MINING FOR EMPIRE:
GOLD, AMERICAN ENGINEERS, AND
TRANSNATIONAL EXTRACTIVE CAPITALISM, 1889-1914

by
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In loving memory of Dr. Harold C. Fleming

and

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ABSTRACT

Between 1889 and 1914, American mining engineers drew on their experience in mining in the American West into management positions with prominent mining finance firms in the British Empire. The careers of three engineers, Hennen Jennings, John Hays Hammond, and Herbert Hoover, demonstrate their influence on British gold mining investment and on the imperial system. The professional biographies of these engineers demonstrate their racialized labor practices, access to technology and capital, ideas about management, and willingness to interfere in the politics and economies of sovereign nations for the interests of the mining finance industry, notably the Transvaal Republic and late Qing China. In their actions in the colonies, they employed the latest mining technologies to extract gold from low grade ores, imposed labor conditions on the basis of race (including the legal foundations of Apartheid in South Africa), and directed investment capital toward profitable mining in support of the monetary gold standard and shareholder dividends. Along with hundreds of other mining engineers, they oversaw a world-historical expansion of the world’s gold supply through the expansion of gold mining on the Witwatersrand in the Transvaal Republic and in Western Australia, effectively doubling the world’s supply of gold in two decades.

These engineers were agents of transnational extractive capitalism and the British and American empires. As an integral component of their careers, they operated in the core of empire: major centers of investment such as London and New York, the media and publishing worlds, and even world’s fairs. They communicated their professional activities and technical developments through the Engineering and Mining Journal, the premier mining publication of the era. They promoted world’s fairs, ensuring that mining was prominently featured as an aspect of civilization at these expositions. They also acted as public intellectuals, speaking and publishing on topics of empire, well beyond the purview of the mine. Based on archival research, contemporary technical journals and media accounts, and autobiographical documents, this dissertation analyzes the influence of American Mining Engineers, both good and bad, in shaping the British Empire and the modern world system before the outbreak of World War I.
1. INTRODUCTION: MINING FOR EMPIRE

Those who see one set of problems in Egypt, another in China, a third in South America, a fourth in South Africa, or trace their connection merely through the old political relations between nations, will be subjected to a rough awakening. —J. A. Hobson, 1900

In 1895, John Hays Hammond planned an urban uprising in Johannesburg, aimed at securing independence for the city—and the adjacent Witwatersrand goldfields, the most valuable gold deposit in the world—from the Boer-dominated Transvaal Republic. Hammond aimed to spark an insurrection and kidnap President Paul Kruger, while an armed filibustering column of 600 men would sweep across the veldt and aid in the city’s revolt. It was an invasion, a coup d’état, and the kidnapping of a head of state, all rolled into one plan. It failed miserably, and Hammond faced a death sentence for treason. He was an American mining engineer, in southern Africa as the consulting engineer for Cecil Rhodes’s companies, the Consolidated Gold Fields, Limited. In 1901, Herbert Hoover seized the entire coal mining industry of the Kaiping Valley in China, including the mineral rights to mine the massive coal deposits. The young American mining engineer was in China at the behest of C. Algernon Moreing, the senior partner of the British engineering and financing firm, Bewick, Moreing & Co. In 1918, Hennen Jennings authored an article for The Engineering and Mining Journal, in which he proudly reported that the Witwatersrand had produced nearly £500,000,000 in gold in twenty-nine years of mining. This was unprecedented in world mining history, as it doubled the world’s supply of mined gold. Jennings had been the consulting engineer for H. Eckstein & Co., the largest mining firm on the Rand. Gold, according to Jennings, had “no intrinsic value except as an incentive or stimulant to future

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human enterprises, effort and labor. Its stored value vanishes when the mass of the people repudiate it.”

While in the employ of British capitalists and imperialists, these three American mining engineers directed the extraction of millions of tons of gold-bearing rock and made it into money and wealth. They were first and foremost agents of international capital. These American mining engineers aided in maintaining and expanding British-American imperial domination by mining gold to support the monetary regime, channeling investment capital and technology into the empire’s periphery, exporting distinct ideas about race, labor, and economics into their mining colonies, and by acting as public intellectuals and experts in their movements between the imperial core and the extractive periphery. This dissertation examines the professional biographies of Hammond, Hoover, and Jennings during their careers as engineers to British mining investment firms, in which they played central roles to envision, engineer, and execute projects of imperial extractive capitalism.

Hennen Jennings is the least known of the three engineers, but he was vital to shaping the gold mining practices on the Witwatersrand as consulting engineer for H. Eckstein & Co., the local subsidiary of the largest mining investment firm in southern Africa, Wernher, Beit & Co. During his decade-long tenure on the Rand, Jennings oversaw the development of deep-level mining in the largest low-grade gold deposit in human history. John Hays Hammond enjoyed a much shorter tenure as consulting engineer to Cecil Rhodes’ Consolidated Gold Fields, Ltd. and the royally-chartered British South Africa Company, but he was instrumental in transforming the political order of southern Africa.

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through a dreamy vision of a quasi-independent political district run by mine operators and worked by “a vast black army of Kaffirs.” Granted, his vision failed miserably and landed him in jail, but it did serve to escalate tensions between the predominantly British and American mining industry and the Boers, which erupted into the Anglo-Boer War. Herbert Hoover is certainly the best known of these engineers, but for his later Presidency and not his engineering. As a young engineer, Hoover worked for Bewick, Moreing & Co. in Western Australia and China, and then became engineering partner in the firm, controlling much of the gold production of the antipodes.

These three men had profound impacts on the extractive colonies of the British Empire, especially in southern Africa and Australia. Yet, they were also very much a product of the American West’s mining districts and the evolution of mining technology. Following the gold strike in California in 1848, the American West became the world’s predominant laboratory for developing mining technology, and Jennings, Hoover, and Hammond all had mining experience in California and other western mining districts before moving abroad. Jennings and Hammond worked in Latin America as well, with Jennings serving as the consulting engineer for the rich El Callao mine in Venezuela, and Hammond at the Minas Nuevas mine in Sonora, Mexico. The American West, southern Africa, and Australia all share a violent legacy of settler-colonialism. Settler-colonialism is a subset and compliment of colonialism involving the replacement of indigenous peoples with an invasive society of settlers, who, over time, develop their own distinct identity and sovereignty, often along lines of race. Indeed, according to Eve Tuck and K. Wayne Yang, “Ideologies of US settler

colonialism directly informed Australian settler colonialism,” as well as “South African apartheid townships,” all of which “were modeled after U.S. seizures of land and containments of Indian bodies to reservations.”

Engineers played a central role in inventing and implementing racialized labor practices in the British colonies, similar to practices that had developed to ensure White supremacy in the multiethnic American West, including different pay scales and job assignments based on race, a callous disregard for the health nonwhite miners, importing scab labor, and leveraging perceived racial differences to suppress the wages paid to all of the miners who worked the ore seams. Far from being the mere technical servants of capital, these engineers actively leveraged their technical experience to direct investment capital, and they played an integral role in creating and supporting the modern global imperial system.⁵

**Gold**

Gold is a compelling substance. Each atom is born in the collision of neutron stars, along with other heavy elements such as platinum and uranium. Until recently, astronomers postulated that heavier elements such as gold were the biproducts of supernova; however, observation of the collision of two neutron stars by Harvard astronomers has pointed to these collisions as the most probable celestial source. Gold does not naturally degrade, tarnish, or rust. One of the least reactive elements, it is resistant to most chemical solutions, except for cyanide, mercury, and aqua regia, a mixture of hydrochloric acid and nitric acid

that can also dissolve platinum. It is dividable: with simple technology, fine gold is easily cut or divided without a loss of the substance. There is little waste in this process, making it useful for currency as there is no loss of overall value with division. A skilled metalworker can even hammer gold to such a thinness that it is translucent.

Gold is a relatively scarce element, and sheer scarcity is a means of value to an extent. Only about one-millionth of the atoms on Earth are gold atoms, and a good proportion of the world’s gold is compressed in the planet’s core, essentially inaccessible. Much of the gold in the planet’s core, in fact, is a result of the planetary formation process and Earth’s molten formation. Oddly, the cosmic bombardment of a young earth by auriferous asteroids introduced much of the surface gold over billions of years. Over those eons, gold also percolated through the mantle and to the surface, and, through tectonics and erosion, was uplifted into mountain ranges and trickled down alluvial flows into streams and rivers.

At the atomic level, gold has 79 protons and electrons, with the outer energy level of each atom only containing one electron in its most stable form. Similar to silver and copper, this floating electron makes gold a good conductive substance, and has applications in electronics, but widespread electrification with gold wiring would have been cost-prohibitive, if not impossible. According to Timothy LeCain, the “distinction between precious and base metals, though, is substantially a function of relative scarcity and cultural fashions.”

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7 Santiago Tassara et al., “Plume-subduction interaction forms large auriferous provinces,” *Nature Communications* 8 (October 2017): 1-7, [https://www.nature.com/articles/s41467-017-00821-z](https://www.nature.com/articles/s41467-017-00821-z).
Arendt argues, “Gold hardly has a place in human production and is of no importance compared with iron, coal, oil, and rubber; instead, it is the most ancient symbol of mere wealth. In its uselessness in industrial production it bears an ironic resemblance to the superfluous money that financed the digging of gold.” In *Das Kapital*, Karl Marx considered gold as the “universal equivalent,” the basis of money. Its real social function was as a signifier and store of wealth—whether in currency or jewelry, gold meant money.

Between 1492 and 1914, the mines of the world produced approximately $16 billion worth of gold in 1914 dollars. Yet just over half of that value, $8.5 billion, had been mined in the twenty years before the outbreak of the First World War. The world-economy’s supply of gold doubled in twenty years, and Hennen Jennings, John Hays Hammond, and Herbert Hoover all directed major gold mining enterprises during that period, with numerous large mines under their purview. As the global economy rapidly expanded despite frequent market fluctuations, the doubling of the world’s gold supply permitted a massive expansion of the world’s monetary supply, since all of the major powers’ central banks adhered to the gold standard. Herbert Hoover recognized that “every gold coin that is minted not only increases the supply of money by the amount of its face value but immediately becomes the balancing point of an inverted pyramid of credit which is immediately built upon it. Credit has gone on [expanding] along with the expanding gold supply.” For John Hays Hammond, the appeal of gold was well beyond its “overwhelming allure,” to encompass the

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12 Herbert C. Hoover, “Are We Near Gold Output Limit?” *The Sun*, (8 September 1912), 3-5, in Box 51, Pre-Commerce, Herbert Hoover Presidential Library, West Branch, Iowa, hereafter HHPL.
economic reality that it “meant wealth.” Gold “signified freedom from menial toil,” and “represented social distinction, power, influence, and prestige. Gold furnished a firm foundation for fortune.”¹³ Hennen Jennings even went as far as considering gold coins as “storage cells of human energy, as to obtain them labor of hand and brain must be expended; in fact, they are thus charged with human electromotive force.”¹⁴ These three engineers argued that the gold industry was essential to the world monetary system by mining and creating the means of expressing wealth and value. By extension, their mining expertise and activities were foundational to the system of credit and financing which undergirded modern industrial development in Europe, North America, and the peripheries of their empires.

In *Carbon Democracy*, Timothy Mitchell argues that carbon fuel influences the political order depending on its material state, an “outcome of particular ways of engineering political relations out of flows of energy.” For example, as a fuel, coal is immediately usable at the point of extraction. It is, therefore, vulnerable to breaches in the chain of control and power; a striking union can seize a position such as a mine entrance, railhead, or port and stop the movement of coal, effectively depriving a region or nation of their vital fossil fuel. Oil, on the other hand, requires intense and technologically-complex refining to turn into a viable source of fuel; this allows for oil companies and shippers to control distribution and supply by keeping the crude oil in a non-usable form until its refining (in highly controlled areas far from the point of extraction) and sale. Given the centrality of coal and oil to the modern industrial economy, their extraction and use influenced the monetary systems of the British

and American Empires. “Political possibilities,” according to Mitchell, “were opened up or narrowed down by different ways of organizing the flow and concentration of energy, and these possibilities were enhanced or limited by the arrangements of people, finance, expertise and violence that were assembled in relation to the distribution and control of energy.”  If we consider money and credit as a form or component of industrial energy, which Hennen Jennings certainly did, Mitchell’s argument can extend to gold ore as well, but especially the low-grade ores of South Africa and Western Australia. In comparison to a readily usable or salable mineral, such as diamonds or a placer deposit of gold, a low-grade auriferous ore is only valuable if the expensive and technologically-complex means of processing are available and can be operated at a low enough cost to ensure profitability. Therefore, it was mining engineers in command of the technical processes that controlled the ability to turn low-grade auriferous ore into the most valuable commodity, the universal equivalent. Theirs was the engineering of monetary relations out of perceived mineral value, notably that of gold; their gold joined iron and coal as major mineralogical drivers of the modern industrial capitalist world.

Recently, environmental historians, geologists, and other earth scientists have been debating whether human activity has caused a new geological epoch, controversially named “The Anthropocene.” The Working Group of the Anthropocene has now suggested that the beginning of the epoch should be around 1950, but other proposals put the date around

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1800, coinciding with early British industrialization.\textsuperscript{17} Paralleling the 1950 beginning of the Anthropocene, J. R. McNeill and Peter Engelke argue for the “Great Acceleration,” a period after 1945 in which the human population has more than tripled while global carbon emissions from fossil fuel use skyrocketed, accounting for three-fourths of the atmosphere’s carbon. Nearly every metric has shown rapid, unprecedented growth, whether it is the number of automobiles, atmospheric carbon levels, or the loss of habitat and biodiversity.\textsuperscript{18} Yet the period between 1890 and 1914—the heyday of Hammond, Hoover, and Jennings—clearly offers a prelude to the Great Acceleration.

Hennen Jennings realized this first acceleration when he examined the state of the global extractive industry in a 1914 speech at the Columbia School of Mines in New York. He pointed to statistics indicating that the “last 15 years’ production of coal has been equivalent to the 97 previous years. That the last 8 years’ production of petroleum has been greater than all previous years in history.” Copper and iron production similarly skyrocketed, as did membership in professional engineering societies, and the global spread of American mining engineering expertise. Jennings went so far as including a set of diagrams for his speech (Figure 1), demonstrating the dramatic spike in mineral commodities production between 1890 and 1910.\textsuperscript{19} If the era of 1945 to the present is the Great Acceleration, then the “engine” of unprecedented economic expansion, carbon pollution, and human population growth was developed half a century earlier and well before the outbreak of three


\textsuperscript{19} Hennen Jennings, Mining as a Profession, Including First Stages of Metallurgy (n.p.: Mining and Scientific Press, 1914), 1-4, 13, in Box 31, Hennen Jennings Collection, American Heritage Center, University of Wyoming, hereafter HJ Papers.
decades of global warfare and economic crisis.²⁰

Engineering can be defined as developing and applying technology to a solve a problem. Technology, according to historian David Noble, “was nothing more nor less than the transformation of science into a means of capital accumulation, through the application of discoveries in physics and chemistry to the process of capital accumulation.” Indeed, “the concurrent emergence of modern technology and the rise of corporate capitalism,” Noble argues, are “two sides of the same process.” While science and technology often developed through independent sites and processes, exchanges and applications back and forth resulted in more efficient and profitable technology, albeit with a long string of failures along the way. Key to this process are the professional engineers, who were “the foremost agents of modern technology… as well as agents of corporate capital.”²¹ Mining engineers such as Hennen Jennings, John Hays Hammond, and Herbert Hoover gained experience in the mines and works of the American West, and moved to wherever their services were needed, based on the geology. They were members of what Clark Spence calls “a highly cosmopolitan fraternity.” They went to the top American universities, namely Harvard, Yale, and Stanford, and had mining experience in the crucible of modern mining engineering technology that was the American West. Granted, many engineers specialized in a mineral or a particular field, such as milling or smelting, but they applied their flexible skills and training applied across the world. Reflecting the professionalization of American

1: Hennen Jennings' calculations of world industrial production
industry, shareholders of mining corporations demanded the services of professional mining engineers to ensure a return on their investment. These engineers wielded complex technologies to extract gold in the British Empire, and they engaged in social engineering projects in and around their mines. These projects of social engineering, such as confining Black workers to fenced and guarded compounds, contribute to “the technological veil” according to philosopher Herbert Marcuse, which “conceals the reproduction of inequality and enslavement.”

The Economics of Imperial Gold Mining

On the outbreak of the Great War, the empires of the Triple Entente controlled ninety-one percent of the world’s gold production, with the overwhelming majority coming out of mines in South Africa, Australia, the American West, Alaska, and Canada—all of which were in either the British Empire or the United States’ territory. The massive expansion in global gold mining contributed to what sociologist Giovanni Arrighi termed the British Systemic Cycle of Accumulation (SCA) or the long-nineteenth century. This long century spans roughly from 1780 until the outbreak of World War One, defined by British capital accumulation to the London metropole. Using Marx’s formula of money (M) and commodities (C) for capital accumulation, Arrighi outlines the general patterns of the SCA. Money exchanged for commodities (MC) defines the rise to economic hegemony, with commodities exchanged for more money (CM’) or financial manipulation (MM’) marking the

Geographer David Harvey argues, “Capitalism is necessarily technologically dynamic,” and that the “struggle to maintain profitability sends capitalists racing off to explore all kinds of other possibilities,” including new mineral deposits around the world.25

In his analysis of the formation and rise of San Francisco as an imperial city, geographer Gray Brechin argues for a “pyramid” of mining, “whose base consists of mechanization, metallurgy, militarization, and moneymaking (or finance) and whose apex is mining.” Viewing the larger trends of state-simplification, industrialization and “high-modernism” in the late nineteenth and early twentieth centuries, political scientist James Scott argues that attempts to make a complex environment “legible” to a central state apparatus involves the marginalization and loss of local knowledge, and that this resulting centralization of knowledge within the state or corporate apparatus occurs at the expense of an intricate awareness of environmental complexity. Such simplifications, as in a market system, “necessarily reduces quality to quantity via the price mechanism. . . . global capitalism is perhaps the most powerful force for homogenization.” Finally, the incorporation and professionalization of the mining industry also reflected broader trends within American industry, such as corporate integration, professionalization, and bureaucratization, as argued by Alfred Chandler in The Visible Hand and Alan Trachtenberg in The Incorporation of America.26

The interlocked logics of extractive capitalism and imperialism connected gold mines in the colonial periphery to the rest of the world, and mark a major theme of this dissertation. The movements of engineers aided this, as they traveled the globe on railroads, steamships, horses, mules, camels, wagons, and automobiles. Their communications also transcended the boundaries of the nation-state, whether through the telegram or through professional journals. Therefore, a transnational methodology that charts the movement of gold, engineers, currency, technology, and ideas is essential. In their argument for considering global history, Michael Geyer and Charles Bright argue that “Within this integrating world, Europeans and Americans increasingly drew the lines of demarcation that defined an emergent global center over and against the rest. Global integration entailed a spatial reorganization of human and capital mobility.” They further advocate for an examination of four “reversals” of the modern age: the expansion of industrial forms of production and destruction; the construction of regimes of order in an attempted unifying effort; migrations and the movement of people and ideas; and the construction of the nation-state as normative. These four reversals disrupted historical economic relations, and by extension, “trade and production were most heavily concentrated and grew most rapidly in the core region.” However, as geology dictated where mining occurs, imperial “intensification and concentration of capitalist production” extended to its extractive colonies, “binding the world together in tighter, if always uneven and unequal, global circuits of power, capital, and culture.”

In examining of the capitalist transformation of the American West, William

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Robbins notes, “inquiries into political economy and systems of power and dependency are central to understanding historical change.” Richard White’s examination of the transcontinental railroads of North America is similarly relevant, especially given his argument about the intersection of markets and the state. Railroad markets, according to White, “were historical; they comprised particular practices, most with active state involvement: subsidies, regulations, military protection, and so on. . . . there is no such thing as a market set apart from particular state policies, institutions, and social and cultural practices.” Furthermore, White’s analysis of the transcontinental railroads reveals the transnational nature of modern engineering projects and practices, as their directorship was often continuous despite the national boundaries in which they operated, and their financing came from international credit markets. As gold mining depended heavily on capital flows and unequal geographic extraction and accumulation, the borders of the nation-state or the suzerainty of an empire seem fungible; during the escalation to the Jameson Raid in South Africa, John Hays Hammond actively worked to extend the British imperial sphere to encompass Johannesburg and the Witwatersrand, stripping the Boers of a valuable mining district and reshaping the Transvaal Republic.²⁸

Empire drove much of late nineteenth-century extractive capitalism. Of course, the term “empire” is quite problematic in and of itself when left undefined. Historian Charles Maier offers a set of definitional criteria for the concept. His criteria includes a ruler or ruling class such as a monarchy, a city-state, a corporation such as the British East India Company, a parliamentary republic, or some combination thereof; a transnational elite, imperial art and

architecture in the core, an extractive periphery, a military able to control and defend its colonial interests, and a frontier. In the case of Jennings, Hammond, and Hoover, they were members of the transnational elite, among the highest paid professionals in the world, and their ilk controlled major extractive colonies. They operated symbiotically with the imperial military apparatus, both in the Anglo-Boer War and in the Eight-Nations Alliance’s violent suppression of the Boxer Uprising in China. If the situation in an imperial mining colony got out of hand, these mining engineers counted on military intervention, which commentator Max Boot has called “small wars,” designed to secure American commercial access to the world’s markets. World’s fairs, which the three engineers promoted, were perhaps the ultimate expression of imperial art, architecture, and ideology. These men were technical agents of empire during the height of the “Age of Empire,” as defined by Eric Hobsbawm, and engineered colonial social relations. Hobsbawm argues that imperial “Progress was most evident and undeniable in technology, and its obvious consequence, the growth in material production.” Mike Davis further examines staggering human toll of this imperial structure in *Late Victorian Holocaus*ts, as British Imperial policies in India, Brazil, Southern Africa, and China exacerbated the El Niño Southern Oscillation’s cyclic droughts and floods, leading to a death toll estimated between thirty and sixty million people. Empire was as much the racialized labor system on the Rand as it was the glittering Palace of Mining and Metallurgy at the 1915 San Francisco world’s fair.29

Among the more troubling (at least to our times) aspects of these engineer’s world

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was the place of race and racialism as a mode of conducting mining operations and in
general. The racialist pseudosciences of eugenics, social Darwinism, and scientific racism
were on the cutting edge of anthropology, human biology, and sociology in their era. These
ideologies were not crude cartoonish racism; instead, racialism is the view that the various
“races” of *Homo sapiens* hold different capacities for civilization based on geographic origin,
climate, craniometry, or other factors, and that civilizational capacity exists on a spectrum,
with Anglo-Saxon or Northern European industrial civilization at the apex. There was a
certain unfortunate sophistication to these misguided beliefs, as articulated by social
Darwinists such as Herbert Spencer, and by scientific racists such as Ellsworth Huntington
and Madison Grant. Grant’s 1916 *The Passing of the Great Race* was a best-seller which argued
that racial difference in Europe was the defining factor of its history, and that European
civilization depended on the contributions of the “Nordics,” or northern Europeans of
certain lineage. Grant’s work drew heavily on physical anthropology, especially cephalic
indexes, and argued “that race, pure and simple, the physical and psychical structure of man,
is something entirely distinct from either nationality or language and that race lies to-day at
the base of all the phenomena of modern society, just as it has done throughout the
unrecorded eons of the past.”30 Huntington, in slight contrast to Grant’s rigid emphasis on
cephalic index, argued that “The nature of a people’s culture, like the flavor of a fruit,
depends primarily upon racial inheritance which can be changed only by the slow process of
biological variation and selection.” For Huntington, “favorable climatic conditions are
absolutely necessary,” as demonstrated by Northern Europe’s bracing climate and “high

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30 Madison Grant, *The Passing of the Great Race, or The Racial Basis of European History* (New York: Charles
Scribner’s Sons, 1916), xvii, [https://hdl.handle.net/2027/uva.x000368003](https://hdl.handle.net/2027/uva.x000368003).
level” civilization.\footnote{Ellsworth Huntington, \textit{Civilization and Climate} (New Haven: Yale University Press, 1915), 1-2, https://archive.org/details/civilizationand01huntsgoog.} For educated upper-class White Americans racialist ideology—supported by the latest science—was in vogue. Among the disturbing aspects of this is that racialism is arbitrarily adding or subtracting value from a human being based on their dermal melanin levels or geographic origin, based on the prevailing social beliefs and structures of dominance; gold, as a store of wealth, similarly has its value ascribed based on social valuation. Race has no genetic or biological basis whatsoever—racism is the ugly, violent, and powerful social construct that permeated the British and American empires and offered a veneer of justification for atrocity as policy.

However, for Hammond, Hoover, and Jennings, this ideology of racialism was a practical tool of management and control, with parallels to the system of chattel slavery in the Antebellum South.\footnote{See Edward Baptist, \textit{The Half Has Never Been Told: Slavery and the Making of American Capitalism} (New York: Basic Books, 2014), especially xxi.} Mining engineers were expected to leverage perceived racial differences to ensure profitability, whether it was the widespread use of African labor in the mines of the Transvaal in conditions approaching slavery, (as discussed in chapter two) or the Chinese Engineering and Mining Company’s (CEMC) trafficking in over 60,000 indentured Chinese laborers to the Rand to address labor shortages in the mines after the Anglo-Boer War (1899-1902). Herbert Hoover sat on the board of directors of the CEMC and held thousands of shares of its stock, thereby personally profiting from the massive Chinese labor scheme. These cultural exports shaped the extractive regimes alongside of the transfers of technology and reflected the predominantly Anglo-American cosmo-politanism of the engineers. American notions of race and labor intersected in the British colonies in
different ways. On the Transvaal, American mining engineers used a highly segregated workforce, with men of European descent controlling the management of the mining works and monopolizing the skilled miners’ positions, relegating native Africans to unskilled jobs, and advocating a system of labor control that evolved into Apartheid. In the gold fields of Australia, Herbert Hoover’s firm, Bewick, Moreing & Co., undercut the unionization demands of white Australian miners by importing Italians as scab labor, which, under the racist ideology of the day, were considered inferior to Anglo-Saxons. In his analysis of the development of the Saudi oil fields, political scientist Robert Vitalis traces the cultural transfer of race-based labor regimes from the American Southwest, specifically the Phelps-Dodge copper works around Bisbee, Arizona (as detailed by James Byrkit in Forging the Copper Collar) into the management of the workforce of the Arab-American Oil Company (ARAMCO). While his focus is on ARAMCO in the mid-twentieth century, Vitalis’s argument easily extends to imperial gold extraction in the late nineteenth and early twentieth century, as the roots of segregated labor in modern mining developed in part in the American West.33

Mining engineering was also an overwhelmingly masculine field. Historian Clark Spence regards “This branch of engineering,” as “a man’s world, into which but a few of the gentler sex intruded.” Spence was only able to find three female mining engineers in the United States in 1900.34 Ruth Oldenziel argues that American engineers “practiced a style of engineering that came to support this gendered division of cultural labor.”35 Indeed, there is

34 Spence, Mining Engineers, 6-7.
35 Ruth Oldenziel, Making Technology Masculine: Men, Women and Modern Machines in America, 1870-1945
no evidence that Jennings, Hammond, or Hoover employed a woman engineer on their staff. Lou Henry Hoover, Herbert’s wife, would be perhaps the closest example, as she graduated from Stanford with a B.A. in geology, and accompanied her husband to China and Australia, occasionally descending into mines to inspect them, despite gendered prejudice or superstition. Still, she received no salary for her examination, and her labor was largely restricted to the domestic and reproductive, albeit often in extreme circumstances such as the Siege of Tianjin during the Boxer Uprising or in the dusty Western Australian mining towns.

The cosmopolitan habits of mining engineers mark another major theme of this dissertation, especially their communication and representation to the investing public. As part of the rising managerial class of American and international business enterprises identified by historians Alfred Chandler, Robert Wiebe, and Mira Wilkins, mining engineers hobnobbed with political, financial, and imperial elites, travelled extensively between extractive colonies and the metropole. They organized and advocated for mining exhibits at world’s fairs, one of the major expressions of empire in the era. They offered their respected expert opinions in industry journals, newspapers, and in public forums, and as public intellectuals, their opinions on matters beyond mining were solicited and respected. In a recent article, historian Stephen Tuffnell maintains, “American engineers were part of a class of transnational specialists, which included professionals, army officers, and agricultural researchers, who collaborated in the subcontracting of colonial infrastructure projects in the

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British and European empires worldwide.” Furthermore, there is a strong case for examining the social networks of elite historical actors. In his biography of Madison Grant, the American racialist and conservationist, historian Jonathan Spiro dedicated much of his time to describing the social networks of Grant, reasoning that his associates “were an interesting bunch who happened to comprise the ruling class of the United States as it was heading toward the American century.” Jennings, Hammond, and Hoover were a part of this ruling elite.

**Hard Rock Mining in the North American West**

The dramatic expansion in world gold production in the late nineteenth century came out of gold strikes and extractive colonialism in the American West. Before the California gold rush began in 1848, world gold production had been stagnant for decades, largely dependent on mining in Spanish-dominated Central and South America. Much of the mining in the Spanish empire was for silver, with the mines of Potosí producing a fortune through the brutal *mita* system of labor organization. England and the United States, largely depended on trade to acquire gold and silver, and most of their domestic mining was for coal, iron, copper, and tin. California’s gold abruptly changed this, and world history along with it. Word of the gold strike filtered into the Pacific Rim in 1848, drawing a polyglot of miners from East Asia, South America, and Mexico. The United States’ annexation of much of Mexico’s northern territory in the 1848 Treaty of Guadalupe-Hidalgo opened the door for

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the mass migration of Anglo-American miners who swarmed the district, using violence and other unsavory methods to consolidate control over the best diggings. Gold began pouring out of the Sierra Nevada mountains in earnest in the 1850s, spiking the world’s gold supply. At approximately the same time, major alluvial gold deposits near Victoria, Australia came into production, because of Australian miners traveling to California’s gold district, realizing the geologic similarities in Australia, and returning to prospect successfully. By 1853, the two most productive operating gold districts were California and Victoria.

The first gold mined in these districts was from alluvial—or placer—deposits. Over millions of years, ores rich in gold eroded out of the mountains and tumbled down streams, fragmenting and coming to rest in the gravels of streambeds. It was easily mined with basic technology, using the dense specific gravity of gold to separate it from the other rocks by agitating the gravel in water-filled sluices so that it settled below the lighter waste rock, known as tailings. If necessary, the rock was crushed using a Spanish mill called an arrasta, a large circular rock wheel pushed in a circle by a mule on a center pivot; the heavy rock wheel pulverized the ore and freed more of the gold. However, the miners suspected that the alluvial gold had come from larger deposits uphill and upstream, and prospectors fanned out across the American West and across Australia in search of these larger hard-rock deposits, known as lodes or quartz deposits. Alluvial mining is relatively cheap; all that is necessary is a supply of running water, a means of digging and separating the gold from the gravel, and adequate labor. It can be done on a small scale. Extracting gold from a lode is far more capital-intensive and complicated than panning in a streambed, and requires digging to reach

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the lode, breaking and removing the ore from the mine, and, depending on the characteristics of the ore, smashing it into small chunks with a stamp mill and treating the ore with various metallurgical processes to separate the gold from the waste rock. And, in a peculiarity of gold’s atomic structure, the main chemicals used in ore treatment are also extremely poisonous: mercury, chlorine, and cyanide. Hard rock gold mining often leads to environmental contamination from these toxins and from other heavy metals present in the ore.

A second major effect of placer mining and capital consolidation in California was the opening of hydraulic and quartz mining districts in the Sierra Nevada Range. Lode mining, according to Susan Johnson, “required more technical know-how, greater outlays of capital, and often larger numbers of workers than did placer mining.” It also required, as Rodman Paul argues, a healthy dose of “optimism” and “speculative excitement.” By 1853, more than twenty joint-stock corporations formed in London for the purposes of mining auriferous quartz, with approximately $10,000,000 in capital. As these quartz mines mark the first major attempt at hard-rock mining in the Anglo-American West, much of the mining and milling was done through a process of trial and error, borrowing mining techniques and ideas from around the world, but especially from Cornish, Spanish-American, German, and Chinese miners. Out of the California quartz mines came an important ore milling technology: the California stamp mill. Heavy iron heads smashed ore into pieces small enough for washing in a sluice, using the high specific gravity of gold to separate it from the lighter tailings, and often mercury amalgamation as well. The technology of the stamp mill combined with the practical knowledge and experience of the California miners radiated outward from California as the placer mines played out, and combined with San Francisco
and foreign investment capital to reshape the American West based on mineral extraction.42

A common expression among miners in the late nineteenth century reflects the capital-intensive nature of lode mining: It takes a gold mine to open a silver mine. The high initial investment made lode mining a corporate enterprise. Distant financial manipulations in London had a profound impact on the mineral west, “Because the American West was incorporated into the expanding world of capitalism at a relatively advanced period,” as historian William Robbins argues, “the influence of its forces was especially noticeable and disruptive, perhaps even distinctive, to the region.”43 Granted, prospecting and placer mining often preceded profitable lode mining; however, placer deposits often gave out much more quickly than the lodes subsequently uncovered. Local geology dictated the mining methods for extracting the ore from the lode. Regionally, exploiting hard-rock mineral deposits involved transporting equipment to mine and mill the ore, and then, depending on the type of deposit, transporting the milled ore to a smelter. Each mining district used different methods based on the geology and conditions, but these methods evolved and transferred to new districts through the movements of miners and mining engineers. As historian Rodman Paul argues, it is best “to think of the mining West as constituting a series of frontiers, sometimes successive, sometimes widely separated geographically and chronologically.” From early gold-quartz mining in California, lode mining evolved based on available capital, technological advancement, geologic conditions, regional processing and transportation infrastructure, global economic fluctuations, the migrations of miners and mining engineers, urban settlement patterns, and a myriad of other factors. From California, lode mining in the

42 Johnson, Roaring Camp, 188; Paul, Mining Frontiers, 30.
43 William Robbins, “In Pursuit of Historical Explanation: Capitalism as a Conceptual Tool for Knowing the American West,” Western Historical Quarterly 30, no. 3 (Autumn 1999), 281.
West moved east and north to Nevada, Colorado, Idaho, Montana, Utah, Mexico, and ultimately to other continents. Every movement brought cumulative knowledge, practices, capital, and experience in extracting precious metals from ore.44

More recently, environmental historians have produced several important interpretations of mining and mining engineers in the American West. Thomas Andrews’ examination of the Ludlow labor war and massacre of 1914 in Killing for Coal exposes the structures of dominance and resistance in the Colorado coal fields as well as the theoretical device of a “workscape,” which Andrews defines as “a place shaped by the interplay of human labor and natural processes.” Andrew Isenberg argues that the “mining” of California extended beyond placer and hydraulic gold mining to cattle ranching, the timber industries, urbanization, and city planning, and that the value extracted by these industries “inspired further exploitation of nature both within and outside of the state.” Timothy LeCain’s Mass Destruction examines the technologies behind open pit copper mining, as pioneered by mining engineer Daniel Jackling in Bingham Canyon, Utah and Anaconda, Montana. LeCain contends that mass destruction technology reflects a larger story of how Americans view nature, technology, and their material world, and how it became integral to the expanding American industrial economy. Thus, sites of mass destruction and pollution are as much a part of the American consumer experience as the Model T and the refrigerator.45

Geographers have also analyzed the impact of mining on the settlement geography

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of the American West. Randall Rohe argues, “The exploitation of many resources shaped the regional character of the West, but probably none wielded greater influence than gold and silver mining. It caused large and rapid movements of population; it established numerous settlements in the West. . . and it produced a distinctive cultural landscape.” Mining was and remains an integrated part of the market economy. Lode mining, as opposed to placer mining, mandates massive investments of time, equipment, personnel, capital, and expertise before the lode turns a profit, including operations called dead work by practical miners, as the requisite labor and investment brought no immediate returns and would be a speculative loss if the deposit was meager. Changing geologic conditions and ore qualities between the origins of Western lode mining in California and the culmination of long-nineteenth century technological mining development in Bingham Canyon, Utah reflects the adaptations of Western miners, mining engineers, and investors in exploiting mineral deposits. Indeed, “The history of mining in the West is one of changing technology,” Rohe states, “with each successive improvement bringing a greater destruction to the land.” In the sections below, each region’s lode mining potential functions as forms of circular cumulative causation and creative destruction, both economic and technological.46

California’s Sierra Nevada range may be one of the most famous modern mining districts in the world. The mines of Potosí do not have a professional football team named after the pioneering prospectors, and perhaps only the gold mines of the Transvaal or the Saudi Arabian oil fields approach the geopolitical significance of California. San Francisco’s “meticulously edited romance of mining” as Brechin refers to it, begins with the initial discovery of placer gold at Sutter’s mill on the American River and extends into San

46 Rohe, Environment and Mining, 184.
Francisco’s imperial periphery. Easily mined auriferous placer deposits defined the first wave of California gold mining, bringing people into the region from around the world. In the first few months after James Marshall’s January 1848 discovery of gold, the entire Pacific Rim contributed people looking to mine gold and make a fortune. By 1849, the mass immigration to California was a “global but selective” phenomenon. This massive influx of people into the mining districts combined with the capital consolidation in San Francisco had several major effects, but the spread of hard-rock mining across the American West, the rise of American mining engineering knowledge, and the increased supply of gold may be among the most consequential.47 Indeed, Jennings, Hammond, and Hoover all had experience in California hard rock mining before joining British firms.

Mining Cities: London, New York, and San Francisco

In the long-nineteenth century, investment capital radiated outward from London, Paris, New York City, and other major financial centers. Coming out of the Civil War, the United States was a debtor nation, with available capital limited to personal investment and high interest rates. This made all industrial sectors of the US favorable for foreign investment, especially speculative mining investment. Clark Spence documents over 500 joint-stock corporations that formed in London for the purposes of investing in mining operations in the American West, however, their total capitalization is impossible to determine. Concerned British shareholders, having lost money in other speculative mining enterprises in the American West, often mandated inspection and management of mining properties by professionally trained mining engineers. As the Gilded Age economy went

47 Brechin, Imperial San Francisco, 29; Paul, Mining Frontiers, 12-15; Johnson, Roaring Camp, 25, 58.
through a series of boom-and-bust cycles, Wall Street began to accumulate capital and
exercise control over its investments to the extent that prominent mining engineers including
John Hays Hammond kept offices in New York City. After resigning his partnership in
Bewick, Moreing & Co., Herbert Hoover opened an office in London, and ran his own firm
until the outbreak of World War One.48

San Francisco’s motto is “Gold in Peace, Iron in War.” The city, now a core
metropole on the Pacific Rim, is a product of the gold and silver extracted from the Sierra
Nevada and the Comstock Lode. Mineral wealth from the early placer mines returned to the
city, where it was reinvested into quartz and hydraulic mining, returning larger profits to the
city, allowing reinvestment into areas such as the Comstock Lode, which again, returned
profits to the core city at the expense of the environment of its periphery. In examining San
Francisco as an imperial mining city, Brechin draws on Lewis Mumford’s concept of the
megamachine, but also the Italian concept of contado, “the territory the city could militarily
dominate and thus draw upon.” The contado provided “the city with its food, resources,
labor, conscripts, and much of its taxes, while its people (the contadini) received a marketplace
and a degree of protection in return,” forming Brechin’s theory of the Pyramid of Mining.
Employing this methodological framework, the wealth extracted from the Sierra Nevada
gold fields and from the Comstock Lode silver deposit flowed back into the hands of San
Francisco’s elite, which they reinvested in urban real estate, hydraulic infrastructure, media,
and the military-industrial complex while externalizing the environmental costs of mining.
San Francisco is an imperial city, based on mining. Its armaments industry and deep-water
port was essential to developing American naval power in the Pacific Rim. John Hays

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Hammond, a native of the city, served as consulting engineer to the public administrator of San Francisco and to the Union Iron Works of San Francisco, a major manufacturer of armaments and other war materials.49

Similarly, William Cronon’s *Nature’s Metropolis* examines the rise of the city of Chicago. Cronon employs a Hegelian-Marxist approach using the theoretical “First Nature” and “Second Nature” dialectic, and Johann Heinrich von Thünen’s “Isolated State” theory of city-hinterland relations. Chicago, Cronon maintains, reflects the relationship between the city and its rural periphery rather than as a distinct entity because of the role of the rural ecology in supplying raw materials to the city, which are then commoditized. Trees of Minnesota and Michigan’s forests meet the saw, axe, and oxen of the lumbermen, converting them from an ecological entity into a measurable commodity, lumber. By tracing these commodity flows, Cronon argues that he is, in effect, mapping “Second Nature.” When the mines of Western Australia and the Transvaal required high-quality lumber for timbering their shafts, drives, and stopes, they often imported lumber from Oregon and Washington, extending “Second Nature” across the Pacific and Indian Oceans.50 Finally, in examining New York City, Sven Beckert’s *Monied Metropolis* examines the formation of a distinct and self-aware social class, the American bourgeoisie. This class evolved out of the mercantile class of the Antebellum and rode the tide of post-war industrialization and financiering toward fantastic wealth while developing their own social institutions and wielding terrific influence in state and national politics. With this process of capital accumulation came the parallel process of proletarianization of the American industrial worker as the benefits of

industrialization, urbanization, and imperialism accumulated among the New York bourgeoisie at the expense of the lower classes.\footnote{Sven Beckert, \textit{Monied Metropolis: New York City and the Consolidation of the American Bourgeoisie, 1850-1896} (Cambridge: Cambridge University Press, 2001).} Investment in mining and other extractive industries pulled value from the mining district and consolidated it in urban centers, but it often originated in these urban centers and then contributed to their growth, expansion, and capital accumulation.

**Conclusion: Mining Engineers as Agents of Capital**

Unlike investment capital, mining districts are a largely immobile phenomenon. Geology dictates where mining occurs, even if unprocessed ores are often shipped across the world to appropriate treatment facilities. From the foothills of California, to the deserts of Western Australia, and to the low-grade ore of the Witwatersrand, the auriferous ores had to be extracted before they were valuable and mobile as a commodity. In contrast to the geographically fixed ores, mining engineers were highly mobile. As previously stated, mining, milling, and smelting technologies evolved based on local geological and logistical conditions, but the driving forces behind this technological evolution were the engineers who designed, implemented, and operated the mining operations.

This dissertation rests on a broad definition of empire, examining the extractive colonies of the British Empire as well as the developing social and professional world of their closely allied American mining engineers at the turn of the century. It is divided into two sections: the first section examines the professional biographies of Hammond, Jennings, and Hoover while in British employ, while the second section examines the softer aspects of
empire, such as communication, representation, and intellectualism among its engineering agents. Chapter two focuses on Jennings and Hammond in southern Africa in light of the spectacularly rich gold deposits of the Witwatersrand. This low-grade “banket” ore, named after its similar appearance to a Dutch pastry, proved remarkably continuous for miles and is the largest gold deposit mined in human history. However, given the low grade of the ore, it could not be profitably mined without resorting to racialist labor practices, capital-intensive treatment processes, and corporate consolidation and amalgamation. Early mining on the Rand occurred amid increasing imperial tensions between the Dutch-descended Boers and the British-dominated mining industry, which culminated in the Jameson Raid (1895) and the Anglo-Boer War (1899-1902). This chapter demonstrates the implementation of a highly-capitalized technological system of gold mining, but one based on profound labor abuses and power centralization through the major mining investment houses.

Chapters three through five examine Herbert Hoover’s career with Bewick, Moreing & Co. in Western Australia and China. Given his later ascendancy to the office of President of the United States, Hoover has received the most attention from sources in his day and from later scholars. However, few accounts dig deeply into his engineering career, focusing instead on his political ascendancy. Hoover joined Bewick, Moreing & Co. at the age of twenty-three as an inspecting engineer in Western Australia. His ideals of efficient mining came to dominate the firm’s operations in Western Australia, and he began development work at the Sons of Gwalia mine, another massive low-grade deposit. However, Hoover’s driving personality conflicted with other engineers in the district, and C. Algernon Moreing soon dispatched him to China as a consulting engineer to the Director General of Mines in Zhili Province. Hoover arrived in China at the peak of an imperial contest to extract
commercial and infrastructure concessions from the ailing Qing dynasty; the Boxer Uprising and the Eight-Nations Alliance’s violent suppression provided the excuse for European imperial powers to demand further concessions and a massive indemnity. Although he had initially been dispatched to survey China’s valuable metal deposits, Hoover moved to control the coal industry of the Kaiping basin, privatizing China’s largest industrial enterprise and its deposits of coal into the hands of European shareholders and directors for a decade. His actions in China sufficiently impressed C. Algernon Moreing, who then promoted Hoover to partner in Bewick, Moreing & Co., dispatching him back to Western Australia before the ink on the partnership document had dried. His authority in the firm thus expanded, Hoover worked broadly in the mines under his purview to institute a program of efficient mining through cost reductions, and Bewick, Moreing & Co., controlled the plurality of gold production in Western Australia during its richest decade. This first section examines the activities of Jennings, Hammond, and Hoover in the British colonies working directly as technical agents of extractive imperialism.

The second section questions how mining engineers communicated and promoted their profession and work in the colonies. How did mining engineers communicate each other and with potential investors? How was the mining industry represented to the public, and what was privileged in the discourse around imperial mining? And finally, what was the social and intellectual role of the mining engineer in American society and culture? While the only mines, mills, and metallurgical product in this section are in print in technical journal or on display at a world’s fair, this section adopts a modified version of Bruno Latour’s question of “who is really doing research?” inside or outside a science laboratory.52 Replace

“research” with mining, and this section begs the question of who is mining, and where?

Granted, these questions could expand to be the subject of a larger work, but I have selected three aspects or case studies to break the veil on their praxis of communication and representation: a major trade publication, mining exhibits at four major world’s fairs, and finally, the positioning of these engineers into the status of public intellectuals.

Chapter six examines the trade publication *The Engineering and Mining Journal*, based in New York City, and its function for communicating mining intelligence between far-flung districts and engineers and investors in New York, London, San Francisco. Through this organ, engineers around the world kept up to date on the latest technological developments, received mining news from other continents, and joined professional debates on the function, nature, and direction of their profession. Chapter seven surveys the representations of mining at four major world’s fairs in the United States: the 1893 World’s Columbian Exposition in Chicago, the 1894 Midwinter Fair in San Francisco, the 1904 Louisiana Purchase Exposition in St. Louis, and the 1915 Panama-Pacific International Exposition in San Francisco. These fairs provided a legible display of empire to the citizens of the United States and to the world; the mining exhibits pushed a vision of mining as integral to industrial society, but also as a profoundly White, male, and affluent activity. The final chapter argues that these three engineers became public intellectuals following their successes in mining the British Empire. Hammond, Hoover, and Jennings offered their perspectives to the world through written works, speeches, and philanthropy, but much of their message reflects larger racialized ideas while arguing for mining as an integral component of western industrial civilization. Their professional successes and personal wealth imbued them with a certain authority that they leveraged into social prominence.
This dissertation pushes the boundaries of the historiography of the American and British Empires by suggesting a broad interplay between American mining engineers, British mining investment, and imperialism. It suggests broad ties between the British and American extractive industries, whether through expertise, investment, or representation. It demonstrates the transfer of engineering knowledge between extractive colonies in related empires, while emphasizing the transnational nature of investment capital. Further, this dissertation provides a case study for international business and economic history, as well as examples of international technology transfer and the history of engineering expertise. These three engineers were white-collar upper management, yet they had an enormous impact on the modern world. They represent larger trends in the history of mining, technology, empire, and capitalism. However, they are not exceptional, nor is this an argument for American Exceptionalism in either mining engineering or in world affairs. If anything, these engineers were complicit in the repression of the British Empire on its colonial subjects and in the destructive environmental legacy of mining. The careers of these engineers offer anecdotes into the particularly brutal and expropriative history of international capitalism of the late nineteenth century, a glimpse into their methods and means. Finally, this dissertation contributes to the historiography of mining, arguing its criticality to the imperial-industrial world system before decades of global war.

If “history is the fruit of power,” as Michel-Rolph Trouillot argues, “power is never so transparent that its analysis becomes superfluous. The ultimate mark of power may be its invisibility; the ultimate challenge, the exposition of its roots.”53 Trouillot writes in metaphor in this statement, but what if we take him at his word? The power behind imperial mining is

at least obfuscated if not invisible, with mining investment acting on distant extractive colonies, but backed by Maxim guns. Even a mine itself holds much that is invisible from the surface; an underground mine is a bit like an iceberg, with the headframe, hoist, and mill as the only surface indications of something large, lurking below. The rest of the mine is invisible without a codex to decrypt the subterranean environment, namely the mine map. According to historian Eric Nystrom, mining engineers depended on mapping and modeling to visualize, understand, and control the mine; these maps were only legible to engineers and surveyors, making them instruments of their own corporate and imperial power.  

The industrial capitalism of the late nineteenth and early twentieth century depended on mining. Iron, coal, copper, and gold drove this mineral-intensive industrialization. Iron provided the physical structure, coal the thermal energy, copper the electrical current, and gold acted as the universal equivalent and the metallic basis for the system of credit and monetary stability which facilitated exchange and transactions in the world economy. Even today, gold is widely mined for its artistic and electronic uses; there are small amounts gold in the laptops (plural) on which I typed this dissertation. Many of the major technology companies, including Apple and Microsoft, monitor their mineral supply chains to prevent human rights abuses and predatory mining practices; their standards are based on prevailing notions of progress and social justice of our era.  

Our modern “tech” society and industry would not function without mining and minerals. Hoover, Hammond, Jennings, and other American mining engineers abroad felt that their mining engineering and gold extraction in

the British Empire was for the greater good as well, and a mark of progress on the dusty frontiers. They used their engineering expertise for what they considered an overall good in the era: expansion of the gold industry, increased mineral production, and providing a return on investment to shareholders through progressive and efficient gold mining using the latest technology. They were commercial ambassadors of American technological expertise and British capital.
2. A FEW VENAL CONQUERORS: HENNEN JENNINGS AND JOHN HAYS HAMMOND IN SOUTHERN AFRICA

Mr. Rhodes and his gang have been following the old ways. They are chartered to rob and slay, and they lawfully do it.... This is slavery, and is several times worse than was the American slavery which used to pain England so much. —Mark Twain

Below an unassuming stretch of the veldt of southern Africa lay the largest gold deposit discovered in human history. Its discovery and exploitation had broad consequences for southern Africa and the world economy, as it spurred British colonialism and rapidly became the largest contributor to the world’s gold supply at the height of Europe’s age of empire. The Witwatersrand (White Waters Range), or the Rand as it became colloquially known, contained a massive set of mineral “reefs” with a low relative concentration of gold in the ore, and this gold triggered an imperial contest that led to the Anglo-Boer War. As the richness of the Rand became evident, British mining capitalists hired American engineers to run their mines, including Hennen Jennings and John Hays Hammond. These two engineers worked for the two largest mining groups, Wernher, Beit & Co., and Consolidated Gold Fields, Limited, and directed operations at the mines under their management. Without these engineers, especially their racialized labor and efficiency practices and the massive amounts of investment capital they directed, the gold of the Witwatersrand could not be profitably extracted.

Mining engineers practiced a profession of control. In southern Africa, they depended on a racialist system of coerced and exploitable labor, which was essential to the

profitability of low-grade mining on the Rand; they directed massive sums of investment
capital into technologically-complex mining and metallurgical operations; and, as the mines
on the Rand began producing gold at unprecedented rates in 1895, they agitated against the
government of the Transvaal Republic in an attempt to control working costs, culminating in
the failed coup d’état and filibustering expedition of the Reform Movement and the Jameson
Raid. Their racialized labor practices led directly to the system of apartheid. They embodied
political scientist James C. Scott’s “high-modernist ideology,” which required an
authoritarian state, in this case the Transvaal Republic and the British Empire, “willing and
able to use the full weight of its coercive power” to implement their engineering schemes,
especially regarding racialized labor practices. They similarly reflect David F. Noble’s
conception of modern engineering as the interweaving of the “twin forces” of “scientific
technology and corporate capitalism,” which defined the modern world economy.

The gold deposits of the Rand affect much of the world. These deposits became
critical to the international monetary supply, as expanded production dramatically increased
the amount of gold in the world economy, outpacing the production of all the other major
goldfields combined by 1899. This allowed central banks to issue much more paper currency
on their expanded gold reserves, and to meet the expanding currency requirements of
modern, coal-powered industrialization. Under the financial hegemony of the Bank of
England’s maintenance of the gold standard, gold had a fixed price on the international
market of £4.25 per fine ounce. Unlike diamonds, copper, silver, and other minerals whose

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price fluctuated based on market forces, gold’s price per ounce was regulated by monetary policy; the major central banks would always buy gold, eliminating concerns of overproduction or oversupply. Therefore, profits could only come through efficient mining and working cost reductions, especially in the case of the low-grade deposits of the Witwatersrand. The highest proportion of a mine’s operating costs came from human labor, and these costs were the easiest to reduce, especially through racialized labor practices and coercion. Economic historian Charles Feinstein argues that this fixed price was “a powerful constraint on the mine companies, but it could not justify the ruthless manner in which they relied on a combination of military conquest, discriminatory legislation, and collusion to destroy the bargaining position of African mine-workers.” On the contrary, this price constraint on gold enabled the repressive racialized labor program, as it would not have been possible with contemporary technology to profitably mine and treat the low-grade ores of the Rand without what historian Frederick Johnstone terms the “ultra-exploitability of non-white labour” through conquest, brutality, repression, and dispossession.

This chapter is divided into five sections, with a brief conclusion. The first section covers the history and development of the Rand gold fields until 1889, with comments on the larger history of southern Africa. The professional biographies of Hennen Jennings and

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6 In discussing race in southern Africa, I will use the terms Black and African as umbrella definitions to denote people with high dermal melanin levels and ethnic origins on the continent. Granted, there are numerous ethnolinguistic groups in southern Africa, but for the purposes of this chapter, a broad definition is sufficient. In quotes from the era, I maintain the original racialist and racist language of the author, as their conceptions of race dictated their labor policies. Following historian Peggy Pascoe, I similarly capitalize broad “racial” categories, such as “White,” given the pervasiveness and power inherent in these words; see Peggy Pascoe, What Comes Naturally: Miscegenation Law and the Making of Race in America (New York: Oxford University Press, 2009), 14.


John Hays Hammond in their time on the Rand comprise the next two sections. The escalation to the Anglo-Boer War (1899-1902) follows, including a discussion of the role of American mining engineers in the Johannesburg Reform Movement and the Jameson Raid, the attempted coup d’état aimed at deposing the government of the Transvaal Republic. The final section discusses the Rand after British victory in the Anglo-Boer War, and the subsequent careers and lives of Hammond and Jennings, who were now rich men with reputations as incredibly profitable engineers.

From Diamonds To Gold

Nearly every major mining firm on the Witwatersrand had its roots in the diamond mines of Kimberley, as the scramble for diamond-rich ground led to consolidation and amalgamation. In 1867, a few Boer children found a twenty-carat diamond on the banks of the Vaal River, and attempted to sell it to passing travelers. The diamond percolated in the local community for a while, until Sir Philip Wodehouse, governor of the Cape Colony, purchased it for £500. In 1871, as news of other diamond strikes emerged, the British Empire seized the diamond fields from the local Griquas and the Boer Orange Free State, declaring them Griqualand West. A major diamond rush followed, ballooning the population of Kimberley to 37,000. Included in the early arrivals to the diamond diggings were Joseph

9 It should be noted that the term “Reform Movement” came extremely late in the planning of the Uprising, as its plans for an uprising of Johannesburg miners faltered and word of its plans reached the Boer authorities. Naming the conspiracy the Reform Movement was nearly a posthumous action for the planners, who had varying, ill-conceived designs for the uprising. However, for the purposes of clarity, it is sufficient as a term. The uprising never garnered broad support in Johannesburg, and the rising tensions caused many of the skilled White miners, especially the Cornish, to flee the district before the planned insurrection. Charles van Onselen, *The Cowboy Capitalist: John Hays Hammond, The American West, and the Jameson Raid in South Africa* (Charlottesville: University of Virginia Press, 2017), 200, 193-211, considers the Reform Committee to be “for the most part a hastily cobbled-together formal structure for Johannesburg’s professional elite.”
Robinson in 1870, Cecil Rhodes in 1871, Barney Barnato in 1873, Alfred Beit and Lionel Philips in 1875, and Julius Wernher in 1876. As the alluvial deposits of diamonds tapered off, the methods of quarrying proved less effective, and adjoining “pipes” of diamonds were found on nearby farms. This triggered a flurry of claim amalgamations and the formation of joint-stock companies, until Cecil Rhodes’ De Beers Consolidated Mines established control of the industry by buying out his competitors with financial support from the Rothschilds and others. De Beers, as the diamond monopoly, controlled outputs and therefore regulated prices of the luxury item in the markets, thereby ensuring continued profitability. From the Kimberley diamond fields, the gold industry of the Witwatersrand gained a rich inheritance: a huge source of financing from profits on diamond sales; segregated labor practices including pass laws and closed compounds; and corporate consolidation and amalgamation processes designed to concentrate power, wealth, and property in the hands of the capitalists.

Gold was first discovered on the Witwatersrand in 1885 on a farm named Langlaagte, after the cash-strapped Transvaal Republic opened its borders to mineral prospecting and mining which had been legally discouraged in favor of Boer agriculture. After the discovery of the first outcrop, prospectors traced and surveyed the deposit to what became known as the main reef, and in July 1886, the Transvaal government declared the area as a public goldfield. The staking of the town of Johannesburg followed, and was completed by December 1886. The first claims worked were on outcrops, where the main...
reef breached the surface of the ground, and the oxidized red ore could be worked with crushing and a simple metallurgical process known as mercury plate amalgamation. As the reef dipped below the surface, the nature of the auriferous ore changed as well, from a reddish rock that was easily treated for gold extraction to a more complex conglomerate called the “banket,” after a Dutch pastry. The unoxidized conglomerate was a bluish color with almond-sized chunks giving it a confectionary appearance and nomenclature. However, the banket was also a refractory pyrite ore that required further milling and metallurgical processes to separate the gold from its bonded sulphur compound; these processes were expensive. As the value of the reef became evident, mines began equipping treatment works, with the first large mill erected in 1887 on the property of the Paarl-Pretoria Gold Mining Company. That same year, shares in Rand mining companies began trading on the newly-established Johannesburg Stock Exchange, and the first market boom in South African gold stocks commenced. It did not last long, with a downturn starting in 1889.12

The riches of Kimberley’s diamond fields effectively financed early mining on the Rand, and the corporate structures developed in Kimberley translated into the major mining groups out of Johannesburg. According to economist S. Herbert Frankel, “individual gold mining companies are part of a larger whole, i.e. a complex of capital-raising and risk-spreading institutions.”13 Effectively, the groups were large holding companies that oversaw mining and engineering operations at their various mines and controlled financing and

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12 It should be noted that the term “reef” is a mining and geological term for the ore deposits rather than any indication of oceanic origins. For a contemporary description of the geology of the Rand by two practicing engineers, see Frederick H. Hatch and J. A. Chalmers, The Gold Mines of the Rand: Being a Description of the Mining Industry of Witwatersrand South African Republic (London: MacMillan and Co., 1895), 22, http://hdl.handle.net/2027/nyp.33433089970614.

investment, a form of corporate organization that spread throughout the London mining-
investment industry, including Bewick, Moreing & Co., the firm of Herbert Hoover
(discussed in chapters 3-5 below). The genealogy of the Eckstein group demonstrates this
principle. Jules Porgés started in Kimberley, associating with Julius Wernher by 1876, and
the two mining magnates joined with Alfred Beit in 1884. Wernher handled the London side
of the business by soliciting investment, and Beit managed affairs in southern Africa. On
Hennen Jennings’ initial contract to the Transvaal, he engaged with Jules Porgés & Co., the
parent company of the Eckstein group.\(^{14}\)

On Porgés retirement in 1889 the firm became Wernher, Beit & Co., and held the
largest market position on the Rand for decades after. Cecil Rhodes’ Consolidated Gold
Fields, Limited, and Barney Barnato’s investment group share a similar legacy from
Kimberley to Johannesburg, but they invested in Rand properties after the Eckstein group
made its initial investments and therefore controlled less of the Rand’s gold deposits.
Historian Frederick Johnstone argues that the “gold mining industry was an oligopolist but
highly centralized structure of organization and control. The absence of any need to restrict
output, and the massive size of the gold fields, combined to produce a distribution of
ownership between several large corporations,” which were interconnected through
investment capital and personnel.\(^{15}\) These investment groups were effective in channeling
capital to their mines. Between 1887 and 1903, a total of £93.1 million was invested, with
dividends of £18.7 million paid out for an internal rate of return of 8.5%. British investors
provided seventy-five percent of investment capital in southern Africa between 1887 and

\(^{14}\) T. A. Rickard, *Interviews with Mining Engineers* (San Francisco: Mining and Scientific Press, 1922), 231-234.
1914, ensuring a dominant position in regional affairs; these investments accounted for about ten percent of overseas investment from Britain, a substantial market share. While many small investors purchased shares in southern African enterprises, the major groups dominated the field, and for them, gold mining on the Witwatersrand was an exceptional investment as it produced gold for the British treasury and relatively high yet consistent dividends for investors.

