Cultural Resource Investigation of the Allied Textile Printing Site, Paterson NJ

Volume 1

Factories Below the Falls:
Paterson's Allied Textile Printing Site in Historic Context

DPMC #: P1047-00

September 15, 2010

Prepared for:

Steven Sutkin, Director
Division of Property
Management and Construction
33 West State Street,
P.O. Box 034
Trenton, NJ 08625-0034

Farewell Mills Gatsch architects LLC

HUNTER RESEARCH

FACTORIES BELOW THE FALLS: PATERSON'S ALLIED TEXTILE PRINTING SITE IN HISTORIC CONTEXT

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION DIVISION OF PARKS AND FORESTRY

Prepared for:

Farewell Mills Gatsch Architects, LLC
200 Forrestal Road
Princeton, NJ 08540

Prepared by:

Hunter Research, Inc.
120 West State Street
Trenton, NJ 08608

TranSystems
One Oxford Valley, Suite 818
Langhorne, PA 19047

URS Corporation
437 High Street
Burlington, NJ 08016

SEPTEMBER 2010

Paterson, to most New Yorkers, and for that matter to most Americans, may be an old story. To me it is one of the most interesting pools of life I know. There is nothing in Paterson, most people will tell you, save silk mills and five-and-ten-cent stores. It is true. Yet to me it is a beautiful city in the creative sense—a place in which to stage a great novel. These mills—have you ever seen them? They line the Passaic river and various smooth canals that branch out from it. It was no doubt the well-known waterfall and rapids of this river that originally drew manufacturers to Paterson, supplied the first mills with water, and gave the city its start. Then along came steam and all of the wonders of modern electrically-driven looms …. From the mills themselves, as one drew near, came the crash of the shuttles and the thrum of spindles, where thousands of workers were immured, weaving silk which probably they might never wear.

Theodore Dreiser from *A Hoosier Holiday* (1916:26-27)

The Employment of Machinery forms an item of great importance in the general mass of national industry. It is an artificial force brought in aid of the natural force of man; and to all the purpose of labor, is an increase of hands, an accession of strength, unencumbered by the expense of maintaining the laborer.

Alexander Hamilton from *Report on the Subject of Manufactures* (1791)

ABSTRACT

The following historic context document was prepared by Hunter Research, Inc. with contributions from TransSystems and the URS Corporation. The project team undertook this work as subconsultants to Farewell Mills Gatsch Architects, LLC, prime contractor to the State of New Jersey, Department of the Treasury, Division of Property Management and Construction, and the Department of Environmental Protection, Division of Parks and Forestry, Natural & Historic Resources Group, Historic Preservation Office. Funding was provided by the National Park Service through the Urban History Initiative.

The document is one component of a broader cultural resource investigation of the ATP site that seeks to lay the groundwork for the site's future preservation and interpretation. Related work components, for which this context provides a basis, involve an assessment of existing conditions, archaeological field investigations and the development of preservation treatment recommendations. All elements of this cultural resource study are intended to meet the stipulations of an amended Programmatic Agreement concluded in June 2002 between the National Park Service, the New Jersey Historic Preservation Office, the City of Paterson, the New Jersey Historic Trust and the Advisory Council on Historic Preservation concerning the preservation status and future of the former Allied Textile Printing Site, Great Falls/Society of Useful Manufacturers National Historic Landmark District, Paterson, New Jersey.

This document contains detailed historical data concerning the land use development of the Allied Textile Printing (ATP) site and more broadly places the site within an appropriate historic setting. It addresses the historical significance of the site as a whole and offers a framework within which the relative historical importance and integrity of surviving structural and archaeological remains can be evaluated.

The ATP site lies within the core of several overlapping designated historic entities focused on the rich industrial history of the City of Paterson, Passaic County, New Jersey: notably, the Great Falls of Paterson/Society for Useful Manufactures Historic District, as listed in the National Register of Historic Places (April 17, 1970) and the New Jersey Register of Historic Places (May 27, 1971); the Great Falls/Society of Useful Manufacturers [sic] National Historic Landmark District (established in 1976); the Great Falls State Park (established in 2004); and the recently created Paterson Great Falls National Park (designated in 2009). The Great Falls Raceway and Power System, portions of which traverse the ATP site, were also designated as a National Historic Mechanical and Civil Engineering Landmark in May of 1977.

The ATP site's historical significance is largely consonant with that of the historic district within which it lies, although it is recommended that the site's period of significance cover the period from 1793 to 1945 (the district's period of significance is considered to be from 1792 to 1924). Particular areas of significance for which the site is notable are: its function within the Society for Establishing Useful Manufactures (S.U.M.) waterpower system; its participation in the concentrated burst of cotton manufacture in Paterson, *circa* 1807-15, and in the manufacture of duck (sail cloth) in the 1820s and 1830s; its role as Paterson's first locus for the

ABSTRACT (CONTINUED)

spinning and weaving of silk; on-site manufacturers' use of the custom and batch production system within both the textile machine tool business and the silk manufacturing industry; and its 20th-century conversion into a modern integrated silk dyeing and finishing plant.

The site has many important associations with prominent figures in American history, notably several members of the Colt family (S.U.M. development and cotton and firearms manufacture), John Ryle (early silk manufacture and the city's water supply system) and James Mayer (textile dyeing). The site has less direct, but still powerful and identifiable links with national figures such as Pierre Charles L'Enfant and Alexander Hamilton. Within the site limits are several key properties, the most important of which are the Gun Mill, the Duck Mill, the Todd Mill and Home Mill, the older sections of the dye works located along the riverbank and a late 18th-century sawmill site. Spread throughout the site are the various arteries of the S.U.M. waterpower system expressed in the form of raceways, gates and wheel pits.

Eight principal historical themes have been identified at the ATP site, as follows:

1. Late 18th-Century Improvement of the ATP Site
2. Development of the S.U.M. Waterpower System and Later Power Sources
3. Management of Water Resources and the Commoditization of Water
4. Colt Family Entrepreneurialism
5. The ATP Site Manufacturers as Custom and Batch Production Specialists
6. Cotton and Wool Manufacture
7. Silk Manufacture
8. Textile Dyeing and Finishing

A framework of seven analytical units has been devised to guide and focus the other upcoming work components of the broader cultural resource investigation of the ATP site, as follows:

1. Early S.U.M. Site Elements
2. S.U.M. Waterpower System
3. Mount Morris Quarry
4. Gun Mill Lot

ABSTRACT (CONTINUED)

5. Waverly and Mallory Mill Lot
6. Passaic Mill Lot
7. Todd Mill Lot

A range of property types has been identified as applicable to the ATP site, most of them industrial in nature and related to the manufacture of cotton, silk and machinery, and to the power systems that were in use. These are broadly considered in terms of their potential historic integrity with regard to design, materials and association. In order to judge the significance and integrity of individual properties within the ATP site six primary questions are posited as the basis for future analysis.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF PLATES

LIST OF PLATES (CONTINUED)

LIST OF PLATES (CONTINUED)

LIST OF PLATES (CONTINUED)

LIST OF TABLES

ACKNOWLEDGEMENTS

The ATP site project team has engaged with a remarkable number of individuals in the course of executing this work over the past six months. To them all, collectively, we offer our thanks for their patience, support and knowledge.

Within the administrative sphere we acknowledge the assistance and expertise of Pasquale V. Papero, Project Manager (State of New Jersey, Department of the Treasury, Division of Property Management and Construction), Ed Mulvan, Project Manager (State of New Jersey, Department of Environmental Protection [NJDEP], Division of Parks and Forestry [DPF]), Daniel Saunders, Acting Administrator/Deputy State Historic Preservation Officer, and Kate Marcopul, Acting Supervising Historic Preservation Specialist (NJDEP/DPF, Historic Preservation Office).

Within the Northeast Regional Office of the National Park Service in Philadelphia, we have received vital support and unerring good advice from William Bolger, National Historic Landmarks Coordinator for the Paterson Great Falls National Park, Alisa McCann, Architectural Historian, and Jed Levin, Archaeologist.

As prime contractor for this work, Farewell Mills Gatsch Architects, LLC have overseen and administered this complex historical study with great skill and tolerance. We thank in particular at this firm Michael J. Mills, FAIA, Principal, Anne E. Weber, FAIA, Meredith A. Bzdak, Ph.D., and Anelle DiSisto, AIA, LEED AP.

Countless valuable sources of historical data have been accessed by the project team as the work has progressed. Foremost among these sources has been the City of Paterson Historic Preservation Commission and its intrepid Executive Director, Gianfranco Archimede, MS, RPA, who along with his assistant Joshua Castano, has made available all manner of maps, photographs and documents without which this study could not have been completed. The vast knowledge of Francis J. Blesso, Project Manager, Paterson Municipal Utilities Authority, is also gratefully acknowledged. We greatly appreciate the incisive comments and helpful suggestions received from Glenn Corbett and Leonard Zax concerning the draft report. Also in the Paterson vicinity we have appreciated the considerable assistance of the staffs of the Paterson City Museum, the Map Room in the Passaic County Clerk's Office, the Passaic County Historical Society at Lambert Castle and the American Labor Museum/Botto House National Landmark in Haledon.

Other critical repositories that have been visited within New Jersey where archivists and librarians have been of unavailing help include the New Jersey State Archives, the New Jersey State Library, the New Jersey Historical Society and the Special Collections Department of the Alexander Library at Rutgers University. Further afield we have been assisted by the staffs of the Hagley Museum and Library in Wilmington, Delaware, the Historical Society of Pennsylvania in Philadelphia, the New-York Historical Society in Manhattan, the Connecticut

ACKNOWLEDGEMENTS (CONTINUED)

Historical Society in Hartford, the University Archives in the University Library, University of Rhode Island in Providence, the Baker Library in the Bloomberg Center at the Harvard Business School in Boston, and the Library of Congress in Washington, D.C.

Last but not least, we wish to acknowledge two key individuals with personal connections to the ATP site. Michael Anthony, a former ATP employee in the Makeup Department generously shared his photographs and vivid memories of the workplace. Considerably more important was the extraordinarily valuable input of Arthur Rosen, retired owner and executive of Allied Textile Printers Corporation and erstwhile landlord of the ATP site. Mr. Rosen kindly consented to an extended taped interview in his home in Hinsdale, Massachusetts. Without his wealth of knowledge about the recent history of the site, it is unlikely we would ever have reached the level of understanding that we eventually gained of the later 20th-century transformation of the ATP site into a modern integrated dyeing and finishing plant.

The creation of this document has been a collaborative effort involving the participation of several historians and other support staff. Damon Tvaryanas, Principal Historian/Architectural Historian at Hunter Research, Inc., has led the historical research and analysis, and he has contributed much of the writing (all of Chapters 2 and 3 and substantial portions of Chapters 1 and 7). Cheryl Hendry, Historian, Hunter Research, has conducted research and analysis under the direction of Damon Tvaryanas, wrote Chapter 6 and compiled the data tabulated in Appendix E. Patrick Harshbarger, Historian, TranSystems, researched and wrote Chapter 5 and portions of Chapter 7, and, as Principal Historian/Architectural Historian, Hunter Research, assisted in revising the draft document into its final form. Ingrid Wuebber, Historian, URS Corporation, researched and wrote Chapter 4. Editorial work and other miscellaneous writing was carried out by Richard Hunter, Principal, Hunter Research. Katie Rettinger, Cartographer, Hunter Research, produced the series of historic reconstruction maps that serve as a cartographic backbone for the report. Other graphics reproduction tasks were performed by Marjan Osman and Melody Lee-Imhof, Graphic Specialists, Hunter Research. The daunting task of compiling and producing this document, both in draft and final form, was carried out by Marjan Osman and Melody-Lee-Imhof under the expert supervision of James Lee, Principal Investigator/Report Manager.

Chapter 1

INTRODUCTION

A. PROJECT BACKGROUND

This document presents a historical overview of the various industrial enterprises that have operated on the Allied Textile Printing (ATP) site from the late 18th century through to the present day. This property, currently containing industrial ruins and an array of partially understood industrial archaeological resources, lies within the core of several overlapping designated historic entities focused on the rich industrial history of the City of Paterson, Passaic County, New Jersey: notably, the Great Falls of Paterson/Society for Useful Manufactures Historic District, as listed in the National Register of Historic Places (April 17, 1970) and the New Jersey Register of Historic Places (May 27, 1971); the Great Falls/Society of Useful Manufacturers [sic] National Historic Landmark District (established in 1976); the Great Falls State Park (established in 2004); and the recently created Paterson Great Falls National Historical Park (designated in 2009). The purpose of this document is to provide historic contextual information as part of a larger cultural resource investigation of the ATP site that seeks to lay the groundwork for the site's future preservation and interpretation. Other elements of the cultural resource investigations as reported in separate volumes involve an assessment of existing conditions, archaeological field investigations and the development of preservation treatment recommendations.

Situated on the south bank of the Passaic River, just below the Great Falls, the ATP site occupies seven-and-a-half critical acres of the City of Paterson's industrial heritage (Figures 1.1 and 1.2; Plate 1.1). The potential economic and educational value of the physical remains of this heritage, not only to the local community but also to the nation, began to be realized in the mid-1960s as a growing appreciation of historic preservation and a rising environmental awareness swept the country, resulting in the passage into law of the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969. The impetus for historic preservation in urban settings was frequently generated at the local level and emerged in response to specific development initiatives. In Paterson's case, well-intentioned plans of state and city officials to improve automobile access into the downtown Paterson and thereby stimulate much-needed urban renewal aroused the concern of local citizens who feared the impact of such a scheme on the city's unique historic industrial fabric.

More specifically, by 1968, Interstate 80 was under construction through Paterson, and proposed N.J. Route 20, a peripheral highway that would encircle the central business district, was in an advanced stage of planning, with the state already beginning to acquire right-of-way. Patersonians, galvanized by Mary Ellen Kramer, wife of then Mayor Lawrence "Pat" Kramer, realized the dramatic effect on the city that these major highway projects would have. Mrs. Kramer became the driving force behind a newly formed citizens group, the Great Falls Committee, and with support from other key figures, notably Francis J. (Frank) Blesso of the Paterson Redevelopment Agency and architect/planner John Young of Urban Deadline, pressure gradually built for a more responsible, less radical approach to urban renewal in the downtown that would be more sensitive both to the city's history and to the extraordinary natural asset at its core, the Great Falls. As a direct result of this local movement, the Great Falls of Paterson/Society for Useful Manufactures Historic District was entered into the National Register of Historic Places on April

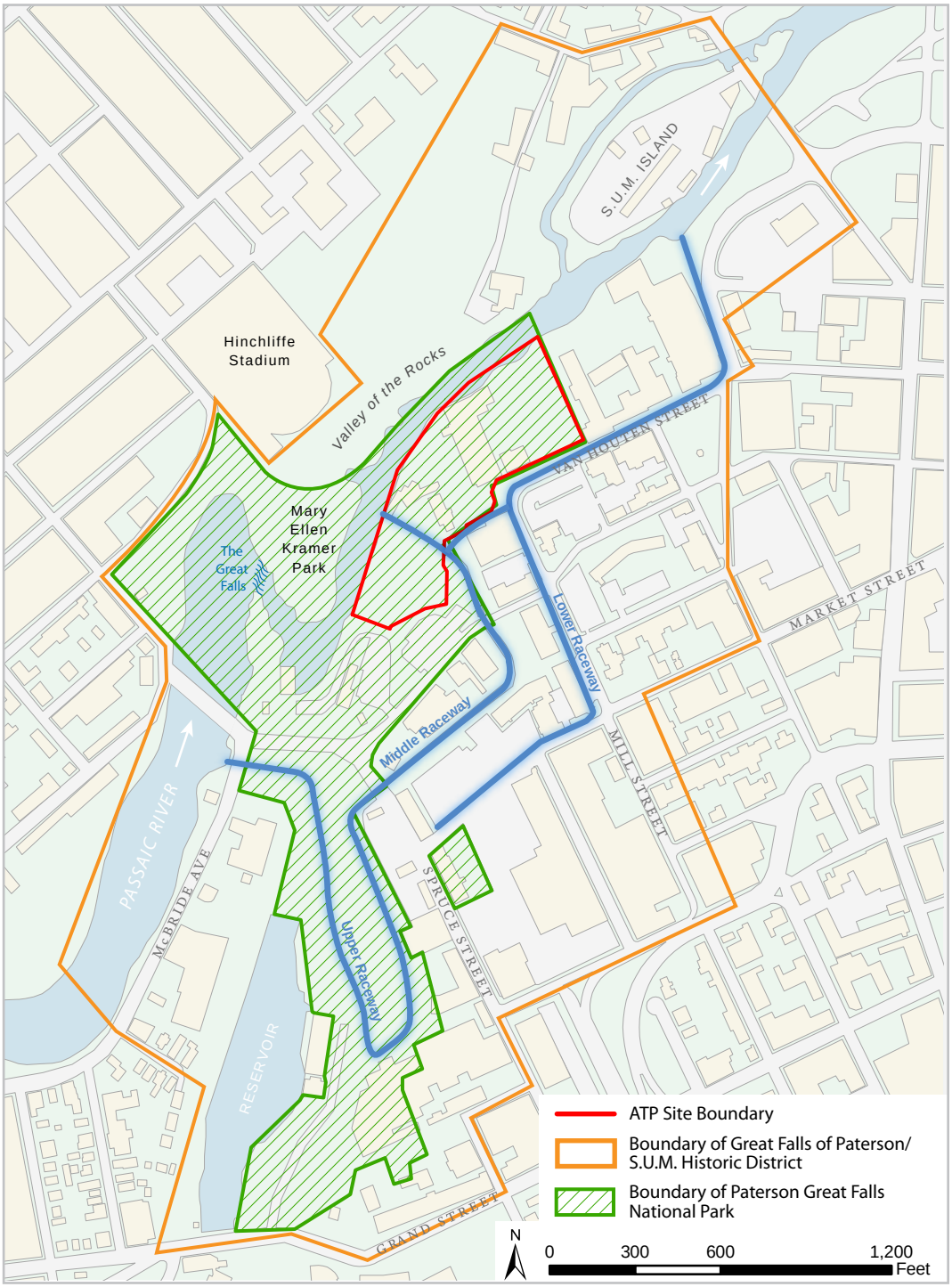


Figure 1.1. Map showing the location of the Allied Textile Printing Site within the City of Paterson. Limits of Allied Textile Printing Site are outlined.

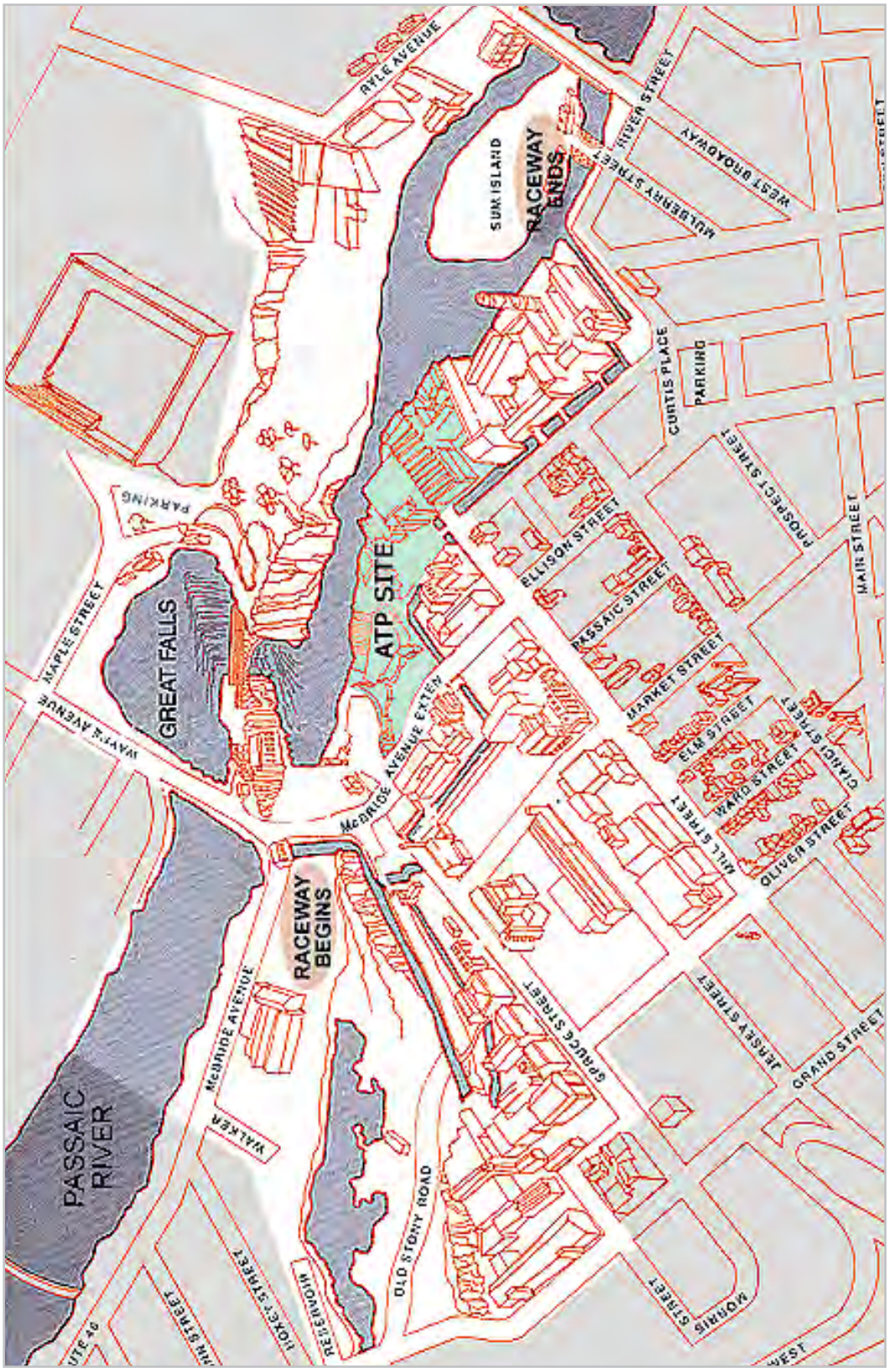


Figure 1.2. Map showing the Allied Textile Printing Site and the Boundaries of the Great Falls/S.U.M. National Historic Landmark District. No Scale. Source: Paterson Friends of the Great Falls.

Plate 1.1. Aerial photograph of the ATP site, 2007. Project boundaries delineated. Source: New Jersey Department of Environmental Protection.

17, 1970 and the New Jersey Register of Historic Places on May 27, 1971. As a result the New Jersey Department of Transportation's plans for Route 20 came under increased scrutiny as the project was now required to comply with Section 106 of the National Historic Preservation Act, Section 4(f) of the U.S. Department of Transportation Act, and the National Environmental Policy Act. Over the following two decades Route 20 was shelved and replaced with the considerably scaled-down highway connector, N.J. Route 19, which was finally opened in 1992 (Blesso 1993:2-4, 9).

In 1971, the Great Falls Committee was incorporated as the Great Falls Development Corporation, a non-profit public membership organization that sought to guide the redevelopment of Paterson's historic downtown and concurrently preserve and restore the raceway system and many of the mills. Under Mary Ellen Kramer's leadership, the committee and its successor corporation played a critical role in the creation of the Passaic County Community College campus in the downtown, the creation of the Great Falls Park (now Mary Ellen Kramer Park), the establishment of the Great Falls Festival and the restoration and reactivation of the hydroelectric plant at the foot of the Great Falls. More relevant to the current historic context study, beginning in the early 1970s, the same citizens' movement sought the involvement of the National Park Service and the Smithsonian Institution in its efforts at heightening awareness of Paterson's industrial heritage. Over the following quarter century, there were numerous field visits, tours, events, publications, videos and even a full-length film, all with a strong historical theme; the Historic American Engineering Record researched and documented numerous mill buildings and the waterpower system; revealing historical research and archaeological studies, required by law as part of the Section 106 compliance, took place; several historic mill buildings were restored and adaptively re-used as apartments and offices, and in the case of the former Cooke Mill, as a family care center and affordable housing; and the Paterson Museum experienced a resurgence following its relocation to the newly restored Thomas Rogers locomotive erecting shop (Blesso 1993:4-10).

Along the way, other important historic designations were garnered. On June 6, 1976, while standing upon a dais with the Great Falls as his backdrop and with 60,000 residents in attendance, President Gerald R. Ford looked downstream over the roof tops of the mill buildings that crammed the ATP site (Plates 1.2 and 1.3) and designated the Great Falls/Society of Useful Manufacturers National Historic Landmark District as "a monument to the genius and to the efforts of the workers, the engineers, the businessmen who turned [Alexander] Hamilton's vision of an industrial, powerful nation into a reality" (Ford 1976). Less than a year later, on May 20, 1977, the Great Falls Raceway and Power System, substantial portions of which traverse the ATP site, were designated a National Civil and Mechanical Engineering Landmark. The date of the dedication ceremony coincided with the 50th anniversary of Charles Lindbergh's crossing of the Atlantic Ocean in an airplane powered by a Wright Aeronautics engine made in Paterson (Blesso 1993:6-7). In the mid-1970s, at the time of these two important designations, the ATP site contained a large swath of the new landmark district's most significant urban historic fabric. Its factories were the stages upon which Paterson's history was woven and cast, and the looming brick edifices that stood between Van Houten Street and the Passaic River were among the city's most venerable. These mills bore witness both to moments of great achievement and to lives of daily struggle.

However, as the historical profile of Paterson's industrial heritage was being raised, its manufacturing functionality regressed. On February 5, 1982 the Allied Textile Printers operations were shut down. Then, on June 24, 1983, disaster struck: a ten-alarm fire reduced the majority of the buildings on the ATP site to smoldering ruins. In the following years, a series of smaller fires and the elements further laid waste to most of what had survived the earlier conflagration (Society for Industrial Archaeology 1983:1). As the

Plate 1.2. Aerial photograph of the Allied Textile Printing site, 1973. Source: Historic American Building Record NJ-17-7.

Plate 1.3. President Gerald R. Ford speaking at the dedication ceremony for the Great Falls National Historic Landmark. Source: *New York Times*, June 7, 1976:1.

bricks were still cooling from the first fire, Paterson's Mayor Frances X. Graves, Jr. declared that the loss of the buildings was "a setback for the City but we are determined to rebuild" (Society for Industrial Archaeology 1983:1). For a mayor of Paterson, history dictated that there was no other conceivable choice, for in February of 1902, the downtown had been devastated by another fire which consumed the city's civic and commercial core. Eighteen days later, a storm-swollen Passaic River had risen above its banks and coursed through the city streets inundating homes and businesses, factories and stores. Then, in July of 1903, while the city was very much still in the early phases of rebuilding, two more storms had converged over the Great Notch in the First Watchung Mountain spawning a tornado which swept down into the city, wrenching homes and mill buildings from their foundations (Graf 1969). On October 3 of the same year, another flood had swept once again through Paterson's streets destroying more buildings and homes. In a building campaign unlike any witnessed by the city before or since, a resurrected Paterson then rose from the mud and ashes … taller, stronger and grander. The city's response to this multiple adversarial punch of 1902-03 became part of its civic identity, its lore and its mythology. In this tradition, Mayor Graves intended to see the ATP site rebuilt and rebuilt quickly … not just preserved as a park or as open space, but as an important asset contributing to the broader renaissance of an economically challenged city.

Ironically, in the months leading up to the devastating fire of June 24, 1983 public and private interests had been seeking a corporate or institutional entity that might take on the task of preserving, restoring and adaptively reusing the complex of buildings on the ATP site. To this end, in December 1982, the ATP property had been donated to the Washington, D.C.-based National Preservation Institute by the realty firms that then owned the site. Shortly after the fire, the National Preservation Institute transferred the property to the Paterson Renaissance Organization, a group of private investors that aimed to restore and redevelop the site in a historically sensitive manner. Unfortunately, this group was unable to follow through on its plans and defaulted on its property tax obligations. On June 9, 1992 the City of Paterson authorized foreclosure proceedings and in June of 1993 reclaimed the property (Blesso 2010: personal communication).

In the meantime, in 1988, the Great Falls/Society of Useful Manufacturers National Historic Landmark District was listed by the National Park Service as a "Priority 1 Threatened NHL." This designation came largely in response to the loss of historic fabric represented by the ongoing deterioration at the ATP site. Federal New Jersey Urban History Initiative funds totaling $4,147,000 were appropriated for Paterson in 1992 in order to help address the problems and opportunities at the ATP site and other locations throughout the city. On September 14, 1993 the Municipal Council authorized a cooperative agreement between the National Park Service and the City of Paterson to access these funds. Among other activities, these monies contributed to the funding for the "stabilization" of the Colt Gun Mill ruins and paid for the preparation of Susan Maxman Architects' Historic Industrial Site Analysis, ATP Site, Paterson, New Jersey, completed in 1996, which provided a valuable historical overview of the project site, an inventory and historical evaluation of surviving building fabric and basic recommendations concerning the site's potential redevelopment (Doddridge 2001; Blesso 2010: personal communication).

Beginning in 1993 the City's Department of Community Development provided site information to several prospective developers and on June 13, 1995 selected the Regan Development Corporation to construct an expansive town home development on the ATP property. Development plans were subject to compliance with the site analysis document prepared by Susan Maxman Architects (Doddridge 2001; Frank Blesso 2010: personal communication). The National Park Service, the New Jersey Historic Preservation

Office and a vocal component of Paterson's citizenry remained concerned, however, about the project's potential impact on the integrity of the Great Falls/ Society of Useful Manufacturers National Historic Landmark District. On April 17, 1997, in accordance with the New Jersey Register of Historic Places Act, the New Jersey Historic Sites Council conditionally approved the City of Paterson's application to sell the ATP site to the Regan Development Corporation. Later that year, in compliance with these conditions and other applicable federal and state regulatory obligations, the city's designated site developer contracted with Historic Conservation and Interpretation, Inc. for completion of various cultural resource survey activities at the ATP site (Historic Conservation and Interpretation, Inc. 1997a, 1997b, 1997c).

On March 24, 1998 the Municipal Council authorized execution of a disposition agreement between the City of Paterson and the Regan Development Corporation outlining the responsibilities of both parties for the development of the ATP site. Planning for the development of the site progressed slowly over the following two years, the momentum for development being slowed by the Advisory Council on Historic Preservation's December 21, 1998 notification to the City of Paterson that the proposed undertaking at the ATP site would adversely affect the Great Falls/Society of Useful Manufacturers National Historic Landmark District. This determination set in motion the federal process of creating a Programmatic Agreement to resolve the looming conflict between the City of Paterson-sponsored private redevelopment project and the federally funded historic preservation planning initiative. It also temporarily froze the expenditure of the Urban History Initiative funds until the Programmatic Agreement was formally in place.

Meanwhile, on February 16, 2000, at the local level, the City of Paterson Planning Board granted conditional site plan approval to the Regan Development Corporation's Phase 1 development scheme, a decision that led to the filing of a lawsuit by concerned citizens' groups (Paterson Friends of the Great Falls n.d.). The Regan Development Corporation's town home project relied significantly on state housing funds. By 2000, due to the extended delays caused in part by the project's substantial cultural resource issues, the New Jersey Urban Home Ownership Recovery Program reversed its decision to fund the development project. In 2001, the Planning Board's approval of the town home project was overturned by the Superior Court of New Jersey and the Paterson City Council voted to de-designate the Regan Development Corporation as the City of Paterson's site developer (Paterson Friends of the Great Falls n.d.).

With the abandonment of the town home project, the way was again clear to proceed with the disbursement of the remaining Urban History Initiative funding that had been allocated for long-term planning for the ATP site. A "Programmatic Agreement Among the National Park Service, the New Jersey Historic Preservation Office, the City of Paterson, the New Jersey Historic Trust and the Advisory Council on Historic Preservation regarding the activities on the Former Allied Textile Printing Site, Great Falls/ Society of Useful Manufacturers National Historic Landmark District, Paterson, New Jersey," signed June 10, 2002, laid out the path to be followed and defined the responsibilities of the various agencies and entities involved with the planning for the future stabilization and development of the site (Appendix A).

The planning process was next complicated by two new designations, those of the Great Falls State Park (2004) and the Paterson Great Falls National Historical Park (2009). In October of 2004, Governor James McGreevey and New Jersey Department of Environmental Protection Commissioner Bradley M. Campbell announced that the Great Falls of the Passaic River would be the focal point of one of three new urban state parks. In response to this state-sponsored initiative, the existing Programmatic Agreement was amended on March 24, 2005 to transfer certain responsibilities from the City of Paterson to the State of New Jersey concerning the fulfillment

of its stipulations (Appendix B). Among the responsibilities assumed by the State of New Jersey was the completion of a cultural resource study of which the historic context document presented here forms a part. Although the cultural resource study is being administered by the State of New Jersey as per the stipulations of the amended Programmatic Agreement, it is funded in large part by the Urban History Initiative monies. Also in 2005, the State of New Jersey initiated a design competition for the newly designated Great Falls State Park. As a result of the state park competition, the Great Falls State Park Master Plan was developed by Field Operations (2008). The proposed boundaries of the new park were to include, at a minimum, the westernmost portions of the ATP site.

On March 30, 2009 President Barack Obama signed legislation designating 35 acres surrounding the Great Falls of the Passaic River as a new national park. As designated, the boundaries of the new National Historical Park overlap with those of the proposed state park. As a result, discussions are ongoing concerning the jurisdiction and responsibilities of the National Park Service and the State of New Jersey with regard to the newly established parklands.

B. SCOPE OF WORK

The "historic context development" task for the ATP site cultural resource investigation has entailed extensive background research, interviews, historic map analysis and client coordination in support of the preparation of this document. The scope of work for the entire cultural resource investigation is included as Appendix C. The detail concerning specific work tasks, research questions and deliverables relating to the historic context development can be found on pages 5 through 11 of the scope of work.

This historic context document seeks to provide detailed historical data concerning the development of the ATP site and more broadly places its story within an appropriate historic setting. It addresses the historical significance of the site as a whole and offers a framework within which the historical significance of surviving structural and archaeological remains can be evaluated.

More specifically, "[t]he historic context will cover the theme of industrial development during the operation of the Society for the Establishment of Useful Manufacturers (1791-1946). The historic context will be based on data gathering and documentary research directed toward understanding the eighteenth century embryonic industrial planning and development of Paterson at the ATP site, development and evolution of the site milling industry (including, e.g. information on the rise and decline of industries on the site in the context of larger historical economic trends and patterns, innovations in technology and engineering, mill building use of space and power source(s) over time, and the lives of the mill workers and managers, and evolution of the cultural landscape over time as the mills were consolidated" (Appendix C, page 5).

Carrying out a comprehensive cultural resource study of the ATP site was one of the primary recommendations of Susan Maxman Architects' Historic Industrial Site Analysis, ATP Site, Paterson, New Jersey (1996). The Maxman report, in and of itself, represented a considerable step in this direction. The present study builds on this earlier work, inventories and evaluates the cultural resource assets of the ATP site, and lays the groundwork for making informed decisions concerning the preservation of its unique historic character and most significant resources. The Great Falls State Park Master Plan has proposed that the entire ATP site should be incorporated into the new state park and has made specific recommendations concerning the use and interpretation of the site, although presently the majority of the ATP site, currently owned by the City of Paterson, lies outside of the bounds of the park's Phase I boundaries. By reexamining the recommendations of the Maxman report in the wake of the events of the intervening years, the series of

studies will help determine both the most appropriate uses for the site and the best means of interpreting its rich industrial and social heritage to the public.

The landscape of the 7.5-acre ATP site is both extraordinarily complex and heavily obscured. The natural topographic, geologic and hydrologic canvas that first attracted Alexander Hamilton and the Directors of the Society for Useful Manufactures to the Great Falls of the Passaic River has been cut down, built up and extensively reshaped in myriad ways over the course of two centuries of intense human utilization. The vestigial evidence of this activity extends below the ground surface, where buried foundations and subterranean hydropower channels cut deeply into the earth, and projects high into the air in the form of broken walls and crumbling smoke stacks. The heavily vegetated and ruinous site is difficult to "read" on the ground and even harder to interpret for the benefit of others. The development of a historic context document (as part of the larger cultural resource study) represents the first step in coming to grips with the complexity of this landscape.

C. PRINCIPAL INFORMATION SOURCES

Susan Maxman Architects' Historic Industrial Site Analysis, ATP Site, Paterson, New Jersey (1996), referred to frequently in this document as "the Maxman report," provides a basic starting point with regard to the history of the ATP site. Levi R. Trumbull's A History of Industrial Paterson (1882), Charles A. Shriner's Paterson, New Jersey. Its Advantages for Manufacturing and Residence: Its Industries, Prominent Men, Banks, Schools, Churches, etc. (1890), William Nelson's article "The Founding of Paterson as the Intended Manufacturing Metropolis of the United States" (1887), Nelson and Shriner's History of Paterson and its Environs (Silk City): Historical, Genealogical, Biographical (1920), William Nelson's manuscript history of the City of Paterson (1881-1882) and the Historic American Engineering Record's surveys of the Great Falls/S.U.M. District (1973a), Essex Mill (1973b) Gun Mill (1973c), Waverly Mill (1973d), Todd and Rafferty Machine Company (1974a) and the S.U.M. Power Canal System (1974b) are the major secondary sources that have been consulted concerning the development of the individual mill seats that together comprise the ATP site.

