THE EMERGENCE OF THE PAPER PLANTATION:
HISTORICAL GEOGRAPHIES OF THE PULP AND PAPER INDUSTRY
IN MAINE, 1880 TO 1930.

A Thesis in

Geography

by

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ABSTRACT

In the late nineteenth century the U.S. pulp and paper industry expanded into new forestry frontiers from core industrial regions along the eastern seaboard, eventually creating new industrial complexes that ranged across North America and beyond. Maine, which became “the paper plantation” as a result of the industrialization of the state’s forests by increasingly large pulp and paper corporations, provides a telling case study as it is representative of the northeastern states where the earliest iterations of expansion across the continent occurred. A historical GIS focusing on individual pulp and paper mills is constructed using Lockwood’s Directory of Paper and Allied Trades and is used to analyze spatio-temporal trends in mill development and corporate control. The roles of firms based in Bangor, Portland, Boston and New York are analyzed, as are differing business strategies. Mass production techniques are contrasted to establishing a specialty niche in the paper market. This analysis, blended with the traditional tools of historical geography, illustrates how ecology, technology and institutional arrangements combined to create geographical patterns of networked places and how the sequence in which these patterns evolved influenced subsequent iterations of growth.
# TABLE OF CONTENTS

List of Figures ............................................................................................................. v

List of Tables ............................................................................................................. vi

Chapter 1  Introduction .............................................................................................. 1
  Research Questions .................................................................................................. 1
  A Historical Geography of the Pulp and Paper Industry in Maine ..................... 6
  Methods ................................................................................................................ 9
  Pulp and Papermaking, A Brief Primer ................................................................. 13

Chapter 2  Geographies of Production ................................................................. 13
  Mill Location and Transportation ...................................................................... 18
  Mill Location and the Lumber Economy ............................................................ 26
  Mill Location in the Wilderness .......................................................................... 32
  Patterns of Pulp and Paper Production, 1880 .................................................. 32
  Patterns of Pulp and Paper Production, 1892 .................................................. 39
  Patterns of Pulp and Paper Production, 1900 .................................................. 45
  Patterns of Pulp and Paper Production, 1909 .................................................. 50
  Patterns of Pulp and Paper Production, 1921 .................................................. 53
  Patterns of Pulp and Paper Production, 1930 .................................................. 55
  The Geography of Pulp and Paper Production, 1880 to 1930 ..................... 57

Chapter 3  Geographies of Capital and Management ......................................... 59
  Production, Control and the Urban Hierarchy ..................................................... 59
  Distances and mill ownership, 1880 ................................................................. 61
  Distances and mill ownership, 1892 ................................................................. 65
Distances and mill ownership, 1900 ......................................................... 70
Distances and mill ownership, 1909 ......................................................... 75
Distances and mill ownership, 1921 ......................................................... 78
Distances and mill ownership, 1930 ......................................................... 82
Corporate Consolidation in the Pulp and Paper Industry .......................... 85
Consolidation and adaptation in the pulp and paper industry ...................... 87
The Types of Paper Production in Maine, 1880 to 1930 .............................. 89
The Geographies of Management and Control, 1880 to 1930 ....................... 96

Chapter 4 Geographies of Workers and Capitalists ...................................... 98
Life Paths of Giovanni Moscone ............................................................... 100
Life Paths of John P. Burke ................................................................. 108
Life Paths of Hugh J. Chisholm ............................................................. 118
The Transformation of Lives and Communities ........................................... 106

Chapter 5 Conclusion ............................................................................. 129

Bibliography ....................................................................................... 139
LIST OF FIGURES

Figure 1-1. Northeastern states, original papermaking districts and the forest frontier……..3
Figure 2-1. The coastal orientation of Maine’s pulp and paper industry in 1880.......... 20
Figure 2-2. The interior orientation of Maine’s pulp and paper industry, 1892..........22
Figure 2-3. The rail and maritime connections of three Maine watersheds.................24
Figure 2-4 The lumber economy of Maine, c. 1880..............................................28
Figure 2-6 The Penobscot Boom, c. 1880.........................................................28
Figure 2-7 Saw mills at Old Town, 1869.................................................................31
Figure 2-8 The production capacity of pulp and paper mill towns in Maine, 1880........34
Figure 2-9 The production capacity of pulp and paper mill towns in Maine, 1892......40
Figure 2-10 The production capacity of pulp and paper mill towns in Maine, 1900.......47
Figure 2-11 The production capacity of pulp and paper mill towns in Maine, 1909.......51
Figure 2-12 The production capacity of pulp and paper mill towns in Maine, 1921......54
Figure 2-13 The production capacity of pulp and paper mill towns in Maine, 1930......46
Figure 3-1. Locations of control for the pulp and paper mills in Maine, 1880..........62
Figure 3-2. Locations of control for the pulp and paper mills in Maine, 1892.........66
Figure 3-3 The Davis Building at 390 Congress St., Portland, Maine....................68
Figure 3-4. Locations of control for the pulp and paper mills in Maine, 1900.........71
Figure 3-5 Locations of control for the pulp and paper mills in Maine, 1909...........76
Figure 3-6. Locations of control for the pulp and paper mills in Maine, 1921.........79
Figure 3-7 Locations of control for the pulp and paper mills in Maine, 1930.........83
Figure 3-8 The distribution of production capacity by pulp and paper firms in Maine.....86
Figure 3-9 The changing proportion of paper types in Maine, 1880 to 1930............89
Figure 4-1 Family home, East Millinocket, 1906 ........................................... 102
Figure 4-2 Construction workers, East Millinocket, 1906 .............................. 103
Figure 4-3 John P. Burke, 1924 .................................................................. 107
Figure 4-5 IBPSPMW Headquarters, Fort Edward, NY ................................. 113
Figure 4-6 Hugh J. Chisholm, 1904 ............................................................... 118
Figure 4-7 The Consolidated Mills of International Paper, 1901 ...................... 125
LIST OF TABLES

Table 3-1 The number of firms in Maine in relation to the number of mills..............85
Chapter 1

Introduction

Research Questions

What were the geographical consequences of the assault on the northern Appalachian forest to create wood pulp for paper? After 1880, vast areas of woodland were cut, logs were transported to new mills powered by dams on once free-flowing rivers, towns were built to house labor pouring into these new industrial places, a water-based transportation system was eventually replaced by networks of railroads and highways, and a white-collar workforce was organized in a range of urban places to manage these distant enterprises. This is a geography of remote mill towns, metropolitan head offices and the exploitation of storied rivers and the great forests surrounding them.

This transformation did not take place overnight, but rather over a half century, involving technological changes, new management styles, labor migration, and the response to new demands for paper products, including newsprint, writing paper, packaging material, and other consumer goods. Understanding this transformation requires the examination of a complex geography, visualizing and calibrating a variety of spatio-temporal patterns in order to construct an analytic narrative in which generalized explanations are placed in the context of specific historical events. This complexity lends itself to analysis using GIS techniques blended with the traditional archival methods of historical geography.

In order to begin understanding these transformations at a regional scale, this study examines the emergence of a pulp and paper industry within a single representative state which lay on the periphery of the traditional papermaking industrial districts of the
mid-nineteenth century. Like similar areas in the Adirondacks and the upper Hudson and Connecticut valleys, Maine had a well-developed forest economy based on lumber production, but lay far to the north of the traditional papermaking districts centered in New York, Massachusetts and Connecticut on the Hoosic, Housatonic and lower Connecticut rivers (Fig. 1-I).

This research project examines three interrelated questions. First, how did new environmental requirements for plant location combine with pre-existing settlement patterns and business practices as well as transportation infrastructure to create new geographic patterns of production? Second, how were economic relationships between core and periphery changed as evolving networks of entrepreneurship, labor, and corporate control rearranged connections between the forest frontier and the national urban system? And finally, how were these geographies altered after the 1910s when rising competition from mills in other regions of the United States and Canada forced firms operating mills in northern New England to consolidate operations and adopt new business strategies in order to survive?

The study investigates the geographical changes wrought by the introduction of wood-based pulp and paper production in Maine by means of a historical GIS analysis of geographies of plant location combined with biographical sketches tracing the geographical aspects of the lives of participants who actively shaped this new world of papermaking and whose life paths were in turn shaped by the industry. While the GIS provides the tools to visualize and analyze relevant spatio-temporal patterns in the development of the pulp and paper industry, it is also important to examine a variety of primary and secondary historical sources in order to form a deeper understanding of how
Figure 1-1. Northeastern states, original papermaking districts and the forest frontier.
these patterns emerged and the impact they had on the lives of the people whose actions shaped these developments at the finest scales.

The study period begins in 1880 when the sulphite process of wood-pulp production had not yet shifted the location of new mills away from older papermaking districts near urban areas and into the forests on the periphery of New York and New England. Although mechanical wood-pulp grinders were commercially viable by the 1860s those new technologies did not spur an immediate industrial expansion deep into the north woods. It was not until the 1880s when demand for wood-pulp began to rise rapidly that investments in new pulp and paper facilities began to shift production close to the source of wood fiber.

The origins of the pulp and paper industry in the United States lie mainly in New York and New England. Other regions, such as the Mid-Atlantic and the Great Lakes, also developed wood-based papermaking in the late nineteenth century, but production in the Northeast far outstripped these areas, especially in the last two decades of the nineteenth century (Smith, 1970). Furthermore, when paper began to be produced in newly opened regions elsewhere on the continent in the nineteen teens and twenties, those mills were often controlled by firms based in Boston and New York which had their start operating mills in the Northeast.

Maine experienced two distinct periods of growth from 1880 to 1930. The first, ending roughly on the eve of the First World War, was a period of rapid expansion in papermaking capacity which saw a significant rise in the construction of new pulp and paper mills located far up-river in the northern forests, connected to distant markets by railroad, and powered by large hydro-power complexes. The second period encompassing the nineteen teens and nineteen twenties was characterized by
consolidation and adaptation as mills were either abandoned or upgraded to higher value-added products such as specialty papers, innovative packaging materials and a new assortment of consumer goods fabricated from wood pulp.

Understanding the genesis and evolution of the pulp and paper industry in this part of the northeastern United States provides insights into the expansion of papermaking into forested rural areas as well as the adjustment to competition from other regions that follow the redeployment of capital to new forest frontiers. Mobility of capital still characterizes the pulp and paper industry today. New papermaking technologies have opened up new sources of cellulose, allowing the industry to exploit a succession of new forestry frontiers. Papermaking technology has always been tied to ecological conditions as well as to social networks of labor, capital and exchange. Technology alone cannot explain why papermaking moved on to new frontiers. Only by understanding papermaking technology in a matrix of dynamic human and natural systems can we understand the contingent geographical changes in the industry over time. In particular, by studying the first pulp and paper frontier in the U.S. this research provides an understanding of the earliest patterns of forest exploitation for paper and thus provides a template from which to understand the industry as it expanded across a continent.

In 1972, Ralph Nader, then a figure of national prominence following his exposé of corporate malfeasance in the auto industry, turned his attention to the pulp and paper industry. Given Maine’s leading role in pulp and paper production nationally, his Public Interest Research Group (PIRG) chose to make the state the focus of their study. In his introduction to their final report, aptly titled “The Paper Plantation,” Nader wrote:
“Maine is corporate country - a land of seven giant pulp and paper companies, imposing a one-crop economy with a one-crop politics which exploits the water, air, soil, and people of a beautiful state” (Osborn, 1974, ix). And yet this was not the first time in which the unequal relationship between core and periphery was raised in Maine. Writing in his 1899 report, Maine’s Commissioner of Industrial and Labor Statistics declared the pulp and paper business to be “the imperial industry” (Irland, 2009, 71). By reaching back into nineteenth century archives a narrative of geographical change can provide a deeper understanding of how this “Paper Plantation” came to be, and how certain processes of modernization that accompanied the industry spread across the forested rural areas of the state.

A Historical Geography of the Pulp and Paper Industry in Maine

Knowing the past is critical to understanding the present. As the pulp and paper industry in Maine begins its’ decline in the twenty-first century and new mills emerge on new forest frontiers in the developing world, it is important to understand how this process of early industrial development occurred. A historical geography of the pulp and paper industry as it emerged in Maine from 1880 to 1930 helps us to understand the impact of the industry on its first forest frontier in North America, the ways in which that frontier was connected to a broader urban system, and the historically and geographically contingent processes by which this occurred. However, the story of the pulp and paper industry in Maine is more than simply understanding how locations of production and control evolved in this period, important as these early iterations of growth are to understanding the evolution of contemporary issues such as river restoration, timberland ownership and regional deindustrialization. This industry was also a critical component
in the process of modernization that transformed these areas from the late nineteenth to the early twentieth century. A richer understanding of this historical geography can start with a statewide mill-level analysis of these locational issues and then begin to delve into finer scale geographies which capture the life paths and multi-scale connections of participants in this process and the changing communities where these modern industrial complexes were located.

This study begins with a GIS-based analysis of the evolving patterns of pulp and paper production in Maine from 1880 to 1930. Using records of individual mills from contemporary business directories it is possible to track the changing volumes of production capacity in mill towns across the state and map the statewide patterns as they evolved over five decades. Chapter Two examines the geographical transformation that took place in Maine when wood replaced rags as the feedstock for pulp and papermaking. Locational considerations such as transportation links, water power and the geographic legacy of the early nineteenth-century lumber industry all played a role where production was located. Consequently, before the rush to produce wood-pulp got underway in the 1880s, Maine’s paper mills lay at the periphery of the core industrial districts in southern New England and New York where the bulk of the nation’s paper was originally produced. The small-scale mills of the initial time-step were located on maritime transportation routes in the southwestern areas of the state which facilitated the importation of rags and the exportation of paper by traditional means. During the 1880s and 90s, however, pulp and paper production in Maine grew exponentially as local and metropolitan capital scrambled to exploit the water power and forest resources of the state’s which lay up-river in the major watersheds of the region. Each of the roughly
decadal time-steps are mapped and reveal that while some older mills were substantially upgraded to keep pace with the new arrivals, rail transportation links allowed production to move inexorably to the north and the east, deep into the forest frontier where the industry began to usurp the role of the lumber business on the rivers and in the mill towns of Maine.

Because these trends have been disaggregated to the mill-level it is possible to demonstrate the historically and geographically contingent nature of this process. Chapter Three offers an analysis of the consolidation of the mills in Maine as firms struggled to survive in the fierce competitive environment that emerged in the late 1890s. The shifting links of each mill to the national urban system are mapped across five decades and the consolidation of particular mills into new firms are examined in light of the evolving business strategies employed by the ever-distant corporations operating in the state. Mapping the production of different types of paper at the mill-level over the course of the study period provides evidence from which to infer which business strategies were adopted by different firms and how they were connected to locational consideration which were contingent on earlier iterations of the process. The analysis concludes with a discussion of how the processes of consolidation and adaptation produced a new industrial landscape in Maine.

Next the study extends the inquiry from the state and the localities to the scale of the individual in order to explore how participants in these events were connected to networks of ideas, migration and finance crossing national and global scales. In Chapter Four the life paths of two workers and an industrialist who took part in building the pulp
and paper industry in Maine are examined and connections are drawn between their work and the broader changes which took place in mill towns across the state.

The final chapter begins with a discussion of how the processes of geographical and historical change wrought by the pulp and paper industry in Maine might be representative of processes taking place elsewhere in the forested watersheds across the northeastern states and how further research might be conducted at broader spatial and temporal scales. This study is then situated within current scholarship in historical geography which utilizes large geodatabases and GIS analysis in order to understand the fine scale processes of modernization and industrial change in this period. Finally, a research agenda is identified which could extend the preliminary findings of this research into an analytic narrative of individual bio-geographies, the evolving urban morphologies of paper mill communities, and the global forces which combined to create the regional geography of North America’s first pulp and paper frontier.

Methods

This study combines the methods of historical GIS (H-GIS) with the more traditional archival tools of historical geography. An H-GIS was assembled using ArcGIS 9.3 (ESRI, © 2008). Data for the study was stored in a relational database using ESRI’s Personal Geodatabase model (Zeiler, 1999). This geodatabase was used to generate information about the locations and changing production methods of the pulp and paper mills, the locations of the corporate offices which controlled them, and the mills’ locations in relation to transportation networks. The data for individual pulp and paper mills were compiled in tabular form from *Lockwood’s Directory of Paper,*
Stationary and Allied Trades. This business directory, published continuously from 1873 to the present, provides a variety of attributes for every pulp and paper mill in the study area. These attributes include the mill’s location, ownership, firm’s officers, home office address, machinery, power sources, types of pulp and paper produced, and productive capacity in pounds per 24 hours. The five intervals covered in the time series are roughly decadal beginning with data for the year 1880. Because of gaps in the data the time-steps are 1892, 1900, 1909, 1921 and 1930. These provide sufficient temporal resolution to identify major inflection points in the spatio-temporal patterns of mill location, production and control.

In order to represent pulp and paper mill locations point shapefiles were created in ArcGIS using the latitude and longitude values, in decimal degrees, found in the Geographic Names Information Service (GNIS). This geodatabase, created and maintained by the U.S. Board of Geographical Names, contains geographic coordinates for millions of features identified in the most up-to-date map products produced by the U.S. Geological Survey (USGS, 2010). Once the shapefiles for each time-step were created, they were joined to Excel spreadsheets of mill attribute data and then imported into the geodatabase. However, before this data was collated, the place names given in Lockwood’s had to be matched to place names in GNIS.

Matching Lockwood’s records to GNIS records proved to be problematic.

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1 Appearing under slightly different titles, it was published primarily as an annual and occasionally as a biennial.
2 The catalog of the Library of Congress lists all volumes of Lockwood’s from the first in 1873 to the present. However, the even-numbered volumes of 1890, 1910 and 1920 were not available, therefore only three of the six volumes used in this study were obtained from the LOC (1880, 1892, 1900). Two of the Lockwood’s volumes (1909, 1921) were available for download as pdf files from the extraordinary collection in Google Books. Attempts were made through PSU libraries to acquire the even-numbered volumes through interlibrary loan but corresponding libraries would not to allow the earlier volumes to leave their premises. The only volume which was available for shipment was 1930, loaned by the library of the University of Wisconsin, Madison.
Because the GNIS data dates from the 1970s to the present and place-names have changed or disappeared over the decades, the researcher cannot rely on an automated process to match these two sets of place-names. The editors of *Lockwood’s* did not always choose a place-name that corresponded to a populated place or civil division which exists in a contemporary USGS map and is thus incorporated in GNIS. In fact, it appeared that the editors favored the name of a nearby post office, which would, of course, be consistent with the directory’s purpose of connecting buyers to sellers. Not only did some of these old post office names disappear from contemporary GNIS records but they were inconsistent over the course of five decades of Lockwood’s records. Thus records for different “places” were created in the original tabulated Lockwood’s data that were actually for a single mill complex.

A number of resources were used to manually match the two datasets including a gazetteer (Atwood, 2004), historical USGS topographical quadrangles (UNHL, 2009) as well as the serendipity of Google Web. Google Maps proved to be a valuable tool in this research as well. On several occasions, by zooming into high resolution aerial images, it was possible to discern where exactly the footprint of an old paper mill lay. In addition, local histories and town registers were consulted which revealed how long a mill had been at a particular location thus sorting out the problem of *Lockwood’s* applying different place names to the same facility over the years.

Mill location was not the only raw data in *Lockwood’s* that required interpretation using other sources. The records, when first transcribed, provided an unfamiliar list of pulp and paper machinery as well as countless types of pulp and paper products many of which could not be identified by a layman. Consulting contemporary sources, including
textbooks, government reports and business publications was required in order to gain an understanding of this arcane terminology and to create a consistent classification system to winnow a vast number of particular paper products into manageable and meaningful categories (Witham, 1920; FTC, 1917; McMaster 1906; IP, 1901).

A final feature dataset, the expanding railroad network in Maine during this period, was represented in polyline shapefiles which were created manually in ArcGIS. By selecting all populated places in Maine from GNIS, a point shapefile was created to serve as a reference layer. Many of these populated places were not relevant, but many others had featured railroad stations in times past and these points were critical to recreating the rail lines. Paper maps included in a transportation history of Maine were digitized and served as references for the state’s railroad networks for 1880, 1890, 1900 and 1912 when the rail network reached its greatest extent (Leavitt, 1940). Historical route maps published by various railroads operating in Maine were acquired on-line in the public domain and provided the location of railroad stations along each route, which, in turn, identified the relevant GNIS populated places in the GIS used for creating the polylines. Such points were not available in the small-scale maps produced by Leavitt. Using the ArcGIS editor at relatively large scales, it was possible to construct lines between the points in the GNIS populated places shapefile which corresponded to the stations along the rail lines identified by the route maps. Consulting the small-scale maps in Leavitt to maintain an accurate depiction of the extant lines for each time-step, a representation of the rail lines, accurate at an appropriate statewide scale, was produced. These shapefiles were then imported into the geodatabase.