These reliably healthy dividends rested on the violent coercions of settler colonialism. Economist S. Herbert Frankel, an advisor in the Finance Ministry of Jan Smuts’s apartheid regime demonstrates the widespread acceptance of this brutality: “The discovery of the gold deposits of the Rand 50 years ago not only marked the commencement of a new era of gold production of incalculable importance to the world as a whole, but also provided the foundation on which European civilization was established in the Union of South Africa and on which it still rests.” By European civilization, Frankel refers to the historical process of White minority rule in South Africa, culminating in decades of apartheid. The process of settler-colonialism in southern Africa began in 1652 with the Dutch East India Company (Vereenigde Oostindische Compagnie, or VOC), who were primarily concerned with establishing productive agriculture to supply maritime trade routes to the Indian Ocean. The British Empire became involved in southern Africa for similar reasons, and until the discovery of diamonds, the region was an imperial backwater, with settlers largely focused on taking land for agriculture. Historian Timothy Keegan argues that British influence, “tended to harden the hierarchies of race rather than dissolve them, and to strengthen the hegemony of white colonists rather than weaken it,” as it did in many parts of

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16 Frankel, Investment and the Return to Equity Capital, 10n1.
the world.  

As British imperialism evolved in the late nineteenth century, in southern Africa it became increasingly corporatist and driven by capital; in addition to seizing lands for profit, especially those of the Matabele, capital pushed the conquered peoples into the labor market. In effect, it was the violent imposition of wage-labor combined with land appropriation to create a large pool of unskilled, dispossessed Black labor, and “the integration of the conquered workers into a new system of production.” Furthermore, according to Lanning and Mueller, “The restructuring of Africa’s economy by the mining companies, and the massive export of minerals and capital they initiated, largely destroyed the self-sufficiency of pre-capitalist agricultural economies.” Effectively, the Boers and the British imposed a White settler-colonialist state through violence and war; the diamond and gold strikes only exacerbated this violence and conquest.

Ideas about race and the process of settler-colonialism are interwoven and interdependent components of imperialism. According to political scientist Hannah Arendt, “Two new devices for political organization and rule over foreign peoples were discovered during the first decades of imperialism,” especially in South Africa in the 1880s and 1890s. “One was race as a principle of the body politic, and the other bureaucracy as a principle of foreign domination. Without race as a substitute for the nation, the scramble for Africa and

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the investment fever might well have remained the purposeless ‘dance of death and trade’…
of all gold rushes.”\footnote{Hannah Arendt, \textit{The Origins of Totalitarianism} (1951; New York: Harvest Books, 1973), 185.} Arendt calls Southern Africa a “phantom world of race,” arguing that what set Kimberley and the Witwatersrand apart from other mineral rushes was “The abundance of natives, of cheap labor, was the first and perhaps most important difference between this gold rush and others of its type.” In fact, the gold fields of the Transvaal could not be profitably mined without Black labor working in a system of near-slavery. “It was soon apparent,” Arendt posits, “that the mob from the four corners of the earth would not even have to do the digging; at any rate, the permanent attraction of South Africa, the permanent resource that tempted the adventurers to permanent settlement, was not the gold but this human raw material which promised a permanent emancipation from work.” Arendt further argues, “The Europeans served solely as supervisors and did not even produce skilled labor and engineers, both of which had constantly to be imported.”\footnote{Arendt, \textit{The Origins of Totalitarianism}, 197-198. Granted, the brutal \textit{mita} system of labor organization under Spanish extractive colonialism in the silver mines of Potosí was equally horrific and callously inhumane, but the labor organization of the Rand differed in the integration of scientific-racialist thought, intensive mechanization of the mine, mill, and treatment works, ties to global investment capital, silver and gold’s temporal relationship to the dominant monetary system, and myriad other factors. See Jason Moore, “‘This Lofty Mountain of Silver Could Conquer the Whole World’: Potosí and the political ecology of underdevelopment, 1545-1800,” \textit{Journal of Philosophical Economics} (2010), 58-75.} Of course, Arendt’s charge that Europeans served only as supervisors is a bit myopic; if anything, the likes of Rhodes, Beit, Porgés, and Barnato were less of supervisors and more of financiers; they imported mining engineers and skilled miners from the United States and Europe to act as technical overseers, control the Black labor force, and extract wealth from colonized lands.

The goals of the mine owners and operators in securing labor are particularly evident in the testimony of George Albu, Chairman of the Association of Mines, in the Industrial
Commission of Enquiry following the disaster of the Jameson Raid and Reform

Committee’s attempted coup d’état (discussed below). His testimony is worth quoting at length:

Commission: Do you intend to cheapen kaffir labour? How do you propose to effect that?
Albu: By simply telling the boys that their wages are reduced. The maximum at present is 2s. 3d. a shift, and we can reduce that to 1s. 6d., that is for skilled labour. For ordinary labour 1s. or less for the shift.
Commission: Suppose the kaffirs retire back to their kraals? Now, in case that happened, and you were without black labour, would you be in favor of asking the Government to enforce labour?
Albu: Certainly. A kaffir cannot live on nothing.
Commission: You would make it compulsory?
Albu: Yes, I would make it compulsory, and without using force a [hut] tax could be levied. If a white man loiters about without doing anything he is run in. Why should a nigger be allowed to do nothing. If there is a famine in a district the Government has to pay for it, and that falls back again on the industry. Therefore I think a kaffir should be compelled to work in order to earn his living…
Commission: Would it not be called slavery?
Albu: Not so long as the men earned a certain amount of money.22

Effectively, Albu oversaw and advocated for a system of coerced and racialized migrant labor for the mines. He effectively argued for a system of collective organization among mine owners and operators to control their labor force. This system was cost-effective for the mining industry as it held an effective monopsony on labor through the recruiting agencies established by the Chamber of Mines, and it provided ninety percent of the labor in the gold mines.

The first of these recruiting agencies, the Native Recruiting Corporation, was established by the Chamber in 1896. It was the only buyer of Black labor-power on the Rand. This labor monopsony promoted labor exploitation in several ways. The recruiters hired African laborers on a temporary contract basis, eliminating the need to feed and house the miners’ families while providing them with enough cash to pay the mandated hut taxes. The labor monopsony exerted a strong downward pressure on African wages through their massive recruitment drives, bringing on thousands of contracted laborers and preventing any meaningful upward mobility among African laborers despite increased levels of mining competency. The costs associated with workplace illnesses and accidents could be externalized; the doctors at the mines recommended that cases of silicosis, or miner’s phthisis, should be treated by discharging the afflicted miner to his rural home for a stout dose of fresh air and no further pay, while industrial accidents could be written off as inexperience and a replacement laborer easily obtained. Johnstone argues that economic and racial social formations, leading to the Mines and Works Act of 1911 and the industrial colour bar, coevolved as a means of ensuring profitability in gold mining and that the economic system of capitalist industrial mining in South Africa could not function without its racialist hierarchy.

The massive pay disparity between White miners, salaried managers, and engineers and the far more numerous Black miners was integral to profitable gold extraction on the Rand. A skilled White miner could generally earn 15s. per shift, around £20 per month, with other skilled labor positions earning up to £30 per month. However, the Black laborers,

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whether engaged in “purely manual,” or “certain kinds of skilled work,” earned around one-tenth of the wages of White workers, due to a concerted campaign of wage reduction “and a scale of monthly payments to natives,” agreed to “by 66 companies.” The Witwatersrand Chamber of Mines organized a “Native Labour Department” to further drive down wages “to a reasonable level,” through broad geographical recruiting and establishing wage scales. For example, the mines of the Rand employed 42,608 Black workers in the first quarter of 1895, at average wages of £3 1s. per month; they employed 5,335 White workers in December 1894 at average monthly wages of £23. If, counterfactually speaking, Black miners earned the same amount as their White counterparts, then the monthly wage bill for Black labor would be nearly one million pounds. Instead, the mines of the Rand paid barely an eight of that amount, not including costs of housing and feeding the Black miners in their compounds, equivalent to around 8s. per African miner per month. In their calculations of labor costs, Hatch and Chalmers reported, “The wages paid to natives, at the present time [1895], at a rate of 60s. a head per month, constitute at least 32 per cent of total working costs,” but potentially up to 45 percent, while White labor accounted for “20 to 25 per cent.”

Depending on the ore grade and other factors, working costs per ton at major deep-level mines averaged £1 10s. per ton, which, given the scale and depth of the low-grade deposit, was quite efficient, and produced, on average 13.8 dwts. of gold bullion per ton for a cash value of £2 7s. 6d. Wages paid to Black labor, therefore, represented about 9s. 7d. per ton; a non-racial pay scale would increase this cost per ton by £3 16s., thereby erasing any possibility of profitable mining. In fact, the Chamber of Mines hoped for further reductions in Native wages, hoping for an “ultimate” rate of 40s. per month, “over 5 per cent less in

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25 A dwt or pennyweight is equivalent to approximately 1.555 grams or 0.05 ounces.
total working costs.” Effectively, the mine operators extracted 7/8ths of surplus value of Black labor in the Rand mines, while subjecting them to brutal working and living conditions.\(^\text{26}\)

American mining engineers such as Hennen Jennings and John Hays Hammond were also responsible for technological implementation and innovation on the Rand. As David Noble argues, technology is the transformation of science into a means of capital accumulation, and the gold mines of the Rand are emblematic of this.\(^\text{27}\) Much of the machinery was of American design and manufacture, a product of the technological developments in mining in the American West and of the expansion of mining engineering schools in the United States. Historian Stephen Tuffnell argues that American mining engineers “constituted a market in themselves and manoeuvred US products into the settler colonial marketplace.” These imported technologies included rock drills, hoisting and elevator apparatus, pneumatic shovels, electrical generators, railroad equipment, and even the barbed wire that circled the compounds and enclosed the fields.\(^\text{28}\)

They also developed several critical technologies on the Rand, unique to the geology and engineering problems at hand. Given that the gold of the Transvaal was a massive, low-grade deposit that required substantial metallurgical treatment to yield bullion, an efficient, streamlined operation designed to maximize the velocity of throughput was necessary. Hennen Jennings was at the forefront of technological implementation as the consulting engineer for the Eckstein group, and the mines under his control implemented large-scale

\(^{27}\) Noble, *America By Design*, 4.
milling operations involving a hundred or more stamps which crushed the ore and released the free-milling gold. The pulverized rock was then moved to immense vats for cyanidization using the MacArthur-Forrest process, which extracted the remaining gold by breaking the atomic bonds between the gold and other refractory minerals. The entire surface process was electrified from the hoist to the cyanide vat, a necessary step when dealing with hundreds of tons of ore per month. African pickers stood over conveyor belts removing non-auriferous rock before the mill using their hands and eyes, but other than that, most of the surface workings were powered by electricity generated by coal. Historian John Higginson argues that this technological innovation and implementation was evidence of “how far discrete groups of engineers were willing to compel the entire workforce to conform to the pace of new machinery.”\textsuperscript{29} Human labor power was restricted to surface jobs that the machines could not do, such as the visual and dexterous separation of valuable ore, and to dangerous underground work that had not been fully mechanized.

Engineers in South Africa operated in the context of settler-colonialism, leveraged racialism in their labor practices, and imported American technology and expertise in the name of profitability for the major mining groups of the Witwatersrand. Hennen Jennings and John Hays Hammond represented the two largest mining groups on the Rand and in southern Africa: Wernher, Beit & Co.’s Eckstein group and Cecil Rhodes’ Consolidated Gold Fields respectively. It is to their professional biographies we now turn.

James Hennen Jennings was born in 1854 in Kentucky to a mining family with ties to the Southern military apparatus that would form the Confederacy. His father owned a bituminous coal mine in Hawesville, but it was not a very successful venture, as the coal was “unsuitable.” After the end of the Civil War, Jennings left for England for his education. He returned to Kentucky after England, and briefly erected and ran a sawmill on his family’s property. However, Kentucky could not hold him long, and he soon attended Harvard University, graduating from the Lawrence Scientific School in 1877. He had studied geology and civil engineering under Professor N.S. Shaler, as mining engineering was not offered at Harvard until after his graduation. He made the acquaintance of Hamilton Smith, a well-known mining engineer who would similarly work on the Rand during its heyday. Smith helped Jennings get an engineering job in California for the North Bloomfield Company, but the position was “chiefly clerical.” It was, however, Jennings’ first professional experience leveraging race as an administrative matter, as he kept “the pay-rolls of the white men and Chinamen,” in his accounts. However, his tenure at the North Bloomfield did not last long, as he moved to the New Almaden quicksilver mine with a recommendation from Smith, initially as a surveyor. He worked under Ross E. Browne, who gave him practical training as a mining engineer.  

Jennings worked in California for about seven years, dividing his time between the New Almaden quicksilver mine and the North Bloomfield Company. He ran a small gold mine in the Sierra Nevada Range, and moved back to the New Almaden as superintendent,

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30 Rickard, *Interviews with Mining Engineers*, 223-227.
which gave him the “opportunity of working a complex lode and experience in working men on contract as well as day’s pay.” His inculcation into managing segregated labor came into play on the Rand, as the district ran on racialist labor policies. He remained in California until 1887, when he went to Venezuela as manager of the El Callao gold mine. His work in California and association with Hamilton Smith and H. C. Perkins made his reputation early on, and the two men pushed for Jennings’ appointment as manager of the El Callao when Perkins left the position. At the time, the mine was declining, but two years before his appointment, “it was the greatest gold mine in the world, yielding $200,000 per month.” It was also Jennings’ first experience in a firm with English financing, and it became a laboratory for engineering personnel and mining practices later exported to the Transvaal. Hamilton Smith had made the first report on the property for the Rothschilds. Captain Thomas Mein worked at El Callao and later became superintendent of the Robinson mine on the Rand. Louis Seymour was a mechanical engineer in Venezuela and moved to De Beers and then the Eckstein Company along with Jennings. His successors at El Callao both managed major mines on the Rand for the Eckstein group, and many of his subordinates also went to South Africa. Jennings later recalled his two years at the El Callao mine “afforded a fine training,” since “The distance of Callao from sources of supply and the honest and progressive work there accomplished by men thrown so very much on their own resources, coupled with the command of large funds to install the best appliances.” His two-year contract with El Callao ended in 1889, and he went to London, contracting with Jules Porgés & Co. 31

Jules Porgés & Co. was the predecessor to Wernher, Beit & Co., and the “parent firm” of H. Eckstein & Co., for whom Jennings worked on the Rand for more than a decade as consulting engineer. He departed London and arrived on the Rand in December 1889, four years after the discovery of gold and three years after the founding of Johannesburg. The district was in the late stages of the boom, and “hopes and market quotations had soared high, but were on the wane.” Many of the mines had yet to show “a substantial net profit, in spite of high yields. No railway had then reached Johannesburg and the cost of working was extremely high, while extractions in the mill were painfully low.” Indeed, the boom faded on Jennings’ arrival, due to increasing complexity of the ore and general speculative frenzy. The initial rush to the Witwatersrand, like many gold districts, attracted prospectors, speculators, capital, and the usual assortment of charlatans, and claims had been pegged out based on the district’s reputation over its geology. According to Hennen Jennings, the depression that followed fell on an industry that “was still young, it was undeveloped,” and most importantly, there was, “immense scope for improving mining results, both as regards working costs and extraction of the gold.” However, despite the speculative depression and low initial yields, the Rand was poised to become the leading gold-producing district in the British Empire, and the Eckstein Group became the leading mining enterprise in the district. Indeed, according to Jennings’ later testimony, it was a “most serious depression, during which all the mines suffered, but it was during this very serious depression that the foundations were laid, by means of hard, earnest and intelligent work.”

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32 Rickard, *Interviews with Mining Engineers*, 231-234.
Wernher, Beit & Co. gained its position on the Rand through financing. Beginning in 1886, Alfred Beit “financed J. B. Robinson in his purchases of farms on the Rand and in return the firm received large holdings in the Robinson, Langlaagte, and Randfontein” mines, which sat above rich deposits. Wernher, Beit & Co. also had “large holdings in the Crown Reef, Jumpers, and Bantjes, and considerable ‘deep-level’ ground.” Mining on the Rand was by necessity a capital-intensive process, requiring high initial investment and a long wait for returns. Jennings later recalled that Wernher, Beit & Co. “endeavored to place the high capitalization due to the boom on a solid basis of actual returns,” by “giving the mines with which they were connected every advantage that science and money could furnish.” As the Robinson and Ferreira mines became profitable, Wernher, Beit & Co. reinvested their profits into other properties, obtaining “controlling interests at low prices in languishing mines or those on which work had been suspended.” This consolidation along with “liberal financing and good management,” led to the Eckstein group and Wernher, Beit & Co. managing a plurality of the mines on the Rand. In 1911, the Eckstein group produced £12,000,000 in gold from nine million tons crushed, employed 8,000 White miners and 56,000 “natives,” and earned forty per cent of the district’s dividends.34

Jennings served as the consulting engineer for the Eckstein group, responsible for overseeing the engineering and management of their massive holdings. He controlled more than ten major mines from the Corner House, as the Eckstein group’s office was colloquially known. On his arrival in 1889, he took several months to survey the holdings and familiarize himself with the complex ore before producing an 1890 report for the principals of the firm. He recommended that “it was right and necessary to spend largely in order to reap

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34 Rickard, *Interviews with Mining Engineers*, 233-236.
bountifully,” and this was “soon done fearlessly on a great scale.” Among the first priorities was to deal with the complex ore to boost extraction. When Jennings made his survey of the district, “nobody realized the great downward continuation of the ore, nor did we know how to best extract the gold.” The Robinson mill was experimenting with several processes, and the Eckstein group decided to begin treating the ore with chlorination. Jennings contacted Hamilton Smith and H. C. Perkins, who engaged a California metallurgist named Charles Butters for the Eckstein group.\(^{35}\)

Jennings and Butters erected a chlorination plant at the Robinson mill, and also observed the development of the MacArthur-Forrest cyanidation process at the Salisbury

\[^{35}\text{Rickard, Interviews with Mining Engineers, 234-238, 121-123.}\]
mine. They adopted the MacArthur-Forrest process at the Robinson mill in 1891, and further engineered the treatment process to be a continuous flow from the hoisting basket to the stamps of the mill to the massive cyanide vats. Jennings also incorporated electrical power into his treatment plants, beginning with the Crown Reef mill. He used “electrical appliances more extensively than any other mine at the time,” supplementing the electric-powered pumps, hoists, and tramming equipment which drew the mined ore from below the surface for treatment. Between these two metallurgical processes and the electrification of the treatment works, the unoxidized gold ore of the Witwatersrand became profitable to extract and treat on a large scale.36

The scale of the Witwatersrand’s gold deposit quickly became apparent. Beginning in 1890, J. S. Curtis, an engineer at the Village Main Reef mine, began drilling survey bore-holes and proved the continuance of the reef of auriferous ore to 530 feet. Jennings directed further survey drilling on the other properties under his management, and the deposit proved to 2,300 feet on the Rand Victoria property in 1893, and then 3100 feet in the South Reef in 1895. In 1892, Hamilton Smith, consulting engineer to the Rothschilds-backed Exploration Company, Limited, made the first estimated valuation of the richest section of the Rand down to 3000 feet and stretching eleven miles. Smith’s “bold and far-sighted prediction” was a shock to the mining and investment community: he estimated that there was £350,000,000 in gold.37 It was the richest gold deposit found on the planet. Smith’s report was picked up by The Times of London, and he began by detailing the world’s annual

36 Rickard, Interviews with Mining Engineers, 234-238, 121-123.
gold production, which had been declining since the depletion of the major placer deposits of California and Australia, and had only begun rising with production from the El Callao mine in Venezuela. Smith, “in common with most persons generally conversant with gold mining, believed that there was but little chance of any very brilliant discoveries being made of new gold deposits.” The Witwatersrand Main Reef changed that. The massive deposit begged the question: “On how large a scale can mining operations be conducted?”

Smith reported on a proposed £1,000,000 investment by a group of British capitalists for development work and treatment plant erection and felt that this scale of investment and industry was necessary. In fact, Smith argued, “Supposing my belief in the uniformity of the beds and their gold contents to be correct, the mine-owner will be justified in erecting plants of a capacity before unknown in the history of gold mining.” His estimate of £350,000,000 in gold overtook the entire historical gold production of California from 1849 to 1892 by just under one hundred million pounds sterling. The Rand was likely to add £10,000,000 per year in gold production to the world’s metals markets, and Smith estimated that the Main Reef had at least a thirty-year life span. With Smith’s estimate and the power of the British Empire, the Rand effectively became the Bank of England’s vault, propping up the international monetary gold standard. It was also, according to Hennen Jennings, “under the mark, as the goldfield from 1887 to June 1915 produced £435,000,000.”

Jennings and the Eckstein group formed a corporation, The Rand Mines, Limited, in 1892 as the extent of the reefs was becoming obvious. The Rand Mines “either purchased at low prices, pegged out, or acquired by amalgamation” approximately 1,700 claims

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40 Rickard, Interviews with Mining Engineers, 240.
encompassing 2,000 acres “that commanded the dip in the choicest districts of the Rand.”

Even then, the properties acquired did not come cheap. The Rand Mines’ initial capitalization of £400,000 “represented only the cost-price of the grounds, without equipment.” At this point in the development of the district, future gold extraction mandated a large capital outlay to purchase or lease the grounds above the reef, due to Transvaal mining law. In contrast to the United States’ apex mining law, where the mining rights followed the vein for as long as it was continuous, the Transvaal’s mining law allowed for mineral extraction only directly below surface claims; therefore, to secure access to the massive Main Reef, the properties above the deposit had to be controlled. Jennings acted as consulting engineer to The Rand Mines on its initial formation, “and laid out some of the first shaft-work,” until the 1893 arrival of H. C. Perkins, who assumed the position. During Perkins’ three-year tenure as consulting engineer for The Rand Mines, the firm started or developed nine subsidiary companies: “the Glen, Rose, Geldenhuis, Jumpers, Nourse, Ferreira, Crown, Langlaagte, and Durban Roodeport ‘deeps’.” Under Perkins’ direction, speed was critical, as the majority of the initial development work was excavating the hundreds of feet of shafts just to reach the auriferous ore. Perkins made “the first great advance in the speed of shaft-sinking,” but his records were soon broken by the engineers of Consolidated Gold Fields, who, under the direction of John Hays Hammond, sunk more than 200 feet of shaft in a single month.41

Jennings’ career on the Witwatersrand was one of management, control, and drawing on the vast resources of British financiers and American mining engineers. He effectively

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helmed the largest engineering and finance house on the Transvaal as the consulting engineer of the Eckstein group, subsidiary of Wernher, Beit & Co. He arrived on the Rand amid a speculative downturn which lasted until 1892, but also as the district’s rich geology became evident. Jennings was able to leverage the investment resources of Wernher, Beit & Co. to expand the property holdings of the Eckstein group when claims were cheap, buying them at low prices before the value of the Main Reef became widely known. Similarly, he had the position and resources to evaluate the effectiveness of different milling and treatment processes for the most cost-effective methods, which could be implemented across a broad sector of the Rand on Jennings’ word. Effectively, Jennings was able to steer the massive industrialization of the Witwatersrand through investment capital and technology implementation. The geology of the low-grade, deep-level, nearly continuous reef mandated an incredibly high initial investment and long wait for returns meant that only mines with high capitalization could even reach the auriferous ore, never mind turn a profit.

Hennen Jennings and the other engineers and metallurgists of the Corner House had the resources and abilities to lay the industrial infrastructure over the richest gold district on the planet, and the time to do so effectively. Hamilton Smith’s promising Times report on the Main Reef came out in January 1893; by 1895, the Transvaal was the world’s top-producing gold district, mining and milling 24% of the estimated gold produced. By the eve of the Anglo-Boer War in 1899, the Rand produced 2,491,593 ounces of gold valued at £10,583,616. Without the massive investment and rapid industrialization led by the Eckstein group and the other major firms, the Rand would not have been able to bring production up to such levels, nor would they have been able to profitably mine and treat the

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low-grade pyrite ore; therefore, Jennings’ career on the Rand and his professional network profoundly affected the district, and by extension, the world’s gold supply and the politics and economics of southern Africa during the heights of imperial contest. Jennings’ career also profoundly affected the finances of gold investment on the Rand, as the mines associated with the Eckstein group had a “total dividend yield” of 142% between 1887 and 1902, according to Elaine Katz. This represented an astonishing return on investment in comparison to the other mines of the Rand, who had average yields of less than thirty percent for the same era. Hennen Jennings was among the top engineers responsible for the industrialization of the Rand; John Hays Hammond was among those responsible for the hardening imperial politics of the British Empire, leading to the Jameson Raid and, by extension, the Anglo-Boer War.

**John Hays Hammond, 1893-1896**

If Wernher, Beit & Co., and the Eckstein group, with Hennen Jennings as their consulting engineer, represented the largest, most productive, and most profitable set of interlocked mining interests in Southern Africa, then diamond magnate and Cape Colony Prime Minister Cecil Rhodes’s efforts certainly represented the most ambitious, narcissistic, racist, and imperialistic. To both rescue his mining enterprises and further his dreams of a White settler-colonialist society in his new namesake country/colony, Rhodes turned to an equally bombastic mining engineer, John Hays Hammond. Hammond arrived in the district late and made few actual engineering improvements or efficiency reforms, but then became a

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key participant in the anti-Kruger conspiracy and uprising known as the Reform Movement and Jameson Raid. These schemes threatened to turn the government of Johannesburg from Kruger and the Boers “to the control of a few venal conquerors,” in the words of mining engineer Robert E. Brown.44


44 As quoted in Van Onselen, The Cowboy Capitalist, 115.
After his imprisonment for treason and subsequent exile from the Transvaal, Hammond leveraged his success into celebrity and attempted to take credit for the development of deep-level mining on the Rand. Many details of Hammond’s life are offered up in his autobiography, but, many of these details are apocryphal or reflect the actions of other men. In examining Hammond’s autobiography, many of the concrete dates and corporate details are accurate, but the events which he recorded are exaggerated to overemphasize his personal role, beliefs, and proclivity to flash his pistol. Recently, South African historian Charles van Onselen has written the first academic biography of Hammond, and argues that the violent traditions of the American West, including vigilance committees, filibustering expeditions, and other forms of extrajudicial violence contributed as much to the Jameson Raid and the attempted coup d’état as British imperial designs and praxis. Hammond, according to van Onselen, was the prime mover among American engineers in planning for the uprising.45 Despite, or perhaps because of, Hammond’s braggadocio, he was appointed consulting engineer for both the Barnato Group and Rhodes’ Consolidated Gold Fields and played a role in the development of the Witwatersrand gold fields and in attempts to develop gold properties and real estate holdings in the corporate settler-colony of Rhodesia.46

Hammond was born in San Francisco in March 1855 to Major Richard Pindell Hammond and Sara Hays Lea. His father had been an artillery officer in the U.S. Army deployed to California on the news of the gold rush of 1848-1849, but he soon resigned his commission in 1851 to begin real estate surveying and speculation in Stockton, an entrepôt

into the Sierra Nevada gold districts. He entered politics in California, rising to speaker of the state house. Sarah Hays Lea arrived in California in 1852 after crossing the Isthmus of Panama, and soon met and wed Hammond; John Hays Hammond followed shortly after their nuptials, born into the developing upper-crust of White California society. His mother and father had both come from elite families in the American South, and Hammond considered himself a Californian and a Southerner as well. He spent his boyhood in San Francisco and received a public education, but also ventured into the mountains and goldfields. When he was sixteen, he was packed off to the East for further education, with a stop in Washington D.C. to meet President Grant. He enrolled in Hopkins Grammar School in New Haven, Connecticut as preparatory for Yale University, and was classmates with Arthur Twining Hadley, later president of Yale. In 1873, Hammond entered Yale University’s Sheffield Scientific School, and gained many influential acquaintances during his time including William Howard Taft, the British scientist and alpinist John Tyndall, the historian Francis Walker, and others on the faculty. He graduated Yale in 1876, and departed for Freiburg, Germany to attend the Royal School of Mines to study mining engineering. He did not complete his course of study. 47

Hammond matriculated at Freiburg until 1879, and toured Europe in his free time. He made the acquaintance of the former Confederate General Nathaniel Harris, who was traveling with his niece Natalie Harris. Hammond began courting Natalie Harris, and they were soon engaged. Before their marriage, however, Hammond departed for Grass Valley, one of California’s richest gold fields. He worked briefly in Grass Valley and toured other mining districts in the American Southwest before approaching George Hearst for a position

as an engineer, performing ore assays and other tasks. His position with Hearst did not last long, as he was soon offered a position with the U.S. Geological Survey inspecting mines in California. This position, according to later recollection, allowed Hammond to “round out my knowledge of mining operations with a study of the economics of mining.” He worked for the USGS until December 1880, and then traveled to Maryland to marry Natalie Harris on January 1, 1881. Returning to California shortly thereafter, Hammond was engaged to manage the Minas Nuevas gold mine in Sonora, Mexico for a group of American mining investors and engineers including Louis Janin, among the most prominent mining engineers at the time. Janin would later recommend a young Herbert Hoover to the British firm of Bewick, Moreing & Co.\textsuperscript{48}

At the Minas Nuevas, Hammond oversaw a highly segregated workforce, since “With the exception of the mine foreman and the metallurgist, the employees were Mexicans and Indians.” This management of non-White labor gave Hammond early exposure to racialized labor practices. He also gained a loyal subordinate in Victor Clement, who he began mentoring in the practicalities of mining engineering; Hammond later recalled that “Minas Nuevas itself was a splendid school in which to acquire a practical knowledge of mining. Since our laborers were entirely ignorant, I was compelled to supervise virtually all mining operations, and this gave my young protégé the opportunity to observe them from every angle.”\textsuperscript{49} Hammond remained at Minas Nuevas until June 1883 when he returned to San Francisco. He did not remain long in California before establishing an office in New York City, adjacent to Wall Street in the Mills Building on Broad Street. From his new office,

\textsuperscript{48} Hammond, Autobiography 1:74-95, 106-114.
\textsuperscript{49} Hammond, Autobiography, 1:114-115.
Hammond inspected mines and consulted on properties in Latin America, including Colombia and Guatemala and further interests in Mexico. He gained several consulting engineer’s positions as well, with Union Iron Works out of San Francisco, a major manufacturer of mining equipment, and with the Original Empire mine, “the North Star mine, the California Mining Bureau, and the Central Pacific and Southern Pacific railroads.” The expansion of his engineering engagements in California prompted him to move back to San Francisco, but he maintained his New York office.  

From San Francisco, Hammond continued his engineering work in the American West. In 1886, he was offered the consulting engineering position for the Bunker Hill and Sullivan silver-lead complex in northern Idaho, but he recommended Victor Clement for the position, as he was widely engaged in California. However, due to his close connection with Clement, Hammond became involved in the affairs of the Bunker Hill and Sullivan, including securing the services of the Pinkerton National Detective Agency’s (PNDA) private detectives on several occasions and personally importing scab miners during the violent 1892 Coeur D’Alene mining strike. In earlier work, I argue that the PNDA conducted a concerted campaign of infiltration, subterfuge, and violence against the union miners of the American West at the behest of mine owners, and that this campaign radicalized the Western Federation of Miners, and by extension the Industrial Workers of the World. Hammond has an interesting proximity to two of the major miners’ strikes in the West, the 1892 Coeur d’Alene strike, and the 1903-1904 strike in the Cripple Creek mining district in Colorado, but further research is necessary. Hammond considered the use of private detectives and security forces to disrupt labor organization as another tool for

50 Hammond, Autobiography, 1:145-158, 176-182
profitable extraction of mineral ore.51

Following the violent suppression of the 1892 Coeur d’Alene strike, Hammond departed the American West, headed for London and an April 1893 appointment with Barnet Isaacs “Barney” Barnato’s mining investment firm, Barnato Brothers. Barney Barnato was another product of the Kimberley diamond fields, and during the capital-intensive claim amalgamation process, had joined De Beers as a life-governor along with Cecil Rhodes, Alfred Beit, and F. S. P. Stow. At the time of Hammond’s recruitment as Barnato Brothers’ consulting engineer, the firm controlled the Glencairn Main Reef Gold Mining Company, the Langlaagte Royal Gold Mining Company, the Roodeport Gold Mining Company, the New Primrose Gold Mining Company, and held shares in other Transvaal gold mining companies, largely through the Johannesburg Consolidated Investment Company. All told, these mines had an authorized capitalization of £715,000, and established treatment works with either thirty or forty stamp mills and planned expansions. Furthermore, Barnato sat on the board of directors for the Johannesburg Estate Company, Limited, which owned the Johannesburg Stock Exchange and other buildings, as well as the Johannesburg Waterworks, Estate, and Exploration Company, Limited, which developed and owned the water supply infrastructure for Johannesburg and assorted other properties, while also serving as an investment vehicle. According to Hammond’s later recollection, Barnato offered him a salary of $50,000 per year, placing Hammond among the highest salaried engineers on the Rand. Hammond further negotiated a profit-sharing arrangement for the properties he oversaw,

the right to withdraw as consulting engineer in six months if either party were dissatisfied, and the ability to hold other consulting engineer positions, provided they did not conflict with Barnato’s holdings.\footnote{52}

Hammond engaged many of his professional subordinates to accompany him in South Africa, including Victor Clement, Ernest Wiltsee, Pope Yeatman, George Starr, and others. These men formed his engineering and metallurgical staff; it was common for a consulting engineer to bring his own staff to a new mining district, but also points to a continuity of practices between engineers. Hammond began inspecting the mines of the Barnato group and other properties and pushed to equip the mines with larger mills and cyanide plants. At the New Croesus, Hammond ordered the mill upgraded from twenty stamps to sixty stamps, and the installation of a MacArthur-Forrest cyanide plant designed by Charles Butters’ Central Ore Reduction Company. He also, according to his later recollection, recommended that Barnato purchase several promising properties including deep-level claims. This particular assertion of Hammond’s is hyperbole, as he was not on the continent of Africa when the first surveys began showing profitable deep-level auriferous deposits, and Hamilton Smith’s famous report appeared in the \textit{Times} four months before his engagement with Barnato. Regardless, Hammond soon soured on Barnato’s business, resigning his position of consulting engineer after six months.\footnote{53}

Soon after his resignation from Barnato’s, Hammond met with Cecil Rhodes and joined the engineering staff of Consolidated Gold Fields. Rhodes is the best-known of the


“Randlords,” due to his sweeping—and violent—imperialist ambitions in southern Africa, including the seizure and founding of the namesake colony of Rhodesia. “Rhodes was the founder or co-organizer of three of the best known corporate entities established on the continent of Africa during the ‘Age of Empire’,” according to historian Colin Newberry.

“These were the De Beers Mining company Ltd., . . . The Goldfields of South Africa. . . and the British South Africa Company, chartered with wide political and military, as well as economic powers. . . to exploit and colonize southern African territories.”

For Cecil Rhodes, mineral development was a means to an end, and that end was his dream of a massive British colony on the southern tip of Africa, complete with industry, agriculture, and a host of subdued natives to provide cheap labor. The three major companies (along with several other concerns) controlled by Rhodes had an interlocking directorate and held each other’s shares, creating a pool of capital for his ambitions. Ian Phimister demonstrates that the De Beers held shares in the crown-chartered British South Africa Company (BSAC) and Consolidated Gold Fields, and that the three ventures freely mingled their finances.

Consolidated held 165,000 shares of the British South Africa Company, and 20,000 shares in De Beers. Indeed, when De Beers issued its February 1892 dividend, they paid 12s. 6d. per share, and offered “a bonus of one fully-paid share in the British South Africa Company of every five De Beers shares.” All told, Rhodes’ main companies existed to finance a massive settler-colonial project of territorial expansion, mineral extraction, and land acquisition. In this, he was joined by Alfred Beit, who served on the board of directors of the BSAC,

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forming an interlocking directorate of gold mining enterprises.\textsuperscript{56}

When Hammond joined Rhodes’ engineering staff, he stipulated a salary of $75,000 per year and profit sharing, but he was joining a much larger set of enterprises than the Barnato group. Consolidated Gold Fields had a capitalization of £1,875,000, and held £1,787,743 in shares in at least twenty-one companies, of which fifteen were mining companies on the Rand, making it effectively a large holding, finance, and engineering firm. Despite Consolidated Gold Fields’ massive capitalization and holdings, the fact was that the Eckstein group had acquired control of the majority of the most promising and profitable properties on the Rand, and Consolidated was late to invest, only forming Goldfield Deep, Limited in December 1893.\textsuperscript{57} Rhodes had hesitated to invest in the Rand, favoring his broader colonization plans north of the Limpopo river with the hopes of discovering a “Second Rand” as a means of drawing British settlers and financing his colonial projects.\textsuperscript{58} In effect, Rhodes wanted Hammond to work as both his consulting engineer on the Witwatersrand and in his larger colonial project of seizing lands to create his namesake colony of Rhodesia—and his immortality.\textsuperscript{59} This was, after all, the man who exclaimed, “I would annex the planets if I could.”\textsuperscript{60}

Hammond held no ideological qualms about Rhodes’ imperialism; on the contrary, he lent his full-throated support to the imperial project, including his engineering skills and personal finances. While engaged with Rhodes and Consolidated Gold Fields, Hammond

\textsuperscript{58} Phimister, “Rhodes, Rhodesia and the Rand,” 75.
\textsuperscript{60} As quoted in Arendt, \textit{The Origins of Totalitarianism}, 121.
was a consultant, investor, and engineer to the Buluwayo Syndicate, among the rawest
eamples of corporate settler-colonialism in an already crowded field. Hammond sat on the
advisory board in Johannesburg, and the company “was registered… to acquire the rights
granted to volunteers and other connected with the war in 1893 against the Matabele in
Matabeleland, South Africa.” The Buluwayo Syndicate should best be considered a
subsidiary of the crown-chartered British South Africa Company, as it received major land
grants of Matabele land from BSAC to the tune of 100,000 acres. Consolidated Gold Fields
received 10,000 Buluwayo Syndicate shares at par as well, a sweetheart deal designed “to give
the Gold Fields Company a larger interest in the syndicate,” further illustrating the
interlocking nature of Rhodes’ colonialist-capitalist project. Alongside Hammond, Robert
Williams, Francis Lowry, S. B. Joel, and Captain Ernest Rhodes sat on the Johannesburg
advisory board, and controlled £50,000 in authorized capital, privately subscribed.\(^61\)

Those private subscribers are a who’s-who of South African mining finance, and
their funds went into surveying, prospecting, mining, land speculation, and infrastructure
development surrounding the settlement of Bulawayo in present-day Zimbabwe. Cecil
Rhodes and Hammond controlled at least 1,000 shares each, as did Barney Barnato, Captain
Ernest Rhodes, Robert Williams, Sigmund Neumann, and many others. The Eckstein group,
however, was not involved. Hammond was directly involved in the operations of the
syndicate, as “the management and control of the affairs of the Syndicate shall be vested in
Messrs John Hays Hammond and Robert Williams,” with “remuneration at the rate of
£1000 per annum and 10% of the net profits.”\(^62\) His holdings in the Buluwayo Syndicate

\(^{62}\) Consolidated Gold Fields et al., to Buluwayo Syndicate, 24 January 1894, Box 1, Folder 1, JHH papers.
later increased to 6,000 shares. Effectively, Hammond was as involved in attempting to secure concessions and mining properties in Rhodesia as he was in engineering for Consolidated Goldfields on the Rand.

Hammond’s projects with the Buluwayo Syndicate involved gold deposits which had been mined before European colonization of southern Africa. Gold mining between the Limpopo and Zambezi Rivers stretches back at least a thousand years, according to recent archeological evidence and oral tradition. Indeed, “the number of early gold mines and the records of lively trade on the east coast,” indicated, according to archeologists Duncan Miller, Nirdev Desai, and Julia Lee-Thorp, that “the scale of precolonial production was clearly extensive and of considerable importance in the economies of some of the region’s Late Iron Age kingdoms.” However, the biggest impediment to indigenous gold mining was the water table in the absence of pumping equipment. The method of hard rock gold mining involved building a fire on the ore face, superheating the ore, and then rapidly dousing the fire and cooling the ore, cracking it for removal, milling, and further refinement, at which point it entered the trade networks of southeastern Africa and the Western Indian Ocean. This method of mining meant that many of the gold deposits found by the Buluwayo Syndicate had already been exploited down to the water table, which became an impetus to profitable modern mining. Since the surface gold had already been mined, mining concerns such as the Buluwayo Syndicate had to make a higher initial investment with a longer timeframe before they could access payable ore, and therefore could not use the profits from

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63 Robert Williams to Buluwayo Syndicate, 15 June 1894, Box 1, Folder 1, JHH papers.
the surface deposits to pay for development at depth, thereby deterring major investment.\textsuperscript{65}

Despite the exhaustion of surface deposits and consequent limits on making a quick profit, the Buluwayo Syndicate began mining operations in Matabeleland, with Charles Jefferson Clark as their principal engineer in Bulawayo. In fact, the presence of old workings indicated the richness of the country, and as Clark reported to Hammond, “The Bank here is receiving large sums of money from private individuals for investment in properties, and anything with an old [mine] working on it is immediately saleable. They are becoming higher priced all the time.”\textsuperscript{66} Clark oversaw at least five paying mines for the Syndicate, including the Dunraven, Bonsor, Queens, Tebekwe; information on these mines is not widely reported and difficult to find, but Clark reported that many of the properties were rich deposits with high gold content per ton, but the deposits were nowhere near the sheer size of the Rand’s low-grade reefs. The mines under Clark’s supervision had similar issues as the Rand’s mines, especially in securing labor. “In the Selukwe district,” Clark reported, “we have not one-tenth enough Kafirs to work our mines. We have great trouble here from scarcity of labour, both white and black.”\textsuperscript{67} As cheap—and often coerced—labor was one of the major factors in profitable mining in southern Africa, it was a major concern for Clark and Hammond. Under the racialized labor system in the mining industry of southern Africa, engineers considered African laborers as abstract calculations.

These racialized abstractions are evident in a report from the Inez mine, which details the mining costs for driving fifty-seven feet of horizontal stopes in one month: “One European at £27 per month… 15 boys at 30/- month… 3 cases candles… 1 packet fuses…

\textsuperscript{66} Charles Jefferson Clark to John Hays Hammond, 6 March 1895, Folder 6, Box 1, JHH Papers.
\textsuperscript{67} Clark to Hammond, 10 October 1895, Folder 10, Box 1, JHH Papers.
1 case dynamite… 2 boxes detonators.” The segregation within the mine extended beyond the enormous wage disparity between the White overseer and the African miners, beyond labor tasks, and into supply and food calculations. A White miner, engineer, or foreman was expected to purchase his own food with wages; African laborers, confined to compounds on the mine property, received “kaffir meal,” a grainy mush which similarly played into the calculations of the engineer. In a list of supplies received at the Inez, the subordination based on race enters into the logistical, with “160 bags kaffir meal,” listed as stores alongside of “2 boxes detonators, 1 packet fuse.”

Effectively, mine labor segregation extended into the mundane arithmetic of reporting supplies, but it was often deadly as well. When toxic air flushed into a shaft in the Tebekwe mine, Clark reported “one of the boys went down to see how the air was at this writing is still at the bottom. We will try and get his body out tomorrow, if the air is not too bad.”

In spite of difficulties in securing adequate supplies of controllable and expendable African labor and high costs to get below the ancient workings, the mines under Clark’s control were still productive. In September 1895, Clark sent 208 ounces of gold from a mine situated on “one of the ancient ruins” to Johannesburg for display. Dr. Jameson, administrator of the British South Africa Company, wanted to “place it on exhibition in Johannesburg, with a big card behind it” as a means of demonstrating the wealth of the lands under the BSAC’s corporate-colonial suzerainty, and thereby attracting further investment capital.

Clark certainly did not limit his investments and activities to the purely auriferous.

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68 “Inez Mine,” Folder 10, Box 1, JHH Papers. The Inez mine was controlled by the United Rhodesia Gold Fields, Limited, whose 750,000 shares were held by Consolidated Goldfields, the Zambesia Group, the Buluwayo Syndicate (of which Hammond was consulting engineer), the Bembesi Syndicate, and other investment groups; Skinner, The Mining Manual for 1895, 674.

69 Clark to Hammond, 2 December 1894, Folder 1, Box 1, JHH Papers.

70 Clark to Hammond, 4 October 1895, Folder 9, Box 1, JHH Papers.
He “secured, with seven others, all of the unappropriated coal area south of the Zambezi,” and planned to form a “gigantic Coal Trust,” which was “going to be a big thing, and one out of which we will make some money.” Clark was also a founding member of the Bulawayo Stock Exchange and was “one of the Directors and one of the Guarantors,” an investor and engineer for the water infrastructure of the city, and had non-mining real estate holdings throughout the city and land grants from the BSAC. He even made an investment in the Johannesburg Opera House which was soliciting £30,000 investment capital for constructing and furnishing. He made numerous investments on Hammond’s behalf, fronting his own money for shares in promising companies on the Bulawayo Stock Exchange or other privately held syndicates. Clark’s operating philosophy in Bulawayo was clear in some the closings of his letters to Hammond, “I hope everything is going ahead well with you and that you are all making lots of money.”

Despite Cecil Rhodes’ grand ambitions for a White colonialist settler state in Rhodesia financed by a non-existent second Rand, the comparatively limited gold deposits north of the Limpopo could not compete with the riches of the Witwatersrand. Hammond and Consolidated Goldfields controlled many rich mines on the Rand. Given Rhodes’

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71 Clark to Hammond, 14 September 1895, Folder 9, Box 1, JHH Papers.
72 Clark to Hammond, 17 April 1895, Folder 6, Box 1, JHH Papers; Clark to Hammond, 14 September 1895, Folder 9, Box 1, JHH papers. It must be noted that the city of Bulawayo had to fight the Bulawayo Waterworks Company until 1924 to gain control of its water infrastructure, in which Clark and Hammond had invested extensively. Such conflicts between private and public ownership of water infrastructure continued throughout the twentieth and into the twenty-first century in both Zimbabwe and South Africa; see, for example, Muchaparara Musemwa, “Early Struggles over Water: From Private to Public Water Utility in the City of Bulawayo, Zimbabwe, 1894-1924,” Journal of Southern African Studies 34, no. 4, (December 2008): 881-889, http://www.jstor.org/stable/40283198, and Patrick Bond, Against Global Apartheid: South Africa Meets the World Bank, IMF and International Finance (Cape Town: University of Cape Town Press, 2003).
73 Clark to Hammond, 26 August 1895, Folder 8, Box 1, JHH Papers.
74 Skinner, The Mining Manual for 1895, 484, reports that Consolidated Goldfields controlled the Simmer and Jack, the Bonanza, the Champ D’Or Deep-level, the Crown Reef and Crown Deep, the Geldenhuis, the Rienforstein Estate, and the Village Main Reef.
initial apprehension toward a major investment in properties on the Rand, Consolidated Gold Fields had a lot of work to do to catch up with the deep-level mines of the Eckstein Group. To recap, the Eckstein Group and Hennen Jennings had surveyed and drilled into the main reef on the Rand and realized the sheer size of the low-grade banket, while simultaneously implementing the MacArthur-Forrest cyanide process and streamlining its electrified milling operations as they pushed to intersect the reef at depth. Consolidated Gold Fields, therefore, had to simultaneously adopt the standard effective treatment works while acquiring deep-level properties and sinking shafts. In fact, Ian Phimister argues that Alfred Beit encouraged Cecil Rhodes and Consolidated Gold Fields into investing in deep-level mining as a means of raising further investment capital on the London markets by leveraging Rhodes’ name and reputation. On the Rand, financing was as critical as technology for profitable gold extraction.

Hammond’s engineering opportunity on the Rand came after the initial development of deep-level mining, but during its peak implementation. In 1894, the Rand produced more than two million ounces of gold, valued at £6,963,100. This production marked the culmination of early deep-level mining, as the mines of the Eckstein group and others reached the reefs and began large-scale mining. It was the largest annual production total since the discovery of the Witwatersrand’s deposit. Production had increased nearly one-hundredfold since 1887’s initial production of 23,149 ounces, and tenfold since 1888’s production of 207,660 ounces. Indeed, “as the economic conditions of mining become more favorable, and as the mines are operating upon a larger scale, and with better management, lower-grade ore becomes more profitably mined,” Hammond reported in a preface to an

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75 Phimister, “Rhodes, Rhodesia and the Rand,” 81
1895 survey of the Rand’s mines that “the available tonnage of payable ore correspondingly increased.” It was, Hammond argued, “to the development of the Deep-Level areas that the Witwatersrand district must look for the most important augmentation of its life.” Their work as engineers was cut out for them: Hammond expected the annual output of gold for the district to reach £20,000,000 per year by the end of the century, and that this would be accomplished primarily through sound management and engineering practices.\footnote{John Hays Hammond, “The Future of the Rand,” preface to \textit{The Gold Mines of the Rand: Being a Description of the Mining Industry of Witwatersrand South African Republic}, eds. Frederick Hatch and J. A. Chalmers (London: MacMillan and Co., 1895), vi-xi.}

One of Hammond’s first laboratories for deep-level mining came at the Robinson Deep mine, adjacent to the rich Robinson mine which was controlled by the Eckstein group. The Robinson Deep formed in 1894 and received its financing and mining claims from Goldfields Deep, Limited, Consolidated Gold Fields’ deep mining subsidiary. It was capitalized at £400,000, shares subscribed, at Hammond’s later recollection, due to the strength of his personal recommendation, reputation, and personal lobbying in Europe. Deep-level mining required an enormous initial capital outlay before any profit could be realized, and therefore speed was of the essence. Two major mining operations had to take place simultaneously: the sinking of shafts to access the reef, and the installation of the mill and metallurgical plant. Hammond directed the installation of the plant with a forty-stamp mill and MacArthur-Forrest cyanide treatment facility, but he focused especially on increasing the speed of shaft sinking. It was, after all, the more time-demanding and arduous of the necessary operations, as the shafts had to descend hundreds of feet through unpayable ground to reach the auriferous reef.\footnote{Skinner, \textit{The Mining Manual for 1895}, 515-516, 625; Hammond, \textit{Autobiography}, 1:291-306.}
The Robinson Deep began shaft sinking operations in 1894, and over the course of eleven months, the two shafts reached depths of 690 and 738 feet. This was not fast enough for Hammond, nor for investors anxious for dividends. They had to reach a depth of 1800 feet before they would encounter the reef, meaning there would be at least two years of waiting at the current pace. He dispatched an assistant to the Comstock Lode mining district in Nevada and to the iron mines near Lake Superior to recruit “the best shaft sinkers he could find, regardless of wages.” Even with this “hand-picked crew,” progress was still slow. Hammond directed another of his assistants, Leslie Simpson, to study shaft-sinking and find ways to increase the pace. Simpson was a young graduate of the University of California and had little experience with shaft sinking, but Hammond directed him to approach the problem without “preconceived ideas.” Between incentives and bonuses for the sinking crews, machine drilling, and other efficiency reforms, Simpson increased sinking rates with the mine reaching 1,600 feet by June 1896. In the next year, the shafts reached the reefs at depths between 1,806 and 2,448 feet, and the forty-stamp mill and metallurgical plant began operations. Shortly after beginning gold production, the Robinson Deep tripled its milling capacity by adding eighty stamps in 1898, and then another eighty, building a massive 200-stamp plant. The three years of shaft sinking and plant erection finally paid off in 1898, as the mine produced 57,718 ounces of fine gold. The mine continued to operate for decades, producing nearly eight million fine ounces of gold by 1930, valued at £33 million. However, Hammond had to supervise the later operations of the Robinson Deep from afar.

78 Hammond, Autobiography, 1:300.
80 “Consolidated Gold Fields of South Africa, Limited,” E&MJ 64 (18 December 1897), 728.
82 Hammond, Autobiography, 1:301.
Another major concern for the mines on the Rand was securing adequate labor, and Hammond and Consolidated Gold Fields emulated the racist practices of the mining groups. As a means of controlling their labor supply, the mines under Consolidated’s control tried to keep their Black miners (who Hammond and other engineers called “boys” and Kaffirs) restricted to living in “compounds” which severely limited their movement. Hammond recalled that he had advocated to “establish native villages near the mines, where boys could live with their wives and families. The mining companies were to provide them with huts and small farms,” as part of a “plan to attempt the civilizing of the wives so that their increasing wants would impose upon their husbands the necessity of continuous work, paralleling in that respect the duty of husbands in civilized communities.” However, under the thin veneer of industrial paternalism and racist civilizing rhetoric lay a closed fist. For Black miners who resisted the demands of the foreman or engineer, “It was frequently necessary to resort to flogging to maintain order among the boys in the compound. Afterwards the natives would come to the managers and thank them, as a dog crawls to lick the hand of its master after a deserved whipping.”

According to Frederick Johnstone, “the mining companies were concerned to secure the maximum possible degree of coercive control over this enormous industrial labour force. The compound system served this purpose.”

Lanning and Mueller consider the compound system to be “an instrument of coercion, the foundation on which the mining industry, and indeed the whole fabric of white minority rule… is built.” Where Hammond felt that he was fulfilling the obligations of the “White Man’s Burden” of Anglo-Saxon imperialism through industrial paternalism, it was far

more akin to a system of slavery with extra steps.

Hammond directly advocated for a system of proto-apartheid on the Rand as a means of controlling labor and maximizing profits. Racial segregation was an integral part of this, both a continuation of Boer racism and of British and American racialism and industrial paternalism. It was, according to Johnstone, also a means of job security for skilled White workers, who occupied “a position of considerable strength in relation to the capitalist class.” By advocating for segregated labor, White miners and other skilled laborers ensured their positions and wages while subordinating informally-trained Black laborers to unskilled positions. Historian Elaine Katz further argues that “The industrial colour bar was also closely tied to problems concerning the origins and development of segregation and apartheid.” Hammond’s embrace of segregation and apartheid was practical as well as ideological, in that he experienced “difficulties” in managing African labor that “were greatly aggravated by the incessant drunkenness of our Kaffir workmen,” due to liquor sales in and around the compounds. This drunkenness was not only “the cause of many accidents in the mines,” as Hammond argued in a 1900 speech, but “of frequent cases of outrage by the Kaffirs of white women and children.” Therefore, to Hammond’s racist thinking, segregation and apartheid were not only necessary for the profitability of the gold mining

86 Johnstone, Class, Race and Gold, 55, 57-72. It should be noted, that while White labor was more well compensated, they were still economically dependent, and that the huge supplies of African laborers and the labor monopsony of the major gold groups exerted significant downward pressure on the wages of White workers. This reinforced class stratification among whites in Johannesburg, with the capitalists and engineers dominating the fields, skilled White workers occupying a position above unskilled Whites and Black labor subordinated by both race and economic position.
88 Hammond, Autobiography, 1:305.
89 John Hays Hammond, “Speech re: Boer War, 1900,” Box 6, Folder 1, JHH Papers.
industry on the Witwatersrand, but desirable for the protection of Whites in the Republic of South Africa.

Surprisingly, Hammond’s most prominent role in South Africa came in the political arena, where his actions led to an armed column of BSAC mercenaries attempting to seize Johannesburg and a subsequent imperial war. As a result of the gold strike on the Rand, large numbers of Europeans and Americans flooded into Johannesburg. This created and exacerbated tensions between the Boers and the “Uitlanders” over political representation, but this debate extended into the circle of mine managers and engineers when they calculated dynamite prices and railroad rates. Hammond blamed the corruption of President Paul Kruger’s Boer government for monopolizing dynamite supplies and selling liquor to African miners, and for restricting political participation for “Uitlanders” as non-Boer Whites were called. This, combined with Hammond’s association with Rhodes, drew him into the “Reform Committee” in Johannesburg. Initially depicted as a movement for reform and lobbying for the franchise for Uitlanders and other economic concerns, the Reform Movement rapidly evolved into a conspiracy for an armed uprising with Hammond admitting to smuggling rifles hidden in mining equipment. Furthermore, the Reform Movement was in communication with Dr. Jameson, administrator of the British South Africa Company, who was actively planning an armed filibuster campaign to seize Johannesburg from Kruger and the Boers. As the Jameson Raid failed to keep its objective a secret, the Boers outmaneuvered and countered the column, attacking and defeating Jameson well away from Johannesburg. The leaders of the Reform Movement, including John Hays Hammond, Lionel Phillips (president of the Transvaal Chamber of Mines), George Farrar, and Francis Rhodes were arrested on charges of treason, with a total of sixty-
four arrests. Hammond was imprisoned in Pretoria and sentenced to death for treason, but eventually had his sentence commuted and was deported from the Transvaal after Cecil Rhodes paid his fine of $125,000. The Jameson Raid and Hammond’s participation in the Reform Movement directly contributed to the outbreak of the Anglo-Boer War in 1899, which will be discussed below.90

Assessing Hammond’s engineering career in South Africa involves wading through much of his self-promotion and hyperbole. He made no major engineering advances, with the only notable accomplishment being the increase in shaft-sinking speed. However, Hammond did assess the potential gold prospects of Rhodesia and of deep-level prospects on the Rand and leveraged his reputation to report accurately and secure further investment. His recommendations, whether to deter large-scale investment in Rhodesian mining or to recommend major investment in deep-level mining, carried weight and moved millions of pounds of investment capital. His racialized labor policies, while not novel to the Rand, contributed to the hardening of racial attitudes in South Africa. His political activities led to the Jameson Raid, and by extension, to the Anglo-Boer War. Make no mistake, Hammond and many of his contemporaries in the mining industry in southern Africa intended to become extremely wealthy through mining, land deals, and other speculative endeavors, primarily through the royally-chartered British South Africa Company, and few tactics were beyond the pale. “To the hard-headed, unromantic business man, who cares nothing for the past and little for the future, it is the land of greatest risk and quickest returns,” Hammond later recalled in an article for *Scribner’s Magazine*. It meant “mills grinding out gold day and night, without ceasing, grinding it out literally by the ton—the greatest gold camp on earth,”

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all powered by “a vast black army of Kaffirs digging forever in endless underground
galleries.”

It was extractive and settler colonialism for the express purpose of profit and
personal enrichment.

