LINES OF COPPER, TEARS OF GLASS:

THE BIRTH, GROWTH AND DEATH OF THE MONTANA POWER COMPANY

by

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CHAPTER 1

INTRODUCTION

Enormous arrays of lights emblazoned the Chicago night skyline during the 1894 World's Fair. An illuminated imitation Taj Mahal highlighted the creation of a synthetic "White City" at a fair more heavily lit than any urban center in the United States at the time. Five thousand arc lamps, 90,000 incandescent light bulbs and a novel usage of alternating current (AC) technology produced this fairy city-containing an array of exhibits that utilized a substantial portion of advanced lighting technology on the North American continent. This celebration of light in the late nineteenth-century Midwestern sky highlighted the enormous progress that electricity had made in just a few years and seemingly augured a limitless future.[1]

Surprisingly, this dazzling urban scene had been foreshadowed in the wilds of Montana. A small group of primitive arc lights had pierced the darkness that enveloped the Alice Copper mine near the brawling new mining town of Butte in 1880. Outside of the small illuminated area around this hard rock mine, the awesome, star speckled dark of the Big Sky night had remained untouched. Yet this tiny display of lights had presaged an explosion in mining activity and the start of the electrical industry in Montana.[2]

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[1] David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge, MA, 1990), pp. 37-41.

[2] *Butte Daily Miner,* as quoted in Cecil H. Kirk, *A History of Montana Power, A Narrative of the Power of Montana and Montana Power.* Volume II, p. 33. This is a two volume, unpublished history of the company by an employee of the firm. The company never allowed publication of this work. The history covers Montana Power from predecessor firms to about 1968. At Montana Historical Society Archives (MHS), which received the work after the firm went out of business.

By the time of the Chicago exhibition, the presence of electric lighting marked special occasions. This new technology illuminated the halls of the Palace Hotel in San Francisco for the triumphal appearances of Ulysses S. Grant and Philip Sheridan. After the introduction of the incandescent bulb in Butte, as legend has the town's swankiest house of ill repute signed up as one of the Copper City's earliest patrons. Great restaurants, such as Delmonico's in New York City enhanced their ambiance with this marvelous new invention. Gilded Age tycoons, compatriots of JP Morgan, the Rockefellers and Jay Gould camped at the eatery's sumptuous quarters. Their conversations undoubtedly focused on the rich opportunities for profit from finance, mining as well as the new technological complex in the emerging electrical industry. As we shall see, like Horace Greeley, these business titans looked with anticipation to the opportunities in the West.[3]

Along with many other impressive international displays of electrical prowess in this era, these events confirmed the rise of a revolutionary new technology. In a few decades the burgeoning uses of electrical power produced several new industries serving the ever-increasing demand for power in the United States. The pioneering power companies in Montana that preceded the Montana Power Company (MPC) arose as part of the industrial and financial processes that created both the glowing Chicago Fair as well as the harsh lights that cut the Montana sky in Butte. The Butte utility appeared on

[3] Charles Coleman, *PG& E of California: The Centennial Story of the Pacific Gas and Electric Company, 1852-1952* (New York, 1952), pp. 31, 55, 60.

the scene in 1912, consolidating these companies into one firm, and commencing to dramatically expand the electrical network in Montana.[4]

The fall of the company ended far differently than implied by such an auspicious beginning, with images of TV reporters for *Sixty Minutes* chasing a flustered Robert Gannon in Butte. The loss of two and a half billion dollars as well as the complete liquidation of thousands of shareholders created this Warhol moment for the firm's last president and Montana Power. Other dire consequences followed for the state: loss of Montana's only Fortune 500 firm, a doubling of utility bills and the loss of hundreds of jobs for the already depressed Butte area.

Montana Power's importance transcends this slapstick "fifteen minutes" of fame moment at its demise. Montana Power became one of the few utilities to break from state price regulation during the deregulation mania of the 1990's. In a jarring development, the firm dissipated all its assets and dissolved shortly thereafter amidst a great deal of controversy. However, besides the failure of the firm after the heated deregulation battle, three other areas of the history of this utility proved pivotal in political, economic and environmental terms for not only the state, but also the rest of the West and the United States, as the events surrounding the Butte firm were often regional or national in scope and importance.

First, the creation of the predecessors of the firm occurred at the very dawn of the electrical revolution at the turn of the nineteenth century. Powerful men and institutions from the Eastern United States set up the firm in a colonial-style environment and guided

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[4] Frank Leighton, *Corporate History of the Montana Power Company, 1882-1912*, Bozeman, 1951, Master's Thesis. This thesis served as the basis for organizing the archives at the MHS.

the development of the state. With the electricity revolution, dams, power lines, reservoirs, mills and logging operations appeared throughout the landscape. Second, the Great Depression produced an epic battle between public power advocates and trust-busters versus the Butte firm. The New Deal commenced building the Ft. Peck Dam and power stations, while working diligently to break up the utility trusts that included Montana Power. Third, lengthy car lines at gas pumps in the 1970's signaled the onset of the first energy crisis. The power company's attempt to generate energy using steam from coal mined in Eastern Montana set off a literal war with newly emergent environmental movement.

Approaches to Utilities in History

The electric utility industry, including Montana Power, labored to create a powerful narrative describing the birth, growth and maturity of the business of supplying electricity and other forms of energy to America. One historian, Forest McDonald, fleshed out the utilities' line of thinking. He saw the industry history unfolding in a four step process. First, visionary pioneers such as Thomas Edison, Charles Brush, Elihu Thomson, Nikola Tesla and William Stanley invented or improved the technological building blocks of the industry: including arc lights, incandescent bulbs, dynamos and transmission wires. These founders integrated these parts into the first primitive electric systems.

Second, manufacturers shipped equipment for power facilities throughout the Country, resulting in a dispersion of small power plants all over America. With this

equipment, colorful promoters established many small light and power companies. After an anarchic birthing phase, prophetic businessmen came forward to implement the third stage-consolidate and institutionalize this chaotic world. These numerous small companies coalesced into the "natural" monopolies that we know today. Fourth, these larger utilities, in spite of occasional ignorant government (according to McDonald) intervention, installed that latest technological innovations to assure a bountiful supply of cheap energy to American businesses and consumers.

This progress narrative contained nuggets of truth. McDonald correctly propounded that the vast majority of investor owned utilities across the country shared a common developmental experience. Despite the Company's Western location and frontier nature, the Butte utility's evolution closely mirrored developments of the electrical industry that occurred in the rest of the nation. However, this illustrious historian missed an essential contextual ingredient: the pervasive, guiding influence of powerful economic actors that shaped the application of technology in the country for their own benefit.[5]

These similarities in the birth, growth and maturity of electric power utilities allow the use of scholarly works focused on the evolution of electrical industry outside of the Rocky Mountain region. Two major writers, Thomas and David Nye put forth

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[5] Burke Video. Forrest McDonald, *Let There Be Light: The Electric Utility in Wisconsin, 1881-1955* (Madison, 1957); McDonald used this schema to identify periods of utility history. Corporate biographies echo these themes. See; Charles Nelson, *KPL in Kansas: A History of the Kansas City Power Company* (Lawrence, 1962); Charles Coleman, *PG & E of California: The Centennial Story of the Pacific Gas and Electric Company, 1852-1952* (New York, 1952); Raymond Mills, *The Force of Energy; A History of the Detroit Edison* Company (East Lansing, 1971); Herbert W Meyer, *Builders of the Northern States Power Company* (St. Paul, MN, 1957); Glen Weaver, *The Hartford Electric Light Company* (Hartford, 1969). Weaver, used the words "sophisticated," "romance" and "high adventure" to describe the history of the HELC.

