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12 November 2014

Online at <https://mpra.ub.uni-muenchen.de/59874/>  
MPRA Paper No. 59874, posted 12 Nov 2014 21:14 UTC

# Electrification in the Pacific Northwest and the Problem of Embeddedness

Mitch Green

November 12, 2014

## **Abstract**

The surplus approach of classical political economy is applied to the problem of qualitative change in the social provisioning as concerns the Pacific Northwest. Two features of the surplus approach, 1) emphasis on structural interdependence and 2) the Sraffian notion of ‘viability’, allow for the economic history of the Pacific Northwest to be recast as a problem of embeddedness. It is argued that two distinct provisioning processes were embedded in two societies, and viability of each is mutually inconsistent with the other. That is, capitalist use of the Columbia River watershed undermined the viability of the non-capitalist provisioning process that precedes it, in which indigenous groups were central. Taking the social relation as the unit of analysis qualitative change is examined with reference to the electrification of the region, and the subsequent rendering of the watershed as an ‘organic machine.’

# 1 Introduction

Before the emergence of capitalism in the Pacific Northwest there was a social provisioning process in which the Columbia River was central. From the end of the last ice age until recently indigenous groups interacted directly with the river and the watershed that drained it, provisioning themselves through a mix of salmon production and other hunter-gatherer techniques. Complex kinship networks connected indigenous peoples of the region and embedded them in a social fabric in which the institution of gift exchange was central<sup>1</sup>. At the center of this institutional fabric was the Columbia River and the ceremonial reproduction of the salmon.

This system was viable in the classical since. A system is viable if it can reproduce its own conditions of existence. The objective relations of production are organized so they reproduce themselves within the system, with or without a surplus. In the ‘surplus approach’(Cf. Chiodi, 2012; Mongiovi, 2011, Lee, 2012) viability of the simplest circular production system can be expressed formally as

$$a + c \rightarrow 1 \tag{1}$$

$$1 - (a + c) \geq 0 \tag{2}$$

where  $a \in (0, 1)$  is the quantity of salmon used as a means of production per unit of salmon produced, and  $c \in (0, 1)$  the quantity of salmon used as sustenance of persons engaged in the production of production, as well as that used for gift exchange<sup>2</sup>. Obviously, the provisioning process was more complicated than suggested by equations (1) and (2). The point here is to demonstrate that while the gift exchange economy in which tribal groups of the Pacific Northwest were central was viable for several millenia following the last ice age,

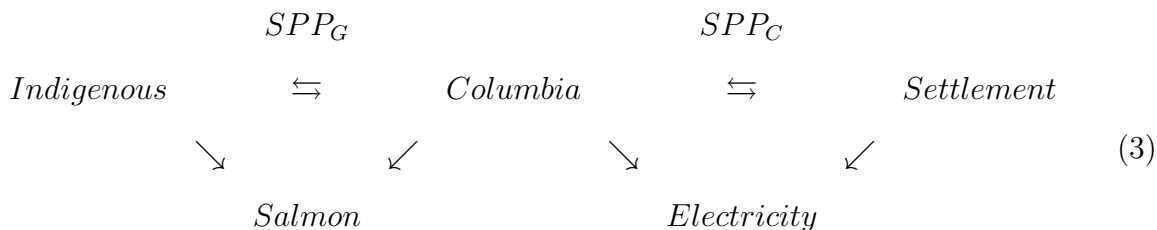
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<sup>1</sup>Lichotawich (1999) provides a broad overview. Hunn (1990) provides a detailed analysis of the Mid-Columbia Indians with regard to the gift. The Lower-Columbia groups are studied in Hajda (1984).

<sup>2</sup>See Gregory (1982) for an application of the surplus approach to gift economies.

it was rendered unviable as the region became increasingly incorporated into the capitalist system. How did this happen?

Capitalists from the east managed to change the provisioning process so that it no longer reproduced itself as an embedded process within the social system of the native Americans of the Pacific Northwest. Because some persons embedded in capitalist social networks were able to exert their agency over the region as whole, a new set of productive relations took root that rendered the old system unviable. One of the central moments in this process was the advent of the railroads and the capital that emerged with it in the region. Once this capital structure was in place, those that sought to maintain its viability went to work to incorporate other social technologies, such as electricity, in the process of creating and maintaining markets in the region. This article examines the emergence of the electric utility closely, because electricity will continue to play an important role in the transformation of the regional economy in the 20th century. This analysis relies upon a relational approach so that the electric utility must always be taken in relation to factors immediately connected to it, namely the railroad - finance nexus and the Columbia River basin in which all of this unfolds historically. A schemata of these relations are given below.



In the economic system that precedes capitalism ( $SPP_G$ ) the provisioning process is embedded in a society in which gift exchange and ceremonial reproduction of salmon are central. In the capitalist economy that follows ( $SPP_C$ ) the provisioning process is embedded in a society in which the insitution of private property is central and the river is placed in the

service of the production and distribution of commodities. Accordingly, the relations that govern the production and distribution of the surplus are determined on the basis of the institutional fabric in which the economy is embedded. In the Pacific Northwest white settlers were granted property rights at the expense of previous institutions governing communal use.

In the modern era the industrial economy determines, largely, the process by which the river-region relationship is socially constructed to reflect the view that the Columbia ought to serve as a great hydrological engine. The Federal Columbia River Power System (FRCRPS) emerges as a set of multi-purpose dams that have reduced the once mighty Columbia into a series of slow moving lakes. The Bonneville Power Administration, in concert with the Army Corps of Engineers and the Bureau of Reclamation operate the Columbia so that it functions, to use Richard White's language, as an "Organic Machine" (1996). The organic machine rationalizes and governs an electric utility industry that emerged from the capitalist development of the region. Because we are interested in the question of qualitative change in the social provisioning process in relation to the Columbia River, we enter the economic history of the region by reference to the electric utility and examine how the men that built and controlled these institutions acted in an institutional capacity, while embedded in a social fabric.

## **2 Embeddedness and Change in the Social Provisioning Process**

To begin with a discussion of power it is useful for the economist to conceptualize the relationship between the embedded individual and the networks in which the person is embedded. Changes in the social provisioning process to such a degree as that which we have witnessed in settling the West, introducing commodity production for the sole purpose of realizing pecuniary gain, and reorganizing the institutional fabric so that capitalist institutions become

central, involve a process whereby unequal power relations are brought to the fore (Robbins, 1994). In our quest to engage in a social theory that avoids the methodological errors of reductionism, essentialism, reification and functional teleology (Sibeon, 2004), we may proceed by conceiving of the problem as a relationship between social structure on the one hand and agency on the other. The institutional fabric conditions, mediates, and gives form to the social provisioning process; wherein individuals carry out their economic life process, acting upon these structures and affecting reproduction. Power emerges as embedded individuals realize the capacity to exert a disproportionate effect upon the reproduction of social structures relative to others, by leveraging their privileged positions at the central junctures of intersecting social networks.

## 2.1 On the embedded individual

In exploring how the concept of embeddedness contributes to the development of the structure – agency problem in social theory, John B. Davis in *The Theory of the Individual*, writes:

to say that individuals are embedded in historical social relationships is quite close to saying that individuals disappear into those relationships. Indeed, many would argue that the embedded individual conception is not a conception of individuals at all, but rather a proposal to ignore individuals, in order to focus on groups, classes, movements, historical forces, history, and so on. According to this interpretation, in fact, rather than there being two traditions of thinking about the nature of the individual, there are really just two great traditions of thinking about society - one that is individualist and includes individuals as agents, and one that is collectivist in which it is not individuals that are agents but instead groups, classes, movements, etc. (2013, pg. 123)

Davis points out an important problem for the economist: how do we theorize about the relationship between the individual and society without veering our analysis toward the polar extremes of methodological individualism and methodological collectivism? One way out of the dilemma is to seek to understand how the embedded individual affects the social structures in which they are embedded, through a framework that encompasses agency as an

emergent outcome of the complex interaction of a range of social and institutional forces. In doing so, we question how some individuals have the capacity to condition the evolution of the institutional fabric whereas others do not. Such differences in so-called “agency” cannot be reduced to the individual nor can they “disappear” into the social structure.

