Miners, managers, and machines : industrial accidents and occupational disease in the Butte underground, 1880-1920
by Brian Lee Shovers

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in History
Montana State University

Abstract:
Between 1880 and 1920 Butte, Montana achieved world-class mining status for its copper production. At the same time, thousands of men succumbed to industrial accidents and contracted occupational disease in the Butte underground, making Butte mining significantly more dangerous than other industrial occupations of that era. Three major factors affected working conditions and worker safety in Butte: new mining technologies, corporate management, and worker attitude.

The introduction of new mining technologies and corporate mine ownership after 1900 combined to create a sometimes dangerous dynamic between the miner and the work place in Butte. While technological advances in hoisting, tramming, lighting and ventilation generally improved underground working conditions, other technological adaptations such as the machine drill, increased the hazard of respiratory disease. In the end, the operational efficiencies associated with the new technologies could not alleviate the difficult problems of managing and supervising a highly independent, transient, and often inexperienced work force.

With the beginning of the twentieth century and the consolidation of most of the major Butte mines under the corporate entity of Amalgamated Copper Company (later the Anaconda Copper Mining Company), conflict between worker and management above ground increased. At issue were wages, conditions, and a corporate reluctance to accept responsibility for occupational hazards. The new atmosphere of mistrust between miners and their supervisors provoked a defiant attitude towards the work place by workers which increased the potential for industrial accidents.

Eforts by organized labor to improve underground conditions in Butte through protective legislation, compensation for work-related accidents and disabilities, and through work stoppages, failed to halt industrial accidents or to effectively alter a recalcitrant disregard held by miners for the dangers of the work place, created over a forty year period in which thousands of Butte miners lost their lives on the job.

This study consists of six chapters: Chapter One is an introduction; Chapter Two offers a profile of the miner's life above and below ground; Chapter Three examines the impact of new mining technologies on the dynamics of the work place; Chapter Four explores the high incidence of accidental fatalities and occupational health hazards in the Butte underground; Chapter Five documents the miners struggle to improve working conditions; and Chapter Six is a conclusion.

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Master of Arts

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History

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 1987

APPROVAL

of a thesis submitted by

Brian Lee Shovers

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

April 17, 1987
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ACKNOWLEDGEMENTS

This thesis could not have been completed without the guidance and assistance of three individuals. Paula Petrik, my primary thesis advisor deserves credit for steering me towards my chosen topic and for providing focus to my research and encouragement to me throughout. I am also indebted to Robert Rydell for his insightful criticism and enthusiasm for my topic from the outset. Finally, I would like to thank Teresa Jordan for her helpful critiques of my paper from start to finish.

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ABSTRACT

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Chapter 1

INTRODUCTION

On May 15, 1917, a coroner's jury convened in Butte, Montana to investigate the accidental death of miner Charles Borlace. Borlace, a thirty-eight-year-old Cornishman from Michigan, died in the Alice Mine when the cage he was riding plummeted two hundred feet to the bottom of the shaft. The bolt connecting the engine brake to the cable drum snapped, and the safety devices designed to catch a runaway cage also failed. During the inquest, the hoist engineer, John Davis, testified that every precaution had been taken to prevent such an accident. Just that morning, the machinist, John Campbell, had inspected the hoisting engine and bolts for defects. When questioned further, however, the engineer revealed that the accident might never have happened had he followed normal practices, brought the cage in the adjacent shaft to a complete stop, and engaged the clutch. Yet, the coroner's jury exonerated both the hoist engineer and the mining company of all blame for Borlace's death, a verdict repeated in virtually every fatal mining accident investigated in the copper mining district of Butte, Montana between 1880 and 1920.[1]

The circumstances surrounding this case and the more than one thousand other fatal mine accidents that occurred during this period were much more complex than this coroner's jury suggested. They raise important questions about the effect of the industrial mining process on the worker. A simplistic analysis of Borlace's death could lead to an indictment

of new mining technologies, for machines--the hoist and safety devices--had failed. But technology cannot be evaluated outside of the social context in which it was used. The hoisting device that failed Charles Borlace was part of a much larger process that encompassed a politically and economically powerful corporation, a pre-industrial immigrant culture, fraternal associations, and labor unions. The conflict in the Butte underground among these various forces and its impact on working conditions is the subject of this study.[2]

My purpose is to focus on the dangers within the Butte underground, a subject thus far only mentioned parenthetically by other mining historians. There are excellent studies of the struggle for corporate control over Butte minerals and on the evolution of organized labor and radical politics in Butte, but none of these attempt to explain the social and economic forces linking life above ground with the dangers below ground. My study poses the hypothesis that the causes of hazardous working conditions and industrial accidents cannot be evaluated without paying attention to technological advances in the mining process, as well as political and economic relationships at work in the community at large. The high number of worker fatalities that occurred in the Butte mines resulted from a complex set of technological, economic, environmental and social circumstances. Interactions between underground miners and managers mirrored the political culture found above ground, often to the detriment of the health and safety of the work force.

Hardrock mining had always been a dangerous occupation, fraught with hazards unimagined by the worker above ground, but between 1880

and 1920 an alarming number of men died in industrial accidents and of occupational diseases in the copper mines of Butte. Butte ranked as one of the most dangerous mining districts in the world, with a fatal accident rate three times higher than traditional mining districts in Cornwall. The danger was directly related to the large scale mining operation developed in Butte in the late nineteenth and early twentieth centuries. The story of large scale copper mining in Butte actually begins before 1883 on the east coast.

The chronology actually starts in1876, thousands of miles from Butte in Philadelphia, with Alexander Graham Bell's demonstration of the telephone at the Centennial Exhibition. Bell's new invention required copper, as did Thomas Edison's incandescent light bulb, patented in 1880. These two technological advances, along with expanded industrial and residential use of electricity, created enormous demand for copper in the last two decades of the nineteenth century.

A set of fortuitous geologic, technologic, and economic circumstances coalesced in Butte to create an industry capable of satisfying this new demand. In 1883 Marcus Daly hoisted his first bucket of copper ore from the Anaconda Mine, which would ultimately become one of the world's richest copper mines. Copper cannot be mined and processed without a substantial investment of capital, which Marcus Daly guaranteed for Butte with the creation of the Hearst, Haggin and Tevis Syndicate in 1882. This venture eventually led to the first integrated copper company in America. In 1881 the Utah and Northern Railroad arrived to carry ore for processing and sale. By 1887, only four years after Marcus Daly began producing ore from his Anaconda Mine, his corporation led the world in copper production.

Smelting and refining proved another major hurdle which Daly handily overcame in 1891 with the construction of the first electrolytic refinery-- it used an electrical process to remove all impurities from copper-- in the West, twenty-six miles from Butte, in Anaconda. William A. Clark and F. Augustus Heinze both owned important Butte mining interests and remained agressive competitors of Daly's. Heinze personally waged an unsuccessful war against consolidation efforts by Amalgamated Copper, a precursor to ACM and the inheritor of Daly's mineral properties. By 1910, New York and Boston investors consolidated the individual entrepreneurial efforts of Daly, Clark and Heinze into a massive corporate enterprise to become known as the Anaconda Copper Mining Company (ACM). The Anaconda Company continued to dominate world copper production for the next thirty years, affecting the interplay between technology and safety within the Butte underground.[3]

The power of mining corporations like the Anaconda Company is not new to historians, but contemporary mining histories have most often focused on details of mining camp life, corporate maneuvering within the industry, descriptions of the machinery and processes necessary to extract metals, and the politics of organized labor without paying adequate attention to the interaction of people and the industrial process. Only a small group of historians, led most recently by Merritt Roe Smith, Ronald C. Brown, and Mark Wyman, have closely examined the impact of technological change on the worker. In Harper's Ferry Armory and the New Technology: The Challenge of Change, Smith explored the impact of worker resistance to technological changes in America's early armaments industry. Brown and

Wyman's books marked a departure from earlier historical studies of the mining West in that they focused more directly on the impact of industrial technologies on miners' lives. Although Brown and Wyman both focused on occupational hazards of the work place, they arrived at very different assessments of technological innovations. In Hard-Rock Miners: The Intermountain West, 1860-1920, which ignores Butte mining, Brown carefully documented the life of the industrial work force and concluded that new mining technologies ultimately made the work place safer and the work more dependable for the worker. Wyman, on the other hand, in Hard Rock Epic: Western Miners and the Industrial Revolution, 1860-1910, indicted both new technologies for creating unforseen hazards underground and mine owners for failing to accept responsibility for company negligence, citing specific examples of unsafe conditions and accidents in Butte associated with new mining techniques. The work of both Brown and Wyman prompted consideration of some broader questions regarding the relationship between new mining technologies and worker safety.[4]

This study of the Butte miner and working conditions draws together several historiographic traditions -- the history of technology, the history of mining in the West, and the history of business and labor. My study of Butte, following Smith's lead, focuses on the workers themselves -- on how particular technological innovations affected them and how they responded to new hazards in the work place. What I contribute in this approach is the use of new source materials, as well as a fresh interpretation of Butte mining. No one has looked at the coroner's inquest prior to my research as a source of information about relationships between miners and supervisors,

about the liabilities inherent in new mining technologies, and about worker habits and attitudes. Evidence of these relationships emerges, in part, from the voices of miners and their supervisors recorded in a sample of over two hundred surviving coroner's inquests. This testimony reveals the complexity of circumstances associated with industrial mine accidents; the corporate domination of workers on the job and within the society at large; and the importance of communication between workers and management. While the inquest provided an unusual opportunity to hear miners talk about their work, the facts regarding management's complicity in fatal mine accidents often remained unspoken because of fear of reprisal. Witnesses to fatal accidents testified in the presence of company supervisors during coroner's inquests, leaving them vulnerable to blacklisting and intimidation for speaking out against company negligence, a very real possibility in a city where a single corporation dominated the mining economy. Coroner's inquests, in short, were hardly "value-free." Nevertheless, they unveil the conditions under which miners labored in Butte during the early part of the twentieth century and illuminate the political and economic hegemony maintained by the Anaconda Company over its employees.

My study builds on two other scholarly studies which focused on the social implications of technological change in the mining industry. In "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919," historian David Emmons described the extent of industrial hazards for Irish miners in Butte and their collective response through fraternal associations. Emmons concluded that this unified cultural response helped the Irish cope with their hazardous jobs. In "Technological

Advances, Organizational Structure, and Underground Mining Fatalities in the Upper Michigan Copper Mines, 1860-1929," Michigan scholars Larry Lankton and Jack Martin used data documenting the cause of mine accidents in Calumet, Michigan to evaluate the impact of technology on worker safety. They concluded that the extraordinary increase in fatalities during this period was due to industrial expansion and an increase in the size of the work force, and that the larger, more technologically sophisticated operations were generally safer than the more primitive, smaller mines.[5] My data from Butte suggests a different conclusion, however. If the years between 1915 and 1917 are any indication, it showed the smaller Butte mines achieved safer working conditions and a lower fatal accident rate than the larger operations.[6]

Scholarly study of industrial hardrock mining is a relatively recent phenomenon in the historiography of the American West. Although mining has represented a major western industry since the 1860s, historians have typically emphasized the romantic era of the California gold rush or labor violence in Colorado, Idaho and Montana during the early part of the twentieth century. A different approach began to characterize the subject in1950 with historian Vernon Jensen's, Heritage of Conflict: Labor Relations in the Nonferrous Metals Industry Up to 1930. Jensen described conflict between labor and management in the copper and silver industry -- paying particular attention to the evolution and demise of organized labor in Butte -- as a consequence of particular economic, social, political, psychological and geographical forces. According to Jensen, these conflicts over issues of property versus human rights between managers and miners remained

unresolved. Two overviews of the gold and silver mining frontier followed in 1963: The Bonanza West, 1848-1900 by Wiliam Greever, and Mining Frontiers of the Far West, 1848-1880 by Rodman Paul. Greever describes the progressive advance of the mining frontier culminating in the Alaskan gold rush. Paul documents the interrelationship among widely divergent mining frontiers, linked together by elaborate transportation systems and by miners who carried new technologies from place to place and adapted existing methods to new circumstances. Otis Young, Jr. describes the establishment of an American mining tradition in his two books, Western Mining, (1970), and Black Powder and Hand Steel, (1976). In both works, Young offers elaborate descriptions of gold and silver mining techniques, tools, and their origins. Historian Richard Lingenfelter, in his 1974 study, The Hardrock Miners: A History of the Mining Labor Movement in the American West, 1863-1893, argued that militant labor unions were a necessary response to industrial mining and that most labor relations during this period remained peaceful, and that violent labor strife has been exaggerated.[7] The work of these five prominent mining historians provided my departure point for examining the technological and social forces impinging on the Butte miner between 1883 and 1920.

The political and economic forces that affected those working in the Butte mines is the subject of two recent books, The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906 by Michael Malone and Copper Mining and Management by Thomas Navin. Malone described the lengthy individual and corporate struggle for dominion over Butte's rich copper mines. He argued that the struggle for control and Anaconda's

hegemony over state economic affairs engendered widespread prejudice against big business and a legacy of public resignation -- attitudes that ultimately affected safety within the Butte underground. Navin's study emphasized corporate management, in an industry intimately tied to high capital investment and continuous technological innovation. Navin provided insight into Anaconda's place in the world market, and the all important relationship between copper mining management and the worker.[8]

During the last ten years a number of western historians have turned their attention to industrial hardrock mining and its occupational hazards, creating a more clear picture of the impact of industrialization on the rural landscape and population. My study of Butte miners is part of this recent historical tradition and, if it helps illuminate an understanding of the impact of industrial technologies and management strategies on the worker and the work place and sheds light on how these changes below ground were reflected in the culture of the community at large, I will have accomplished my goal.

ENDNOTES

1. Inquest No. 8164," Charles Borlace," 13 May 1917, Office of the Clerk of Court, Butte-Silver Bow County, Butte, Montana, [hereafter repository location will not appear].

2. Edwin T. Layton, ed., Technology and Social Change in America (New York: Harper & Row, Publishers, 1973), 1-8. In his introduction to this collection of essays Layton defines technology as "knowledge at work within a social context." This definition helps the historian view the industrial accidents in Butte in a broader perspective.

3. Michael Malone, The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906 (Seattle: University of Washington Press, 1981), 11-57.

4. Ronald C. Brown, Hard-Rock Miners: The Intermountain West, 1860-1920 (College Station: Texas A & M University Press, 1979); Mark Wyman, Hard Rock Epic: Western Miners and the Industrial Revolution, 1860-1910 (Berkeley: University of California Press, 1979).

5. David Emmons, "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919," Journal of American Ethnic History 5 (Fall 1985); Larry Lankton and Jack K. Martin, "Technological Advance, Organization, Structure, and Underground Mining Fatalities in the Upper Michigan Copper Mines, 1860-1929," Technology and Culture (Forthcoming).

6. The Anode, February 1918, 5.

7. Vernon Jensen, Heritage of Conflict: Labor Relations in the Nonferrous Metals Industry Up to 1930 (Ithaca: Cornell University Press, 1950); William Greever, The Bonanza West, 1848-1900 (Norman: University of Oklahoma Press, 1963); Rodman Paul, Mining Frontiers of the Far West, 1848-1880 (New York: Holt, Rinehart & Winston, 1963); Otis Young, Jr., Western Mining: An Informal Account of Precious-Metals Prospecting, Placering, Lode Mining, and Milling on the American Frontier From Spanish Times to 1893 (Norman: University of Oklahoma Press, 1970); Black Powder and Hand Steel (Norman: University of Oklahoma Press, 1976); Richard Lingenfelter, The Hardrock Miners: A History of the Mining Labor Movement in the American West, 1863-1893 (Berkeley: University of California Press, 1974).

8. Malone, Battle for Butte; Thomas Navin, Copper Mining and Management (Tucson: University of Arizona Press, 1978).

Chapter 2

LIFE ABOVE AND BELOW GROUND ON THE INDUSTRIAL FRONTIER

Beneath a craggy ridge of the continental divide in the sparsely vegetated upper reaches of the Summit Valley located in southwestern Montana, sixty million years of complex geologic phenomena produced one of the world's richest deposits of nonferrous metals--gold, silver, manganese, zinc, and copper. Toward the end of the nineteenth century, miners exposed the mineral wealth beneath the city of Butte, Montana -- a veritable treasure chest of precious and industrial metals. During the last century miners removed nearly five billion pounds of zinc, seven hundred million ounces of silver, and nearly three million ounces of gold from the granite underlying the Butte hill. But copper made the mining district's reputation.[1]

The search for copper brought an industrial way of life to Montana. Thousands of Butte miners, many of them immigrants, lost their lives due to industrial accidents and respiratory diseases contracted working underground in Butte between 1880 and 1920. Men died from falling rock, explosions, hoisting mishaps, fires, and from inhaling the silica dust released from breaking rock with the machine drill. The individual miner became part of a much larger, more complex, and sometimes more dangerous technological process of ore extraction, over which he often exercised little control. To understand fully the impact of new technologies on the Butte

miner and the dynamics that developed between the urban community that rapidly emerged around the mines and the world below ground requires investigation.

From its humble beginnings as a gold and silver camp, Butte grew into a cosmopolitan city equal to its burgeoning new industry, mushrooming from a population of 3,363 in 1880 to 30,470 by 1900.[2] Butte's population increased tenfold during the last two decades of the nineteenth century. Copper mining inspired an urban, industrial character in Butte's architecture that was more reminiscent of San Francisco, Massachusetts or Pennsylvania mill towns than the northern Rockies of Montana. Certainly Butte bore no resemblance to the neighboring agricultural communities of Bozeman and Missoula. In the Glittering Hill, a novel set in Butte during the 1890s, Clyde Murphy aptly portrayed the incongruity of the sprawling mining metropolis set against the backdrop of its pristine mountainous surroundings:

> Then came a cavalcade of memories--of snow crowning the distant Continental Divide; of droves of men at shift-changing time, coming off the hill, now in clusters and again in long thin files; of the incessant clamor of streetcar bells, of the thunder of steel wheels on steel rails; of the screeching of mine whistles; of the sharp clopping of horses' hoofs on the cobblestones; ...[3]

Marching up the flanks of the Butte hill were clusters of workers' cottages, small hip-roofed woodframe houses, built in close proximity to the over three dozen operating mines spread across the hill toward the East Ridge. The miners and their families congregated in ethnic and occupational enclaves close to their work and their fellow countrymen: in Walkerville

(site of Butte's most prosperous silver mines, the Alice and the Lexington); in Centerville, a predominantly Cornish and Irish neighborhood; in Dublin Gulch, adjacent to Marcus Daly's Anaconda Mine; and, in Finntown, Meaderville and McQueen to the east, home to Finns, Italians, Serbians, Croatians, and Butte's major smelters. These neighborhoods were linked to the mines and the commercial district by a street railway as early as 1890.[4] From the intersection of Park and Main, the heart of Butte's commercial district, an observer could clearly view the frenetic economic and social life of this bustling metropolis.

By 1900 Butte was indisputably the economic capital of Montana and the most significant urban center between Minneapolis and Spokane. An imposing architecture of stone, brick, and cast iron replaced the woodframe false fronts of the gold and silver camp. Within view of the busy street corner of Park and Main, the observer could look north up the hill and see mining baron William A. Clark's First National Bank; the Hennessy Building (the elaborately detailed six-story brick department store and headquarters of the Anaconda Company); the Miner's Union Hall (the headquarters of the West's most powerful labor union); and the imposing black steel headframes looming along the hill in the distance. When the mines changed shifts, streetcars, horse-drawn wagons, and miners clogged Main Street going north, making their way to and from work, each man re-entering the above ground world dominated by boarding houses, cafes, saloons, theaters, churches, and a landscape disfigured by the spoils of the city's mining enterprise.

Butte, in 1900, bore the distinctive imprint of both its industrial

economy and its work force. Reports from friends and relatives describing wages unequalled in the mill towns along the Eastern seaboard or in the Michigan copper mines lured European immigrants to Butte by the thousands beginning in 1883. By 1900 over 34 percent of the Butte population was foreign-born, dominated by the Irish, English, and Canadians who comprised approximately 64 percent of the foreign-born population.[5] During the first two decades of the twentieth century, the ethnic makeup of the population remained relatively constant but not static. By 1910 Finns constituted 10 percent of Butte's foreign-born; immigrants from southern and eastern Europe had increased, while Irish and British arrivals had declined.[6]

At the beginning of the twentieth century, Butte was a city of miners; over 60 percent of Butte's adult males worked in the mines. At the same time, thousands of men labored above ground as blacksmiths, ironworkers, boilermakers, carpenters, and smeltermen, in occupations supporting the mining industry and in a wide variety of other businesses that supported Butte's large urban population.[7] In addition, the work force in 1900 included 3,000 women working as teachers, milliners, clerks, laundresses, waitresses, domestics, prostitutes, and boarding house operators.[8]

Butte of 1900 bore little resemblance to the frontier settlement conceived of and described by Frederick Jackson Turner in his all-encompassing frontier thesis presented in1893. The thousands of European immigrants who made their way to Butte, Montana between 1880 and 1910 brought with them European religious and social values.

Traditional ethnic values persisted in the Irish, Cornish, Finnish, and Italian communities through the religious and fraternal institutions that were created in their respective neighborhoods between 1880 and 1910. The industrial urban character of Butte reshaped the values of the second and third generations of these immigrant populations.