powerful concepts that will elucidate the historical importance of the Butte utility. Hughes offers a similar approach to McDonald, but with a more powerful approach that demonstrates the impact of systems momentum in the growth of electrical systems in both Europe and the United States. Nye digs deeper, focusing on the economic, political, technological and financial factors that drove the consolidation of the American utility industry prior to the Second World War. Nye's work featured the evolution of General Electric (GE), which due to its ownership stake in Montana Power, exerted enormous influence on the firm. The use of these methodologies will allow us critically to evaluate the utility's experience from the founding of the enterprise in 1912 to the Company's demise in 2000.[6]

Systems Dynamics in Utility Growth

Hughes analyzed the dynamics of the utility industry as a network system. He utilized a five part model that explained the evolution of major power systems. The invention and development of the basic electrical technology defined the first phase. In the second phase, financiers, inventors and entrepreneurs then transferred this technology to other locations. Problems, often substantial, arose impeding further progress. In the third phase, the system overcame these difficulties and resumed growth. During phase four, the system kept growing, achieving substantial momentum. This momentum created regional power systems. Lastly, the particular problems associated very large networks

[6] David E Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge, MA), 1990;Thomas P. Hughes, *Networks of Power; Electrification in Western Society, 1880-1930* (Baltimore, 1983); The Board of MPC voted to sell the utility assets in March, 2000. The company operationally turned into Touch America at this point..

occurred needing sophisticated financiers and consulting engineers (public and private) to devise solutions to the problems posed by vast electrical systems. The development of the Butte enterprise followed this model. The evolution of the electrical industry in Butte illustrated this.[7]

In the 1880's a number of small firms in the Copper City constructed primitive systems based on Edison's early discoveries. Butte Electric (BE), one of these firms, received equipment and expertise from a predecessor company of General Electric in 1888 in exchange for stock and board membership. The first transmission, direct current (DC) technology limited electric power to small grids reached by each generator. Electricity from these transformers could not reach the copper deposits outside of Butte. Miners needed to generate electricity at the dig site.

The development of both a functioning AC transformer and improvements in transmission capacity allowed Butte Electric to utilize hydroelectric power. Due to the small company's relationship with GE, the firm possessed the technological and financial resources to build dams on the Madison, Wise and Big Hole Rivers. Their transmission lines from these dams enabled Montana Power to supply ACM in both Anaconda and Butte with hydroelectric power. The utility also expanded operations via subsidiaries to Billings, Bozeman and Livingston.

In 1912, Butte Electric morphed into Montana Power, adding new power generating resources in Great Falls, Helena and Thompson Falls. This new concern quickly gained the momentum in the state of Montana described by Hughes. Over the next two decades, the Company built several more dams, vastly expanding generation

[7] Hughes, *Networks of Power,* pp. 14-17; Kirk, *A History of Montana Power.*

capacity in Montana. The utility also ferried much of this new power to ACM facilities in Anaconda, Butte and Great Falls.[8]

The new power firm exercised powerful financial muscle. Between 1912 and the advent of the Great Depression, the utility acquired all rivals in the state. By 1928 Gifford Pinchot ranked Montana Power as one of the top 41 utility holding corporations in the United States. [9]

The Depression almost crushed ACM, thereby suppressing electricity demand in Montana. However, due to the resources made available to Montana Power by American Power and Light, the firm expanded its power network into natural gas and petroleum production. However, the perceived failure of private utility trusts prior to the Depression led to a powerful drive for public power generation on a vast scale, particularly in the West.[10]

As World War II commenced, improved transmission grids enabled the utility to ferry electric power on a regional basis both to and from either public and private producers in the Northwest. The Butte firm kept adding power capacity to serve ever broadening markets. By the 1970's this trend led to the vast expansion of coal-fired power generation that occurred at Colstrip, Montana.

In fact, during this period, Robert Gannon, the last president of the company, developed the belief that the electrical network had grown so large and so heavily regulated that the company could no longer receive adequate returns for power generation

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[8] Kirk, *A History of Montana Power.*
[9] Gifford Pinchot, *The Power Monopoly: Its Makeup and Its Menace* (Milford, PA., 1928), pp. 4, 123, 207, 208.
[10] Ibid, p. 4; Kirk, *A History of Montana Power.*

As he ascended to lead the enterprise, he instead championed the need for the firm to move into the emerging telecommunications network. He anticipated that fiber optic networks would prove superior to the copper one. Montana Power, newly renamed Touch America, commenced to lay down a massive network of fiber optic cables with few committed customers for this service.[11]

The Power Industry as a Social Construction

David Nye used a multi-factored approach to understand the development of the electrical supply industry in the United States. The process he described culminated in the creation of the duopoly of General Electric and Westinghouse. Nye posited that GE and Westinghouse utilized the economic, technological, financial, and political power at their disposal to dominate their industry. As we have seen, the rise of GE to prominence proved critical in the development of the Montana firm. The manufacturer's cash, technology and expertise powered the development of the Butte firm.

Montanans often connected the ownership of Montana Power with ACM, as these two companies teamed up in the public consciousness to form the "Twins". John D. Ryan served as president of both companies from 1912 to 1933 creating the image of the companies working in lockstep with the giant copper concern as the clearly senior "Twin". However, the Eastern manufacturer helped finance the major predecessor

[11] Burke Video. Interview with Burke in Butte, August 2005.

company of the utility, Butte Electric, and controlled a majority of the shares of the Butte firm until 1949.[12]

Nye postulated that the growth of the electric complex occurred in waves, reflecting the impact of the introduction of new inventions and innovation. Each wave followed the direction laid out by major industry players to maximize profits and control in this new industry for the period 1880-1940. Between 1880 and 1900, industry leaders emphasized expansion of public lighting and street car franchises as the key area of growth for their business. In this era, Montana saw the introduction of street lights and some street cars became common in a number of Montana cities.

Pioneering power companies with their massive electrical infrastructures desperately needed a highly conductive material to move electrical current from the generating source to the user. Copper turned out to fill the bill better and cheaper than other alternatives. This mineral's superior performance as an electrical transmission media caused the demand for and price of copper to rise considerably. The development of the massive copper deposits in the area surrounding Butte, Montana ensued.

This ever-increasing demand for copper caused enormous interest in the Butte copper load by corporate interests who wished to control this valuable resource. Local entrepreneurs had already developed a number of mineral properties in the area. Agents from Rockefeller and allied interests came into the state and purchased a key copper load. The owners of the Amalgamated properties, including the legendary Marcus Daly, found

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[12] Joseph K. Howard, *Montana: High, Wide and Handsome* (New Haven, 1959), p. 254; Leighton, *Corporate History.*

themselves cashed out for almost unimaginable $39,000,000. This transaction served as the starting point for the legendary Anaconda Company. [13]

Mining managers quickly discovered the utility of electricity in all areas of underground mining. From the early introduction of the Brush arc light in the 1880's, miners found that electric power meant trustworthy and safe lighting. Electrical mining machinery soon proved much more efficacious for subsurface tunneling than steam or hand powered tools. To feed the insatiable demand for copper spawned by the run-up to the First World War, Anaconda introduced giant electric smelting furnaces. The great ore diggers needed plentiful and cheap "juice."[14]

During this period, Montana remained deeply rural. The state followed national trends, with rural areas receiving scant access to electrical power until after 1930. Private power businesses, concerned about the bottom line rather than social welfare, viewed electrification of rural areas as prohibitively expensive. Only action by the national government during the New Deal dramatically hastened electrification of thinly populated regions.[15]