Gold Mining and The Anglo-Boer War

War and violence were a feature of European imperialism in Africa. To understand
the outbreak of the Anglo-Boer War, it is necessary to set the historical context by briefly
examining the political history of the Transvaal, and the roots of conflict between the mining
industry and the agriculturalist-pastoralist Boers. In 1652, the VOC founded a settlement on
the Cape of Good Hope as a resupply port for the Indian Ocean trade; it was populated with
about two thousand religious discontents from the Low Countries, French Huguenots, and
radical German protestants nursing grievances against Europe and monarchy. In 1806, as
Napoleon waged war across Europe, the British seized the port and assumed a loose control
over the colony, but the Afrikaners resented British imperial rule and their grievances
simmered until 1834 when the British announced the abolition of chattel slavery in their
territorial possessions. The recalcitrant Boers voted with their wagons, and in 1835-37 began
the Great Trek north across the Orange and Vaal Rivers, forming the Orange Free State and
the Transvaal. It was racialized pastoral conflict, as the Boers seized lands and forced Black
Africans into laboring in their fields. Among the Boers on the Trek was a young Paul
Kruger—future president of the Transvaal—a stubborn, brutal man. He rose in the ranks of
the informal Boer commandos and participated in numerous settler-colonialist incursions

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against neighboring African kings and nations.\textsuperscript{92}

In 1843, the British Empire expanded its holdings in southern Africa by annexing the previously Boer-controlled state of Natal, but within a decade it had also recognized the independence of the Orange Free State and the Transvaal. Following the diamond strike in Kimberley, the British shuffled the lines of the Cape Colony to annex the district and its glittering wealth. In violation of their recognition of the Transvaal's independence, in 1877 the British annexed the Transvaal without any idea of the value of the Rand gold field; this annexation led to the first Anglo-Boer war and the embarrassing defeat of the British at the Battle of Majuba. Paul Kruger led the resistance against British annexation, and in 1881, the British reversed the annexation and tolerated the independence of the Transvaal, provided they could consent to its foreign policy. In 1885, the discovery of the auriferous reefs of the Witwatersrand changed everything. In the course of two years, a chancre of industrialization grew on the face of Kruger's pastoral republic as the gold mining industry built and dominated Johannesburg, increasing the population of non-Boer Whites due to mining and secondary industries. Paul Kruger’s government was generally opposed to the mining industry, but the wealth, resources, and ambitions of men such as Cecil Rhodes and Alfred Beit held a certain inertia. As the value of the Rand’s reefs became evident in the early 1890s, the major mining groups chafed under Kruger’s rule.\textsuperscript{93}

John Hays Hammond later distilled the grievances of the Uitlanders who dominated the mining industry to four major concerns: a lack of political representation and the franchise; high dynamite prices due to a government monopoly; high railway freight rates


\textsuperscript{93} Ibid.
affecting the costs of coal, supplies, and machinery; and the government’s apparent inability to adequately supply the mines with a large population of tractable Black laborers. These “extortions” were of much more concern to Hammond and the other mining elites of the Rand than to the average White man in Johannesburg; aside from political representation, the prices of dynamite, Black labor, and rail freight were concerns of cost efficiency for the mining groups. Lanning and Mueller argue that “the companies were united in their opposition to Kruger’s policies… They complained that the government of the Transvaal was failing to organize the supply of cheap African labour and that the republic’s dynamite monopoly was costing them thousands of pounds a year.” Elaine Katz argues that Kruger’s policies “angered all the mine owners,” but refutes an earlier notion advanced by Blainey that the economic and geologic position of the various mines (outcrop versus deep-level) and groups dictated their willingness to revolt against the Kruger regime. Instead, it seems that the major impetus toward fomenting a rebellion against the government was about who would control the gold fields: groups of European capitalists and financiers with their American engineers, or the Boer government. For this, Historian Charles van Onselen has a unifying theory: Cecil Rhodes, John Hays Hammond, and Dr. Leander Starr Jameson all shared a “belief in the inherent superiority of all things Anglo-Saxon.”

The situation in Johannesburg escalated in the fall of 1895 as gold production hit its highest level, making the Rand the highest-producing gold field in the world. By January 1896, Hammond found himself in the Pretoria gaol on charges of treason. His crimes against

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95 Lanning and Mueller, *Africa Undermined*, 123.
the Kruger government included arms smuggling, conspiracy, “inciting to rebellion and high treason” under the aegis of the hastily-named Reform Movement, which was financed by Rhodes, Beit, and the BSAC. According to his later recollection, Hammond coordinated the smuggling of arms, importing them from England to the Kimberley diamond fields. “There they were received by Gardner Williams, the American mining engineer in charge of the De Beers diamond properties,” Hammond recounted. Transporting the weapons from British-controlled Kimberley to Johannesburg was a more complicated matter, but the conspirators settled on using “empty Standard Oil drums. Each of these was provided with a false bottom,” and contained enough oil to convince the customs inspectors of their benign nature. After the nefarious drums arrived in Johannesburg, Hammond stored them in Consolidated Gold Fields’ properties on the Rand. The “floatation,” as the conspirators referred to their planned uprising, was under way, but plagued with leaks and other issues. The two prominent financial backers, Rhodes and Beit, were safely ensconced in the distant and British-controlled Cape Colony: Rhodes at his Groot Schuur mansion and Beit on a beachfront holiday.

Across the Bechuanaland border, Dr. Leander Starr Jameson made preparations while encamped at Pitsani. He long experience as Cecil Rhodes’ lieutenant in the BSAC, and had gathered a force of 600 mounted men under the banner of the Crown-chartered Company, with “six Maxim machine-guns, two 7-pound mountain guns, and a 12 ½-pounder field piece,” as well as a cask of brandy, and cases of champagne to celebrate their planned victory. By the end of December 1895, Jameson and his force were getting restless.

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Their mission was to relieve Johannesburg once the Reform Committee’s planned uprising began, effectively a filibustering expedition to seize the city, the goldfields, and political control of the Transvaal. Jameson was an old hand at marauding throughout southern Africa, having led columns against African kings and chiefs to seize their lands for the BSAC, Rhodes, and the Crown, although not necessarily in that order. However, as December wore on, preparations for the Reform Committee’s uprising sputtered and the committee sent telegrams to Jameson to hold his force at Pitsani. It had been six months’ preparation, and Jameson would have none of it. In the evening of December 29th, Jameson called his forces together, and ordered the march on Johannesburg, three days’ ride distant. The armed column rode for four days, penetrating 170 miles into the Transvaal Republic and within view of Johannesburg when a force of armed Boers met them near a small town called Doornkop. For the previous two days the Boer commandos had sniped and harried Jameson’s force, but now Jameson was surrounded and no reinforcements were coming from Johannesburg. After a few hours of fighting, Jameson’s column surrendered, and he was hauled off to the Pretoria gaol with his officers and men. The “flotation” of the Reform Movement had sunk, and Kruger remained in power.100

The Transvaal government’s reaction to the Jameson Raid and planned revolt was swift and severe. Hammond, Lionel Phillips (manager of the Eckstein Group), Frank Rhodes, George Farrar, Charles Leonard, Victor Clement, Charles Butters, Thomas Mein, and other conspirators were arrested on January 9th after surrendering their stock of 1,800

rifles. All told, the collapse of the raid resulted in the arrest of 64 members of the Reform Committee.\textsuperscript{101} The Transvaal government soon charged and convicted Hammond and the others of high treason and sentenced them to death by hanging. The British government began lobbying for their release, aghast at the failure of the raid, but not its planning. In fact, Joseph Chamberlain, Colonial Secretary for Her Majesty’s Government, was aware that Rhodes was planning a coup against Kruger’s government, and kept his knowledge of the plans under wraps for years to follow. Effectively, the British government had adopted a “passive leave-it-to-Rhodes policy” in their vague plans for a federated South Africa under British hegemony. Instead of a federated South Africa under British control, the crown got an international incident and increased tensions with Kruger and the Boers.\textsuperscript{102}

An intense lobbying campaign by the British government, the United States government, and the Johannesburg mining industry attempted to reduce the sentences of the conspirators of the Reform Movement.\textsuperscript{103} Eventually, during a personal meeting with Paul Kruger, Barney Barnato threatened to shut down all the mines on the Rand and throw every miner out of work if the sentence was not dropped, a move that would have further destabilized the Transvaal and gutted its treasury. Kruger relented, offering to release Hammond and the others in exchange for a fine of $125,000 per prisoner. Cecil Rhodes paid Hammond’s fine personally, and Hammond retreated to London with his family to continue his work as Consolidated Gold Fields’ consulting engineer, albeit far removed from the Rand.\textsuperscript{104} In his 1937 \textit{Autobiography}, Hammond is explicit: “The Reform Movement as a whole

\textsuperscript{101} Van Onselen, \textit{The Cowboy Capitalist}, 148.
\textsuperscript{103} Van Onselen, \textit{The Cowboy Capitalist}, 315-330 details the lobbying efforts within the US to effect Hammond’s release, largely based around Hammond’s professional circles, his fellow Yale alumni, and Natalie Harris Hammond’s ties to the Southern elite.
was Fascist rather than Bolshevik in its nature. Direct action was finally undertaken by a
group of hard-headed, successful, conservative men of affairs, not hot-headed radicals. It
was the monied element in the revolt that finally assumed the leadership.”

Hennen Jennings later recalled, “I can only say that I had the rare good fortune to keep out of jail and
yet to hold the respect and esteem of my friends in it.”

As resentments between the mine operators and the Transvaal government
simmered, the Witwatersrand Chamber of Mines convened an Industrial Commission of
Enquiry to elucidate the difficulties facing the mine operators. It was empaneled to “institute
an enquiry into the state of affairs generally of the mining industry of the Witwatersrand,”
and they conducted interviews with more than thirty prominent engineers and mine
managers over the course of two months in 1897. The major grievances of the mine
operators were familiar: lighten the duties on foodstuffs for the mines, end the government
dynamite monopoly, reduce rail freight charges on coal and other supplies, and administer
and enforce the Pass, Liquor, and Gold Thefts laws to keep Black labor cheap, plentiful, and
controllable in the compounds. However, an esteemed commission’s report could not

106 Rickard, Interviews with Mining Engineers, 247-248. Van Onselen, The Cowboy Capitalist, 135-137 claims that
Hennen Jennings and Henry C. Perkins personally lobbied President Kruger in the final hours before the
collapse of the reform movement due to their anxieties over the planned uprising, and may have informed
Kruger of details of the conspiracy, even going so far as to pledge loyalty to the Kruger government. Van
Onselen points to Hammond’s wounded and profound egocentrism in not naming Jennings and Perkins as the
midnight emissaries to Kruger, however, anxieties regarding the plan (or lack thereof) for the coup and a
political administration following the uprising certainly would have concerned Jennings and Perkins, perhaps
enough for them to seek a peaceful solution to a rapidly escalating situation. Perkins is reported to have called
the plotters “bloody fools to take part in politics.” Regardless of whether Jennings and Perkins approached
Kruger, Beit and the Eckstein Group were on board with the planned uprising, and Lionel Phillips, the
manager of the Eckstein Group and a close associate of Jennings, was imprisoned alongside of Hammond and
similarly sentenced to death before the commutation of his sentence. It may have been personality,
factionalism, or a pragmatic sense that the revolt was doomed that led to Jennings and Perkins’ apprehensions
toward the Raid, but certainly both knew that political unrest and resulting interruptions in mining operations
would be costly, regardless of success or, as seemed more likely, failure.
contain an escalating imperial contest between the British and the mining industry on one side, and the Kruger government on the other. Tensions between the Boers and British escalated until October 11, 1899, when the Boers declared war.¹⁰⁷

In his seminal history of the Anglo-Boer War, historian Thomas Pakenham argues for the influence of the Randlords in precipitating the conflict: “There is a thin, golden thread running through the narrative, a thread woven by the ‘gold bugs’: the Rand millionaires who controlled the richest gold mines in the world.” Pakenham continues, “I have found evidence here of an informal alliance between Sir Alfred Milner, the British High Commissioner, and the firm of Wernher-Beit, the dominant Rand mining house. It was this secret alliance, I believe, that gave Milner the strength to precipitate the war.”¹⁰⁸ For Britain, the war proved to be the longest, costliest, and bloodiest inter-state conflict between Waterloo and the Great War; it lasted nearly three years, cost more than £200,000,000, and took the lives of at least 59,000 people. Many of the engineers on the Rand evacuated as tensions escalated, including Hennen Jennings in 1898. Gold production ground to a near halt as many of the Black miners fled the compounds and returned to their villages, creating a labor shortage in the aftermath. But, after three bitter years of fighting, the Boers admitted defeat and came under the British empire in return for a free hand in ruling over the African and coloured people of South Africa. Effectively, Cecil Rhodes and Alfred Beit had financed and organized the Jameson Raid to secure British control over the richest gold deposit in the world; the Anglo-Boer War cemented this control while maintaining White minority rule.

¹⁰⁸ Pakenham, The Boer War, xvi-xvii.
The Witwatersrand Mines in War, from "Present Mining Conditions on the Transvaal," E&MJ 71, 8 June 1901.

Jennings, Hammond, And The Rand After The War

The Anglo-Boer War devastated gold production on the Rand. In May 1901, during the depth of the war, only 150 stamps pounded ore on the Witwatersrand as the remaining 5,850 stood idle. Only 74,000 ounces of gold came out of the treatment works that month, down from a pre-war high of 300,000 per month, or a total of 3,536,945 ounces for all of 1899. By April 1902, as hostilities concluded, a third of the mines on the Rand were back in operation, with a third of the milling capacity online as well. The mines of the Rand were

the economic driver of the Transvaal, and bringing them back to production was a priority of the British colonial authority. Most of the technical challenges of profitably extracting gold from the pyritic banket had been overcome before the war, and producers looked to bring the Rand back to full capacity. In the next decade, the largest impediments to maximized gold production were labor issues: Africans refused to return to the mines, indentured Chinese laborers imported by the Chinese Engineering and Mining Company proved costly, resistant to the harsh working conditions, and politically laden, and White miners went out on strike at several key times to protect their wages and status as the mine operators attempted to restrict wages and working conditions.\footnote{Higginson, “Privileging the Machines,” 12-32; Peter Richardson, Chinese Mine Labour in the Transvaal (London: MacMillan, 1982).} Despite the labor difficulties, by 1913, the Witwatersrand’s gold production exceeded all of North America and Australasia combined, contributing $182,351,000 to the world’s gold supply in that year alone.\footnote{Frederick Hobart, “Gold and Silver Production in 1913,” E&MJ 97 (10 January 1914), 51.}

John Hays Hammond quickly returned to profitability as well. Following his release from the Pretoria gaol, Hammond retreated to London, continuing to act as consulting engineer for Consolidated Gold Fields. He returned to the Rand once before the outbreak of the Anglo-Boer War, and took a two-year engagement as consulting engineer to J. B. Robinson, another Randlord and owner of the Randfontein and Langlaagte Estates mines. However, South Africa had lost its allure for Hammond and he sold his shares, reinvesting the profits in mining interests in North America. Some of his withdrawal from South Africa came at the start of a decades-long attempt to refurbish his reputation after the disaster of the Jameson Raid. He also travelled to imperial Russia to survey mining properties before
moving his family and offices to New York City, engaged as a consulting engineer for the Venture Company.\textsuperscript{112} Accompanied by Hennen Jennings, Hammond inspected the Camp Bird Mine in Ouray, Colorado and installed A. Chester Beatty as the mine manager. He also became involved in the Stratton’s Independence mine in the Cripple Creek district during the deadly labor unrest of the 1903-1904 labor war, and renewed his appointment as consulting engineer for the Union Pacific and Southern Pacific Railroads, directed by E. H. Harriman. He was soon recruited to the Guggenheim’s Exploration Company at a fantastic salary, and inspected mines in Mexico and the American West for investment, especially the Esperanza and El Oro mines. The Exploration Company was also heavily involved in financing Daniel Jackling’s massive open-pit mine in Bingham Canyon, Utah, where mass destruction copper mining techniques were perfected. The Exploration Company provided eight million dollars in capital to Jackling and controlled a quarter interest in the Utah Copper Company. Differences in the atomic composition, social use, and ascribed values of copper and gold aside, many of the techniques developed on the Transvaal transferred to Jackling’s mine, including massive milling and treatment works and a high velocity of throughput to work a very low-grade ore at a profit.\textsuperscript{113}

Hammond had made fame and fortune by the middle of the first decade of the new century. He was perhaps the most well-known mining engineer in the world, a product of success, self-promotion, and his imprisonment after the Jameson Raid and Reform Committee conspiracy. A positive recommendation by Hammond on a mine assured


\textsuperscript{113} Timothy LeCain, \textit{Mass Destruction: The Men and Giant Mines That Wired the America and Scarred the Planet} (New Brunswick: Rutgers University Press, 2009), 122-137.
investors of its value, and that the Guggenheims had already ventured their capital. He briefly considered a domestic political career and stumped for his Yale friend, William Howard Taft, during the election of 1908. Given his extensive associations in England, he was appointed by Taft as Special Ambassador to the coronation of King George in 1911. He was an informal advisor to Taft’s “golf cabinet,” and hatched several investment schemes in Mexico, that, in an echo of his South African adventures in corporate militarism, ultimately dependent on the willingness of the U.S. to intervene militarily across its southern border.\textsuperscript{114} However, age and years of traveling to distant mines had taken their toll, and his health began failing. More and more, the famed engineer retreated to his palatial mansion in Gloucester, Massachusetts, on Cape Ann. He devoted much of his time to social and political causes and writings, joining the League to Enforce Peace and other organizations as Europe devolved towards the Great War. In 1926, he made the cover of \textit{Time} Magazine, as eleven dinners in his honor were hosted around the world, in Manhattan, London, Salt Lake City, Tokyo, San Francisco, Johannesburg, and other centers of mining and finance.\textsuperscript{115} He died at his Lookout Hill mansion on Cape Ann on 8 June 1936 at eighty-one years old, having traveled the world and amassed a fortune.\textsuperscript{116}

Hennen Jennings evacuated the Rand in 1898, retreating to London as tensions grew between the British and Boers to work in the London offices of Wernher, Beit & Co. He returned in 1902, “and spent a year in aiding in the reorganization of the mines.” The postwar reconstruction of the Rand mining industry was pivotal, as the “deep-level problem

\textsuperscript{114} Van Onselen, \textit{The Cowboy Capitalist}, 369-410.
\textsuperscript{115} “Political Notes: Unique,” \textit{Time Magazine} 7, no. 19 (10 May 1926), \url{http://content.time.com/time/covers/0,16641,19260510,00.html}.
\textsuperscript{116} Associated Press, “John Hays Hammond, Sr., Dies; Famed Engineer, Adventurer,” \textit{Washington Post} (9 June 1936), 1, ProQuest Historical Newspapers.
had to be re-adjusted on a bigger unit basis,” and a lively discussion over the technical aspects of hoisting from great depths was beginning in the mining engineering presses.

Jennings chaired a board of fifteen engineers and mine operators in producing a “descriptive and statistical statement” of the Rand gold mining industry for Joseph Chamberlain, Colonial Secretary. Jennings also focused on establishing a technical school in the Transvaal, and for this effort and his accomplishments in the mining industry of South Africa as a whole, the (British) Institute of Mining and Metallurgy awarded him their gold medal. After his return from Johannesburg to London, Jennings served as president of the same institution, and worked to reform technical education in England. In 1905, Jennings relocated to Washington, D.C., and began construction on a mansion at Massachusetts Avenue and Sheridan Circle, on what is now colloquially referred to as Embassy Row.\footnote{Rickard, *Interviews with Mining Engineers*, 245-248; “Home of Mining King,” *Washington Post* (23 December 1906), R7, ProQuest Historical Newspapers.}

In his semi-retirement, Jennings became director, vice president, and consulting engineer for the Conrey Placer Mining Company (CPMC), operating near Virginia City, Montana. This company was owned by the McKay Endowment of Harvard University’s Sheffield Scientific School, of which Jennings was an alumnus. Its operations included four large dredges that worked alluvial deposits in Alder Gulch, reworking claims that had been picked over in the initial mining boom of the 1860s, but on a massive scale. Jennings had learned valuable lessons on the Rand that transferred to southwestern Montana, including working on a large scale and the benefits of electrification, and worked to improve the CPMC’s operations through this experience. Historian Clark Spence wrote the only history of the CPMC in 1989; I am planning a future article to further consider the role of Jennings,
the McKay Endowment, and Harvard University in shaping the Madison and Ruby River Valleys.\footnote{Clark Spence, \textit{The Conrey Placer Mining Company} (Helena: Montana Historical Society, 1989), 3-27, 47-121.}

In D.C., Hennen Jennings and his wife were active on the social circuit and in philanthropic giving. He served on the Board of Trustees for the establishment of George Washington University, and was elected as President of Associated Charities of Washington D.C., replacing the recently deceased Supreme Court Justice David J. Brewer in the role.\footnote{"Seek Site for University," \textit{Washington Post} (17 October 1907), 11; "Tributes to Brewer," \textit{Washington Post} (13 December 1910), 2, ProQuest Historical Newspapers.}

As the Great War loomed in Europe, Jennings became increasingly concerned about the ability of the world’s mines to supply the necessary gold to maintain the gold standard and the world’s dominant monetary system during an escalating continental war, and volunteered his services to the U.S. Bureau of Mines, to which he served as consulting engineer. Jennings argued that “The war is to be won by the efficiency, harmony and morale of the workers behind the firing lines as much as by the exercise of these qualities by the soldiers at the front.” This military, economic, and social victory depended on the “right conception of what gold, and in fact money in any form, has the power of doing or not doing.” In fact, “As 91 per cent of the gold output of the world comes from the Allies’ territories, as a war measure it is plain that it is to the advantage of the Allies to uphold the gold standard.” He worked for the U.S. Bureau of Mines throughout the war, advocating for expanding mineralogical production to meet the expanding need of the U.S. military-industrial complex.\footnote{Hennen Jennings, “The Gold Industry and Gold Standard,” \textit{Ec&MJ} 105 (11 May 1918), 867, 873.} He also chaired the section on Mining, Metallurgy, Economic Geology, and Applied Chemistry at the Second Pan-American Scientific Congress, held in D.C. between
December 1915 and January 1916. The bureaucratic stresses of coordinating mineral production for a wartime economy presumably took its toll, and Jennings began suffering from ill health. He died of heart disease on 5 March 1920; his friend and fellow mining engineer, Charles Janin, considered his death “as directly caused by the war as was the death of many who went to the other side. His loss will be deeply felt by the mining profession.” His death solicited notes of condolence from luminaries in the mining community and from major political figures in the United States and England, including John Hays Hammond, Herbert Hoover, Lord Bryce, Lord Milner, the Belgian Ambassador Baron de Cartiér, the Bishop of Washington, and many others.  

Conclusion

The low-grade banket of the Witwatersrand could not have been profitably mined without the experience and skills of American mining engineers directing the massive amounts of investment capital. As the grade of an ore decreases, the speed and scale of the mining, milling, and metallurgical processes must correspondingly increase to drive down the working costs per ton for profitable mining. On the Rand, the most effective way of reducing working costs per ton was a system of racialized labor, where White engineers and miners supervised Black miners who toiled in a system of state-sanctioned wage slavery. This system laid some of the groundwork for Apartheid. In implementing this, American engineers drew upon their experiences in directing racialized labor in the American West, Mexico, and Venezuela, but also the long brutal history of settler-colonialism in southern

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121 Funeral Remembrances, Box 1, Hennen Jennings Collection, American Heritage Center, University of Wyoming.
Africa. Given the nature of the banket and the costs of mining, it would have been impossible to profitably work the deposit without coerced labor—that is, appropriating the labor of Africans through violence and dispossession. But the engineers and capitalists faced a distinct choice to employ violence, whether through the closed compounds and pass laws or through the land theft and enclosure of the British South Africa Company. This praxis enabled the engineers to control a massive workforce at a fraction of the wage costs of the same number of White miners. Without this extraction of surplus value from the masses of Black miners on the Rand, profitable low-grade mining would have been impossible with contemporary mining technology.

Between 1887 and 1915, the Rand produced £435,000,000 worth of gold which was largely sold to the central banks of England and Europe as gold reserves. From the resulting profits, the mining groups issued dividends to their shareholders and reinvested in further mining operations on the Rand and around the world. The Rand’s gold thus provided for the expansion of the world’s monetary supply just as the global economy rapidly expanded under the twin forces of imperialism and coal-fired industrialization. American engineers such as Hennen Jennings and John Hays Hammond bear much responsibility for this economic expansion by reducing the working costs and increasing the scale of industrial mining on the Rand. Their methods of control were extreme: finance and technology, settler-colonialism, White supremacy, unfree labor, and eventually a major war of regime change, all in the name of large-scale industrial gold extraction.

When Herbert Hoover arrived in Western Australia in 1897, he sported a scraggly mustache to hide his youth. A prominent British engineering firm, Bewick, Moreing & Co., employed the twenty-two-year-old mining engineer at $6,000 per year, a fabulous salary for the time.¹ He landed at the tail end of a speculative boom in the Western Australian gold fields, as the famous districts of Kalgoorlie and Coolgardie became synonymous with both fantastic profits and unscrupulous promotions on the London stock market. Hoover’s position as inspecting engineer meant he was to travel the Outback, often atop a camel, and inspect Bewick, Moreing & Co.’s mines, looking for ways to improve efficiency at established mines, and to inspect other promising properties and ore deposits for further investment. This was no easy task, according to Hoover, since “No other lode mining country in the world presents such an array of severe conditions which must be struggled against to do cheap mining.” Western Australian gold mining was beset by “inefficient equipment, refractory ores, scarcity of water and timber, expensive transportation, inefficiency of labor, severe conditions of life, and consequent high wages,” which combined to make gold mining expensive. If the costs of extracting and milling auriferous ore exceeded

¹ Dealing with several difference currencies and trying to estimate their value in present-day currencies quickly becomes confusing. As a quick means of estimating value between the 1890s and the present, we can roughly estimate that $1000 in 1897 would be worth around $28,000 today; it could have bought 1516 grams of gold in 1897. When dealing with British currencies in 1897, £1,000 would be worth roughly $139,000 today, or 7.3 kilograms of gold in 1897. Granted, any estimation of monetary value over time is a controversial statistic, with the value and purchasing power parity varying widely, and few good tools for calculating the values today. The best internet currency conversion site I have found is Rodney Edvinsson, “Historical Currency Converter,” last modified 10 January 2016, http://www.historicalstatistics.org/Currencyconverter.html; his analysis is based on the Swedish economy, but still offers insight. Other websites for currency conversion do not offer the variety of currencies, or are limited in their historical depth.
its value, then there was no profitable means of running a mine.²

However, there was much more to gold mining in Western Australia than persistent flies and bad water. First, the gold mining of Western Australia existed both in the context of settler colonialism by the British Empire, and within the network of international finance and investment centered in London. The logic of imperialism and colonialism demanded a return on its investment of blood and treasure, and this came with resource extraction; similarly, investors in mining concerns demanded a return on their investment through dividends, paid out of productive, efficient, and profitable mining. Racial hierarchies and racialism were part and parcel of the administration of the British Empire, and Hoover’s position at Bewick, Moreing & Co., existed within, and exploited this hierarchy. Second, Hoover’s efficiency reforms attempted to reduce working costs; this initially came through anti-union practices, labor exploitation, and wage reductions before other, more structural or administrative reforms. When Hoover took control of the Sons of Gwalia, one of the most promising mines in the region, he had the chance and available capital to remake the property to his ideals of efficiency.

In larger terms, Herbert Hoover implemented mining practices developed across the American West, but many of these practices had little to do with technological implementation. Instead, these practices aimed for social control. He carried darker attitudes developed in the heartland of America throughout many of the colonial regions of Great Britain specifically and the West in general. In his goal to impose efficiency, he undermined the lives of many working-class people. He cut wages, extended working hours, and

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² Herbert Hoover, “Mining and Milling Gold Ores in Western Australia,” *Engineering and Mining Journal* 66, (17 December 1898), 725, hereafter *E&MJ.*
attempted to control the private lives of his employees to enhance their productiveness. He also used ethnic and racial prejudices to divide and conquer his workforce. Hoover thus belonged to the process of “settler colonialism” analyzed recently by many historians and scholars.

This chapter analyzes the early career of Hoover, well before he came into the public eye during the Great War, and three decades before he assumed the presidency. It is the story of Hoover’s formative years as a young American mining engineer on the distant reaches of the British Empire. Australia became the basis of Hoover’s reputation not only as a “pragmatic” engineer, concerned with the minutiae of reducing costs, but also as a vicious foe of organized and autonomous labor. His profitability for Bewick, Moreing & Co., under the harsh conditions of the Australian bush, helped position him to become a partner in the firm. On the heels of a mining boom in Western Australia, Hoover and Bewick, Moreing & Co. assumed control of several of the largest mines, and transformed them into long-term productive properties, laying the groundwork for further investment and consolidation, a topic addressed in the next chapter. ³

This chapter examines the foundation of Hoover’s career and the base of his later success and prominence. It touches on his early life in Iowa and Oregon, his education at Stanford and experience in the American West, the life and connections of C. Algernon Moreing, senior partner at Bewick, Moreing & Co., the climate of Western Australia in the 1890s, Hoover’s early mine inspections, and the acquisition and reorganization of the Sons of Gwalia mine. These were the base of Hoover’s career, and of his later success and

prominence. For now, an examination of his early life presages his travels to the Antipodes.

**Early Life and Education**

Hoover was born in West Branch, Iowa, in 1874 to Jesse and Huldah Hoover, both devout Quakers. His father was a blacksmith, farm implement dealer, and town councilman, and Huldah was prominent in the Quaker church and taught at the nearby Muscatine school. Their modest cottage measured a mere twelve by twenty feet and housed both parents, Herbert, and his two siblings. His interests in geology were evident at a young age, as Herbert routinely purloined agate and other minerals from streambanks and the railroad’s gravel piles, amassing a prized collection. Both parents died when Herbert was still a child; his father of typhoid when he was six, and his mother of pneumonia three years later. Herbert, his brother Theodore, and his sister May thereafter lived with different relatives in the area. Hoover’s net inheritance was a modest $718.32, and it had to serve as the ten-year old’s means of subsistence until adulthood. He went to his Uncle Allan’s farm, a few miles

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outside of West Branch, working at various tasks on the farm while attending school.

At eleven, Hoover’s guardian received a letter from another uncle, Dr. Henry John Minthorn, physician and superintendent of a Quaker academy in Newberg, Oregon, offering to adopt Herbert and educate him. Alone, Herbert boarded a migrant train, and traveled to Portland. There, he met his uncle, and took a steamship down the Willamette River to Newberg, another Quaker hamlet. Herbert’s life in Newberg was one of hard work and long hours at farm chores, punctuated by strict adherence to Quaker sabbath rituals and horse-and-buggy house calls. Minthorn developed Hoover’s intellect, conversing in subjects such as physiology, history, and literature, and instilling a sense of compassion and self-sufficiency. At fourteen, Hoover became the office boy for Minthorn’s land speculation company, learning recordkeeping, typing, and accounting while polishing his writing and communication skills. He soon became responsible for advertising the company’s lands and met the resulting eager migrants at the train depot, guiding them to lodgings, homes, and properties. Hoover enrolled in night school, studying algebra, geometry, Latin, and the classics. It was also in Oregon that Hoover’s love of fishing developed beyond bait-fishing in Iowa streams and toward fly-fishing on Western rivers, a pastime he would continue throughout his life.5

A friend of Herbert’s father, Robert Brown, came to visit the teenager. Brown was a mining engineer, and he laid out the merits of the profession to Herbert, in all its glory. A mining engineer, according to Brown, spent much of his time outdoors and in the environment, but used a sophisticated understanding of mathematics and geology, as well as managerial and administrative skills to extract charismatic minerals from the earth. The

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catch, for Hoover, was that engineering required higher education, namely a college degree; he had not completed high school in favor of working at the land company, and he lacked money for tuition. Timing proved key, as Hoover came of college age in the same year that Leland Stanford formed Stanford University in Palo Alto, California. Despite failing the English grammar sections of the entrance exam, Hoover was admitted to Stanford, on the condition that he receive tutoring before the inaugural semester in 1891. He left for Palo Alto with all his belongings and savings, his bicycle, and fifty dollars from his uncle.6

Once at Stanford, Hoover ingratiated himself with the new administration and faculty. Dr. Swain, who had administered his entrance exam, “secured” Hoover “a job in the University office at $5 a week.” Hoover soon shifted to the office of the Geology department, where his typing skills earned him thirty dollars a month, and he worked under Dr. John Branner, the budding of a productive mentorship. Branner got him a summer position with the US Geological Survey, first in Arkansas, and then in California and Nevada. Arkansas exposed Hoover to the soft-rock geology of a zinc and coal rich region, while California and Nevada gave him experience in hard rock auriferous geology, in one of the most productive gold mining regions in the world. He also gained another mentor in Dr. Waldemar Lindgren, a pioneer in the field of economic geology, and they bonded over a dead government mule and a recalcitrant federal accountant.7

When Hoover was not in the field with the US Geological Survey, he studied widely at Stanford, absorbing courses in “physics, chemistry, geology, mathematics, mechanics and engineering,” as well as in “history, economics, and English and French literature.” He was

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active in campus politics and life, campaigning against fraternities, managing the baseball and football teams, and eventually serving in the elected position of financial manager of the teams. He also developed a relationship with his future wife, Lou Henry. Lou and Herbert shared a remarkably similar upbringing: both were from Iowa, both had been raised Quakers, both were fascinated with geology, and both were passionate about the outdoors, with Lou’s father raising her with a passion to hunt and fish. Herbert graduated in 1895 as the repercussions of the Panic of 1893 gripped the West Coast. He had $40 in cash, and went to the gold mining districts of the Sierras on another USGS survey.⁸

Hoover joined another of Lindgren’s surveys, employed in the High Sierras for the summer of 1895. However, in the midst of a financial panic, the US government cut its appropriations to the survey, and Hoover left in mid-October. He traveled to Nevada City, initially seeking a managerial position commensurate with his university education and USGS survey experience. This was not to be the case; Hoover settled on a job pushing a heavily laden ore cart in the Reward Mine in the Grass Valley, paid two dollars for a ten-hour night shift, and working seven arduous days per week. He transferred to the Mayflower mine, and learned rudimentary mining skills from Cornish miners. However, Herbert quickly tired of life on the bottom rung of the goldfield hierarchy, and he left the Grass Valley after a few months. He secured a job as copyist and office boy in the firm of Louis Janin, a famous mining engineer and prolific writer, but quickly leveraged his experience with Lindgren’s USGS surveys in the Grass Valley to aid Janin in a court case regarding mining claims and the complicated apex mining law. Janin’s client, the North Star Mining Company, won the lawsuit, and Hoover earned a promotion within the firm and a salary of seven dollars a day.

His new position involved surveying and inspecting mines in Arizona, New Mexico, and other mining districts in the American Southwest. He also began publishing in some of the preeminent technical journals of the field, the *Mining and Scientific Press* and *The Engineering and Mining Journal*, writing one article on crossings in ore deposits, and another on the economic geology of Cripple Creek, Colorado, an emerging gold district.⁹

Hoover’s performance in Janin’s firm marked him as a competent geologist, surveyor, and engineer, reflected by his $2,000 a year salary. Whether it was Hoover’s surveying work across the Southwest, his professional publications, mine inspections, or his contributions to the legal wrangling over contentious mining claims, Louis Janin recognized Hoover’s acumen and competence. A fellow engineer, William Shockley, came to meet with Janin in San Francisco. Shockley represented Bewick, Moreing & Co., a British engineering and financial firm with developing interests in the goldfields of Western Australia. Bewick, Moreing & Co. was looking for an experienced engineer, at least thirty-five years old, to survey the Outback and conduct examinations of the company’s mines and interests. Despite Hoover’s youth, Janin recommended him to Shockley, and Hoover garnered letters of support from Waldemar Lindgren, the engineer R. A. F. Penrose, P. H. McDermott of the Steeple Rock Development Corporation, and B. S. Cook of the Oregon Land Company. As his references and recommendations made their way to Bewick, Moreing & Co., Hoover described his excitement for the position to Penrose. It paid “$6,000 per year and some fees which make it worth $10,000.” More than just the compensation drove Hoover, despite

more than a three-fold increase in salary. He was more excited “that it is a strong company in a confidential position and in a new country. I am therefore anxious to secure it.”

And secure the position he did. Three days after describing the position to Penrose, Hoover began making arrangements for the Antipodes. The twenty-three year old entrusted his Stanford friend, Lester Hinsdale, as power of attorney, directing Hinsdale to manage his financial affairs in the United States. After discharging Herbert’s debts, Hinsdale was to pay Theodore Hoover’s tuition at Stanford, and support May and their cousin, Harriet Miles, in California. Hinsdale was also to invest the remaining funds prudently. Hoover upgraded his wardrobe, bought a life insurance policy, and boarded a train to New York City, stopping briefly in West Branch to visit family. On March 31st, 1897, he boarded the S.S. Britannic of the White Star Line, heading to London.

Herbert Hoover’s early life and engineering career highlighted an adaptable personality and a strict work ethic. However, like many successful people, he also experienced a lot of good fortune. His successes should be viewed within the of the connections he made, as well as in the circumstances of his education and employment. Without the advice of Robert Brown and the encouragement of Dr. Joseph Swain to pursue geology and engineering at Stanford, the door to the elite world of mining engineering likely would have remained closed. Even his choice to enter Stanford in its pioneer class presented

10 Nash, The Life of Herbert Hoover, 49-51; Waldemar Lindgren to Louis Janin, March 8, 1897, Pre-Commerce: Correspondence, Box 10, Herbert Hoover Presidential Library, hereafter HHPL; Herbert Hoover to R.A.F. Penrose, March 1, 1897, in Life and Letters of R.A.F. Penrose, Jr., eds., Helen R. Fairbanks and Charles P. Berkey (New York: Geological Society of America, 1952), 199-201, Pre Commerce: Correspondence, Box 12, HHPL; P.H. McDermott to Louis Janin, March 5, 1897, Pre-Commerce: Correspondence, Box 9, HHPL; B.S. Cook to Louis Janin, March 3, 1897, Pre-Commerce: Correspondence, Box 9, HHPL; Herbert Hoover to R.A.F. Penrose, March 17, 1897, in Life and Letters of R.A.F. Penrose, Jr., 201. Hoover’s starting salary of $6,000 would be worth roughly $175,000 in 2017.

unique opportunities for the young Hoover: he associated closely with prominent individuals, especially university president David Starr Jordan and Dr. John Branner, who, in turn, helped Hoover build professional connections with Waldemar Lindgren, establishing himself in the field of economic geology. His internships with the USGS provided him introductory professional experiences with both soft and hard rock geology, but also with surveying and exploration experience in the austere environments of Arkansas, Oklahoma, and the Southwest. A mining engineer had to be as comfortable on a mule in the desert as in a chair in an urban office, and Hoover’s employment in Louis Janin’s firm provided experience with both. Hoover’s early efforts, Stanford education, and successes positioned him for a pivotal role in Bewick, Moreing, & Co., and in the goldfields of Western Australia.
Charles Algernon Moreing and International Gold Mining

If Herbert Hoover’s employment in Louis Janin’s firm and his association with Waldemar Lindgren and John Branner marked his entry into professional mining engineering in the American West, then his position with Bewick, Moreing & Co., opened the door to the international world of gold mining and finance. The biography of C. Algernon Moreing, head of the company, demonstrates the global influence of the business. Moreing was born in New South Wales in 1856, son of a “Gold Commissioner” in the colony. When Moreing was ten, his father sent him to England for an education, eventually graduating from King’s College, London. Beginning in 1874, he worked for Thomas Bewick, a mining engineer who was “engaged in opening up the Langley Barony Lead Mines in Northumberland.” Moreing’s engineering work for Bewick took him to France, Prussia, and the United States, and he advanced in Bewick’s firm. In 1882, Moreing was offered the management of Compagnie Francaise des Mines des Diamants du Cap, one of the major diamond mining companies in South Africa, which employed roughly five thousand men.12

Moreing changed the engineering practices of Compagnie Francaise des Mines des Diamants du Cap from a chaotic, open pit arrangement, which frequently suffered from collapses and slides as the sides of the pits fell inwards. Instead, Moreing implemented underground operations for the Kimberley diamond mines under his control, directing the digging of shafts, tunnels, and stopes to access the diamond-bearing grounds. What was novel about Compagnie Francaise is not the shift in mining practices, however, but that the immense fortunes made by the company and others from the Kimberley diamond fields

12 “C. Algernon Moreing, Esq., M. Inst. C.E., F.G.S., &c.,” The Mining Journal (n.d): 3-6, Bewick Moreing (Hooveriana) 1885-1909, Box 1, HHPL.
made the financiers incredibly rich, thus funding early gold exploration on the Transvaal. It was run by Jules Porgés, Julius Wernher, and Alfred Beit, who, in a series of incorporations and mergers, created Jules Porgés & Co., (which became Wernher, Beit & Co., in 1889) and gained a controlling interest in De Beers Consolidated Mines, Cecil Rhodes’ firm. In short, Moreing was a leading mining engineer to one of the richest diamond mining firms in the world, and its capital was used to consolidate control over the gold fields of the Transvaal, developing them into the world’s most productive gold district.¹³

Moreing returned to London in 1885 after three years due to poor health, but with his reputation as a shrewd engineer, manager, and investor made. He subsequently became consulting engineer to the French Diamond Mining Company in London, but shortly thereafter joined Thomas Bewick as a partner in Bewick, Moreing & Co. Their firm expanded rapidly, with Moreing establishing an office in the Transvaal in 1889, under the charge of Charles Alford, and an office in San Francisco under Edward Hooper. Bewick, Moreing & Co.’s business interests spanned the globe, including Bolivia, Siberia, Western Australia, South Africa, Mexico, and the American West. C. A. Moreing also co-authored an encryption system for mining interests to securely communicate over telegraphs, which came into wide use and went through five editions.¹⁴ He held memberships and positions in the Institute of Civil Engineers, the Royal Colonial Institute, the Royal Geological Society, and other organizations. He was also an avid mountaineer and member of the Alpine Club, an elite association in English society. Bewick, Moreing & Co. was among the foremost mine

¹³ Ibid., 4-7.
engineering and management firms of London, with offices and interests around the world in strategic mining districts, a network of investment partners, and a lineage stretching out of the Kimberley diamond mines. For a young mining engineer such as Herbert Hoover, there were few firms with more promise and opportunity. 

Western Australia’s Climate: Investment and Pestilence

After the S.S. Britannic made port in Liverpool, Hoover traveled to London, and weekended at C. Algernon Moreing’s extravagant country home. Moreing expected his new engineer to remain in the company’s employment for life, which, given the prevalence of disease in Western Australia, may have been a shorter engagement than expected. Perhaps Moreing was making calculations regarding disease and staff turnover in the antipodes, but we cannot know for certain. Hoover reported that the gold districts were “a very bad country—every man on our staff – 36 engineers – have had the typhoid fever and out of 53 men sent from this firm 6 have died from it.” He arranged with his college friend, Lester Hinsdale, for a life insurance policy and affirmed the distribution of his salary to maintain his brother and cousin in San Francisco. Before traveling to Australia, Hoover also visited the House of Commons, Westminster, “and a host of landmarks of our British forebearers.” For a young man on his first trip east of the Mississippi River, England amazed him, but he did not linger. After his orientation with Moreing and sightseeing near London, Hoover traveled through Dover, Paris, the Alps, Rome, Port Said and the Suez Canal, and Ceylon, arriving in Western Australia on May 12, 1897. He remained in quarantine against smallpox for ten days.

15 “C. Algernon Moreing, Esq., M. Inst. C.E., F.G.S., &c.,” The Mining Journal (n.d): 5-8, Bewick Moreing (Hooveriana) 1885-1909, Box 1, HHPL.
in the port of Albany, then departed for Coolgardie, “over the 300 miles of newly constructed narrow-gauge railway,” and commenced his engineering work in the Antipodes. In July 1897, Hoover recruited his Stanford friend, George Wilson, to join him as an assistant.\(^1\)

Hoover considered the investment situation in Western Australia “over-rated.” He cited the floatation of stocks for 482 mines on the London exchange, “with a total capitalization of over $350,000,000,” as proof of this excess, and claimed that perhaps only fifteen of the mines in Western Australia might pay dividends. Indeed, “rank swindling and charlatan engineering” plagued the district, a trait shared by most booming gold districts. The *Engineering and Mining Journal* echoed his sentiments: “up to the present time 33 only out of the 500 companies have paid dividends, and 13 of these were exploration or promoting companies, whose profits were derived from stock issues or sales of properties.” Three of the largest mines paid the bulk of the dividends. “The worst feature,” according to the *E&MJ*, was that “the gold mines of Western Australia have been almost hopelessly handicapped by this enormous overcapitalization. . .. It will be impossible to put them on a reasonable working basis until nearly all of the companies have been reorganized or have collapsed, a process which will involve very heavy losses” for shareholders.\(^2\)

As a gold district, Western Australia initially developed in fits and starts. In 1882, “Gold was discovered in what is now the Kimberley district,” but large-scale mining took

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\(^1\) Hoover to Lester Hinsdale, 14 April 1897, London, Pre-Commerce: Correspondence, Box 7, HHPL; Hoover, *Memoirs*, 29; Hoover to Hinsdale, 21 May 1897, Albany, Pre-Commerce: Correspondence, Box 7, HHPL; Hoover, *Memoirs*, 30; Nash, *The Life of Herbert Hoover*, 68; Hoover to Hinsdale, 9 July 1897, Cue, Pre-Commerce: Correspondence, Box 7, HHPL.

several years to develop. In 1887, another gold discovery near Yilgarn led to the development of the mines at Southern Cross, but it was not until 1892 that gold discoveries at Coolgardie brought Western Australia into the forefront of worldwide gold mining, alongside of the Transvaal and California. However, prospects in Western Australia were dubious at best. Miners traveling from the American West were advised not to “go without purchasing a return ticket,” and were warned of “Idle men,” brackish water, and expensive “inferior beef.”

Despite their relative isolation, the goldfields of Western Australia attracted international attention and financial speculation on the London stock market. Whitaker Wright, a famous mining financier and among the world’s richest men of the era, invested heavily in the West Australian goldfields. Wright was a habitually unscrupulous promoter, reaping far more in profits from speculation and financiering than actual mineral production, and leaving a global trail of failed mines from New Mexico and Colorado to Queensland. But it was the finds at Kalgoorlie and Coolgardie that made Wright’s speculative fortune. Beginning in 1894, Wright led the practice of launching finance companies on the London markets, which then purchased mines and put them on the London Exchange as subsidiaries. The fervor for stock in Western Australian mines on the London market fed widespread speculation, beginning in 1894. Before Hoover arrived in 1897, nearly 800 companies involved in Western Australian gold mining had been floated on the London Exchange, many of them dramatically over-subscribed and over-capitalized, and many

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18 T.A. Rickard, “First Impressions of Westralia,” E&MJ 64 (20 November 1897), 610; T.A. Rickard, “The Gold-Fields of Western Australia—A Caution to American Miners,” E&MJ 59 (19 January 1895), 51; see also Garrick Moore, Mining Towns of Western Australia (Perth, W.A.: Department of Minerals and Energy; Curtin University of Technology, 1997).
collapsed under the weight of geological reality. This speculative boom inspired Wright to launch his boldest financiers attempt, the London and Globe Finance Corporation, in 1895. He recruited a host of prominent individuals as board-members of his company as a means of attracting investment, effectively using their celebrity, nobility, and status within imperial Britain to foster speculation.19

Swindlers and charlatans, as Hoover called them, ran rampant in promoting the mines of Westralia, and Wright epitomizes this category. The London and Globe Finance Corporation acquired control over two of the richest mines in Coolgardie, the Lake View and the Ivanhoe. The London and Globe purchased both mines, floating the Lake View in June 1896 and the Ivanhoe in 1897, and combining the West Australian Exploration and Finance Corporation with the London and Globe, at a total capitalization of £2,000,000. This was five times the previous capitalization, where each of the companies was capitalized around £200,000, but the flagrant overcapitalization did not dissuade the nearly nine thousand investors who purchased shares.20

Several factors account for this bullish spirit in mineral investment in the London markets of 1897. Londoners celebrated the Diamond Jubilee of Queen Victoria, marking sixty years of imperial expansion across the globe. The richest gold mines were in British colonies and interests, namely the Transvaal, Western Australia, the Klondike, British Columbia, and through investment and corporate involvement, the American West.21 The

21 Clark Spence, British Investment and the American Mining Frontier, 1860-1901 (1958; Moscow: University of Idaho Press, 1995), 3, cites the investment and involvement of at least 518 British joint-stock companies in the American West.
markets were also recovering from the Panic of 1893, with metal prices on the rebound. As in most depressions, the investor class was spared the worst of the devastation, and they eagerly looked for new opportunities for investment. Finally, the reputation of Whitaker Wright, and other promoters, rested on the profits of new development, since mines generally paid the highest dividends on the richest ores before moving into lower-grade workings. This was especially true of the Ivanhoe and Lake View mines.22

Wright’s ostentatious lifestyle, and his unscrupulous business dealings must be considered as well. With the profits from his promotions and speculations, Wright lived in high society, built an elaborate mansion and estate, owned a racing yacht named *Sybarita*, and hosted extravagant parties, epitomizing late Victorian society in all its bourgeois excess. In southwest Surrey, his estate at Lea Park was enormous, initially purchased for £250,000 from the Earl of Derby. He quickly directed £400,000 of improvements, including an artificial lake with a submarine smoking room and conservatory, a fifty-horse stable, Italian statuary, fine art, and a boathouse designed by Edwin Lutyens. “Everything he touched,” the *Daily Telegraph & Courier* reported, “turned – or seemed to turn – to gold. The name of Whitaker Wright became a synonym for success and magnificence.” Wright’s financing of an underground railway in London proved to be his undoing. Using similar financiering tactics to his mining promotions, Wright gathered investment for the railway, claiming £7,000,000 worth of assets while only holding £1,500,000. The project collapsed. Investors lost huge sums of money, and pushed a Justice to issue a warrant. Wright fled England, but was arrested in New York and extradited. He was tried, and the jury convicted him on twenty-

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four counts. The justice sentenced him to seven years. After sentencing, Wright went to the
lavatory and swallowed an elephant’s dose of prussic acid—hydrogen cyanide. He dropped
dead in a waiting room. Wright built his career on creative accounting, bombastic promotion,
and profiting off reputation and potential rather than execution and efficiency. The Economist
reported, “It was apparent to everyone that the London and Globe and its two allied
companies were huge gambling concerns.” Hoover and Bewick, Moreing & Co. had other
ideas for Western Australia. 23

Rampant speculation was not the only issue plaguing the goldfields, “a territory
wider than that part of the United States west of the Rocky Mountains.” It seemed to be a
profoundly unhealthy and austere environment. According to mining journalist T.A. Rickard,
“The [water] condenser and the camel are the two main factors in the exploration of the
mining region. Both bespeak the scarcity of water and the flatness of the country.” The
Western Australian goldfields were caught between a host of overcapitalized mines in
Coolgardie, Kalgoorlie, and other scattered districts and the barren expanses of the desert,
rife with flies and blistering heat, plagued by diseases such as typhoid and Barcoo fever, and
barely connected to the rest of the world by rail and telegraph. 24

“Real damnation,” was the best way Hoover could describe Western Australia when
he first arrived. “The dry broil,” of the heat was not as bad as the flies, which mandated that
“one must always wear a net and bathe hands in olive oil to avoid poison from them.” He
had already been bedridden for a week from Barcoo Fever, caused by the ingestion of water

23 David McKie, “The Fall of a Midas,” The Guardian (2 February 2004),
https://www.theguardian.com/Columnists/Column/0,5673,1136841,00.html; “Conviction of Whitaker
Wright,” Daily Telegraph & Courier (27 January 1904), 8-10, microfilm; “Whitaker Wright’s Sentence” The
Economist (30 January 1904), 165.
24 T.A. Rickard, “First Impressions of Westralia,” E&MF 64 (20 November 1897), 610.
contaminated by cyanobacterial algae toxins and manifesting as a hepatitis with nausea and vomiting. This put an unwelcome dent in his demanding schedule of mine inspections.

Daytime temperatures routinely pushed 150° Fahrenheit, with Hoover’s assistant, George B. Wilson, reporting that it hit 165° in the sun, and a brisk 115° in the shade. The country was “anything but lovely,” with the stunning sunsets as “the only thing to relieve the monotony.” Gold exploration was changing the ancient landscape of Western Australia, which Wilson claimed was “the oldest geologically of all known parts. It is a great level desert having been eroded from a mountainous continent.” Corkscrew windstorms, “technically termed ‘willy-willys’” swept the tedious landscape, adding convection action to the “West Australian grill.” The best that Wilson could offer to Lester Hinsdale was to “write soon and use asbestos envelopes,” a curative to the hot monotony of the desert. 25

In regarding the native people of Western Australia, Hoover demonstrated what linguist Mary Louise Pratt calls the “imperial gaze” of White travelers in “contact zones,” reinforcing imperial control of the colonized periphery. Hoover also reflected an environmentally-based racialism, where the climate and terrain dictated the progress of civilizations alongside of race. Hoover and Wilson acted as amateur anthropologists, but the tone was similar to their descriptions of the landscape. To Hoover, the customs of the Aborigines were “disgusting and brutal, to a degree.” The tribes were “always small, seldom over 200,” and if an aborigine of one tribe was “caught by members of another, even when peacefully hunting, he is killed instantly.” Family relations, especially during death rituals, astonished Hoover, “When a man dies, his father falls on his body and is beaten by other

25 Hoover to Hinsdale, 11 September 1897, Mt. Malcom, Box 7, Pre-Commerce: Correspondence, HHPL; Wilson to Hinsdale, 4 February 1898, Kalgoorlie, Box 7, Pre-Commerce: Correspondence, HHPL; Hoover and Wilson to Hinsdale, 30 January 1898, Menzies, Box 7, Pre-Commerce: Correspondence, HHPL.
niggers with long sticks, he being supposed to be so absorbed in grief as to not feel it. If he does, woe be to him," as it would be evidence of witchcraft. There were distinct differences within Aboriginal peoples, based on geography, as “the coast tribes live very much better and are physically and mentally much superior to those of the interior. They have, however, too little intelligence to work very much, except as shepherds or something of that kind.”

Wilson was far more explicit in his disdain for the indigenous peoples, even violently so. “The fact is... they are no better than animals,” he wrote, claiming that the Aborigines were “the lowest human beings I ever dreamed of. Once out in the bush I had to set the dog on an ugly black ‘belle’ in order to drive her away from my camp. A man can’t regard them as anything but animals.”

The exploration and exploitation of the Western Australian goldfields cannot be separated from the process of settler colonialism in Australia and in the British Empire as a whole; casual comments on the primitive nature of the “niggers” by a young mining engineer further justified the expropriation and colonization in Western Australia. Settler colonialism evolves as a process, without a fixed end or goal, as much in the minds of its agents as in the policies and practices of the imperial apparatus. Both the US and Australia are settler-colonialist societies, and both Hoover and Wilson were participants in, and beneficiaries of, settler colonialism in the United States and Australia.

