to indicate that the Golden Fleece vein has an origin different from the other veins or belongs to a separate period of mineralization. It rather seems to be a variation from the normal type, such as may be frequently encountered in almost any connected area of mineralization. The products of the telluride group are both silver and gold. In the Gallic-Vulcan mine the silver would probably predominate if the mine were of productive size. In the Golden Fleece the proportion by value of gold and silver in the ore was approximately 1:1; a very much higher proportion of gold than is characteristic of any of the other mines.

Right to Left – **Frank Mendenhall, Wayne Fobare and Wendall Fobare standing on a dump after a hard day's work.**

Minerals Formed at Moderate and Shallow Depths

Primary Minerals

Tetrahedrite - One of the most prevalent and, because of its silver content, one of the most important ore minerals in the Lake City country. In many places it is conspicuous in the ore, but even where it can be detected with less ease it is very important. In greater or less quantity it is present in all mines of the district and, in fact, is reported in some quantity in nearly all mines of the San Juan region.

Bismuth Compounds - The complex sulfur compounds of bismuth are reported in considerable quantities in the Monte Queen mine. According to the operators it contains high percentages of silver, about 20% of bismuth and considerable zinc. It is gray in color, resembling tetrahedrite, but containing little or no copper.

Barite - Abundant in the gangue of the galena-sphalerite veins, especially in those of the variety carrying tetrahedrite, which are developed most characteristically along Henson Creek and near Lake San Cristobal, but is less common in those of the Capitol City type, in which quartz predominates. It is present also in much smaller quantity in the telluride veins, where silica seems to be the predominant gangue.

Rhodochrosite - Occurs in many of the veins in the Lake City region and in some lodes is absent in one portion and present in great quantity in another. Thus in the Hidden Treasure mine it makes up the bulk of the vein filling in the northern end of the Hidden Treasure ground and is practically absent in the Ute end of the same vein. When first mined, it is generally deep pink in color but rapidly bleaches on exposure until it has only a slight pinkish tinge, which distinguishes it from dolomite. Tetrahedrite is more generally associated with rhodochrosite than with any of the other minerals; so much so that in milling the crushed ore on the Wilfley tables in the Hidden Treasure mill about an inch of rhodochrosite above the line of concentrates and gangue is saved from the tables. This is done because the rhodochrosite contains considerable quantities of silver even if the included particles of tetrahedrite are too fine for observation.

Hinsdalite - Was first collected by E. S. Larsen, to whom belongs the credit of its discovery and investigation. It was found on the dump at the mouth of one of the tunnels of the Golden Fleece mine, at an elevation of about 9,950 feet, where it is present in a considerable amount. It is an original vein mineral associated with quartz and a little pyrite, galenite, tetrahedrite and barite. The fresh mineral is pale greenish, but much of the mineral is dark gray from the inclusions. The streak is colorless.

Pyrite - Is present in all lodes of the region and is by far the most widely distributed of the metal-bearing minerals. It differs in abundance in the different lodes and is generally found in greatest amounts in the lower and less valuable portions of the mines.

Where not contained in tellurides, gold is apparently more generally contained in and associated with pyrite than with any of the other minerals. In the Convention mine the rich silver values contained in the gray copper and its oxidation products contained but little gold, but in the lower levels the vein carried chiefly quartz and pyrite, and in this mixture the gold was commonly notable, yielding a much better average than in the more profitable silver ores above. Similar conditions were found in the Moro mine.

Galena - Is absent in only a few Lake City veins, but its amount varies greatly in the different lodes and in the different portions of any single lode. In some mines, such as the Ute-Hidden Treasure, it forms an extremely abundant and very profitable mineral at one end of the mine, and at the other, it sinks greatly in amount and is less abundant than tetrahedrite. In the lead-zinc-copper group of Capitol City it shows the most common association with sphalerite, but in the other mines this association is either lacking or is very much less marked. When not associated with sphalerite, it is commonly intimately mixed with tetrahedrite. The mixture can be detected with the naked eye in many specimens, in which the tetrahedrite seems to fill the interstices between shattered fragments of galena. All the high-grade un-enriched galena owes its high silver content to tetrahedrite. Little pure galena in the Lake City lode carries more than 22 ounces in silver to the ton and much of it carries a good deal less.

Sphalerite (Zinc-blende) - Next to pyrite, zinc-blende (ZnS) is the most abundant and most universally distributed mineral in the lodes of the Lake City region. In practically no mines is it entirely lacking, although it is much more abundant in some than in others.

In general, the sphalerite belongs to one of the earlier periods of mineral deposition. This is noticeable in the Ute vein and the Moro vein, in both of which the sphalerite is much shattered and penetrated by the white quartz which forms a large portion of the gangue material. Where zinc is prominent and yet is not sufficiently abundant to be saved, it becomes very objectionable and in not a few instances, has led to the abandonment of workings.

Chalcopyrite - Is especially abundant in veins that carry neither the tellurides nor notable quantities of tetrahedrite. In subordinate amounts, it is present in all mines. Chalcopyrite shares with tetrahedrite the copper production of the district, but copper is in all of the lodes essentially a by-product. Tetrahedrite (gray copper ore), where unaccompanied by silver values, is not important ore in this district, and it is highly improbable that these veins could have been worked for their copper content alone.

Tellurides - Are absent in all except two of the Lake City lodes, the Gallic-Vulcan mine and the Golden Fleece mine. They range in color all the way from lemon yellow through greenish-yellow to silver-white and steel gray. From their color and general appearance, it is probable that all of varieties of calaverite, sylvanite, krennerite, petzite and hessite are present.

Quartz - Is present in the gangue of all the mines of the Lake City region and is probably also the most abundant vein mineral in the district. It occurs in the sharply contrasted varieties, both of which are present in greater or lesser amounts in all of the veins. The second type of quartz is the ordinary white crystalline variety. This is probably the most common type in most of the veins. The white quartz occurs without question in more than one generation, but the bulk of it is younger than any of the metallic minerals, for it cuts through sphalerite, galena, tetrahedrite, pyrite and even rhodochrosite in places. Veinlets of this white quartz also frequently cement shattered masses of the metallic minerals.

Dolomite and Calcite - Dolomite and calcite occur very rarely as individual species in the Lake City veins. Both these minerals are of such slight importance in the district as to be negligible.

John Saville running a Gardner-Denver mucking machine inside the Pride of America Mine.

Secondary Minerals

Atmospheric agencies have acted on the minerals of the Lake City lodes to form oxidation products and secondary sulfide enrichment minerals.

Ore Deposits

Oxidation Products - An extensive discussion as to the character of oxidized products formed in the outcropping portions of the Lake City lodes is difficult, if not impossible. Few of the outcrops are prominent, many of them being covered with landslide material and with different forms of rock debris. Such workings that have been driven on them are now generally abandoned and inaccessible. For this reason, the list of minerals produced during the processes of oxidation would probably be much greater if a more general examination had been possible.

In general the oxidized zones of the Lake City ore deposits are not deep. Thus, in the Moro mine oxidation has penetrated to a depth of approximately 100 feet, and on the Ilma vein near Lake San Cristobal, to about 200 feet. This lack of depth is due in part to the length of the winter season, which, during a large part of the year, undoubtedly prevents access of water to the veins. However, in spite of the large preponderance of run-off over infiltration, a great deal of water has found its way into the lodes, as is evidenced by the extremely rich character of the oxidized ores and the ores produced by secondary sulfide enrichment. Probably a very considerable part of the eroded portions of the lodes has been carried down in solution to what are now mining remnants and has enriched them enough to make profitable mining possible. With less rapid erosion, however, the veins would have been very much richer in their upper portions than is actually the case.

The minerals produced by oxidation are comprised of those such as the soluble sulfates, chalcanthite and melanterite, which have been taken into solution and afterward partly crystallized out. These soluble sulfates are rare in the Lake City veins, probably due to the continued presence of water in the veins, which has kept the minerals in solution and prevented their crystallization.

Also included in this listing are minerals formed by the re-precipitation of the dissolved constituents. The following examples are listed: limonite, hematite, pyrolusite, basic ferric sulfate, malachite, azurite, anglesite and cerussite. Cerussite is comparatively uncommon in the Lake City lodes, probably on account of the absence of wall rocks containing carbonate of lime. It is, however, present in some quantity in most of the lodes. Anglesite, especially in its fine grained form, is a very common oxidation product of the lead veins. It occurs almost exclusively in the 100 feet of the Moro vein. Limonite is by far the most abundant of all the minerals produced in this way.

A third type of minerals includes those that have been precipitated by the reaction of various sulfates on one another. These include native copper and native silver. In the Excelsior mine, a mass of native copper weighing 150 pounds was found in the oxidized zone, and smaller masses have been found elsewhere.

Native gold is not common in the oxidized ores of any except the telluride veins, and there only to a minor degree. It is present, however, as will be explained later, in the upper part of the zone of secondary sulfide enrichment.

Secondary Sulfide Enrichment Minerals - This process has been the most important of all the features that have rendered the Lake City lodes commercially profitable. The comparatively low-grade ores which are found on the levels at depths below the reach of all secondary action, and the sharply contrasted and very rich masses of bonanza material in the upper levels are the most striking features of all of the Lake City lodes. The disappointing results of so much of the costly extensive development in the district are in large part due to the failure to recognize this distinction.

The minerals produced by secondary alteration include the following:

Pyrargyrite and **Proustite** - The so-called ruby silver ores occurred in large quantities in all of the producing mines, and the major part of the silver production in the region is to be attributed to their presence. The two ruby silver minerals are the antimonial sulfides, pyrargyrite (known as dark ruby silver) and proustite (a light ruby silver). The antimonial variety seems to have been by far the most common in the ores mined, but the arsenical variety undoubtedly occurred and it is likely that indefinite amounts of arsenic replaced the antimony in much of the ore.

Secondary Chalcocite - This mineral, in its finely divided sooty form, is a common constituent of ores high in chalcopyrite and pyrite. In some mines, such as the Moro, it extends as deep as 500 feet. As copper is only a minor ingredient in point of value, this mineral is of more scientific than commercial importance.

