

M INING MAJESTY

SEEKING THE SILVER LINING IN A PROSPECTING PAST WRITTEN BY JOE FLANAGAN PHOTOGRAPHED BY JET LOWE

Looking toward the San Juan Mountains at night, the thought hits you that the West was never entirely won. Here, night is a massive presence. If you're standing on the street of a small town in southwestern Colorado, you don't have to look at the horizon to feel the dark sea of forbidding geography that lowers over everything like a reminder of the eternal. In daylight, the ranches along the Animas River disappear as the mountains close in and you ascend toward the crags of the Continental Divide. To say that the landscape is beautiful falls far short of the truth. To say it is harsh is inadequate, too. But the adage "some things are better left alone" seems as true in the 21st century as it was in the 19th.

RIGHT: REMNANTS OF A MINING LEGACY IN COLORADO'S SAN JUAN MOUNTAINS.





SILVERTON HAS ALL THE AURA OF THE CINEMATIC WEST, FROM THE RUSTIC STOREFRONTS TO THE WIDE, STRAIGHT MAIN STREET, TERMINATING AT EITHER END IN THE SPECTACULAR PRESENCE OF THE SAN JUAN MOUNTAINS.

TOP: SILVERTON AS IT LOOKED AT THE BEGINNING OF THE 20TH CENTURY. BOTTOM: A PACK TRAIN HEADED FOR THE MINES.

And that is why it comes as such a surprise to discover, tucked away in isolation at over 9,000 feet, a well-kept Victorian town whose bright paint and architectural flourishes seem the very repudiation of wilderness.

At first sight, one might suspect Silverton was once an exclusive resort, an economic phenomenon that has since melted into the mountainsides. The town is a relic of mining history, a national historic landmark built in the pursuit of precious metals. Silverton has all the aura of the cinematic West, from the rustic storefronts to the wide, straight main street, terminating at either end in the spectacular presence of the San Juan Mountains.

While the town is remarkable in its own right, a good part of its historical importance lies in an unprepossessing building on the outskirts. The Shenandoah-Dives Mill shows how it was done,

how gold, silver, lead, copper, and zinc were taken from the raw rock of the mountains. Built in 1929, the mill brought the latest technology, a process called flotation, which ushered in mining's modern era. There are only four mills like it left in the United States, and only the Shenandoah-Dives is in its original condition. It, too, is a national historic landmark.

Last summer, the NPS Historic American Engineering Record compiled a history of the site, documented in large-format photographs and architectural drawings. HAER is working with the San Juan County Historical Society, which owns the complex, to preserve and interpret the place. "It's so visible on the landscape, and so much a part of the culture of the town," says David Singer of Silverton Restoration, Inc., a consultant to the society. "People are really holding on to this piece of their history."

BELOW: THE MOUNTAINS AROUND SILVERTON WERE POPULATED WITH MINES AND MILLS SUCH AS THIS ONE AT SILVER LAKE, NORTH OF TOWN.



THIS SPREAD SAN JUAN COUNTY HISTORICAL SOCIETY

ELUSIVE METALS

Though it sounds like an esoteric industrial term, flotation milling was a bright flash not only in the West, but in the global economy as well. It arrived when the mining industry was in crisis. Many of the richest deposits had been tapped out. What was left—low grade ore—was so hard to cull it was seldom worth the trouble.

With the advent of flotation, valuable metals spread far and thin among raw, useless ore could be extracted with relative ease. Complex minerals could be unlocked, their prized components separated out. In short, the process worked like a powerful magnet for scarce needles in a very large haystack.

Aside from a brief excursion by 16th century Spanish explorers, the mountains had been the domain of the Ute. In 1860, a prospector named George Baker led an expedition into what is now

Silverton. The group found some gold but several were killed by the Indians, and the rest were stranded over the winter. Some died of cold and starvation. No one visited again until after the Civil War.