Hoover’s responsibilities in Western Australia involved inspecting mines and

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27 Wilson to Hinsdale, 5 June 1898, Coolgardie, Box 7, Pre-Commerce: Correspondence, HHPL; Transcribed Accounts of Western Australia, 1897, Box 50, Pre-Commerce, HHPL.
28 Nash, *The Life of Herbert Hoover*, 63; Nash’s examination of Hoover’s amateur anthropology is restricted to a vague comment on the habits of Englishmen. For a definition and examination of settler colonialism, see Lorenzo Veracini, *Settler Colonialism: An Overview* (New York: Palgrave Macmillian, 2010), 1-15.
properties of interest to Bewick, Moreing & Co., and these were scattered across the
outback. Railroads were generally latecomers to the goldfields, as the costs of construction
mandated a rich ore deposit or government investment. Conditions in the backcountry were
harsh, and the best way to travel was uncomfortable. “Long camel rides wrench every
muscle in one’s body,” Hoover wrote, “40 miles a day is usual; with teams. . . I make about
70 miles a day.” Due to water scarcity and the dangers of the outback, “One never thinks of
taking such a trip as I am now on without a bicycle strapped on behind, because it is often
50 miles from water to water; and if an accident should happen to the team a bicycle is the
only salvation.” The records of Hoover’s early travels show the sheer space and scale of the
Western Australian landscape. He had proceeded “as far as Lake Darlot, 90 miles,” when
they were “overtaken by a special bicyclist, who had come from Cue, the end of the
telegraph, in three days, 390 miles. So I am to go back to a place called Lakeway, 185 miles
from here, to make two examinations.” On his first trip, he “examined 14 mines,” including
two that would make his name as an engineer, the East Murchison United and the Sons of
Gwalia. George Nash calculated that Hoover traveled 4,886 miles in eight months, mostly by
camel and horse, to inspect the mines of Bewick, Moreing & Co. 29

Mine examinations separated the paying mines from the worthless. Many of the
mines under Bewick, Moreing & Co.’s management had “been bought during boom times,
when no regard was paid to the intrinsic value of the mine,—simply the statement that it was
in W.A. was enough to sell it.” This was the logic of post-boom mine investment, as good
mines were separated from the bad. Hoover’s task as Bewick, Moreing & Co.’s number four

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29 “Transcribed Accounts of Western Australia, 1897,” July 16, 1897, Box 50, Pre-Commerce, HHPL; Nash,
The Life of Herbert Hoover, 68.
man in Western Australia, therefore, was “killing the bad ones immediately,” like a physician
called in “to mend the lame ducks” through corporate euthanasia. In his inspections, Hoover
also culled the mines of excessive administrative staff and miners. He “let out eight men,”
from one mine, and had “some more in the noose.” At another, he discharged “an old
accountant, a man 72 years old, and entirely incapable of doing this work.” He moved to
reorganize much of the engineering and mining staff, as he felt “Australians are far behind
Californians in mining methods, knowledge and general shrewdness so that we have a
decided advantage.” Hoover’s initial role as inspecting engineer, it seems, was to clean up
Bewick, Moreing & Co.’s holdings in Western Australia after the excesses of the speculative
boom, and institute a new regime of sound investment, engineering efficiency, labor
management, and mine operations. Hoover coveted the position; he had “full swing to make
or kill myself professionally.” He would soon put his plans in place at the Sons of Gwalia, a
promising mine near Leonora.30

The Sons of Gwalia: Acquisition and Financing

In retrospect, the Sons of Gwalia gold mine proved to be among the most valuable
mines in Western Australia, especially outside of Coolgardie and Kalgoorlie. Hoover’s early
inspections and recommendation to Bewick, Moreing & Co. opened up what became the
third most productive gold mine in Western Australia; it is still in operation in 2018 under
the auspices of St. Barbara Limited. It has produced over 113,000 kilograms of gold, valued
above $4.5 billion today. The present underground mining operations are on the Hoover

30Transcribed Accounts of Western Australia, 1897,” July 16, 1897, Box 50, Pre-Commerce, HHPL; Hoover
to Hinsdale, 9 July 1897, Cue, Box 7, Pre-Commerce: Correspondence, HHPL.
Decline, which reached below 1600 meters in 2016. Open pit mining began in 1984, mixing surface and underground mining methods and allowing for the large-scale processing of low-grade ore. St. Barbara Limited estimates that they have approximately fifty-four thousand kilograms of gold in reserves, at a grade of 7.9 grams per ton of ore. One hundred and twenty years after Hoover assumed the management of the Sons of Gwalia, the deposit continues to produce gold at a profit.\(^{31}\)

Early in 1898, Hoover was an inspecting engineer for Bewick, Moreing’s sixty-four mines in Western Australia, but he wanted an opportunity to test his efficiency plans at an undeveloped mine. He had just transformed the managerial structure of the East Murchison United and pushed Bewick, Moreing & Co. to acquire a controlling interest in the Sons of Gwalia. Hoover inspected the Sons of Gwalia in September 1897, and hoped for management of the mine. In fact, he insisted on it in a telegram to the London office, stating that he “cannot undertake the responsibility with respect to success according to our estimate as to the value of unless entire management designing machinery and plant in our hand.” Some of this was due to an interpersonal feud within Bewick, Moreing & Co.’s Western Australia staff, but Hoover’s desire to open and manage a promising mine on his own was quite substantial. Hoover had traversed the outback of Western Australia for the better part of a year, and the Sons of Gwalia was among the most promising and least developed ore deposits in the region, effectively a tabula rasa for Hoover’s ambitious engineering schemes.\(^{32}\)

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32 As quoted in Nash, *The Life of Herbert Hoover*, 66; “Transcribed Accounts of Western Australia, 1897,” Mt. Malcom, 11 September 1897, Box 50, Pre-Commerce, HHPL; Nash, *The Life of Herbert Hoover*, 60-61; Hoover to Hinsdale, Lawlers, 9 July 1897, Box 7, Pre-Commerce, Correspondence, HHPL; Hoover to Hinsdale, Mt. Malcom, 11 September 1897, Box 7, Pre-Commerce, Correspondence, HHPL.
Industrial gold mining required a large capitalization upfront in order to secure profitable extraction of the deposit. The mining stock markets of London provided this financing, in exchange for future dividends. For the Sons of Gwalia, Bewick, Moreing & Co. began promoting the company on the London market in November and December of 1897, touting the early production of 5,667 ounces of gold and the promising geology of the lode. The “Sons of Gwalia, Ltd.” was incorporated in January 1898, with an initial public offering of 300,000 one-pound(sterling) shares. Bewick, Moreing & Co. and its promoting company, London and W.A. Exploration, controlled and distributed the shares. In fact, all the shares passed through London and W.A. Exploration, as compensation for promotions and £50,000 in early working capital. They received 250,000 free shares, and an additional 50,000 shares for the working capital. On the opening day of public trading in Sons of Gwalia shares, the value of the one-pound shares more than doubled to £2.2.6, and the London and W.A. Exploration could have sold its shares for enormous profits.\(^{33}\)

In contrast to the machinations of Whitaker Wright’s London and Globe Finance Co.’s Western Australian promotions, Bewick, Moreing & Co.’s promotion of the Sons of Gwalia seems more measured, and based in the geological realities of the district rather than misleading reports and titular members of the board of directors. Bewick, Moreing & Co.’s promotional materials distributed Hoover’s report on the Sons of Gwalia, and it was widely quoted in the London Mining presses. *The Mining Journal, Railway and Commercial Gazette* reprinted the juiciest sections of the prospectus, touting the potential future profitability if the ore deposit continued at depth. Under initial working conditions, and before the erection of Hoover’s proposed mill and cyanide plants, there was £98,000 in blocked-out ore above

\(^{33}\) Nash, *The Life of Herbert Hoover*, 66.
the 100-foot level, and another £230,000 above the 200-foot level. “There is every geological evidence,” Hoover’s report stated, “that it will maintain its value and quantity in depth.” However, as a note clarified, “the whole of the Working Capital of the Company has been subscribed, and the Vendors are taking the whole of the purchase consideration in shares, this prospectus is advertised for public information only, and not for the purpose of inviting subscriptions.” Bewick, Moreing & Co.’s promotions were aimed at gaining reputable subscribers and ample working capital, and not just a drastic increase in share prices.³⁴

Bewick, Moreing & Co. wanted its reputation to reflect stable international investment and competent local management. Hoover’s promotion to management of the Sons of Gwalia was one manifestation of this, but had been presaged by earlier managerial changes. To that end, Hoover had appointed his friend and fellow Stanford alumni Deane Mitchell as chief engineer of the East Murchison United, and Mitchell assumed the position in November 1897. Mitchell had experience as an inspecting engineer, and Hoover brought him to Western Australia as one of his first recruits. Mitchell replaced the chief engineer at the East Murchison United, and set about reducing working costs. Hoover, in his initial report on the mine, criticized the wanton spending of the previous management, including “inefficient mining methods, employment of excess labor, erection of ‘lavish buildings,’ and other wasteful practices,” to the tune of £13,200 in wasted capital. However, conditions at a mine in the distant reaches of the Western Australian Outback promised difficulty in reducing labor costs. Nonetheless, Hoover intended for the Sons of Gwalia and the East Murchison United to be his efficiency laboratories in improving profitability through

decreased working costs and improved mining practices.\textsuperscript{35}

\textbf{Sons of Gwalia: Efficiency Reforms}

Hoover’s strategy for mining efficiency involved several main policies, laser-focused on reducing working costs per ton. By reducing costs per ton, a mine could work a lower-grade ore at a profit. He cut costs in three ways: reduction of labor expenses, improved treatment works, and reorganized accounting practices. East Murchison United was Hoover’s first test site, but the Sons of Gwalia was his first attempt at exercising complete control over a valuable mining property. Cutting labor costs came on the backs of the workers, and two short-lived strikes bear this out. Hoover’s reforms involved changing shifts underground rather than on the surface, reducing worker pay by “20 minutes per diem,” increasing the length of the work-week, decreasing wages by five shillings per week, introducing single-handed drilling, and importing Italian miners on a contract basis to leverage ethnic tensions in labor relations. Recalcitrant miners faced prompt dismissal.\textsuperscript{36}

Like many members of the mining managerial class across the globe, Hoover held a disdain toward the concept of organized labor. He was, by his own admission, “particularly bitter” toward labor unionism, seeing it as enabling “the saucy independence and loafing proclivities of many of the Australian miners.” Mining unionism in Western Australia had followed the booming districts and growing mining towns, and as the Sons of Gwalia emerged as a district, union organizers attempted to unite the miners. Mr. Price, “representing the Workers’ Association” in Leonora, recruited more than one hundred

\textsuperscript{35} Nash, \textit{The Life of Herbert Hoover}, 58, 60.
\textsuperscript{36} Nash, \textit{The Life of Herbert Hoover}, 72-73, 77n52.
miners to the union over the course of two mass meetings in late April 1898. This was two thirds of the mine’s workers. Needless to say, the union’s membership drive elicited anger from Hoover, who was just assuming control of the property. In his mind, a disobedient and organized workforce was an impediment to efficiency, which was the ultimate goal in profitable gold extraction. He quickly began a campaign against the unionists, using several different strategies.37

To save in labor costs, Hoover extended work hours, lowered wages, fired potential organizers, and hired Italian miners as scab workers to leverage racial tensions. Hoover first increased working hours at the mine, “from 44 hours to 48 hours per week,” and instituted single-hand drilling. The increased hours marked the extension of the work week to six eight-hour days, which was met with “some trouble” from the miners. He fired several miners who resisted the increased work week. His strategy was explicitly aimed at disrupting the activities of the union, as he stated in a report, “We have accomplished most of our reforms without any united revolt, chiefly I fancy because the possible ring leaders had been previously dispensed with.” When he “asked the men to change shifts at the point of employment instead of on the surface,” cutting twenty minutes per miner per diem, the miners “met and determined to strike and I therefore promptly posted a notice that we would not grant the usual hour off on the Saturday shift, but the men would have to work the full 48 hours, and intimated we were prepared for any strikes by importing Italians” as scab labor. The miners of the Sons of Gwalia pushed back against this labor regime, and

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tensions between Hoover’s management and the union miners only escalated.\textsuperscript{38}

On the mucky lower levels of the mine, the truckers struck for higher wages, “owing to the wet ground,” and joined the miners in protesting the working conditions. Hoover “discharged the entire crew at that level, and replaced them with men at the old rate.” When Hoover refused to “pay double pay for Sunday work,” six men refused to keep working, so Hoover “discharged them and replaced them with new men.” It was raining pink slips at the Sons of Gwalia, with Hoover discharging any worker who went against his cost-saving measures and wage cuts. As a means of ensuring that his mine was fully staffed despite any labor unrest, Hoover began recruiting Italian miners on contract through an Italian recruiter named Ceruti Pietro. The effects of this were twofold. First, Hoover’s recruitment of Italian labor exerted a downward pressure on wages in his mine, as the contracted Italian workers worked for less than their “White” Australian counterparts. As contract laborers, the Italians offered a convenient force of scab labor. Hoover was explicit about their purpose, writing, “I have a bunch of Italians coming up this week and will put them in the Mine on contract work. If they are satisfactory I will secure enough of them to hold the property in case of a general strike, and with your permission will reduce wages.”\textsuperscript{39}

Hoover played on ethnic prejudice, much like mine owners did in the United States and the Transvaal. His specific use of Italians as laborers played into the perceived racial hierarchies of Western Australia, and therefore leveraged race to control labor. In the racialist discourse of the late nineteenth century, people of northern European descent


claimed the highest rung on the hierarchical ladder, relegating other ethnicities to arbitrarily subordinate positions. Italians and other people of southern European descent occupied the next rung down, below Northern Europeans, but above other racial groups. In the case of Western Australia, Hoover’s recruitment of Italians as contract labor solidified the racial hierarchy, challenging the superior social position of the White miners, but not nearly approaching the perceived inferiority of the Afghani camel drivers or the aborigines. His plans came to fruition by July 1898, as he reported, “We have some 15 Italians in the Mine and the rivalry between them and the other miners is no small benefit. Although the Italians are fully 20% superior we do not intend placing them throughout the Mine, for when in majority they are somewhat troubling.” He claimed that the Sons of Gwalia paid the highest wages on the goldfield, at five shillings per day more than any other mine in the region, a major outlay of capital. Hoover, therefore, used racial resentment as a means of undercutting the labor solidarity of his miners, pushing a vehemently anti-union labor regime in the name of increasing profitability and decreasing labor autonomy. 

Hoover also intensified the amount of work to be done by each miner. Single-hand drilling, however, represented a different tack, designed at controlling the working environment and increasing production. If the wage reductions and work hour increases represented an assertion of total control over the terms of employment, then single-handed drilling was a way of exercising control over the conditions of labor and of the “workscape.” Before Hoover’s reforms, miners at the Sons of Gwalia used two-handed drilling, which

40 Hoover to Ceruti Pietro, 18 May 1898, in Letter Book, 59, Pre-Commerce, HHPL; Nash, The Life of Herbert Hoover, 71-73, 77. For a discussion of scientific racism in the United States and its ties to the elite conservation movement, see Jonathan Peter Spiro, Defending the Master Race: Conservation, Eugenics, and the Legacy of Madison Grant (Burlington: University of Vermont Press, 2009); further discussions of race in mining engineering can be found in “The Accumulated Knowledge of a Thousand Generations,” a chapter below.
meant that miners worked in teams to drill, with one miner holding the drill while the other hammered. Single handed drilling was much faster, as miners drilled individually. Hoover saw it as a way to “secure us 20% more work for the same outlay.” When Hoover had initially implemented single-hand drilling at East Murchison United, the miners destroyed the equipment, pitching the drills into the stamp-mills and continuing to work with two-man teams on the older double-jack equipment. Hoover saw single-handed drilling as a more advanced, efficient, and practical means of increasing production through modern mining methods.41

In an article published in *The Mineral Industry*, Hoover wrote, “In but few mines is single hand work done, not because it is not desired, but because the men are either incapable or unwilling to do it.” The miners saw this as undercutting their autonomy and experience working underground. In *Killing for Coal*, historian Thomas Andrews argues that the “workscape,” or the environment of work shapes labor solidarity, resistance, and community. Underground miners worked in a tight, dark, and dangerous environment, and took pride in their skill and ability to do so. When the mine’s management introduced changes to the workscape, it was attacking the skills and experience of the miner and their ability to control some of the conditions of the workscape.42

Hoover further attacked his efficiency dilemma by instituting an economy of scale through improved treatment works and “conservative” mining. Rather than gutting the mine

of its richest ore in the interest of quick profits, Hoover developed the mine to expose and exploit all the payable ore, extending mine longevity. The formation of the ore deposit sloped downward at roughly a forty-five degree angle. When Bewick, Moreing and Co., first acquired the Sons of Gwalia, the mine had a vertical shaft and a number of tunnels cut through the deposit; Hoover redesigned the main shaft to cut down at a forty-five degree angle, through the gut of the angled deposit. In his plans, a winding hoist lifted buckets of ore along the incline and out below the headframe, which dumped the broken ore into a crusher basket for further production. This ambitious project took several months to design and implement, and work began in September 1898. This was Hoover’s attempt to exploit the geology of the deposit to maximize profits, effectively the job description of any competent mining engineer of the era.43

Another component of Hoover’s efficiency crusade involved the crushing mill and treatment plant. This involved several factors, namely securing a supply of fresh water, revamping the antiquated ten-stamp mill until its replacement, and securing appropriate wood for fuel and timbering, and the means of transporting wood and other supplies to the mine. Improving the treatment works of the mine was an expensive process, and dependent on a number of factors, both human and environmental. A lack of suitable water at the mine was one of the major concerns for opening and operating the proposed mill, as it was necessary for conversion to steam power. This was a problem not only for the Sons of Gwalia, but for nearly all of the mines of Western Australia, as much of the available water in the desert was extremely salinized, sometimes to nearly the twenty-eight percent saturation point. In his article in The Mineral Industry, Hoover examined the situation in many of the

43 Nash, The Life of Herbert Hoover, 73-79.
mines of Western Australia, “Water for mining purposes is secured largely from mine workings or from wells,” and, given its salinity, “water for steam and domestic purposes must be condensed.” The milling and treatment processes were water-intensive, with “about 300 to 400 gal. represent the average loss per ton, or a cost of from 25c. to $3 per ton of ore for mill water alone.” Some of this water was converted to steam energy, but much of it was used in the treatment of the ore, with cyanide and other agents extracting the gold from the auriferous ores. At the Sons of Gwalia, Hoover had a well for fresh water, but it did not produce enough for his purposes, and he needed a more plentiful and reliable supply to work his mill and supply his miners’ consumption. Later, once the mine reached below the water table, they gained access to plenty of water for milling.

When Bewick, Moreing & Co. assumed control of the mine, it had an inadequate ten-stamp mill that was operating at full capacity. Within days, Hoover and his staff repaired the mill, “after considerable delay,” and began to make the mill more cost-effective until they could erect a larger mill. They were “able to considerably improve the extraction by slower milling, cleaning grease off the Plates,” and Hoover hoped “to be able to maintain the monthly output of about 1,100 ounces without so much selection of ore.” The ore yielded just over an ounce of gold per ton when properly treated, and Hoover wanted to ensure outputs improved. By June, they “had to completely overhaul” the mill through mechanical changes, increasing “the extraction from 45% to 71%,” from an original extraction rate of fifteen per cent, while decreasing losses of water and quicksilver.

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However, the ten-stamp mill was inadequate for Hoover’s plans and the ore deposit of the Sons of Gwalia. In a contentious debate over the direction of the surface equipment, Hoover frequently clashed with Ernest Williams, his superior in Coolgardie, over the plans and installation of further treatment works. Despite the acrimony, they eventually installed a larger, fifty-stamp mill and a cyanide plant for the treatment of tailings. Installation of the new mill came after Hoover’s departure, but before he left, he pondered “the question of keeping 50 Stamps employed,” and stated it was “merely a factor of development. If the Mine continues in depth as at present, and development be pushed there is no doubt that it can be done easily.” Retrospectively, Hoover’s predictions proved accurate, as the deposit continued at depth and the Sons of Gwalia maintained underground mining operations until 1963, largely along Hoover’s initial plans.46

Another fundamental concern for the mine was the availability of timber and coal, both for fuel and for supporting the structure of the mine. The logistics and economics of the timber and fuel situation in Western Australia are interesting in their complexity and global reach. “Mining timber,” according to Hoover, was “especially scarce.” The endemic trees, “Jarrah and Karri” were sometimes used as sources of timber, but paled in comparison to imported lumber from Oregon, which could be purchased for $60 per thousand feet at a rail depot. The headframe for the Sons of Gwalia was made of Oregon lumber, as was much of the timbering underground. To run the mill, cordwood or coal was needed. This presented another cost of mining in the Westralian desert. “Fuel exists at present rather plentifully in the ‘bush,” Hoover wrote, “It is of inferior quality, and requires about 2 ¾

cords per horse-power per month. This wood costs from $5.50 to $7.50 delivered.” Coal would have been more efficient and cost effective, “equivalent to wood at $5 per cord, or possibly less,” except for the lack of transportation infrastructure, and the 112-kilometer distance between the Sons of Gwalia and the nearest railhead at Menzies.47

Due to its remote location, getting supplies to the Sons of Gwalia was a costly enterprise. Western Australia was still in the midst of rail infrastructure development, with the railways lagging behind the mining districts. To address these issues, Hoover proposed purchasing a caravan of camels for the mine, despite his antipathy towards the stubborn and uncomfortable beasts. The Sons of Gwalia contracted with the Afghan camel brokers, Faiz and Tagh Mahomet, for the purchase of fifty camels and Hoover put the beasts to work hauling freight to the mine. He expected “with our own camels be able to save some £500 on freight within the next two months.” Hoover also began working with the other Bewick, Moreing & Co. mines in the region to purchase goods in bulk. Together with the mines of East Murchison United, Brownhill, and Northam, Hoover suggested “placing an Agent at Fremantle” for coordinating ordering and freight, thereby undercutting other merchants and mine equipment suppliers. Previous freight contracts had charged twelve shillings per ton for freight from Menzies to the Sons of Gwalia. Hoover’s plan was to put a forwarding agent at the port of Fremantle and one at the railhead in Menzies, thereby cutting the local merchants out of the supply chain and reducing costs for Bewick, Moreing & Co. mines.48

The final internal reforms for the Sons of Gwalia were changes to its accounting

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practices. Hoover instituted reforms along three major lines: adjusted milling totals, converting to short tons, and adding an accounting category for “redemption” work.

Hoover’s driving concern at the Sons of Gwalia was reducing working costs per ton of ore, as a means of profitably exploiting the deposit. When the mill at East Murchison United was down for maintenance for nearly a fortnight, Hoover advocated shifting the monthly totals based on when the mill was able to run, drawing a brief bit of criticism for his creative stopgap reporting. Moving from the long ton (2,240 pounds) to the short ton (2,000 pounds) was another measure designed to give the appearance of lower working costs per ton. By changing the units of measurement at the mine, Hoover brought it in line with other gold mines throughout the world, especially in the American West and South Africa, and, by dint of the smaller short ton, seemingly increased the throughput of the mine and mill just by making a small change on paper. It was a mark of standardization in Hoover’s practices.49

Accounting changes came with Hoover’s insistence on adding a bookkeeping category for “redemption” work. As the mine got “a large portion of our ore from development,” the costs of development work added to the costs per ton at the mine, while the ore unearthed as a byproduct of development went into the general production costs. It was “not equitable to use this ore in a basis of Mining costs without crediting development something, nor is it equitable to estimate mining costs on the basis of the small tonnage needed to cover the deficiencies of development dirt.” Working costs, through Hoover’s inclusion of the “Redemption” account, went up from 19/- to 26/-, exclusive of payroll, but “when working on a larger scale. . . it becomes necessary to timber Stipes etc. as well as running a Cyanide Plant etc.,” it was going to be impossible to meet such a low working

49 Nash, The Life of Herbert Hoover, 74-75.
cost. “Therefore, by the addition of 7/- per ton Redemption to working costs,” Hoover argued, “our costs are still remarkably low and at the same time we wipe off a considerable portion of a rapidly accumulating Capital Account.” Effectively, Hoover reorganized the accounting process to consider the long-term development of the mine.50

Hoover also attempted to change the conditions of the small miners’ town which had sprung up around the mine. As the Sons of Gwalia was two miles from the main town of Leonora, many miners elected to set up crude burlap tents and other shelters near the mine. Despite earlier criticism of premature building, Hoover saw the need to erect permanent structures on site, for mine administration, assaying, and other purposes, including a “officers’ mess.” Hoover attempted to control the supply and distribution of hard alcohol among his miners, a challenging task in the “sodden conditions” of Western Australian mining towns, but he also ordered quantities of alcohol for his managerial and engineering staff. Effectively, Hoover reinforced lines of class and hierarchy in developing brick buildings for his mine’s offices, ordering periodicals and publications for the officers’ mess, and supplying alcohol for his managerial staff while attempting to restrict the miners’ access to the same. He later recalled that he had a foreman, who functioned as a bridge between the miners and managers, with a habitual binge drinking problem. The foreman felt that “if you live in this place you just have to get good and drunk once in a while.” While Hoover kept that foreman on, he also worked to restrict “sly-grogging,” or the extralegal sale of hard alcohol on the leasehold property of the Sons of Gwalia, targeting a woman with a small house on the lease, who sold liquor on the side. When challenged, she asserted that

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“she possessed a miner’s right. . . and was engaged in the legally permissible search for alluvial gold.” He was unable to evict her from her property, and she likely continued supplying illicit booze to the miners.  

As to supplying his managerial and office staff, Hoover betrayed a taste for quality bordering on luxury, especially for the Outback. He took pains to supply his engineering and managerial staff well supplied with quality alcohol and choice periodicals. At one point, he ordered 3 cases of “square labelled Pilsener,” one case of “Highland Cream Whiskey,” and one case of “French (Chateau Lafite) Claret.” When inferior booze arrived, Hoover wrote an annoyed letter to the importer, exclaiming, “The least said about the quality of the liquor supplied by you the better,” and that the costs were exorbitant. He switched liquor suppliers the next month, ordering a further six cases of lager and two of claret, but when it arrived, the wine was “so far from being ‘first class’ as to be undrinkable.” For the miners, Hoover subscribed to several technical journals. He also ensured that his engineering and administrative staff had access to plenty of extracurricular reading material, such as Harpers’ Monthly, Scientific American, The Times of London, the Financial Times, and others. Effectively, Hoover reinforced the divisions between his miners and engineering staff through the construction of new buildings, access to reading materials, and supplies of alcohol, based on the rank and role of each person. While this may seem minor in contrast to contracting for scab labor, it fits into the larger pattern of Hoover’s attempt to control all the components and operations of the Sons of Gwalia for maximum efficiency, while explicitly reinforcing the class divisions between the management and miners.  

52 Hoover to Andrew M. Patterson, Esq., 18 August 1898, in Letter Box, 460, Box 53, Pre-Commerce, HHPL; Hoover to Messrs. Fink & Co., 18 September 1898, in Letter Book, 536, Box 53, Pre-Commerce, HHPL;
By the standard of working costs, Hoover’s reforms were successful. Through labor cost reductions and efficient mining and milling, the working costs dropped by fifteen percent, from £1.3.9 per ton in August to £1.1.4 per ton by October 1898, helping to quadruple the profits over the previous quarter, and making the Sons of Gwalia into one of the most cost-effective mines in Western Australia. At East Murchison United, Hoover’s appointed manager Deane Mitchell instituted many similar reforms under Hoover’s orders, with similar results. By the end of his seven-month tenure as manager of Sons of Gwalia, Hoover had laid the groundwork for one of the richest and longest-lasting mines in Western Australia. Granted, the rich ore deposit underneath the Sons of Gwalia was the largest factor in Hoover’s success, but his ruthless management and efficiency practices enabled profitable exploitation, and laid the groundwork for Bewick, Moreing & Co.’s success and long-term presence. Hoover’s tenure at the Sons of Gwalia came to a close in November 1898, owing to interpersonal friction between Hoover and his superior, Ernest Williams, but also to C. Algernon Moreing’s designs on the rich coal districts in China. Moreing offered Hoover the position of consulting engineer for the Chinese Bureau of Mines, and Hoover accepted. He departed Australia via London, and stopped briefly in San Francisco to marry Lou Henry.  

Conclusion

What should be made of Hoover’s early life and engineering career, both in the American West and Western Australia, and its representation and reinforcement of currents around the world? He seems to embody the myth of the self-made man, rising from

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53 Nash, The Life of Herbert Hoover, 82n83, 86-87.
orphanhood to prominence along the idealized industrial-capitalist path as an engineer and manager. His employment with Bewick, Moreing & Co. highlights the global scope of mining finance and investment, especially in the colonial holdings of the British Empire. Within this imperial context, the rhetoric and politics of racial hierarchy shaped both the labor regime in and around the mine, and in the relations between European and American colonial agents and the indigenous people of Western Australia, whose dispossessed lands Hoover inspected and mined. The gold and wealth that Hoover extracted flowed back to the imperial core of London, enriching the shareholders and investors while also contributing to the monetary supply of Britain to operate and expand its empire. It also served as a target of speculative investment, creating and then destroying wealth based off the reputation and pedigree of the promoters like Whitaker Wright and C. Algernon Moreing. Gold mining in Western Australia in the 1890s was a transnational and global phenomenon, an epitome of capitalism and high finance, drawing people and resources from around the world in service of profitable gold extraction.

In many respects, the Sons of Gwalia was a laboratory for a viciously efficient form of extractive capitalism in both human and environmental terms. Sited in a colony with a repressed indigenous population, owned by distant shareholders, and managed by a technocrat, the mine was a space of labor exploitation, the purposeful manipulation of racial tensions and class hierarchies, and large-scale industrial technologies applied to the geology. Hoover’s first goal was control; he wanted authority over every aspect of the mine and its environment, whether through how the miners worked and what they drank and read, or through controlling transportation, fuel, timber, and water supplies to the mine. He exercised this control explicitly for profit; in his view, profitability dictated whether a mineral
deposit would become a stable paying mine, a relic of charlatanism and misguided ambition, or consigned to remain unexploited due to prohibitive costs. His efficiency practices at the Sons of Gwalia laid the groundwork for continued stability and profitability, and for further and sustained capital accumulation through gold mining in the British Empire.

Like many other economically successful men he learned from and mentored, Hoover expressed managerial capitalism in a distant mining colony, in the interest of efficient, long-term mining and a stable return on investment for its shareholders. Whether this is a laudable set of practices is debatable and ultimately a question of ideological perspective; what matters is that it fits the patterns of global extractive capitalism in the late nineteenth century, while bolstering the monetary supplies of the British Empire and paying dividends to the investor class in London, thereby furthering capital accumulation by extracting wealth from Britain’s colonies. Writing in *The Engineering and Mining Journal*, Hoover exclaimed that “The history of the Rand will in many ways be the history of Western Australia; as the economic conditions of mining become more favorable and the operations are conducted on a larger scale,” then, “the working costs will decrease and lower grade ores become profitable.” While he was focused on working costs and efficiency, Hoover unintentionally made another point: that the histories of the gold-producing colonies in the British empire shared a history. A history of extractive colonialism, labor exploitation, racialism, and capital accumulation for the imperial core.\(^5^4\)

\(^{54}\) Hoover, “Mining and Milling Gold Ores in Western Australia,” 726.
Herbert Hoover left Western Australia in the midst of contention and acrimony in Bewick, Moreing & Co.’s upper-level engineering staff, despite his success in running the Sons of Gwalia as one of the most cost-efficient mines in the district. C. Algernon Moreing promoted him to a position in China as a technical consultant to the Director General of Mines of Zhili province, containing the cities of Beijing and Tianjin and a broad rural hinterland. Hoover relinquished control of the Sons of Gwalia to a subordinate, and departed Australia via Perth. While waiting for his ship, he took the opportunity to telegraph Lou Henry in California with a brief message asking if she would marry him. She cabled back, accepting his proposal, knowing that they would be bound for China immediately after their nuptials. Hoover traveled first to London to report to Moreing, and then to San Francisco to his fiancée. Neither Lou nor Herbert could know that they were about to embark on a particularly adventurous relationship that would circle the globe and expose them to a major uprising in China, an expansion of Hoover’s role in Bewick, Moreing & Co. to full partner with a commensurate increase in his salary and stockholdings in mining enterprises around the world. Within a decade, the Hoovers were rich, and Herbert had an international reputation as a financier and mining engineer, operating around the world as a sole proprietor of his own mining finance and investment firm. After fifteen years of marriage, Lou and Herbert witnessed firsthand the outbreak of the Great War in Europe, and they and their two sons became the first family of the United States in 1929. These pivotal years brought Hoover international renown and wealth, but are marked by a certain
paired ruthlessness and pragmatism. These traits were especially evident in his role as Moreing’s representative in China, the subject of this chapter.¹

Bewick, Moreing & Co. entered the Chinese mining sector in the British imperial sphere, beginning in 1898. Algernon Moreing had been surveying late Qing China² for several months, looking for mining and investment possibilities during the Scramble for Concessions. Hoover arrived in March 1899, in the midst of European imperial powers demanding concessions from the ailing Qing dynasty, as floods devastated northern China, and anti-foreign sentiment simmered in Shandong province, exacerbated by the 1897 murder of two German missionaries which sparked German seizure of Jiaozhou Bay and the Scramble for Concessions. European powers demanded ports, railroads, and mines from the Qing, and Hoover worked to secure all three for Bewick, Moreing & Co. Following the Eight Nations’ brutal campaign against the Boxers, Hoover and Bewick, Moreing & Co. used the unrest to consolidate European control over the Chinese Engineering and Mining Company (CEMC) by privatizing it into a British-controlled limited liability company and floating shares on the London market. The CEMC was a prized acquisition, as it controlled the Kaiping colliery in Zhili province, the greatest industrial enterprise in China at the time. Despite a major lawsuit in the British courts challenging the corporate structure, Hoover and Bewick Moreing remained in control of the CEMC until the 1911 Xinhai revolution, when it merged with the Lanzhou Coal Company to form the Kailan Mining Administration. Shareholders of the CEMC received a massive buyout for their shares, sixty percent of the

¹ Jeansonne, *Herbert Hoover*, 60-78.
² The Qing Dynasty came to power in 1644, and lasted until the Xinhai revolution of 1911-1912. According to Endymion Wilkinson, *Chinese History: A Manual*, Revised Edition (1998; Cambridge: Harvard University Press, 2000), 898, the Dynasty can best be broken into early and late Qing, with the year 1840 as the chronological dividing point.
first £300,000 in profits.³

Hoover’s activities in China epitomize what journalist Naomi Klein terms “disaster capitalism,” which she defines as “orchestrated raids on the public sphere in the wake of catastrophic events.” It is a form of what geographer David Harvey calls “accumulation through dispossession.”⁴ These techniques of accumulation came to be repeated throughout the world during the twentieth century, so it is perhaps fitting that a young American engineer became deeply involved in the first instance of the century. The general format for such capitalism goes as follows. Find a state, in this case China, that is in the Global South and weakened by both internal problems, and—according to European and American standards and ideals—perceived industrial or economic backwardness, or under-development. Then, offer loans and technical advisors, but with conditionalities and structural adjustments that divert some of the resources or profits to the lenders and further the internal problems of the country, especially rural unrest, inequality, foreigners, drought, and famine. Mix in a healthy dose of paternalism and racism, especially in technical affairs. If possible, find an unwitting or unscrupulous local official to aid in foreign investment in exchange for a portion of the profits, in this case Zhang Yi.⁵ When local resistance to policies erupts, dispatch foreign military to brutally suppress unrest, while pointing to weakness of the state


⁵ Zhang Yi, or Zhang Yanmau is also known as Chang Yen-mao, highlighting the differences in romanization between the Wade-Giles and Pinyin systems and also illustrating the diversity of names used by Qing officials, including pen names. Most of the sources refer to him as Chang Yen-mao or some variation on this. However, the Pinyin romanization system is recommended by modern scholars and style guides, and will be used throughout.
in managing its population. Use resulting chaos to both secure further investment and austerity measures in order to satisfy loans and debts, and in China’s case, a massive and crippling indemnity.\(^6\)

As will become clear, Hoover’s role was one of an “economic hitman,” whether willingly or unwittingly. He entered China as a young expert, surveyed its mineral resources, and quickly identified the most valuable enterprise. After securing a loan for a major infrastructure project, Hoover moved to privatize the CEMC, securing an agreement from Zhang Yi while under duress. He absconded with the agreement, returning to London, where the terms of the agreement changed and the sources of international financing became murkier. Hoover returned to China and seized the finances and titles of the CEMC, while attacking the traditional, local distribution of profits known colloquially as the “squeeze” and massively reducing the workforce. Under pressure from higher officials, Zhang Yi sued to recover the CEMC in British Courts, but only scored a moral victory.

Zhang Yi’s unfortunate prediction in an 1898 official memorial, regarding foreign aid and expertise at the Kaiping Colliery, “The benefit derived has been counterbalanced by the harm done,” had come true. Suffice to say, Zhang’s premonition came with major financial

consequences for China.  

The Kaiping Colliery and the Chinese Engineering and Mining Company, 1878-1900

The Kaiping Colliery was the largest industrial enterprise, the most modern and westernized, and the most valuable in late-Qing China. Li Hongzhang, a prominent statesman and general, advocated the Self-Strengthening Movement (1861-1895), using western technology and advisors to modernize the Chinese military and industry as a means to resist further European incursion. These efforts included developing the mineral resources of China, especially coal and iron deposits, because, in Li’s reasoning, “the building of ships, cannons, and machinery will be impossible without iron, and we will be helpless without coal.” The development of the coal deposits at Kaiping would also provide a source of revenue for the cash-strapped dynasty, as sales of domestically mined coal displaced the costs of importing coal; Li intended that this revenue be directed back into the modernization movement. Above the water table, small-scale coal mining had occurred in Zhili province for centuries, but it was not until Li’s modernization push, including improvements to transportation infrastructure, that large-scale coal mining became economically viable.  

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7 The term “economic hitman” is borrowed from the anecdotal account of John Perkins, Confessions of an Economic Hitman (New York: Plume, 2005); Zhang Yi, “Memorial,” November 1898, Box 1, Bewick Moreing (Hooveriana), HHPL; Wilkinson, Chinese History, 534-535.

8 The Self-Strengthening Movement came to an end with the Chinese defeat in the Sino-Japanese War (1894-1895), partially due to the conservative opposition surrounding and promoted by Empress Dowager Cixi. Statesmen such as Li Hongzhang and Yuan Shikai were staunch supporters of the Self-Strengthening Movement, and subsequently led the most technological and militarily modernized provinces and militaries.

Exploratory drilling began in the Kaiping basin in 1878, and developmental mining began in February 1879 with the sinking of the first shaft. Work progressed rapidly, with the second shaft opening in March 1879. As part of the “self-strengthening” movement, Li brought in English mining engineers as consultants, who imported the major machinery necessary for underground mining. By the end of the year, the colliery had several new buildings, and underground work had progressed to the two-hundred-foot level. It took several years for the mine to extract coal on a large scale, with only 3,613 tons produced in 1881. However, by 1883, the mine produced 75,317 tons, and production continued to increase. Along with the development at the mine, Li also pushed for transportation infrastructure for moving the coal to the ports for sale as bunker fuel to power steam ships, and backhandedly developing a railway line to a canal port for transshipment to Tianjin’s maritime coal market. By 1889, the mines produced 247,867 tons of coal, the company employed 3,000 workers, and the rail line extended to the port at Dagu, further opening the coastal market as well as supplying the Chinese Navy and the fledgling military-industrial complex.  

Over the next ten years, the Kaiping colliery and the Chinese Engineering and Mining Company continued to expand and experienced a shift in management due to the death of the first manager. In 1892, Zhang Yi assumed the management of the colliery, heralding a broad expansion of operations and investment, but also coming under fire for corruption, graft, inefficiency, and mismanagement. He leveraged his position as general manager for personal enrichment, quickly becoming one of the wealthiest men in the province. He displayed few scruples in his business dealings. However, despite Zhang’s

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mismanagement, the Kaiping colliery’s operations tripled between 1889 and 1900, and several statistics bear this out. Coal production per year tripled, from 247,867 tons of coal in 1889 to 778,240 tons in 1899. The number of workers engaged also tripled, from 3,000 to 9,000; Hoover and other western observers considered these labor practices as inefficient, but that was in comparison to the productivity of skilled American miners with the most modern equipment. Finally, stock issues also increased dramatically in the 1890s, from 1,500,000 taels in 1889 to 4,190,000 taels in 1900, of which 1,850,000 came from foreign investment.\(^\text{11}\) Since 1889, the company had been paying consistent dividends to its stockholders, ranging between ten and twelve per cent. This was a massive and profitable industrial undertaking. This decade of three-fold increases by nearly every measure indicated that the Kaiping colliery was the foremost industrial enterprise in late-Qing China, and the ancillary operations of the company, including its shares in railroad companies, its fleet of steamships, and its planned expansion of the port facilities and harbor at Qinhuangdao only made it more valuable to the Chinese economy and plans of modernization. It also made the Chinese Engineering and Mining Company a prime target for European acquisition during the Scramble for Concessions by Western Powers. Its value was quickly realized by C. A. Moreing during an inspection tour in 1898.\(^\text{12}\)

\(^{11}\) Taels are measures of weight, and as China did not have a centrally-issued currency during this era, trade and commerce was often conducted by taels or by foreign currencies. This measure of weight was also not standardized and there were more than 170 currency taels, but the most common tael was the Shanghai tael, equivalent to 1.3 ounces of silver. On the London market in 1900, one ounce of silver was worth $0.62, and therefore a tael was worth approximately $0.80, but this number fluctuated based on the metals market, and its exchange value also fluctuated based on geography. A thousand taels in 1900 would be worth approximately $20,500 in 2015, and the total capitalization of the Chinese Engineering and Mining Company in 1900 would be worth approximately $85.9 million in 2015, exclusive of its properties, mineral claims and rights. Wilkinson, *Chinese History*, 251; *Encyclopaedia Britannica*, s.v. “Tael,” accessed 23 January 2018, [https://www.britannica.com/topic/tael](https://www.britannica.com/topic/tael); “Movement of the Price of Silver,” *Federal Reserve Bulletin* (1 November 1917), 842, [https://fraser.stlouisfed.org/files/docs/publications/FRB/pages/1915-1919/24568_1915-1919.pdf](https://fraser.stlouisfed.org/files/docs/publications/FRB/pages/1915-1919/24568_1915-1919.pdf).

Moreing’s visit to China came at the invitation of William Pritchard Morgan, Member of Parliament, and one of the first investors in the Sons of Gwalia. In fact, the M.P. made a good deal of money off the sale of the Sons of Gwalia to Bewick, Moreing & Co., in 1898, and he had been a part-time business partner of Moreing for years. Morgan had first visited China in 1896, and had met with Li Hongzhang, who encouraged him to return with one of Bewick, Moreing & Co.’s top engineers, as a larger part of Li’s continued modernization campaign. Morgan returned to China in 1897, accompanied by William Shockley, the engineer who had recruited Herbert Hoover to Moreing’s firm. Morgan’s reports and an invitation from Li Hongzhang encouraged Moreing to visit China for himself, partially to inspect its mineral wealth, but also to offer a massive loan to the Chinese government and a bond issuance for the development of Qinhuangdao harbor. Before Moreing left for China, he published an article in *The Nineteenth Century*, an elite British periodical which catered to high society and the investor class. He claimed that Britain had a great opportunity for investing in China, and that offering loans to the dynasty would secure British influence in China, while simultaneously bringing China into the modern world. Given the concessions won following Britain’s victories in the two Opium Wars (1839-1842 and 1856-1860), Moreing’s ambitions had a violent precedent. As a reward for his activism in securing a large loan for China’s modernization projects, Moreing expected a mining concession in Zhili province, and set his eyes on the Kaiping mines.\(^{13}\)

Moreing contended that “the public debt of a country may be said to be a fair index of her capacities and resources,” and he compared the public debts of France, Great Britain,

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\(^{13}\) Nash, *The Life of Herbert Hoover*, 97-98; Pritchard Morgan, telegram, 30 March 1897, Bewick Moreing (Hooverania), Box 1, HHPL; C. A. Moreing to Li Hongzhang, telegram, 3 January 1898, Bewick Moreing (Hooverania), Box 1, HHPL.
and the United States to India and China. He found that European public debts ranged from £28 to £5 per citizen, whereas India under British rule had a public debt of seventeen shillings per person, while China had less than two shillings per person. He concluded “that this condition of things in the most populous and undeveloped region of the globe concerns us, our prosperity, and our very existence more than those of any other country.” Strong lending from Britain, whether public or private, would accompany commerce; further, these loans must come with conditions, namely the forced opening of more treaty ports, unrestricted commercial access to the Yangzi valley, the extension of the Burma railway into China, the implementation of a uniform currency, massive infrastructure improvements, provincial taxation, “and last, but not least, the mineral amongst other resources of this great empire require development.” In Moreing’s view, lending and state debts were the fulcrum for encouraging mineral resource exploitation, for “As long as China was under no pecuniary obligation to foreign countries there was no pressing need for internal development.” Therefore, British lending paired with development conditionalities would open China to further investment and trade. “If Great Britain avails herself of the exceptional opportunity she possesses,” Moreing argued, “to insist on the reforms and measures . . . as conditions of the proposed loans, she will have taken a step for which every part of her empire, to say nothing of the wider circle of traders in all parts of the globe, will have reasons to be profoundly grateful, both now and in years to come.” In other words, a massive loan to the Chinese government was the wedge which would open the country to Western investment, especially concerning the exploitation of China’s vast mineral resources. Moreing argued, whether cynically or honestly, that this would be a net positive for China and its
population.¹⁴

**Hoover, Mine Inspections, and the Boxer Uprising**

During his visit, the CEMC approached Moreing seeking a £200,000 loan to develop the port facilities at Qinhuangdao. In exchange for securing a loan, Moreing wanted concessions for a mining claim in Zhili province, and for the Chinese government to begin modernizing its system of mining claims and laws, including establishing a bureau of mines. The dynasty acquiesced, under the guidance of Li Hongzhang and Zhang Yi, and created the Chinese Bureau of Mines. They asked Moreing to recommend a consulting engineer for the bureau and he selected Hoover, removing him from the contentious dispute roiling his Western Australia engineering staff. Hoover’s salary from the Chinese Bureau of Mines was £2,500, with Moreing paying up to another £1,000 for expenses. He was further entitled to “one-fifth of all profits from development of Chinese mines,” according to historian Glen Jeansonne. The newlywed Hoovers arrived in Tianjin in March 1899, and Herbert quickly began inspecting the mineral wealth of China, anxious to both develop its resources and secure profitable investments for Bewick, Moreing & Co. The bipolarity of Hoover’s role in China did not seem evident to the young engineer because he envisioned these two tasks as one in the same: foreign direct investment would modernize China’s economy and infrastructure, and the foreign investors would be duly rewarded for their largesse. It was economic progressivism applied to China.¹⁵

The groundwork for Hoover’s role as consulting engineer to the Chinese Bureau of

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Mines had been laid by Moreing’s negotiations with Zhang Yi and Li Hongzhang, but also with Gustav Detring, a German national and Commissioner of Customs for Tianjin. Detring was among the most influential and respected Europeans in north China, and he had associated with Zhang and Li to expand investment and production at the Kaiping mines and other modernization schemes. Moreing and Detring had originally envisioned that Bewick, Moreing & Co. would secure the contract to serve as mining engineers, financiers, and managers for all of China, but this proved entirely too ambitious. Moreing lowered his sights to Zhili province. In August 1898, Detring authorized Moreing to raise a sum of £200,000 for a loan for the construction of the new port at Qinhuangdao and the opening of a new colliery near Tianjin; the loan was to be repaid within fifteen years, and interest was not to exceed ten per cent. As Detring and Moreing solidified the final details of the loan, Zhang Yi was promoted to Director-General of Mines for Zhili province and Assistant Director of the Northern Railways. Hoover was to be his technical advisor.¹⁶

Two weeks after the Hoovers arrived in Tianjin, Herbert set out for an inspection tour of the province’s mineral resources and operating mines. He traveled with a large entourage, including a military escort, a personal cook, several mining officials, interpreters, and others, making for slow travels throughout a province the size of France. On his inspections, Hoover witnessed widespread mining for gold, silver, and copper.¹⁷ The scope of mining activities was limited by Chinese technology, namely the lack of pumping

¹⁶ Gustav Detring to C. A. Moreing, 10 August 1898, Tianjin, Bewick Moreing (Hooverania), Box 1, HHPL; Nash, The Life of Herbert Hoover, 99.

¹⁷ It should be noted that China has a long history of mining, but their mining activities were largely tangential to the overall Chinese economy, but there was a “quite sophisticated” Chinese mining manual, first published in 1637, less than a century after the publication of Georgius Agricola’s De Re Metallica. Indeed, during times of economic downturn, Chinese officials promoted coal mining as a work-relief program. See Pomeranz, The Great Divergence, 63-67.
machinery which restricted mining to above the water table. Hoover lamented the failure of several metal mining operations in Zhili, which used a “curious mixture of foreign and native methods, but without much profit.” However, the province produced nearly 50,000 ounces of gold and 140,000 ounces of silver in 1898, indicating the potential mineral wealth. He also looked upon Chinese mining methods with a mixture of curiosity and paternalism, pointing to the labor-intensive means of transporting ore to the surface and to the small-scale milling operations, but also noting the productivity of the small workings and the “fineness” of the resulting silver and gold. Hoover also commented on the labor situation, arguing, “The fact that an unlimited amount of able-bodied labour can be obtained in China for 6d. per day is often estimated in too favorable a light.” The downside to the cheap costs of labor was in the quality of the workers: “To work, in the sense of Western miners, is an unheard-of exaction, and, even where these men have been employed under foreign direction for a number of years, the ratio of effectiveness is about 5 to 1.” However, Hoover did not consider this to be a disqualifying factor, as, “even at this rate, mining should be very cheap. The men are docile and easily handled, and their tendencies to dishonesty are probably no greater than those of other human beings under the same conditions.”

Hoover’s schedule of mine inspections continued for several months, a continuation of his peripatetic habits from Western Australia. He preferred to ride on horseback amid his entourage, despite the offers of a sedan chair; often, Lou accompanied his inspections, similarly mounted. She went underground as well, which for superstitious Chinese miners, was a poor omen. Overall, Herbert inspected more than fifty gold mining districts in Zhili

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18 Herbert Hoover, “Metal Mining in the Provinces of Chi-li and Shantung, China,” Transactions of the Institution of Mining and Metallurgy 8 (28 March 1900), 324-331, https://hdl.handle.net/2027/hvd.32044102934080
and Shandong provinces, and traveled as far afield as Inner Mongolia and the Gobi Desert. In the course of his travels and inspections, he began hatching schemes for further development, whether to open Zhili province to prospectors in order to survey its mineral wealth and begin exploitation, or different financial mechanisms to increase production at the Kaiping Colliery. Hoover also considered the incorporation of another company to further develop rail and infrastructure to move coal to the developing harbor at Qinhuangdao, or pushing for a Mining Administration to regulate mining claims and development. In his later recollections, Hoover recognized that he was not alone in his surveys: “The reform period had bred a horde of foreign concession hunters demanding great mining areas with the aid of each foreign Ambassador or Minister, and, with large sums for too-easy corruption, sometimes securing results.” However, in his mind, he was pushing for the same goals as he advocated in Western Australia, namely efficient and profitable mining that responsibly exploited the region’s mineral wealth. In “the freshness of youth,” he thought that the first challenge for China’s mineral industry was the lack of a codified mining law, which would use some of the profits of mining to finance the ailing Qing dynasty. Modernization in mining would therefore finance modernization in government.\(^\text{19}\)

Despite China’s latent wealth in gold and silver, Hoover focused on the Kaiping basin, as he estimated that it would be the greatest anthracite field in the world. He had dispatched George Wilson and two other engineers to manage operations in the basin, and was further negotiating the development of the Qinhuangdao port facilities. Lou Henry managed their household in Tianjin, including fifteen servants and a stable of several horses, while also learning Mandarin and collecting Ming porcelain. The busy schedule of Herbert’s

inspections and negotiations kept him occupied throughout the early months of the new century. By June 1900, he had secured the appointment as “Engineer-in-Chief” for the Mining Bureau of Zhili province, at a salary of £2,500 per year and a contractual term of three and a half years, and an appointment as the chief engineer for a colliery at Wushuizhuang for an additional £500 per year, plus an allowance for rent, and whatever else Moreing decided to pay him. Hoover’s success in China seemed poised to continue. After all, he had a prominent position and influence with several of the major figures in Self-Strengthening Movement. Foreign investment would accomplish the interlocked goals of securing a return on investment for British shareholders while developing China’s mineral resources, transportation infrastructure, and overall economy, supposedly for the benefit of the Chinese. In reality, though, Hoover had been riding the steady winds before a developing storm.²⁰

Hoover’s activities in China were a part of an immense imperial contest to parse the Qing dynasty and the wealth of China among European powers, known as the “Scramble for Concessions.” Reacting to the murder of two German priests in Shandong Province (known as the Juye Incident), Germany seized Jiaozhou Bay in 1897. This triggered a rush of other European imperial powers to push the dynasty for other economic concessions. The most valuable of these were ports, mines, railroads, and other infrastructure, but the imperial powers involved valued quantity over quality, and pushed the dynasty for concessions. It was, in the words of historian Joseph Esherick, a “new stage” of imperialism in China, a cutthroat commercial imperialism backed by the military might of European empires and the ascendant and increasingly bellicose and militarily dominant Japanese empire. The ailing

dynasty faced growing budgetary woes, and in 1898, attempted the 100 Days’ Reforms, a short-lived modernization campaign ordered by the Emperor. However, a coup by Empress-Dowager Cixi and her conservative, xenophobic allies ended these reforms and placed the Emperor under house arrest, exacerbating the political tensions in the Dynasty.\textsuperscript{21} The increasing burden of taxation in the provinces also reflected the declining price of silver in China and internationally, and the purchasing power of Chinese “cash” copper coins\textsuperscript{22} dropped precipitously. Repeated flooding of the Yellow River in Shandong inundated agricultural areas, destroying crops and jeopardizing food supplies; floods in August of 1898 affected more than 1,900 villages, triggering an internal refugee crisis which was quickly exacerbated by a cholera epidemic. At the same time, a horrific drought and famine gripped the northern provinces of Shanxi and Shaanxi, peaking in 1901. Combined, these events killed approximately ten million people according to an estimate by Mike Davis. To many Chinese people, it must have seemed as if they were facing an apocalypse. Gaunt, dispossessed Chinese peasants turned to social banditry to survive, while others turned to a millenarian movement fermenting in Shandong province.\textsuperscript{23}

These were the Yihequan, or “Righteous & Harmonious Fists,” known to westerners as Boxers, and their simmering resentments against foreigners and collaborating Chinese Christians was primed to erupt into an uprising. The Boxers practiced spirit-possession rituals and martial arts, believing that advanced practitioners could become invulnerable to Western bullets. They trained for self-defense, mainly as protection against the excesses of

\textsuperscript{21} Esherick, \textit{The Origins of the Boxer Uprising}, 320, 168-205.  
\textsuperscript{22} Wilkinson, \textit{Chinese History}, 247-252.  
German Catholic missionaries and their converts, which could be brutal and inhumane. Throughout 1898 and 1899, their influence spread as a decentralized movement, largely without leaders, but with plenty of grievances. On their large-character banners, the slogan “Support the Qing, destroy the foreigner,” flew prominently, and bands of Boxers spread throughout Shandong, attacking Christian missions and their Chinese converts. They believed that the Qing dynasty had been so weakened by foreign influence and incursion that it could not resist further, and therefore, the people must defend the dynasty. Training grounds for recruiting others to the Boxer cause sprang up throughout Shandong province, and spread north into Zhili province in the spring and summer of 1899. Angry young men, facing a combination of economic hardship, environmental catastrophe, political unrest and corruption, and increasingly violent foreign incursions did what angry young men often do. They resorted to violence.24

In June of 1900, just as Hoover was appointed as Engineer-in-Chief, the Boxer uprising spread like “prairie fire,” according to historian Joseph Esherick. Importantly, the xenophobic court of the Empress-Dowager offered the Boxers the right to peacefully associate for self-defense, which was unprecedented in Chinese society and political life. The spread of the Boxers into Zhili had begun late in 1899, but it bloomed dramatically in the spring of 1900. It was less of a case of Boxers moving en masse from Shandong than it was of the teachings of the Boxers migrating into Zhili, and finding a similarly discontented population in a region beset by drought and hunger. Both foreign troops and the Chinese military moved to suppress the nascent Boxer movement in Zhili, killing at least fifty, while the Boxers in Zhili were only responsible for one death. Tensions escalated, and in May the

Boxers began attacking symbols of modernization, including railway stations on the Beijing-Tianjin line. Fearing isolation in Beijing, foreign ambassadors increased the guards at their legations. Boxer violence increased, but they were still largely a poorly-armed rabble, facing the machine guns of western forces. The Boxers had the support of the population, who fed, supported, and housed their growing strength, and received the endorsement of the Empress-Dowager in mid-June when she declared war upon the foreign powers.25

25 Esherick, The Origins of the Boxer Uprising, 271-280, 287-290. It should be noted that the Boxers did not receive the support of modernizers such as Li Hongzhang and Yuan Shikai, who withheld their modern military forces from supporting the Boxer Uprising.
The brewing maelstrom in northeastern China engulfed Lou, Herbert, and his engineering staff. Herbert noticed the unrest while surveying an anthracite deposit west of Beijing, and began recalling his staff. Lou Hoover had been visiting Beijing when she was stricken with a particularly nasty sinus infection, which concerned Herbert enough to evacuate her to Tianjin and the care of a western physician. She quickly recovered. Throughout June, Boxers streamed into Beijing and Tianjin from the countryside, traveling in small groups of five or ten, hoisting a large-character banner. Dispossessed peasants joined with recently unemployed boatmen and canal workers—who had been rendered
obsolete by the railroad—to form the Boxer contingent in Tianjin. As the crisis escalated, the foreign legations in Beijing pled for help from their home governments. They were isolated in the capital city, as the Boxers attacked and destroyed the rail line between Tianjin and Beijing. In response, the British Admiral Sir Edward Seymour organized a relief column, composed of troops from Britain, France, Germany, Russia, and the United States, but they quickly became stranded on the broken rail line, and, surrounded, turned their Maxim guns on the Boxers. Seymour’s column made a slow retreat to Tianjin, as the Empress-Dowager’s court declared war against the Western Powers. Open hostilities between the Western Powers on one side and the Qing Dynasty and the Boxers on the other now raged. The Boxers occupied Tianjin by June 15, and surrounded the foreign concession. The Hoovers found themselves besieged on a narrow strip of land, defended by 1,700 Russian troops, and bombarded by Chinese artillery.  

The Boxers and Chinese military “desperately besieged” the foreign concession in Tianjin “for about a month.” During the siege, Herbert worked at organizing the defenses, including overseeing firefighting, boiling drinking water, feeding Chinese refugees who had taken shelter in the concession, and building “barricades out of sacks of rice, sugar, and peanuts taken from warehouses.” One of Hoover’s staff, Wilfred Newberry, seized a herd of dairy cows from near the concession. George Wilson took up arms during the initial assault, later claiming he “took part in the second fight. It did not last long. You have no idea how effective is the modern military rifle and the machine gun. The Boxers retreated,

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27 Herbert Hoover, “Information for Biographers,” 9-10, Pre-Commerce: Subject, Box 46, HHPL.
leaving a field full of dead.” Lou Henry was dubbed “Captain of the Guard,” and she arranged the schedule for the watch in her part of the concession, packing a .38 Mauser and taking shifts as well. She also volunteered as a nurse and for other tasks. The worst of the siege lasted nine days; US Marines and Welch Fusiliers arrived as reinforcements, and eventually the Seymour column broke through to the foreign concession, further strengthening the defenses.

By July, “sufficient forces” had arrived in Tianjin, and, according to Hoover, “it was determined to attack the Chinese Army itself.” As he was familiar with the area, Hoover accompanied the Marines during the attack, armed with a rifle. He did not fire a shot, but came to “recommend that men carry weapons when the go into battle—it is a great comfort.” Hoover later compared his experience in Tianjin to the Anglo-Boer War, occurring concurrently in southern Africa, and claimed “the losses amongst these Europeans were greater than the losses in Kimberley, Ladysmith and Mafeking altogether.” For the young couple, it was in Herbert’s later recollection, “an event that was to modify their lives, and also give them something to talk about ‘for the rest of their born days.’ But, of far greater moment than that, it was to start one of the many currents which shaped the new century.”

If, according to Hoover, the Boxer Uprising was “one of the many currents” to shape the twentieth century, then the brutal campaign of the Eight-Nations Alliance to suppress the Boxers and punish the Qing Dynasty for its resistance to Western commercial

29 George Wilson to Lester Hinsdale, Tongshan, 2 December 1900, Box 7, Pre-Commerce: Correspondence, HHPL.
30 Hoover, “Information for Biographers,” 9-10, Pre-Commerce: Subject, Box 46, HHPL; The Memoirs of Herbert Hoover, 53-54.
imperialism must be considered as a current as well. After massing strength in Tianjin, the Alliance, comprised of troops from Japan, Russia, the British Empire and its colonial regiments, France, German, Austria-Hungary, Italy, and the United States, moved on Beijing, raping, looting, and massacring their way to the capital. The combined force burned nearly every village in its eighty-five-mile path. Once in Beijing, the Eight-Nations Alliance engaged in an orgy of looting, and sent punitive expeditions into the countryside. “It is safe to say that where one real Boxer has been killed,” the American commander, Major General Adna Chaffee critically reported, “fifty harmless coolies or labourers on the farms, including not a few women and children, have been slain.” These “punitive picnics” into the outskirts of Beijing terrorized the Chinese population through rape, arson, looting, mass execution, and other tactics. Diplomats from the Eight-Nations Alliance forced the Qing Dynasty to agree to a massive indemnity of 450,000,000 taels, the execution of prominent pro-Boxer officials, garrisons of foreign troops in the capital, the suspension of civil service exams and occupations of commercial enterprises throughout China. Such was the cost of resisting foreign influence and commercial investment.32

**Acquiring the Chinese Engineering and Mining Company**

In the chaos of the Boxer Uprising and Eight-Nation Alliance’s punitive invasion, Hoover seized control of the largest industrial concern in China, the Chinese Engineering

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32 As quoted in Esherick, *The Origins of the Boxer Uprising*, 310-312; Cohen, *History in Three Keys*, 55. Pomeranz, *The Great Divergence*, 24, effectively argues that the differences between Northern Europe’s fossil-fuel intensive industrialization track and China’s labor-intensive track came down the necessity to adopt coal and fossil fuel as a power source, but also the massive land expropriation of the Americas. While it is a romantic counterfactual notion to imagine China and the Global South without the horrors of European (or other) colonialism, it is equally romantic to suggest that fossil-fuel based industrialization could occur without colonization, and that it is a question of morality on the part of a few individuals.
and Mining Company, and reincorporated it as a British firm. Even as Tianjin was under siege, Hoover was negotiating with Zhang Yi for further control of the CEMC, using Gustav Detring as an intermediary. Hoover held a particularly strong position in these negotiations, as Zhang was in custody in the foreign concession of Tianjin. He was suspected of being a Chinese spy or Boxer sympathizer and was facing possible, albeit arbitrary and extralegal, execution at the hands of the foreigners. Information flow into the foreign concession was limited, and the status of the Kaiping colliery was unknown. On June 23, 1900, Detring warned Zhang that the Boxers might seize and destroy the mines, creating great losses for the CEMC and the Chinese modernization effort. What Zhang did know was that foreign forces had seized or destroyed the CEMC’s property at Dagu, and that many of the company’s buildings and holdings in Tianjin burned during the siege. Needless to say, Zhang was not negotiating from a position of power.  

Hoover and Detring had other factors to leverage: debt and the foreign invasion itself. The Kaiping Colliery was cut off from communications and the lower levels of the mines had flooded. Foreign forces would certainly occupy the colliery after the Boxers had been suppressed. Hoover convinced Zhang that British investment and ownership would protect the Kaiping colliery and the CEMC from Russian control, which, given the rampant looting and seizure of Chinese property by the Eight-Nation Alliance, was a legitimate concern. Zhang granted Detring power of attorney as general agent for the CEMC, which gave him broad powers. The CEMC’s debts became a further tool for Detring and Hoover, as an interest payment was due to the Deutsch-Asiatische Bank on June 30, but it was impossible to repay given the economic paralysis of the enterprise secondary to the Boxer

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Uprising. According to Nash, “Detring perceived in this imminent default an excellent opportunity. Informing the Deutsch-Asiatic Bank of the company’s inability to pay its debt, he invited the bank to foreclose on all of the company’s property hypothecated to it as security for the loan.” The bank was more than willing to foreclose on the CEMC’s assets during the crisis, and German authorities began guarding the seized assets, including the company’s six steamships, and its wharves at Tianjin and Dagu. The CEMC’s situation worsened further, as its stock value tumbled from one hundred taels per share to twenty-one, destroying eighty percent of its value, and virtually eliminating its financial resources.34

Unbeknownst to Hoover, Detring, and Zhang, the situation at the Kaiping colliery was not as dire as they feared. Granted, the lower levels of the mines flooded due to pump failure, but this was less urgent than the threat of the Boxers. A Chinese manager who remained at the works organized “two volunteer forces,” to guard the works. They had “nearly two hundred volunteers to protect our works all around, armed with Mausers.” The volunteers also guarded the railway, and the manager believed “with these forces we are able to keep off any Boxers or gangs of robbers that should attempt to destroy or loot the works.” Indeed, according to the Chinese manager, he did not think it was “necessary to send any foreign troops at present, as it will only be an excuse to the outlaws and natives to destroy our works, should they hear of foreign troops coming here.” In fact, when Russian forces occupied the mining district in September 1900, looting began in earnest. Despite flooding and the unrest of the Boxer Uprising, the mines continued operating on a limited basis, producing 200 tons of coal per day in August 1900. Production declined and then

ceased as Russian forces occupied the colliery in September.

The combination of pressure from Detring and Hoover, financial insolvency, a violent social movement bent on destroying all things foreign, and a punitive invasion of eight foreign nations put Zhang and the CEMC into a difficult position. This culminated in the July 30th agreement, negotiated between Hoover, Detring, and Zhang, and mediated by the only British lawyer in Tianjin. This agreement transferred the entirety of the CEMC to Herbert Hoover, who was tasked with reorganizing the CEMC into a joint Sino-British concern with a capitalization of £1,000,000 in £1 shares. The old shareholders in the CEMC would trade their shares for new shares, equivalent to a 37.5% stake, effectively ensuring that they would be relegated to minority status in the new CEMC. Furthermore, pursuant to the agreement, Bewick, Moreing & Co. would provide £100,000 of working capital to the CEMC within six months, an injection of needed funding. However, within the text of the agreement, there were no fixes for many of the provisions, including the organization of the company, the relative influence of Chinese and European subscribers, and of the continuing authority of Zhang in the new company. In effect, Zhang agreed to transfer all the assets of the CEMC, China’s most valuable industrial enterprise, to a twenty-five-year-old American engineer. Hoover cabled the news to C. Algernon Moreing in London, and accompanied by Lou Henry, left for England by way of Shanghai and Nagasaki. The Eight-Nations Alliance reached Beijing the day before the Hoovers left Shanghai.