Technology emerged as the key factor in Nye's analysis, driving the burgeoning electrical industry. In the late 1870's and early 1880's, Brush's simple arc light and Edison's incandescent bulb allowed for the first practical use of electrical illumination. The late 1880's and early 1890's witnessed the introduction of sophisticated transformers

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[13] Lawton, Thomas, *Frenzied Finance*, New York, 1905, pp. 228-233, 315, 338. Lawton worked as an investment pool operator. He describes how Rockefeller interests purchased the Amalgamated Copper properties in Butte and promptly turned around and sold the shares for $75,000,000. Lawton posits that markets are rigged and run for the benefit of a few inside players.
[14] Nye, *Electrifying America*, p. 186; Burke Video.
[15] Ibid, pp. 216, 314; Kirk, *A History of Montana Power*, volume II, chapter 11, pp. 1-3, 39.

that enabled the transmission of electrical power over vast distances. Substantial improvement in electric motors as well as transmission and distribution systems continued until the advent of the Great Depression. Importantly, trusts came to dominate these technological processes. This allowed them three potent means to place them to control electricity markets: the mastery of the process of invention and innovation, control of patents and access to massive amounts of investment capital. [16]

Anyone entering the utility industry needed to possess to the basic generating plant, as well as a rudimentary distribution system. GE and Westinghouse served as gate keepers for this technological base, as they possessed the manufacturing infrastructure and the crucial patents to create these systems. The endless innovation in the early years of the industry required manufacturers with the technological resources to keep up. Patent laws in the United States generally protected invention and innovation. Successful pioneers in the field could either freeze out or charge hefty rents to late comers to the business.[17]

Every aspect of power development proved enormously, almost ruinously, expensive. The invention, manufacture and placement of utility infrastructure as well as constant innovation required large staffs of rare, highly trained scientists and technicians. An early industry rule of thumb stated that in order to generate one dollar of annual revenue, three dollars of permanent investment had to be made.[18]

Pioneers and promoters of the electrical complex possessed limited funds. To survive and prosper, these entrepreneurs needed permanent investment capital. However,

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[16] Ibid, pp. 172, 350-351.
[17] Ibid, p. 172.
[18] Ibid, p. 169; Thomas K McCraw, *The TVA and the Power Fight, 1933-1939* (New York, 1971).

as Nye and others pointed out, the United States at this time possessed the financial sector of a less developed country.[19]

This period has been called the era of Finance Capitalism. Ironically, in practice this meant that only a few institutions possessed the requisite resources to make substantial productive investments. The Federal and state governments supplied bond guaranties and large land grants for railroads and land development. However, much of the actual money needed for capital intensive industries like railroads and utilities the United States came from large metropolitan banks on the East Coast at high rates of interest.[20]

Unsurprisingly, the captains of finance that ran these banks allocated capital for the growing electrical industry. American and Western European financial institutions preferred funding the large trusts (which they perceived as less risky than smaller firms) with these firm's supposedly more certain cash flows. Consequently, the power industry sector consequently experienced consolidation and concentration. In the early 1880's fifteen major firms competed for contracts. By the turn of the century, General Electric and Westinghouse conducted the lion's share of the business.[21]

As we shall see, the utility industry in Montana followed suit. A small electric power industry emerged in the state during the 1880's. This diffuse group of small enterprises experienced a process of slow consolidation, as the smaller companies lacking the resources to remain competitive sold out to stronger rival firms. Industry

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[19] Ibid, pp. 169-172; McDonald, Forrest, *Insull*, (Chicago, 1962), pp. 26-42; McDonald, *Let There be Light*, p. 13.
[20] Nye, *Electrifying America*, pp. 172-173.
[21] Ibid, p. 170.

consolidation accelerated with the introduction of alternating current to transmit electricity. AC, unlike Direct Current, allowed for the long distance transmission of electricity. The importance of moving cheap hydroelectric power from remote dams to mining sites became a factor after the turn of the century. Only power companies backed by wealthy patrons could afford to build the large dams and transmission lines necessary to harness inexpensive, relatively abundant hydroelectric power. Power companies that lacked the requisite financial resources sold out.

This concentration of financial and economic power required acquiescence of the politicians. Nye analyzed the interaction of electric early industry leaders with federal, state and local governments and demonstrated how the early victories by trusts in the political arena helped lead to the creation of the GE and Westinghouse duopoly. These events also subsequently impacted the creation and growth of Montana Power, not only in power generation, but also in the development of natural gas, oil, coal, and telecommunications.

Federal and state authorities seemingly offered electric industry pioneers of the 1880's an inviting space to establish their industry. Decentralization, a limited scope of power and a pro-development philosophy characterized these two levels of government in the United States. The introduction of the electric power industry in Europe provoked a far heavier involvement by governmental entities. In the United States, some municipalities ran power stations in the United States, but private ownership remained the cultural norm.[22]

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[22] Ibid, pp. 179-182. Hughes, *Networks of Power*, pp. 59-65, 184-187.

By the 1920's, entrepreneurs such as Samuel Insull and institutions such as Goldman, Sachs as well as GE had cobbled together immense holding companies of electric utility companies. Montana Power joined such a trust in 1928, becoming part of the American Power & Light. After the market cataclysm in late October of 1929, the share value of the utilities in these trusts and pools plummeted by as much as ninety percent from the record heights of the late twenties.[23]

These losses suffered by stock investors placed these trusts in disrepute with the public and a majority of Congress. The trusts' new pariah status engendered a hostile reaction to the utility industry. First of all, Congress passed the Utility Holding Company Act in 1934. This act abolished the multi-state utility holding company. Also, the public viewed electrical rates as artificially high. These high charges fed trust profits. This perceived predatory performance by the electric trusts greatly increased public interest in public generation of power at the national level.[24]

The election of 1932 placed Franklin D. Roosevelt, a critic of private utility behavior and advocate of public power, in the Presidency of the United States. FDR proposed a number of massive public power ventures. Congress ultimately authorized the creation of the Tennessee Valley and the Bonneville Power Authorities. Public power generated by these Bureau of Reclamation facilities loomed as massive competitive threat to private Western utilities like Montana Power. The Federal government also pushed rural electrification with the creation of the Rural Electrification Act in 1935.[25]

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[23] Pinchot, *The Power Monopoly*, pp. 4,123, 207-208.
[24] Robert Sobel, *The Great Bull Market: Wall Street in the 1920's* (New York, 1968), pp. 93-94.
[25] McCraw, *TVA and the Power Fight*, pp. 80-86, 90, 97, 109-110.

Like the Federal government, state governments initially refrained from intervening against the private development of electric power until well into the twentieth century. As we shall see below, electrical utilities experienced increasing problems from both corrupt and progressively oriented municipalities. This led electric utilities to prefer state regulation over municipal. After the First World War, this preference for state regulation led key leaders of utility trusts to join forces with progressive political groups to place electric utilities under state supervision. The utility leaderships believed that state public service commissions invariably lacked the staffs and funding to do more than inconvenience power companies. Hence, electric power companies, with substantial resources, normally got the better of the regulatory process.[26]

Montana Power experienced few problems with city and state governments. The Montana Public Service Commission started in 1920, but didn't really oppose imitative of the Company until the 1970's. However, when it came to the dealing with the Federal government, The Butte firm found itself at ground zero in the New Deal's efforts to generate power, significantly increase rural electrification and regulate power companies.

Political influence, even by powerful elites, can prove fleeting without public support. As Nye showed, these elites had two potential political problems to deal with. First of all, they needed to overcome the obstacles to the introduction of electricity to new areas. The industry faced opposition from gas lighting companies and those who found electrical wiring denigrated the urban space. These very forces significantly slowed the electrification of London. Further, another group of opponents favored electrical power,

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[26] Nye, *Electrifying America*, pp. 179-181; Hughes, *Networks of Power*, p. 207; McDonald, *Let There Be Light*, pp. 118-119.

they believed in public ownership of the generating and transmission facilities. Industry leaders needed to frame the public perception of electricity to combat both poles of opposition.

