

# An Urban Mining Ecology: Butte, America

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**The process of extraction has a profound impact on the environment, transforming and disfiguring the land through the sorting of geological conditions that has resulted in the Anthropocene age. The valuing of resources and their extraction over the inhabitable surface has fueled the development of this country and the settlement of remote places. It was the existence of a vast mineral resource under the Butte Hill in the late 1800's that set the stage for urbanization in this remote place and the trajectory for a new ecology, an urban mining ecology. Too often the industrialized sorting of the land creates a resultant landscape and is not seen as an opportunistic condition as well. By utilizing the Butte Hill as a place to test alternative strategies to extraction and reclamation, contemporary and future sites can shift their current extractive practices to avoid the unusable post-industrial ecology. This paper examines the history of Butte, Montana that has created the current urban condition through the prioritization of extraction as a unique place to examine projective futures for a post-industrial ecology, one that does not see the evils of the past as something to hide or attempt to eliminate. Rather one that seeks to leverage the efforts of transforming a contaminated place for a new community; one that engages the environment of the future and the Anthropocene age.**

...and here was a scene so dreadfully hideous, so intolerably bleak and forlorn that it reduced the whole aspiration of man to a macabre and depressing joke. Here was wealth beyond computation, almost beyond imagination — and here were human habitations so abominable that they would have disgraced a race of alley cats.<sup>1</sup>

—H. L. Mencken, *The Libido for the Ugly*

The process of extraction has a profound impact on the environment, transforming and disfiguring the land through the sorting of geological conditions that has resulted in the Anthropocene age. This valuing of

the subsurface condition over the surface landscape has a long history in this country as the vast resources present beneath us and the motivation to pull them to the surface are intimately tied to the urbanization of remote places. At the start of the 20th century, the conditions H. L. Mencken describes were typical for many extraction-based mining towns and industrial regions around the country, although he did state that this particular instance in Pennsylvania was the ugliest place on earth he had ever seen. In many ways the physical conditions in the mining town of Butte, Montana at the time were likely not much better as miners toiled day and night to extract precious metals from hard rock. There are few examples anywhere else in the world that showcase the collision of unimaginable wealth and the new urban ecology of mass extraction better than Butte.

Butte, America, as it was known by many residents, was a world-renowned destination for mining, located in western Montana at approximately 5,538 ft. above sea level, atop the Boulder Batholith. The copper and gold veining which cross the Butte district in an east-west manner are contained within this host rock. These veins are the product of geologic processes along the Northern Rocky fault lines that generated an ore body that is 25 miles wide and 70 miles long and extends deep into the earth.<sup>2</sup> The ore veins of the region can stretch over 12,000 feet, have a vertical continuity of over 4,500 feet, and have mining widths approaching 50 feet. The subsurface resources available within the Butte Mining District have yet to be exhausted, and allow Butte to be still called the “Richest Hill on Earth.”<sup>3</sup> It is this richness and depth of resources that contributed to the construction of a complex network of shaft mines that extend over a mile deep to reach the ore. Approximately 49 miles of vertical shafts and 10,000 miles of horizontal workings exist under the Butte Hill (including much of the historic uptown) as miners followed the veins of valuable materials prior to the conversion to open pit mining.<sup>4</sup> It was the existence of this vast mineral resource, in this particular place of the intermountain west in the late 1800s, that set the stage for Butte's urbanization.