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35 As quoted in Carlson, *The Kaiping Mines*, 59-59. Some historians have argued that it was the Russian and Japanese occupation of the Kaiping Colliery and the CEMC’s other assets which pushed Zhang to transfer the company’s assets to Hoover, but as this report indicates, the Kaiping Colliery was not occupied by foreign troops until well after Hoover had taken control. For example, see Ian Phimister and Jeremy Mouat, “Mining, Engineers and Risk Management: British Overseas Investment, 1894-1914,” *South African Historical Journal* 49, no 1 (14 January 2009): 9, https://doi.org/10.1080/02582470308671445.

As Herbert and Lou were en route to London on an uncomfortable German mail ship, C. Algernon Moreing began operating in the London markets to float the new CEMC. Moreing first contacted Lord Salisbury, the British Secretary of Foreign Affairs, and informed him of the agreement. Moreing also formed a limited liability company. Hoover drafted a memorandum detailing the organization of the British CEMC, with a European board of directors and a “local advisory board,” in Tianjin, composed of Zhang, Detring, and Hoover himself. He also stressed the restructuring of the company’s assets, including the steamships and wharves repossessed by the Deustche-Asiatische Bank in June, and a reorganization of the management structure at the Kaiping colliery and other holdings. British apprehension toward investing in China in the aftermath of the Boxer Uprising meant that there was little interest in purchasing shares of the CEMC, so Moreing turned to other contacts in the mineral investment circles. He called upon financial contacts with the Oriental Syndicate and the Belgian Compagne International d'Orient to finance the transformation of the CEMC to European control. These companies and their investors represented the highest levels of haute finance in Europe, with investment from “the International Bank of Brussels, the Central Bank of Antwerp, the Bank of Outremer,” the Hongkong and Shanghai Bank (HSBC), and other major European banks. Percy Tarbutt advocated for South African mining investment groups, including Consolidated Gold Fields and the Village Main Reef Gold Mining Company. Carl Meyer represented Rothschilds financing, De Beers and HSBC, and Edmund Davis, a long-time investor in the Westralian markets and friend of Moreing, represented the Belgian interests and drove much of the financial process. These three men held interlocking positions on the boards of directors for the Pekin Syndicate, the Yangtse Valley Syndicate, and the Oriental Syndicate, all European
concerns with broad investment in China in the final years of the 1890s. 37

The new CEMC was capitalized at £1,000,000. However, this was not a simple initial public offering (IPO) by any means. Moreing approached the Oriental Syndicate, offering them complete control of the CEMC in exchange for nearly eighty percent of the Syndicate’s shares, and further muddying the financing of the CEMC. Moreing planned to distribute the shares of the Oriental Syndicate to other interested parties, including Hoover, who received 12,200 shares as well as a Colonel Albert Thys, the financial advisor to King Leopold II of Belgium, who was infamous for his colonial butcheries in the Congo. Moreing also made revisions to the July 30th agreement to circumvent the Chinese restrictions against foreign ownership of property outside of the treaty ports, changing the language from “sale” to “lease,” and using the multinational syndicate instead of one nation’s control of the mines. He further offered Detring a lifetime position with the CEMC, and a substantial number of shares to gain his approval for the financing scheme. Hoover was involved with Moreing’s revisions to the July 30th agreement, and ensured that Zhang Yi was named as “Director-General” for life and that the China Board (composed of Hoover, Detring, and Zhang) would have control over local operations. However, European supremacy in business affairs was solidified through both the proposed organizational structure and stock ownership. Hoover appointed C. A. Moreing as his attorney with power to sell or transfer any mines or concessions in China, effectively transferring authority over the largest industrial enterprise in China to Moreing on November 9, 1900. 38

38 Nash, *The Life of Herbert Hoover*, 136; Herbert C. Hoover to C. A. Moreing, “Power of Attorney,” 9 November 1900, Box 1, Bewick Moreing (Hooveriana), HHPL.
Herbert and Lou Henry Hoover departed London for China by way of a vacation through the United States, and in possession of the revised ownership documents of the CEMC. Given that Northern China remained under foreign occupation, Lou Henry remained in Yokohama while Hoover continued to Tianjin, wading ashore in early January 1901. He consulted with Detring regarding Moreing’s revisions to the agreement, and, following consultation with the British lawyer in Tianjin, Detring agreed to the revisions. However, the lawyer, who had no background in corporate or international law, advocated that Hoover and Detring antedate the document back to July 30th, 1900, so as not to have competing documents, and to avoid British consular regulations put in place after the suppression of the Boxer Uprising and the rampant looting and property seizure by the Eight-Nations alliance and associated foreigners. The British Consulate certified the new antedated and revised document, thereby legitimizing the appropriation of all the property of the CEMC to the Oriental Syndicate. According to Hoover’s agreement with Detring, Zhang was to receive lifetime directorship and 75,000 free shares, while Detring was allocated 50,000 shares.\(^{39}\)

However, in the company’s registration in London, there had been no mention of a permanent directorship for Zhang, an issue that would come back to haunt Moreing. After some contentious negotiations, Zhang officially assented to Hoover’s proposed changes on February 24, 1901. The second agreement not only transferred all of the CEMC’s assets to European control, including its wharves, steamships, rail infrastructure, and mines, but also to all of the mineral rights in the fabulously rich Kaiping Basin. According to Hoover, “The rights of the old company extended to an area of coal within a radius of three miles of their

\(^{39}\) Herbert Hoover to Gustav Detring, Tianjin, 24 January 1901, Box 1, Bewick Moreing (Hooveriana), HHPL.
working shaft, representing a coal supply for probably 20 years,” whereas the new agreement “secured and turned over to the new company the exclusive rights to the entire coal basin, giving the company practically a monopoly of the coal. . . for at least 100 years.” Effectively, Zhang transferred all of the assets of the old, Chinese company, plus extensive mineral rights to a new, British company for a three-eighths interest and a promise of £100,000 in investment capital by the end of February 1901. Historian Ian Phimister argues this exchange “actually had the effect by May 1901 of transferring the entire ownership, including the newly developed harbour facilities at Chinwangtao [Qinhuangdao], into European hands. Not to put too fine a point on it, the previous Chinese owners were defrauded of their property.”

Hoover and Moreing were far from the only metaphorical sharks in the bloody waters of post-Boxer concession-seeking. International finance demanded a piece of any sort of privatization of Chinese industry, and the eight imperialist governments of the Alliance competed for the biggest prizes. Indeed, according to Hoover’s later recollection, “It was universally believed that China would be dismembered. Everybody was entering upon a great grab.” Russian troops began occupying the Kaiping colliery in September 1900, and Russian concerns wanted the mines and infrastructure for their own interests. Belgian financiers, including Col. Thys, considered breaking with Moreing to join with the Russians. The German Deustche-Asiatische Bank, holder of the CEMC’s foreclosed steamship fleet and dock facilities, considered independently seizing the rest of the CEMC’s assets, and placing them under German control. Hoover himself filed an indemnity claim with the US

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Consulate for $55,009, mostly for “a breach of contest caused by the actions of the Government” regarding its support of the Boxers and his lost salary, but also for damages to personal effect. The contest over the CEMC came in the thick of the imperial-financial contest over the fate of China. However, by early February, Hoover convinced the British Consulate to dispatch troops to the colliery, replacing the departing force of Russians with their own occupying force. British flags flew over the mine shafts.41

Controlling the Kaiping Colliery

Having secured title, legal claim, and protected by the British military occupation, the next step for Hoover was to assume control over the operations of the CEMC. Before the ink dried on the contract, Hoover cabled Moreing in London, stating “H.C. Hoover must be appointed to be temporary general manager, only he must be authorised to sign cheques,” thereby seizing financial control of the day-to-day operations. Moreing confirmed his appointment in a telegram to Detring. Hoover quickly went to the Kaiping Colliery, and installed George Wilson as his on-site manager. The overwhelming majority of the mine’s workforce had fled under the threat of the Boxers, the Russian occupying force, and the subsequent British military occupation, and Hoover aimed to use the absence of Chinese management and labor to dramatically reshape mine operations. Writing to Moreing, Hoover argued, “The presence of the troops on the mines and the absence of the Chinese Directors gives us an opportunity to introduce sweeping reforms.”42

Hoover quickly moved to secure the title deeds for the individual mines and

42 Herbert Hoover to C. A. Moreing, March 9, 1901, as quoted in Nash, The Life of Herbert Hoover, 160, 161n12.
associated properties of the CEMC “by main force.” Without possession of the title deeds for the CEMC’s property, Hoover feared Zhang Yi would sell off parcels of property in order to gain working capital for the dynasty or personal enrichment. Some of Hoover’s concerns were justified, as Zhang had already sold some of the CEMC’s property, and lesser officials had sold off supplies and equipment, but Hoover took the extraordinary step of seizing Zhang’s imperial seal of office. At one point in May 1901, Hoover reported that it was necessary to “seize by violence” the cash reserves of the Kaiping Colliery, in order to prevent distribution against his wishes. In another case, Hoover reportedly brandished a revolver and threatened to kill a Chinese employee if he resisted handing over the titles. George Nash disputes this account, calling it “melodramatic and implausible,” without any evidence to corroborate it, but that may be a bit generous. Hoover stated that the Chinese employee “insisted on taking documents which did not belong to him but belonged to the company, and I resisted it.” Nash cites two prominent “anti-Hoover Chinese” who spread the tale of an armed Hoover threatening the Chinese employee’s life, from Wang Hezhai, an administrator of the later Kailan Mining Administration, and Dr. Chen Waiping, the editor of the *Chinese Christian Advocate*. Given Hoover’s ruthlessness in securing the CEMC as a British company, the revolver anecdote must be seriously considered, especially in light of an interview he gave to the *New York Times* before his return to China in 1901: “Diplomacy with an Asiatic is of no use. If you are going to do business with him you must begin your

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43 Walter Liggett, *The Rise of Herbert Hoover* (New York: H. K. Fly, 1932), 95. While Liggett’s book is largely considered part of the canon of “smear” books, Liggett had a professional reputation as an investigative journalist and had a hired researcher who went into the files of *Chang Yen-mao vs. Moreing*.

44 Herbert Hoover to C. A. Moreing, March 22, 1901, as quoted in Nash, *The Life of Herbert Hoover*, 164n30, 166n48; Nash considers the revolver anecdote to be part of the larger “Smear” campaign to besmirch Hoover’s reputation during his political career in the 1920s. Nash uses the Wade-Giles romanization of Wang Hezhai and Dr. Chen Waiping, citing them as Wang Ho Chai and Chen Wai Ping, respectively.
talk with a gun in your hand, and let him know you will use it.”

The anecdote of Hoover threatening the life of a Chinese employee raises numerous questions that cannot be dismissed as “melodramatic and implausible.” What events lead to Hoover brandishing a revolver? If the event was a later fabrication, what were the motivations behind the fabrication? How did tensions in the office escalate to that point? What was the nature of the documents involved, and why did the Chinese employee feel that he must keep them? Did Hoover routinely carry a firearm in the course of his business operations, and why? Was this an isolated incident? What would he have done if the employee had refused to turn over the documents, to which both men believed they had a valid claim? How does this violent anecdote play into the larger narrative of the European acquisition of the Kaiping Colliery and the CEMC, especially given Hoover’s rhetoric and actions during the Boxer Uprising? Unfortunately, a lack of documentary evidence leaves these questions as rhetorical, and other biographers of Hoover, even in the “smear” books, are largely silent on this incident.

Hoover’s primary concern in seizing the title deeds and accounting books was the elimination of the “squeeze.” As his prior years in Australia proved, Hoover was clearly obsessed with controlling costs at his mines to reduce working costs and maximize profits for shareholders, often at the expense of the workers. Once in China, Hoover confronted an


46 From the biographies consulted, only Nash, Hoover: The Engineer, 164-166 mentions the revolver incident. Liggett’s The Rise of Herbert Hoover does not mention the particular details of the incident, but states that Hoover seized the title deeds “by main force,” quoting a letter written by Hoover on 22 March 1901. Even the most salacious of the “smear” books, John Hamill, The Strange Career of Mr. Hoover Under Two Flags (New York: William Faro, Inc., 1931), 53-88, does not mention the revolver incident. It seems a bit excessive on Nash’s part to attribute the statements of two mid-level Chinese officials familiar with the Kaiping colliery, Wang Hezhai and Dr. Chen Waiping, as part of a larger conspiracy to besmirch Hoover’s character.
intricate network of patronage, bribery, graft, false appointments, and other means of

distributing the funds from an enterprise to the managers, employees, and families in the

area. It was a practice, according to Hoover, “hallowed by ages of custom” and was a “sort

of appendage of the profit system.” It could even be considered a form of social welfare,

where the profits of the company went to the local community, rather than to foreign

shareholders. However, Hoover did not let the “ages of custom” stand in the way of his

business dealings, and he attacked the squeeze at the Kaiping colliery head-on. It had been in

his sights before the Boxer Uprising and foreign occupations, but he now had the power to

get to the core, especially given the absence of the Chinese managers from the colliery.47

After seizing the accounts, money, and titles, Hoover’s next move was to reduce

personnel numbers. Blatantly targeting the local custom, he cut the Chinese managerial staff

from 624 to 120, eliminating 500 officials from the rolls. Much as he thought of himself as a

physician in Western Australia, curing sick mines by excising inefficiency, Hoover took

“surgical operations” in China to reduce payroll and put the mines “on lines of a commercial

firm.” Of the 25,000 employees on the rolls of the CEMC, Hoover claimed that 6,000

“employees were fictitious.” He attempted to reduce excesses in his workforce by

implementing several different identification systems at the mines, as a means of keeping

skilled workers while restricting others from employment. However, these identification

“checks” quickly became an underground commodity in the mining town, where the

purchase of a check meant purchasing a job, regardless of experience or qualifications. By

targeting the employment rolls, Hoover “turned a losing business into a profit of $150,000

47 The Memoirs of Herbert Hoover, 62-63; Carlson, The Kaiping Mines, 81
Mexican a month by reducing the ‘squeeze’ alone.” 48 While Hoover claimed efficiency and sound accounting practices as the beneficiary of his campaigns against the squeeze, it can also be considered a form of corporate-driven austerity policies and a corruption of local social welfare practices. Fewer of the profits from the mines went to the surrounding community, instead, more of the profits diverted to European shareholders. This was part of the larger process of Western commercial and military imperialism at the turn of the century.

Despite Hoover’s actions in acquiring the CEMC for European investors and attempting to redirect the profits to European shareholders, his tenure in China was ending due to events beyond his control. The Belgian investors of the Belgian Compagnie Internationale d’Orient and the Oriental Syndicate were working to force Moreing out of the operations of the CEMC, and as part of this push they sent another engineer to replace Hoover, an American named J. H. Dugan. Hoover may also have been quarrelling with Emile Francqui, the representative of the Compagnie Internationale d’Orient. Regardless, Hoover left China in September 1901. Like many engineers in imperialized countries, he had made a large sum of money as Engineer-in-Chief of the Mining Bureau of Zhili province, with a salary of $33,000 per year. He also held 17,700 shares in the Chinese Engineering and Mining Company, which were valued around $60,000; he later estimated that his net worth was nearly $250,000 upon leaving China. He returned to London via the United States, with a promotion in Bewick, Moreing & Co. to partner. The Chinese Engineering and Mining Company also appointed him to its board of directors in London. As Hoover’s banner year of 1901 drew to a close, the San Francisco Chronicle estimated that he was “the highest salaried

48 The Memoirs of Herbert Hoover, 61-64; Carlson, The Kaiping Mines, 80-82. Further complicating the currency valuation in China, western business concerns often used circulating Mexican dollars, which were worth roughly half of a US dollar. See Wilkinson, Chinese History, 250.
man of his age in the world.” Given the stocks and investments he had accumulated along the way, the Chronicle’s estimate may have been too modest.⁴⁹

**Chinese Officials Sue for Redress**

It did not take long, however, before the conflicts and controversy over the Western privatization of the Chinese Engineering and Mining Company attracted the attention of political elites in China. These included Li Hongzhang and Yuan Shikai, both of whom had initially encouraged limited foreign investment in the development of Chinese industry. Li died shortly after Hoover left in 1901, with Yuan assuming his mantle in Chinese politics as a pragmatic modernizer, and the formal position as Viceroy of Zhili province. In a memorial to the throne, Yuan contended that Zhang had had no authority to sell the property of the CEMC to foreigners without imperial consent, which had not been given. He demanded that Zhang Yi recover the assets of the CEMC to Chinese control, adding official sanction to Zhang’s festering grievances.⁵⁰

Zhang’s objections were legitimate. He was even then being squeezed out of his position in the CEMC. As the Belgian investors moved to secure further control of the CEMC, Albert Thys backtracked on several agreements made between Hoover and Zhang, stating in a letter that they had “no power to make such an engagement,” and that the board of directors “had no knowledge of it,” and “has never since ratified it.” In effect, Thys nullified the agreement of February 1901 and argued that since Europeans held the majority

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of the CEMC’s debenture (unsecured and thus riskier) capital, “it is therefore just and
necessary that the preponderant influence belongs to those who have the preponderant
interest in the business.” That the CEMC’s debenture capital had been acquired through
unsavory means proved irrelevant, and the London board of directors, including Hoover,
voted to approve Thys’s statement. It triggered three angry meetings of shareholders in
China, who were upset at being sidelined from the enterprise and confined to a minority
position in the company. Despite offers of further shares, Zhang filed suit against Moreing
to fully recover the assets of the CEMC.51

However, under the treaty provisions of extra-territoriality, the Chinese officials had
to submit to the British judiciary for legal matters involving their citizens. Zhang, the once-
powerful Director-General of Mines for Zhili, and general manager of the Kaiping Colliery
sued Moreing in the High Court of Justice in London, filing the claim of His Excellency Chang
Yen-mao and the Chinese Engineering and Mining Company of Tientsin (plaintiffs) and Charles Algernon
Moreing, Bewick Moreing & Company, and the Chinese Engineering and Mining Company, Limited
(defendants) on June 17, 1903. The trial began in January 1905. That it occurred at all reflects
the scope of European interests in controlling Chinese industry: the CEMC had offered
Yuan Shikai a loan of £1,000,000 toward the massive Boxer indemnity if Zhang would drop
his lawsuit, and Sir Ernest Satow, the British High Commissioner in Beijing, considered
using British troops to repel any Chinese attempts at nationalizing the Kaiping coalfields.
Yuan refused the loan.52

The two trials of 1905 and 1906 vindicated Zhang, but did not restore control of the

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51 Albert Thys to T. R. Wynne, 12 November 1902, as quoted in Nash, The Life of Herbert Hoover, 193n52; Carlson, The Kaiping Mines, 87-89.
CEMC to China. The British judge in the first trial absolved Zhang “of any breach of faith or any impropriety at all, which is more than I can say for some of the other parties concerned,” alluding to Moreing and Hoover’s role in the CEMC’s acquisition. The second case, however, did not restore Zhang to his role as Director General, and instead kept European control of the company. In fact, given the scope of investment in the CEMC from European haute finance and mining investment, Zhang’s lawsuit was doomed to limited success at most. He only targeted the initial actors in the privatization of the CEMC, namely Moreing, Hoover, and others, and failed to appreciate the deep web which international finance had constructed to secure the enterprise and its profits for investors. It must also be noted that during his first presidential campaign, Hoover hired an attorney, Arthur Train, to purchase and destroy every copy of the trial transcript, in order to control the narrative about his actions in acquiring the CEMC. Zhang was also limited by the nature of the British Empire and legal system at the time, as he was forced to sue for ownership of a formerly Chinese company in a court on the opposite side of the world, rather than in the legal system of China. According to Ellsworth Carlson, after the trials “the British were even more firmly entrenched.” Such was the logic of financial imperialism.

Conclusion

While Herbert Hoover was not the only actor involved in seizing the CEMC for European ownership, he certainly played a pivotal role at some of the most critical junctures. He seized control of the CEMC, using documents antedated from before the Boxer Uprising, leveraging debts, and confiscating deeds, funds, correspondence, and accounts. In

effect, Hoover and Moreing used the weakness of the Chinese government during and after the Boxer Uprising to privatize the holdings of China’s largest and most valuable industrial concern, monopolizing coal production in Kaiping and paying dividends to European stockholders until its 1911 merger on favorable terms.54

Indeed, Hoover’s role in acquiring the CEMC paid benefits to the stockholders. He also personally profited. He held several thousand shares of the CEMC’s stock and benefitted financially from the privatization and restructuring. After the transition to European control, the CEMC issued dividends each year, beginning with the year ending on February 28, 1902 and continuing for a decade. Dividends were at least 7.5% each year, but more often they paid ten or fifteen percent, representing major returns for investors, but also funnelling large amounts of capital out of China and into the portfolios of British and Belgian investors. Granted, between 1899 and 1911, production increased 84% to 1,433,546 tons, but the company was reluctant to invest in major improvements to its facilities, and its mineral claims dramatically increased as a result of the February 1901 agreement. Therefore, these production increases represent more mining, but not necessarily better mining than before the seizure of the CEMC. In effect, the Europeanization of the CEMC represented a shifting of the “squeeze” from local Chinese officials and associates to foreign stockholders, as they appropriated and absorbed the profits of the enterprise. When Hoover moved to make the enterprise more cost-effective and to eliminate excess officials from the payrolls, he was appropriating those funds for dividend payments and servicing the interest on the CEMC’s loans, a pattern followed by subsequent mine managers.55

55 Carlson, The Kaiping Mines, 82-84
The Chinese Engineering and Mining Company also played a major role in supplying the goldfields of South Africa with contracted Chinese labor. Attempting to recover from shortages of African labor following the Anglo-Boer War, the major gold mining houses of South Africa, including H. Eckstein & Co., Consolidated Gold Fields of South Africa, Barnato Brothers, and others formed an association to import Chinese laborers, later formalized into the Chamber of Mines Labour Importation Agency (CMLIA). This agency opened a headquarters in Tianjin and engaged with the CEMC to use its wharves at Qinhuangdao and the rail infrastructure to transport its contract laborers. The CEMC also recruited Chinese laborers for the CMLIA, using its networks and expertise from the Kaiping mines to secure contract laborers, becoming the one of the foremost labor-suppliers for the CMLIA, and monopolizing labor recruiting in Zhili province. All told, 38,758 indentured Chinese workers left from the CEMC’s pot at Qinhuangdao, joining a total of 63,695 miners recruited. As a board member of the CEMC, Hoover communicated extensively with William Lincoln Honnold, an engineer in South Africa, and saw Chinese labor as a means of undercutting the wage demands of White miners, much as he had used pressure from Italian contractors to coerce White Australian miners at the Sons of Gwalia. According to historian John Higginson, “none” of the Chinese laborers “were freely contracted. Their time of laboring was just short of bondage,” and this “servitude bore a chilling resemblance to modern slavery.”

The seizure and privatization of the Chinese Engineering and Mining Company from a Chinese firm to a British company with European investors transformed the mines into

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one of the crown jewels of British financial imperialism in China. The exploding tensions of the Boxer Uprising offered the disaster that supposedly demonstrated the irremediable instability of the Chinese government, and thus provided the excuse for European control. Leveraging loans and debts, Hoover and Moreing seized the richest industrial enterprise in China from the ailing dynasty and began extracting capital from the enterprise in the form of dividends paid to European investors. They also enriched themselves in the process, holding “free” shares as a form of compensation for privatizing the Chinese industrial concern, and receiving dividend payments on these shares. It took the Chinese government more than a decade to recover its enterprise, and the terms of the acquisition involved buying off the European stockholders. While the privatization of the CEMC and coal in the Kaiping basin seems to pale in comparison to the overall devastation of the Boxer Uprising and the Eight-Nations’ Alliance invasion, it is important to note that it was part of the same set of circumstances. China was effectively robbed at gunpoint by British and other imperial Western powers; Hoover and Bewick, Moreing & Co., made off with the assets, while securing coal supplies for Britain’s Royal Navy and Merchant Marine in the Far East.
5. A MOST VALUABLE FACTOR IN THE MINING INDUSTRY: HEBERT HOOVER AS A PARTNER IN BEWICK, MOREING & CO.

Well, we provide a number of services. —Mark Zuckerberg, 2018.¹

After Hoover’s return from China to London in 1901, Bewick, Moreing & Co. reorganized its corporate structure. C. Algernon Moreing offered Hoover a partnership in the firm at twenty per cent interest. Hoover was to handle the engineering side of the business and operations in Australia. As the Australian speculative boom in London ebbed after 1899, the realities and geologies of Western Australian mining increasingly dictated technical efficiency as the only means of profitable mining. During Hoover’s tenure as partner, Bewick, Moreing & Co. became the consulting engineers for sixty-four companies in Western Australia. By June 1904, Bewick, Moreing & Co. offered its engineering services to mines producing more than fifty percent of Western Australia’s gold output.

Hoover’s record of success during these years was mixed; many of the mines under his control petered out at depth or encountered complex ores that could not be profitably treated with available technologies. As in the past, Hoover recruited a skilled staff of managers and engineers who prioritized results, often at the expense of labor conditions. The mines under Bewick, Moreing & Co.’s control were the most cost-efficient in the region, with the *Engineering and Mining Journal* lauding the efforts of “these progressive engineers” for “putting mining onto a business basis.” Overall, the success or failure of Hoover’s projects ultimately depended on many factors beyond his control: the whims and financiering of the London metals market, the geology of each lode, and on the talents of the

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¹ As quoted in “Media Company or Tech Company? Facebook’s Profile is Blurry,” *NPR* (11 April 2018).
engineering and managerial staff which he recruited. Hoover transformed Bewick, Moreing & Co. from a marginally profitable investment firm into an engineering powerhouse.²

This chapter considers Bewick, Moreing & Co.’s gold mining projects in Australia as they represent the firm’s largest sector in investment, personnel, and profits and losses, with brief comments on the formation of the Zinc Corporation. Bewick, Moreing & Co. was a global corporation during Hoover’s tenure, and its interests on the Pacific Rim evolved beyond Western Australian gold to include mines in New Zealand, “deep lead” auriferous gravels near Victoria, Australia, the Bawdwin silver mine in Burma, and a major project to extract zinc from the tailings of the famous Broken Hill silver-lead-zinc mines in New South Wales. However, miners, merchants, politicians, and other mine owners accused the firm of being a monopoly, an increasingly gravid charge as monopolies became unpopular in Progressive, Populist, and trades-union politics. The company and its partners, C. Algernon Moreing and Hoover, repeatedly denied that it was monopolistic, because they did not own the mines and properties to which they served as consulting engineers and managers. While the partners’ argument does have a certain merit, Bewick, Moreing & Co. nonetheless monopolized knowledge of efficiency and management practices based on Hoover’s models, supply chain management, and access to British capital based upon their sterling corporate reputation. Bewick, Moreing & Co.’s monopoly was one of expertise, financing, and management rather than outright ownership, yet they translated it into vertically and horizontally-integrated local monopolies, networked into a global corporation that was

capable of withstanding major economic and political shocks.³

This chapter focuses on Hoover’s career as a partner in Bewick, Moreing & Co. as it relates to gold mining in Western Australia, between 1901 and 1908. After the Transvaal and the western United States, Western Australia was the third most productive gold district in operation in the world at the time, and Bewick, Moreing & Co. controlled a plurality of the gold production as well as many of the most productive mines. The chapter is broken into several sections, beginning with Hoover’s promotion to partnership after his acquisition of the Chinese Engineering and Mining Company. Before the ink dried on the partnership document, Hoover departed for Australia and began recruiting a talented and profitable staff of managers and engineers focused on efficiency and results. He turned to acquiring more properties for his firm to manage, taking advantage of the market collapse secondary to the Whitaker Wright scandal (discussed in Chapter 5 above), especially the Lake View Consols and Ivanhoe mines on Kalgoorlie’s Golden Mile. However, during his time in China, Bewick, Moreing & Co.’s mines had dropped in efficiency and output, and Hoover reinstituted efficiency practices at the Sons of Gwalia and oversaw the decline of the East

³ Nash, The Life of Herbert Hoover, 262, 325-327. Little has been written about the activities of Bewick, Moreing, & Co., outside of the biographies of Hoover. For a history of Bewick Moreing’s activities in Western Australia, see Hartley, “Bewick Moreing in Western Australian Gold Mining 1897-1904: Management Policies and Goldfield Responses.” Penetrating the murky chaos of the London Metals market remains a daunting task, with Clark Spence attempting a history of British investment in the American West, and concluding that it was difficult to track ownership with any certainty, Clark Spence’s British Investment and the American Mining Frontier 1860-1901 (1958; Moscow: University of Idaho Press, 1995), 3, 11-12. Jeremy Mouat examined Whitaker Wright’s role in promoting the West Australian goldfields through financial engineering and unscrupulous practices. Once Wright’s London and Globe Finance Corporation collapsed in December 1899, Wright, tried and convicted of fraud, committed suicide in the London courthouse, as seen in the above chapter. Jeremy Mouat, “Whitaker Wright, Speculative Finance, and the London Mining Boom of the 1890s,” in Raymond Dumett, ed., Mining Tycoons in the Age of Empire, 1870-1945 (Burlington, VT: Ashgate Publishing, 2009), 128-149. See also A. R. Hall, The London Capital Market and Australia, 1870-1914 (Canberra: The Australian National University, 1963) for a broad view of British investment in all sectors of the Australian economy. Nash argues that Bewick Moreing was the beneficiary of the Wright Scandal, as investors moved toward dependability and transparency. See Nash, Hoover: The Engineer, 229-230.
Murchison United as its ore grade decreased at depth. On his return to London, Hoover was also an increasingly prominent public face of the company and had to answer to angry shareholders in the wake of the mining investment downturn and a major stock forgery by another partner in the firm, who absconded with more than £170,000 to pay off his speculative debts. Despite this, Hoover and Bewick, Moreing & Co. broadened their market position in Western Australia, briefly controlling more than fifty percent of Western Australia’s gold output. Hoover oversaw widespread efficiency reforms and cost-cutting measures, but these were controversial in the goldfields, as they compromised mine safety, labor stability and wages, and upset local merchants, unions, and politicians. Hoover also oversaw a major project, known as the Consolidated Deep Leads (pronounced “leeds”) to access a subterranean alluvial deposit, but the project proved unsuccessful due to the sporadic values of the gravel and the massive costs of pumping billions of gallons of water from the underground river. Finally, in 1908, Hoover resigned his partnership, and used his professional reputation and financial resources to open a sole proprietorship engineering and investment firm and make a further fortune. As the Great War escalated in Europe, Hoover left his mining engineering and financing career behind, and embarked on a career in the public sector, first as a humanitarian who saved millions of people from famine in Europe, and then as a politician, serving as Secretary of Commerce before gaining election as the thirty-first President of the United States.

**Engineering Partner in Bewick, Moreing & Co.**

Hoover’s profitability and aggressive pragmatism after the Sons of Gwalia and the acquisition of the CEMC was clear to C. Algernon Moreing. On Hoover’s return to London
in 1901, Moreing offered him one of four partnerships in the firm, responsible for
engineering and technical administration. The reorganization was due to the retirements of
Thomas Bewick and Edward Hooper from the firm. Moreing remained the senior partner at
a fifty percent interest, and Hoover joined the firm at a twenty percent interest. This
obligated him to buy out Hooper’s interest at a sum of £8,000, but, since most of his assets
were tied up in stockholdings, he borrowed the funds from Moreing, thus entering the
partnership in debt to the firm’s senior partner. Moreing and Hoover were joined in the
partnership by A. Stanley Rowe, a clerk and accountant, at twenty percent interest, and the
mechanical engineer Thomas W. Wellstead at ten percent. Moreing handled the financial side
of the business, leveraging his contacts and corporate reputation in the London metals
market to sustain investment. T. W. Wellstead handled supply and administrative affairs for
Bewick, Moreing & Co.’s global operations, and A. S. Rowe managed the accounts. At
twenty-seven years old, Herbert Hoover’s role was, as he described in his later memoirs, “to
operate the mines—both as an engineer and administrator.”

Given the scope of Bewick, Moreing & Co.’s global holdings, this was no small feat.
The company managed or controlled “coal mines in China, Wales, and the Transvaal, a tin
mine in Cornwall, a group of gold mines in Western Australia, New Zealand, South Africa,
and West Africa, copper mines in Queensland and Canada, a lead-silver mine in Nevada, and
a turquoise mine in the Sinai Peninsula.” Of these holdings, the gold mines of Western
Australia were the partnership’s largest asset. They also acted “for several exploration
companies, which are engaged in other portions of the world,” and had “branch offices in
New York, Kalgoorlie, Melbourne, and Johannesburg,” as well as Tianjin, Auckland, and

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Tarkwa. Typically, the firm managed a mine for a set annual fee, usually around £2,000 per year plus a share of the profits, with the mine paying the salaries of Bewick, Moreing & Co.’s engineering and administrative staff. The manager of each mine was “not only necessarily a mining engineer,” but was also the “commercial head of the enterprise, and therefore, the dual capacity of technical and commercial execution is combined.” Hoover, therefore, was the chief engineer and manager for a sprawling international firm with offices and interests on five continents.\(^5\)

There were further issues with Bewick, Moreing & Co.’s prospects, namely that the firm had not been very profitable on its own. In fact, “the profits of the firm itself,” according to Hoover, “had not averaged more than £7,000 per annum for the previous seven years.” Instead of Hoover’s idealistic conception of profitably managed mines providing steady dividends and capital for continued development, the reality was “that these profits were made by jobbing in the stock market as a result of the tremendous position which the firm had in the control of the management of seven or eight mines.” Still, Bewick, Moreing & Co. had the potential to be “a great engineering firm in London,” in Hoover’s opinion, and that “as bad as the machinery was, it was a good foundation on which to build.” He hoped to move the firm away from speculative profits and toward a reputable concern known for its sound engineering and management practices.\(^6\)

Hoover relished the opportunity, intending to spend much of his time in the field and not in the offices, “unlike,” he stated, “the previous partners who sat around London and New York.” He spent barely a month in London before departing for Western


\(^6\) Herbert Hoover, “Information for Biographers,” 13-14, Pre-Commerce: Subject, Box 46, HHPL.
Australia, right as the partnership document came into effect. It had been dated 18 December 1901, and Herbert and Lou Henry Hoover boarded the P. & O. Liner China out of Marseilles on 20 December. He had departed the goldfields of Western Australia three years before, recruited to the China operation out of the management of the Sons of Gwalia mine near Leonora, and in the midst of a managerial spat with Ernest Williams. He was entering a changed gold mining district, as a massive speculative investment bubble had formed in 1899, and burst in December of that year when Hoover was conveniently in China. The fallout continued throughout the first year of the new century, with dividends shrinking from the major Kalgoorlie producers. Compounding the speculative excesses of the London metals market was the increasing complexity and decreasing grade of ore at depth. For Hoover, his new role as Bewick, Moreing & Co.’s chief engineer meant he could apply his efficiency reforms to much more than just the Sons of Gwalia.⁷

**Hoover’s Engineering and Managerial Staff**

On his return to Western Australia in January 1902, Hoover likened the scene in gold mining to a bad hangover after the excesses of the Roaring Nineties. It had, in Hoover’s later recollection, “passed through one of the gigantic gold booms of history and was now in the bitter headache of the morning after.” Several factors had contributed to the speculative collapse of 1899, including rampant speculation and insider financiering, the unrest in South Africa during the Anglo-Boer war, the unfolding Whitaker Wright scandal, as well as the declining grade and increasing complexity of the ore. The market crash in Western

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Australian shares reduced dividends paid by the major Kalgoorlie mines between 1899 and 1901 by more than one million pounds sterling, from a dizzying £1,833,550 to a paltry £893,250 in 1901. Some of the mines in Western Australia fared worse than others, but the collapse of the London and Globe Finance Corporation especially affected two of Wright’s mines, the Lake View Consols and the Ivanhoe. During and after the crash, their issued dividends decreased by £500,000 and £155,000 respectively, among the largest losses on Kalgoorlie’s Golden Mile. This had been exacerbated by willful misrepresentations of the Lake View’s ore reserves by the mine manager, but at that point, it was just another straw on the camel’s back. The district was in shambles.\(^8\)

Francis A. Govett, a prominent London stockbroker and member of the boards of those mines, was on the same steamer as Hoover, and the two took to discussing the situation in Western Australia. Govett was an investor and financier with no engineering or management experience. The Lake View Consols was a sophisticated mine with rich ore, having “treated 28,643 tons of ore, yielding 97,748 ounces of gold, an average 3.44 ounces per ton treated.” The Ivanhoe was a larger operation with a sophisticated mill and treatment plant, but resting on lower-grade ore. It produced and “treated 74,750 tons of ore, yielding 107,052 ounces of gold, at an average of 1.43 ounces per ton,” and its treatment works were even more extensive. As the new chairman of the board of these concerns, Govett controlled two major industrial enterprises, yet he was a neophyte in matters of mine management, and Hoover’s knowledge and reputation impressed him during their voyage. They remained business associates for years. After reaching Kalgoorlie, Govett quickly

dismissed the local superintendent and contracted with Bewick, Moreing & Co. for its managerial and engineering services. Hoover understood that this was a prime opportunity, as it marked the beginning of Bewick, Moreing & Co.’s consolidation of control over a plurality of gold production in Western Australia. Mine management was inefficient and often corrupt. Share values were down, and investor confidence was shaken. The ore was increasing in complexity at depth, necessitating more expensive and elaborate treatment methods. However, Hoover was confident. Despite the myriad factors affecting gold mining in Western Australia, overall production had increased in 1901, and the depressed share values and dire financial straits meant that the mines of Kalgoorlie were ripe for consolidation and reorganization.

Hoover left the coast and traveled 375 miles inland to Kalgoorlie. He immediately went to work assembling a loyal and hardworking managerial staff for the mines in Western Australia. In his opinion, Bewick, Moreing & Co.’s mines had suffered from mismanagement in his absence, reverting to the old “English and Colonial” managerial methods and inefficient mining practices which he so loathed. Hoover immediately began recruiting to fill engineering and administrative roles, sending for “American managers and engineers.” He prioritized “university trained mine managers, metallurgists, and mechanical engineers,” as he later recalled, but a closer look at his top personnel reveals that Hoover favored a loyal and hardworking upper staff over credentials. He mixed university-trained engineers with men of broad practical experience, and prioritized experience in California and the American West. Historian Ron Limbaugh examined Hoover’s recruits, and found that of the fifteen

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members of his managerial staff, “only twelve are confirmed to have been from the United States.” Moreover, “Only seven of the fifteen could be said to be ‘university-trained,’ and of those, only three held degrees in geology or engineering.” While his personnel recruitment did not reflect his later aspirational assertions of recruiting only the highest-quality, university-educated American engineers, Hoover did have an eye for talent, hard work, and loyalty. Many of the men he recruited had practical, hands-on experience in California and the American West.  

For example, consider William Joseph Loring, the man who eventually took over Hoover’s position as a partner in Bewick, Moreing & Co. Loring was a practical millman, having begun at the Empire mill in Plymouth, California when he was just twelve, and then worked his way up the organizational ladder. He supervised the main mill of the Utica Mining Co from 1888-1901, operating a 160-stamp mill that at one point produced $203,000 of gold in one month while processing a particularly rich ore deposit. In August 1901, Loring became the superintendent of another California mine, but was soon recruited by Theodore Hoover to Herbert’s staff in Western Australia at a salary of $9,000 per year plus expenses. Loring assumed superintendency of the Sons of Gwalia on April 11, 1902, and immediately re-instituted a Hooverian labor and efficiency regimen, reducing the labor force from 814 to 420 men, increasing ore reserves, decreasing working costs, and paying off roughly £20,000 of the company’s debts. He also attempted to reduce wages at the mine, but the labor arbitration court blocked this move, and raised wages one shilling per shift. These labor, management, and efficiency reforms at the Sons of Gwalia enabled Loring to remit

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£46,750 to London as profits. He remained at the Sons of Gwalia for just under two years, and then was promoted as a joint general manager for Bewick, Moreing & Co. in Western Australia alongside William Prichard, responsible for the company’s mines outside of Kalgoorlie. Loring “traveled about 30,000 miles a year among the various mines” under his aegis, “under great discomfort, owing to the heat and dust.” Since the company “did not use the motor-car until 1906,” Loring noted that one of his trips “required 64 horses.” On Prichard’s resignation in 1905, Loring took charge of Bewick, Moreing & Co.’s operations in Western Australia, and then all of Australia in 1906. When Hoover resigned his partnership, Loring acquired his interest in July 1908, moving to London to supervise engineering and management for the partnership. Loring’s ascension to partner represented the cementing of Hoover’s engineering and managerial regime in Bewick, Moreing & Co. 11

William Anthony Prichard serves as a contrasting example of the men on Hoover’s staff, as a university-educated engineer. He had graduated with an A.B. in geology from Stanford in 1898, three years after Hoover; Herbert’s older brother Theodore concurrently attended Stanford and was friends with Prichard. When Herbert assembled his managerial staff in early 1902, Prichard “was profitably working a 4-dwt. gold property,” a low-grade mine in the California goldfields when Theodore Hoover recommended him. Prichard left California and travelled to Western Australia, joining Bewick, Moreing, & Co. Herbert put him in charge of the Lake View Consols after Govett discharged the former, Wright-associated management of the mine. Following the financial and speculative shenanigans of the Wright era, the mines were in bad shape. Hoover, Prichard, and W. R. Feldtmann

surveyed the Lake View Consols, and reported that they had “estimated reserves, 50,430 tons ore, should yield 21 ½ dwt.” Prichard assumed management of the Lake View Consols, and within a few months, reduced working costs by nearly a pound per ton. Indeed, according to Prichard, “Many thousand tons of hitherto unpayable ore were thereby made payable and a new life given to the mine.” Prichard’s management of the Lake View Consols marked a turnaround in the mine’s operations, even as the overall quality of ore diminished.

When W. R. Feldtmann resigned as Bewick, Moreing & Co.’s General Manager for Western Australia in January 1903; Prichard and Loring assumed a joint general managership, with Prichard managing the mines in Kalgoorlie until his 1906 resignation. Prichard and Loring, therefore, represent two different styles of the American mining engineer; Loring grew up as a practical millman and gained his skill and business acumen through competence and diligence; Prichard was of the newer generation of mining engineers, scientifically trained at Stanford but with a few years of practical experience under his belt. 12

Other members of Hoover’s staff were not as highly trained as these two, but to Hoover, their hard work and commitment to cost-saving reforms was more important than academic training or practical experience. Hoover’s primary concern was cost-efficient mining, and his staff pushed his efficiency program rather than adhering to their personal formulae. John Agnew held a technical certificate in mine management from Thames, New Zealand, and was with Hoover at the Sons of Gwalia and in China. When Hoover visited the Lancefield mine near Laverton, Western Australia, he promoted Agnew to superintendent of

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the distant mine, likely due to Agnew’s proven competence and experience in China. Wilfred Newberry was similarly called back to Western Australia from China; he had been on Hoover’s staff at the Sons of Gwalia, but little information exists regarding his technical training or experience outside of Hoover’s orbit. Newberry had been involved in the siege of Tianjin alongside George Wilson, and had briefly supervised a colliery at Linsi for the CEMC before rejoining Hoover in Kalgoorlie. Another veteran of both Western Australia and China was James Arthur Diggles, who was a student at Stanford in geology during Hoover’s tenure, but did not gain a degree. Hoover had boarded at his parent’s homes during his Stanford days, and then recruited him to Western Australia in 1898. He supervised mines in Western Australia for Bewick, Moreing & Co., until his death in 1910.

Deane P. Mitchell, former manager of the East Murchison United, rejoined Hoover’s Western Australia staff as well, rounding out the veteran members of Hoover’s orbit.13

Other new recruits to Hoover’s staff brought varying levels of skill, education, experience, and training to Western Australia. William Arthur “Thomas” Pomeroy had a degree in mining engineering from the Columbia School of Mines (Class of 1893), and experience in Arizona. Hoover recruited him from an Arizona gold mine, along with another “mine engineer-manager” named J. M. Davey, who came with Pomeroy. Hoover appointed Pomeroy as the supervisor of the Great Fingall mine, and Davey as the underground boss.14

Frank Dennis had an A.B. in history from Stanford, but had practical mining experience in Grass Valley, California where he had met Hoover. Other recruits to Hoover’s staff included

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William Goldstone, who may or may not have attended the University of California; Robert Grant and Hervey Shipman, who were touted as graduates of the Colorado School of Mines, but no record of their attendance exists; and Herbert Vail with practical experience in California. Despite Hoover’s mistaken later comments on hiring only the finest university-trained engineers, the diversity of training and experience among his staff demonstrate that he was more concerned with profitability than pedigree. If personnel is policy, then results mattered more than academic preparation to Hoover—and to Bewick, Moreing & Co.’s clients and shareholders.15

Mine Management: Lake View Consols, Sons of Gwalia, and East Murchison United

Having recruited a managerial and engineering staff to remedy the issues ailing the Western Australia gold fields after the market unrest and downturn of 1901, Hoover now turned in earnest to reforming individual mining operations. Three mines under Bewick, Moreing & Co.’s management offer case studies of his approach: the Lake View Consols, the East Murchison United, and the Sons of Gwalia. The Lake View Consols, as discussed above, came under Bewick, Moreing & Co.’s management after the collapse of Whitaker Wright’s speculative empire. The East Murchison United had been a promising and profitable mine outside of the Kalgoorlie district, but its ore quality declined at depth and its management had suffered and the company was liquidated in 1905. Finally, the Sons of Gwalia had been Hoover’s laboratory during his first trip to Australia, but it had suffered from mismanagement and declining ore grades, leading Hoover to consider reducing milling capacity as a means of temporarily reducing working costs. Each mine will be considered

15 Limbaugh, “Pragmatic Professional,” 52-54
briefly below, beginning with Lake View Consols. To convey a comparative picture of these mines and the characteristics of mine management, each will be considered over the course of their lives under Bewick, Moreing & Co.’s management.

Hoover’s reforms at the Lake View Consols demonstrate the acquisition of a financially troubled mine, and the reform of its operations. In the early days of 1900, the Lake View Consols “was producing 30,000 oz. of gold a month,” although the production statistics had been inflated by milling ore reserves “in a very unminerlike manner.”[16] Indeed, the collapse of the Lake View Consols and the London & Globe Finance Corporation was symptomatic, and “offers convincing proof of the instability and insecurity of mining investment and speculation in London.”[17] Shareholders called a meeting demanding an explanation of Wright’s financiering. This led to Francis Govett’s trip to Kalgoorlie and Bewick, Moreing & Co.’s management of the mine beginning in the early months of 1902. Furthermore, given the gutting of the most valuable sections of the mine during Wright’s apogee, the remaining ore was a complex sulphide-telluride formation. Basically, some of the gold atoms bonded with a mix of sulfur, selenium, or tellurium in the ore, making it difficult to extract and refine the gold to a pure form. Metallurgists of the era referred to these more complicated ore formations as refractory or recalcitrant. Breaking these atomic bonds required chemical metallurgy, especially the use of cyanide treatment, a process developed in the American West and on the Rand with the MacArthur-Forrest process. In February 1900, the mill began to process these ores using the developing Diehl cyanide process, increasing the complexity and cost of operations at the mine, which reduced the artificially high

dividends paid in an already shaken market. The Wright Scandal and increasing working costs jeopardized the profitability of the mine despite the value of the unextracted ore.18

Bewick, Moreing & Co. assumed management of the troubled mine, and Hoover appointed William A. Prichard as superintendent of the property. Once in control, Govett and Hoover withheld a planned dividend to redirect funds to development work, as the previous “mismanagement has been serious,” and the treatment works for the Diehl process were “too extensive for the developments effected.” The values of the Lake View Consols £1 shares had plummeted from the artificial high of £28 per share down to £3 per share, reflecting the investment downturn and “bear tactics” in the London markets. Govett returned to London in April 1902 and broke the news to shareholders that the payable ore had been depleted, but that “there is a large amount of low-grade ore that might pay if economies in mining and treatment were effected.”19 The remaining ore in the mine consisted of “about 50,000 tons, of which half average $30, varying from $25 to $40, while the other half averages about $15” per ton. There was also a remaining rich lode of “about 750 tons that contains $80 gold per ton.” In other words, the Lake View Consols’ rich ore had been plucked out during boom times, and what was left was overwhelmingly low-grade, complex sulphide-telluride ore that required a large economy of scale for profitability.20

Eight months after Bewick, Moreing & Co. assumed management, the mine turned a profit of £11,000. Prichard continued efficiency reforms, especially regarding the Diehl process of ore treatment. It was a complex operation, involving stamp-milling “to extract the

native gold,” and then “the removal of the heavy sulphides by concentration, with subsequent roasting, regrinding and cyanidation, aided by the filter press.” The treatment works at the Lake View Consols had been improved to the point where the cost was “only 19 shillings or less than $5 per ton.” With higher efficiency came increased production of low-grade ores, and further cost reductions, down to $4.30 per ton. In a letter to the *Engineering and Mining Journal*, Hoover was enthusiastic that “There is no doubt that the process will be worked at Kalgoorlie for under $4.” In fact, Hoover’s ideal cost reduction came to fruition, reducing treatment costs to $3.90 per ton by June 1903. Ore reserves increased as the mine prospected to the 2,000-foot level, but, as “over 50 per cent of gold is obtained from concentrates,” the dramatic profitability of the Wright days had passed in favor of Hoover’s efficiency regimen.

However, with Hoover’s efficiency regimen came Hoover’s ideas of financiering, and, against the wishes of the shareholders, profits from the Lake View Consols were eventually invested in other mining enterprises, transforming the mining company to a finance and holding company. This included investments in the Broken Hill Silver-Lead-Zine mines (later incorporated into the Zinc corporation, discussed below) and the silver mines in Burma. Hoover even gained a seat on the board of the company in 1908, and given the exhaustion of the Lake View’s ore, helped transform the Lake View Consols into the Lake View and Star, Ltd., and then the Lake View and Oroya Exploration Company, under Hoover and Govett’s joint directorship. This new corporation held the Lake View Consols’

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advanced treatment plant, but also held financial interests in mining companies in Russia, Burma, Australia, and other regions. Effectively, Hoover, Govett, and Bewick, Moreing & Co., took an extremely troubled and partially-gutted mine, increased its treatment efficiency, exhausted all payable ore, funneled its profits into other investments, and then amalgamated and transformed the company into a holding and financing company with interests around the world. It paid dividends for years after, issuing a 10 per cent dividend in 1913 and 1914.23

If the case of the Lake View Consols represented the resuscitation of an ailing mine, then the East Murchison United is a case of corporate euthanasia, due to the mine’s distance from Kalgoorlie and its decreasing ore grade at depth. As discussed in Chapter 3, the East Murchison United was a mine under Bewick, Moreing & Co.’s management, and Hoover appointed his Stanford friend, Deane P. Mitchell, as superintendent in 1897. It was a mid-sized gold mine near Lawlers, on a property of 521 acres equipped with a 40-stamp mill. Its production in 1898 was 18,850 oz. of gold from 16,214 tons treated, and 18,831 oz. from 21,217 tons in 1899, enough to justify paying dividends each year.24 However, by 1901, the mine was beginning to show difficulty at depth, with ore grades decreasing and explorations descending below the 250-foot level in search of payable ore. Like many promising mines in Western Australia, the East Murchison declined at depth. Its production in nine months of 1901, 23,465 ounces, represented the zenith of the mines’ production; in the same period of the following year it produced 14,505 ounces, a decline of 8,960 ounces, and it ceased paying dividends as share values plummeted from £1 to 1/8th of a pound.25 By the end of 1903, the

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original mine was “worked out,” but Bewick, Moreing & Co. kept its large and modern mill and treatment plant in operation, milling the ore from “half-a-dozen leases, which the parent company has from time to time acquired to keep itself going.”

Once the ore dwindled at depth, Bewick, Moreing & Co. attempted to salvage the mine, first through heavy borrowing and an additional stock subscription offer, but further capitalization could not fix the geological realities. The ore bodies of the mine had been fully exploited, and an expensive mill and treatment plant would sit idle without ore to process. Even with the ore supplies of surrounding mines to keep the mill operating, it was a losing venture. Its best years as a mine had been 1900 and 1901, and the dividends issued in 1900 were its last. From a total capitalization of approximately £180,000, the East Murchison United only ever paid £60,000, despite producing a total of “159,717 oz. gold from 236,432 tons of ore.” Like many mining ventures, it absorbed more capital than it produced profits, and in late 1905, Bewick, Moreing & Co. liquidated the company at a loss.

The final case study represents Hoover’s attempts to reform a long-duration, low-grade mining property which continues to produce gold into the twenty-first century. It was among Hoover’s most profitable ventures, and one of his most personal, as he had first developed the mine on an industrial scale in 1898. In contrast to the East Murchison United and the Lake View Consols, which effectively ceased mining operations by the end of the decade, the Sons of Gwalia ultimately proved to be an extensive, low-grade deposit with long-term viability as efficient mining technology advanced. It was one of the richest

operations of Hoover’s career. But, on his return to Western Australia in early 1902, the situation did not look rosy. Hoover had given up the management of the mine in 1898 to go to China for C. Algernon Moreing, and when he returned, he considered that the mine had been mismanaged under Richard M. Atwater. Unable to simply dismiss him, Hoover instead arranged for Atwater to be promoted out of the district, and appointed W. J. Loring as superintendent, beginning on April 11, 1902. Hoover had recommended that “20 of the 50 stamps on the Sons of Gwalia should be hung up for a time to allow the mine to be thoroughly developed,” but Loring “asked his permission to examine the mine before coming to a decision.”

Hoover’s concerns about the Sons of Gwalia were understandable, if perhaps overblown. Nearly all of the mining stocks for Western Australia took a major hit during the 1900 metals market downturn, and recovery was slow. Shares of Sons of Gwalia, Limited’s stock had reached a high of £6 3/16 during the boom, but declined to below par market value by 1902. The effect of the downturn on the Sons of Gwalia came as the mine was putting its full works into operation, with only 108,000 tons of ore in sight on the four developed levels, and decreasing ore grades. The management had also spent “over and above the original working capital of £50,000,” on infrastructure such as “machinery and plant, buildings, and the shaft,” as well as large expenditures on “mine development, implements and tools, stores, horses, vehicles, and furniture.” The board of directors asked for another issuance of 50,000 £1 shares for further working capital and for purchasing adjacent properties. For jittery investors, such expenditures threatened their dividends. This

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28 Rickard, *Interviews with Mining Engineers*, 278-279.
slowed, but did not stop mining operations, and by 1901, *The Economist* recommended investment in the mine, stating it was “genuinely good, and with ore in sight for years to come.”

Loring was the superintendent of the Sons of Gwalia for two years. He “had the Californian’s dislike of hanging up stamps,” to temporarily reduce milling capacity when ore supplies for the mill diminished, and firmly believed “that the mine was capable of producing sufficient ore to maintain the mill at full capacity.” Indeed, an efficient and practical millman such as Loring was necessary to operate the Sons of Gwalia at a profit, as the low-grade ore of the mine could only be profitably worked through cost-effective treatment. The fate of the mine was not, as Nash asserts, dependent “on the secrets, a thousand feet down, that awaited grimy men with picks and drills.” Low-grade auriferous ore is not particularly charismatic in appearance. Mining was no longer about discovery; instead, under Hoover and many other American mining engineers it was about technology, efficiency, and management. Success or failure depended on profitable and efficient operations of the mill and treatment plant, and on draconian workforce reduction, especially the continued use of poorly-paid contracted Italian labor. During his tenure, he reduced working costs from 35s. 6d. to 21s. per ton, doubled the ore reserves in sight from 60,000 tons to 120,000 tons, and reduced the workforce from 814 to 420 men. Concurrently with Loring’s appointment, the board of directors of the company also decided to “utilize the whole of the sum of £140,000 which stood to the credit of profit and loss in the accounts in

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30 “Australasian Gold Mines,” *The Economist* (3 August 1901), 1169.
31 Rickard, *Interviews with Mining Engineers*, 278-279.
35 Rickard, *Interviews with Mining Engineers*, 278-279.
writing down the assets of the company to a point more nearly representing the prospects of
the mine as a dividend payer in the future.” 36 The low share prices combined with efficiency
reforms and favorable reporting in the mining and investments presses made the Sons of
Gwalia a good potential investment in early 1903.

By June 1903, the Sons of Gwalia had turned around under Loring’s management,
and the company issued a dividend of two shillings per share. This was followed by a three-
shilling dividend in December 1903, after annual net profits of £123,394 for the year. 1904
was similarly lucrative, with the mine producing a profit of £116,130. By June 1905, working
costs were down to 17s. 2d. per ton, and dividends continued throughout 1908. 37 All told,
the Sons of Gwalia may have been among Hoover’s most profitable mining ventures, and
certainly his most personal. He had advocated for Bewick, Moreing & Co. to secure the
mine in 1897, and his early management put the mine on a footing for long-term
development. The extent, depth, and grade of the ore mandated a high volume and low
working cost for profitable exploitation; Hoover, Loring, and Bewick, Moreing & Co.’s
efficiency practices rescued the mine from its depressed share prices and debts, and put it on
the path to 120 years and counting of gold production. Effectively, the Sons of Gwalia was
the mine where Hoover’s ambitions and faith in efficient, long-term management worked,
and worked well. It justified his optimism, and his beliefs in technology and technocracy.
Granted, much of this was due to the nature of the ore deposit as a large, low-grade
proposition which dictated cost-effective mining and milling for profitable extraction, but
this geology was also the future of mining, and its profitable extraction reflected efficiency

36 “Sons of Gwalia, Limited,” The Economist (7 June 1902), 901.
139.
reforms made on the Rand and in the American West, and implemented by Hoover in the Antipodes.

During Hoover’s first trip to Australia as engineering partner for Bewick, Moreing & Co., he inspected most of the company’s mines, replaced the majority of its supervisors with his own handpicked men, and reformed the company’s practices in the midst of a mining depression. Herbert and Lou spent the first few months of 1902 in Kalgoorlie, with Herbert recruiting a managerial staff and implementing reforms at the Lake View Consols and other mines under his firm’s control. He and Lou also inspected Bewick, Moreing & Co.’s outlying mines, and they “afterward calculated that in just 2 ½ months they traveled 3,500 miles in Western Australia,” visiting Cue, Lawlers, Laverton, Leonora, and other districts by horseback, buggy, and camel. However, London was calling. Hoover had assessed his mines, and had to report back to the other partners and to the concerned shareholders. He left his new managers and supervisors in Western Australia, and along with Lou Henry, traveled to Fremantle. On 31 March 1902, they sailed on the Barbarossa for Europe, via Columbo and the Suez Canal, disembarking in Genoa. They traveled for Paris and then London, arriving in mid-May.\(^{38}\)

**Angry Shareholders and the Rowe Defalcation**

When Hoover returned to London, he expected to meet with shareholders concerned about the investment situation in Western Australia. Given the market downturn following the collapse of Whitaker Wright’s London and Globe Finance Corporation and the Westralian speculative bubble, the concerns of the “bewildered and swindled”

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\(^{38}\) Nash, *Hoover: The Engineer*, 232-236
shareholders were understandable. Stock prices had receded during the bust, and shareholders often prioritized dividends over development work. It is important to remember that these shareholders invested in a globalized commodity market, but the speed of communication was variable. Telegrams linked the metropoles of the British, European, and American Empires with their colonial holdings, transmitting small amounts of textual information rapidly, but the transmission of physical items, such as corporate reports, commodities, and people traveled at the speed of steamships. Therefore, London investors had due reason for concern about their investments in Australia; it was a six-week voyage halfway around the world. Hoover, therefore, was the representative of the situation in Bewick, Moreing & Co.’s Australian mines to nervous London shareholders. Between June 1902 and his return to Australia in 1903, Hoover assuaged the investors of the Sons of Gwalia, worked to amalgamate two Kalgoorlie mines, the Hannan’s Brownhill Gold Mining Company with the Hannan’s Oroya, took an inspection tour of British Columbia and the American West, and dealt with a major crisis involving forged shares of the Great Fingall mine.