The electrical trusts and their associates approached these crucial public relations efforts or "spin" in the current parlance, on three levels. First of all, the industry continuously portrayed electrical technology as a consumer product or commodity, rather than as a factor of economic power. Crucially, GE and Westinghouse designed and controlled their own exhibitions at international fairs. These two firms saw their message viewed by millions of fair goers. The electric suppliers showed consumers a world in which individuals could either now or later purchase new devices that would enhance their personal well being. The exhibitors portrayed electricity as a phenomenon that empowered individuals. As electric appliance use increased, later fairs focused consumers on the use of electricity in their own house, as opposed to collective uses. A choice by an individual consumer did not imply the need for a collective, political response.[27]

Novel technology and gaudy lights caused a strong public reaction at the end of the nineteenth century. The visual experience of electricity proved transformative to many in society, filling a large part of the American populace with a sense of awe and wonder. Nye labeled this reaction the technological sublime. This new technology miraculously altered the night sky and changed the night time environment in breathtaking ways. In ever increasing levels of brilliance, the fairs put forward the use of electricity as a current consumption item and a sublime technological artifact that pointed

[27] Nye, *Electrifying America*, pp. 193-198.

the way to an unlimited future of wonder and prosperity. While railroads may have held some romance and allure, their steaming locomotives could not stand up in the public mind to the awesome electrical towers that defeated man's ancient foe of darkness nightly at various world fairs. The electrical trusts worked diligently to shape these feelings and images to further their own designs.[28]

Lastly, the electrical utility industry both as individual companies and through key trade organizations propagandized on the behalf of private power and attack public power initiatives. These public relations gambits commenced in earnest after the First World War and accelerated under the New Deal. The company took advantage of both a captive media and customer base to evangelize its views. By the early 1920's the ACM had absorbed all but a couple of newspapers in Montana. This state of affairs lasted until 1959. Unsurprisingly, little investigative journalism into the doings of the power industry occurred during this period.[29]

Chapter Breakdown

This thesis considers the birth, evolution, and ignominious end of Montana Power, breaking the firm's history into two parts. The first two chapters will cover the essentially colonial period of the company, when the management and ownership possessed almost complete freedom of action in Montana. The second part, consisting of the last three chapters, will deal with the company facing the challenges of public power,

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[28] Ibid, 193-198; Mumford, Lewis, *Technics and Civilization* (New York, 1934), pp. 108, 205.
[29] Bradley Snow, *From the Sixth Floor to the Copper Dome: The Company's Political Influence in Montana, 1920-1959*, Bozeman, 2003. Master's Thesis; Dennis L. Swiblod, *Copper Chorus: Money, Politics, and the Montana Press, 1889-1959* (Helena, 2006).

the environmental movement and regulation that severely curtailed the firm's freedom of action.

The first chapter covers roughly 1878 to1912. As with any story involving electricity, one must make the obligatory journey to Menlo Park, New Jersey to follow how Edison and the other pioneers created the electrical industry. Special attention will be paid to the crucial advent of a usable AC current. Using Butte as a focal point, we will examine evolution of the smaller firms (predecessor companies) that came to form Butte Electric and ultimately Montana Power. In the second chapter covering from the creation of the firm in 1912 to the advent of the New Deal, under the firm direction Ryan, not only continuing to grow, but also consolidate almost the entire Montana electrical power market. At the end of this period, American Power and Light purchased the Butte firm. The utility thereby joined this enormous GE controlled holding company.[30]

The after shocks of the Great Panic of 1929 on Wall Street profoundly impacted the Butte enterprise and will be examined in chapter three. The federal government intervened aggressively into the operations and prospects of the power company. Montana Power ran afoul of the Securities and Exchange Commission, dam building initiatives by the Army Corps of Engineers and the Bureau of Reclamation and the Federal Power Commission. The Second World War somewhat dampened the conflict with the national government. From then until roughly 1970, the utility faced both conflict and cooperation with the Federal government. This period represented the storied presidency of Jack Corette. During this period MPC largely triumphed, profiting mightily

[30] Frank Leighton, *Corporate History.*

from the utility's access to inexpensive hydroelectric power produced by the national government.[31]

In chapter four, covering 1970 until the mid-nineties, the power company bent to the pressures of national and regional electrical networks, commencing to build the massive Colstrip coal fired plant complex. This project led to direct conflict with the emerging environmental movement The fallout from this prolonged struggle severely tested the firm. The firm's sour experience at Colstrip encouraged the company to seek deregulation and to embrace the telecommunications business while deemphasizing the energy operations.

To accomplish these goals, Montana Power needed to get the state of Montana to deregulate the Company. Covered in chapter five, a whirlwind campaign in 1997 succeeded in gaining freedom from the regulation of electricity production. This success enabled the management to sell all the utility assets of the firm at a very favorable price and place the newly generated proceeds into the ill starred Touch America.[32]

This scenario surrounding the creation of Touch America brings to mind the character played by Kevin Costner in the film *Field of Dreams.* He firmly believed that if he built a ball field in the middle of an obscure cornfield in rural Iowa, the mysterious players he desired to meet must appear. Similarly, Montana Power managers apparently believed that if they only created the fiber infrastructure, then customers would surely show up. This deep belief that success must occur in advanced technological ventures

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[31] Kirk, *A History of Montana Power*, volume II, Chapter 9, pp. 1-18; McCraw, *TVA and the Power Fight*, pp. 86-90.

[32] Patrick Judge, *Montana's Power Trip: Electric Deregulation, Consumers, and the Environment*, Missoula, 2000, Master's Thesis.

reflected attitudes forged in the early era of *Electrifying America*. However, outsider observers wondered why this rich company constructed a nice ball field in the middle of nowhere. Unfortunately for the Butte utility, "Moonlight" Wilson never showed up.

CHAPTER 2

EDISON AND THE WAR OF ELECTRIC CURRENTS

Montana Power formally came into existence on December 12, 1912 (12/12/12). The General Electric executives, the investment bankers, the top managers from the new utility and the representatives of ACM would have undoubtedly enjoyed celebrating the event with an elaborate bash at the Delmonico's at 44th Street and Fifth Avenue in New York City. This gem of the Gilded Age still glimmered. Having previously hosted the financial creator of GE, J.P. Morgan and the legendary electrical genius, Nikola Tesla, not to mention Theodore Roosevelt, this sumptuous restaurant would have been the ideal place for the businessmen associated with the 12/12/12.

Ensconced on one of the private rooms on the second floor, these industrial and financial luminaries could have sampled Delmonico's signature nineteenth-century creation, Lobster Newburg, along with the famous Delmonico steak and tenderloin. Fresh vegetables with delicate sauces rarely found west of the three star restaurants of Paris, Bordeaux and Burgundy flanked these delectable meats. A wine cellar that often exceeded 16,000 bottles supplied Chateau Margeau and other highly touted *grand crus* to these exemplars of corporate America. Unfortunately, these busy men resided not only in New York, but also in Butte, Boston, and Schenectady making such a feast unrealistic. Local festivities had to suffice. Each group, however, had much to celebrate.[33]

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[33] Kirk, *A History of Montana Power*, volume I, pp. 39-50, 56-59; volume II, chapter 9, pp. 1-5; Leighton, *Corporate History of the Montana Power Company,* pp. 1,4. Leighton draws from his review of a Federal Power Commission investigation in the mid 1940's into the founding of the Butte firm to characterize some of the motivation of participants. Culinary insights provided at http://wwwsteakpefection.com/delmonico/History.htlm.