## URBAN EXTRACTION - A NEW SOCIAL ECOLOGY

It was not long after the mining boom of Butte that the state of Montana began calling itself the “Treasure State” and using the motto “Oro y Plata” (Gold and Silver) on the State Seal. The economics of Butte have always been tied to resource extraction. Mining began with gold, but

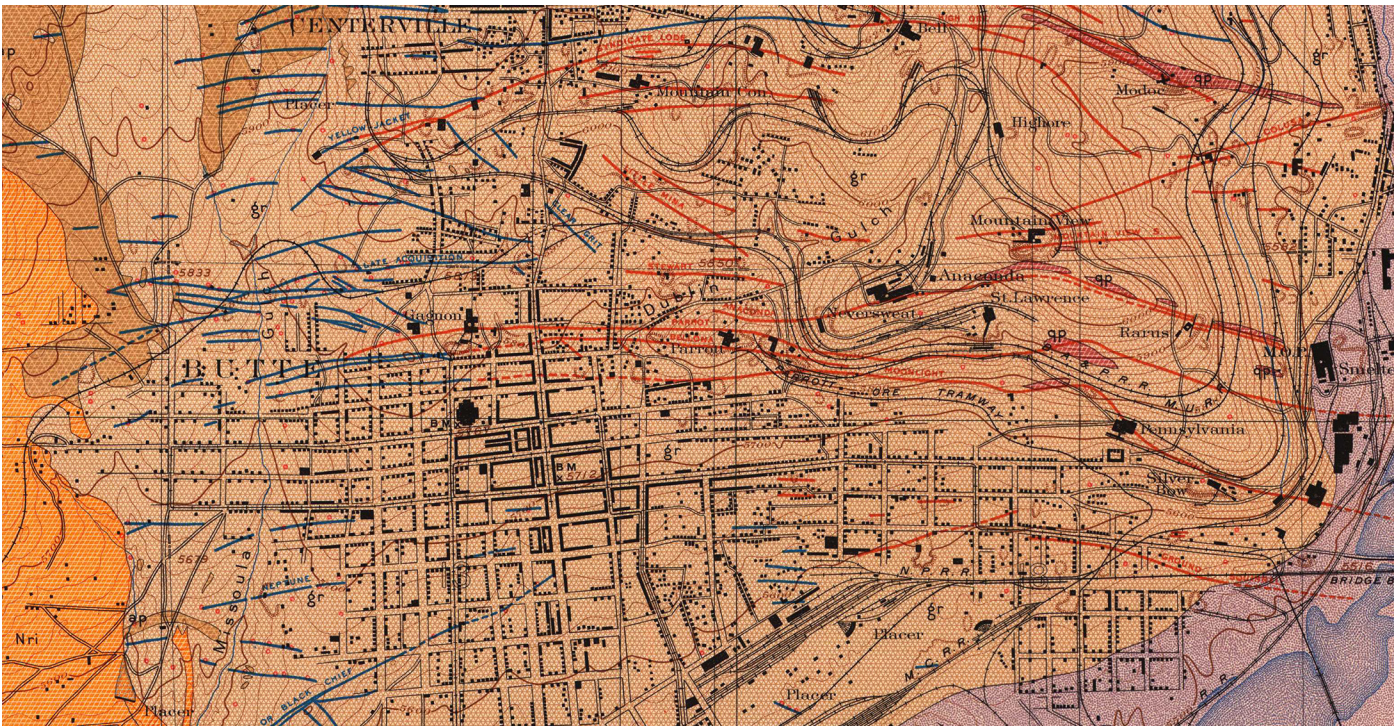


Figure 1. Detail of Economic Geology Sheet surveyed in 1895. Butte Special Map Folio #38 by Weed, Walter H.; Emmons, Samuel F.; Tower, George W. published by the United States Department of the Interior, 1897

quickly shifted to copper as the country's growth and need for electricity fueled a round-the-clock extraction, with Butte producing 30% of the nation's copper in 1920, and placed the mining town, with its \$55 million dollar annual income, at number five on the state list of revenue<sup>5</sup>. Copper from Butte was of such importance to the American war effort that after the bombing of the Miner's Union Hall in 1914 and the subsequent labor strikes resulting from the Granite Mountain Fire, martial law was instated to ensure continuous production. It lasted through 1921, the longest period of military occupation in the U.S. since the Reconstruction era. During war times, striking miners were accused of treason, and were escorted to work at gunpoint in order to support the war effort<sup>6</sup>.