These primarily rural European immigrants relied on the church, and fraternal and ethnic organizations and traditions in facing the perils of industrial employment and an unfamiliar urban way of life. Dozens of churches emerged to serve Butte's varied ethnic population: the Catholic church predominated in serving the large Irish and growing Slavic and Italian communities; the Methodists followed with their large Cornish membership; the Scandinavians continued their Lutheran traditions; and the Jewish community supported two synagogues.[10] Dozens of secret societies also formed along ethnic or occupational lines as a means of easing the transition into an industrial environment. In some cases, these organizations fulfilled a function beyond maintaining the ethnic traditions of the homeland. Such was the case with the Ancient Order of Hibernians (AOH), an Irish independence organization first transplanted to America in 1836 and later to Butte. In Butte, the AOH upheld Irish traditions, but more important, it sought work for its members and provided sickness and accident benefits for its over one thousand members, most of whom worked in the mines.[11]

Economic opportunity attracted European immigrants and native-born miners to the increasingly dangerous and unhealthy conditions found in the Butte underground. In 1900 the single working man

predominated in Butte.[12] Clearly, high wages lured many single men west. During the first decade of the twentieth century, laborers in the steel mills of Braddock, Pennsylvania worked twelve hours a day for just over $2 in wages while the Butte miner, regardless of experience, earned $3.50 for eight hours of work.[13] While the cost of living was somewhat higher in Butte, relatively stable employment provided opportunity for both single men and those men with families. If home ownership represented an index of working-class economic opportunity and security, then Butte in fact did offer the immigrant miner part of what promoters had promised. In 1900, over 50 percent of the Irish miners who had lived in Butte for between four and seven years owned their own homes, and by 1910 this percentage was even greater.[14]

Repeatedly, American men and women have journeyed west for economic opportunity. Significantly, by 1900 it was not the promise of gold or fertile land which attracted thousands to southwestern Montana; it was the possibility of a weekly paycheck. Between 1873 and 1900, the United States suffered from periodic economic downturns, and, after the Panic of 1893, silver mining in the West came to a standstill because of the repeal of the Sherman Silver Purchase Act, making good paying jobs in the Butte underground attractive to both the native and immigrant worker. Under these circumstances, the prospect of a guaranteed wage attracted the nations' artisans and mechanics.[15] But balanced against the possibilities presented by this new life in the West were the grim statistics of accidental death underground and the ever-present occupational hazard of miner's

consumption and debilitating respiratory ailments. Along with the promise of a paycheck, new arrivals from the green hills of West County Cork, Ireland, or from the forested Keweenaw Penninsula of northern Michigan encountered a city devoid of vegetation and trees, choked by the sulphur and arsenic-laden smoke emitted from the local smelters and despoiled by mounds of mine waste. Confronted by depressed national economic conditions Butte's high wages and the promise of a relatively independent lifestyle initially overshadowed these industrial and environmental liabilities.

Part of the lure of underground mining derived from the independent nature of the work. Statistics regarding transcience among Butte miners between 1914 and1920 underscore this attitude. During 1914 each job on the Butte hill was held by two and one-half men compared to nine men for each job in 1920, indicating a persistent movement from mine to mine.[16] Dick Matthew, a man who worked a variety of jobs underground in Butte beginning in 1928, described mining as "the most independent laboring job there is." According to Matthew, who came to Butte from a ranch in Choteau, Montana, the miner "designs his own work and there ain't nobody looking down your collar."[17] The miners' independent nature derived partly from the large number of job prospects. An extremely rich and extensive mining district and a growing demand for copper, and later zinc and manganese, created almost unlimited opportunity for the experienced miner. Endless opportunity translated into an occupational independence that often clashed with the complex technological process

engineered by corporate managers, creating unforeseen hazards underground for the worker. By 1900 the Butte miner found his life divided between two very different but connected worlds.

The unflagging energy in the streets of Butte in 1900--the throngs of men and women frequenting the shops along East Park, the clanging streetcars climbing up Main, the newsboys on the corners hawking papers, and the music and chatter drifting out of the cafes and saloons on Main Street-- mimicked the activity day and night in the candle-lit passageways thousands of feet beneath the streets of Butte. While the snow fell and temperatures above ground plummeted to -20 degrees Fahrenheit, the miners, stripped to their waists, prepared for a day of work in a dimly lit stope where temperatures reached 90 degrees Fahrenheit. More than 2,000 feet separated these two worlds: the world above distinguished from the one below by the work performed, the work place itself, and the language spoken.

As early as 1890, miners practiced their trade in more than thirty mines, varying in size from twenty to four hundred employees, dispersed across the Butte hill.[18] Regardless of size, the primary task remained the same: follow the ore vein and get the ore to the surface. The size of the mine did, however, sometimes alter the tools used to accomplish this task. Moving larger volumes of men and ore to and from the surface required the aid of more complex tools and machinery. For example, a small mining operation of twenty to one hundred men might rely on hand drills for breaking the rock and a bucket and small steam hoist for transporting men

and ore to the surface, while a mine employing hundreds of men would probably use machine drills and a system of cages and skips for the movement of men and ore.

While the size and sophistication of the mining operation in Butte varied enormously, the length of the work day did not. The ten-hour day prevailed until 1905 in the mines of the Amalgamated Copper Company, which controlled approximately two-thirds of the working Butte mines, even though the state legislature mandated an eight-hour day in 1901.[19] While the smaller mines like the Tramway and the Belle of Butte worked a single shift, the larger mines like the Mountain Con and the Anaconda operated two and sometimes three shifts, to amortize their larger capital investment. Butte miners worked seven days a week, averaging twenty-seven days a month, and received time off only when the shaft needed repair or the machines maintenance. During the early years, the Parrot was the only mine of any size to give its workers a Sunday holiday.[20]

The workday ordinarily began for miners on the day shift at seven a.m. After donning work clothes in the "dry" or change house, miners gathered around the shaft collar (surface opening) to await transportation in a bucket or cage down the shaft to their assigned level and work station. The bucket, large enough for two or three men to stand, was attached to a manila -- later, wire-- rope, and descended down the shaft by means of a steam-powered engine. This hoisting engine was eventually powered by compressed air and later electricity. The rope ran up over a sheave wheel (pulley) located at the top of the headframe, a four-legged wooden and later

steel structure located over the shaft collar, and was attached to a large cylindrical drum (10 to 20 feet in diameter) located in the hoist house. As the size of the operation expanded, the bucket was ultimately replaced by a cage, a steel conveyance not unlike an elevator car, within which five to seven miners could stand to be hoisted. Eventually skips, large steel boxes capable of holding from seven to ten tons of rock, carried the ore to the surface.[21]

Miners travelling to and from the work station entrusted their safety to the stationary engineer. The engineer raised and lowered the cages and skips guided by either an audible bell system or a visible set of lights linked to a signal apparatus located at every level. There was a station tender at each level (normally every 100 feet) whose job it was to load men and materials and signal its destination to the engineer. In Hardrock Miners, Ronald C. Brown aptly described the miners' sense of helplessness as they descended to the work place:

> As the warning bell sounded, the cage dropped into the dark shaft. The only light came from lanterns affixed to the cage itself and from those passed on the way down. Likened by some miners to being buried alive, the fall produced only muted sounds, the smell of damp ground, and the rush of air; then from the pit of the stomach came the sinking feeling that accompanied the rapid fall.[22]

At an early date miners alerted the territorial legislature to the dangers associated with the bucket and the open cage, such as men falling from these conveyances from dizziness or catching clothing or tools against the shaft walls. As early as 1887, Montana passed a law prohibiting work in

a vertical shaft below the 300-foot level without an iron- bonneted safety cage.[23] By the early part of the twentieth century, engineers improved the iron-bonneted cage by adding one-half inch iron plate on three sides and a four-foot safety gate on the front. Even these safety features did not eliminate hoisting fatalities or the apprehension of miners about dropping as much as 3,000 feet into the earth at a speed of from 500 to 800 feet per minute.

Having arrived at their work level, the miners proceeded from the station (an enlarged area adjacent to the shaft) into the drift (a four- to eight-foot wide horizontal tunnel that followed the orebody), the way lit only by candle or torch. Electric lights appeared in the Walkerville silver mines as early as 1881, but the shafts and drifts in the majority of Butte mines were not lit electrically until the 1890s. Carbide lamps replaced candles for light in the Butte stopes around 1912.[24] Crosscuts, or horizontal tunnels connecting orebodies, intersected the drifts.

The job commenced when the miner reached his assigned work station. Tasks ranged from the most unskilled mucking (shovelling ore or waste into a car or down a chute) and tramming (pushing an ore car down a track to the station for loading) to the highly skilled trade of blasting and timbering. Miners generally worked in pairs following the ore vein either up (an overhead stope) or down (an underhand stope) from the level with hammer and steel and blasting powder. With contract mining, a popular employment system in Butte, the amount of rock removed or broken during a day determined a man's wage. Four men, working as a team on opposite

shifts, performed all these various tasks. The miner removed the ore from the vein by drilling a number of six- to eight-foot-deep holes, one to two inches wide, into the Butte granite. Then he loaded six to twelve holes with dynamite and ignited the charge, bringing down tons of rock in a timed series of blasts. Until the late 1890s, this drilling was done by two men without power tools, one wielding a sledge and the other holding and turning a hand steel, a skill perfected over the centuries in the tin mines of Cornwall and passed on through Cornish immigrants working in the copper mines of Michigan and the silver mines of Nevada.[25] Although the labor-saving machine drill eventually replaced the physically demanding technique of hand-drilling, the primary task of ore removal remained virtually unchanged.

The task of ore removal could not be accomplished without the specialized skills of an industrial work force that included pumpmen (assigned to keeping the work place free of water), mule skinners, and later motormen (charged with delivering the ore car from the drift to the station), shaftmen (employees who timbered the descending shaft), and samplers, surveyors, and geologists (specialists who analyzed the orebody and charted the course of development). The underground operations also relied on a host of men on the surface including topmen (workers responsible for removing the ore cars and men from the cages), sawyers, blacksmiths, machinists, electricians, compressor men, ropemen (men charged with maintaining and replacing the wire rope used for hoisting), and teamsters, later replaced by locomotive men. Still, the majority of men actually

worked underground; there was approximately one man on surface for every four underground. Those working underground took orders from the shift bosses, who might supervise from twenty to sixty men, and the bosses took their lead from the mine foremen and the superintendent on top, and the assistant foremen working underground.

The Butte miner may have been less closely supervised than his contemporaries toiling in a Pennsylvania steel mill, but the labor was neither any less demanding, nor were the conditions any less trying. For eight to ten hours a day, the men hired to bring the copper ore to the surface performed physically exhausting labor in a confined environment, a world unto itself. The miner typically spent his entire day or night in perpetual underground darkness, laboring in a stope or raise just high enough for a man to stand erect at temperatures as high as 107 degrees Fahrenheit at 100 percent humidity. At the 3800-foot level of the Stewart Mine, not only did the air temperatures reach these extremes, but also the water pumped from the stopes there reached 113 degrees Fahrenheit.[26]

Where the work place was not hot and humid, another potentially more hazardous condition persisted: dusty air. The silica dust that filled the air from the machine drill posed an unseen danger to the miner: miners' consumption or silicosis, an often fatal lung disease. Until 1916 miners drilled practically all stopes without wetting the surface, creating an epidemic of respiratory diseases underground unmatched in any other industry.[27] John Gillie, general superintendent of Amalgamated Copper Company, testified before a federal industrial relations commission in 1914

that dust was an inherent, unavoidable aspect of mining. In a single year, according to Gillie, miners detonated over four million pounds of powder in the Butte underground, filling poorly ventilated stopes with deadly granite dust.[28] The introduction of wet drilling districtwide by 1925 eventually improved the dust problem, but failed to eliminate the deadly hazard.

Just as the heat and dust readily diminished the strength of even a young man working underground, so did an atmosphere laden with the smells of human and animal excrement, powder, sweat, and rotting food. Hundreds of men shared their workspace with the mules enlisted to pull ore cars to the station. Not until 1923 did ACM completely replace the mule with electric locomotives.[29] Toilet cars did not make widespread appearance in the Butte district until after 1916, forcing the miners to relieve themselves wherever convenient and creating an unsanitary and fertile environment for disease and vermine.

Life underground did not accommodate those weak of heart or mind. Even the young and physically robust could barely endure the heat, bad air, noise, darkness, and strenuous work of the underground. In 1915 Jacob Oliver, an experienced miner of thirty-five years and the Deputy State Mine Inspector between 1890 and 1892, testified before the Commons Commission on Industrial Relations that the average life of a miner under contemporary conditions was sixteen years.[30] At $3.50 a day, the wages of a Butte miner were high, in fact almost twice that paid Michigan copper miners.[31] Yet the high wages did not compensate for a work life cut short by a disabling injury, a fatal industrial accident, or the crippling disease of

miners' consumption. The throngs of European immigrants who made their way to Butte to work in its copper mines found a perilous work environment, inhabited by unfamiliar machines, routines, and unforeseen hazards.

ENDNOTES

1. Henry McClernan, "Sixty Million Years of History: The Formation of Butte Copper," The Speculator: A Journal of Butte and Southwest Montana History 1 (Summer 1984),16. These figures are in 1984 dollars.

2. Abstract of the 12th Census of the U. S., 1900 (Washington: Government Printing Office, 1903), 100. The population figure for Silver Bow County is 47, 635, and the city of Butte dominates the county.

3. Clyde P. Murphy, The Glittering Hill (New York: World Publishing Co., 1944), 19.

4. Rex Myers, "The Butte Rail Connection: Mining and Transportation, 1880-1980," The Speculator: A Journal of Butte and Southwest Montana History 1(Summer 1984): 32-33.

5. Abstract of the 12th Census of the U. S., 106.

6. Abstract of the 13th Census of the U.S., (Washington: Government Printing Office, 1913), 212.

7. Abstract of the 12th Census of the U.S., Special Report (Washington: Government Printing Office, 1904), 432.

8. Mary Murphy, "Women's Work in a Man's World," The Speculator: A Journal of Butte and Southwest Montana History 1 (Winter 1984): 19. According to Murphy, twenty-two percent of Butte's 13,000 women worked as wage earners.

9. Dale Martin and Brian Shovers, "Butte, Montana: An Architectural and Historical Inventory of the National Landmark District," an unpublished report, Butte Historical Society, 1986, 31-53.

10. Ibid.

11. Dave Emmons, "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919," Journal of American Ethnic History 5 (Fall 1985): 45-47.

12. Abstract of the 12th Census, 131. Abstract of the 13th Census, 166. In 1900 only 31.7 percent of the Butte men were married. This number increased to 43.7 percent by 1910.

14. Emmons, "Immigrant Workers and Industrial Hazards," 58. This figure on home ownership is extracted from the manuscript censuses of 1900 and 1910. It is derived from a sample of 193 Irish miners and it includes only those with children, excluding those who are single or childless.

15. George Brown Tindall, America: A Narrative History (New York: W.W. Norton, 1984), 700-702; 763. Tindall provides an overview of the periodic economic depressions in America between 1873 and 1893.

16. Paul F. Brissenden, "The Butte Miners and the Rustling Card," American Economic Review (December 1920): 770.

17. Dick Matthew, interview with author, Butte, Montana, 24 January 1986.

18. Annual Report of Inspector of Mines,State of Montana, 1890 (Helena: Independent Publishing Co., 1890), 17.

19. U.S. Commission on Industrial Relations, Mining Conditions and Industrial Relations at Butte, Montana, Senate Document 415, 64th Congress, 1st Session, 1915, Final Report & Testimony, Vol. IV, 3853. [Hereafter cited as "Commons Commission Report."]

20. Annual Report of Inspector of Mines,State of Montana, 1889 (Helena: Independent Publishing Co., 1889), 99. [Hereafter cited as Mine Inspector Report, 1889.]

21. Brian Shovers, "The Emergence of a World-Class Mining District: A Survey of the Evolution of Butte Mining and Its Mineyards," unpublished report, Butte Historical Society, 1984, 7-12.

22. Ronald C. Brown, Hard-Rock Miners: The Intermountain West, 1860-1920 (College Station, Texas: Texas A&M University Press, 1979), 67. For more information on the perils of hoisting men, see 92-102 in Mark Wyman's Hard-Rock Epic: Western Miners and the Industrial Revolution, 1860-1910 (Berkeley: University of California Press, 1979).

23. Mine Inspector Report, 1889, 96.

24. Wyman, Hard-Rock Epic, 103, for information on electrification of Butte mines. Dating of the introduction of the carbide lamp from interview with Ed Shea, interview with author, Butte, Montana, 23 January 1986.

25. Shovers, "Butte Mining," 13. The exact date that the machine drill arrived in the Butte district is undocumented, but the Annual Report of the Inspector of Mines, State of Montana, 1897 (Helena: Independent Publishing Co., 1897) mentions the use of Ingersoll-Sergeant drills at the Mountain Con Mine.

26. G.S. Rice & R.R. Sayers, "Review of Safety & Health Conditions in the Mines at Butte," U.S. Bureau of Mines Bulletin 257 (Washington: Government Printing Office, 1925), 15.

27. Ibid., 12.

28. "Commons Commission Report," 3950.

29. William B. Daly, et. al., "Mining Methods in the Butte District," Transactions of American Institute of Mining Engineers, Vol. LXXII, 1925 (New York: AIME, 1926), 244-87.

30. "Commons Commission Report," 3916.

31. Mine Inspector Report 1889, 112.

Chapter 3

NEW TECHNOLOGIES AND THE DYNAMICS OF THE WORK PLACE

In the early part of the twentieth century, the U.S. Department of Labor considered mining a very dangerous occupation, and for good reason. The fatality rate for an American metal miner in 1908 was almost three times greater than that of a combat soldier.[1] On June 20, 1909, the Butte Miner reported the following gruesome incident, a tragedy that underscored the labor department's statistics:

> Hapis Sirois, a topman at the Moonlight mine, better known as Joe King, met a horrible death by being hoisted up into the sheaves at the mine yesterday morning. Sirois was hurled from the cage almost as soon as it came in contact with the sheave wheel and fell a distance of 1550 feet to the sump. The body was reduced to a mass of bones protruding from the torn and bleeding flesh. It was unrecognizable.

That very same year, forty-four other miners, many of them foreign-born like Sirois, lost their lives beneath the Butte hill. In this case, like numerous other accidents that occurred during this era in Butte, the unfortunate French-Canadian miner had no control over his own fate; a machine caused his death, a machine improperly operated by an apprentice hoist engineer. A variety of circumstances, ranging from the instability of local orebodies to the use of complex new mining technologies to a reliance on an untrained and fiercely independent work force, made the Butte mining district more dangerous than its European counterparts, particularly during the early part of the twentieth century.

The widespread use of more complex machinery in the Butte

underground by 1890 created a new, sometimes dangerous dynamic within the work place. Beginning in 1890 the entire mining operation became larger, more complex, and infinitely more difficult to supervise. During a time when technological change required a highly trained and carefully supervised work force, large numbers of untrained, rural European immigrants peopled the Butte underground. A horrific loss of life, unparalleled in American industrial history, marred the transition from small-scale traditional hardrock mining to large-scale industrial mining in Butte.

Between 1860 and 1910, the invention and application of new mining technologies revolutionized hardrock mining in the American West. Machines replaced hand labor in drilling, hoisting, and tramming, allowing miners to reach depths and production levels previously out of reach. The introduction of electricity to the underground permitted another surge in productivity, as well as improved the miner's work environment through better lighting and ventilation.[2] As mining historian Mark Wyman points out in Hard-Rock Epic, however, the new breed of mining machinery also contributed to an alarming increase in underground fatalities. Corporate industrialists, often geographically removed from the tragedies regularly occurring on their properties, took little time to weigh the human impact of new technologies.[3]

The transition from hand drill to machine drill happened over a fifteen-year period. Trial and error eventually produced a tool light enough to be operated by a single man and durable enough to withstand the rigors of the underground. It did not take mine managers long to recognize the productive advantages of the superhuman machine drill. At the Quincy Mine

in Michigan, the Rand drill enabled 50 percent fewer miners to produce 50 percent more copper. By 1895 the Leyner, and Ingersoll & Rand machine drills prevailed on the Butte hill, almost completely replacing the hand sledge and steel. Somewhat earlier, dynamite replaced black powder, again increasing the miner's productive capabilities with its superior ground-breaking attributes.[4]

While mine superintendents tallied up mounting dividends, the Butte obituaries recorded the legacy of this new machine technology. The machine drill filled the unventilated stopes with silica dust. Inhaled by miners, these sharp-edged dust particles scarred the lungs of unsuspecting workers, creating an epidemic of tuberculosis and respiratory disease among miners. A significant number of Butte miners between the ages of twenty-five and forty-four filled the local cemeteries, and between the years 1907 and 1914, over 50 percent of the miners who died within that age group succumbed to a respiratory disease.[5]

A national public outcry ultimately prompted a technological solution to this devastating health hazard, but thousands of Butte miners died before mine owners introduced wet drilling and mechanical ventilation systems to abate the dust. By 1914, ACM installed 150 Ram water drills, a drill that had proved successful in Arizona mines in reducing the dust level, and by 1925 all the company mines had converted to wet drilling.[6] In February of 1918, ACM organized the first ventilation and hygiene department in the copper industry, and the department supervised the installation of eighteen reversible surface fans and an additional one thousand auxiliary fans underground as well as forty miles of flexible air ducts to carry fresh air into the drifts and stopes.[7] While improved drilling and ventilating technologies

greatly improved underground working conditions, respiratory disease remained a health threat well into the twentieth century due in part to a reluctance among some miners to embrace the safer new techniques.[8]

The enormous increases in ore production in Butte between 1883 and 1900 cannot be attributed solely to the widespread use of the machine drill and dynamite. New hoisting and tramming technologies proved equally important. Initially, the steam-powered hoist constituted a danger to the miner accustomed to the much slower horse-powered whim and bucket system. In 1887 cage-related accidents accounted for 30 percent of the deaths, and as late as 1896, hoisting accidents still accounted for 35 percent of the fatalities. But by the year 1916, a record year for mine fatalities, hoisting accidents constituted only 5 percent of the known fatalities. [See Table 1 at end of chapter.]