For the General Electric (GE) group, the formation of the Montana utility signaled another impressive transfer of the pioneering technology of Edison and subsequent massive improvements of that technology to a location in the remote Rocky Mountains. GE President Charles Coffin, as well as other senior executives, had not only invested heavily in the utility, but also sat on the board of directors and had even occupied senior management positions in this promising firm in Butte.

Wall Street had participated in the creation of Montana Power and many other utilities. Firms such as Lee, Higginson and W.S Seligman had floated bonds for Butte Electric and the new firm as well as many other utilities and tram concerns. The Butte enterprise's plans for acquisitions, additional dams and an increasing array of long distance transmission lines presaged profitable future underwritings.

Though perceived as an uncouth and brawling mining town in the Eastern part of the country, Butte now served as the home office of a well-managed and forward-looking utility. The small management team undoubtedly took pride in the growing company. Company men like Max Hebgen and John Monrony, looked to build more dams and push the edge of transmission technology in order to create even more hydroelectric power for their chief client-the Anaconda Copper Mining Company (ACM).

John D. Ryan represented the Rockefeller-controlled copper mining concern, as well as a core group of investors that had followed him in the profitable business of creating this new power company. ACM did not formally own the utility. However, the immense electricity consumption generated by the underground excavation and

processing of ore by Anaconda created enormous leverage with newly-minted power firm. For starters, the mineral company consumed anywhere from two-thirds to three-quarters of the utility's electricity output. Ryan also served jointly as president of both companies.[34]

This chapter considers the events that the participants would have toasted at the fictive New York gathering. It focuses on the war of currency and the rapid electrification of the United States from the 1880's to the pre-World War I period. These events shaped the development of the electrical power supply and utility industries in Montana as well as throughout the United States.

Thomas Hughes and David Nye outlined the development of electrical industry. Edison founded the early business, which started the drive to electrify America. The system sprouted up, first as tiny power stations and then morphed into ever larger systems that covered cities or whole areas of states. Conflict marked this explosive growth as various players struggled to shape and control the evolution of electricity. Key actors such as Edison, Westinghouse and finally JP Morgan used the tools described by Nye: technological superiority, enormous financial clout, patent law and the political system to eventually carve out a powerful duopoly. These same processes played out in a similar way for electric power in Montana.[35]

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[34] Kirk, *A History of Montana Power*, volume II, chapter 9, volume II, chapter 9, 1-5; Leighton, *Corporate History,* Corporate Evolution Chart, in MHS collection. Note: Due to legal considerations, firms at the times often utilized numerous corporate identities. To avoid confusion, one moniker will be utilized for all subsidiaries within a given ownership group. Also note that senior MPC executives-Max Hebgen and John Morony had dams named after them.

[35] Hughes, *Networks of Power*; Nye, *Electrifying America.*

In the electrical energy world, all roads lead to Thomas Alva Edison. He emerges as the key personality in the establishment of the electrical power industry. Hughes and Nye both agree on the seminal importance of Edison's discovery of the incandescent light bulb and his initial development of the power technology that manifested in the construction of the original Pearl Street station. After agreeing at this beginning point, the two authors offer slightly different analyses, with Hughes developing a systems perspective and Nye emphasizing the structural processes (social construction) that shaped this new industry. However, both Hughes and Nye recognized that the highly inventive electrical industry required vast infusions of investment. The endless need for cash infusions drove the new industry into the clutches of the American financial community. These banks directed the industry on the path to short-term profits. The rolling out of the new electricity system in the country did not occur seamlessly. Edison soon found himself at loggerheads with George Westinghouse over whether Alternating Current (AC) transmission would triumph over Direct Current (DC) in a conflict dubbed "the current wars." This massive battle continued as JP Morgan rolled the Edison Electric Company into the new General Electric (GE). The victory of AC and the truce between GE and Westinghouse had profound implications for the nation and Montana in particular.

Alternating Current occurs when the flow of an electric charge undergoes a periodic reversal of direction. In the typical American house line, this happens sixty times every second. Conversely, with Direct Current, electric charges move only in one

direction in a wire. The key difference for our purposes lays in the fact that AC, unlike DC, can be transmitted cheaply over great distances.

The expansion of the electric industry caused an enormous need for copper. The large reserves of the ore in the territory led to an acceleration of mining and smelting activities- industrial processes that improved markedly with the introduction of electric power. Copper digging and refining increasingly benefited from electrical power and the new AC transmission system assured that electricity created at dams could readily and inexpensively be ferried to mining sites. The East and Midwest's need for copper and that industry's desire for indigenous energy production placed Montana on the road to a colonial relationship with these other regions. The developed seaboard areas lent their expertise, financial muscle and technology to the Territory. Montana supplied the natural resources.

This new technology enabled the power industry in the state to expand beyond small DC generators in towns and at mine locations. Two firms with powerful financial backing emerged: Butte Electric and the Missouri River Power Company (MRPC). In order to produce cheap electricity, they engaged in a "dam race" to harness hydropower. The denouement of this event came as the mighty waters of the Missouri swept away MRPC's major dam, soon bankrupting that firm. During the financial panic that insured from the 1908 dam breakage, Ryan and a handful of associates bought out the power interests of James J. Hill, as well as MRPC. Armed with an exclusive contract to provide power to ACM, Ryan stood poised to operate a large firm to compete with Butte Electric. GE saw the wisdom of consolidating the firms to prevent competition and paid the Ryan

group a princely sum for their assets. Ryan's sale to the GE group created the new trust: Montana Power.[36]

In Hughes' view, Edison's invention of the incandescent light bulb, while very important, did not constitute the inventor's greatest achievement. That accomplishment consisted of bringing together all the necessary elements-light, wires, and dynamo- to create an economic illumination system. Edison served not only as an inventor, but also as an agent of technological innovation and transfer, manager and financier. This approach, while eminently successful, consumed vast amounts of cash that Edison did not personally possess. Almost from the beginning, Edison needed a well-heeled patron.[37]

By the mid 1880's, a number of spectacular inventions by this electrical genius caused the emergence of Edison as the "Wizard of Menlo Park". His work attracted the attention of J. P. Morgan, the most influential financier in the country. Morgan and his associates backed Edison from about 1880. In 1887 this group funded the Edison Electric Light Company (EEL) as Edison's major commercial enterprise. Morgan's privileged access to his bank's capital and its connections proved indispensable to Edison.[38]

However, the highly talented inventor's constant need for cash turned his relationship with Morgan to that of a virtual employee. When Edison opened the first operational power station on Pearl Street in New York City in 1882, he personally appeared at 23 Wall Street, the headquarters of Drexel, Morgan, to make sure that

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[36] Samuel Hauser and a number of investors owned and operated the Missouri River Power Company, which was one of six firms operated by this group. For simplicity, these companies are identified under the MRPC banner. Henry Rogers and William Rockefeller of Standard Oil invested in this firm. At one time, Rockefeller owned more than 20% of the stock.

[37] Hughes, *Networks of Power,* pp. 18-23; Jill Jonnes, *Empires of Light: Edison, Tesla, Westinghouse and the Race to Electrify the World (New York, 2005),* pp. 52-55, 101.

[38] Jonnes, *Empires of Light,* pp. 3-11, 83-84.

"Jupiter" Morgan's lights worked. A little later, he performed a similar task in making sure the generating apparatus at the banker's Murray Hill home functioned properly.[39]

Morgan recognized the enormous opportunities for very profitable investment that this new technology augured. Competition did not interest this powerful banker. He preferred investments in monopolies or highly concentrated industries. He made certain that Edison moved in this direction.