The draw of wealth was so great that immigrants were often instructed, "Don't stop in America, go straight to Butte!" The strong attraction of Butte encouraged the development of a formidable community, both physically and socially. In 1890, Butte was one of the most culturally diverse cities in the country, with foreign-born residents exceeding 45% of the population<sup>7</sup>. Strong formal enclaves of Chinese, Cornish, Scandinavians, Lebanese and the largest population per capita of Irish in the U.S. existed within the city. In 1900, there were approximately 40,000 people living on the Butte Hill, and by 1920 that number had ballooned to nearly 90,000. The mining town was becoming a metropolitan place, with many similarities to other cities in the country. The mining industry was even facilitating the creation of large pieces of civic infrastructure. In 1899, copper baron William A Clark purchased 21 acres and invested one million of his own dollars to construct the Columbia Gardens Amusement Park, an oasis of green created in the barren landscape of extraction, for

the enjoyment of residents of Butte. However, this city was inseparable from the intensity of mining which set the trajectory for this new ecology.

Despite these efforts at civility or the establishment of a cosmopolitan lifestyle, Butte's inseparable ties to mining caused it to struggle with a bifurcated identity. After less than 20 years of mining activity, the settlement had over 200 saloons and by 1900, 85% of its population was under the age of 25. Journalist Ray Stannard Baker said of Butte "It gives one the impression of an overgrown mining camp awakened suddenly to the consciousness that it is a city, putting on the airs and properties of the city, and yet often relapsing into the old, fascinating, reckless life of a frontier camp"<sup>8</sup>. It was this two-faced existence that made Butte such a unique place. Butte possessed many of the qualities of contemporary highly "civilized" cities, while remaining linked to the resources and lifestyle that led to its success. (Fig. 2) These two realities, occurring simultaneously, evidence a type of labor and leisure that would not be possible without the vast urbanization of the Butte Hill.

#### IMPACT OF MINING

"It was Geology, not geography that made this isolated valley such a remarkable place"<sup>9</sup>.

From the earliest days of mining in Butte, the enormity of both the resources and the processes conceived to extract them had a range of negative impacts on the surrounding region. The drive to fuel smelters and shore up mine shafts had removed every combustible stick in the valley. The rampant deforestation was further exacerbated by the total botanic suppression caused by air pollution from the smelters and the deposition of inhospitable waste rock strewn across the Butte Hill. By 1900, the rocky landscape of the Silver Bow Creek Valley had become barren, riddled with heaps and holes, and stained by air and water that teemed with an array of toxic metals. In 1912, Walter Harvey Weed



Figure 2. Butte Panoramic Images from 1914. Panoramic Photographs Collection. Prints and Photographs Division. Library of Congress. LC-USZ62-61196 and LC-USZ62-133271

wrote “Heaps of waste are everywhere prominent, attesting by their great size the extent of the underground workings”<sup>10</sup> foreshadowing the environmental impact of mining on the Butte Hill.

Starting in the 1870s with small hand-dug shafts, the surface occupation and subsurface condition in Butte has evolved due to the mechanization of the process. First through increased man-power as more and more people traveled to this remote place to “strike it rich” and then through the transition to heavy earth moving equipment in the 1950s. This large scale sorting of the land continues today in the active Continental pit and the massive resorting of the land through reclamation. A collection of maps drawn in 1895 by USGS cartographer R. H. Chapman illuminates the transition period between these two extremes. It shows a perforated city, one that evolved with distributed excavation operations. A city that flowed between content and context. At this time we see a young child whose playground is a waste rock pile draped in a thick smog from the 24-hour processing of metal. It was a place Edwin Dobbs described in his 2010 keynote address to the Vernacular Architectural Forum Symposium as “...endlessly rich and stimulating, a thousand times



Figure 3. Neversweat Mine - Butte, Montana 1900. Butte Silver-Bow Public Library

more interesting than the fakery of a Disneyland.” It was a messy city producing 20% of the world’s copper while also hosting Charlie Chaplin’s first performance in the United States. To this day it is difficult to decipher whether the holes or the homes came first.