The invention of various safety devices for hoisting engines and cages greatly diminished the danger of riding the cage to and from the surface. Probably a dozen men lost their lives in Butte between 1887 and 1920 when the hoist engineer failed to shut down the engine, running the cage into the sheaves at the top of the headframe. Beginning in 1910, ACM installed the Welch Cut-Off--an automatic braking system that stopped the cage when the engineer neglected to do so--to prevent overwinding. As early as 1909, added insurance against engineer error appeared even in the smaller mines in the form of a bell and light signal system.[9] Flashing electric lights combined with the ringing bells to alert the hoist engineer to the cage location and its desired destination.

Accidents still occurred occasionally when the station tender ignored the gate-closing rule or when the safety device malfunctioned. In August

1898, a hoist engineer at the Original Mine lifted the cage to the 300-foot level from the 1,000-foot level where the wire rope broke and the safety dogs failed to catch on the cage guides. Ironically, another engineer and the deceased miner had inspected the rope just two days before the accident without noting any defects in the five-month-old rope. Deputy Mine Inspector Frank Hunter testified before a coroner's jury that rope defects were more difficult to detect on a round rope, especially when the rope had been covered with a protective covering of tar. Hunter also reported that two-thirds of the safety dogs inspected were ineffective. The dogs caught during tests on the surface but, when put to the test with the cage in operation, they invariably failed, putting the lives of those in the cage at risk.[10] While mine operators clearly benefited from the use of machines, the miner was not always so fortunate.

New tramming technologies, such as the underground electric locomotive, made possible the movement of twice the ore in half the time. But again, the new technology exacted a human cost. Until 1907, the trammer moved ore from the stope to the level station with a car pulled by horses and mules, but the horse ultimately relinquished its role to a 250-volt DC motor capable of pulling a load of twelve tons. By 1923, a team of two hundred four-ton trolley locomotives hauled ore along the drifts of the ACM mines, retiring all but two mules on the Butte hill.[11] While electricity represented an inexpensive source of power for tramming, miners fell prey to certain hazards associated with the new technology. In the narrow, dimly lit drifts, a carelessly suspended trolley wire represented a death trap for the inattentive trammer.

Even though electricity constituted an invisible danger if used

improperly, the adaptable new power source also guaranteed vastly improved working conditions for all those who labored underground. Electrical power meant the possibility of a better lit and better ventilated work environment. Candles had been the primary source of lighting in the stopes until the introduction of the carbide lamp around 1912. Not only did candlelight hamper the miner's view of unprotected chutes or manways, occasionally leading to fatal falls, but a forgotten candle also ignited a timber in the Pennsylvania Mine in 1916, causing a tragic fire that claimed the lives of twenty-one miners. A carbide lamp, which ignited the oily insulation on a lead electrical cable being lowered down the Granite Mountain shaft of the Speculator Mine, started a fire that caused the worst hardrock mine disaster in the nation's history, claiming 164 lives. The adoption of a battery-powered electric miner's lamp in the 1930s eventually eliminated the open flame from the work place.[12]

Electricity also partially solved underground ventilation problems. The replacement of steam-powered engines and pumps with electric-powered appliances reduced working temperatures dramatically. More importantly, electricity powered the extensive mechanical ventilation system installed across the Butte hill after 1915. The large reversible fans located on the surface cooled the work space with a continuous circulation of fresh air and could be manipulated to redirect the flow of smoke and gases in the event of fire underground.[13]

Over the forty years beginning in the 1870s the Butte miner witnessed a major transformation of the work place. Machines replaced the hand drill; electric power replaced steam for hoisting; and the trolley--followed eventually by a battery-powered locomotive--replaced

horsepower for tramming. The introduction of these new technologies coupled with a greatly expanded work force, capital investments of major proportions, and more efficient methods of smelting and refining, accelerated Butte's ascendency to the rank of world's largest copper producer by 1887.[14] While new technologies proved a mixed blessing in the work place, a number of new hazards appeared as the worker profile and management of the work force evolved with corporate control of the Butte mines, further distancing the untrained immigrant recruit from the skilled veteran of the underground.

Butte mine owners, large and small, enthusiastically adopted the use of new technologies with little thought as to their impact on the worker. During Butte's infancy as an industrial mining camp, much of the work was done by highly skilled Cornish and Irish miners, but beginning in the 1890s, the ethnic texture of the work force changed with an infusion of predominantly rural immigrants from Italy, Croatia, Serbia and Bohemia.[15] These experienced tillers of the soil arrived in Butte ill-equipped to meet the demands of an industrial work place in the process of technological transformation. While 80 percent of the immigrants from the British Isles working in American metal mines during this period had previous mining experience, only 5 percent of the southern and eastern Europeans had worked underground before.[16]

Beyond the problem of inexperience emerged a persistent conflict between two very different cultures: the twentieth century world of machine work versus a nineteenth century pre-industrial, agricultural world. The European immigrant came from a work world defined by the land, seasons, family, the church, and village, in which trust and cooperation

pervaded work relationships. In the Butte mines, the rural immigrant confronted a hostile, subterranean environment of smoke, intense heat and noise, without command of the language or the skills and experience necessary to do the work safely and efficiently. As labor historian Herbert Gutman noted in his classic study, Work, Culture and Society in Industrializing America, the rural sub-culture within the immigrant population persisted in the face of industrialization. The immigrant relinquished traditional work habits and routines reluctantly, especially since the new arrival of peasants, farmers and artisans from Europe periodically revived rural values.[17] Boarding the cage each day, the immigrant miner travelled from the familiar world of neighborhood and family into an alien underground environment where a brief moment of inattention could prove fatal.

Inexperienced immigrants often found themselves doing dangerous work that the more experienced northern Europeans avoided through seniority. Unaware of potential dangers and often unable to understand directions from English-speaking partners, the immigrants faced a much higher degree of risk. The novice's first underground assignment was normally mucking, a task in which the "greenhorn" relied completely upon the direction and judgment of his more experienced partner. A fortunate novice might be teamed with a man willing to share his knowledge of the work place and its inherent hazards, but more typically the experienced miner resented the inexperienced man, particularly if the new recruit's ineptness slowed production.

Frederick Hoffman, writing about the problem of industrial accidents for the Bureau of Labor Statistics in 1915, cited inexperience as a factor

contributing to a large number of accidents. In both the metal mines of the American West and the South African Transvaal, the world's two most dangerous regions to work underground, immigrants predominated. In both instances the work force consisted of men imported from agricultural communities where the inhabitants were ignorant of machinery and unaware of the potential danger inherent in the work.[18] A young Turkish immigrant named Mahmada Kaki died from a fall of ground in a Butte mine after ignoring explicit instructions from the shift boss to drill and blast out the waste rock to make room for a timber. Instead the inexperienced miner turned his drill into the ore with complete disregard for what the shift boss regarded as common-sense practice.[19]

Knowledge of safe and efficient methods derived partly from familiarity with the task and partly from training. Supervised training was not available in any of the Butte mines between 1880 and 1920. The novice miner was typically given a shovel, assigned to a level and a stope, and put to work without having to demonstrate his competence. By contrast, in Europe a man did not become a miner without a long apprenticeship under a master. "A good miner is a skilled craftsman, like a carpenter or smith," wrote editor Richard Rothwell in the September 1897 issue of the Engineering & Mining Journal as he decried the hazards associated with employing the inexperienced miner. Rothwell further observed that in the metal mines of western United States "men fresh from the farm or bench go to work and within a month or two call themselves miners." According to the editor, the self-proclaimed miners' ignorance of safe mining practices constituted an ever-present menace to themselves and others.[20]

Many of Butte's underground tragedies can be linked directly to

inadequate training and an absence of employment standards. The foreman asked only two questions of twenty-four-year-old Rhinehart Christman the day he was hired-- the very same day he died from a fall down a chute at the Mountain View Mine: "Are you a miner?" and "Where did you work before coming here?" Although the young man claimed experience in Colorado silver mines, the foreman at the Mountain View lacked any means of verification except the recruit's performance.[21] By contrast, miners coming from the mines of Germany and Cornwall were part of a centuries-old apprenticeship tradition.

A miner's training in sixteenth-century Germany and on into the early twentieth century began at age ten working above ground at sorting tables. Initiation to the underground occurred only after six years at sorting and pushing ore cars to the shaft. At age twenty the young German silver miner apprenticed for seven years after which he took a journeyman's test. A journeyman miner enjoyed a privileged status in German society, entitling him to the right to bear arms and exemption from military service and some general taxes. Cornish miners performed an equally lengthy apprenticeship, beginning work above ground between the ages of nine and twelve, sorting rock for milling before going underground with his father or uncle to learn the skills of drilling, blasting and timbering. The mine owners in Cornwall were well aware of the skills and experience of their entire work force, since individual families maintained an occupational heritage that stretched back in time over generations.[22] In contrast, Butte mine owners employed a largely rural immigrant work force after 1900, composed of many who had never been underground before. Because of the tremendous demand for copper and the shortage of experienced miners, Butte mine owners

increasingly relied on men without the necessary skills.[23]

Divisiveness between nationalities that characterized political and cultural life above ground increased existing underground hazards associated with an untrained immigrant work force. Prejudices surfaced between northern and southern Europeans and reflected a visible tension between the more experienced Cornish and Irish miners and the greenhorn Finns, Serbs, Croats, and Italians. By 1900 many of the skilled Cornish and Irish miners had risen to managerial status and, as shift bosses and foremen, reigned over hiring and firing in Butte's underground.[24]

Tension between supervisors and workers emerged over time, creating a mood of mistrust and spiteful negligence which added to the intrinsic dangers of mining. When an explosion at the Cora Mine claimed the lives of seven miners in 1905, the Cornish shift boss pointed an accusing finger at the dead Finnish miners. Referring to one of the men killed, Nels Wareenpaa, the shift boss Andrew Wickey, Jr., testified at the inquest that "the man was a hard worker... like most Finns are, but not a competent miner... very few Finns are." The shift boss concluded that the deceased "could do hard work if somebody done[sic] the thinking for him."[25] As miners congregated in ethnic neighborhoods with separate lodges and churches, animosities between the various nationalities persisted and grew, shattering the traditional bond between miners so essential to a safe work place.[26] A high rate of transience within the work force also weakened bonds between workers.

Unfamiliarity with the specific geologic hazards of the work environment, caused by the very nature of mining and the movement of workers from mine to mine, contributed to the safety problem for both the

veteran and the novice. Even for those unusual miners who remained at a particular mine over a period of months, the work environment changed as the drift or stope advanced. The familiarity of the work environment found by a worker on the shop floor of a factory or mill did not exist underground. The work routine and its location did not vary in a factory as it did daily in a mine. As the miner moved from one stope to another, the rock consistency and location of the vein varied from one to another, calling for thoughtful decisions about drilling and timbering.[27]

In addition, copper miners in Butte during the late nineteenth and early twentieth centuries readily shifted their allegiances from mine to mine, motivated by the prospect of better working conditions or more amiable bosses up the hill. Dick Matthew, an Anaconda employee who began work for the company in the late 1920s, corroborated this Butte tradition of transience by describing his own experience of quitting one mine in the morning over a disagreement with the shift boss and hiring on at a second mine by noon the same day.[28]

A study conducted by a government mine engineer working in South Africa examined the impact of worker transience on the most common of mine accidents, fall-of-ground. In both the Transvaal and in Butte, falling ground constituted the most common cause of fatal injuries. Mines in the Rand, like Butte, posted a fatality rate higher than other European nations, and engineer R. N. Kotze attributed the unusually high rate of 4.14 deaths per thousand workers in the deep gold mines of South Africa to the safety problems associated with the extraordinary transience of the district's miners. In 1912, 82 percent of the Rand's 19,582 miners moved into new places of work over the year; almost 30 percent of these miners had been

employed in the same mine less than two months. The government mine engineer concluded that a miner well acquainted with his work place naturally became more aware of the locations of hazardous ground.[29]

An inquest into a Butte mine fatality illustrated the connection between transience and fatal fall-of-ground accidents. A fifty-five-year-old miner named George Evans signed on as a mucker at the Never Sweat Mine two nights before his death. Evans, a miner with years of experience in Colorado silver mines, worked alone the evening of April 10, 1917, when falling rock crushed him. Fellow miners testified to their knowledge of unstable ground in Evans' part of the mine, even though their fellow worker, Evans, remained unaware of the hazard. Perhaps this accident could have been prevented had Evans known of the danger. Frequent movement from mine to mine limited the miner's knowledge of the work place, its particular geologic anomalies, and his ability to guard against dangerous rock.[30]

The geologic landscape of every mining district differs. The orientation and depth of the orebody varies randomly within a particular district, posing a variety of potential problems and hazards to both the mine engineer and the miner. According to Claude T. Rice, a prominent mine engineer and columnist for Mining and Engineering World, ore removal was more problematic in Butte than in other copper mining districts because of the continual earth movement occurring under the Butte hill and the tangled network of veins. Rice added that the technique of undermining associated with stoping out the ore caused an undesirable movement of the old fault blocks beneath Butte.[31] Walter Harvey Weed, a well-known geologist for the U.S. Geological Survey, noted that the broken gas and water lines and fissures in the streets of Butte were further proof of the continual faulting

described by Rice.[32] Even armed with the most up-to-date timbering and waste-filling technologies, the miner still faced the unpredictable hazards of falling rock indigenous to the Butte geology.

Because of the complexity of the Butte geologic formations, the stability of the underground rock walls varied from mine to mine. Certain mines, such as the St. Lawrence, gained reputations as dangerous places to work. Deputy Mine Inspector Frank Hunter testified about a dangerous hanging wall-- the wall located above the ore vein-- in the St. Lawrence during a coroner's inquest conducted in 1897: "When I worked there seven or eight years ago, it used to kill them pretty lively then."[33] That very same year Deputy Inspector Hunter described a "soapy seam" at the 1400-foot level of the Gagnon, where 3,000 pounds of rock slipped off the hanging wall, crushing a mucker named Allen Anderson. The soapy seam, a layer of slippery talc-like rock that Hunter referred to, had become saturated with moisture, posing a serious hazard to even the most cautious miner.[34]

The experienced miner employed two techniques for testing the stability of the ground above him before beginning work. By "barring down," the miner tried to pry loose rocks with a long bar and by "sounding the ground," the miner rapped the rock with the bar, listening for a hollow or "drummy" sound. Occasionally Butte's unusual geology challenged the reliability of both these techniques. Novica Kujunzich, a mucker at the St. Lawrence, died when fifty tons of rock dropped off the footwall, the area of the stope wall located below the vein, snapping his neck. The assistant foreman testified that sounding the rock sometimes proved an unreliable test of ground stability: "You couldn't tell nothing there," he claimed, "not by

sounding it at all . . . the ground is too soft to be able to tell, by sound, that it's loose." The deceased mucker's partner had carefully barred down on the faulty ground just hours before the accident.[35]

Accidents occasionally occurred even when the miner recognized potential danger and timbered as a precaution against falling ground. Blasting frequently knocked timbers out of place, leaving dangerous ground exposed while the timberman replaced the timbers. In February 1917, a timberman named Matt Erkila, replacing timbers under an area of "heavy ore" on the 2600-foot level of the Speculator Mine, died when a slab of ore slipped off the hanging wall, crushing the young immigrant miner under tons of rock. North Butte Mining Company safety engineer Robert J. Cole testified at the coroner's inquest that heavy ore was hard to hold, and that sounding this type of ground often indicated little about its stability.[36]

Just as the geology varied from mine to mine across the hill, working conditions changed over the years as the Butte shafts deepened. As the mine depth increased, so did the occupational hazards associated with the work. In 1889, the Anaconda Mine reached a depth of 1,000 feet; by 1897, shaft sinkers achieved a depth of 1400 feet, and by 1915, the mammoth copper producer ranked as one of Butte's deepest mines at over 2600 feet. Working conditions generally deteriorated with depth: temperatures increased by as much as thirty degrees; large volumes of water entered the workings; and subsidence and settling of ground accelerated.[37] All of these circumstances created a more dangerous situation for the miner and higher costs for mine owners.

The Butte mine owners of the late nineteenth century who had relied on natural air flow for ventilation eventually resorted to an expensive

mechanical ventilation system as the shafts deepened and good air diminished. A report published by the Silver Bow County Health Department in 1912 concerning sanitary conditions above and below ground cited the 2500-foot-deep Mountain Con Mine for its high concentration of carbon dioxide and poor air quality. Of the ten mines tested, the Little Minah, its shaft sunk to a depth of only 1100 feet, measured the lowest level of carbon dioxide.[38] Men working in a poorly ventilated stope fatigued rapidly, and as a result, their productivity diminished. Investment in ventilation systems, however, reaped immediate savings for mine managers. According to State Mine Inspector William Walsh, opening an air course through a crosscut in the West Gray Rock Mine increased productivity there, which resulted in daily savings of $250, amounting to $7500 monthly.[39]

As the Butte mine shafts descended, the demand for more efficient machinery and mining methods increased, resulting in higher production costs. Higher production costs ultimately meant orders from the mine superintendent's office to the foreman for higher worker productivity to enable Butte to remain competitive with other copper producers. In 1908 Butte copper cost $4.59 per ton more to extract and refine than Michigan copper. A substantial portion of this added cost could be attributed to labor, smelting, and refining. But $.98 a ton derived from additional timbering, exploration and machinery costs in Butte.[40] Until 1906 the deep mines in the Michigan district operated using minimal amounts of timber even at depths of 5,000 feet; Butte miners, in contrast, set over seventy-five million board feet of timber a year in an effort to secure the underground workings.[41]

Costs escalated when mining at depth, as did problems associated with

supervising and managing the work force. By 1900 new mining machines and methods effectively solved the technical difficulties encountered in the deep Butte mines. But these solutions often neglected critical new relationships between the workers themselves and their supervisors, creating new hazards for the underground miner.

Metal mining resembled no other early twentieth century industrial enterprise in its organization and management. The operations of large steel and textile factories were much easier for managers to oversee and regulate. Frederick Taylor's theory of "scientific management" fascinated eastern mill and factory owners who experimented with Taylor's methods for worker supervision in hopes of increased efficiency and expanded production rates. Enthusiasm for Taylor's system also touched the corporate boardrooms of the mining industry, but "time-motion" studies did not readily transfer from the shop floor of a textile mill to the underground stope. In 1913, a columnist for the Engineering & Mining Journal noted the difficulties in applying "scientific management" to an industry like mining in which conditions changed continually. Differences in the rock composition and the orebody prevented the establishment of a standard drilling rate.[42] The author also described the difficulty of supervising a work force dispersed throughout the various working levels of a mine. The very nature of mining resulted in a different system of management, one potentially hazardous for the worker.

Supervising the design and operation of a metal mine required a well-trained and synchronized managerial staff directed from the mine superintendent's office. The overall operation of the mine came under the direction of the mine superintendent, the man ultimately responsible to the stockholders and to the state and federal agencies for overseeing mine

safety. The superintendent delivered production quotas to the mine foremen, who in turn passed directions on to a crew of shift bosses. The shift boss represented the most important link between the superintendent's office above ground and the men working below ground. Enormous responsibility fell upon the shift boss, the man on whom the superintendent depended for enforcement of safety regulations, for the maintenance of a contented work force, and to meet production goals.[43] The shift boss took his orders from the mine foreman at a daily meeting held on the surface, although he spent most of his twelve- to fourteen-hour day underground directing the miners. The shift boss often found himself caught between his managerial responsibilities and his duty to the men who worked under him. For his added responsibilities and hours--often the first to arrive in the morning and the last to leave at night--a shift boss received a wage perhaps one dollar and one-half a day higher than a mucker and often considerably less than a good contract miner.[44] However, the shift boss avoided the backbreaking stoop labor of the mucker and the underground dangers of drill and dynamite. The promotion from miner to shift boss did not elevate the social status of the man who had been a miner; in fact, shift bosses frequently referred to themselves as miners and continued to reside in working-class neighborhoods.[45]

Responsibility for the safety and well-being of the work force inevitably resided with the shift boss, since he had the most intimate daily contact with the operation. Ed McQuire, a shift boss at the Bell Mine in 1897, described his duties as he saw them: "To fix whatever needs fixing and if one man wouldn't do it to send another, and to make sure everything is right." As one of a handful of supervisors responsible for the activities of up

to fifty men, the shift boss delegated some of his responsibility to the men doing the work. When asked during a coroner's inquest whether "every man is his own boss in regard to timbering and protecting the mine," McQuire responded, "Yes, every man is supposed to timber up if he thinks it is necessary."[46] Since it would have been impossible for the shift boss to directly oversee work in various parts of the mine throughout the workday, he accorded a certain amount of responsibility to the miner. Since the miner had more experience than the mucker, the shift boss assigned him to oversee his partner's safety.