A network of crucial patents theoretically protected Edison's system from poaching by rivals, creating the requisite conditions for monopoly. Hence, the inventor faced constant pressure from Morgan and the other investors to use his patents to generate short term dividends for investors rather than for reinvestment in business development. Edison championed the more expensive central plant approach to power generation. Morgan's investment group favored the more profitable and quick sales of single unit systems to private operators (like the one at the Alice Mine near Butte). Edison soon discovered the costs involved in crossing the great financier.[40]

The Pearl Street power plant proved revolutionary. However, the operational range of this station could not exceed a one-half mile radius around the facility. After this point had been reached, an unacceptable power loss in current transmission occurred. Attempts to overcome this transmission deficiency required increasingly large amounts of very expensive copper wiring. At this level of technology, moving power beyond the half-mile marker proved completely unrealistic.[41]

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[39] Ibid, pp. 3-11, 65, 84. Morgan foes nicknamed the banker "Jupiter" Morgan after the Roman deity.
[40] Ibid, p. 57.
[41] Ibid, pp. 3-11, 65, 84.

Since the initial DC current power stations provided superior illumination to gas lights and cost about the same, DC central power systems still spread rapidly in the mid and latter 1880's. However, others saw enormous possibilities in the use of Alternating Current, in lieu of DC.[42]

AC transmission avoided the distance and load limitations inherent in DC. However, the transmission of AC required a very high voltage current that could easily kill or maim humans that came in contact with the wiring. Also, this type of current operated at too high a voltage level for most of the then current electrical uses even if primitive transmission systems could ferry the electricity.[43]

Pittsburgh industrialist George Westinghouse, founder of an industrial airbrake company and a keen student of the new electricity game, quickly realized the possibilities inherent in the AC approach. He founded the Westinghouse Electric Company (WEC) to harness this new scientific know-how. This company quickly improved the new current technology, and challenged both Edison Electric and the DC system. In the mid-1880's William Stanley, another celebrated electrical inventor, teamed up with the Westinghouse staff to modify the Gaullard-Gibbs transformer. This improved device allowed for stepping down AC currents from a transmission high voltage to a consistently usable 100 volts. Later, Nikola Tesla joined Westinghouse to complete the developments in current technology that he had started at Edison's labs. In Pittsburgh, Tesla created a polyphase approach to AC that expanded the performance of this technology well beyond that of DC central plants.[44]

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[42] Ibid, pp. 3-11, 83-84.
[43] Ibid, p. 57.
[44] Jonnes, *Empires of Light*, pp. 118-123, 131-136; McDonald, *Let There Be Light*, pp. 24-28.

After the introduction of a working polyphase transformer, WEC sales heavily outpaced the sales of Edison's company. The decline of generating unit sales placed the company in a highly vulnerable position. Under the founder's guidance, the Menlo Park manufacturer remained committed to DC technology. His concerns over the safety prevented the inventor from embracing the general use of AC equipment. More poignantly, the famous inventor also faced enormous write-offs on his substantial investments in increasingly obsolescent DC equipment.

Rather than adapting to the new technology, Edison fought back. To defend his profitable niche, the author of the Pearl Street station commenced the "War of the Electric Currents." This battle took place over a wide range of areas. The conflict raged in the national political arena, the courts and financial markets. The foray by Westinghouse into the electrical generator business started a long period of corporate strife with Edison that served to shape the industry and caused Edison to lose his prominent place in it.[45]

Edison pursued one major strategy in opposition to Westinghouse. He attempted to have AC power transmission deemed lethal and unsafe. State legislatures could then legally proscribe this annoying transmission technology. The inventor launched this sally against WEC during the bidding and preparation period prior to the Chicago Exposition of 1893.[46]

Edison's assault on the Pittsburgh industrialist's current of choice almost succeeded and merits recounting. The struggle between these two industrial titans clearly

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[45] Jonnes, *Empires of Light*, pp. 106-107.
[46] Ibid, pp.15, 150-153, 175-179.

demonstrated the socially constructed nature of this industry. These men and their associates clearly shaped the direction of the business to suit their personal desires. The technology, while important, did not irresistibly lead to any preordained outcomes in the utility industry. Edison struck quickly. Through a number of agents, he worked to portray AC as a lethal technology that posed too many dangers for safe use.

Harold Brown, an engineer and former Edison employee, launched a one man campaign against Westinghouse. As Brown's campaign gathered steam, Edison quietly backed him with financial and technical support. In 1888, Brown sought to convince the New York City's Board of Electrical Control of the terminal propensities of AC by a live demonstration on a dog. He gave this demonstration of the effects of low voltage current on a bound black retriever in front of a stunned press corps. After showing that the animal did not die at the lower, DC voltages, he raised the voltage into the AC range. Brown hoped for a quick death of the animal, but the game canine weathered several heavy shocks before literally being cooked to death by the powerful current. Unfortunately for Brown and Edison, this singular display only served to energize the ASPCA, while appalling the public and the New York City Board of Electrical Control.[47]

Undaunted, Brown and the inventor from Menlo Park tried another tack. At this moment, the New York's penal system conducted a search for a more humane alternative to hanging. This effort by New York prison officials offered the two DC proponents a novel way to display the lethal nature of the other current. Brown convinced the New York prison authorities that electrocution, by a high voltage AC current would instantly

[47] Ibid, pp. 165-174.

and humanely kill a human. The state prepared to conduct an execution at the Auburn Prison in upstate New York at the first opportune moment. From Edison's point of view, the swift execution of convicted murderers by high voltage current would make a clear statement on the perils of AC power to the public. The lethal impact on a prisoner along with Edison's enormous public prestige as an inventor might tip the scales against Westinghouse in the political process.[48]

The candidate for the first electrocution, William Kemmler, had confessed to brutally murdering his girlfriend in Buffalo. His imminent execution at the hands at hands of officials at Auburn Prison seemed a foregone conclusion. Since Mr. Kemmler confessed and possessed no financial resources, the legal process appeared at an end. However, the esteemed W. Bourke Cochran, a dean of the New York State Bar, protested the proposed electrocution. Cochran contended that death by electrocution constituted cruel and unusual punishment and commenced a series of appeals on Kemmler's behalf. In the background, Westinghouse picked up the fees for the miscreant's extensive legal bills.

Cochran and other attorneys lost all the appeals right up to the state appellate court. Jill Jonnes, historian of electrical power development, felt that the extensive testimony of Edison, at this appellate level, as an expert witness on electricity swayed the court to uphold the verdict that death by electrocution did not constitute cruel and unusual punishment. Kemmler's demise resembled that of the black retriever. The executioner needed to apply several shocks to accomplish the state's grim work.[49]

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[48] Ibid, pp. 178, 185, 190.
[49] Ibid, pp. 185-198, 208-213.

Fortune then seemed to smile again on the two Westinghouse foes. Close on the heels of the execution of the hapless Kemmler, another death by electrocution occurred to bolster the drive to criminalize AC. John Feeks, a lineman in New York City, died as a result of touching a high voltage line. Subsequently, crowds watched as Feeks lifeless corpse literally fried in a maze of electric wires suspended over the city street. Needless to say, this incident roused public indignation. The legislative bodies of both the state and city of New York almost banned AC power transmission. Only the complete opposition of businesses using the newly prominent high voltage arc lights barely carried the day for Westinghouse. The same pro-AC coalition narrowly rebuffed a similar effort by Edison in Virginia.[50]

Again, these bizarre episodes put the battle in the electric complex in perspective. Legal and political processes superseded solely technological considerations on this crucial issue. Powerful actors, such as Edison, Morgan and Westinghouse, worked diligently to shape the evolution of the electric technology in a desired direction for their business interests. Technological developments served as putty in the hands of these men. The epic confrontation of currents had a major impact on the electric power companies that preceded Montana Power. AC transmission permitted the long distance movement of electric power. This opened the state of Montana to hydroelectric exploitation. Montana contained not only extensive river systems that could be dammed, but many water sources that picked up enormous power running down from steep mountains. Utility investors dubbed hydroelectric power "white coal."[51]

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[50] Ibid, pp. 198-201, 204.
[51] Fletcher, *Sinews That Serve,* p. 5; McDonald, *Let There Be Light*, p. 111.