One challenge facing this analysis is the confusion in usage of the term embeddedness. While it would be redundant to reproduce the work of a number of scholars that have surveyed the literature on embeddedness, it is important that we define our usage and understanding of the term here to avoid further confusion of the issue (Cf. Krippner and Alvarez, 2007; Dale 2011). Defining what embeddedness means in the context of the capitalist transformation of the Pacific Northwest requires that we engage some of these differences in both the various strands of heterodox economics and economic sociology.

Krippner and Alvarez (2007) distinguish between approaches to embeddedness that follow in either the Polanyian (1944) or Granovetterian (1985) traditions among economic sociologists. When used as an analytical device for examining the degree to which the economy becomes embedded in or disembedded from the social, the research question follows in the Polanyian tradition and is directed toward resolving macro-level problems; the Granovetterian tradition focuses on micro or meso-level phenomena situated in social networks (2007, pg. 221). For Krippner and Alvarez either approach serves as a “powerful platform for launching a critique of neoclassical economics but is much less useful when turned toward the task of developing a positive research program for economic sociologists” (2007, pg. 221). Hence, insofar as embeddedness establishes the foundation for a research program in economic sociology it fails in providing coherence and internal consistency apart from its criticism of *Homo economicus*.

Supporting Krippner and Alvarez (2007), Dale (2011) argues that Granovetter (1985) has cast the problem of embeddedness as a problem of economic action, situating the atomic individual in a relational context in which social relations give meaning to action. By doing so, the embeddedness approach in economic sociology diverges from the meaning and use

established by Polanyi.

For our purposes here we are not so much interested in resolving the tension in divergent approaches to embeddedness. Rather, in using the concept of embeddedness we acknowledge that in our analysis of the cumulative development of the social provisioning process, we must begin by situating those elements of the institutional fabric that are conceived of as “economic” as mutually constitutive of the institutional fabric. The institutional fabric can be analyzed in a relational manner, suggesting a role for the Granovetterian tradition a la social network analysis, as well as from the Polanyian tradition of critiquing the liberal thesis of the ontologically prior economy, as an analytic category with independent meaning. To the extent that we employ embeddedness in the Polanyian fashion, we reject the notion of the disembodied economy as a concept devoid of meaning (Cf. Beckert, 2007; Block, 2001, 2003; Jessop, 2001; Krippner, 2001; Somers and Block, 2005; and Dale, 2011). Markets do not exist in the absence of social systems and do not operate independent of them. Therefore, they are always embedded in a nexus of social relations. Integrating the concept of embeddedness with the understanding of the economy as a social provisioning process, allows us to envision provisioning from an historically contingent vantage; the interplay between structure and agency are seen as the moment at which the evolutionary process unfolds. The concept of the embedded individual acting within an institutional framework enables analysis that does not run afoul of Roger Sibeon’s four cardinal sins of social theory: reductionism, essentialism, reification and functional teleology (2004).

### **3 Emergence of the Electric Utility Industry**

Markets for electricity and electric products emerged toward the close of the 1870’s. At its inception, electricity was developed for use in illumination. On-site or isolated systems for arc lights were installed as early as 1878. While impractical for use in the modern experience, arc lights did have the effect of generating a spectacle. Bystanders could observe the marvel of an



illuminated commercial intersection, whose source of power was unseen. More marvelous was Edison's incandescent light, which did not burn and flicker as the arc light's carbon filament did when it shone. The warm, steady glow of the Edison light symbolized a progressive, peaceful and clean view of the future (Nye, 1990). Homes, streets, and factories could be lit by a device that safely contained the smoot and smog of the industrial city, keeping it away from the daily experience of the modern city dweller. And light was just the beginning - with electricity the future was ours to make and render submissive. The first act of controlling Nature through fire was thought to have been completed and perfected with the electric light. Consistent with the prevailing ideology of the day, technological achievement enshrined in the electric light was hailed as yet another step toward to the ascension of man to its teleological end (Cf. Spencer, 1851).

By the 1920s electricity had become big business. However, from 1880 to 1925, a period marked by rapid growth, the new industry would settle into instituted norms concerning the specific manner in which electricity would be provisioned and for whom it would generate claims on the surplus. A number of possibilities would be settled: a) the type of technology employed, b) market boundaries, and c) market governance.

A thoroughgoing analysis of the electric utility industry is not of primary interest to this article. Rather, the focus lies in the interrelations between the utility, the railroads, and the Columbia River basin. Men of railroads and finance played a significant role in recreating the provisioning process in the Pacific Northwest (Green, 2014). The railroads in the region provide a convenient entry point to this analysis, because the corporations involved and the men who controlled them embodied the main thrust of the modern business enterprise. The electric utility is nearly indistinguishable from the railroads with respect to the structure, conduct and performance of the going concern. Railroads and utilities rely upon a large complement of plant and equipment, and are governed by the same logic of the machine process. The goodwill capital in each case emerges from the exclusive right of the going concern to make claims on the output of this social, machine process. The going business

is governed by the same businessmen, both in class and cohort. The social networks that controlled the railroads also shaped the development of the electric utility, by capturing the technology and shaping the development of its initial market boundaries.

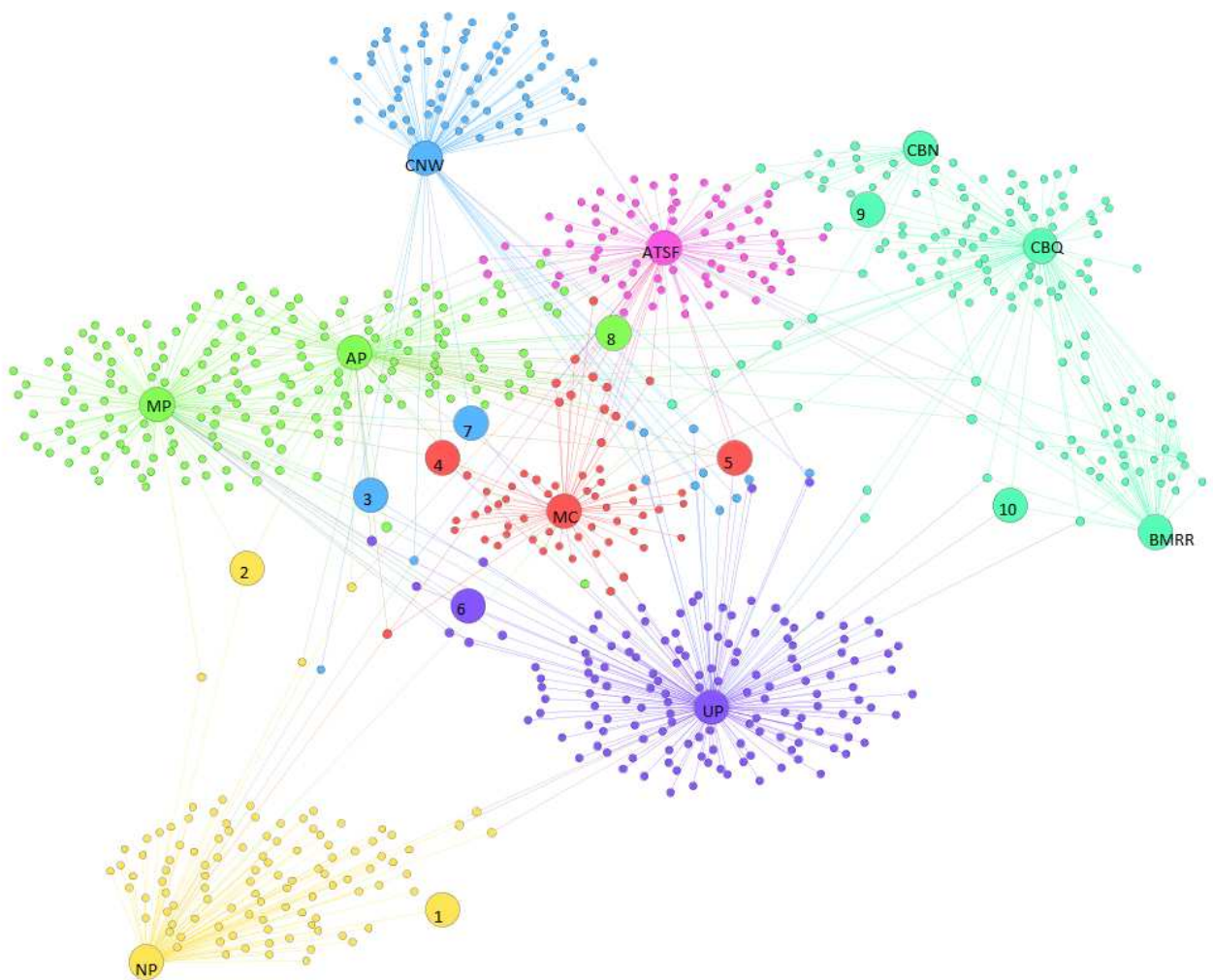
### **3.1 The Railroad Roots of the Electric Utility**