A serialized article entitled "The Manufactures of Paterson, N.J." that appeared in Scientific American in 1859 contains detailed information concerning the development of the Society for Useful Manufactures and the history and activities of several firms operating on the ATP site. The R.G. Dun and Company records at Harvard University's Baker Library also provide considerable information concerning many of the firms operating on the site during the third and fourth quarters of the 19th century. Albert Henry Heusser's The History of the Silk Dyeing Industry in the United States of 1927 includes voluminous information concerning the development of the silk industry in general but, perhaps more valuable for the present undertaking, this work also describes specific events in Paterson and activities on the ATP site itself.

Cartographic materials were consulted at the Paterson City Museum, the Passaic County Historical Society, the New Jersey State Library, the New Jersey Historical Society and the Passaic County Clerk's Office. The Passaic County Clerk's collection of Works Progress Administration tracings of early maps of Paterson was critical to the successful completion of this document. In many cases, original copies of the maps from which these reproductions were made are no longer extant.

The Society for Useful Manufactures (S.U.M.) was the motivating force behind much of the early development of Paterson. Its history has been summarized by most of Paterson's published historians and many works on the economy of the fledgling United States. Robert Herz's Master's Thesis entitled, "The SUM: a History of a Corporation" (1939) provides a more in-depth treatment of this organization. Although small concentrations of S.U.M.-related materials can be

found in the catalogs of many archival institutions, by far the largest collections of primary source materials are held by the Paterson City Museum and the Passaic County Historical Society.

The Passaic County Historical Society's "Gledhill Papers" contains the most comprehensive surviving body of early S.U.M. communications, minute books and other records. These materials were extensively indexed and abstracted by Passaic County Historian Edward A. Smyk in a project completed in 1996. This represents the best entry point for any study of S.U.M. primary source materials and especially for understanding the initial formation of the Society and the early development of its Paterson holdings.

The materials under the stewardship of the Paterson City Museum consist principally of early letter books, communication files and title records. These documents illustrate the S.U.M.'s involvement in the sale and lease of mill properties and its role in the delivery of power, first in the form of water from the raceways, and then later in the form of steam and electricity. From its inception in the late 18th century, the S.U.M. was keenly interested in understanding the energy needs of the manufacturers, but perhaps never more so than from the 1890s to 1910s when the Society worked to end the mills' use of water from the raceways and switch them over to its central steam and electric power plants. The S.U.M. records at the Paterson City Museum also include detailed surveys of machinery and measurements of power usage.

For most of the 19th century, members of the Colt family were active in the management of the Society for Useful Manufactures and in the development of the ATP site. The most famous family member was Samuel Colt, the man responsible for the founding of the Colt firearms manufacturing empire. His association with Paterson is documented in several published and unpublished secondary sources, principally Charles T. Haven and Frank A. Belden's A History of the Colt Revolver (1940), William Kellner's "On Samuel Colt and the Patent Arms Manufacturing Company, New Jersey: A Thesis Presented to the Faculty of the Graduate School Fairleigh Dickinson University" (1968) and Phillip R. Phillips and R.L. Wilson's Paterson Colt Pistol Variations (1979). Several manuscript collections associated with the activities of key members of the Colt family (Peter Colt, Christopher Colt, Samuel Colt, John Colt and Roswell Lyman Colt) during the period when they were involved in the industrial development of Paterson were consulted. These are held by the Connecticut Historical Society, the Historical Society of Pennsylvania, Rutgers University and the University of Rhode Island.

With regard to Pierre Charles L'Enfant's involvement in the design of the S.U.M. hydropower system and the layout of early Paterson, Russell Fries' article "European vs American Engineering: Pierre L'Enfant and the Water Power System of Paterson, New Jersey" (1975) was reviewed, along with the principal published sources on L'Enfant's life and achievements: H. Paul Caemmerer's The Life of Pierre Charles L'Enfant (1970) and Scott W. Berg's Grand Avenues: The Story of the French Visionary Who Designed Washington, D.C. (2007). Several archival collections containing documents relating to Pierre Charles L'Enfant were examined at the Library of Congress. Chief among these were the Digges-L'Enfant-Morgan-Papers. Unfortunately, few useful references to L'Enfant's activities in Paterson were identified. The most relevant primary materials with information concerning the execution of L'Enfant's duties in the city are the S.U.M. materials at the Paterson City Museum and the Passaic County Historical Society.

Social and labor history has not been a major focus of this historic context study, since the emphasis of research has mostly been directed at the physical remains and functional operation of the ATP site. A brief overview of the social and labor environment in industrial Paterson is provided in Chapter 4 and is

Part I

NARRATIVE HISTORIES

Chapter 2

LABORATORY FOR AMERICAN MANUFACTURING

A. NEW AMERICAN URBAN MODEL: THE S.U.M. AND PIERRE L'ENFANT

On August 18, 1875, William Nelson paid a call at "The Harbourage," the house of Elisha Boudinot Colt on Rumson Neck in Monmouth County, New Jersey (Nelson 1881-1883:1). The Harbourage was an impressive retreat perched atop a bluff overlooking the fashionable beach resort of Seabright. Nelson, whose recent achievements included being elected clerk of the Passaic County Board of Chosen Freeholders and drafting the Charter of the City of Paterson, was, by profession, the editor of the *Paterson Daily Press*. By avocation, he was a historian – not just any common dabbler in the tales of olden times but an obsessive researcher, compiler and collector who, by the time of his death in 1914, had become, by far, the most prolific author and editor of works on the history of New Jersey.

Nelson's purpose that rainy summer Wednesday was not a social visit with Mr. E.B. Colt, the master of the house, but rather an interview with his aged father, John Colt. The elder Mr. Colt was recovering from an illness that had gripped him the previous night and, at the request of his family, would not talk with the historian for long. Much had already been teased out of the recesses of John Colt's mind during an earlier visit made by William Nelson in August of 1873. Nelson undertook the trek from his home in Paterson to the Jersey shore twice in order to speak to the man who was one of the last surviving direct links to the earliest days of Paterson.

A much less world-weary John Colt had first come to Paterson at the age of seven. He arrived in the company of his father, Peter Colt, who in 1793, was appointed to superintend the work of the Society for Establishing Useful Manufactures (S.U.M.) acting "for the Society in the same manner as if the works were his own property" (S.U.M. Minute Books February 18, 1793:79). Initially, Peter and John Colt were the only members of the large Colt family to relocate to New Jersey from their family home in Connecticut. It was unclear how long Peter Colt's term of employment would last and there was no point in uprooting a family for a job the duration of which might well be measured in months rather than years. In part, Peter's decision to bring his youngest son along with him was no doubt based on a desire to have some element of his family close at hand. It was also an opportunity for the young John Colt to gain some experience and to learn something about the world. Although John had plenty of opportunity for normal boyhood experiences during his first stay in Paterson, he also appears to have served as his father's assistant (Nelson 1881-1883:5).

John Colt was 89 years of age at the time of his second audience with William Nelson. In the notes Nelson took that day, he commented at some length on the old man's physical condition and faculties. He paid particular attention to Colt's vision. "His eyesight was injured when at sea, and returning he had occasion to do much writing; he set out to use glasses for twenty years. He only uses them in reading or writing. He uses none to walk about the house or grounds. He can read signs across a street with his naked eye, and formerly could read signs across the Hudson River. He feels well, and perceives no signs of increased debility. He often reads the *Tribune* in the morning without glasses, before he is aware that he is doing without them" (Nelson 1881-1883).

Perhaps in Nelson's mind Colt's ability to still see things so vividly in the present provided a measure of his ability to see things accurately in the past. Colt's firsthand knowledge of the seminal events of the 1790s was of paramount interest to Paterson's foremost historian. It is through John Colt's keen eyes and mind that we derive our earliest clear information concerning the first improvements of the riverfront mill lots in the section of Paterson today known as "the ATP site." John Colt knew the ground intimately having visited them first during his father's tenure as Supervisor of the S.U.M. and then had grown to know them even better as an owner and an operator of some of the most significant factories which were later erected on that ground.

In August of 1873, John Colt told William Nelson that in his childhood a sawmill stood on the land opposite today's northern terminus of Mill Street on the ATP site. It was accompanied by a one-and-a-half story house made of squared logs that stood to the east of the location now occupied by the Gun Mill. According to Colt, the mill had been built prior to 1794 and measured "20 or 30 feet by 20 feet in area" (Nelson 1881-1883:7).

A road of stone and logs, constructed by Major Pierre Charles L'Enfant in 1793, ran past these buildings and around the northeastern side of Mount Morris providing access to what would later become an important source of building stone (Nelson 1881-1883:5). Not very far away stood the focal point of the S.U.M.'s initial efforts – its cotton mill. This stone mill building stood approximately on the site of today's Hamilton Mill on the west side of Mill Street. According to John Colt, "the windows of the original mill were square; the roof was shingled, and pitched or peaked; a cupola or belfry on top, with bell. On the west side was a wooden overshot wheel. The tail race ran down Mill Street. The water was four feet deep when full, but it was not necessary to keep it more than eighteen inches head; it was generally three and a half or four feet … The tail race for the old mill was excavated and laid down where the present one is straight down to the river, under Scott's Mill. The race itself ran across from the old mill to about where the Phoenix Mill now is, and so down to the river. It was sixteen feet wide and three feet deep with a dry wall on the water side" (Nelson 1881-1883:8).

* * *

The area around the Great Falls, nestled below a prominent gap in the First Watchung Mountain where the Passaic River tumbled down into the Newark Basin, was rugged, rocky and densely wooded in the early 1790s (Figure 2.1). Despite being only 16 miles from New York City as the crow flies, there were few roads and only a scattering of farms and mills in this inhospitable and inaccessible terrain. Peter and John Colt, approaching the falls for the first time, likely traveled upriver by boat past Newark, landing at the head of tide at Acquackanonck (modern Passaic). From there it was five miles overland to Gordon's Bridge, where the road crossed the Passaic and continued on over the First and Second Watchung Mountains to Pompton. From the bridge, access to the falls would have been most easily gained along the right bank of the river, skirting the south side of the hill later known as Mount Morris.

Peter and John Colt will have viewed the Great Falls and surrounding land in close to a pristine state and oversaw the initial reshaping of this dramatic landscape for industrial development purposes. Figure 2.2 attempts to reconstruct the *circa* 1793-94 configuration of these first improvements to what later became known as the ATP site on the basis of John Colt's descriptions as communicated to William Nelson more than 80 years later. Colt's recollections concerning the early years of Paterson are particularly important because unlike the published statements of later historians, the young John Colt was actually witness to many of the critical decisions that were being made in the attempt to rectify the vision of Alexander Hamilton, the plans of Pierre Charles L'Enfant and the internal politics of the S.U.M. with a troublesome topography, difficult finances and a paucity of technical knowledge, experience and time.

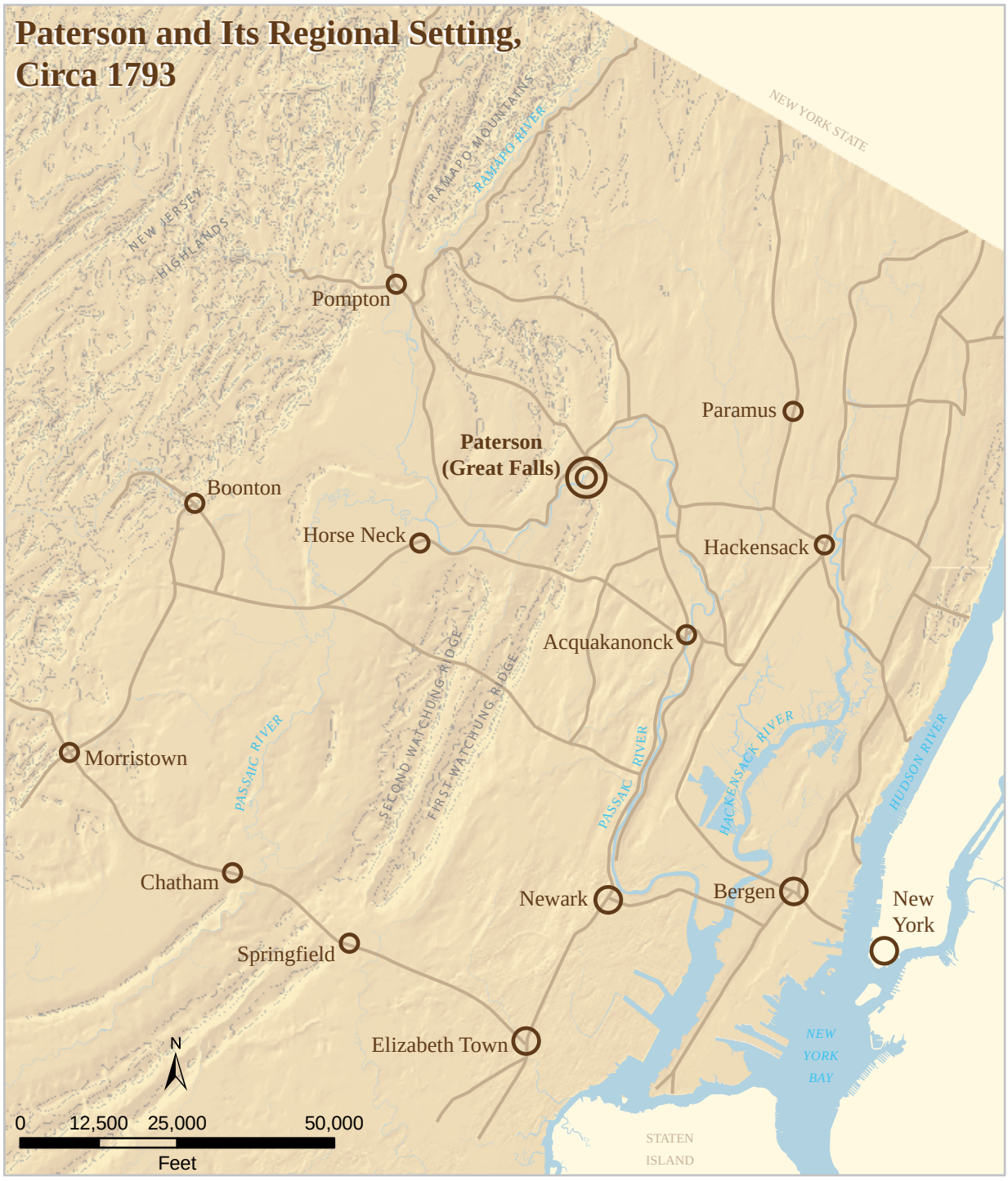


Figure 2.1. The Great Falls on the Passaic River in their Regional Setting. *Circa* 1793. Source: Hills 1781.

The goal of the project with which John and Peter Colt had become embroiled was nothing less than to ignite the fires of a national industrial system of manufacture and, in the process, to make all of the parties involved as rich as possible.

In its earliest phases, Alexander Hamilton had been the project's catalyst and champion (Plate 2.1). In December of 1791, while serving as the nation's first Secretary of the Treasury, Hamilton produced his *Report on Manufactures*. The Secretary of the Treasury had been asked by the House of Representatives to investigate "the subject of Manufactures; and particularly to the means of promoting such as will tend to render the United States, independent on foreign nations for military and other essential supplies." Hamilton's *Report on Manufactures* recommended an aggressive and active role for the federal government involving the implementation of tariffs, the granting of subsidies, the solicitation of skilled foreign workers and the acquisition and assimilation of technological innovations. Within its pages the *Report* "announced that a society is forming with a capital which is expected to be extended to at least a million dollars on behalf of which measures are already in train for prosecuting on a large scale, the making and printing of cotton goods" (Hamilton 1913 [1791]:55).

This announcement probably reflected the genesis of the S.U.M. which had begun to be organized on the basis of a prospectus published on April 29, 1791 and was soon formalized in an act of incorporation by the 14th General Assembly of the State of New Jersey on November 22, 1791 (Appendix D). Promoted by Hamilton, the prospectus described a society of investors who would oversee the establishment of a manufacturing town focused upon one or more factories capable of producing paper, cotton cloth and other manufactured products. Initially, Hamilton served as its primary agent and in this capacity hired William Hall, as superintendent of the society's fabric printing enterprise, Thomas Marshall to superintend the cotton mill, William Pierce to manufacture machinery and Joseph Mort "as an assistant in the manufactory" (Hamilton, December 7, 1791 in Syrett 1966a:345). In hiring these individuals, the S.U.M. was establishing a deliberate link to the advanced textile manufacturing technology that was in use in England. Marshall, for example, who was to be paid a princely salary of £100 sterling in Paterson, had superintended the operation of Richard Arkwright's Masson Mill in Derbyshire (Fitton 1989:81).

Although less in the forefront of the establishment of the S.U.M., but no less an influential figure, was Tench Coxe, a Philadelphia-based merchant and ally of Hamilton prior to his (Coxe's) switching allegiance to Jefferson in 1796. Coxe was an ardent supporter of building up American manufacturing as a foil to dependence on Great Britain, as well as an avid student of British textile technology. In 1787, Coxe helped create the *Pennsylvania Society for the Encouragement of Manufactures and Useful Arts*, which acted not so much as a business but more as an organization that gathered high-quality data on British technology for transfer to America. After being tapped as Assistant Secretary of the Treasury by Hamilton in 1790, Coxe researched and wrote the first draft of the *Report on Manufactures*, which was subsequently revised by Hamilton mainly to add an economic justification for American manufacturing.

Coxe and Hamilton also collaborated on the formation of the S.U.M., which both foresaw being an object lesson for American manufacturing. Coxe can take some credit for originating the idea for the S.U.M. based on his desire to put into use a patent he had acquired in March 1791 for an improvement on the Arkwright spinning machine. At about the same time, he presented to Hamilton a plan to create a joint stock company to finance a cotton factory through a loan backed by government securities. Coxe's proposed method of publicly financing the S.U.M. was not adopted (it was solely a private enterprise unsubsidized by taxes), but it strengthened the impression, especially among Hamilton's political foes, that the connections

The Great Falls

Approximate location of proposed dam

PASSAIC RIVER

Project Limit

Saw Mill

Mine Pit

Log House

QUARRY ROAD (BOUDINOT STREET)

Tail Race

STONY ROAD (LITTLE FALLS ROAD)

Canal

MOUNT MORRIS

Cotton Mill

Reservoir

Gate?

Gate?

Canal

Bull Mill

MARSH

0 100 200 400

Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the

Allied Textile Printers Site

in 1793

Figure 2.2

Plate 2.1. Trumbull, John. Portrait of Alexander Hamilton [1757-1804]. *Circa* 1805. Trumbull's posthumous portrait served as the basis for the image that appears on the United States ten dollar bill, making it one of the most reproduced images in the world. Hamilton's report *Report on Manufactures* of 1791 addressed the issue of American industrial independence in far more encompassing terms than the words of the Congressional mandate that had ordered its compilation. While Congress had been primarily interested in ensuring that the nation would not be crippled during times of conflict by an inability to procure guns, ammunition and other materials, Hamilton instead studied the role of industry in supporting the broader might of nations, equating strong economic underpinnings with increased national independence and security. Source: National Gallery of Art.

between the federal government and the S.U.M. were too close for comfort. In 1792, Coxe wrote a strongly worded rebuttal to the insinuation that public monies had been invested in the S.U.M. and subsequently lost through the speculations of the S.U.M.'s Governor William Duer (see below) (Wright and Cohen 2006:54-55).

Many possible mill seats in the Mid-Atlantic region were suggested for the S.U.M. but localities in New Jersey were recommended most frequently and the location of present-day Paterson seems to have been the frontrunner from the start. New Jersey was clearly favored because of its proximity to both New York City and Philadelphia, the young nation's two largest port cities and population centers. The other primary selection criterion was the availability at the site of a reliable and abundant source of waterpower. Although the *Pennsylvania Society for the Encouragement of Manufactures and the Useful Arts* had established a horse-powered cotton factory near the center of Philadelphia in 1787 as part of a slightly earlier effort at introducing mechanical cotton manufacturing to the United States, it was understood by the time of the S.U.M.'s founding that water-driven machines modeled after Arkwright's "water frame" (Plate 2.2) were the future of the industry (Scharf and Westcott 1884:2314).

Locations on the Delaware (and some of its smaller tributaries), the Raritan and the Passaic rivers were all suggested but the inherent potential of the Great Falls of the Passaic was immediately apparent to anyone who visited New Jersey's foremost natural wonder (Plate 2.3). While the force of almost any large river could be tapped to drive machinery, none of the other locations could offer anything approaching as great a flow of water in such rapid topographical descent. Beyond simple mathematical facts, the Great Falls captivated the imagination with a drama none of its competitors could match.

The recently elected Governor of the S.U.M., William Duer (Plate 2.4), proposed to tap the waters of the Passaic River above the falls by means of a great canal that would extend for nearly seven miles before reconveying its waters back into the Passaic River at its head of tide at Acquackanonck. Duer, who prepared his plan in consultation with a Frenchman identified only as "Allon," proposed to situate the Society's new town near the terminus of the canal in the vicinity of Vreeland's Point in modern-day Passaic (Figure 2.3). At its eastern end, the canal was to be improved with locks to permit water traffic between the town's factories and the navigable waters of the lower Passaic River (Fries 1975:71-75).

Before this ambitious plan could be advanced, a financial debacle, largely of Duer's own creation, threw the nation into turmoil early in the spring of 1792. Duer and another director of the S.U.M., Alexander McComb, had unsuccessfully brokered a scheme which included amongst its goals nothing less than the cornering of the market in U.S. government securities and the takeover of the newly founded Bank of the United States and the Bank of New York (Gordon 1999; Fleming 2009). Several members of the S.U.M.'s board of directors were personally invested in Duer's machinations as was a substantial amount of the S.U.M.'s capital. When the scheme collapsed, Duer and McComb were consigned to debtor's prison and the nation's financial system was thrown into chaos. The S.U.M. weathered the initial buffeting of the storm but the tenor of the organization changed. The Society now had less capital and a Board of Directors less interested in grandiose, far reaching plans, while the general public was less than enthusiastic about potential investments in speculative ventures (Fries 1975:75).

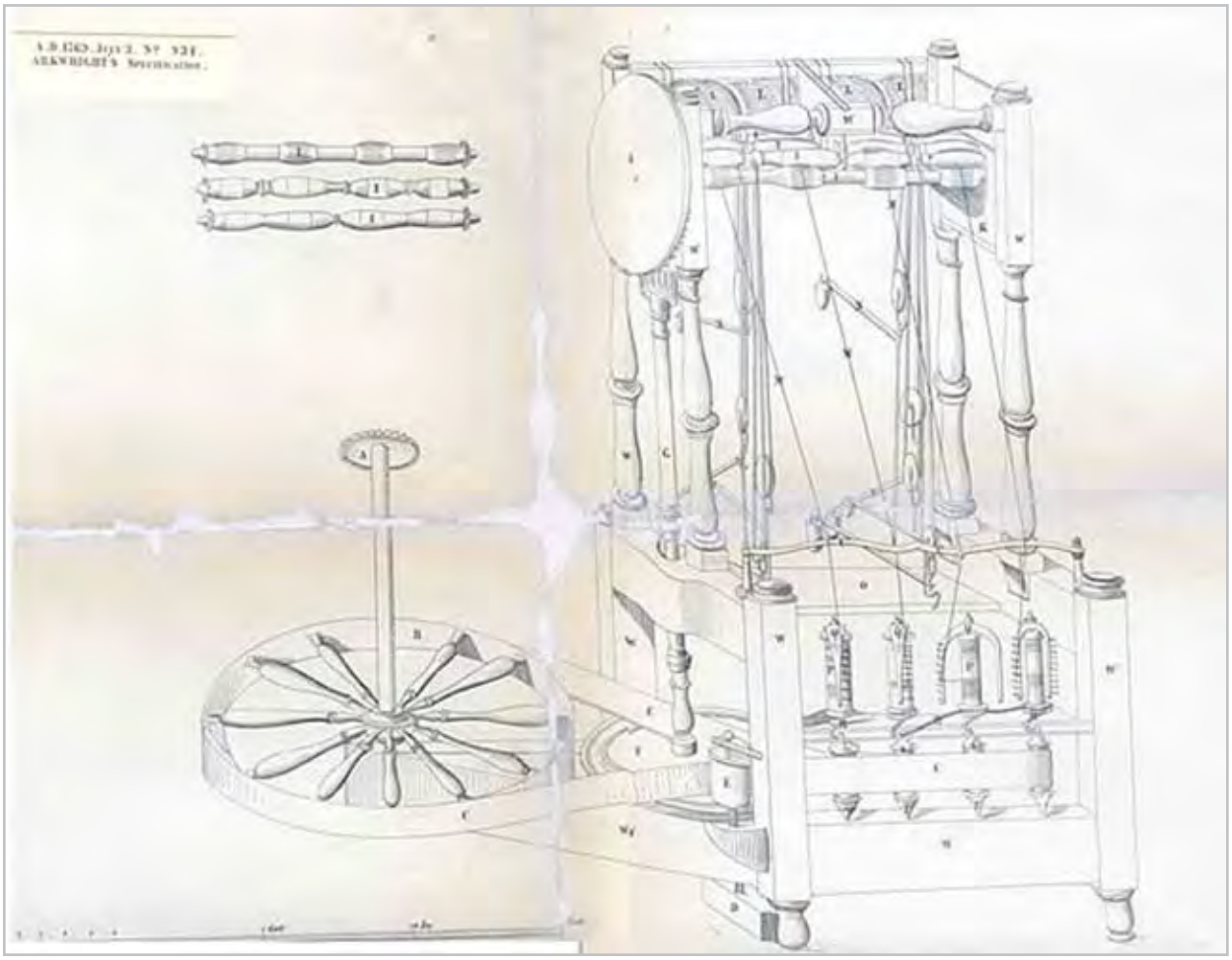


Plate 2.2. Patent drawing for the "The Water Frame." In 1769, Richard Arkwright patented a water-powered spinning machine which became known as the "water frame." Arkwright's machine was the first powered, automatic continuous spinning machine. A few years earlier James Hargreaves had introduced the "spinning jenny," a hand-powered machine which allowed a single operator to spin multiple balls of thread at once. In 1779, the technology of the "spinning jenny" and the "water frame" were combined by Samuel Crompton in the "spinning mule" which utilized waterpower to spin multiple balls of thread at once. John Kay's "flying shuttle," introduced in 1733, reduced the labor needed to weave wide sections of cloth. These inventions began the transformation of textile manufacture from a craft activity into a modern industrial process. The "spinning jenny" was first introduced into the United States in Philadelphia in 1775, but it was not until 1790 that Samuel Slater installed a version of Arkwright's machinery in his mill at Pawtucket, Rhode Island. Source: http://www.lancashirepioneers.com/arkwright.

Plate 2.3. Hamilton, Henry. *View of the Rocks at Passaic Taken on the Spot…* 1777. This colored engraving, looking roughly northeast, is one of several 18th- and early 19th-century images that took considerable artistic liberty in their depiction of the Great Falls of the Passaic River. By the mid-18th century, the Great Falls had become known as one of North America's great scenic marvels. Images such as this exaggerated their grandeur and spread their fame on both sides of the Atlantic Ocean. Indicative of the priorities of the time, no consideration of any of the potential impacts of the S.U.M's plans on the vista at the Falls have been identified in any early documents. Source: New Jersey Historical Society.

Plate 2.4. Hall, Henry Bryan, Sr. Portrait of William Duer [1743-1799]. *Circa* 1780. Born in England and educated at Eton, William Duer settled in New York in 1773. Duer was a close associate of Alexander Hamilton and served as his first Assistant Secretary of the Treasury. His subsequent financial embarrassment, resulting from indiscretions taken with federal funds and some massive failed speculative ventures, soured his relationship with the Secretary of the Treasury and threatened the economic security of the nation. Thomas Jefferson took advantage of the situation to discredit many of Hamilton's policies. Source: New York Public Library, Humanities and Social Sciences Library/Print Collection, Miriam and Ira D. Wallach Division of Art, Prints and Photographs. New York Public Library Digital Gallery, Digital ID:421710.

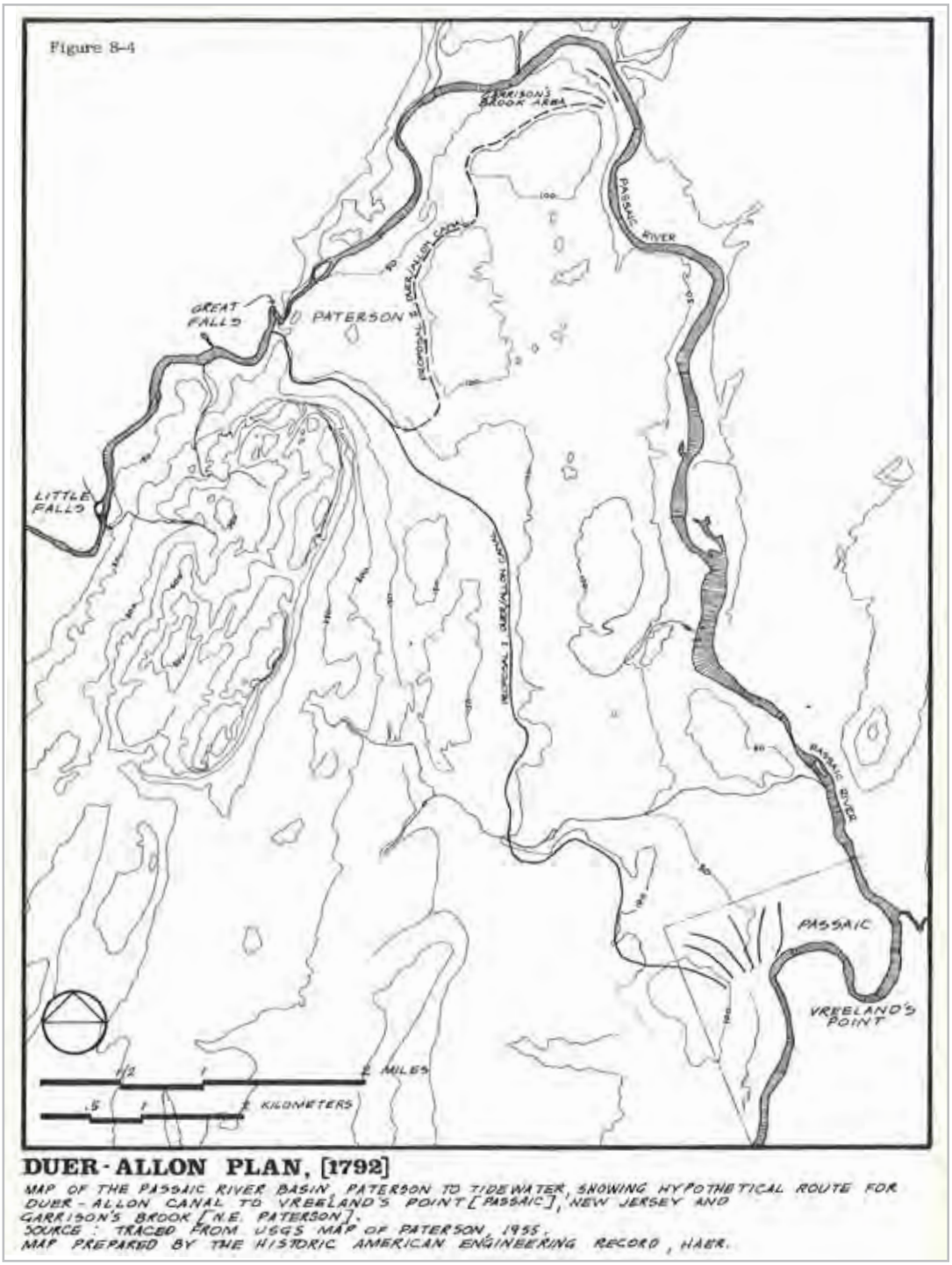


Figure 2.3. Map showing the alignment of William Duer's proposed seven-mile-long S.U.M. Canal. Source: Fries 1975:74.

In the wake of these financial setbacks, Hamilton wrote to the Governor and Directors of the S.U.M. on April 14, 1792:

> Gentlemen,
>
> Among the disastrous incidents of the present juncture, I have not been least affected by the temporary derangement of the affairs of your society. If however no real misfortune shall have attended any considerable part of your funds, the mere delay will be no very serious evil. It will not be difficult to put the business in train with more promising prospects …. No time ought to be lost in determining upon the place and contracting for the land and commencing the buildings. Under present circumstances I would advise that the latter be begun upon a moderate scale yet so as to be capable of extension (Hamilton, April 14, 1792 in Syrett 1966b:280-281).

Hamilton suggested that the Society should immediately push forward with the cotton spinning and weaving elements of their plan and proceed with cotton printing as soon as feasible, but recommended that progress towards any other planned industrial pursuits should be suspended for the time being (Hamilton, April 14, 1792 in Syrett 1966b:280-281). Clearly, in the new more fiscally restrained environment, plans for the immediate construction of a canal to tidewater would need to be reexamined, and with William Duer out of the picture, the long canal had lost its strongest supporter.

Instead a plan was quickly developed for a truncated waterpower system focused on the site of modern-day Paterson. Philip Schuyler, Hamilton's father-in-law, seems to have been instrumental in some of the decisions that followed. Schuyler was the owner of several mills and he was also familiar with recent advances in power technology as demonstrated by the fact that he oversaw the installation of the first steam engine in the United States when one was set up to pump out a flooded family copper mine on the First Watchung ridge close to the Passaic River. Perhaps also relevant, he was serving at this time as the head of the Western Inland Lock Navigation Company, which by clearing obstructions, building short canals and deepening sections of the river sought to improve navigation on the Mohawk River and expand waterborne transportation and freight service between Albany and Ontario (Fries 1975:76).

Asked by Hamilton to provide advice on the location of the factory and the layout of its hydropower system, Schuyler visited the site on May 29, 1792 in the company of Nicholas Low, Elisha Boudinot and John Bayard, members of a committee of S.U.M. directors appointed to fix the site of the works. At a meeting of the S.U.M. directors which was attended by Secretary Hamilton, on July 4, 1792, it was reported that after consultation between the members of the committee, Schuyler and Hamilton, it had been decided that Duer's plan for the canal "in all probability would cost more than the funds of the Society would at present warrant." As a result it was determined "most prudent to fix the principal seat of the factory at the Great Falls" and lands were then purchased under the rights of the organization's charter which had been signed the previous year by Governor William Paterson of New Jersey (Appendix D) (S.U.M. Minute Books, July 4, 1792).

Schuyler seems to have been responsible for conceiving in the broadest terms the basic outline of the waterpower system that would eventually be constructed and to have recommended that a proper survey of the surrounding lands be carried out in order to plan for and undertake the requisite engineering (Fries 1975:76). The recommendation for a survey appears to have been carried out immediately for future discussions of the proposed course of the hydropower canal refer to specific survey stakes and designated points on plans developed as a result of such a field exercise.

Throughout the early years of its existence, Alexander Hamilton served the S.U.M. in what can perhaps best be described as a senior advisory capacity. He did not

hold one of the Society's directorships but was present at their meetings when crucial decisions were to be made. His relationship with the Society certainly would have been an ethically complicated one given his role as Secretary of the Treasury of the United States. Hamilton surely recognized the potential for conflict between his role as the chief official in charge of developing the nation's financial policies and his association with a state-sponsored private corporation. He appears to have been quite careful in this regard, certainly far more careful than his Assistant Secretary, William Duer. Duer, for example, had utilized federal monies in his trust to cover some of his own private financial dealings. Unfortunately for Hamilton, Duer's personal financial failure and the resulting nation-wide Panic of 1792 had only served to focus more critical attention on Hamilton's own activities.

Hamilton's political adversary, Thomas Jefferson, and Jefferson's anti-Federalist Republican compatriots were only too willing to use recent events for any advantage possible and made every effort to place the blame for the near collapse of the American financial system at Hamilton's feet (Fleming 2009). The very concept of the S.U.M. project was anathema to Jefferson, whose vision of the future United States was that of a loosely bound democratic collection of agrarian states, largely free from the machinations of capitalists and the corrupting influence of cities and industry.

Hamilton thus tried to keep some measure of separation between himself and the Society. However, although he was not at the top of the S.U.M. chain of command, the directors of the Society nevertheless seem to have attempted to directly implement Hamilton's vision for Paterson and deferred to his wishes on many occasions even though they were the ones with the most direct financial stake in the success of the endeavor. Hamilton did play an active role in the Society's affairs when he believed it was appropriate. For example, he worked behind the scenes during the initial organization of the Society, personally lobbied the New Jersey State Legislature in support of the granting of the S.U.M.'s charter, helped locate and engage mechanics whom he believed had critical knowledge of modern technology, and secured the advice of his father-in-law with regard to the site of the factory and the configuration of its hydropower system.

In the wake of Duer's fall from grace, Hamilton recognized and spoke of the need to appoint officials who could more closely oversee the daily operations and finances of the Society. The events of the recent months had demonstrated the potential pitfalls when the finances and day-to-day responsibility for the activities of the S.U.M. were left in the hands of the Society's Governor. Even so, he surely must have wanted to reduce the amount of attention he was having to give to the affairs of the organization. After all, the list of his non-S.U.M. responsibilities included nothing less than managing the financial policy and economic systems of the entire fledgling nation.