The miner's primary duty extended to safeguarding the well-being of the mucker shovelling alongside of him by examining the ground and picking down loose ground before permitting the mucker to work. Unfortunately, many a mucker lost his life to a fellow miner's faulty judgement. Situated at the bottom of the occupational hierarchy, the mucker had no alternative but to follow instructions from his working partner or face possible termination for not producing.[47]

Claude T. Rice writing for the Engineering & Mining Journal in 1909, described the following chain of events as representative of western mines that he worked in. The sometimes catastrophic cycle began with the mine superintendent giving an order to his foreman for a specific amount of ore per day. The foreman called together his crew of shift bosses, repeating the demand from the top, and the shift bosses made their daily rounds calling for more rock. The miners, not wanting to disappoint a man who identified himself as one of them, piled up the rock, sometimes neglecting to spend the extra time to timber and make the work place safe. During two and one-half years working in the West, Rice recalled only two occasions when a miner

was "called down" for failure to pick down some loose rock.[48]

Other questionable management practices were the result of rivalries between shift bosses over the amount of ore hoisted. In his 1900 report, Deputy Inspector Hunter noted the "disregard for prudent practices" that this kind of competition produced.[49] Testifying before a congressional commission investigating working conditions in Butte in 1914, Deputy Inspector Orem blamed rivalry among shift bosses for ventilation problems caused when overanxious bosses raised waste stored in chutes to the surface in an effort to outdo one another.[50]

Most rules were broken without consequence, but sometimes a miner's disregard for safety or fear of reprimand proved fatal. Working on the 1,200-foot level of the St. Lawrence Mine, Abraham Ninan, an experienced miner of twelve years, had repeatedly warned a mucker named Harrington not to do any shovelling under a suspicious slab of rock. The young immigrant disregarded his partner's warnings and was crushed by an avalanche of earth while shovelling ore into a car. Perhaps, as Inspector Hunter suggested, Harrington felt more threatened by the possibility of being fired for not working hard enough than by the danger pointed out by a fellow miner. "Harrington was recently from the 'old country,'" Inspector Hunter remarked, "and he was afraid he would be discharged if he did not do a certain amount of work." Muckers often found themselves in the compromising predicament of defying the judgment of fellow miners in an effort to protect their sometimes tentative relationship with the shift boss. Peter Shea, the shift boss on duty at the St. Lawrence the day Harrington died, told a coroner's jury that a mucker would never be penalized for failing to move a specific amount of dirt. But in 1906, the Montana Deputy Mine

Inspector, William Orem, corroborated Hunter's observations, by reporting instances of foremen reprimanding miners for wasting time in taking extra precautions in timbering.[51]

Discipline in the mines was inconsistently applied and was sometimes ineffective. John C. Smith, a shift boss at the Speculator Mine, warned his men about covering chutes when not using them, and he had, in fact, discharged a man after warning him once about his reckless work habits. Feeling sorry for the miner, Smith reinstated the man the following night. That same night, the careless miner was knocked down a chute four floors to his death after ignoring warnings from his fellow miners about standing under some bad ground. As this incident demonstrated, discipline did not necessarily alter dangerous work habits or create a safer working environment.[52]

First in 1897 and again in 1906, the state mine inspector made reference to a lack of discipline among supervisors in enforcement of safety regulations. In the over two hundred inquiries into accidental deaths examined only two instances of disciplinary action for disobeying safety procedures appear, substantiating claims made by the state mine inspector about lax discipline. With some mine operators, the state mine inspector linked management indifference to enforcement of safety regulations to a traditional corporate maxim that shifted responsibility from owner to worker: "The men should know enough to take care of themselves." The state mine inspector refused to accept this point of view, responding that the superintendent's duty to his workers' safety did not cease once he provided the tools and instruction for a safe operation.[53] According to the conclusions of a U.S. Bureau of Mines investigation of responsibilities for

Butte mining accidents, each operator ought to employ a competent supervisor for every twenty to thirty workers, and that supervisor ought to inspect each work place three to four times daily in order to decrease accidents. In Butte, shift bosses typically supervised from forty to fifty men, visiting some work stations as infrequently as once every two days.[54] Besides the shortage of supervisory staff and the occasional indifference of the management to the safety of their employees, there was another problem with supervision: the miners' abhorrence of supervision, which derived principally from a system of contract mining adapted from Cornish traditions.

Miners from Cornwall carried to Michigan and Butte their metal mining techniques, a pride in their skilled occupation, and a spirit of independence. Rather than working for daily wages, most Cornish copper and tin miners labored under contract, either performing tutwork, a contract negotiated between the shaftmen and mine owners for developing a mine; or a tribute, an arrangement by which the miner paid all expenses required to get the ore of the ground and to the surface, for a share of the profit. In both cases, the miner negotiated the price to be paid per foot of shaft developed or amount per ton for extracted ore; both arrangements demanded a keen judgement and consummate skill on the part of the miner, for an inaccurate estimate could cause his family to go hungry. Working under this type of worker/management relationship over the centuries, the Cornish miner evolved into a independent worker, unaccustomed to taking orders or advice from anyone.[55]

By 1900, contract miners made up the majority of shaftmen and miners in the Butte underground, creating a significant segment of the work

force that labored independent of regular supervision. The Butte miners adopted certain aspects of the Cornish contract system. The miner negotiated with the foreman for a specific pay rate for each ton of ore removed, or for foot of shaft or drift advanced, to be measured by the foreman weekly. The miners' union guaranteed the contract miner the minimum daily pay rate regardless of his advance.[56] Thus, a contract miner received additional compensation for increased productivity, although the foreman continually adjusted the rate to hold down company labor costs.

The contract system had a significant impact on the enforcement of safety regulations and the relationship between worker and management. Jerry Sullivan, an experienced contract miner of over ten years, died in the Bell & Diamond Mine when the lagging he had set his machine drill on gave way, dropping the driller and his machine to the floor below. Shift boss Patrick F. Connell testified that the accident could have been prevented had Sullivan used the common system of lagging. Although the shift boss admitted that he had not noticed this irregularity in making his rounds, pointing to a problem with oversight of employees and perhaps a shortage of supervisors, local deference to the miner would have silenced any acknowledgement of the miner's error had he noticed. According to Connell, bosses remained reluctant to tell an experienced miner about safety out of respect for the miner's judgment and independence.[57] In this case, the deceased even disregarded warnings from his partner and proceeded to work under unsafe circumstances.

Shift bosses throughout the district virtually ignored the methods by which contract miners performed their prescribed tasks. After two young Swedish miners died in a blasting accident in the Rarus Mine in 1905, the

shift boss Dennis Hines explained his lack of scrutiny in this way: "We do not pay much attention to those contractors. We see that they live up to the contract, and put in timber, and run the drift according to contract, but that is all." As long as the contract miner completed a specified amount of work, the management generally ignored the manner in which the work was performed.[58]

At coroners' inquests, the miners repeatedly voiced their approval of this minimal system of supervision. A contract miner named Isaac Pakkala testified during the inquest into the death of his partner at the Leonard Mine that the shift boss had not visited their stope for five nights and that they did not expect a boss to oversee the safety of their work.[59] Sometimes the contract miner pushed himself and partners harder than expectations set by management. Driven on by the incentive of the bonus paid for increased productivity, the contract miner occasionally took chances that resulted in disaster. Such was the case with Antone Barnabo, a contract miner who worked at the Pennsylvania Mine. Anxious to break as much ground as possible, Barnabo and his partner loaded each of nine holes, still hot from earlier blasting, with eight times more powder than necessary to do the job. This mistake in judgement cost Barnabo his life.[60]

While a certain amount of carelessness emerged out of the allure of a bigger paycheck, the miner also encountered increased pressure from corporate mine owners, through their subordinates, to increase production in order to meet growing production demands for copper and the competition from Arizona and abroad. Unseen but distinct connections linked the underground miner in Butte to the world copper market, influencing the dynamic between worker and the work place. In the emerging new

enterprises of communications and electrical power generation, copper assumed primary significance beginning in the 1880s. Each year between 1897 and 1919, the world consumption of copper increased 139 percent, while American use of the red metal increased at an annual rate of 218 percent. The manufacture of electric generators in the United States increased at a phenomenal rate of 730 percent each year between 1899 and 1909.[61] During the early part of the twentieth century the world demand for copper superseded all previous expectations.

Butte mine owners responded to this insatiable demand by expanding operations and the size of the work force. The number of underground miners working in Butte leaped from approximately 2,000 in 1883 to 14,500 in 1916. During the same period, the amount of ore extracted grew from over 24 million pounds to an astronomic 352 million pounds, and the price of American copper jumped from 16.5¢ a pound to 33¢ a pound in 1916. The corporate balance sheets showed enormous profits as new mining and smelting technologies steadily whittled away at production costs. What the ACM ledgers did not reveal were the mounting deaths and debilitating injuries attributed to expanded production: only twelve men died underground in Butte in 1887 compared to a total of sixty-five fatalities in the banner year of 1916. During those same years the fatal accident rate in Butte jumped from 3.6 to 4.5 deaths per thousand workers. [See Table 2 at end of chapter.]

War in Europe also stepped-up demands on the Butte miner. Beginning in August of 1914, the war initially halted the flow of copper to European consumers, causing massive layoffs in the Butte mines and a general disruption of working patterns in place after the last slump in

copper production caused by the Panic of 1907.[62] Strife within organized labor, marked by the destruction of the Miners' Union Hall in June of 1914, increased tension between workers and management in the streets of Butte and distrust among workers below ground. By early 1915, the escalated war in Europe generated enormous demand for American metals, and Butte producers responded, hiring thousands of miners, many of whom lacked the experience necessary to create a safe working environment.[63] The cry for copper, zinc, and manganese opened new mine shafts as well as old works that had been abandoned, and pleas from organized labor for safer working conditions fell on deaf ears. Between 1916 and 1917, zinc production more than doubled in Butte, increasing from twenty million to over fifty million pounds. Prosperity brought with it unlimited opportunities for work, but often under circumstances tainted by the pressure to produce without regard for safety.[64]

The United States's entry into the war in the spring of 1917 again inflated the demand for Butte metals and marked another episode of intensified labor struggle, creating intensified mistrust in Butte's underground world.[65] While 1917 brought healthy profits to corporate mine owners, it remained a year filled with tragic memories for Butte miners. In June 1917 a fire in the Granite Mountain shaft of the Speculator Mine ignited a series of strikes and company reprisals that plagued Butte mining for the next four years.

Between 1917 and 1920 working conditions did not improve. Worker safety took a back seat to the persistent wrangling between labor and management and to the economic crisis created in the copper industry by peace and a sagging market caused by bulging surpluses. Between 1916 and

1920, 410 Butte miners died underground, accounting for over 37 percent of all mine fatalities that occurred in Butte over the four decade period beginning in 1880.[66] The boom and bust cycle brought on by war in Europe clearly had a devastating impact on the Butte miner. By 1920 the world price of copper fell from its 1916 high of 33¢ a pound to a low of 17¢ a pound, putting some 10,000 copper miners out of work. While production dropped sharply in 1920, the fatal accident rate climbed to 4.4 deaths per thousand workers. Unsafe work practices that preceded the frenzied war years persisted into the 1920s, as did the bitter strikes and growing economic insecurity, creating an ideal climate for accident and injury. [See Table 2 at the end of chapter.]

During the war years, while the price of copper made steady gains, competition within the industry increased, threatening Anaconda's supremacy over other American producers. Arizona and Utah copper producers, exploiting low-grade porphyry orebodies, using open-pit mining techniques, and implementing a more efficient concentration process, mounted a viable challenge to Butte. In Bingham Canyon, Utah, Daniel Jackling introduced American copper producers to the cost-effective advantages of open-pit mining. The technique required fewer workers and eliminated many of the hazards associated with underground mining. To remain competitive during the 1920s, ACM employed open-pit techniques in their newly developed operations in Cananea, Mexico, and Potrerillos and Chuquicamata, Chile.[67]

After 1920, Butte never again dominated the Anaconda Company portfolio, but even as the number of men working underground in Butte declined between 1921 and 1931, the fatality rate remained high.[68] While

certain aspects of the mining process became safer over time, due in part to new methods for blasting, hoisting and lighting, those very same technological solutions introduced hazards to the underground unimagined by their inventors. Innovative technology continued to haunt both miner and management well into the twentieth century. While early twentieth century corporate mine operators willingly made large capital investments in new mining technologies for which they recognized enormous profits, they remained indifferent to the ever-growing human costs associated with industrial accidents and occupational diseases.

Table 1: Causes of Butte Mine Fatalities

(Percentage caused by)

Year	Fall of Ground	Explosion	Cage	Electrocution	Fall(shaft, chute)	Struck	Suffocation	Total number
1887	50	8	33	0	8	0	0	12
1896	17	35	37	0	7	4	0	23
1900	20	40	16	0	12	0	12	25
1905	25	28	18	0	18	10	2	40
1907	32	9	12	2	29	15	0	31
1916	26	1	5	5	11	20	32	65

Note: These years represent pivotal years for either dramatic increases or decreases in production levels. The year 1920 does not appear because detailed information on fatalities is not available for the last half of that year.

Table 2: Correlation between price, productivity, number of workers, and the fatality rate for Butte, Montana

Year	World Price	Amt. Copper Produced	No. Underground Workers	Fatality Rate
1883	16.5 c/lb.	24,664,640 lbs.	2,000	4.0/thousand workers
1887	13.8 c/lb.	78,697,920 lbs.	3,390	3.6/thousand workers
1896	10.9 c/lb.	228,958,614 lbs.	7,000	8.3/thousand workers
1899	17.7 c/lb.	237,953,951 lbs.	8,679	2.8/thousand workers
1907	20.0 c/lb.	226,290,873 lbs.	10,000	3.4/thousand workers
1909	13.5 c/lb.	314,858,291 lbs.	8,537	5.3/thousand workers
1916	33.0 c/lb.	352,893,273 lbs.	14,500	4.5/thousand workers
1920	17.0 c/lb.	177,743,747 lbs.	7,000	4.4/thousand workers

Note: Figures derived from the Copper Handbook (1905, 1918) and Montana Mine Inspector Reports: 1889-1912.

ENDNOTES

1. Frederick L. Hoffman, "Industrial Accident Statistics," Bureau of Labor Statistics Bulletin 157, Industrial Accident & Hygiene Series No. 5 (Washington: GPO, 1915), 6.

2. Wyman, Hard-Rock Epic, 3-31. Wyman cites advantages afforded miner with new technologies. "Commons Commission Report" testimony of John Gillie gives examples of improved conditions due to new lighting and ventilation on the Butte hill.

3. Wyman, Hard-Rock Epic, 84-118.

4. Larry D. Lankton & Charles K. Hyde, Old Reliable: An Illustrated History of the Quincy Mining Company (Hancock: Quincy Mine Hoist Association, 1982), 59. Engineering & Mining Journal 60(28 December 1895): 21. The latter journal makes reference to the type of drills used in Butte.

5. U.S. Department of Labor, Bureau of Labor Statistics Bulletin 231 (Washington: GPO, 1918), 367.

6. First Biennial Report of Montana Department of Labor & Industry, 1913-1914, (Helena: Independent Publishing Co., 1915), 282.

7. Isaac F. Marcosson, Anaconda (New York: Dodd, Mead & Co., 1957), 150-151.

8. Ray Lilley, interview with author, Butte, Montana, 20 December 1985. Lilley corroborated statements by other informants concerning worker reluctance to use water in drilling because of discomfort it created in the work place.

9. Claude T. Rice, "Recent Advances in Butte Mining Practice," Mining & Engineering World 39 (26 July 1913): 146.

10. Inquest No. 2125, "Andrew Rosette," 19 August 1898, 38-41, Office of Clerk of Court, Butte-Silver Bow County, Butte, Montana, [hereafter repository location will not appear].

11. William B. Daly, et al., "Mining Methods in the Butte District," Transactions of the American Institute of Mining Engineers LXXII (New York: A.I.M.E., 1926): 262-63.

12. G.S. Rice & R. R. Sayers, "Review of Safety & Health Conditions in the Mines of Butte," U.S. Bureau of Mines Bulletin 257 (Washington: GPO, 1925), 5-8.

13. "Commons Commission Report," 3951-3955.

14. Malone, Battle for Butte, 34-56.

15. Martin and Shovers, "Butte Architecture," 31-34.

16. Albert H. Fay, "Mine Accidents," Engineering & Mining Journal 108 (1 November 1919): 728.

17. Herbert G. Gutman, Work, Culture, and Society in Industrializing America (New York: Vintage Books, 1977), 15; 47; 263; 272.

18. Hoffman, "Industrial Accident Statistics," 102-103.

19. Inquest No. 8290, " Mahmada Kaki," 11 February 1918, 31.

20. Engineering & Mining Journal 64 (4 September 1897): 273.

21. Inquest No. 8281," Rhinehart Christman," 25 January 1918, 32.

22. Richard Dietrich, "Untersuchungen zum Fruhkapitalismus im Mittel deutschen Erzbergban und Metallhandel," Jahrbuch fur die Geschichte Mittel-und Ostdeutschlands (10 September 1961): 168. I am indebted to Dr. George Waring of Montana College of Mineral Science and Technology, who is currently studying 14th-18th century European mining, for calling my attention to this information on the European apprenticeship system.

23. Martin and Shovers, "Butte Architecture," 31-34.

24. The names of Irish and Cornish shift bosses and foremen appear repeatedly thoughout the over two hundred coroner's inquests examined.

25. Inquest No. 3814, " Nels Wareenpaa, et al.," 12 May 1905, 42-44.

26. Martin and Shovers, "Butte Architecture," 37-44.

27. Wyman, Hard-Rock Epic, 109. The changing nature of the work routine and environment is evident in nearly every inquest examined.

28. Dick Matthew, interview with author, Butte, Montana, 24 January 1986. (Hereafter cited as Dick Matthew, interview.)

29. A.W. Rogers, "Migration of Miners and Accidents on the Rand," Engineering & Mining Journal 93 (8 June 1912): 1141.

30. Inquest No. 8152, " George Evans," 10 April 1917, 10.

31. Rice, "Advances in Butte," 147.

32. Walter H. Weed, "Geology & Ore Deposits of the Butte District, Montana U.S. Geological Survey Professional Paper 74 (Washington: GPO, 1912), 50.

33. Inquest No. 1706, " Peter D. Harrington," 1 August 1897.

34. Inquest No. 1662," Allen Anderson," 8 May 1897.

35. Inquest No. 8209, " Novice Kujunzich," 1 August 1917, 30.

36. Inquest No. 8106, "Matt Erkila," 14 February 1917, 21.

37. Montana Mine Inspector Reports, 1889; 1897; and 1915 (Helena: Independent Publishing Co.) Each mine inspector report cites the depth and conditions found in the major Butte mines.

38. Silver Bow County Health Department, "Report on the Investigation of Sanitary Conditions in the Mines, and Conditions Under Which Miners Live in Silver Bow County," 1912, Small Collections 89, Montana Historical Society, Helena, Montana. [hereafter MHS]

39. "Commons Commission Report," 3969.

40. James R. Finley, "Cost of Lake Superior and Montana Copper," Engineering & Mining Journal 85 (25 April 1908): 859.

41. Lankton and Hyde, Old Reliable, 107. Figure regarding the number of feet timber set in Butte mines from Con Kelley's testimony, "Commons Commission Report," 3862.

42. Engineering & Mining Journal 96 (13 September 1913): 514.

43. Claude T. Rice, "Prevention of Accidents in Metal Mines," Engineering & Mining Journal 87 (6 February 1909) : 302.

44. Dick Matthew, interview with author, Butte, Montana, 24 January 1986. According to Matthew, in the 1930s a shift boss made $65 a week. A miner's weekly paycheck ranged from $45 to $90 a week--the latter figure earned by some contract miners. According to the October 6, 1917, Engineering & Mining Journal, the following wages prevailed based on copper at 19 cents per pound: underground miners, $4.50 per day; blacksmiths, machinists, electricians, $5.25; hoist engineers, $5.75; and shift bosses, $6.00.

45. The residence of shift bosses is ascertained from names drawn from the over two hundred inquests examined and cross-referenced through the R.L. Polk, Butte City Directories.

46. Inquest No. 1613, " Frank Upton," 9 January 1897.

47. Inquest No. 1706, "Peter Harrington," 1 August 1897. In the course of this inquest Peter Shea, the shift boss, established the heirarchical relationship between the miner and mucker.

48. Rice, "Prevention of Accidents," 302.

49. Annual Report of the Inspector of Mines of the State of Montana, 1900 (Helena: Independent Publishing Co., 1901), 14.

50. "Commons Commission Report," 3978.

51. Inquest No. 1706, "Peter Harrington," 1 August 1897. Biennial Report of the Inspector of Mines of the State of Montana, 1905-06 (Helena: Independent Publishing Co., 1906), 28.

52. Inquest No. 3998, "Fred Axtell," 27 October 1906, 24.

53. Mine Inspector Report, 1900, 13.

54. Daniel Harrington, "Some Phases of the Relative Responsibility of Management and Workers for Accidents in Mines, U.S. Bureau of Mines Report of Investigation 2993 (Washington: GPO, 1930), 2.

55. A.K. Hamilton Jenkin, The Cornish Miner (London: George Allen & Unwin Ltd., 1948), 204; and Arthur Cecil Todd, The Cornish Miner in America (Truro, Cornwall: D. Bradford Barton Ltd., 1967), 23.

56. Dick Matthew, interview with author, Butte, Montana, 24 January 1986; Henry Hull, interview with author, Butte, Montana, 22 December 1985; Ed Shea, interview with author, Butte, Montana, 23 January 1986. Details about the contract system were acquired from these interviews. The absence of Anaconda Company employment and personnel records prohibits more specific documentation of the numbers of Butte miners working under the contract system.

