Silver Lake Basin: A Mining Chronicle

By
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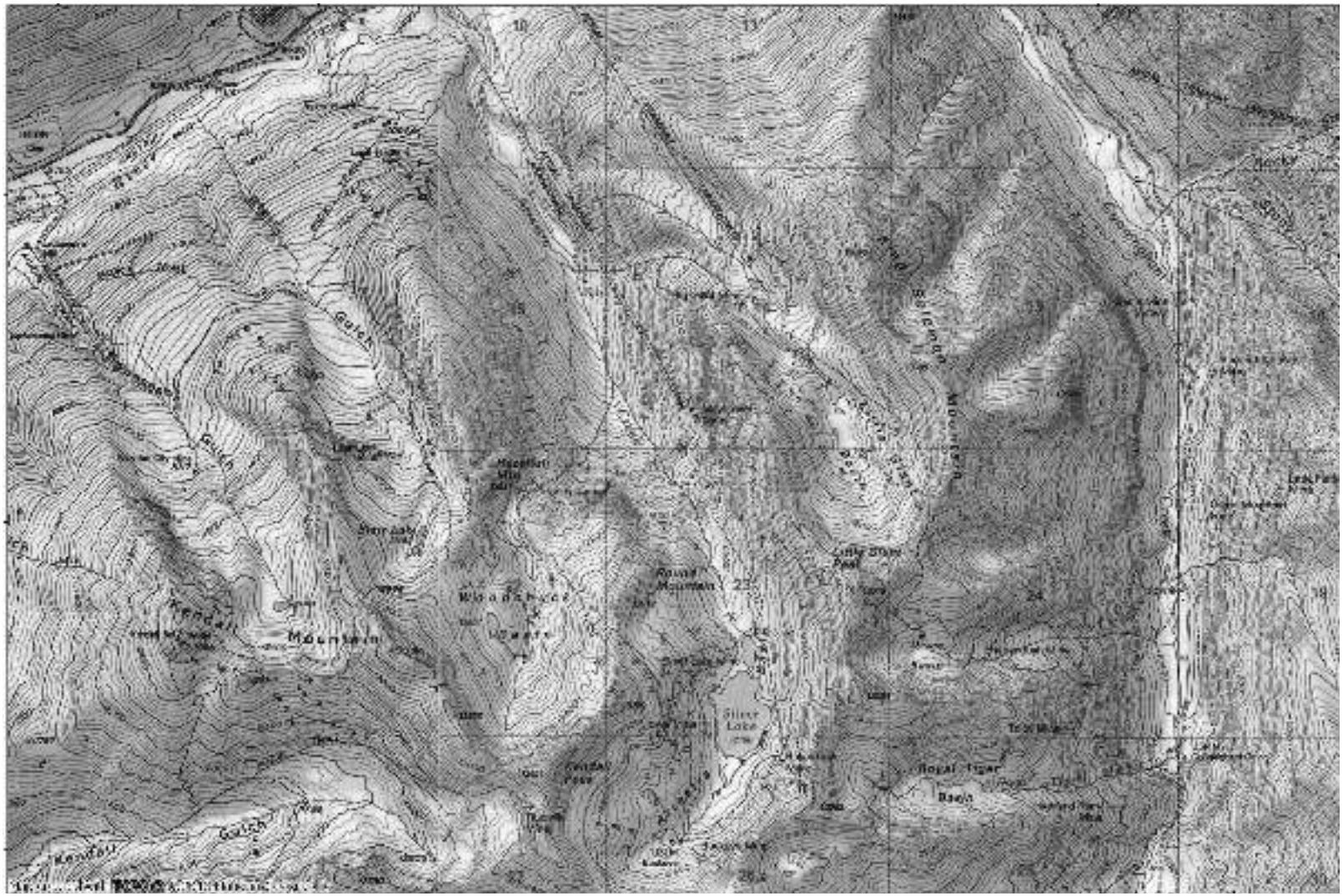
Silver Lake, which early settlers called Arrastra Lake, lies in a basin at the head of Arrastra Creek, four miles southeast of Silverton, Colorado, near the center of the Las Animas Mining District, in what was then part of La Plata County.

Early Prospecting and Mining

On June 15, 1871, prospectors created the Las Animas Mining District as a primitive form of frontier government to regulate claim activity throughout the vast Animas River drainage. During the district's first several years, explorers on the floor of Arrastra Gulch must have gazed up and south at the gulch's imposing headwall and wondered what lay beyond. Snow and ice locked in the precipice for all but a few months each year, however, discouraging exploration.[1]

In 1875 a handful of independent explorers made the dangerous ascent into the upper reaches of Arrastra Basin. The following year, John Reed became the first documented prospector to scout a route up the headwall. On the other side, he found a hanging valley carved by glaciers between North Star and other summits to the east and Kendall Peak and Round Mountain to the west. Their flanks, with a thousand feet of relief, were sheer and rugged, and the mountaintops presented a lacework of veins and dykes. At the valley's center lay what was at that time a pristine glacial lake, about forty acres in size, surrounded on most sides by exposed bedrock and with its outflow cascading northward until it roared over the valley's craggy headwall into Arrastra Gulch.[2]

Examining the flank of Round Mountain on the valley's west side, Reed quickly found several veins that carried silver, lead, and copper.



The town of Silverton, northwest of Silver Lake Basin (bottom center), lies just off the upper left corner of this map. (Topo map printed from "Silver-Lake-printable.topo. National Geographic.)

He staked two claims on Round Mountain that he named the Whale and the Round Mountain, as well as a third, the Silver Lake, on the northwest side of the lake.[3] Also in 1876, an unknown prospector working at the hanging valley's head identified a huge fault up Arrastra Gulch just south of the lake, and traced it southwest, where it disclosed a vein he claimed as the Buckeye.

During that summer, both he and Reed excavated shallow workings to prove ore and retain title to their properties, then left for the season. When the men returned the following year, Silver Lake Basin, as the valley came to be known, saw its first production, which the owners shipped by burro to the Greene Smelter just north of Silverton.[4] However, the volume of pay rock was insignificant considering the arduous and perilous approach, which hindered Reed and the other prospector from packing much out or from importing anything beyond the most essential materials, limiting output.[5]

The year 1876 also saw Jonathan Crooke and his brother, Lewis, purchase the Royal Tiger claim on the southeast side of Silver Lake, which they began working in 1877.[6] In 1878 they sold a controlling interest to McPherson Lemoyne. Meanwhile the original miners labored on the Buckeye for approximately three years until, although they had not exhausted the vein, that holding fell silent around 1879.[7]

Silver Lake Basin pulsed with activity in 1881. A few other prospectors made the hazardous ascent into the cirque, where they examined the east flank of Kendall Peak a short distance south of Reed's ground. After climbing rock cornices, they found a rich vein directly west across the lake from the Royal Tiger, staked it with the Iowa and Stag claims, and blasted a tunnel and shaft to explore the lode at depth.[8] At the end of the season, the party had samples assayed in Silverton. The report found the ore was rich not only with silver and industrial metals but also gold. The next year the group returned and began production. The members persuaded a crew of ten or so miners to make the sheer cliff at the Iowa their home for the working season and carried up all of the supplies and lumber necessary to build a basic surface plant.[9]

By 1881, early prospectors had claimed the four significant properties in Silver Lake Basin: the Silver Lake, the Buckeye, the Royal Tiger, and the Iowa.