Covellite - the indigo-blue sulfide of copper does not occur in quantity but is found in a number of mines as a product of secondary sulfide enrichment coating the surfaces of sphalerite.

Bornite - is rarely seen and then only as thin films on the surface of chalcopyrite which has been exposed to alteration. In massive form it is absent in these mines.

Secondary Galena (PbS) - is uncommon as a product of secondary enrichment. This is probably due to the fact that oxysalts of lead are so much more insoluble than the corresponding salt of other metals that their transportation from place to place goes on in only a minor degree. In many mines that have a large content of coarse-grained sphalerite, however, a thin gray film of metallic character has been deposited in the cracks of shattered sphalerite.

Gold - in the Gallic-Vulcan crystals of sphalerite were observed coated with leaves of native gold, the latter mineral having apparently been reduced from solution by the zinc sulfide. This occurrence, though of no commercial importance, is worthy of special note as it has been observed in a number of places, notably in the Ibex Mine in Leadville, Colorado, where metallic gold coating crystals of sphalerite were discovered in large quantity at about the central part of the sulfide-enrichment zone.

Mechanical Disintegration

In a region like that at Lake City, where the land surfaces are precipitous, erosion proceeds with great rapidity and the veins consequently have been much dissected. The difference between the lowest and highest topographic points (8,758 feet, and 14,306 feet above sea level) within the mineralized region is 5,548 feet. The highest point in the outcrop of the several veins examined is 12,867 feet and the deepest point that has been reached in mining on any vein is 7,900 feet. So far as yet determined, therefore, it appears that the veins extend over a vertical range of 5,000 feet. The rarity of mineralized outcrops above an altitude of 13,000 feet renders it probable that their upper limit does not extend much beyond this level. If the length of the Ute-Hidden Treasure vein may be regarded as an approximate indication of the depth of the fissure, there should be a presumable lower limit of known fissure formation of 7,000 feet. It would, therefore, appear that the formation of the known Lake City fissures has taken place within a vertical range of 5,400 feet and that almost the entire range of fissure formation is revealed in one place or another by the deep erosion The mechanical disintegration of the lodes has moreover proceeded with great rapidity, for slopes are steep and frost action through a large part of the year relatively intense. Owing to the deep erosion of the country rock in which the veins are contained, great lengths of outcrop have been developed.

As a further consequence of the steep and precipitous nature of the land surface, the veins show fairly well on slopes. Because of the glacial and landslide action, debris has accumulated near the stream levels and has covered the outcrops there, leaving the veins exposed high up on the mountain slopes only. Hence, the original discover shafts on a great many of the properties have been sunk at rather high elevations and carried down to a depth that would ordinarily give the operators an idea of the dip and strike of the lode. The intersection of dipping veins with the steep surface, however, leads to confusion, so that further exploration is generally made by crosscut. Often, these crosscuts are unsuccessful, this being due to the fact that after a vein attains any depth in this region, it generally undergoes a great change in vein filling and suffers a marked decrease in values. Hence, if cut at all (and often it is not), its appearance is so different that it is seldom recognized as the one worked for or five hundred feet above.

If the vein was stripped for a vertical distance of several hundred feet down the slope, and drifts run on it, there would be less doubt as to its identity, and as work progressed the operators might judge whether the work was worth continuing. With everything in sight, there would be less dead work and uncertainty, and the cost of stripping the vein would generally be far less than the expense of running a long crosscut. Where veins have been sufficiently well disclosed to make certain of their continuation in depth, their operation by means of crosscuts or drifts has been of a distinct advantage, as these have afforded easy drainage and have permitted the development of much stoping ground at moderate cost.

The steep slopes have not only been of great advantage in exploitation, but, in view of the nature of the oxidation and secondary enrichment, have been one of the most valuable assets of the district. If the ores several hundred feet below the surface were as good as those near the upper levels, this would not be so. As conditions are, it is most fortunate, for the zone of secondary enrichment is near the surface and nowhere else, and the number of linear feet along the veins is increased by the steepness of the slopes.

Lake City District Ore Deposits

The Lodes

In general, the lodes of the Lake City area are fissure veins. In the ordinary understanding of the term, a fissure vein is a crack or crevice in the rock filled with later-introduced vein material. Some of the Lake City lodes are of this type. They have also been formed largely by replacement and exhibit all stages of the transition from a simple filled fissure to one of sheeting and brecciation where most of the mass of vein material has been produced by the alteration of the enclosing rock. Both types of mineralization are common in the same lode, one prevailing in one part, the other in another.

The term "lode fissure" has been used for those veins whose included mineral has been largely introduced through small, closely spaced fractures, from which solutions have replaced the intervening rock. The Lake City lodes are in the nature of "lode fissures". In some places, as in the Golden Fleece mine, the vein, although of a very well defined linear form, consists of a broken zone in which the filling of interstices between rock fragments has been the dominant process. Replacement has been secondary in spite of the extremely broken and shattered character of the zone of mineralization.

Included fragments are present in all of the lodes, and many of the fragments show a very high degree of alteration, but some have been simply surrounded by vein material and have undergone little alteration from the introduction of mineralizing water.

In length the Lake City veins average between 1,000 and 1,203 feet. Exceptionally strong wide lodes, such as the Ute-Hidden Treasure vein, Black Crooke and Golden Fleece extend for nearly 3,000 feet. The vertical range of the fissures seems to be about equal to their explored lengths along the strike. In a great many mines, work has ceased before the vein has disappeared, especially where adit tunnels have not been run at lower levels to search for the continuation of the vein. Among the exceptionally long veins is the Moro, which has a length of 2,000 feet, if the correlation of its two parts on either side of the small gulch is correct. It probably represents the root of a fissure, the greatest portion of which has been removed by erosion.

The Vermont/Ocean Wave/Wave of the Ocean vein is also a vein root. The vein is fairly straight due to the effect of topography on the southward dip. If these veins form a single continuous fissure, its total length is over 5,000 feet. The Vermont tunnel, started from the bottom of Henson Creek to tap into the vein at 1,100 feet below the highest point on the outcrop, has been a failure. It was reported that the vein was not discovered in the workings, and it is possible it pinched out above the tunnel level.

The Red Rover tunnel, which should have intersected this fissure, disclosed no indication of it. The probability that this vein is a fissure whose upper portions have been completely eroded and whose roots alone remain is strengthened by the extremely rich ores discovered in the upper workings and their very rapid deterioration with depth[BE1]. A strong contrast between primary vein filling, (which can occur in the roots of fissures), and secondary enrichment products, is probably indisputable proof of the previous existence of a very large vertical range of material. From this, a rich secondary ore has been derived and concentrated. In other words, the greater the contrast between the secondary and oxidized ores and the primary ore, the nearer is the approach to the point at which the vein may be expected to disappear completely.

The widths of the veins in the Lake City region vary between a few inches and twenty feet. The average is approximately eighteen inches. Many veins were wider in their upper portions and grew gradually narrower with depth. This was the case in the Lellie, Ulay, Black Crooke, Golden Fleece and Vermont. Practically all veins explored by deep workings have pinched out almost entirely. Few widths of twenty feet are found and these extend for short distances only. That in the Hidden Treasure mine was apparently caused by the intersection of a branch vein. Widths of eight and ten feet are found in a few places in the Ute and Black Crooke veins and according to reports, in certain portions of the Golden Fleece vein. Pinches and swells in the vein occur both in strike and in depth and it is, indeed, to these that the division of ore into shoots is chiefly due. The Ute vein is a uniformly wide fissure throughout its length. It probably conforms more nearly to the ideal type of fissure vein than any other in the region. It is notably irregular and subject to many pinches and swells in its extension into the Hidden Treasure ground.

Terminations

Veins which terminate in depth either narrow into a single small fissure, as in the Lellie, the Black Crooke and Golden Fleece, or divide into a number of stringers which finally disappear entirely. Terminations along the strike show a division into many branches, which finally disappear, as at the southwest extremity of the Ute vein. A sufficient number of examples, however, could not be examined to justify any general rule.

Strike

Along the strike, none of the veins are straight, but twist and turn generally with sharp angles, somewhat in the manner of a flash of lightning. The veins of the Pelican and those of other mines notably and admirably bring this out. Some of the veins seem to have formed along two intersecting lines of weakness; branch veinlets continue along the old direction, though the main vein assumes a new trend. A marked conformity of jointing and vein direction prevails throughout the districts.

Most of the veins in the Lake City area strike in one or the other of two general directions, northeast-southwest and northwest-southeast. The richest lodes tend to run northeast, but this is probably of little significance as far as the relation of the ore deposits to the geology is concerned.

The prominent directions of jointing are approximately the same as those of the fissures. The directions correspond in general to those prevalent in the Silverton quadrangle. Contrary to natural supposition, the prominent veins in the southwest portion of the Lake City quadrangle do not have the same prevailing direction as those immediately adjoining the northeast portion of the Silverton quadrangle. Its predominant veins strike in a northeast-southwesterly direction.

Dip

Nearly all the lodes have steep dips, ranging from 45 to 90 degrees. Only one with a dip less than 50 degrees is known, and that one continues for only a short distance. A few veins are essentially vertical. The common inclination is between 60 and 70 degrees. In the Capitol City group of veins the dip is uniformly east, but in the other more widely scattered fissures it varies greatly, dipping here on one side and there on the other. In depth the dips are nearly as irregular.

Where there has been much movement this feature has also produced differences in width of the veins along the dip similar to those, which occur along the strike.

Intersections

Intersections of fissures with different trends undoubtedly take place in many veins, but they can seldom be observed. The Ilma vein which runs nearly north and south, intersects the Golden Fleece vein. The actual intersection cannot be observed, but it lies on the eastern boundary of the rich ore shoot, which is the most prominent feature of the Golden Fleece vein, and with little question had some effect in producing this ore body.

Fault

Slickened sides are common in the Lake City fissures, but they generally indicate movement subsequent to the vein filling. Displacements undoubtedly exist between the two walls of any single fissure, and the large quantities of breccia fragments included in most of the fissures, the prevalence of pinches and swells in the veins, and the selvage clays commonly noted point to some movement between vein walls. The extent of this cannot be determined, as there are no recognizable beds in the alternating complex of volcanics to serve as a basis of measurement. It is believed, however, that the faulting along fissures has in general been comparatively slight.