3 Portland & Ogdenburg Railroad, 1879; Boston & Maine Railroad, 1898; Maine Central Railroad, 1923; Bangor and Aroostook Railroad, n.d.
The data in the H-GIS was used to visualize changing patterns of mill development over time. The patterns examined in this research include the spatio-temporal shift in the total production capacity in each mill, the relationship between mill development and transportation, spatio-temporal change of management and control in each mill from different levels in the urban hierarchy, the consolidation of mills under the ownership of large corporations, and the changing mix of paper types and mill machinery used in each mill.

Pulp and Papermaking, A Brief Primer

The fundamentals of making paper from vegetable fiber have remained unchanged since the process was invented in China nearly 2000 years ago. Whether the source of the fiber is rice stalks, linen cloth or spruce wood, it needs to be broken down into a pulp in which the fibers are separated and agitated in such a way that they form a thin wet matted sheet which, when dried, becomes paper (Weeks, 1916).

Papermaking remained a handicraft until early in the 19th century when the Fourdrinier brothers, Hugeunot stationers of London, acquired the rights to a papermaking machine, invented in France by Nicholas Robert, and received an English patent for it in 1807. The machine has borne their name ever since. Rather than pouring the pulp into a single sheet, pressing it, and hanging it up to dry, as had been the earlier practice, the Fourdrinier machine created a continuous sheet of fully dried paper. Pulp was fed into the “wet end” of the machine where it was carried on a continuous belt of wire mesh lined with felt through a series of rollers that pressed and dried the pulp into long sheets of paper which emerged from the “dry end.” This technology reached American shores
in the 1820s. The original machines were both narrow and slow because faster and wider machines would shake apart during the papermaking process. Over the course of time engineers and operators worked to build more robust machines and, as width and speed increased so did productivity. Fourdrinier machines, immeasurably improved over the original model, are still at the core of papermaking operations in the 21st century (Whitham, 1920; Ohanian, 1993).

The pulp which entered the wet-end of the Fourdrinier was traditionally created from the animal and vegetable fibers found in rags. After cleaning, sorting and cutting this material into small pieces, it was submerged in water and reduced to pulp in a beater engine which cut and ground the material until it was separated into individual strands of fiber. By the early nineteenth century the growth in demand for paper began to create an acute shortage of rags but substitutes were soon found. Among a wide variety of vegetable fibers, wood-pulp was the most successful substitute and eventually won over the marketplace (Smith, 1970; McGaw, 1987).

The original technology for reducing logs to wood-pulp was a grinder invented in Germany in the 1850s which first found commercial application in the United States in the 1860s. Because this mechanical method broke the wood fibers into small segments it was not able to produced a durable paper product and was only good for the production of cheap disposable newsprint. Nearly concurrently, advances in industrial chemistry led to other wood-pulping methods beginning with the use of caustic soda which was introduced in the U.S. in the 1860s as well. Chemical pulping methods reduced the wood to pulp while leaving only long component fibers which, when matted together, created a much stronger paper product. This stronger pulp was not only useful to create a wide
variety of paper products, but it also allowed the Fourdrinier machine to run at faster speeds, thus boosting productivity. While the soda pulp process met with some limited success in the 1860s and 70s it was not until the sulphite process achieved commercial success in the early 1880s that the first great integrated pulp and paper mills began to appear in the forests of the northeastern U. S. (Smith, 1970; Ohanian, 1993).

**Why Paper Matters**

Although this study focuses on the places and firms that turned trees into pulp and then paper, it brackets out a fuller investigation of use of that paper, one which would necessarily have to consider the emerging culture of consumption in the modern world. Some of the paper was in the form of newsprint, in massive demand during the era of urban media that brought news and advertising to millions of people (Barron, 1997; Smith, 1964; Clarke, 1941). Some of the paper was used for business needs, such as the letters between decision-makers and clients and the ledgers of business records (Zunz, 1990). Some was for social intercourse, as friends and families living further afield in an urbanizing and migrant world wrote letters and postcards to keep in touch (Henkin, 2006). And paper was used for wrapping packages, for labels, boxes and other consumer non-durables. A concern for health and hygiene brought tissue paper to replace cloth handkerchiefs and tampons to replace rags. Different kinds of specialty paper, driven by consumer demand, helped mills create niches for survival in a highly competitive market, and industrial chemists worked in research labs to find new ways to create wood-based paper products. In the study that follows, the emphasis is on the front end of the process, the transformation of wood into pulp and paper, and the sites where that took place, but
the wider end purposes are always present in those firms’ locational and investment decisions.
Chapter 2

The Geographies of Pulp and Paper Production

The criteria for locating pulp and paper mills changed over time. However, this did not mean that the actual locations of production in Maine changed *en masse*. The statewide patterns of production not only reflected the location of new mills, it also reflected the “stickiness” of older mill sites built in earlier iterations of growth where owners had successfully adapted to changing conditions and continued to successfully produce paper. An examination of the changing production capacity at the mill town level demonstrates the historical and geographical contingency of this change.

Prior to the late 1860s, when rags were the only feedstock, pulp and paper mills were located as close to urban areas as the location of both water power and clean water supplies would allow. Mills were located close to local markets as well as to ready supplies of rags. But, because of the need for clean water for the production of unblemished pulp, they were located at some distance from crowded urban precincts where water supplies were fouled by the concentration of human habitation and other polluting industries. The location of water power sites also determined where pulp and paper production could take place. By the 1870s the commercial development of groundwood pulp on a limited scale began to change this locational equation as pulp manufacturers found that locating near the source of pulp logs reduced the transportation costs of their feedstock. In addition paper production was drawn into the interior in order to reduce the transportation costs of the wood-pulp itself.

When businessmen began to construct pulp and paper mills in the interior they were not creating an industry in the wilderness. In Maine, as well as in similar forested
areas across the northeast, there was already a thriving forest economy based on the extraction, manufacture and shipment of lumber. This pre-existing economic geography had a major impact on the location of pulp and paper production as well.

This chapter begins by examining how transportation networks and the pre-existing lumber economy shaped the location of Maine’s pulp and paper production. It also notes how great water power developments could uncouple the location of pulp and paper making from the old forest economy and create large factory towns in the wilderness. Next the changing statewide patterns of pulp and paper production are examined across each time-step from 1880 to 1930. Maps utilizing proportional symbols illustrate where these changes took place against a background of the expanding railroad networks in Maine. The analysis draws connections between the relevant locational factors and the scales of production as mill location begin to shift inexorably to the interior forests of the state.

**Mill Location and Transportation**

From the earliest colonial days and into the nineteenth century the people of Maine were linked to the outside world by the river and the sea. It was not until the 1840s and 1850s, when a railroad network expanded into the interior, that this orientation began to change. The demographic and economic transformation that followed the introduction of the iron rails was a slow one and different sectors of the economy changed at different paces.

By 1880, when this study period begins, the location of Maine’s nascent pulp and paper industry was still largely oriented towards river and ocean, a legacy of mid-nineteenth century conditions that had taken advantage of rivers to float logs down to
sawmills near the littoral. Prior to the 1870s the majority of paper mills used rags as the feedstock for their pulping operations so the mills operating in 1880 which had been built in the 1850s and 1860s were located near the coast in order to minimize the transportation costs of both their inputs and their output.

As these locational considerations were superseded by the need for proximity to high volumes of wood and the growing need for larger water power sites, investors in newer mills took advantage of the flexibility that railroad transportation afforded. In the early days of this geographical transition, before the first sulphite wood pulp mills were built in Maine, there were nearly an equal number of pulp and paper mills in the interior, but the volume of production was still heavily oriented towards maritime transportation routes (Fig. 2-1).
Figure 2-1. The coastal orientation of Maine’s pulp and paper industry in 1880
The largest producer of pulp and paper in Maine in 1880 was the S. D. Warren Co. mill site at the village of Cumberland Mills, then within the municipal boundaries of Portland. Originally built in 1854, this site met three critical locational criteria: first, it had sufficient water power; second, it was far enough away from the city to have plentiful clean water; and third, despite this distance, it was only four miles from the wharves of Portland harbor. The same geographical logic drove the Hollingsworth & Whitney Co. of Boston to purchase a pulp and paper mill on water privileges on Cobbosseecontee Stream in the town of Gardiner, then a busy little seaport on the lower reaches of the Kennebec River. But even as the locational equation began to change with the advent of wood-pulp technology the leading capitalists of the time continued to open new mills on the coast. Such was the case in 1872 when the wood-pulp mill of the Forest Paper Co. was built, not in the forest, but on Casco Bay in the town of Yarmouth (MEHR, n.d.; Smith, 1972; Smith, 1970; Warren, 1955).

The next twelve years saw a burst of new mill construction in Maine as local and metropolitan capitalists sought to build mills at sites which would take advantage of the forests and undeveloped water power in the state. By 1892 the balance had tipped firmly towards connections by rail rather than sea. In that year the mills of the interior were responsible for 67% of pulp and paper production, nearly an exact reversal of the proportion in 1880 (Fig. 2-2).
Figure 2-2. The interior orientation of Maine’s pulp and paper industry, 1892
Maine’s early railroad network connected a pattern of settlement which had been determined in an age of water transportation (Judd, 1995). Thus connections were made from the maritime entrepôts of the state, most notably Portland and Bangor, into an interior whose major towns were located up the state’s three largest rivers: the Androscoggin, the Kennebec and the Penobscot (Fig. 2-3).
Figure 2-3. The rail and maritime connections of three Maine watersheds
By 1880 Portland was connected out-of-state by four lines; two towards Boston and southern New England, one northwest to Montreal, and a fourth to the west through the White Mountains and on to up-state New York. The network that linked Portland eastward to the rest of Maine bifurcated with one line connecting to Bangor, the principal seaport on the Penobscot River, via an interior route through Waterville. A second line ran east along the shores of Casco Bay *en route* to Brunswick on the lower Androscoggin. From there it reached the lower Kennebec River where it turned north and ran along its navigable banks through Gardiner, past the head-of-tide at Augusta, and continued on to Waterville. From the junction at Waterville a single track connected to the eastern Maine entrepôt of Bangor.

Maine was connected to the Canadian Maritimes by the European and North American Railroad which ran from Bangor up the east side of the Penobscot River to the Mattawamkeag River where it turned east and crossed the border well south of the Aroostook River. At this time the Aroostook country was served by rail connections from New Brunswick with the frontier settlements of Houlton and Caribou at the end of lines connecting them to the Canadian port of Saint John on the Bay of Fundy. While the line along the eastern banks of the Penobscot opened up some water power sites to industrial development, the majority of the watershed needed more railroad construction before its full industrial potential could be realized.

The same was true for the Androscoggin watershed which was partially connected by the St. Lawrence and Atlantic line linking Portland to Montreal. Through a junction a few miles east of Portland, this line ran north, bypassing the main branch of the Androscoggin River lying to the east. Before it turned northwest it crossed the tributary
Little Androscoggin River at the waterpower site of Mechanic Falls but did not run along the Androscoggin proper until it was a short distance from the New Hampshire border. This left the most valuable waterpower sites on the Maine side of this watershed undeveloped with the notable exceptions of Livermore Falls. Likewise, the populated interior of the Kennebec watershed had been connected by branch lines extending from the interior trunk route running northeast from Portland to Bangor, but much of the country up-river lay beyond the railroad network.

Thus Maine’s transportation connections were sufficient to support the first stage of pulp and paper development near the timberlands and waterpower the industry needed in order to take advantage of the latest technology. But further expansion of the railroad network would be necessary before the full potential of the forests and falling water of Maine could be realized.

**Mill Location and the Lumber Economy**

The location of future pulp and paper mills was not only determined by the extent of the railroad network; it was also influenced by the well-developed lumber industry which preceded it. This industry, as it had grown in the eighteenth and early nineteenth centuries, had been entirely dependent on riverine networks of transportation linking timberlands, some of which were one hundred miles or more from the littoral, down-river to saw mills and coastal shipping routes. Beginning with the fairly simple infrastructure of colonial days it reached its peak in terms of production in the 1870s, at which point it left a locational legacy upon which the pulp and paper business would grow. By 1880 the lumber business in Maine had created dams to regulate river flow, mutual-benefit
corporations to coordinate river drives as well as a legal framework and stable business networks which mediated the harvest, transportation and manufacture of sawn timber (Judd, 1995). The following exposition of the geography of Maine’s lumber economy c. 1880 has been drawn from works which illuminate the environmental history and historical geography of lumbering at local, state and national scales (Williams, 1989; Wynn, 1981; Smith, 1972; Wood, 1935; Hempstead, 1931, Defenbaugh, 1907). Figure 2-4 illustrates where these towns and cities could be found in Maine.
Figure 2-4 The lumber economy of Maine, c.1880

Figure 2-5 The Penobscot Boom, c.1880. Actually an entire boom system, the Penobscot Boom comprised a series of booms and sorting channels from Pea Cove to Olamon Stream, stretching for miles above Marsh Island, a large island in the middle of the Penobscot roughly ten miles above Bangor. Note the lumber mill towns at Old Town, Great Works, Stillwater, Orono and Basin Mills. All but Stillwater would host pulp and paper mills. (Hempstead, 1931)
The rivers of Maine shaped the geography of the first forest economy. The extent of tidewater determined how far inland the shipping point for sawn lumber would be located and this was where the primary commercial centers were located. The next line of settlement occurred at the falls nearest to the littoral where the first sawmills were located. Where flat-water was found, both above the down-river mills and above the shipping point on tidewater, early commercial interests built booms to store the logs from up-river destined for the mill and to store the rafts of sawn lumber awaiting shipment. The booms and mill towns were surrounded by a matrix of nearby villages at the center of small farming communities. Due to poor soil and a limited growing season, these communities practiced a very limited commercial agriculture, providing little more than a safety net for families while allowing the men and boys to engage in the broader commercial world of logging and millwork on a seasonal basis.

Pulp and paper mills were established in these settlements, often by local saw-mill owners who invested in wood-pulp grinders as an adjunct to their lumber business. When chemical pulp technologies became available some mill owners invested in pulp digesters. Instead of discarding the waste-wood from their mills they converted it to pulp supplemented by fresh logs readily accommodated in the storage booms near their mills. When investors from Portland or Boston searched for locations to build pulp and paper mills it made sense to locate in towns such as these in order to take advantage of the infrastructure and work force.
Figure 2-7 Saw mills at Old Town, 1869. These mills would be replaced by the Nekogneagon Pulp Co. mill in the 1890s. (Wells, 1869)
Mill Location in the Wilderness

Not all pulp and paper mills were located where saw mills could be found. Industrial developers of the 1880s and 90s had the technology and resources to harness the great falls that were beyond the exploitation of lumbermen of an earlier generation. The great opportunities that these locations offered for pulp and paper production were matched by the difficulties facing the men building and operating new mills there. The first was moving men, horses and materials deep into the wilderness. All of these new mill complexes had to wait for the development of rail links before construction could proceed. In addition, the infrastructure for a town to support the workers and their families, with a population in the thousands, had to be constructed.

In the case of Rumford Falls, developed by Hugh J. Chisholm and his associates from 1882 to 1893, the entrepreneurs had to organize a new railroad company, a power and light company, a realty firm, a lumber mill, a newspaper and other ancillary businesses before they could begin building their pulp and paper mills. In fact, securing the land and water rights and developing the basic town infrastructure took nearly ten years, while building the mills was achieved over the course of two short construction seasons, about a year and a half in total (MeBILS, 1901).

Patterns of Pulp and Paper Production, 1880

At the outset of the study period the total capacity for pulp and paper production in the state was 184,000 pounds per day. Of the twenty three towns where mills were located three had a capacity between 20,000 and 30,000 pounds per day while three others were capable of roughly half of that output. All of the other pulp and papermaking
places fall short of 10,000 pounds per day with most producing in the 2,000 to 4000 pound range (Fig. 2.5).
Figure 2-8 The production capacity of pulp and paper mill towns in Maine, 1880
The largest of the big three was the S.D. Warren Co. mills at Cumberland Falls with a daily capacity of 14,000 pounds of book paper and newsprint, as well as 16,000 pounds of ground-wood pulp. It should be noted that the 7,000 pound daily capacity of soda pulp from the Forest Paper Co. in Yarmouth was being used in book paper production at Cumberland Mills. These facilities lay less than ten miles apart and were connected by rail. Counted as one integrated complex, which it became after S. D. Warren took over sole ownership in 1876, this pulp and paper operation began the 1880s as the largest and most advanced facility in Maine. This firm enjoyed a national reputation for quality and innovation dating back to before the Civil War and would become one of the world’s leading producers of fine book and writing papers in the decades to come (Smith, 1970; Warren, 1954; Chisholm, 1906).

The favorable ecological factors at this place included a fall of water on the Presumscot River which provided sufficient water power for production in this period, a steady supply of clean water for use in the pulping process and, most importantly, a river network that was capable of delivering great quantities of logs to the mill gates. At this early stage in the industry’s development, pulp mills such as the ground-wood mill at Cumberland Mills and the soda mill at Yarmouth relied on poplar to make wood pulp and the Presumscot watershed was large enough for area farmers to keep a steady supply of “popple” flowing down-river (Smith, 1970).

Gardiner, the second largest papermaking place in Maine in 1880, was another beneficiary of S.D. Warren’s investments. Their facilities included a groundwood pulp mill and a paper mill producing 6,000 pounds per day. Another Boston firm,

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4 This was the vernacular Yankee term for the species.
Hollingsworth & Whitney, produced 8,000 pounds per day in Gardiner at their Cobbossee Mill, while Richards & Co. produced 10,000 pounds of manila paper per day (Lockwood, 1880). Like Cumberland Mills, Gardiner was served by both rail and marine transportation routes. Its waterfront on the lower Kennebec River was busy in both the lumber and the ice trades and the Maine Central Railroad linked it to the outside world as well. All three facilities were located on water power sites first developed in 1806 by Robert Hallowell Gardiner, an heir to the Kennebec Proprietors whose original land grant encompassed most of the lower Kennebec valley. The dams which Gardiner had built were on Cobbossecontee Stream only a mile or so above where it entered the Kennebec at the town’s anchorage (MEHR, n.d.).

The third major papermaking town was Brunswick on the Androscoggin located on navigable water just above Merrymeeting Bay where, a short distance from the ocean, the Androscoggin meets the Kennebec. Not only were the locational elements of water power on tidewater present in Brunswick but this was also a clear example of pulp and papermaking emerging from the lumber economy. Maine’s oldest groundwood pulp operations began here in 1868 in the basement of a saw mill owned by C. D. Brown and E. B. Denison. There these two men managed to produce 2,000 pounds of pulp per day which they pressed and shipped in barrels. In 1870 they organized the Androscoggin Pulp Co. and built the Pejepscot Mill, a much larger facility. By 1880 Androscoggin Pulp, then based in Portland, was producing 10,000 pounds of wood pulp boards per day at Brunswick and had been joined by the Bowdoin Paper Manufacturing Co. which was turning out an equal volume of newsprint (Smith, 1970; Chisholm, 1906; Lockwood, 1880).
The second tier of pulp and papermaking places included South Windham, Mechanic Falls and Belfast. As with the first three, these places had been well developed by 1880, had good water power sites and had the necessary transportation links. After building their new mill at Brunswick, the Androscoggin Pulp Co. expanded rapidly before failing in 1875 and reorganizing with the backing of a Lawrence, Massachusetts entrepreneur named William A. Russell. Among the mills built by this firm was the wood-pulp board mill at South Wyndham, a few miles up the Presumscot River from Cumberland Mills which was capable of producing 12,000 pounds per day making it one of the largest pulp mills in the State (Smith, 1970; Lockwood, 1880).