While the Iowa miners acclimated, John Reed toiled on his adjoining Silver Lake real estate a short distance to the north. During 1880 and 1881, he traced the Silver Lake vein for a considerable distance with shallow excavations hewed into solid bedrock. In the short working season of 1882 he generated several tons of ore from a tunnel he drove at a snail-like pace directly on the vein for a distance of around fifty feet. Remaining in the basin for the winter, with its heavy snows, would constitute a life-threatening event, forcing him and the other miners out each autumn.[10]

During a stay in Silverton in 1883, Reed convinced John W. Collins that his Silver Lake and Round Mountain claims would pay well if worked, but required additional investment. For a share of the Silver Lake, Collins joined Reed to form a partnership, and that summer the men scrambled into the basin to resume production. They packed in enough lumber and equipment to build a small blacksmith shop and cabin, and hired three or four miners to begin a second tunnel. Once they reached the vein, the party extracted about five tons of material per day and hauled it down to Sweet's Sampler in Silverton.[11]

About that time, on the east side of the basin, Julius Johnson cut a tunnel deep under the Royal Tiger claim. An old-time prospector, he had leased the property from McPherson Lemoyne. Johnson's contract ended in roughly 1883, when Lemoyne sold the Royal Tiger to Edward Innis.[12]

By 1885 activity in Silver Lake Basin had slowed, probably due to the national recession that began in March 1882 and lasted until May 1885, coupled with difficulties the extreme terrain posed. Reed and Collins stopped work at the

Silver Lake Mine, and around that year the Iowa also became idle. The Royal Tiger remained the only active operation.[13]

Otto Mears, wagon-road and railroad magnate, known as "the Pathfinder of the San Juan," initiated his interest in the mining industry in 1886 by leasing the Buckeye, which had been dormant since about 1879. He constructed the best surface plant in the basin to sustain a crew of ten in year-round production. Relative to the era, the Buckeye Mining Company was progressive, boasting a ventilation blower that forced air underground and warming boxes so miners could thaw frozen dynamite prior to use. The mine worked at full capacity in 1887, but two years later Mears quit his contract and closed the property.[14]

In 1888 Benjamin W. Thayer and James H. Robin examined the Iowa Mine, located a few hundred feet above lake level directly south of the Silver Lake property. They found a vein that offered an unusual combination of gold, silver, and galena, the principal ore of lead. The partners leased the ground the following year, began production, and benefited when Congress passed the Sherman Silver Purchase Act of 1890, which required the U.S. government to buy nearly twice as much of that metal as previously to coin silver dollars.[15] The legislation bolstered silver's market price, raising the value of the Iowa's ore. Thayer and Robin boosted their workforce to expedite development and then discovered a second vein of galena, which ensured greater profits.[16]

The Stoiber Brothers

In the Las Animas District, the key mining outfits that managed to survive the 1882 recession were among the first to boom in response to the positive climate of 1890, and several of these operated in Silver Lake Basin. What followed laid the groundwork for that small area to become one of the most advanced centers of mining technology in Colorado.[17]

While the Iowa was a confirmed bonanza, developments on the Silver Lake claims a short distance north soon overshadowed Robin and Thayer's relatively simple operation. Sometime after 1885, Edward George Stoiber and Gustavus H. Stoiber apparently purchased the Silver Lake Mine from John Reed and John Collins.

After running the Stoiber Brothers Sampling Works at Silverton for four years, the owners had a significant disagreement in 1887 and divided their mutual assets. Gustavus assumed control of the sampler and Edward the Silver Lake claims, which numbered two hundred.[18] Gustavus' choice was safer because the works provided a reliable source of income, whereas Edward based his decision on his belief that the claims would afford great rewards for their high risk.[19]

After Edward took control of the Silver Lake properties, he spent two years examining the geological features contained in the Whale,[20] Silver Lake, and Round Mountain claims; conducting assays; staking more claims with the aid of his new wife, Lena; and calculating the optimal manner of development.

Unlike most mine owners, Edward Stoiber took a primary interest in the bountiful low-grade ore and considered the high-grade a bonus. However, he faced the problem of the cost of shipping inferior pay rock out of the basin and processing it at the sampling works exceeding the return. Stoiber realized that if he could mine and concentrate the ore in large volumes with a highly efficient system, economies of scale would render the low-quality material profitable at a nominal cost per ton. By 1890, at the age of only thirty-five, the German engineer had designed a plan.[21]

During the late spring of that year, when Silver Lake Basin's snow blockade consolidated, a small army of workers with mule trains packed in thousands of board feet of lumber, tons of construction hardware and bricks, and the basic necessities of life to Stoiber's mine. There, at lake level, far above timberline at an elevation of 12,250 feet, they assembled the largest surface plant and concentrating mill yet constructed in the Las Animas

*Silver Lake Mine and Mill, 1890 or 1891. The man at the stern of the rowboat pointing a rifle is probably Edward Stoiber, accompanied by his engineers. (*Mazzulla Collection *(Scan #20007880), Courtesy of History Colorado, Denver Colo., CHS.X7880.)*

Mining District.

Mules drew ore cars on rails from the mine's underground stations to the mill, the first built at that altitude. A new story-and-a-half boarding house accommodated a crew of fifty. Workers manipulated heavy timbers for a stout tunnel house that would enclose a blacksmith shop, for sharpening the drill steels that miners dulled on a daily basis, in addition to carpentry and machine shops.[22]

Laborers at this original Silver Lake Mill, adjacent to the mine on the northwest side of the lake, first separated out the larger, heavier pieces of solid "shipping ore." Then, from pulverizing the rest of the low-grade product, they generated fifty tons of concentrates per day, which translated into five railroad cars of freight and provided Stoiber his economy of scale. Constructed on at least three stair-step terraces, the mill used gravity, with the aid of water pumped from the adjacent lake, to draw the material through treatment, after which workers dried the slurry and sacked it for shipment. Half the value of the output came from gold and the remainder, from silver, lead, and copper.[23]

Stoiber implemented several innovations that set his mill apart from others in the area. Its enclosed, coal-fired power plant created enough steam to heat that structure as well as the boarding house.[24] Also, a flume carried at least five hundred thousand tons of piped mill tailings directly into Silver Lake's north end, creating an artificial beach and a long peninsula that separated the northern and southern lake portions. Unfortunately, this operation, along with those of the mine's neighbors, killed the aquatic life.[25]

Around 1891 Edward Stoiber built his own alternating-current power plant, evidently the second in the state, down on the Animas River. Power lines transported electricity two miles, too

far for direct current, up to his property at Silver Lake Basin. This facility lit the remote building interiors and ran, to perfection, some small motors in the mill. Also, over the course of the summer, muleskinners hauled up supplies and coal so that the mine and mill could run through the winter.[26]