Few of the lodes are disturbed by later movement. A definite fault was observed in the Ilma vein, which displaces the vein 35 feet, and post-mineral faulting was observed in the Gallic ore body.

Origin of the Lodes

Too few fissures have been explored in the Lake City country to permit any generalization as to their origin. It seems probable that they were produced by the same causes that gave rise to the fissures in Silverton, Ouray and Telluride. These causes were undoubtedly operative subsequent to the invasion of the volcanic series by the monsonite masses, for some of the fissures cut this rock. It is believed the fissures were produced by compressive strains due possibly to the gravitative readjustment that accompanied recent movements in the region.

In general, it may be believed that there is no evidence for attributing difference in ages of formation to the lodes that have different trends. They are believed to have been formed during a single period of fissure formation and to have been mineralized also during a single period.

Distribution of the Lodes

Most of the veins of the Lake City mining district are located on the slopes of gulches that drain into Henson Creek. A few are on the slope north of the Lake Fork of the Gunnison. Of these two localities, the former is a part of the Lake City Quadrangle. The latter is so near it and of such historical interest that it has been thought advisable to incorporate it into this text.

There is probably no geologic reason why the vein should be so separated as others exist which may prove equally valuable if discovered. In other words, the area is one in which local conditions have not been the cause of the formation of fissures and the subsequent filling with vein material. The conditions were widespread and it is only natural to suppose that the processes, which formed one vein, have been equally active in other parts of the mining district proper.

Fissure Filling and Metasomatism

Mineral solutions that have penetrated the fissures have deposited gangue and ore minerals in them and have altered the adjoining rock. In very few fissures is alteration of the wall rock entirely lacking, and in some of them it is so extreme that the entire ore mass in the mine is to be attributed to it. In general, however, silification and sericitization have been the predominant types of alteration. These have resulted in a very fine grained dense-black jasperoid material, which in places extends four or five feet from the vein fillings. Fragments of included rock have been especially subjected to this later type of alteration and are usually spoken of in the mines as black quartz. A later type of alteration of this black material is seen frequently, and a light-green margin has been developed extending from a fraction of an inch to six inches from the vein filling into the previously altered country rock. Many included fragments have been completely altered to this light-green material, but small cores having the shape of the fragment are often left in the center. Microscopic study of the material shows it is composed of very finely divided secondary silica and a great abundance of extremely minute particles of sericite. The greenish material is generally marked by the coarser crystallization of the quartz and a relatively smaller quantity of sericite.

The original rock is either an andesite breccia or a solid andesite with glassy or crypto-crystalline groundmass. Barite, rhodochrosite, sphalerite, galena and tetrahedrite replacing the wall rock beyond the limits of the open spaces have not been commonly observed. Their occurrence, however, as distinct crystals in the black silicified fragments shows they have been deposited either as replacements of an already altered country rock or have replaced these fragments previous to their silicificiation. Pyrite, on the other hand, commonly extends into the country rock farther than even the silicification and sericitization. It is then well crystallized into minute cubes. Studies of the paragenesis of the ores indicate the pyrite; silica and sericite represent the earlier stages of vein formation and are probably the first results of solutions entering the fissures.

Banding

Where fissures have been filled with ore minerals or where included plates of country rock have been completely replaced, banded structure is commonly well developed. This is the case in the ore from the Hidden Treasure, also in the ore from the new shaft in the Ulay mine. The ore in the Ute vein is also roughly banded. No specimen observed, however, shows well-developed comb structure throughout the vein. Almost universally one band grades into another, making it in many places impossible to determine the relative ages of formation. It may be said, however, that white crystalline quartz is as a rule the latest mineral deposited. It commonly cements shattered galena and sphalerite or chalcopyrite, rhodochrosite and tetrahedrite. It also coats crystals of barite, which project into cavities. The tetrahedrite in veins belonging to the tetrahedrite-rhodochrosite group, is later in formation than the galena, as it permeates that mineral in many places along cracks and fractures. It is generally closely associated with the rhodochrosite, being commonly scattered through the rhodochrosite mass without any regularity. In general, silicification and sericitization of the country rock was followed by the deposition of vein minerals in the following order:

(a) Pyrite in the wall rock and in the fissures

(b) Rhodochrosite-galena-sphalerite

(c) Tetrahedrite

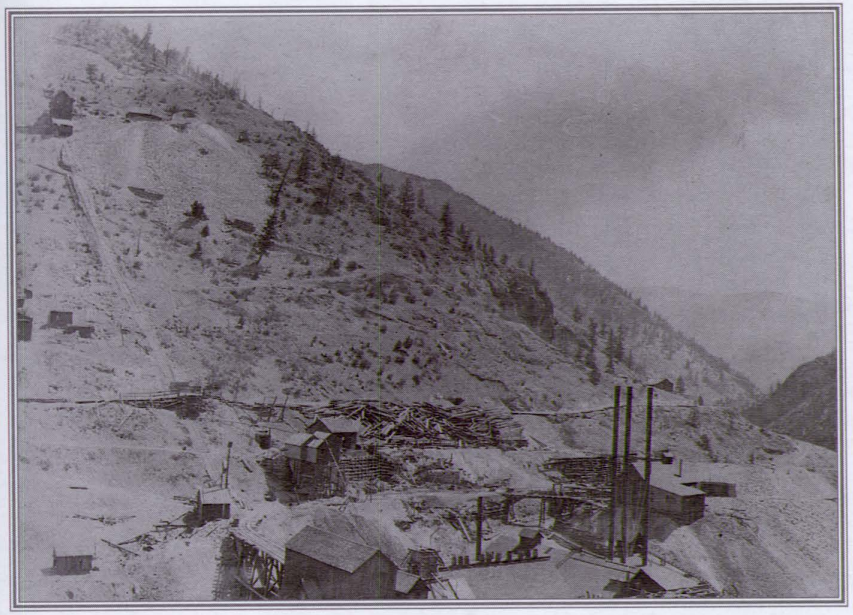
(d) White crystalline quartz

(e) Secondary sulfide-enrichment minerals

In many places, however, the sphalerite, galena and rhodochrosite show reversals in the order of their formation, and in many it is difficult, if not impossible, to determine their relative ages with any certainty.

Effect of the Country Rock

The effect of the country rock upon the vein filling has apparently been of no marked consequence for the minerals in many of the veins vary at places where no change occurs in the latter, mineral having apparently been reduced from solution by the zinc sulfide. This occurrence, though of no commercial importance, is worthy of special note as it has been observed in a number of places, notably in the Ibex mine in Leadville, Colorado. There metallic gold coating crystals of sphalerite were discovered in large quantity at about the central part of the sulfide-enrichment zone.



Ute and Ulay Mine and Mill Site showing surface tramway

A Summary of Ore Deposits

The lodes of Lake City are fissure veins formed partly through the replacement of shattered and sheeted zones in the country rock and mainly through the filling of open spaces. They average between 500 and 1,000 feet in length, have a similar vertical range, and an average width of 10 inches to 5 feet. They show a wide range of strike and dip at steep angles. They consist of three closely related mineralogic types:

The first contains pyrite, galena, sphalerite and chalcopyrite with subordinate tetrahedrite, in a quartz gangue with some barite and rhodochrosite, and yield silver and lead with subordinate copper.

The second contains galena, sphalerite and tetrahedrite with subordinate chalcopyrite and pyrite, in a gangue of quartz, barite and rhodochrosite, and yield chiefly silver and lead.

The third contains petzite, tetrahedrite and minor quantities of other sulfides, in a gangue of finely grained quartz carrying some hinsdalite in places. This type yields silver and gold in proportion by value 1:1 and is characterized by high values in both gold and silver.

The first two groups constitute the bulk of the Lake City lodes, as there is but one productive telluride vein. These ores are low grade where unaffected by superficial alteration. The major portion of the Lake City production comes from ores enriched by secondary sulfide enrichment that has produced chiefly pyrargyrite as a secondary mineral. Oxidized ores are widely distributed. Lodes are for the most part separated by considerable areas within which no veins have yet been located, the Capitol City group being the only closely spaced series of veins exploited.

The Lake City lodes comprise the northeastern portion of the mineralized area that includes Rico, Telluride, Silverton and Ouray. The lodes show great similarity to those of this area but were probably formed under a slightly smaller layer of overlying rocks.

The preceding pages describing the historical background, topography, geology, structures, genesis of minerals, metallurgical similarity, mineralogy and mechanical disintegration of the entire region surrounding the area of this report, and the Lake City district in which the claims reported herein are a part, have been long, tedious and tiresome reading.

However, there appear to be no alternatives in establishing the continuity of the many seams and to support the existence of these seams. The possibility of the development and future operation in this area is most unlikely.