Most of Western Montana brimmed with potential "white coal." The state's rushing rivers could serve to generate cheap power- if electricity could be sent for long distances. As we shall see later, this quest for hydroelectric power led to the construction of a massive system of dams and reservoirs. If DC power had prevailed, electric power in Montana would have been largely limited to steam generated power at mine sites and in cities. Legal restrictions and suspicion of AC power development in England substantially delayed implementation of the system. A similar outcome in the United States might have delayed or nullified the creation of the Butte firm. The Missouri and Flathead River systems might have faced very different futures. However, the high powered current did win, with immediate consequences for Edison.[52]

The Emergence of GE

By the time of the Chicago Fair, the "war of electric currents" had ended and Westinghouse faced a major new opponent. The corporate combat leading up to the 1893 fair in Chicago brought matters to a head between Edison and Morgan. Henry Villard, railroad magnate and close associate of Edison, tried to get the master trust builder to finance the acquisition of an important competitor, the Thomson-Houston Company (TH) of Boston, by the investor's firm. Villard's plan envisioned a larger, more powerful Edison Electric Light, however, in current parlance, in bringing this transaction to Morgan, Villard inadvertently put EEL "in play."

A combination of the inventor's firm with the well-regarded Boston firm intrigued the dealmaker. Unfortunately for Edison and Villard, Charles Coffin, president

[52] Hughes, *Networks of Power,* pp. 227-238; McDonald, *Let There Be Light*, p. 111.

of Thomson-Houston, instead convinced Morgan that the New England firm's management could generate better returns for investors than Edison's firm. Coffin's possession of an operational line of AC products may have also tipped the balance against Edison Electric. The new enterprise, founded in Morgan's office, sported the deliberately nondescript moniker of General Electric as both Edison and his famous name found themselves outside the new GE. Morgan did not deign to inform Edison of the move. The famed builder of electrical systems had, in the argot of the day, just experienced "trustification" or more precisely had been "Morganized". The most powerful banker in the United States anointed Coffin as the first president of the newly created General Electric Company.[53]

Formed by two Philadelphia high school science teachers, Elihu Thomson and Edwin Houston, the Thomson-Houston Company supplied transformers and other equipment to the small, new power plants that sprang up like spring wildflowers throughout America after 1882. The Boston manufacturer set up Silverbow Electric in Butte (the earliest name for Butte Electric) and sent the power plant facilities to Butte from New England in 1889. Coffin's firm took bonds and stock from the Butte firm as payment for its machinery. Hence, the new GE started as a major investor in a predecessor company of the Butte utility.[54]

Even with the superiority of AC established, Westinghouse still faced mortal combat with the minions of Morgan's empire. GE did everything possible to edge the Pittsburgh firm out of the festivities in the Windy City. Fortunately for Westinghouse, the

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[53] Jonnes, *Empires of Light*, pp. 225, 234, 240-242; McDonald, *Insull*, p. 50; McDonald, *Let There Be Light*, pp. 18-19, 28-29.
[54] Kirk, *A History of Montana Power*, volume II.

gaudy Chicago Exhibition served to vindicate him and foreshadowed the evolution of the electrical complex.

At that time, Westinghouse simply provided more lighting for less money. His engineers bested GE with a low bid of some $480,000 to GE's $577,000. Westinghouse's pioneering scientists created a giant AC generating facility. Utilizing twelve giant 1000 horse power, 75 ton engines wedded to an enormous 2,000 horse power motor, the system could generate 15,000 horse power of electricity to run the almost 100,000 lights and numerous machines that produced the "White City." Using electricity, the Westinghouse employees built moving sidewalks, railways and elaborate water fountain. Throughout the United States, an extensive expansion of the urban use of railcars or trams followed closely on the heels of the fair.[55]

Behind the scenes, the Westinghouse crews also extensively utilized electrical power in constructing the fair. Electric currents animated saw mills, hoists, pumps, fans and painting machines. Much of this equipment quickly found a place in the mining industry. Other major industries started to introduce these machines into production processes.[56]

Fireworks continued in areas other than Lake Michigan. The feud between Morgan's progeny and Westinghouse continued on other fronts with bare knuckled intensity. The companies attacked each other over patent rights and in financial markets.

One of the key tools for large companies to shape the business environment involved the enforcement of United States patents. Theoretically, patents rights seemed

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[55] Jonnes, *Empires of Power*, pp. 251-254.
[56] Ibid, pp. 261-264.

straight forward. These laws existed to protect the creators of inventions or industrial processes from having others pirate their work. Operationally, enforcement of these laws proved ambiguous. Subjected to legal review, courts deemed much of the anticipated product or process protection as too fuzzy or overlapping. Some swashbuckling manufacturers chose to ignore patent restrictions altogether or, like GE, engaged in industrial espionage to obtain key designs from competitors. To succeed in this endeavor required very deep pockets. Thus the corporate recourse to civil law process served the largest corporations with the deepest legal resources.[57]

Litigation emerged as a powerful weapon of business warfare. In the early 1890's, GE and Westinghouse filed over three hundred lawsuits against each other. Companies such as GE could have alleged patent infringement by a competitor and thereby shuttered a competitor down with a restraining order to cease production for using the patent in question. America's often highly politicized and corrupt judiciary of the time added to the uncertainty of the legal process.

Similarly, legitimate patent rights holders often needed to sue to enforce their rights. Edison brought suit against a number of firms to protect the crucial patent for the incandescent light bulb. While GE ultimately won this suit, competitors functionally ignored the patent during the years of extensive, often merit-less appeals. Only the enormous resources of the Boston firm allowed the company to persevere. In fact, the Massachusetts-based manufacturer almost shut down Westinghouse's bid for the Chicago Columbian Exposition charging that the Pittsburgh firm's "stopper lights" breached the

[57] Ibid, pp. 296-297; Nye, *Electrifying America*, pp. 171, 262.

special light bulb patents. Smaller competitors such as Tesla Electric (when Tesla went on his own) simply could not protect their work from larcenous rivals.[58]

The Boston and Pittsburgh based giants also savaged each other in financial markets with so-called "bear raids" on each others stock. In 1894, agents for GE caused a large decline in Westinghouse shares by spreading rumors in the New York, Philadelphia and Boston exchanges questioning the solvency of the Westinghouse firm. This assault on the Pittsburgh enterprise served as a prelude to an attempted hostile takeover of the company by GE forces. In response, Westinghouse commissioned Thomas Lawton, the famed distributor of watered Anaconda shares, to retaliate in kind against the gentlemen from Massachusetts. Large declines in the share price of GE appeared after this author and financier commenced his efforts. The bloodied Boston manufacturer chose to back off. Needless to say, all the tactics employed by both sides violated almost all modern securities laws.[59]

Access to Morgan funds accorded GE one major asset not duplicated by Westinghouse-superior acquisition financing for utility customer. When it came to doing business, particularly in the capital-starved West, GE provided capital to utility customers. Utilities needed to make large purchases to set up their generation, plant and transmission facilities. Power companies buying this equipment could make partial payment with their own securities to pay for these purchases. This Morgan creation pumped over $59,000,000 into the shares of electric power and traction companies in this era.[60]

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[58] Jonnes, *Empires of Light*, p. 309; McDonald, *Let There Be Light*, p. 30.
[59] Jonnes, *Empires of Light*, pp. 309-310; Lawton, *Frenzied Finance*, pp. 90-91.
[60] Nye, *Electrifying America*, pp. 171-172.