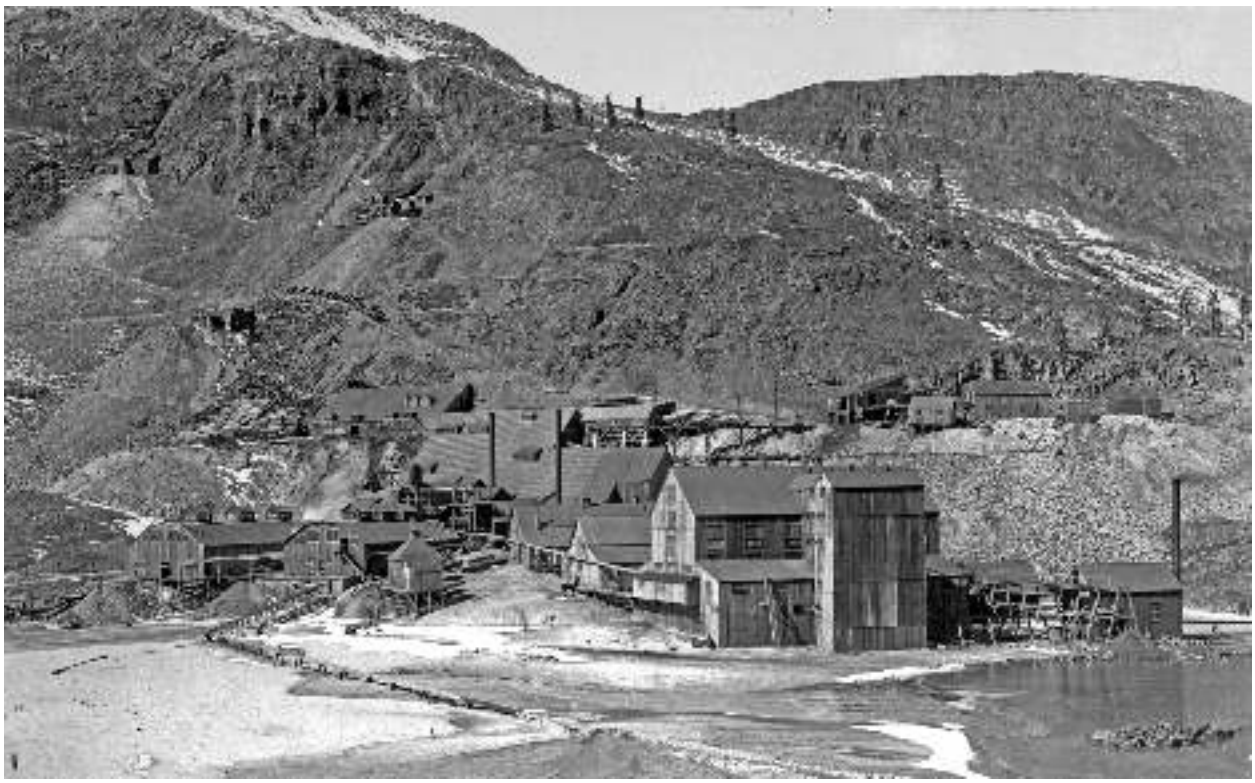
The Silver Lake Mines Company reported to the United States Mint 1891 revenues of $254,908—about $6,800,000 today—constituting approximately 25 percent of the total value of production of San Juan County.[27] Of course, the company's heavy expenses offset much of this total, resulting in a smaller profit figure.

After two successful years of mining and milling, Edward Stoiber expanded operations in 1893. Lena Stoiber, the company's personnel manager, increased the workforce to 130 and had her husband build a second boarding house that provided amenities heretofore unseen in the Las Animas Mining District. These included a dining hall, a kitchen equipped with a brick oven, and a water tower suspended in the rafters. Thus the building offered running hot and cold water as well as flush toilets and steam radiators to furnish heat.[28]

But then Colorado's mining economy worsened. The Panic of 1893 prompted Congress to repeal the Sherman Silver Purchase Act, causing the Silver Crash of that year.[29] As a result, almost every mining company in the Las Animas District closed. Most of the mines that continued operating from the early 1890s into the ensuing depression, including the Iowa and the Silver Lake, were proven gold producers.

Development amidst Depression

Edward Stoiber, along with a handful of other mine owners, responded to the crash not by cur-



Silver Lake Mine, Mill, three boarding houses, and artificial beach composed of mill tailings, likely photographed in September1897. (Courtesy of the San Juan County Historical Society, J-2-A-6-3-a2.)

Southwesterly view of the Iowa Mine reflected in Silver Lake, June or July 1898. (Courtesy of the San Juan County Historical Society, J-1-B-1-3-a.)

tailing operations but by taking the opposite approach. They poured capital into underground development, mechanization, and mill improvements on a scale the county had not yet seen. Their purpose was to extract and concentrate product using economies of scale great enough to dramatically reduce the cost per ton, rendering low-value ores profitable to mine even during the financial decline.[30]

Meanwhile at the Iowa, in 1893 Edward Stoiber's brother, Gustavus, joined Robin, Thayer and two other investors, H. W. King and R. W. Watson, in organizing the Iowa Gold Mining and Milling Company to work that Silver Lake Basin property. This consolidation made the Iowa second only to the Silver Lake in implementing economies of scale, as an enlarged workforce drove two adits into the vein system in order to work it simultaneously at different levels.[31]

Edward Stoiber built a second AC power plant on the Animas River in 1894, which also furnished current to his brother's Iowa Mine. Waterwheels drove dynamos to generate electricity for hoisting and pumping and for lighting the remote mines and buildings. At the same time, at the Iowa, Gustavus Stoiber installed the most advanced compressed-air system in the Las Animas District. This provided energy to operate the piston rock drills at that mine and, later, at the Silver Lake. Gustavus convinced the U.S. Postal Service to locate the misspelled Arastra Post Office at the Iowa in 1895, while Edward housed most of the combined workforce at the Silver Lake.[32]

During this period, the two Stoiber holdings ranked among the greatest producers in the region, thanks to the owners' work ethic and, equally important, their frugality. They paid close attention to operating costs and squeezed efficiency

at each opportunity. The brothers' great success depended on a coordinated effort, which brought about their reconciliation. Edward and Lena became two of the largest stockholders in the Iowa company.[33]

Edward Stoiber's Silver Lake Mine boasted ten miles of underground passages at numerous adit levels used to work the vertical veins simultaneously at different elevations, creating an ore factory that yielded silver, gold, lead, copper, and zinc. A central internal shaft linked the various levels.[34]

Although his venture earned a profit, Edward realized the need for a more efficient process. Workers could access his mine solely by a steep, mile-long mule trail. So in 1895 he contracted with William M. Frey to construct an 8,640-foot Bleichert double-rope, gravity-drawn tramway, capable of moving five tons of crude ore and concentrates per hour from his mine to a shipping terminal he'd built earlier part way down Arrastra Gulch. Once completed, this tram segment attracted notice for its long spans, one of which stretched almost 2,200 feet across a snowslide area.[35]

In 1896, with a labor force of 125, Gustavus Stoiber, James Robin, and the other Iowa investors made significant progress toward building an empire as large as Edward's Silver Lake. The partnership hired the Trenton Iron Works to construct its own Bleichert tramway. It ran parallel to the Silver Lake line, terminating at a concentration mill constructed the previous year at timberline in Arrastra Gulch, a mile or so up from the Animas River.[36]

The same year, the party gained advantage when it purchased the Tiger Mining and Milling Company, which had just begun work on the Royal Tiger Mine, the operation directly across Silver Lake from the Iowa on the lake's east side. That group had done little with the property because it could not bear the development costs and was eager to sell. Like the Iowa, the Royal Tiger yielded mainly lead. Once Gustavus Stoiber and

This postcard view shows the Bleichert tramway that descended from the Iowa Mine on Silver Lake to its mill in Arrastra Gulch. Note the man riding in a bucket. (Courtesy of the Denver Public Library, Western History Collection, X-62249.)