Minerals In Order Of Abundance

MINE	PRIMARY	SECONDARY	TERTIARY	QUATERNERY
Capitol City Mines				
Gallic-Vulcan	Quartz	Sphalerite	Fluorite	Chalcopyrite
		Galena		Tellurium
		Pyrite		Tetrahedrite
		Barite		
		Apatite		
Woodstock	Quartz	Sphalerite	Chalcopyrite	Pyrite
	Galena			
Capitol City	Quartz	Sphalerite	Pyrite	Chalcopyrite
			Chalcopyrite	
			Barite	
Chord Extension	Galena	Quartz	Fluorite	
	Barite	Pyrite		
	Tetrahedrite	Chalcopyrite		
Silver Chord	Quartz	Pyrite	Chalcopyrite	Tetrahedrite
	Sphalerite			
	Galena			
Czar	Quartz	Pyrite	Chalcopyrite	
	Sphalerite			
Excelsior	Quartz	Pyrite	Tetrahedrite	
	Sphalerite			
	Galena			
Henson Creek Mines				
Vermont Group	Galena	Sphalerite		
	Barite	Jasperoid		
	Rhodochrosite	Pyrite		
	Tetrahedrite	Sericite		
		Quartz		
Lellie	Quartz	Sphalerite	Pyrite	Chalcopyrite
	Galena		Jasperoid	
	Barite		Sericite	
	Tetrahedrite			
Fanny Fern	Galena			
	Barite			
	Tetrahedrite			

Minerals In Order Of Abundance

MINE	PRIMARY	SECONDARY	TERTIARY	QUATERNERY
Henson Creek Mines, cont.				
Cleveland	Barite	Quartz		
	Galena			
Golden Crown	Quartz			
	Pyrite			
Pride of America	Galena	Sphalerite	Pyrite	
	Tetrahedrite	Sericite		
Sacramento	Quartz	Chalcopyrite		
	Sphalerite			
	Galena			
	Tetrahedrite			
Ute	Quartz	Pyrite	Barite	
	Sphalerite	Chalcopyrite		
	Galena	Tetrahedrite		
		Jasperoid		
Hidden Treasure	Galena	Sericite	Chalcopyrite	Fluorite
	Barite	Jasperoid		Sphalerite
	Rhodochrosite	Quartz		Pyrite
	Tetrahedrite			
Missouri	Galena	Jasperoid	Quartz	
Favorite (now	Barite	Sericite	Chalcopyrite	
known as the	Tetrahedrite			
Silver Leaf)				
California	Quartz	Sphalerite	Sericite	Chalcopyrite
	Galena			
North Lake Fork Mines				
Monte Queen	Sphalerite	Barite	Sphalerite	Quartz
	Galena		Sericite	
	Rhodochrosite		Quartz	
	Tetrahedrite		Pyrite	
Dauphin	Jasperoid	Barite	Sphalerite	Quartz
		Tetrahedrite	Galena	
			Pyrite	
			Sericite	

Minerals In Order Of Abundance

MINE	PRIMARY	SECONDARY	TERTIARY	QUATERNERY
North Lake Fork Mines, cont.				
Rob Roy	Jasperoid	Barite	Sphalerite	Quartz
		Tetrahedrite	Galena	
			Pyrite	
			Sericite	
Golden Wonder	Jasperoid	Telurium		
		Stibnite		
Sulphuret	Jasperoid	Barite	Sphalerite	
		Tetrahedrite	Galena	
			Pyrite	
			Sericite	
Ilma	Quartz	Rhodochrosite	Jasperoid	Chalcopyrite
(Black Crook)	Sphalerite	Tetrahedrite	Sericite	
	Galena		Pyrite	
	Barite			
Contention	Quartz	Rhodochrosite	Jasperoid	Chalcopyrite
	Pyrite	Barite	Jasperoid	Sphalerite
	Tetrahedrite			Rhodochrosite
Golden Fleece	Petzite	Pyrite	Hinsdalite	Quartz
	Jasperoid			Sphalerite
	Tetrahedrite			Rhodochrosite
South Fork of Henson Mines				
Moro	Quartz	Pyrite	Sphalerite	Tetrahedrite
	Galena	Barite	Chalcopyrite	
			Jasperoid	
			Sphalerite	

La Bale Tunnel showing Clarence Wright (second from right) as a boy.

THE SHERMAN SILVER PURCHASE ACT

In 1890 during Benjamin Harrison's administration, the passage of the Sherman Silver Purchase Act (SSPA) was created. Colorado had figuratively laid the rails for this Act. In January of 1885, the first national silver convention met in Denver, Colorado and formed the Silver Alliance. Shortly thereafter, branches were set up in all parts of the state.

Colorado millionaire Horace Tabor, known as the Silver King, had made the appeal for free silver coinage. He stated, "You wipe off the silver from the market and you double the value of gold, and gold securities and the department of securities, which have to be paid in gold."

In 1889, Colorado sent forty-three delegates to a national silver meeting in St. Louis, Missouri. The silver foundation had been laid. Colorado congressman and candidates from both parties were waiting for the return of silver coinage. But despite their energy, and the work of western colleagues, they were denied a total victory. In 1890, the passage of the SSPA took place. This act more or less dovetailed with the McKinley Tariff Act of the same year. Westerners, without personal interest in the high rates of that tariff, supported the measure in return for enactment of their desired silver act.

Under the SSPA, legislation required the United States to purchase 4,500,000 ounces of silver per month; most of the current production of the United States. Colorado silver mines were producing 58% of the total amount that was being produced in the United States.

The McKinley Tariff Act, as it was called, was hailed too soon to western mining since it made purchase of foreign materials almost impossible, forcing the price of domestic metals to rise. It closed a number of domestic smelters that had been buying foreign metals and could not afford to pay the increased cost of American metals.

It appeared at first that the SSPA would work. Silver prices began to rise from $0.936/ounce in 1889 to $1.046/ounce in 1890. Early in 1892, the value of silver was declining, and fell to $0.876/ounce, ending with a low of $0.782/ounce in 1893.

The SSPA was repealed by the United States Congress in October of 1893, under the administration of Grover Cleveland, thus beginning the silver panic of 1893. This act started a nation-wide depression. The nation was plunged into a panic that saw the failure of 580 banks and 16,000 businesses. The State of Colorado was the hardest hit of all, as it was producing more than half the silver in the United States at that time. While Coloradans had to fight hard to maintain the SSPA, the collapse of the silver market started an economic crash in Colorado, as the price of silver dropped over night. By November 1st, over 45,000 people in Colorado were out of work, 377 businesses failed and 435 mines were closed.

The repeal of the SSPA had a serious effect here in Hinsdale County, as towns, cities and settlements were closed down. The collapse of businesses and closures of mines created havoc. Mass evacuations occurred, leaving towns and cities to vanish. Following is a list of towns and settlements which have disappeared from Hinsdale County through the years: Sterling, Tellurium, White Cross, Burrows Park, Lake Shore, Crookeville, Rose's Cabin, Henson, Sherman, Engineer City, Treasureville, Capitol City, Timber Hill, Junction City, Beartown, Hermit, Belford, Lost Trail Camp, Carson and Bachelor City.

In 1893 at the time of the repeal of the SSPA, miners were paid a rate of $1.00-$5.00/day depending on occupation in the mines. Following is a pay scale showing wages paid.

Shift Boss	$ 3.50 to 5.00 per day
Miners	$ 2.50 to 3.00 per day
Trammers	$ 2.50 to 3.00 per day
Cagers	$ 2.50 to 3.50 per day
Nippers	$ 1.00 to 3.00 per day
Timbers	$ 3.00 to 4.00 per day
Top Men	$ 2.00 to 3.00 per day
Laborers	$ 2.00 to 3.00 per day
Engineers	$ 3.00 to 5.00 per day
Pump Men	$ 3.00 to 5.00 per day
Ore Sorters	$ 2.00 to 3.00 per day
Blacksmiths	$ 3.00 to 5.00 per day

After the repeal of the SSPA, the miners working here in Hinsdale County tried to work with the mine companies, even offering to work for wages cut by half. But the mines collapsed in spite of this drastic compromise. For example, the Vermont mine, one of the oldest working mines in the area produced $115,343.84 in ore. But after 1893 and the collapse of the silver market, it produced only $301.84 in ore.

The mines here in the Lake City area of Hinsdale County produced close to thirteen million in ore. At today's market value in 2000, that would amount to over 200 million dollars. What would the mines have produced had it not been for the repeal of the Sherman Silver Purchase?

Miners outside the Black Crook Mine

Gold (lode), silver, copper, lead, and zinc produced in Hinsdale County, 1875-1923