The development of the electric utility mirrors that of the railroads in terms of the social construction of its markets. Such similarity should not be a surprise as it is clear that the utility emerges from the same set of networks as the railroads. Figure 1 provides a glimpse at the extent to which eastern financiers would direct the affairs of the railroads. The very financial institutions, and in some cases particular financiers, went on to develop the electric utilities. Most notable for our purposes here are J. P. Morgan and Henry Villard.

The House of Morgan was deeply involved with a range of financial matters of concern to the railroads. Junius Morgan, through George Peabody, had dealt in railroad securities during the 1850's. Pierpont Morgan, with Morgan & Co. and Drexel, Morgan, acted as financier to the Union Pacific as early as August 1869. According to Vincent Carosso (1987), Morgan's "long association with the [UP] provides a good illustration of the many different types of financial transactions with which [the Morgans] concerned themselves." Morgan was instrumental in moving the railroad business toward greater coherence amongst their interconnected balance sheets. In regards to systemic insolvencies facing railroads in the 1880s, Morgan reorganized the Philadelphia & Reading, Baltimore & Ohio, and Chesapeake & Ohio systems, to name a few (Carosso, 1987).

The financial fragility that grew up with the extensive liability issues of the railroads, "gave Morgan the authority to achieve the financial stability and orderly development of railroad properties which the 'gentlemen's agreements' had failed to attain" (Carosso, 1987). J. P. Morgan hosted meetings in December, 1888 and January, 1889 to discuss the establishment of what would become the Interstate-Commerce Railway Association (Grodinsky, 1962; Carosso, 1987; White, 2011). Morgan would continue to dominate the field of finance

Figure 1: Financial control of major railroads 1872-1894. Node scale is arbitrary. However, large nodes indicate either business enterprise or important financiers. Directors: 1. Henry Villard, 2. Frederick Billings, 3. Jay Gould, 4. Frederick Ames, 5. Oliver Ames, 6. Russel Sage, 7. Sidney Dillon, 8. Thomas Baring, 9. William S. Ladd, 10. William Endicott, Jr. Railroads: Missouri Pacific (MP), Northern Pacific (NP), Atlantic and Pacific (AP), Union Pacific (UP), Chicago and Northwestern (CNW), Chicago, Burlington and Quincy (CBQ), Burlington and Missouri (BMRR), Missouri Central (MC), and Atcheson, Topeka and Sante Fe (ATSF).



Source: Hanson et al (2009)

during the emergence of the electric utility industry, and would play a central role in its development.

### 3.2 Villard and Edison

The electric utility bears a direct connection to the social networks in which Henry Villard was embedded, whether we consider the emergence of the industry as a whole or the PNW in particular (see Figure 2). Villard enters prominently in the history of the region. A railroad concern in the Willamette Valley of Oregon had issued extensive liabilities to a group of German bondholders in the early 1870s. After a default in 1873 a bondholder protection committee was formed, and Villard was dispatched to Oregon to actively manage the concerns obligated to make coupon payments on the outstanding liabilities. From 1874 onward Villard would exert his influence in the development of the region. Thus, relationships between Villard and other parties outside the region are central to the analysis (see Green, 2014 for a more detailed account of Villard’s activities in the region). As early as 1879 Villard was in contact with Edison concerning the development of electricity for commercial application (Buss, 1978). Villard was an early stockholder and director in the Edison Electric Light Company.

The relationship between Edison and Villard was first established and introduced through Grosvenor P. Lowrey, who served as general counsel for the Western Union telegraph, and became quite acquainted with Thomas Edison as a result of extensive litigation surrounding the issue of patent infringements (Buss, 1978). Lowrey and Villard met in conjunction with the Kansas Pacific Railroad having been placed into receivership in 1878<sup>3</sup>. Given the significant claims on the Kansas Pacific held by Frankfurt bondholders, Villard was sent to receive the railroad, at which time Buss (1978) suggests the two likely discussed Edison’s work, who by then was “something of a public prodigy for his invention of the phonograph and stock market printing telegraph.” This connection proved to be important because

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<sup>3</sup>For a detailed discussion of the Kansas Pacific failure and its subsequent receivership, see Julius Grodinsky’s *Transcontinental Railway Strategy, 1869-1893* (1962).

it was Lowrey that organized the interests at Western Union to subscribe funds for the incorporation of Edison Electric Light Company in 1878. This initial capitalization provided for the construction of Edison's lab at Menlo Park.

In January, 1880 Villard had plans to join the interests of Edison with those of the electrical equipment firms in Germany (Buss, 1978). Villard approached Lowrey to suggest the exploitation of Edison's patents throughout Europe, to which Lowrey was amiable<sup>4</sup>. On January 2, 1880 Lowrey wrote Edison to introduce the scheme<sup>5</sup>. Provided Lowrey could secure Edison's support Villard planned to sell rights to Edison's patents in Germany, Austria, Russia, France, Italy and Spain for \$450,000 in total. Villard would market these to Jacob Stern, a well-connected Frankfurt banker. While Stern was less optimistic than Villard he was willing to consider negotiating the sale of patent rights for Germany and France, provided the inventions that underlie their patents proved serviceable (Buss, 1978). In another letter dated January 18, 1880, Lowrey informed Edison that he had arranged for a meeting with Villard regarding the financing of Edison's interests in Europe. Lowrey advised Edison, "if you send him to me I think I can do very well for you...Drexel Morgan and Company were not liberal enough."<sup>6</sup> Indeed domestic financiers during this period, especially with regards to the emerging electric technology, were more reluctant than their European counterparts to finance large ventures (McGuire, Granovetter, and Schwartz, 1993; Wilkins, 1989; Carosso, 1987)<sup>7</sup>.