The directors of the S.U.M. had already devoted close to a year to the process of selecting a site for their works. Time and money were rapidly being expended and little was being accomplished; meanwhile political opposition to the endeavor was gradually solidifying in the pages of the region's Republican newspapers (Fleming 2009). Hamilton almost certainly wanted to prevent any potential future political ramifications that might arise as a result of real or perceived improprieties in the finances of the organization. Future scandals could impact not only the likelihood of the success of the S.U.M. but also the wider political goals of the Federalist party.

On April 14 of 1792, Hamilton, with all of this in mind, wrote to the directors and stated that their best course of action in the wake of the Panic of 1792 was to appoint "principal Officers of the Institution and regulate their duties. I mean a Superintendent, an Accountant, and a Cashier, especially the first. Tis impossible that any thing can proceed with vigour or efficiency till this is done" (Syrett 1966b:280-281).

The man Hamilton favored for the post of superintendent of the S.U.M. was Nehemiah Hubbard, Jr. a prominent merchant of Middletown, Connecticut. Hubbard had actually already been elected to the post on January 21 of 1792, but it is unclear if he (Hubbard) was even aware that he was a candidate (Syrett 1966b:356). What is clear, however, is that by May 3, he had declined the position. Hamilton wrote to him on that day in an attempt to persuade him to reverse his decision. Hamilton's letter implies that Hubbard's rejection of the office was driven in large part by the current disturbed nature of the Society's affairs. Hamilton wrote that it was his intention to attend a meeting of the Society on May 15 and that he was confident he would be "able to give such a direction to their measures as will recover the ground that has been lost by delay & indecision" (Syrett 1966b:356). In a final effort to secure Hubbard's services he closed the letter by stating that, "If I can announce that you are willing to serve the company, it will give me particular satisfaction" (Syrett 1966b:356).

In the meantime, it became clear that a certain amount of basic infrastructure would be required in order to facilitate the erection of the factory and the development of the new town. Although the Society's recently purchased property had been selected in part because of its proximity to New York City and Philadelphia, it was, in fact, quite isolated. Located roughly six miles upstream from the navigable reaches of the Passaic River, most materials had to be carted overland to the site. A relatively well-traveled road linked the Great Falls with the village of Newark, but few supplies and not very much in the way of available manpower could be found in this largely undeveloped region.

Stone and timber were among the most pressing of the Society's material needs. On July, 9, 1792, William Hall, the Englishman appointed by Hamilton to oversee the Society's cotton printing operation, wrote to the directors of the S.U.M. concerning the construction of a sawmill. Hall agreed to construct a dam in the Passaic River below the basin of the falls that would provide a head of water capable of driving a mill of two saws. He indicated that the mill was to be constructed in the vicinity of "the mine hole" which suggests that a quarry had already been opened at Mount Morris in order to supply the Society's need for building stone (S.U.M. Papers 1792).

No progress on the sawmill's construction appears to have taken place until August. At a meeting of the directors of the S.U.M. held on the 20th of that month, it was "resolved that a sawmill with two saws be immediately erected as near to the works of the factory as convenient, below the falls in a line with the Passaick River, to be sixty four feet in length and twenty two feet in width and that the water be conducted by a Ditch or canal, and that a sum not exceeding eight hundred dollars to be appropriated" (S.U.M. Minute Books, August 1, 1792).

By this point any consideration of erecting a dam in the Passaic River seems to have been shelved as it was now recommended that the mill draw its head of water from the main S.U.M. canal and that the water be returned directly to the river following its use. The committee's report suggests that there was some disagreement with William Hall concerning how long the head race and tail race of the mill should be. Hall felt that the races should be longer than those which he was bound to construct under the stipulations of his contract (Smyk 1966:186).

Only sporadic references to this sawmill appear in the later records of the Society and these are further confused by the fact that on September 29 of 1792, the Society's Governor, Nicholas Low reported that the committee in charge of selecting the location of the company's works had purchased the gristmill and sawmill of Cornelius Van Winckle for $5,000. Van Winkle's mills are known to have stood near the foot of modern-day Mulberry Street. After the Society's purchase of Van Winkle's sawmill, it becomes unclear if subsequent references to a sawmill in the Society's minutes reflect the actual construction of a sawmill on the ATP site by William Hall or the sawmill of

Cornelius Van Winkle. It is only John Colt's account of the existence of a sawmill and house on the later site of the Gun Mill during his childhood that confirms that this building was actually constructed. These would have been the first buildings constructed on the ATP site (Nelson 1881-1883:7; Smyk 1966:198).

Alexander Hamilton's courting of Nehemiah Hubbard was to no avail. After it became clear that Hubbard would not be relocating to New Jersey to assume the management responsibilities of the S.U.M.'s project, Hamilton put forth Major Pierre Charles L'Enfant (Plate 2.5) as a candidate to fill the position:

> As Major L'Enfant may not be well known to all of the Directors, I can not omit the opportunity of saying from much experience and observation of him, I have a high opinion of the solidity of his talents, and believe him to be in every respect intitled to the confidence of the direction.
>
> The interesting problem is yet to be solved—How shall the water be conveyed to the works? On this point I beg leave to say that nothing aught to be risked. Efficacy and solidity ought to outweigh considerations of expense if within any reasonable bounds. I feel persuaded before hand that those attributes will belong to whatever plan Major L'Enfant may propose: and I doubt not it will meet with the attention it shall merit (Hamilton, August 16, 1792 in Syrett 1967:216-217).

The positions offered to Nehemiah Hubbard and Pierre Charles L'Enfant were clearly not quite the same job. Hubbard's expertise was as a merchant and financier who would have been capable of overseeing all of the affairs of the S.U.M., including the regular operation of the factories. He had been offered the position of "Superintendent-General of the Works of the Society." Pierre Charles L'Enfant was offered the job of "Agent for Superintending the Erection of the Work." The decision to hire L'Enfant was rooted in a fundamental change of approach made by the directors of the S.U.M. They had initially intended to let a contract for the construction of the raceway system rather than undertake the work themselves (Fries 1975:79). To a large extent all of the troubling details regarding the design and construction of the raceway system would have fallen on the shoulders of the selected contractor rather than on the S.U.M. When all of the responses to the S.U.M.'s advertisements with regard to the proposed construction came back as not meeting the full scope of the project or too expensive (or both), the S.U.M. determined to undertake the project itself and therefore found itself in need of a qualified engineer and construction supervisor.

L'Enfant was hired with the understanding that his tenure of service was not to exceed one year, suggesting that it was never intended that he oversee the operation of the S.U.M's works following their construction. He was a planner and engineer whose talents were most suited to tasks involving construction and design. Hamilton had singled him out as one of the few professional engineers working in the United States who might be able to address that "interesting problem" which was "yet to be solved" … namely, the design of the S.U.M.'s hydropower system (Syrett 1967:216-217).

L'Enfant came to Paterson already a disgruntled man and he would leave Paterson even more discontented. He had recently resigned from his most famous role, that of chief planner of the new national capital, Washington, D.C. He had been driven to take this drastic measure, despite receiving considerable support from no less a patron than George Washington, in part because of disputes and dissatisfaction stemming from his own prideful nature, but also because of the behind-the-scenes machinations of several of the wealthy commissioners in charge of the new city and of Thomas Jefferson, who it has been speculated harbored a strong personal dislike of the French engineer (Berg 2007:191).

Plate 2.5. De Hart, Sarah. Silhouette of Pierre L'Enfant [1754-1825]. *Circa* 1802. This silhouette may be the only surviving image of L'Enfant made during his lifetime. The image is part of a Franco-themed collage believed to have been cut by noted silhouette artist, Sarah De Hart, of Elizabethtown, N.J. Source: Diplomatic Reception Room, U.S. Department of State, Washington, D.C.

L'Enfant had come to America among one of the first groups of French soldiers sent to the New World to assist and advise the American forces in the prosecution of their conflict with Great Britain. L'Enfant was among the most junior members of the detachment's corps of engineers. He was not trained in the traditional manner of French military engineers but was the son of an established military artist. His father had held an official military position and traveled with the French army on several of its European martial exploits producing paintings that documented and in many cases aggrandized its achievements on the battlefield. The paternal Pierre L'Enfant held a teaching position at the Royal Academy and used his position to enroll his son under his tutelage in the general study of fine art (Berg 2007:22). It is believed that when the French expeditionary contingent was organizing, the elder L'Enfant used his influence at the French court to have his son included on its rolls as a volunteer lieutenant. Although young Pierre Charles L'Enfant lacked much of the fundamental knowledge that would have been forthcoming had he attended a formal engineering training program, the basic ability to render and to draw plans were always considered useful skills during military campaigns (Berg 2007:32).

L'Enfant did not rise to any particular military distinction during the American Revolution. After the death of his French commander, he served under Baron Von Steuben and was engaged by the federal government to illustrate the Baron's military training manual (Berg 2007:40-43). L'Enfant saw some actual conflict and was wounded in the leg at the Battle of Savannah on September 16, 1779, but for the most part he remained on the periphery of the elite corps of officers that commanded the American Army. He did, however, come to the attention of George Washington. The Marquis De Lafayette had requested that George Washington sit for a portrait for his own use, a portrait which was made according to Washington by "Monsr. Lanfang" (Berg 2007:42). On May 23, 1783, a congressional committee that included none other than Alexander Hamilton elevated L'Enfant to the rank of Major on the basis of statements of satisfaction by George Washington, General Von Steuben and General Duportail, the chief engineer of the Continental Army (Berg 2007:50-51).

L'Enfant's experience with actual engineering and architectural projects was somewhat limited considering the level of responsibility with which he was soon entrusted. He attained some prominence in the affairs of the new national government as the designer of pavilions, settings and backdrops for parties and celebratory events. For example, in 1787, he was selected by a group of New York Federalists headed by Alexander Hamilton to plan the city's celebration of the ratification of the Constitution. It should be noted that under L'Enfant's guidance, the gala – which involved parades down Broadway and feasts with attendance lists numbering in the thousands – feted the person of Hamilton almost as much as it did the creation of the new federal government (Berg 2007:64). L'Enfant's most notable achievement as the new nation's preferred event planner was the architectural transformation of New York's City Hall into Federal Hall, the seat of the new national government. This work was largely accomplished in order to accommodate the inauguration of President Washington and involved the addition of a grand Classical Revival portico to the building that served as the principal stage for the public component of the event. L'Enfant's success in designing the sets of important public events and choreographing their theater was likely due in part to what he had learned while studying under his father. It easy to see how, for a classically trained artist, there would have been substantial parallels between composing a celebratory painting commemorating a great military accomplishment and designing the setting for an inauguration. The architecture of both would be similar, full of drama and classical imagery.

From what is known of Pierre Charles L'Enfant's training and previous experience, there is little to lead one to believe that he possessed the credentials to design a complex and sophisticated hydropower system such as was required at Paterson. It is true that as the great age of American canal building had yet to truly

dawn, there were few others in the young nation who had any experience in the subject at all. Hundreds of mill raceways had been constructed throughout North America by this date, but certainly none compared in their volume or complexity with the system that the S.U.M. was proposing to build. L'Enfant was one of perhaps less than a dozen professional engineers working in the United States at that time, but his known practical experience was in illustration, urban planning and architecture.

On August 1, 1792, at a meeting attended by Nicholas Low, John Bayard, Elisha Boudinot and Alexander Hamilton, he was selected to serve as the Society's agent and to prepare a plan for both the town of Paterson and the area extending from above the falls to the site of the S.U.M's works. Based on a preliminary examination of the site selected for Paterson, L'Enfant tendered a written report to the directors of the S.U.M. on August 19. In this document, the French engineer discussed and weighed the merits of several scenarios for the conveyance of water to the proposed site of the Society's works which had been previously advanced by Hamilton, undoubtedly with input from General Schuyler and others (S.U.M. Minute Books, August 20, 1792; Smyk 1966:179).

A number of engineering challenges needed to be overcome. A ridge of upcast stone lay along the southern edge of the river above the falls. At the proper location, a cut would need to be made in this ridge to accommodate the flow of a sufficient volume of water to power the Society's mills. To the south of this ridge was an irregular gully that served at times of high water as an overflow channel for the river. This natural channel allowed floodwaters to bypass the main precipice of the falls (Fries 1975:77).

The waters diverted from the river for hydropower use would need to be carried across (or through) this gully and then over (or through) a second rock ridge that, on its northern face, acted as the southern edge of the gully and, on its southern face, formed a large bluff that overlooked the relatively flat lands which had been selected as the site of the S.U.M.'s works. L'Enfant proposed the construction of a large stone aqueduct in a more or less Roman tradition to carry the raceway across the gully. The aqueduct would also carry a "towing path and Carriageway on each side" (S.U.M. Minute Books, August 20, 1792). This would permit canal barges to utilize the raceway and also provide an easier route for overland cart traffic to climb the bluff above the site proposed for Paterson. It would thus provide a critical transportation link between the proposed manufacturing town and the region upstream above the falls.

After breaching the ridges and traversing the gully, L'Enfant proposed that the water be fed into a large reservoir that would ultimately feed two secondary raceways (only one of which was to be initially constructed in order to save money). Each of these raceways was to be provided with its own reservoir in order to ensure the availability of a consistent head of water at all times. These secondary raceways would feed a network of lesser raceways that would reuse the same water multiple times as they fed into the various mill sites and gradually dropped in elevation down to the height of the river below the falls (Fries 1975:81).

L'Enfant's solution to the problem of how to carry water across the gully may provide evidence of at least one possible precedent to which he turned for inspiration in designing the Paterson hydropower system. The extent to which the formal gardens of Versailles may or may not have influenced L'Enfant's plan for Washington, D.C. has been debated extensively by several generations of urban planners and art historians. That L'Enfant knew Versailles quite well is not a matter of contention. His father's professional relationship with the French royal court makes it almost a certainty that young Pierre visited the grounds, probably on numerous occasions. What has not been discussed in terms of its influence on L'Enfant's professional life is the fact that the palace gardens made use of one of the largest and most

heavily engineered manmade water supply systems then in existence in order to power its fountains and fill its basins and pools. During L'Enfant's lifetime, on any given day in which the garden fountains of Versailles were in operation, they required more water than the entire city of Paris. Versailles relied on several independent water supply systems that utilized wind and water-powered pumps to tap the water of distant rivers. They were engineering marvels of their day. The complex systems used reservoirs, aqueducts and canals to provide the gardens of the royal palace with the massive and constant head of water needed for the grand displays. The aqueducts used to convey water to Versailles' gardens likely made a strong impression on L'Enfant in his youth and may well have come to mind as he worked out the details of Paterson's hydropower system.

With regard to planning the town of Paterson, L'Enfant addressed the subject in his report in the following manner…

> The shortness of time I have had to take a knowledge of the situation to combine the system of conveying water as I propose and to satisfy myself of the practicality has left me so little leisure to consider about the plan of distribution for the town as induces me to confine to a few general outlines of the manner in which I conceive it is most proper to have it laid out. Surrounded by high mountains as is the tract the Society has at disposal, I consider it was not material to observe a regular north and South and East and West direction for the streets a method which I apprehend would rather be improper, because it would end every street against steep mountain which would impede a free circulation of air the better to be secured by determining variously the direction of the principal streets as are marked upon the map where I have taken advantage of a rising ground reserving the summit of it for the erection of some Public building carrying the streets from thence according as the accidental opening may admit of prolonging them at a distance in measure as the town will enlarge or as arrangement may be made with the owners of the land where properly the prolongation of the streets will increase in value (S.U.M. Minute Books, August 20, 1792:59-66).

L'Enfant seems to be describing here a town plan that consists of a series of radiating avenues that would converge on "a rising ground" atop which he would construct a principal public building of the city. Conceptually, urban plans of this type can be traced back to Pope Sixtus V's reworking of the streetscape of Rome in the late 16th century. Broad avenues were cut through the city's fabric converging on plazas centered on the city's most significant churches and other landmarks. Perspective became an important part of street design. Optimally, avenues were to extend from the center of the city, unblocked to the horizon in the fashion that L'Enfant describes with reference to his proposed principal streets of Paterson. Christopher Wren proposed a plan of this type for London after the fire of 1666 (Figure 2.4) and, as inferred above, the gardens of Versailles and L'Enfant's own plan for Washington, D.C. followed the same model (Figure 2.5). L'Enfant's plan for Paterson differed somewhat from these earlier precedents in that his avenues were not regularly spaced like the spokes of a wheel but rather laid out to avoid obstacles in the surrounding landscape. Baroque urban plans of this type shaped a city into a series of connected monumental public spaces and grand architectural vistas and introduced a heightened theatricality into the language of civic planning. This stood in direct contrast to organic "medieval" city plans like those of colonial New York or more rational plans indicative of Renaissance thought like those of Philadelphia (Reps 1992). In utilizing city plans that were the product of High Baroque thought, L'Enfant was unequivocally demonstrating that artistically he belonged to the French tradition as still promoted by the Royal Academy of Painting and Sculpture and the Royal Academy of Architecture.

L'Enfant is unclear in his description of how the Passaic River or the raceway/canal system which he proposed would interface with the street plan of his town. This could be taken as evidence that L'Enfant had not

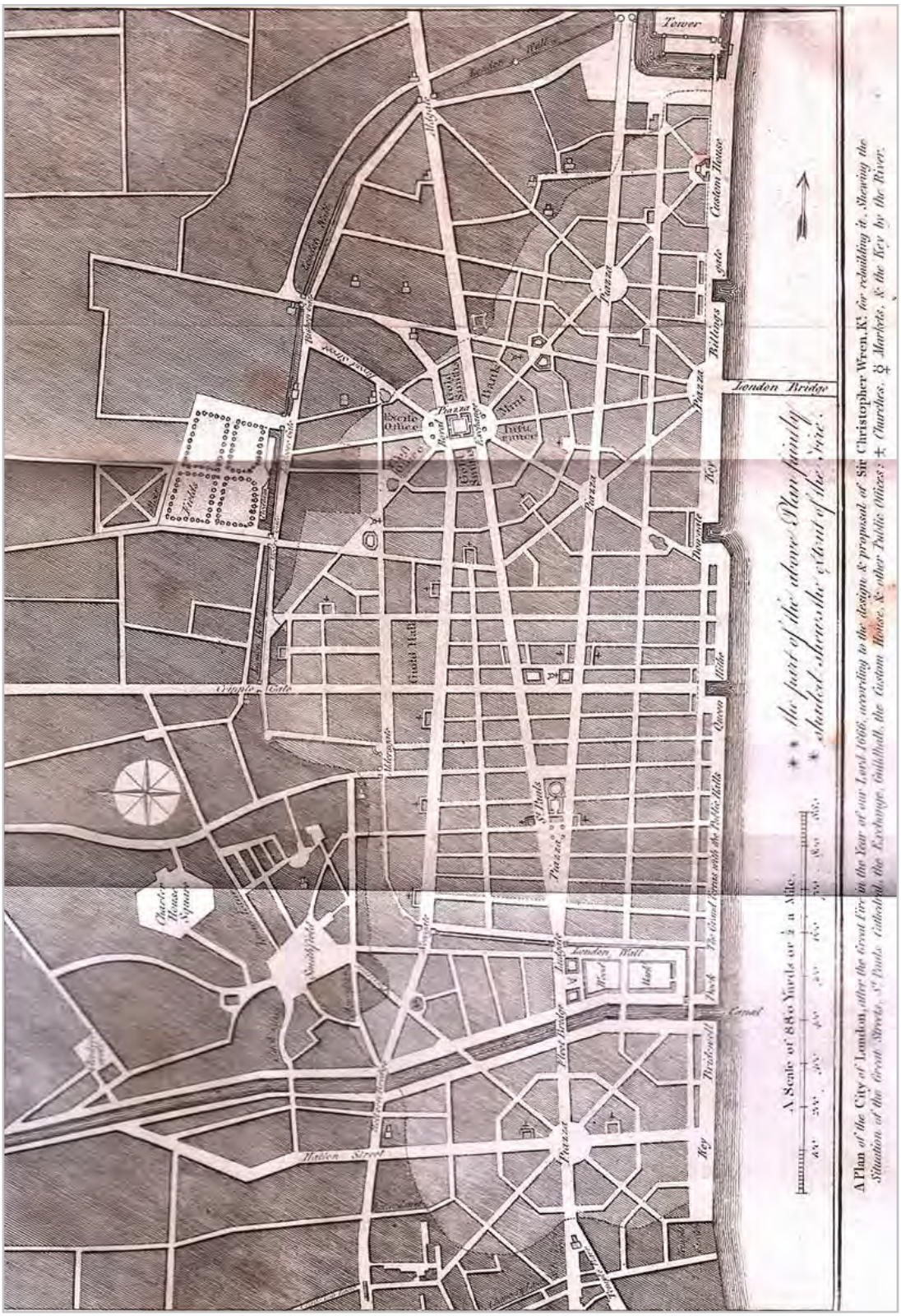


Figure 2.4. Christopher Wren. *Proposed Plan for the Reconstruction of London.* 1666. Source: Harrison 1775.

Figure 2.5. Pierre Charles L'Enfant. *Plan of the City of Washington.* 1792. Source: Library of Congress Geography and Map Division.

recognized the aesthetic possibilities which waterways could offer his planned city. However, his plan for Washington, D.C. clearly shows that he was both an urban planner of considerable sophistication and one capable of designing a city to relate successfully to a body of water. In the case of Washington, this was the Potomac River. The lack of such details in L'Enfant's description of his plan for Paterson most likely imply that the industrial components of the new city would be separate and distinct from its residential/civic/commercial components. In the plan for Washington, D.C., the President's House and the Congress House (the Capitol Building) were to be the primary focal points of the city (Figure 2.5). L'Enfant chose two of the most elevated locations within the core of the city on which to site the buildings that would serve as its symbolic anchors. Avenues radiated out from these nodes crisscrossing and creating other secondary nodes.

There would appear to be close parallels between L'Enfant's plan for Washington and his plan for Paterson. In both, L'Enfant envisioned long avenues radiating out from topographically dominant points surmounted by edifices of civic importance. In his plan for the new national seat of government, these were to be the principal buildings of the federal and legislative branches of government. In his description of his plans for Paterson, it was to be an unspecific "public building." Had L'Enfant attempted to shape Paterson as a model city of manufacturing, it seems likely that he would have applied a logic and strategy similar to those adopted for Washington. The S.U.M.'s factory building would have occupied the most prominent location at the center of his planned community, not a generic public building. Unfortunately, this would have meant locating a water-powered factory building, impractically and implausibly, on the summit of a hill.

Other solutions were possible. In 1775, construction had begun on a Royal Salt Works at Arc-et-Senans in France. The salt works was a pet project of the French visionary architect Claude-Nicolas Ledoux, a member of the Royal Academie of Architecture (Trachtenberg and Hyman 1986:416-417). Its planning and construction were undertaken while L'Enfant would have been engrossed in his studies at the Royal Academie of Painting and Sculpture. Since the salt works was a major artistic and engineering endeavor personally authorized by Louis XV, it is likely that L'Enfant would have been made aware of its plans at some point during his training in the arts and engineering prior to his embarkation for America.

The significance of Arc-et-Senans for Paterson is that it was one of the first attempts in history to construct a classically inspired, industrial city on a previously blank landscape. Although never fully completed, the plan of the new city was to consist of a series of radiating avenues that would converge through a semicircular inner urban precinct on a central building containing the residence of the director of the salt works and a chapel (Figure 2.6). The director's house was flanked on either side by the main factory buildings of the salt works (Plate 2.6). Housing and other elements of civic infrastructure were to be arranged within the semilune of the city. Thus in Ledoux's plan, the primary industrial aspects of the city also became principal visual and symbolic focal points, although they did not lie at the absolute center of the community but rather prominently flanked the true nexus of the community, its seat of administrative power.

Such a solution, or some variant thereof, certainly could have been employed at Paterson. In his plan for Washington, L'Enfant incorporated a series of secondary nexus points in the form of plazas around which the contingencies of the governments of the 14 United States were supposed to have focused their activities. L'Enfant could have integrated individual mill seats into the fabric of Paterson in a similar fashion. However, the French engineer makes no implicit mention at any time of any specific intent to symbolically reflect the industrial aspects of the new town in its plan.

Figure 2.6. Claude-Nicolas Ledoux . Plan of the Saline Royale at Arc-et-Senans as it appeared in a copper engraving published in 1805. Various evolving versions of Claude-Nicolas Ledoux's plan show the salt works city with a square, circular and semi-circular footprint. In its final form, the saltworks was constructed in a half-round plan. Construction began in 1775. Source: Toman *et al.* 2007.

Plate 2.6. Photograph of the Saline Royale at Arc-et-Senans. Most of the buildings of the planned community which was to surround the royal salt works were never constructed. Several of those that were built have not survived to the present day.

Evidence points to the probability that L'Enfant's "rising ground" was a prominent hill that once stood south of Market Street and east of Main Street. This location, later known as "Colt's Hill," would have stood near the center of a ring of mountains as L'Enfant described in his report. Mount Morris has been suggested as another potential location, but it lies on the edge of the lands which were available to have been laid out for the city and it rose too steeply from its surroundings to have been a suitable site for the construction of a large public building. Backed up so closely by the Passaic River, geographically and topographically, it is difficult to conceive of how Mount Morris could have served as the focal point of the town that L'Enfant described.

"Colt's Hill" on the other hand was situated at the center of Paterson as it evolved in the early 19th century. Its summit rose gently to a considerable height dominating the surrounding landscape. John Colt himself provided key evidence that this was the rising ground on which L'Enfant intended to place his urban nucleus. Colt stated that, according to L'Enfant's plans, the "Dublin Spring" "was to be the center of a grand system of avenues extending out toward the northeast, east and west. He had a regiment employed in digging up trees and stumps in all directions for these grand thoroughfares …." The "Dublin Spring" rose to the surface in what later became known as the Dublin neighborhood, not far from the western edge of the base of "Colt's Hill" (Nelson 1881-1883:3).

With the selection of the area immediately below the Great Falls as the seat of the Society's factory, the land that would later become known as the ATP site took on a measure of real significance. This was, in part, because its location. Large rock outcroppings, including, most notably, Mount Morris, lined the edge of the Passaic River downstream from the falls. The relatively flat terrace south of Mount Morris represented the first spot at which water drawn off above the Great Falls could be channeled back into the river. While the Society's plans still called for a relatively complex and lengthy hydropower system, there was little call to identify such a point. During L'Enfant's tenure at Paterson, the principal improvements made in this area were the sawmill and miller's house discussed above and the stone and gravel road that John Colt noted L'Enfant had laid down. This was presumably done in order to access the quarry that had been opened in order to supply stone for the mills, the piers of L'Enfant's proposed aqueduct and the foundations for workers housing.

As quoted above, on October 16, 1792 Alexander Hamilton had recommended that concerning the mode adopted to carry water to the Society's works "nothing aught to be risked" and the "efficacy and solidity ought to outweigh consideration of expense." Despite the Society's waning financial position in the wake of the national panic, the Society appears in every way to have taken Hamilton's advice to heart and approved L'Enfant's quite elaborate plan, even including his recommendation for the construction of a large stone aqueduct.

L'Enfant was aware, however, that economics were and would continue to be a major consideration. Immediately following his formal appointment by the directors of the S.U.M., in a letter to Hamilton acknowledging the importance of the project's finances, he wrote that he was "wishing to assure you that your favorit child will be carefully nursed and bread up to your satisfaction without Involving the parents in Extravagant or useless Expense. My sole Embition being to deliver it worthy of its father and capable of doing honor to his Country" (Syrett 1967:263).

During the fall of 1792, L'Enfant pressed ahead with the construction projects under his charge. On September 17, 1792, he again wrote to Alexander Hamilton, this time detailing his progress to date:

> Dear Sir,
>
> The Progress of the business here has been as rapide as the time and the stady pursuit of the differents objects to pursue has permitted in

> the short space since 22nd of last month that the directors have agreed upon the plan which I propos for the canal. The ground through which this is to be carried is already cleared of all timber and immense rock removed from the way of operation so that I am in hope in a few weaks to be enabled to make a beginning of the foundation of the grand acqueduc – also to open the Rock accrose the ill and to make a beginning every way proportional to the number of hands as shall be collected the which daily increase in number.
>
> Several of the Principal Streets are cut through and about clearing. Stone is extracting from the quarry and provision of every sort making to enable a beginning of the principal and most necessary building for the manufactury and the employed for whom in waiting til the building are completed. I have ordered a number of barrack to be erected suited to the purpose... (Syrett 1966b:388).

As of the late fall of 1792, L'Enfant appears from all accounts to have been making good progress with his work and all evidence would seem to suggest that Hamilton and the directors of the S.U.M. were satisfied with his work. Although L'Enfant was actively undertaking the day-to-day management of most activities at Paterson, the directors and Hamilton were still continuing their search for a Superintendent of the Works. Samuel Ogden, a Pennsylvania and New Jersey ironmaster, was offered as one possible alternative, but Hamilton spoke out against his potential appointment.

> Mr Ogden is without exception one of the most opinionated men I ever knew. On this subject he seems to think there is nobody, but himself, who has a single rational idea. In one week he would drive L'Enfant off the ground. Already he has affirmed that L'Enfant knows nothing of Water works, when it is well known that he was regularly bred to this, as a part of his profession, He is by trade what is called in France a civil Engineer that is an Artist acquainted with Mechanics generally, particularly in reference to architecture, aqueducts, Canals &c &c including necessarily a knowledge of hydroulicks (Syrett 1967:538).

Hamilton's opinion appears to have been taken seriously, for Ogden was not offered the job.

With the onset of winter, L'Enfant's activities at Paterson seem to have slowed and then stopped. On February 20, 1793, the minutes of the directors recorded that two days previously, Peter Colt, of Connecticut, John Colt's father had been offered the position of "Superintendent of the Factory" and had accepted (S.U.M. Minute Books, February 20, 1793). Colt arrived in Paterson and soon found the situation not to his liking. Much needed buildings had not yet been completed, workers were unhappy and, in his measure, progress was generally behind. Most annoyingly for Colt, L'Enfant was not to be found. "The Absence of Maj. L'Enfant of whom I get no Intelligence becomes everyday more distressing…I do not feel myself at liberty to take a single step in this business without consulting him as I am totally uninformed as to his Plans of the town and the general Arrangements made for the building's thereon" (Fries 1975:84).

Colt's complaints concerning L'Enfant's absence were soon repeated by Nicholas Low (Syrett 1969:189). L'Enfant had, in fact, retired to Philadelphia for the winter, apparently to prepare a more detailed version of his plans for the works at Paterson, but perhaps also to negotiate a new assignment, the design of a house for the Philadelphia financier Robert Morris on Chestnut Street (Berg 2007:209). He returned to the S.U.M. site in March and, in his opinion, found "everything in as good a state as I had promised from my arrangement made previous to my leaving the place" (Fries 1975:85).

L'Enfant may have anticipated more rapid progress on the project but any momentum provided by his return was quickly undone by none other than Samuel Ogden who proposed at a March meeting attended by Elisha Boudinot, Peter Colt and L'Enfant to construct a canal

system on roughly the same lines as had originally been suggested by William Duer and to purchase all of the necessary lands for the fixed sum of £20,000. While this may have seemed quite an attractive offer to many of the directors, Ogden's move clearly annoyed L'Enfant who saw in it the potential for all of his own work to be usurped. According to Elisha Boudinot in a letter written to Alexander Hamilton on March 26 of 1793, "The Major then said he would not begin any part of his plan that was not in actual operation until then and they concluded to discharge the laborers that applied and give out that they would not be wanted till the 20th April. This will occasion a delay that I am sorry for" (Syrett 1969:246).

However, before leaving for Trenton where he was to pass the remaining time preceding the April 16 meeting of the S.U.M.'s directors, L'Enfant went ahead and instructed a core group of workers to remain and continue building the aqueduct foundations (Fries 1975:85). Samuel Ogden's plan was eventually rejected, but the complaints of Colt and others, and the disturbance caused by the directors' consideration of Ogden's proposal, had soured his feelings for the whole endeavor. In order to expedite construction, the directors reached an agreement with L'Enfant by which he would concentrate his efforts on the construction of the canal system. His work on the development of the town of Paterson would be deferred until after water had been carried to the society's cotton mill. Peter Colt was to be given the responsibility of finishing (and in most cases starting) the construction of the various buildings of the Society's works. L'Enfant promised at this time to bring water to the mill site by the end of the year (Fries 1975:85-86). However, by late spring, it became obvious that L'Enfant would not be able to meet this commitment. On June 9, the directors met and decided to stop all work on the aqueduct. In their opinion, a more expedient solution to the waterpower problem needed to be pursued. At this juncture Pierre Charles L'Enfant's participation in the S.U.M.'s plans effectively came to an end and responsibility for the continuation of the project fell to Peter Colt (Fries 1975:85-86).

B. PETER, JOHN, ROSWELL AND SAMUEL: THE COLT FAMILY AND INDUSTRIAL PATERSON

Upon his return to Paterson in July of 1793, after a brief trip home to Connecticut to visit with his family, Peter Colt found himself in charge of all S.U.M. construction activities in Paterson (Fries 1975:87). The footings for L'Enfant's aqueduct had been abandoned and work now instead was progressing along simpler lines. Rather than carrying water across the gully, Colt instead raised an embankment across the mouth of the ravine and used it as a reservoir. Openings in the stone outcroppings that blocked the flow of the water from the river into the gully and from the gully down to the site of the cotton mill were enlarged and a single canal was constructed that led directly to the site of the cotton mill.

The plan that Colt implemented was the simplest possible solution to the problem that the S.U.M. had been wrestling with for over a year. It was the quickest and, in the short run, the most cost effective and it permitted water to be carried directly to the Society's cotton mill. This was the most pressing of the Society's needs as both workmen and machinery were standing idle waiting for this to be accomplished (Fries 1975:86-87). While the walls of the Society's new stone mill were rising, some work had commenced on spinning coarse yarns in a temporary frame building known as the "Bull Mill." It was so named because its machines were operated by horses and oxen. The building stood on what is today the northwest corner of the intersection of Mill and Market Streets next to the site of the Society's cotton mill (Trumbull 1882:38).

The results achieved by Peter Colt during the early 19th century have often been contrasted with the unfulfilled plans of Pierre L'Enfant. Later histories have portrayed Colt as a practical, capable and resourceful man who was able to successfully complete the construction of the Society's cotton mill and waterpower system, where the Frenchman's ambitious scheme had failed. L'Enfant, in turn, has been presented as an irascible

and easily offended individual whose plans were both grandiose and impractical. While there are probably elements of truth in both descriptions, in reality the situation was more complex. L'Enfant's scheme was not so grand that it was openly questioned by any of the Directors. In fact, L'Enfant appears to have produced exactly what Hamilton had asked for: an effective solution to the challenge of supplying the Society with a well-built and well-designed hydropower system that would meet all of the Society's immediate and mid-range power supply needs.

Peter Colt, on the other hand, took the most direct and obvious approach, and seems to have ignored all considerations other than the need to expeditiously supply the Society's cotton mill with water. The result was a system which worked, in the short term, to power a single mill, but which would need considerable future improvement in order to function successfully over the long run, and which was not especially well suited to the creation of additional mill seats. It should be remembered, as will be discussed below, that the Colt family's influence in Paterson would be long lasting. While Pierre Charles L'Enfant left Paterson in 1793 and was never to return, Peter Colt and his children and grandchildren remained and held positions of consequence in the city. They were perfectly positioned to shape the manner in which the tale of the early years of the S.U.M. would later be told.

With that said, the responsibilities and achievements of Peter Colt should not be minimized. He was charged with overseeing the design, construction, operation and maintenance of the hydropower system. He was responsible for planning and coordinating the construction of the original mill complex and housing for employees. He supervised the experts hired by Hamilton and the directors to construct the mill machinery and oversee the day-to-day bleaching, printing, spinning and weaving processes. He was the "point man" for basic labor issues and coordinated the provision of supplies and building materials. He oversaw the Society's daily finances in Paterson and represented the Society as their man in charge on site. The job of supervising the Society's works required a unique skill set and men with such abilities were hard to find in the volatile socio-economic climate of the young republic. Colt had been selected for the job because he was suitably qualified, because he was well connected, and because he echoed Alexander Hamilton's views concerning the need to promote American trade and industry.

Although not of the same social or economic standing as most of Hamilton's core group of associates and supporters, Peter Colt was nonetheless adequately credentialed and well equipped to function in the service of a group such as the S.U.M. Most of the men tapped by Hamilton to serve in the Treasury Department or as directors of the S.U.M., shared similar backgrounds and experiences and possessed a common philosophy. Many were patriots bound together by the experience of war. For a few, and Hamilton was one, this meant belonging directly to or being closely associated with Washington's personal cadre of officers. Both Hamilton and L'Enfant had, for instance, shared similar memories of a cold winter at Valley Forge. Although L'Enfant had only hovered on the periphery of Washington's core group of officers, a group to which Hamilton could claim absolute membership, he had moved closer to its center after the war through personal service to Washington and his Federalist allies. He was also, after all, personally responsible for designing the regalia of the Society of Cincinnati and traveled to France to recruit Lafayette and other French veterans into its membership (Berg 2007:51-53). Although only a very few of Hamilton's associates had actually belonged to Washington's inner circle, most had served their country in some manner during these trying times, many as officers in the Continental Army or as key members of Congress.