### THE PRESENT CONDITION

Present-day Butte is the physical manifestation of over 130 years of mining. Its streets come with names like Aluminum, Gold, Platinum, Silver and Mercury, and the giant craters (the Berkeley and Continental Pits) on the northeastern edge of town are an ever present reminder of the geologic underpinnings of this community (Fig. 4) . At one point, there were at least 200 mine shafts puncturing the urban surface and integrated into the fabric of the city. The overburden from these shafts was scattered about the community and to this day has a significant role in shaping the city. Today over 660 million metric tons of waste rock are spread across the 25 square mile surface of the Butte Hill<sup>11</sup>.

As mining techniques became more efficient and metal prices dropped, the process of mining became less informative to the city’s urban form. In the 1950s, when open-pit mining became the primary extraction method, the city transformed from a community spatially entwined with mining to one that was simply adjacent to a mining operation. The waste rock that had once contoured the city was now hauled to one location, creating an impoundment for the tailings, located north of the Berkeley Pit, generated by the processing of ore. Because of the seemingly endless lode of materials beneath the city, speculations to expand operations, or even restart underground mining, have been part of a more recent history and present day conversation. In 1972 the Butte Regional/Urban Design Assistance Team, which included representatives from the American Institute of Architects and local professionals, proposed to move the residents and historic structures from the top of the hill down into the valley in order to expand the Berkeley Pit westward into what is now the historic uptown of Butte. City council ultimately halted the plan in 1976<sup>12</sup>. This proposal brings into question the value of a resource versus the value of a community’s culture.

At the turn of the last century, over 45 mining companies and almost 18,000 miners in 34 different labor unions were working the Hill. Today there is one active mining operation at the Continental Pit which is



Figure 4. Aerial Photograph of Butte, Montana 2013. United States Geological Survey

run by Montana Resources with approximately 350 employees. Butte is uncommon among the cohort of “boomtowns” that went bust or redefined themselves within a new economy. The most significant contributor to the new economy and image of the city is the exploitation of the historic past in tourism and festivals that rely on nostalgia, trapping Butte in a period defined by the Historic Landmark designation. In 1961 Butte became a National Historic Landmark which was then expanded to the Butte-Anaconda Historic District in 2006, becoming the largest historic landmark district in the country with over 6,000 contributing properties. In 2002 Butte celebrated its first Evel Knievel days as a way of celebrating a new heritage. In the same year they were also named Distinctive Destination by the National Trust for Historic Preservation which bolstered their position as a tourist destination. They now host the annual Montana Folk Festival under the shadow of the Original Mine Headframe. These festivals along with St. Patrick’s Day celebration and the Chinese New Year celebration collectively draw over 250,000 people to the city each year earning it the title of Tourism Community of the Year by the Montana Office of Tourism and a new nickname, the Festival City. The Montana Folk Festival alone brings in over 150,000 people annually to this community of 34,000 and is anticipated to more than double in the future. In 1963 the World Museum of Mining was founded on the west side of Butte on the former Orphan Girl mine yard “to preserve the enduring history of Butte and the legacy of its rich mining and cultural heritage”. This overlay of the past is so significant that there are also contaminated landscapes and channel walls for the creek that are made of smelter slag, included as part of this historically-designated fabric to be preserved for future generations (Fig 5).

Another example of the burdens of the past can be seen in the abandoned Berkeley Pit. This increasing body of acidic water in the former open pit mine has become an attraction for the town with billboards along the interstate boasting the overlook as a tourist destination between Glacier and Yellowstone National Parks. This attraction offers very little to the community that bears its environmental burden and the pending mechanized cleaning of the water that will run in perpetuity to prevent contamination of the region’s water system.