While in control of the Oregon Railway and Navigation Company (ORNC), Villard commissioned the S.S. Columbia and installed an Edison system so that he may introduce Portland to the possibilities of electric light (Hirt, 2012; Villard, 1904; Robley, 1938; Wollner,

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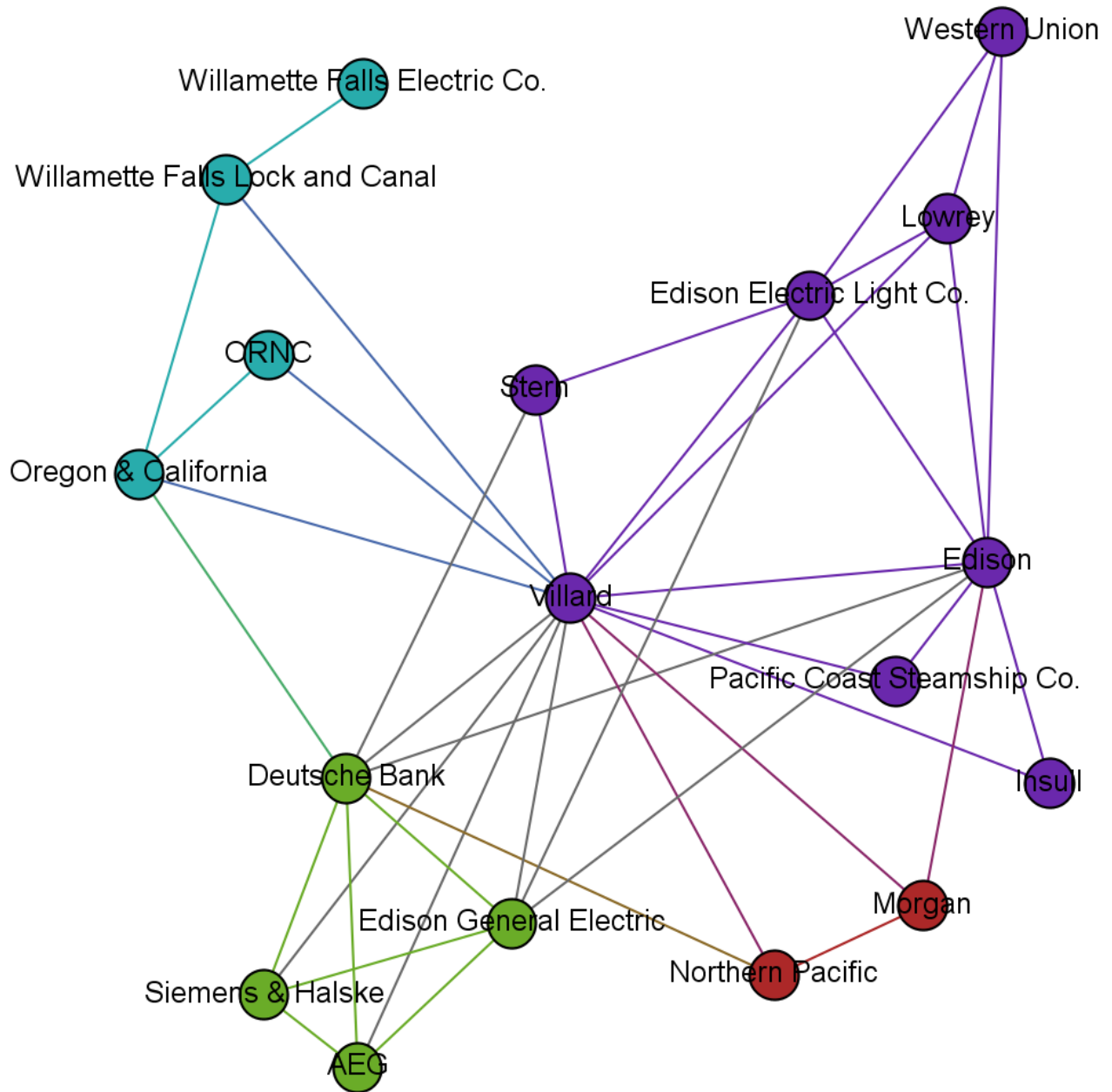
<sup>4</sup>Lowrey to Thomas Alva Edison (TAE), 2 Jan. 1880 (TAED D8026)

<sup>5</sup>In the letter dated January 2, 1880 Lowrey refers to Villard as "a gentleman who is in intimate relations with some of the most important financial people in Germany." Since Villard was on the board of directors for Edison Electric Light Company it is rather strange that he is not referred to by name.

<sup>6</sup>Lowrey to TAE, 18 Jan. 1880, (TAED D8026)

<sup>7</sup>This historical example highlights Schumpeter's (1983, [1934]) recognition that the banker "stands between those who wish to form new combinations and the possessors of productive means," suggesting a far more central role for the financier than serving as intermediary. Here we see the banker as "ephor" in historical detail. See also Minsky (1990) for an analysis of Schumpeter's theory of finance.

Figure 2: Villard and Edison: 1879 - 1889



Source: Constructed by author based upon relations found in Buss (1978) and Wilkins (1989).

1990). Villard's "Brilliant Spectacle", as Paul Hirt terms it, was the first commercial application of Edison's system. According to Buss (1978) "Villard persuaded Edison to design an incandescent lighting system for the vessel despite the protest of [John Roach, the shipright,] and the objections of the marine underwriters association who feared a malfunction in the system would set the ship ablaze.<sup>8</sup>" Later, Villard would solicit the development of an electric engine for use in freight rail, as he envisioned electric motors driving the system of feeder lines for the Northern Pacific.

After Villard's financial troubles following the downturn of 1883, he focused more on the process of developing Edison's central stations (Buss, 1978). Villard would later organize the Edison General Electric Company, using the financial resources he had cultivated in the Deutsche Bank. Using his connections in international financial circles, Villard was able to facilitate investment between Edison and German electric interests. Villard managed to place Edison patents in Germany, as well as German investment in New York for a cable plant that would serve as an input into the Edison system domestically.

After Villard's resignation from the Northern Pacific, resulting from a combination of mismanagement and tight credit following the recession of 1882, he left for Europe in the spring of 1884<sup>9</sup>. However, Villard remained connected with Edison Electric Light Company during this sojourn. While in Europe he cultivated his financial relationships with German bankers, most notably, those connected with the Deutsche Bank, which included Jacob Stern and Werner Siemens. According to Buss (1978) it was Villard's association with Edison that allowed him to establish a business relationships with Werner Siemens. Werner Siemens, as well as brothers Friedrich, Karl and Wilhelm, had established considerable interests in the production of electric cables. In addition, the Siemens brothers had established an inter-

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<sup>8</sup>See also Villard (1904, pg. 290).

<sup>9</sup>According to Buss (1978) the root of the cause of his downfall in 1883 was due to his inability to gain access to liquidity. Given the recession of 1882 (March 1882 - May 1885) the position of the Northern Pacific became more fragile, requiring the further issue of liabilities just to validate its debt structure. Buss (1978) suggests that internal doubt over the ability of Villard to manage the Northern Pacific led to reduction in his ability to secure lines of credit. This would ultimately undermine his control of the NP and cause his exit from the firm.

European telegraph network (Buss, 1978). Meanwhile, Siemens and Halske had diversified, building the first electric train in 1879. Villard also cultivated a relationship with George Siemens of the Deutsche Bank beginning a period in which Villard would act as intermediary for German investment in US interests. See Table 1 delineating Villard's promotional work resulting in over \$65 million dollars of securities purchased by the Deutsche Bank in US railroads, and later Edison General Electric.

According to Wilkins (1989) there were two main firms in Germany that dominated the industry of electrical equipment manufacture. These were Siemens and Halske and Deutsche Edison Gesellschaft (formed in 1883 by Emil Rathenau). Deutsche Edison Gesellschaft changed its name in 1887 to Allgemeine Elektrizitäts Gesellschaft (A.E.G). George von Siemens was chairman of the board of A.E.G, and was also a director at the Deutsche Bank. George von Siemens was a cousin of Werner von Siemens of Siemens and Halske. Hence, the two firms were connected via family relations. Villard was connected to each. Both firms jointly owned patents on Edison's technology in Germany, as result of an 1883 accord between the two firms intended to bring about harmony in the German market (Wilkins, 1989)<sup>10</sup>.