Year	Ore (short tons)	Gold	Silver			Copper			Lead			Zinc			Total Value
		Lode Gold	Quantity (fine ounces)	Average Price per Ounce	Value	Pounds	Average Price per Ounce	Value	Pounds	Average Price Per Pound	Value	Pounds	Average Price Per Pound	Value	
1875	———	12,000	a 47,953	$1.24	$59,462	———	———	———	———	———	———	———	———	———	$71,462
1876	———	a 20,000	a 154,688	$1.16	179,438	———	———	———	a 50,000	$0.61	$3,500	———	———	———	202,488
1877	———	a 25,000	a 92,814	$1.20	111,377	———	———	———	a 100,000	0.055	5,500	———	———	———	141,877
1878	———	a 20,000	a 154,688	$1.15	177,891	———	———	———	a 200,000	0.036	7,200	———	———	———	205,091
1879	———	a 6,000	a 193,359	$1.12	216,562	———	———	———	a 500,000	0.041	20,500	———	———	———	243,062
1880	———	a 6,000	a 116,016	$1.15	133,418	a 30,000	$0.21	$6,420	a 1,000,000	0.05	50,000	———	———	———	195,838
1881	———	10,000	123,750	$1.13	139,838	a 40,000	0.182	7,280	a 1,200,000	0.048	57,600	———	———	———	214,718
1882	———	20,000	61,875	$1.14	70,538	a 40,000	0.191	7,640	a 600,000	0.049	29,400	———	———	———	127,578
1883	———	20,000	193,359	$1.11	214,628	a 22,652	0.165	3,738	a 1,000,000	0.043	43,000	———	———	———	281,366
1884	2,184	2,500	154,687	$1.11	171,703	a 350,000	0.13	45,500	a 1,000,000	0.037	37,000	———	———	———	256,703
1885	———	b 2,000	b 16,320	$1.17	117,462	a b 46,460	0.108	5,018	a b 100,000	0.039	3,900	———	———	———	28,380
1886	———	2,060	16,320	$0.99	16,157	a 46,460	0.111	5,157	a 100,000	0.046	4,600	———	———	———	27,974
1887	———	4,308	90,365	$0.98	88,548	12,027	0.139	1,660	547,543	0.045	24,638	———	———	———	119,154
1888	———	2,667	86,248	$0.94	810,733	2,000	0.168	336	1,205,973	0.044	53,063	———	———	———	137,139
1889	———	1,794	16,685	$0.94	15,685	17,359	0.135	2,343	240,812	0.039	9,392	———	———	———	29,194
1890	———	3,697	57,387	$1.05	60,256	60,584	0.156	9,451	660,708	0.045	29,732	———	———	———	103,136
1891	———	19,869	186,850	$0.99	184,982	8,248	0.128	1,056	8,308,048	0.043	357,246	———	———	———	563,153
1892	———	22,514	411,758	$0.87	358,229	29,914	0.116	3,470	4,753,783	0.04	190,151	———	———	———	574,364
1893	———	88,970	385,653	$0.78	300,809	a 10,000	0.108	1,080	a 3,808,111	0.037	140,900	———	———	———	531,539
1894	———	85,196	395,899	$0.63	249,416	a 10,000	0.095	950	a 3,322,170	0.033	109,632	———	———	———	445,194
1895	———	243,195	485,595	$0.65	314,317	a 10,000	0.107	1,070	5,251,014	0.032	168,032	———	———	———	726,614
1896	———	212,794	510,883	$0.68	347,400	133,202	0.108	1,426	4,488,856	0.03	164,066	———	———	———	725,686
1897	———	168,171	243,437	$0.60	146,062	8,085	0.12	970	5,550,058	0.036	199,802	———	———	———	515,005
1898	———	51,282	186,456	$0.59	110,009	104,038	0.124	12,901	9,828,482	0.038	373,482	———	———	———	547,674
1899	———	38,343	155,902	$0.60	93,541	49,676	0.171	8,495	10,572,353	0.045	475,756	———	———	———	616,135
1900	———	56,470	155,485	$0.62	96,401	29,180	0.116	4,844	9,377,082	0.044	412,591	a 100,000	$0.44	$4,400	574,706
1901	———	76,148	152,122	$0.60	91,273	12,532	0.167	2,093	7,588,675	0.043	326,313	a 126,591	0.41	5,190	501,017
1902	———	98,348	117,177	$0.53	62,104	8,314	0.122	1,014	6,213,763	0.041	254,764	319,000	0.048	15,312	431,542
1903		16,515	33,139	$0.54	17,895	11,263	0.137	1,543	459,462	0.042	19,297	1,106,000	0.054	5,724	600,974
1904	5,591	10,521	46,585	$0.58	27,019	13,187	0.128	1,688	1,041,222	0.043	44,773	59,089	0.51	3,014	87,015
1905	5,041	11,991	54,419	$0.61	33,196	84,485	0.156	13,180	767,681	0.047	36,081	236,178	0.059	13,876	108,324
1906	7,086	24,510	87,940	$0.68	59,799	63,821	0.193	12,279	753,950	0.057	42,975	38,387	0.061	2,342	141,905
1907	10,740	7,520	50,109	$0.66	33,072	99,410	$0.20	19,882	1,204,628	0.053	63,845	———	———	———	124,319
1908	980	2,454	29,498	$0.53	15,634	188,698	0.132	24,908	280,485	0.042	11,780	———	———	———	54,776
1909	1,697	7,587	75,731	$0.52	39,380	714,569	0.13	92,894	106,327	0.043	4,572	———	———	———	144,433
1910	3,468	6,320	54,422	$0.54	29,388	465,472	0.127	59,115	296,182	0.044	13,032	———	———	———	107,855
1911	723	3,830	7,753	$0.53	4,109	21,696	0.125	2,712	118,645	0.045	5,339	36,439	0.057	2,077	18,067
1912	9,554	6,811	34,722	$0.62	21,364	53,739	0.165	8,867	1,257,800	0.045	56,601	11,926	0.069	823	94,456
1913	4,329	5,280	30,477	$0.60	18,408	76,304	0.155	11,827	782,318	0.044	34,422	54,732	0.056	3,065	73,002
1914	118	170	5,987	0.553	3,311	17,098	0.133	2,207	5,723	0.039	223	———	0.051	———	5,978
1915	488	737	9,621	0.507	4,878	9,114	0.175	1,595	266,128	0.047	12,508	———	———	———	19,718
1916	377	1,246	10,030	0.658	6,600	16,248	0.246	3,997	75,638	0.069	5,219	12,575	0.134	1,685	18,847
1917	517	1,136	7,721	0.824	6,362	6,099	0.273	1,665	209,816	0.086	8,027	4,117	0.102	420	20,610
1918	5,222	6,249	22,245	$1.00	22,245	18,308	0.247	4,522	767,972	0.071	54,526	———	———	———	87,542
1919	1,219	8,232	22,942	$1.12	25,695	7,705	0.186	1,433	55,679	0.053	2,951	———	———	———	38,311
1920	568	6,151	21,522	$1.09	23,459	2,625	0.184	483	80,625	0.08	6,450	———	———	———	36,543
1921	495	3,425	32,039	$1.00	32,039	9,357	0.129	1,207	65,756	0.045	2,959	———	———	———	39,63
1922	1,550	1,298	50,074	$1.00	50,074	14,269	0.135	1,926	114,200	0.055	6,281	———	———	———	59,579
1923	684	732	30,046	$0.82	24,638	10,076	0.147	1,481	19,971	0.07	1,398	———	———	———	28,249
Totals		1,451,921	5,678,693		4,607,114	2,864,073		403,390	97,277,369		3,994,589	1,104,034		57,928	10,514,922

NAME OF LODE	LOCATION	WIDTH	DEVELOPMENT	CHARACTER	YIELD PER TON	OWNERS
Hotchkiss	Lake fork of Gunnison, Lake District	Vein, 14 in.	Tunnel, 120 ft., Tunnel, 80 ft.	Gold, Silver, Tellurium and Gray Copper	400 oz. Silver	F.C. Peck, M.S. Taylor, J.H. Shaw, George Wilson
Melrose	Galena district	Lode, 4 ft. Vein, 20 in.	Adit, 30 ft.	Galena and Gray Copper	400 oz. Silver	Franklin & Co.
Ocean Wave and Extension	Red Rover Mountain, Galena District	Lode, 4 ft. Vein, 2 ft.	4 tunnels, 60, 220, 300 and 420 ft. in length	Galena and Gray Copper	$50 to $200	Ocean Wave Mining & Smelting Co.
Plutarch	Hotchkiss Mountain, Lake District Henson Creek	Lode, 3 ft. Vein, 18 in.	3 shafts, 100, 75 and 50 ft. Tunnel, 200 ft.	Gray Copper and Brittle Silver	190 oz. Silver	Nutting, Chambers & Co.
Ule		Vein, 30 in. to 5 ft.	Shafts and tunnels, well-opened	Galena and Gray Copper, Silver, Lead, and Brittle Gold	$30 to $550	Crooke & Co.
Ute	Galena Distrcit	30 in. to 7 ft.	Shafts and tunnels, well-opened	Galena and Gray Copper	$20 to 4100	Crooke & Co.
Wave of the Ocean	Red Rover Mountain, Galena District	Lode, 4 ft. Vein, 2 ft.	Shafts and tunnels, well-opened	Galena and Gray Copper	$50 to $200	Ocean Wave Mining & Smelting Co.
Accidental	Galena District	Lode, 4 ft. Pay 10 in.	Well developed	Carb. of Copper and Sulph. of Silver	Avg. of Ore sol, 350 oz.	John F. Dodds, W.N. Ewing, T.J. Peter , J. Georke, J.N. Akers

NAME OF LODE	LOCATION	WIDTH	DEVELOPMENT	CHARACTER	YIELD PER TON	OWNERS
American	Galena distrcit	Lode, 7 ft. Pay vein 5 to 10 in.	3 drifts, 20, 23, 30 ft. each	Gray Copper and Galena	100 to 600 oz. Silver	John F. Dodds, W.N. Ewing, T.J. Peter, J. Georke, J.N. Akers
Belle of the East	Near Lake City	Lode, 4 ft. Pay, 15 in.	Shaft, 100 ft., Levels, 110 and 80 ft. each	Gray Copper and Galena		J.W. Mc Ferran, L. Whipple, Wm. Peck
Belle of the West	Near Lake City	Lode, 5 ft. Pay, vein 10 in.	4 shafts Drift, 585 ft.	Gray Copper and Galena	85 oz. Silver	Samuel Wade Otto Mears
Belle of the West No. 2	Hotchkiss Mountain, Lake District	Lode, 3 ft. Vein, 15 in.	Drift, adit	Gray Copper and Galena	80 oz. Silver	Jos. Chambers Reilly & Co.
Big Casino	Galena Gulch, Galena District	Lode, 3 ft.	Shaft, 50 ft. Tunnel, 90 ft.	Gray Copper and Galena	65 oz. Silver	J.J. Holbrook W.T. Forrest
Croesus	Capitol Monument, Galena District	Lode, 7 ft. Vein, 28 in.	Levels and shafts	Gray Copper, Iron and Copper pyrites	60 oz. Silver	Mesler & Co.
Dolly Varden	Copper Mountain, Galena District	Lode, 4 ft. wide Vein, 10 in.	Levels and shafts	Gray Copper and Copper pyrites	$100 up to many Thousands	Henry Cooke J.L. Hill & Co.
Gray Copper	Alpine Creek, Lake District	Lode, 5 ft. Vein, 3 in. to 3 ft.	Tunnel, 25 ft. Drift, 70 ft.	Tellurium, Galena and Gray Copper	200 oz. Silver	G. Crummy, J. Williams, W. Richards
Hidden Treasure	Ute Hill	Lode, 4 ft. Vein, 18 in.	Tunnel, 340 ft.	Gray Copper and Galena		J.R. Mullin H. Musgrave J.S. Hough

LETTERS OF TRANSMITTAL

To His Excellence, Charles S. Thomas, Governor of Colorado

Sir: I have the honor to transmit herewith a copy of "An act to amend an act retitled 'an act to create a bureau of mines, etc.;'" Also statistical tables showing the precious metal production of Colorado; the same being designated as bulletin No. 3 of this department.

Respectfully submitted,

Harry A. Lee, Commissioner of Mines

Denver, Colorado, April 21, 1899

State of Colorado

Office of Bureau of Mines

The following act, amending the law governing the Bureau of Mines, is a copy of House Bill Number 212 as certified to this Department by the Honorable Secretary of State. The printed law herewith has been carefully compared with the certified copy now on file in this office.