Prospectors were back in 1870, and before long the conflict with the Utes was at a boil. In negotiations with the U.S. Government, the tribe relinquished four million acres in exchange for annual payments. Mining boomed, and towns like Silverton, Ouray, and Telluride grew up quickly. Gold and silver were abundant. By all accounts, Silverton was rough, wild, and dangerous. There was gambling, drinking, and the full complement of vices associated with the frontier. Between mining accidents, fights, and vigilante justice, there were, as the literature of the historical society says, “many opportunities to die violently.”



The first few years were rich. Mining companies placed ads in foreign newspapers, promising work and the chance to own land, a tactic that lured people from all over the world.

The hard winters, bad roads, and inefficient processing made mining a difficult business. The only way to move goods in or out was by pack animal, which was expensive and slow. In time, the rich ores near the surface were exhausted, and the town entered its first dry spell.

The railroad, which arrived in 1882, redrew the picture. The mining companies could fill entire railcars. Before, they hauled ore by horse or mule to a smelter 46 miles south in Durango. Now it was economically feasible to dig out tons of low-grade ore. While silver and gold remained the most prized, lead, copper, and zinc came into their own with the rapid advance of industry.

ALL THAT GLITTERS

Flotation is a process in which ore is immersed in a water-and-chemical solution and valuable minerals are “floated” away from the other material assisted by their difference in weight. Bill Jones, a member of the historical society and an assayer who worked at Shenandoah-Dives, says the process uses the law of opposite things attracting and similar things repelling. “The trick is to add chemical agents that either promote or suppress the attraction.”

In the 1860s, it was established that ore ground into fine particulate—and mixed with water and oil—would attach to the latter. When agitated, the minerals separated out even more readily. Inventors, adding acids, salts, and heat, saw that minerals clung to air bubbles on top of the mix. A 1903 English patent—which used bubbles in concert with oil, soap, alkali, and agitation—is the forerunner of modern flotation. By the time Shenandoah-Dives was built, there had been many advances, and the facility was state of the art.

Opening the door to the mill on a frigid December day releases a wave of cold that rivals the outdoors. The concentrated mass of hardware makes it difficult to see its purpose. Every square inch, it

WHILE THE TOWN IS REMARKABLE IN ITS OWN RIGHT, A GOOD PART OF ITS HISTORICAL IMPORTANCE LIVES IN AN UNPREPOSSESSING BUILDING ON THE OUTSKIRTS. THE SHENANDOAH-DIVES MILL SHOWS HOW IT WAS DONE, HOW GOLD, SILVER, LEAD, COPPER, AND ZINC WERE TAKEN FROM THE RAW ROCK OF THE MOUNTAINS.



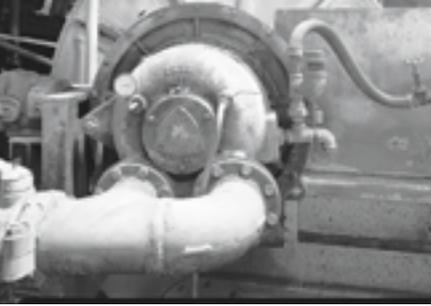
LEFT AND ABOVE: HISTORIC HARDWARE, THE APPARATUS USED IN THE FLOTATION PROCESS.

The mines boomed through much of the 1880s, slumped after the economic crisis of 1893, and came back with World War I. But by the time Denver’s Stearns-Roger Engineering Co. arrived in the spring of 1929—with the latest construction innovations, steamshovels and dumptrucks—Silverton was dozing through another downturn. The company was focused on gold, but it soon became apparent that flotation had the potential to extract plenty of money from the abundance of low-grade ore.

seems, was used to maximize production. The place must have been terribly noisy, but now the only thing that breaks the silence is the occasional ice sliding down the corrugated roof.

As the ore came out of the mine, a metallurgist crushed a sample, analyzed the content, and worked out the optimum chemical equation to extract the metals. He relayed the information to the mill, which set up accordingly.