Russell was also involved in a papermaking venture in Belfast, another second-tier town. Here, in 1856, he leased two small mills with the capacity to make 6,000 pounds of manila and newsprint. Before the advent of more advanced chemical pulping methods manila was manufactured using a pulp created from worn out rope and took its name from the Philippine city famous for exporting cordage made with locally grown jute. Belfast was one of Maine’s major ship-building centers in the mid-century nineteenth century, launching clipper ships captained by local men who conducted a world-wide business in a variety of staples trades. Belfast’s ship building and maritime connections continued into the 1870s making it a logical place to locate a paper mill dependant on used cordage. Together with a locally owned mill producing leather board Belfast had the capacity to produce 15,000 pounds of pulp and paper products per day (Judd, 1995; Weeks, 1916; Lockwood, 1880; Williamson, 1877).

The last of these second-tier places was the only one of Maine’s top production sites in 1880 to be located inland and out of reach of maritime transportation routes.
Mechanic Falls was located on the Little Androscoggin, an up-river tributary of the Androscoggin itself. Here the St. Lawrence and Atlantic Railroad provided the necessary land transportation connection. Like the Pejepscot Mill at Brunswick, the pulp and paper mills were built here by a local entrepreneur whose business stumbled after a rapid expansion. Adna C. Dennison was a storekeeper in Norway, a small country town nearby through which the St. Lawrence and Atlantic also passed. He prospered supplying the large work gangs who passed through the area building the road in the late 1840s and invested his money in a small paper mill in Norway. By 1851 he had expanded to Mechanic Falls and, by the late 1860s, was producing paper made with ground-wood pulp supplied from his Norway mill. Before his business failed in 1875 he owned or operated additional mills in Poland and Brunswick and had investments in mills in Yarmouth, South Paris and Gorham. The mortgage holder on Dennison’s mills, W. H. Parsons Co. of New York, salvaged the business by financing a state-of-the-art pulp mill at Canton which provided a reliable supply of low cost ground-wood pulp to the mills at Mechanic Falls which the old Norway mill had been unable to do. The Canton mill was completed in 1880, apparently after Lockwood had compiled the information for his 1880 directory, and the data for that year shows the production capacity at Mechanic Falls standing at 16,000 pounds per day (Smith, 1970; Lockwood, 1880).

Many small mills, such as those at Norway, East Dover, North Wayne, Farmington and Farmington Falls were operating with the limited machinery of the antebellum period and at what was basically a pre-industrial scale. That is to say these were family mills operated by a master and a few hands. They had adopted industrial technology such as beater engines and cylinder machines and hence were able to produce
about a ton of product every day compared to production measured in reams in the handcraft mills of the early nineteenth century. Nonetheless, they were completely outclassed by the grinders, engines, and much wider Fourdriniers and cylinders adopted by the larger mills of 1880 and they disappeared from the scene by the next time-step in 1892.

Patterns of Pulp and Paper Production, 1892

The larger mills of 1880 were small by comparison to the mills of 1892.\(^5\) This difference in production capacity is readily apparent by comparing the 1880 and 1892 maps (Fig. 2.6). It was during the 1880s with the introduction of sulphite pulp digesters that the “pulp craze” got fully underway in Maine.\(^6\) During this decade new mill complexes were constructed with production capacities that dwarfed the mills of the previous decade, and the leading mill complexes of 1880 that survived this transformation, such as the S. D. Warren mills, were upgraded to match the new competition.

\(^5\) The three largest mill places in 1880 had an average production capacity of 24,600 pounds per day compared to 124,700 pounds for the three largest places in 1892.

\(^6\) This phrase appears in contemporary news accounts and has been adopted by paper historians to describe industry developments in the 1880s and 1890s (Smith, 1970).
Figure 2-9 The production capacity of pulp and paper mill towns in Maine, 1892.
The industrial age of papermaking in Maine dawned in the 1880s. It was during this decade that capital, locally generated, as well as from metropolitan sources, was invested in new pulp and paper mills at scales hitherto unseen in the state. Some existing facilities expanded in a similar fashion. Not only were these mills much larger, they featured the most advanced technology of the day. The first commercial sulphite pulp digesters in the United States were installed at the Penobscot Chemical Fibre Company’s new mill at Great Works in 1883. This was the first chemical process that enabled the pulping of spruce and fir, a capacity that had profound implications for the forests of the northeast (Ohanian, 1993; Smith, 1970). In addition to new industrial chemical processes, rapid innovations in papermaking technology were also introduced to mills in Maine. Machinists and engineers of this period were continually introducing more robust Fourdriner machines capable of running on wider frames at ever increasing speeds.

Running the machines at higher speeds also became possible because of the stronger pulp produced by the sulphite process. Besides the fragility of the machines, it had been the disruption of production due to less durable ground wood and chemical soda pulps tearing between the wet and the dry ends of the Fourdriniers which had limited the speed of paper production (Lamoreaux, 1984). Faster and wider paper machines, and more of them, caused production capacity to skyrocket in this period.

Of the six notable papermaking places of 1880, five grew significantly during the “pulp craze” of the 1880s and were generally producing at the same scale as the large

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7 In 1880 the average paper mill was capable of producing a little over 7,000 pounds per day, by 1892 the average had nearly quadrupled to 27,700 pounds.
8 For example, in 1880 Hollingsworth & Whitney were producing 8,000 pounds of manila per day at their Gardiner mill with two cylinder machines, one 52” in width and the other 56”. By 1892 the cylinder machines had been replaced with two Fourdriniers of 90” and 68” width. Production capacity in 1892 had soared to 26,000 pounds of manila per day.
new mill places. The exception was Belfast where William A. Russell had shut down his manila operation, leaving only a small locally owned leather board mill. Russell had not quit the State of Maine however, and was busy in the 1880s investing in new mills up the Androscoggin and Penobscot Rivers where great stands of spruce and fir could be found.

After the disappearance of many small scale mills, as illustrated in the 1892 map, the remaining 1880 mills were located for the most part on the littoral from the lower Kennebec River to the southwest. There were no old mills up the Androscoggin beyond Brunswick, with the exception of Mechanic Falls, and there were only two smaller mills on the upper Kennebec at Waterville and Skowhegan. All of the pulp and paper production capacity on the Penobscot in 1892 was in new facilities, most of them less than five years old. There were five new mill places on the Kennebec with two of the largest at Madison and Solon deep in the interior and well past the more populated areas which were located down-river from Skowhegan. Five new enterprises were also begun far up-river on the Androscoggin in the neighborhood of Livermore Falls. Overall the geographical trend to the north and east can be represented by the overall capacity of the new mills which in 1892 stood at 63.2% of the production in Maine. While the older mills, which had survived the transitional decade of the 1880s, were competing successfully with the newcomers, their share of the State’s output was slipping as larger and more efficient mills were being built nearer to the supplies of pulp wood.

The “pulp craze” came to the Penobscot in 1883 when a financial syndicate in Boston formed the Penobscot Chemical Fibre Co. and built a sulphite pulp mill at the village of Great Works, within the boundaries of Old Town, with a capacity to produce 50,000 pounds per day. This location was set right at the center of the older lumber
economy. Great Works took its name from the many saw mills, built in the 1820s and 30s, which spanned the river there. These rows and rows of gang saws were powered by one of the many falls which lay within a roughly ten mile stretch of the river just above the lumber port of Bangor. Around those falls lay other sawmill towns such as Veazie, Orono, and Stillwater. Above them lay a long series of booms stretching up-river twenty miles. And above that lay the Penobscot watershed draining millions of acres of timberland. The Boston capitalists had an ideal combination of natural resources and a workforce that was skilled in the business of moving logs down-river and was accustomed to the industrial world of mill work. In addition, at Bangor and the surrounding mill towns there were a host of ancillary businesses, a well coordinated system in fact, that provided the goods and services necessary to support a thriving forest economy. From the 1880s forward, coincident to the declining fortunes of the lumber business in Maine, the pulp and paper industry rapidly adopted the elements of this older forest economy and established its dominance in the region.

It was not only metropolitan capital that was in play on the Penobscot. Great fortunes had been made in the lumber trade here and local businessmen also invested in substantial new pulp and paper mills. In Orono J. Frederick Webster, the scion of a family whose fortunes were built from the saw mills of that town, built the Webster Paper Co. mill with the capacity to produce 40,000 pounds of newsprint per day. On Ayers Island in the same town a partnership of Bangor lumber barons constructed the Bangor Pulp and Paper Co. mill with a capacity of 84,000 pounds of pulp and paper per day. Across the river from Bangor at South Brewer another saw mill magnate, Frederick W. Ayer, in partnership with Webster, installed sulphite digesters to convert the waste wood
at his Eastern Manufacturing Co. Supplemented by logs from up-river, this facility had the capacity to produce 32,000 pounds of pulp per day. Far above the Bangor area three mills had been constructed by Boston interests; the Howland Falls Pulp Co. at Howland, the Piscataquis Falls Paper Co. across the river at Enfield, and a new mill constructed by the aforementioned Penobscot Chemical Fibre Co. in Lincoln. All told these mills, devoted exclusively to wood-pulp, had the capacity to produce 84,000 pounds per day.

On the Kennebec the trend in new production capacity was north towards the forest resources in the interior. Far up-river, the Moosehead Pulp and Paper Co. built a large ground wood mill on Carratunk Falls in the Town of Solon capable of producing 48,000 pounds of pulp per day. Nearby, the small town of Madison experienced boom times when the Madison Investment Co., with offices at the heart of Wall Street, constructed a sulphite pulp mill which could produce 80,000 pounds of pulp daily. Closer to their home bases local capitalists constructed new mills at South Gardiner and Augusta. At the former local businessman J. T. Richards built a sulphite pulp mill with a daily capacity of 20,000 pounds, while the mill complex of the Cushnoc Paper Co. at Augusta had the capacity to produce 40,000 pounds of pulp, both sulphite and ground wood, and 32,000 pounds of manila and book paper.

On the lower Androscoggin the W.H. Parsons & Co. of New York, which had reorganized Adna C. Dennison’s failed Bowdoin Paper Manufacturing Co., deepened their investments in the region by building new mills at Lisbon Falls which could produce 64,000 pounds of ground-wood pulp and newsprint per day. Up-river, new mills built by Portland businessman Hugh J. Chisholm and his associates at Livermore Falls and Jay brought 70,000 pounds of new production capacity on line.
The most striking geographic shift in production in this time-step was the explosive growth on the Penobscot which connected the pulp and paper industry to millions of acres of northern forest. Similarly, construction of new mills up-river on the Kennebec and the Androscoggin drew the industry into the midst of even more forested acreage. What drove the shift in production into the interior was the need for pulp production to be near the source of wood. From 1880 to 1892 pulp capacity in Maine had grown by a factor of fifteen from 49,000 pounds per day to 762,000 pounds. All but one of the sixteen new facilities built in this time-step included wood-pulp mills. While the pulp production capacity at pre-existing mills rose four-fold to 192,000 pounds per day, 454,000 pounds of capacity, a full sixty percent of the pulp capacity in 1892, was newly built on the Penobscot or in the up-river mills: at Madison and Solon on the Kennebec, and at Jay and Livermore Falls on the Androscoggin.

Rail transportation was essential to link these new mill developments to national markets. For the most part existing rail lines, such as the European & North American which connected the main stem of the Penobscot to Bangor, were able to accommodate this growth. The 1892 map does, however, show where a new rail line up the Kennebec River facilitated the construction of the two new pulp mills at Madison and Solon.

**Patterns of Pulp and Paper Production, 1900**

The production capacity of Maine’s pulp and paper mills continued to skyrocket between 1892 and 1900, growing nearly four-fold from 1.2 million pounds per day to 4.7 million pounds. The majority of this growth came in existing mill towns as old facilities were upgraded and new machines were brought on line in new buildings at existing mill
sites. Growth in the old mill towns more than tripled during this period and in 1900 those towns amounted to roughly 65 percent of the State’s capacity. Nonetheless, these years saw the creation of two new mill towns, Rumford Falls and Millinocket, built in the wilderness from the ground up at massive water-power sites and devoted entirely to the production of pulp and paper. Both of these developments depended on the construction of entirely new railroad lines deep into the interior. In addition, the Hollingsworth & Whitney Co. built a large new complex just up the river from their Gardiner mills in the town of Winslow. Finally, a new mill was constructed at Riley, across the river from Livermore Falls and Chisholm where the paper machines received its’ pulp output by rail cars travelling less than a mile on local sidings (Lockwood, 1900).

The geographical trend in mill location statewide continued to the north and east; up-river and into the interior (Fig. 2.7). This was particularly strong in the Androscoggin watershed where Hugh Chisholm, in partnership with the Brown family of Portland and William A. Russell, built a massive integrated newsprint and paper bag complex at Rumford Falls in 1893. By 1900 these mills had been merged into the International Paper Co. and were producing 620,000 pounds of pulp and paper per day, the largest capacity of any mill site in the state. During this decade Chisholm poured resources into his other mill complex around Livermore Falls. In addition to the new pulp mill at Riley, the capacity of the mills across the river grew substantially, both at Livermore Falls and at nearby Chisholm. All told the production capacity on the Androscoggin grew by over 410 percent and this watershed’s share of the State’s total capacity jumped from 23.8 percent to 42.7 percent.
Figure 2-10: The production capacity of pulp and paper mill towns in Maine, 1900
By contrast there were no new mills built to the southwest along the Presumscot. These were still boom times for the industry all over Maine and existing capacity in this watershed grew by 67.2 percent, with most of this growth being the result of the S. D. Warren Co. investing in more capacity at its Yarmouth and Cumberland Mills sites. However, the growth to the north and the east of Maine was so extraordinary that even with this significant growth the Presumscot’s share of the state’s capacity fell from one-fifth of the total in 1892 to less than ten percent in 1900.

Rail access and hydro-power remained critical factors in the location of pulp and paper production. The two largest mill complexes in 1900, Rumford Falls and Millinocket, were also the farthest north and west of all of the mill places. It was the extraordinary water power potential that initially attracted interest from both land speculators and investors, but it was the extension of rail networks in the 1890s that made development possible. Chisholm and his partners began to acquire land around Rumford Falls in the 1880s and in 1891, with their financing in order, they began surveying canals and lots and built a thirty mile rail line from Canton connecting to the Maine Central. This new line, the Portland and Rumford Falls Railroad, brought in the materials and work force that in 1892 constructed the water power facilities and pulp and paper mills in a single season. When the mills began operation in 1893, they were the largest producers of newsprint in the world (Smith, 1970; Chisholm, 1952; MeBILS, 1901). The 1900 view shows the Portland and Rumford Falls line extended beyond Rumford Falls and on to the Rangley Lakes.

A similar sequence of events took place in Millinocket, far to the north of Bangor on the West Branch of the Penobscot. In the early 1890s a group of Bangor capitalists
organized the construction of the Bangor and Aroostook Railroad to connect Bangor to the rich agricultural region in the Aroostook and St. John River Valleys. Besides anticipating the shipment of vast stores of potatoes and lumber, these investors also recognized the potential for industrial development in their market area. In fact the falls at Millinocket were factored into their plans and the new line they opened in 1892 from Bangor to Aroostook County was surveyed to make that connection via Millinocket. The B & A investors and other Bangor associates quietly bought up land in the area and in 1899, when New York interests decided to invest in a newsprint facility to rival IP’s Rumford Falls complex, they sold out to these new investors (Smith, 1970). Again, the railroad made the creation of a large mill town in the Maine wilderness a possibility.

The trend up-river in the 1890s was not as pronounced on the Kennebec. Only a single new mill complex was constructed in this decade and that was at Winslow, only twenty miles above the head of tide at Augusta. Here the Hollingsworth & Whitney Co. constructed a massive pulp and paper facility to produce various manila papers using sulphite and groundwood pulp. Winslow lay across the river from the city of Waterville in the most densely populated part of the Kennebec Valley. This firm chose to locate its’ plant down-river and to supplement the limited water power available there with a coal-fired steam plant, rather than open up a new water power site deep in the Maine woods. In Winslow they found a ready labor market and the rail connections they needed, while the pulp logs were driven far down-river to the mill.

The most dramatic expansion of pulp and paper production up-river in this time-step occurred in the Penobscot watershed at Millinocket where the Great Northern Paper Co. built an integrated pulp and paper facility dedicated exclusively to the production of
newsprint. The Rumford Falls mills held the title of world’s largest paper mill for only a few years. When the Millinocket complex began production in 1900 it was able to claim that distinction. This mill site in the wilderness extended the reach of pulp and paper far into the interior of the Penobscot. Production capacity on the Penobscot grew by over 300 percent by 1900 with Millinocket alone providing 44 percent of the total capacity (Lockwood, 1892, 1900).

**Patterns of Pulp and Paper Production, 1909**

The pulp and paper industry in Maine continued to expand during the first decade of the twentieth century although the rate of growth began to diminish slightly after the huge increases in production capacity in the 1880s and 1890s. While capacity more than tripled between 1892 and 1900, it grew by 78 percent between 1900 and 1909. However this was still a substantial increase and Maine continued to be one of the most dynamic areas in which the industry operated, competing successfully against mills elsewhere in New York and New England. Seven new mill complexes were constructed during this decade with a capacity equal to 30 percent of the State’s 1900 capacity. At the same time the capacity at mills extant in 1900 grew by nearly 50 percent.

Two of these new mill places, at East Millinocket and Woodland, together responsible for 85 percent of the new capacity in 1909, were completely new towns built from the ground up. Their locations extended the industry’s geographical trend to the north and the east for yet another decade. Great Northern, having had great success with their Millinocket facilities, built the mills at East Millinocket in 1906 on a large water power site a few miles downstream in much the same fashion as they had created their
Figure 2-11 The production capacity of pulp and paper mill towns in Maine, 1909
original mill complex in 1899, by hewing a new community out of the wilderness. Farther to the east at Woodland a new Boston firm, the St. Croix Paper Co., opened up the transnational St. Croix watershed to pulp and paper production for the first time, also in 1906, by building a new mill town on the American banks, just up-river from the lumber ports of Calais and St. Stephen. This development only became possible following the downeast rail connection linking Calais to Bangor in the 1890s (Fig. 2.8).

The other five mills, new in 1909, were considerably smaller and lay to the south and the west bucking the dominant trend up-river and into new watersheds. With the exception of the modest groundwood mills at Shawmut and Old Town in the heart of the old lumber economy, these were small specialty producers which did not need the locational advantages found up-river by larger mills. At Damariscotta leather board was produced for the shoe industry, while the E.I. Du Pont De Nemours Powder Co. at Newhall used pulping technology to create a cellulosic fiber necessary for the manufacture of explosives. In East Poland, the National Fibre Co. produced wood pulp boards, presumably to supply its leather board mill at Kennebunk.

Among the mills which had been constructed by 1900, expansions and upgrades continued to tilt the share of production capacity towards the interior in the Androscoggin and Penobscot watersheds. Up-river on the Androscoggin lay the great mill complexes at Rumford Falls, Chisholm and Livermore Falls, now subsidiaries of International Paper. The capacity of these mills more than doubled during this decade from approximately 1.2 million pounds per day in 1900 to nearly 2.5 million pounds in 1909. By contrast the capacity down-river, which was concentrated in the large mill towns of Brunswick and Lisbon Falls, grew only slightly from 570,000 pounds per day to 600,000 pounds per day.
during the same period. On the Penobscot the capacity of up-river mills grew 70 percent from 1900 to 1909 compared to the down-river mills which grew at a rate of 43 percent. By 1909 the former had a capacity that was double that of the down-river mills. The Kennebec watershed continued to be the exception to the rule as the old up-river mills at Skowhegan, Madison and Solon barely grew in proportion to the down-river mills at Gardiner, Augusta and Winslow; from about 40 percent of their capacity in 1900 to 45 percent in 1909. This continued to reflect the dominance of the Winslow mill which relied on coal-fired steam rather than hydro-power. Finally, as in the last time step, the capacity of the Presumscot mills, located to the south and west of most of the mills in Maine, continued to grow at a slower pace than those elsewhere in the state. From 1900 to 1909 the percentage of the state’s production capacity on this watershed held steady at about 9 percent.

Patterns of Pulp and Paper Production, 1921

During the next decade, as captured in the data from the 1909 and 1921 Lockwood directories, the rate of growth in statewide capacity continued its downward trend. Still, a 44 percent rate of growth reflected the ever increasing prosperity in the pulp and paper industry in Maine during this period. By 1921 the geographic trend towards the interior slowed as well. Of the three new mills constructed in this period only one, built at Van Buren, represents modest growth to the north. Its capacity is off-set to the southwest however by new mills at Steep Falls on the Presumscot and at Bar Mills on the Saco River. Overall, the capacity of interior mill towns in Maine held steady in proportion to the capacity of down-river mill towns and the geographical distribution of the pulp and
paper industry in Maine began to hold steady for the rest of the study period with the exception of growth in the St. John Valley (Fig. 2.9).