Of the 65 original shareholders of the S.U.M., 28 had served on active duty in the Continental Army. At least 12 of the stockholders served in critical financial

and procurement positions within the American forces (Herz 1939:27). The importance of the key officers within the Continental Army's Quartermaster and Commissary Corps to the successful prosecution of the Revolutionary War should not be overlooked. These men played a critical role during the war effort and seem to have gravitated to key positions of bureaucratic and governmental power in both state and federal government following the conclusion of the hostilities with Great Britain. Many of these individuals had been prosperous merchants before the war and had risked their own personal fortunes by mingling their own money with public funds in an effort to bolster the finances of the Continental Army.

Their skill in business and finance had been tapped to serve the needs of the war effort. For the most part, they did not view public service to be mutually exclusive of profit making and taking. During the war they had risked much and believed themselves entitled to every opportunity to profit from their patriotic activities, both those undertaken before the signing of the Treaty of Versailles and those engaged in afterwards during the first tumultuous years of the new United States (Herz 1939:15-17; Tucker and Tucker 2008:18-19). Hamilton framed the idea of the Society for Establishing Useful Manufactures in just such a light, "[t]he more I have considered the thing, the more I feel persuaded that it will equally promote the Interest of the adventurers & of the public and will have an excellent effect on the Debt" (Irwin 2004:815).

Peter Colt clearly saw the world through the same lens. Colt was the son of Benjamin and Miriam Harris Colt of Lyme, Connecticut (Table 2.1). Born in 1744, he was the youngest of ten siblings. Following his father's untimely death in 1756, Peter went to live first with his eldest brother, John, and then upon reaching the age of 14, elected to join the family of another brother, Harris. Harris was a "mechanic" by profession but it was quickly apparent that young Peter was too slight of build either to be trained in that discipline or to work the family farm. Instead, he was sent to school, with his rather minimal stake in his father's estate being used to fund his tuition. Peter attended a succession of different lesser schools before finally being enrolled in Yale College. He graduated in 1764 with a Bachelor's Degree and a fairly significant debt (Colt 1821).

He worked briefly as a store clerk but then moved to Elizabeth, New Jersey, where he taught school and was introduced to William Paterson, the future Governor of New Jersey, who would prove so instrumental in arranging for the S.U.M.'s charter, and to the brothers Elisha and Elias Boudinot, two of New Jersey's most distinguished and important politicians. Both Boudinots were to become influential directors of the S.U.M (Nelson 1881-83:1).

Peter Colt soon returned to Connecticut, settling in New Haven and becoming a partner in a West Indies trading concern. Upon the opening of the Revolutionary War, he was initially asked to serve with the rank of Lieutenant Colonel as a personal aide to Major General Daniel Wooster who was in command of the Connecticut state forces. Almost immediately upon agreeing to take up this position, Colt's business partner died aboard ship while returning from the West Indies. With the blessing of General Wooster, Colt decided to abandon his appointment in order to settle the outstanding accounts of his mercantile partnership (Colt 1821). A short time later, a neighbor and friend of Colt, Jonathan Fitch, was appointed as a colonel to serve as the commissary for the County of New Haven in support of the Connecticut forces. He asked Colt to undertake "the outdoor parts of the business that is all of the active and arduous parts of the business" (Colt 1821). In this capacity, Colt saw the opportunity both to serve his country and to settle many of the remaining issues of his mercantile business by conveying much of his remaining stock to the military (Colt 1821). Within its lowest levels, the Commissary Department of the Continental Army was largely comprised of local merchants who were paid a commission of 1.5 percent on provisions acquired for the military (Tucker and Tucker 2008:19).

Table 2.1.

GENEALOGICAL CHART OF THE COLT FAMILY

In 1777, Colt was appointed to oversee the provisioning of the Continental Army under Commissary General William Buchanan in a district east of the Hudson River that included parts of New York, Massachusetts, Connecticut and Rhode Island (Colt 1821). Colt served in this capacity for a number of years. In March of 1779, William Buchanan resigned and was replaced by Jeremiah Wadsworth, a New Haven merchant who was well known to Colt. Wadsworth actually provided the Colt family with a home during this period of service by allowing him to live in one of his own untenanted properties (Colt 1821).

In February of 1781, Robert Morris (later a major shareholder in the S.U.M.) was appointed the Executive Head of the Treasury Department and undertook to consolidate the Quartermaster and Commissary departments. The Commissary Department was effectively eliminated. Supplies were afterwards to be purchased directly on commission. Left without jobs and the lucrative commissions to which they had grown accustomed, Wadsworth and Colt were forced to change armies. Wadsworth, with the aid of a fluent French-speaking partner, John Carter, entered into a contract to provide supplies to the French army of General Rochambeau. Wadsworth and Carter employed Colt to provision an element of the force under the command of Armand Louis de Gontaut, Duc de Lauzun. Joining them in this enterprise was none other than Deputy Quartermaster General Nehemiah Hubbard, Jr., the first man to whom the directors of the S.U.M. offered the job of Superintendent (Colt 1821).

Following the close of the war and the end of the lucrative revenue stream from the French, Colt, in partnership with Barnabas Deane, opened up his own store, "Peter Colt & Co.," in Hartford, Connecticut (Tucker and Tucker 2008:20). He also remained financially connected with Wadsworth and Carter who continued their large scale trading business even after the termination of their French contract. In 1788, Wadsworth and Colt became the principal investors in one of the largest textile enterprises attempted in the United States prior to the founding of the S.U.M. This was the Hartford Woolen Manufactory Company. Its goal was to produce woolen cloth equal in quality with that produced in Britain. Although well capitalized, the company lacked the managerial, technological and mechanical knowledge to successfully pursue the business. Wadsworth attempted to extract the requisite knowledge from English deserters and former prisoners of war with experience in the woolen industry (Tucker and Tucker 2008:21). Peter Colt served as the company's treasurer. During this time, Colt prepared at least three long essays laying out the argument for the development of the wool and cotton industries in the United States and the need for government sponsorship of industry. It is unclear if these essays were actually published but their content shows that, philosophically, Peter Colt was a strong proponent of Alexander Hamilton's policies (Colt *circa* 1792).

There are no clear records concerning how the decision was made to offer Peter Colt the position of Supervisor of the S.U.M.'s works or who first put forward his name. John Colt, his son, suggested that it was "Judge Boudinot [Elisha] and others interested in the Society" who wrote to Peter Colt offering him the position (Nelson 1881-1883:3). Boudinot certainly knew Colt from his days as a schoolteacher in Elizabeth and probably had encountered him later on. Nehemiah Hubbard certainly may have tendered a recommendation on Colt's behalf after he refused the job himself. Regardless of how Peter Colt's name came to the top of the S.U.M.'s list, few Americans at the time would have been able to boast such an appropriate resume. His Yale education immediately distinguished him but he also was an experienced merchant with financial skills. During his years with the Commissary Department, he had demonstrated an organizational ability and as an officer in the Continental Army he had earned membership into that most distinguished of American fraternities, the Society of Cincinnati (Johnston 1889:376). He was a professed and well-known supporter of the development of American industry and was involved in the management of one

of the very few water-powered textile factories to have been established in the United States prior to the formation of the S.U.M.

Peter Colt did his best to see the plans of the S.U.M. through to fruition and continued to serve in the capacity of Supervisor until failing finances finally forced the directors in 1796 to abandon their efforts at operating their factory (Tucker and Tucker 2008:22). Colt resigned his position with the S.U.M. in the same year and left Paterson for Rome, New York. How he felt about the shutting down of the cotton mill is not known, but there were certainly some S.U.M. employees who expressed their displeasure at the mill's closure. According to one Dr. James Mease of Philadelphia, in a statement included in George White's *Memoir of Samuel Slater*, published in 1836:

> The Society soon after established the first cotton factory and printing house, in that state; but in a short time found that a loss attended their business, and it is more probable that from this circumstance, a cessation would soon have taken place of their operations, had they not been forced to give them up, from the following cause. As there was no native workmen to be had, the company were obliged to employ foreigners, who were expressly sent for, or, more probably found in New York. Without any assignable cause, the foreman expressed to the manager of the concern, his determination to leave the establishment, when fully employed; and as no persuasion appeared to have the least effect of altering his determination, he was desired to pack up the machinery. This he did, but filled the vacant spaces with quick-lime, so that when they were examined, the iron work, and particularly the cards, were found entirely destroyed. This fact I had many years since, from the late Hon. Elias Boudinot (White 1836:177-178).

During Peter Colt's tenure as Supervisor relatively little development took place on the ATP site itself. Although a sawmill stood on the property and the tail race of the Society's cotton mill ran through it (see above, Figure 2.2), there was little incentive for immediate development. With the abandonment of L'Enfant's plans, the priority had shifted from providing a source of waterpower for a range of mill sites to a source of waterpower for just one, the cotton mill. Paterson's waterpower system could be – and was eventually later – expanded. In the mid-1790s, however, it was not configured to support additional development on the ATP site. The financial situation just did not favor the investment in additional infrastructure and the construction of additional mills.

Peter Colt did not return to New Jersey permanently for over a decade. In the meantime, he was recruited by General Philip Schuyler, Nicholas Low and George Scriba, all of whom were involved in activities of the S.U.M., to undertake a management position with the Western Inland Lock Navigation Company (Nelson 1881-1883:14). When he did return to Paterson in 1810, according to the account of his son, John, it was because he wanted to be near his eldest son, Roswell Lyman Colt (Plate 2.7), who had renewed the family's involvement with the S.U.M. (Nelson 1881-1883:15-16). Although accounts vary concerning the dates of the first purchases and the speed with which he accumulated shares, Roswell Lyman Colt had by 1810 begun the gradual purchase of a substantial ownership stake in the S.U.M. (Trumbull 1882:47). Roswell had first entered into the world of business by accepting an opportunity with the large New York mercantile and shipping firm of Jacob LeRoy & Sons (Tucker and Tucker 2008:24). Jacob LeRoy was the son of one of the original S.U.M. shareholders, Herman LeRoy, and it is clear that even from the start Roswell Colt was making good use of his father's hard-earned connections in the development of his own career.

Apparently on the advice of his father, Roswell soon began to seek out and purchase shares in the S.U.M. In 1807, the S.U.M.'s cotton mill burned to the ground leaving the organization with no income and relatively little in the way of assets (Clayton and Nelson 1882:410). This provided Roswell with a prime opportunity to purchase a nearly valueless stock. According to Roswell Colt's obituary of 1856 in the

Plate 2.7. Childs & Inman. Lithographic portrait of Roswell Lyman Colt [1779-1856]. *Circa* 1830. This image is based on a painting of Roswell Colt by Thomas Sully. Source: New Jersey Historical Society, Manuscript Group 1361.

Paterson Daily Guardian and the account of John Colt, Roswell had gained control of the majority of the S.U.M.'s shares as early as 1809 (Trumbull 1882:47). Other accounts place this event in 1814 by which date, Roswell had married Margaret Oliver, the daughter of a wealthy Baltimore merchant, Robert Oliver. Roswell is known to have borrowed very substantial sums of money from his father-in-law and has been said by some to have used these funds to leverage his purchase of the S.U.M. (Herz 1939:80).

Testimony in a subsequent court case stated that:

> Roswell Colt in 1814 bought up at a depreciated price a large proportion of the shares, and called the society together, and proposed to its members a plan for improving its affairs, which was to abandon all hope of manufacturing, and to confine its operations to increasing the water-power which it was supposed to own, and the number of sites for manufacturing purposes, to be used by others, and to lease to others the sites with water privileges for manufacturing purposes, which plan was adopted, and ever since has been pursued, under the sole direction of Roswell L. Colt who was then made Governor of the Society, and has continued as Governor ever since (Herz 1939:86).

Regardless of the specific date of Roswell's acquisition of a controlling interest in the S.U.M., this had certainly been achieved by June of 1814 when, at a special meeting of the Society, the results of an election by the shareholders was announced. As per these results, the directors of the S.U.M. would be Peter Colt, Roswell L. Colt, John Colt, Samuel Colt, Robert Collet, Oliver D. Ward, Henry Morris, Thomas Ward, Robert Oliver, John Oliver, James Craig and Nicholas Delaplaine. The majority of these individuals were members of Colt's extended family or close business associates. The remainder were the proprietors of some of the very few small industrial concerns operating in Paterson at that time. Roswell Colt was selected as Governor and his younger brother, John, was appointed Deputy Governor (S.U.M. Minute Books, June 14, 1814).

Although Roswell Lyman Colt has been credited as the force behind the transformation of the S.U.M. from a manufacturing concern into a landlord, the first tentative steps in this direction actually appear to have occurred before his involvement with the Society. At some point around the year 1800, the raceway system feeding the original cotton mill was extended and reconfigured into what would later become part of the Middle Raceway in order to facilitate the leasing and development of the mill site on which the Essex Mill now stands. In this location in 1801, a sandstone paper mill, later known as "the Old Yellow Mill," was erected by Charles Kinsey and Israel Crane (Historic American Engineering Record 1973b). This new section of raceway appears to have terminated at this time at a spillway that cascaded over a 20-foot fall at the foot of Mount Morris before flowing back into the Passaic River.

Perhaps even more significantly, the construction of the Lower Raceway along the northern edge of Boudinot Street (later renamed Van Houten Street) also predated the period of Roswell Lyman's control of the S.U.M. While the extension of the original cotton mill raceway system to the site of the Yellow Mill could have represented an isolated response to a single mill development opportunity, when considered in concert with the construction of the Lower Raceway in 1807, it would appear that the S.U.M. was trying to implement a comprehensive program to reengineer its raceway system in order to open up the land on the west side of Mill Street, north of Market, and on the north side of Boudinot Street between Mill and Prospect streets, as potential leasehold mill sites (Fries 1975:88).

Russell Fries in his article "European vs. American Engineering: Pierre Charles L'Enfant and the Water Power System of Paterson, N.J." broadly attributes the credit for the development of this plan to Peter Colt, but notes the probable contributions of L'Enfant and Luke Usher (the Society's millwright). Fries believed that the plans for these improvements to the waterpower system were sketched out in 1794 before Peter Colt left

Paterson for the first time, but were not implemented due to the cost of construction and the low demand for additional mill sites at the time (Fries 1975:88). Regardless of the source of the inspiration for these new design elements in the Paterson waterpower system, it is clear that the purpose of their construction could only have been the creation of potential leasehold sites for marketing by the S.U.M. to others.

The extension of the Middle Raceway and the construction of the Lower Raceway finally opened up the lands of the ATP site to large-scale industrial development. The first mill to be constructed on the Lower Raceway was that of John Parke. The construction of this mill, which stood on the site of the present Phoenix Mill building a short distance to the east of the ATP site, commenced in 1810, and was probably instigated by the destruction of the original cotton mill which had been occupied by Parke (Clayton and Nelson 1882:441). Parke's was the first of a series of mills that would be constructed over the course of the next decade along the Middle and Lower Raceways.

Some sense of the mill building activity along the Lower Raceway in the second decade of the 19th century may be gained from the sketchbook of retired English naval captain Joshua Rowley Watson, who visited the Great Falls in mid-August of 1816. In one sketch, produced from a vantage point at the falls close to where the hydroelectric plant is situated today, Watson depicts a mill that has the appearance of a cotton or woolen factory and which seems to occupy the site of what was later known as the Mallory Mill (Plate 2.8). A second sketch, drawn from a position on the riverbank further downstream (probably near the eastern end of the ATP site), shows other mill and workshop structures that would have been situated on mill lots fed by the Lower Raceway (Plate 2.9).

These newly created mill parcels are shown on *A Map of the Village of Paterson in Essex County*, produced in 1820 (Figure 2.7). This, the earliest known detailed cartographic representation of Paterson, shows that by 1820, all of the available mill sites between the Middle Raceway and Mill Street, and between Boudinot Street and the Passaic River, had been leased or sold to mill proprietors. About half of the real estate along Congress Street had been similarly claimed. Of the 16 occupied mill lots which represented virtually the entirety of industrial Paterson at that date, the Colt family controlled three for their own uses (Figure 2.8). This map shows both tangible evidence of the beginnings of the Colt family hegemony over Paterson's industrial community and the significance and value that the Colts placed on the mill sites located at the elbow formed by the intersection of Mill and Boudinot Streets.

Probably the most desirable mill seat on either the Middle or Lower Raceways from the point of view of available hydropower was the site that stood along the eastern edge of its recently constructed waste weir between Boudinot Street and the Passaic River. This location was unique because of its proximity to both raceways and to the Passaic River. Perhaps even more remarkable, it stood on the site of a nearly 20-foot fall in elevation between the height of the Middle Raceway and that of the Lower Raceway or waste weir.

It was this location that Roswell Colt selected for his family's first mill. Samuel Colt, a cousin of Roswell L. Colt, first proposed the idea. Samuel Colt was a Newark merchant who first entered into industrial pursuits when, on the basis of family connections, he was asked to supervise the rolling mill and nail manufactory of Jeremiah Halsey Pierson in Ramapo, New York (Nelson 1881-1883:28-29). Pierson's father had begun the manufacture of cut nails in the late 1780s and by the 1790s had patented his own nail manufacturing machine (Swank 1884:108-109). Roswell Colt agreed to finance the new Paterson enterprise, investing his own money and that of his brother, John. John's share in the venture had been earned during a period in which he was involved in international trade, representing both his own interests and those of several firms in Europe and the Far East. Roswell, who had been entrusted with the care of his

Plate 2.8. Watson, Joshua Rowley. *Passaic River over the Falls looking down.* August, 1816. This sketch, drawn by a retired English naval Captain during his travels in the United States, shows the view looking downstream from the Great Falls from roughly the modern-day location of the hydroelectric power plant. The large rock outcrop in the right foreground is Mount Morris; just beyond is a three-story mill building, probably constructed within the preceding three years, which is conjectured to occupy the site of the later Mallory Mill. Source: New-York Historical Society, The Sketchbook of Joshua Rowley Watson, page 7.

Plate 2.9. Watson, Joshua Rowley. *Patterson 16th Augt.* August, 1816. This sketch, drawn by a retired English naval Captain during his travels in the United States, shows the view looking downstream from roughly the location of the Home Mill or the Nightingale Mill, close to the eastern end of the ATP site. The S.U.M. Island is in the center of the view, with Gordon's Bridge to the right and the Dutch Reformed Church to the left, on the left bank of the Passaic. The identity of the buildings in the right foreground is uncertain; they are probably mills and workshops on the mill lots fed by the lower end of the Lower Raceway to the east and downstream of the ATP site. Source: New-York Historical Society, The Sketchbook of Joshua Rowley Watson, page 5.

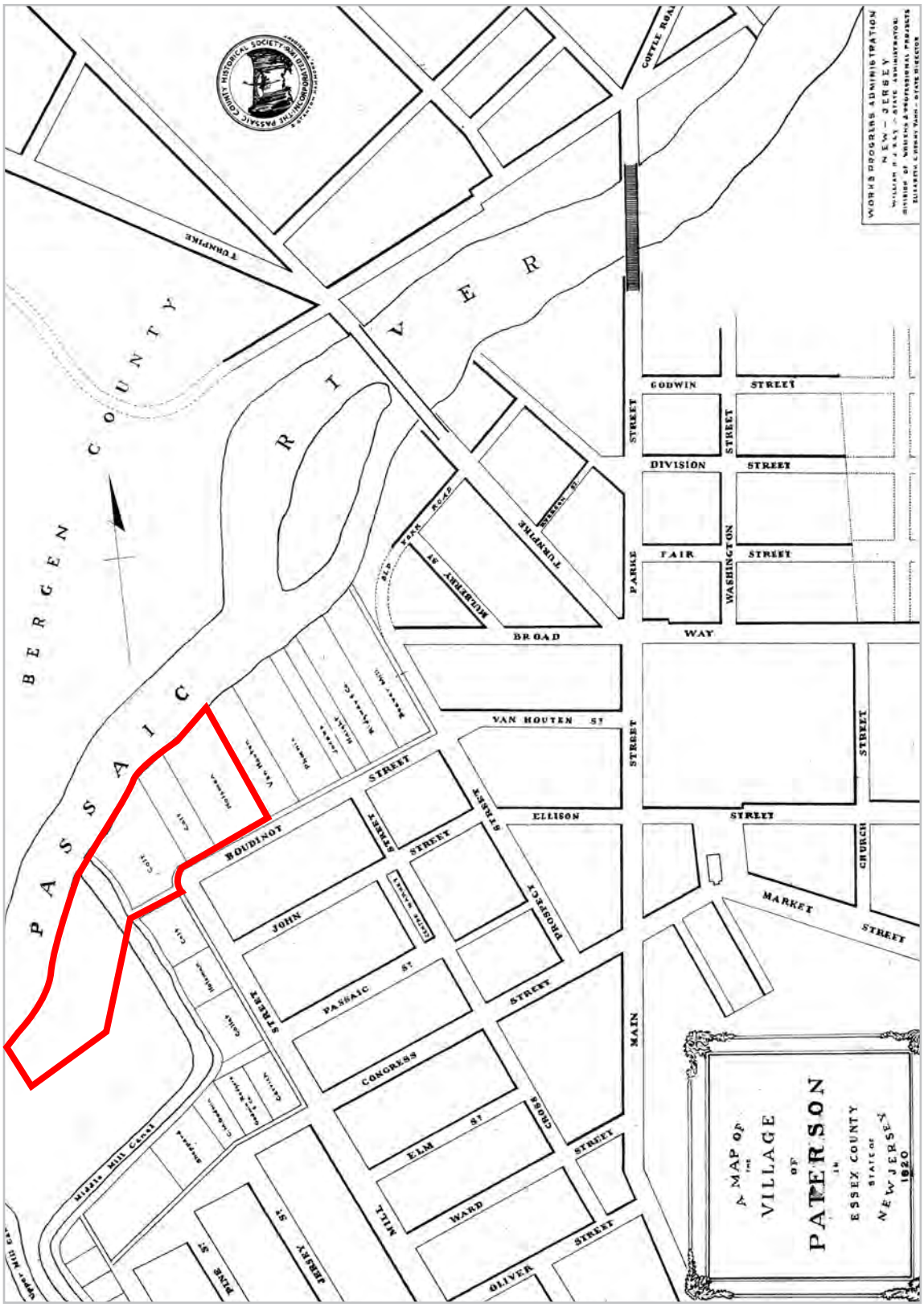


Figure 2.7 *A Map of the Village of Paterson in Essex County, State of New Jersey.* 1820. [As traced by the Works Progress Administration]. Scale: 1 inch= 445 feet (approximately). Limits of Allied Textile Printing site are outlined.

Figure 2.8. *A Map of the Village of Paterson in Essex County, State of New Jersey.* 1820. [As traced by the Works Progress Administration]. Detail showing mill sites along Boudinot Street. Scale: 1 inch= 110 feet (approximately). Limits of Allied Textile Printing site are outlined.

brother's money, invested it in the rolling mill without first consulting John. John returned in the summer of 1812 from a successful trading voyage to France to find himself a full partner in the firm of "Samuel Colt &. Co." (Nelson 1881-1883:28-29). The third partner in Samuel Colt and Company was Nicholas Delaplaine, Samuel Colt's brother-in-law. Samuel Colt was the "practical manager" of the concern but Delaplaine apparently oversaw the day-to-day work at the factory (Nelson 1881-1883:29; Clayton and Nelson 1882:438).

In the fall of 1812, construction was completed on the rolling mill of Samuel Colt, John Colt and Nicholas Delaplaine (Nelson 1881-1883:18). The mill was described as being a small frame building with a high-peaked shingled roof and was whitewashed on its interior. It is almost certainly the building depicted more than two decades later in the oil painting by Thomas Whitley reproduced as Plate 2.10. William Nelson later noted that he possessed a picture of the building that may be the same as that illustrated here (Clayton and Nelson 1882:438). John Colt also recounted to William Nelson that he had personally commissioned some watercolor views of the nail mill and several houses in Paterson that were made by "a Frenchman from Brooklyn" – these presumably are different paintings altogether (Nelson 1881-1883:17).

According to the account of John Colt, the firm of Samuel Colt & Company made shovels, spades, camp kettles, frying pans and the like. The early success of the firm was in large part due to the demand for these supplies from American militia units and the Army during the War of 1812. According to Colt, the rolling mill employed about a dozen men included teamsters and woodchoppers who were required to feed the establishment's wood-fired furnaces (Nelson 1881-1883:18). In 1814, the manufacture of nails was begun. Swedish and Russian bar stock was imported for this purpose. At first, the cut nails were headed by hand by a staff of "forty headers," but this process was subsequently mechanized. According to Colt, the rolling mill operation was abandoned at the close of the war when the flooding of the market by English imports made its continuation unprofitable (Nelson 1881-1883:18). Some evidence exists that the rolling mill was abandoned by Samuel Colt & Company but was afterwards operated, in the 1820s, by others who may have rented the facility (Ransom 1966:101).

Personal misfortune seems to have haunted both Nicholas Delaplaine and Samuel Colt. John Colt recalled that Mrs. Mary Andruss Delaplaine "was found lying in her room one day, with her throat cut out, and Mr. Delaplaine's razor lying before her." Suicide was presumed (Nelson 1881-1883:29). Following the disturbing death of his first wife, Delaplaine courted her sister, Lydia, whom he married four years later (Brown 1983:144). Nicholas Delaplaine appears to have withdrawn from the firm of Samuel Colt & Company the year after his second marriage. Both he and his new wife would die less than three years later, both departing this life in February of 1821 (Brown 1983:144).

In the following year, 1822, Samuel Colt sold his interest in the nail manufactory to John Colt, leaving him the only remaining partner in the concern (Essex County Transcribed Deed F/121). According to John Colt, following his exit from the company, "Samuel Colt went from Paterson to Rochester; there he engaged in business, but soon sank into every dissipation. At last, one night in the lowest kind of place, where negroes &c. gathered, he was terribly beaten. He was carried to the hotel, covered with blood and dirt; there they washed and cleaned him, and had his wounds dressed but he died during the night" (Nelson 1881-1883:29).

The nail manufactory remained in operation until 1824 when John Colt finally closed the operation down and rented its facilities to others for different purposes (Nelson 1881-1883:18). U.W. Freeman's *Map of the Town of Paterson* (Figure 2.9), which was published in 1835, shows the footprint of the building that formerly housed Colt's rolling mill and nail works and the

Plate 2.10. Whitley, Thomas. Oil painting of the Nail Factory. *Circa* 1835. The date of this painting and the identity and location of the mill depicted therein have been the subject of considerable debate and confusion. A card affixed to the rear of the painting reads: "The Nail Factory at the foot of Broadway at the Pitch of the Race way Painted by Thomas Whitley – cir 1850 – Presented by Mrs. James H. Rogers." Current thinking is that the painting shows John Colt's rolling mill and nail factory, which formerly occupied the site of the Gun Mill at the "pitch" of the Middle Raceway. Assuming this location attribution is correct, since Thomas Whitley emigrated to the United States around 1835 and was based in Paterson from 1835 to 1839, and the mill of the Patent Arms Manufacturing Company was erected in 1836, the painting can be reasonably securely dated to 1835-36. Source: Passaic County Historical Society Collections, Lambert Castle.

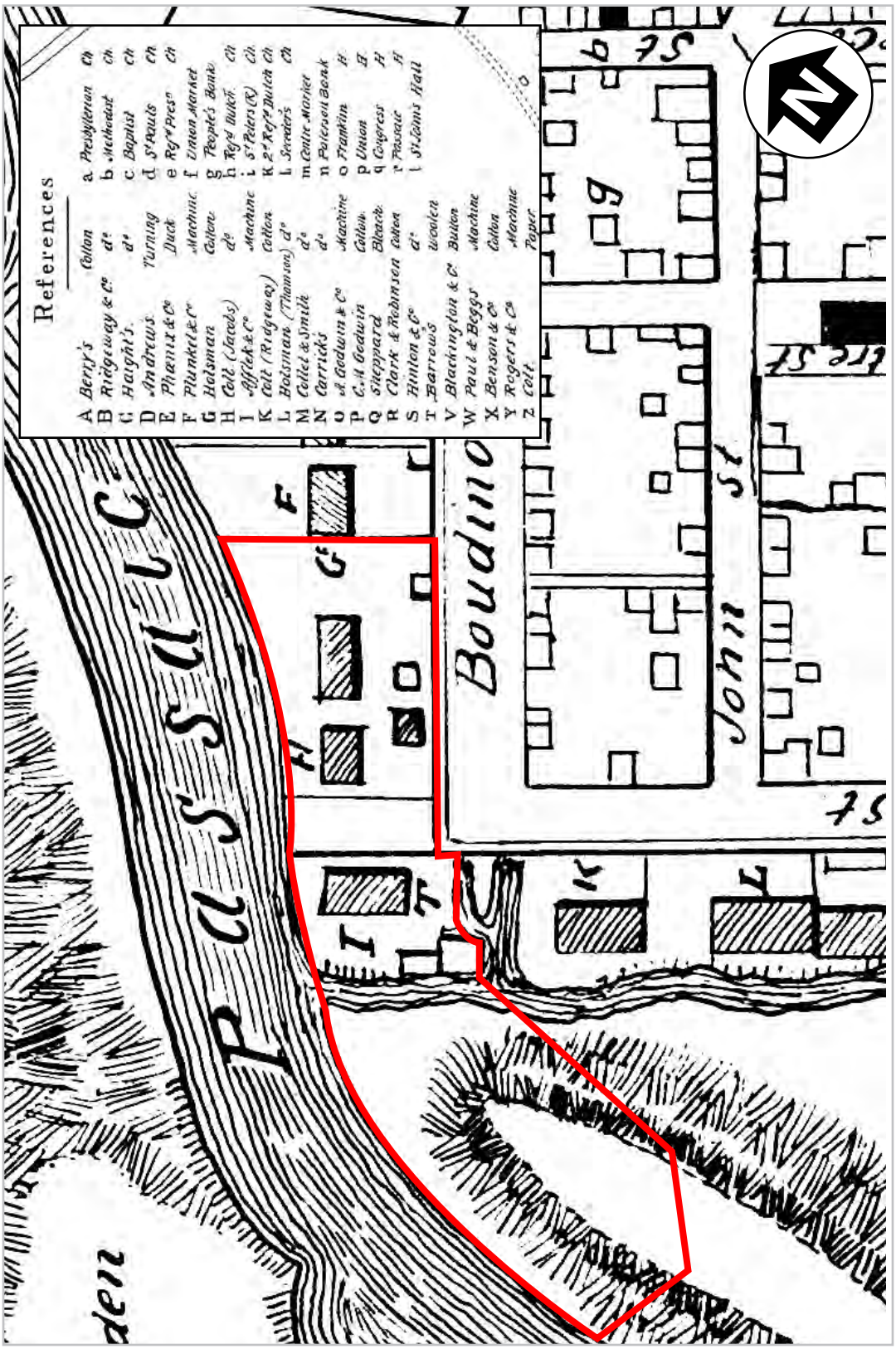


Figure 2.9. Freeman, U.W. *Map of the Town of Paterson, New Jersey.* 1835. [As traced by the Works Progress Administration]. Scale: 1 inch= 100 feet (approximately). Limits of Allied Textile Printing site are outlined.

relationship of the building to the adjacent raceways. This map was published just a few months prior to its demolition around the same time that Thomas Whitley produced his painting of the nail factory (Plate 2.10). The key accompanying the Freeman map indicates that the building was occupied by "Afflek & Co." This probably represents the firm of Affleck & Dunmire which L.R. Trumbull identified as having occupied the old nail factory and operating a millwright and jobbing shop there (Trumbull 1882:78).

Although John Colt may have halted his own manufacturing operations at the nail factory in 1824, the Colt family clearly continued to recognize the economic value and development potential of the manufacturing sites along Boudinot and Mill Streets. Around 1813-14, John Colt had expanded his manufacturing interests by opening a textile factory on a mill site located immediately to the east of the rolling mill and nail factory. Known as Passaic Mill No. 1, this property was owned by Peter Colt until 1823, when it was transferred outright to John Colt for the purchase price of $8,000 (Essex County Deed P2/258).

During John Colt's early period of occupancy, he appears to have shared the facility with Oshea Wilder who utilized the building until 1815 to produce wire. This was an early example of a pattern that would prove both enduring and significant in Paterson's industrial history: multiple enterprises occupying different floors or different sections of the same mill building. Such businesses often supplied one another with needed materials and equipment. The wire produced by Oshea Wilder was, for example, utilized in the manufacture of cotton and wool cards, some of which may very well have been purchased and used by John Colt in his cotton operation (Trumbull 1882:43). This precedent had been set from the very start with the original S.U.M. mill. While the S.U.M. undertook cotton manufacture under its own name, it also rented space to John Campbell, who undertook to weave stockings, and John Richards, who wove cotton fabrics on hand looms (*Scientific American* 1859:283).

John Colt began his enterprise with the intent of manufacturing shoemaker's and seine thread using flax spinning machinery which he had acquired in fulfillment of a debt. Then Colt was shown a piece of superior quality British-made "duck" or sail cloth (Nelson 1881-1883:19). The English used flax for the production of sail cloth. Previous attempts to manufacture this material in the United States had met with some measure of success, but flax thread was prone to twist in the loom. Without the requisite technical knowledge and machinery needed to keep the thread straight, American manufacturers had resorted to the application of copious amounts of starch which in turn resulted in the fabric being prone to mildew (DeBow 1853:480). This was not a desirable trait for a product that was intended to be stored for long periods of time aboard ships in a dark, damp environment.

British manufacturers had overcome such problems by doubling and twisting the individual flax threads prior to weaving. No starch was needed (Nelson 1881-1883:19). Colt recognized the vast potential market for domestically manufactured sail cloth and set out to weave doubled and twisted duck. In order to accomplish this, he hired skilled Irish hand weavers and had a number of robust looms constructed. In this fashion, he wove enough duck to convince the United States government to agree to purchase all of the fabric he could manufacture (Nelson 1881-1883:19).

Not satisfied with the speed with which linen duck could be woven by hand or the expense involved in its manufacture, Colt set about trying to find a mechanic who could construct power looms capable of manufacturing it. After some initial false starts, Thomas Rogers of Paterson (later better known as the founder of the Rogers Locomotive Company) worked out an effective design which permitted Colt to divest himself of his expensive skilled weavers and hire women and children to operate his new power looms (Nelson 1881-1883:19-20). Colt also switched from using flax thread to cotton thread and became the first manufacturer in the world to produce "doubled and twisted" power-woven cotton duck. Colt met with a

remarkable degree of success and he soon expanded his facilities by leasing the Essex Mill (the old Yellow Mill) for the manufacture of "warp and filling" for the New York and Philadelphia markets. Passaic Mill No.1 became popularly known as the "Duck Mill" (Trumbull 1882:59).

By the end of 1829, John Colt had consolidated his primary assets, both his real estate and his manufacturing enterprises, into the Paterson Manufacturing Company. For a number of decades, John Colt was the largest domestic manufacturer of duck and believed he was responsible for approximately 50% of all of the material produced in the United States. Although in 1833, Colt noted that he was the only manufacturer of the material in New Jersey, what he actually meant was that he was the only manufacturer of cotton duck (McLane 1969 [1833]:162). By the late 1820s, he had already begun to experience some measure of competition from John Travers, the proprietor of the neighboring Phoenix Mill, who had begun the manufacture of linen duck (Trumbull 1882:52). Colt responded by entering into an arrangement with Travers by which they agreed to divvy up potential contracts between the two of them. Colt maintained an advantage by means of his ability to weave duck in 44-inch widths. According to his own statements, during the mid-1830s, he was the only American manufacturer able to produce duck in such widths, which was both economical from a production standpoint and obviously more desirable to potential buyers who desired large sheets of duck for use as sail cloth (John Colt 1834a).

The success of John Colt's duck manufacturing venture comes to life in his correspondence with his brother Roswell:

> The Duck is going off very fast – my Sales at New York are increasing considerably (220 Bolts have already been sold at New York Store) I have not <u>now</u> over 1000 to 1200 Bolts instead of Bales on hand, say here and in New York on Saturday I sold 44 Bolts in N. Yk – to different customers (John Colt 1833).

For John Colt and later, his son, Elias Boudinot Colt (who, after 1859, headed the newly formed Passaic Manufacturing Company), the production of cotton duck at the Duck Mill would always supply a substantial portion of their income. It should be remembered that for much of this period when John Colt was functioning as a private mill proprietor, he was also continuing to serve as the chief agent of the S.U.M. overseeing its day-to-day operations in Paterson.