Robin had erected a surface plant and boarding house there, they invested in underground expansion and increased production.[37]

Edward Stoiber built a third boarding house at the Silver Lake, five stories high including the basement, completed in 1897.[38] At that time the mine employed about 300 workers, many of them immigrants from Austria, Italy, and Finland.[39] The newest structure featured the same luxurious amenities as its predecessors and, in addition, a ventilation system, barbershop, laundry room, library, and reading room, as well as bathrooms and spacious "sleeping apartments" that accommodat-

ed no more than four men each. The dining room could seat 250 at a time. Stoiber piped in fresh water and collected and burned kitchen trash in a dedicated furnace. Dishwashing machines, drying tables, and two brick ovens ventilated by chimneys adorned the cooking area. The *Silverton Standard* proclaimed it "the best boarding house in the state, if not in the United States."[40]

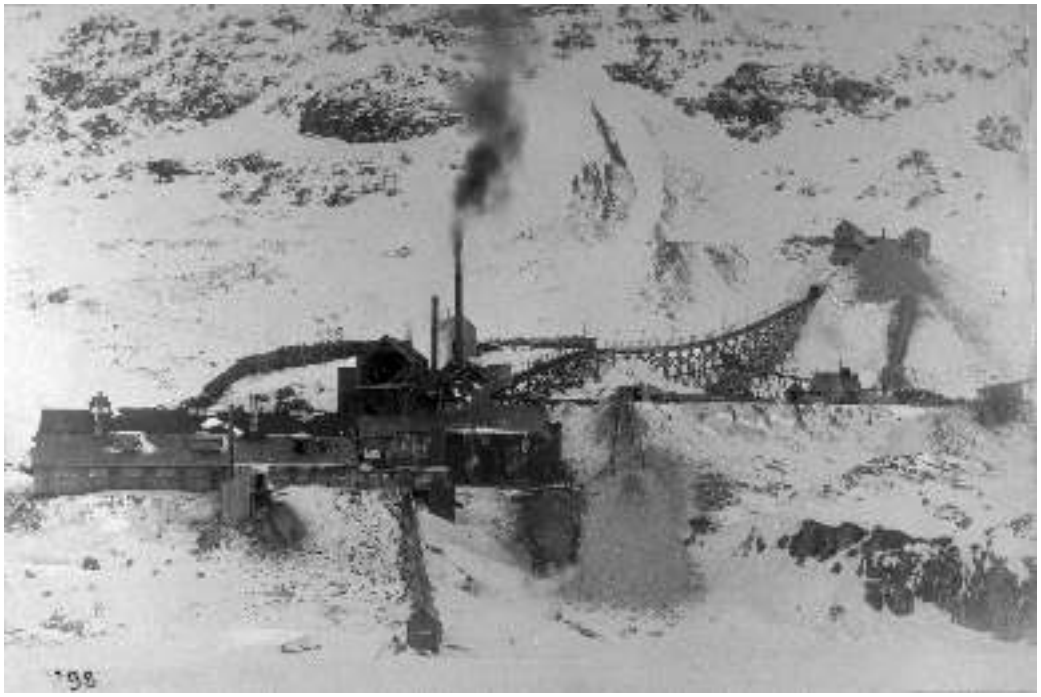
Unlike the other mine owners in the basin, Edward Stoiber was concerned enough with the lake's water quality to install a primitive sewer system, virtually unknown on the mining frontier, for his boarding houses at the Silver Lake Mine. Mill tailings covered the septic tanks.[41]

Additional Improvements

By the end of 1897, the Stoiber brothers had transformed Silver Lake Basin into an industrial landscape. Their three mines, from which an octopus of roads radiated outward, took on the appearance of massive factories, creating noise audible within all of the surrounding basins.[42]

San Juan County's well-capitalized mining companies, such as the Silver Lake, had used electric hoists to move cages between the various levels in their shafts as early as 1895. Since his mine already had an electrical infrastructure, Edward Stoiber, ever the progressive, decided to experiment with innovative electric-model drills. By January 1899, miners at the Silver Lake were successfully using these tools in its stopes, drawing the attention of industry experts, although the machines, while portable and convenient, were somewhat too lightly constructed for the work required of them.[43]

In 1898 Edward Stoiber commissioned Frey to build a 6,200-foot tramway extension from where the first segment ended at a temporary station just above the Iowa Mill, to a massive, newly constructed ore-storage terminal on the south side of the Animas River, west of the mouth of Ar-



The Iowa Mine around 1900. Note the inclined railway that carried ore from the mine's main adit to its tramway terminal. (Courtesy of the San Juan County Historical Society, J-2-C-2-20-b.)

South view of the frame Iowa Stamp Mill, Arrastra Gulch, 1902. The gulch's headwall, beyond which lies Silver Lake, appears at the top. Note the telegraph poles and the towers of the multitude of tramway systems. (Courtesy of the Denver Public Library, Western History Collection, Z-2560.)

rastra Gulch.[44] The project increased the line's capacity from five to thirty tons per hour. This terminal served as a base station for the Silver Lake Mine and included an assay shop and freight yard. The second tram section enabled Stoiber to haul concentrates from his mine on the lake all the way down to a branch of the Silverton Railroad that Otto Mears constructed especially for him. The two tramway segments together totaled almost fifteen thousand feet, making it one of the longest systems in the state.[45]

Despite the successful operation of his elongated tramway, Edward Stoiber's mill on the lake proved uneconomical. As a result, in 1900 he built a second one at the site of his storage terminal and abandoned the original. The new mill building alone covered two acres and descended from ore-holding bins on flat ground at the top. The product proceeded via gravity down a series of ten stair-step terraces through various stages of crushing and concentration to the valley floor. The structure was able to treat one thousand tons of pay rock every twenty-four hours, more than many mines generated in a month.[46]

Because of Edward Stoiber's advanced, enlightened concepts of mining, milling, and improving working conditions, his Silver Lake Mine became a model that similar companies across the West imitated by the late 1890s.[47] He created a legacy from which his astute contemporaries could learn and profit.

Meanwhile, by 1898, miners at the Iowa had driven about eight thousand feet of underground workings on its four levels. The owners acquired the Black Diamond and other claims and initiated further underground development at their second property, the Royal Tiger. That year they built a tramway segment across the lake that allowed miners at the Royal Tiger, which had no mill, to send its product to the Iowa terminal, where workers coupled the buckets onto the main line. The mobile receptacles then coasted down to the Iowa Mill, where men emptied them and sent them back up to the Iowa and Royal Tiger for refilling.[48]

In addition, the following year the Iowa partners added another section to their main tramway line. The lengthened system, known as the Iowa-Tiger, extended its reach from the Iowa Mill to the company's own ore-storage-and-loading terminal located on the Animas River, to which Otto Mears constructed a second spur to furnish direct service on his Silverton Railroad.[49] By 1900 the Royal Tiger was producing a greater volume than the Iowa.[50]

During this period, Edward and Gustavus Stoiber together drove the Unity Tunnel, an adit likely named to reflect their fraternal cooperation.[51] Via this ambitious project, the brothers penetrated three thousand feet of solid rock to undercut the vein systems of both the Silver Lake and Iowa mines. Their goal was to provide a platform for miners to stope the veins seven hundred feet upward to the existing operations, and also to serve as a central artery through which workers could haul out the deep ore. Although they began boring in 1895, the Stoibers did not complete the connection with the deepest workings in the Silver Lake Mine until 1901. To service the adit, the brothers built another surface plant that included many of the same components found at the two mines.[52] Then, in 1900, they linked the portal with the main line by tramway.[53]

In 1899 an unnamed partnership leased the Buckeye Mine, the fourth player in Silver Lake Basin, idle since Mears quit his contract ten years earlier. The investors rehabilitated the critical excavations and began production, mainly of lead ore,[54] and activity lasted several years. This venture marked the last known occupation of the site, which lacked a mill. However, individuals or small companies could have worked the property at some time after that.[55]