Villard planned to seize control of Edison interests in America and form the basis of an international cartel centered in Germany (Wilkins, 1989)<sup>11</sup>. Returning to the United States in 1886 Villard acted as representative of the Deutsche Bank, charged with "exclusive production rights" for the Siemens cable business (Wilkins, 1989). The idea was that Edison interests in the United States and electric interests in Germany would be joined, through the exchange of patents. Edison patents were in use in Germany while Siemens and Halske patents would be used in United States. In this way, the two communities of interest may

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<sup>10</sup>Siemens and Halske was the largest single shareholder in A.E.G at the time of its founding. Wilkins (1989) notes that according to Buss (1978) Edison's sojourn to Germany in 1884 was "ostensibly to market Edison generating plants." However, apparently Villard used "Edison's name to establish a relationship with Werner von Siemens of Siemens and Halske and Emil Rathenau of Deutsche Edison Gesellschaft at the same time renewed his earlier acquaintances with George von Siemens." In 1887 Villard participated and assisted in the process which transformed Deutsche Edison into A.E.G, at which time the latter was wholly independent of American Edison interests.

<sup>11</sup>For more on the international electricity cartel in question, see Reich (1992)



be joined together in an international market. Given the high cost of imports in the United States, Villard suggested that Siemens and Halske invest in the production of a US-based plant to produce the cables. In April 1887 he was busy working out arrangements for such a scheme. Villard intended for production of Siemens and Halske cables to be undertaken by an Edison enterprise. As Villard returned to Germany in 1888 to report these developments to Siemens and Halske, a new strategy emerged, whereby the German interests would seize control of the Edison interest in the U.S (Wilkins, 1989). Because Edison in 1889 was starved for liquidity, he was amenable to Villard's suggestion that Edison interests be consolidated under a new firm known as the Edison General Electric company. Buss (1978) notes that \$8.3 million out of the \$12 million capitalization of the new Edison General Electric firm represented investments from the German interests (see Table 1). After the reorganization, Villard emerged as president of Edison General Electric. Once in control, he brokered the ratification of the Siemens and Halske cable factory contract (Buss, 1978)<sup>12</sup>.

### **3.3 Villard and the Central Station**

Villard championed Edison's central station concept (Buss, 1978; McGuire, 1986). In a letter to Siemens and Halske dated April 5, 1887, Villard described his work promoting the central stations (Buss, 1978). Villard stated that his promotional activities included the cities of New York, Philadelphia, Boston, Washington, Cleveland, Chicago, St. Paul, Minneapolis, and Denver. Whereas domestic financiers were reluctant to finance the development of the electric utility industry around the central station concept, Villard and other German finance capitalists provided support (McGuire, Granovetter, and Schwartz 1993; Carosso, 1987;

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<sup>12</sup>It is worth noting that pricing for the new cable factory was determined prior to its construction. Buss notes (1978), the "market price of the lead cable was to be set according to a formula developed in Germany." The Edison interest in the contract was authorized to issue any rebates it deemed necessary to build up the market. Further, and not inconsequential from the standpoint of the German interests maintaining and developing its own going concern prices, was the stipulation that Siemens and Halske was guaranteed 20% of the profits and unfettered access to the bookkeeping. Going concern prices may be understood as devices through which the business enterprises establishes a value flow sufficient to reproduce itself in perpetuity. The establishment of going concern prices reflects the agency of those directing and controlling the enterprise, and should not be construed as emerging from the market (Lee, 2011).

Table 1: German investment in U.S. securities resulting from Villard's promotional work

| Year | Purchaser                                              | Type of Security                | Amount       |
|------|--------------------------------------------------------|---------------------------------|--------------|
| 1886 | Deutsche Bank; Jacob Stern                             | Cincinnati, Hamilton & Dayton   | \$2,500,000  |
| 1887 | Deutsche Bank                                          | Northern Pacific                | \$6,000,000  |
| 1887 | Deutsche Bank                                          | Oregon Railway & Navigation Co. | \$3,500,000  |
| 1887 | Deutsche Bank                                          | Cincinnati, Hamilton & Dayton   | \$2,166,000  |
| 1887 | Jacob Stern; Speyer, Ellison & Co                      | Denver and Rio Grande           | \$1,500,000  |
| 1887 | Deutsche Bank & Jacob Stern                            | Missouri Pacific                | \$1,500,000  |
| 1887 | Deutsche Bank; Heidelback, Ickelheimer & Co. Rothchild | Northern Pacific                | \$5,000,000  |
| 1887 | Jacob Stern                                            | Illinois Central Mortgage       | \$5,000,000  |
| 1888 | Deutsche Bank                                          | Northern Pacific                | \$10,000     |
| 1888 | Deutsche Bank                                          | Chesapeake & Ohio               | \$1,600,000  |
| 1888 | Deutsche Bank                                          | Oregon Railway & Navigation Co. | \$1,750,000  |
| 1888 | Deutsche Bank; Speyer, Ellison & Co.                   | Houston & Texas Central         | \$2,000,000  |
| 1889 | Deutsche Bank                                          | Wisconsin Central               | \$250,000    |
| 1889 | Deutsche Bank                                          | Northern Pacific                | \$500,000    |
| 1889 | Deutsche Bank                                          | Houston & Texas Central         | \$2,418,000  |
| 1889 | Deutsche Bank; Jacob Stern                             | Northern Pacific & Manitoba RR  | \$50,000     |
| 1889 | Muller, Shall & Co.; Speyer, Ellison & Co.             | Northern Pacific & Manitoba RR  | \$100,000    |
| 1889 | Muller, Shall & Co.                                    | Edison General Electric         | \$100,000    |
| 1889 | AEG                                                    | Edison General Electric         | \$3,800,000  |
| 1889 | Siemens and Halske                                     | Edison General Electric         | \$4,000,000  |
| 1889 | Deutsche Bank                                          | Edison General Electric         | \$750,000    |
| 1889 | Deutsche Bank; Speyer, Ellison & Co.                   | Central Pacific                 | \$3,250,000  |
| 1889 | Heidelback, Ickelheimer & Co.                          | Wisconsin Central               | \$22,000     |
| 1889 | Speyer, Ellison & Co.                                  | Wisconsin Central               | \$15,000     |
| 1889 | H. P. Goldschmidt & Co.                                | Wisconsin Central               | \$21,000     |
| 1889 | Jacob Stern                                            | Wisconsin Central               | \$21,000     |
| 1889 | Deutsche Bank                                          | Central Pacific                 | \$6,500,000  |
| 1890 | Deutsche Bank                                          | Northern Pacific Consols        | \$2,000,000  |
| 1890 | Deutsche Bank                                          | Northern Pacific Consols        | \$9,000,000  |
|      |                                                        | Total                           | \$65,323,000 |

Source: Buss (1974)

Wilkins, 1989). Morgan envisioned the development of the industry around the notion that electric products would be sold as commodities, and that markets boundaries would reflect proprietary claims on the patents underwriting such technology. Electric manufacturing firms would buy the right to lease the patents for defined terms, thereby generating a flow of income that may then be capitalized.

Edison, Insull and Villard sought to market electricity itself as a commodity. Centralized production and distribution of electricity through, what would later be known as the utility, offered a mechanism through which the new markets might be governed. Like the railway empire Villard built in the PNW, the central station would pursue an aggressive growth strategy, seeking to place itself at the center of a large network of financial flows related to the provisioning of electricity. The transmission and distribution grid, like the network of steel and wooden ties in the case of the railroads, would fix in space the boundaries of the market. The business enterprise engaged in electricity provisioning along the central station model would capitalize the load growth of cities within these boundaries. Further, through the use of market governance institutions, the holding company in particular, it could connect many urban systems into great, regional empires. To this end, the promise of business enterprise exemplified in the central station concept was nearly indistinguishable from that of the railroad corporations of the late 19th century.

### **3.4 The North American Company**

The North American Company, one of the most important public utility holding companies in the 20th century, was a creature of Villard's and evolved from his earlier use of the holding company as a market governance institution in the PNW. Villard had gained control of the transportation and navigation situation in the PNW by leveraging his social network via the "Blind Pool" (Hedges, 1930). However, to ensure ongoing control of both the Northern Pacific and his own ORNC he incorporated the Oregon and Transcontinental Company in 1881. Students of market governance will recall that corporations were generally not

provided the legal right to hold stocks in other corporations prior to 1888, however, this did not prevent Villard and others from seeking special legislative favors to enable them to do so<sup>13</sup>. Villard did experiment with other forms of market governance, such as traffic pooling agreements. However, traffic agreements are typically not an enduring form of market governance (Bonbright and Means, 1932). Since Villard was determined to ensure that Portland would be the terminus for the transcontinental railroad in the region (Hedges, 1930; Villard, 1904; Buss, 1978; Grodinsky, 1962), he sought firmer control over the Northern Pacific.