John Colt was certainly not the only person to commence the manufacture of cotton on the ATP site. In fact, cotton manufacturing proliferated here throughout the second, third and fourth decades of the 19th century. C.G. Van Wagoner's *Map of the Town of Paterson, New Jersey* of 1840 (Figure 2.10) shows other new mill buildings as the cotton industry continued to drive industrial development. Daniel Holsman's Home Mill occupied the mill lot immediately to the east of the Duck Mill. Erected in 1813, it would prove to be one of Paterson's earliest and most resilient cotton manufactories. The building was later, during the 1830s, occupied by the firm of Benson and Rutan, and still later, during the 1840s, by Stark & Parsons. Both concerns spun cotton yarn on commission (Trumbull 1882:56-57). For a brief period, between 1832 and 1835, John Barrow & Sons wove satinet and woolen goods in a frame building at the rear of the Waverly Mill lot, the mill seat located immediately to the west of the Duck Mill. Satinets are fabrics with a cotton weft and a wool warp usually used in men's clothing. In 1845, the firm of Lawton and Cutler also undertook to weave satinet. They operated out of the Mallory Mill, which was situated immediately to the west of the Waverly Mill property (Clayton and Nelson 1882:455).

In the late 1840s William Inglis from Fife, Scotland, wove diapers and toweling on the first floor of the Mallory Mill and then, in partnership with James Jackson, occupied the entire mill building, spinning yarn and weaving cotton flannels, until the destruction of the mill by fire in 1856 (Clayton and Nelson

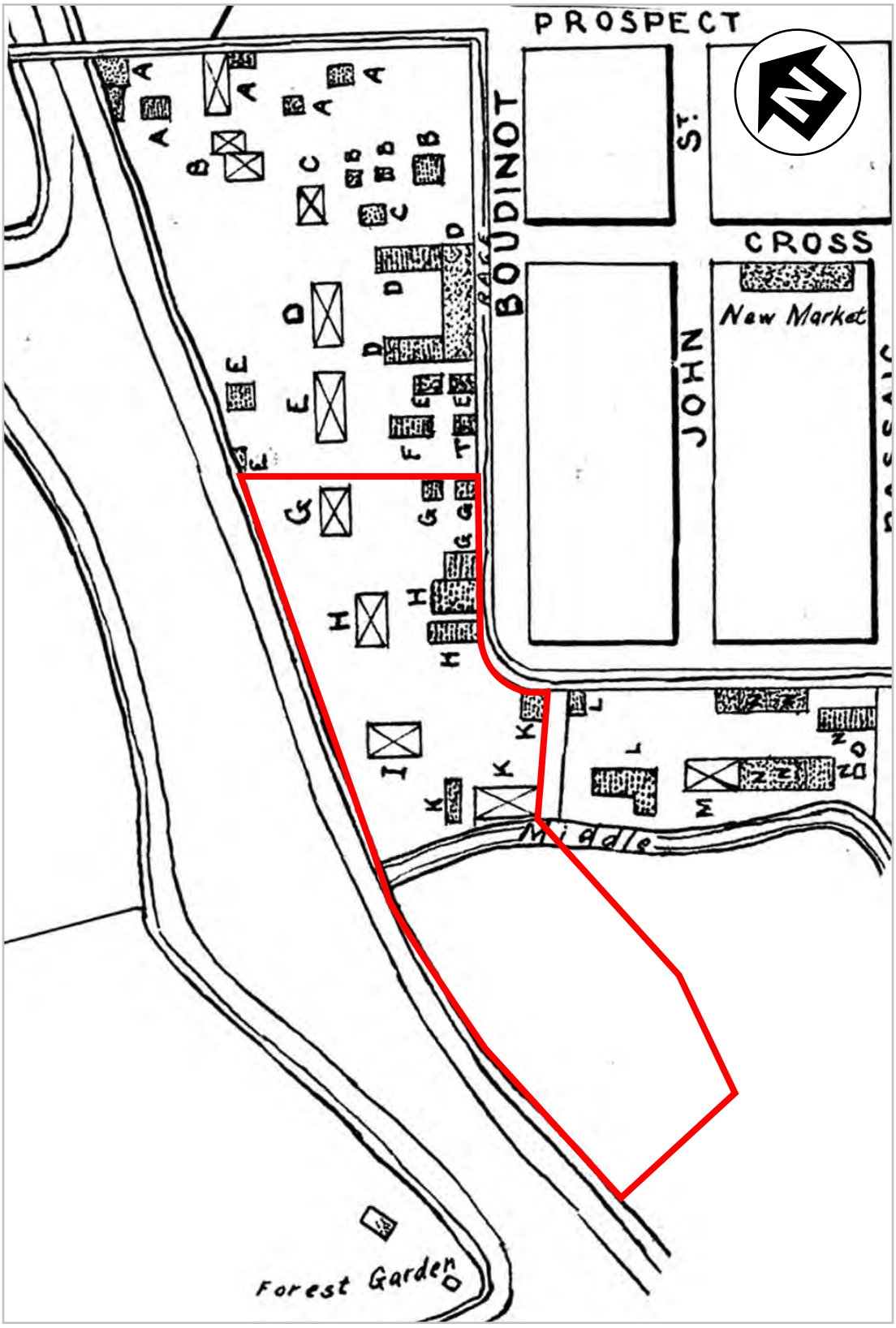


Figure 2.10. Van Wagoner, C.G. *Map of the Town of Paterson, New Jersey*. 1840. [As traced by the Works Progress Administration]. Scale: 1 inch= 225 feet (approximately). Limits of Allied Textile Printing site are outlined. The map identifies "K" as the "Patent Arms Manufactory," "I" as the "Mallary Mill" (which it indicated was a woolen manufactory), "H" as the "Passaic Mills" (a cotton manufactory) and "G" as the "Home Mill" (also a cotton manufactory). It should be noted, however, that the WPA tracing introduces a measure of inaccuracy when compared to the original map (which is reproduced in W.W. Clayton and William Nelson's History of Bergen and Passaic Counties, New Jersey [1882]). Also, unlike the WPA tracing, the original map does not identify specific buildings.

1882:419). In 1855, David G. Scott commenced the bleaching, dyeing and printing of cotton fabrics in his Waverly Mill. Scott's business expanded rapidly and was incorporated under the name of the Franklin Manufacturing Company. During the 1870s and 1880s, it grew to occupy both the Waverly and Mallory mills.

In the nearby Colt Gun Mill (a substantial stone mill building which was erected in 1836 on the site of the rolling mill and nail factory, H.M. Low and Company undertook the manufacture of cotton from 1842 to 1858 (Trumbull 1882:56). During the 1860s, two cotton making firms produced yarn in the Colt Gun Mill at the same time. Snyder, Rae and Vreeland occupied the upper two stories of the building, while Benjamin Buckley and Company occupied the ground floor of the establishment (Trumbull 1882:56-57) (Figure 2.11).

Cotton played a dominant role in the early industrial history of Paterson. The spinning of cotton thread and the weaving, bleaching, printing and dying of cotton cloth were all among the activities that were intended to be promulgated by the S.U.M. It was the cotton industry that fed the *circa* 1810-15 construction boom that really established Paterson as a functioning industrial community. The success of the industry fluctuated over the course of the 19th century and closely reflected the boom and bust cycles that defined both the local and national economies for much of the early period of Paterson's growth. L.R. Trumbull (1882:41) documented five "almost complete prostrations" of business in Paterson history occurring in 1796, 1816, 1837, 1857 and 1874 but there were, in fact, even more. For example, John Colt wrote to his brother Roswell, in April of 1834 that economic conditions had deteriorated to the point that "many persons talk of moving away - If business does not revive in 6 mos, you may write 'the deserted village' after the word Paterson" (John Colt 1834b).

As might be assumed by reading the long list of relatively short-lived firms provided above, the cotton industry in Paterson was characterized by the varied activity of a large number of smaller firms. These were primarily private operations owned by a single proprietor or by a limited partnership. Only a handful of Paterson's cotton manufacturing concerns were ever formally incorporated. By and large this meant that they were also undercapitalized, which ultimately proved a substantial hindrance to the long-term growth of the industry in the city. Few of Paterson's cotton mills undertook to weave fabric. There was a nearby ready market for spun yarn and thread in the weaving shops of New York and Philadelphia. In 1829, for example, 62% of all yarn spun in Paterson was sold in these markets (Garber 1968:35). As few Paterson manufacturers were sufficiently capitalized, power looms were relatively rare. Instead, most of the weaving that was undertaken was done on hand looms in small shops or private homes (Garber 1968:36).

By and large, in Paterson, separate mills undertook all of the different component processes in the cotton textile manufacturing business. The development of large cotton factories which integrated all aspects of the textile manufacturing process under a single "roof" was retarded and Paterson's smaller manufacturers soon found it difficult to compete with the large textile corporations that were emerging in New England and with the new shops that were beginning to spring up in the Southern states. John Colt's Paterson Manufacturing Company, which was adequately capitalized through the backing of the Colt family, was one of the most notable exceptions. The neighboring Phoenix Manufacturing Company was another. There were never more than three or four cotton manufactories in their league in the city. The size and capitalization of these corporations enabled these companies to compete in ways that the myriad of other smaller firms could not. John Colt's enterprise also benefited from the fact that it produced a niche product that was not in competition with most of the nation's other textile manufactures.

While it is true that the manufacture of cotton goods played a much larger role in the early years of Paterson than it did in the later 19th century, L.R. Trumbull noted that, even though Paterson's cotton industry was considered to have been in the process of a long slow period of decline by the 1880s, it was perhaps better viewed as more of a stagnant industry than a dying one (Trumbull 1882:63-64). Although over the course of the second half of the 19th century, the total number of manufacturers was decreasing and new ventures were usually unsuccessful, Paterson's cotton output remained relatively stable. The business thus consolidated into a smaller number of larger firms. Growth, especially when compared with that which was then being experienced in the industry in the rest of the United States, was minimal and the impression of the imminent demise of cotton manufacturing in Paterson was intensified by the overall expansion of other forms of industry throughout the city. Ultimately, it is important to acknowledge the cotton industry's contribution to the development of industrial Paterson. The industry stimulated the overall development of industrial Paterson, encouraged the emergence of a class of skilled textile workers and fostered the establishment of machine shops and other mill support enterprises which provided the backbone for future industrial growth in the city (Garber 1968:45).

* * *

Thus it was that under Roswell Colt's shrewd oversight the fortunes of the S.U.M. were transformed in large part through the success of the cotton industry. The S.U.M. had been formed as a unique public/private venture targeted at establishing an extensive manufacturing works that would be owned and operated by the shareholders of the S.U.M. By the late 1790s, the goal of the S.U.M. operating its own facilities had been abandoned and the organization scaled its operations back to focus on the leasing of its facilities. This was a change forced upon the Society by the shortcomings of the organization in the face of the economic realities of the time rather than the implementation of a carefully considered new business model. While there was no demand for mill sites, the organization slumbered.

Following its acquisition by Roswell Colt, instead of functioning as a shadow of its former self as the unhappy landlord of a single mill, the S.U.M. morphed into a real estate company that leased mill sites and water rights. The first steps in this direction may have been taken before Roswell Lyman Colt's involvement, but he, without doubt, should be credited with overseeing the S.U.M. during its period of greatest vitality. No pretense was made with regard to the construction, ownership or operation of factories. In operating this way, Roswell Colt reconceived the S.U.M. into an almost pure revenue stream for himself and his family. Colt even took advantage of a long forgotten clause in the company's charter that allowed it to operate a lottery to raise up to $100,000 in capital funds. According to Colt, during the 1790s, an attempt to utilize this clause had resulted in a loss to the S.U.M. of about $14,000, meaning that the option to attempt to raise the full sum was still on the table. Colt hired an outside organization, the D.S. Gregory Company, to operate what was at that time the State of New Jersey's only lottery and the profits of this enterprise went largely into Colt's own deep pockets (Herz 1939:85, 87).

At the same time that he was reinvigorating the Society for Establishing Useful Manufactures, Roswell Colt was also working to carefully develop an image of himself as a financial baron in the tradition of Stephen Girard or Nicholas Biddle and began casting himself as the leading citizen of Paterson. Since Paterson was still largely a company town administered under the S.U.M.'s original charter, Colt, as the chief stockholder and Governor of the S.U.M., wielded a remarkable degree of power and served as the primary focus of civic authority in the community until the Township of Paterson was formally founded in 1831.

KEY

1. Silk Mill
2. Stable
3. Carpenter's Shop
4. Boiler House
5. Store House
6. Cotton Mill
7. Picking Room
8. Silk Frames
9. Reeling Room
10. Machine Shop
11. Wheel House
12. Spinning Room
13. Pearl Manufactory
14. Cotton Shed
15. Packing House
16. Bleaching?

Frame
Brick
Stone
Other
Street
Project Limit
Property Line

VALLEY OF THE ROCKS

RIVER

PASSAIC

North Gates Wasteway

QUARRY

MOUNT MORRIS

MALLORY MILL

WAVERLY MILL

David Gavin Scott

PASSAIC MILL No. 1

Paterson Manufacturing Company

TODD MILL

Todd, Mackey & Co.

GUN MILL

Benjamin Buckley & Co.

Lower Raceway (circa 1807)

VAN HOUTEN STREET

Middle Raceway (circa 1800-1801)

Lower Raceway (circa 1807)

MILL STREET

0 50 100 200

Feet

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the

Allied Textile Printers Site

in 1850

Figure 2.11

Viewed superficially, Colt may have appeared every bit the model of the successful entrepreneur and self-made businessman who recognized the opportunities before him and fairly took advantage of them. A closer look at the record quickly reveals a far more complex reality. Roswell Colt utilized a series of personal connections and friendships to shape his later success. His father, Peter Colt, belonged to a generation of patriotic individuals who had believed that it was possible for men of strong moral standing to simultaneously pursue the success of the nation and their own personal enrichment in the same business or governmental ventures without crossing ethical lines. In the course of their activities, they relied on opportunities presented by strong personal connections established through the shared experience of service during the Revolutionary War or by mercantile or financial ties. These ties were often reinforced by marriage.

Roswell Colt, on the other hand, took full advantage of his father's personal reputation and business connections to advance his own interests, but had no particular sense that in doing so he was serving the public good or advancing the prospects of his country. Roswell Colt was an entrepreneur, a speculator and a capitalist whose interest apparently extended no further than the financial betterment of himself and his immediate family. He cultivated personal relationships with highly placed men in both business and government, but these friendships were utilized primarily for his own financial gain. In order to support his own lavish lifestyle and to bankroll the business investments of himself and his family, he borrowed hundreds of thousands of dollars from his father-in-law. He also exploited a carefully cultivated friendship with Nicholas Biddle, the head of the Bank of the United States to secure insider trading information which allowed him to reap enormous profits in stocks and securities. Biddle also arranged for loans in excess of $300,000 from the Bank to Colt (Tucker and Tucker 2008:50-51). Much of this principal seems to have never been repaid. Through various legal manipulations Colt always seemed to remain one step ahead of his many creditors while keeping nearly all of the less seemly aspects of his business life hidden from public view (Tucker and Tucker 2008:50-51).

Roswell Colt's true colors began to show through in the 1830s when he decided to erect the largest home Paterson had ever seen. The splendor of this residence and its grounds is evident in an elaborate description of the property published in the *American Agriculturalist* (Allen 1845:151-154). As the site for his new palatial residence, Colt selected the sandy hill that Pierre L'Enfant had originally envisioned as the center of Paterson. The symbolic importance of the site could not have been lost on the Colt family. L'Enfant had intended to make it the umbilicus of the city by placing a significant public building on its summit and radiating all of Paterson's primary avenues from its base. Roswell Colt selected it as the site of his baronial manse, installing himself, the Governor of the S.U.M., as the symbolic and literal focal point of the city. According to Robert Herz's thesis entitled "The S.U.M., The History of a Corporation," Roswell House (Plate 2.11), as the mansion and its associated farm and ornamental gardens were known, was constructed for the sum of $100,000, an expense borne entirely by the S.U.M. (Herz 1939:81-82).

For his wife, the house was the last straw. She had found some his previous actions quite objectionable, but when Roswell chose to ignore her opinions concerning the location, design and scale of the new house, she left him, taking six of her ten children with her. Her family, in a public and messy court case, sued Roswell for the money he had borrowed from her father during his lifetime. Roswell lost and was forced to make good to the Oliver family in the form of a bond and mortgage on the S.U.M. and through the bestowing of specific lease rights to S.U.M. properties upon the Oliver heirs. This largely resolved Roswell's financial battles with the Olivers but opened up an entirely new area of conflict with a large group of the S.U.M.'s remaining non-Colt family stockholders who not unreasonably claimed that Roswell had used company assets to pay private debts. Some of these

Plate 2.11. View of Roswell House, the grand residence of Roswell Lyman Colt in Paterson, looking north, *circa* 1875. Source: Passaic County Historical Society 1956:31.

of his invention, Colt set out on a lecture tour of the United States and Canada marketing himself as "Dr. Coult of Calcutta" and speaking on the wonders of "Nitrous Oxide Gas. For Ladies and Gentlemen" (Phillips and Wilson 1979:65-66).

The gun that Chase fashioned for Samuel Colt proved unsuccessful, but the young inventor was not overly deterred and commenced a long process of refining designs and improving production methods. Over the course of these activities, which extended through 1835, he used the services of a number of different gunsmiths before finally engaging John Pearson of Baltimore, who was able to produce functional, although not completely perfected, prototypes of revolving handguns, rifles and even a shotgun. Meanwhile, Colt had been actively pursuing both English and American patents for his firearms. It was in May of 1835, while in Baltimore, that Samuel Colt first sought an introduction to Roswell L. Colt, who was at that time in residence in the city (Samuel Colt 1835a). Samuel solicited both Roswell's advice and financial backing and appears to have received both. Roswell apparently exerted considerable political clout in an effort to expedite the granting of a United States patent to Samuel (Tucker and Tucker 2008:56). Samuel also sought information from Roswell concerning how to set about acquiring an English patent for his invention. At Roswell's request, his brother John produced a lengthy letter outlining the process for Samuel (John Colt 1835). In August of 1835, Samuel, following John Colt's advice, traveled to England and France in pursuit of such patents. In February of 1836, Samuel was successful in acquiring his first American patent (Phillips and Wilson 1979:67).

With patent in hand, Samuel considered his options. He could either try to raise capital and manufacture his revolving firearms himself, or he could sell his patent to another individual or group who would manufacture the weapons. There was simply no way that Colt could raise sufficient funds to construct a factory and manufacture the firearms on his own. Convinced, however, by Henry L. Ellsworth and others that his patent was very valuable and that he was likely to be the recipient of large government contracts, he was reluctant to convey his patent outright to another business entity. In addition, in order to finance his activities and the perfection of the weapon, he had already sold 1/8 interests in his invention to his father and to Joseph G. Selden, a wealthy relative from Troy, New York (Samuel Colt 1835b).

Ultimately, the solution was the formation of a private company, the Patent Arms Manufacturing Company of Paterson, N.J. which was chartered by the State of New Jersey on March 5, of 1836. Roswell L. Colt, once again, was influential in assisting Samuel in the lobbying of the State government in favor of the new corporation. Roswell also helped to promote the sale of stock in the new company among his own highly placed friends in New York and New Jersey. Henry LeRoy, Roswell Colt's former employer was enticed to buy shares, as was LeRoy's Son, William. The President of the new company was Thomas Addis Emmet, a wealthy New Yorker and relative through marriage of Henry LeRoy (Tucker and Tucker 2008:56). Other members of the Emmet family were also convinced to buy stock in the venture. Daniel Holsman, the proprietor of the neighboring Home Mill, was one of a few native Patersonians who invested in the firm (Phillips and Wilson 1979:67).

It is likely that the selection of Paterson as the site of the manufacturing concern was due to the influence of Roswell Colt. Samuel Colt agreed to assign the right to manufacture his guns to the new company in return for a share in the profits of all firearms sold, a salary of $1,000 a year and the right to subscribe to $50,000 worth of stock. He would "devote sufficient time, not to exceed nine months from the period when this proposal shall be accepted, to organize, establish and set in operation, proper works for the Manufacturing of Arms, and will select workmen and instruct them in the art and business of constructing Arms according to said Improvements, and will at other times give such other aid as may be necessary to perfect and introduce

remaining shareholders sued for misappropriation of S.U.M. funds for personal use and identified a long list of such indiscretions in their filings. The import of their claims was tempered somewhat by the sheer magnitude of Colt's holdings. In an 1846 affidavit, 2,269 shares of S.U.M. stock were identified as being in existence. Two hundred and eleven of these shares were held by Roswell Colt's sons, Roswell Colt, Jr., Morgan Colt and Thomas Colt. Roswell, himself, controlled 2,000 and 3/7 shares of stock. This meant that the control of only 57 and 4/7 shares (or approximately 3%) of S.U.M. stock lay outside of Roswell Colt's immediate family's control (Herz 1939:81). Roswell may have been misappropriating money from the S.U.M. but he was primarily stealing from himself.

When Roswell Colt died in 1856, his personal estate was valued at close to $590,000 (Herz 1939:81). A few years prior to his death, Roswell had passed the Governorship of the S.U.M. on to his son, Morgan G. Colt. After Morgan Colt died in 1869, the Governorship passed to Roswell Colt's son-in-law, DeGrasse B. Fowler. Colt family control of the S.U.M. officially ended in 1885 when John R. Bartlett and a group of associates purchased a large block of stock from his heirs (Trumbull 1882:47). However, Elias Boudinot Colt, the son of Roswell's younger brother John, who owned the family mansion upon the bluff above Seabright, continued to serve as the Governor of the S.U.M. until approximately 1895 (Herz 1939:115).

* * *

By the early 1830s, Paterson had grown into an attractive industrial village with a population of over 9,000 (Plates 2.12 and 2.13). Although plagued by frequent economic upturns and downturns, the village's prospects were quite good. A large proportion of the credit for this success belonged to the Colt family. Peter Colt constructed the S.U.M.'s cotton mill, laid out its first raceway and personally administered the village of Paterson during its earliest days. Roswell L. Colt resurrected the S.U.M. and oversaw Paterson's period of greatest growth from his hilltop mansion, while his capable brother, John Colt, ran one of its larger manufacturing concerns and made sure that the water continued to flow through the raceway system. However, the member of the Colt family today most noted for his associations with Paterson was someone who actually spent very little time in New Jersey.

This was Samuel Colt, the son of one of Peter Colt's nephews (Plate 2.14). A different Samuel Colt to the one who had previously been a principal partner in the Colt family's rolling mill and nail factory, this Samuel Colt – the future founder of Colt's Patent Fire-Arms Manufacturing Company of Hartford, Connecticut – was born to Christopher and Sarah Colt in that city on July 19, 1814 (Phillips and Wilson 1979:65). He was born just four days after Roswell L. Colt had assumed the post of Governor of the S.U.M. for the first time. Samuel's father, Christopher Colt had begun his career as a Hartford merchant who profited from an advantageous marriage to the daughter of one of the wealthier men in town. Following a series of financial setbacks which left him bankrupt and the death of his first wife, in 1821, Christopher remarried and relocated his large family to Ware, Massachusetts where he took up a position as an agent for a silk mill (Tucker and Tucker 2008:26-27). In 1830, Christopher Colt arranged for his son to sail as a midshipman on the *Corvo*, a trading ship sailing from Boston to Calcutta. It was on this voyage, while faced with the unending monotony of ocean travel and the daily tasks of life aboard ship, that young Samuel Colt first conceived of a design for a revolver and whittled a small wooden model of his concept (Plate 2.15) (Haven and Belden 1940:14).

Upon his return to Connecticut in 1832, Colt contacted Henry L. Ellsworth, the Commissioner of the U.S. Patent Office who was impressed with the concept and encouraged the young man in his activities (Phillips and Wilson 1979:65). With limited financial support from his father, Colt took his model to a Hartford gunsmith, Anson Chase, and engaged him to make a working model on the basis of the design. In the meantime, in order to raise funds for the development

Plate 2.12. Hill, John William. *Paterson, N.J.* 1834. Published in 1834 and probably depicting the city as it looked in 1833, this colored lithograph represents one of the earliest known views of the city. The view is looking north.

Plate 2.13. Detail from Hill's lithograph of *Paterson, N.J.* 1834. The building with the tower/cupola shown at the center of the image is probably the Phoenix Mill.

Plate 2.14. Hayward, Gerald S. Miniature portrait of Samuel Colt [1814-1862]. *Circa* 1856. Source: Genocchio 2007.

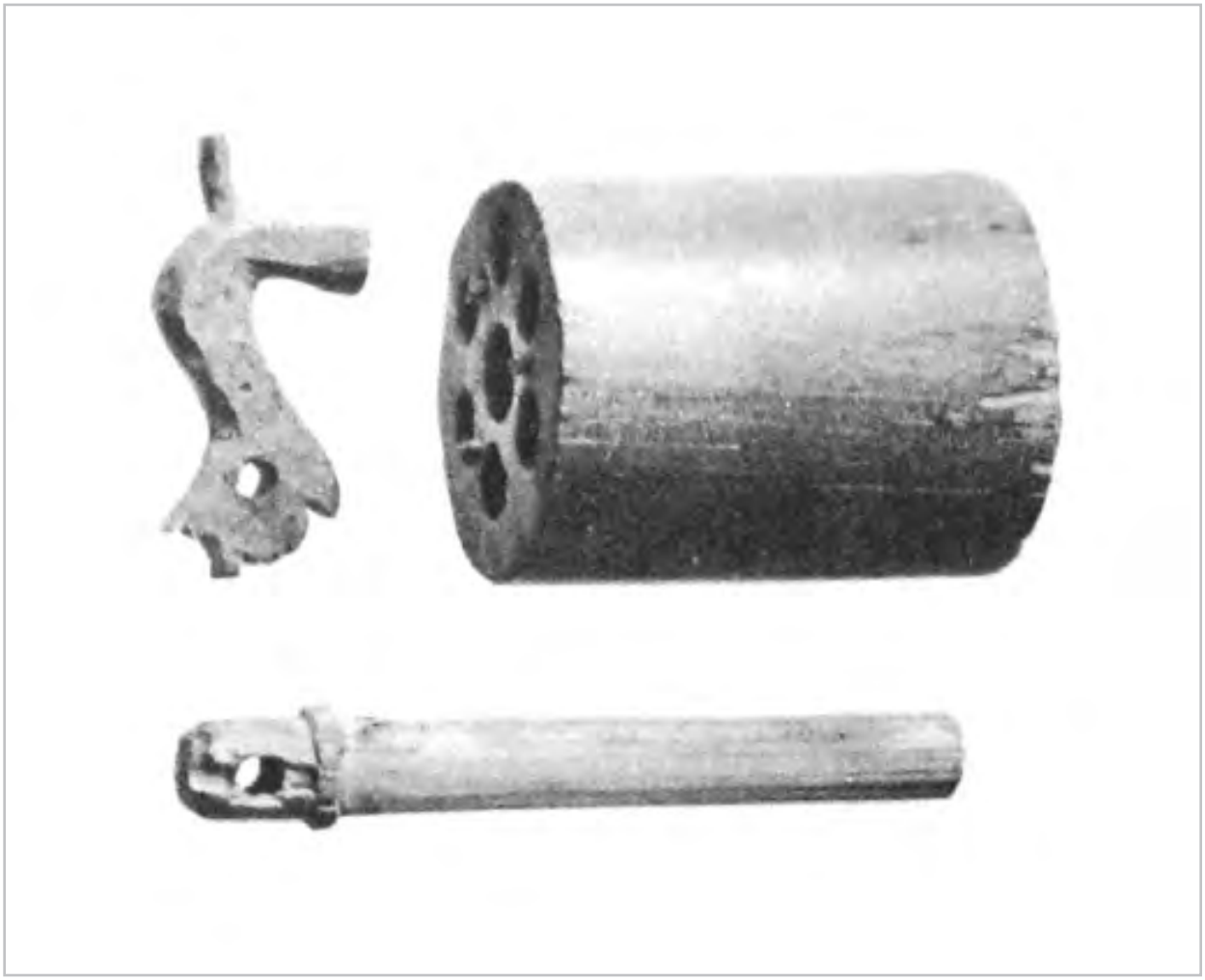


Plate 2.15. Samuel Colt's original wooden model for the key components of his revolver, carved while Colt was serving aboard the ship *Corvo*, 1831-32. Source: Phillips and Wilson 1979:66.

Improvements which may from time to time be found useful and advantageous" (Phillips and Wilson 1979:126-127).

The Patent Arms Manufacturing Company agreed to "establish suitable works for the Manufacture of Fire Arms, as soon as they can obtain a proper and commodious location, and construct, and procure the necessary machinery for the purpose" (Phillips and Wilson 1979:127). The site selected for the company's works proved to be none other than the location of John Colt's rolling mill and nail factory. The officers, directors and stockholders of the Patent Arms Manufacturing Company had every expectation that their new venture would represent a remarkable success and the company set out to construct first-rate manufacturing facilities that would fulfill this goal. As has already been discussed, the rolling mill and nail factory site was one of the best mill sites that Paterson had to offer and, perhaps most importantly, was already controlled by the Colt family and was, at that moment, notably underutilized. On May 1, 1836, the Paterson Manufacturing Corporation conveyed its lease rights to the site to the Patent Arms Manufacturing Company (Essex County Transcribed Deed L/624).

On the recommendation of Christopher Colt, Pliny Lawton, a mechanic from Springfield, Massachusetts, was hired to serve as the manager of the works. Lawton and Colt set out for Paterson to commence planning their works. On May 30, Samuel Colt wrote to his father regarding progress at Paterson,

> We have completed the plans, drawing, etc of our building which is to be 134 feet, 4 inches long by 44 feet wide on the outside . We have ingaged a gang of hands to commence taking down the old building now on the lot & when done will proceed without delay to level the ground & lay the foundation for our factory, all of which will be done under the supervision of Mr. Lawton until raised to a sufficient height to enable the Contractor (who ever they may be) to prosede without any interruption….the strip of land for 450 ft between the bluff & the river with the exception of a right of way to the quarry is included in the lece without additional rent which ground will inable us to extend our works if necessary with little inconvenience (Samuel Colt 1836).

It took quite some time to actually complete the construction of the company's works and, in the meantime, Samuel Colt convinced the company to lease the Jaffary Mill on Congress Street in order to commence manufacturing operations. It was in this building that the first production model Colt revolvers were probably produced. However, the Patent Arms Manufacturing Company building that was erected according to the specifications of Mr. Colt and Mr. Lawton would soon dominate the landscape of the ATP site and served for many years as one of the principal iconic landmarks of industrial Paterson (Plate 2.16). Constructed in more or less the same location and orientation as the old rolling mill (Figure 2.10), the massive new five-story stone factory building was dominated by a tall bell tower topped by a gilded weathervane in the form of a Colt rifle. The local newspaper, the *Paterson Intelligencer*, reported in its February 1, 1837 edition that the factory would be commencing its manufacturing operations later in the spring, noting that it would be making both firearms and cutlery on the premises.

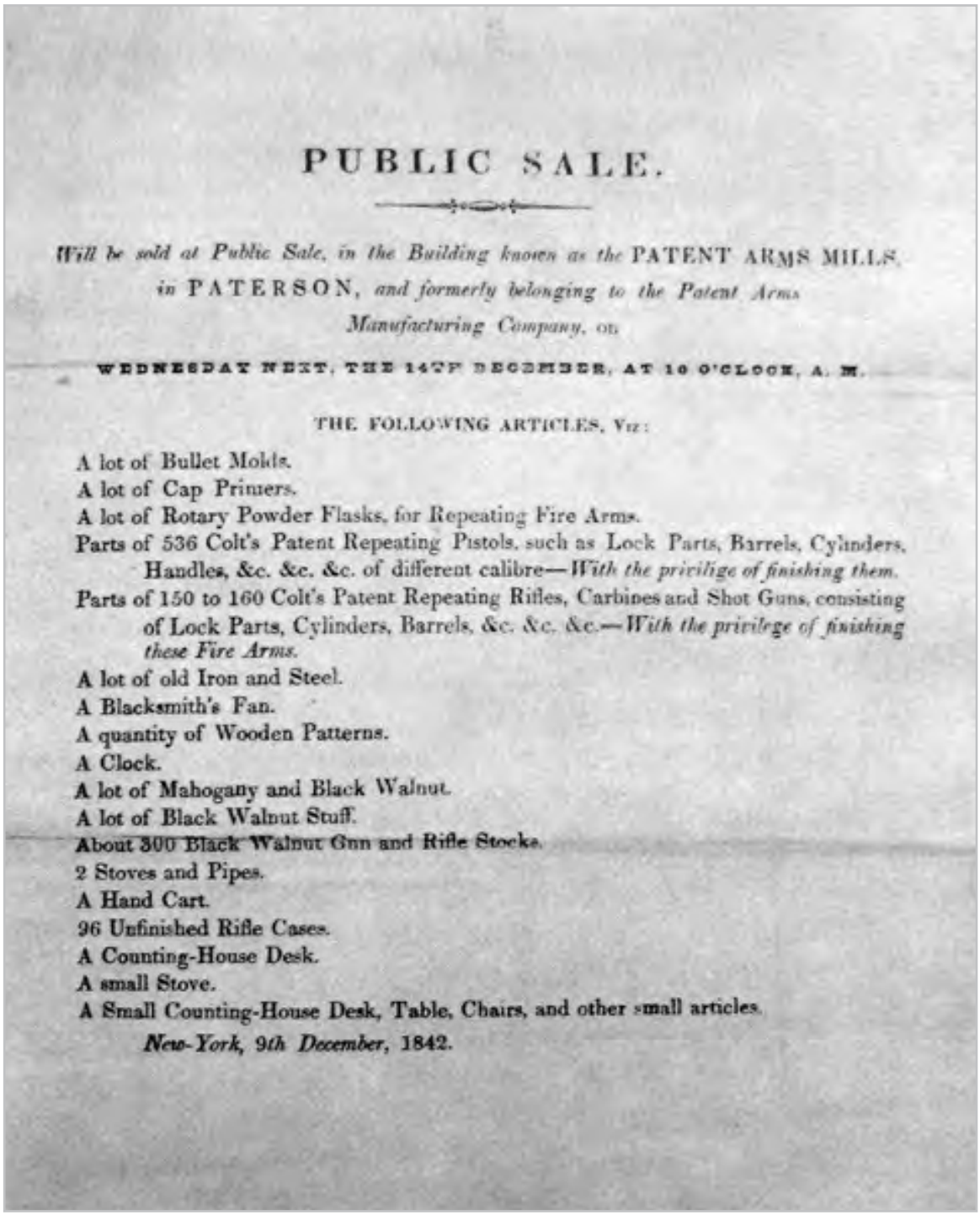
Unfortunately, the Patent Arms Manufacturing Company never lived up to its anticipated success. Sales of guns were limited (Plate 2.17) and the expected government contracts failed, for the most part, to materialize. Samuel Colt traveled the country attempting to market his arms to both the Army and Navy and other potential buyers and ran up large bills in the process. The deteriorating state of the company's finances eventually led to the development of a chronic and ongoing dispute between Colt and key officers in the firm, particularly its first two treasurers, Dudley Selden and John Ehlers. John Ehlers was a wealthy hardware merchant and gun dealer from Hoboken, New Jersey. During his term of office, Ehlers attempted to impose an unprecedented level of frugality on the company as a whole and on Samuel Colt in particular (Phillips and Wilson 1979:156-159).

Plate 2.16. View of the Gun Mill, looking west, *circa* 1850. This view has been reproduced in several histories but has usually been printed incorrectly as a mirror image. It has been suggested that this photograph may date as early as 1840 and it has also been posited that the figure in the foreground is Samuel Colt. The presence of the light pole at right (which appears to be a gas fixture) may contradict these suggestions. Gas first became available to Paterson consumers in 1848 about six years after Samuel Colt had detached himself from the Paterson Arms Manufactory. Source: Shriner 1890:1890.

Plate 2.17. Boxed set of Colt No. 5 "Texas" revolvers. This pair of revolvers, with the serial number 1, suggests that they were manufactured in 1839, the first year of their production. Source: Collection of Paterson City Museum.

By 1840, the Patent Arms Manufacturing Company was on its last legs. Colt was, by this time, heavily indebted to the company because of several loans granted to him to cover his expenses and for guns used by Colt in his attempts at promoting their sale. Ultimately, Samuel Colt's dispute with John Ehlers led to a court case between Ehlers and the Patent Arms Manufacturing Company. The Chancery Court of New Jersey ruled against the company and the assets of the firm were exposed to public sale (Plates 2.18-2.20) (Phillips and Wilson 1979:162-164).

Within a few years, Colt had reentered the field of gun manufacture elsewhere and the story of his success in later years in Hartford is well known. Many of the critical lessons learned during his less than successful sojourn in Paterson served him well in his future ventures. Samuel Colt's actual involvement with Paterson lasted only a few years (1836-1841) and during this period he was rarely resident in the city. But the name of the charismatic, famous inventor and salesman has been irreversibly imprinted on the popular history of Paterson and has, unfortunately, largely overshadowed the civic memory of the other Colts who made far greater contributions to the development of the city.



PUBLIC SALE.

Will be sold at Public Sale, in the Building known as the PATENT ARMS MILLS, *in* PATERSON, *and formerly belonging to the Patent Arms Manufacturing Company*, on

WEDNESDAY NEXT, THE 14TH DECEMBER, AT 10 O'CLOCK, A. M.