On June 5th, 1902, Hoover attended the annual meeting of the Sons of Gwalia, Limited, at the “Winchester House, London.” It was a contentious meeting. Share values had plummeted from a high of £6 down to near market par value; ore grades had dropped from their 1900 high of 23 dwt. per ton down to 12 ½ dwt. per ton in April 1902. Not only had ore grades declined precipitously, but two factors pointed to further necessary and expensive development work. The ore body “was trending in a southeasterly direction,” and that the mine was “for the moment passing through a barren portion of the lode,” and

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39 The Memoirs of Herbert Hoover, 79.
would hopefully “pick up the bigger values deeper down.” The Board of Directors had also borrowed money to pay dividends in their last issuance, further complicating the mine’s finances. But there was a silver lining. Provided that the mine could produce, and the mill could treat “a tonnage of 7,500 per month,” the mine could operate at a profit. What the directors proposed, therefore, was to operate the Sons of Gwalia as a low-grade proposition to avoid “reconstruction or liquidation.” William Prichard Morgan, a long-time investor in the Sons of Gwalia and associate of Moreing, was unhappy with the management, and called for an investigation.40 Hoover was incensed at the suggestion, claiming “The fact that we are able to make a profit on 12-dwt. ore is clear proof that we are working at a low cost. No other London company is working in Western Australia so economically.” In the end, Morgan’s proposal for an investigation was voted down, and Hoover’s managerial regime carried the day.41

Hoover’s next public step was an amalgamation of two major mines on Kalgoorlie’s Golden Mile, the Hannan’s Brownhill and the Hannan’s Oroya. The Hannan’s Brownhill was one of the major mines in Kalgoorlie, but it had experienced diminishing ore grades at depth and increasingly complex sulphide ores, much like many of the other major producers. It was still a lucrative mine, with profits of £100,000 in the first six months of 1902 from 12,145 tons of ore crushed for a production of 31,751 ounces. Its treatment plant was among the largest and most advanced on the Mile. In contrast, the Hannan’s Oroya had promising ore reserves but limited treatment facilities, consisting of a few small mills, inadequate to profitably treat complex sulphide-telluride ores. Hoover proposed an

40 “Sons of Gwalia, Limited,” The Economist (7 June 1902), 901.
41 As quoted in Nash, Hoover: The Engineer, 238-239.
amalgamation of the two firms, to use the Brownhill’s mill and treatment facility to process
the Oroya’s ore, thus eliminating the need to build a redundant mill. According to the
_Economist_, “The combination of the two properties would ensure a long life to the
amalgamated company, who would possess liquid assets of between £140,000 and £150,000.
From the date that the amalgamation was consummated it would be a dividend-paying
concern, with ample resources for the development of the combined properties.” The
shareholders, voting both by presence and proxy, approved the amalgamation which
involved increasing its capitalization by 225,000 £1 shares, changing the name of the
company to Oroya Brownhill Company, Limited, and by setting compensation for the board
of the company. Effectively, Hoover and Bewick, Moreing & Co. secured the future of the
two mines through amalgamation, bringing two large Golden Mile producers under one
company.⁴²

Outside of shareholders’ meetings, Hoover fell into his role as the engineering
partner for Bewick, Moreing & Co., and part of his responsibilities included finding mines
for acquisition. Bewick, Moreing & Co. had moved to clean up the mess left by the collapse
of the London and Globe Finance Corporation in Western Australia, but both firms were
global affairs. Whitaker Wright had invested heavily in the gold mines of British Columbia,
and these mines suffered as well. Shortly after the shareholders’ meeting of Hannan’s
Brownhill, Hoover sailed for North America on a six-week trip, visiting New York, Denver,
San Francisco, and British Columbia. He and his brother Theodore, a mine superintendent
in California, inspected several mines and works in British Columbia, but Hoover declined to

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⁴² “Hannan’s Brownhill Gold Mining Company, Limited,” _The Economist_ (19 July 1902), 1133-1134; Nash,
_Hoover: The Engineer_, 239-240; see also Walter R. Skinner, _The Mining Manual for 1900_ (London: n.p., 1900), 126-
127, 134-135, [http://hdl.handle.net/2027/hvd.hb2fck](http://hdl.handle.net/2027/hvd.hb2fck).
involve Bewick, Moreing & Co. in another clean-up operation from another of Wright’s speculative mining bubbles in another part of the world. He returned to London via New York, arriving in September 1902, having traveled 16,000 miles in six weeks.⁴³

In the closing months of 1902, the situation in Bewick, Moreing & Co.’s managed mines seemed to be stabilizing. Hoover had his own staff in place in Western Australia, men he could trust to implement his efficiency reforms. He took the time to pen an article for the *Engineering and Mining Journal*, describing the state of gold mining in Western Australia and Bewick, Moreing & Co.’s successes in management, especially in comparison to treatment costs in Cripple Creek, Colorado.⁴⁴ Lou had bought a French Panhard motorcar, and quickly put 2,000 miles on the new automobile by ripping around England and Wales. They had also rented a house in the Kensington district of London, close to Hyde Park and Kensington Palace. In comparison to Hoover’s usual frenetic pace, the final months of 1902 seemed to be a period of relative calm.⁴⁵

Events on Boxing Day shattered this calm. As it was a Friday evening and a holiday, Herbert and Lou had dinner with another junior partner in Bewick, Moreing & Co., A. Stanley Rowe, and afterwards, they went to the theater along with Rowe’s wife. Rowe acted strangely throughout the night, questioning whether the Hoovers would raise his children if anything happened to him. When Hoover returned to the office on Monday, December 29, 1902, he found a twenty-page letter from Rowe, admitting to serious financial troubles and resigning his position as secretary and partner of Bewick, Moreing & Co. and as secretary of

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⁴⁴ H. C. Hoover, “Gold Mining in Western Australia in 1902,” *E&MJ* 75 (3 January 1903), 18.

Great Fingall Consolidated, Limited. Hoover contacted Mrs. Rowe, who was distraught: Stanley had shaved his mustache and absconded, leaving her with five children and an excuse. Herbert called Lou and sent her to visit Mrs. Rowe, who produced an additional nine-page handwritten confession. Rowe had been gambling in the London stock markets, and poorly at that, another victim of the bears. He gambled and lost £70,000 by purchasing shares of the Great Fingall at a high price, and then lost it all in the downturn. To recoup his losses, Rowe began forging thousands of Great Fingall shares and borrowed against these forged shares, exacerbating his circumstances. He also borrowed from other mining investment houses, using loans from one to repay the other, all on security of forged shares, playing a shell game to keep solvent. He eventually borrowed more than £55,000 from other firms, including Messrs. Robinson and Company, a major mining and investment firm focused on South Africa. Overall, Rowe’s fraud exceeded $1,000,000.46

C. Algernon Moreing, the senior partner of the firm, was in China dealing with business concerns and hunting tigers in Manchuria. The recently retired senior partner, Thomas Bewick, was similarly off attempting to kill large game animals, namely moose in Canada. Hoover called upon the other remaining junior partner, Thomas W. Wellstead. Together, the two young partners, twenty-eight and thirty-two years old respectively, had to deal with a major scandal that threatened the very reputation of their firm as well as its financial liquidity. They quickly called upon prominent, senior members of the London mining investment community, including Francis Govett, Lionel Robinson, and other brokers. The Rowe Defalcation threatened mining investment in Western Australia, injecting

46 Nash, Hoover: The Engineer, 246-249, 270; The Memoirs of Herbert Hoover, 82-85. It should be noted that this was not Rowe’s first fraud, having served nine months in prison in 1885 for embezzlement from another firm.
further instability into the district. Bewick, Moreing & Co. was arguing that it alone could remedy the over-capitalized and unstable investment markets in Western Australia, and now a junior partner had made off with thousands of pounds borrowed on forged securities. Hoover and Wellstead frantically dispatched a cable to Moreing in Tianjin, and, as press accounts began detailing Rowe’s theft, the remaining junior partners pledged to recoup the defrauded in full. The junior partners attempted to get ahead of the press accounts by touting their firm’s repayment of Rowe’s theft, and tried to control the narrative. The last thing Hoover wanted was for Bewick, Moreing & Co. to join the ranks of the London and Globe Finance Corporation. Their position, according to a cable from Hoover to Moreing, was “much worse than anticipated.”

As Moreing made his way back from China to London via the United States, Hoover and Wellstead detailed Rowe’s defalcation in a letter postmarked care of Theodore Hoover in San Francisco. The visible scope of Rowe’s fraud widened to £140,000, roughly $700,000, a large sum of money which Hoover had pledged to ameliorate with Moreing’s funds. The remaining partners arranged their liabilities for the Rowe debts based on their interest, with Moreing assuming Rowe’s share and seventy per cent of the total burden, Hoover twenty per cent, and Wellstead ten. They also reorganized the firm, with Moreing holding a half interest, Hoover a third, and Wellstead a sixth; Hoover again had to borrow from Moreing to cover his partnership share. George H. Nash details the minutiae of the Rowe Defalcation in his biography of Hoover; the scandal illuminates not only the financial scale of the firm’s holdings, but also the market position of the Great Fingall. The fact that Moreing could

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cover nearly £100,000 from his personal finances, estimated between twelve and twenty-seven million U.S. dollars in 2017, further demonstrates the financial stakes of London mine investment and Bewick, Moreing & Co.’s market position. It also presents an opportunity to examine the Great Fingall mine, outside of Cue.48

Outside of Kalgoorlie’s Golden Mile, the Great Fingall was among the richest mines of Western Australia, and one of the major producers under Bewick, Moreing & Co.’s management. Unlike the Golden Mile’s sulphide ores, it was also a pure quartz lode, requiring little metallurgical treatment for efficient extraction of its largely free-milling ore.

The company, Great Fingall Consolidated, Limited was registered by Bewick, Moreing & Co. and A. Stanley Rowe in May 1899 to “acquire the undertakings of the Great Fingall Reefs, Limited, and the Consolidated Murchison Gold Mines, Limited.” The previous companies held valuable mineral leases near Cue, but had abandoned their workings in the late 1890s and acquired an interest in the Sons of Gwalia. Bewick, Moreing & Co. liquidated and amalgamated the companies, taking over the properties, small mill, 24,000 shares of Sons of Gwalia stock, and £18,000 cash in hand, and quickly purchased adjoining mining leases with shares in the new company. With the increased capitalization following amalgamation, the mine began development at depth, doubled its milling capacity with a larger mill and the Consolidated Murchison’s cyanide plant.49 The mining correspondent for The Economist considered it “the most noteworthy mine in West Australia at the present moment,” which

48 For a detailed examination of Hoover’s reaction to Rowe’s defalcation, see Nash, *Hoover: The Engineer*, 245-276. Hoover personally lost £25,400 in the defalcation and reorganization, leaving him in debt to Moreing. He also sent several checks for small sums to Rowe’s sister, who was caring for his children while Rowe served eight years in prison. On his release, Rowe wrote an apology to Hoover, who responded with a note declining to meet and a check for £20 to help Rowe get back on his feet, and offered to buy Rowe a second-class ticket to Northwestern Canada to re-establish himself.
promised to “become one of the great gold mines of the world.” By January 1902, the mine’s prospects were rising, as it “promises to become a large producer, the shares have been in demand.” In fact, the mine’s stocks moved contrary to the Western Australian markets, gaining value in the generally stagnant or declining market. Its share value rose to £14 per share, and “may still go higher.” Given the Great Fingall’s trajectory as a rising stock and an outlier in a relatively flat investment market, it is understandable that Rowe chose that company to defraud, aside from his insider knowledge and unrestricted access to company stationary.

Following Rowe’s forgeries and fraud, shareholders of Great Fingall called a meeting, and attempted to vote Bewick, Moreing & Co., out of the management of the firm. They were unsuccessful, partially due to the firm’s commitment to repay the victims of Rowe’s fraud, but also due to the strength of Great Fingall’s market position. Its working costs were down to around 25s per ton, and total costs were about 31s per ton due to Hoover’s efficient managerial regime. Some of the ore was worth 150s per ton, meaning that each ton of ore processed could yield a profit of just under £6 per ton. By April 1903, the mine was running eighty stamps, had discovered a new ore chute, and had further reduced working costs to 26s per ton while paying some of the highest average wages of a gold mine in the world. Given C. Algernon Moreing’s repayment of Rowe’s frauds, the market position of Great Fingall barely suffered in the long run, despite shareholder dissatisfaction. Granted, the company opted to issue a reduced dividend in April 1903, but they directed the capital

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50 “Australasian Gold Mines,” The Economist (3 April 1901), 1168-1169.
52 “Gold Mining Investments—VI,” The Economist (10 January 1903), 57; “Gold Mining Investments—VII,” The Economist (17 January 1903), 101.
toward further development, ensuring future profitability and increased dividends.  

By October of 1903, the outlook of the Great Fingall was positive, with ample production and returns forecasted. The special mining commissioner for The Economist, J. H. Curle, considered the Great Fingall as “intrinsically the best,” and looked “to this mine to be producing £2,000 a day in a year from now.”  

In December 1903, Curle estimated that “next year the Great Fingall will be earning the biggest profits of any gold mine in the world, and as regards its gross output will rank among the first three or four.” It was, to Curle, “The finest purely-quartz mine I have ever seen, and as regards width of ore, regularity, and character, I would call it the ideal gold mine of one’s dreams.”  

In the year following the Rowe defalcation, the mine made a net profit of £384,286, paid a 220 per cent dividend, and sat upon a massive ore reserve of 400,871 tons worth about £1,650,000. Prospects appeared even brighter the next year, with £337,500 paid in dividends, a promising new ore deposit at depth, a milling capacity of 16,000 tons per month in the 100-stamp mill, improvements in tailing treatments for further gold extraction, further cost reductions, and ore reserves valued at around £2,500,000.  

However, as the mine processed its ore reserves, its new prospects declined. It had “gone wrong altogether at depth.” Similar to many of the mines of Western Australia, the ore grade had dramatically dropped off as the mine went deeper, and the Great Fingall entered its terminal phase where the mill worked toward exhausting the available ore, and dividends were projected to decline. Still, the mine was a major producer on ore reserves

54 “The Greatest Gold-Producing Mines,” The Economist (17 October 1903), 1753.  
56 “Great Fingall Consolidated, Limited,” The Economist (9 April 1904), 611.  
57 “Great Fingall Consolidated, Limited,” The Economist (22 April 1905), 691.  
alone. Even after its ore grade declined at depth, the mine “realized £681,728,” as reported to the April 1906 shareholders meeting, paid £387,500 in dividends, and had four years’ supply of ore for its mill.\(^{59}\) Development operations and underground prospecting continued throughout 1907, and had found sporadic deposits worth 35s per ton at depth, but no new large deposits.\(^{60}\) By 1908, Great Fingall had become a low-grade concern, with decreasing ore grade at depth, diminishing returns, and “very little scope for any discoveries now beyond the bottom of the mine.” Throughout its productive life, the mine paid £1,612,500 in dividends; it still had some ore reserves remaining for processing, and had purchased other properties to keep the mill operating. However, as a major producer in Western Australia, the mine was in its senescence.\(^{61}\)

If Hoover’s first trip to Western Australia as a partner in Bewick, Moreing & Co. focused on recovering the goldfields from the chaos and crash of the Whitaker Wright affair and market downturn, then his next trip was his real opportunity to establish his firm as the dominant mining engineering, management, and financiering concern in the Antipodes. While the Rowe defalcation hurt Hoover’s personal finances, Bewick, Moreing & Co.’s quick action to remunerate defrauded shareholders saved the company’s reputation, and allowed it to further its market position. All told, the Rowe defalcation was mostly an issue of the company’s image; its overall corporate structure and interests were sufficiently large enough to weather the storm without much ill effect, and its reputation for honest business dealings was enhanced. The next years marked a further expansion of Bewick, Moreing & Co.’s

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\(^{59}\) “Great Fingall Consolidated, Limited,” *The Economist* (28 April 1906), 732.
\(^{60}\) “Great Fingall Consolidated, Limited,” *The Economist* (27 April 1907), 743.
mining empire.

Hoover’s personal life also underwent a major change. In early August 1903, Lou Henry Hoover gave birth to their first child, Herbert Charles Hoover, later called Herbert Hoover Jr., despite not sharing his father’s middle name. Just over a month after she gave birth, Lou left London and travelled to Kalgoorlie, newborn in tow; Herbert followed on a separate steamship five days later. It was to be Herbert’s third trip down under, and he was returning to the district with the confidence of the London investment market. His reputation as an engineer was solid, and he was well known in London’s mining investment community, which itself could boost share prices. J. H. Curle, *The Economist’s* special mining correspondent, considered “Mr. Hoover as a most valuable factor in the mining industry to-day.”

**Consolidating and Diversifying Holdings**

Hoover’s third trip to Australia instituted not only another round of consolidations and efficiency practices, but also an expansion of Bewick, Moreing & Co.’s managerial empire in Australia. Over the next few years, Hoover drove several major projects, with a mixed record of success. At the beginning of 1903, Bewick Moreing controlled a quarter of the gold production in Western Australia. By June 1904, the firm directed half of the total gold production, and thirty-two mines, twenty more than when Hoover left in 1899. Through waste elimination, rigorous record keeping practices, and cost cutting, Bewick, Moreing & Co. standardized the administration of their mines, and reported this information to shareholders and the public. Hoover also revived a major project to mine alluvial gold

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deposits outside of Melbourne, the Consolidated Deep Leads, but it was unsuccessful and unprofitable. He also set his sights on the zinc-rich tailings of the Broken Hill silver-lead-zinc mining complex in New South Wales, forming the Zinc Corporation and purchasing the majority of the district’s tailings, and then managing a process of trial and error to profitably extract the zinc.

Technically, Bewick, Moreing & Co. depended on large milling operations and improved reduction equipment, directed by smart engineers and managers who oversaw a reduced and efficient workforce. Western Australian gold production was declining overall, but this was due to lower-grade ores and widespread declines at depth. As Bewick, Moreing & Co. managed to get working costs per ton down, the firm became the authority in Western Australia on treating low-grade auriferous ores at a profit. In *Mass Destruction*, Timothy LeCain argues that open-pit mining and large milling and smelting operations were necessary for treating low-grade copper ores as part of an increased velocity of “throughput,” a term originally described by Alfred Chandler. Hoover’s firm combined increased capacity and velocity of throughput with expertise and administration to profitably manage mines across a continent.63

Hoover turned to consolidating and combining mines on the Golden Mile in the Kalgoorlie-Boulder district. Before 1902, according to calculations by historian Richard Hartley, Bewick, Moreing & Co. only managed one mine on the Golden Mile, namely Hannan’s Brownhill. Beginning in 1902, once Hoover gained partnership and traveled to Western Australia, Bewick, Moreing & Co. began managing the Lake View Consols, the

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Oroya Brownhill (reorganized from Hannan’s Brownhill and Hannan’s Oroya), the Great Boulder Main Reef, the Ivanhoe and the Paringa Mines. A second round of mine management acquisitions came in 1904, when Bewick, Moreing & Co. began managing the Golden Horseshoes Estates, the South Kalgurli Gold Mines, the Great Boulder Perseverance (discussed below), the Hannan’s Proprietary, and the Boulder Deep Levels. According to Hartley, “At the height of its activities in June 1904, the company managed twenty mines which accounted for 37% of the gold produced and employed nearly 20% of the state’s goldminers.” Hartley’s figures may be a bit low, as he omitted Bewick, Moreing & Co.’s management of the Ivanhoe, a major producer.64 The 1902 acquisitions accounted for an expansion in Bewick, Moreing & Co.’s managerial empire of control of £2,130,000 in authorized capital, and stated reserves of 550,868 tons of auriferous ore, omitting reserves from the Paringa and Great Boulder Main Reefs.65

The Golden Mile acquisitions of 1904 offer more of a mixed bag of results. The five mines that came under Bewick, Moreing & Co.’s management had a total authorized capitalization of £4,050,000, but this market position was fleeting. The two largest mines that came under Bewick, Moreing & Co.’s managerial control, the Golden Horseshoe Estates and the Great Boulder Perseverance were each capitalized at £1,500,000, but the firm only managed these mines for seven and three months, respectively. The remaining three mines that stayed under Bewick, Moreing & Co.’s management, the South Kalgurli, Hannan’s Proprietary, and Boulder Deep Levels only had a total authorized capitalization of

64 Hartley, “Bewick Moreing in Western Australian Gold Mining,” 2, 18 (appendix 2). See also Hartley, “The 1904 Watershed in Bewick Moreing’s Western Australian Gold Mining Activities,” 10-31, especially 16, which offers production statistics for the Ivanhoe.
£1,050,000, and the only mine to report ore reserves, the South Kalgurli, had 123,200 tons in sight. Combined with the mines acquired in 1902, Bewick, Moreing & Co., controlled an authorized capital of £3,180,000 at the end of 1904. Had they remained in control of the Great Boulder Perseverance and the Golden Horseshoe, the two largest producers in the goldfield, this capitalization would have been £6,180,000. The actual value varies, as the authorized capital represented shares sold, whose subsequent value fluctuated based on market trends. Granted, these calculations do not include properties outside of the Kalgoorlie-Boulder district.66

With this expanded market share on the Golden Mile, Hoover and his managers could institute cost-saving reforms, including draconian labor force reductions. Hoover and his managers continued using contracted Italian miners and laborers, a practice he had begun in 1897 at the East Murchison United and perfected at the Sons of Gwalia in 1898. When Hoover went to China, the practice of using contracted Italian labor expanded to Bewick, Moreing & Co.’s other properties, meeting with several strikes at the Great Fingall and other mines. However, once Hoover assumed partnership, the number of Italian contractors declined, as Hoover preferred to use Italian labor as a threat to drive down wages of White Australian miners through competition rather than as a majority of the labor force. Furthermore, while Italian laborers only comprised 4.13 percent of the labor force, Bewick, Moreing and Co. employed half of them. The firm also shortened the duration of most miners’ employment, hiring and firing miners and other workers according to the needs of the mines and cost-reduction reforms rather than providing stable employment. According

66 Data for these calculations comes from Skinner, The Mining Manual for 1906, 18, 67, 70, 80, 158-159; Nash 340-350.
to Richard Hartley, there was “a considerable variation in the number of workers employed from month to month.” As payroll represented the most flexible expense in a mine’s operating budget, it was easiest to reduce costs by either reducing wages or by reducing personnel numbers, and Hoover and his managers did both. Unemployed White Australian miners resented Bewick, Moreing & Co.’s management, as rumors swirled that the Italian contractors got preferential rates.67

Hoover’s efficiency regimen met with other criticisms as well. Union leaders criticized the firm for operating its mines in an unsafe manner, with “high levels of dust and fumes in working areas and the danger of rock falls when ore was being mined by the shrinkage stoping method.” Royal Commissions, local newspapers, and boards of arbitration criticized the air quality in Bewick, Moreing & Co.’s mines, its labor and contracting processes, its timbering and stoping practices, and other issues.68 From the supply angle, Bewick, Moreing & Co. streamlined its purchasing through its Fremantle centralized store, which alienated local merchants accustomed to doing brisk business supplying the large mines. This was a major source of revenue for the merchants, and Hartley considers the “withdrawal of the custom of nine mines in Kalgoorlie and a further nine or ten serviced from Kalgoorlie,” as a “savage blow” to the merchants. This evolved into a 1904 “election year campaign by the goldfields press and the merchants and their supporters against Bewick, Moreing & Co.’s dangerous monopoly.” Suffice to say, while Bewick, Moreing & Co. often earned the trust and investment of London’s shareholders through their efficient

67 Hartley, “Bewick Moreing in Western Australian Gold Mining,” 1-9. Hartley goes in depth regarding the labor and management regimen of Bewick, Moreing & Co., and the responses of the goldfields, both from labor and merchants.
68 Hartley, “Bewick Moreing in Western Australian Gold Mining,” 8-12.
management of Western Australian mines, that sentiment did not extend to the workers, merchants, and independent mine operators of Western Australia. Perhaps it was because some of Bewick, Moreing & Co.’s profitability came out of their wages and profits.69

Two mines serve as examples of the increasing complexity of operations, declining ore grades, and continued reverberations of the investment market downturn. On Kalgoorlie’s Golden Mile the Great Boulder Perseverance was one of the two largest producers but its early management was scandal-plagued. The previous managers had dramatically overstated its ore reserves, triggering a bear raid in the London investment market. A bear raid was an investment practice also known as short-selling; in effect betting against rising share prices with the expectation (or insider information) that share prices would go down despite expectations, and selling shares before the price dropped. This triggered an investigation by a Royal commission in Australia before Bewick, Moreing & Co. could fully institute its Hooverian managerial regime, and the firm quickly dumped its controlling interest at a loss during the controversy. In contrast, the Lancefield gold mine in Laverton was a mine in its early stages of development, but it quickly began posting expensive losses as its ore increased in complexity courtesy of bonded arsenic. Its mill and treatment plant struggled to extract the gold, and the company declared insolvency in 1907. Together, these mines heralded that the days of easy profit, either through the early days of “rank swindling and charlatan engineering,” or through Bewick, Moreing & Co.’s later efficiency and cost-cutting measures, had come to an end.70

The Great Boulder Perseverance was under the direction of Frank L. Gardner, a

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70 Hoover to R.A.F. Penrose, Coolgardie, 2 April 1898, Life and Letters of R.A.F. Penrose, Jr., 202
veteran engineer and mining investor with broad experience on the Rand and around the
world. Its property sat adjacent to the Lake View Consols and the Ivanhoe. The company
registered in London during the boom days of 1895, producing annual profits and paying
dividends beginning in 1897. It contracted with Hannan’s Public Crushing Company for its
milling operations, of which it owned an interest, and began erecting treatment plants for its
sulphide ores. By 1900, its £1 shares traded at around £11 on the London Markets before
feeling the effects of the crash.\footnote{Skinner, The Mining Manual for 1900, 112.}

Even as share values declined, the mine continued turning a profit due to its rich ore, earning £17,743 in 1900 and £163,555 in 1901, with the ten-fold increase due to economic recovery, enhanced treatment works, increased volumes of treated
ores, and working cost reductions before Bewick, Moreing & Co. assumed the management.
The mine, an ebullient Frank Gardner reported to his shareholders in 1902, “may develop
into a gold mining proposition second to none in the world.”\footnote{“Great Boulder Perseverance Gold Mining Company, Limited,” The Economist (22 March 1902), 473-474.}

The Great Boulder Perseverance’s profits increased in 1902, for a total of £257,123,
and ore reserves increased through further development. There was, according to Gardner,
“no reason whatever to doubt a continuance of our prosperity.” However, rumors circulated
about overstated or overcalculated ore reserves by Gardner’s general manager for the
property, Ralph Nichols. In 1903, the company underwent reorganization, issued further
shares to increase its capitalization, issued a dividend to its shareholders, continued
development work at depth, and began prospecting other points on its property holdings by
diamond drilling. Profits continued through 1903, boasting a production of 132,593 tons of
ore extracted and milled, an increase in ore reserves, and a net profit of £396,566.\footnote{Walter R. Skinner, The Mining Manual for 1903 (London: n.p., 1903), 87; “Great Boulder Perseverance Gold Mining Company, Limited,” The Economist (22 March 1902), 473-474.}
was sanguine about the mine’s potential, stating it held estimated ore reserves worth £1,500,000, and that it “continues to be one of the most successful mines owned in England.” Earlier rumors of overstated ore reserves re-emerged in 1904, but Nichols issued a statement to assuage investors. In the early days of 1904, Bewick, Moreing & Co., had been in negotiations to buy out Frank Gardner’s interest to gain management of the mine, and purchased “38,500 of Gardner’s shares, costing an average of £1 7s. 9d.,” along with another 21,500 shares from other sources. Despite the company’s overall capitalization of £1,500,000, Bewick, Moreing & Co.’s purchase of Gardner’s interest came at a bad time.

The rumors had been correct: Ralph Nichols, the former general manager of the mine, had indeed been overestimating ore reserves to bolster stock prices. He had reported reserves at “a total of 401,677 tons for 502,096 ounces” of gold. However, when William Prichard and W. J. Loring inspected and assayed the newly acquired property, beginning in May 1904, they found that Nichols and his staff had dramatically overstated the reserves. They offered a new estimate that was thirty percent lower than Nichols’ calculations. It was a difference of 155,148 ounces of gold; furthermore, it appeared that either Nichols had lied, inflating his production totals by selectively milling the highest-grade ores, or he was over-
confident and incompetent when it came to mine valuation. Rumors swirled that Nichols’ underground manager, Michael Flynn, had been in communication with bearish London investors, and had been in league with them to drop the value of the Great Boulder Perseverance’s stocks when Bewick, Moreing & Co., assumed management, ensuring a tidy profit for bearish investors. It was equally Bewick, Moreing & Co.’s error, as “they had made a mistake in taking over the management of the property before inspecting it.”

Ore reserves dropped drastically with Bewick, Moreing & Co.’s estimation and valuation, from Nichols’ estimate of 401,000 tons to Loring’s much more conservative estimate of 139,000 tons. The ore grade decreased as well, from 27 dwt. per long ton in January 1904 to 14 ½ in October. However, Hoover’s firm had broad experience profitably processing low-grade ores. It was also a major producer on the Golden Mile, accounting for just under ten percent of Kalgoorlie’s gold production in 1904. It sat “over two of the strongest lodes on the Kalgoorlie fields,” and further diamond drilling indicated other rich lodes below 1,400 feet. Bewick, Moreing & Co. therefore had “every confidence that further ore bodies will be discovered.” They were hopeful that they could turn the property back to profitable production, but this was not to be the case. The firm had lost “approximately £27,000” in acquiring control of the mine, and its troubles were not over. Share values plummeted, and C. Algernon Moreing felt justified in selling their interest in the mine at half the price initially paid. Bewick, Moreing & Co., lost control of ten percent of the Golden Mile’s gold production due to the scandal. These multiplying scandals irked Hoover,

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77 “Great Boulder Perseverance Gold Mining Company, Limited,” The Economist (11 February 1905), 239.
proving that the vein of charlatanism and dishonesty in the gold mining industry was still rich and payable.

If the scandals of the Great Boulder Perseverance represented the human-factor in uncertainty of mining investments, then the Lancefield mine, five miles north of Laverton, represented difficult metallurgical issues. The company registered in 1904 to “acquire a property of the same name,” which contained 203 acres; its initial offering was 200,000 £1 shares. This capital quickly went to erecting a fifty-stamp mill and a cyanide plant. In December 1904, the mine held ore reserves of 222,606 tons, assayed at 34s 6d per ton, a rather rich ore. Working costs would average 18s 6d per ton, ensuring profitable extraction, and the Board of Directors estimated an annual profit of £50,000. Extensive drilling on the property indicated that it sat upon a rich and extensive lode. It seemed as if the Lancefield was a new, higher-grade property and a means of redeeming Western Australia from its low-grade stupor and tumultuous investment climate. Hoover and Govett sat on the board of directors, a promising sign for London investors. However, as exploration and development work continued, the ore changed character at depth into a sulpho-telluride ore containing large quantities of arsenic, complicating the metallurgical treatment of the ore.79

Within six months of their initial report to shareholders, problems began emerging with the treatment of the complex ore. The chairman of the board, R. J. Hoffman, reported “During the last six months all the skill and science of mining has been brought to bear to treat the ore by the ordinary methods of milling, concentrating, and cyaniding, but our extraction has remained at about the same figure since we first treated the sulphide ore—viz.

at 50 to 55 per cent of the gold content.” That inefficient extraction dropped the realizable value of the ore from 34s to “only 17s or 18s,” just about equal to the costs of treatment. Hoover inspected the Lancefield, and felt that the only way to remove the arsenic pyrites in the ore was to further complicate the treatment process by adding a roasting step, which required smelting works. The firm faced a dilemma: whether to invest in experimentation to find a process to separate the gold from the arsenic, or to erect a plant with roasting capability at a similar cost. They elected to erect additional treatment works, which they hoped would realize a “90 per cent. extraction out of ore going 38s.” per ton, and predicted a future profit of £5,000 per ton. To finance this project, the company issued further shares at 12s per share, for a total of £60,000 in additional capitalization.80

Even with new treatment equipment and technology, the Lancefield continued to face challenges in profitably treating its ore. It had to be frustrating, as there was a fortune in gold locked up in the ore by arsenic, but no clear way around it. By 1907, the “unique” plant captured 87 percent of the gold, but its monthly tonnage was low, only treating 7,000 tons per month. The board hoped for “between 8,000 and 9,000 tons, or . . . 100,000 tons per year.” It was only “when we achieve this figure that our costs will come down and our mine be considered as working.”81 Despite all of the money and technology poured into the mine, it only produced £110,211 in yielded gold value, out of a capitalization of £260,000. Share values sat at ¼ of a pound, and in October 1908, the Board of Directors reported that the mine had to “close down pending the perfection of our plant.” They were never able to “get the tonnage though which was requisite” for profitability, and suspended mining operations.

in July of 1908, at a loss of nearly £150,000. Hoover and Govett resigned from the board that year, replaced by “Moreing and another man.” The mine struggled for another five years, and then liquidated.82

These two failures in Western Australia illustrate the increasing complexity of gold mining in Western Australia. The boom years had gone down with the Wright scandal, and the investment opportunities of the downturn had passed as well. Managerial reforms and efficiency practices could only go so far, especially when dealing with capricious and impatient investors and recalcitrant ores. However, their market position was strong enough to withstand these failures. Beginning in 1903, Hoover and Bewick, Moreing & Co. began looking for further investment and mining opportunities in Australia. Hoover had tired of the cutthroat gold investment market and wanted more certain enterprises. He turned to an audacious project to mine an auriferous gravel deposit outside of Victoria on the one hand and a known quantity of base metal ore on the other.

The Consolidated Deep Leads

The scope of Hoover’s final gold mining project as partner in Bewick, Moreing &Co.’s illustrates his ambition and the resources at their disposal. The “Deep Leads,” a subterranean alluvial floodplain near Victoria promised huge profits from auriferous gravels, if the estimated twenty-five billion gallons of water inundating the deposit could be successfully pumped. This project demonstrates Hoover’s desire to evade the speculators and shenanigans of Western Australian gold investment and mining in search of a sure

project. The ultimate failure of the Deep Leads stung. Beginning in late 1904, after Bewick, Moreing & Co.’s failure to control the Great Boulder Perseverance and Golden Horseshoe Estates, Hoover turned to a massive alluvial gold deposit outside of Victoria. He oversaw the formation of Consolidated Deep Leads and the expansion of pumping operations, until pumping capacity reached twenty-two million gallons per day. It was likely the largest pumping operation in world mining history, yet it was unsuccessful in that the mines never produced enough gold to begin to pay expenses, and the mining companies went into bankruptcy. It was, in the words of George Nash, his “greatest disappointment.”

The idea was alluring: there were millions of pounds sterling of gold sitting in gravel, and not trapped in some recalcitrant and expensive-to-treat ore such as the Lancefield’s arsenic-contaminated mess, or in some scheme of speculative investment and misreported ore reserves. Earlier mining operations had produced £7,000,000 in gold upstream in the subterranean deposit, and this attracted the attention of Whitaker Wright’s financing group. They formed Moorlort Goldfields, capitalized at £700,000 and the Loddon Valley Goldfields, capitalized at £750,000. They spent approximately £400,000 on shafts and pumping equipment, out of a total capitalization of £1,450,000. When Wright’s financial house of cards collapsed, the two concerns ran out of operating capital and went into receivership, as he had been siphoning capital out of all of the companies under his umbrella to maintain the veneer of liquidity. In 1903, Francis Govett’s brokerage house and Bewick, Moreing & Co. approached the remaining “irate” shareholders of Moorlort and Loddon Valley, and proposed to incorporate a new mining company, the London and Globe Deep Leads Assets, Limited, which was soon renamed to Consolidated Deep Leads. Bewick,

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83 Nash, Hoover: The Engineer, 307-308.
Moreing & Co. raised £37,500 in working capital for the project.\textsuperscript{84}

It should have been a straightforward pumping operation, as according to J. H. Curle of the *Economist*, “water rather than gold is the real problem.”\textsuperscript{85} But, the water was a real problem. Initially, Hoover’s pumps moved 9.5 million gallons of water per day, lifting about 38,000 tons of liquid up several hundred feet of shafts. As it was basically a thirty-five-mile-long subterranean lake, all of the mining concerns benefited from any pumping operation, and Bewick, Moreing & Co. moved to “federate all the interests” into one single combination, “with the object of pumping the leads dry.”\textsuperscript{86} Hoover contacted his former mentor at the U.S. Geological Survey, Dr. Waldemar Lindgren, and recruited him to survey the deep leads. Lindgren had experience surveying and valuing similar alluvial deposits in California, and Hoover respected his opinion. After all, Lindgren was “the head of the Geological Survey at Washington, of the Western Division of the United States,” a renowned economic geologist of broad experience.\textsuperscript{87}

Lindgren arrived in Victoria in September 1903, and surveyed the alluvial deposit for nearly four months. Hoover had “£400,000 at his command to invest in the industry,” and he met with Lindgren to discuss his survey. Aside from the pumping capacity already under Hoover’s control, other proximate mines pumped similar daily quantities, “so that within a radius of seven miles 22,000,000 gal. of water are pumped daily.” However, this massive


\textsuperscript{85} “Mining In Australasia-VII,” *The Economist* (29 July 1905), 1231.


operation barely dented water levels in the leads. More pumping capacity was necessary, and more properties and firms had to be acquired or controlled to contribute to the overall operation. When Lindgren’s report was published in June 1904, it seemed promising. He reported that a great amount of gold had already been extracted upstream of the Consolidated Deep Leads’ properties, and the deposit “ranged up to 1,000 ft.” in width, with a thickness of three and a half feet. Lindgren reported that the Moorlort property, comprising 3,000 acres, sat above an estimated “£1,329,850” in payable auriferous gravel, for a net profit between £300,000 and £400,000, depending on development and working costs. Loddon Valley sat on approximately £1,700,000, and Lindgren thought “that one-third to one-fourth will be available for dividends” over a fifteen-year life. This was an incredibly optimistic report.

Hoover worked to expand the pumping capacity of all of the properties of the Consolidated Deep Leads. In 1906, Loddon Valley’s pumping capacity increased to twelve million gallons per day, or 4.3 billion gallons per year. But this massive increase in pumping capacity cost working capital, and the water needed to be removed before any payable gravel could be accessed. Lacking sufficient working capital, the Moorlort property had to suspend operations late in 1905, and had to reconstruct in 1906 for further capitalization. The beginning of the end for the Deep Leads project came as the Loddon Valley began accessing its gravel, and found it to be far less valuable than Lindgren’s report anticipated. All of the firms were deeply indebted, and despite a small infusion of working capital from the Victoria government and an assessment on stockholders, the enterprise failed. Loddon Valley

abandoned its operations in late 1908, and Moorlort surrendered its lease in 1909. At least a million pounds went into funding the operations, to no avail. In a stinging disappointment, Hoover and Bewick, Moreing & Co. discovered that they could not profitably move a subterranean river, despite their engineering acumen, financial resources, and technical capabilities.90

_Leaving Bewick, Moreing & Co._

A central theme to Hoover’s ambition and career with Bewick, Moreing & Co. was his ruthless drive for efficiency in order to mine profitably and pay dividends to shareholders. This created money in the London and world economy, as Bewick, Moreing & Co. sold its refined gold to the British treasury, which issued currency and allowed for the shareholders to receive dividends and circulate the gold-backed currency into the economy. However, as the cases of the Great Boulder Perseverance and the Golden Horseshoe proved, Hoover’s attempts at amalgamation and efficiency could be derailed by financial machinations in the stock market and by misrepresentations by engineers. Similarly, the geologic realities of the Lancefield mine and the Deep Leads proved to Hoover that certain obstacles could not be profitably overcome. His engineering success in Western Australia were most evident at the Sons of Gwalia, which was largely outside of the insane speculation of Kalgoorlie’s Golden Mile, and was an undeveloped, extensive, low-grade lode only able to be profitable when worked efficiently. His financiering and combinative successes of the Oroya Brownhill and Lake View Consols came in the midst of an economic downturn, reaffirming the classic economic idiom of buy low, sell high. Indeed, Bewick, Moreing & Co.

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indirectly benefited from the malfeasance, corruption, and downright fraud of Whitaker Wright’s financial and mining empire by broadening their holdings and market share in Western Australia. Hoover had worked continuously for Bewick, Moreing & Co., from 1897, and through management practices had returned enormous value to London shareholders and his firm, but the outside influences that he could not control irritated him. For the rest of his career as a mining engineer, he pursued projects with a nearly guaranteed return on investment, and in more marginal and less speculative fields of mining, especially base metals.

While he was still engineering partner at Bewick, Moreing & Co., Hoover began his transition away from the speculative mess of gold mining, and toward more reliable base metals, in this case zinc. The Zinc Corporation was another matter involving a massive capital outlay, involving the purchasing of zinc-laden tailings surrounding the famously rich Broken Hill silver-lead-zinc mines in New South Wales. With earlier metallurgic techniques unable to extract the zinc, tons of the base metal sat in piles. Bewick, Moreing & Co. formed a subsidiary, the Zinc Corporation, capitalized at £350,000, which bought the six million tons of tailings from the Broken Hill mines. After experimenting with four metallurgic processes and requiring additional stock offerings and debentures, Hoover’s firm met with success, and the Zinc Corporation paid its first dividends in 1909. Much as mining the deep levels of the Transvaal was only possible with a huge capital outlay, the treatment of Broken Hills’ tailings could only be accomplished through major investment. After several mergers, the Zinc Corporation persists today as Consolidated Zinc, publicly traded on the Australian Securities Exchange. Hoover’s personal investment in the firm and professional engineering
and promotion turned the piles of zinc-rich tailings into a fortune.\textsuperscript{91}

By this point, Hoover had soured on his partnership in Bewick, Moreing & Co. He had been dragged in front of courts during the Zhang Yi trials, the A. Stanley Rowe defalcation, and the Great Boulder Perseverance affair, distracting him from his engineering and combinations. He resented union miners for demanding fair wages which undercut his cost-cutting measures. Labor-friendly politicians targeted his firm and his operations directly. C. A. Moreing’s financiering schemes had failed to secure majority control over Western Australian gold production, and personal friction between the two men increased. Many of the promising mines in Western Australia had failed at depth, with ore grades declining or becoming more complex and recalcitrant, and therefore unprofitable. New lodes were not being discovered and mined, as government regulation discouraged prospecting to promote increased employment. Indeed, Hoover’s friend and The Economist’s mining correspondent, opened a 1906 article with the lines “The mining outlook in West Australia is not good. For some years past there have been almost no new mines discovered, and the exhaustion of the known mines, due to increases of plant, is now rapid. It is, indeed, doubtful if any of the newer mines will prove of much value.” The district had bottomed out.\textsuperscript{92}

Hoover was physically exhausted from his years of constant work, and suffering from malaria following an inspection of a silver-lead deposit in Burma. At the time of his resignation, Bewick, Moreing & Co., operated around the world, controlling “over 40 different mines, and employing 25,000 or 30,000 labourers.” He also clashed with Moreing, calling him a “wholly impossible partner.” Effective 30 June 1908, Hoover sold his

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\textsuperscript{91} Nash, \textit{Hoover: The Engineer}, 312-317; 356-370; Chandler, \textit{The Visible Hand}, 287-314.
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partnership interest in Bewick, Moreing & Co. to W. J. Loring for £30,978, plus “two years average profit” and an allowance of “six months actual profits in addition to paying me the cash which I had invested in the firm.” It was, altogether, “about £45,000.” He established an independent office at “62 London Wall, E.C., and started into business on my own account, resolved to devote myself to mining for the profits I could make out of the production of metals.” Hoover retained his directorships on the Chinese Engineering and Mining Company, and on other “various important companies” that would ensure a continued income. He was worth approximately $425,000, a monumental sum for a thirty-four-year-old orphan from Iowa, and a fortune that would only grow in the coming years.93

Ironically, the self-styled “Great Engineer” turned increasingly to the world of financiering, drawing on his contacts in the London metals market, especially Francis A. Govett and Lionel Richardson. He established an office in San Francisco, hoping to return to the American West, and one in New York City at 71 Broadway. He formed a profitable friendship and selective business association with another prominent mining engineer, A. Chester Beatty of the Guggenheim Exploration Company. He began lecturing at Columbia School of Mines, and at his alma mater, Stanford University, combining these lectures into his 1909 textbook, Principles of Mining. With Lou Henry doing the bulk of the difficult translation work from the original Latin, Herbert worked on the first English-language translation of the 1553 mining tome, De Re Metallica, where his technical knowledge of mining and metallurgy was essential to deciphering the techniques of medieval Central European practices. In this later phase of his mining career, he became a respected public

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93 Hoover, “Information for Biographers,” 16-19, Pre-Commerce: Subject, Box 46, HHPL; Nash, Hoover: The Engineer, 380-383.
intellectual, as addressed in Chapter 10 below. He served on the Board of Regents for Stanford. He invested in mines in Russia, Nicaragua, Japan, Madagascar, Korea, Romania, and in oil in California and Peru, as well as other concerns. He had a global reputation as a competent, and more importantly, profitable engineer and financier.\footnote{Nash, \textit{Hoover: The Engineer}, 384-404; Nash comments extensively on Hoover’s post-Bewick, Moreing & Co. career, especially his interests in Russia, Burma, and the oil business in chapters 20-22.}

When war broke out in Europe in 1914, Hoover was in London, and began his career as a humanitarian. He had been lobbying European governments, especially those of Great Britain and Germany to participate in the 1915 Panama-Pacific International Exposition in San Francisco, as well as tending to other business concerns. Hoover saw the emergency in Europe, and reacted immediately, forming the American Relief Committee to evacuate U.S. citizens. He effectively seized the lobby of the prominent Savoy Hotel, and called upon his engineering contacts to begin distributing relief and coordinate evacuations by purchasing steamship tickets \textit{en masse}. He “dealt with stranded Americans, some 160,000 of them.”\footnote{Hoover, “1914,” Pre-Commerce: Subject, Box 46, HHPL} After the evacuation of U.S. citizens, Hoover formed the Commission for the Relief of Belgium (C.R.B.), beginning his reputation as a humanitarian. His management of food supplies for civilians caught in the war-torn European mainland saved millions from famine. If his engineering and financiering career made his fortune, then his humanitarian career made his international reputation, and catapulted him into national prominence in the United States, first as President Woodrow Wilson’s director of the U.S. Food Administration, and then as program director for the American Relief Administration which fed tens of millions of people in war-ravaged Poland and revolution-torn Russia. He famously declared “Twenty million people are starving. Whatever their politics, they shall be
His career as a humanitarian thrust him into politics, with Warren G. Harding appointing him as Secretary of Commerce. In 1928, he won election as the 31st President of the United States. Many other authors cover Hoover’s political career, but his mining engineering career catapulted him into politics and prominence. In my assessment, few presidents have had as colorful a pre-presidential life and career as Herbert Hoover (perhaps Theodore Roosevelt is his closest intellectual colleague), but Hoover was the first U.S. President to have never held elected office or serve as a general officer until his ascendency.

Conclusion

An efficient monopoly requires both vertical and horizontal integration of the industry and controlling an overwhelming majority of the resource. Bewick, Moreing & Co.’s novel resources were efficiency practices and financing, but it also extended to controlling mines and treatment works, mining supplies, and expertise. In Western Australia, Hoover’s management and the reputation of Bewick, Moreing & Co. led to control of fifty percent of the province’s gold output in June 1904, but this was fleeting, lasting only a few months. Bewick, Moreing & Co.’s vertical integration in Western Australia involved directing supplies in Fremantle, mines on the Golden Mile and throughout the province, milling and treatment plants Bewick, Moreing & Co.’s market position was strong enough to withstand the decline of ore grade in Western Australia, a major defalcation by one of its partners to the tune of

96% As quoted in Jeansonne, *Herbert Hoover*, 143.
£170,000, and the routine challenges of mining operations on the other side of the planet in
the era of the telegraph and the steamship. Hoover’s efficiency practices and engineering
management led to new standards for Western Australian mining firms, while furthering
Bewick, Moreing & Co.’s dominant position in mining investment in the Antipodes, Burma,
and China. The efficient monopoly of Western Australia allowed Hoover and his associates
“a ready pool of investment capital,” per Mouat and Phimister, “and consequently the
opportunity to gain control of various mining properties, in Australia and around the world.”
The monopoly held by Bewick, Moreing & Co. was not one of direct ownership, but of
finance, expertise, and management; its tentacles spread from London to the Pacific Rim and
throughout the world.98

During his career as a mining engineer for Bewick, Moreing & Co., Herbert Hoover
was highly profitable as a partner. He pushed the firm away from financiering and
speculation, and from its marginal market position to become the largest overall interest in
Western Australia. The mines under his direction contributed millions of pounds sterling to
the British Treasury and world economy through dividends paid and investments made. His
firm also contributed to the mining economy in Western Australia through wages paid and
supplies purchased, but this was controversial and dictated by its market position. His efforts
were not always successful, but nothing in industrial gold mining was. Ore bodies declined at
depth. False reports of ore reserves spurred market speculation and controversy. Profitable
treatment was not always possible, especially as other elements recalcitrantly bonded to the
valued gold atoms. Personnel proved problematic, especially in the case of A. Stanley Rowe.
However, Hoover’s career with Bewick, Moreing & Co. was a success, and he made his first

fortune as partner. His reputation as a businessman, pragmatic engineer, innovative financier, and rigorous manager led the mining journalist, Walter R. Ingalls, to declare Hoover as one of “our generals” in the ranks of mining engineers, alongside of Daniel Jackling and John Hays Hammond.99

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On April 17, 1901, Richard Pennefather Rothwell died of stomach cancer. *The New York Times* prominently ran his obituary, calling him “an eminent mining engineer and writer on industrial topics.” He cofounded the American Institute of Mining Engineers in 1871, served as its president in 1882, and was a fellow of the Geological Society of London, the Imperial Institute of London, the Royal Statistical Society of Great Britain, the Federated Institute of Mining Engineers of Great Britain, the Society of Chemical Industry of London, the American Society of Civil Engineers, the Société de l’Industrie Minerale, the Geological Society of France, the Australasian Institute of Mining Engineers, and the New England Free Trade League. In his leisure time, he was similarly a member of the “Lotos, Reform, Hardware, and Larchmont Yacht Clubs” of New York City, where he resided until his death.

Rothwell was the lead editor of *The Engineering and Mining Journal*, author of the annual *The Mineral Industry* review, as well as the “principal stockholder” of the Scientific Publishing Company, the *E&MJ’s* parent corporation. He also had practical experience as an engineer, and after a firedamp explosion Rothwell led “a party of brave men who descended a colliery shaft. . . to rescue the lives of others at imminent risk of their own.” He “had charge of the statistics of gold and silver for the United States Census in 1890,” and at the 1898 Paris Exposition, the Société d’Encouragement pour l’Industrie Nationale de France awarded a gold medal for his journalism and statistical work. In his obituary, Rossiter W. Raymond, long time Special Contributor to the *E&MJ*, claimed “out of a wide familiarity with technical journals of its class, that I do not think it now has, or has ever had in the past, among such
periodicals, an equal in the world for combined commercial and technical value.”

Before his passing, Rothwell worked out of an office at 243 Broadway, in New York City, where he relocated the *E&MJ* in late 1894. On foot, it would have taken him fewer than ten minutes to walk to the New York Stock Exchange, four-tenths of a mile away. Every day, upon leaving his office, he stood directly across the street from City Hall. He became editor of the *E&MJ* in 1874, and using his technical and statistical acumen, turned a small, indebted professional journal into a recognized authority on matters of mining and investment. In contrast, the *Wall Street Journal* did not begin publication until 1889, and the first calculation of the Dow Jones Industrial Average was not until 1896. Three days after Rothwell’s death, the *Wall Street Journal* ran an ad for the *E&MJ*, claiming that “1½ Cents a Day Will keep you reliably informed about the good mines and the Fakes,” and proffered subscriptions for an investment of five dollars a year. *The New York Times*, *The Washington Post*, *The San Francisco Chronicle*, and *The Economist* frequently featured reports and commentary from the *E&MJ* on matters regarding mining and mineral movements in the United States and abroad. Investors made decisions based on the information in the *E&MJ*. Through its reporting and location, the *E&MJ* positioned itself in the financial core of the industrial-capitalist world economy.¹

Rothwell’s journal functioned for the benefit of professional mining engineers, for investors and bankers interested in shares of mining corporations, and for the distribution of

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mining intelligence to other major media outlets. Specifically, the *E&MJ* operated in four ways. First, it was a source of information on new mining technologies, which, depending on the nature of the deposit, appealed to the mining engineer for the purposes of extracting and treating the ore while marketing these processes for the patent holder. Second, it offered information from the gold fields in several forms: abstract production totals from both individual mines and the mining district as a whole; details on the individual workings of specific mines; and, geologies and histories of specific mining districts, detailing the nature of the ore deposits and potentials for future development. Third, the *E&MJ* listed stock prices for publicly traded mining corporations around the world from the stock markets of London, Paris, New York, San Francisco, Boston, and Salt Lake City. It maintained special correspondents and branch offices in these cities for the sole purpose of reporting on the stock movements and associated financial and political developments of the week. Finally, the editors frequently editorialized on matters of interest to mining engineers and investors, providing a staunchly pro-mining commentary on a number of issues including labor disputes, monetary policy, racial ideology, technology, and politics, both national and international. Furthermore, the journal welcomed letters and other contributions from mining engineers on similar topics, while offering reviews of new technical writings on the subject of mining. The *E&MJ* functioned as a source of information centralization and distribution, thereby translating complex global information into a legible form that reflected the hegemony of the mining industry and the imperial financial power of the British Empire and the United States.³

This chapter is broken into several sections. The first section examines the methods used in examining such a bulk of materials and provides a brief historiography of industrial mining, as well as economic history and theory. The subsequent sections examine the content and structure of the *Engineering and Mining Journal* (*E&MJ*), from the front page of each issue to reports from working mines and shareholders meetings. The final three sections look at the undercurrent of racialist discourse throughout the journal and its sustained assumption that mining defined White civilization, the occurrences and authored pieces of prominent mining engineers John Hays Hammond, Hennen Jennings, and Herbert Hoover, and a conclusion.

**Methodology, Background, and Theory**

Due to the sheer scope of the *Engineering and Mining Journal*, I attempted to gain a sense of the journal’s overall character during the key years between 1895 and 1901 through three specific volumes: volume 59, which covers from January through June of 1895; volume 65, covering the first half of 1898; and volume 71, which similarly covers January through June of 1901. These three volumes contain over two thousand pages of material, and seventy-eight individual issues. These volumes are available through Google Books, the Hathi Trust, or the Internet Archive, as are many other volumes from the founding of the journal through the 1920s. Given such an immense volume of materials, my approach was to keyword search through Adobe reader for topics and terms of interest. Hence, the results are a sampling, and cannot be construed as a detailed history of the *E&MJ*, but rather as an analysis of several sections of the journal. I specifically focused on the front pages of the issues, the “Foreign Mining News” section, correspondence from the London Stock Exchange, relevant letters to the editor and editorials, contributed articles, and reports from
foreign working mines. Many of the more esoteric editorials and articles are detailed in the comprehensive index that accompanies each volume. Furthermore, I concentrated on gold mining, rather than casting a broad net for all mineral resources, due to the primacy of the gold standard in the international monetary regime. Similarly, I largely limited my research to gold mining within the British Empire, because, according to sociologist Giovanni Arrighi, they were the financial and military hegemon of the long-nineteenth century.  

The founding and professionalization of the E&MJ parallels the professionalization of the field of mining engineering in the United States, with an interlocking directorate between the journal and the American Institute of Mining Engineers (AIME). Mining in the American West quickly evolved beyond the mythical independent miner and prospector to an industrialized, heavily capitalized, and professional practice revolving around trained mining engineers. This industrialization and professionalization of the American mining industry began in California and Nevada, largely due to the depletion of placer deposits in the Sierra Nevada range, prompting miners to seek other sources of gold, notably in lode deposits. 

As new gold discoveries in the American West declined in the later years of the nineteenth century, mining engineers and capital transcended national borders, seeking new gold fields and opportunities for profitable investment. Most notably, mining engineers entered into the British Empire, and used its colonies, transportation and commercial infrastructure, accumulated capital, and military force for their professional ends. Mining

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engineers exploited gold deposits in British Guiana, India, Southern Africa including Rhodesia and the Transvaal, Australia and New Zealand. These mining engineers and investors needed a network for communicating technical and financial information, and the *E&MJ* filled this niche.

A brief word on economic theory. Production, movement, and centralization of gold supplies in support of the gold standard were major forces in the late nineteenth century, and its economic geography reveals much about the nature of *fin-de-siècle* international capitalism. Indeed, the “institution of the gold standard proved crucial,” according to Karl Polanyi, who argues its downfall was “the proximate cause” of the Great War and the collapse of European civilization beginning in 1914. As previously mentioned, Arrighi considers the British Empire as hegemonic, both financially and militarily during the long-nineteenth century, largely due to “the London-centered cosmopolitan networks of *haute finance.*” Karl Marx realized the utility of gold-backed currency as the “universal equivalent” that facilitated international capitalism. Immanuel Wallerstein, pioneer of World-Systems Theory, argues that the “world-system” is “the only kind of social system,” defined by a “single division of labor.” He further argues that the British Empire was the center of the “world-economy,” with three structural positions: “core, periphery, and semi-periphery.” Economic geographer David Harvey argues, “Capitalism is necessarily technologically dynamic,” while the “struggle to maintain profitability sends capitalists racing off to explore

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all kinds of other possibilities,” including new mineral deposits throughout the colonial periphery. All of the aforementioned theorists stress the mobility of capital, and its tendency to accumulate at the center based on extraction from the periphery. How does this relate to the *E&MJ*?7

Within each issue of the *E&MJ*, the editors paid substantial attention to the international movement of gold from the mines in the periphery to the banks and governments at the core. Once located and surveyed, auriferous ore enters the commodity chain before the mining engineers and miners even begin extraction. The *E&MJ* (and other publications) went as far as calculating the potential yields for the various districts on an annual basis, as an increased supply of gold meant a large supply of gold-backed currency necessary for economic growth and the extension of credit. It similarly determined the lifespan of goldfields, assuring future returns on investment. For example, in 1898, the *E&MJ*’s London correspondent reported, “The gold output of the Witwatersrand in December was . . . the largest ever reported in a single month. . . equal to 2,483,600 oz. fine gold, or $51,336,000 in value.” However, the outbreak of hostilities during the Anglo-Boer War effectively stopped the gold production of the Transvaal, and the *E&MJ* reported, “the gold situation in 1900 was unprecedented. It has never before happened that the output of a great gold producing country has been cut off entirely,” and that “Instead of $100,000,000,” the projected output, “the Transvaal appears in our table for only $6,845,046.” Within the mining and investment circles, the main fears regarding the Anglo-Boer War were precisely

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the contraction of the world’s gold supply due to mine shut downs.\textsuperscript{8}

Gold mining in the 1890s and 1900s was a global industry, buttressed by the force of the British Empire. The \textit{E&MJ} was the American clearinghouse for information regarding mining and mineral investment. The next several sections examine the information found in the weekly front pages and staff editorials written by Rothwell and Raymond, relevant letters to the editor and contributed articles, the function of the “Foreign Mining News” section, the role of the special correspondent to the London Stock Exchange, reports from working mines, the Victorian racialist rhetoric within the \textit{E&MJ} and the related rhetoric tying the mining industry to the fate of western civilization.

\textbf{Front Pages and Editorials}

The year 1895 opened with an announcement from the \textit{E&MJ} that “as the world-wide representative of this industry,” it had moved its offices “from the house it had occupied for a quarter of a century to its present quarters in the Postal Telegraph Building.” While this sounds like a major transition, in reality, it was a move of roughly six-hundred linear feet. Despite the limited distance of the move, it was a major upgrade, as the \textit{E&MJ} now had the space to devote to an open library containing “a great number of papers from the mining districts of this and other countries, and books of reference which can be consulted.” Friends of the journal were “cordially” invited to “make use of them.” Three weeks later, Raymond lamented, “the enforcement of the law in Brooklyn” regarding a streetcar workers’ strike, “has been greatly hindered by ill-timed expressions of sympathy with the strikers on the part of citizens who should have known better.” Now, a new office

\textsuperscript{8} “By Cable,” \textit{E&MJ} 65 (15 January 1898), 89; “Gold and Silver in 1900,” \textit{E&MJ} 71 (January 5, 1901), 10.
and some casual anti-union sentiment from a journal directed to engineers, management, and investors should not attract undue attention, except for the economic circumstances surrounding these statements, notably the reverberations of the Panic of 1893, and of the general tone of the front page surrounding issues of unionization and bimetallism in the subsequent issues.9

In early February, the *E&MJ* commented on “The critical business situation,” gripping the nation in midst of a depression, and noting that the flight of gold from American banks to Europe threatened both the government’s and the major banks’ supply of gold, while lauding, “The determination to support the credit of the Government and to borrow gold at once under the existing powers conferred upon the Executive [which] will do much toward restoring confidence.” The following week, Rothwell penned an editorial applauding the actions of the presidency in restoring commercial confidence, as “there is no danger of our Government drifting away from gold payments or failing to keep faith with its creditors.” However, Rothwell did not think these actions were quite enough, and advocated an “International Monetary Clearing House system” based on a universally recognized bimetallic standard that “would prevent the shocks which now occur from time to time.”