This act passed by both houses of the Twelfth General Assembly almost unanimously received the approval of His Excellency, Charles S. Thomas, at 9 o'clock a.m., April 10, 1899, and the same will be in full force and effect at 9 o'clock a. m., July 9, 1899.

The especial attention of all owners, agents, managers or lessees, operating or controlling mines, mills or metallurgical plants within the State is called to sections 8, 10, 11, 13, 14 and 20.

Respectfully,

Harry A. Lee

Commissioner of Mines

Denver, Colorado, April 22, 1899.

AN ACT

TO AMEND AN ACT ENTITLED "AN ACT TO CREATE A BUREAU OF MINES, TO DEFINE THE DUTIES OF THE COMMISSIONER OF MINES AND PROVIDE FOR THE GOVERNMENT THEREOF, AND MAKING AN APPROPRIATION THEREFOR; AND TO REPEAT AN ACT ENTITLED 'AN ACT DIVIDING THE STATE OF COLORADO INTO METALLIFEROUS MINING DISTRICTS, AND APPOINTING AN INSPECTOR OF METALLIFEROUS MINES,' APPROVED APRIL 1, 1899, AND PORTIONS OF OTHER ACTS IN CONFLICT HEREWITH.

Be it enacted by the General Assembly of the State of Colorado:

Section 1. That section 1 of an act entitled "an act to create a Bureau of Mines, etc., Approved March 30, 1895, be and the same is hereby amended to read as follows:

Section 1. There shall be and is hereby established in this State a department to be known as "The Bureau of Mines of the State of Colorado," the principal office of which shall be maintained at the State Capitol in the City of Denver.

Sec. 2. That section 2 of said act be and the same is hereby amended to read as follows:

Sec. 2. It shall be the duty of the Governor to appoint a citizen of this state, having had not less than seven (7) years practical experience CE in mining in the State of Colorado, together with a practical and scientific knowledge of Mining, Metallurgy, Mineralogy and Geology, in the office of Commissioner of Mines, to hold the said office for the term of four (4) years, or until the appointment and qualification of his successor, as provided in section 1 of Article XVI of the Constitution of the State of Colorado, who shall take and subscribe the oath of office prescribed by the Constitution; and he shall give bond to the State of the sum of $20,000, to be approved by the Governor of the State, conditioned upon the faithful discharge of his duties.

The Governor shall have power at any time to remove from office the Commissioner of Mines, for incompetency, neglect of duty or abuse of the privileges of his office.

Sec. 3. That section 6 of said act be and the same is hereby made section 3 of this act and amended to read as follows:

Sec. 3. The Commissioner of Mines shall, with the consent of the Governor, appoint two inspectors of practical experience in mining, citizens of the United States and legal voters of the State of Colorado, and having had not less than seven (7) years practical experience in mining in the State of Colorado, who shall hold their office for the term of two (2) years, and whose duties shall be as hereinafter specified and he shall appoint a clerk who must have a mineral knowledge of Mineralogy and shall act as assistant curator for the state mineral collection; and before entering upon the discharge of their duties they shall subscribe to the oath required by the constitution, and each give bond to the state in the sum of $5,000 to be approved by the Governor, conditioned upon the faithful performance of their duties, respectively; said bonds shall together with the Commissioner's bond, be deposited with the Secretary of State.

The Commissioner of Mines may appoint a stenographer, who shall act as assistant clerk, and such other competent assistants as he may deem necessary for the carrying out of the object of this act; provided, appropriation be made therefor, and shall have the power, with consent of the Governor, at any time, to remove the inspectors, clerks or other assistants for incompetency, neglect of duty or abuse of the privileges of his office.

Sec. 4. It shall be the duty of the Inspectors to examine and report to the Commissioner the condition of the hoisting machinery, engines, boilers, whims, cages, cars, buckets, ropes and cables in use in all the metalliferous mines in operation in the state, the appliances used for the extinguishment of fires, the manner and methods of working and timbering the shafts, drifts, inclines, slopes, winzes, tunnels and upraises through which persons pass while engaged in their daily labors, all exits from the mine and how the mine is ventilated, together with the sanitary condition of the same, and also how and where all explosives and inflammable oils and supplies are stored, also the system of signals used in the mine. He shall not give notice to any owner, agent, manager or lessee of the time when such inspection shall be made.

Sec. 5. That section 5 of said act be hereby made section 5 of this act and amended to read as follows:

Sec. 5. The Commissioner of Mines may as appropriations may be made therefor, from time to time, appoint deputy inspectors in the various mining camps or districts to investigate or report on accidents, or appoint such other competent assistants as he may deem necessary and proper for the carrying out of the object of this act; for the purpose of making more extended geological researches and surveys concerning the mineral districts of the State; the appointments of said deputy inspectors or assistants to become void upon the performance of the specific things or acts designated by the commissioners in their said appointment; but the entire expenses of the bureau must not in any one year be greater than can be paid out of the fund or appropriation provided therefor.

Sec. 6. That section 4 of said act be hereby made section 6 of this act and be amended to read as follows:

Sec. 6. The Secretary of the State board of capitol managers shall provide suitable and ample rooms in the state capitol building for the use of said bureau and shall provide the necessary fuel, lights and appurtenances to the proper and creditable management of said office; said office shall be deemed a public office, and the records books and papers thereof or on file therein, shall be deemed public records of the state; all books and documents and all other articles whatever in the office of the commissioner of mines, shall be transferred by him to his successor in office, who shall give him a receipt for the same. The Commissioner shall keep and maintain a complete list and record of all articles, papers and documents received by him and belonging to the said office.

Sec. 7. That section 3 of said act be hereby made section 7 of this act and amended to read as follows:

Sec. 7. That it shall be the duty of the Commissioner of Mines as he has opportunity and means, aided by the other officers, except the inspectors, of the bureau, working under his instructions, to collect and preserve for study and reference, specimens of all the geological and mineralogical substances including mineral waters found in the state, especially those possessing economic or commercial value, which specimens shall be

marked, arranged, classified and described, and a record thereof preserved, showing the character thereof and the place from whence obtained; to collect and in like manner preserve in his office, minerals, rocks and fossils of other states, territories and countries; to collect and make a part of the records of his office the geological surveys and reports bearing upon the mining industry heretofore made by other officers of the state or by the United States Government; to collect and record all data and records giving the history and showing the progress of the mining industry of the state from the earliest date up to the present time; to examine, report and record the geological formation of each important mining district and each important mine, giving the name of the mine, altitude, location, name of owners, character of vein development, character of walls or enclosing rocks, character and extent of ore veins or deposits, methods of ore extraction, power used, fuel used, water used in boilers, pressure carried, cost of fuel, cost of timbers, cost of transporting supplies to mine, cost per ton for transporting or to market, method of treatment, cost of treatment per ton, average cost of sinking per foot, average cost of drifting per foot, average number of men employed, wages paid and hours worked, and all other information that will tend to give a correct idea of the expense and serve as a guide to profitable mining and milling of ore; to investigate, report and record the advancement made in the application of electricity, compressed air, water power and steam as labor saving devices to all branches of mining operations; to collect statistics upon smelting, concentrating, milling and dressing of metalliferous ores, upon all the mineral products of the state for reference and study; to distribute reliable information regarding the product, available supply, location, character and adaptability for economic purposes of the resources of Colorado in coal, coal oil, asphalt, iron, building stone, slates, marble, fire clays, cements, pottery and porcelain clays, asbestos, mica and the various mineral waters, and such other items within the province of this bureau as in the judgement of the commissioner of mines may be advisable to procure standard works on the mining industry, smelting, concentrating, milling and dressing of metalliferous ores, mining engineering, geology, mineralogy and other subjects which can aid in the study and promote knowledge of all who are interested in mining or manufacturing of any of the mineral products of this state; and the commissioner of mines shall give receipt, when demanded, for all enumerated herein to the persons from whom he receives them; to make or cause to be made, with the approval of the Governor and under the direction of some officer of the bureau, exhibits of the mineral resources and products of the state, at such industrial exhibitions held in this or other states or countries, as may be deemed advisable or desirable, and for which due appropriations shall have been or may be provided.

Sec. 8. Section 7 of said act be and the same is hereby made section 8 of this act, and amended to read as follows:

Sec. 8. The Commissioner of Mines, inspectors, or either of them, shall not act as manager, or agent or lessee, for any mining or other corporation during the term of his office, but shall give his whole time and attention to the duties of the office to which he has been appointed. No officer of this bureau nor any agent or person in any way connected therewith, shall make a report of any mine or mining property with the intent to promote or aid in the sale of other conveyance thereof, and any such officer, agent, or person violating this provision shall, upon conviction thereof, pay a fine of not less than five hundred ($500.00) dollars, nor more than five thousand ($5,000.00) or be

imprisoned in the state penitentiary not less than one (1) nor more than three (3) years or both in the discretion of the court. The Commissioner shall, on receipt of reliable information relating to the health and safety of the workmen employed in any metalliferous mine, mill or reduction plant in the state, or whenever he deems such inspection necessary, examine or instruct one of the inspectors to examine and report to him the conditions of the same. The owner, agent, manager or lessee shall have the right to appear to the commissioner on any difference that may arise between such parties and the inspector. On receipt of notice of any accident in a mine, mill or reduction plant, whether fatal or not, the commissioner shall inquire into the cause of such accident.

Sec. 9. It shall be the duty of the commissioner of mines to biennially make report to the Governor, showing the amount of disbursements of the bureau under his charge, the progress made and such statistical information in reference to mines, mining, milling and smelting as shall be deemed important, and shall transmit copies of said report to the general assembly at the biennial session. There shall be printed at least one thousand (1,000) copies of said report for distribution and said reports shall contain a review of the work of the bureau.

The commissioner may, from time to time, with the consent of the Governor, as appropriations may be made therefor, compile, publish and distribute bulletins upon subjects, districts and counties; such bulletins, when treating of a district or county, shall give in detail the history, geology, mines, mils, process of treatment and results, together with a classification and location of mines and prospects together with maps of the same one thousand (1,000) copies shall be distributed free to state and county officers, public libraries, newspapers, magazines and exchanges of the bureau, and the remainder sold at cost of printing.