*Figure 2-12 The production capacity of pulp and paper mill towns in Maine, 1921.*
Patterns of Pulp and Paper Production, 1930

On the eve of the Great Depression in 1930 the rate of growth in Maine had slowed to a 15 percent increase over 1921. This downward trend in the rate of growth, more pronounced from 1909 to 1930, reflected the regional shift of the pulp and paper industry nationwide towards the South and the Pacific Northwest. In these regions the share of national pulp and paper production began at two percent in 1899 and grew to thirty percent of pulp and sixteen percent of paper production by 1931 (Ohanian, 1993). It also reflected the shift of the newsprint sector in particular from the northeastern United States to the Canadian Shield from the early 1910s onward (Smith, 1970). Nonetheless, in absolute terms Maine mills had the capacity to produce over twelve million pounds of pulp and paper per day and the state ranked third in overall capacity, behind New York and Wisconsin (Irland, 2009; Lockwood, 1930).

The only new facility to be opened in Maine in the 1920s was a large paper mill built at Madawaska by Fraser Paper Ltd. of Toronto. In terms of the geographical distribution of mills in Maine, this mill, as well as International Paper’s kraft mill at Van Buren, did allow for a much greater amount of pulp wood to be taken out of Maine’s interior in the 1910s and 1920s for papermaking at mills in the northernmost region of the state (Fig 2.10). The small new mill at Richmond on the Kennebec actually represents the capacity of the old Damariscotta mill, whose machinery was moved there for reasons unknown, and was lying idle in 1930 according to Lockwood’s.

9 This was actually part of a single mill complex which Fraser had built on both sides of the border. Another large mill at Edmundston, N.B. supplied the paper machines at Madawaska with pulp via a pipeline which ran across the St. John River.
Figure 2-13 The production capacity of pulp and paper mill towns in Maine, 1930
The Geography of Pulp and Paper Production, 1880 to 1930

The geography of pulp and paper mill towns in Maine changed dramatically from 1880 to 1930, both in terms of their location and in the relative size of their production capacities. This series of maps illustrates how the industry was reoriented from the southern coastal region of the State in towns, traditionally served by maritime transportation networks, to mill towns in the interior connected by railroad to the rest of the national economy. The trend is made clearer by symbolizing this shift with proportional symbols representing the relative size of each mill town’s production capacities, in proportions held constant across all six time steps.

The initial locational pattern of production in 1880 was largely set in place due to the needs of the rag-based paper industry which favored proximity to urban areas and maritime transportation routes in order to minimize the transportation costs both of the importation of rags and the exportation of paper. The mills of this time-step were also built at a smaller scale than their successors and their power requirements could be met by relatively small water-power plants found close to the littoral.

As production capacity grew rapidly during the 1880s and 1890s, wood-pulp changed the locational equation. New wood-pulp facilities, often integrated with newsprint mills, were built to the east on the Penobscot or to the north on the Kennebec and Androscoggin in order to cut the transportation costs of their inputs. The geography of the lumber economy which had developed earlier in the century was gradually usurped by the pulp and paper industry as mills were located in saw mill towns and the transportation infrastructure built for bringing logs downstream from the interior were utilized by the papermakers. The contingent nature of these changes can be noted as
some of the pulp and paper mills of the original time-step survived and grew during this period as owners either added wood-pulp facilities down-river or abandoned generalized papermaking for a specialty niche as will be discussed in Chapter 3. By 1900 pulp and newsprint production grew even further into the interior as two of the world’s largest facilities were built at giant hydro-power developments deep in the wilderness, and entirely new mill towns were created at Rumford Falls and Millinocket to support them. After 1909 the production capacity in Maine continued to grow to new heights but much of this growth was generated at existing facilities. This also reflects the location specific, contingent nature of this process. As will be demonstrate in the following chapter, mill owners were still able to take advantage of the great forest resources of Maine, but statewide growth depended on changing the production processes at individual mills.
Chapter 3

Geographies of Capital and Management

This chapter investigates two geographic aspects of the ownership and management of the pulp and paper mills in Maine. The first involves the connections between individual pulp and paper mills to the urban hierarchy over time. This, in combination with an analysis of the concentration of production capacity by firm, provides a geography of corporate consolidation and the expanding distances between mills and their owners. The second is the geographic aspect of management decisions and the effect that this had on patterns of mill survival and growth. In the face of mounting competition and falling prices mill owners were forced to adapt by choosing between business strategies at the mill level which required investment in different production technologies and the production of different types of pulp and paper. Analysis of these changing geographies demonstrates the role of consolidation and adaptation in creating a new industrial landscape in Maine.

Production, Control and the Urban Hierarchy

Ultimately the location of pulp and paper mills was decided by the entrepreneurs and the corporations that built them. Nature might have provided the streams, but capital dammed and heightened fall sites, financed railroads to haul out paper and supply workers in the towns they built, and instructed lawyers to alienate millions of acres of timberlands to supply the pulp wood for the mills. The owners and managers of mills in Maine operated at different levels of the urban hierarchy. Many of the earliest mill owners lived in the small towns and villages where they built their mills, but this was not
always the case. Intermediate small cities, such as Portland and Bangor, Maine also
played an important role in the development of the industry. And, from the beginning of
this period, capitalists from the metropolitan centers of Boston and New York had a hand
in investing in mills and directing their management, a hand that became firmer as the
decades went by. Viewed over the course of a half-century this geography of mill
ownership shifted up and down the urban hierarchy and had a great influence on the
location of pulp and paper production. Decisions made by original owners may have
locked in the location of some mills, but as firms were consolidated or reorganized and
new business strategies emerged from far away corporate headquarters the patterns of
production and control changed dramatically.

Each Lockwood’s record lists the name of the company controlling the mill, the
names of the company’s officers, and in many cases, especially when the company’s
business was not conducted through a local post office, the company’s address as well.
This information, supplemented by various local and national directories and “Who’s
Who” compendiums, provided the data to map a geography of control for each mill
complex in the state.

Boston figures most prominently in the creation of a pulp and paper industry in
Maine. Boston investors had backed industrial ventures throughout the city’s regional
hinterland and their involvement in Maine’s nascent pulp and paper industry was the
continuation of a broader trend which had begun with canals and textile factories much
earlier in the century. Throughout the period 1880 to 1930 the GIS map sequence
generated from Lockwood’s data reveals a sizable proportion of state-wide pulp and paper
production capacity was in the hands of Boston capitalists. It was only in the 1900 time-
step, shortly after the International Paper Co. consolidation, that Boston yielded to New
York as the home to the corporate offices of paper companies with the highest production
capacity in Maine, and that was only by a very slim margin. By the next time-step in
1909 Boston firms had regained a substantial lead over their New York rivals. While the
trend was towards the consolidation of corporate control up the urban hierarchy to
metropolitan centers of capital outside of Maine, the process was also influenced by local
capitalists. Furthermore, the process was not always unidirectional as ownership and
management functions could also move back down the hierarchy as the industry evolved.

Distances and mill ownership, 1880

At the outset of the study period three Boston firms controlled about one-third of
the production capacity in Maine (Fig. 3-1). When the capacity controlled by other
Massachusetts capitalists in Lawrence and Lynn is included, the proportion rises to over
forty percent. Unlike the mills owned and operated by Maine firms, the Massachusetts-
owned mills were nearly all on coastal transportation routes. Mills which had grown
from local origins were often built to serve limited local needs. It would appear that
Boston investors expected to ship their production beyond local markets, whether to
wharves in Boston for that city’s paper needs or elsewhere. When Samuel D. Warren of
the Boston firm of Daniels, Warren & Co. invested in Maine mills in 1854, he chose to
purchase locally owned mills at Congin Falls in the village of Cumberland Mills, just
outside the busy seaport of Portland, Maine. Day after day a steady stream of horse-
drawn wagons made the four-mile journey back and forth, bringing rags from the docks
at the harbor and returning stacked with reams of paper. When the firm, which became
Figure 3-1. Locations of control for the pulp and paper mills in Maine, 1880.
S. D. Warren & Co. in 1867, purchased new mills at Gardiner in 1862 and at Yarmouth in 1876, they chose sites with easy access to tidewater (Smith, 1970; Warren, 1954).

Roughly another third of the production capacity in 1880 was controlled by firms operating from Portland, Maine. This capacity was scattered around the state in eight different mill complexes ranging from the city’s near-hinterland along the Presumpscot River to the northernmost mill in this period, located in the village of East Dover near the edge of agricultural settlement. In the case of the Presumpscot mills their location was set by Portland investors who chose to build in their own back yard. The more widely scattered mills were generally located by local investors whose ownership had passed on to Portland interests. This could happen in three different ways; the purchase by Portland businessmen of successful locally-owned mills, the failure of a local capitalist whose property was acquired by Portland businessmen, or local mill owners prospering and then moving their business to Portland, the most important business center in the region.

In the case of the mills at Mechanic Falls and Brunswick built by Adna C. Dennison in his halcyon days in the 1870s, the local investor lost his business to his creditors (W. H. Parson & Co. of New York) and it was reorganized into two firms, one of which, purchased by Portland merchant Charles Milliken for $100,000, was being operated from that city in 1880 (Smith, 1970). At Benton Falls, on the Kennebec tributary of Sebasticook Stream, a local grist mill owner, James Given invested in grinders with which he successfully produced wood pulp in the 1870s. By 1880 his mill had been acquired by the Kennebec Fibre Co. of Portland (Mitchell, 1909). The earliest wood-pulp entrepreneurs in Maine, C. D. Brown and E. B. Denison, saw-mill owners of Brunswick, began a two-man operation in the basement of their mill in 1868, packing
their modest output in barrels. After incorporating as the Androscoggin Paper Co. in 1870 they moved the business to Portland where, in 1880, their Androscoggin Paper Co. was acting as sales agent for mills in North Gorham, Skowhegan, and East Dover, as well as operating a large new facility built next to their saw-mill in Brunswick (Smith, 1970; Lockwood, 1880).

According to Lockwood’s, approximately one-sixth (17.6%) of the production capacity in the state was controlled by local owners. If we include the three mills whose ownership remains undetermined (and it is likely, given their small output and remote locations, that they were locally owned), the proportion of capacity rises to just above one-fifth (22.5%). The mills which were locally owned in 1880 generally represented a legacy of small family-scale operations that had already been rendered obsolete by the highly capitalized mills controlled from Portland or Boston. Most were swept aside by the competition that arose during the “pulp craze” of the 1880s and disappeared by the 1892 time-step. Small mills, deep in the interior, such as those at Norway, South Paris, North Wayne, East Turner and Farmington all went out of business in the 1880s. On average the locally owned mills which closed during this period had an 1880 capacity of 2,400 pounds of production per day whereas the mills which expanded and survived had an 1880 capacity of 4,500 pounds. Representative of the latter was local merchant J. T. Richard’s mill at Gardiner, capable of producing 10,000 pounds of book paper and newsprint and ranking sixth in production capacity of the thirty mills operating in Maine that year. Rather than closing in the 1880s it was acquired by the Boston firm of Hollingsworth & Whitney, fitted with new machinery, and was producing 14,000 pounds of Manila paper in 1892. Richards, after selling his paper-making operation, apparently
decided to concentrate on pulp production and built a new steam-powered sulphite pulp mill a few miles down-river and acquired and expanded the locally owned R. E. Lyon pulp mill up-river at Skowhegan. Unless the small locally owned mills found the capital to expand, they were forced to sell out or close their doors.

**Distances and mill ownership, 1892**

Between 1880 and 1892 ownership patterns changed substantially (Fig. 3-2). Boston interests still controlled about one-third of the production, but the geographical distribution of their mills had changed as they pushed east into the Penobscot watershed and further north into the up-river interior. By contrast, the share of capacity controlled from Portland fell from one-third to less than one-fifth (18.2%). In fact, it was the massive expansion into the Penobscot that seems to account for Portland’s diminished share of state-wide capacity. Apart from two pulp board mills on the Presumscot, all of Portland’s remaining investments in 1892 lay on the Androscoggin. Three large new mill complexes on the Penobscot located in South Brewer and Orono were developed by capitalists in the Bangor area, while Boston firms opened up four new mills farther north, three of them well up-river, at previously undeveloped water-power sites.

In addition, New York firms began to build new facilities in Maine in the 1880s. Far up the Kennebec River the Manufacturing Investment Co. of 15 Broad St., a shadowy firm of national politicians and newspaper owners, built a single ground-wood pulp mill at Madison which accounted for 6.5% of the entire state’s capacity (Lockwood, 1892; Smith, 1970). Up-river, the Moosehead Pulp and Paper Co. built an even larger pulp mill in the town of Solon. Although the owners of this facility have not been determined, the
Figure 3-2. Locations of control for the pulp and paper mills in Maine, 1892
fact that this mill was controlled by the International Paper Co. in 1900 would suggest that its 1892 owners may have operated from New York as well.

The “pulp craze” of the 1880s drew investors in from all levels of the urban hierarchy. The locally owned share of production capacity grew from about one-sixth to nearly one-quarter of the total in 1892. These locally owned and operated mills differed from those of the 1880 time-step in their large production capacities and newer machinery. This reflects the well-capitalized efforts of local businessmen, outside of Portland, who were able to raise the funds to build pulp and paper mills of roughly the same scale as those built by investors from Boston and New York. Some of these Maine capitalists were papermakers who had not only weathered the shake-out of the 1880s but had prospered as well and were able to up-grade or build new mills with their own earnings. Others had made fortunes in other industrial enterprises, often the lumber business, and were keen to get in on this promising new forest products industry. The 1892 time-step marks the high point for local control of Maine’s pulp and paper industry.

Inexorably, the market forces driving consolidation in the industry moved the points of control for the mills and timberlands in the state farther up the urban hierarchy to Boston and New York.

This time-step marked not only the high-point for locally controlled mills, but indeed for all mills operated by Maine firms, including those headquartered at the intermediate cities of Portland and Bangor, Maine. One such firm was organized from the wreckage of Adna C. Dennison’s papermaking business centered at Mechanic Falls. The five mills that Denison had constructed there during the 1860s and 70s, along with an affiliated chemical pulp mill in nearby Canton were acquired by Portland merchant
Charles Milliken for $100,000 (Smith, 1970). The reorganized Poland Paper Co. was incorporated in 1887, with the ship-building and ice magnate Arthur Sewall of Bath, Maine serving as president and Milliken as treasurer. The company’s affairs, however, were conducted from Milliken’s Portland offices at 24 Plum St. and the directors were mostly Portland men including William G. Davis who succeeded Sewall as president in 1894 (Waterman, 1894; Smith 1970).

*Figure 3-3 The Davis Building at 390 Congress St., Portland, Maine (MHS)*

Poland Paper, which continued in business well into the twentieth century, had a relatively small share of Maine’s rapidly growing pulp and paper industry. The bulk of the Portland enterprises were run out of a single suite of rooms at 390 Congress Street (*Fig 3-3*). This modest office building housed, in addition to a business college and an insurance brokerage, the home office address of no less than six pulp and paper firms, all
featuring rosters of overlapping officers, and operating mills from Brunswick to Rumford Falls on the Androscoggin River as well as mills closer to home on the Presumscot. It was in these offices, at the heart of a busy regional business center that we can find the origins of one of the twentieth century’s largest multi-national corporations, the International Paper Co.

It is clear from examining the data from Lockwood’s as well as from a Portland directory of “Leading Men” (Bacon, 1891) that it was from this building that William A. Russell and Hugh J. Chisholm directed their Maine investments. While Russell was working out of offices at 84 Water St. in Boston in 1890 and was presumably only an occasional visitor to the Davis Building, both Chisholm and his partner in the Rumford Falls development, C. A. Brown, were living and working in Portland (Smith, 1970, MaBRC, 1890). Another common thread was the presence of the wood-pulp pioneer E. B. Denison whose two-man operation in Brunswick emerged as the Androscoggin Paper Co. He was listed as treasurer of that firm in 1891 under William Russell’s presidency at the same time as he is listed as treasurer in Hugh Chisholm’s Umbagog Pulp Co. Tellingly, one directory states that the Umbagog Pulp Co. can be contacted “at the treasurer’s office at 390 Congress St.” which could imply that Denison worked in some directorial capacity on all of Russell and Chisholm’s Androscoggin valley projects from the Davis Building (Bacon, 1891, 174).

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The International Paper Co. (IP) was formed in 1898 as a merger of twenty-two pulp and paper mills producing nearly all of the newsprint in the United States and the St. Maurice Lumber Co. of Quebec which held extensive timberlands in Canada. William A. Russell was one of the principals involved in creating IP. In addition to his Maine mills, Russell also brought large mills in New Hampshire and Vermont into the combine. His fellow directors elected him the corporation’s first president. His Maine partner, Hugh Chisholm, was also instrumental to the merger and joined the board of directors as well. In January of 1899, just months after assuming leadership of the “Paper Trust”, William Russell died and Hugh Chisholm was selected as his replacement, serving as president of the firm until 1909 (Smith, 1970). Thus, during the next time-step from 1892 to 1900, the management of the mill complexes at Livermore Falls, Otis Falls, Jay and Rumford Falls, accounting for just over one-fifth of the total capacity of the state, passed from 390 Congress St. in the tertiary city of Portland, Maine to IP’s home office at 30 Broad St. in the center of New York’s financial district.

**Distances and mill ownership, 1900**

By 1900 the geography of control for Maine’s pulp and paper mills had a remarkably different profile (*Fig. 3-4*). In this time-step New York edged out Boston and became the point of control for the largest proportion of production capacity in the state. Furthermore, while Boston interests were distributed among several firms every New York-directed mill in Maine was owned by the International Paper Co. On the Androscoggin, IP acquired five mill complexes from the Portland firms outlined above

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11 A popular nickname for IP, used often by its unhappy customers and powerful adversaries in the newspaper business as well as in progressive political circles generally.
Figure 3-4. Locations of control for the pulp and paper mills in Maine, 1900.
including new mills at Jay and Riley, built by Chisholm and his associates after 1892 and integrated via short internal rail connections with the older mills at Otis Falls and Livermore Falls. The fifth mill complex at Rumford Falls had come on line in 1893 when Hugh Chisholm’s Rumford Falls Paper Co. opened a newsprint mill, then the largest paper mill in the world. These were all among the original IP mills in 1898. The following year the firm invested heavily in Rumford Falls, installing wider and faster papermaking machines in the existing plant and building an entirely new plant operated by their subsidiary Continental Paper Bag Co. On the Kennebec, IP acquired the locally-owned Richards Paper Co. pulp mill at South Gardiner as well as the Moosehead pulp mill far up-river at Solon. The firm’s acquisitions on the Penobscot included a pulp and paper mill complex at Orono, originally developed by local businessmen. Finally, up-river at West Enfield the Boston commission merchant and industrial developer Samuel Montague merged his Piscataquis Falls Pulp & Paper Co. into the New York combine. All told, IP controlled nearly forty percent of the state’s production capacity of which over four-fifths (81.6%) was from mills located on the Androscoggin. As IP consolidated its operations in the early twentieth century its’ interests on the Kennebec and the Penobscot began to fade, though it continued to dominate production on the Androscoggin.

Boston firms continued to thrive in Maine’s rapidly expanding paper industry in the 1890s and controlled roughly the same proportion of production capacity as International Paper. In 1899 a major new Boston corporation, the Great Northern Paper Co., was created. Great Northern built a pulp and paper operation far up the West Branch of the Penobscot River at Millinocket in 1900. In addition, the firm acquired the
Madison mills from the Manufacturing Investment Co. of New York. Together these mills vaulted Great Northern to the top ranks of newsprint producers in the world, allowing them to compete head-to-head with International Paper, a key goal of their investors who wanted to break IP’s near monopoly on newsprint production in North America. Although the company was incorporated in Maine and *Lockwood’s* lists a New York address, Great Northern’s corporate affairs were actually run by its president Garret Schenk from offices in Boston. This subterfuge was apparently made in order to avoid paying Massachusetts corporation taxes\(^\text{12}\) (McLeod, 1980).