The Guggenheims

In early 1901, after completing the Unity Tunnel, Edward Stoiber sold his Silver Lake mining properties to the Guggenheim family's exploration company for $2,350,000—about $67,708,000 today.[56] The sale stipulated that the corporation would retain him as consultant until the new mill was finished and began treating ore successfully, which proved true that May.[57] Then he and Lena retired to Denver and traveled Europe.[58]

Unfortunately the Guggenheims lacked the personal interest and purity of motive Edward Stoiber had possessed. Furthermore, within three months of the sale, the principal vein at the Silver Lake pinched out, leaving the costly operation with much less pay rock than the new owners had supposed. Whether Stoiber knew the situation before the sale remains uncertain. The new manager directed his miners to extract existing ore and drive new exploratory workings in search of the lost vein and others. These undertakings succeeded, exonerating Stoiber. Nevertheless, through 1902 the crew managed just 260 tons of product per day, approximately one quarter of the new mill's capacity.[59]

In 1903 the Guggenheims' exploration company merged with the giant American Smelting and Refining Company (ASARCo), which they had organized with some of the nation's most powerful smelter men in 1899. The combined entity controlled Edward Stoiber's Silver Lake empire and operated it to both exploit the mine's profitability and to provide a source of ore for ASARCo's Durango Smelter. But in October 1904 a blaze destroyed the tramway's turning station above the Iowa Mill, pulling over a number of towers on the Silver Lake and Unity segments in the process, and dropping all of their buckets. The accident halted the entire operation. The operation's manager, Rowland Cox, could have brought the old mill at Silver Lake Basin back on line but declined to do so.[60]

H. A. Guess, mill assayer, replaced Cox in 1905 and returned the Silver Lake Mine to full production. But on April 20, 1906, an arsonist set fire to the new Silver Lake Mill on the Animas River, causing $250,000 in damage[61] and destroying, as well, the lower tramway terminal. Guess ordered a second suspension of operations at the mine. On April 21, the day after the mill burned, Edward Stoiber died of typhoid fever at the age of fifty-one while on vacation with Lena in Paris.[62]

Later that year ASARCo initiated construction of a much smaller replacement mill on the same site and workers completed it in 1907. But then another national recession struck. The company closed its new facility in 1908 and leased out blocks of ground at the Silver Lake to small par-

ties instead of working the mine itself.[63]

Over the next few years, a number of natural calamities took a toll. In 1909 the Silver Lake tramway's turning station burned again and wrecked the system. Then in 1911 a series of avalanches destroyed towers on both the Silver Lake and Iowa tramways and started a fire at a transformer station. In 1912 a blaze that started at the Silver Lake's blacksmith shop destroyed the upper tramway terminal and virtually all of the property's other buildings except one of the boarding houses. As a result, the corporation gave up large-scale production but continued to contract blocks of ground to small groups. Ironically, in contrast to Edward and Lena Stoiber, ASARCo never earned a profit from its Silver Lake operation, although the company employed competent engineers.[64]

Meanwhile, during the early 1900s the Iowa Gold Mining and Milling Company, second-largest outfit in the Las Animas Mining District and one of the county's most profitable, experienced misfortunes that rivaled those at the Silver Lake. Gustavus Stoiber and James Robin discovered that the main problem with extracting ore using economies of scale was that the mine's life was relatively short, since its reserves were limited. By 1901, the Iowa showed signs of exhaustion after only six years of intensive mining, in contrast to more than fourteen at the Silver Lake Mine.[65]

In response, the Iowa's owners pursued an aggressive exploration and development campaign. But when that plan failed, they halted mill and tramway operations and leased both the Iowa and Royal Tiger while seeking a buyer. Because of the meager output from both properties, no one, including the Guggenheims, seriously considered purchasing the complex. Although in 1902 miners working for Al Kunkle, lessee of the Royal Tiger, struck a new vein rich in gold and silver and over five feet wide, it lasted only a year before giving out. Consequently Kunkle, followed by the lessees at the Iowa, moved on to other endeavors.[66]

The stress caused by the Iowa's rapid failure proved too much for its owners. James Robin shot himself in 1903. Two years later an avalanche wrecked a significant portion of the Iowa Mill and, soon after, Gustavus Stoiber died of a massive stroke.[67]

The Mears-Slattery Syndicates

After these tragedies, Stoiber's and Robin's heirs abandoned their hopes that the Iowa and Royal Tiger real estate would return to profitability. But in 1908 Otto Mears and Jack Slattery approached them with a proposal to lease the entire idle operation, including the Iowa Mill. The owners accepted, and the lessees embarked on what became a long-lasting, lucrative syndicate.[68]

Mears and Slattery rejected the conventional view that labor costs were an expense merely to be tolerated, believing instead that their success hinged on the quality and loyalty of their miners. So they hired the most competent ones they could assemble and initiated a profit-sharing program to provide their employees an incentive to find pay rock and produce it efficiently. They also persuaded a number of other investors to join their company in order to finance repairs, improvements, and equipment. Then Mears and Slattery rehabilitated the surface plant and underground workings at both the Royal Tiger and the Iowa mines and undertook an organized ore-exploration program.[69]

In 1909 workers at the Iowa sank a shaft and discovered an extension of the valuable Melville Vein, the upper levels of which Robin and Gustavus Stoiber had previously identified and mined. The following year, elsewhere in the excavations, another crew discovered a gold ore vein valued at $1,200 per ton—about $30,900 per ton today. Later in 1910 the foreman at the Royal Tiger blasted a chamber out of a vein's hanging wall, the shot revealing a hidden, parallel vein rich with free gold.[70] The partners sent the newly discovered pay rock via tramway down to the Iowa Mill

The Iowa Mine on the left, the Silver Lake Mine on the right, with Round Mountain in the background, taken around 1900 from the Royal Tiger Mine on the east bank of Silver Lake. (Courtesy of the San Juan County HIstorical Society, J-2-C-5-20-a.)

for processing.

Thus Mears and Slattery kept over one hundred employees busy through 1912. The miners made several more discoveries, too, and heavy production continued through 1913. But an avalanche destroyed the Royal Tiger's boarding house that year, and after five years of continuous yield the lessees finally saw production at the Iowa and Royal Tiger slow.[71]

To raise capital, Mears, Slattery, James Pitcher, and a few other investors organized another syndicate. In 1913 they leased the dormant Silver Lake from ASARCo and rehabilitated the Stoiber Tunnel, the mine's principal entry, which Edward Stoiber had excavated to intersect the Nevada vein. The partners generated low-grade ore through 1914 and contracted for additional ground. The burgeoning combined Iowa and Silver Lake workforce justified reopening the Arastra post office, which the government had closed years before. The company maintained a constant but limited production into 1917, when experienced miners noticed an eight-foot-wide vein laden with copper, silver, and gold in a wall of the Stoiber Tunnel. They sent its material, along with the rest they extracted, down to the Iowa Mill for treatment.[72]

The Mears entity was not the only one to labor at the Silver Lake and Iowa mines during the first years of World War I. Small parties of lessees, mostly Italians the Stoibers had previously employed, extracted a modest output from their claims. The Unity Tunnel saw activity as well from groups that may have contracted directly with ASARCo to work ground above and below the tunnel level. Also, several partnerships pooled their capital and modified the idle Bleichert tramway at the Unity so that it terminated near the Iowa Mill, where the lessees sent their product for processing.[73]

At that time, the Iowa Mill served as the center for ore concentration in and around Silver Lake Basin. To improve recovery, in 1915 Louis Bastian, former superintendent of the Silver Lake Mill, installed flotation equipment, which relied on oil or detergent to float metalliferous material off and away from waste. The facility then attracted ore from miners located in the surrounding territory and, in 1916 alone, produced seven hundred tons of concentrates from just the Iowa