Figure 5. Tailings Observation Area east of Anaconda, Montana identified by bollards and gold chain to separate reclaimed land from the historically-designated waste site, 2013. Photograph by Author

But tourism is not the only new economy for this mining town. The anthropogeomorphological condition, a byproduct landscape created by industrialized sorting regimes that gave Butte its form has generated a new economy of reclamation. This economic investment is not dissimilar to tourism as it does very little to allow the community to reclaim culture, specifically one that is leveraging the past for a new future.

#### SUPERFUND

In 1983 the Environmental Protection Agency (EPA) designated Silver Bow Creek as a Superfund Site, making it the largest superfund site in the United States, reaching from Butte 120 miles to Milltown, just east of Missoula, Montana. This designation started the process of collecting data and determining the appropriate remediation projects in the Butte Priority Soils Operable Unit (BPSOU). Clean up operations began in 1987 and were divided into two phases. An initial Phase I that was an expedited Response Action to source areas of contamination by removing or capping waste dumps, railroad beds and other related areas of mine waste. Phase II is the final remediation work related to addressing the remaining environmental and human health issues associated with water and soil. This plan resulted in the Record of Decision (ROD) being adopted in 2006. In 2008, The Atlantic Richfield Company (ARCO) agreed to pay \$187 million to finance the cleanup of the Clark Fork River contamination as a result of a century of mining activity in Butte and Anaconda<sup>13</sup>.

“The environmental benefits will go directly to local landowners with improved soil, and extend to all Montanans through cleaner water and improved fisheries.” said Robbie Roberts, EPA’s Regional Administrator from Denver<sup>14</sup>.

#### RECLAMATION AND RESTORATION

The EPA’s general mission is to protect human health and the environment through implementation of environmental laws enacted by Congress and assigned to EPA for implementation<sup>15</sup>. Due to the EPA’s findings of the Practical Infeasibility to remove the hazardous materials a Waste Left in Place (WLIP) strategy was implemented. In order to

stabilize the ground and reduce the risk of erosion, all waste rock to be capped in place was graded to a maximum slope of 1:3. BRES Appendix B, Butte Hill Revegetation Specifications, to the 2006 ROD for BPSOU outlines the criteria for the WLIP cap to provide a barrier between people and the waste material. Once the site was properly graded for slope and drainage a minimum of 18 inches, settled depth, of cover soil is placed over the waste rock and is then seeded with an approved mix which is irrigated for a maximum of two years to establish the plant life. The cap continues to be monitored to ensure that it is providing the level of protection for people and the environment but is not asked to do more.

Reclamation of the Butte Hill is similar to that of many sites where the EPA standards and the state laws governing hard rock mining reclamation dictate an attempt to return the landscape to its “pre-mining condition.” This process has made the Butte Hill uninhabitable in a new way. The WLIP cap has created a fragile and uninhabitable prairie segregating many parts of the community once connected by mining (Fig 6). Within the 2006 ROD for the BPSOU the EPA identifies areas of redevelopment within the reclamation sites. Of specific note are the outline to create the Butte Hill Trail on the abandoned rail bed, now the BA & P Trail, Open Space to both help with storm water management and to improve the aesthetics of the town, Education related to damage to the WLIP protection of the waste material, and a series of park and recreational areas for the residents. While this does exceed the basic criteria of Human Health and the Environment, it is a passive and rather generic approach to both the physical and social restoration to a place as unique as Butte. One can only imagine what the city of Butte would look like today had the sorting of the waste rock from mining not been based on efficiency, but rather on a conscious decision of beneficial place making.