57. Inquest No. 2998, "Jerry Sullivan," 11 April 1901, 10.

58. Inquest No. 3866, " Frank Ellisson & Oscar Matti," 6 October 1905, 3.

59. Inquest No. 7362, " Kalle Jantunen," 1 January 1912, 18-19.

60. Inquest No. 3779, " Antone Barnabo," 11 January 1905, 32-33.

61. Engineering & Mining Journal 96 (6 December 1913): 1062-63.

62. Department of Labor & Industry Report, 1913-14, 308-09.

63. Emmons, "Irish Miners of Butte," 59-61.

64. Marcosson, Anaconda, 156.

65. For a discussion of Butte during World War I see Michael Malone and Richard Roeder, Montana: A History of Two Centuries (Seattle: University of Washington Press, 1976), 209-215.

66. Data on underground fatalities derived from Mine Inspector Reports, 1916-1920.

67. Thomas Navin, Copper Mining and Management (Tucson: University of Arizona Press, 1978), 29-32; 210-215.

68. U.S. Bureau of Mines Bulletin 264 (Washington, D.C.: Government Printing Office, 1926); U.S. Bureau of Mines Bulletin 310 Washington, D.C.: Government Printing Office, 1929); U.S. Bureau of Mines Bulletin 374 (Washington, D.C.: Government Printing Office, 1933). These fatality figures are for copper mines in Montana. There are no specific figures for Butte fatalities.

Chapter 4

THE HIGH COST OF MINING: UNDERGROUND FATALITIES AND OCCUPATIONAL HEALTH HAZARDS

Between1880 and1920, more than two thousand miners lost their lives to accidents and occupational disease working underground in Butte. From1880 until at least 1915, mining industrialists viewed workers as an expendable commodity and regarded mine-related accidents, occupationally-induced diseases, and disabilities as necessary costs of doing business. While this attitude prevailed among many American industrialists during the Gilded Age, it did not go unchallenged by workers and their Progressive-era sympathizers in the press and politics. Social commentators of the time, like Gilbert Roe, decried corporate disregard for the workers' welfare and advocated legislative action to protect the worker. "These times are dark ages when the human machine is driven to the limit without lubrication or repair or simply 'scrapped' when disease, often the direct result of the occupation, robbed it of further usefulness," Roe declared.[1] During Butte's rapid growth as copper producer, mine operators followed the lead of other American industrialists, sidestepping responsibility for the growing number of work-related accidents and ignoring both the evidence for the relationship between respiratory disease and dry drilling and readily available solutions to this devastating occupational disease. By 1915, however, public outcry over the enormous loss of human life coupled with a challenge to corporate immunity in the courts led to a series of laws to

compensate the miner and his family for injuries sustained on the job and to demand a more responsible corporate attitude toward worker safety and well-being.

Before 1915 mine managers avoided accepting responsibility for the fate of their employees by shifting the blame for accidents and occupational diseases to the miner, accusing him of carelessness and a disregard for prudent mining practices. The coroner's juries--convened to investigate mine fatalities--and the courts invariably sided with management on the liability issue. Legal precedence and the economic vulnerability of the nineteenth-century hardrock miner combined to support the corporations' position of innocence in regard to mine-related fatalities and to silence worker resistance to charges of carelessness. Miners who witnessed the accident and testified in a coroner's inquest along with their immediate supervisors consistently adhered to the company line, blaming the dead miner for carelessness in all but a handful of inquests. A coroner's jury, appointed by the county coroner, questioned witnesses to the accident and management personnel, in an effort to determine the cause of the fatal accident and the party at fault. The state mine inspector, the public watchdog assigned to investigate all mine fatalities and to answer questions posed by the coroner's jury, also acted out of deference to corporate interests and common law interpretations, finding the miner guilty of inattentiveness and disregard for established practices in at least one-half of the accidents reported. Protected in the courtroom by workers' fear of reprisal, the mine operators efffectively shifted responsibility for occupational injuries and death onto the miner and his alleged "carelessness."

Without a doubt, worker carelessness among both veterans and inexperienced miners led to some fatal mine accidents. When working underground, a brief instant of inattention or disregard for safe working procedures could be fatal, and long hours and trying physical circumstances taxed the wariness of even the most diligent miner. Safe and prudent practice required miners to cover all ore chutes not in use, but miners occasionally ignored such precautions to save time, resulting in unnecessary accidents. For instance, after eating his dinner, miner Sam Adamovitch walked into an unprotected chute in the Pittsmont Mine and fell eighty feet to his death. The deceased miner's partner, Mark Simonich, testified that both miners were fully aware of the 20 x 14-inch unprotected hole, but they ignored the danger of an open chute. Had these men taken the time to set down the 2 x 12-inch lagging as instructed, this unnecessary accident probably could have been prevented.[2]

Ignoring safety regulations when riding the cage to and from the surface occasionally resulted in tragedy. Philip Harrington hurriedly left the 1,600-foot level of the Pilot Butte Mine to retrieve some blasting powder stored on the 900-foot level. In his rush to complete this task, Harrington jumped off the deck four feet before reaching the level platform, trapping himself between the deck and the wall plate. Had the miner observed the districtwide regulation requiring the closure of the cage safety gate, this accident would not have occurred. Travelling at an average speed of 800 feet per minute, the cage constituted a serious hazard to the unwary, particularly to the man who ignored safe operating procedures.

Similarly, the nipper, the person assigned to bring dull drill steel to

the surface for sharpening, assumed responsiblity for securing any loose tools before ascending. The company provided the nipper with a steel box covered by a bar and fastened to the cage for safe transportation of tools to the surface. Nipper Thomas Houston, working in the Gray Rock Mine, ignored the practice of securing tools before hoisting. He lost his life when a loose drill steel caught in the cage guide, knocking him off the top deck. Examination of the cage after the accident indicated that the safety gate had never been closed.[3]

Carelessness killed and injured both the experienced man and the "greenhorn"; in fact, the veteran occasionally took chances that an inexperienced man cautiously avoided. For reasons unknown, Thomas Rutter, a ten-year veteran of the underground, crawled into the bottom of a chute in an attempt to pry loose some dirt rather than working the obstacle loose from the top. The dirt came loose, burying and suffocating the imprudent miner. William Clyme, the deceased miner's partner, testified at the coroner's inquest that this sort of indiscretion was not infrequent: "Men sometimes risk a good deal without thinking of the danger attached to it."[4]

Some experienced miners fell victim to "battle fatigue" after frequent confrontations with danger and developed an insensitivity to the perils of their work environment. Pete Novakovich worked for fifteen years underground in Butte before falling prey to a moment of inattention while working at the Pittsmont Mine one winter evening in 1916. Novakovich and his partner Johnson noticed a dangerously loose hanging wall where they drilled on the 1,200-foot level, and by the time Johnson returned with some stulls to shore up the wall, Novakovich lay crushed by several tons of rock,

pick in hand. According to Johnson, a bar, not a pick, was the proper tool to use when picking down loose rock on a hanging wall. With a bar, the deceased could have accomplished his task from a safe distance, but he apparently decided on the pick as a matter of convenience, ignoring prudent practices.[5]

Accidental falls and falling ground accounted for the largest percentage of mine fatalities in Butte and other western mining districts, oftentimes caused by worker inattentiveness to hazards. Routine tasks often inspired carelessness, particularly among the seasoned veterans. For thirty years, English-born Frank Upton worked as a miner, first in Nevada and then in Butte. Upton fell forty-five feet down a manway after being knocked off the two-inch lagging he stood on by a falling rock. With his years of experience underground, Upton ought have known better than to stand over an open manway while prying down some loose ground overhead. Perhaps the cold and dizziness that had bothered the deceased for several weeks prior to the accident clouded his judgement in January 1897 at the High Ore Mine. When asked by the shift boss Duggan if he would not like to lay off until he felt better, Upton replied that he "would wear it out" and that he did not need anyone to give him orders. In the inquest that followed Upton's death, the jury questioned his partner Fitzgerald regarding the work habits of experienced men and those of the deceased in particular. Fitzgerald testified that his partner generally took more chances than a "greenhorn" and that a good number of the fatal accidents that occurred in the High Ore Mine could be attributed to the careless actions of veterans.[6] Hundreds of Butte miners, veterans and new recruits alike, appeared as statistics along

with Frank Upton. In the instances cited worker carelessness contributed to these fatal accidents, but there is evidence that operator negligence also created dangers that led to accidents.

Butte mine managers followed the precedent set in other American industries: blame the worker for job-related injuries. A study conducted in a Lawrence, Massachusetts mill in 1905 attributed 93 percent of the accidents there to worker carelessness, and the courts' rulings in personal injury cases consistently upheld this contention in the West.[7] The common law dictum of "assumed risk," which stated that employees relinquished any legal right to compensation for job-related injuries when they enlisted to work in a dangerous occupation like mining; "contributory negligence" --any negligence on the part of the worker relieves the owner from liability--and "the fellow servant" doctrine-- the owner is not responsible for injury of one employee caused by the carelessness of another--shielded mining companies from the personal injury claims filed by the families of miners killed on the job. The miner was guilty of contributory negligence "if he did not use the safest means, time and methods of accomplishing the work."[8] Given these legal barriers, it is not surprising that even prudent miners seldom looked to the courts for compensation concerning company negligence and complicity in fatal accidents and, instead, placed their hope for recompense in the collective action of organized labor.

While a few miners came forth with testimony indicting the company, their pleas for just compensation and prosecution of the guilty parties fell on deaf ears. Roy Rose, the partner of a timberman who died falling down a twisted ladder the the Speculator Mine, accused the North

Butte Mining Company of blatant disregard for its workers in his testimony before a coroner's jury. Several times during the week prior to the fatal accident, Rose and his partner, a single Irishman named Nicholls, had warned the shift boss about the hazardous condition of the ladder in the manway they used for hoisting timbers. The timberman's work required the use of this faulty ladder, but the company did nothing to improve conditions in the manway. The shift boss, William McGuire, attributed the accident to the unavoidable circumstances caused by copper water dripping on the ladder, denying any previous knowledge of damaged ladder rungs. In this case, as in all but one of the over two hundred cases, the coroner's jury judged the miner guilty of carelessness, absolving mine management of all responsibility for employee safety. Roy Rose quit the Speculator Mine soon after testifying against the company, but the men who remained had to adapt to the company's obvious disregard for employee welfare. The week following Nicholls's fatal fall, another miner sustained injuries working in the same manway.[9]

Although the mining companies remained virtually immune from liability for work-related accidents, it became more difficult to ignore the rising costs associated with mine accidents. In 1918, ACM calculated the loss of 21,325 shifts during the course of one year due to personal injuries on the job. That amount of lost work time resulted in the production of two million fewer pounds of copper which translated into over $120,000 in lost profits. Taken together, the time lost to accidents was equivalent to closing the largest Anaconda Company mine for an entire month, which in turn affected the total amount of money injected into the local economy, hurting miners,

merchants, and corporate investors alike.[10] Recognition of these financial losses however, did little to reverse lax supervisory habits that had developed over the years.

Expedience rather than safety often dictated decisions concerning mine development and safety management. Mine engineers often layed out the drifts with little consideration of potential hazards, such as protruding electric trolley lines. A young ore car tender named Moran pushed an empty ore train into a four-foot wide drift at the 2,000-foot level of the Speculator when the carbide lamp on top of his cap struck the wire at the top of the drift, electrocuting him. Only five feet separated the track from the live electric wire carrying 500 volts, which required that the swamper stoop when he walked directly underneath the wire. The mining companies in Butte normally installed side boards to protect the miner from electrocution, but in this case, one side board was missing. Had the mine engineer been considering the safety of the men working underground, he would have provided for a wider and taller drift in order to prevent similar accidents. In this case, the coroner's jury found the young immigrant miner guilty of carelessness, relieving the company of all responsibility for improving conditions and eliminating hazards.[11]

Even in the rare case of the coroner's jury pointing a finger at the company for negligence, nothing occurred in the way of a reprimand of the guilty party. A miner named Earl Clayton died in the Speculator from asphyxiation after entering a stope where the air remained gaseous due to blasting. In this case, the jury found the shift boss negligent for his failure to ascertain whether the previous crew had turned on the air compressor to

make the work area safe after blasting. According to witnesses, the shift boss, Charles Erb, failed to investigate the air compressor line after being informed of its breakdown, but his omission apparently went unpunished by his superiors.[12]

The death of Earl Clayton was neither the first nor the last fatal mine accident that occurred at the Speculator Mine because of lax supervision and inattention to prudent mining practices. On the evening of June 8th, 1917, ten men worked to lower 1,200 feet of lead-armored electrical cable down the Granite Mountain shaft of the Speculator. The cable finally reached its destination at the 2,600-foot level, but not before some armor tore off, leaving oily insulation exposed underneath the lead armor. After putting in an eighteen-hour shift, the men reported the incident to the assistant foreman and headed home, completely unaware of the impending tragedy. The carbide light of a shift boss who inspected the damaged cable ignited the oily insulation at approximately 11:30 p.m. Within fifteen minutes, the fire roared down the shaft, trapping hundreds of men. The deadly smoke and gases rapidly spread into the adjacent Speculator shaft and the connected workings of the Diamond and the Badger State Mines. One hundred and sixty-four miners suffocated in the Speculator fire, a tragedy that could have been averted through greater vigilance by management.

On the morning of June 9th, newspaper headlines bewailed the enormous loss of life and heralded the courage of mine rescuers and survivors. Overwhelmed by grief, neither observers nor commentators tackled the more difficult task of investigating the causes of the disaster. An inquiry conducted by the U.S. Bureau of Mines some four years later pointed

to a multiplicity of problems. While the study's author, Daniel Harrington, acknowledged the skill and efficiency of mine rescue crews, he also pointed out the inadequacy of the four signal systems which all failed within fifteen minutes of the fire's ignition. It appeared that although the men lowering the cable had taken proper precautions, the supervisor who allowed them to work for eighteen hours (ten hours beyond a standard shift) demonstrated poor judgement. While the federal government-authorized investigation revealed the need for concrete-lined shafts, a fire-proof signal system, and a better means of regulating air flow between connecting mines, it totally ignored the overriding problem of supervision and attention to proper procedures.[13]

A disaster the magnitude of the Speculator fire particularly wrenched the Butte community, but less dramatic accidents occurred regularly without fanfare. In 1916 ACM reported the injury of over 2,300 men. That same year, thirty-seven men suffered permanent disabilities such as the loss of an eye, finger, arm, or leg. With the passage of Workmen's Compensation in 1915, the amount of compensation paid by the state varied with the injury: loss of a thumb paid $150 and loss of an eye paid $2,750, equivalent to less than two year's wages.[14] Prior to the advent of state compensation, the permanently disabled miner and his family faced a grim future; if he was fortunate or well-connected or loyal, the company might offer him a position as watchman or timekeeper. With the passage of Workmen's Compensation, a disabled miner might be retrained as a bookkeeper or clerk. The availablity of those positions, however, varied and a clerk's salary amounted to only about one-half of that paid to a miner. As

graphic evidence of the frequency and extent of permanently disabling injuries an ad for the Albert Boettcher Artificial Limb Manufacturer appeared in the 1916 Butte City Directory. Amputees on the streets of Butte provided the city's citizens a vivid reminder of mining's dangers, but victims of the most serious occupational hazard, silica dust, remained invisible.[15]

A respiratory epidemic of major proportions afflicted Butte miners, without regard for their experience or the care with which they performed their work. Over 40 percent of the 1,000 miners examined in 1914 had impaired health due to a variety of respiratory diseases: silicosis, tuberculosis, or a condition known as "miners' consumption." While mine fires and powder explosions captured the local headlines, the miner faced a much more severe and subtle danger in the silica dust that filled the air underground and their lungs. Between 1907 and 1913 only 279 men died from mine-related accidents while 675 miners succumbed to some form of lung disease.[16] The causes of and cures for miners' consumption had long been known and studied in other mining districts, but the problem grew to disastrous proportions in Butte before the legislature enacted regulations to contain the disease.

According to Butte surgeon Dr. Edward McGinn, miners' consumption was caused by a scarification of the lungs, which reduced a man's resistance and vitality, leaving him susceptible to tuberculosis.[17] In other words, the silica dust generated by drilling, blasting, and loading the ore not only clogged the miners' lungs, but it also damaged their lung tissue, creating a fertile environment for pneumonia and tuberculosis. Long before the Butte surgeon's observations-- as early as 1850-- the English noted problems with

mine dust and silicosis. Thirty years before the widespread American use of the machine drill, over half the miners in Cornwall succumbed to silicosis and by 1887, the English Sanitary Congress publicly recognized the problem.[18] A study conducted on Australian miners using the machine drill in the Bendigo district between 1875 and 1906 cited an alarming increase in lung-related fatalities, an increase from 77 per 10,000 inhabitants to 191 per 10,000 inhabitants.[19] Respiratory diseases also plagued the gold miners of South Africa and, as early as 1912, the government enacted a law to compensate white miners disabled by occupational diseases such as miners' consumption and silicosis. Interestingly enough, miners and mine owners shared the cost of the program.[20] Butte mine owners' response to the dangers of mine dust lagged far behind their peers in Europe and Africa.

The earliest government studies of American mines revealed a serious health problem much broader than officials anticipated. The Public Health Service, under the direction of A.J. Lanza, first examined lead miners in Joplin, Missouri, in 1914. An unusually high tuberculin death rate--237.45 per 100,000 for the years 1911 to 1916, or twice the national average--led researchers to Butte after the Joplin study. In occurrence of fatal respiratory disease, Butte ranked above Newark, New Jersey; Gary, Indiana; and all other cities in Montana including the smelter city of Anaconda.[21] Three different studies--the first conducted by the Silver Bow County Health Department in 1912 and the last two performed by federal investigators--focused on the Butte miner and his predisposition to respiratory disease. All three concurred: conditions underground coupled

with unsanitary living conditions above ground had created an epidemic of pulmonary fatalities among miners between the ages of thirty and sixty.[22] Significantly, the miner had no control over the conditions that precipitated this unforseen hazard in the Butte mines, and for years management refused to acknowledge the source of the problem.

A debate ensued among doctors, company officials, and union men over the source of the debilitating respiratory diseases. Mine managers seemed anxious to point to the overcrowded boarding houses and the unsanitary "foreign element" who occupied them. The majority of the doctors stood behind ACM in this regard, linking disease with the squalor found in working-class neighborhoods. According to the medical practitioners who were led by Dr. T.D. Tuttle of the State Tuberculosis Hospital at Deer Lodge, the miner contracted tuberculosis because of excessive drinking and the unsanitary condition of his home environment. But relevant statistics challenged these conclusions. Between1907 and 1913 housewives, living in the working-class neighborhoods hardest hit by tuberculosis, accounted for only four percent of the fatalities, indicating that circumstances beyond the home environment lay at the root of the tuberculosis epicemic.[23] Miners, not store clerks, contracted the dread disease; its origins were occupational rather than domestic.

The Silver Bow County Health Department study plotted the 526 tuberculin deaths that occurred between 1908 and 1912 on a city map which showed that 71 percent of these deaths occurred in an area outlined by a Maltese cross, coincidentally a neighborhood populated principally by Irish miners and their families. The Irish miner bore the burden of this

occupational disease, incurring over 50 percent of the deaths as compared to only 2 percent for the Italian community and 8 percent for those of Finnish descent. This graphic illustration of the disease's origins led county health inspectors to a more careful examination of underground conditions. The inspectors monitored air and water at each working level of ten different mines, and they concluded that tuberculin germs existed in greatest numbers in the mine tunnels where dry air persisted. Germs prospered in mines, like the Mountain Con Mine, where inadequate ventilation allowed silica dust to remain in the air. The absence of toilet cars and covered metal water containers throughout almost all of the Butte underground provided another conduit for tuberculin germs. The results of the study portrayed the Mountain Con Mine as the most dangerous work environment and, since the Mountain Con had always hired the Irish to the exclusion of other nationalities, the high tuberculin mortality rate among Irish miners bore out the study's conclusion.[24]

Scientific evidence, however, did not daunt ACM efforts to shift the blame to the miners themselves. According to the testimony offered by the Anaconda Company's Con Kelley to a congressional committee on industrial relations convened in Butte in 1914, the miner did not contract the often deadly tuberculosis in the Anaconda mines because the hygienic properties of the sulphuric acid in the mine waters actually destroyed tuberculin germs. Kelley pointed to the miner's way of life as the primary cause of tuberculosis.[25] The health department's graphic depiction of working-class neighborhoods through photographs and description lent some credence to Kelley's indictment of living conditions. Ironically, successful company

lobbying efforts to exclude these neighborhoods and adjacent mineyards from the city limits, depriving miners' families of municipal services such as sewage and garbage removal, contributed to the squalor that Kelley abhorred in his testimony. Clearly, tuberculin microbes multiplied in Centerville and Dublin Gulch where single miners crowded into poorly ventilated rooms without adequate toilet or food preparation facilities. For example, ten people shared one sleeping room and an outside toilet at 1817 S. Dakota, disposing of slops and dishwater through a hole in the floor. Cows and chickens freely wandered the backyards in these neighborhoods; cases of tuberculosis went unreported; and landlords never properly disinfected the rooms contaminated by carriers of the infectious disease.[26] While inadequate sanitation contributed to the spread of tuberculosis in Butte's working-class neighborhoods, the origins of the disease derived from the lung-damaging dust generated beneath the streets of Butte.

Both European and American medical studies conclusively linked respiratory troubles with dry drilling, a practice that persisted in the American West even after 1916. Controlling dust represented the key to arresting the crippling respiratory diseases that ravaged Butte miners even prior to the introduction of the machine drill. In 1890, several years before machines replaced hand drills, sixty-three Butte miners succumbed to respiratory disease, approximately eight times the number who died accidentally underground. Despite the direct connection between dry drilling and lung damage and the availability of alternatives, ACM did not institute a system of wet drilling throughout its mines until 1925.[27] And once that technology became available, some miners refused to work in the

muck and damp created by the machine, switching off the water spray whenever possible.