Mine.[74]

In 1913 Mears commissioned a novel project to rework the expansive original mill-tailings dump on the shore of Silver Lake, which, in essence, constituted a ready form of extremely low-grade ore. He hired Arthur Redman Wilfley to build a unique mill on the north side of the Animas River opposite Arrastra Gulch to process the tailings with specialized equipment. Sand pumps mounted on a barge vacuumed up approximately 80 percent of the total and piped it as a slurry over to the outlet of Silver Lake, from which a wooden flume steeply descended the headwall along the gulch's west side. A trestle carried the flume out beyond the mouth of the gulch and over the river to the mill.[75]

But the enterprise ran into trouble in early 1915. The flume developed leaks because the slurry acted like liquid sandpaper, rapidly wearing the wood. In addition, Wilfley's new mill machinery failed to perform as expected and Mears replaced it with flotation. He also lined the damaged plank trough with concrete. As a result of this troubleshooting, from 1915 through 1918 Mears' railroad hauled away dozens of cars of concentrates from the treated tailings, garnering over $100,000—about $2,058,000 today—from the profitable operation. The structure functioned

Elevated view from the north, circa 1905. The Buckeye Trail that pack trains descended to haul in timbers appears at the top of the photo, while at lower right the Silver Lake Mill tailings peninsula lies adjacent to the Silver Lake Mine. Slightly above it and to the left is the Iowa Mine. Center-left at the far south end of the lake, up the slope is the Buckeye Mine, and at lower left the Royal Tiger Mine. Kendall Peak is the summit to the right. (Courtesy of the San Juan County Historical Society, J-2-B-5-1-b.)

smoothly into 1919 when, having exhausted the richest and most debris-free material, Mears closed it.[76]

In 1917 and 1918 Mears' syndicates continued to lease the Iowa and Silver Lake mines, along with the nearby Mayflower and Highland Mary, located, respectively, to the north and east of Silver Lake Basin. World War I had boosted the demand for industrial metals. At the same time, because of its political and economic value abroad, silver increased in price to a level not seen since Congress passed the Sherman Silver Purchase Act of 1890. During 1918 miners at both the Iowa and Silver Lake worked around the clock in three shifts.[77]

In November 1918, however, Slattery suspended operations at all of the syndicate's mines and had the boarding house at the Silver Lake fumigated following the outbreak of the Spanish influenza pandemic, which decimated the crews. He had a difficult time finding replacement workers and reopened only the Iowa in 1919. At that juncture, the Southwestern Mining Company and the Melville Leasing Company renewed their contracts for the Iowa Mine, cutting the workforce to forty. The two companies did not renew the contracts for the Silver Lake, however, in effect signaling an end to that mine's run.[78]

The Iowa Mine remained one of the Las Animas District's best producers through 1920, when operations collapsed because its workings, like those of the Silver Lake, were running out of ore. As with the Silver Lake Mine, individuals and small companies leased portions of the Iowa until the mid-1920s, but major activity did not resume.[79]

Earnest Biondi and four other miners leased the Royal Tiger in 1923 and worked the mid-level stopes, marking its last recorded occupation. The Iowa Mine was the scene of the most sizable late-date effort, for in 1926 the Colorado-Mexico Mining Company employed seven miners there and continued limited work until at least 1931. Charles Chase, engineer at the Mayflower Mine, provided concentration services at the Iowa Mill.[80]

In 1937 or 1938, Chase commissioned the Silver Lake Cross Cut, a passage driven southwest from Little Giant Basin toward the deepest excavations in the Silver Lake Mine. He negotiated a lease with ASARCo, which still owned the ground. Using a jumbo rig with four automatic drills, his workers bored twenty-four hours a day until, after driving thousands of feet, they reached the Silver Lake Vein by 1940. Some of the material they located was higher in grade than Chase had expected and he began production. Then the giant corporation decided it wanted to mine its own property and Chase secured a reverse lease, which afforded him royalties and compelled ASARCo to maintain the crosscut and finance additional development. That lucrative contract lasted eight years.[81]

The Significance of Silver Lake Basin

Historically, the Silver Lake, Iowa, Royal Tiger, and Buckeye constituted the working mines in Silver Lake Basin. In their heyday, the Silver Lake Mines Company and the Iowa Gold Mining and Milling Company owned most but not all of the claims, some of which overlapped or extended under the lake. In 1891 the claims under various ownerships carried these picturesque names: Yellow Jacket, North Star, Big Bear, Thornton, Ulysses, Good Fortune, Cross Cut, Little Shaver, Martha U.F., Arabian Boy, Silver Spur, Round Mountain, Gretchen, Maxwell, Black Diamond, Stag, Rochester, Whale, American Boy, J. W. Collins, Grip, Melville, White Diamond, Belle of the West, Keystone, Sinaloa, Eclipse, Pickwick, Silver Lake, Iowa, Royal Tiger, Royal Tiger No. 1, and Buckeye.[82] By 1905 the number of claims in Silver Lake Basin had more than doubled.

Silver Lake Basin occupies a niche without parallel in Colorado mining history. Located only four air miles from Silverton, the region's metropolis and trading center, the cirque lies in

a site so remote that it hindered early exploration and development. Prospectors first visited the basin in 1876, so production began well after documented activity as early as 1860 on the floor of the adjacent Arrastra Gulch.[83] Following the Silver Crash of 1893, Silver Lake Basin's output defied the statewide trend and ranked among the greatest in the district.

Silver Lake Basin embraced innovation ahead of the rest of the San Juan area, introducing AC power, compressed-air systems, and electric-model drills to its mines. Some of the longest tramways in the Las Animas Mining District served its mines.[84] Domestic amenities initiated at its boarding houses included flush toilets, dishwashers, and a septic system. Despite the challenges posed by devastating fires, avalanches, legislation, and sickness, its miners persisted in extracting the riches the basin's veins offered.

Edward and Gustavus Stoiber were paramount among a handful of pioneers who developed the practice of mining and milling low-grade ores with economies of scale, and they applied their expertise at Silver Lake Basin. For over a decade they, with the aid of their partners, maintained a monopoly that expanded and controlled the locale's output, an arrangement that today might violate antitrust laws. With their German work ethic, these two brothers epitomized the strike-it-rich success story on a scale their peers surely envied.

Silver Lake Basin Today

In 2015 ASARCo still owned the claims that comprised the four mining properties situated at Silver Lake.[85] Scant evidence of the basin's once-abundant, state-of-the art surface structures remains, however, and the area constitutes an archaeological site.

Silver Lake contains contaminated water, with an increasing metal concentration at depth resulting from the submerged mill tailings and mine dump rock. An analytical study published in 2009 identified the primary pollutants as lead, zinc, iron, aluminum, copper, and cadmium. But of these metals, only lead tested above the maximum containment level (MCL), the reading at which a toxin in drinking water poses a known or expected health risk. At the time of the study, however, water bugs provided the only evidence of life in the lake.[86]

Accessing Silver Lake today is scarcely easier than when John Reed staked his claims in 1876 because time has witnessed the destruction of the tramways and most of the mule trails. Two options are available. The more direct route involves driving east from Silverton two miles along County Road 2. At the renovated Mayflower Mill, turn south and wind down a hill. Cross the wide bridge over the Animas River at the mouth of Arrastra Gulch and continue 2.5 miles or so, on foot or in a four-by-four or off-highway vehicle (OHV), to the Mayflower Mine site. You will encounter several forks in the road, but just follow the tramway towers, still standing, up to the mine. Then, from the trailhead where the road ends, hike about 1.25 miles to the top of the headwall and on down to Silver Lake.