Once GE obtained a partial ownership of these electric power companies, they could easily exclude competition for future business. The conglomerate cemented relationships with these new companies by providing extensive consulting services for electric utilities. Some of these newer utilities experienced substantial operating problems and the manufacturer needed to intervene to preserve the share prices of the stock they had taken for their products. Overtime, Coffin's firm placed these shares into the Electric Bond and Share Company (EBS).[61]

Other capital, not tied to magnates like Morgan, became available at irregular intervals. Westinghouse worked intensely for years to get capital outside the Morgan circle. He ultimately received funds from August Belmont and others.[62]

However, investing in *de novo* utilities proved very risky. The aftermath of the Panic of 1893 injured both firms, since both of them owned securities of new power and traction companies. However, GE's much larger exposure to these risky utility stocks caused a major liquidity crisis that almost broke the company. Morgan needed to put together a financial rescue package to save the overextended firm. Exhausted from their Darwinian struggles, both companies entertained the thought of a truce.

In 1895, after years of bitter conflict in the courts, the formerly warring adversaries pooled their patents. Competitors found themselves excluded from many processes and often had to pay hefty licensing fees to the two participants in order to use these protected technologies. Smaller competitors vanished or took on the role of remoras

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[61] Ibid, pp. 170-174.
[62] Jonnes, *Empires of Light*, pp. 217-225, 339-342.

to these two pelagic behemoths. By the turn of the century, the duopoly had achieved industrial rationalization.[63]

The national electrical supply industry had come to fit Nye's model for a highly concentrated electrical complex. GE and Westinghouse stood atop the electrical plant and supply business. These firms had kept innovating, creating more and more industrial uses for electric machinery and current. These newer technologies also substantially affected the copper mining industry and subsequently Montana. Demand for this highly conductive mineral increased significantly.[64]

Copper, Electricity and Montana

Copper mining initially proved very profitable. In turn of the century America, the expanding need for electricity in urban areas drove the demand for copper upwards, enhancing the prospects for miners of the mineral in Montana. The developments in electrical technology not only made Montana copper mining more profitable, but as the need for electrical wiring grew in North America, the industry reaped even greater profits.

Moreover, the creation of these new electrically powered tools and lights opened up new horizons for underground, hard rock mining. From the time of the Fugger family in sixteenth century Germany, mines often produced fabulous wealth for their owners. However, operation of these primitive hard-rock operations often proved perilous. Disasters such as flooding, gas explosion and collapse haunted dig sites. Ever-deepening

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[63] Nye, *Electrifying America,* pp. 170-174.
[64] Ibid, p. 170.

forays into the subterranean world of precious minerals killed or maimed many workers. Electric technology helped lower these risks.[65]

As indicated previously, the first major breakthrough occurred with the introduction of the powerful arc light by the Brush Electric Company. Use of these lights immediately enhanced production and safety in and around the mines. Other electrical products soon materialized in the mines. John Ryan personally rhapsodized about the introduction of fans in the Anaconda mines. Prior to these fans, the mine operators often lost control of fires that broke out in shafts. Walling the corridor off usually contained a conflagration, but this meant the loss of that wing of the mine for a substantial period of time, if not forever. Large loss of life often occurred and well as profit. The fans often could help suffocate these potentially ruinous blazes. Additionally, mines well below the surface flooded form time to time. Unwanted seepage often closed valuable tunnels. Electric pumps proved much more flexible and powerful than the steam or mechanically powered varieties, saving prime veins from abandonment to subterranean waters.[66]

As technology advanced, more sophisticated equipment came into use. Electric locomotives proved very useful. Few mines could handle steam powered locomotives safely. Increased productivity occurred with the introduction of electric powered drills. Also, powerful hoists made the movement of men, machinery and ore much more efficient.[67]

Hence, mine owners such as those in Anaconda desired more electrical power, generated as cheaply as possible as well. Mining operations initially generated all their

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[65] Ibid, pp.186; Mumford, *Technics and Civilization*, pp. 68-76.
[66] Ibid, volume I, pp. 32-33, 37, 49, 112,117, 139-140.
[67] Nye, *Electrifying America*, pp. 146, 204-206.

own power. However, as applications for power expanded, they found themselves running major steam plants. These operations proved inefficient as they required substantial boilers as well as enormous amounts of expensive coal or wood stocks on hand. The copper miners needed a cheaper and more convenient source of power.[68]

This evolving need for electrical power created a space for nascent electric power purveyors in Butte. Mining, even without using electricity directly in the mines, initially caused substantial growth in the general Butte economy. An expanding city and local business desired electrical illumination also. William Clark, one of the "copper kings" and some local business associates made the first attempt at power generation in Butte.[69]

In late 1882, Clark commenced building a primitive plant in Butte under a license with the Brush Electric Light and Power Company. Similar developments occurred in the other developed areas of Montana at this time or very shortly thereafter. Clark's modest facility could supposedly handle up to eighty lights and initial tests seemed successful. All appeared well until an unforgiving December cold snap froze the pipes running to the boiler. A thaw produced no resumption of power and the apparatus never functioned again.[70]

Clark persevered. By 1884, he had another plant working. This facility actually functioned, eventually morphing into the Butte Electric Light Company. This small company had the Butte market to themselves until Thomson-Houston successfully petitioned the City of Butte for an electrical generation franchise in1889. Butte city

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[68] Kirk, *A History of Montana Power*, volume I, pp. 37, 98.
[69] Ibid, p. 90.
[70] Kirk, *A History of Montana Power*, volume I, pp. 33, 134; Leighton, *Corporate History of the Montana Power Company*, pp. 7-8.

councilmen had complained of high power rates from Clark's company and quickly affirmed TH's request. Titled the Silverbow Electric Light Company, this new company, with state of the art production facilities, quickly dominated the market.[71]

Clark's company bought equipment from Westinghouse, but received no substantial financial support from the Pittsburgh firm. After the merger of TH into the new GE, Clark saw the writing on the wall and commenced negotiations to sell out to Silverbow, recently renamed Butte GE. Clark later took his new found electrical business expertise to Missoula, where he proved a key factor in developing power generation in that Western Montana city.[72]

GE not only continued to invest heavily in the Butte operation, but as previously stated, supplied a number of key executives to both the board of the company as well as the operations. GE vice president Henry Byllesby owned a large share of Silver Bow and ran the company until relieved over operational problems relating to dam construction. Another GE executive, Harry Turner, became President of Butte GE. When problems arose later, GE President Charles Coffin briefly assumed command to reorganize the operation. Later, Stanley Z. Mitchell, of the GE affiliate, Electric Bond and Share Company, served in some executive capacities at Butte Electric as well as a director.[73]

Critically, experts that evaluated GE at this time praised the emerging giant's expertise and business savvy. Albert Chandler Jr., an eminent business historian, in his book, *The Visible Hand: The Managerial Revolution in American Business*, touted GE's managerial know-how as some of the best in America. The manufacturer therefore

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[71] Ibid, pp. 37-39. MHS predecessor archive, box 14, folder 5.
[72] Leighton, *Corporate History of the Montana Power Company,* pp. 8, 10.
[73] Kirk, *A History of Montana Power*, volume I, p. 33.