The holding company offered a mechanism through which control of large corporations could be established with a minimum stake in the subsidiary concerns. Moreover, the Oregon and Transcontinental charter allowed for a rather broad scope of market activity, to include production of the primary commodity groups that would serve as the basis of its freight traffic, such as agriculture, mining and lumbering. Indeed, Villard's Oregon Improvement Company was itself a holding company engaged in these activities, and was held by the Oregon and Transcontinental Company. However, with the emergence of the electric utility, his holding company system would evolve to conform with the pursuit of encapsulating this

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<sup>13</sup>The legitimacy for a concern to hold stocks in another company prior to 1888 was not explicitly provided for under the general incorporation acts in any state (Bonbright and Means, 1932). The implicit right to hold stock in other corporations was commonly referred to the courts. In 1888 New Jersey amended its general incorporation laws allowing explicitly for intercorporate stock holdings. Nevertheless, many holding companies did exist prior to 1888, sanctioned by "special favors of a legislature." In 1868, the state of Pennsylvania granted the Continental Improvement Company the "full power and authority to hold and own securities of any form, either as collateral or otherwise, and to dispose of the same at pleasure" (Bonbright and Means, 1932). Bonbright and Means (1932) cite forty-one further instances between 1868 - 1872 in which holding companies were incorporated with identical favor as the Continental Improvement Company, and in many cases with the same language, for the same set of incorporators.

While Bonbright and Means (1932) focus their early history of holding companies in Northeastern states, apparently these practices were common in Oregon as well. Villard's Oregon Improvement Company, which held stocks in mining concerns set up to exploit the coal reserves in Western Washington, was named after the many "Improvement Companies" cited by Bonbright and Means (1932). The New York Times referred directly to the Oregon and Transcontinental Company as a holding company. A Times article dated June 16th, 1890, states, "[t]he Oregon and Transcontinental Company, according to Poor's Manual, was organized June 28th, 1881, under the laws of the state of Oregon, for the general purpose of constructing railroads, to secure harmony of action between the Oregon Railway and Navigation Company and the Northern Pacific Railroad Company by a purchase of a controlling interest in the stocks of these two companies and to furnish the means to build and equip branch lines of the Northern Pacific Railroad Company (which that company cannot under its charter construct) in order to increase the value of its land and its traffic by development of the territory tributary to it, and to protect it from the encroachment of rival lines."

new technology under his corporate control.

In 1890 the Oregon and Transcontinental Company was dissolved in Oregon and reorganized as the North American Company for incorporation in New Jersey, which allowed for a broader scope of market activities permissible to the going concern. In this example, it would be inappropriate to think of the two enterprises as distinct going concerns. The capital (in the Veblenian sense) embodied in the Transcontinental was not diminished as a result of the new charter. The plant and equipment associated with the underlying properties remained unchanged, and the going business was still going. The only difference was that new markets became available to the going concern as a result of the new charter, as well as new social relationships to be capitalized. The purpose of the North American Company was to pursue the development and proliferation of Edison's central stations in the Midwest, where he was well known among the German immigrant population, and thus carried the goodwill for the concern (Buss, 1978).

## 4 Electrifying the Northwest

Histories of electricity in the region often begin by recounting its first demonstration in Portland, Oregon. This “Brilliant Spectacle” (Hirt, 2012) was thought to be the moment at which consumers would demand electricity and thereby pass into modernity (Nye, 1990). It is easy to read into this history an inexorable drive toward electrification. Indeed, the possibilities for a clean and “bright” future seemed within reach (Nye, 1990), prompting a progressive, utopian response<sup>14</sup>. Yet, the new technology was always under the control of interests vested in the reproduction of a pecuniary, proprietary society, so that whatever technological marvel electricity promised the actual application would be limited in scope. Only those applications that generate a profit and do not undermine the viability of the

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<sup>14</sup>Nye (1990) points to a number of utopian novels, including Edward Bellamy's later work, in which electricity would ameliorate most social ills. One prediction suggested that electricity could be used to prevent divorce, by allowing for the production of “Electric Equalizers” that automatically “dissipate any domestic storm and insure harmony in families.”

economic system as a whole, will be undertaken. For our purposes it will be of interest to show how the development of the industry in the PNW was connected to the legacy of Henry Villard and the railroads he commanded.

Because the electricity industries are governed by business enterprise this analysis begins earlier than Villard's symbolic, techno-spectacle, opting instead to trace its emergence to the corporate roots that precede it. The political economy conjuncture resulting from private control of the region's watershed, provided the germ for the emergence of a new resource: hydroelectric power. While placing rivers into service as sources of power for the machine process is not unique to the PNW, with Lowell, Massachusetts as the most obvious example in U.S. economic history<sup>15</sup>, its modern practice reflects the region's peculiar, institutional development. In particular, the struggle over control of the river for the sake of a going navigation business produced the conditions under which the Willamette Falls at Oregon City would become a site of economic importance. The growth and development of Portland's first central station began with the development of hydroelectric power at the Willamette Falls, therefore a brief examination of the economic processes that transformed that space into a resource is warranted.

During the period 1860 - 1880 the Oregon Steam Navigation Company (OSN) enjoyed monopoly over river traffic into the Inland Empire<sup>16</sup>, along the Columbia River and upper Willamette River (Johansen, 1941). Demand for navigation services was fueled primarily by Idaho's gold rush in the early 1860's (Cf. Scott, 1917). Goods and persons were transported by the OSN to Wallula (the landing at present day Walla Walla, WA) along the Columbia, then transported by mule train to the various mining districts (Johansen, 1941; Johansen and Gates, 1967). At first the region was wholly dependent upon imports, but by the

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<sup>15</sup>The immigration pamphlets published by corporations such as the Oregon Railway and Navigation Company and Oregon Improvement Company, as well as the city of Portland, described the region as possessing the water power potential of Lowell, MA. The verity of these claims was irrelevant; immigrants from the East understood what Lowell had achieved by placing its waterways into industrial service. Aside from the occasional mill, the rivers of the Columbia basin remained largely ungoverned until the reclamation projects of the New Deal era.

<sup>16</sup>Recall, the Inland Empire refers to the upper portion of the Columbia River basin, defined chiefly by the Snake River basin.

Table 2: Freight rates per ton

| Leg                            | Distance                               | Rate (ton)           |
|--------------------------------|----------------------------------------|----------------------|
| Portland - The Dalles          | 121 miles                              | \$10.00              |
| Portland - Umatilla            | 217 miles                              | \$20.00              |
| Portland - Wallula             | 240 miles                              | \$25.00              |
| Portland - Palouse             | 317 miles                              | \$32.00              |
| Portland - Penewawa and Almota | 348 miles                              | \$37.50              |
| Portland - Lewiston            | 401 miles                              | \$40.00              |
| Fast freight                   | Portland - The Dalles                  | \$2.50 per ton extra |
|                                | Portland - all points above The Dalles | \$5.00 per ton extra |

Source: Poppleton (1908)

mid 1870's the production of wheat in the Inland Empire formed the basis of an export business. Charging "all the traffic can bear," the OSN generated sufficient revenues to further consolidate ownership of the portages and docks, maintain its growing fleet, and enrich its owners. Poppleton (1908) provides a glimpse of its rate structure effective April 1, 1877.