Another Boston firm, Hollingsworth & Whitney, who had operated mills on tidewater at Gardiner since the 1870s, built a massive state-of-the-art pulp and paper mill at Winslow in 1899 across the Kennebec River from the busy shoe-and-textile town of Waterville. In 1892 this firm had produced 26,000 pounds of manila per day at Gardiner using cordage and wood-pulp purchased from others. The new mill complex at Winslow had a capacity of 240,000 pounds of sulphite and ground-wood pulp per day as well as 170,000 pounds of paper output which had expanded to include manila, waxed paper and specialty fiber products. This was the fourth largest mill complex in Maine in the 1900 time-step, outranked only by facilities owned by Great Northern and IP. Hollingsworth & Whitney had not only bet on economies of scale, they were also following a strategy of product diversification, building a product line that would face a limited number of competitors.

With the creation of IP, Portland’s role as a point of control for pulp and paper production in Maine shrank considerably. Two of the mills managed from the Davis

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\(^{12}\) This ruse worked until 1946 when the murder of Schenk’s successor William A. Whitcomb at his desk by a deranged job-seeker landed the Boston office in the glare of newspaper headlines.
Building on Congress St. in 1892 were not included in the IP merger, the Androscoggin Paper Co. mill at Brunswick and the Sebago Wood Board Co. at South Windham. In 1900 *Lockwood’s* lists both under Androscoggin Paper Co. parentage with an address at 390 Congress St., the offices of its’ treasurer E. B. Denison. The Poland Paper Co. continued at Mechanic Falls and a new Portland firm the Somerset & Kennebec Co. appeared in 1900 controlling the Richards Co. pulp mill at Skowhegan and the Kennebec Fibre Co. mill at Benton Falls. Despite the nearly four-fold leap in production capacity statewide between 1892 and 1900, the output controlled at Portland fell from nearly one-fifth (18.2%) to a mere 5.5%.

Local businessmen, some with financial backing from far up the urban hierarchy, had also been expanding production capacity in the 1890s and the 1900 time-step reflects those efforts. In the town of Topsham, across the Androscoggin River from Brunswick, Francis C. Whitehouse served as a managing director of three large mill complexes that had grown out of Adna C. Dennison’s Brunswick mill built in 1868. W. H. Parsons, a paper wholesaler and financier in New York, had held the mortgage on Dennison’s failing business. As early as 1880 Whitehouse appears in *Lockwood’s* as secretary of the Bowdoin Manufacturing Co. in Brunswick, of which Parsons was president and Dennison, vice president. By 1892 Dennison was out and Whitehouse was vice-president of Bowdoin Paper as well as secretary-treasurer of the newly created Lisbon Falls Fibre Co. with pulp and paper mills a few miles up-river from Brunswick. Parsons was president of both concerns, but the firms operations were being managed locally. During the 1890s the firm chose to expand locally once again, building the Pejepscot Paper Co. mills in Brunswick at the next falls up the river from the Bowdoin mills. Here again
Whitehouse was listed as treasurer, while David S. Cowles, former Standard Oil executive and Parsons’ son-in-law, was serving as president in New York (Leonard, 1911; Lockwood’s, 1900; LBML, 1889). The output of the firm’s mills grew exponentially from 1880, when their only mill produced 10,000 pounds of paper per day, to 1892, when two facilities produced 114,000 pounds, until the 1900 time-step when the three mill complexes had a capacity of 560,000 pounds of pulp and paper per day, which put them at roughly the same level as Great Northern and Hollingsworth & Whitney in terms of their production capacity statewide.

Distances and mill ownership, 1909

By 1909 Boston, once again, came to dominate ownership of pulp and paper production in the Maine woods (Fig. 3-5). Two major construction projects in the first decade of the twentieth century helped to boost Boston’s share of production capacity to nearly fifty percent. In 1905 Great Northern Paper began constructing pulp and paper mills a few miles down-stream from their Millinocket facilities at a village they named East Millinocket. These sister mills, along with enhanced production at its original mills, helped to boost the Northern’s pulp and newsprint production three-fold from 600,000 pounds per day in 1900 to nearly 1.8 million pounds in 1909. Farther to the east, in 1906, Boston capitalists launched the St. Croix Paper Co. in the village of

13 The firm so dominated the forests and streams of eastern Maine that it was known simply as “The Northern.”
Figure 3-5 Locations of control for the pulp and paper mills in Maine, 1909

[Map showing locations of control for pulp and paper mills in Maine, 1909]
Woodland just above tidewater at Calais. This was a major new newsprint facility with a daily capacity of 710,000 pounds and became the first paper mill to exploit the forests of the transnational St. Croix watershed.

In this time-step it becomes clear that Boston firm’s mills were dominant from the Kennebec River to the east, while New York- controlled mills, mostly owned by IP, dominated the western region of the state, especially in the Androscoggin watershed. On the Kennebec, Boston’s Great Northern controlled the pulp and paper mills at Madison, while further downstream Hollingsworth & Whitney continued to operate at Winslow and Gardiner. The output at these facilities kept pace with statewide growth expanding from 546,000 pounds per day in 1900 to just over one million pounds in 1909.

Along the Kennebec, a dividing line between eastern and western Maine, three facilities were operated by New York firms. Near the headwaters of the river, IP continued to operate a pulp mill at Solon, while downstream a new firm, the United Boxboard Co. of New York, took control of the mills at Skowhegan and Benton Falls, owned previously by the Somerset & Kennebec Co. of Portland. These New York mills had a combined output of 250,000 pounds per day, less than one-quarter of the three Boston mills on the river. On the Androscoggin the contrast between Boston and New York was even more stark. IP’s string of mills between Livermore Falls and Rumford Falls had a production capacity just shy of two million pounds per day. Boston’s only presence in the watershed was a ground-wood mill at East Turner, dormant since the 1880 time-step and re-opened by the National Fibre Co., producing 14,000 pounds per day.
The proportion of locally managed pulp and paper mills fell roughly in half during the 1909 time-step while output growth was anemic, rising by little more than four percent.\textsuperscript{14} Of these, the most significant were the three mill complexes on the lower Androscoggin managed by F. C. Whitehouse at Topsham, across the river from Brunswick. Next was a mid-sized pulp and paper mill at Augusta still being operated by the Cushnoc Paper Co. And finally, there was the tiny leather board mill of Sherman & Co. of Belfast producing 6,000 pounds per day and which, judging by \textit{Lockwood’s} records dating back to 1880, appears to have been running much of the same ancient machinery it was using in the previous century.

\textbf{Distances and mill ownership, 1921}

The 1921 time-step reveals that virtually all of the production capacity in Maine, outside of the Penobscot, was owned by Boston and New York firms (\textit{Fig. 3-6}). Two locally owned plants appear at Auburn and Belfast, but these are very small leather board mills producing less than 10,000 pounds per day between them out of a statewide total over 12 million pounds. All told, firms in Boston and New York controlled well over ninety percent of Maine’s pulp and paper production.

During the 1910s local management was superseded by metropolitan control on the lower Androscoggin River. In 1921 \textit{Lockwood’s} lists the three mills at Brunswick and Lisbon Falls, previously managed by F. C. Whitehouse from his home office in Topsham, consolidated into one firm, the Pejepscot Paper Co. with offices at 42 Broadway in lower Manhattan. During this interval the Androscoggin Pulp Co. closed

\textsuperscript{14} Locally controlled mills had a 13.8\% share of statewide capacity in 1900, falling to 7.6\% in 1909. Capacity at these mills grew from 648,000 pounds per day to 676,000 pounds or 4.3\%.
Figure 3-6. Locations of control for the pulp and paper mills in Maine, 1921.
their old Bowdoin mill in Brunswick and opened a new ground-wood pulp mill at Steep Falls on the Saco River. In 1921, however, they were no longer operating from 390 Congress St. in Portland; the firm’s address in Lockwood’s that year was on State St. in Boston. Also during this interval, the large pulp and paper complex at Augusta passed from the locally owned Cushnoc Paper Co. to the Kennebec Paper Co. with offices across the street from Grand Central Station in mid-town Manhattan.

The sole exception to metropolitan control lay in eastern Maine. Three important facilities and one small pulp mill on the Penobscot remained under the direction of Bangor capitalists. The Eastern Manufacturing Co. was a major sawmilling operation at South Brewer in 1889 (Defenbaugh, 1907) when owner Frederick W. Ayer invested in leading-edge technology of the day and began turning mill waste into wood pulp using the chemical sulphite process (Chisholm, 1906). In 1892 the mill was producing 32,000 pounds per day, near the average for the eleven mills producing sulphite pulp in Maine that year. At some point in the 1890s paper machines were added to the facility and in 1900 they were producing manila paper for envelopes as well as writing paper (Lockwood, Smith). The firm was committed to in-house technical innovation and in 1916 the South Brewer plant became the location for a laboratory of M.I.T.’s School of Chemical Engineering Practice where faculty and students engaged in hands-on research projects that were applied directly to improve the mills’ production processes (MacDougall, 2009a). The 1909 time-step reveals that ground wood pulp was added to their output and that their paper line had expanded to include wrapping paper, finished book paper and other specialty papers. During the 1910s Eastern Manufacturing acquired the Katahdin Pulp & Paper Co. plant up-river at Lincoln from Boston interests and the
1921 time-step shows the combined capacity of the two facilities at 430,000 pounds per day with a complex line of specialty paper products (Lockwood, 1921). That ranked them eighth of twenty-three firms operating in Maine that year, but their concentration on specialty paper would have made the company disproportionately larger in profits in comparison to the newsprint behemoths such as IP and Great Northern who relied on high volume and razor-thin profit margins to compete in what was essentially a commodity market.

The same year in which Eastern Manufacturing began producing wood pulp another group of Bangor capitalists opened a large integrated pulp and paper mill on Ayer’s Island in Orono. The Bangor Pulp & Paper Co. changed its name to Orono Pulp & Paper in the 1890s but it remained a Bangor firm. Lockwood’s data for 1892 shows that at 110 inches in width, its Fourdrinier machines were the widest in the entire state, indicating that this group of investors had the resources to leap-frog ahead of the competition and begin production with the latest and most efficient papermaking technology available at the time. By 1921 this facility was producing 220,000 pounds per day of sulphite pulp as well as book, kraft, tissue and specialty papers; it was a mid-sized mill with the economies of scale and technical prowess to remain competitive throughout the study period. Together with the Nekonegan Pulp Co. mill at Old Town these Bangor enterprises controlled nearly six percent (5.8%) of the statewide production capacity and were the last remaining bastion of local capitalism in Maine’s pulp and paper industry.
Distances and mill ownership, 1930

In 1930 the pattern of metropolitan capital’s dominance in Maine expanded from Boston and New York to include Toronto (Fig. 3-7). Fraser Paper Ltd. of that Canadian metropolis, a firm which grew from a modest lumber business on the Tobique River in New Brunswick, built a new mill complex on both sides of the St. John River spanning the international border. In Edmundston, N.B. a mill produced pulp which was piped across the river as a slurry to a paper mill on the Maine side at Madawaska where the specialty papers and packaging materials coming off the machines were not subject to high U.S. tariffs. This paper mill alone, producing 800,000 pounds per day, accounted for just over five percent of the state’s capacity. While there were some notable changes in local control during this interval, the trend to metropolitan control of the state’s pulp and paper industry reached a plateau and only shifted slightly from 92.2% in 1921 to 89.9% in 1930.

The 1921 to 1930 time-step saw a modest rise in local ownership from one-tenth of one percent to over five percent of statewide production capacity. One of only two new mills built during the 1920s, a mid-sized pulp wood facility, was built by the Keyes Fiber Co. of Waterville, featuring a roster of local officers in the 1930 Lockwood’s. Waterville interests also took control of the Kennebec Paper Co. mills of Augusta formerly controlled from New York. The mills appear in Lockwood’s under the restored name of the Cushnoc Paper Company. The president of this company was Walter S. Wyman, the president of the Central Maine Power Co. (CMP), the largest electric utility in the state. Wyman had built CMP from a single power plant in a sawmill at nearby Oakland in the 1890s to become the dominant public utility in Maine from his home
Figure 3-7 Locations of control for the pulp and paper mills in Maine, 1930.
base at Waterville, besting competitors from Portland, and combining dozens of local electric companies into a single network stretching from Kittery on the New Hampshire border to the lower reaches of the Penobscot. In the course of his rise, he had joined forces with Samuel Insull of Chicago, a former Edison lieutenant, whose Midwest Utilities holding company became a rival to General Electric before coming to a scandalous end in the 1930s. In the 1920s Insull absorbed CMP and was impressed enough with Wyman to make him president of the entire New England network of Midwest. Thus Wyman was in the unusual position of operating the affairs of large subsidiary companies in Massachusetts and the other New England states from a small manufacturing city in Maine. He also had the deep corporate pockets of Midwest and influential local connections which he used in the 1930s to stimulate flagging demand for electricity from CMP’s industrial customers. Wyman used this capital to keep the textile firm Bates Manufacturing in Lewiston from closing its doors during the Depression and also led the drive to build a new specialized coated paper mill in Bucksport in 1932 (Clark, 1999). Although more research will be necessary to confirm the point, it would seem likely that Wyman, faced with the closure of a major customer, stepped up and organized a local syndicate to save the mills. A similar phenomenon appears to have happened on the Penobscot during this interval as well. There the pulp mill at Old Town controlled by the Nekonegan Pulp Co. of Bangor in 1921 appears in the 1930 Lockwood’s under the management of the Chapman Fiber Co., Edward M. Graham, president. Graham was also president of the Bangor Hydro-electric Co., Maine’s second utility which controlled the networks in the eastern portion of the state.
Corporate Consolidation in the Pulp and Paper Industry

Over the course of the study period the number of facilities grew while the number of firms stayed roughly the same, dipping briefly during the 1900 time-step, indicating some consolidation as firms built or acquired more mills. Nonetheless the average number of mill complexes owned by a single firm during this period never rose higher than two (Table 3-1), and most of the firms operating in Maine only controlled a single mill. However, when consolidation is considered in terms of total production capacity by firm, it becomes clear that, over time, capacity became concentrated in the hands of a small number of large corporations.

Table 3-1 The number of firms in Maine in relation to the number of mills.

<table>
<thead>
<tr>
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<th>1880</th>
<th>1892</th>
<th>1900</th>
<th>1909</th>
<th>1921</th>
<th>1930</th>
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<tr>
<td>Firms</td>
<td>24</td>
<td>26</td>
<td>18</td>
<td>24</td>
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<tr>
<td>Mills</td>
<td>29</td>
<td>35</td>
<td>34</td>
<td>40</td>
<td>41</td>
<td>40</td>
</tr>
<tr>
<td>Ratio of Mills/Firms</td>
<td>1.2</td>
<td>1.3</td>
<td>1.9</td>
<td>1.7</td>
<td>1.8</td>
<td>1.7</td>
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Figure 3-8 shows that the percentage of capacity controlled by the top quartile of firms jumped dramatically in the 1892 to 1900 time-step. Two firms, International Paper and Great Northern Paper, dominate the top quartile. The former resulted from the horizontal integration of twenty-two pulp and newsprint mills in the Northeast, eight of which were in Maine, while the latter resulted from the construction of a huge new integrated mill at Millinocket as well as the acquisition and up-grading of a large pulp mill at Madison. While many Maine mills were controlled from the metropolitan center of Boston from the outset of the study period, the late 1890s mark the entry of large corporations into the Maine woods.
Figure 3-8 The distribution of production capacity by pulp and paper firms in Maine.
Consolidation and adaptation in the pulp and paper industry

The production capacity of pulp and paper manufacturers in Maine grew exponentially during the “pulp craze” of the 1880s. According to Lockwood’s, production capacity grew by an entire order of magnitude, from approximately 180,000 pounds per day in 1880 to over 1.2 million pounds per day in 1892. And capacity continued to expand significantly in the 1890s, growing four-fold during the 1892 to 1900 time-step to nearly 4.7 million pounds. The result, especially after the business depression that began in 1893 and proceeded through the middle years of the decade, was oversupply and falling prices (Lamoreaux, 1985; Smith, 1964). This challenging economic environment forced pulp and paper firms to adapt in order to survive. The strategies and tactics adopted, and the demise or survival of particular mills which resulted, reveal a particular geography of production at the mill level over time. This study explores and maps this sorting process at the state level beginning with the extant mills in Maine of 1880, the rush of new mill construction in the 1880s and 1890s, and on to the mills which survived through the 1920s.

At a strategic level, pulp and paper firms tried to gain control of prices or gain control of costs by consolidating their operations with competitors. In an age of monopoly capitalism firms which consolidated horizontally aimed to control prices by merging with competitors producing the same types of paper in order to control sufficient market share to become price leaders and halt the slide in prices. Firms which consolidated vertically attempted to control capital assets which could produce inputs for the type of paper they were manufacturing in order to control their costs and undercut their competitors on price. Simple examples of the latter would be paper makers who
acquired pulp making operations, or further backwards in the process, acquired timberlands. Papermaking firms which engaged in forward vertical integration might acquire paper dealers in large cities or establish their own regional or national distribution networks.

Within these strategic decisions at the level of the firm lay tactical decisions about individual mill operations. Economic historian Naomi R. Lamoreaux (1985), in her study of corporate behavior during the wave of mergers that took place in the United States between 1895 and 1904, identifies two contrasting business strategies which industrial firms of the period employed in their production facilities: mass production and product differentiation.

A paper mill which became devoted to mass production might have begun in the 1870s producing a small amount of newsprint, writing and wrapping paper. In the 1880s the owners might have decided to concentrate in newsprint, invested in the widest and fastest possible Fourdrinier machines and ran them 24 hours a day on three shifts, thus driving unit costs down in order to prevail over newsprint producers which had not adapted in a similar fashion. This tactic was appropriate for paper types such as newsprint which could not be distinguished from competitor’s products and required producers to compete on price alone. This required constant improvements in papermaking processes in order to squeeze out razor-thin profit margins amidst constantly declining prices.

Alternatively, the same mill owners could have taken a different tack and decided to concentrate on high-quality writing paper. This would also have required investments in new pulp-making and finishing technology, the beaters and calendars that lay on either
end of the Fourdrinier machines in the papermaking process, as well as the technical
know-how to produce paper that was distinguished from the writing paper of the 1870s
which had differed only slightly from the newsprint which was coming from this mill at
that time.

The investors might also have wanted to invest in branding and marketing their
writing paper in order to ensure a premium price for their product. This tactic, known as
product differentiation, relieved the investors of having to grow larger and more efficient
and allowed a particular product line to face a limited number of competitors, or none at
all, which resulted in higher profit margins on a lower volume of production. Of course
some firms had the resources to pursue both tactics at once, and built mills producing
specialty paper products at great economies of scale.

The Types of Paper Production in Maine, 1880 to 1930

In 1880, the pulp and paper industry in Maine was still in its infancy. The pulp
craze of the 1880s was nearing take-off, and the growth of industrial-scale integrated pulp
and paper mills was more than a decade in the future. Still to come were the steady
erosion of pulp and paper prices, fierce competition in newsprint production from mills
on the Canadian Shield, and the development of rival industries in the Upper Great Lakes
region and the Pacific Northwest. Figure 3-9 displays the changes in the production of
different types of paper products throughout the study period. From this data it is
possible to track the different investment strategies employed by firms as they struggled
to adapt and keep their Maine mills competitive in a challenging economic environment.

In order to make sense of the scores of different paper products identified in
Figure 3-9 The changing proportion of paper types in Maine, 1880 to 1930.
Lockwood's it was necessary to reclassify them into four broad categories: newsprint, book, paper board and specialty papers. G.S. Witham, identified as a plant manager for the Union Bag & Paper Co. and a mill operator of long experience, produced a textbook on the industry in 1920 from which three of these categories were derived. He outlined a taxonomy of paper products based on broadly different production techniques. Newsprint fell in a category of its own due to the use of ground-wood pulp which produced a thin, brittle and relatively impermanent paper. Witham used the term “book paper” to categorize all of the paper products which were designed to hold ink, including a long list of sub-categories not limited to publishing, but including stationary and art papers as well. Book paper, while it could include a small proportion of ground-wood pulp, required stronger chemical pulps which preserved the longer wood fibers and produced stronger paper. A third broad category, “paper board”, was used to designate all of the paper products formed by stacking layers of paper on top of each other during the production process, often using cylinder machines, in order to form a thicker, stiffer product. This includes a variety of products used for packaging, such as corrugated cardboard. It also included leather board, an important sub-category for Maine.