### A STAGNANT ECOLOGY

Reclamation efforts have restored significant areas of natural habitat and the efforts specifically surrounding Silver-Bow Creek and the Clark Fork River have restored native fish populations to the waterways. While this is a success for the displaced native species, the aim of returning the Butte Hill to its “pre-mining condition” ignores the opportunity to leverage this post-industrial landscape for a new future. Looking to the past, a time prior to the settlement of Butte, traps the community in an uninhabitable place, for without mining there would be no community.

Today, Butte is a community showcasing its extraction history. Enamored with its storied past, all things in Butte point backward, with very little attention going to imagining how this legacy translates into a novel future for a community that will continue to rely on extraction for its well-being. One exception is Dobb’s speculation that the tremendous environmental problems associated with Butte provide it with a kind of “shield” that makes it problematic and less attractive than the other, more rapidly developing areas of Montana (e.g. Bozeman, Missoula), that have become characterized by ubiquitous sprawl. Relying on this protection alone, however, only assures that Butte’s future will look like its past.



Figure 6. Missoula Gulch Reclamation Site, Butte, Montana 2014. Photograph by Author

### THE POST-INDUSTRIAL FALLOW GROUND

The history of extraction has created a wealth of resources, both the valuable material and the ability to reflect on its implications to the environment. But too often this resultant landscape is not seen as an opportunistic condition as well. If the sorting and remaking of the land was imbued with an agenda of place-making instead of mere efficiency or satisfying the minimum standards for safety, these highly disturbed places could take on a value beyond the residues of extraction. There is a prominent role for the designer in this equation. If we can engage these processes of excavation, sorting, and processing in creative and productive ways, the potential exists to turn what many see as a necessary and context-less evil into one of the most impactful and unique forms of place-making of our generation.

Butte, Montana offers a unique case study to examine projective futures for a post-industrial ecology, one that does not see the evils of the past as something to hide or attempt to eliminate. Rather one that seeks to leverage the efforts of transforming a contaminated place for a new community; one that engages the environment of the future and the Anthropocene age. As the industrial sorting of the land will continue, be it for extraction, reclamation or in response to rising sea levels, can we utilize strategies that seek a mutualistic inhabitation of these landscapes and provide opportunities for sustained communities. Specifically can we move beyond the trappings of the past that burden the present and future opportunities for a new engagement with place.

There is a well-established tourism industry in the Intermountain West for precisely these types of places, which solely focuses on the past as it offers an “other” to visitors. The tourism is predicated on only remembering “the good times” and downplays or ignores the social struggle and environmental impact that these extractive settlements truly embodied. This type of extraction, which continues today around the world, is typically hidden from public view, or situated in remote locations. The monumental scale and infrastructure required by the extraction and reclamation industry should be coupled with the creation of a new economy that can leverage the existing tourism market without

the need of nostalgia. The roles of view, access, and experience should be re-calibrated to showcase this place as the evolving product of a process, and not a historic event simply to be remembered or a process to be feared. The goal is to illuminate the urban role in the industrial process, as opposed to merely the distilled products of that process. Furthermore, the role of human occupation within the industrial process should inform a future for this place of extraction through an effort of reclaiming a future that can only occur because of the industrial sorting of the land, but one that is not encumbered by extraction.

By utilizing the Butte Hill as a place to test alternative strategies to extraction and reclamation, contemporary and future sites can shift their current extractive practices to avoid the unusable post-industrial ecology. The presumed outcome of all the labor, money and energy that goes into extraction should be focused on more than just the singular and irresponsible production of concentrated ore. Future projects of industrial extraction should be systemically interwoven into a larger plan of social, ecological and financial resilience. The process of extraction should be held accountable for the actual creation of place instead of the destruction and eventual reclamation of it for we can never return to the “pre-existing condition”, nor should we. By engaging the anthropogeomorphological condition shaping our future as designers we can shape the new urban ecology. To do this we must move away from the “do no harm” approach to extraction and to the industrial urbanization of the land. We must move to an ecology that leverages the industrial process to create a more sustainable future, one that is mutualistic in our extraction and occupation.

## ENDNOTES

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