THE FOLLOWING ARTICLES, Viz:

A lot of Bullet Molds.
A lot of Cap Primers.
A lot of Rotary Powder Flasks, for Repeating Fire Arms.
Parts of 536 Colt's Patent Repeating Pistols, such as Lock Parts, Barrels, Cylinders, Handles, &c. &c. &c. of different calibre—*With the privilige of finishing them.*
Parts of 150 to 160 Colt's Patent Repeating Rifles, Carbines and Shot Guns, consisting of Lock Parts, Cylinders, Barrels, &c. &c. &c.—*With the privilege of finishing these Fire Arms.*
A lot of old Iron and Steel.
A Blacksmith's Fan.
A quantity of Wooden Patterns.
A Clock.
A lot of Mahogany and Black Walnut.
A lot of Black Walnut Stuff.
About 300 Black Walnut Gun and Rifle Stocks.
2 Stoves and Pipes.
A Hand Cart.
96 Unfinished Rifle Cases.
A Counting-House Desk.
A small Stove.
A Small Counting-House Desk, Table, Chairs, and other small articles.

New-York, 9th December, 1842.

Plate 2.18. Broadside announcing the sale of articles from the "Patent Arms Mills" in December of 1842. Source: Connecticut Historical Society, Colt Papers.

PUBLIC SALE.

TAKE NOTICE, that the subscribers will sell at Public Vendue, on Wednesday, the 14th day of May instant, at 11 o'clock A. M., all the

MACHINERY AND TOOLS

belonging to the subscribers, lately the property of the Patent Arms Manufacturing Company, consisting of Drilling Machines, Cutting Engine, Engine Lathes, Stabbing Machines, &c., &c. The sale to begin at the Paterson Machine Co.'s Works, on Congress street.

The sale will be for Cash, and will be without reserve.

JOHN EHLERS,
DAVID B. RISING, Att'y.
for E. LAFFAN,
D. K. ALLEN,

Paterson, May 10, 1845.

Plate 2.19. Broadside announcing the sale of Machinery and tools of the Patent Arms Manufacturing Company, May 1845. Source: Connecticut Historical Society, Colt Papers.

CATALOGUE
OF MACHINERY & TOOLS,
IN PATERSON.

B. 2 Drilling Machines
1, 2. 2 Engine Lathes
22. 1 Slabbing Machine
A. 2 Drilling Machines
10, 11. 2 " "
12, 13. 2 " "
14, 15. 2 " "
31, 32. 2 " "
33. 1 " "
43. 1 Cutting Engine
37. 1 Lathe
38, 39. 2 "
40, 41. 2 "
25, 26. 2 "
45. 1 Engine Lathe
4, 5. 2 " "
7. 1 " "
8. 1 " " Cappimer
16, 17. 2 Slabbing Machines
18, 19. 2 " "
20, 21. 2 " "
55. 1 Nut-boring "
R. 1 Reaming "
S. 1 Polishing " for Rifles
54. 1 " " for Pistols
C. 1 " " with 2 wheels
D. 1 " " "
53. 1 Riffling Machine
30. 1 Power Punch
E. 1 Hand Lathe
H. 1 " "
M. 1 " "
N. 1 " "
Q. 1 " "
23, 24. 1 Hand Lathe, and
1 Cone Milling Machine
L. 1 Cone Drilling "
O. 1 Travers Reamer
R. 1 Filing Machine
V. 1 Screw "
52. 1 Tube Press
I. 1 Drop Stamp
J. 2 Tapping Machines
P. 2 Transferring Machines
48 Vices
G. 1 Small Grindstone,
U. 1 Large "
E. 1 Upright Saw
W. 1 Saw bench with 2 saws, and
1 Stock Cutting Machine
6 Anvils
1 Sett Triphammers
3 Forges, with 1 blowing Machine
T. 1 Lot Sundry Tools
Blacksmiths' Tools, Tongs, Matches and Swedges
1 Moulding Trough
6 Flasks for Brass Moulding

whole sail amounts to $6.209 — a Hundred
Paterson May 14 & 15 1845. Saml. Colt.

Plate 2.20. "Catalogue of Machinery and Tools" of the Patent Arms Manufacturing Company, May 1845. Annotated by Samuel Colt with comment on the revenue generated. Source: Connecticut Historical Society, Colt Papers.

Chapter 3

SPECIALTY PRODUCTION OF SILK AND IRON

A. SILK AND IRON: THE VARIED TEXTURES OF INDUSTRY

In 1844, John Warner Barber with the assistance of Henry Howe published a book entitled *Historical Collections of the State of New Jersey.* It was the fourth in a series of works prepared by Barber and Howe which focused on the history of a state and included historical narratives, descriptions and woodcut illustrations of each of its principal cities, towns and villages. Of Paterson, they wrote:

> The advantages which Paterson possesses for a manufacturing town are obvious. An abundant and steady supply of water; a healthy, pleasant and fruitful country, supplying markets fully with excellent meats and vegetables; its proximity to New York, where it obtains raw material, and sale of manufactured goods; and with which it is connected by the sloop navigation of the Passaic, by the Morris canal, by a turnpike-road and by a railroad-render it one of the most desirable sites in the Union … from a mere village Paterson now got to be the second town in importance in the state (Barber and Howe 1844:410).

The two woodcuts that illustrate the text are telling, both because most towns were only allocated a single view but also because of the subject matter. One illustration shows the Great Falls of the Passaic River, Paterson's most famous and memorable landmark. The second depicts the mills of the ATP site and a few of their eastern neighbors (Plate 3.1). At the time of publication of *Historical Collections of the State of New Jersey* these mills were among the most substantial and important edifices in the city. Barber and Howe could have chosen an image of a courthouse or church or any one of a number of other public buildings in the city, but instead chose to show this row of mills. These brick and stone factories, illustrated again in Edwin Whitefield's lithographic *View of Paterson from the Manchester Side* of 1853 (Plate 3.2), lying west of Prospect Street, were the heart of industrial Paterson and, in large part, the city's identity.

At the time these views were created, Paterson was an attractive, growing factory town, although admittedly, as a manufacturing center, it was plagued by the periodic ups and downs of the national economy. Far too often, it seemed, its mills would be idled, businesses would be cast into receivership, and people would temporarily drift away. But the town kept getting larger, its population kept expanding, and more and more factories were built. The long-term success of the city was based first on the growth of its cotton manufacturers (spinners, weavers, bleachers, dyers and printers) and their related support industries (millwrights, mechanics, spindle manufacturers and blacksmiths) and, second, on an industry which did not directly manifest itself on the ATP site, the manufacture of railroad locomotives. And then, in the mid-19th century, silk manufacture began to emerge as the third major industry to play a role in shaping Paterson's future.

As early as 1794, the S.U.M. considered the propagation of white mulberry trees as a potential gateway into the wider silk industry, but did not act upon this idea (Davis 1917:484). In general, few early American silk mills were established before the 1860s. William Horstmann's factory in Philadelphia was one of the few that did. In 1815, he set out to make silk trimmings and fringes and in the process established one of the longest-lived American silk manufacturing companies. By the 1830s, several silk mills had also

Plate 3.1. View of Paterson, looking southeast, *circa* 1844. Source: Barber and Howe 1844.

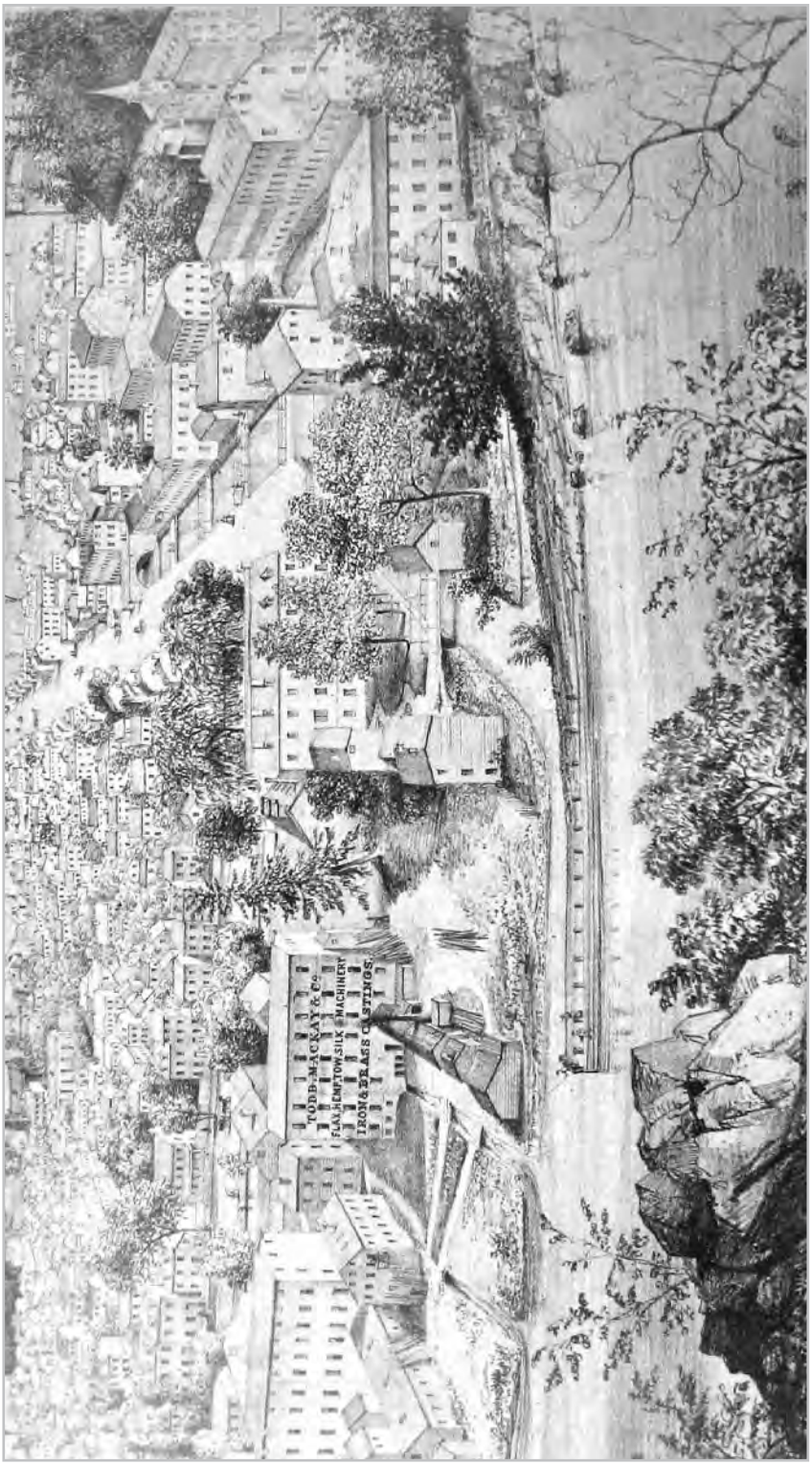


Plate 3.2. Whitefield, Edwin. *View of Paterson from the Manchester Side.* 1853. The view is looking southeast. Source: New Jersey Historical Society, Manuscript Group 1361.

been founded in Connecticut. Probably the most noteworthy of these early establishments were the Mansfield Silk Company of Mansfield, Connecticut and the Connecticut Silk Manufacturing Company of Hartford. The latter concern is particularly relevant to the history of Paterson as it was in large part owned and managed by Christopher Colt, Samuel Colt's father (Heusser 1927:105, 111). These early efforts were curtailed, in large part, by the difficulty in obtaining suitable raw silk and affordable, skilled labor.

During the 1830s, something of a fever gripped the country as the cultivation of mulberry trees and the husbandry of silk worms was promoted as a fast track to riches. What was overlooked was that the care and feeding of the silkworm was difficult work, while the unraveling of silk cocoons and the hand reeling of silk fiber was tedious and required a copious amount of time and considerable care and dexterity. In the early 1840s, after the rage had waned, a mulberry tree blight drove most of the remaining silkworm dreamers from the business (Garber 1968:108).

The first attempt to manufacture silk in Paterson was undertaken at the Gun Mill by Christopher Colt, Jr., Samuel Colt's older brother. He had entered the silk business with his father and served as the agent of the Connecticut Silk Manufacturing Company. Following that company's failure in 1840, he relocated to Paterson and reportedly brought much of the company's machinery with him (Brockett 1876:110). According to William Nelson, Colt added some new machinery to the old and operated about "1,000 spindles, 200 or 300 doubling spindles and 500 or 600 winding spindles" (Clayton and Nelson 1882:467). Although these accounts suggest that he installed a considerable amount of machinery, he is said to have occupied only one side of the fourth floor of the mill built to manufacture his brother's revolvers. Colt's venture was capitalized by the firm of Crumbie and Draper of New York, but apparently the experiment lasted for only a few months before it was abandoned. Little or no silk was actually produced (Trumbull 1882:171).

All evidence would seem to indicate that Christopher Colt had been attempting to manufacture silk sewing thread (Heusser 1927:1880). It was the first branch of the industry to be extensively pursued in the United States. This was because it was a process that could be easily mechanized. Adequate supplies of quality raw silk were difficult to come by for American manufacturers. Prior to the 1870s most of the raw silk in circulation in the United States was Chinese silk imported through Europe. This material was generally of inferior quality because the best silk was culled for the European markets before any was shipped across the Atlantic. The highest quality silk, as far as Americans were concerned, was coarsely bodied and uniformly reeled (Garber 1968:161).

This was because domestic silk manufacturers favored the use of high-speed machinery in their processes. American labor was relatively more expensive than foreign labor. In the days before the introduction of high protective tariffs, American silk factory owners were reported to run their machinery at faster speeds than their European counterparts in order to compensate for the higher labor cost (Garber 1968:161). Thin or poorly reeled silk fibers tended to break, quickly escalating production costs. The processes involved in the manufacture of sewing thread – throwing and twisting – could be more easily undertaken with high-speed equipment than those processes involved in the production of warp, weft, ribbon or broad silk, again helping to reduce the disadvantage of higher domestic labor costs (Garber 1968:160-161).

Although Christopher Colt was the first to introduce silk manufacture to Paterson, he is not usually credited by industrial historians as having been the founder of 19th-century Paterson's largest industry. That honor is more often bestowed upon John Ryle (Plate 3.3). Ryle was born in 1817 in Bollington, near Macclesfield, England, the epicenter of the British silk industry. At five years old he was working as a "bobbin boy" in a silk mill and by the age of 22 he was superintending a mill owned by his brothers, Reuben and William. In 1839, he left England for America and first took employment

Plate 3.3. Photograph of John Ryle [1817-1887]. Source: Read 2003:50.

in a silk mill in Northampton, Massachusetts, and then worked as a silk merchant importing the products of his brothers' mill. Late in 1839, George W. Murray, an acquaintance of Mr. Ryle's, induced him to travel with him to Paterson in order to evaluate the value of the machinery left in the Gun Mill by Christopher Colt. By the spring of 1840, Murray had tendered $3,200 to Colt for his machines and had engaged Ryle to oversee putting the enterprise into effect (Brockett 1876:112). Thus it was that the fourth floor of the Gun Mill became the true birth place of Paterson's silk industry.

In 1843, Ryle's initial contract with George Murray ran out. At that point he purchased a share in the business which was thereafter known as Murray and Ryle. In 1846, the partnership occupied both the fourth and the third floors of the Gun Mill paying a rent of $600 per year. H.M. Low & Company also engaged in cotton spinning on the third floor, while the first two floors remained vacant in the wake of the failure of the Patent Arms Manufacturing Company. In that same year Ryle, acting with financial assistance from his brothers, was able to buy out all of George Murray's interest in the business (Heusser 1927:180). Upon assuming full control of the firm, he had skylights installed in the fifth floor of the Gun Mill and, in another first for Paterson, commenced there the weaving of fine broad silk. The most famous product of John Ryle's looms was the 20-foot-wide by 40-foot-long American flag that flew above the Crystal Palace in New York City during the World's Fair of 1852 (Clayton and Nelson 1882:455). Unfortunately, the weaving of broad silk would not prove profitable and was soon abandoned (Garber 1968:119). In this same year, John Ryle also acquired a three-quarter interest in the Gun Mill leasehold (Passaic County Deed L/36). In 1852, he purchased the outstanding interest giving him full control of the real estate (Abstract of the Title of Society of Useful Manufactures as to Gun Mill Lot n.d.).

According to L.R. Trumbull's *History of Industrial Paterson* (1882:174), soon after Ryle had acquired the Gun Mill leasehold he expanded his operations to include the first floor of the building and leased the second floor to H.M. Low & Company thus fully tenanting the available mill space. Ryle also commenced the construction of auxiliary buildings in the area between the Gun Mill and the Passaic River. The first of these buildings was constructed around 1850 and was a two-story silk mill located immediately to the north of the Gun Mill (Trumbull 1882:174) (Figures 3.1 and 3.2). The William Perris insurance map *Paterson Mills 1854* (Figure 3.2) also indicates that by this date someone was spinning silk in a rear portion of the "Mallary" Mill. This may have been John Birchenough who claims to have started to manufacture silk "in a room in the Gun Mill Yard" in March of 1853 (Trumbull 1882:178). Although the location shown on the map was not technically within the bounds of the Gun Mill lot it was immediately contiguous with it and thus Birchenough was a likely suspect as there were still as yet few other silk makers then working in Paterson. By 1854, Ryle's complex of buildings had been expanded to include a row of stone buildings along the river that contained additional silk manufacturing facilities and, on its western end, up against the eastern side of the mouth of the North Gates Waste Way, a dye house. These new buildings appear on both Bevan, Slator and Slator's *Map of Paterson, New Jersey* of 1860 (Figure 3.3) and Hopkins' *Paterson: Extracted from the Map of the Counties of Bergen and Passaic, New Jersey* of 1861 (Figure 3.4), but are portrayed in the most detail on a somewhat later insurance map drafted by William A. Miller in 1874 (Figure 3.5).

Until the introduction of aniline dyes in the 1880s and 1890s, the vast majority of silk goods produced in the United States were not dyed in the piece (as finished textiles) but rather in the yarn or "skein." In the earliest days of Paterson's silk industry, product had to be sent to Philadelphia to be dyed because there were no local dye houses (Trumbull 1882:154, 172).

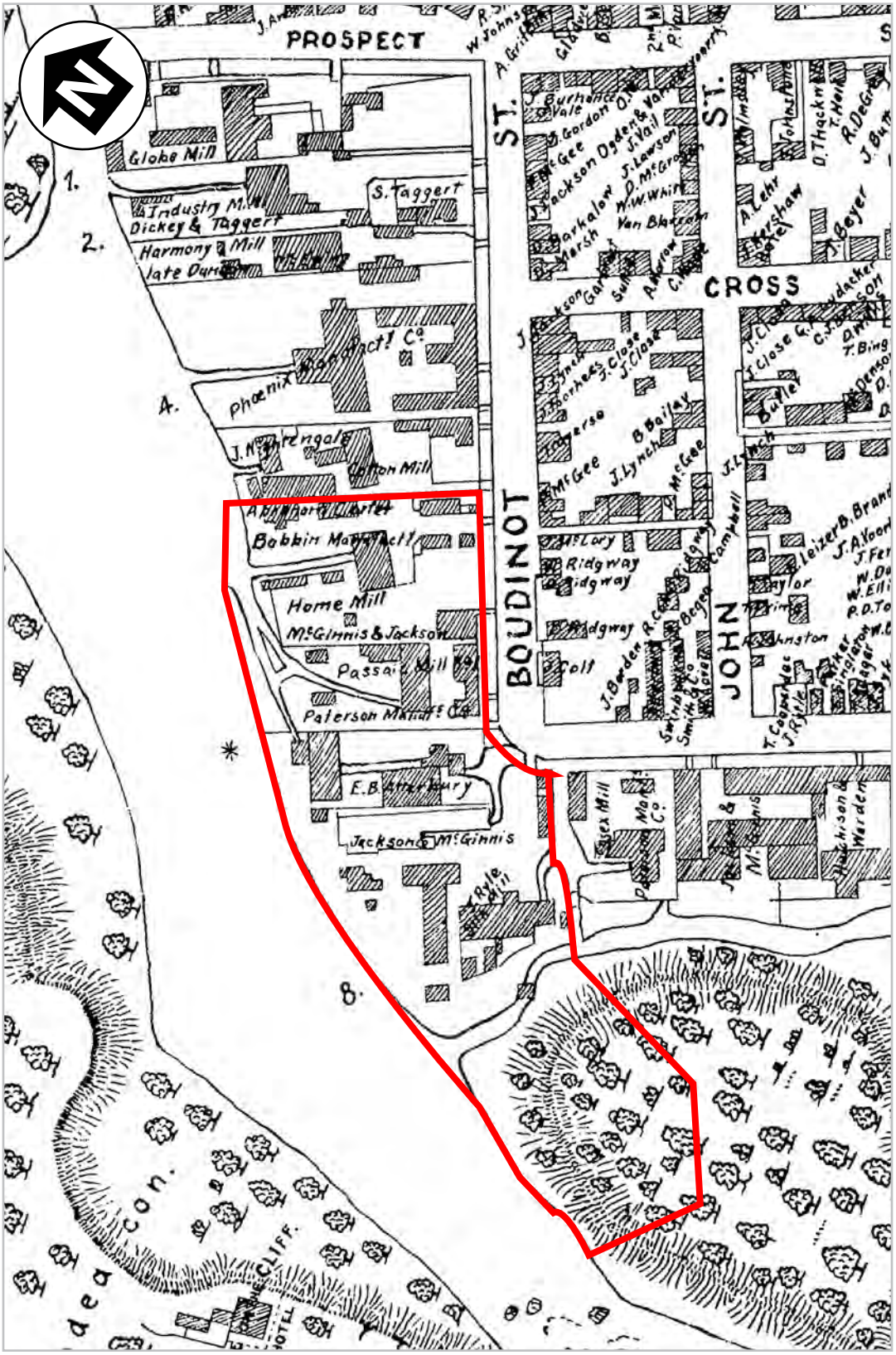


Figure 3.1. Sidney, J.C. *Map of Paterson, N.J.* 1850. [As traced by the Works Progress Administration]. Scale: 1 inch= 200 feet (approximately). Limits of Allied Textile Printing site are outlined.

Figure 3.2. Perris, William. *Paterson Mills 1854.* 1854. Scale: 1 inch= 85 feet (approximately). Limits of Allied Textile Printing site are outlined.

Figure 3.3.. Bevan, J., J. Slator and T. Slator. *Map of Paterson, New Jersey.* 1860. [As traced by the Works Progress Administration]. Scale: 1 inch= 200 feet (approximately). Limits of Allied Textile Printing site are outlined.

Figure 3.4. Hopkins, G.M. *Paterson: Extracted from the Map of the Counties of Bergen and Passaic, New Jersey*. 1861. [As traced by the Works Progress Administration]. Scale: 1 inch= 200 feet (approximately). Limits of Allied Textile Printing site are outlined.

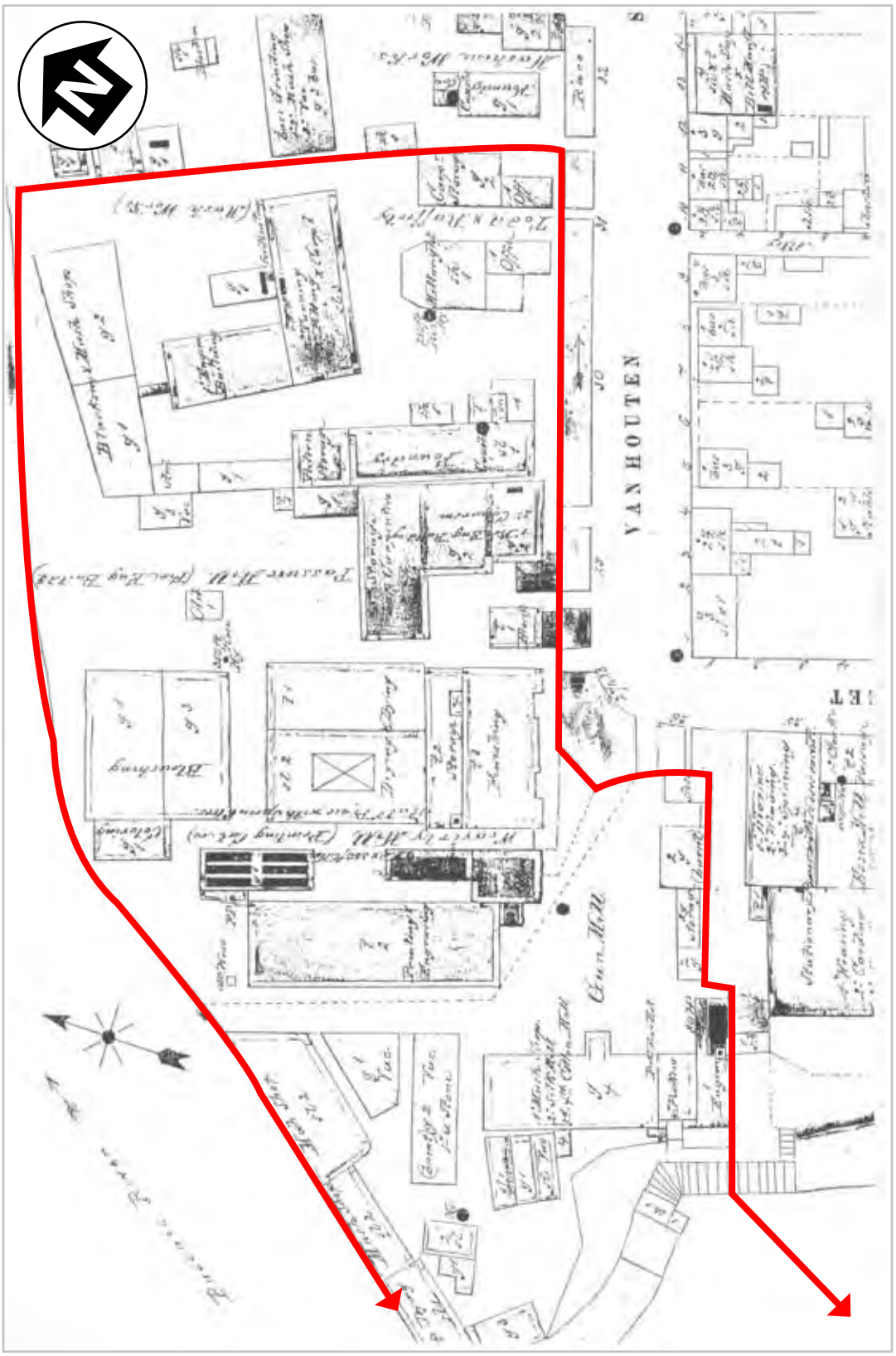


Figure 3.5. Miller, William A. *Paterson, New Jersey.* 1874. Scale: 1 inch= 60 feet (approximately). Limits of Allied Textile Printing site are outlined.

If the product was thread or "machine twist," (a more complex and stronger thread variant) or organzine (silk warp) or tram (silk weft), this was not too great an imposition. It could be sent to a dyer and then shipped directly to market (in the case of thread) or to an end user who would produce the finished product (in the case of organzine or tram). However, if the manufacturer wished to use his own silk in his own woven goods it was not efficient to have his materials shipped to Philadelphia and back before weaving could commence. So far as Paterson's silk mills were concerned, silk dyeing utilized specialized processes, materials and expertise that could not be provided easily by the town's existing cotton bleaching/dyeing/printing shops. In order for the manufacture of ribbon or broad silk to be successfully carried out in Paterson, the city needed its own silk dye shops. Just as he was the first in the city to weave broad silk, Ryle was also the first to recognize this pressing need for local dyeing facilities.

According to Constant Putoz, an elder figure in Paterson's silk industry, who was interviewed before his death by Albert Heusser, John Ryle constructed a dye shop in the Gun Mill yard and hired James Mayer (Plate 3.4) to serve as its foreman (Heusser 1927:184). In 1858, Mr. Ryle "induced" a friend of his, William C. Browne (Plate 3.5), to relocate from New York to Paterson and to enter into a partnership with Mr. Mayer, thereby establishing the first custom dye house in Paterson. Although independent from Ryle, the firm continued to occupy a building in the Gun Mill yard. The partnership was short-lived and dissolved before the start of the Civil War and Mayer soon afterwards returned to his original position with Ryle (Heusser 1927:182-183). The existence, however briefly, of this independent dye house in the yard of the Gun Mill is notable because it marks the start of what later would become a very significant industry for the city.

The complex of buildings constructed by Ryle in the Gun Mill yard appears in an important photograph taken around 1855 (Plate 3.6), while the impressive primary façade and tower of the Gun Mill were captured by an unknown photographer about ten years later (Plate 3.7). This image is the only surviving photograph to show the full width of the Gun Mill prior to the removal of its tower. A detailed photograph, most likely taken in 1860 (Plate 3.8), not only clearly shows the skylights installed to facilitate Ryle's use of the building's fifth floor/attic (Plate 3.9), but also allows one to peer down in to the rear yard area (Plate 3.10) and view the north wall and roof of John Ryle's dye house (at the left of the image) and the carpenter shop and boiler house that had been appended to the west wall of the Gun Mill (at lower right).

For as long as it retained its full five-story height and its graceful bell tower, the Gun Mill remained one of the most memorable sights in Paterson. The silhouette of the tower rising above the river gorge below the Great Falls of the Passaic was visually striking and led to its image being documented as a stereo-optic view by a commercial photographer (Plate 3.11) and its use in a later edition of Barber and Howe's *Historical Collections.*..(Plate 3.12).

Although a handful of other attempts at silk manufacture were made in Paterson in the 1840s, there were no other large manufacturers that compared with Ryle's silk works until John C. Benson opened his own silk factory with 1,600 spindles and a dye house in the early 1850s (Garber 1968:121). The high cost of American labor and the difficulty of acquiring raw silk of any quality substantially retarded the growth of the industry. This situation persisted throughout the remainder of the 1850s. Silk manufacture continued to be the focal point of occasional speculative ventures but most of the firms which opened in Paterson subsequently failed.

With regard to silk, John Ryle remained the single constant presence in the city throughout the antebellum era. He was one of only a handful of American silk entrepreneurs who was capable of undertaking the business profitably under normal economic conditions and thus was able to bring some measure of stability to the enterprise where others could not. Several

Plate 3.4. Photograph of James Mayer. Source: Heusser 1927:183.

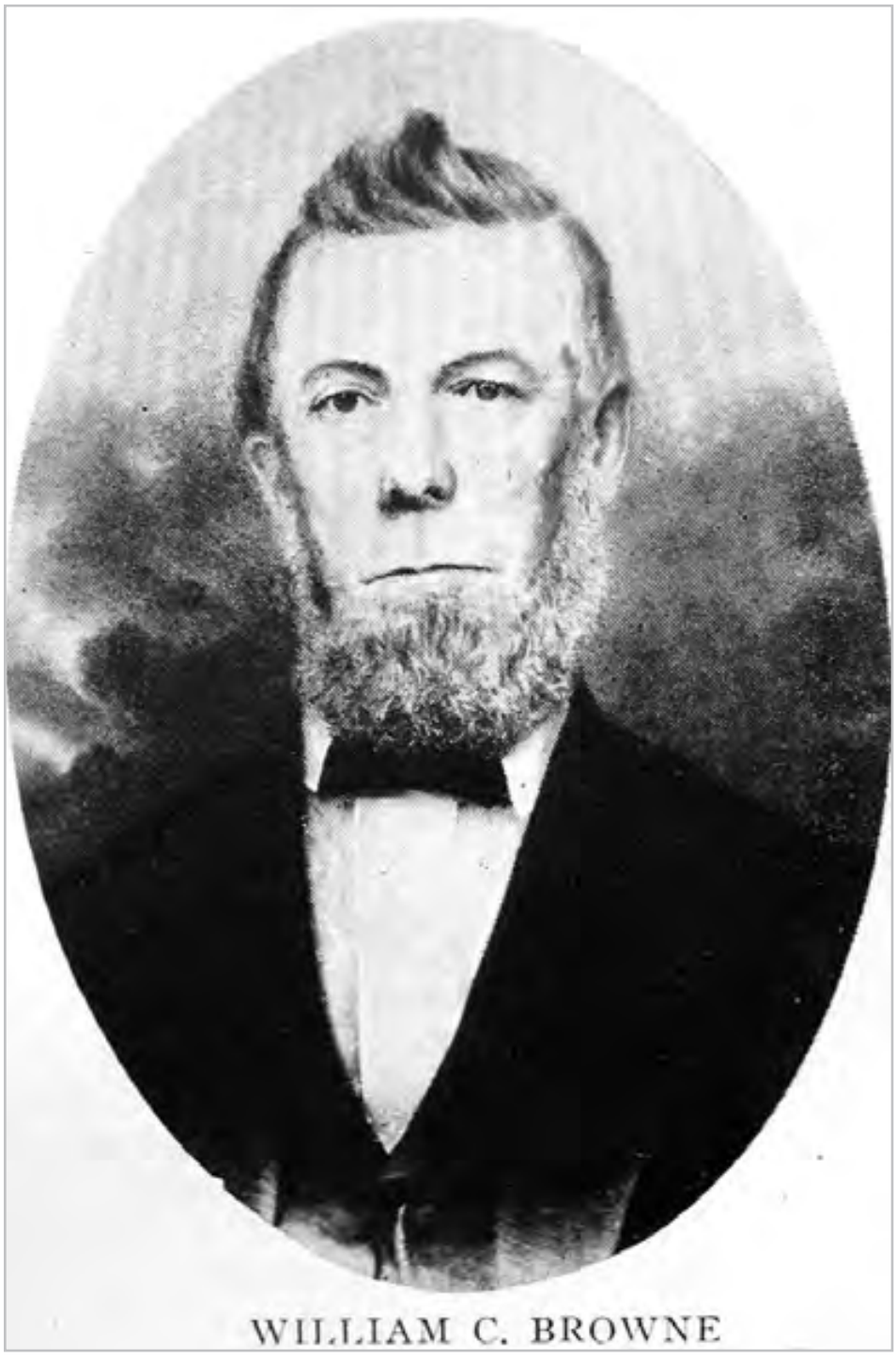


Plate 3.5. Photograph of William C. Browne. Source: Heusser 1927:182.

Plate 3.6. View of the Gun Mill lot from the opposite side of the Passaic River near the "Cottage on the Cliff," looking southeast, *circa* 1855. The building immediately to the left of and behind the Gun Mill may be David G. Scott's mill which stood on the site of the Waverly Mill until it burned in 1857. Source: Paterson Historic Preservation Commission.

Plate 3.7. View of the Gun Mill and the rear of the Waverly Mill, looking southwest, *circa* 1865. This view shows the recently constructed Waverly Mill in the center of the view but does not show the Mallory Mill which was constructed *circa* 1870 on the neighboring lot to the right. Source: Paterson Historic Preservation Commission.

Plate 3.8. View showing a tightrope walker crossing the Passaic River below the Great Falls, looking east, *circa* 1860. Although tightrope walkers have made a spectacle of crossing the Great Falls on several occasions, this image was probably taken in the summer of 1860 when the Frenchman, Mons de Lave, was engaged by Henry Wilson, the proprietor of the Cottage on the Cliff, to cross the chasm from the cottage to Mount Morris as a tourist attraction (Graf 1971). Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.9. Detail of photograph of *circa* 1860 showing the Gun Mill. The mill's rifle-shaped weathervane is visible surmounting its cupola. The large chimney was attached to the mill's boiler house. The skylights visible in the mill's roof were probably those installed in 1846 to facilitate the use of the fifth floor of the mill for silk manufacture (Trumbull 1882:173). Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.10. Detail of photograph of *circa* 1860 showing the complex of buildings in the rear yard of the Gun Mill. These buildings developed in connection with the growth of Paterson's silk industry. Source: New Jersey Historical Society, Manuscript Group 1361.