The flotation circuits were tailored to specific metals. There was a method to isolate zinc, to isolate lead, to isolate copper. A circuit could be adjusted to isolate one mineral one day and a different mineral the next.



ABOVE SAN JUAN COUNTY HISTORICAL SOCIETY, BELOW NPS/HAER

LEFT ABOVE: THE MILL'S INDUSTRIAL-SIZED WATER PIPES. RIGHT ABOVE: VICTORIAN ERA RESIDENTS OF SILVERTON.

The raw ore, arriving from the mine by aerial tram, was crushed into small particles, then mixed with water. This was sent through a series of jigs, encouraging the heavier gold and lead to settle out. The rest continued on to the flotation cells—long, rectangular troughs equipped with agitators. A mineral-rich froth formed at the top, bubbles like glistening metallic spheres. This was skimmed off, dried, and readied for transport.

Where all this took place is a compaction of catwalks, encrusted vats, channels and gears, impellers and conveyors. A delicate chrome wheel—whose small silver cups doled out precise measures of chemicals to the churning sludge—stands out conspicuously. On its face, in a fussy cursive script, are the words, “Clarkson Reagent Feeder.”

Over time, metal grillwork replaced the mill’s heavy wooden planks. This gives the effect of being surrounded in all directions by industrial hardware. Looking down into two great vats—one for zinc, one for lead—there are a pair of immense blades, now-silent agitators that once helped the heavier materials separate to the bottom.

THINKING BIG IN A SMALL TOWN

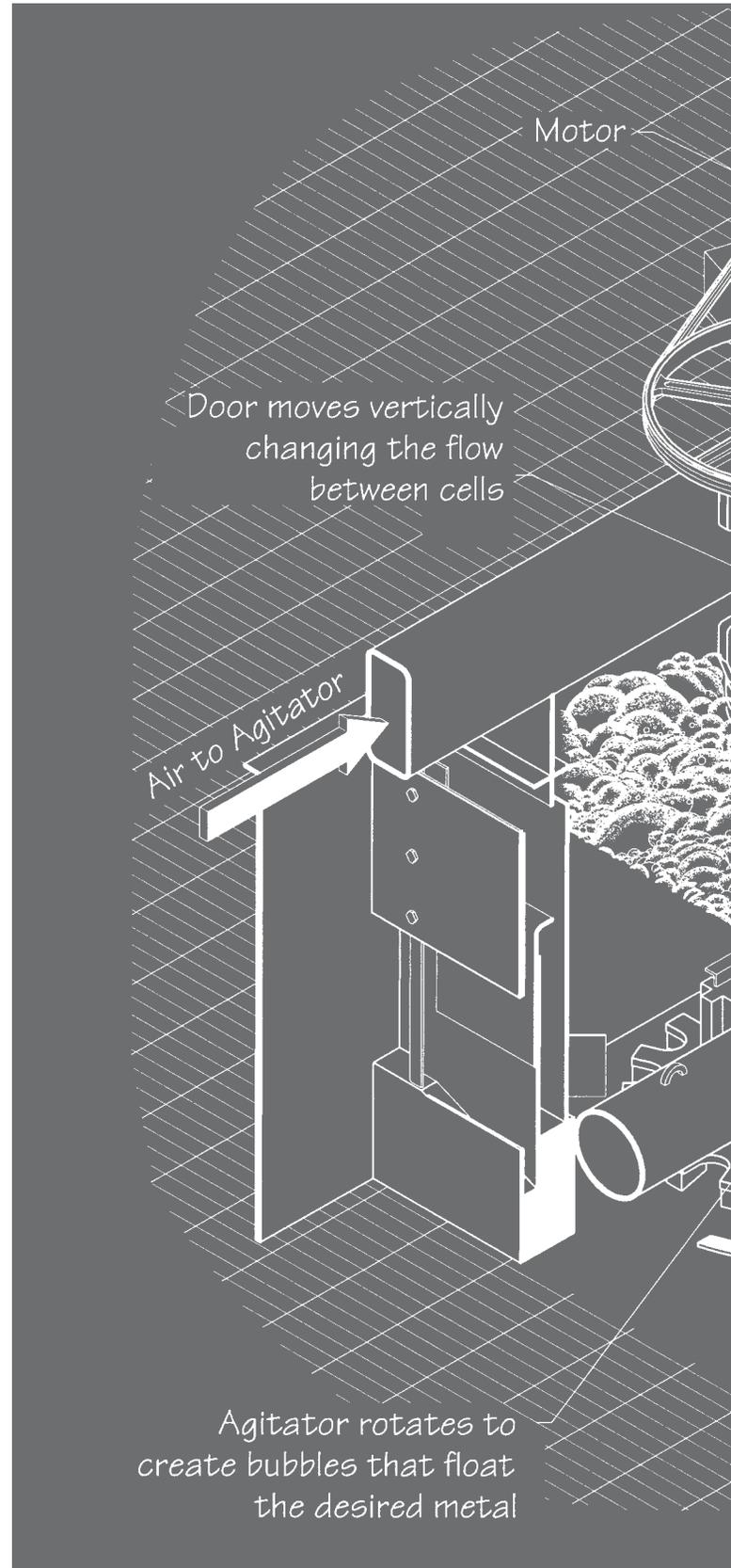
For a small organization, the San Juan County Historical Society has made quite an impact. Oddly enough, the demise of the mill spelled Silverton’s renaissance. “People started to think, ‘What do we have here of value?’” says Singer, who’s managing the mill’s documentation. Mining was a thing of the past, but the past was now an economic asset. The catalyst was the 1974 fire that gutted the train depot. The railroad donated the building to the society, which restored it and sold it back. An adjacent building underwent a similar process. Says Bill Jones, “It became a cycle. We had a banker who was fairly savvy and had roots here. He’d lend us money to fix up a building and then we’d resell it. It just kind of snowballed.”