All three of these categories were used in this analysis in addition to a fourth category, “specialty papers,” which was defined in such a way as to identify which mills had invested in the production of specialized paper products. In a report on the paper industry issued by the Federal Trade Commission (FTC, 1917), separate sub-categories were defined according to the type of finishing process applied to paper products running

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16 Witham outlines other categories such as construction papers and tissue papers, but these were either not found in Maine, or were produced in the state by advanced means that fall into the “specialty papers” category.
through the Fourdrinier machine. A standard “machine finish” was applied by a calander stack to smooth the surface and allow for the general application of ink. It is by that criteria that this analysis defines simple “book paper.” Paper products that required specialty pulps and finishes such as “sized and supercalandered” paper in which a specialty calander stack is heated and fitted with different surfaces with which to smooth the finished paper, are categorized as “specialty paper.” This last category also encompasses advanced tissue papers such as those produced by the Hollingsworth & Whitney mill at Winslow, in contrast to commodity tissue products such as toilet tissue or paper towels which were not produced in Maine during this period.

At the outset of the study period, mills statewide, with the notable exception of the S. D. Warren Co.’s facilities, were small and not technologically advanced. In 1880 the average width of Fourdrinier machines was less than sixty inches (57.9”); by 1930 that figure had risen to nearly one hundred-thirty inches (128.6”). This metric has been used by at least one economist as a proxy measurement for the level of technology for a particular mill (Ohanian, 1993). The daily output of a paper mill was limited by the width of the sheets of paper and the speed at which they rolled off the dry end of the machine. Consequently successful firms invested heavily in wider and more robust machines with which to reduce unit costs.

Papermaking machines, in and of themselves, were not sufficient to keep up with the competition; the types of paper that mills produced mattered as well and mills began to specialize. The types of paper that firms chose to produce at individual mills reflected which of the two different business strategies, mass production and product differentiation, the mills owner had chosen to pursue. In 1880, several Maine mills
produced newsprint as well as other paper products. The firms that continued to engage in newsprint production were forced to follow a mass-production strategy and build the most efficient mills possible, running for twenty-four hours a day.\(^{17}\) On the other hand, firms which chose a product differentiation strategy invested in the production of more and more specialized paper products which faced less competition, were more resistant to price pressure and yielded higher profit margins. Tracking the changing output of mills in *Lockwood’s* reveals a remarkable shift in types of paper produced in Maine during the course of the study period. Initially the output of mills was described in very general ways such as “news,” “book” or “leather board.” By 1930 *Lockwood’s* reported the production of scores of different paper products including “postal card,” “lithograph label,” and “die-wiping” papers. In fact advertisements placed in the 1930 *Lockwood’s* were sometimes printed on the specialty paper which the firm was advertising and throughout the volume the reader could find pages with a variety of finishes and textures.

Maine mills altered the types of paper they produced considerably from 1880 to 1930. In the 1880 time-step most mills (74.4%) were producing simple book paper, either for publishers or as wrapping paper. Several small mills devoted to leather board, a type of paper board used in the shoe industry, make up the second category. Their proximity to the shoe factories of Maine and the Merrimac valley ensured that this category would persist throughout the study period. Finally there was only a single mill, Bowdoin Manufacturing of Brunswick, that was devoted exclusively to newsprint.

\(^{17}\) Because of the necessity to run around the clock, newsprint mills were among the first industrial mills in the U.S. to adopt an eight-hour day. Twelve-hour days were routine before the advent of big newsprint mills and the need for night shifts, but workers began to resist alternating twelve-hour “tours” which forced them to work days for two weeks followed by nights for two weeks (Smith, 1970).
although it was one of the larger operations in the state at the time and accounted for 7.4% of total output.

Figure 3-9 charts the changing mix of paper products produced by Maine mills from 1880 to 1930. Two major trends can be discerned from this chart. The first was an explosion of newsprint production in the 1880s and 1890s which reached a plateau after the 1909 time-step. The second was the rapid rise of specialty papers from the 1900 time-step forward. Great investments in newsprint plants were made on the Androscoggin during the 1890s, most notably by Hugh J. Chisholm and his associates at Otis Falls and Rumford Falls, and also by the W.H. Parsons associated firms operated by F. C. Whitehouse at Lisbon Falls and Brunswick. This was a trend witnessed elsewhere on rivers reaching into great stretches of timberlands, such as in the Adirondacks and the upper Connecticut River valley, due to the cheap and easily accessible ground-wood pulp. This northward shift in newsprint production resulted from the construction or upgrading of vertically integrated mills in which paper machines were housed in the same mill complex as ground-wood pulp operations. This was necessitated by the transportation costs not only of the pulp logs but of the high volume of the manufactured pulp itself. Much smaller specialty mills, such as those on the lower Connecticut producing fine stationary, could afford to use chemical pulp shipped in lower volumes by rail from the forest frontier. Giant newsprint plants needed to be on that frontier (Smith, 1970).

Newsprint production in Maine did not continue growing to the end of the study period. It reached its apex in 1909 as a proportion of statewide paper production, as well as reaching a plateau in terms of volume. Overall production of newsprint grew only
marginally in the 1921 and 1930 time-steps. Newsprint production began to shift from the United States to Canada after controversial congressional action that removed tariff barriers to its’ importation in 1911. The last great newsprint mill to be built in Maine, the St. Croix Paper Co.’s mill at Woodland, was brought on line in 1906. After the 1909 time-step the number of newsprint mills fell as their owners either closed them or switched their production to specialty papers. The IP newsprint mill at Rumford Falls, the largest mill in the world when it opened in 1893, ceased producing newsprint and in 1921 *Lockwood’s* reported the products produced there included bag and wrapping, express, kraft, envelope manila and decorated poster paper among other specialty papers. By the 1930 time-step only three mills, those of Great Northern at Millinocket and East Millinocket as well at the St. Croix mill at Woodland, were producing newsprint. After the Canadian tarrifs were eliminated, six mills dropped out of newsprint production.

By the late 1890s the industry nationwide was suffering from a crisis of overcapcity and falling prices (Smith, 1970). It was at 1900 that the data on paper products reveals that mill owners in Maine were beginning to pursue a strategy of product differentiation. During the 1892 to 1900 time-step specialty paper grew from less than one percent of the statewide total to nearly one-fifth (19.7%). While none of the older mills extant in 1892 were producing this category, two large new mills built in the late 1890s\(^\text{18}\) were responsible for all of the specialty paper produced in 1900. Production in this category tripled in the next time-step and in 1909 the proportion of specialty paper had grown to nearly thirty percent. During this period, not only were large new facilities constructed, such as the Oxford Paper Co.’s mill at Rumford Fall, but existing mills began to retool for specialty paper production. The Eastern Manufacturing Co.’s mill at

\(^{18}\) Orono Pulp & Paper Co., Orono and Hollingsworth & Whitney, Winslow.
South Brewer, which produced plain book and manila paper in 1900 was advertising “Finest Linen Finished Paper a Specialty” (Lockwoods, 1909, 61). By the end of the study period nearly sixty percent (58.9%) of the production capacity in the state was specialty papers. This surge in the volume and proportion of specialty paper production from 1900 onward had come about as book paper mills up-graded to specialty pulps and finishes and as newsprint production was abandoned in the face of competition from Canada.

The Geographies of Management and Control, 1880 to 1930

The geographical aspects of the management and control of pulp and paper production in Maine changed in two important respects. First, as the industry developed from the 1880s onward, both ownership as well as management functions became more distant from the mills. The necessity for ever-increasing capital inputs to keep mills competitive drove these functions further up the urban hierarchy and the successful mills which remained in production over time were increasingly controlled from metropolitan centers such as Boston, New York and Toronto. Second, the nature of the management directives changed over time resulting in a particular geography of mill location which was contingent on the business strategies employed at each mill each step of the way. The importance of the business strategy and the investments that followed was independent of whether these decisions were made on State St. in Boston or from an office on the mill property.

The Lockwood’s data indicates that sixty nine pulp and/or papermaking facilities were extant or created in Maine from 1880 to 1930 beginning with the twenty-nine listed
in the 1880 volume. Where the forty facilities which emerged in 1930 were located depended on decisions made in earlier iterations of this process. Over time a sorting process, which can be discerned from common trends in industry integration and mill-level investment strategies, left the industrial landscape of the region with a geographical pattern that reflected not just the opportunities afforded by a proximity to resources and access to transportation links but also reflected the contingencies of business decisions made over time.
Chapter 4

Geographies of Workers and Capitalists

Global Lives and Local Lives

Although the locational patterns of mill sites lend themselves to a Weberian approach within economic geography (Leblanc, 1969), other frames of analysis can also shed light on the evolution of the pulp and paper industry. These might include an environmental history of the transformed waterways and woods of Maine, or an analysis of the role of governance on access to forest resources. But one framework that has particular value, given recent work in historical geography, is to trace the impact of modernity on the people and places in these remote areas of Maine and elsewhere in the northeast, the ways in which social and economic networks intertwined with structural transformations between core and periphery. Opening up pulp and paper production was in many cases the catalyst for bringing the comforts and complications of modern life to the rural precincts of the northeast by tightening and thickening their connections with a national, indeed a global economy. The recent work of Miles Ogborn (2008) serves as a model for this approach, tracking the pathways of individuals caught up in transforming economic developments across the globe during Britain’s colonial period.

Global history, in the formal Wallersteinian sense, has proved problematic for many historical scholars. Ogborn has pointed out that it needs to operate at the largest scales of space and time in order to identify and highlight the trends in world capitalism that its practitioners see as the critical drivers of human affairs. Doing so, however, not only ignores the agency of the individuals who took part in shaping the world around them, but also loses sight of regional history. Without understanding global history
across multiple spatial and temporal scales we risk missing valuable insights into the lower scale processes that account for higher scale patterns. In fact, argues Ogborn, by beginning with explanations at the global level scholars have often taken historical research and forced their findings into a master narrative rather than following their evidence into a rich new understanding of the people and places that took part in shaping our globalized societies.

Another scholar who has worked to set local places into broader historical frames is Stephen Hornsby, whose work along the wider Atlantic shore adopts both a Meinigian broad brush and a careful reconstruction of local regional relations. His *British Atlantic, American Frontier* (2005) explored “spaces of power” in places from Newfoundland to Barbados in the early modern period. His study of Bear River, Nova Scotia (1996) sought to position a small Fundy port within the regional Maritimes and Central Canadian economic and political matrices that transformed the town over a half century. Bear River, long connected to the trading system along the Atlantic shore in the age of sail, to Saint John NB, the Caribbean, and the metropolitan center of Boston rather than the cities of the Canadian interior, was one of those places that felt the brunt of new pulp technologies in the early twentieth century, and became one of its casualties in the 1920s. Hornsby used merchant business papers and diaries, as well as archival photographs, to reconstruct the rhythms of a place, and its broader regional connectivity, through the lens of the Clarke Brothers, its leading business family.

In the case of the pulp and paper industry in the Maine, the lives of people who operated these industrial enterprises can be traced geographically across multiple scales. In this chapter the lives of three men engaged in the pulp and paper industry of the period
are traced locally while highlighting their connections to global networks of migration, capital and ideas. These geographical biographies remind us that similar networks impacted thousands of individuals, from the workers who built and operated the mills to the capitalists who directed them, in these once sparsely settled corners of the northern woods. By examining the lives of capitalists like Hugh J. Chisholm, as well as the lives of workers such as John P. Burke and Giovanni Moscone, we can form a richer understanding of how the mill towns examined in the previous chapters were connected to broader patterns of technological and cultural innovation, tracing the threads of individual connectivity which were woven into the fabric of modernity.

The life paths of Giovanni Moscone and John Burke illustrate two geographical aspects of the workforces assembled to build a pulp and paper industry on this forest frontier. The former crossed an ocean to participate in building the massive pulp and newsprint mills at Millinocket, Maine, bringing with him a new language, new food ways and the folk traditions of a stone mason from the Abruzzi region of Italy. The latter was connected locally, learning the ways of papermaking from his family and neighbors in Franklin, New Hampshire before moving on to Fort Edward, New York where he spent the rest of his long life organizing his fellow workers into a powerful national union.

The Life Paths of Giovanni Moscone

Giovanni Moscone’s experience, travelling to the woods of Maine to build a paper mill, fit the pattern of many Italian immigrants who came to the United States in this period to build the infrastructure of an industrializing society. At first he came to

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19 Details of the Moscone family history were provided by his great-great nephew Christopher P. Foran (Personal communication, November 15, 2009).
America alone. A ship’s manifest compiled by immigration authorities in New York documents that he arrived on the SS Victoria from Naples in the year 1900 and that it was the first time he had set foot in the country (USCI, 1900). He was twenty-seven years old, a mason, and, so the form notes, a family man. In fact he had left his wife and two young boys at home in the village of Catignano. He possessed the modest sum of ten dollars and told the official processing his arrival that, like many of the men disembarking from the Victoria, his next destination was Boston where he had no relatives. Given that his final destination was deep in the wilderness of Maine, it might be supposed that Boston was a way station arranged by Italian labor contractors, or padrones, who had recruited multiple crews of stone masons to work on construction projects throughout New England (Peck, 1996). Giovanni was traveling thousands of miles to build what was then the largest paper mill in the world.

The following year he was joined by his family. Another ship’s manifest records that Filomena Moscone arrived aboard the SS Buenos Aires from Naples with her two boys Pietro and Ferdanando (USCI, 1901). Filomena reported that she was joining her husband and that her final destination was New York although we know that she was bound for Maine. Perhaps Giovanni had travelled to New York to meet them on the dock and guide them to their new home in the north woods.

When Filomena and her children arrived at their final destination in Maine they would have found a town struggling to be born. Until 1899 the site chosen for the massive pulp and paper mills being constructed for the Great Northern Paper Co. was a forested wilderness, home to a solitary farm. The landscape had not been altered since Henry David Thoreau recorded his overnight stay there in 1853 during his journey to the
Maine Woods (1864). While the area lay far north of the agricultural frontier, it had attracted the attention of investors early in the 1890s because of its great water power potential. The Bangor capitalists who directed the construction of the Bangor and Aroostook railroad in 1892 took pains to lay the main line of tracks as close as possible to the falls on the West Branch of the Penobscot River called Millinocket by the Abanaki people of the region. They also took care to buy the land around it.

The Town of Millinocket, Maine was the creation of the Great Northern Paper Co. Formed by a powerful syndicate of New York capitalists led by Rockefeller lieutenant Colonel Oliver Payne, Great Northern bought out the Bangor businessmen and built a mill complex that was designed to singlehandedly challenge the International Paper Co. (IP) in the newsprint business. As soon as the ground thawed in the spring of 1900 a small army of engineers and construction workers poured onto the site and began building a pulp and papermaking facility that was a prime manifestation of the global economy in the Gilded Age.
Not only was global capital marshaled from the pinnacles of finance in New York City, but labor was recruited world-wide as well. The 1910 Census returns reveal a workforce in Millinocket that was drawn from the paper and lumbering economies of Maine, Quebec and the Maritimes as well as other pockets in New York, New Hampshire and Vermont. But it also documents the trans-oceanic reach of this single enterprise in the wilderness. Three distinct groups travelled from the Old World to Millinocket: Jewish workers identified in the Census returns as Russian-Lithuanian, Levantine workers labeled Assyrian, and Italian workers such as Giovanni Moscone (U. S. Census, 1910).

*Figure 4-2 Construction workers, East Millinocket, 1906*(Scott, 1990)

In 1910 Giovanni was thirty-eight years old and lived in a house that he owned with his wife and five children, aged three to fourteen. A certain degree of assimilation is apparent as the older boys, Pietro and Ferdanando in the immigration document of 1901,
were now Peter and Freddy to the Census enumerator. Unlike some of their Italian neighbors both of the adults were literate and were able to speak English. And like nearly every household in Millinocket, regardless of ethnicity, all of the school-age Moscone children were attending school ((U. S. Census, 1910)).

Giovanni does stand out from his neighbors by his occupation. The Italian workers of the construction period in 1900 to 1901 were mostly stone masons, recruited through labor agents to provide the skills necessary to create massive brick structures lying on granite foundations. The 1910 Census returns reveal that nine years later these gangs of masons had either moved on or had chosen to work in the paper mill they had just built. Moscone appears to be one of the only workers in Millinocket listing his occupation as mason. The Census reports that he was an employee rather than working on his own account, but it is unclear whether he was still employed by the Northern or whether there was enough construction activity in town for him to find steady work with a building contractor. According to his descendants he often travelled back and forth between Millinocket and Boston for work. He had family there, as well as solid connections to the large community of Italian stone masons working in that busy city ((U. S. Census, 1910)).

The fact that he was able to practice his craft was unusual in this town whose economy was dominated by pulp and papermaking. One can infer from the clear ethnic grouping in the enumerators report that the town was geographically segregated. Local histories also record the existence of a “Little Italy” and provide some descriptions (Duplisea, 2008; Duff, 2004). We can read the census returns as a stroll around this section of the town and pick out the employment patterns. Giovanni Moscone was one of
only a handful of artisanal workers in the Italian community. There was a shoe-maker and a couple of bakers, but the vast majority of the workers in his neighborhood were employed in the mill. Beyond a few artisans and the big crew of mill workers the Italian community featured only a few men of business. The enumerator gives them the title of agent or retail merchant. These were the *padrones* and their business partners who arranged the recruitment and transportation of new workers from Italy and, through their grocery stores and dry goods establishments, provided them with familiar food and other necessities from home and kept them bound in a tight network of patronage and credit (Peck, 1996).

The great majority of the Town's population were Protestants of British and Irish ancestry. While most came from elsewhere in Maine, a great many had either recently arrived from the Maritime Provinces of Canada or were born to parents native to that region. The Census identifies their place of origin as "Canada-English" but the histories of lumbering and papermaking in Maine make it clear that this stream of Canadian migrants came almost exclusively from the Maritimes (Smith, 1970; Smith, 1972). In addition there are a significant number of Anglophones from the other papermaking states of the northeast, notably New York, Massachusetts, New Hampshire and Vermont.

However, this was a polyglot town and there were significant minorities whose first or only language was not English. These included not only the Italian community of the Moscone family, but also many French-Canadians from Quebec and New Brunswick. The latter, like their English-speaking counterparts from the Maritimes, were both first generation and born in Maine to parents whose origins were listed as "Canada-French." English and French were not the only languages heard at home and in the mill. The
Lithuanian Jewish community would have spoken Russian and Yiddish and the families whose origins were "Assyrian" would have spoken Arabic and perhaps Hebrew. These were the groups that were large enough to form their own ethnic enclaves. Beyond this, there were a handful of households from other parts of the world including Poles and Finns, who had likely moved to this new mill town from the granite quarries of coastal Maine, and Swedes probably from a nearby farming settlement in Aroostook County. In addition to being segregated by ethnicity, the residential streets were also divided by class. The Protestant English speakers who lived nearest to the Italian community were generally in the lower status occupations, often the men were enumerated as "laborers" and the women, many single heads of household, as "housekeepers."

As the residential sections of Millinocket were segregated by ethnicity so were the work places, especially at the Great Northern Paper Co.'s complex of mills, offices, canal and rail yards and in the rapidly growing business district. From the enumerated occupations we can find only a handful of merchants who are not from the dominant ethnic group – the Yankees of New England. There are some Jewish proprietors, although a large majority of the group listed as Russian-Lithuanian were young men employed in lower status jobs at the mill. And, as noted above, there were a few Italian “retail merchants” although it is not possible to determine from Census returns alone whether their shops were in the business district or remained in the neighborhood known as “Little Italy.” Besides the men of business, the men providing high order services to the townspeople; the physicians, lawyers, teachers, even the photographer, were exclusively Yankee.

The Great Northern mill complex can be thought of as a chain of spaces along
which the raw materials were transformed into wood-pulp and thence to newsprint. At the apex stood the simple but elegant granite office building from which this manufacturing enterprise was directed. Status and wages ascended up this chain from the canal and rail yard where the four-foot pulp logs were manually loaded on to conveyor belts through the wood room, the pulp mill and the papermaking machines, and on to the desks, laboratories and drafting tables of the main office.

The offices of the Great Northern Paper Co. in Millinocket housed not only the mill’s supervisory staff but also the management of all of the company’s manufacturing facilities and functions including purchasing and research and development. The company’s head office in Boston was quite small in comparison, handling corporate finance and legal matters only, as the firm preferred to keep senior managers as close to their operations as possible (McLeod, 1981). This meant there were a broad range of jobs distributed throughout these spaces, requiring many different skills and affording varying degrees of status and income.