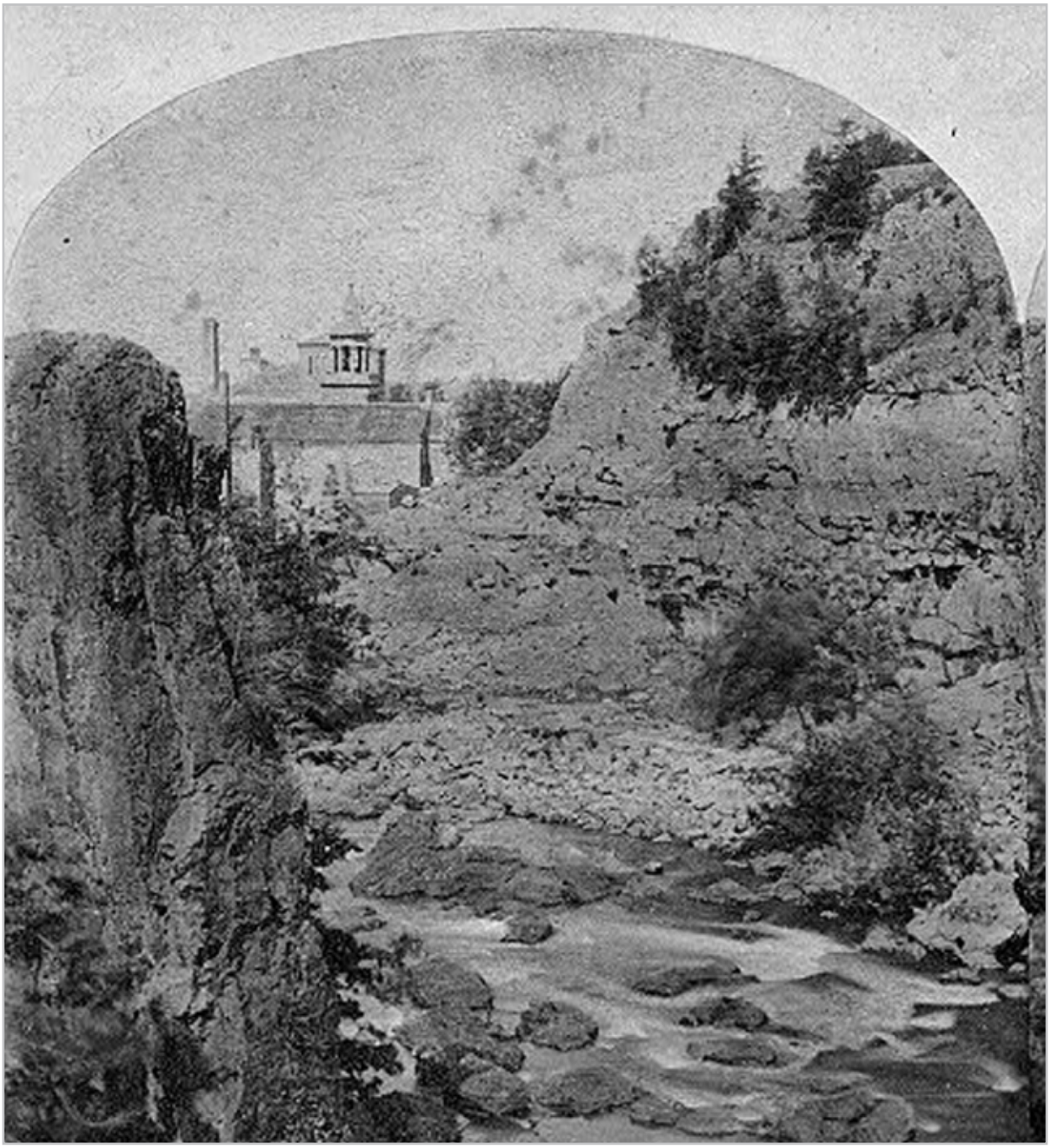


Plate 3.11. View of the Gun Mill from the falls of the Passaic River, looking east northeast, *circa* 1860. Source: New York Public Library, Robert N. Dennis Collection.

Plate 3.12. View of the Gun Mill from the "Cottage on the Cliff," looking east, *circa* 1868. This image clearly shows both the Gun Mill flume and the large walls that were constructed between the area of its discharge and the Gun Mill. Source: Barber and Howe 1868.

factors separated Ryle from his competition. The first was his life-long knowledge of the silk making industry and his understanding of its practice in England. Effectively Ryle had learned the trade in the country where its manufacture had been perfected to the greatest measure. He also had access to capital that others did not. At crucial moments he was able to apply to his brothers for financial support which, for example, helped him leverage the purchase of his company and its facilities.

Another of Ryle's assets was his willingness to incorporate innovation and improvements in equipment and practice. In Linus Pierpont Brockett's *The Silk Industry in America: Prepared for the Centennial Exposition*, it is recounted that prior to accepting his first offer of employment in an American silk mill, Ryle had visited with Christopher Colt, Sr. at his silk factory in Hartford and had been "deeply impressed by the advances already made in processes and machinery, which were described and shown to him by Mr. Colt." After another visit, this time to the silk mill in Northampton in which he was later employed, he reportedly noted that "the American methods in manufacture were, in many respects, in advance of those in the old country. But on a more careful examination he perceived that many minor economies were neglected" (Brockett 1876:111).

Ryle understood the management and processes involved in English silk mills but appeared willing to accept and perfect American advances. He also appears to have assembled skilled and talented people to work in his facilities. L.R. Trumbull noted, for example, that Ryle employed "from the earliest period of his occupancy of the Gun Mill," Charles Mosely, who was the builder of some of "the best class of machinery in use." He "was a master mechanic in every sense of the word" who worked diligently to perfect and improve the machinery used in the Ryle concern. Mosely introduced the "guide or transverse motion, used on winders or spinners to guide the threads in filling the bobbins, so that they were filled evenly and not in the sloppy manner before in vogue. Mr. Mosely did more than will ever be known by the general public, or even the craft, to improve the process of manufacture" (Trumbull 1882:174-175). John Ryle was not only wise enough to employ a person like Mosely, but was open-minded enough to adopt his innovations.

The Gun Mill and its adjacent complex of buildings served in large measure as an incubator for the industry. Many of its future leading figures received their initial training working as employees under John Ryle's supervision in the 1850s. These included Robert Hamil, James Booth, James Walthall, J. Jackson Scott and James Thorp. Similarly, the cluster of stone buildings along the river's edge was home to the early operations of a number of individuals who would later become prominent in the silk dyeing business. John Ryle's dyeing division, which was located here, may well have been the first true silk dyeing facility in the city. It has already been discussed how the firm of Browne and Mayer opened Paterson's first custom dye shop within the precinct; later on, similar operations were undertaken by Pierre Thonnerieux (Plate 3.13), John Heidenreich and Albert King, all of whom would rise to become well-known figures in Paterson's dyeing industry. Claude Greppo (Plate 3.14) was probably the best known silk dyer to rent space in the Gun Mill yard but, unlike the others mentioned here, he had already achieved a large measure of success before renting out space there. He was merely supplementing other facilities by arranging for additional space in which to conduct his silk finishing activities.

Even with these advantages, Ryle's ability to make a profit in the industry was tentative at best and was insufficient to fully overcome substantial downturns in the economy or significant personal financial misfortune. After completing a massive investment in the construction of a new mill building, the Murray Mill on Mill Street, a "general depression" in business prevented him meeting his debts (Trumbull 1882:180). Taking on his nephew William Ryle as a partner, Ryle immediately refashioned the company along identical

Plate 3.13. Photograph of Pierre Thonnerieux [?-1910]. Source: Heusser 1927:228.

Plate 3.14. Photograph of Claude Greppo [1834-c. 1890]. Source: Heusser 1927:189.

lines to his original endeavor and operated with a large measure of success until 1869 when the uninsured Murray Mill was consumed by fire. This forced another reorganization of the business, this time under the guise of the Ryle Silk Manufacturing Company (Trumbull 1882:180-181). It too became insolvent a few years later and was replaced by John Ryle & Sons, which quickly merged or morphed into the Pioneer Silk Company, a firm that survived until 1901 (*New York Times* June 4, 1901).

Ryle's interests and his responsibilities did not end with the manufacture of silk. Among his other notable achievements, he was for a period the largest shareholder and the driving force behind the Paterson Water Company. Ryle also rose to become an extremely well respected civic figure and served from 1869-70 as his adopted city's Mayor.

* * *

The greatest expansion of the silk industry, which ultimately reshaped the landscape of industrial Paterson, did not occur until after the start of the Civil War. This new found success was not based on advances in technology caused by American ingenuity, nor by the implementation of new business models, nor by the leadership of key individuals; rather it was founded almost completely on the repeal of an import tariff on raw silk (which occurred largely due to successful lobbying of the federal government by John Ryle) and on increases in the tariff levied on silk goods of foreign manufacture. Substantial increases in this last mentioned tariff occurred in 1861, 1862, 1864 and 1865 (Trumbull 1882:197; Garber 1968:133). By the end of the Civil War, foreign silks were taxed at a rate of a full 60% percent of their value (Garber 1968:133). This had two important ramifications for the domestic silk industry. First, it immediately made American manufactured silk competitive with imported English silk and, second, it crippled the English silk industry, which relied heavily on the American market.

While a dramatic increase in the sales of domestic silk was immediately apparent, the relationship between the demise of the English silk industry and the growth of the industry in Paterson proved more complex and long drawn out. The chaos into which the English silk industry was thrown resulted in the immigration of hundreds of highly skilled and experienced silk workers to American shores, bolstering dramatically the skill set of the available labor force. In 1865, approximately one hundred of Paterson's residents had been born in England or Scotland. By 1870, five years later, this number had grown to 4,254 (Garber 1968:147). These new British immigrants were supplemented by additional skilled individuals moving to the United States from Germany, France and Switzerland who also saw their countries' domestic silk output decrease. The already mentioned skilled dyers, Claude Greppo, Pierre Thonnerieux John Heidenreich and Albert King, all belonged to this group. A considerable amount of silk making machinery was also shipped from idled English mills to their American counterparts during this period (Garber 1968:156).

The growth of both the American – and more specifically Paterson's – silk industry was greatest in the years between 1870 and 1880 when the impact of the increased tariffs of the 1860s was heightened by an advantageous drop in the price of raw silk. The reduction in the cost of silk was due in part to the removal of the import tariff but has also been attributed to the introduction of a greater volume of Italian and Japanese silk into the market, the construction of the Suez Canal (opened in 1869), and a general decrease in demand for silk caused by the near closing of the American market to imported silk goods (Garber 1968:164-165). The industrial schedules of the Federal Census of 1860 report four silk mills in business in Paterson in that year employing 590 employees (Morris William Garber in his thesis "The Silk Industry of Paterson, New Jersey: 1840-1913[1968:128] argued that the number was actually slightly higher – six). Over the course of the next two decades those numbers increased to 82 mills employing 9,809 persons (Garber 1968:196).

Although the silk industry also grew during this same period elsewhere in the industrialized United States, its expansion in Paterson was disproportionately greater. By 1880, close to one out of every three American silk workers worked in a Paterson silk mill or dye shop. This ratio also roughly held with regard to the total value of the silk output of the United States. In the years between 1870 and 1890, the value of Paterson's silk output ranged from 1/4 to over 1/3 of the national total (Garber 1868:198). Part of the reason for Paterson's exceptional growth was the presence of individuals like Ryle and other Englishmen who maintained links with their former homes, thus causing the community to become a magnet for new immigrants with silk-making experience. Another factor was available land, for unlike many other developing urban centers Paterson still possessed significant areas in the immediately surrounding countryside where growth could be absorbed. The town was also only a short distance from the rapidly growing metropolis and port city of New York, with which Paterson maintained strong canal and rail links.

The need for additional space to facilitate the continued growth of the silk industry had direct ramifications for industrial organization and land use patterns at the ATP site. Situated at the heart of the already extensively developed and largely occupied industrial Paterson, the ATP site was largely developed by 1870. Although additional buildings were occasionally constructed along the sides or to the rear of the mill seats between Van Houten Street and the Passaic River, there was little room for further expansion to accommodate the growth and needs of the silk industry. The extent of the development along this section of the Passaic River front during the 1870s and 1880s can be discerned on an overlay map that reconstructs the locations of the buildings on the site *circa* 1875 (Figure 3.6) and by means of several other contemporary maps, such as Hyde's *Atlas of Passaic County, New Jersey* of 1877 (Figure 3.7) and Robinson and Pidgeon's *Atlas of the City of Paterson, New Jersey* of 1884 (Figure 3.8).

Although a few specialty silk firms like C.B. Auer & Company, which produced millinery items and neck ties at the Gun Mill lot, did rent space in some of the mills on the ATP site in the 1870s, it was not until the 1890s that the Mallory Mill, the Waverly Mill and Passaic Mill No. 1 were largely reconfigured for silk manufacturing processes following the demise of the cotton-based enterprises that had formerly occupied them. During the 1850s, 1860s and early 1870s, a large portion of Paterson's silk industry was focused on the manufacture of silk thread and machine twist. These activities could be readily undertaken by smaller companies in modest-sized and sometimes non-contiguous rooms rented in larger facilities or in smaller independent mill buildings. However, by 1880, the patterns of Paterson's silk industry had shifted towards larger concerns and more sophisticated and technologically complex products like ribbon and broad silk. In 1880, while Paterson produced 34.5% by value of the nation's total silk output, it produced only around 3% of its silk thread and machine twist (Garber 1968:198).

As the technology of silk spinning and throwing machines had improved and better quality raw silk came on the market, the need for the use of highly paid skilled employees in the most basic parts of the industry diminished. Silk thread and twist began to be more extensively manufactured in Massachusetts, Connecticut and Pennsylvania where skilled silk workers were scarce but labor and facility costs were low (Garber 1968:198). For Paterson's mill owners the weaving of broad silk and ribbon was more remunerative but required much more highly skilled and thus more highly paid labor. It also required factory buildings in which multiple tasks – reeling, reeling, spinning, throwing, weaving and, in the largest concerns, stretching, bleaching, dyeing, drying, finishing and packing – could all be accomplished and spatially organized into a logical production order.

KEY

1. Fabric Dyeing/Coloring
2. Fabric Dyeing
3. Machine Shop
4. Silk Mill
5. Cotton Mill
6. Blacksmith
7. Picking
8. Engraving
9. Printing Calico
10. Bleaching
11. Boilers
12. Finishing
13. Carpenter's Shop
14. Gatehouse and Flume
15. Millwright
16. Office
17. Engine Building
18. Turning
19. Fitting
20. Storage
21. Pattern Storage
22. Carpenter's Storage
23. Vacant
24. Foundry
25. Fire Engine Building
26. Copper Smith

Frame
Brick
Stone
Other
Street
Project Limit
Property Line

VALLEY OF THE ROCKS

PASSAIC RIVER

North Gates Wasteway

QUARRY

MOUNT MORRIS

MALLORY MILL

WAVERLY MILL

Franklin Manufacturing Company

PASSAIC MILL No. 1

TODD MILL

Todd & Rafferty Machine Works

GUN MILL

Buckley & Co.

John Ryle & Sons

(Burnt)

Lower Raceway (circa 1807)

Middle Raceway (circa 1800-1801)

VAN HOUTEN STREET

MILL STREET

0 50 100 200

Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the

Allied Textile Printers Site

in 1875

Figure 3.6

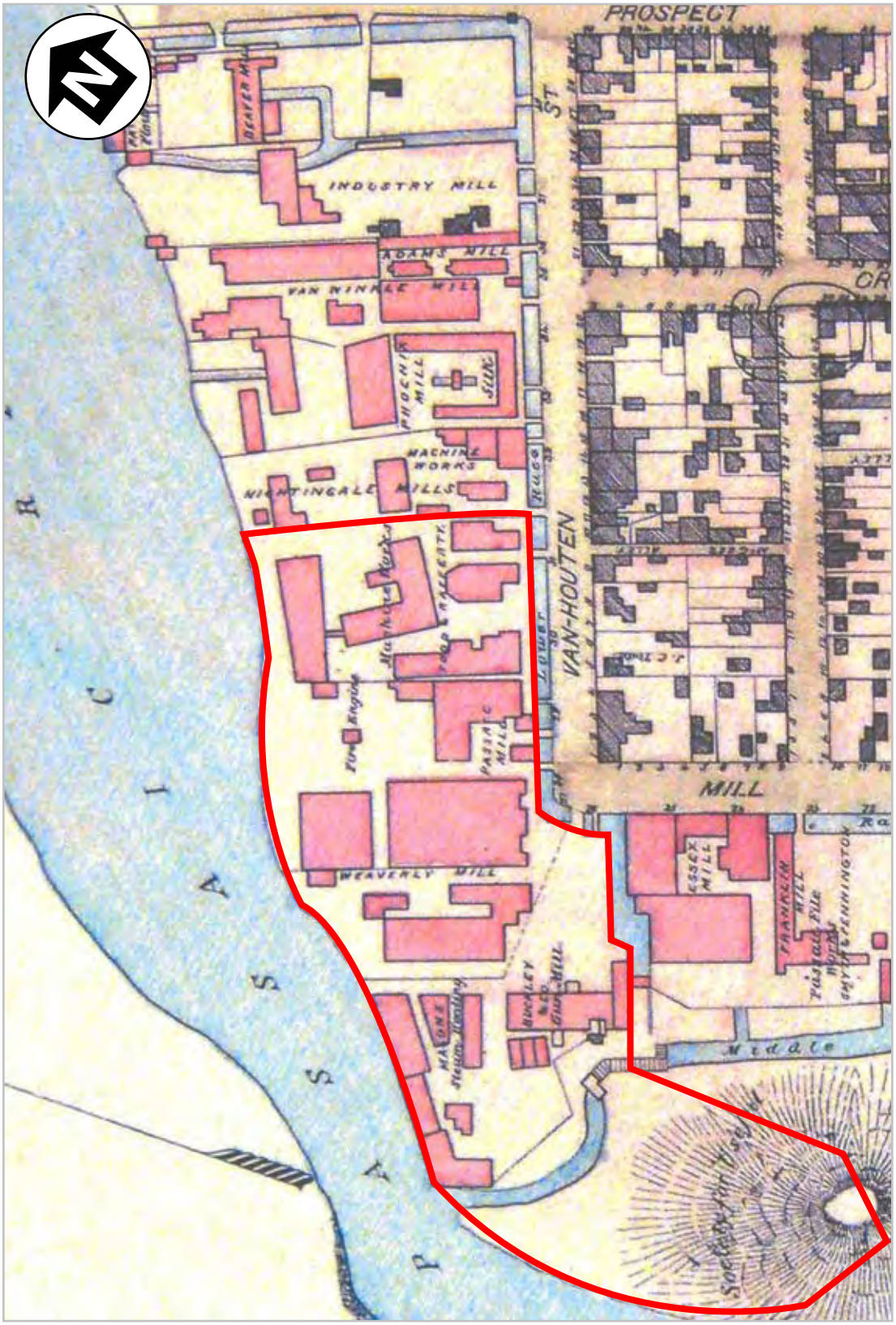


Figure 3.7. Hyde, E.B. *Atlas of Passaic County, New Jersey.* 1877. Scale: 1 inch= 175 feet (approximately). Limits of Allied Textile Printing site are outlined.

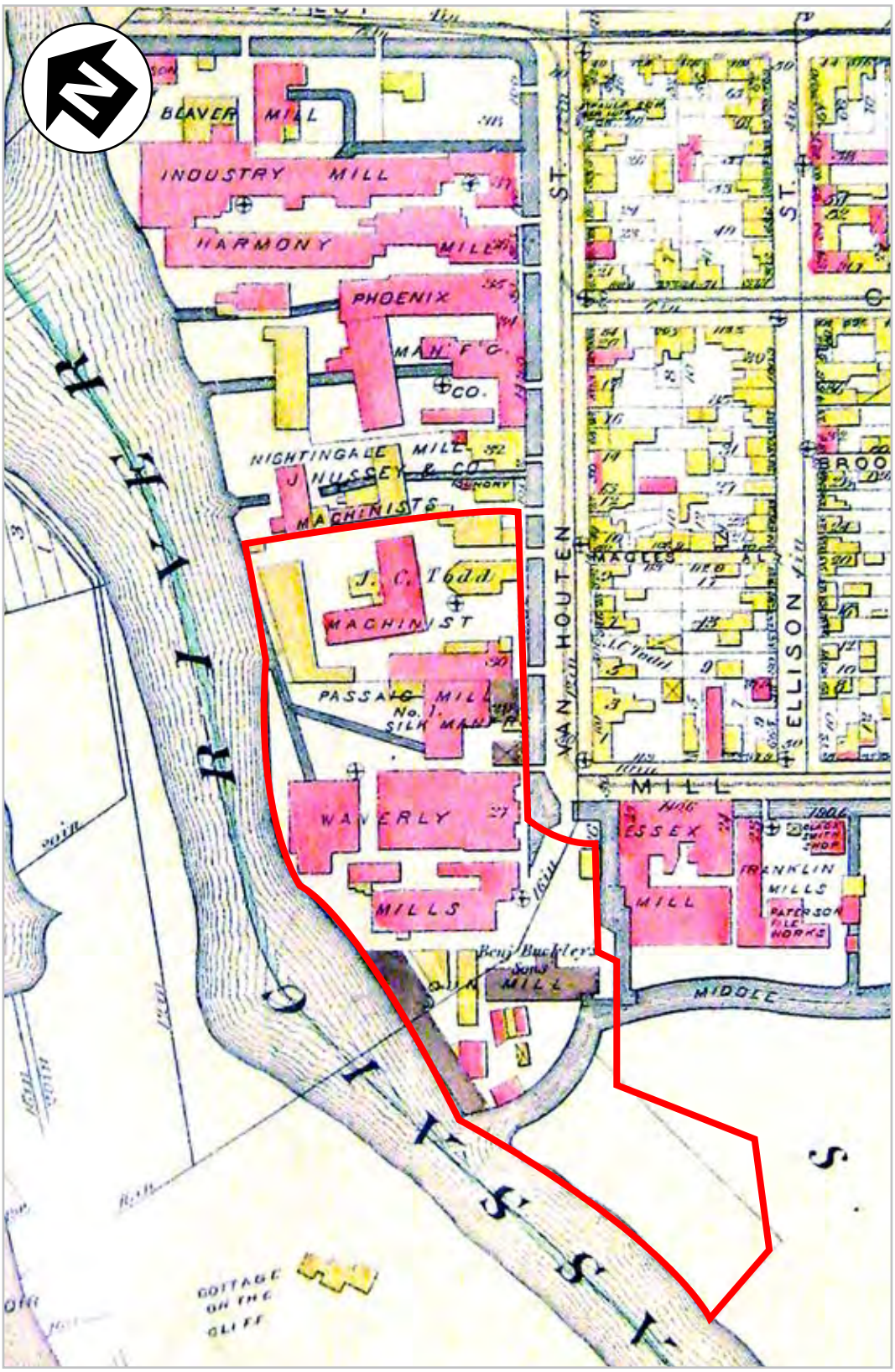


Figure 3.8. Robinson, E. and R.H. Pidgeon. *Atlas of the City of Paterson, New Jersey.* 1884. Scale: 1 inch= 185 feet (approximately). Limits of Allied Textile Printing site are outlined.

For well capitalized, large modern concerns, this typically resulted in a newer factory building being constructed on the edges of the old industrial district or beyond. With the proliferation of steam power and, eventually, electricity, silk mills were no longer tied to a location along one of Paterson's raceways and could relocate instead to the fringes of the city where land was cheap. Smaller companies and start-up concerns with little capital remained in the old industrial core. The smallest of these rented out rooms in tenant mills, while some mid-sized concerns, like the Gallant Brothers, found that larger older buildings, especially when conjoined like the Mallory and Waverly Mills, could still meet their needs. Silk dyeing operations followed roughly the same pattern, but were largely affixed to the mill races and the Passaic River because of their copious need for fresh water and an avenue for waste water disposal.

In part, it may have been the need to accommodate the expansion of the dye works located in the Gun Mill's yard that drove a major reshaping of the landscape of the western part of the ATP site in the closing years of the 19th century. Quarrying activity, which had begun in the 18th century and continued throughout the 19th century, intensified dramatically, reducing the mass of Mount Morris and clearing the way for the extension of the site's industrial facilities to the west of the North Gates Waste Way. This area is shown in a photograph (Plate 3.15) taken in August of 1879 prior to the commencement of the heaviest phase of quarrying activity. Subsequent photos document the existence of a steam-powered rock-crushing mill on the site and the removal of extensive amounts of geological material (Plates 3.16-3.18).

Robinson's *Atlas of the City of Paterson and Haledon* of 1899 (Figure 3.9) and the Sanborn Map and Publishing Company's *Insurance maps of Paterson, N.J.* of the same year (not illustrated) are the first maps to show the expansion of silk dyeing west of the waste weir. These maps and a reconstructed map of the buildings on the ATP site *circa* 1900 (Figure 3.10) show the facilities of the Knipscher & Maass Silk Dyeing Company, which represented the introduction of the first large-scale silk dyeing concern to the ATP site, and document the earliest phase of the reshaping and consolidation of the site by larger companies. Already by the early 1890s many of the single proprietors and smaller partnerships had been displaced by larger silk dyeing companies.

The Knipsher and Maass Dyeing Company was founded in 1889 by William E. Knipscher and Frank Maass. Knipscher was born in Germany in 1852 and was trained as a boy in the silk dyeing industry. At a young age he was made a foreman at the Riverside (Passaic County) silk dyeing plant owned by Jacob Weidman (Plate 3.19), a prominent figure in the dyeing industry and one of the first to construct large-scale dyeing plants. Knipscher (Plate 3.20) left Weidman's employ in 1887, took on a partner, Robert Close, and opened his own shop. Close left the firm in 1899 and was replaced by Frank Maass (Plate 3.21), a New Yorker who had received a technical education in Zurich, Switzerland. It was at this point that the firm located itself in the Gun Mill yard in the stone dye house and stone silk mill that John Ryle had constructed along the river's edge and expanded the facilities by constructing additional buildings on the west side of the North Gates Waste Way. Knipscher and Maass's new expanded Gun Mill plant can be seen in a number of historic photographs taken in the opening years of the 20th century (Plates 3.22-3.26). Detail of one of these images (Plate 3.25) shows the impressive fall of water from the gate house of the North Gates Waste Way behind the Gun Mill. Another later view of the expanded complex is provided by Plate 3.27. According to Albert Heusser, "[t]he Knipscher & Maass Silk Dyeing Company gave new vigor to the operations in the old historic premises by the river. Modern equipment was provided as occasion demanded; and here were tried out and put into successful practice some of the first local experiments involving the use of tin phosphate silicate for heavy weighting" (Heusser 1927:252).

* * *

Plate 3.15. View of the quarry and Gun Mill lot from the falls of the Passaic, looking northeast, August 5, 1879. This view shows Harry Leslie walking a tightrope across the falls and is also the earliest image to document the removal of the cupola from the Gun Mill. Source: Paterson Historic Preservation Commission.

Plate 3.16. View of the rock crushing mill at the base of Mount Morris, looking south southwest, *circa* 1887. Source: Paterson Historic Preservation Commission.

Plate 3.17. View of dams in the Passaic River and the rock crushing mill atop the wall above, looking south southwest, *circa* 1887. Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.18. View showing the extensive quarrying and reshaping of Mount Morris, looking east, *circa* 1890. Source: New Jersey Historical Society, Manuscript Group 1361.

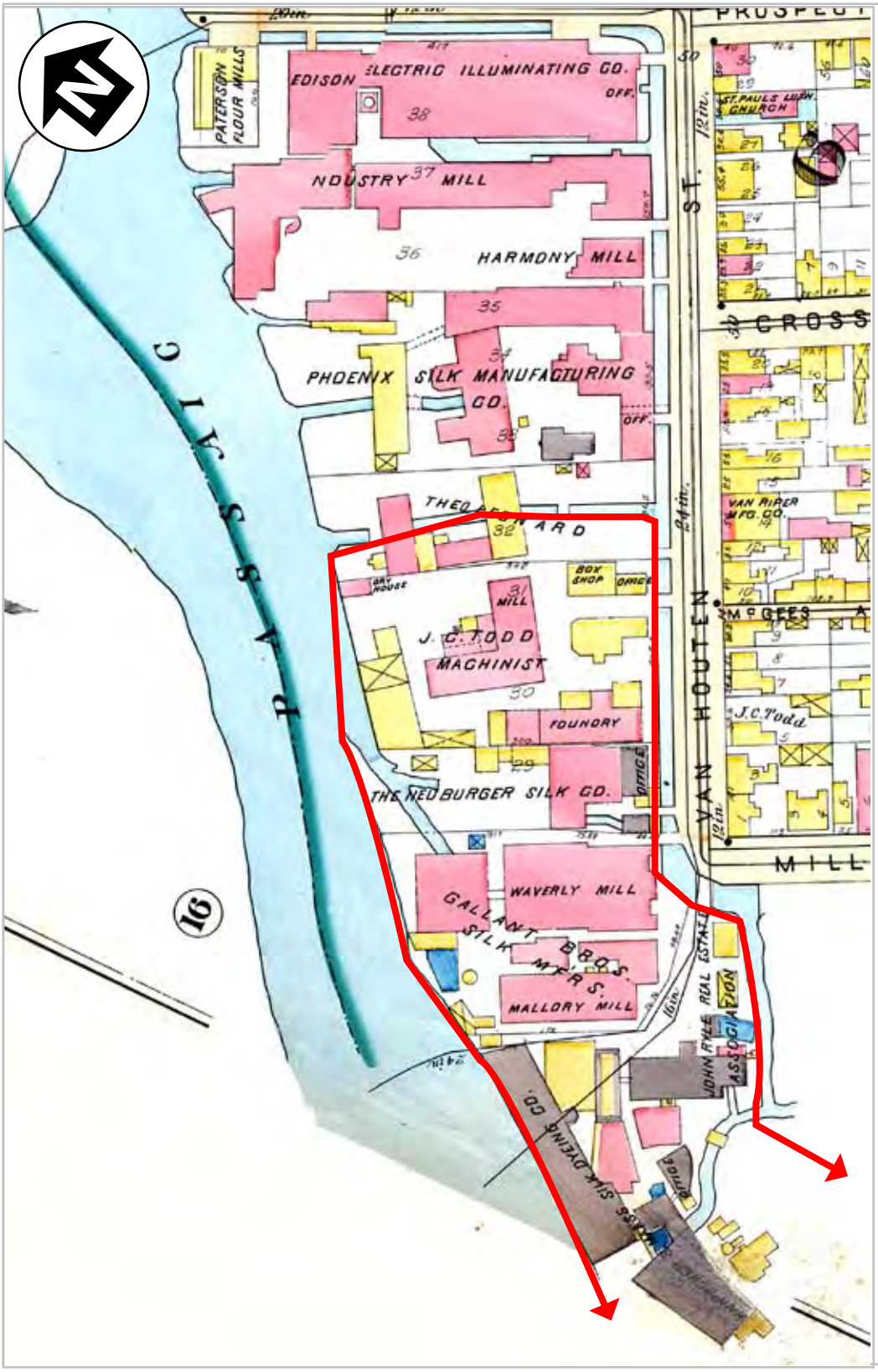


Figure 3.9. Robinson, E. *Atlas of the City of Paterson and Haledon.* 1899. Scale: 1 inch= 170 feet (approximately). Limits of Allied Textile Printing site are outlined.

KEY

1. Office and Vaults
2. Foundry
3. Carpenter Shop, Dyeing
4. Box Shop
5. Dye House
6. Storage
7. Drying
8. Store House
9. Laboratory
10. Water Tank
11. Dyeing, Shipping, Office
12. Blacksmith Shop
13. Waterwheel House
14. Machine Shop, Throwing, Storage and Paper Ribbon
15. Copperworks
16. Carpenter Shop
17. Wash House and Office
18. Throwing, Wool Scouring
19. Weaving and Winding
20. Warping and Weaving
21. Spinning, Winding, and Doubling
22. Coal
23. Sheds
24. Lathe Room
25. Machine Shop
26. Silk Ribbons, Broad Silk
27. Pattern Storage
28. Millwright Shop
29. Chipping Shop
30. Draughting Room

Frame
Brick
Stone
Other
Street
Project Limit
Property Line

VALLEY OF THE ROCKS
RIVER
PASSAIC
Knipscher &Maass Silk Dyeing Co.
MALLORY MILL
WAVERLY MILL
Gallant Brothers Silk Manufacturers
PASSAIC MILL No. 1
The Neuburger Silk Co.
TODD MILL
J.C. Todd Machinist
GUN MILL
John Ryle Real Estate Association
QUARRY
North Gates
Wasteway
Middle Raceway (circa 1800-1801)
Lower Raceway (circa 1807)
VAN HOUTEN STREET
MILL STREET
MOUNT MORRIS

0 50 100 200
Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the

Allied Textile Printers Site

in 1900

Figure 3.10

Plate 3.19. Photograph of Jacob Weidman [1845-1921]. Source: Heusser 1927:207.

Plate 3.20. Photograph of William E. Knipscher [1852-1915]. Source: Heusser 1927:251.

Plate 3.21. Photograph of Frank Maass [1863-?]. Source: Heusser 1927:252.

Plate 3.22. View looking northeast and downstream showing the Passaic River and the Knipscher & Maass Silk Dyeing Company works during the flood of March 3, 1903. Source: Griffith n.d.

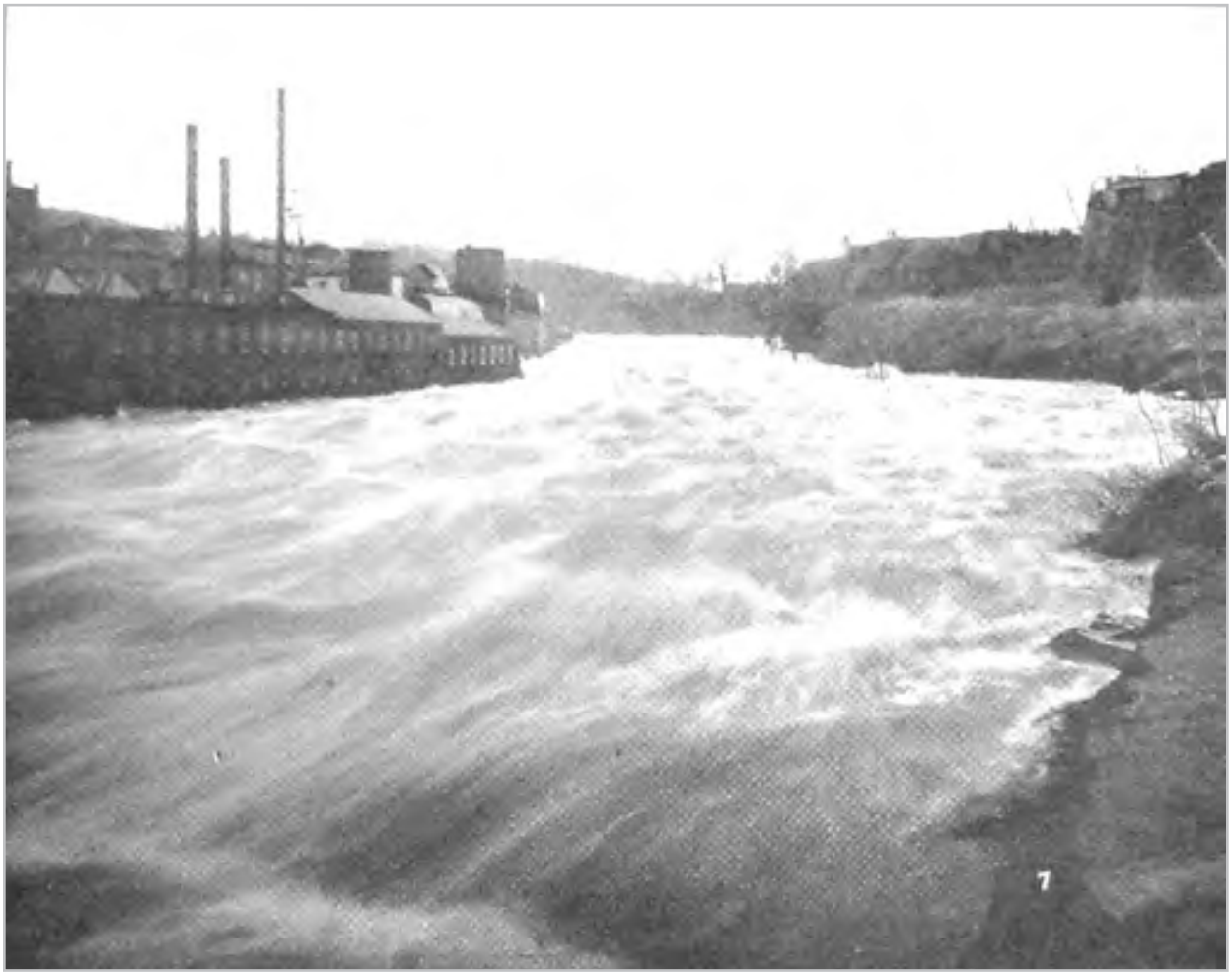


Plate 3.23. View looking southwest and upstream showing the Passaic River and the Knipscher & Maass Silk Dyeing Company works during the flood of March 3, 1903. Source: Paterson Evening News 1915.

Plate 3.24. View of "Paterson, N.J. from Water Works Park," looking northeast, *circa* 1904. Source: Detroit Photographic Company.

Plate 3.25. Detail of historic photograph of "Paterson, N.J. from Water Works Park" showing the Gun Mill flume and gatehouse structure, *circa* 1904. Source: Detroit Photographic Company.