Sec. 10. That section 9 of said act is hereby made section 10 of this act and amended to read as follows:

Sec. 10. Every owner, agent, manager or lessee of any metalliferous mine or metallurgical plant in this state shall admit the commissioner or inspector on the exhibition of his certificate of appointment, for the purpose of making examination and inspection provided for in this act, whenever the mine is in active operation and render any necessary assistance for such inspection. But said commissioner or inspector shall not unnecessarily obstruct the working of said mine or plant. The refusal of the owner, agent, manager or lessee to admit the commissioner or inspector to such mine or plant to lawfully inspect the same, shall upon convection, be deemed a misdemeanor, and shall be subject to a fine of not less than fifty dollars ($50.00) nor more than three hundred dollars ($300.00) or be imprisoned not less than one (1) nor more than three (3) months or by both such fine and imprisonment.Sec. 11. That section 11 of said act be and the same is hereby made section 11 of this act and amended to read as follows:

Sec. 11. The commissioner and inspectors shall exercise a sound discretion in the enforcement of this act and if they shall find any matter, thing, or practice in or connected with any metalliferous mine or metallurgical plant to be dangerous or defective, so as to, in their opinion, threaten or tend in the bodily injury of any person, the commissioner or inspector shall give notice in writing thereof to the owner, agent, manager or lessee of such mine or plant, stating in such notice the particulars in which he considers such mine, or plant, part thereof or practice to be dangerous or defective; and he shall order the same to be remedied; a copy of said order shall be filed and become a part of the

records of the bureau of mines, and said owner, agent, manager or lessee shall, upon compliance of said order immediately notify the commissioner of mines in writing. Upon the refusal or failure of said owner, agent, manager or lessee to report within reasonable length of time, said owner, agent, manager or lessee shall be subject to a fine of not less than fifty dollars ($50.00) nor more than three hundred ($300.00) dollars for each and every such refusal or failure.

Sec. 12. That section 12 of said act be and the same is hereby made section 12 of this act and amended to read as follows:

Sec. 12. If the commissioner, inspectors or either of them, shall reveal any information in regard to metallurgical processes, ore bodies, shoots or deposits of ore or location, course or character of underground workings or give any information or opinion respecting any mine or metallurgical process; obtained by them in making such inspection, except in the way of official reports filed for record, as hereinbefore provided, on conviction thereof he or they shall be removed from the office and fined in a sum not less than one thousand ($1,000.00) nor more than five thousand dollars ($5,000.00).

Sec. 13. That section 12 of said act be and the same is hereby made section 13 of this act and amended to read as follows:

Sec. 13. In case the owner, agent, manager or lessee, after written notice being duly given, does not conform to the provisions of this act, or disregards the requirements of this act, or any of its provisions or lawful order of the commissioner or inspector made hereunder, any court of competent jurisdiction, may, on application or information of the commissioner of mines, by civil action in the name of the people of the state of Colorado, enjoin or restrain the owner, agent, manager or lessee from working the same until it is made to conform to the provisions of this act; and the costs of action paid by defendant, and such remedy shall be cumulative, and shall not affect any other proceedings against such owner, agent, manager or lessee, authorized by law for the matters complained of in such action.

Sec. 14. That section 13 of said act be and the same is hereby made section 14 of this act and amended to read as follows:

Sec. 14. Any owner, agent, manager or lessee having charge or operating any metalliferous mine or metallurgical plant, whenever loss of life or accident serious enough in character to cause the injured party to stop work for two consecutive days and connected with the workings of such mine or metallurgical plant, shall occur give notice immediately and report all the facts thereof to the commissioner of mines.

The refusal or failure of the said owner, agent, manager or lessee to so report within reasonable length of time shall be deemed a misdemeanor and shall upon conviction be subject to fine of not less than fifty dollars ($50.00) nor more than three hundred dollars ($300.00) or be imprisoned not less than one (1) or more than three (3) months, or by both such fine and imprisonment. The commissioner of mines upon receipt of notice of accident shall investigate and ascertain the causes and make or cause to be made a report, which report shall be filed in his office for future reference.

Sec. 15. The commissioner of mines shall receive for his services a salary of twenty-five hundred dollars, ($2,500.00) per annum to be paid as other officers of the state are paid and shall also receive his necessary traveling expenses when traveling on the business of his office, not to exceed the sum of one thousand dollars ($1,000.00) per annum. The inspectors shall each receive the sum of fifteen hundred dollars ($1,500.00) per annum and actual traveling expenses, not to exceed the sum of one thousand dollars ($1,000.00) per annum. The whole of said salary and expenses to be paid out of the bureau of mines fund hereinafter proved for and not otherwise.

The commissioner of mines shall have at his disposal the sum of two thousand dollars ($2,000) for the fiscal years of 1899 and 1900, and shall, in his annual report, itemize the expenditures made from this fund.

Sec. 16. That section 14 of said act be and the same is hereby made section 16 of this act and amended to read as follows:

Sec. 16. The Commissioner of Mines is hereby authorized, with the approval of the Governor, to draw upon the funds appropriated by this act, from time, to pay the salaries and traveling expenses of himself and inspectors and the salary of the clerk and other assistants, and printing of bulletins hereinbefore provided, and to defray the necessary expenses of his office; and the State Auditor is hereby required to issue his warrant on the State Treasurer for such payments or expenses as they may accrue, and in all accounts rendered or presented for payment, on account of the bureau of mines, the commissioner shall be required to make vouchers in duplicate, one of which shall be filed in his office. He is hereby authorized to procure such instruments and apparatus from time to time as may be necessary to the proper discharge of the duties under this act, not to exceed the amount appropriated for incidental and operating expenses.

Sec. 17. That section 15 of said act be and the same is hereby made section 17 of this act and amended to read as follows:

Sec. 17. For the purpose of carrying out the provisions of this act, there is hereby appropriated out of the funds in the State Treasury not otherwise appropriated, the sum of twenty-four thousand dollars ($24,000.00) for the fiscal years 1899 and 1900, said amounts including the sum of two thousand dollars ($2,000.00) for printing, incidental and operating expenses, to be at the disposal of the Commissioner of Mines, as otherwise provided for.

Sec. 18. That section 18 of said act be and the same is hereby made section 18 of this act.

Sec. 18. It shall be the duty of the Commissioner of Mines to furnish as far as practicable, to the proper officials of the State School of Mines, such information, plats, surveys, etc, resulting from the researches of his department, from time to time, as said officials may ask or deem advantageous to the advancement of the interest of the State School of Mines.

Sec. 19. That section 19 of said act, be and the same is hereby made section 19 of this act and amended to read as follows:

Sec. 19. The mineral specimens heretofore collected by the bureau of immigration and the Worlds Fair Commissioners are hereby transferred to the custody of the Bureau of Mines, and if found necessary, the Attorney General shall bring suit to recover the same.

For the purpose of providing the necessary rules and regulations for the government of metalliferous mining in this State, the following section, to be known as section 20, is hereby enacted and made a part of this act:

Sec. 20. First-That explosives must be stored in a magazine provided for that purpose alone; said magazine to be placed far enough from the working shaft, tunnel or incline to insure the same remaining intact in the event the entire stock of explosives in said magazine be exploded; that all explosives in excess of the amount required for a shift's work must be kept in said magazine; that no powder or other explosive be stored in underground workings where men are employed; that each mine shall provide and employ a suitable device for thawing or warming powder and keep the same in condition for use; that oils or other combustible substances shall not be kept or stored in the same magazine with explosives.

Second-That the Commissioner of Mines shall have authority to regulate and limit the amount of nitro powder stored or kept in general supply stores in mining camps or mining towns where there is no municipal law governing the storage of same.

Third-That oils and other inflammable materials shall be stored or kept in a building erected for that purpose, and at a safe distance from the powder magazine and their removal from said building for use shall be in such quantities as are necessary to meet the requirements of a day only.

Fourth-That no person shall, whether working for himself or in the employ of any person, company or corporation, while loading or charging a hole with nitroglycerine powder or other explosive, use or employ any steel or iron tamping bar; nor shall any mine manager, superintendent, foreman or sift boss, or other person having the management of direction of mine labor, allow or permit the use of such steel, iron or other metal tamping bar by employee under his management or direction.

Fifth-That all old timber removal shall as soon as practicable be taken from the mine and shall not be piled up and permitted to decay underground.

Sixth-That no person addicted to the use of intoxicating liquors or under eighteen years of age shall be employed as hoisting engineer.

Seventh-That all hoisting machinery, using steam, electricity, air or hydraulic motive power, for the purpose of hoisting from or lowering into metalliferous mines employees and material, shall be equipped with an indicator geared positively to the drum shaft, and so adjusted with dial or slide as to move a target or indicator and thereby at all times show the exact location of the cage, bucket or skip, said indicator to be placed near to and in clear view of the engineer and to be free of gong, bells or other automatic attachments.

Eighth-That all mines employing steam and other hoisting power, and equipped with cage or skip, shall, when hoisting material from tow or more levels, employ a man to be known as a "cager" whose duties shall be to load and unload said cage or skip to said levels and to give all signals to the engineer.

Ninth-That there shall be established by the Commissioner of Mines a uniform code of signals, embracing those that are most generally in use in metalliferous mines, and the commissioner shall have the power to enforce the adoption of such code of signals in all mines using hoisting machinery. The code of signals shall be securely posted, in clear and legible form in the engine room at the collar of the shaft and at each level or station.

Tenth-That all mines having but one exit, and the same covered with a building containing the mechanical plant, furnace room and blacksmith shop, shall have fire protection. Where steam is used, hose of sufficient length to reach the farthest point of the plant shall be attached to feed pump or injector, and the same kept ready for immediate use. In mines where water is not available, chemical fire extinguishers or hand grenades shall be kept in convenient places for immediate use.

Eleventh-That all persons shall be prohibited from riding upon any cage, skip or bucket loaded with tools, timber, powder or other material, except for the purpose of assisting in passing same through shaft or incline, and then only upon special signal.