Given that the Panic of 1893 sent silver prices plummeting in the United States and gave employers the justification for wage reductions, industrial unrest followed the stock market crash, and like the Brooklyn streetcar strike, the *E&MJ* voiced its perspective. In the midst of the closure of the Hunter Mine in Mullan, Idaho, due to Miners’ Union demands for the “full Union scale of wages,” the *E&MJ* advocated “heroic measures” to reign in “the

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tyranny” of the “lawless elements.” Similarly, during a coal miners’ strike in Pennsylvania, the *E&MJ* warned the union against “ill-advised and foolish strikes for higher wages or further concessions.” While the *E&MJ*’s front-page coverage of foreign matters was necessarily limited in 1895 due to the Panic, its voice on matters of anti-unionism and monetary policy exhibits their staunchly pro-business perspective.

The gaze of the journal returned more fully to the foreign in 1898, due to several interlocking circumstances. Markets had largely recovered from the Panic of 1893, while foreign mining development opened new mines to productivity especially in Western Australia and the Transvaal. Indeed, the world’s production of gold since 1895 had increased rather dramatically, from $196,995,741 in 1895 to $238,616,168 in 1897, predominantly due to the expansion of deep-level mining on the Rand. Finally, political developments in the world arena mimicked some of the uncertainty of the Panic of 1893, and the *E&MJ* directed its gaze at both the developing imperial conflict between the United States and Spain and to the re-election of President Kruger in the Transvaal, part of a dispute that contributed to the outbreak of the Anglo-Boer war. Indeed, the first issue of the *E&MJ* for 1898 opened with an editorial entitled “The Foundations of Prosperity,” followed by production statistics, which showed “how nearly equal in gold output” the United States and the Transvaal were in 1897.

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Developments in the British Empire characterized much of the reporting over the next several issues. Transvaal deep-level gold mines, “such as the Robinson, The Ferreria, the Simmer and Jack” and others “were able to return to their stockholders as profits a sum equal to 28.5 per cent of the gross output.” On that same front page, the editors discussed ore shipments from the silver-lead-zinc Broken Hill mine complex in Australia, as well as demands for American mining machinery for use in Siberia. The subsequent issue reported exports of American-made electrical machinery to the Transvaal, a result of further development. A few weeks later, the *E&MJ* reported on an appropriations bill in Congress providing for two new consulates, one in Dawson City near the ongoing Klondike rush, and the other in Pretoria, which “should have been in existence long ago, in view of the number of Americans who are living and working in the Transvaal, and of our large present and prospective trade interests in that country.” The common theme running through these articles involves the *E&MJ* communicating about commodity movements to and from the remote resource colonies. In the first case, the dividends paid reflect the extraction of gold and its distribution as money to London shareholders, while the machinery exports reflect a reinvestment of corporate profit for future development and subsequent profit. The consulates, on the other hand, indicate both the ties of the mining industry to the government and diplomatic apparatus and of the government’s involvement in the welfare of commercial U.S. citizens abroad.\(^\text{13}\)

In 1901, the *E&MJ* opened its journal on a laudatory note, complementing its readership and congratulating “them on the completion of a successful year that has seen the

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mineral industry of the United States and the allied industrial arts make a further advance toward undisputed supremacy among the nations of the earth.” It then commented on the substantial gains of gold-producing nations despite the conflict in South Africa, which lead to a slight decrease in total production, and the continuing ramifications over the failure of the London & Globe Finance Corporation, run by mining tycoon Whitaker Wright, especially its effects on the London stock market. Later issues celebrated the “entrance of the Commonwealth of Australia into existence,” and predicting, “great growth and prosperity before the new Commonwealth, and its mineral industry will contribute a full share of the gain.” Further down, its interest shifted to the paradox of the Colar gold fields in India, and the Indian government’s purchase of gold for monetary purposes. Milling and refining facilities on the subcontinent were not equipped to process auriferous ore, and the British mining interests shipped the ore to London rather than processing it for sale to the government mints in Bombay. Revealing the journal’s bedrock assumption that the rules of imperial capitalism should govern the globe, in an editorial, the E&MJ chauvinistically offered the Indian situation as a “curious instance of the difficulty which governments seem to experience in conforming themselves to commercial methods.”

In commenting on the unrest in the Transvaal due to the Anglo-Boer War, the E&MJ issued several statements, highlighting the remorse of investors in light of restricted dividends from Witwatersrand mines, the delayed reopening of several deep level mines, and the loss of refined gold from the Robinson Deep during the Boer occupation of the Witwatersrand, “Presumably. . . appropriated to the uses of the Transvaal government.” It

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further lamented the military rule of the Rand as “hardly compatible with mining and milling operations of a large scale,” as the “outlook for large production is not an encouraging one as yet.” The common grounds of the front-page reports for 1901 portray a mining industry, that despite a major conflict in southern Africa, a major scandal in the London investment markets, and the American occupation of the Philippines, was both proud of its production increases over the past several years and anxious to continue development in the affected regions. It went as far as to feature an article on the opening of the 1901 Pan-American Exposition at Buffalo, “complete with a mining exhibit under the able charge of Dr. David T. Day,” an appeal to returned prosperity under international trade.15

Imagining a mining engineer, banker, or investor viewing the E&MJ’s weekly issue demonstrates the importance of the front material, most of which was functionally editorial in nature. Even if they were interested in a specific mineral, region, or corporation, they likely skimmed the front-page editorials prior to locating articles of interest in the table of contents, featured on the bottom left of the page. For the general reader, the front page conveyed the breaking news of the week from around the world. The front material was effectively the gateway to the rest of the issue, and by positioning the informed editorials at the forefront of the journal it demonstrated the perceived sense of authority of the editors on matters of mining, finance, foreign affairs, and politics.

Contributed Articles

The E&MJ encouraged correspondence from other professional mining engineers as

a means of communicating developments from afield. Often, this consisted of brief letters to
the editor; however, more formal submissions from distinguished engineers often made
print. These articles highlight the major developments and investments within the field, as
well as reflecting the international travels of independent mining engineers. Foremost among
contributors was Thomas A. Rickard, who, by his own accounting, “averaged 35,000 miles a
year, including two voyages around the world,” between 1889 and 1902. Rickard was a well-
respected geologist and mine inspector, and later became president of the American Institute
of Mining Engineers and editor of the *E&MJ*. In fact, Rickard’s contributions on Australia
constitute a plurality of submitted articles on foreign mining districts, and it is notable that
major industrial development of the Australian goldfields occurred simultaneously and
subsequently. Geographically, seven of the contributed articles reported on Australian
developments, with two articles focusing on the goldfields of Western Africa, and one
exchange between Rickard and John Hays Hammond, largely to preserve their reputations in
light of a Colorado mining controversy surrounding the Stratton Independence mine. The
geographical distribution of submissions is likely due to the volumes analyzed, as more
articles featuring the Transvaal likely appeared earlier, simply due to the time of
development.\(^\text{16}\)

In 1895, Rickard’s articles dominated the foreign contributions. He inspected the
deep level mines in Bendigo, New South Wales, and commented on the workings, geology,
corporate structure, engineering controversy, government intervention in mining—described
as “that tendency toward socialism”—and the disparity between extensive subsurface

\(^{16}\) Spence, *Mining Engineers*, 327; T.A. Rickard, letter to the editor, *E&MJ* 71 (12 January 1901), 47; John Hays
Hammond, letter to the editor, *E&MJ* 71 (12 February 1901), 47.
development and poor surface infrastructure in the district, “wherein the primitive barbarism of the sledge hammer and hand-feeding are still retained.” The following week, he commented on the situation in the Western Australian goldfields, warning American miners against traveling to the district and contending, “No persons should go without purchasing a return ticket. When they get there they will find themselves in a treeless desert broken by barren ridges,” and plagued by a shortage of drinking water and “Inferior beef.” Despite the offers of high wages, Rickard warned, “No amount of enthusiastic chatter about the mining districts of Australia or Africa should make an American forget that in neither of them is there a mineral region which can compare with the Rocky Mountains in the diversity and richness of its resources.” The other contribution for 1895 came from John Plummer, and detailed the production totals of Australasia in 1894, with brief comments on production history since 1874, notable districts and mines, government policies and total production.\footnote{T.A. Rickard, “Mining at Bendigo, Australia,” \textit{E\&MJ} 59 (12 January 1895), 29; T.A. Rickard, “The Gold-Fields of Western Australia--A Caution to American Miners,” \textit{E\&MJ} 59 (19 January 1895); John Plummer, “The Australasian Gold Yield of 1894,” \textit{E\&MJ} 59 (2 March 1895), 199-200.}

Similar to 1895’s contributed articles, in 1898 Rickard wrote two-thirds of the total, both on Australia. The outlier came from George Bancroft, and was an abstract from a paper presented at the annual meeting of the American Institute of Mining Engineers. Bancroft’s article was extremely technical, detailing the geology of the region, the mineralogy of the gold deposits, the methods and practices of treating the refractory ores, working conditions and pay-scales, and the logistical difficulties of obtaining fresh water, timber, and coal for the working mines. Similarly, Rickard’s article on “indicative minerals” discussed the occurrence of minerals alongside of auriferous ore, and possible correlation to both the grade of the ore and the depth of the deposit. While he admits that dependence on indicative
minerals for valuing a mine is based upon “an old scientific untruth,” he argues, “The experience of certain mining districts has proved that gold is notably accompanied by particular minerals,” and proposes a discussion within the profession. In contrast, Rickard’s other article of the year is a cynical polemic on “the bogus financiering and the charlatan engineering which were the motive force behind the West Australia boom of 1895,” and the “monumental foolishness” of the investment, including a mine that produced £30,000 of gold, was sold for £180,000, and subsequently floated on the London market for £700,000. “Of course,” he lamented, “mining engineering as a profession, suffered severely because of the antics of the charlatans.”

In contrast to the focus on Australia in the previous two volumes, the 1901 contributions came predominantly from West Africa, as several corporations financed surveys into the Ashanti region. One article, in the form of a letter to the editor from Frank Owen of Akrapong, Ashanti, detailed the surveys of “experienced American engineers from the Rand, Mr. Louis Webb being in charge.” Along with reporting on the surveys, Owen commented on the operations of the Ashanti Gold Fields Corporation in mining and milling, and on the European-staffed mint, with that corporation having “crushed 5,000 tons for a yield of 12,000 oz. of gold,” a particularly rich ore. Owen concluded with comments on the local climate, especially the dangers of malaria, and what he calls “backwater fever. . . after you have had an attack of this it is high time to quit.” Indeed, Owen paraphrases an unnamed Irishman in attributing the cause of death for foreigners: “They eat too much, and

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they drink too much, till they die. Then they write home and say that the climate killed them.”

Given the expansion of the district, the *E&MJ* commissioned a second report with much more technical detail, seeming to appeal to investors specifically. It details the geography of the region, the difficulty in transporting supplies to the interior, available rail and telegraph infrastructure, the geology and mineralogy of the districts and ores, and calling for managed surveying and developments due to the high costs of ore extraction. The largest issue the correspondent highlights is the perceived racial inferiority of the Fanti, who “do not believe in the pick and shovel, being good only for carriers” of supplies inland. “Native fitters,” who were willing to work for mining concerns, “get 7s. a day, and their handicraft would be amusing were it not for its utter uselessness and wholesale waste.” Overall, the correspondent concluded, “that 1 oz. of ore will not pay dividends on the Coast.” The tone of these two submissions indicates initial enthusiasm regarding a new district, which contrasts with the report from Australia.

Ernest Nardin’s report was the abstract of a paper given at the Institution of Civil Engineers in London, and described the technical aspects of the chlorination of gold ores at the Mount Morgan mine in Queensland. The refining process is the focus for Nardin, and he provided a systematic explanation of the workings, chemistry, and results, including a technical drawing with five figures. His report indicates a mature mining district, scientifically managed by expert engineers with efficiency in mind, and dividends as a result.

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19 Frank Owen, “Gold in Ashanti,” *E&MJ* 71 (23 February 1901), 240
These contributed articles display the evolution of colonial goldfields under the hand of mining engineers. Rickard’s reports from Australia depict a gold district in the midst of a speculative boom, and the lessons learned as the mines and works industrialized under the guidance of mining engineers, while Nardin’s report portrays a mature processing facility. Yet the reports from Ashanti display a relatively undeveloped district, with professional engineers implementing the lessons learned from the rushes in the Transvaal and in Australia. Granted, local climate, topography, and labor issues limited the development of the district, but it was no Wild West of speculation and charlatanism. Their presence in the *E&MJ* indicates the network of experts involved in producing the journal and in producing gold in the colonies, and the communications between these two aspects of professional mining engineering. Finally, these reports informed bankers and investors of new potential districts for capital investment and subsequent capital accumulation. Once “the fooleries and exaggerations” of early goldfield development “are discarded. . . the real business of development begins,” and therefore, explained Rickard, the fields could be worked for a dividend. It was this very correspondence which, rather than the creative destruction that Rickard highlighted, allowed for rational investment and timely dividends.22

**Foreign Mining News**

Mining news from abroad constituted a weekly feature in the *E&MJ*, providing details from mining districts around the world. The editors divided this section geographically, giving specific news from Africa, Australasia, South America, Canada, Mexico, Europe, and Asia, with articles for each depending on developments in the mining

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districts. Generally, each report is a short paragraph; however, extensive developments merited longer discussion. Within each issue, the Foreign Mining News section was toward the back, sandwiched between U.S. mining news and market reports for the coal industry. It was also three to five pages before the section on market reviews, depending on the length of the coal reports. In the index to each issue, each region received a page number under the heading of “Foreign:” with the region following immediately below. The Foreign Mining News functioned as a means of making remote mines legible to investors, shareholders, and engineers. Similar to the contributed articles, the evolution of a mining district from the early finds and claims through its industrialization is evident within the Foreign Mining News, as demonstrated by several types of articles. While not complete, I have identified three major types, allowing for outliers and overlap between the types: geology and mineralogy, technical reports, and, the penultimate state, a sterile statement regarding a mine or district’s production, distilled to fine ounces, dollars, or pounds for a given period. Due to the sheer volume of reports, I selected archetypical reports for analysis below.

Reports on mineralogy and geology came in two major forms: potential deposits and reports from active mines. The first largely existed as a means of either encouraging or dissuading further surveying and prospecting in a region. An 1895 report from Zululand offers a decent example. The “correspondent” reported, “the mineral resources of that section are now being developed. The country contains good water, wood, and coal, and several gold belts traverse it in the northwest by a southeast direction, the most northerly being the Denny-Dalton fields.” After covering the basic logistic details of mineral extraction from Zululand, the correspondent gave a brief outline of the mineralogy near Komo Mountain, with the quartz “much like the Rand deep level stuff, being a grayish color and
covered with pyrite. Other minerals, such as copper, silver, asbestos and mica, have also been found in considerable quantities, and may soon be developed.” The second sort of mineralogy articles came from working mines, with a report from the Kapanga goldfield in New Zealand serving as an example. The intersection of the “two principal reefs” of the mine, “known as Scotty’s and the Kapanga reefs,” were the primary mining sites, but as the “reefs have an underlie of about 45°, dipping away from the shafts in a westerly direction,” requiring substantial work down to the 600’ level. The expense and difficulty of this enterprise was merited, because drilling revealed “a dark green andesite rock full of joints and carrying veins of calcite,” a mineral profile that, “in the other levels were considered good indications of gold.” The report continues to detail the mineralogy of several levels, down to 800 feet. These two reports specifically encouraged both investment and further development of their respective region, based on a careful mineralogical survey by trained mining engineers, and the E&MJ duly reported the developments.23

The second major type of foreign report conveyed technical details from distant mines, and required a familiarity with mining terminology to predict output and profits. An 1898 report from the Kalgoorlie district in Western Australia provides a working example of a technical report in the Foreign Mining News. The report comes from an E&MJ correspondent inspecting the prominent mines of the district. In “Tetley’s shaft” of the “Australia Mine,” the correspondent noted “a stope fully 300 ft. in length, average width 15 ft., shipping value from several thousands of tons without sorting, 3 oz. 18 dwt. The ore is telluride, and in some parts of the stopes it makes a grand sight.” In the neighboring East Australia mine, he found “one stope above the 100 ft. level, 40 ft. wide and 400 ft. in length,

23 “Zululand” E&MJ 59 (1 June 1895), 519; “New Zealand,” E&MJ 59 (25 May 1895), 494.
which averaged over 1 oz. 5 dwt. This stope is oxidized, and is treated locally by Huntington mills and cyanide.” At a nearby milling and treatment facility at the Great Boulder mine, the correspondent issued a favorable report: “This mine has produced over 5 ½ tons of gold from an obsolete 30-stamp battery treating oxidized ores, which are getting beautifully less” as the mine went deeper. To deal with increasing development, “This company has decided to erect a combination process for the treatment of the 60,000 tons of tailings already on the ground and sulphide in the mine,” using the “Pelatan Clerici process—cyanide solution with agitation.” Without a specialized technical literacy, much of this report is incomprehensible, but shows the technology applied and the projected yields of the mine. To a mining engineer, this report demonstrates the skill in exploiting refractory ores as well as the geology and treatment methodology for the tailings, ensuring maximum extraction and minimal waste, alongside of maximum profits and dividends.  

The third major type of foreign report was also the most prolific and reduced the complex workings of a mine or district into a short, legible statement. These reports take all of the difficulties of finding a lode deposit, surveying its extent, securing the necessary capital, labor, and equipment, extracting and processing the ore, and all of the associated complexities of hard rock mining and reduce it to a statement such as:

Mount Lyell Mining Company.—No. 6 furnace started May 26th. A dividend of 4s. per share has been declared. This company announces an issue of 25,000 new shares of £3 each, in the proportion of one share for every ten held, at a premium of £3 per share.

In other reports, the production total reduced even further, to reflect an entire mining

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24 “Western Australia--Kalgoorlie District,” E&MJ 65 (28 May 1898), 653. As a unit of measure, a dwt., or pennyweight, is equivalent to 1/20th of a troy ounce, or approximately 1.56 grams.

district as the total fine ounces of gold. For Western Australia in 1901, the *E&MJ* reported, “The gold output for March is reported at 127,846 oz. crude, an increase of 1,796 oz. over March 1900.” Given the technical intricacies and refractory ores of the Kalgoorlie district, as detailed in the previous paragraph, this demonstrates several things. First, the reports to investors and shareholders had attracted sufficient interest to accumulate the necessary capital for further development at a profit. Second, the investors needed a distilled and legible report from the goldfields to continue investment, thereby increasing their dividends. Third, the district had matured beyond the point where ore and assay reports became necessary, reflecting the substantial prior investment.26

Developments in foreign mining districts were important enough to the editors of the *E&MJ* to merit a devoted section, close to the stock market reports, stock prices, and dividend reports. Given the brief nature of these reports in contrast to the contributed articles or the reports on individual mines (discussed below), they seem designed primarily as an informational tool for investors and shareholders, while keeping engineers appraised of distant developments. An investor in London or New York could get a condensed idea of the developments, and decide whether to investigate further, invest, or hold off on a certain district, as well as how their existing capital functioned in the periphery. In this way, for an investor with primarily foreign holdings, the terse reports from afield may have been their first destination in the weekly journal if the front page held little of interest. Flip to the back, check on developments, and then see how stock prices were doing and whether to expect a dividend that quarter. Simple.

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26 “Western Australia,” *E&MJ* 71 (27 April 1901), 543.
Another valuable source of information on mining activity within the British Empire came from the special correspondent at the London stock market. Each week, the correspondent issued a report on the trading activities of the market, political circumstances, mine and district production, expectations and speculation, the social activities of mining engineers, tycoons, and investors, and other developments from the London exchange. As the correspondent’s reports had to traverse the Atlantic by sea, the reports were dated about two weeks prior to their publication in the *E&MJ*, offering a report on what had happened rather than specific investment advice. Nonetheless, the London correspondent offered an insider’s look at the market activity, with prose that demonstrates both a familiarity with mining and with financial markets. These weekly reports focused on several major themes: government politics, reputation politics and their effects on investment, mine and stock performance, market movements, and other relevant issues. The interesting thing about the London correspondence is that while the column contains a lot of information about foreign mining developments, it is largely reporting on the discourse about these developments within the London investment community.

While not all the London columns exhibit the aforementioned major themes, many of them do. A column from May 1898 serves as an example. The correspondent begins with a report on “the extraordinary collapse in the Bottomley group in the West Australian market,” due to the fact that “these companies belonging to Horatio Bottomley,” were “huge affairs, existing entirely on his talk and having no genuine basis as far as actual gold mining is concerned.” It went on to detail the “extraordinary collapse” of the stock prices following their unmerited inflation, and lamenting “The harm that this class of business
does to genuine mining is incalculable.” Next, the correspondent detailed the “cheerful mood” of the South African market due to the “hope of the Transvaal government really making some concessions to the mining industry,” including curtailing “the natives obtaining unlimited supplies of spirits,” and reducing the price of dynamite. Fears of market upset due to the escalating Spanish-American War and Whittaker Wright’s British America corporate losses characterized the discussion about North American market performance, with a generally pessimistic outlook for those stocks. The correspondent then discussed Tasmanian developments, notably the proposed narrow-gauge railroad from the Mount Lyell mines to a harbor that “is one of the worst imaginable,” navigable only by “special light draught steamers,” and the proposed £200,000 debentures to finance the railroad. He commented positively on this development, noting, “the North Mount Lyell will become a big producer, and there should be enough traffic to make the railway pay.” The column concluded with a brief comment on difficulties in raising the necessary capital for the “Klondike Goldfields, Limited” to begin exploiting new claims, based on the word of three gentlemen, whom “Nobody in London knows.”

After Rothwell’s 1901 death and T. A. Rickard’s assumption of the editorship in 1903, the E&MJ recruited another special correspondent to London, J. H. Curle of the Economist. Curle wrote broadly for both papers, and his name was widely respected as a mining journalist. He frequently traveled to the mining districts of the British Empire for both the E&MJ and the Economist, often traveling with Herbert Hoover to report on mining in Australia. Overall, the London column illustrates the influence of the London market, individual investors, and promoters upon the exploitation of mineral resources. The

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financing of the railroad from the Mount Lyell district in distant Tasmania depended upon the whim of the shareholders and investors in London. Reduced dynamite prices and native labor supplies on the Rand influenced investment behavior, especially considering the simmering conflict between the mining industry and the Kruger government, which erupted in the Anglo-Boer war in the next year. Indeed, conversations and controversy in the financial core had repercussions abroad because investments from the core drove mineral extraction, infrastructure construction, and the colonial politics surrounding these issues in the imperial periphery.


Reports from Working Mines

Unlike the previously mentioned weekly features, reports from productive, foreign mines were much more sporadic. These articles often depicted well-established mines, and detailed mineralogy, mining and milling infrastructure, the labor situation, working expenses, quantities of ore processed and the resulting output in fine ounces, as well as details about
the company’s finances. Usually, photographs of the mines and works accompanied the report, offering the distant observer a gaze into the operation of the mine. A report on the Simmer & Jack Mine, “one of the best known mines on the Witwatersrand,” gives an excellent example for analysis. Two photographs accompanied the article, the first “a view of the slimes plant,” and the second, “an interior view of the new 280-stamp mill, the largest in the Transvaal,” and the third largest mill in the world.28

The article next addresses the location of the Simmer & Jack, and its finances and performance in terse detail. Like many similar mines on the Rand, the Simmer & Jack was “conducting deep-level explorations,” on a property that “covers 859 mining claims, and was represented at the close of 1897 by £5,000,000 stock.” It then describes the previous years’ activity, “largely one of construction. The 280-stamp mill was put up, taking the place of the old mill,” and the treatment of tailings through the “Siemens-Halske process,” and the quantities of ore extracted from various shafts, drifts, and stopes, including deep-level workings. Two tables accompany the report, one detailing the extraction of gold from 164,065 tons of ore via the mill and tailings treatment, and the second detailing expenses per ton, with a total profit of $1.77 per ton. Given the low-grade ore of the Simmer & Jack, the engineers depended “for success on close working and on mining and milling on a large scale.” The report concludes, “The Simmer & Jack is one of the typical mines of the Transvaal, and it is apparently a well managed property.” Similar reports follow the same form, offering commentary on finances, geology, ore grade and processing, operations, and other errata. These reports reflect the direct flow of distilled information to the financial

centers, spurring further investment and development in a cumulative and circular process.  

Mining as White Civilization

This section does not cover a regular feature of The Engineering and Mining Journal. Instead, it addresses the journal’s rhetoric regarding mining and civilization, and the journal’s use of racialist rhetoric to justify labor exploitation. Given the prevailing attitudes toward race during the era, especially ideas about scientific racism, mining engineers often implemented race-based labor practices and pay-scales, especially in southern Africa. This rhetoric is manifest in four ways: assumptions that mining—and by extension, its profits—is a prerogative of White civilization, racial hierarchy within working mines, ascribing laziness based on race, and arguing for the framework of what would become apartheid as a means of controlling African labor in Southern Africa.

The racialist rhetoric of 1895 is largely of the first sort, assuming a Whiteness of mineral extraction. Following an examination of gold fields in Mashonaland, John Hays Hammond reported that of “1,980 miles of quartz reefs... 880 miles actually cover ancient workings.” Hammond was “quite positive” that, of the reasons for the “discontinuance of the workings... the most probable cause to have been the extermination of the gold mining race, in wars with the negro tribes who have occupied the country since its modern re-discovery.” At the Monastery Diamond Mine near the town of Winburg, ancient human remains were found in the course of digging, and “The skulls unearthed exhibit every trace

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of their belonging to a white race.” Despite the fallacy of these two claims, the fact that they were presented in the respected journal demonstrates the prevailing notions of racialism within the mining engineering community. 31

The racial rhetoric of 1898 had a strong visual component, largely based upon reports from working mines on the Rand. A prominent example is a company photograph from the Langlaagte Royal Mine, captioned as follows:

The manager and his staff are in the foreground; the European or white employees seem to have preferred elevated positions and are seen above the head-gear itself and directly under it. The lower ground is occupied by the 'boys'--the native Kaffir and Zulu workmen, who form so large a part of the working force in a Transvaal mine. It will be seen that they are in the majority in the group, occupying the largest part of the ground, though they are closely crowded together. Numerous as his class is, the 'boy' seems contented with his subordinate part, and perhaps does not quite understand how important he is in the calculations of the companies. Without him the mining development of the Transvaal could never have reached its present point, and the supply of his people is a question anxiously discussed by the mine managers.

The assumptions within the caption betray the notions held by the editorship, including the natural inferiority of the “Kaffir and Zulu workmen,” acceptable hierarchies within the labor force based on melanin levels, and the necessity of exploiting African workers for corporate profits and capital accumulation. 32

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The third and fourth major trends in racist rhetoric largely come from the 1901 volume, and are interconnected. The commentary ascribes laziness, stupidity, and slothfulness to indigenous workers, whether Fanti or Zulu, and therefore the paternal need to protect and control the workforce. This rhetoric leads to calls for legal controls over the Black workers by the White management, effectively building the foundations of legislated apartheid. In a front-page article, excitement about the potential of the West African goldfields met with a warning about labor supplies, with the caveat, “The natives will not work if they can help it, and white men cannot. The country is extremely unhealthy for white men.” As noted above, correspondence from the region similarly lamented the perceived
inadequacy of African labor, as well as the malarial climate that greeted White gold-seekers.\textsuperscript{33}

As British forces regained control of the Transvaal in the Anglo-Boer war, mining engineers and investors clamored for ways to control their Black workforce. As the war had cut dividends and incurred unforeseen costs, “The only way which our London contemporaries can suggest to reduce expenses in mining is to cut down the wages of native labor.” Anticipating worker resistance to this plan, the \textit{E\&MJ} worried, “The average Kaffir or Zulu may not be a profound financier, but he knows the difference between one pound and three pounds for his month's work.”\textsuperscript{34} An article in the same issue laid out a plan to deal with this contingency, and the general difficulty in securing adequate supplies of labor. This article, entitled “Taxes and Labor in the Transvaal Mines,” established an embryonic plan for legislated apartheid, all in the name of securing labor for the mines, and is worth quoting at length:

\begin{quote}
We hold the country; we can organize the labor supply; we can erect shelters along the roads the natives travel, we can prevent them being molested by officials or by touts, as they were in the past; we can bring in an efficient pass law ensuring no loss by desertion; we can do away with premiums--except to official agents; we can control the sale of liquor; we can ensure regular work every day of the week; we can contract with the native for a longer period; we can reduce sickness to a minimum, we can use hand labor instead of rock drills in narrow stopes, and we can expect a supply in excess of the demand, so that the mines need not outbid each other. I venture to say that these items, which come under the head of organization, and in no sense affect the natives’ wages, will mean a saving in the future of something like £1 a month per native employed in each mine.\textsuperscript{35}
\end{quote}

Industrial paternalism was not a novel concept within the business community; however, this statement is far more pernicious regarding race relations than a company store or

\textsuperscript{33} “Editorial Notes,” \textit{E\&MJ} 71 (23 February 1901), 237; see notes 19 and 20 above.
\textsuperscript{34} “Mining Conditions in the Transvaal” \textit{E\&MJ} 71 (16 March 1901), 328.
hospital. If this were just simple bluster and rhetoric in an insignificant professional journal, it could be written off as quaint-yet-outdated racialist posturing. However, the 1911 Mines and Works Act, often called the colour bar act, is one of the first pieces of apartheid legislation, and the system of apartheid in South Africa included many of the features that the *E&MJ* advocated following British control of the Transvaal.36

Prominent Mining Engineers and the *E&MJ*

Mining engineers used the *E&MJ* as a communication tool, source of technical information, a space to present, analyze, and debate developments in the field, and as a means of communicating their movements and professional status. Herbert Hoover, John Hays Hammond, and Hennen Jennings all wrote articles, submitted personal movement statements, wrote letters to the editor, and were frequently named in other articles and editorials, especially as they gained prominence in their later careers. In between 1890 and 1910, these three engineers were named in more than three hundred pieces, whether a brief submitted to the personal news column or an authored technical article.37

John Hays Hammond was the most prolific of the three in the *E&MJ*, routinely sending reports of his global movements to the editors for listing in the personals section. He submitted several articles and letters to the editor, some of which were reprinted from other sources, but each featured prominently. His first article, in 1890, examined California’s auriferous gravels and was originally printed in the State mineralogist’s report. In 1897,

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37 To get this figure, I keyword searched their full names and last names in every volume (49 through 90) of the *E&MJ* over the two decades. Repeat occurrences of their names in a single article were not counted.
following his release from custody on charges of treason for his participation in the Reform Movement, Hammond disputed another author’s claim in a letter to the editor regarding the revolt. Hammond’s named frequency in the *E&MJ* increased between 1900 and 1910, as his prominence became a selling point for investment, and as he acted as the chief engineer for the Venture Company investment group, with interests in Stratton’s Independence in Cripple Creek, the Camp Bird mine in Ouray, the Utah Copper Company in Bingham Canyon, and interests in Mexico and elsewhere. At the end of the decade, Hammond joined a fiery debate in the field with his article “Professional Ethics for the Mining Engineer,” which garnered several replies and rebuttals in letters to the editor. A subsequent article, “Suggestions Regarding Mining Investments,” was reprinted as a transcript of a speech delivered before the Finance Forum of New York, and also reprinted in an edited form in the *Wall Street Journal*. Hammond used the *E&MJ* as a means of professional self-promotion and reputation building, and his name and prominence became a measure of a firm’s credibility.  

Hennen Jennings was more circumspect in his engagement with the *E&MJ*, but still frequently mentioned. He authored a 1902 article, “Hoisting from Great Depths—II,” regarding deep level mining and its expenses and risks, and had his 1903 addresses as president of the British Institute of Mining and Metallurgy (IMM) reprinted. He occasionally submitted personal reports of his movements and engineering, but to nowhere near the frequency of Hammond. As president of the IMM, he pushed for advances in technical

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education in South Africa and in London, and the *E&MJ* reported on his efforts. His career and engineering works on the Transvaal often led the article, whether in reminiscent articles or in obituaries of fellow engineers. Further, his position on corporate boards or professional organizations similarly merited mention. As his engineering career became less active, he was seen as one of the giants of the profession, and even his building of a prominent mansion in Washington D.C. gained attention, as did a tour of the newly-opened Panama Canal with other members of the American Institute of Mining Engineers. The *E&MJ* treated Jennings as a respected figure in the field of mining engineering, and his name offered credibility to many other authors’ articles and arguments.39

Herbert Hoover was the most prolific contributor to the *E&MJ*, authoring nineteen articles, and frequently writing letters to the editor as part of the larger technical debates in the field. The *E&MJ* often reported on Hoover’s activities in Western Australia and around the world, and he also reported his movements to the personal section on a regular basis. Hoover professionally associated with T. A. Rickard, who became editor of the *E&MJ* in 1903, following Rothwell’s death and the brief editorial tenure of Dr. David Day, and with J. H. Curle, one of the London correspondents. Hoover’s writings often sparked a broad debate in the field: one of his articles, “The Economic Ratio of Treatment Capacity to Ore Reserves,” garnered nine reply letters to the editor in subsequent issues. Hoover used his authorship of technical articles and association with the editor and correspondents of the *E&MJ* to cement his reputation as one of the foremost technical voices in the field, and his

name frequently graced the front page of the journal.  

The professional ties between the three engineers are also evident in the pages of the *E&MJ*, with several articles mentioning them together. In an article, “American Mining Engineers,” Hoover, Hammond, and Jennings are all cited as prominent engineers in the British Empire. They were, according to the *E&MJ*, responsible for “such a marvelous development of mineral resources,” which, “The world has never before seen.” The credit due to American mining engineers abroad manifested in “the fact that capitalists persist in paying American mining engineers and metallurgists about twice as large salaries as they pay the engineers of other countries.” The sheer volume of mentions of these three engineers in the *E&MJ* indicates that they were aware of its importance and function as the preeminent voice of the mining engineering profession, but also of its effects on mining investment and finance.

**Conclusion**

On the front page of the issue of 26 March 1898, an editorial note described a job posting on another page of the journal. The position was “for a mining engineer capable of filling the position of assistant general manager at the great mines of the Broken Hill Proprietary Company, in New South Wales.” This job offer merited a front-page editorial for two points. First, “the fact that the ‘Engineering and Mining Journal’ is the medium through which miners and engineers in all parts of the world can be most readily and effectively reached.” The second claim of the editorial was “that American mining engineers

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40 “The Early (Pre-WWI) Writings of Herbert Hoover,” Box 26, Pre-Commerce: Subject, HHPL; H. C. Hoover, “The Economic Ratio of Treatment Capacity to Ore Reserves,” *E&MJ* 77 (24 March 1904), 475.  
41 “American Mining Engineers,” *E&MJ* 70 (1 September 1900), 242.
and metallurgists are sought for in all the great mining centers, where the value of their training and experience, their exceptional originality and the power of adapting themselves to circumstances are fully admitted.” Through this editorial, the *E&MJ* self-positioned as the preeminent technical journal for the mining industry, demonstrating its worldwide readership, its respect as an organ of technical information, and its service to “the unrivaled ingenuity” of the American mining engineers.\(^{42}\) In 1910, the journal printed and circulated 526,500 copies, indicating more than ten thousand subscriptions.\(^{43}\)

Due to its central location near Wall Street, the *E&MJ* attempted regular and active influence upon investment trends in the mining industry by informing its readership of developments in distant mining districts and in the major mineral stock exchanges. It provided geological and technical descriptions of mines and mining districts, and was unabashed in criticizing charlatanism and unchecked speculation. It preached the gospel of industrial progress and efficient management, in the name of expanded profit and uninterrupted development. It communicated timely developments in technology and new metallurgical techniques for treating recalcitrant ores. It commented upon politics, economics, monetary regimes, labor issues, and ideas about race. It centralized and distributed information necessary for mining investment and development. The journal that Richard P. Rothwell raised from an obscure technical publication into the preeminent trade magazine acted in concert with the legions of American mining engineers abroad, with the investors in New York, London, and elsewhere, with the imperial and colonial governments, and with the mining tycoons and major banking houses that drove mineral extraction in the

\(^{42}\) “American Mining Engineers Abroad” *E&MJ 65* (28 March 1898), 365.

British Empire and around the world.
7. GLORIFYING THE GOLDEN FLEECE: MINING AT WORLD’S FAIRS, FROM CHICAGO TO SAN FRANCISCO

Over-eagerness to drink of the force fountains produced over-promotion and over-competition, which demanded in turn remorseless skimming of cream resources without any reckoning of the future, as is shown by the wasteful methods of mining and extravagant use of fuels, and the intensive, remorseless use of labor, both of hand and brain. —Hennen Jennings, 1914.¹

“California,” claims a promotional pamphlet for the 1915 San Francisco world’s fair, “conjures up visions of the days of ’49 and the rush to the gold mines. It is therefore appropriate that mining should be prominently illustrated at the Exposition.” Mineral extraction was one of the primary economic sectors of the American West in the late nineteenth and early twentieth century. The myth of the independent miner, panning for a fortune in the idyllic streams of the Sierra Nevada Mountains or following a rich ore vein in Cripple Creek to make a name and fortune evolved into a cultural representation of the mining industry as a whole. This myth ignores the environmental and social consequences of the extractive industries in the American West. Four world’s fairs, the infamous 1893 World’s Columbian Exposition in Chicago, the 1894 Midwinter Exposition in San Francisco, the 1904 Louisiana Purchase Exposition in St. Louis, and the 1915 Panama-Pacific International Exposition in San Francisco invoke the myth of the independent White male American miner, in part to downplay the human and environmental costs of mineral extraction. Each exposition occurred in the context of widespread mining labor strife, yet completely discounted the actual miners in favor of the mythological. As the mining industries wielded substantial social, economic, and political power due to the integral nature

¹ Jennings, Mining as a Profession, 8.
of their commodities to the modern industrial capitalist system, the fair organizers attempted to tie the extractive industries to the fate of modern society, systematically downplaying the dangers to the miners and the surrounding communities and ecosystems as a price worth paying for modern industrial society.²

The intimate ties of the extractive industries and the modern nation-state gained prominence during industrialization. Indeed, the industrial system rested on carbon-based fuel and metallurgic technology, as well as the financial manipulations necessary to finance the capital-intensive mining processes. Lewis Mumford, a prominent critic of machine-age civilization in the early twentieth century, developed the theory of the megamachine—essentially the synthesis of human and mechanical power responsible for complex technological societies—with mining as a core component. Gray Brechin, author of Imperial San Francisco, expanded on Mumford’s megamachine with his theory of the “pyramid of mining,” a parallel and supporting structure to the industrial-capitalist system. Brechin argues for the absolute influence of the mining industry through control of metallurgical and mechanization technology, militarism, and financial management.³

There have been several interpretations of the meaning of world’s fairs.⁴ World’s

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²The Mine at the Panama-Pacific International Exposition (New York: Read Printing, 1915), microfilm.
fairs are expensive propositions, involving a heavy outlay of capital with dubious prospects of return on investment. Given this, why were they so popular? In All the World’s a Fair, Robert Rydell surveys international expositions in the United States from Reconstruction to World War One. Fairs “performed a hegemonic function” that “propagated the ideas and values of the country’s political, financial, corporate, and intellectual leaders.” Through this assertion, fairs affirmed the “moral authority” of the United States, according to Robert Rydell, while frequent militaristic displays showed the violence undergirding the moral authority. The message was the desired consensus of the priorities of elites and “their vision of progress as racial dominance and economic growth.” Between 1876 and 1916, over one hundred million visitors received this message.5

The message of the fairs differed according to the audience. Expressions of cultural hegemony target the visitors and general population; however, world’s fairs do not exist simply as cultural monoliths. A significant portion of the message of fairs involves interstate and international competition, with the population as mere spectators of the competition. In this arena, fairs display wealth and conspicuous consumption for nation-states. Anthropologist Burton Benedict considers the “idealized consumer cities” of the fairs as a form of potlatching and collective representations. Both potlatches and world’s fairs “express rivalry between groups,” escalating into the destruction of the fairgrounds as a means of expressing the financial strength and social prestige of the host nation or region. The buildings “were very expensive, designed to impress and to be destroyed at the end of the fair.” Indeed, demolition began on the fairgrounds almost immediately after the fair.

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5 Rydell, All the World’s a Fair, 3-8; Rydell, Findling, and Pelle, Fair America, 63-68.
concluded.\textsuperscript{6}

Recently, historian Sarah Moore argued that the PPIE represented the prevailing masculinist and expansionist discourse of the American empire. In San Francisco, “America’s new empire was recreated in gigantic miniature,” as the Panama Canal “embodied the historical arc of American empire building.” The Canal Zone was “an imagined territory where the United States could recondition its national body to be vigorous, virile, manly, and triumphant.” The 1915 exposition “functioned pedagogically and embraced Social Darwinian logic,” while Fairs generally “were designed to give tangible form to such profoundly resonant concepts such as citizenship, patriotism, democracy, progress, nationalism, and civilization.” The Midwinter exposition and the PPIE glorified California’s mining heritage as a triumph of White civilization over the “abundant” wilderness and perceived racial backwardness that dominated California before annexation. Similarly, historian Abigail Markwyn argues that the PPIE reflected the ambitions of San Francisco’s business and political elites--that the fair operated as both a symbol of its rebirth following the 1906 Earthquake and as an expression of San Francisco’s status as the commercial center of the Pacific Rim.\textsuperscript{7}

More generally, world’s fairs reflected the international ideologies of nationalism, modernity, technocracy, and imperialism. A nation-state consolidates around ascribed, normative notions of language, culture, and history. Benedict Anderson termed this the “imagined political community” of the modern nation-state. After the nation-state forms, it must project its legitimacy both internally and externally. In addition to representing the


\textsuperscript{7} Moore, \textit{Empire on Display}, 4, 10, 75; Markwyn, \textit{Empress San Francisco}, 1-22.
American nation-state and empire, world’s fairs embodied James Scott’s “high-modernist ideology.” Scott viewed high-modernism as a “muscle-bound... version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and above all, the rational design of social order commensurate with the scientific understanding of natural laws.” Cultural representations of mining at world’s fairs are consistent with the high-modernist impulse toward miniaturization, simplification, and legibility. Visitors to the Forty-niner camp, the Guleh, or the demonstration mine could gain a vision of the processes of mining, as seen from the perspective of the tourist or mine inspector, and feel as if they understand the fundamentals of several types of mining, stripped of its local complexity and variability. A “museum or theme park,” such as the Forty-niners camp or the Palaces of Mining and Metallurgy, were “limiting case[s], where control is maximized but impact on the external world is minimized... A sharply experimental terrain where the number of rogue variables and unknowns are minimized.”

World’s fairs attempt to project a sense of calm onto an unstable world. In the context of the three expositions under examination, each fair occurred amid social strife and conflict. For the 1893 and 1894 exposition, the United States reeled from the related mining strikes in 1892 in Idaho’s Coeur d’Alene silver fields and the 1894 labor war in Cripple Creek, Colorado, as well as the massive economic fallout of the Panic of 1893. The 1904 LPE took place as another labor war in Cripple Creek simmered, finally erupting with the suspicious bombing of a train depot and the forced deportation of hundreds of union

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miners. Finally, the 1915 PPIE followed closely on the heels of what historian Thomas Andrews calls “America’s Deadliest Labor War,” the armed conflict between union coal miners and the company-controlled private detectives and state militia. Yet, at each of the expositions, there is notable silence on the political context of mining in the American West.

The 1893 World’s Columbian Exposition and 1894 Midwinter Exposition

Chicago’s White City of the 1893 World’s Columbian Exposition reflected the commercial ambitions and ideological notions of American elites during a time of conflict and unrest. Situated on the edge of the lagoon, and in between the Electricity and Transportation Buildings, the Mines and Mining Building was a massive structure, measuring 700 by 350 feet. Inside the building, numerous states displayed their mineral wealth, alongside of corporate exhibits of technological processes for mineral extraction and processing. One of the major attractions within the building was the gold nugget found by James Marshall at Sutter’s Mill in 1848, triggering one of the largest gold rushes in history. Photographs of the hydraulic mining process, as well as lode mining technology from the Comstock Lode, accompanied Marshall’s nugget and other displays of the auriferous states. However, one of the most extravagant displays came from Montana, a seven-foot cast silver statue of an allegorical Justice. In neo-classical style, Justice stands on an orb, clad in robes and holding a sword and a balance, and cast completely of silver mined from Montana. From abroad, the Cape Colony displayed diamonds from the De Beers Kimberly mines, complete with washing operations “conducted by stalwart Zulus, attired in full dress. Exposition costume--a cap and a pair of short trousers; for other garments they cannot be

New South Wales also contributed a display of its mineral wealth, and, as one of the major gold-producing regions in 1893, their display was hailed by Hubert Howe Bancroft as “one of the most interesting and comprehensive collections in the hall of Mining.” The representations of mining in Chicago as abstract, commodity-based, and disassociated from the labor process set the precedent for the following world’s fairs, but most directly the 1894 Midwinter Exposition.11

Although a small exposition in scale, the 1894 Midwinter Exposition did not suffer from a lack of rhetoric and representation. San Francisco’s status as an imperial city, built on the 1849 gold rush in the Sierra Nevada Range, rested heavily on the myth of the Forty-niner. These self-proclaimed founders, often affluent White males from the northeast, claimed the title of Argonaut, imagining “themselves to be reliving a classical legend.”12 To perpetuate this legend, one of the predominant attractions at the fair was the Forty-niner camp. The camp was “a reproduction of an early mining settlement,” which would draw the attention of “every man who has at any time in his life been engaged in the seductive occupation of gold-mining.” The model camp displayed the cabins of several prominent Californians, including Senator George Perkins and industrial baron John W. Mackay, as well as a display of “Mining as it was done in early days—Long Tom sluice boxes, rocker and pan.” Fairgoers could also see a bronze statue of “The Prospectors,” an “ideal representation of the men who sought their fortunes in the new El Dorado.”13 Each of the

12 Brechin, Imperial San Francisco, 14.
13 Taliesin Evans, All About the Midwinter Fair (San Francisco: W.B. Bancroft, 1894), microfilm, 155-161, 148-149.
figures in “The Prospectors” is a bearded Caucasian male, perpetuating the myth while ignoring the initial ethnic diversity and gender dynamics of the California gold rush and the violence associated with securing the gold fields for White Americans. Historian Susan Johnson argues that as placer mining deposits declined in California, “the Gold Rush increasingly came to be remembered as the historical property of Anglo Americans.”

In addition to silencing the ethnic diversity of the 1849 gold rush, the fair organizer’s use of a historical event to portray mining downplayed recent industrial strife. Two strikes, one in the Coeur d’Alene Mountains in 1892 and the other in Cripple Creek in 1894, profoundly changed the nature of western hard-rock mining. Each strike focused on the rights of the miners to form a union and bargain collectively. In the Coeur d’Alenes, the miners wanted to be paid according to a standard scale, and for a union-funded hospital. In Cripple Creek in 1894, the site of an ongoing industrialized gold rush, union miners, affiliated with the Western Federation of Miners, struck for an eight-hour day at three dollars. The mine owners of both districts called on the power and authority of the state to break the strikes, as well as hiring private detectives to infiltrate and disrupt the strikes. Each strike ended with armed conflict between the workers and the forces of the mine owners. Furthermore, the 1894 exposition occurred in the fallout of the Panic of 1893 and amid the industrial strife of the Pullman Strike.

The 1904 Louisiana Purchase Exposition

In contrast to San Francisco, St. Louis did not have as famous a legacy of mining, instead acting as an entrepôt for the trans-Mississippi West and also a lead mining district. It was the gateway to the American West, a “point on the firing line of Western Progress,” where, according to Frederick J.V. Skiff, former mining engineer and Director of Exhibits, “the forces of civilization found their most potent expression and greatest climax.” As a fair, the LPE acted pedagogically to advance notions of racial hierarchy within human civilization. Palaces representing the advances of industrial-capitalist society stood in contrast with anthropological exhibits of societies considered primitive, most notably the Filipino village. The Palace of Mining and Metallurgy was no exception to this rule. In a thirteen-acre “Mining Gulch,” displays of modern mining technology contrasted with a village of “Mexican Indians” exhibiting the “primitive and picturesque methods of smelting copper ores. . . in use when Cortez visited that country.” According to Dr. Joseph Holmes, chief of the Department of Mines and Metallurgy, this contrast was purposeful, as “adjoining this rude camp will be erected a structure devoted to the demonstration of the more modern methods of mining.” Following the success of the mining exhibition, John Hays Hammond and Dr. Rossiter W. Raymond lobbied the American Institute of Mining Engineers to present Dr. Holmes with a silver cup “in recognition of his work in the organization and presentation of the mining exhibits at the Louisiana Purchase Exposition,” as a testimonial to his efforts.

Within the Palace of Mining and Metallurgy, forty-one states and twenty-nine nations displayed minerals and technology. Many of the displays featured a stack of the notable mineral products of the state, often as a means of showing its prosperity. Similar to California’s use of the mythical Argonauts as icons, the LPE called on antiquity in its representation of mining, calling on Vulcan, “The God of Fire and Iron.” Constructed of cast iron, Vulcan stood fifty feet tall, towering over the displays within the Palace, a hammer in one hand and a spearpoint in the other. Colorado’s display featured “a gleaming pile of gold. . . a heap of silver, and minerals of every hue,” and Governor James Peabody directly oversaw his state’s displays.\footnote{William Rau, *The Greatest of Expositions* (St. Louis: Samuel Myerson Printing, 1904), microfilm, 185; Mark Bennitt, ed., *History of the Louisiana Purchase Exposition . . .* (St. Louis: Universal Exposition Publishing Company, 1905), microfilm, 400-402.}

Colorado’s “gleaming pile of gold” is particularly ironic, as the state was the battleground of a massive labor-management war in the gold mining districts of Cripple Creek and Telluride. Beginning in February 1903, the Western Federation of Miners (WFM) began a series of strikes in the smelters of Colorado City, which soon spread into Cripple Creek and beyond, based on the principles of industrial unionism. It was a particularly violent strike, with several major deadly incidents occurring under suspicious circumstances, the most notable being the Independence Depot blast, which killed thirteen non-union miners. The Mine Owners’ Association, the Citizen’s Alliance, and the state militia quickly seized power in the district, using the unrest to depose the civil government, deport hundreds of union miners, and destroy the WFM in the district. One Pinkerton agent was “made a deputy sheriff and told to kill any union man or sympathizer that said a word to me.” Governor Peabody was a partisan of the mine owners in Colorado’s labor war of 1903-
1904, and Colorado’s display at the LPE was an extension of the battle lines. A sterile pile of gold and silver, mined in the state, sends the message that Colorado remains open to business, and that the demands of the unionists are secondary to the needs of commerce.19

The 1915 Panama-Pacific International Exposition

If the 1904 LPE exalted the acquisition of the West and the imperial expansion of the United States to the Pacific Ocean, the 1915 PPIE celebrated the construction and opening of the Panama Canal, one of the most massive civil engineering projects in world history. The physical processes of canal building employed technology pioneered in mining. A famous photograph of the construction process shows President Theodore Roosevelt operating a Bucyrus steam-shovel in the canal. Roosevelt, in a white tropical suit and hat, is dwarfed by the machine he controls; the contrast of the White man and the massive dark metal machine demonstrates the mechanical power deployed in the canal. Steam-shovels and explosives cleaved the land of Panama and created a manufactured seaway. While the removal of earth from the canal was not for the purpose of mineral extraction, the engineers used similar technologies—mining engineers had begun adopting steam shovels for open pit mining. In his study of the Bingham Canyon copper mine in Utah, environmental historian Timothy LeCain argues that the use of Bucyrus steam-shovels, dynamite, and other technologies fundamentally changed the techniques of mining by increasing the “velocity of throughput,” a concept first articulated by the economic historian Alfred Chandler in The Visible Hand. In the Palace of Mining and Metallurgy, the Bucyrus Company and the Utah Copper Company both contributed displays. Mass-destruction technology, pioneered in an

open-pit copper mine in Utah, transformed the Isthmus of Panama from a narrow strip of land into a built environment for the increased velocity of throughput for maritime transportation and, by extension, global capitalism.\textsuperscript{20}

Planners of the San Francisco Palace of Mining and Metallurgy did not intend to create “a museum of geology and mineralogy.” Instead, they planned an “educational exhibit of the mining and metallurgical industries.” Charles E. van Barneveld, chief planner of the Department of Mines, emphasized the “cooperation necessary to the discovery, appropriation, development, and use of the hidden mineral wealth of the nation, to bring out the dependence of civilization upon the mining industry, and to emphasize the fact that a country’s economic position in the world is largely determined by the supply of the economic minerals it possesses or controls.” To downplay the environmental and social damages of mining, the planners of the Palace of Mining and Metallurgy chose to emphasize three things: a \textit{model} mine below the Palace; the end results of mining, namely refined minerals including gold, copper, zinc, coal, and iron; and the use of mined resources in common consumer and industrial products. Barneveld stated the reasoning for the exhibit in a letter sent to mine owners, metallurgists, and mining engineers prior to the opening of the PPIE. Van Barneveld emphasized the need to downplay the environmental damage to the public: “When it comes to questions of legislation, Federal representation and support, litigation arising from disputes over smelter fumes, tailings disposal, and stream pollution, do the press and the general public sympathize with the mining industry? By no means. Their

\textsuperscript{20} LeCain, \textit{Mass Destruction}, 148-150; \textit{The Mine at the Panama-Pacific International Exposition}; Chandler, \textit{The Visible Hand}. 
sympathies are usually with the other side.”

Neat piles of ore and refined minerals were the standard displays in the Palace of Mining and Metallurgy. Images of the state displays in The Blue Book show obelisks of Utah coal competing with piles of Missouri zinc, Montana copper, Nevada silver, and gold from Idaho, California, and the Transvaal. The destructive power of mining apparatus was even glorified in its power to transform the landscape, as Frank Morton Todd examined a “steel-built gold dredge, the largest in the world. . . one of those huge and monstrous mechanisms that turns the surface of a landscape upside down and leave it a waste of cobbles and bowlders, in order to snatch from the crevices the metal that has washed into the valleys from the foothill placers.” The Palace of Mining and Metallurgy represented the machine at its most polished, downplaying the true costs of mineral extraction.

In addressing the terrific human cost of mining, the exhibitors adopted a curious strategy: disaster response was glorified. Daily displays of a mock rescue featuring the latest rescue technology, a well-drilled team of mine rescue experts, and an on-site medical facility re-enacted a mine catastrophe, while a massive explosion of coal dust “furnished the realism for a rescue.” The simulated accident dispatched “A truck of the United States Bureau of Mines Rescue Corps. . . the crew of five jumped off smartly and proceeded to get into goggles and self-contained breathing apparatus.” Todd views this as illustrative of “how far organized society has progressed in conserving the lives of those that minister to it; at least in the mining trade.” As the smoke cleared, the masked rescuers emerged with a single victim on a stretcher, administered basic first aid, and moved him to the adjacent medical facilities.

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for immediate attention.\cite{23}

Aside from the twice-daily explosion, mine safety companies displayed their products and services including the American Blower Company’s Sirroca fan, the Draegar Oxygen Apparatus, Concordia and Kohler safety lamps, Pyrene fire extinguishers, and others. In the Demonstration Mine, “All modern devices relating to the industry were illustrated. . . Life-saving apparatus, and every sort of first-aid-to-the-injured device, was in its proper, handy place.” For the miners who survived the day and did not need to utilize the rescue equipment, “There was a welfare exhibit consisting of a model industrial village and in it was a model of a wash and change house where the men could change from street clothes to working clothes and wash up after work.” Cleary, the Department of Mines advocated industrial paternalism as a means of controlling the industrial worker in the face of widespread labor radicalism. To leave the Palace of Mining and Metallurgy after viewing the rescue demonstration, examining the new safety technology, and seeing the welfare exhibit while still believing that mining was a hazardous and often fatal occupation would have been nearly impossible. The entire purpose of the Palace of Mining and Metallurgy was to promote both the safety and economic necessity of the extractive industries; therefore, the exhibitors purposely minimized and downplayed the inherent hazards.\cite{24}

The penultimate misrepresentation of the mining industry was in the Demonstration Mine. As the brochure for the mine stated, “There will be no discomfort connected with a visit to The Mine.” Visitors descended in a simulated mine elevator to a chamber with

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several stopes representative of various mines in the United States including the Homestake
gold mine in Lead, South Dakota; the Lehigh Coal mine in Lanford, Pennsylvania; The
Nevada Consolidated Copper Company's (of New York City) mines at Ely, McGill, and
Copper Flat, Nevada; and the Bunker Hill & Sullivan lead mine of Kellogg, Idaho, among
others. The Mine was overtly educational to the ends proscribed by the Department of
Mining and Metallurgy in portraying mining as a modern and efficient trade. “Visitors who
expect to see in The Mine such ancient appliances famed in story such as the mine mule, the
gray-bearded miner with pick and candle, black blasting powder and unventilated working
places, will be agreeably disappointed to find here a model mine, designed and operated
under such modern working conditions.” The latest technology and several example mines
composed the bulk of The Mine; the miners were left out, except for “twice daily at 11 and
2 o'clock,” when the simulated explosion triggered the simulated rescue with the simulated
victim. Other than that, the exhibit ignored its workers.25

In the five years before the 1915 Panama-Pacific International Exposition, organized
labor and mine operators clashed spectacularly in several instances, including the Italian Hall
Disaster and Copper Country Strike of 1913-1914 and the Ludlow Massacre of 1914. The
Ludlow Massacre and the forcible suppression of prior labor activities again displayed the
role of militarism in maintaining the hegemony of the mine owners. In Calumet, Michigan,
the Italian Hall Disaster involved the trampling death of 73 people during a Western
Federation of Miners’ Christmas party, as someone shouted “Fire!” in a crowded hall; the
concurrent strike lasted for ten months. Subsequently, in Butte, Montana, the Speculator
mine disaster claimed the lives of 168 miners amid labor unrest in the district; Frank Little,

25The Mine at the Panama-Pacific International Exposition.
an organizer for the Industrial Workers of the World was kidnapped, beaten, dragged behind a car, and lynched from a bridge less than two months after the Speculator fire and the city was under U.S. Army occupation to guarantee wartime copper production.  

Attitudes toward racial discrimination paralleled those toward organized labor, as the productivity of the Transvaal region of South Africa overshadowed the apartheid practices of South Africa, codified in the restrictive 1911 Mines and Works Act. According to Todd, “the Transvaal produced, from some 51 mines, $180,812,720—about nine times the California production.” One racially segregated country copying the labor practices of another is not terrifically surprising; however, as demonstrated in Chapter Two, numerous mining engineers with experience in California and the Sierra Nevadas invested and worked in the mines of the Transvaal, including John Hays Hammond and Hennen Jennings. Brechin comments on this transfer of California mining expertise, “With their extensive experience, California engineers commanded top salaries, and by the turn of the century, Californians were managing half of the mines on the Rand.” To the engineers, apartheid was efficient, as mining journalist T. A. Rickard stated: “The employment of backward races by a dominant people was never done in a spirit of more intelligent humanness than in these South African mines.” While The Race Betterment Foundation, a eugenics organization, maintained the official eugenics display in the Palace of Education, the principles of scientific racism permeated the rhetoric of the mining engineers and the displays of the Palace of Mining and Metallurgy as well.