Researchers identified other means in addition to wet drilling for controlling the spread of debilitating pulmonary ailments. Mining companies in Australia, South Africa, and Great Britain demonstrated reasonable success using a series of physical exams as a prerequisite to hiring in order to determine a miner's predisposition to silicosis or tuberculosis. Studies had shown that a miner with tuberculosis became a prime candidate for silicosis. Outside America, miners received physicals at intervals of six and twelve months. The mining companies treated those with symptoms of tuberculosis for the disease and relieved them of their duties until no longer contagious. The system of pre-employment physicals met unified resistance in American mines from both labor and management. Miners' unions called the plan discriminatory, and mine managers resented a policy that gave an unfair competitive advantage to those who did not participate.[28] With the introduction of a "rustling card" system, a mechanism designed to weed out labor radicals by granting the company extraordinary discretion in hiring, miners raised vehement objections to any additional system that empowered the company to link hiring and firing with an employee's health or political associations. Rejection of this new plan for disease identification and prevention left Butte miners without a means of stopping the spread of disease.

Even without pre-employment screening and wet-drilling, a good number of deaths could have been prevented with proper medical care. County health official Dr. C. H. Horst attributed the spread of tuberculosis

within the mining community to inadequate treatment. Even when early signs of tuberculosis drew the attention of doctors serving the miners, treatment did not follow. In fact, the two hospitals serving injured or sick miners sent all men with contagious diseases home for care. Doctors in Butte never recommended treatment on initial diagnosis but waited until the disease gained enough of a foothold that the afflicted man could be sent to the state tuberculosis sanitarium.[29] The Montana State Tuberculosis Sanitarium, established at Warm Springs in 1912 after years of persistent lobbying from the Butte legislative delegation, provided the best treatment possible with its meager budget, small staff, and large caseload of tubercular Butte miners. The Anaconda Company contributed $25,000 to sanitarium building construction, but it would be 1946 before the company agreed to compensate the victims of occupationally-caused silicosis.[30]

In an effort to halt the rising number of fatalities, the Silver Bow County Health Department came forth with a series of recommendations for change in local working and living conditions as well as care of those afflicted with respiratory diseases. Suggestions included installation and regular inspection of toilet cars and metal-covered drinking containers in all mines; examination of all employees for tuberculosis and dismissal of all those carrying the disease; and enactment of laws to guarantee sanitary living conditions and strict enforcement of rules regarding the reporting of tuberculin cases. The local report, however, ignored the issues of mine dust and proper ventilation, virtually excusing the company from any obligation for the elimination of the most severe occupational hazard.[31] According to a report by Bureau of Mines Inspector Lanza, technological solutions to Butte's

problems with mine dust existed. Lanza pointed to British success with wet drilling and the advances made by American coal mining companies with ventilation.[32] While improved sanitation both above and below ground beginning in 1916 and preventative medical procedures virtually eliminated tuberculosis as an occupational hazard, problems with silicosis prevailed as long as men worked underground in Butte.

Between 1880 and 1920, the cost of producing a ton of copper ore declined while the human costs tallied in extracting that ore soared. Until 1915, the mining companies successfully used the courts, the legislature, and economic intimidation to avoid sharing responsibility for mine fatalities and injuries. The passage of the Montana State Workmen's Compensation Act in 1915 signalled a change in the public attitude toward workers and their corporate employers. As the public became more sympathetic to the plight of industrial workers, corporate mine managers looked toward conciliation rather than confrontation as a means of enhancing their public image and protecting their capital investments from costly work stoppages and personal injury suits. In 1917, after several years of intense labor strife between miners and managers over working conditions and wages, the editor of Anaconda's safety magazine, The Anode, described the changing corporate attitude with an editorial reprimanding mine managers for continually blaming the miner for accidents in the absence of proper supervision. According to the editor, A.S. Richardson, accidents reflected on the mine foreman's knowledge of mining and his skill as an instructor and example to his employees.[33] In 1890, mine managers refused to acknowledge any complicity for diseases or injuries contracted in the work

place. Richardson's remarks signalled change. At the same time, change did not occur without struggle. The origins of legislation to protect the miner at work and his family in the event of an accident came only through the concerted efforts by organized labor. Workmen's Compensation legislation represented a significant step towards greater corporate responsibility for improving underground working conditions, by making the mining company liable for the costs associated with worker compensation.

ENDNOTES

1. Carl Gersuny, Work Hazards and Industrial Conflict (Hanover: University Press of New England, 1981), 20.

2. Inquest No. 8098, " Sam Adamovitch," 31 January 1917, 11 and 12.

3. Inquest No. 8246, "Thomas Houston," 31 October 1917, 13-19.

4. Inquest No. 2174, "Thomas Rutter," 12 November 1898, 12 and 19.

5. Inquest No. 8065, "Pete Novakovich," 2 December 1916, 7-8.

6. Inquest No. 1613, " Frank Upton," 9 January 1897.

7. Gersuny, Work Hazards, 25.

8. Mark Wyman, Hard Rock Epic: Western Miners and the Industrial Revolution, 1860-1910 (Berkeley: University of California Press, 1979), 120-123.

9. Inquest No. 8593, "Robert Nicholls," 31 December 1919, 9 and 52.

10. The Anode, September 1918, 3.

11. Inquest No. 7985, "Armidis Moran," 6 June 1916, 16-20.

12. Inquest No. 3954, " Earl Clayton," 20 July 1906, 31.

13. Daniel Harrington, "Lessons From the Granite Mountain Shaft Fire, Butte," U.S. Bureau of Mines Bulletin 188 (Washington: GPO, 1922), 15-16; 32.

14. Second Annual Report, Montana Industrial Accident Board (Helena: Independent Publishing Co., 1917), 109-113.

15. G.S. Rice & R.R. Sayers, "Review of Safety and Health Conditions in the Mines at Butte," U.S. Bureau of Mines Bulletin 257 (Washington: GPO, 1925), 13.

16. U.S. Commission on Industrial Relations, Mining Conditions and Industrial Relations at Butte, Montana, Senate Document 415, 64th Congress, 1st session, 1915, Final Report & Testimony, Vol. IV, 3960. [Hereafter cited as"Commons Commission Report."]

17. Arthur Cecil Todd, The Cornish Miner in America (Truro, Cornwall: D. Bradford Barton Ltd., 1967), 17.

18. Frederick L. Hoffman, "Mortality From Respiratory Diseases in Dusty Trades," U.S. Bureau of Labor Statistics Bulletin 231, Hygiene Series 17 (Washington: GPO, 1918), 336.

19. Ibid., 332.

20. David Emmons, "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919," Journal of American Ethnic History 5 (Fall 1985), 32. This information derived from the U.S. Bureau of Census, Mortality Statistics, 1916, 17th Annual Report, (Washington: GPO,1918), 42-43; 96-97.

21. Statistical information is available on mine-related respiratory fatalities for Butte in the "Commons Commission Report of 1914," which shows a high of 190 tuberculin deaths in 1913, of which 72 percent could be attributed to miners. According to the study conducted by Lanza and Harrington for the Bureau of Mines and published in U.S. Bureau of Mines Bulletin 257, the year 1919 recorded a high of 223 deaths attributed to respiratory disease.

22. "Commons Commission Report," 3838-3841.

23. Silver Bow County Health Department, "Report on Investigation of Sanitary Conditions in Mines, and of Conditions under which Miners Live," Silver Bow County, 1908-12," Small Collections 89, Montana State Historical Society, Helena, Montana 1-3. [Hereafter cited as "Report on Sanitary Conditions."]

24. Ibid., 3; 11-15.

25. "Commons Commission Report," 3719.

26. "Report on Sanitary Conditions," 1-4.

27. Information on respiratory disease fatalities gathered from death certificates for 1890 located in the Butte-Silver Bow Clerk & Recorder's Office. Information on the advent of wet-drilling in the Butte underground derived from Rice & Sayers, "Review of Safety and Health Conditions."

28. Rice & Sayers, 20.

29. "Commons Commission Report," 3849-50.

30. Engineering & Mining Journal 93 (29 June 1912): 1289.

31. "Report on Sanitary Conditions," 21.

32. A.J. Lanza, "Prevention of Illness Among Employees in Mines," American Institute of Mining Engineers Bulletin 147 (1 March 1919), 436-7.

33. The Anode, March 1917, 1.

Chapter 5

THE STRUGGLE TO IMPROVE UNDERGROUND WORKING CONDITIONS

Early twentieth-century Butte miners faced numerous dangers underground and grave financial futures if they were injured on the job. The "laissez faire" attitude towards corporate negligence in the work place adopted by the Montana courts left the disabled miner, or in the case of a fatal accident, the widow and her children, to fend for themselves. To protect themselves from economic hardship caused by accidents underground the miners joined together under the union banner to provide for one another by responding to family needs in the event of an accident. The Butte Miners' Union also petitioned the state legislature for laws to improve working conditions and to provide financial assistance to miners injured on the job. Over a period of twenty-six years lobbying from Butte miners' unions prompted passage of more stringent laws governing underground conditions, culminating in 1915 in a workmen's compensation law, providing benefits for those hurt in industrial accidents. While workmen's compensation improved the economic circumstances of some injured miners, and new regulations pertaining to ventilation and sanitation helped improve some working conditions, enlightened legislation did not halt underground injuries or fatalities. The new compensation law provided at least a measure of relief to the miner absent in previous Montana legal opinions that depended on precedent established by nineteenth century English common law.

From the vantage point of the courts, the plight of the injured Butte

copper miner in the 1880s resembled that of the English industrial worker of fifty years earlier. In 1837, an English railroad worker sued his employer for a job-related injury, accusing his boss of negligence. The judge blamed the man's injury on a fellow worker's negligence, thereby exonerating the railroad and establishing a legal precedent imitated in American courts for the next sixty years. During the early years of industrialization legislators sought to protect industrialists from any litigation which might halt the forward momentum of the national economy. Consequently, legislators assumed that if railroads had to pay for all damages caused "by accident," the industry and subsequently the national economy, could be permanently crippled.[1] The Montana courts followed precedent, ignoring pleas for compensation from injured Butte miners out of deference to the state's major industry. The injured miner, left without the means to earn his livelihood, turned to fellow miners for financial aid and support.

Butte miners organized both to demand higher wages and to protect themselves from the hazards of the work place and the economic pitfalls of industrial accidents. At first, miners walked off the job to protest wage cuts. On June 13, 1878, the Butte Workingmen's Union staged a walkout over wage cuts at Marcus Daly's Alice Mine and at A.J. Davis' nearby Lexington. Union leaders, men who made their way to the Butte silver mines from the well-organized Nevada Comstock, reasoned that all workers, miners, and laborers ought to organize to guarantee a united front in disputes over wages and conditions. Twice, in 1882, in a statement of purpose for the Butte Miners' Union, and in 1893, with the formation of the Western Federation of Miners, union organizers recognized the hazardous nature of their occupation and upheld the doctrine of equal pay for all underground workers, both the

unskilled mucker and the experienced driller.[2] Unions played on the themes of brotherhood and worker solidarity in their struggles to secure a safe work place. The Knights of Labor, a national organization of workers that included miners, championed a slogan that appealed to men doing hazardous work like mining: "Injury to one is the concern of all."[3]

In recognizing the health and safety hazards inherent in their work and the indifference shown by mine owners and the government to their situation, miners' unions instituted benefit programs to aid the sick, the injured, and families of the deceased. The Butte Miners' Union paid the injured or sick miner $10 a week. To families of workers killed on the job, the union paid up to $90 in funeral expenses. In 1896, the Butte Miners' Union paid out a total of $29,000. In one fifteen-month period between 1910 and1912 the union contributed $114,000 in benefits to members.[4] In contrast, mine owners ignored sick or injured employees, except to institute a monthly pay deduction of one dollar from miners to cover hospital care in the event of an accident.[5]

Local fraternal organizations also offered benefits to care for their members. The Ancient Order of Hibernians (AOH), an Irish organization composed of large numbers of miners, paid its injured or sick members $8 weekly for a total of thirteen weeks. Fifty cents covered the monthly membership fee. That the Hibernians cared for their own is clear from the example of Jeremiah Hurley. Hurley died in the mines, leaving his wife and children to provide for themselves. In addition to the regular AOH death benefits, the Hibernians made a cash donation to the widow and then offered her a janitorial job at the Hibernian Hall.[6] The German Benevolent Society, the Scandinavian Brotherhood, the Sons of Croatia, the Italian Benevolent

Society, and the Austrian St. Joseph Society also offered their members health benefits.[7] The steady rise in fatalities, disabling injuries, and occupational diseases in the early twentieth century taxed the limited financial resources of the miners' union and fraternal organizations, creating a demand for government compensation for industrial accidents and providing an impetus to improve hazardous working conditions. Cutting the number of hours spent in the inhospitable underground constituted the first step towards improving conditions.

The fight for an eight-hour day constituted a major issue in the union's campaign to improve underground working conditions. As early as 1867, hardrock miners in the Comstock gained the concession of an eight-hour day from mine managers at a daily wage of $4. The campaign in Montana began at the state constitutional convention in 1889, when the Butte Miners' Union demanded a shorter work day on the basis of higher productivity. Although initial efforts failed, the miners continued to press their case. During the 1891 legislative session, a bill to institute an eight-hour day failed by a vote of thirty-one to twenty-one, largely because of a warning delivered on the legislative floor by William Penrose, editor of The Mining Journal and a representative from Silver Bow County, that a shorter work day would ultimately lead to mine closures that would put thousands of miners out of work.[8] The issue reappeared in a bill introduced by a Socialist smelter worker named M.G. O'Malley in 1897. The Attorney General drew up a bill calling for an eight-hour day; it passed the House the last day of the session but failed after ending up in the wrong Senate committee. For his efforts, the Anaconda Company fired O'Malley.[9] William A. Clark, a candidate for the United States Senate and major Butte copper

mine owner, who was anxious to gain the support of organized labor, joined with Augustus F. Heinze, an independent mine owner of prominence, to institute the eight-hour day in their Butte mines. This action actually affected only a small portion of Butte miners, since the largest local mine operator, Amalgamated, refused to cooperate. Even though the 1901 legislature passed a bill introduced by Silver Bow County miner J.J. Quinn, the law remained unenforced until 1905 when Amalgamated finally adopted an eight-hour work day in all of its mines.[10]

The miners assumed that a shorter work day underground would lead to a healthier work force, but as the ten-year struggle for an eight-hour day advanced, so did the depth of the mines and the number of miners working underground, creating associated ventilation and sanitation problems. Respiratory ailments increased dramatically with the expanded use of the machine drill, the increasing heat, and the lack of fresh air in the deep Butte stopes. During a two-year period beginning in 1906, almost three times as many men died of respiratory disease as of fatal accidents. By 1911, the shocking number of Butte miners succumbing to tuberculosis and miners' consumption came to the attention of Governor Edwin Norris. The governor selected a legislative committee to investigate conditions in Butte and to enact laws to protect the safety and well-being of miners.[11] After inspecting the Leonard, West Colusa, and Pennsylvania Mines as guests of ACM, Senator I.A. Leighton of Jefferson County generally defended company practices: "I can say that in our inspection today we found no place where a man could not work in comparative ease and safety. Of course, in view of the work there must necessarily be some places that are not altogether desirable."[12] In the language of their report to the whole, the committee

avoided any condemnation of conditions in ACM mines. The committee reported: "We find the companies of Butte are doing all in their power to perfect their ventilation and sanitary conditions and are not sparing expense in doing so." In February, P.J. Duffy of Silver Bow County introduced a measure that ultimately did little to alter conditions. House Bill 392 made it the duty of the mine operator "to provide where necessary, feasible, and practicable, a suitable and practical method for ventilating. . . ." The same policy applied to providing toilet arrangements and protecting manways, chutes, and winzes with guardrails. Any corporation failing to comply with these new regulations was guilty of a misdemeanor, punishable by a maximum fine of $250.[13] Although some operators saw ventilation as improving workers' productivity and voluntarily chose to install large reversible fans, the vagueness of the language and the trivial fine made this new law virtually unenforceable.

As struggles over the eight-hour day and ventilation and sanitation practices demonstrated, legislation alone could not alter working conditions. Mining companies ignored laws as long as government enforcement and oversight remained weak. As early as 1888, miners petitioned the territorial legislature for a public agency to oversee mine operations. Mine superintendents resisted the creation of such an agency. Finally, in1889, the legislature established the state mine inspector's office. But from the outset the office was under-staffed and without sufficient authority to prosecute offenders of state mining law. For example, as Deputy Mine Inspector Trevarthen reported in 1889, getting operators to comply with laws regarding ventilation was nearly impossible in light of existing laws:

> A company may run a drift one thousand feet from the shaft with no air except compressed air which escapes from a drilling machine. Men with families are placed here to work and many are brought to the surface insensible, and all that can be done according to law is to instruct the agent to secure better ventilation and trust to their generous hearts to get the work done. If no one is suffocated to death by the poor air. . . then they are free from the law, and yet it is daily bringing men to a premature grave.[14]

While state law required the state inspector to visit each mining property yearly and report on its condition, the legislature authorized a staff of two to oversee 13,000 mining claims statewide. According to the state's first inspector, G.C. Swallow, even if only one in twenty of these claims required inspection, the task would still be impossible. Furthermore, Swallow complained in his first report, yearly inspection did nothing to protect the miner from hazards. The unrealistic workload meant he and his deputy could only take the time to inspect an operation after an accident.[15]

For example, during his yearly visit the inspector-- appointed to his post by the governor--was expected to note any unsafe conditions and report those, in writing, to the mine owner. If he were notified through a written complaint by three or more employees of a dangerous situation in the work place, the statute required the mine inspector to investigate the complaint and notify the superintendent of the problem and its remedy. Charges of negligence could then only be brought against the mine owner if someone were then injured as a result of the previously identified problem.[16] The state mine inspector often found mine operators resistant to suggestion and his powers to enforce change limited by existing law.

Mine operators and their employees occasionally defied the law and enforcement efforts by the mine inspector. In 1887, the legislature passed a law prohibiting the development of a vertical shaft below 300 feet without

an iron-bonneted safety cage and a closing and locking gate to prevent passengers from being knocked out of the cage. In November 1897, the mine inspector notified ACM's general manager that unless the company obeyed this law a complaint would be filed with the county attorney. In January 1898, the mine inspector visited the Silver Bow county attorney and received assurance from him that action would be taken against the company. But five months later, action had not been taken because the county attorney refused to cooperate. A short time later, Mine Inspector Byrne received a petition signed by 450 miners of the Anaconda Company protesting the use of safety doors as a danger to their safety.[17]

On several occasions, the state mine inspector petitioned the legislature for increased enforcement authority, and each time the legislature rebuffed new propositions on the grounds that too much power in the hands of the mine inspector could halt the healthy progress of the state mining industry.[18] But in 1907, the legislature revised the state codes to increase the enforcement powers of the state mine inspectors. According to the new mining laws of Montana, the inspector gained the right to prosecute any mine owners who refused to make such repairs as requested by the mine inspector. Even when entrusted with new enforcement powers, however, the state mine inspector refused to take action against negligent mine owners.[19]

For instance, the revised codes of 1907 allowed for criminal prosecution of any owner, lessor, or lessee guilty of negligence, provided that the employee could be shown to be blameless in the accident.[20] Between 1909 and 1912, the mine inspector abstained from assigning blame in any of the Butte mine fatalities. Prior to and after this time, coroner's juries

typically assigned blame either to the deceased miner's carelessness or "unavoidable circumstances." Although juries occasionally cited management for negligence no evidence of prosecution exists for any of these cases. The mine inspector failed to exercise his newly won powers of prosecution, leaving the worker to plead on his own for improved safety in the work place.

There are a number of reasons for the mine inspector's reluctance to prosecute operator safety infractions. In his annual report to the governor, the mine inspector could cite safety violations and cast aspersions upon the state legislators for their refusal to draft more stringent regulations, but filing criminal charges against mine operators entailed a much riskier endeavor for the government agent. To find the mining company guilty of negligence in court required an unusual combination of circumstances: winning the cooperation of the county attorney; securing testimony from economically vulnerable miners; and overturning decades of legal precedent protecting corporate interests. These obstacles were enough to deter even the most stalwart champion of workers' rights. At the same time, the courts continued to find management innocent in regard to industrial accidents.

Unsuccessful attempts at retribution by the injured miner in the district courts and in the state supreme court gave the state mine inspector reason to be cautious in taking up the workers' cause in the courts. In 1914, Lowndes Maury, a Butte attorney with worker sympathies, testified before a congressional commission on industrial relations convened in Butte that no miner had won a single personal injury settlement in the Butte courts against either ACM or North Butte Mining Company in the past seven years, although the historical record contradicts this assertion. Ultimately,

however, the Montana Supreme Court overturned those isolated worker victories won in the lower courts.[21]

Although the Montana courts and the Silver Bow coroner's juries continued to abide by the common law dictum of "contributory negligence," courts elsewhere began to reinterpret this legal precedent in favor of the injured miner. The Illinois case of Himrod Coal Co. v. Adack (1901) dented the corporate armor by separating negligence of the injured worker from willful violation of the mining statutes by the mine owner. In the past, disregard for safety by the mine operator did not concern the courts as long as the miner could be shown to be careless or inattentive. Another important shift in attitude toward corporate responsibility occurred in the Illinois Appellate Court in Consolidated Coal Co. v. Lundak (1902). The court ruled that posting notice of occupational dangers did not exempt the employer from liability for injuries sustained through the mine owner's negligence.[22] It took longer for the public and judicial sentiment toward corporate irresponsibility to shift in Montana, perhaps because of the mining industry's economic predominance in the state.