Twelfth-All persons giving, or causing to be given, false signals, or riding upon any cage, skip or bucket upon signals that designate to the engineer that no employees are aboard, shall be deemed guilty of a misdemeanor under this act.

Thirteenth-That all shafts more than fifty (50) feet in depth equipped with hoisting machinery shall be divided into at least (2) compartments, and one compartment to be partitioned off and set aside for a ladderway. The ladders shall be made sufficiently strong for the purpose demanded, and in vertical shafts, landings shall be constructed not more than twenty (20) feet apart, said landings to be closely covered, except an opening large enough to permit the passage of a man; said ladders shall be inclined at the most convenient angle which the space allows, and shall be firmly fastened, and kept in good repair. In all incline shafts the landings shall be put in as above described, but a straight ladder on the incline of the shaft. Ladders in upraises and winzes shall be likewise provided and kept in repair, but where winzes connecting levels are used only for ventilation and exit, only one such winze on each level need be equipped.

Fourteenth-That hereafter shafts equipped with buildings and machinery, with only the working shaft for exit, shall be divided into at least two (2) compartments, one of which shall be tightly partitioned off and used for a ladderway as hereinbefore provided for, said ladderway shall be securely bulkheaded at least twenty five feet below the collar of the shaft, and below this bulkhead, a drift shall be run to the surface, if location of drift shall be run to the surface; if location of drift is upon sidehill or wall without the building and upraised to the surface, if upon a level. Said ladderway and landings shall be kept at all times in good repair and afford easy mode of escape in event of fire.

Fifteenth-That hereafter all tunnels or adit levels at safe distance from mouth of same shall connect with the surface, and be provided with safe and suitable ladders, and thus afford a means of exit in case of fire destroying buildings over the mouth of the tunnel or adit level.

Sixteenth-That employees engaged in sinking shaft to incline shall at all times be provided with chain or other kind of ladders so arranged as to insure safe means of exit.

Seventeenth-That all shaft collars hereafter constructed shall be covered and so arranged that persons or foreign objects cannot fall into the shaft. Where a mining cage is used a bonnet that raises with the cage and falls back into place when the cage descends shall be used. This bonnet or shaft cover need not be tight beyond what would exclude anything from falling into the shaft that would endanger life, and the cage shall also be equipped with safety clutches and a steel hood or bonnet, oval in shape if solid, and if divided in the middle and hinged at the sides, the angles of the sides when closed shall not be less than forty-five degrees nor the steel less than three-sixteenths (3-16) of an inch thick.

When wooden doors are used, the shaft must be housed in and covered and said doors so constructed as to stand at an angle of not less than forty-five degrees pitch; when closed hinged at the lower sides, and opening upward, or outward, and said doors shall not be less than four inches in thickness.

Eighteenth-That all stations or levels shall, when practicable, have a passageway around the working shaft, so that crossing over the working compartment can be avoided. At all shaft stations a guard rail or rails shall be provided and kept in place across the shaft, in front of the level, so arranged that it will prevent persons from walking, falling or pushing a truck, car or other conveyance into the shaft. All winzes and mill holes extending from one level to another shall be covered or surrounded with guardrails, to prevent persons from stepping or falling into the same.

Nineteenth-That where any shaft is sunk on a vein, ore shoot or body, a pillar of ground shall be left standing on each side of the shaft of sufficient dimensions to protect and secure the same, and in no case shall stoping be permitted up to or within such close proximity to the shaft as to render the same insecure, until such time as the mine is to be abandoned and said pillars withdrawn.

Twentieth-That all abandoned mine shafts, pits or other excavations endangering the life of man or beast shall be securely covered or fenced.

Twenty-first-That any person or persons removing or destroying any covering or fencing placed around or over any shaft, pit or other excavation, as hereinbefore provided, shall be deemed guilty of a misdemeanor under this act, and upon conviction thereof in any court of competent jurisdiction shall be fined in a sum of not less than fifty dollars ($50.00) or more than three hundred dollars ($300.00) or imprisonment in the county jail for six (6) months, or by both fine and imprisonment.

Twenty-second-That any person or persons operating any metalliferous mine or mill and employing five or more men, shall report the same to the bureau of mines and employing five or more men, shall report the same to the bureau of mines and state when work is commenced and when stopped, and mines working continuously shall report on or before December 1, of each year, together with the names of the owners and managers or lessee in charge of said work, together with the post office address, the name of the claim or claims to be operated, the name of the county and mining district, together with the number of men employed, directly or indirectly, the same being classified into miners, trammers, timbermen, ore sorters, mill men, teamsters, etc. The necessary blanks to carry out the provisions of this section shall be furnished upon application by the commissioner of mines.

Twenty-third-That any owner, lessee, manager, superintendent or foreman in charge of any metalliferous mine who shall willfully misrepresent or withhold facts or information from any inspector or other officer of this bureau regarding the mine, such as length of time timbers have been in place, or making any misrepresentation tending to show safety when the reverse is true, shall be deemed guilty of a misdemeanor, and upon conviction thereof in any court of competent jurisdiction, shall be fined in any sum not less than one hundred dollars ($100.00) nor more than three hundred dollars ($300.00).

Twenty-fourth-That strangers or visitors shall not be allowed underground in any mine, unless accompanied by some owner, official or employee deputized to accompany same.

Twenty-fifth-Notice of the maximum number of men permitted to ride upon or in the cage, skip or bucket, at one time, shall be posted at the collar of the shaft and at each level. All men or employees riding upon or in an overloaded cage, skip or bucket, as provided in notice so posted, shall be guilty of a misdemeanor, and upon conviction in a competent court, shall be fined not less than five dollars ($5.00), nor more than fifty dollars ($50.00) for each and every offense.

Twenty-sixth-The commissioner of mines or inspectors under this act shall have power to make such examination and inquiry as is deemed necessary to ascertain whether the provisions of this act are complied with; to examine into and make inquiry respecting the condition of any mine, mill or part thereof, and all matters or things connected with or relating to the safety of the persons employed in or about the same; to examine into and make inquiry respecting the condition of the machinery or mechanical device, and if deemed necessary have same tested; to appear at coroner's inquests held, respecting accidents, and if deemed necessary, call, examine and cross-examine witnesses; to exercise such other powers as are necessary for carrying this act into effect.

Twenty-seventh-Any person, owner, agent, manager or lessee operating a metalliferous mine or mill in this state, who fails to comply with the provisions herein set forth, shall be deemed guilty of a misdemeanor against this act, and, when not otherwise provided, shall be liable to the penalty prescribed in section 13 of this act, or to a fine of not less than twenty-five dollars ($25.00), nor more than three hundred dollars ($300.00), for each and every provision not complied with, or both, at the discretion of the court.

Sec. 21. The secretary of state shall provide the bureau of mines with a seal, the same to be marked "The Bureau of Mines of the State of Colorado," and bear the coat of arms of the state. The commissioner of mines is hereby empowered to affix seal to all certified copies of sections of record and shall charge the legal rate allowed for such service. Any and all moneys thus collected shall be transferred to the proper officer and by him credited to the bureau of mines fund.

Sec. 22. All justices of the peace and county courts in their respective counties, shall have original jurisdiction in prosecution for the violation of sections nine (9), ten (10), thirteen (13), nineteen (19) and twenty (20), of this act, with the right to appeal from judgment of justices of the peace to county courts in their respective counties, under the same conditions as in civil cases; and in all trials before justices of the peace and in county courts the defendant shall be entitled to a trial by jury as in other misdemeanor cases. District courts in their respective districts shall have original jurisdiction upon information or indictment in all prosecutions for violations of this act.

Sec. 23. That sections eight (8), sixteen (16) and seventeen (17) of said act be and the same hereby repealed.

Sec. 24. That section twenty (20) of said act be and the same is hereby made section twenty-four (24) of this act.

Sec. 25. An act dividing the state into metalliferous mining districts and appointing an inspector of mines, approved April 1, 1889, and all other acts inconsistent herewith are hereby repealed.

Sec. 26. That section twenty-one (21) of said act be and the same is hereby made section twenty-six (26) of this act.

Approved this 10th day of April, A. D. 1899, at 9 o'clock A. M.

SOURCES

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Thompson, Thomas Gray, Early Development of Lake City, Colorado. Colorado Magazine

Milo Z. Morse was born in Anderson, Indiana on May 19, 1948, while his parents, of Montrose, Colorado, were there for a short time. Early on, Milo developed an interest in mining in the Lake City area. This interest was fueled, in 1964, while going through several old trunks full of mining records. These had belonged to his great-grandfather, Herbert Eugene Merryman, a mining engineer in Lake City at the turn of the century. Mr. Merryman graduated from the Colorado School of Mines in Golden, Colorado, in 1895.

He began working in the mines in the Lake City area at the age of 18, working in the Ute/Ulay and the Hidden Treasure mines. At the age of 19, Milo was working in the Pride of America and the Big Casino mines, and has since gone on to purchase these mining claims. Milo has spent a great deal of effort in collecting and organizing the information for this book. After many years of work, he brings this book to you with much pride.

Faye Bielser, born in De Kalb, Illinois on February 19, 1946, majored in English grammar and literature throughout her high school and college years. While attending Aurora College in Aurora, Illinois she enrolled in a course in geology under the tutelage of Dr. Clarence Smith and earned an A (the only one she received), while there.

She has made her home in Colorado since 1967, having lived in the San Luis Valley in the south-central part of the state for 28 years. While living there she developed a great interest in the history and geology of southwestern Colorado. At one time, she was a member of the Rio Grande Rock Club, and served as its secretary for two years.

A resident of Lake City since the spring of 1995, she is employed as Head Teller at First National Bank of Lake City. The opportunity to help in the creation of this work, and the knowledge she has gained in doing so, has given her a great deal of pleasure. She hopes the reader enjoys reading this book as much as she did in writing it.

Tommyknockers were legendary characters, similar to Leprechauns who inhabited the mines and were known as jokesters who played tricks on the fellows working there. As a result, whenever anything went wrong, the Tommyknockers were blamed for the mishaps.

This is a photo captured of an elusive Tommyknocker who came to Lake City one night for a beer.