The Moscone’s neighbors in “Little Italy” worked almost exclusively at the bottom of the chain, enduring long hours of hard manual labor in return for the lowest wages. These workers, semi-skilled at best, were generally shunned by the highly skilled mechanics who supervised the cooking of the pulp and tended the papermaking machines. Those workers commanded as much as five dollars a day a full decade before Henry Ford’s workers at River Rouge and they worked closely with the engineers in the research and development group, gradually expanding productivity with stronger pulp formulas and faster machines (Smith, 1970; McLeod, 1981). The ethnic division of these work spaces is crystal clear in the Census returns: men with the origins “Maine”,
“Canada-English,” and even “England” or “Scotland” on occasion, have occupations such as “papermaker”, “machinist”, “engineer”, “piper”, "draftsman" or “millwright.” By contrast, Giovanni Moscone’s neighbors are listed as “wood cleaner”, “wood barker”, “shovels ashes” or “unloads cars.” Moscone himself, while hardly a member of the middle class, did enjoy the higher status and wages of a skilled artisan.

**The Life Paths of John P. Burke**

The divisions of ethnicity and skills seen at the pulp and paper complex at Millinocket were also found in the union halls. The International Brotherhood of Papermakers was a crafts union affiliated with Samuel Gompers' AFL. Disdainful of the unskilled and the semi-skilled, they identified themselves as craftsmen and their union as a guild. It was a rival union, the International Brotherhood of Pulp, Sulphite and Paper Mill Workers (IBPSPMW), led by John P. Burke who championed the cause of all of the industrial workers in the pulp and paper mills.

*Figure 4-3 John P. Burke, 1924(CMHRMHS, 2009)*
Burke was raised on a hill country farm in Vermont and began factory work in New Hampshire while he was still a boy. According to 1880 Census records his father Michael was a farmer in the village of North Duxbury on the Winooski River. Both his father and mother, born in the late 1840s in Vermont, were the children of Irish immigrants. Michael Burke’s father Patrick can be found in the 1850 Census residing in the nearby town of Waterbury and, judging from the occupations of his neighbors and three boarders, was working as a laborer. The Central Vermont Railroad reached Waterbury in 1849 so perhaps that is what brought the Burkes to the area. In any event, according to the 1880 census there were several Burke households scattered about the neighboring town of Duxbury and John Burke’s father Michael was farming next door to his grandfather Patrick’s farm (U. S. Census, 1850; U. S. Census 1880).

While more research will be necessary to determine the extent of Burke’s travels through Maine it is clear that he was fully engaged in the affairs of the pulp and paper industry in the state throughout a good deal of the twentieth century. Beginning with his attendance in 1909 of the first national convention of his union, held at Portland, Maine, through his long term as the union president from 1917 to 1965, Burke was connected by frequent travel and correspondence to Maine, as he was to all of the states and Canadian provinces where the IBPSPMW had active locals. His union struck against the IP mills on the Androscoggin in 1910 when he was serving as an organizer for the International (Larson, 1993). And the union came back from the edge of the abyss, after losing a bitter strike against IP mills in New York in the 1920s, when the Great Northern Paper Co. voluntarily recognized the IBPSPMW and hundreds of Maine workers joined its’ ranks (Zeiger, 1984). But beyond his geographical connections to Maine, his roots in rural
New England were similar to thousands of pulp and paper mill hands of this period. His life’s journey helps to shed light on the lives of workers across the northeast whose own paths led out of an agrarian small town past and into the industrial struggles of the twentieth century.

When John Burke was still in his early youth his father decided to pull up stakes and, like many other marginal farmers in Northern New England, moved his family to a factory town. According to the U.S. Census, the Town of Franklin, New Hampshire was home to the Franklin Falls Water Power Co. which had dammed and channeled the considerable water power of the headwaters of the Merrimac River to two industrial customers just downstream: the Winnipesogee Paper Co., which owned a majority share in the power company, and a hosiery mill owned by A. W. Sulloway, the minority shareholder in the development. A biographical sketch states that John Burke worked as a carpenter in a hosiery mill in his youth (Fink, 1984). The 1900 Census identifies him at age 16 living with his parents and seven brothers and sisters in Franklin and working as a hosiery finisher. One thing that set him apart from other teenage factory workers of that day was that he graduated from high school (Fink, 1984).

It is clear from the Census that by 1900 the family had good connections at the paper mill. While John’s father Michael was working as a wood grinder, one of the lower status jobs in the wood room, his older brother seems to have moved up the mill worker’s pecking order as his occupation was enumerated as “machine tender,” a title used by the high status workers who operated the great papermaking Fourdrinier

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20 The Winnipesogee Paper Co. owned a complex of seven mills in Franklin which in 1895, according to Lockwood’s, were producing 78,000 pounds of pulp per day as well as 78,000 pounds of newsprint. In 1900 this complex then owned by the International Paper Co. was producing 110,000 pounds of pulp and, although the data is missing, it seems reasonable to assume a proportional volume of newsprint.
machines. These machines were run by teams of men who needed years to master the complex skills necessary to keep paper production flowing smoothly (Smith, 1970).

It is known that Burke graduated from the public high school in Franklin, New Hampshire. His biographer also notes that he took courses at the Rand School of Social Science (Fink, 1984). Founded in New York City in 1906 by the American Socialist Society, this institution was dedicated to providing an education for workers in subjects such as history and economics while encouraging class-consciousness and political action. It became an important center of radical thought in the early twentieth century and also served as a training center for many labor activists with practical coursework in labor organizing and negotiating strategy (Tamiment Library, 2009). In addition to furthering his education he explored the world far beyond the confines of small town New Hampshire. In 1910 he shipped aboard a cattle boat to pay for his passage to England from where he commenced a tour that included Ireland and Wales (Fink, 1984; Fort Edward Historical Society, 2009).21

The 1910 Census found a twenty-six year old John Burke and several of his siblings living at home, his mother Mary the head of household. His occupation that year was listed as carpenter, but it is probable that he was working in the paper mill by then. Large mills such as the one at Franklin employed a variety of skilled and semi-skilled craftsmen for maintaining the physical plant. He joined the pulp and sulphite local of the International Brotherhood of Paper Makers (IBPM) in 1905.

21 This anonymous source identified only as “Courtesy of the Fort Edward Historical Society” provides biographical information on Yahoo Answers in response to the question “What do you know about John P. Burke, a long-time labor leader in the paper industry?” and cites “documents on file” at the John P. Burke Archives, Fort Edward Historical Society.
Paper industry unionism had its origins in 1884 when skilled machine tenders in Holyoke, Massachusetts formed a benevolent society in order to lobby the state government for laws that would reduce working hours. Though the depression years of 1890s were a difficult time in which to promote a labor union, these same papermakers held on and formed the organizational core of the IBPM which was chartered by the American Federation of Labor (AFL) in 1902. At the time that he joined the IBPM, lower status workers in the industry, organized as the International Brotherhood of Pulp, Sulphite and Paper Mill Workers (IBPSPMW), had been forced into a shotgun marriage with the skilled machine tenders of the IBPM as the price of gaining recognition from the AFL. There was great antagonism between the two branches of the union with the skilled workers refusing to admit the lower status newcomers into the leadership ranks. By 1906 IBPSPMW locals began seceding from the broader union and the two branches engaged in a bitter spat for the next three years that saw rival locals scabbing against each other at strikes around the region. In 1909 a truce was arranged and the occupational specialties within the pulp and paper industry were carefully divided between the two separate unions which then proceeded to work cooperatively together until their merger in the 1960s (Zieger, 1984).

That Burke rose rapidly through union leadership suggests that he had a keen mind and an effective public persona. At age twenty-one, only one year after he had received his union card he was elected an officer in the Franklin local and shortly after that he was appointed to the international staff as a special organizer. In 1909 he attended the first conference of the independent IBPSPMW in Portland, Maine and five years later he was elected a vice-president of the International. In 1917, at the age of
thirty-three he was elected President-Secretary of the IBPSPMW, a position that he held for forty-eight years until his retirement in 1965. After ascending to leadership he moved to Fort Edward, New York a pulp and paper town similar to Franklin on the upper Hudson River where the IBPSPMW had its headquarters. He would live there for the rest of his life (Zieger, 1984).

The labor historian Robert Zieger argues that the isolated geography of the pulp and paper industry caused it to “exhibit a certain old-fashioned individualism” not found in urban industries such as autos, steel or rubber (Zieger, 1984, 22). Nearly 65% of the pulp and paper mills in the mid-1930s were located in towns with populations less than 10,000, while fully one-third were located in places with fewer than 2,500. Furthermore most paper mills did not employ large numbers of people. According to Zieger in the mid-1930s the average paperboard mill, a portion of the industry comprising nearly half of its mills, employed 120 workers, while a 1939 survey of the industry found that 40% of the pulp and paper mills in the United States employed fewer than 100 workers (Zieger, 1984). In the Northeast, these communities had often been settled for a century
or more and by the time union organizers arrived at the turn of the last century they still clung to an ethic of individualism and deference to local authority. Without the dynamism of an urban environment, the insularity and tight social networks of a small paper mill town could sometimes serve as an impediment to effective labor action.

Because of his position within global networks of socialist thought John Burke was able to bridge the divide between the small town and the urban realm of union organizing. According to Robert Zieger, whose research included reading much of Burke’s correspondence:

Burke was a literate man who regularly sent books on labor history and public affairs to his many correspondents in the labor movement and on the management side. He read the New Leader and other social democratic publications as well as the trade union press. . . . He handled much of the union’s enormous correspondence personally, particularly relishing opportunities to discuss broad social issues with certain employers, socialist intellectuals, and old friends in the labor movement. (Zieger, 1984, 53)

Throughout his many years as a union leader the geography of his formative years, his experience of the farms, forests and factory towns of the rural Northeast, influenced both his personal life and by extension his conservative approach to industrial unionism. He embraced the egalitarianism which, whether disingenuous or not, crossed class divides in small town New England. He never owned a car, insisting that he was able to get valuable thinking done while walking around Fort Edward. He and his wife Bessie lived along-side of his fellow mill workers in a modest home and, when he was not on the road in Canada or elsewhere in the United States, he worked above a storefront downtown, administering the affairs of a union that eventually grew during his tenure to represent 175,000 workers. While he considered himself a socialist, and had actually run for Governor of New Hampshire in 1914 on the Socialist Party ticket, he remained a
cautious union leader shaped by this geography and fully aware of the small town politics that were inherent to organizing workers in the pulp and paper industry (Zieger, 1984).

The union had grown from a base of about 1,500 workers in 1910 to 7,000 workers in 1917 when Burke assumed leadership. It had a distinct regional focus having spread from the old papermaking districts on the lower Connecticut River to the newer mills developed near the forested regions from Maine to the Adirondacks. During the war years there was a sharp rise in prices and output throughout the industry and, under war-time labor regulations, both workers and management cooperated and prospered together. By the early 1920s Burke was leading a union workforce of 15,000 that had just begun to move beyond its home base in New York and New England to organize workers on the Canadian Shield and in the Pacific Northwest (Zieger, 1984).

The inflationary environment of war-time was followed by a sharp turn in the business cycle and, in the paper industry, firms and their workers were plunged into a difficult period of adjustment. The paper companies, freed from war-time policies which encouraged cooperation with labor unions, began to embrace the so-called American Plan which favored an open-shop approach to labor management. While some firms such as Scott Paper and Great Northern attempted to co-opt their workers with paternalistic worker welfare policies and company directed labor organizations, International Paper chose simply to cut wages and fight to break the unions (Zieger, 1984). As has been noted previously, the business strategy that International Paper chose to pursue was based on driving newsprint prices up through the sheer force of their market dominance while driving costs down via vertical integration and economies of scale. As far as the
management of this firm was concerned, workers with bargaining power over their wages were a direct threat to these plans (Heinrich, 2001).

By 1921 IP had antagonized its workers to the point where strikes were called against all of its mills in the Northeast by both the IBPW and the IBPSPMW. John Burke found himself in a fight for the life of his union. The strike was especially heated at the firm’s aging mills on the upper Hudson River, including the facilities at Corinth, Palmer and Fort Edward (Zeiger, 1984;CMHRMHS, 2009). At first the unions were able to force a major reduction in IP’s output and revenue, but the company fought back with injunctions, evictions from company housing and the use of replacement workers. Despite what looked like early victories, in the end the corporate power of capital prevailed. In 1922, the crafts unions such as the firemen, pipefitters and electricians crossed the picket lines and for the next four years the paper workers lost a slow demoralizing war of attrition (Zieger, 1984).

The geography of the isolated mill towns complicated Burke’s efforts to resolve the conflict. In 1924 and 1925 he tried to salvage what he could from the looming disaster. Aiming to at least maintain the union’s traditional recognition at the older mills he offered wage cuts and changes in work rules to the company. However, within these small towns the workers, furious at their neighbors for crossing picket lines, grew alienated from the International, accused Burke of selling out and refused to endorse his proposals. He also faced the tendency of the paper workers to not look beyond their isolated outposts and found it increasingly difficult to raise strike funds from locals not directly involved in the conflict (Zieger, 1984).
In 1926 the strikes were over and the IBPSPMW was decimated. The union had spent nearly one quarter of a million dollars on strike support, an enormous sum of money which nearly bankrupted the organization. To make matters worse it had lost nearly two-thirds of its dues paying members during the conflict. The IBPSPMW, which had originally organized twenty IP mills, found itself without a single local representing the workers of the most important pulp and paper firm in the country. Having also lost a series of strikes against the St. Regis Paper Company in the Black River valley during this period the IBPSPMW was down to 6,000 members in a handful of locals and was forced to rebuild itself nearly from scratch (Zieger, 1984).

Beginning with a company-wide union shop agreement with the Great Northern Paper Company in Maine and depending on the loyalty and dues of Canadian union members, the IBPSPMW survived the hard times of the late 1920s and early 1930s. Growing slowly at first from a nadir of 4,000 members in 1933, the Union began to enjoy success organizing workers outside of its tradition base in the Northeast. Organizing efforts gained traction with the National Recovery Act (NRA) in 1935, and by 1941 the Union had 60,000 members (Zieger, 1984).

During the 1930s Burke struggled against his more radical rivals in the Congress of Industrial Organizations (CIO) who were also attempting to organized pulp and paper workers (Zieger, 1984). Like the local activists who opposed him during the IP strike, the CIO organizers were focused on heady short-term gains in contrast to his strategy of cautious growth and the occasional tactical retreat. Ultimately he was vindicated and his conservative brand of small-town socialism proved more effective in organizing a far-flung forest products industry across North America than had earlier efforts by radical
industrial unions. Eventually his union grew to dominate the industry and as he grew older his members continued to return him to office until he retired at the age of eighty-one (Fink, 1984).

The Life Paths of Hugh J. Chisholm

Hugh Chisholm was a driven entrepreneur whose business enterprises in Maine helped to reshape the landscape of the pulp and paper frontier. An early pioneer in the wood-pulp industry, he began by investing in a wood-fiber mill at Fairfield, Maine in 1870 while still in his early twenties. By the turn of the century he was widely regarded as the most powerful man in the pulp and paper business, after organizing and serving as president of the International Paper Company (Chisholm, 1952).

*Figure 4-5 Hugh J. Chisholm, 1904*(Harrison, 1904)
Born in Chippewa, Ontario in 1847 to recent Scots immigrants, he was forced to leave school at the age of thirteen to help support his family following the death of his father. At first he sold newspapers on the railroad between Detroit and Toronto, where he befriended a fellow newsboy also destined for bigger things: Thomas Edison. Not satisfied with working for newsagents, he saved his earnings until he was able to buy directly from the newspapers themselves, thus cutting out the middleman. Before too long he began hiring newsboys of his own and in 1867, still a year shy of his majority, he formed a firm with his brother Charles; they were soon marked as prodigies. Chisholm Brothers rapidly expanded its operations until it controlled the distribution of newspapers on the trains and steamboats connecting Chicago and Detroit to Quebec and the Maritimes, as well as the Grand Trunk line linking Montreal to the all-season port of Portland, Maine. Ultimately they became the sole newsagents on over 5,000 miles of railroad and steamship routes and employed 200 people (NYT, 1912; Chisholm, 1952; PIIHF, 2009).

As a natural extension of their services to the travelling public, Chisholm Brothers entered the business of publishing; they produced travel guides and souvenir books, eventually creating the first picture post cards in North America. Hugh Chisholm was a wealthy man in his early twenties. In 1872, at the age of twenty-five he split the partnership with his brother, retaining the New England portion of the business and moved to Portland, Maine. There he married Henrietta Mason, the daughter of a prominent physician, and received U.S. citizenship. He had already invested in a ground-wood pulp business in Maine in 1870, the Somerset Fibre Company in Fairfield on the
Kennebec River, and he was looking for other ways to invest up the supply chain from the publishing business (Chisholm, 1952; PIIHF, 2009).

Hugh Chisholm was briefly enrolled in business courses in Toronto early in his career, but otherwise had little formal education. What he needed to know he learned from others in the course of doing business. Like any aspiring entrepreneur, it was critical that he create connections with business leaders who could not only help him gain access to capital but also to learn the complex networks of supply and distribution particular to his business. The geography of these connections forms an important element in understanding his life paths. The local and regional network he developed while in Portland, Maine included a number of important capitalists and others with a deep understanding of the paper business, especially the emerging pulp and papermaking technology that was to transform the industry from small rag-based paper mills to much larger wood-based mills situated near the vast timberlands of northern New England. By choosing to move to Portland at that time Hugh Chisholm had put himself in a prime location to take advantage of some of the most promising opportunities of the second industrial revolution.

Portland in 1872 was a thriving seaport with a population of approximately 32,000. An intermediate city, firmly in the orbit of Boston, it was given an important boost in 1853 when the St. Lawrence and Atlantic Railroad connected it to Montreal, making Portland the winter port for one of the most dynamic cities in North America during the late nineteenth century. This was one of the rail lines, later absorbed by the Grand Trunk, upon which Chisholm built his first business. Portland had been linked to the forest economy of the Northeast since colonial times when it was a center for the
export of masts and other naval stores for the Royal Navy. By the mid-nineteenth century it was the business center for a large hinterland stretching from northern New Hampshire to central and northern Maine. This was an economy heavily dependent on the water power and forest resources of the region. The capitalists of Portland had had generations of experience investing in timberlands and manufacturing establishments, as well as in the supply and distribution of a wide array of increasingly complex products fabricated from wood (Judd, 1995; Conforti, 2005).

Chisholm’s earliest business partners indicate that he was connected to some of the most important social networks in Maine and Massachusetts. During the 1880s he invested in a series of five mills on the Androscoggin River in western Maine with the Brown family of Portland and William A. Russell, a Lawrence, Massachusetts papermaker with earlier investments in Maine. Russell became a long term partner with Chisholm in a variety of businesses, eventually joining his own mills into the original combination of International Paper.

Chisholm’s early investments on the Androscoggin included the Umbagog Pulp Co. and the Otis Falls Pulp and Paper Co. around the town of Livermore Falls, within which he created a new village at Otis Falls which he named Chisholm. He added ancillary firms to his portfolio, creating the Livermore Falls Iron Foundry as well as investing in local railroads and power companies. To Chisholm this was just a beginning as he was imagining an even greater mill complex farther up the river at the great falls in the remote farming town of Rumford. As early as 1882, he and C. A. Brown had begun buying land in the area. It was not until 1890 however that their acquisitions were sufficient to begin surveying lots, canals and a new rail line to Canton forty miles distant,
connecting this wilderness site to the wider world. In 1891 the Chisholm-Brown interests formed the Rumford Falls Power Co. to harness the water power and develop the new town of Rumford Falls. They also poured the huge sum of $500,000 into building pulp and paper mills which operated as the Rumford Falls Paper Co. In 1892, following a year of intense construction, their firm began production and the town that sprang from the wilderness was enjoying boom times (Smith, 1972).