The society was soon a successful business with a knack for attracting partners and money. The town’s diminutive size was a plus, the society’s connection very close because, as Singer puts it, “people who sit on the historical society are the people who run the gas station, the T-shirt shop, etcetera.” Says Jones, “virtually everybody on the board of directors worked for the company at one time or another.” Silverton recently built a museum in the local Victorian vernacular.

When Colorado legalized gambling in some of its depressed mining towns, it instituted a tax used toward an historical fund—matching grants that the society uses to advantage. Silverton also qualifies for assistance from the Colorado Economic Development Agency.

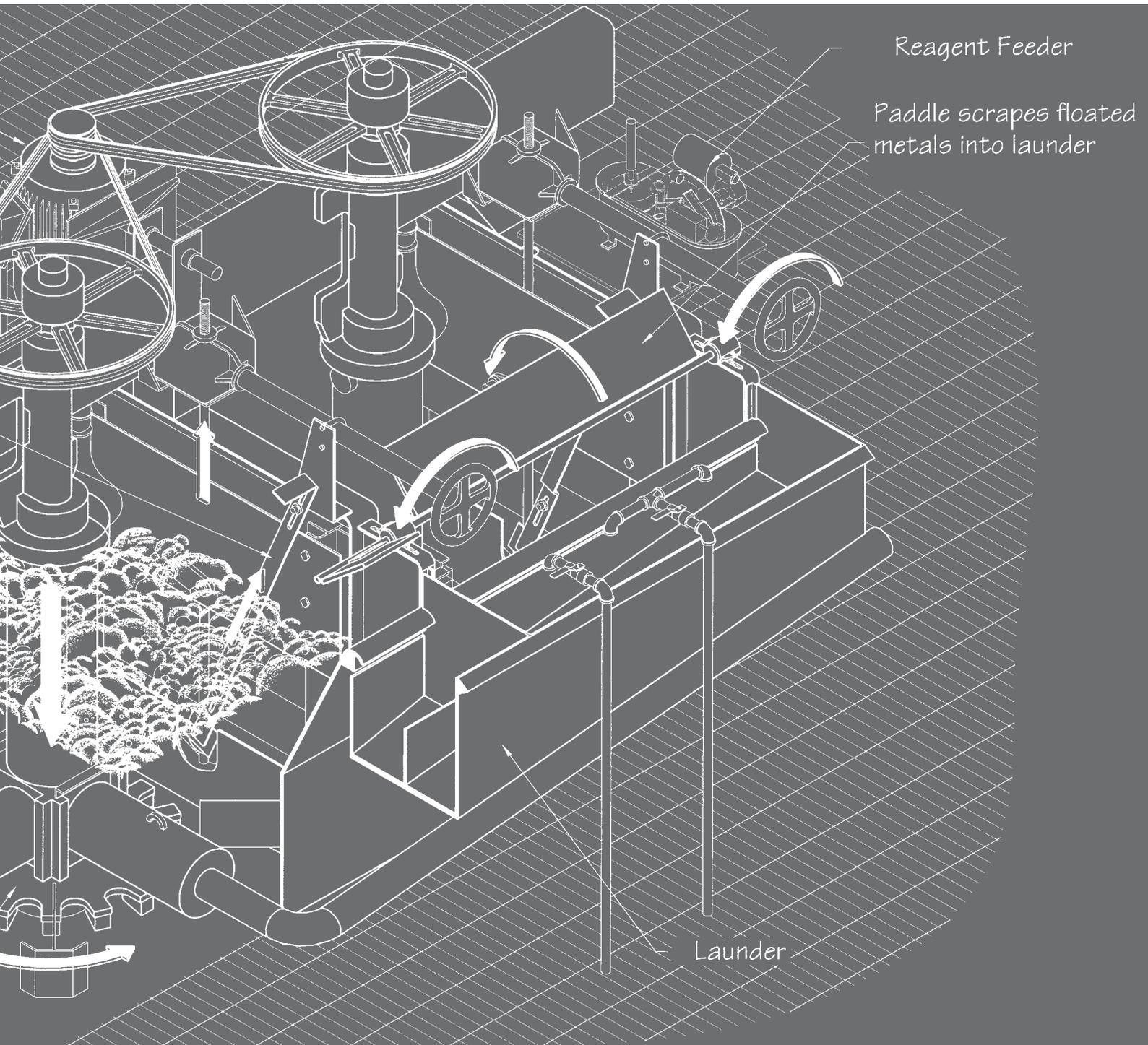
In 1991, when the mine announced it was going to close, the society approached the Sunnyside Mining Co.—the current owner—and simply asked for it. There was the thorny issue of the tailings

RIGHT: FLOTATION CELL, HEART OF WHAT MAKES THE MILL A NATIONAL LANDMARK.



Agitator rotates to create bubbles that float the desired metal

THE HARD WINTERS, BAD ROADS, AND INEFFICIENT PROCESSING
MADE MINING A DIFFICULT BUSINESS. THE ONLY WAY TO MOVE GOODS IN OR OUT
WAS BY PACK ANIMAL . . . THE RAILROAD, WHICH ARRIVED IN 1882, REDREW THE
PICTURE. THE MINING COMPANIES COULD FILL ENTIRE RAILCARS.





BY ALL ACCOUNTS, SILVERTON WAS ROUGH, WILD, AND DANGEROUS. THERE WAS GAMBLING, DRINKING, AND THE FULL COMPLEMENT OF VICES ASSOCIATED WITH THE FRONTIER. BETWEEN MINING ACCIDENTS, FIGHTS, AND VIGILANTE JUSTICE, THERE WERE, AS THE LITERATURE OF THE HISTORICAL SOCIETY SAYS, “MANY OPPORTUNITIES TO DIE VIOLENTLY.”