Compared to similar navigation concerns operating in the Midwest and Great Lakes areas, OSN rates were unusually high. On average, the OSN's rate per ton was ten times that which prevailed on the Missouri, a notoriously dangerous river to navigate in the pre-dam era (Poppleton, 1908). Whereas the OSN charged \$40 per ton to move freight from Portland to Lewiston, a distance of 401 miles, the same ton would travel 3,200 miles from St. Louis, MO to Ft. Benton, MT.

Differences in convention help explain part of the regional divergence in rates. The OSN maintained the convention among Columbia River steamboat captains to specify tonnage by cubic volume: the maximum reach of any part of the freight was used to define a three-

dimension envelope in which the freight could be housed. For example, an ox cart would be measured so that the length include the tongue fully extended, its height with the tongue lifted vertically, and width calculated from wheel to wheel. The rule of thumb then yielded one ton for each cubic feet of this notional envelope. Under no circumstances would volume be deducted for empty space within the envelope. According to Poppleton (1908), this method resulted in overestimates of weight by as much 300% when compared to practices in the East. The geology of the Columbia River basin also added additional cost to navigation. At various points along the Columbia, the river cuts through cascading falls, which prior to the construction of a lock and canal system, required portage to make passage. Portage involves transferring cargo to wagon teams, and later railroads, below the falls then transporting it above the falls, where it is loaded on a new ship that continues unabated until it encounters another obstacle. While Poppleton (1908) reflects the popular view that prevailed in the 1860s and 1870s that the OSN's rates were almost all profit, Johansen (1941) points to the high cost of portage as evidence that profit rates were probably lower than people imagined. Nevertheless, the OSN's rates were going concern prices: the mark up was sufficient to reproduce the concern and generate a flow of income to its shareholders, sometimes as high as 37% (Johansen, 1967), but usually around 12% (Poppleton, 1908).

Owing to the high cost of portage at the Willamette Falls (Oregon City) two concerns endeavored to build lock and canal systems. In 1868 the People's Transportation Company built a crude, wooden system on the east side of the river. In the same year, a legislative act provided for a state-subsidized corporation, the Willamette Falls Canal and Locks Company, with the hope that prices might be regulated by competition (Robley, 1938; Stewart, 1950). Large debts incurred in the construction of its canal, as well as the threat of a protracted rate war between rival steam and rail concerns, resulted in the sale of the People's Transportation Company to Ben Holladay in 1871 (Wright, 1875; Villard, 1944). As discussed in Green (2014), it was Holladay's intention to control the railways in Oregon since his arrival in 1868. Maintaining the viability of the Oregon and California Railroad, which he had incorporated



with the hopes of renewing the goodwill embodied in his legal claim to the Oregon Central Railroad's (Cf. Hedges, 1930; Villard, 1944; Ganoe, 1924) land grant, required control over the navigation business on the Willamette. However, by 1870 public opinion had soured against Holladay and the Granger controlled legislature passed a bill that provided for further subsidies to the Willamette Falls Canal and Locks Company, with the hope of dislodging his control (Villard, 1944; U.S. War Department, 1899). It is important to emphasize that the Grangers in Oregon viewed monopoly control over steamships, docks, and silos as the source of their disadvantages, holding to the belief that market forces at the Liverpool grain exchange would yield them a fair price (Cf. Buck, 1969; Carr, 1875).

The legal device that gave birth to the Willamette Falls Canal and Locks Company, also spawned the creation of two concerns that would further threaten Holladay's control: Willamette River Transportation Company and the Farmers' Dock and Warehouse Company. Holladay promptly lowered rates in an effort to expel the contestants from the market, driving the price below a sustainable level for the new concerns. The OSN joined Holladay on the Lower Columbia<sup>17</sup> (Villard, 1944).

In 1874 a compromise was struck between Holladay and Barney Goldsmith, who controlled the opposing enterprises and acted as agent for the Willamette Falls Canal and Locks Company, so that all going concerns engaged in the Willamette navigation business were to operate under a unified management, while the locks company would adopt the railroad freight rates. Further, a system of subsidies between the concerns would be established to level respective differences in cost.

However, the market governance agreement between Holladay and Goldsmith was foiled as the OSN held that its pursuance would breach its previous agreement in 1863 with the People's Transportation Company, which divided the market (Villard, 1944; Johansen, 1941). Per the agreement, the People's Transportation Company would leave the Lower Columbia market to the OSN, and vice versa regarding the Willamette. While Holladay purchased the

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<sup>17</sup>The stretch from the confluence of the Willamette and Columbia to its mouth at the Pacific Ocean.

former concern in 1871, its going business remained intact. In this case the going business was structured by the market division agreement with the OSN; should the agreement breakdown, the web of financial relations that constitute the going business would begin to unravel.

In addition, state fiscal support to the Willamette Falls Canal and Lock Company was insufficient to overcome the redundancy of two competing canal concerns relative to the size of the market, and so it would be absorbed by the larger, more solvent OSN. Holladay's navigation concerns, which by 1872 included the Oregon Steamship Company, would pass into Villard's control in 1876 while working in the interests of the Frankfurt bondholders. In 1879, Villard organized the Oregon Railway & Navigation Company (ORNC), allowing him to secure control of all railway and navigation concerns in the region, while freeing him from the Frankfurt bondholders<sup>18</sup>. The outcome was absolute control of the Willamette Falls, which enabled him to initiate a process that would recreate the site as an electric resource.

In 1884 Villard, after he was ousted from the ORNC and the Northern Pacific, but remaining in control of the Willamette Falls, commissioned a full survey of its waterpower potential. In doing so, Villard sought to apply Edison's technology controlled by the Edison Electric Light Company to the property at the falls, which had become a resource as a result of cumulative development of the institutional fabric. That is, a river does not naturally yield power as a resource. To produce a resource requires a nexus of social and spatial relations so organized that a proprietary relation may be conferred upon it, in conjunction with the application of a specific technology (De Gregori, 1987).

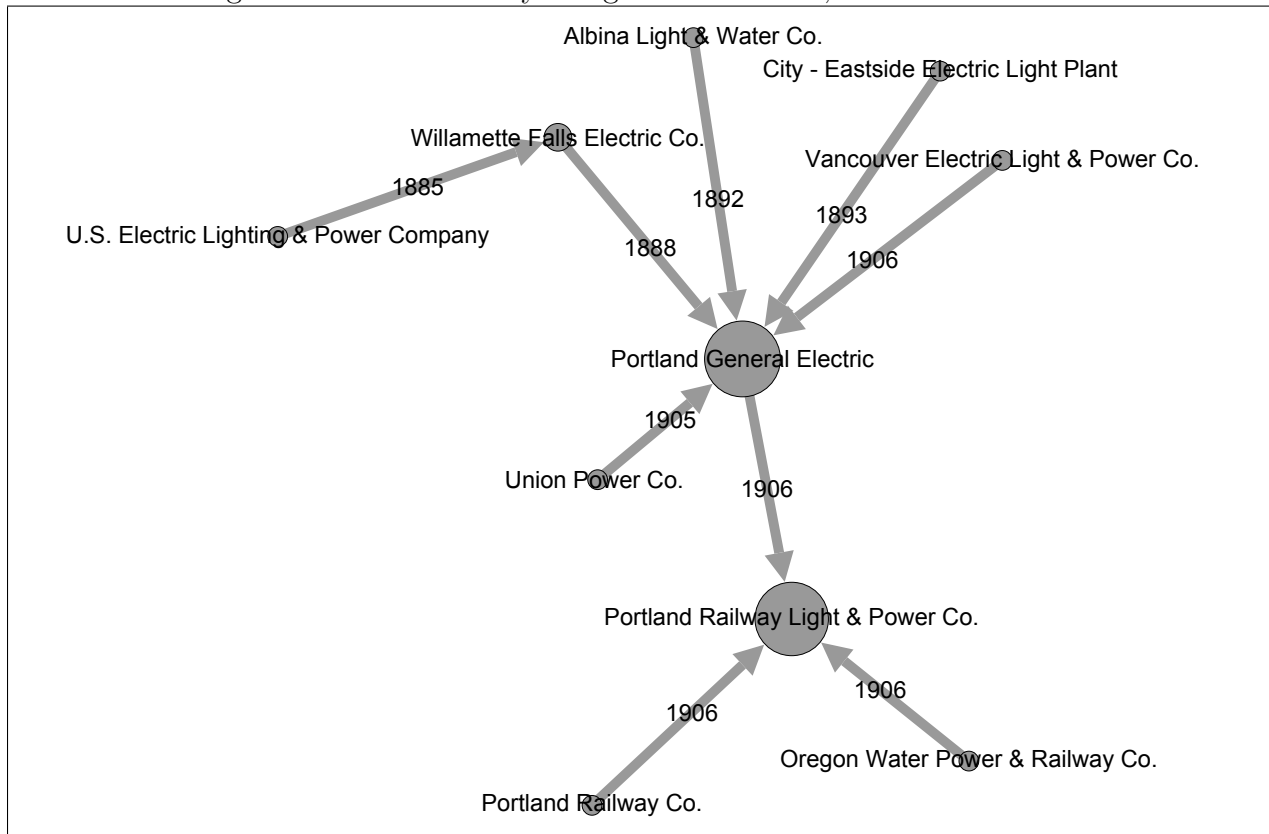
On November 8th, 1888, Morey and Eastham, members of Portland's business elite, incorporated the Willamette Falls Electric Company. According to Wollner (1990), Easton had formulated a plan to buy the Willamette Transportation Locks Company<sup>19</sup> as early as 1883, due to its monopoly on the falls. In 1887 he had purchased the rights sufficient