Despite the large holdings that Chisholm and his associates had amassed and the rapidly growing demand for newsprint in the 1890s, it was proving difficult for them to make a profit. The fixed costs for this segment of the paper industry were enormous and, because newsprint was a commodity, easily substituted for from any number of newsprint mills, the only way to maintain market share was by competing on price alone. Consequently, throughout the 1890s all of the mills in the U.S. producing newsprint were forced into a frantic competition to reduce their marginal costs in order to lower their prices and still turn a profit, after accounting for the cost of capital. The only way to reduce marginal costs was to run the mills around-the-clock at full production regardless of the consequences (Lamoreaux, 1985; Ohanian, 1993). Because none of the newsprint producers could afford to slow down their mills and reduce output, the price of newsprint fell steadily throughout the decade and mill owners like Hugh Chisholm grew increasingly desperate to form effective cartels in order to halt the slide in prices (Lamoreaux, 1985; Smith, 2002). As a consequence, the geographic nature of Chisholm’s social networks was dramatically altered. He could no longer rely on a tight-knit group of associates in close proximity to Portland, Maine. Increasingly he had to reach out to his competitors and fellow entrepreneurs across the Northeast. This required
frequent travel away from his office and mills in Maine to tense and mistrustful negotiations in places such as Bellows Falls, Vermont and in New York, Glens Falls, Watertown and Saratoga Springs. In addition he had to widen his contacts with the banking world beyond Portland to engage with some of the most powerful financiers in the world.

Early attempts to form cartels of independent mill owners failed due to the usual problems of free riders, and so Chisholm and others decided that a formal merger of competing firms was the only way forward. This would prove to be a daunting challenge. In order to gain control of the newsprint industry they would have to combine over twenty different mills, as well as any other holdings the mill owners had that would contribute to the production of newsprint including rail lines, power companies and timberlands. The accounting difficulties alone were enough to scuttle their early efforts. It was impossible for the various interests to agree on the value of their contributions to the new firm and thus their respective debt and equity stakes. The historian David C. Smith whose research included extensive reading in the trade journal of the day was able to reconstruct a time-line of the secretive negotiations that first leaked to the press in February of 1895. All that was known at the time was that the meetings were to determine whether a merger should be attempted or if it would be sufficient to form a joint selling agency. By the Spring of that year The Paper Trade Journal was able to report that a merger was in the works and that a deal was about to be consummated. Throughout July and August there were weekly reports from Saratoga Springs that focused on who would be in the new combine, how it would be financed and how the

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22 This business weekly The Paper Trade Journal was published by Lockwood’s, the same publishing house which compiled the business directory used in this study.
participants would share in the spoils. The rumors flew so fast and furious that the price of newsprint actually rose in anticipation of the merger. The negotiations broke down however over the valuation of the member mills and by January of 1896 the “giant new combine” was put to rest, at least as far as the public was concerned (Smith, 1972, 248).

Hugh Chisholm and William Russell did not give up however. They had been venturing beyond Portland and the financial precincts of State Street in Boston. By this time they had formed a wide-spread network of interest that stretched from the mill towns of the Black River to Wall Street itself where the great banking houses channeled the capital of foreign empires into the rapidly industrializing hinterlands of North America. Moving confidently in these rarified circles they continued their efforts to form a “Paper Trust.” Chisholm and his home town of Portland, Maine were now connected to tentacles of globalization that emerged in the Gilded Age. In the end they were successful and in January of 1898 the International Paper Co. was formed combining twenty-two mills in Maine, Massachusetts, New Hampshire, Vermont and New York; “a successful marriage of the Fourdrinier and the counting house” (Smith, 1972, 249). William Russell was IPs first President, but when he passed away a mere five months into office, Hugh Chisholm took his place and ruled one of the world’s largest corporations from offices at 30 Broad St. in lower Manhattan (Smith, 1970; Chisholm, 1952; IP, 1901).

Despite the fact that he had scaled the heights of American business in New York, Chisholm never really left Maine. Shortly after he and Russell had created IP, he was involved in another mill development on the Androscoggin at Rumford Falls. Organized as the Oxford Paper Co., this was a very different paper mill from the great newsprint plant that went up on those same falls in 1892. Begun in 1900, the Oxford mill came on
line in 1901 and began producing specialty book paper. In the paper business, book paper refers to all grades of paper which can be printed upon that lie between newsprint, made from the lowest quality pulp, and paperboard, or the thicker multi-ply paper products used to form containers (Witham, 1920). Hugh Chisholm’s new business, which he controlled independently of IP, had the capacity to make some of the highest quality book paper of that time. By installing state-of-the-art Fourdriniers and the most advanced finishing equipment, the engineers, pulp mixers and machine tenders had the flexibility to produce a wide variety of custom engineered specialty products. Their first order was to produce all of the post cards used by the U. S. Post Office (Chisholm, 1952).

The Board of Directors that he chose to direct the enterprise and the managers he hired to run the daily business from Portland and Rumford Falls were drawn from his
local circle of business associates in and near by Portland. The only New Yorker sitting on the board was the president of the wholesale house that would be the sole distributor for the Oxford Paper Co. (Smith, 1972). In 1907, less than ten years after taking the helm at IP, he stepped down from the daily duties as president of IP and two years later he resigned as Chairman of the Board. His focus then returned to Maine and from 1909 until his death in 1912 he was president of the Oxford Paper Co. (Chisholm, 1952).

More research will be necessary to trace his paths in these years as he moved between homes and offices in Manhattan, Portland and Rumford Falls, but it is clear that these paths did not lead in one direction up the urban hierarchy. He was intimate with the towns he had created on the Androscoggin and he administered them in great detail. He maintained a residence in Portland overlooking the fashionable Western Promenade. And, after he had left the offices of International Paper on 30 Broad Street, he kept his Maine enterprises connected to the financial hub of Manhattan with new offices at 200 Fifth Avenue (Lockwood, 1909). We can interpret Chisholm's journey up and down the urban hierarchy during his later years as the paths of a transition figure in American business. The CEOs who followed him would not maintain homes in the mill towns where their firms operated. Nor would they venture back down from the office towers and wealthy suburbs of the great American cities. Their paths would be in one direction only.

The Transformation of Lives and Communities

An examination of the geographical aspects of individual biographies, or the life paths, of three men whose journeys and connections crossed multiple scales in the
globalizing world of the Gilded Age brings the focus of this historical geography to people and places, not as flotsam and jetsam floating in an unrelenting tide of global forces, but as active participants navigating those waters in many different directions. More research will be necessary to weave such individual stories into the fabric of the communities in which the pulp and paper industry was embedded. The examination of the 1910 Census returns of Giovanni Moscone’s Millinocket provides a glimpse at the possible insights such an inquiry might produce. A careful reading of those returns revealed some of the contours of a polyglot community, divided by class, ethnicity, vocation and social status. By combining tabular data on individuals, such as Census returns or town directories, with cartographic data, such as Sanborn Fire Insurance Co. maps and nineteenth century county atlases, further research could flesh out the physical and cultural morphology of these communities.

The research in Chapter Three which identified the Davis Building in Portland as the place where Hugh Chisholm’s social networks of capital and management came together, suggests further research to find the convergence of social networks within the urban structure of a paper mill town. In which Roman Catholic church were the services in French? Which community leaders could be found in the Masonic Lodge or the Union Hall? What role did the spaces of white collar work play in the in-migration of a professional class or the out-migration of younger locals? Such information at fine scales could provide insights into the processes driving the modernization of these rural industrial places.

Much remains to be learned of the ways in which the pulp and paper industry transformed the river towns of Maine from the late nineteenth century to the middle of
the twentieth. This study provides preliminary results as well as a research framework for further work in this area. At the state scale, GIS methods can store and analyze the locational patterns which distributed the workers and capital into particular places while by-passing others, and also to identify networks of social and economic exchange operating across scales in the broader urban system. At the local scale, similar geodatabases could identify networks of individuals crucial to the processes of modernization and thus inform the archival work necessary to draw out their stories, their life paths. The result could be a comprehensive narrative, informed by the impersonal forces of economics and social change operating at coarse scales and by fine scale biogeographies which illuminate the transformative processes of modernization.
Chapter 5

Conclusion

Using the records for individual mills found in Lockwood’s Directory of Paper and Allied Trades it has been possible to illuminate some of the geographical changes that contributed to the emergence of a “Paper Plantation” in Maine. Prior to the “pulp craze” of the 1880s, Maine played a small role in the production of pulp and paper in the United States. By the 1920s it ranked third amongst the states, joining New York and Wisconsin at the top after passing Massachusetts, the top producer in the late nineteenth century (Irland, 2009). The geography of Maine’s industry had changed profoundly as well. In 1880 paper production was to be found, for the most part, along the coast and navigable waterways in the more heavily populated southern regions of the state. However, there was some evidence of trends to come. Scattered about the interior, some pioneering ground-wood pulp mills operated at relatively small scales. And a large integrated pulp and paper complex owned by S. D. Warren Co. of Boston was operating at Cumberland Falls and Yarmouth. But for the most part small mills, owned by Maine firms, were catering to local markets, producing basic book paper and newsprint on small narrow Fourdrinier machines while using rags as their feedstock. By 1930, however, the industry had drastically changed. Two large corporations, Great Northern Paper and International Paper, managed by executives in Boston and New York, controlled nearly 45% of the production capacity statewide concentrated in a handful of massive integrated pulp and paper mills powered by giant hydro-electric developments. These facilities were no longer owned by local elites engaged in their communities but were publically traded corporations, owned by anonymous shareholders concerned only with “return on
investment” and the dividends which that would yield.

An important additional summary is that there was a particular pattern in the distribution of pulp and paper production in the state which was the logical outcome of geographic choices contingent upon pre-existing conditions. A sorting process had taken place though the intervening decades which reflected a number of factors, including the ecological and transportation needs of the various types of pulp and paper, capital available to mill owners, and the business strategies adopted for each mill by the mill owners.

Maine’s pulp and paper industry was a part of the evolution of a broader forest economy which had begun with the extraction, transportation and manufacture of lumber. The location of early pulp and paper mills took advantage of this infrastructure and some saw-mill towns became paper-mill towns. However, the great mills of the 1880s and 1890s required far more energy than the saw-mills of an earlier age and connecting hitherto unexploited water-power sites by railroad was also a part of the geographical changes in production during the study period. In addition, different types of production were better suited to certain locations than others. Newsprint and ground-wood pulp operations for example were best located up-river to reduce transportation costs, while leather-board mills remained near the shoe-making towns they served. As market conditions for various paper products changed so did the geography of production.

Many smaller operators either failed or chose to sell out to their competitors. Only investors with deep pockets could compete as the scale of production and the sophistication of the technology grew over the years. There were local capitalists who had these resources and invested successfully in the industry, but the long-term trend was
towards consolidation and control from intermediate cities such as Portland and beyond, to great financial centers such as Boston and New York.

Third, the choice between a strategy of mass-production or product differentiation not only influenced where a new plant would be located but also determined if a plant would survive over the course of many decades. Minutes of board meeting would be needed to really confirm such a choice, but it is reasonable to deduce such pathways from Lockwood’s data on product types that acts as a proxy measure across the life courses of the many mills across the state.

The distribution of pulp and paper production statewide at a particular moment in time is best understood by tracking the interaction of these factors at regular intervals at the mill level. Examining statewide trends in pulp and paper production mask the process that occurred as individual plants experienced changes in ownership and investment decisions. Thus the mill-level analysis can explain the rapid expansion and subsequent leveling-out of newsprint production in Maine not just in terms of spruce-wood supply and the change in U.S. import tariffs but also according to the Chisholm group’s investments in various ground-wood and newsprint facilities on the upper Androscoggin, the subsequent consolidation of these mills in IP, and the corporate decision to abandon newsprint and begin to concentrate on bag, wrapping and a variety of advanced specialty papers in these mills. Similar details emerge on the Kennebec and the Penobscot, where the Great Northern Paper Co. created massive new production centers, and where IP failed to up-grade the smaller facilities it had acquired in 1898.

Of course, it is the aggregation of production in these plants which makes up state-wide trends, but production at each plant was contingent upon changes wrought at
earlier time-steps. Therefore a detailed explanation of state-wide trends depends on unpacking these changes in ownership and business strategy. For example, Alvin Record’s decision to build a pulp mill at the Falls at Jay Bridge in the town of Jay in the 1860s opened up an opportunity for loggers up-river whose sales had previously gone to the saw-mills still operating at these falls; in this way pulp production emerged in the midst of the geography of a lumber economy (Jay Register, 1905). Other pulp-wood entrepreneurs failed in similar saw-mill locations, but Record succeeded and was able to sell his operation to the Chisholm associates in Portland operating as the Falmouth Paper Co. This firm added new buildings and the latest Fourdrinier machines to the site in the 1890s and a thriving newsprint operation emerged. Similar integrated mills of that scale existed elsewhere, for example in Brunswick and Orono, but their production remained steady or declined over the next three decades, while IP, to whom Chisholm had sold the Jay mills, was willing to invest in greater newsprint capacity and production grew. By the 1920s however, the corporate officers in New York chose to shut the paper machines on this stretch of the Androscoggin and in 1930 only ground-wood production at nearby Riley and Livermore Falls remained.

Similar geographical patterns of increasingly distant locations of management and ownership emerged on other watersheds in Maine. Local papermakers were the pioneers, either operating small scale rag-based paper mills on tidewater or experimenting with ground-wood pulp works amongst the saw-mills of down-river manufacturing towns linked to markets by the limited rail connections of the 1870s and early 1880s. Many of these mills disappeared, but others were acquired by new owners in Portland or Boston, often consolidated with other mills, and rapidly expanded their production in the 1880s
and 1890s. During those decades these legacy mills were joined by a new generation of larger papermaking operations either integrated into existing pulp facilities, such as the case of Jay, or built with their own pulp-making capacity on-site. Many of these new facilities were owned and managed from the intermediate cities of Portland and Bangor, but others were constructed by much larger firms based in Boston or New York. Finally, beginning in 1898 with the arrival of IP, the largest mill complexes began to be consolidated into modern corporations and management shifted from local towns and intermediate cities in-state to distant metropolitan centers where operating decisions became embedded in national and global networks of equity and credit.

Events in Maine were part of a broader expansion of the wood-based pulp and paper industry into a forest frontier across the northeastern United States. Further research will be necessary to confirm that similar geographic changes were taking part across the sub-boreal forests which stretched from New Hampshire, through Vermont and into up-state New York. However there is some evidence that this may be the case. A brief survey of Lockwood’s New Hampshire records reveals a similar pattern to Maine in 1880: thirty-five mostly small mills either producing leather-board at a capacity of less than 2,000 pound a day, or a mix of news, book and writing paper in the 2,000 to 8,000 pound range. In addition there was a large mill complex at Franklin, NH on the upper Merrimac River, accessible by water and rail, and producing 14,000 pounds of groundwood pulp and nearly 20,000 pounds of newsprint.

A limited amount of research indicates that the Franklin complex also followed a trajectory familiar from the study of the industry in Maine. A census report issued in 1875 reveals the local origins of the Franklin mill, built after local capitalists developed a
canal from nearby falls for water-power. It is notable that according to the 1880 Lockwood’s record the treasurer of this enterprise, the Winnipissogee Paper Co., was none other than William A. Russell of Lawrence, Mass., Hugh J. Chisholm’s partner on the Androscoggin. Subsequent Lockwood’s records show that pulp and paper production at Franklin expanded exponentially in the 1880s and 1890s and that the officers included A. N. Burbank, another partner of Russell’s and a founding director of International Paper. The 1900 records indicate that the Franklin complex of mills was a very large newsprint operation owned by IP, while the 1930 Lockwood’s records a much smaller capacity mill, still owned by IP, producing specialty carbonizing and half-tone papers.

Thus, for this New Hampshire facility at least, there is a familiar sequence to that deduced from the Maine data. It moved from locally owned rag-based papermaking in the 1850s, to mass-production of ground-wood pulp and newsprint, directed at first by intermediate capitalists, through a phase of rapid expansion in productive capacity and corporate consolidation, and finally on to retrenchment and adaptation as a specialty mill. Since the International Paper Co. was formed by the merger of twenty-two pulp and paper mills from Maine to New York is seems reasonable to suppose that the same process may have taken place in similar mill-towns, later incorporated into the IP empire, across the entire region, although further research will be required to confirm such a pattern.

A similar pattern of development can also be found on the Black River in New York which drains a large swath of the Adirondacks into Lake Ontario. Here local entrepreneurs turned to the small city of Watertown near the mouth of the river for the finance and expertise to expand their initial efforts. As in Portland and Bangor, Maine,
successful regional consolidations of local mills accompanied a surge in productivity and technological advance in the 1880s and 1890s. By the late 1890s metropolitan capital from New York began to search for opportunities to profit from this new industry and intermediate businessmen in Watertown were also able to participate in the creation of a major national corporation, the St. Regis Paper Co. (Amigo & Neuffer, 1980).

Just as this study points to more research on a mill-level understanding of pulp and paper development elsewhere in the northeast, it also raises questions about fine-scale patterns elsewhere in North America. Were similar developments taking place contemporaneously in the Mid-Atlantic region where the Appalachian forests were also being converted to pulp and paper in large mill complexes in the twentieth century? And as regions such as the southern States were developed well after the late nineteenth century, was the advanced technology and corporate power of the pulp and paper industry such that local actors did not play as important a role as they did in the northeast resulting in a different set of relationships between core and periphery? There is also a geography of corporate control to be investigated that may have played out in other important metropolitan centers such as Philadelphia, Chicago, Toronto and San Francisco in ways that compare or contrast to the concentration of corporate power found in Boston and New York.

In addition to expanding the geographical scope of this inquiry, it would also be interesting to consider conducting research at finer temporal scales. An H-GIS based on the complete Lockwood’s records of mills across New England and up-state New York would provide a biennial and later an annual temporal resolution to changes in pulp and paper technology, production and evolving business structures.
Historical geographer Richard Healey has created such databases for the investigation of the anthracite coal industry in Pennsylvania over a span of decades encompassing the second industrial revolution (Healey, 2007). Because his data is at such a fine temporal resolution he is able to compare changes in ownership, production and transportation at individual mines to a variety of economic trends at national and regional levels, including coal prices and broader economic indicators that track turns in business cycles. In addition he has sorted through voluminous archives of information about business decisions on equally fine scales. By carefully calibrating this information his studies have supported arguments in favor of regional adjustment theory. Unlike neoclassical economic theory, under this framework the development of economic regions is explained by business decisions affecting local nodes of production which exist in actual time and space. Here firms are not expected to participate without agency in regional economic change, driven inexorably by an “invisible hand” towards equilibrium conditions. Rather, they are discovered making decisions in response to actual disequilibrium conditions, driven by historically contingent spatial differences in production at local and regional scales, while responding to the perturbations in demand driven by the exogenous effects of business cycles operating at national and global scales (Healey, 2007; Knowles & Healey, 2006; Healey & Stamp, 2001,;).

The decadal time-steps used in this study cannot be calibrated to such price swings or changes in the business cycle, and changes in business decisions have been inferred from information gathered at much coarser scales. In would certainly be fruitful, however, for future scholarship to investigate the regional development of the pulp and paper industry at time intervals of years, or even months, in order to understand the
responses of individual firms and workers to changes in prices, wages or working conditions and how their adjustments altered the course of subsequent developments in the economic landscape.

In order to form such rich explanations of the regional dynamics of the pulp and paper industry as it migrated across the continent to new forest frontiers, it will be necessary to form extremely large geodatabases. The GIS developed for this investigation covered six time-steps investigating various attributes of production and control in sixty-nine different locations, not all of which were extant across the entire time-series. This resulted in a database on the order of several hundred records, each containing over twenty five attributes. Work by Healey as well as by colleagues investigating such varied economic phenomenon in the nineteenth century as the development of the iron industry (Knowles & Healey, 2006) and the networks of travel between small towns (Fyfe & Holdsworth, 2009) have required the development of much larger and more sophisticated geodatabases.

This raises procedural issues that must be addressed by scholars investigating the regional forest economies of this period and beyond, issues which, it should be pointed out, are shared by many social scientists searching for explanations at the nexus of historical and geographic change. Because of the size of component datasets and the complexity of extracting and meaningfully collating data from historical sources, the creation of such databases will increasingly become the work of teams of investigators operating at different institutions often separated by great distances. Work in what is now called the “digital humanities” raise questions of authorship and accessibility, but for this work the sheer digital availability of some of the Lockwood’s directories was certainly a
dividend that accelerated comprehension of both specific places and broader trends. Furthermore, the need for particular datasets will increasingly overlap as different investigations rely on digital representations of the same spatio-temporal variables, such as historical transportation networks or demographic change framed by the same geographical units (Gregory & Ell, 2008). Multi-investigator research, facilitated by information science librarians *au courant* with the specific data needs, may well be a new platform for such work. Even so, the work presented here shows that one person, accessing a comprehensive business directory, is able to apply GIS to help visualize spatio-temporal changes, and to draw on the traditional eclectic archival sources of a historical geographer to begin to understand regional economic and social change.
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