LEFT: A MINE OPENING IN KING SOLOMON MOUNTAIN.

ponds, reservoirs of chemical-laden water. That brought the EPA into the equation. But when the company offered to retain responsibility for them (tests show they are safely retaining their contents), the acquisition moved ahead.

The deal also included an old electrical substation, a turn-of-the-century industrial building now in the National Register of Historic Places. The powerhouse, as it is known, was the lifeline on which the mill—and the town—depended. Its rehabilitation, currently underway, epitomizes the society’s creativity, which encourages a healthy business environment. The building will house retail businesses, with adjacent land leased or sold and the proceeds seeding more preservation. With the costly restoration of the mill looming, Beverly Rich, the society’s chairperson, plans to apply for a grant from the NPS-administered Save America’s Treasures program.

The first phase is recording the site, and the society found an eager partner in HAER. As a rare and intact example of engineering history, the site was a prime candidate. Singer, through his consulting firm, organized a partnership with the society and the National Park Service to use the project as an educational opportunity. They conducted workshops at the site, high-tech instruction in assessment and documentation. Preservation professionals spent a week learning from National Park Service staff who specialize in the work. Singer calls the results “a living document” to guide rehabilitation. The workshops helped convince the Getty Conservation Institute to give \$25,000 toward the documentation. Other support came from the NPS National Center for Preservation Technology and Training, the Colorado Historical Society, the Mountain Studies Institute, and private donors.

INVESTING IN HISTORY

For a mining boss, Charles Chase was ahead of his time. “He treated his workers in a way that was not standard in the industry,” says Singer. “He saw that his economic well-being was tied to the town’s.” Says Rich, “They called him Papa. Even my Dad called him that.” When the Depression came, workers took a pay cut to keep the mill running, the only one in the Four Corners area that didn’t shut down. Under Chase, Shenandoah-Dives was the first to store toxic water in self-contained ponds rather than dumping it straight into the river, a common practice at the time.

WWII saw a spike in production and profits, but the operation “was never wildly successful,” says Jones. “It sort of eked along.” The ore wasn’t as rich or plentiful as investors hoped. The 1950s



RIGHT, FAR RIGHT SAN JUAN COUNTY HISTORICAL SOCIETY



LEFT ABOVE: WORKERS AT THE COLORADO BOY MINE, BUILT IN 1893 A FEW MILES NORTH OF SILVERTON. RIGHT ABOVE: A VIEW OF THE NEARBY SILVER LAKE MILL.

RIGHT: ENTRANCE TO THE MAYFLOW MINE, KEY TO THE MILL'S SUCCESS. THE RUINS OF THE TRAM TERMINAL AND A BOARDING HOUSE FOR MINERS ARE VISIBLE NEAR THE CENTER.

brought cheaper foreign metals on the market, and rising labor costs didn't help. The Eisenhower Administration, to help contain communism, encouraged businesses to buy metals from other countries, hoping to boost their economies and diminish Marxism's appeal.

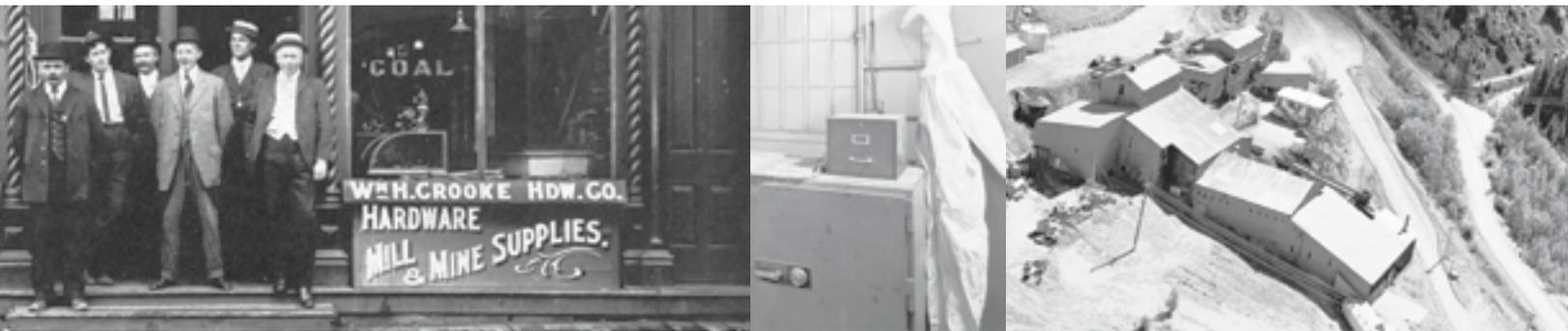
The mill shut down in 1953, then ran sporadically over the ensuing decades. Silverton's population dropped by half. Mining in mountainous places has always been expensive and labor-intensive. Nowadays, it's done in large open pits, huge operations where diffuse, widespread deposits are extracted with an enormous economy of scale. Flotation is used to this day.