In 1911, the former Progressive district attorney of Butte, Burton K. Wheeler, ushered the Employer's Liability Act through the house in the state legislature, but the bill died in the senate where Republican John E. Edwards of Rosebud County argued that Wheeler's bill would unfairly penalize Montana industry by forcing mine operators to accept liability for accidents occurring on their premises. Wheeler's bill would have denied industry its use of the doctrines of "assumed risk," "fellow servant," and "contributory negligence" that had so frequently dismissed employer responsibility for occupational injuries in the past.[23] The defeat of Wheeler's bill granted a

temporary reprieve to mine owners, but at the same time it signalled growing dissatisfaction with a legal system that placed the entire burden of industrial accidents on the shoulders of the worker. For the next four years corporate mine managers moved to head off government intervention in their affairs and to promote a united front against agitation by organized labor for improved working conditions and financial protection for those injured on the job. In 1912 ACM instituted a new hiring policy, the "rustling card" system, as a means of identifying outspoken critics of corporate management policy affecting the worker.

As of December 1912, anyone wishing to work in the ACM mines had to procure a "rustling card" from the company employment office. After being hired, the mine foreman returned the card to the employment office where it remained until the miner either quit or was discharged. Much controversy surrounded this new hiring practice. ACM, the employer of over ten thousand underground miners, claimed the size and transient character of the work force necessitated a system for tracking the employee's work record. Organized labor charged that the system was discriminatory, allowing the company to blackball troublemakers and agitators. The rustling card application included information about the prospective worker's place of birth, citizenship, family residence, literacy, occupation, and last place of employment. What the rustling card system did was merely formalize hiring practices that had previously been under the purview of the mine foremen's subjective judgment.[24] For the next eight years, outspoken members of the Western Federation of Miners and later the Metal Mine Workers Union attacked the rustling card system as a corporate tool to silence those critical of working conditions.

Whether the new hiring system actually quieted those miners critical of conditions is a matter of speculation, since documentation of specific instances of discrimination in hiring cannot be found. An economist who studied ACM employment practices in 1920 could not document any cases of blacklisting but found apprehension among miners about criticizing unsafe conditions. William Walsh, a state mine inspector of many years, testified before the Commons Commission in 1914 that he never received a formal complaint about working conditions from the Butte Miners' Union.[25] Perhaps miners feared company reprisals against "troublemakers;" whatever the cause, miners did not openly criticize company policies. With the support from other workers, however, miners did clamor for protection against the financial traumas associated with industrial accidents.

By the early twentieth century politicians and labor leaders across the West called for a government system to protect the worker from the economic effects of unsafe industrial practices. In July of 1911, the Western Federation of Miners held its annual convention in Butte and the president, Charles Moyer, called for political action to promote a government system of compensation for injured workers. In his speech, Moyer contrasted the corporate treatment of workers with that of machines; the owner repairs the machine when it breaks down, but the broken down worker is merely replaced.[26] Organized labor asked the government to intervene on behalf of injured miners. That same year mine operators moved to neutralize labor's vitriolic rhetoric. The American Mining Congress--an association of mine operators and engineers including entrepreneurial mining luminaries such as John Hays Hammond and James Douglas--recommended the adoption of workmen's compensation in coal-mining states to be paid for by a small

tax on coal production.[27] Butte mine owners would continue to oppose workmen's compensation until its passage in 1915, but in 1914 ACM responded to labor's demands for a safer work place by initiating a "Safety First" campaign in all of its Butte mines.

At the beginning of 1914, ACM became the first American copper producer to promote underground mine safety. Mine safety had become a topic of national interest during the early part of the twentieth century with underground fatalities topping 35,000 and serious injuries reaching 2,000,000.[28] Anaconda actually followed the lead of European industrialists, who by 1913 had successfully cut occupational fatalities in half through safety campaigns.[29] Beginning in 1914, Anaconda approached the problem of mine accidents from a number of different avenues: education, regulation, enforcement, monetary incentives, and contests.

The company appointed C.W. Goodale, an ACM mine superintendent, to organize and oversee the safety program. Goodale selected a safety engineer whose job included inspecting every mine once a month and discussing unsafe mining practices and equipment with the foreman. The safety engineer could only make recommendations to the foremen and shift bosses and had no authority to reprimand the miners directly. If, however, the shift boss ignored the second notice of a safety infraction, he could be laid off or discharged. The safety engineer convened monthly safety meetings for the shift bosses and foremen to discuss safety problems and the means for avoiding accidents. Incentives for obeying safety regulations varied from temporary discharges for rule violation to a $750 cash bonus paid to the foreman with the best annual accident record. Between January and March of 1915, Anaconda discharged twelve men for safety

infractions.[30]

The Anaconda Company used a multi-media approach to bring the safety message to its employees. The company published a monthly magazine, The Anode, in which they described the most up-to-date safety devices and techniques, a tally of the month's accidents with the location of the foreman in charge, and employee testimonials on the subject of safety, for which the author received a $15 bonus. During the war, The Anode linked safety with patriotism; and associated accidents with curtailed production of copper, which in turn crippled the Allies' effort to preserve world democracy. An Anode article of June 1918 called upon aliens to learn the native language and to adopt the American way of life as a means of increasing production and avoiding unnecessary accidents.[31] The company even produced a series of safety films demonstrating the proper way to perform specific tasks such as setting a dynamite charge or timbering a stope. In addition to using these films for training new employees, local theaters provided free screenings of safety films for the miners and their families.[32]

The company, in effect, turned safety into a spectator sport. The Anaconda Company also used competition to train its underground miners in first aid and mine rescue. Individual mines sponsored teams. Sixteen different teams competed against one another in a series of events in which individuals vied for a $30 first prize and teams competed for a $120 cash award. The first mine rescue competition and subsequent contests took place at Columbia Gardens, a large company-owned amusement park east of Butte. The Anaconda teams also travelled to competitions sponsored by the U.S. Bureau of Mines in Arizona and Colorado. A Miner's Field Day held in

July of 1918 at Columbia Gardens attracted thirty-three first aid teams and twenty thousand spectators.[33] Between 1915 and 1920, the Anaconda Company trained over two thousand employees in first aid and mine rescue, which according to the company led to a substantial decrease in serious accidents and fatalities.

In 1916, two and one-half times more serious accidents occurred in other American metal mines than in Anaconda mines. The Butte mine operators attributed this achievement to the new "safety first" campaign. One year after the initiation of the safety campaign Anaconda boasted an overall 35 percent reduction in mine fatalities from the previous year. It should be noted that part of this reduction in fatalities in 1914 might be attributed to a drastic reduction in Butte production and the work force with the outbreak of world war and a temporary curtailment of shipping. In addition, between 1915 and 1916 ACM actually witnessed an increase in mine fatalities.[34] While periodic reductions in accidents may have bolstered worker morale, it did nothing to provide financial assistance for those who continued to be maimed or killed on the job. The underground miner looked to government for financial protection from industrial accidents.

Failing to win protection against the economic trauma of industrial accidents in the courts, the Butte miner returned to the legislative arena to fight his battle for compensation for injuries incurred on the job. On March 8, 1915, Montana became the twenty-seventh state to grant its workers the protection of workmen's compensation. The reason for the government's action is stated clearly in the First Annual Report of the Industrial Accident Board, which had been created to administer the law:

> Accidents are incidental to industrial enterprises, and

> because this is true, the industry is responsible to the injured workmen and should bear the cost of accidents. This cost is an added liability--part of the expense of operating--and separated from any consideration of humane sentiment. The lost time of the injured employee is as legitimate a part of the cost of the product as is that of the raw material.[35]

The state legislature finally recognized the employer as a responsible party in the injury of an employee, but passage of protective legislation did not occur without a long, bitter struggle on the part of workingmen and their allies in Helena.

As was the case with mine safety, the United States lagged behind the Europeans in enacting laws to aid the miner in the event of an accident. By 1814, Germany passed a law to compensate the injured worker for lost work time, and the English followed suit in 1897. The first American law did not gain legislative approval until 1911.[36] The debate that preceded the passage of an American law found some employers supporting the protection of workers "provided it did not cost any more than the . . . wasteful liability system," and some labor unions reacting coolly to a compensation system that eliminated the possibility of cash awards from the courts. These seemingly contradictory positions can be explained by a new attitude in the courtroom where sympathetic juries increasingly found in favor of the injured workman. In forfeiting his right to litigation, the worker gained temporary benefits amounting to one-half to two-thirds of his lost pay. Although short of an equitable settlement, the Montana Workmen's Compensation law was a vast improvement over the former system where 85 percent of those injured received no compensation.[37]

In 1910, Montana's Governor Norris appointed a commission to prepare legislation to protect the injured worker, but each time legislation

was introduced during the two sessions following Norris' initiative it failed to gain the necessary votes for passage.[38] John Wallace, the industrial insurance commissioner for Washington, speaking before an American Federation of Labor convention, reiterated the need for a compensation law in Montana. Wallace calculated that the state of Washington had already lost a total of 13,817 man-years of labor to industrial disabilities and fatalities, and he looked to a compensation act as a means to encourage operators to eliminate work place hazards.[39] Early in 1914, a group identified as the People's Power League took up the Montana crusade for workmen's compensation by placing an initiative on the November ballot calling for a mandatory system of compensation in the event of a disabling or fatal injury.

From the outset, the initiative met organized opposition from a group calling itself the Montana Advancement Association. The opposition, led by individuals from the Anaconda Company, warned the electorate in large newspaper ads that passage of the proposed initiative would increase taxes $2 million, curtail industrial expansion, increase the cost of living, reduce the number of available jobs, encourage the hiring of foreigners, and force farmers to share the cost of the system intended for hazardous industries.[40] The oppositon fiercely objected to the amount of the award given to the families of those killed on the job. The initiative proposed a pension of $30 a month for the widow and $7.50 a month for each child (up to three children) to be paid until the wife remarried. The opposition protested that such a pension amounted to twice the award provided for under Washington and Idaho law. A Montana Progressive editorial pointed out that Idaho did not even have a binding law, only a proposal for legislation.[41]

Critics of Initiative No. 7 quickly outnumbered supporters, drawing support from both farmers and railroaders. Beginning in the mid-1890s, the Populists had united farmers and organized labor on the issue of political reform, but their support failed to materialize on workmen's compensation. W.K. Harber, editor of the Daily River Press in Fort Benton and a member of the People's Power League, railed against the initiative campaign for "lumping the compensation act with a farm loan act when they deserved separate consideration by the voters." He also worried that farm labor could be labelled a "hazardous occupation," bringing unnecessary financial hardship to Montana farmers.[42] Just one week before the election, Colonel Sam Gordon, editor of the Yellowstone Daily Journal in Miles City and a prominent leader of the Progressive Party in Montana, spoke out in opposition to the initiative because of the proposal's complexity and its lack of consideration for the employer.[43] On November 1, the Great Falls Tribune, the only major independent daily newspaper in the state, published an editorial recommending against passage of Initiative 7. On election day, Montana voters rejected a bill to compensate injured workers by four thousand votes, tossing the controversial issue back into the hands of Montana's elected representatives.[44]

Legislators arrived in Helena in January of 1915, prepared to debate the issue of workmen's compensation. On January 20, the House heard testimony on two bills: one modelled after a Michigan law that allowed for a voluntary system that excluded domestic, agricultural and railroad workers from coverage and the other a compulsory system that required all employers in hazardous industries to participate. Much of the debate in committee centered upon the constitutionality of the compulsory bill. The

rights of aliens and their survivors emerged as another critical issue. On February 16, Cornelius Kelley, vice president and managing director of the Anaconda Company, testified before a joint legislative committee that his company preferred a "just compensation act over the current system where the ambulance-chasing lawyer beats the body of the injured to his home." Kelley added that the company would like to see a bill that was non-compulsory with rates reasonable enough to allow Montana mines and industries to compete with other states. Kelley emphatically opposed compensation for foreign dependents residing in nations without equivalent compensation laws.[45]

When the final bill incorporated all of Kelley's concerns, Butte Socialist legislator, Alex Mackel, charged that the committee members were "a set of servile corporate tools" who voted for the measure because they "were told to do so" without knowledge of the implications of what they voted for.[46] Even though the new law left participation in the compensation system up to the discretion of the employer, the provisions of the law eliminating the corporate courtroom defenses of "assumed risk," "contributory negligence," and the "fellow servant" doctrine encouraged employer participation. During the first year of enforcement in Montana, 1,518 employers signed up to participate, covering 43,769 employees, or 96 percent of those working in hazardous occupations.[47] But the primary question remained--did the new law effectively accomplish the goal of protecting the injured worker?

While the provisions of the new law protected a large number of Butte miners, the compensation paid out did not adequately meet miners' needs. After a two-week waiting period, the injured person received 50 percent of his wage or a maximum of $10 a week for 300 weeks, and in the event of a

permanent disability, the payment extended for an additonal 100 weeks, and $5 weekly thereafter.[48] Even after the weekly benefit increased to $12.50 per week in 1919, Montana still maintained the lowest benefits in all of the forty-two states offering workmen's compensation. The $54 a month paid to the injured miner did not meet family expenses in Butte, Montana. The widow of a man killed underground could not collect more than a total of $4,000 over an eight-year period. The families of those who succumbed to occupational diseases such a miners' consumption, silicosis, or tuberculosis received no compensation, since the law did not recognize them as vocational diseases until the 1940s.[49] In addition, large numbers of Butte miners working underground after 1915 remained unprotected by the new law which excluded both single and married alien immigrants. Nonresident alien dependents could not collect benefits if a son, husband, or brother met with an accidental death in the Butte mines.[50] According to a labor union bulletin published in 1917, no claims were filed in one-third of fatal accidents because the deceased either had no dependents or those dependents lived in Europe. A radical labor paper, The Butte Bulletin, reported in 1918 that only 41 of the descendants of the 164 men killed in the Speculator fire of the previous year actually collected compensation.[51]

The framers of the Montana Workmen's Compensation Act had intended to create a law that would not only financially aid those injured on the job but would also make the work place safer by providing an incentive for employers to improve conditions and eliminate the hazards associated with costly industrial accidents. Accident statistics for Butte's two major mining companies seem to defy the legislature's good intentions. Even though ACM mines counted half the number of serious accidents reported in

other U.S. metal mines in 1916, the numbers occurring in Butte mines continued to climb. In 1916, one year after the adoption of workmen's compensation, the Anaconda Company reported 3,176 accidents in its mining and smelting operations, and the North Butte Mining Company recorded 260. One year later, the number of accidents at the Anaconda operations doubled and those at the North Butte mines jumped to 901. During those two years, Anaconda paid out nearly $500,000 in compensation benefits to injured employees, which seemed to do little to elicit more vigilant supervision underground.[52] Years after passage of a workmen's compensation act the Butte mines remained haunted by accidents: in 1924, the mine fatality rate climbed to 4.8 deaths per thousand workers, compared with 3.16 per thousand in Arizona and 3.15 per thousand in underground Michigan copper mines. The first significant reduction in the number of mine fatalities did not occur until 1942 when the rate dropped to 2.5 deaths per thousand workers.[53] Workmen's compensation did not significantly alter underground hazards in Butte, even if it did relieve some of the financial distress suffered by those injured.

When legislative reform proved inadequate in altering underground working conditions, the workers shifted the battle front to the picket line. It took a major mine disaster to galvanize an organized protest against unsafe working conditions. The Speculator Mine fire precipitated a walkout led by the newly formed Metal Mine Workers' Union (MMWU). The issues that prompted a unified response from labor included obvious negligence on the part of management in preparing for a mine fire, low wages, and a general frustration among union miners over company blacklisting and deteriorating conditions. By the end of June 1917, the MMWU successfully shut down all

mining operations on the Butte hill. The circular distributed by the fledgling union cited four basic demands: the abolition of the "rustling card" system, the strict observance of state mining laws, the dismissal of the state mine inspector, and an increase in wages to match the inflated cost of living.[54]

Working conditions emerged as a primary concern of labor in the wake of the nation's worst hardrock mining disaster. The union blamed the large loss of life in the Speculator fire on the absence of manholes in the concrete bulkheads separating drifts. At the same time, organized labor pointed to the rustling card system as a relevant factor in company intimidation of workers and the silencing of those who would have spoken out about safety infractions.[55] In July, John Powers, the state chairman of the Montana Socialist Party, wrote to Governor Stewart calling for the dismissal of Mine Inspectors Orem and McGrath for failure to act on knowledge of unsafe conditions in the Speculator. According to Powers, the mine inspectors knew that miners were working below the 3,000-foot level with no means of escape through raises or through solidly bulkheaded drifts.[56] The new representative of a large segment of miners, the MMWU, also demanded that monthly inspections of the underground be made by a bipartisan committee composed of workers and management, that manholes be built in all bulkheads, and that all new men be shown escape routes as an initiation to the underground.[57]

The mine operators rallied in opposition to the new union demands and issued a joint statement in the name of William A. Clark, the only independent mine entrepreneur amidst a handful of corporate entities. Clark threatened the workers: "I will close them down, flood them and not raise a pound of copper before I will recognize the anarchistic leaders of the

union."[58] On June 27, Clark announced to the press that Butte miners were the highest paid in the world and that the conditions that they labored under compared favorably to any mining district. Even if Butte miners' wages ranked high when measured against other districts as claimed by Clark, the daily wage of $4.75 did not meet expenses in 1917. Butte miners worked for $3.50 a day from 1878 until 1907, a time when the price of copper increased from $.16 to $.20 a pound, and the volume of metal produced jumped from 24 to 226 million pounds.[59] At $4.75 a day, the Butte miner earned almost $1400 a year while the average living expenses for a family of four amounted to about $1800, resulting in indebtedness for over 80 percent of the wage earners.[60]

In the end the Butte mine operators overwhelmed the organized resistance of the mine workers. The Butte miners went back to work for a $.50 a day pay raise in September of 1917, forgoing their demands for a $6 a day wage and safer working conditions. Organized labor in Butte would never again regain the unified strength it exhibited prior to 1914. Aware of continuing dissension within labor's ranks, the mine operators ignored worker demands for an end to the rustling card system and pleas for improved working conditions. Periodic strikes erupted during the next three years without consequence to the miner and the conditions under which he labored.

Since 1883, the Butte miner had struggled tirelessly to eliminate the more apparent dangers in the work place and to secure financial benefits for those crippled or killed on the job. In time, the public took notice of the miner's plight. The legislature responded to the high incidence of injury and death in the Butte underground by passing laws to regulate conditions in the

mining industry, but accidents persisted well into the twentieth century. Even the best intentioned laws could not alter the defiant attitude towards dangers in the work place ingrained in both worker and management over forty years.

ENDNOTES

1. Lawrence M. Friedman, A History of American Law (New York: Simon & Schuster, 1973), 409-10.

2. David Emmons, "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919," Journal of American Ethnic History 5 (Fall 1985): 53.

3. Edward Chase Kirkland, Industry Comes of Age: Business, Labor, and Public Policy, 1860-1897 (Chicago: Quadrangle Books, 1967), 371.

4. Emmons, "Irish Miners of Butte," 53.

5. Daniel Harrington, "Accident Prevention in the Mines of Butte, Montana," U.S. Bureau of Mines Technical Paper 229 (Washington: GPO, 1920), 28.

6. Emmons, "Irish Miners of Butte," 51.

7. Accident Insurance Policies, 1898-1905, Anaconda Copper Mining Company Records, Collection 169, Box 91, File 153, Montana State Historical Society Archives, Helena, Montana. These organizations provided benefits to the sick and injured of $5 to $7 weekly and to members paying dues of from $.50 to $1 monthly.

8. Richard Lingenfelter, The Hardrock Miners: A History of the Mining Labor Movement in the American West, 1863-1893 (Berkeley: University of California Press, 1974), 190-92.

9. Vernon H. Jensen, Heritage of Conflict: Labor Relations in the Nonferrous Metals Industry Up to 1930 (Ithaca: Cornell University Press, 1950), 100.

10. Ibid., 101. Clark's position on the eight-hour day cited in Malone, The Battle for Butte, 151.

11. Anaconda Standard, 4 January 1911, 11.

12. Anaconda Standard, 7 January 1911, 7.

13. Anaconda Standard, 23 February 1911, 8; 5 March 1911, 11.

14. Reports of the Inspector of Mines & Deputy Inspector of Mines for the Six Months Ending November 30, 1889 (Helena: Journal Publishing Company, 1890), 123.

15. Report of the Inspector of Mines and Deputy Inspector of Mines for the Year Ending November 30, 1890 (Helena: Journal Publishing Company, 1891), 2.

16. The Codes, Statutes, and Constitution of the State of Montana, edited by Wilbur F. Sanders (Helena: L.P. Sanders, 1895), 42.

17. Tenth Annual Report of the Inspector of Mines of the State of Montana for the Year Ending November 30, 1898 (Helena: Independent Publishing Company, 1899), 5-6.

18. Fourteenth Annual Report of the Inspector of Mines, State of Montana, 1902 (Helena: Independent Publishing Company, 1903), 10-11.

19. Mining Laws of the State of Montana, Revised Codes of 1907 and 1911 (Helena: Independent Publishing Company, 1911), 5.