Allow at least four hours to make the trip from the mine up to the lake and back. This trail has several steep switchbacks that cut across scree (detritus) where cribbing has given out and a rope helps hikers navigate a rock ledge. Use extreme caution here. Generally, you can make the trip in late July but the prime time stretches from August through the beginning of October. Even then, huge avalanche debris fields that do not completely melt can cross the trail, requiring extra vigilance. The Silverton Visitors' Center can provide further information for planning your trip.[87]

The second access option, safer but much longer, involves hiking or driving south (OHV or 4WD vehicle only) from Silverton's city limits on County Road 33, the Kendall Mountain Road, which skirts the mountain's base. You will find an old USGS topographical map or a modern GPS unit helpful. Approximately two miles from Sil-

verton, the road splits. The left fork proceeds up Kendall Gulch to the abandoned Titusville Mine, with a branch ascending close to the top of the mountain. Follow the right fork, County Road 33A, the Deer Park Road, which miners of old employed to haul timbers to Silver Lake Basin by burro.[88]

Where Deer Park Road nears Deer Park Creek, you have two choices. Choice 1: You can continue driving on the road for a quarter of a mile, then veer to the left on foot and hike east on a pack trail. Eventually this trail climbs steeply northeast and leads to the Buckeye Mine site above the south shore of Silver Lake.

Or, Choice 2, you can keep driving east on Deer Park Road, north of the creek, for about a mile until you reach the marsh north of the Montana Mine site. Opposite the access road to this mine, leave Deer Park Road and take the Buckeye Trail, which heads north and becomes a braided elk path through the woods. In time it climbs northeast and intersects the pack trail referenced in Choice 1, taking you to the Buckeye Mine site.[89]

Larry Godwin believes he lived near Silverton, Colorado, in a previous life, during the Stoiber era, and possessed an intimate familiarity with the Silver Lake Basin. His article "Emil Fischer, Guide to the San Juan Mines" appeared in the 2014 Mining History Journal. A retired accounting professor, Godwin lives with his editor-wife, Cathy, in Missoula, Montana.

South view across Silver Lake of the remains of the Iowa Mine, August 2008. The two brick structures constituted the firewalls of the boilers inside the powerhouse, the largest building in the Iowa complex. The lower portal of the Buckeye Mine appears to sit at far left-center behind the dump. (Courtesy of Renee Vardy.)

Edward G. Stoiber

[*Engineering and Mining Journal*, 5 May 1906.]

Edward G. Stoiber, who died suddenly in Paris, France, April 21, was one of the leading mining men and metallurgists of Colorado. He was born in Germany in 1854, and graduated from the School of Mines in Freiberg. He came to Leadville from Germany as early as 1879, and for three years followed his profession as mining engineer. From there he went to Silverton, where he established a sampling plant, gradually drifting into the business on a large scale by acquiring several properties in that vicinity. These smaller claims he ultimately expanded into the immense Silver Lake property, which he sold to the Guggenheim Exploration company for $2,350,000 about four years ago. After the consummation of this deal, Mr. Stoiber withdrew from active business and practically lived a retired life. When not in Denver, he spent his time in European travel. He was in Port Arthur only a short time previous to the Russian-Japanese war, and returned from there over the Siberian railroad before the declaration of war.

During his active career Mr. Stoiber devoted himself closely to his work at Leadville and Silverton, and it may fairly be said that he was one of the first who was successful in the treatment of low-grade mixed sulphide ores at a profit. As an operator, Mr. Stoiber did everything in his power to improve and modernize the mining business. With him it was a science that required deep study. He was on the alert to put into practice new ideas that he believed would redound to the benefit, not only of himself, but others. It is known that he made frequent trips to the most important concentrating plants in this country and Europe, taking copious notes and sketches of every new device that came before his observation. He introduced many improvements, some original with himself, and did not hesitate to experiment with new devices.

The debt which the mining industry of Colorado owes to Mr. Stoiber is recognized by the practical men who are engaged in it. More than to any other man is due to him the present prosperity in the San Juan region of that state. He had no patience with the irrational system which has filled so many gulches with useless mining plants; but with the soundness in reasoning that characterized the old Freiberg man, he adapted the process to the ore, instead of trying to adapt the ore to the process, and although neither a mine finder, nor an inventor, he solved difficult problems in ore treatment, in a practical way, made money for himself, and taught others how to do it.

As a philanthropist, Mr. Stoiber was always ready to contribute to any worthy cause. His benevolent deeds are well known to the charity workers in Denver. He was always kind and considerate to his employees and was highly esteemed by them. He was much interested in education and made large donations to its aid; he contributed the scientific section to the University Club library and made the gift of an elaborate set of instruments to the State School of Mines.

His ambition was to develop the mining resources of the state wherever practicable, and it may well be said of him that he devoted his life to the interests and welfare of the industry. His loss, at so early an age, will be regretted by a host of friends, among whom are included many who are engaged in the mining industry.[90]

Notes:

1. Eric Twitty, *Historic Mining Resources of San Juan County, Colorado* (Washington, DC: U.S. Dept. of the Interior, National Park Service, revised Mar. 1992), 5. An arrastra was a primitive device early prospectors used in the San Juan area around 1871 to crush gold ore. It consisted of a horizontal wooden wheel anchored to the ground by a capstan at the center. Donkeys tied to the wheel slowly turned it in a circle to accomplish the task. Both the gulch and the device are sometimes misspelled "Arastra."
2. Eric Twitty, *Basins of Silver* (Lake City, CO: Western Reflections Publishing Co., 2009), 70. Bedrock is the solid rock that underlies loose material, such as soil or clay.
3. Twitty, *Basins of Silver*, 70.
4. Frederick Leslie Ransome, *A Report on the Economic Geology of the Silverton Quadrangle, Colorado* (Washington, DC: U.S. Geological Survey, 1901), 20.
5. Twitty, *Basins of Silver*, 70.
6. Allen Nossaman, *Many More Mountains, Volume 3: Rails into Silverton* (Denver, Sundance Publications Ltd., 1998), 325. This Royal Tiger is not to be confused with the one of the same name in Royal Tiger Basin to the east.
7. Twitty, *Basins of Silver*, 89.
8. Ransome, *Report on Economic Geology*, 147, 150. The Silver Lake Lode, varying from six to twenty feet in width, passes under Silver Lake and is probably continuous with the lode of the Royal Tiger Mine. Cornices are masses of rock projecting over a mountain ridge.
9. Twitty, *Basins of* Silver, 122. A surface plant consisted of a shaft collar or adit (tunnel portal) to access the underground workings; a blacksmith, and often machining and carpentry shops, where tools and equipment were maintained and fabricated; a means, usually involving ore cars, of transporting materials into and waste rock out of the workings; a ventilation system to draw foul air from the workings; and a dump area for waste rock.
10. Twitty, *Basins of Silver*, 122.
11. Twitty, *Basins of Silver*, 123. A sampling works, or sampler, was a combination assay house, smelter, and ore buyer. It specialized in providing assays, testing batches of complex ore to identify the best treatment methods, and buying small lots from producers who needed immediate income. At the sampler, workers segregated the purchased ore into piles by composition and when enough of a single type had accumulated, they smelted the batch in a custom run.
12. Twitty, *Basins of Silver*, 123. A fortune teller had told Innis how to reach what she called a "lake of gold." Innis hoped to approach his fabled lake of gold from the opposite side of King Solomon Mountain should his Highland Mary Mine, located at the east end of Royal Tiger Basin, fail to make a discovery. Royal Tiger Basin is located three-quarters of a mile directly east of Silver Lake Basin (see map); it is not related to the Royal Tiger Mine, merely a coincidence in name.
13. Twitty, *Basins of Silver*, 135.
14. Twitty, *Basins of Silver*, 138.
15. Infoplease, "Sherman Silver Purchase Act," www.infoplease.com/encyclopedia/history/sherman-silver-purchase-act.html (accessed July 2015).
16. Twitty, *Basins of Silver*, 146.
17. Twitty, *Historic Mining Resources*, 73.
18. Karen A. Vendl and Mark A. Vendl, *Mines around Silverton* (Charleston, SC: Arcadia Pub., 2015), 34.
19. Twitty, *Basins of Silver*, 147-8.
20. Ransome, *Report on Economic Geology*, 149.
21. Twitty, *Basins of Silver*, 149.
22. Ransome, *Report on Economic Geology*, 40, 156; Twitty, *Basins of Silver*, 149. Drill steels were implements miners struck with hammers to drill holes into ore-bearing rock to load explosives for blasting.
23. Ransome, *Report on Economic Geology*, 94. Slurry is a thin mixture of water with a fine, insoluble material.
24. Twitty, *Basins of Silver*, 151.
25. Renee Vardy, *The Study of the Effect of Long-Term Water Cover on the Mill Tailings of Silver Lake Mill #1, near Silverton, Colorado* (M.S. thesis, Wichita State University, 2009), 39. Tailings were waste products from milling, not mining.
26. Twitty, *Basins of Silver*, 152.
27. Ransome, *Report on Economic Geology*, 149. Colorado legislators had recently carved San Juan County out of La Plata County.
28. Twitty, *Basins of Silver*, 153.
29. Twitty, *Basins of Silver*, 160.
30. Twitty, *Historic Mining Resources*, 83.
31. Twitty, *Basins of Silver*, 147, 171, 173.
32. Twitty, *Basins of Silver*, 166, 172, 174-5; Ransome, *Report on Economic Geology*, 156.
33. Twitty, *Basins of Silver*, 174, 329.
34. Twitty, *Basins of Silver*, 177. An adit was a horizontal entrance to a mine.
35. Twitty, *Basins of Silver*, 170; Robert A. Trennert, *Riding the High Wire: Arial Tramways of the West* (Boulder: University Press of Colorado, 2001), 67. A tramway was an aerial, usually gravity-driven, means for transporting ore. It consisted of one or two wire ropes suspended over a series of towers. Its contemporary counterpart is the motor-driven ski lift. The Bleichert system, named after its inventor, featured two wires: a stationary track cable fixed to the tower tops, and a lower traction cable that pulled buckets clamped to it and ran in an endless, closed loop.
36. Twitty, *Basins of Silver*, 170-3.
37. Twitty, *Basins of Silver*, 173.

38. Twitty, *Basins of Silver*, 176.
39. Vendl, *Mines around Silverton*, 37.
40. Mark A. Vendl, Duane A. Smith, and Karen A. Vendl, *My Home at Present* (Lake City, CO: Western Reflections Publishing Co., 2013), 10-11, 105, 107.
41. Vendl, *My Home at Present*, 107; Twitty, *Basins of Silver*, 176.
42. Twitty, *Basins of Silver*, 178.
43. Ransome, *Report on Economic Geology,* 156; Twitty, *Basins of Silver*, 197. A stope was an area worked vertically between two mine levels. To stope was to excavate vertically, extracting ore between two levels.
44. T. A. Rickard, *Across the San Juan Mountains* (1902; reprint, Ouray, CO: Bear Creek Publishing Co., 1980), 66-7.
45. Twitty, *Basins of Silver*, 193.
46. Twitty, *Basins of Silver*, 203.
47. Twitty, *Basins of Silver*, 187.
48. Twitty, *Basins of Silver*, 205, 211; Twitty, *Historic Mining Resources*, 97.
49. Twitty, *Historic Mining Resources*, 97.
50. Ransome, *Report on Economic Geology*, 160.
51. Not to be confused with the Unity Mine on the east slope of Hazelton Mountain.
52. Twitty, *Basins of Silver*, 213, 215-17.
53. Ransome, *Report on Economic Geology*, 156.
54. Ransome, *Report on Economic Geology*, 161.
55. Twitty, *Basins of Silver*, 218.
56. Of the sale price, apparently about $1.3 million was in cash and the remainder in stock.
57. Twitty, *Basins of Silver*, 239.
58. Twitty, *Historic Mining Resources*, 99.
59. Twitty, *Basins of Silver*, 242.
60. Twitty, *Basins of Silver*, 220, 244, 245.
61. Vendl, *Mines around Silverton*, 43.
62. Twitty, *Basins of Silver*, 245-6.
63. Twitty, *Basins of Silver*, 252, 254-5, 256.
64. Twitty, *Basins of Silver*, 257, 258, 259-61.
65. Twitty, *Basins of Silver*, 245-7.
66. Twitty, *Basins of Silver*, 247.
67. Twitty, *Basins of Silver*, 247.
68. Twitty, *Basins of Silver*, 261.
69. Twitty, *Basins of Silver*, 262.
70. A hanging wall was the mass of rock overlying a mineral lode. Free gold is that found in a pure state, not combined with other minerals.
71. Twitty, *Basins of Silver*, 262-4.
72. Twitty, *Basins of Silver*, 277-8.
73. Twitty, *Basins of Silver*, 279.
74. Twitty, *Basins of Silver*, 279-80.
75. Twitty, *Basins of Silver*, 287-9.
76. Twitty, *Basins of Silver*, 290.
77. Twitty, *Historic Mining Resources*, 133, 134; Twitty, *Basins of Silver*, 292.
78. Twitty, *Basins of Silver*, 294-5.
79. Twitty, *Historic Mining Resources*, 134.
80. Twitty, *Basins of Silver*, 308, 323.
81. Twitty, *Basins of Silver*, 333-4.
82. Emil Fischer, "Map of Red Mountain and the Mining Region of San Juan, Ouray, San Miguel, and Dolores Counties, Colo.," Chicago: Rand McNally and Co., 1891. This North Star is not to be confused with the mine by that name in Dives Basin, nor the one located at the base of Sultan Mountain. In his 1905 "Map of the San Juan Triangle," George Samuel Clason referred to the White Diamond by that name, whereas Emil Fischer, on his 1891 map, called it simply the Diamond.
83. Twitty, *Basins of Silver*, 328.
84. Twitty, *Basins of Silver*, 342.
85. Pueblo County Government, Pueblo, Colorado, "Pueblo Online Property Search," www.co.pueblo.co.us/cgi-bin/webatrallbroker.wsc/atrpropertysearchall.html (accessed July 2015).
86. Vardy, *Study of the Effect*, v, 43, 46.
87. Durango Outdoors, "Arrastra Gulch to Silver Lake," www.durangoutdoors.com/nearby-trails/arrastra-gulch-to-silver-lake.htm (accessed July 2015). Cribbing was a timber framework that lined a mine shaft, other mine works, or, in this case, a steep slope, to contain loose rock.
88. Ransome, *Report on Economic Geology*, 145.
89. Terrance M. Kerwin, e-mails to the author, 12 April and 11 June 2015.
90. *Engineering and Mining Journal* 81 (5 May 1906): 865. Charles C. Nott and Archibald Hopkins, *Cases Decided in the Court of Claims of the United States, at the Term of 1905-6* (Washington, D.C.: USGPO, 1906), 271, reports that Stoiber lived in Gunnison, Colorado, in 1883.