26 Andrews, Killing for Coal, 1.
28 Brechin, Imperial San Francisco, 54–55; Brechin quotes Rickard’s statement on mining conditions in South Africa following the 1911 Mines and Works Act.
Mining Engineers and World’s Fairs

The Panama-Pacific International Exposition attracted the attention and participation of John Hays Hammond, Hennen Jennings, and Herbert Hoover, each of whom advocated for the fair or lobbied for participation. Hennen Jennings saw the PPIE as a manifestation of industrial civilization, and the power inherent in technology. In his opening keynote address to the Second Pan-American Scientific Conference, Jennings cited it as a manifestation of the progressive increases of industry and technology of the previous half-century, but especially the fifteen years preceding the exposition. In those fifteen years, “these fundamental force producers and force restrainers have probably, with the exception of gold, more than equaled the total output of all previous time in the history of the world. With these outputs, bank deposits, railroad construction, war armaments, steam vessels, and other forms of wealth and power have sympathetically advanced.” Jennings argued that “although these forces have made possible the construction of the Panama Canal,” and likewise “the San Francisco Exposition,” that they were “correspondingly responsible for the European war” which was turning the fields of France and Eastern Europe into abattoirs and hellscapes.29

John Hays Hammond was among the most famous American mining engineers of the time, partially because of his role in the Boer War and his partnerships with Cecil Rhodes, who “typified greatness,” and Lord Rothschild, but also from his successful career in engineering around the world and self-promotion in the press and political arena. In the early years of his career, Hammond worked in Mexico, which he described as a “people

unaware of the virtue of work,” who did not “possess the attributes of an intelligent
democracy.” In the 1892 Coeur d’Alene strike in northern Idaho, he hired Pinkerton
detective Charles Siringo, who infiltrated the Western Federation of Miners and then joined
the shooting war between the miners and the mine owners’ hired gunmen. Later, he
confined his Black South African laborers “to compounds during the customary three years
of employment.” Hammond approved draconian measures to control his workforce. In
Africa, his “Kaffirs are called boys,” and he considered it “frequently necessary to resort to
flogging to maintain order among the boys in the compound.”

Hammond’s involvement in
the fair was substantial, as he “was President of the Commission Extraordinary sent abroad
by our Government to extend invitations to the various foreign nations.” He was particularly
connected to the PPIE, as he had “the pride of a native Californian born in San Francisco,”
which influenced his lobbying for foreign governmental participation. In his commission
abroad, he “met many of the European representatives,” who, in connection with his duties,
felt that he was “altogether too conservative in my predictions as to the success of the great
Panama-Pacific Exposition.”

Herbert Hoover similarly advocated for international participation in the PPIE,
especially to the governments of Great Britain and Germany as he was based in London.
After making his fortune as a mining engineer and financier, Hoover began lobbying for
British and German participation in the PPIE. He led an “Organization Committee” in
London, comprised of “men of very great importance in the Commercial and Political
world” of England, and coordinated directly with Charles C. Moore, president of the

Papers, MSS 259, Yale University, hereafter JHH Papers.
Exposition.\textsuperscript{32} Hoover’s lobbying campaign in Europe was pivotal, as European participation in the exposition was down due to the cost of sending a delegation to San Francisco, but also due to conflicts over transit fees in the U.S.-controlled Panama Canal. In fact, Charles Moore argued that “those nations that have not already agreed to take part in the Exposition are waiting to see what Great Britain and Germany will do in the matter.”\textsuperscript{33} His efforts were largely in vain as war broke out in Europe, but the subsequent refugee crisis and Hoover’s deft management of the Commission for Relief in Belgium and U.S. Food Administration brought him international fame.\textsuperscript{34}

Instead of representing the reality of mining labor as arduous, dangerous, and dirty, the allegorical miner took shape in neoclassical marble, glorious and anonymous. Unlike the infamous six-story statue of Vulcan at the 1904 LPE, the planners of the 1915 Palace of Mining and Metallurgy did not rely on a patron deity. Instead, they called on Albert Weinert to sculpt their vision of a miner. A nearly nude figure stands on a clean pedestal, holding a hammer in his right hand and a pick in his left. He wears a belt with medallions sewn into it, and a loose robe around his midsection, leaving his muscled torso and legs exposed. The whiteness of the stone suggests purity unrealistic of subterranean work, and a racial composition deemed suitable of honest wealth. He faces the rising sun in a niche on the eastern façade of the Palace of Mining and Metallurgy. Absent is a Draegar apparatus or a Kohler lamp; these items did not fit with the myth of the California miner. The forty-niner worked independently, panning the river under the western sunlight, making his fortune by

\textsuperscript{32} Herbert C. Hoover to Charles C. Moore, 13 October 1913, Box 59, Pre-Commerce: Subject, HHPL.

\textsuperscript{33} Charles Moore to Herbert Hoover, 27 October 1913; Herbert Hoover to Charles Moore, 11 November 1913, Box 59, Pre-Commerce: Subject, HHPL.

\textsuperscript{34} For a biography of Herbert Hoover, see George H. Nash, \textit{The Life of Herbert Hoover: The Engineer, 1874-1914} (New York: W.W. Norton, 1983), especially 52-203, 223-244, and 348-474. Hoover’s role in promoting the PPIE in England and Germany is discussed in pages 541-559.
his individual work ethic and absolutely not through expropriating the digging sites of non-White miners or dispossessing Californios or Miwok Indians of their land. The forty-niner did not die in a mine explosion, nor is he crushed when the roof of the mine collapses. He does not die from the slow violence of black lung or silicosis, but spends his later years living off of his fortune in the sun. He is an Argonaut. 35


One of the major silences of mining displays at world’s fairs was the environmental impacts of the extractive industries. For as long as humans have been mining, there has been environmental damage. Gray Brechin references “the father of mineralogy,” Georgius Agricola, to demonstrate the knowledge and acceptance of environmental degradation by the proponents of mining. Agricola's work, *De Re Metallica*, acknowledges the claim of mining's detractors, “Thus it is said, it is clear to all that there is greater detriment from mining than the value of the metals which the mining produces.” Agricola dismissed these detractors by envisioning the use of the money created in mining to restore the damaged ecosystems; the concentration of wealth and power in the hands of the mine owners clearly demonstrated that their priorities did not include environmental stewardship. As seen in chapter eight below, the translation of Agricola was a major project for Herbert and Lou Henry Hoover, and distributed to elite members of the mining finance, management, and engineering industry.\(^6\)

Ecological devastation is particularly evident in the techniques of hydraulic mining, developed in the Sierra Nevada Mountains. River diversion pressurized water, which then scoured hillsides, exposing buried gold while forcibly eroding the soil and leaving the landscape denuded and deforested. Hydraulicking was not the only mining technique that drastically altered the landscape of greater San Francisco via deforestation: “A typical example of deforestation. . . is to be seen on the eastern slopes of the Sierra Nevada, overlooking the Truckee Valley, where the cutting of trees to provide timber for the deep mines of the Comstock left the hillside exposed to erosion, so that today they are bleak,

\(^6\) Brechin, *Imperial San Francisco*, 25-26, 35-37. It is important to note that Herbert and Lou Hoover translated *De Re Metallica* from its original Latin to English, finishing the work in 1912.
barren and hideous.” The polluting effects of mining and metallurgy were known to Agricola; similarly, the mine owners and engineers of the United States were well aware of the environmental impacts of mining, yet the Palaces of Mining and Metallurgy conveyed an alternative, favorable view of the industry.  

World’s fair displays of mining were the direct cultural expression of the extractive industry’s goals. Nothing less than modern western society was at stake. “Mining,” argued Frederick J.V. Skiff, showed “how man conserves the forces of nature to his uses.” According to Van Barneveld, “The main policy of the Department of Mines and Metallurgy was to bring out the dependence of civilization upon the mining industry.” The mining industry depended on militarist forces, economic domination, environmental destruction, and social control. It therefore depended upon, and was integral to the high-modernist, industrial-capitalist American empire. The displays of the 1893 World’s Columbian Exposition, 1894 Midwinter Exposition, the 1904 Louisiana Purchase Exposition, and the 1915 Panama-Pacific International Exposition highlighted this mutual dependency in one of the most powerful cultural mediums of the era.  

37 Mumford, Technics and Civilization, 72; Andrew Isenberg, Mining California: An Ecological History (New York: Hill and Wang, 2005).  
8. THE ACCUMULATED KNOWLEDGE OF A THOUSAND GENERATIONS: MINING ENGINEERS AS PUBLIC INTELLECTUALS

At the turn of the twentieth century, American mining engineers worked in gold mining districts throughout the British Empire, and in the centers of finance and capital. These engineers did much more than design, organize, operate, and finance mines; they acted as agents of empire and reinforced the gold-standard monetary regime and racial divisions in the colonies. They were not all business, however, as the lives of Herbert Hoover, John Hays Hammond, and Hennen Jennings illustrate. Having commanded large salaries for their extractive expertise, these men entered the public sphere in the first decade of the twentieth century through speeches, political activism, publications, philanthropy, interviews, and comments on domestic and international politics. In their public lives, they offered a history and legacy for mining engineers based on a mining civilization, advocated a certain professionalism in the midst of a heated debate within the field, and touted new practices of efficiency and economy. Most troubling, these men held intertwined ideas about labor organization and racial categories, and implemented these ideas in their professional practices and in public comment, joining the larger discourse of scientific racism.

Between 1875 and 1914, the world economy expanded dramatically, and industrial

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1 A version of this chapter is currently under revision for Technology and Culture.
2 See Gray Brechin, Imperial San Francisco: Urban Power, Earthly Ruin (Berkeley: University of California Press, 2006), 13-70, for a discussion of how mining technology dominated industrial development in late nineteenth and early twentieth century San Francisco. Brechin’s concept of the “Pyramid of Mining” is especially useful. Other engineering professions shared similar prestige in the era, however, much of their work either depended upon mining for raw materials (electrical engineering and copper), or used mining technology, such as skyscraper engineers or John Frank Stevens of the Panama Canal, who used open-pit mining technology, such as dynamite, Bucyrus Shovels, and railcars in the construction of the waterway. See also Timothy J. LeCain, Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet (New Brunswick: Rutgers University Press, 2009) for a discussion of early 20th century mining’s centrality to the American economy.
development and technological change ushered in new ideas about the meaning and fate of industrial western civilization. Among mining engineers, a growing certainty of their role in this industrial society emerged. These engineers felt personally responsible for supplying the industrial system with necessary minerals and for undergirding the monetary system, the twin material pillars supporting the triumphant belle époque. Hammond, Hoover, and Jennings spoke and published widely in this unprecedented period of economic expansion, and their rhetoric steered the field of mining engineering towards explicitly discussing its role in shaping Western Civilization, especially regarding the perception of racial difference and hierarchy.

At the turn of the century, mining engineers were on the cutting edge of industrial technology, and engineering seemed to promise a bright future. The mining engineers’ rhetoric about the history of their profession, efficiency and conservation practices, racial hierarchy, and professionalism all contributed to the discourse surrounding the teleological idea of Western industrial civilization as dominant and proper, while positioning mining engineering as a fundamental component of this civilization. While there have been numerous studies on the technical aspects of mining engineering, precisely how these engineers parlayed their experience in mineral extraction into public prominence has not been examined. In retrospect, it is unclear why technical expertise in mining and metallurgy qualified these engineers to act as political and economic leaders on a global scale. How and why did an ability to extract gold from below the earth’s surface suggest an ability to comprehend and manage global socioeconomic problems, well removed from the concerns

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of engineering? This chapter provides a brief historiography of mining engineering and public intellectualism, and then examines their social standing, the creation of a history of the profession through the Hoover’s translation of *De Re Metallica* and hierarchical civilization rhetoric, their thoughts and contributions to the debate on professionalism, advocacy of efficiency and conservation practices, and their engagement with racialist discourse and race-based labor practices. A brief conclusion discusses the roles of Hammond, Hoover, and Jennings with the outbreak of World War I in Europe.

**Historiography**

Andrew Carnegie was far more than a steel magnate. He published extensively, with books such as *The Gospel of Wealth* and *Triumphant Democracy* establishing the idea and precedent of the industrialist as a respected public intellectual. Carnegie’s moral authority arose from his successes in making steel and money; Jennings, Hammond, and Hoover similarly parleyed their expertise and wealth into authority. While there has been much written about mining engineers, many of the works focus on the position of the engineer at the mine, or the intricacies of the profession, few examine their non-technical writing and rhetoric in depth. Clark Spence’s *Mining Engineers and the American West* remains among the definitive histories of the field. Spence details the evolution of the profession in the American West and the habits of many engineers, Hammond, Jennings, and Hoover included. However, Spence paints his engineers with a broad brush, preferring to survey the profession and examine as many men as possible. Spence does offer insights into the reading habits of certain engineers, as well as their portrayal in media and fiction. In *Revolt of the Engineers*, Edwin Layton offers an analysis of engineers across the United States around the
turn of the century by focusing on professional societies and trade publications, but focuses on the internecine struggles between conservative and progressive factions in the engineering community during a turbulent period when the profession expanded by an unprecedented 2000 per cent. More recently, Eric Nystrom has demonstrated that mine maps and models constructed a visual culture and technology of mining engineering, facilitating “access to markets, capital, and engineering talent,” while attempting to control the subterranean landscape. These works focused on the acts, works, and associations of mining engineers, but are limited in their analysis of the intellectualism and public role of engineers beyond their professional commitments.  

Other works in the history of technology also merit consideration, as they speak to the larger construction of technology as White, male, professionalized, and imperialistic. In *Making Technology Masculine*, Ruth Oldenziel describes “how American engineers began to lay claim to a new knowledge domain they called technology while making universal claims for it,” and how they “employed discourse, language, and narrative strategies and practiced a style of engineering that came to support this gendered division of cultural labor.” Similarly, according to Michael Adas in *Machines as the Measure of Men*, Europeans leveraged their perceived superiority in science and technology into ideologies of dominance over non-White peoples, starting in the mid-eighteenth century. Finally, Spiro’s biography of Madison Grant, American eugenicist and conservationist, demonstrates the pervasive and interlocking

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nature of the eugenics movement to the elite scientific, intellectual, and conservation community in the United States. Grant’s *The Passing of the Great Race*, published in 1916, was merely the visible tip of the iceberg of intellectual racism in the United States. Grant associated with influential people at the top of American society, including Theodore Roosevelt, Charles Davenport, Gifford Pinchot, and David Starr Jordan. Hammond knew Roosevelt personally and praised Pinchot; and he was a member of the Boone and Crockett Club, alongside Grant. Hoover frequently corresponded with David Starr Jordan in his role as a trustee of Stanford University. As discussed below, their rhetoric of civilization firmly fit within Grant’s conceptions of racial hierarchy, and Hammond was a believer in eugenics.⁵

The Social World of the Mining Engineer

After publishing *Principles of Mining*, a collection of lectures he delivered to students at Columbia and Stanford, Herbert Hoover felt indebted and humbled. “If I have contributed one sentence to the accumulated knowledge of a thousand generations of engineers,” with his 1909 publication, “or have thrown one new ray of light on the work, I shall have done my share.” Hoover’s experience with the U.S. Geological Survey, engineering projects in Australia and late-Qing China for the prominent British firm, Bewick, Moreing, and Co., and extensive global travels notwithstanding, he was embarking on a new phase of his career. He had made a fortune as an expert mining engineer, and was building on that technological success to position himself as a respected public intellectual as well. Hoover largely entered

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the public sphere through two books, one in collaboration with his equally well-educated spouse, Lou Henry Hoover. Hoover’s first book, *Principles of Mining*, aimed to modernize mining practices among young and prospective engineers. The second book, Lou and Herbert’s translation of Georgius Agricola’s 1556 tome on mining theory and practices, *De Re Metallica*, offered a historical heritage for the profession of mining engineering and tied it to the fate of western industrial civilization.⁶

John Hays Hammond followed a similar path. In 1908, he advocated for the expansion of the duties of the mining engineer into the economic and managerial sides of mining, proclaiming, “He is indeed an engineer of limited usefulness who does not go further professionally than to submit a purely technical report.” Hammond’s globetrotting career spanned from Mexico to the Coeur d’Alene mining district in Idaho, from the Transvaal in South Africa to Colorado and Russia. He was also about to embark on a new phase of his professional career: politics in service of the Republican Party and his old Yale friend, William Howard Taft. Prior to traveling to England for George V’s coronation, Hammond was interviewed by the *New York Times*, and offered advice to ambitious young men. “When a man whose annual income is reported to be $1,000,000—equal to that of twenty Presidents,” the *Times* lauded, “gives advice on the subject of success in life it is worth listening to, for the name John Hays Hammond has spelt success since youth.” While Hammond’s wealth was a sure selling point for his advice, it was not his only qualification in

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⁶ Herbert Hoover, *Principles of Mining: Valuation, Organization and Administration* (New York: McGraw Hill, 1909), iii; Georgius Agricola, *De Re Metallica*, trans. Lou Henry Hoover and Herbert Hoover (1912; New York: Dover Publications, 1950; Mansfield, CT: Martino Publishing, 2014). All references refer to most recent edition. Lou Henry Hoover similarly held an A.B. in Geology from Stanford, and was a member of the AAAS, National Geographic Society, and other professional associations. While Herbert’s fame and expertise provided much of the legitimacy for the commentary in *De Re Metallica*, Lou had better skills in Latin, German, and French, and was responsible for the bulk of the translation.
the mind of the *New York Times*. Hammond’s acquaintance with Barney Barnato, Cecil Rhodes, the Guggenheims, and Taft, as well as his role in the South African Reform Movement and imprisonment for the Jameson Raid helped form his opinions about success, world peace, politics, and the opportunities for young men in the American West.  

In contrast, many of Hammond’s public pronouncements took the form of articles for professional and popular presses, speeches and toasts to slices of high society and trade groups, activism for the Republican Party and the National Republican League, and interviews and profile pieces in such major newspapers as the *New York Times*. Given his association with the *haute finance* elites of his day and his legendary salary, Hammond also enjoyed access to such exclusive clubs as the Century Club, the Boone and Crockett Club, the Rocky Mountain Club, and others.

As the senior engineer of the three, Hennen Jennings had retired to Washington D.C. in 1905, building a palatial mansion. His expansive career in the Transvaal defined the district, but his retirement was not spent in idleness. Aside from working as the consulting engineer for the Conrey Placer Mining Company in Virginia City, Montana, Jennings served on the boards of various philanthropic endeavors in the D.C. area. His style was much more restrained than Hammond and Hoover; he made few public statements and preferred a more organizational or managerial approach in his public role. When asked the reasons for his success in a 1915 interview with T.A. Rickard, Jennings replied, “Whatever success I have had has not been due to the possession of any particularly brilliant brain, but to hard work

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with interest in it, and to the coming into kindly contact with men about me,” namely other skilled engineers and managers. At the time of his conversation with Rickard, Jennings chaired a section of the Second Pan-American Scientific Congress, and he was soon to volunteer his services for the U.S. Bureau of Mines during the Great War. It was in this position that he produced his famous article, “The Gold Industry and Gold Standard,” a warning to the allied powers about Germany’s wartime debt exceeding the world’s gold reserves, thereby threatening the metallic monetary system. In the press, Jennings was hailed as a “Mining King,” and a “South African Multi-millionaire.” The prestige and material affluence of these engineered placed them on a pedestal, and their views on moral, social, and political issues gained credence.⑧

Creating a History of the Profession

Herbert and Lou Hoover’s frequent steamship travels left plenty of time for scholarly work as they traversed the oceans en route to the next engineering project, while imbuing them with a global perspective and a sense of scale. Following his 1908 resignation from the board of Bewick, Moreing & Co. at the age of thirty-four, Hoover founded his own consulting company. This gave Herbert and Lou the time and available capital to study the classics. He read voraciously during these voyages and years, becoming “interested in the older literature of engineering and applied science,” and amassing “quite a collection of fifteenth and sixteenth century books on early science, engineering, metallurgy, mathematics,

alchemy, etc.,” including a copy of Georgius Agricola’s *De Re Metallica* in the original Latin. Beginning in 1907, the Hoovers began their translation efforts on this book, a project which took the better part of five years, in which they “lugged the manuscript all over the world for the odd moments that would be available to work on it.” While Herbert provided the technical expertise, Lou had the stronger language skills, and Herbert credited her “for her patience in the drudgery of medieval Latin, German, and French grammar and syntax.” Finally, *The Mining Magazine*, based in London under their friend Edgar Rickard and Albert Frost and Sons publishing, agreed to publish a limited run of three thousand copies.9

Despite its benign appearance, *De Re Metallica* represents much more than a translation of an obscure text on mining practices in sixteenth-century Saxony, written by a German physician and intellectual. Instead, the translation reflects an appropriation of central European mining heritage by a new generation of mining engineers in a thoroughly industrial system. In the translator’s preface, the Hoovers were unabashed about reinforcing the historical legacy of the profession of mining engineering. “If the work serves to strengthen the traditions of one of the most important and least recognized of the world’s professions,” they wrote, “we shall be amply repaid.” As an engineer responsible for worldwide mining investments and operations, Herbert Hoover saw the ties of the scientific extractive industry to industrial civilization, and linked it to the famous Latin mining text from Saxony: “Science is the base upon which is reared the civilization of today, and while we give daily credit to all those who toil in the superstructure, let none forget those men who laid its first foundation stones.”10

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10 Agricola, *De Re Metallica*, v, xv.
The translation of *De Re Metallica* helped the profession define itself and its own history. It was widely distributed in Hoover’s professional community, both as a gift to other engineers and for sale. Certainly, no modern mining engineer would consider using twigs as divining rods to find mineral veins, yet the Hoovers gifted 1,500 of the 3,000 copies to fellow engineers and institutions, offering the remainder for sale through Rickard’s firm for five dollars each. The Hoovers presented both Hennen Jennings and John Hays Hammond with a copy. Hammond called *De Re Metallica* a “Magnum Opus,” which would “long remain a classic on the subject,” and Jennings imagined that the Hoovers’ translation was “undertaken as a matter of love.” H.F. Bain, of the *Mining and Scientific Press*, lauded the Hoover’s efforts “in dignifying the profession and building up its best traditions.” The translation of Agricola was so well received in the mining engineering community that the Mining and Metallurgical Society of America (MMSA) produced its first gold medal in its organizational history, awarded to the Hoovers for “distinguished contributions to the literature of mining.”

*De Re Metallica* represents several major trends. First, it appropriates the mining legacy of both sixteenth-century Saxony and of the ancient Mediterranean civilizations by American mining engineers as a means of legitimizing their profession. Agricola frequently references antiquity, with views on mining and mineralogy from Ovid, Sappho, Pindar, Virgil, Timoecles, and a phalanx of other dead Greeks and Romans. At the time of Agricola’s original writing, Saxony was the preeminent mining district of the western world regarding technical mining. Sixteenth-century Spanish mines in Central and South America produced a

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11 “Publication and Reception of De Re Metallica,” November 1913, Special Collections—Books, Box 12, Hoover Presidential Library, hereafter HPL; W.R. Ingalls to Herbert Hoover, November 19, 1913, Special Collections—Books, Box 13, HPL.
higher quantity of mineral products, especially silver, but at a horrifying cost in both human lives and environmental damage under the brutal *mita* system of coerced indigenous labor. Saxony’s technical preeminence in the sixteenth century eventually led to the founding of Freiberg Mining Academy, a foremost institution of technical mining education and the *alma mater* of John Hays Hammond.12

Most importantly, the translation of Agricola established mining as an integral part of Anglo-Saxon civilization in the economic geology community. Dr. Rossiter W. Raymond, long-time special contributor to the *Engineering and Mining Journal*, and secretary of the American Institute of Mining Engineers reviewed the translation of *De Re Metallica* for the *American Historical Review*. Raymond lauded Agricola’s efforts “to clear away the rubbish of tradition, superstition, and alchemy, and to lay the foundations of modern geology, mineralogy, and metallurgy. His work and his character alike mark him as truly great.”

Regarding the Hoovers’ translation, Raymond stated, “Fame is not merely merit, but merit recognized by many men,” and the Hoovers “could find their greatest satisfaction in the knowledge that they have contributed in no small degree to such a reward for illustrious service.” Mining, as practiced in ancient Greece, Rome, Saxony, in the American West by Cornish miners, and by American engineers in British colonies became equal to that of agriculture or commerce, since, as Agricola argued, “If there were no metals, men would pass a horrible and wretched existence in the midst of wild beasts.” The practices of American mining engineers operating around the world received provenance from the legendary mines of antiquity through the woodcuts, while at the same time highlighting the

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technological advances made since the days of Agricola. Essentially, the Hoovers claimed the legacy of mining in Ancient Greece, Rome, and Saxony, thereby constructing a teleological history of mining as an instrumental part of Western Civilization and industrial capitalism.\(^\text{13}\)

In a 1914 speech celebrating the quinquagenary anniversary of the founding of the Columbia School of Mines, Hennen Jennings echoed the rhetoric surrounding *De Re Metallica* and the ties of mining to industrial civilization. “To consider man without the earliest primitive contributions of the miner,” Jennings opened his speech, “takes us back to savagery.” In fact, according to Jennings, agriculture was impossible without early metal tools. Agriculture provided early man with “food for existence, but mining gives him the materials for power, art, and civilization.” The miner and metallurgist, and later the professional mining engineer, bore responsibility for the advancement of industrial civilization to its prewar apogee. Jennings cites the statistics of industrial development since the 1864 founding of the Columbia School of Mines, and noted a twelve-fold increase in global bank deposits, a major increase in the mining and production of all the major economic minerals, and an exponential growth of membership in technical societies. Overall, he articulated the dramatic growth of the world economy in the end of the nineteenth century, evident in expanded mineral production and other metrics. The great gold discoveries of the American West, Australia, and the Witwatersrand, and subsequent advances in mining technology were unilaterally responsible. “It would appear that mining and metallurgy, after dwelling in a lowland of drowsy accomplishment for centuries,” Jennings concluded, was then “pioneered and stimulated by great gold discoveries, sprang

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into great activity, and by leaps and bounds, all within the life of this School of Mines.”
Western industry and civilization, according to Jennings, owed much to mining and technical
education.14

Professionalism in Practice and Principle

Arguing for an era of “expansion” in the role of the mining engineer, John Hays Hammond pointed out that “the great majority of problems presented to the engineer ultimately involve the determination of the pecuniary relations of the propositions under consideration.” Hammond advocated an unrepentant honesty on the part of the engineer as part of their professional ethic—a quality that at least some previous engineers sorely lacked—especially concerning relations with employers and investors. In the United States, engineers and engineering societies from the major disciplines had debated professionalism and their roles and relations with their employers and the public, as detailed by Edwin Layton. Engineers stood at the margins, and were “expected to be both a scientist and a businessman.” This rang especially true for mining engineers, as financial concerns and profitability dictated the viability of any mine. These engineers participated in the contemporary debate over professional standards and ethics, which led to the formation of the MMSA in 1908, of which Jennings and Hoover were members.15

Hammond participated in the professionalism debate through articles and public statements. He even espoused a Golden Rule for experts: “Tell unto others, now, whatsoever

14 Hennen Jennings, Mining as a Profession Including First Stages of Metallurgy (Mining and Scientific Press, 1914), 1, 6-7, Box 31, Hennen Jennings Collection, AHC.
you would not have them tell on you (with unjust misunderstanding and scandalous comment) hereafter!” In fact, the necessary honesty of the engineer made them “preeminently qualified” not only for technical work but also for a public and political role. “His scientific training,” Hammond argued, “makes him an expert in the determination of fact.” Furthermore, a competent engineer “is called upon to exercise great tact and diplomacy, to possess energy, personal courage, resourcefulness, characteristics vitally essential to his professional success,” and therefore benefitting a role in the public eye. While Hammond may have been overly laudatory of his chosen occupation, his success as a mining engineer reflected the professionalization of the practice, and his financial compensation mirrored this trend.16

For Hennen Jennings, professional engineering mandated an evidence-based approach and a clear understanding of the financial situation. “The essence of engineering ethics is to obtain full truth, first for himself, then to give it in full to his employer,” Jennings preached to a convocation of young mining engineers, “In writing reports for private owners, the engineer should protect himself and the public by placing before himself, and then on record, all facts obtainable in any way bearing on the problem.” Jennings believed that the economic concerns of a mining operation should remain foremost in the mind of the engineer, as “one of the most valuable experiences a young engineer can obtain is a good insight into the accounts and commercial considerations at the very outset of his career.” Indeed, professional organizations of technical experts held promise for a more stable and profitable extractive and industrial industry. “The transactions of the mining and other

engineering societies, as well as the honest and high-class publications of the leading technical press,” provided the industry, its engineers, and investors, with “such an educational light that it is hoped and believed that mining exploitation by the stock exchange is very much on the wane.” Such exploitation by the mining stock market belittled “the good name of a basic industry upon which modern civilization rests.” It was up to the professionalism of the engineer to ensure steady and profitable mineral production, and by extension, shore up the foundational industry of western civilization.17

Similarly, Hoover realized the mandate for unimpeachable character in the field of mining engineering, due to the implicitly pecuniary nature of the mining engineer’s position. Hoover labelled it “the most dominant characteristic” of the profession, with “a gradual evolution. . . altering the larger demands on this branch of the engineering profession from advisory to executive work.” This financial acumen was necessary for a mining engineer because, as he emphasized, “Mines are operated only to earn immediate profits,” to finance continued development. Hammond, Hoover, and many other professional mining engineers realized that charlatans and unscrupulous promoters were a cancer on their professional reputation. For Hoover, this came out of his long experience battling speculators and swindlers in Australia and London. Indeed, he saw honest dealings as integral to the profession and espoused a certain pride in technical and financial competency. “There is the right of every red-blooded man to be assured that his work will be a daily satisfaction to himself,” Hoover proposed, and “that it is a work which is contributing to the welfare and advance of his country, and that it will build for him a position of dignity and consequence

17 Jennings, “Mining as a Profession,” 9; T.A. Rickard, “Hennen Jennings, and Mining on a Big Scale,” Mining and Scientific Press (December 25, 1915), 960, Hennen Jennings Collection, Box 1, AHC; Jennings, “Mining as a Profession,” 8-9.
among his fellows.”^18

While these engineers realized that the shift of mining engineering from the competent miner to the university-educated and technically-experienced engineer had been a phenomenon of the past half-century, they likewise perceived their role as the logical extension of the mine management ethos with the prerogative to increase mine profitability. It was their duty to instill a certain professionalism in the next generation as a means to ensure the continuation of a vital industry.

Efficiency, Conservation, and White Trade Unionism

This professionalizing impulse extended into another major aspect of Hammond, Jennings, and Hoover’s new role as public intellectuals: their advocacy for conservation and efficiency practices, or, as Layton defines it, “scientific planning applied to natural resources.” Within the field of mining, efficiency practices became necessary as lower-grade ores became more commonly processed; however, efficiency became a rallying cry well beyond the purview of the mine.19

As Hammond entered the public political arena, his expertise in mining and resource management lent to discussing the use of the nation’s natural resources. To Hammond, “the future industrial development in the Southern States depends upon the adoption of a wise policy in the conservation of its natural resources,” especially coal. Hammond was “tempted to use the term ‘utilization’ as tantamount to conservation.” Echoing a USGS official, conservation was “Utilization with a maximum efficiency and a minimum waste.” Efficiency

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^18 Hoover, Principles, 124, 126, 128; The Memoirs of Herbert Hoover, 131-134.

mandated wise-use policies as well as regulation on an industry-wide scale; yet national industrial development was “dangerously approaching the Charybdis of cut-throat competition in order to avoid the Scylla of monopoly,” most notably in the coal mining industry in the South. Due to competitive prices, Southern coal mining interests often gutted their mines, extracting only the highest-grade coal and abandoning the less easily accessible deposits.\(^{20}\)

Inefficient mining also compromised worker safety. “Not only is there an irreparable loss of mineral products indispensable to the industry of future generations,” an infuriated Hammond contended, “but what is far more deplorable and inexcusable, the accompanying loss of human life.” Efficient conservation practices, then, benefitted the corporations in ensuring continued profitability, the workers in ensuring a safe work environment, and future generations in guaranteeing supplies of resources necessary to industrial civilization. Conservation, therefore, contributed to a positive view of regulated industrial development, in which resources such as Appalachian coal could be conserved for use by future generations through efficiency practices and the regulations of prices and supply, ensuring both profits for present mine operators and a necessary economic mineral for future industrial use. For its continued growth—and at the dawn of the twentieth century this growth appeared fantastic—the industrial fossil-fuel basis of the United States required protection against wasteful cutthroat competition while ensuring proper motivation and compensation for the mine operators.\(^{21}\)

For Hoover, efficiency practices defined his career as a “doctor of sick mines.”

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\(^{21}\) Ibid.
went so far as to refute the economist’s formulation of wages as based upon supply and demand of labor and jobs, arguing, “the academic economist” needed to “recognize that in these days of international flow of labor, commodities and capital, the real controlling factor in wages is efficiency.” Hoover even saw this failing as the root of “insensate dispute as to wages” between employers and employees. Given his claims that mining was an industry based entirely on profitability, basing wages on efficiency mandated action on the part of both capital and labor in ensuring the use of the most efficient methods. However, Hoover’s paean to efficiency took a technocratic turn, presaging Frederick W. Taylor’s 1911 Principles of Scientific Management, by transmuting workers into “human units,” the “proper coordination and efficiency of” each being one of three elements of sound management. “The whole question of handling labor,” Hoover argued, “can be reduced to the one term ‘efficiency.’” Hoover followed this line of logic into a treatment on the productivity of miners of various races, as discussed below.

Efficiency and technology combined to undertake previously unimaginable feats of mining in Jennings’ opinion. Speaking on the use of large-scale dredging equipment in Montana, Jennings queried, “How many men with mere muscular energy at their command and primitive appliances would it have taken to do this work?” He quickly provided an answer: “it would appear that the miner, mechanic, metallurgist, chemist, engineer, and scientist have increased the laborer’s power in this instance a thousandfold [sic] and created for him work necessarily abandoned under old conditions.” In Jennings’ view, efficiency and technology enabled monetary expansion through the gold standard, allowing for

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unprecedented industrial expansion. “Gold coins,” according to Jennings, “can be considered storage cells of human energy, as to obtain them labor of hand and brain must be expended.” This storage of efficient human energy, enabled by technology and expertise, gave out “strong genial currents of trade confidence, circulating and binding trade, and bringing together different industries and peoples in different lands.” Efficient and technologically-advanced mining practices, therefore, bound together world trade.

Both Hoover and Hammond supported trade unionism, provided it was of the moderate variety. Hoover saw unions as “normal and proper antidotes for unlimited capitalistic organization,” which grew alongside of corporations. He described two phases of unionization, the first characterized by “demagogic means,” which led to “injustice in demands, and for violence to obtain them.” Obviously, as a mining engineer responsible for the profitable operation of an extractive enterprise, this first phase was especially dangerous. However, after time passes and unproductive “violence disappears in favor of negotiation on economic principles . . . the unions achieve their greatest real gains.” An economically-focused trade union willing “to approach difference in a business spirit” was intensely beneficial, as “there are few sounder positions for the employer, for agreements honorably carried out dismiss the constant harassment of possible strikes.”

Hammond, despite his draconian attitude toward the Industrial Workers of the World and the Western Federation of Miners, and his close association with the labor unrest of the Coeur d’Alene district in 1892 and Cripple Creek in 1903-1904, supported the

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24 Hoover, Principles of Mining, 167-168.
unionism of the American Federation of Labor. He was a personal friend of Samuel Gompers, describing him, as “the best labor leader we could have found in those days. He stood out against the arbitrary, narrow, and selfish employer, and against the militant radicals in his own party.” Despite a profound belief that “large aggregations of capital” constituted “one of the inevitable phases of industrial evolution and of human progress.” In theory at least, Hammond felt that trade unionism was beneficial to industry as a whole, provided it was not infected with radicals, anarchists, and communists.\(^\text{25}\)

Hennen Jennings was less clear in offering support for trade unionism. However, he envisioned the engineer as an empathetic conduit between corporate ownership and shareholders and the workers. An engineer who has “worked for wages,” and who has “been thrown into intimate contact at the formative time of life with the ordinary wage earner, on equal terms, have obtained an experience most desirable and most necessary.” Given the aggregations of capital necessary for large-scale, low-grade mining, the isolation of workers from shareholders was concrete. Jennings was the consulting engineer for the Conrey Placer Mining Company in Virginia City, Montana—a company whose major shareholder was the McKay Endowment Fund of the Lawrence Scientific School at Harvard University. The miners of the Conrey Placer Mining Company likely had little interaction with Harvard, much like many miners would never meet a shareholder. “In these days of impersonal corporate ownership,” Jennings argued, “the closest and most intelligent link between capital and labor is that of the engineer.” A competent professional, therefore, must “know the life, ambitions, and viewpoints of each, and bring wisdom and sympathy to both sides, in the

bitter and dangerous struggle that is now going on between those, so intimately bound and tied together, that the paralysis or death of one, means the same for the other.” While I have not found Jennings’ articulated position on unionism, he expressed empathy for the plight of White miners.\textsuperscript{26}

This rhetoric of efficiency, conservation, and conservative unionism mirrored the larger economic progressivist narrative of the early twentieth century, from Frederick W. Taylor’s scientific management principles to government intervention in preventing undue monopoly or cutthroat competition to the growing conservation movement spearheaded by Theodore Roosevelt, Madison Grant, and Gifford Pinchot. However, Jennings, Hammond, and Hoover articulated another, darker aspect of progressive thinking, prolific in the era: the notion of racial difference as a scientifically quantifiable phenomenon.\textsuperscript{27}

\textbf{The Rhetoric of Racial Difference}

Holding racist beliefs in the early twentieth century was largely the rule and not the exception, particularly in the White, educated, and elite circles of Hammond, Jennings, and Hoover. Perceived racial differences became the basis of disparities in wages paid and working conditions, and these three engineers used race as justification. Twenty-seven years of experience as a consulting engineer informed Hennen Jennings’ views on racial difference, when in 1904 he argued for the importation of Chinese labor to the Rand. He pointed to his management experience “in handling labour in California, Venezuela, and the Transvaal,” which involved directing “all classes of white labour, Mexicans, Kaffirs, and—for a short


\textsuperscript{27}Spiro, \textit{Defending the Master Race}, 52-72, 138-139.
period—Chinese.” This experience, in Jennings’ view, enabled him to judge the respective value of laborers based on the melanin content in their dermis and their geographic origins. Jennings concluded that the best way to reduce labor costs on the Rand would be “by making the white men supply the brains and paying them well, but the greater portion of the muscle must be supplied by another race, one that will be satisfied not to enter the white domain, and will cheerfully work for wages far below those required by the white population.” Only White men possessed the necessary intellect to operate a crew of miners, relegating non-White labor to a status similar to draft animals. Racial difference, therefore, was crucial to the efficient and cost-effective management of a mining enterprise.28

Jennings’ comments on the necessity for White labor to supply the brains in mining operations came in the midst of the 1904 shortage of African labor on the Transvaal. Following the Anglo-Boer War, African miners were understandably reluctant to return to the dangers of deep-level mining, low wages, and the restrictions of the native compounds, a base of apartheid. As a solution, mine operators on the Rand began importing indentured Chinese laborers, in a condition that historian John Higginson considers as “something just short of bondage,” with a “chilling resemblance to modern slavery.” Between June 1904 and June 1905, the mine operators imported 41,340 Chinese laborers to replace South African laborers driven away by reduced wages and poor working conditions. Herbert Hoover, while not directly managing any of the mines on the Transvaal, was nevertheless involved in the importation of Chinese labor through the Chinese Engineering and Mining Company, a

primary recruiter of indentured labor for the mines of the Rand.²⁹

Mine operators of the Rand seem to have dramatically overestimated the tractability of Chinese laborers. They refused to serve as mere draft animals or muscular machines. Beginning in June 1905, indentured Chinese miners fought to resist the violence perpetrated by the White workers and overseers through labor riots and assassinations. Per Higginson, “mining officials at some of the larger deep-level mines sought and received permission to try, sentence, and imprison Chinese workers on the mining sites themselves,” frequently resorting to flogging and torture to ensure compliance. By late August, hundreds of Chinese miners engaged in open conflict with “armed white supervisors and skilled workers” on the grounds of the Nourse Deep. Further struggles ensued; the division between skilled White miners and Chinese miners widened, eventually contributing to the 1907 strike of White miners.³⁰

Given Hoover’s participation in the Chinese Engineering and Mining Company’s contracting of indentured Chinese labor for the Transvaal, his statements on racial difference in mining labor in Principles of Mining seem to have been informed by the violent failure of the Chinese labor experiment on the Rand.³¹ In discussing mine administration, Hoover preferred White labor, and attempted to scientifically quantify the differences in efficiency between the groups, thus justifying extreme wage disparities to the future mine engineers.

“The lower races,” Hoover argued, “require a greatly increased amount of direction, and this

³⁰ Higginson, “Privileging the Machines,” 23-25.
³¹ Ibid.
excess of supervisors consists of men not in themselves directly productive. There is always, too, a waste of supplies, more accidents, and more ground to be kept open.” Furthermore, the higher intelligence of American and Australian miners made “the ratio of efficiency as measured in amount of output works out from four to five colored men as the equivalent of one white man.” Hoover then compared the output and cost per ton of material at mines employing “colored” and “white” men at several mines in India, Australia, the Witwatersrand, and the United States. Not surprisingly, given the trends of early twentieth century racialist pseudoscience combined with his passion for productivity, Hoover’s calculations found White American and Australian miners to be overwhelmingly more efficient. 

Unlike Hoover, Jennings persisted in his belief of the necessity in implementing racial hierarchies in labor organization. In a 1915 interview with T.A. Rickard, Jennings considered it a pity that importing Chinese labor had stopped “on economic lines,” and he saw “no moral ground why this scheme should have been abandoned.” Racial hierarchy in mining labor was useful, because “even at a higher wage, the work of the Chinese averaged better than that of the Kaffir or native black African.” Granted, Jennings had long since retired from engineering on the Rand, but he persisted in seeing the value of a workforce organized and compensated on the basis of race for cost-effective mining. Considering his theory of gold coins as “storage cells of human energy,” as articulated in “The Gold Industry and Gold Standard,” there seems to be a disparity between the effort exerted by non-White miners and the value of that labor in securing gold for the world monetary system. “To obtain them labor of hand and brain must be expended,” Jennings argued, “in fact, they are

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32 Hoover, Principles of Mining, 161-165.
thus charged with human electromotive force.” Continuing his metaphor, Jennings described
the watts of the coin as “the labor force stored,” which included the “work of managers,
engineers, metallurgists, chemists, overseers, mechanics, and other skilled laborers, as well as
the more unskilled work of drillers, trammers, shovelers, etc.” It is hardly surprising that
unskilled labor occupies the lowest tier in Jennings’ statement, as non-White workers on the
Rand only occupied unskilled positions at the time of his writing. 33

Hammond’s racism was much more explicit, lacking the justifications of efficiency to
veil the prejudice. A key tenet of racialist thinking relied on different and advancing stages of
civilizations, teleologically culminating in European industrial civilization as the perceived
highest form. As a mining engineer, Hammond viewed mining as an indicator and necessary
condition of civilization. As a racialist, he believed that certain racial groups were capable of
mining, while lesser races would be incapable. In his 1895 surveys of Matabeleland,
Hammond found ancient gold mining works that had been abandoned. Refusing to attribute
the characteristics of civilization to the indigenous peoples of southern Africa, Hammond
instead believed in a “gold mining race,” whose “extermination” at the hands of “the negro
tribes who have occupied the country since” led to the abandonment of the workings. This
ludicrous theory, however, directly contradicts both archeological evidence and oral
tradition, which came out of later research in the region. Hammond attributed the
abandoned gold mines to the biblical reign of King Solomon, calling them the mines of
Ophir. As a professor at Yale’s Sheffield Scientific School, Hammond offered a lecture
entitled “The Land of Ophir,” and maintained his position on the mines as a product of

33 Rickard, “Hennen Jennings, and Mining on a Big Scale,” 970; Jennings, “The Gold Industry and Gold
Standard,” EMJ 105, 872.
King Solomon and biblical civilization in his autobiography, published in 1935. Hammond’s *rediscovery* of King Solomon’s mines was an attempt to claim a biblical legacy for his profession while denying the indigenous Africans a key aspect of civilization—the ability and desire to mine gold.  

Hammond took a paternalistic tone toward Black Americans in the South as well. He espoused industrial education as “a great opportunity for the colored people of the South,” to better their material circumstances while remaining subservient. This was in response to “foolish suggestions for exportation, made by doctrinaires, both among your own people and among dreamers of the white race.” He echoed Booker T. Washington’s approach toward technical education, but with the caveat of strictly defined racial roles. He further mandated that “with this education must go the elevation of your moral standards and your sense of duty” to the structures of White supremacy in the American South.

Hammond’s racism did not stop with people of African descent. Following the 1905 Russo-Japanese War, he warned that the U.S. and Great Britain must cooperate in naval matters in the Pacific in defense against an ascendant Japan, in what would seem an odd arena of commentary for a mining engineer. American commercial interests in the Far East faced a threat from “Those victorious islanders who are cradled on the sea,” and who have “shown such a splendid capacity for naval warfare.” Hammond feared the ascent of the Japanese in the Pacific as a threat to Anglo-American naval dominance, echoing Alfred Thayer Mahan’s *The Influence of Sea Power Upon History*. To protect American interests, the

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35 John Hays Hammond, “Note to Southern Blacks,” (1908), Box 6, Folder 3, JHH papers.
U.S. needed to expand its Pacific Fleet; further, “the most intimate relations must characterize the diplomacy of the two great English-speaking races.” Hardening “racial antipathies” against the Japanese on the west coast of the United States presaged a “bitter” contest for “commercial supremacy in that part of the world.” Hammond lamented an opportunity lost regarding trade and development in the Far East with Russia’s defeat in 1905. Instead of the Open Door policy in the East, American commercial interests now faced a racial threat from an ascendant Japan.\textsuperscript{36}

Hammond firmly supported the Eugenics movement:

I think it would be a great mistake if the science of Eugenics were carried to the extent of mathematical certainty. I would prefer to go elsewhere than associate with perfected beings. I should like to preserve some of the endearing frailties of mankind. We have, however, a big task before us in the eliminating the undesirables. Let us do that first.\textsuperscript{37}

Racialism pervaded Hammond’s thinking and career as an engineer and public intellectual. Granted, these examples only constitute a sample of all of his public addresses and writings. To be sure, much of his activism for the Republican party and on matters of engineering, conservation, and other issues did not specifically address racial difference. However, belief in racial difference was one of the lenses through which he viewed the world, and he communicated these theories from a position of technocratic authority, lending the perspective of a man of wealth, experience, and intellect to an oppressive system. His later fascist sympathies come


\textsuperscript{37} “Interview with Purinton,” October 1914, Box 6, Folder 9, JHH papers. See also, Eric Hobsbawn, \textit{The Age of Empire, 1875-1914} (New York: Vintage, 1987), 253-258.
Conclusion: The Great War

Prior to the outbreak of war in Europe, both Hammond and Hoover became politically active within the Republican Party, with Hammond founding the National Republican League at a personal cost of $30,000. Hoover later joined Hammond’s organization. Hoover also joined the board of trustees of Stanford University, while Jennings served on the board of trustees of George Washington University. Hoover and Hammond lobbied European governments for participation in the 1915 Panama-Pacific International Exposition (PPIE) in San Francisco, while Jennings vocally supported the fair. As the guns of August heralded the end of the belle époque, these three men worked to ameliorate the conflict. Most famously, Hoover resigned from his role in promoting the PPIE in London and immediately began coordinating the evacuation of American tourists from England. He then formed the Commission for the Relief of Belgium (CRB), feeding millions of war-ravaged people in Northern Europe.

Hammond had been encouraging peaceful negotiations between European nations since before the outbreak of the Great War, albeit along nationalist lines. He had advocated and pursued a system for the peaceable settlement of international disputes through judicial means, and for expanded international trade and cooperation. Some of this, granted, was due to his enduring friendship with President Taft, and some of it may be attributed to a desire

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38 In John Hays Hammond, “The Jameson Raid and the World War,” *Scribner’s Magazine* 79, No. 3 (March 1926), 227, Hammond is openly sympathetic with the rise of fascism in Europe, and argued “The Reform Movement [of South Africa] which planned the revolution has been much misrepresented by Boers. The truth about it is that it was Fascist rather than Bolshevist in its nature. That is to say, it was undertaken by hard-headed, successful, conservative men of affairs, and not by hot-headed, irresponsible radicals.”

to ensure the future of Anglo-Saxon civilization, but much of Hammond’s activism was due
to a sincere wish to avoid a catastrophic conflict based on the technologies he, as an
engineer, understood as having devastating potential. As the war progressed, Hammond
presided over the World Court League and joined Taft in the League to Enforce Peace as a
member of the permanent Executive Committee. Their efforts were in vain.⁴⁰

Hennen Jennings also realized the paradoxes of the Great War, mining, and
industrial capitalist civilization. In early 1915, as he chaired his section of the Second Pan-
American Scientific Congress, he came to the conclusion that “the miner, metallurgist,
scientist, and engineer unlocked and tapped great force fountains” which the modern world
had “not had time to properly digest its uses or control the haste, greed, and waste that has
been brought in its train. And, although these forces have made possible the construction of
the Panama Canal or the San Francisco Exposition, they are correspondingly responsible for
the European War.” Jennings realized the contributions of mining engineers to the industrial
system, and the powers which industrial mining unleashed on Europe. He volunteered his
services to the U.S. Bureau of Mines during the Great War, working tirelessly despite his
advancing age. He died of a heart attack in 1920. Charles Janin, another mining engineer of
wide repute, considered “that his death is as directly caused by the war as was the death of
many who went to the other side.”⁴¹

These three engineers expanded their field into new frontiers, both geographical and
technological. As their mining careers began to wind down, they became respected public

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⁴⁰ The Autobiography of John Hays Hammond, 2:611-657; Special to The New York Times, "LEAGUE TO
ENFORCE PEACE IS LAUNCHED," New York Times (1857-1922), Jun 18, 1915,
⁴¹ Hennen Jennings, opening remarks, Proceedings of the Second Pan-American Scientific Congress (Washington:
Government Printing Office, 1917), 11, hdl.handle.net/2827/osu.32435065451189; Hennen Jennings
Collection, Box 1, AHC.
intellectuals, albeit in different ways, and according to their personalities. Jennings was reserved, preferring to serve on the boards of charities and institutions. Hoover chose to write and publish, commenting on his field’s origins and future, and then used his managerial skills to run the Commission for the Relief of Belgium. Hammond, ever bombastic, dove into activism and reveled in the public eye, advocating for everything from the World Court to better care for people with tuberculosis to standardizing state laws. If anything, they epitomized the ideas of American elites in the prewar period, articulating a firm belief in technological progressivism, efficiency and conservationism, engineers as the new professionals, and the rhetoric surrounding the intersectional ideas of race and civilization based on technology. These ideas had a major impact on both domestic and international affairs, much as their engineering careers affected their field and the world economy of the late nineteenth century. Hammond may not have been an elected official, but he was a trusted friend of William Howard Taft. Jennings, ever the expert administrator, quickly fell into an influential bureaucratic position. Hoover, once he began evacuating tourists from London, realized “on August 3, 1914, my career was over forever. I was on the slippery road of public life.” What Hoover did not realize was that his “slippery road” had begun years earlier, as had the roads of the other engineers to public life.\footnote{\textit{The Humanitarian Years,} Herbert Hoover Presidential Library and Museum, accessed 6 January 2017, \url{https://hoover.archives.gov/exhibits/Hooverstory/gallery02/index.html}.}
9. CONCLUSION: AN EMPIRE ENGINEERED

“There are many hundreds of American engineers in the employ of English concerns, and almost universally they are in executive positions. The whole of the gold mining industry practically is under the direction of American Engineers, and England owns mines yielding fully seventy-five percent of the gold output of the world, and the American form of administration has been introduced into this industry almost universally.” --Herbert C. Hoover, 1904.¹

Herbert Hoover, John Hays Hammond, Hennen Jennings and their subordinates were among legions of American mining engineers around the world before the Great War. The mines they controlled contributed to the unprecedented expansion in gold production between 1890 and 1914. These three engineers warrant study because of their prominence in the field; they were at the top of their industry and wielded vast resources. Their professional biographies not only demonstrate these men’s clout, but also suggest that the careers of other mining engineers around the world may have followed similar trajectories—there were thousands of mining companies operating in Africa and Australasia in the first decade of the twentieth century, each requiring engineering expertise for profitable mining.²

These engineers directed international investment capital into their mines, whether through wages paid to miners or installing technology to improve treatment and efficiency. This facilitated investment was for the purposes of profit in dividends paid to shareholders through the sale of gold to central banks, such as the Bank of England. A key principle shared by investment capitalism and imperialism is growth through expansion, whether through the entanglement of territorial holdings or the expansion of gold production; capital and empire rests on accumulation while simultaneously destroying and reconfiguring

boundaries. The careers of these three engineers also transcend boundaries and borders, whether it was Hennen Jennings’ supervision of the El Callao mine in Venezuela or the Eckstein group in South Africa, Hoover’s role in China during the Boxer Uprising, or Hammond’s work in Mexico in and southern Africa, each engineer traversed the globe and worked on multiple continents, directing capital toward mineral extraction.

Their careers left a legacy of environmental destruction that is inherent in the mining industry. Auriferous ores must be destroyed to extract the valued gold. This profitable destruction extended onto the landscape, especially in Australia. The Sons of Gwalia and the low-grade mines around Kalgoorlie transitioned to open-pit mining, leaving gaping holes on the land. Today, there is even a Bed and Breakfast on the rim of the Sons of Gwalia pit in the brick manager’s house Hoover ordered constructed, “where guests, museum visitors and travellers can enjoy coffee on the verandah overlooking the vast open pit of the modern gold mine.”

The Kalgoorlie Super-Pit is visible from space and is still in operation, extracting gold atoms that were forged in the collision of neutron stars. On the Witwatersrand, there is serious concern about acidic contaminated water seeping out of the mines and tailing dams and infiltrating other aquifers. This contaminated water has a pH around 3.5, and contains traces of sulfates, uranium, nickel, zinc, chromium, and other metals. According to Suvania Naidoo, a sustainable development expert at the University of South Africa, this acid mine drainage has serious socioeconomic impacts when it contaminates other water sources.

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6 Suvania Naídoo, “An Assessment of the Impacts of Acid Mine Drainage on Socio-Economic Development
Mining contamination persists in the environment for years after the mines close, and toxins accumulate in the bodies of the people living and working in and near the mines—they bear the social and environmental costs, while the profits return to investors. As racialism was an operating principle for American mining engineers abroad, these devastated sites of mining are also legacies of environmental racism. Granted, Hammond, Hoover, and Jennings operated in a system that did not overly concern itself with pollution and remediation; they certainly are not solely responsible for the environmental impact, but they engineered the beginnings of the process. It now rests with the local communities and governments to address these scars and toxins. But the gold is gone from the ground, and the profits with them. The pits, flooded mines, and tailing dams remain, scattered across the world.

The relics of these engineers’ social engineering resonate as well, most evident in the brutal system of Apartheid in South Africa and in Rhodesia, but also in the difficulties that South Africa and Zimbabwe faced after the end of White minority rule. Racialist settler and extractive colonialism are not fixed events—they are ongoing processes. In the racialist labor system of the Rand, the systemically lower wages paid to African miners constituted a pervasive theft of their income and health, stripping them and their descendants of wealth by denying a fair income because of prejudice; it applied to hundreds of thousands of African miners. Karl Marx famously argued that profits and capital accumulation come from extracting surplus value from workers by compensating them less than the value of their

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labor. The racialist labor system of the Rand took this to the extreme with its coercion, compounds, hut taxes, and hazardous working conditions.

In China, the audacity of the investors in privatizing the coal deposits of the Kaiping Basin and the infrastructure of the Chinese Engineering and Mining Company and the subsequent extortions to return the industry to Chinese hands in 1911 has similar roots. Hoover’s ideas about efficient mining existed in a complex system of ideas about race and civilization, with the perceived inefficiency of Chinese mining reflecting their advancement as a culture. Coal was essential for powering modernization. Stripping a government engaged in mineral-intensive industrial modernization of their coal reserves hampered this effort, and contributed to the government unrest that plagued China in the early twentieth century.

These engineers served as the technical agents of empire, specialists in extractive colonialism. The United States, Australia, and South Africa share a brutal legacy of settler-colonialism, since mineral resources drove or exacerbated much of this settlement. Whether it was the knighted, formal, and bureaucratic British Empire and its political and military suzerainty, carefully negotiated in imperial conferences, or the “open-door” American commercial empire that emerged through the violent incorporation of the American West, both systems worked toward capital accumulation through peripheral exploitation.9

However, the empires of these engineers were more than just the mine and the Maxim Gun; they operated in a complex network of investment, communication, representation, and ideology. Mining engineers communicated technical developments and production forecasts within the profession and to investors through trade publications such

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8 Marx, Das Kapital, 130-164.
as The Engineering and Mining Journal, but also through more traditional investment presses such as the Financial Times and the Economist. World’s fairs projected a sanitized display of imperial mining and the American role therein, and by 1915, glorified the efforts of mining engineers in modernizing the field and making efficient and safe mining the gold standard, but also in reifying white domination over the mining industry. These engineers were also intellectual agents of empire in their role as public intellectuals, the voices of the mining industry to their professional peers and the American public; their long careers in distant colonies, high salaries, and their roles in events such as the Jameson Raid or the siege of Tianjin only bolstered their standing as veterans of commercial imperialism.

Researching this dissertation has been an exercise in going beneath the surface of these engineers’ myth and appearance. The first tracings of valuable information come from their own image and works, whether it was the presentation of mining at world’s fairs or their egotistical documents such as memoirs, interviews, and autobiographies. Other scholars certainly lit the way beneath the surface, sloping deeper into the technical reports and journals of the era. But, like a valuable deposit, their histories were often situated in isolated extractive colonies or within the boundaries of the nation-state or empire. Much of the story, however, occurred as much in shareholder’s meetings in London, on steamships on the high seas, over the telegraph cables, and in besieged cities in China as it did in the manager’s office or mineshaft. Much as these engineers transcended the boundaries between the surface and the underground in pursuit of gold, they pushed the physical boundaries of nation-state and empire, while hardening the social and racial boundaries for control and profit.

Their activities undergirded the expansion of the world’s gold supply and of the
British Empire, but information on their actions often lay just below the surface of reporting on other events. The Jameson Raid is written off as a part of Rhodes’ larger colonial ambitions, while the seizure of the Chinese Engineering and Mining Company and Kaiping Colliery is overshadowed by the atrocities of the Eight-Nations’ Alliance in their march on Beijing. This dissertation sought to dig deeper into interlocked commercial and imperial ties—after all, empires cost money, and in the case of the British Empire, a substantial portion of this physical money was mined and made by American mining engineers overseeing technological spectacles in distant colonies. The modern industrial capitalist system ran on coal and oil, held up by iron and steel, financed by gold and silver. Intellectually separating the extraction of these mineral products from the functions and actions of empire reinforces the artificial separation of human and nature but also colony and empire. If anything, the stories uncovered in this dissertation are akin to metaphorical alluvial nuggets, eroded and washed down from the main lode to the surface, in the form of technical reports, press clippings, and memoirs. The professional biographies of Hammond, Hoover, and Jennings are just the outcrops, the surface presentation, the glimmer in the stream. They indicate that there is a rich lode of historical information even deeper below the surface.

These engineers participated in a world-historic transformation of the political and economic system, a massive expansion of industry, finance, credit, extraction, and technology. Their engineering projects worked to extract value from mining colonies at the fringes of empire and consolidate it in the centers of empire and investment. Many of their methods seem unsavory in retrospect: racialized labor forces, union-busting, murky financiering, disaster capitalism, and violence. The massive expansion of the world’s gold
supply paralleled and enabled the expansion of the industrial economy, leading to decades of global war and the Great Acceleration. The form of capitalism in which these engineers operated foreshadowed similar practices by other corporate entities, governments, and empires. It enriched shareholders and central banks by extracting value from its colonies through mining, protected by a massive military force that could selectively intervene to protect its interests. The litany of conflicts, interventions, and wars involving the United States or Great Britain’s military or covert service in the twentieth century often involved gaining or protecting access to a desired mineral resource, whether gold, oil, coal, or others. Trade boosters of the era asserted that commerce followed the flag: business increased with American government presence abroad, the key tenet of the Open Door policy of the U.S. Government. Proponents of the mining industry countered that the flag followed the pick of the miner and prospector—mineral resource extraction, especially gold, justified and supported imperial intervention around the world, and American mining engineers operated at the bleeding edges of the British and American empires. All in the name of controlling shiny flecks of metal, birthed in the cosmic collision of neutron stars.
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