20. Ibid., 6.

21. U.S. Commission on Industrial Relations, Mining Conditions and Industrial Relations at Butte, Montana, Senate Document 415, 64th Congress, 1st session, 1915, Final Report & Testimony, Vol. IV, 3802. [Hereafter cited as "Commons Commission Report."] Montana Reports, 40 Montana 508, Osterholm v. Boston & Montana Co. On February 26, 1910, the Montana State Supreme Court overturned a decision by District Court Judge Bourquin, which had found the employer negligent in operating a cage without safety doors, in which a miner at the Greenleaf Mine fell to his death. Montana Reports, 47 Montana 1, Melville v. Butte-Balaklava Copper Co. On February 10, 1913, the high court overturned a ruling by Judge McClernan in Butte for the plaintiff, in which a miner who was killed while working overtime in defiance of the eight-hour day. These two cases in which district courts found the mine operator negligent in providing for the safety of their employees disputes Maury's contention that Butte courts always ruled against the miner in personal injury cases.

22. Engineering & Mining Journal, 8 March 1902, 353; 5 July 1902, 51.

23. Anaconda Standard, 27 January 1911, 8; 18 February 1911, 10.

24. Engineering & Mining Journal, 15 September 1917, 466.

25. "Commons Commission Report," 3971. Paul F. Brissenden, "The Butte Miners and the Rustling Card," American Economic Review (December 1920): 770-72.

26. Western Federation of Miners, Proceedings 19th Annual Convention, Butte, July, 1911 (Denver: 1912), 43-44.

27. Engineering & Mining Journal, 24 September 1910, 601; 1 April 1911, 648.

28. Friedman, History of American Law, 422.

29. Engineering & Mining Journal, 13 September 1913, 513; 2 August 1913, 232.

30. Harrington, "Accident Prevention in Butte Mines," 7-9. Engineering & Mining Journal ,20 March 1915, 546; The Anode, 1(March 1915), 7.

31. The Anode, 1(June 1915), 8.

32. The Anode, 1(November 1915), 3.

33. The Anode, 1(May 1915), 1; 4 (August 1918), 1.

34. Harrington, Bureau of Mines Technical Paper 229, 24; The Anode, 1(January 1915), 7. In 1915, the West Gray Rock had the best safety record with three accidents in 51,443 shifts worked as compared to the Pennsylvania having the worst at thirty-six accidents in 133,344 shifts worked. In 1915 twenty-eight miners died in Anaconda mines; forty-six in 1916 and thirty-nine in 1917.

35. First Annual Report of the Industrial Accident Board, 1916 (Helena: Independent Publishing Company, 1916), 7.

36. Ibid

37. Carl Gersuny, Work Hazards, 100-04.

38. First Biennial Report, Montana Department of Labor and Industry, 1913-14 (Helena: Independent Publishing Company, 1914), 17.

39. The Montana Socialist, 4 January 1914, 3.

40. Anaconda Standard, 1 November 1914, 10.

41. Montana Progressive, 15 October 1914, 3.

42. Great Falls Tribune, 22 October 1914, 3.

43. Great Falls Tribune, 31 October 1914, 3.

44. Engineering & Mining Journal, 14 November 1914, 890.

45. Anaconda Standard, 17 February 1915, 1.

46. Anaconda Standard, 27 February 1915, 1.

47. "Industrial Accident Board Report of 1916," 63.

48. Ibid., 26-7.

49. Ninth Annual Report of the Industrial Acident Board (Helena: Independent Publishing company, 1918), 85.

50. Second Annual Report of the Industrial Accident Board (Helena: Independent Publishing Company, 1918), 85.

51. Emmons, "Irish Miners of Butte," 54. Emmons cites the Butte Bulletin, September 10 and 30, 1918, as his source.

52. "Industrial Accident Board Report of 1916," 118-20.

53. William W. Adams,"Metal-Mine Accidents in the U.S.", U.S. Bureau of Mines Bulletin No.264 (Washington: GPO, 1924), 12-17; Bulletins No.310; 374.

54. The Montana Socialist, 16 June 1917, 1.

55. The Montana Socialist, 30 June 1917, 1.

56. The Montana Socialist, 7 July 1917, 4.

57. U.S. Department of Justice, "Glasser File," record Group 60, microfilm.

58. Ibid.

59. Jensen, Heritage of Conflict , 302

60. Glasser, "Butte Miners' Strikes," U.S. Bureau of Labor Statistics, Glasser File, 8-13.

Chapter 6

CONCLUSION

By 1920 accidental death or injury had become a daily threat to the Butte miner. Nearly every other week the Butte Miner carried a story about some unfortunate miner crushed by a falling rock or crippled by a fall down a chute. But knowledge of the dangers of the occupation did not keep men out of the mines or prevent the onslaught of accidents. Neither increased vigilance on the part of mine operators nor the passage of new safety regulations seemed to alter the high rate of mine fatalities. A complex set of social, economic and technological circumstances combined in the Butte underground to create occupational hazards unknown in other Montana industries.

Divergent factors affecting labor and management contributed to the high number of industrial accidents in the Butte mines. Beginning in the 1880s an increased world demand for copper greatly expanded the scale of operation and the number of miners employed. The number of underground workers increased seven times between 1883 and 1916, from 2,000 to 14,500. A shortage of well-trained, experienced miners resulted. While the early Butte miner claimed generations of experience in the copper mines of Cornwall, Ireland, and more recently in Michigan and the Nevada Comstock, the new recruit came from agricultural communities in Italy, Serbia and Croatia. By 1916 thousands of these recent rural immigrants, without mining experience or command of the English language, populated the Butte

underground. These "greenhorns" worked alongside veterans noted for their transient and independent work habits, derived in part from a "contract" system of Cornish origins. The contract miner worked virtually independent of supervision, motivated solely by the amount of ore removed or drift advanced. The conditions of the work place--long hours, intense heat and impure air--coupled with a willingness to take risks for the bonus promised by filling an extra ore car made even the most careful miner susceptible to a moment of fatal inattention. A potentially volatile situation existed in the Butte underground with a work force that claimed immunity to the hazards of the occupation, either through ignorance or arrogance.

As in other industries, technological change had a dramatic impact on the worker. The introduction of new machinery and mining techniques altered the working environment, sometimes to the detriment of the miners' health and safety. Introduced in the 1880s, dynamite and steam-powered hoisting, and later electrical appliances, contributed to the growing numbers of fatal mine accidents. By 1907 the miner apparently adapted to these new technologies, because deaths attributed to explosions, cage mishaps, and electrocution were overwhelmingly outnumbered by those caused by fall-of-rock and accidental falls.[1] The use of electricity for lighting, ventilation and hoisting generally improved working conditions and eliminated some hazards of the underground. At the same time, other new technologies created unforseen hazards. The machine drill, although not directly responsible for any accidental fatalities, maimed and killed hundreds of Butte miners each year by perpetuating an epidemic of respiratory diseases.

While approximately three out of every one-thousand miners

succumbed to a fatal accident working, approximately 40 percent of the one thousand miners examined in 1914 suffered from some form of respiratory disease.[2] By the first decade of the twentieth century British and Australian medical researchers linked the frequency of tuberculosis, silicosis and miners' consumption in hardrock miners to the silica dust generated by dry drilling with a machine drill. Shortly thereafter, European mine operators instituted a system of wet-drilling and pre-employment physicals to combat this devastating occupational disease. Butte mine owners chose to ignore medical evidence of the problem and technological solutions until 1925. Corporate resistance to change ultimately affected all relations between worker and management in Butte, which when coupled with powerful social, economic and political forces acting upon the new technologies, created a variety of new hazards in the Butte underground.

Between 1883 and 1920 mine management underwent changes that created tensions between miners and supervisors that affected the safety of the work place. While the consolidation of the Butte mines under a single corporate entity, the Anaconda Copper Mining Company, improved the efficiency of the mining process, it also distanced management from the everyday problems of the work force and created a conflict between the priorities of the corporate board members in New York and the supervisory staff in Butte. By 1915 only one major competitor of the Anaconda remained on the Butte hill, leaving the worker little choice in employers, thereby granting the Anaconda Company enormous economic and political authority in negotiating conditions and wages. Worker fear of economic intimidation and reprisal silenced many of those who might have spoken out against unsafe working conditions. Resigned to the status quo, the Butte miner

developed a defiant attitude towards management's efforts at supervision and the dangers inherent in industrial hardrock mining.

At the same time that hazards of the work place increased because of the unresolved conflict between workers and management and the expanding depth of the Butte mines, and worldwide competition stimulated a demand for greater worker productivity and a reduction in production costs. These pressures on management to produce overshadowed concerns about worker safety, contributing to an increase in industrial accidents. These circumstances did not deter the efforts of organized labor to change the conditions under which they labored.

At each turn in the struggle to improve working conditions, the political and economic hegemony of the Anaconda Company over miners blunted labor's efforts. When the miner sought redress in the courts from the financial hardships caused by industrial accidents, he faced an unsympathetic legal system unwilling to acknowledge corporate negligence. Appeals to the state legislature for protective and enforceable mining regulations generally went unheeded, due to fear of corporate reprisals that might cripple the state economy. The agent appointed to oversee mine safety and the enforcement of safety laws, the state mine inspector, often ignored infractions out of deference to the economic and political might of the mine operators. The miners, united under union affiliation, finally turned to the picket line to improve conditions, but that tactic proved ineffectual against the imposition of martial law and company reprisals against organizers. Even the passage of a workmen's compensation law in 1915 proved a pyrrhic victory, leaving thousands of alien immigrants unprotected and thousands of others inadequately compensated for

disabilities encountered on the job.

The year 1920 marked over forty years of mining in Butte and, more significantly, the end of the district's reign as the world's leading producer of copper. Even as an enormous copper surplus created by overproduction during the war forced half of Butte's miners out of work, the fatal accident rate remained higher than it had been during years of high productivity. It seemed as though neither legislation nor production rates had any noticeable impact on the health and safety of the worker. None of the changes made in mine ventilation and sanitation, mine rescue, or in new techniques for wet-drilling, could overcome the contemptuous attitude of management towards labor and the miner's enmity towards his employer and the work place. Years of labor strife had engendered mistrust between owners and miners, which manifested itself in a combative tension between factions. The miner, embittered by years of unsuccessful battles and inured to loss of life, adopted a recalcitrant attitude towards the work and its accompanying hazards. Neither regulation nor technology could change the habits of mind and work developed over forty years; only moving the mining operation above ground proved a successful remedy against the hazards of the underground.

ENDNOTES

1. See Table 1 in Chapter 3 on page 57.
2. Rice and Sayers, "Review of Safety and Health Conditions," 13.

BIBLIOGRAPHY

Books

Barton, D.B. A History of Tin Mining and Smelting in Cornwall. Cornwall: D. Bradford Ltd., 1967.

Bell, Thomas. Out of This Furnace. Pittsburgh: University of Pittsburgh Press, 1976.

Brown, Ronald C. Hard-Rock Miners: The Intermountain West, 1860-1920. College Station: Texas A & M University Press, 1979.

Crampton, Frank A. Deep Enough: A Working Stiff in the Western Mining Camps. Norman: University of Oklahoma Press, 1982.

Details of Practical Mining. Editorial staff of Engineering & Mining Journal. New York: McGraw-Hill Book Co., 1916.

Edwards, Richard. Contested Terrain: The Transformation of the Workplace in the Twentieth Century. New York: Basic Books, Inc., 1979.

Friedman, Lawrence M. A History of American Law. New York: Simon & Schuster, 1973.

Gersuny, Carl. Work Hazards and Industrial Conflict. Hanover: University Press of New England, 1981.

Greever, William. The Bonanza West, 1848-1900. Norman: University of Oklahoma Press, 1963.

Gutman, Herbert G. Work, Culture and Society in Industrializing America. New York: Vintage Books, 1977.

Hays, Samuel P. The Response to Industrialism 1885-1914. Chicago: University of Chicago Press, 1957.

Jenkin, A.K. Hamilton. The Cornish Miner: An Account of His Life Above and Underground from Early Times. London: George Allen & Unwin Ltd., 1948

Jensen, Vernon H. Heritage of Conflict: Labor Relations in the Nonferrous Metals Industry Up to 1930. Ithaca: Cornell University Press, 1950

Kirkland, Edward Chase. Industry Comes of Age: Business, Labor and Public Policy, 1860-1897. Chicago: Quadrangle Books, 1967.

Lankton, Larry D. and Hyde, Charles K. Old Reliable: An Illustrated History of the Quincy Mining Company. Hancock: Quincy Mine Hoist Association, 1982.

Layton, Edwin T., editor. Technology and Social Change in America. New York: Harper & Row, Publishers, 1973.

Lingenfelter, Richard. The Hardrock Miners: A History of the Mining Labor Movement in the American West, 1863-1893. Berkeley: University of California Press, 1974.

Malone, Michael. The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906. Seattle: University of Washington Press, 1981.

Marcosson, Isaac F. Anaconda. New York: Dodd, Mead & Co., 1957.

Montgomery, David. Workers' Control in America: Studies in ther History of Work, Technology and Labor Struggles. Cambridge: Cambridge University Press, 1979.

Murphy, Clyde P. The Glittering Hill. New York: World Publishing Co., 1944.

Navin, Thomas. Copper Mining and Management. Tucson: University of Arizona Press, 1978.

Paul, Rodman. Mining Frontiers of the Far West, 1848-1880. New York: Holt, Rinehart & Winston, 1963.

Samuel, Raphael, editor. Miners, Quarrymen and Saltworkers. Boston: Routledge & Kegan Paul, 1977.

Stevens, Horace J. The Copper Handbook, Volume X, 1910-11. Houghton: Stevens, 1911.

Todd, Arthur Cecil. The Cornish Miner in America. Cornwall: D. Bradford Barton Ltd., 1967.

Wyman, Mark. Hard Rock Epic: Western Miners and the Industrial Revolution. Berkeley: University of California Press, 1979

Young, Otis, Jr. Black Powder and Hand Steel. Norman: University of Oklahoma Press, 1976.

_____. Western Mining: An Informal Account of Precious-Metals Prospecting, Placering, Lode Mining, and Milling on the American Frontier from Spanish Times to 1893. Norman: University of Oklahoma Press, 1970.

Articles

Daly, William M., et al. "Mining Methods in the Butte District." Transactions of American Institute of Mining Engineers, Volume LXXII, 1925. (January 1926), 244-87.

Emmons, Dave. "Immigrant Workers and Industrial Hazards: The Irish Miners of Butte, 1880-1919." Journal of American Ethnic History 5(Fall 1985):

Finley, James R. "Cost of Lake Superior and Montana Copper." Engineering and Mining Journal 85(25 April 1908): 858-860.

Goodale, C.W. and Boardman, J.L. "Bureau of Safety of A.C.M. Co." Transactions of American Institute of Mining and Metallurgical Engineers 68(1923): 8-32.

Lankton, Larry and Martin, Jack. "Technological Advance, Organization, Structure, and Underground Mining Fatalities in the Upper Michigan Copper Mines, 1860-1929." Technology and Culture (Forthcoming).

Lanza, A.J. "Prevention of Illness Among Employees in Mines." American Institute of Mining Engineers Bulletin 147 (1 March 1919): 434-454.

McClernan, Henry. "Sixty Million Years of History: The Formation of Butte Copper." The Speculator:A Journal of Butte and Southwest Montana History 1(Summer 1984): 16-19.

Rice, Claude T. "Recent Advances in Butte Mining Practice." Mining & Engineering World 39(26 July 1913): 145-150

_____. "Prevention of Accidents in Metal Mines." Engineering & Mining Journal 87(6 February 1909): 300-302.

Rogers, A.W. "Migration of Miners and Accidents on the Rand." Engineering & Mining Journal 93(8 June 1912):1139-1141.

Newspapers, Journals and Periodicals

Anaconda Standard,1900-1915.
Butte Bystander, January 7, 1896-December11, 1897.
Butte Daily Bulletin, January 1919-June 1919; January 1920-June 1920.
Butte Intermountain, April 1881-December 1882; April 1883-June 1883.
Butte Miner, 1900-1920.
Great Falls Tribune, 1912-1915.

Joint Strike Bulletin, June-September 1917.
Montana Progressive, 1912-1915.
Montana Socialist, 1913-1917.

The Anode, 1915-1925.
The Colliery, 1910-1915.
Engineering and Mining Journal, 1893-1920.
The Labor World, April 1902-September 1903.
Miners Magazine, 1900-1907; 1914-1921.
Mining and Engineering World, 1900-1915.
Mining and Scientific Press, 1882-1893.
The Speculator: A Journal of Butte and Southwest Montana History, 1984-85.
Transactions of American Institute of Mining Engineers, 1914-1925.

Government Documents and Publications

Federal

U.S. Bureau of Census. Abstract of the 12th Census of the U.S. Washington: GPO, 1903.

_____. Abstract of the 13th Census of the U.S. Washington: GPO, 1913.

U.S. Bureau of Mines. Bulletins Numbers 264; 310; 374. Washington: GPO, 1924; 1927; 1931.

U.S. Commission on Industrial Relations. Mining Conditions and Industrial Relations at Butte, Montana. 64th Congress, 1st Session, 1915. Senate Document 415.

U.S. Department of Labor. Bureau of Labor Statistics Bulletin 231. Washington: GPO, 1918.

Harrington, Daniel. "Lessons From the Granite Mountain Shaft Fire, Butte." U.S. Bureau of Mines Bulletin 188. Washington: GPO, 1922.

_____ "Accident Prevention in the Mines of Butte, Montana." U.S. Bureau of Mines Technical Paper 229. Washington: GPO, 1920.

_____ "Six Year Accident Record of Mines of the A.C.M. Co. in Montana." U.S. Bureau of Mines Report of Investigation Number 2259. Washington: GPO, 1921.

_____ "Somes Phases of the Relative Responsibility of Management and Workers for Accidents in Mines." U.S. Bureau of Mines Report of Investigation Number 2993. Washington: GPO, 1930.

Hoffman, Frederick L. "Industrial Accident Statistics." Bureau of Labor Statistics Bulletin 157. Washington: GPO, 1915.

_____ "Mortality From Respiratory Diseases in Dusty Trades." U.S. Bureau of Labor Statistics Bulletin 231. Washington: GPO, 1918.

U.S. Immigration Commission. Immigrants in Industries, "Copper Mining and Smelting." 61st Congress, 2nd Session, 1909. Senate Document 633.

Industrial Accident Statistics. Labor Statistics Bureau Bulletin 157. 63th Congress, 3rd Session, 1915. House Document 1440.

Rice, G.S. and Sayers, R.R. "Review of Safety and Health Conditions in the Mines at Butte." U.S. Bureau of Mines Bulletin 257. Washington: GPO, 1925.

Report of the Industrial Commission on the Relations and Conditions of Capital and Labor Employed in the Mining Industry. 57th Congress, 1st Session, 1900. House Document 181.

Works Project Administration, National Research Project and Department of Interior. Report on Technology, Employment and Output Per Man in Copper Mining. Washington: Bureau of Mines, 1940.

State

Mining Laws of the State of Montana, Revised Codes of 1907 and 1911. Helena: Independent Publishing Co., 1911.

Montana Department of Labor and Industry. Biennial Reports, 1913-1922. Helena: Independent Publishing Co.

Montana Industrial Accident Board. Annual Reports of the Industrial Accident Board, 1916-1924. Helena: Independent Publishing Co.

Inspector of Mines Office. Annual Reports of the Inspector of Mines of the State of Montana, 1889-1913. Helena: Independent Publishing Co.

Sanders, Wilbur F., editor. The Codes, Statutes and Constitution of the State of Montana. Helena: L.P. Sanders, 1895.

County

Silver Bow County Coroner. Inquests into Butte Mining Fatalities, 1886-1920. Inquest Numbers195-8863. Butte-Silver Bow Clerk of Courts Office. Butte, Montana.

Silver Bow County Health Department. Report on Investigation of Sanitary Conditions in Mines, and of Conditions Under Which Miners Live in Silver Bow County. Montana State Historical Society, Small Collections #89, Helena, Montana.

Court Proceedings

ACM v. Hart, 69 Mont. 354.
ACM v. Hickey, 33 Mont. 46.
ACM v. Kerns, 87 Mont. 546.
ACM v. Knipe, 37 Mont. 161.
ACM v. Leary, 36 Mont. 157.
ACM v. McCarthy, 70 Mont. 309.
ACM v. Maki, 87 Mont. 314.
ACM v. Titus, 47 Mont. 583.
Edwards v. Butte & Superior, 83 Mont. 122.
Goodwin v. Elm Orlu, 83 Mont. 152.
Hollingsworth v. Davis-Daly Estates Copper Co., 38 Mont. 143.
Melville v. Butte- Balaklava Copper Co., 47 Mont. 1.
Osterholm v. Boston Montana Co., 40 Mont. 508.
Wirta v. North Butte Mining Co., 64 Mont. 279.

Mining Company and Union Records

Anaconda Copper Mining Company. Accident Insurance Policies, 1898-1905. Montana State Historical Society, Collection 169, Box 91, File 153. Helena, Montana.

Western Federation of Miners. Proceedings of 19th Annual Convention, Butte, July 1911. Denver: Western Federation of Miners, 1912.

Unpublished Reports

Dale Martin and Brian Shovers, "Butte, Montana: An Architectural and Historical Inventory of the National Landmark District," An unpublished report, Butte Historical Society, 1986.

Shovers, Brian. "The Emergence of a World-Class Mining District," An unpublished report, Butte Historical Society, 1984.

Interviews

Hull, Henry. Philipsburg, Montana. 22 December 1985.

Matthew, Dick. Butte, Montana. 24 January 1986.

Shea, Ed. Butte, Montana. 23 January 1986.