Bill Jones stands in the perpetual twilight of the mill. Before him is a massive electromagnetic motor, the primitive-looking source of power for the entire interconnected system. "It's one of only three

A clapboard office stands beside the mill, faded and sagging with age. Cables that no longer carry cars run up the steep slope, a pair of them still suspended motionless over an icy chasm. Somewhere up there, in drifts of snow and black outcroppings, is the entrance to the mine. The tram was itself an innovation. Avalanches frequently took out the wood supports, so the company replaced them with riveted steel towers. Because of their strength, the supports could be spaced far apart. The resulting tramway—over 9,000 feet long, operated by a 12-man crew—was featured in the 1957 Jimmy Stewart film *Night Passage*.

Today, the 123-year-old steam train between Silverton and Durango still operates. Tourists take the three-and-a-half-hour climb up here, walk around Silverton for a while, and then ride the relic—a national historic landmark—back down again.

One can imagine a restored complex as essential to the visitor experience, sitting on its small plateau above Silverton, the stilled tram directing the eye upward into the mountains, which still seem to promise heartbreak while hinting at possibility. Here is where the miner's quest resembles what the mill's stewards are trying to



ONE CAN IMAGINE A RESTORED COMPLEX AS ESSENTIAL TO THE VISITOR EXPERIENCE, SITTING ON ITS SMALL PLATEAU ABOVE SILVERTON, THE STILLED TRAM DIRECTING THE EYE UP INTO THE MOUNTAINS, WHICH STILL SEEM TO PROMISE HEARTBREAK WHILE HINTING AT POSSIBILITY.

built and it's the only one still existing. GE wanted it for their museum, offered to bring in a brand new one for free. The company said, 'No, we're using this one.'" It's another of many side tours into technological history one could take in this place. Singer envisions visitors in front of one of the ore crushers, examining the inner workings in 3D on a computer screen.

In the machine shop, where mechanics repaired equipment and fabricated their own parts, the scene is as if they had just gone home the night before. The lid to a toolbox is open; an array of drill bits are scattered on a workbench; a welding helmet hangs on a nail. Jones steps out into the blinding world of sun and snow, closing the door behind him. "It's not your ordinary tourist attraction," he says.

accomplish: to draw wealth and vitality out of something that is outwardly irredeemable. Yet all the ingredients are in place for this to happen, the past emerging into the present to shine like a gem.

For more information, contact the San Juan County Historical Society, P.O. Box 154, Silverton, CO 81433, (970) 387-5609, silvertonarchive@aol.com, or visit www.silvertonhistoricalsociety.org.

LEFT TO RIGHT ABOVE: LOCALS GATHER IN FRONT OF CROOKE'S HARDWARE MILL & MINE SUPPLIES IN DOWNTOWN SILVERTON AROUND THE END OF THE 19TH CENTURY; INSIDE THE NOW-DORMANT SHENANDOAH-DIVES MILL; AERIAL VIEW OF THE COMPLEX.