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<sup>18</sup>See Green (2014) for a detailed discussion of this reorganization.

<sup>19</sup>This was the concern that Holladay had incorporated to consolidate his navigation holdings after his purchase of the People's Transportation Company. However, its subsidiaries as distinct going concerns remained intact, evidenced by Villard's direct reference to the Oregon Steamship Company as the navigation company he came to acquire and control in 1876 (Villard, 1944).

Figure 3: Electric Utility Mergers in Portland, OR: 1884 - 1906



Source: MacColl (1976)

to grant him effective control over the Willamette Falls. Because the engineer's report to Villard had so thoroughly documented the enormous potential of waterpower at the falls, Morey and Eastham were able to draw upon such accretion to the joint stock of knowledge<sup>20</sup>. On June 3rd, 1889, Willamette Falls Electric Company demonstrated the first long-distance transmission of electricity from Oregon City to Portland using alternating current generation.

The Willamette Falls Electric Company was reorganized as Portland General Electric in 1891. The new concern was capitalized at \$4.25 million, most of which flowed from the Old Colony Trust Company of Boston. The General Electric Company of Boston was also a major investor in Portland General Electric (PGE), in order to establish ties between Portland and the Boston firms so that the former would purchase equipment from the latter.

<sup>20</sup>Other stockholders in Willamette Falls Electric Company included David P Thompson, R. H Thompson, Lester Leander Hawkins and William K Smith.

The Old Colony Trust Company, according to MacColl (1978), served as Boston's "old guard" financial institution<sup>21</sup>.

The organization of PGE provides evidence in support of the claim that electric utilities found roots in in the railroad - finance nexus. Frederick Ames, a director for the Old Colony, was also a director at American Loan and Trust Co., as well as a number of important railroads (see Figure 1, see Figure 4 for the Boston financial network in which Ames was embedded). Henry Reed, secretary of the Lewis & Clark Centennial Exposition<sup>22</sup>, reported on July 7th 1904 that PGE had won the contract to supply the Exposition with electric current, valued at \$82,000. Wollner (1990) dismisses the interconnections between PGE executives<sup>23</sup>, financiers, and the governance of the Exposition as superficial to the ongoing development of the going concern. However, Wollner's analysis is teleological, and the men of electricity and finance in his corporate history of PGE are seen as heros, undertakers of a progressive and inevitable technology. While PGE retained local control initially, when it was incorporated into the Portland Railway, Light and Power Company (PRLP) 1906, such control passed in the hands of Eastern capital<sup>24</sup>. The controlling interest in PRLP lied in the hands of the Clark family of Philadelphia. (MacColl, 1978). MacColl states that the

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<sup>21</sup>MacColl claims Boston as the center of high finance during the age in which the railroads, as well as the first great trusts in mining, textiles, and utilities, were most central. This claim is too ambitious: the financial center for these concerns encompassed networks that spanned Boston, New York, and Philadelphia in the U.S., as well as London, Berlin and Frankfort in Germany (White 2011; Wilkins 1987).

<sup>22</sup>World fairs and expositions were a popular way to promote electrification. They were also platform from which to perpetuate the ideology of imperialism. The "Great White Way" in Chicago's World Fair possessed double meaning: cities were white with illumination, with central boulevards emblazened with electric light, but the exhibitions were structured so that the brightest, and most central displays, were those of recent Western settlement and achievement in American history. Again, the Anglo-Saxon, Christian American was held up as the pinnacle of human achievement, whereas other cultures, both extant and extinct, were displayed so that they "dimmed" as they grew more distal to the center. Native American and African traditions were not illuminated at all and occupied the very edges of the expositions (Cf. Nye, 1990; Hirt, 2012).

<sup>23</sup>At the time, Henry Goode was both president of the Exposition's planning and governance board as well as Portland General Electric. Goode originated from the Northwest Thomson - Houston Company, which was strongly tied to Eastern financiers through Charles Coffin. James R. Thompson of Portland General Electric was also the fair's electrical engineer (Wollner 1990). For a detailed account of the financial connections of the Northwest Thomson - Houston Company, regional subsidiary of the firm that would be merged with Edison General Electric to form General Electric, see the July 24th, 1895 issue of *Electricity*, a weekly publication.

<sup>24</sup>Streetcars or "traction" enterprises were often the most important source of load growth for the electric utilities. The most direct means to provide stability in either market was through combination.



formation of the PRLP was “Portland’s first bona fide monopoly,” however, such a claim is untenable given the Oregon Steam Navigation Company had consolidated total control over river traffic as early as 1862 (Poppleton, 1908)<sup>25</sup>. Figure 3 offers a summary of the consolidation of Portland’s electric utilities between 1884 - 1906.

## 5 Conclusion

Marx (1852) remarked on the problem of cumulative development that, “[m]en make their own history... under circumstances already existing, given and transmitted from the past. The tradition of all dead generations weighs like a nightmare on the brains of the living.” Considering the emergence of the electric utility in the Pacific Northwest in relation to the Columbia River is an attempt to wake our brains from the nightmare. Tracing the roots of the utility to its common roots with the railroad corporations that grew up with the Columbia River trade, exposes the contingency surrounding alternate purposes for which a watershed might be put to use. In doing so we expel an notion of universality or inevitability governing the development of a social provisioning process.

The heterodox surplus approach, suggested by Lee (2012), focuses on the interplay between structure and agency. The surplus itself becomes the object of analysis, in which decisions over its composition and magnitude provide a point of departure for a theory of qualitative change as concerns economic systems.

Analyzing in detail social relationships, as we have done in the present article, centers the analysis on agency as the locus of change. Agency is taken as contingent upon the historical conditions in which it is socially embedded. Agency emerges as a relational phenomena.

In the 20th century the Columbia River basin becomes the site of large-scale public works development for the sake of “reclaiming” a wasted river. The Columbia River that, for 9,000 years, has served as a central part of the provisioning process for a gift economy,

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<sup>25</sup>In fact, it was the Oregon Steam Navigation Company that provided much of the capitalized value for the later incorporated Oregon Railway Navigation Company, which, in turn, provided the same for the Oregon and Transcontinental.

becomes encapsulated within the capitalist machine process, rendering viable the production of a new surplus as it destroys the viability conditions for another. Electrifying the region with the organic machine builds upon the tradition of *some* generations - those of railroads, electrification, and finance - but, not all as Marx suggested.

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