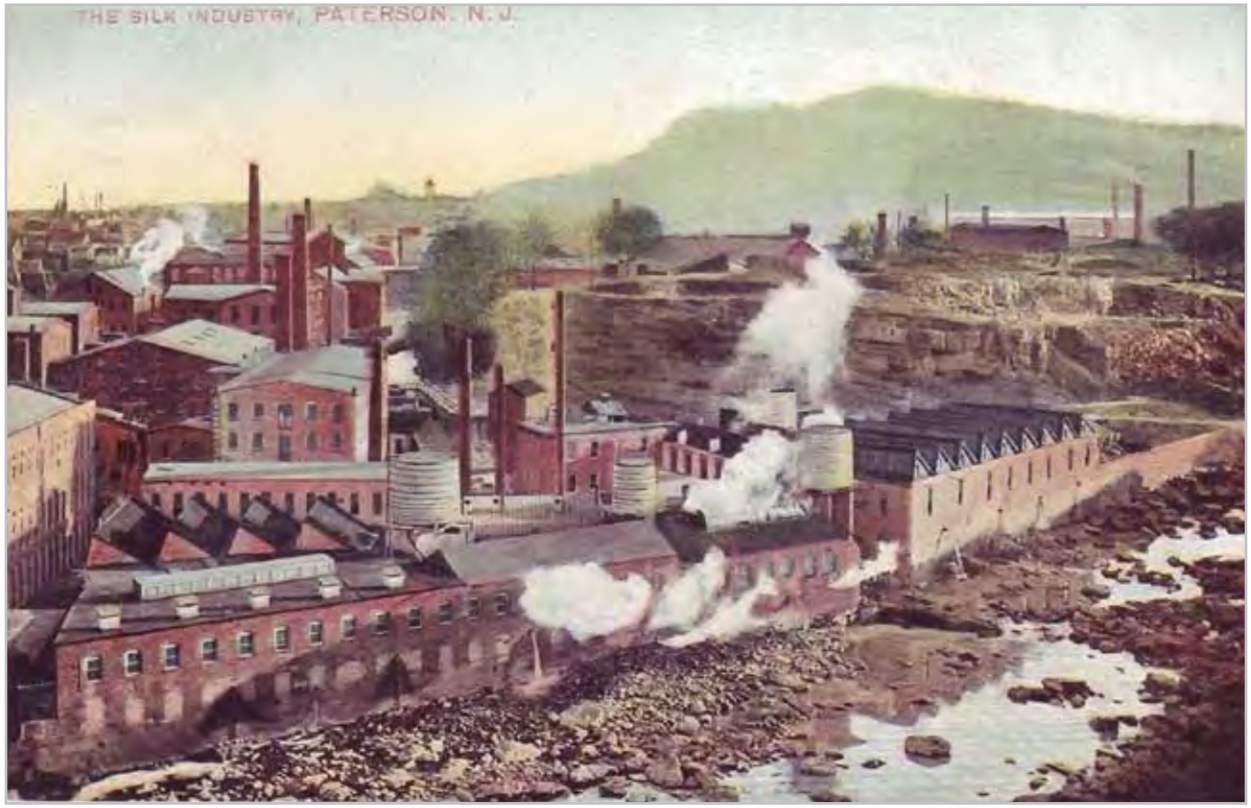


Plate 3.26. Historic postcard view of the Knipscher & Maass Silk Dyeing Company works, looking southeast, *circa* 1905. Note the low level of the Passaic with almost no flow. This was a typical condition when almost all of the water from above the falls was being diverted by the SUM or the Passaic Water Company. Note also the steam and water issuing from the dye house in the foreground. Source: Paterson Historic Preservation Commission.

Plate 3.27. View of the Standard Silk Dying Company's facility from the Spruce Street viaduct, looking north-east, *circa* 1927. Source: Heusser 1927:252.

Although the cotton and silk industries dominate the 19th-century history of the ATP site, other manufacturing activities took place there as well. Some were small concerns like the Malone Steam Heating firm, identified as operating in the Gun Mill yard by Hyde's *Atlas of Passaic County, New Jersey* of 1877 (see above, Figure 3.7). The Paterson Parchment Company in the Gun Mill yard and Hart & Leeds Paper Box factory in the Gun Mill itself (which by this point had lost its upper story [Plate 3.28]) appear on the Sanborn Map and Publishing Company's *Insurance Maps of Paterson, N.J.* in 1887 (see below, Figure 6.1b). Other non-textile firms were larger and turned out more sophisticated products…

> At Paterson, N.J., seven young engineering students—George Duggan, Henry Walstenholme, Richard Jenkinson, Julian and Edward Yzewyn, Tice Van Dyk and Frederick Bomelyn—have been improving their summer evenings by prowling along the shores of the Passaic River with a dip needle, the instrument used to locate subsurface metals. Last week, under a bridge, the needle dipped strenuously. The prospectors seized shovels, dug, ejaculated, waved their shovels in muddy triumph. Their buried treasure was not a cache of pirate bullion, or a mastodon's skull, but an 18-foot iron hull designed to run under water; a submarine of primitive design (*Time* August 22, 1927).

The odd, lozenge-shaped heavily rusted hulk uncovered that day in 1927 (Plate 3.29) was the product of the mind of John Holland. Holland, an Irish immigrant, engineer and teacher in the Paterson Catholic schools, has been called the "Father of the Modern Submarine." The ship pulled from the bed of the river was his very first submarine. Its hull had been fabricated at the Albany Shipyard in New York City, but its mechanical systems and engines were designed, constructed and installed in the spring of 1878 at the Todd & Rafferty Machine Works at the eastern end of the ATP site in Paterson.

Although early submarine manufacture may seem an exotic sidebar, the Todd & Rafferty Machine Company in fact played an integral role in the history of the development of the textile industry on the ATP site. In addition to other products and projects like that represented by Holland's submarine, the company specialized in the manufacture of textile mill machinery and related steam engines. This type of work done at the Todd & Rafferty plant – smithing, casting and the erection and assembly of machines and engines – was dramatically different in nature from the textile manufacturing being undertaken at the neighboring mills and serves as an important counterpoint in the story of the development of the ATP site.

The business that became the Todd & Rafferty Machine Company was started originally in 1847 as a partnership between Joseph C. Todd (Plate 3.30) and Daniel Mackey. Todd was a carpenter from Somerville, New Jersey, who came to Paterson in search of work and found employment in the pattern shop of Godwin, Clark and Company; Mackey was a local Paterson mechanic. In typical Patersonian fashion, the new company rented a space on the first floor of the Nightingale Mill and engaged in the manufacture of machinery for mills until they had grown sufficiently large and possessed enough capital to purchase its own mill. In order to manage this expansion, they took in a third partner Philip Rafferty, who was "a shrewd Business man and a financier" (Clayton and Nelson 1882:441).

In November 1850, the firm purchased the old Home Mill of Daniel Holsman and commenced the manufacture of mill machinery there. In 1855, Daniel Mackey retired from the concern and in 1872, Todd & Rafferty, as the firm was subsequently known, merged with the boiler works of Rafferty, Smith and Company (located in another part of Paterson) to form the Todd & Rafferty Machine Company. By 1874, the company's Van Houten Street facilities had been expanded considerably to suit its growing needs (see above, Figure 3.5). A large foundry was constructed

Plate 3.28. View of the Gun Mill, looking west, *circa* 1910. This image shows the cobble-paved yard in front of the mill and loss of the upper story of the building. Source: Heusser 1927:178.

Plate 3.29. The salvage of John P. Holland Boat Number 1 from the bed of the Passaic River, August 1927. Source: Paterson City Museum.

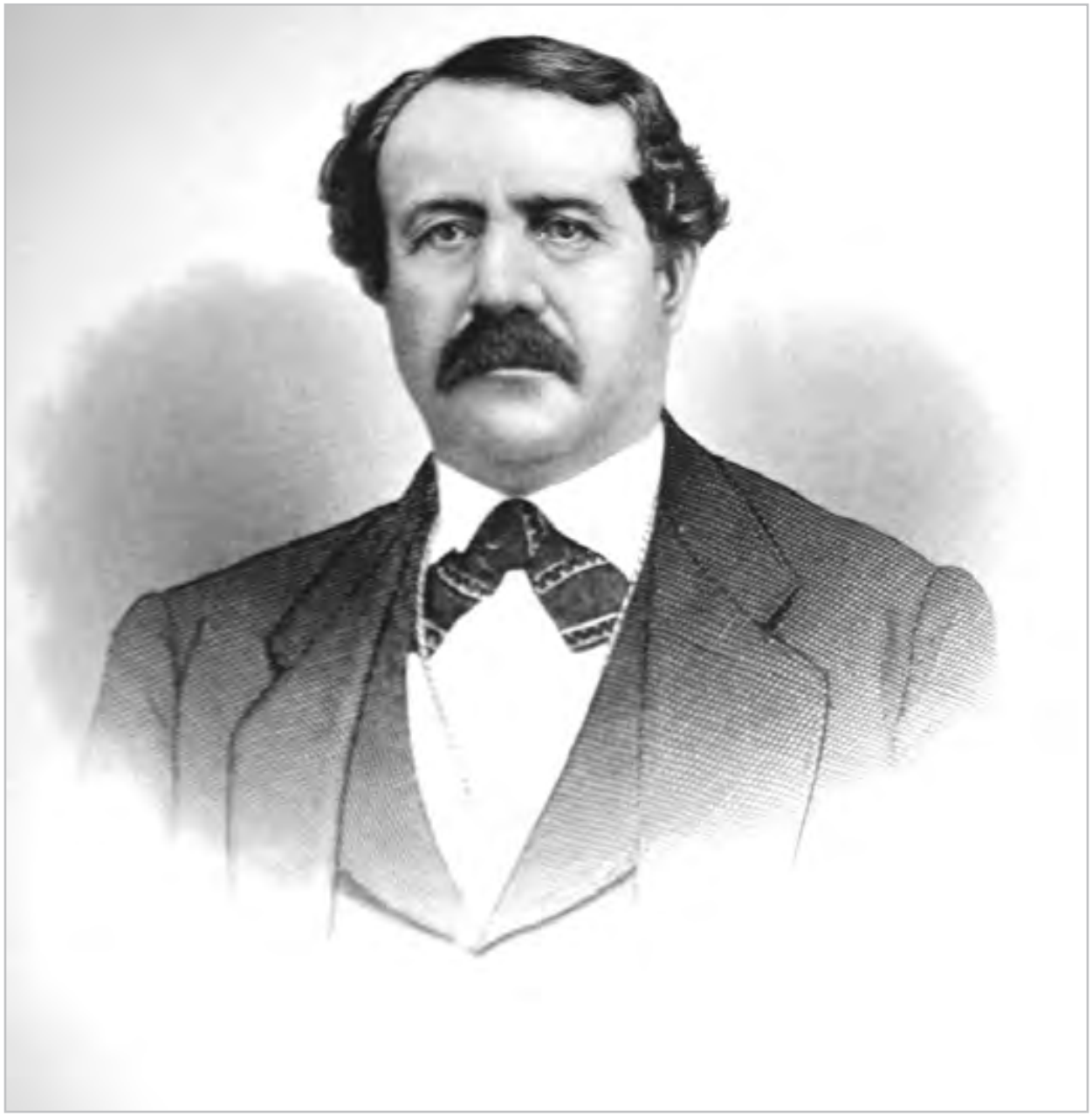


Plate 3.30. Portrait of Joseph C. Todd. Source: Trumbull 1882.

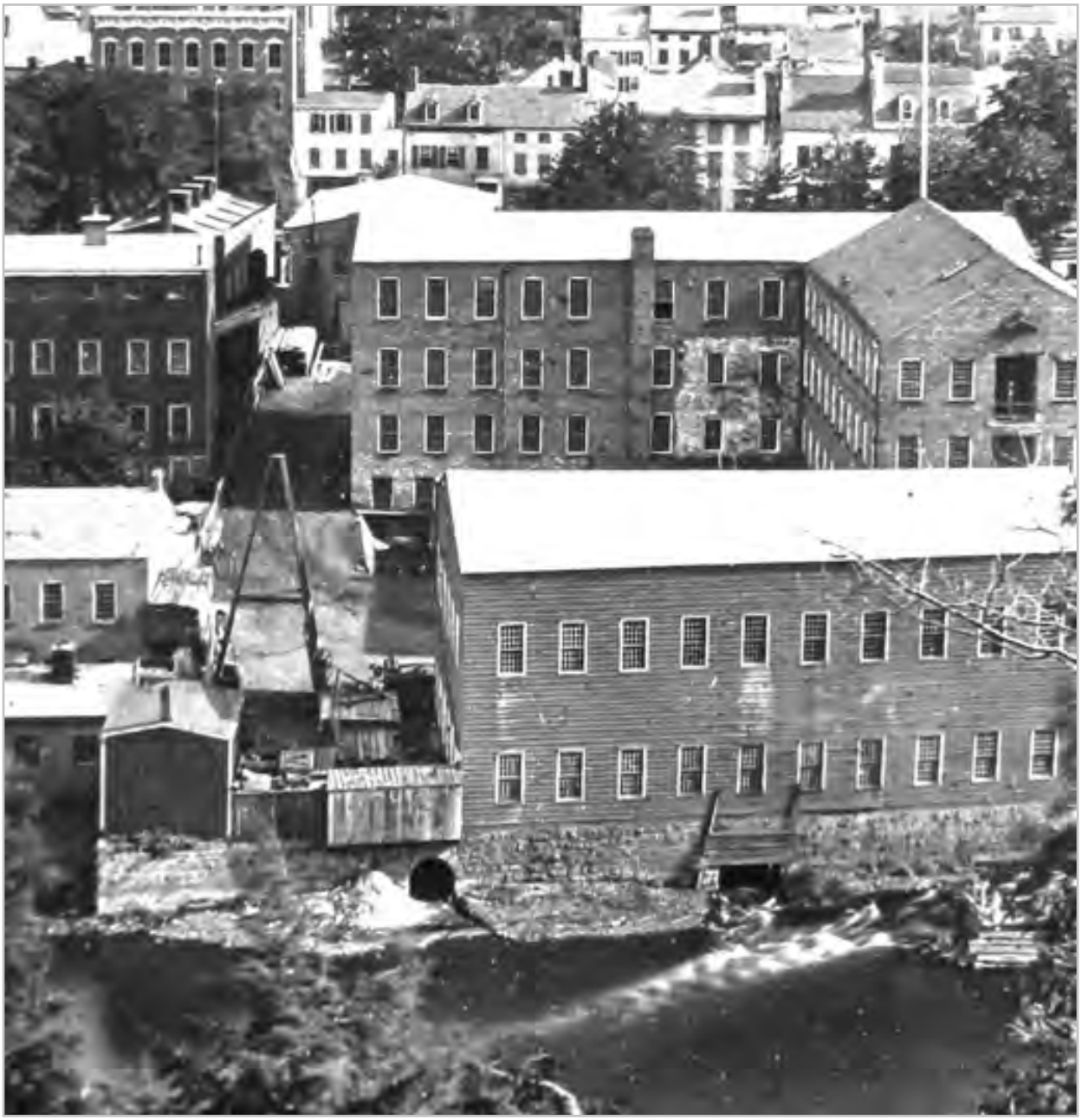


Plate 3.31. View of the rear yard of the Todd Mill, looking southeast, *circa* 1890 (Doremus, Photographer). The frame building on the river's edge is the steam engine erecting shop of the Todd works. Two tail race outflows are visible in this view. Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.32. View of the rear yard of the Todd Mill, looking southeast, - 1907. Source: Quakenbush & Company, 1907.

along its western property line, blacksmiths and erecting shops were constructed along the river (Plates 3.31 and 3.32) and an office, carpenter shop and storage buildings were put up fronting the Lower Raceway. Although Philip Rafferty died in 1872, the firm continued for a few years under the Todd & Rafferty name for a number of years before falling into receivership in 1877 (Hughes 1877). The company subsequently resurfaced as "The J.C. Todd Machine Works" at some point before 1884 (Stewart 1879:255; Robinson and Pidgeon 1884; Shriner 1890:197).

According to William Nelson's history of the firm, Todd's businesses built the first silk making machinery in Paterson (Clayton and Nelson 1882:441). They enjoyed a symbiotic relationship with the local textile mills but while Paterson was primarily a city of cotton and silk, Todd & Rafferty carefully crafted a specialty in the manufacture of hemp and flax machinery, including machines for making rope, jute and bagging. In the course of cornering this niche market, Todd & Rafferty developed a client list that extended far beyond the limits of the city, as well as overseas. They sold hemp and jute rope machinery to mills located all over the world – in "Britain, Calcutta and Australia," as well as China, Mexico, South America and the rest of the United States and Canada (Bishop 1868:227; Clayton and Nelson 1882:196). Excluding railroad locomotive plants, other Paterson machine shops rarely seem to have done any international business at all with most of their output being oriented toward the needs of Paterson's own textile factories and other local manufacturing concerns.

As briefly stated above, the Todd & Rafferty Machine Company also enjoyed a thriving business in steam engines and is known to have supplied some of the first stationary engines installed in mills in Paterson. They made large horizontal engines as well as special purpose and small engines, and they did a considerable business manufacturing "Baxter Marine Engines." These were "turned out for use on steam launches, yachts, tugs and freighting vessels of every size. They are from two to forty horse-power and sell at from $420 to $2,350" (Clayton and Nelson 1882:196). The engines they installed in the two submarines which they worked on for John Holland were a "4-horsepower Brayton-cycle petroleum engine" (in Holland Boat No.1) and "a two-cylinder, 17-horsepower Brayton-cycle engine" (in the "Fenian Ram") (Whitman 2003).

Todd & Rafferty also made much smaller steam engines:

> Mr. Todd has also become the owner of the patent Baxter portable engine, of which he has manufactured manv hundreds. These little engines are from one to four horse-power and sell for $150 to $350. They are much used in printing offices, in running sewing machines and wherever a small power onlv is needed. One of them will run a press for ten hours and with the consumption of half a bushel of coal. It is no wonder they are popular. One of them occupies only about as much room as a large base-burning stove. Mr. Todd still builds steam engines of all kinds and sizes, not confining himself by any means to these small portable engines (Clayton and Nelson 1882:196).

Although at various periods in its history, the company experienced difficulty with its finances, particularly following the death of Philip Rafferty in 1872 and the Panic of 1873, it remained solvent and in almost continuous operation until the mid-1890s.

B. CONSOLIDATION AND DEMISE: STANDARD SILK DYEING AND ALLIED TEXTILE PRINTERS

On January 1, 1909, the Knipscher & Maass Silk Dyeing Company joined with five other Paterson silk dyeing firms to form the National Silk Dyeing Company (Heusser 1927:257). This event marked the beginning of an important trend in the industry which would ultimately result in dramatic physical changes to the ATP site. In the early days of the 20th century, the silk manufacturing industry in Paterson was still dominated by shops which tended to specialize in a specific aspect of the larger production

process. With regard to silk dyeing, this movement had actually intensified during the final quarter of the 19th century. As more and more specialty dye shops came into existence, there were fewer and fewer larger silk spinning or weaving businesses that saw much benefit in maintaining their own dye divisions. This specialization of work left Paterson's many small silk manufacturing companies quite vulnerable to relatively minor fluctuations in the general market conditions or in the price of materials and labor. An increase in the price of dyestuffs, for example, could threaten the existence of a small specialty dye shop, but would have had much smaller consequences for a company that incorporated spinning, weaving and dyeing in a single plant. Even when the wider silk industry was experiencing periods of growth, the failure of shops, particularly smaller shops, remained a common event (Swan 1937:4).

By the turn of the 20th century the majority of Paterson's silk dyeing enterprises were very small concerns, although a few of the older and more established companies had by now begun to grow to considerable size. In Paterson, in 1902, there were 22 separate silk dyeing firms employing 3,464 persons. Thus, on average, each firm employed approximately 157 individuals. These numbers are skewed, however, as the five largest firms employed approximately 72% of this workforce. By far the largest of these concerns was the Weidmann Silk Dyeing Company which, in 1902, employed 950 workers in its plants. This made Weidmann the fourth largest employer in the entire city (Moody 1903:262). By 1906, the number of Weidmann employees had grown to 1,400, an almost 50% increase within this four-year span (Garrison 1906:297).

The rapid expansion of the Weidmann Company threatened to overwhelm its smaller competitors who found it increasingly difficult to compete. It quickly became apparent to the owners of the other large and mid-sized firms that the only path forward was through consolidation. In 1903, the Boettger Piece Dye Works and the Alexander Dye Works in nearby Lodi were among the first to merge creating the United Piece Dye Works, a single company employing 1,225 persons (Heusser 1927:379-380). Obviously, the number of workers a firm employed only represents one aspect of its relative position within an industry, as it does not take into account revenue, market share or gross product figures, but workforce size does still provide a simple index for comparing competing firms.

In 1908, the National Silk Dyeing Company was formed from the Auger & Simon Silk Dyeing Company (of Paterson and Williamsport, Pennsylvania), the Lotte Brothers Company (of Allentown, Pennsylvania) and the Emil Geering Silk Dyeing Company, the Gaede Silk Dyeing Company, the Kearns Brothers Silk Dyeing Company and the Knispscher and Maass Silk Dyeing Company (all based in Paterson) (Heusser 1927:257). A desire to control the market for dyed goods was clearly a primary driving force behind this merger.

On November 18, 1913, the *Boston Evening Transcript* reported that the United Piece Dye Works, the National Silk Dyeing Company and the Weidmann Silk Dyeing Company were in the process of finalizing an arrangement which would have joined all three of these large firms, thereby creating a single corporation which would have wielded near absolute control over the industry (*Boston Evening Transcript*, November 18, 1913:4). These merger plans were subsequently denied by National Silk, but it remains likely that such an arrangement was being seriously contemplated. The *Boston Evening Transcript* notice also revealed that both the United Piece Dye Works and the Weidmann Silk Dyeing Company were substantially controlled by the "Gillett Brothers" organization. Gillette Brothers were probably the successor firm to Gillett et Fils of Lyons, France, which is known to have purchased a controlling interest in the Weidmann Company on January 1, 1909 (Heusser 1927:222).

The economic benefits of increased company size and the reduced competition were not the only motivations behind the merger trend. An effectively managed larger corporation could better integrate the various processes involved in silk dyeing and offer increased expertise and services through access to the combined knowledge of the key members of the staffs and the facilities of the companies which it absorbed. The National Silk Dyeing Company, immediately upon its formation, set about a program of integration designed to improve the efficiency of both the individual plants and the larger firm as a whole. In an effort to centralize effort and eliminate redundancy, the Knipscher & Maass facilities on the Passaic were closed and all of the plant's equipment, which was relatively modern, was shipped to other locations (Heusser 1927:252). National Silk prided itself in not laying off any of the persons employed at any of the plants it acquired. Frank Maass became the company's Secretary and Assistant Treasurer, while William Knipscher also served with National Silk until the time of his death in 1915 (Heusser 1927:251-252, 259).

Knipscher & Maass's vacated plant remained under the control of the National Silk Dyeing Company for a number of years. A.H. Mueller's *Atlas of the City of Paterson, New Jersey* of 1915 (Figure 3.11) indicates that, nearly seven years after terminating its operations at the plant, National Silk still exerted at least some measure of control over the facility. National Silk probably retained its interest in the plant in order to prevent its potential future use by a competitor. However, the Mueller atlas and the Sanborn Map Company's *Insurance Maps of Paterson, New Jersey* of 1915 (see below, Figure 6.2b) both indicate that the portion of the former Knipscher & Maass works situated east of the North Gates Waste Way was at that time occupied by the Globe Dye Works. Globe was a very small firm with fewer than 20 employees that specialized in cotton dyeing and thus was probably not considered to be a potential competitor to the National Silk interests (Low 1915:407).

The neighboring Standard Silk Dyeing Company plant represented much more of a threat to National Silk's efforts at restricting competition. As a corporate entity, Standard Silk largely represented the interests of the George Warren Cole, Jr. and his brothers, Charles Peter and William Scott Cole. Before setting out on their own, all three brothers had worked for a number of years in the Paterson silk dyeing industry and had ties to the Gun Mill yard. George W. Cole and William S. Cole, for example, had both worked in the offices of Knipscher & Maass. Charles P. Cole had less of a connection to the site, having been trained in the dye house of the Weidmann Company (Heusser 1927:304-306).

In 1900, Adam Jaeger and George W. Cole, Jr. formed the Liberty Silk Dyeing Company which undertook skein silk dyeing in a group of riverfront buildings at the rear of the Waverly Mill lot (Plates 3.33 and 3.34). Both Charles P. and William S. Cole held executive positions in the firm (*The Textile World Official Directory…*1902:156; Heusser 1927:304-306). Liberty Silk is known to have employed the "Dynamite" process of silk weighting (Santomauro and Hershey 2008:48). The weighting of silk involved the deposition of various metals or chemicals (most commonly tin) on the fabric as a finishing process. This produced a more luxuriant feel and imitated silk of more costly grades of both fiber and weaving. The "Dynamite" process involved treating tin or phosphate weighted silk with sodium silicate to produce some of the most heavily weighted silk fabrics produced at that time. This adulteration of the silk often mechanically and chemically damaged the silk threads and frequently resulted in the development of pink spots on the fabric within a very short period of time (Tímár-Balázsy and Eastop 1998:105).

Damage to the Liberty Silk Dyeing Company plant caused by the Paterson flood of 1903 encouraged the firm to relocate to Allentown, Pennsylvania. Meeting with little success in Pennsylvania, the brothers returned to Paterson in 1906. No longer associated with Adam Jaeger, the three siblings incorporated the

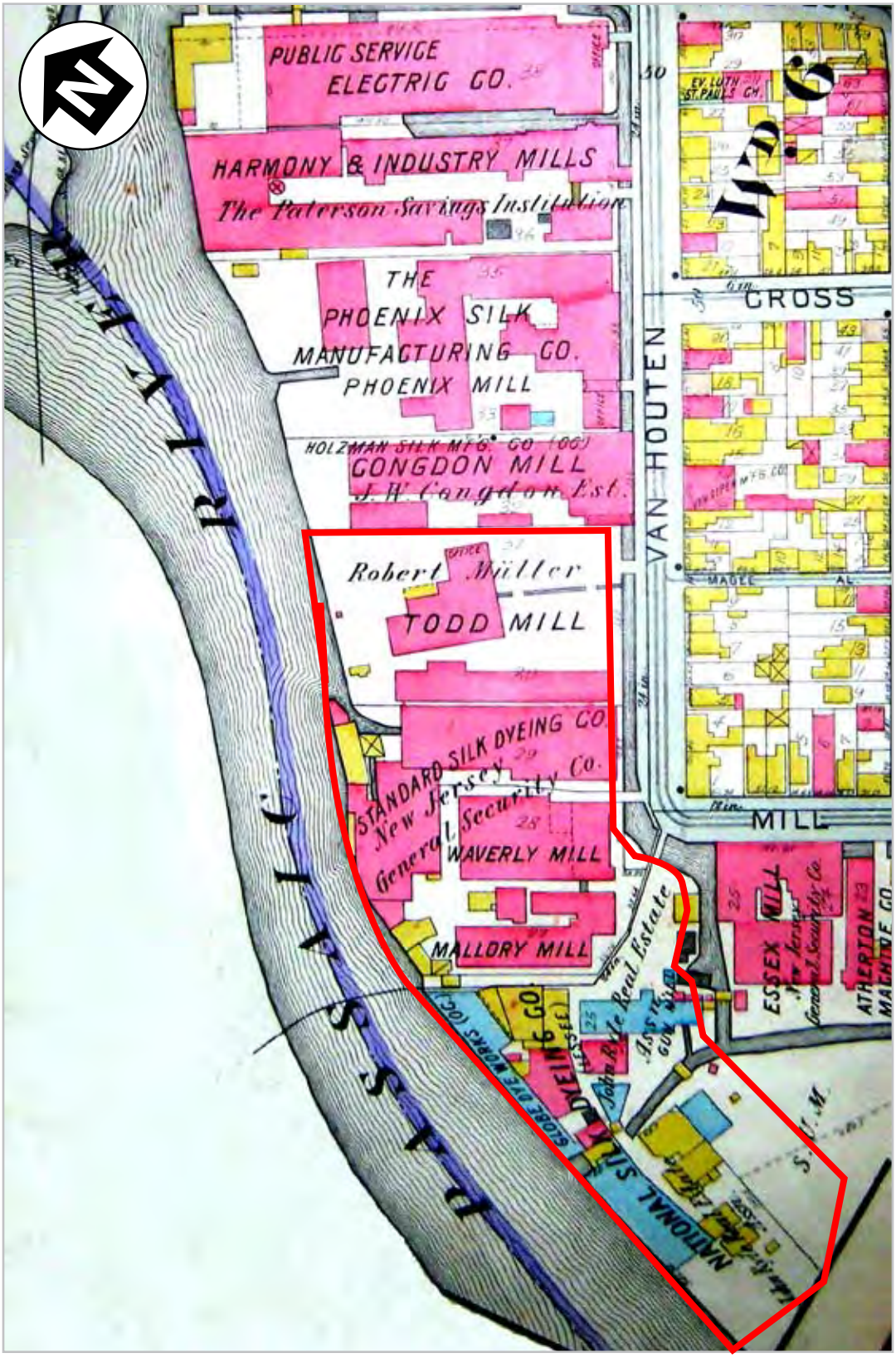


Figure 3.11. Mueller, A.H. *Atlas of the City of Paterson, New Jersey.* 1915. Scale: 1 inch= 180 feet (approximately). Limits of Allied Textile Printing site are outlined.

Plate 3.33. View of the Waverly and Mallory mills from across the Passaic River, looking southeast, *circa* 1890 (Doremus, Photographer). The Gun Mill, now reduced to three stories, is visible at right. Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.34. View showing the rear of the lots of the Todd, Passaic, Waverly and Gun mills [left to right], looking southeast, *circa* 1910. Source: Paterson Board of Trade 1910.

Standard Silk Dyeing Company in 1907, with George W. Cole. Jr. serving as President, Charles P. Cole as Vice-President and William S. Cole as Secretary (Heusser 1927:302-303). The three brothers returned to their old place of business reportedly because it was the only suitable facility in the city available for lease at that time (Heusser 1927:302). They initially occupied only the buildings along the river frontage of the Mallory and Waverly mill properties. The main Waverly building, the largest building on either the Mallory or the Waverly property, was already occupied. Since the bankruptcy of the Gallant Brothers Silk Company in 1903, the main Waverly mill building had served as the factory of Baker & Schofield, manufacturers of broad silks (Plate 3.35) (*New York Times*, March 12, 1903). This latter company moved to the Waverly Mill in 1906 following the destruction by fire of the mill it had previously leased elsewhere in Paterson (*New York Times*, July 22, 1906).

According to Albert Heusser, the Cole brothers had to perform major renovations to the dilapidated buildings on the riverfront in order to render them suitable for use by the newly formed Standard Silk Dyeing Company (Plate 3.36) (Heusser 1927:302). Piece dyeing, the dyeing of woven silk goods rather than silk skeins, was the major focus of the company. Under the direction of plant superintendent Joseph Seyer, Jr., who joined the firm in 1918, the company perfected a number of technological advances in silk weighting and received a patent for one of the first processes for the production of washable silk fabrics (Seyer 1922; Heusser 1927:304-306).

A.H. Mueller's *Atlas of the City of Paterson, New Jersey* of 1915 (Figure 3.11) shows how the Standard Silk Dyeing Company's facility wrapped around the main Mallory and Waverly mill buildings (Plate 3.37) and occupied a row of secondary buildings along the river along with the Passaic Mill No.1 (Plate 3.38). In 1923, the Standard Silk Process Corporation, a subsidiary, was incorporated in order to weight silk skeins prior to "degumming." Degumming was the process by which the naturally occurring sericin or "silk gum that covered silk fibers" was removed (Heusser 1927:303). Sericin was normally removed prior to the dyeing of silk, either before or after weaving, but its removal reduced the "weight" of silk by as much as 30%. Silk was more typically weighted after the degumming process.

The Standard Silk Process Corporation occupied large portions of the Waverly Mill (Plate 3.39). The layout of the property as it existed around 1925 is shown in a composite map of the ATP site developed to show existing infrastructure in that year (Figure 3.12). By 1927, Standard Silk had grown to become "one of the largest independent silk dyeing establishments in the country" (Heusser 1927:304). Flush with success and looking to provide room for future growth, the firm soon annexed the former Knipscher & Maass works (Plate 3.40). It also initiated a very large construction program which was intended both to enlarge and improve its facilities. Standard Silk's construction campaign involved the expansion and linking of buildings and the construction of large boiler plants on the Mallory Mill and the Passaic Mill lots (Heusser 1927:303-304). These were the first steps in a 30-year-long process of integration aimed at tying the disparate buildings of the ATP site into a single textile plant.

The Standard Silk Dyeing Company continued operations into the 1930s but eventually succumbed following George W. Cole, Jr.'s reputed bout with insanity and his subsequent death late in 1928 or early in 1929 (Plate 3.41) (*New York Times*, June 9, 1929). Standard Silk left behind a commodious and extensively modernized plant which would soon be occupied by Allied Textile Printers, Inc.

* * *

Much of the following history of Allied Textile Printers and its successor firms is derived from an interview of Arthur Rosen, a former employee and part owner in the firm, who was also the son of Irving Rosen, one of the

KEY

1. Dye House
2. Tenant Mill
3. Offices, Shipping, Drying, Finishing
4. Finishing
5. Treating Room
6. Weights Department
7. Broad Silk Weaving
8. Broad Silk Weaving, Silk Throwing
9. Winding and Warping
10. Stock Room
11. Storage
12. Pipe Shop
13. Broad Silk Weaving, Hat Band Weaving

Frame
Brick
Stone
Other
Street
Project Limit
Property Line

VALLEY OF THE ROCKS

PASSAIC RIVER

Globe Dye Works

MALLORY MILL

WAVERLY MILL

Standard Silk Dyeing Co.

PASSAIC MILL No. 1

TODD MILL

GUN MILL
John Ryle Real Estate Association

Lower Raceway (circa 1807)

VAN HOUTEN STREET

MILL STREET

Middle Raceway (circa 1800-1801)

MOUNT MORRIS

0 50 100 200
Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the Allied Textile Printers Site in 1925

Figure 3.12

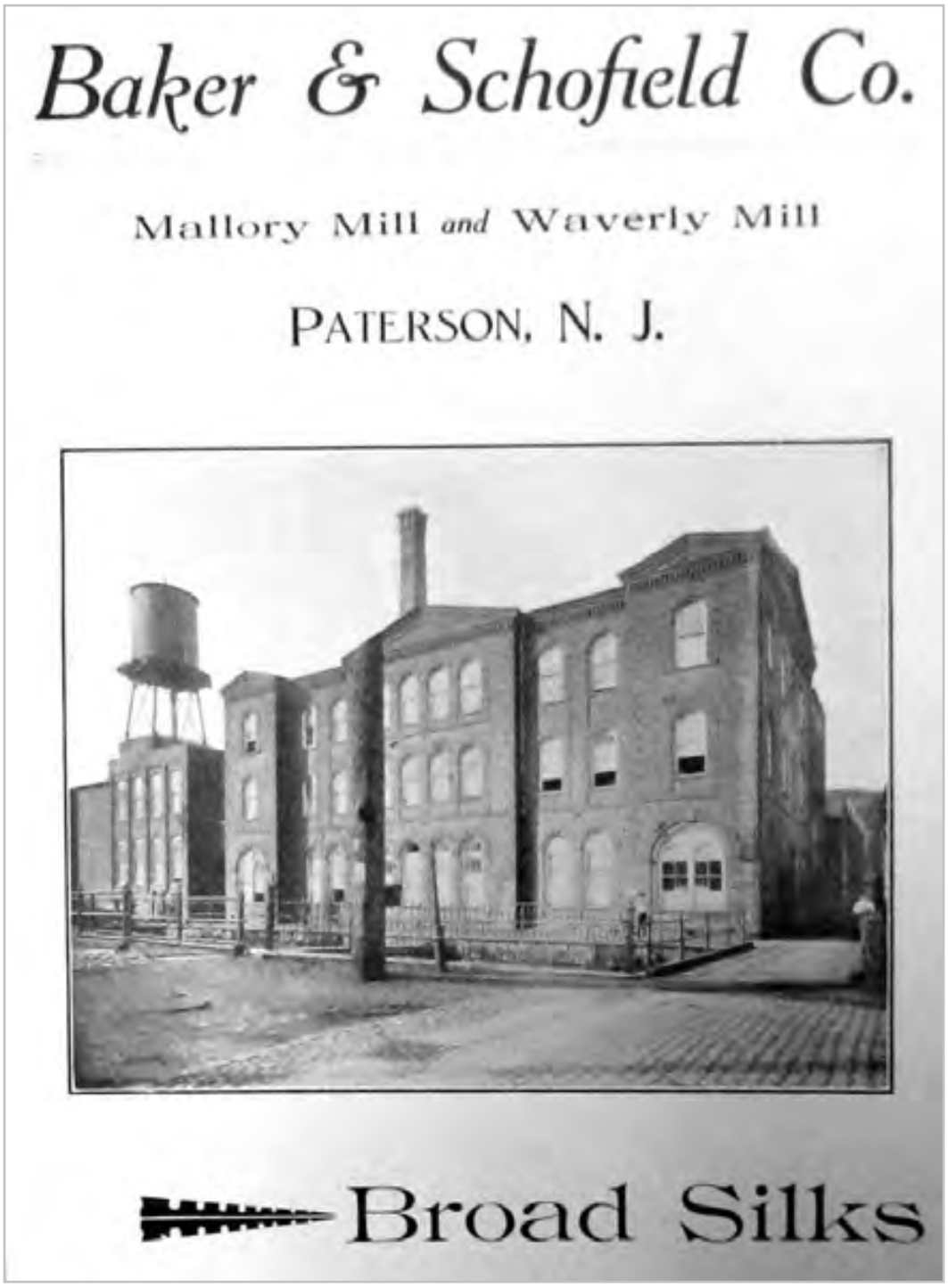


Plate 3.35. View of Mallory and Waverly Mills, looking north, *circa* 1910. Source: Paterson Board of Trade 1910.

Plate 3.36. View of the rear of the Todd, Passaic, Waverly and Mallory mill lots from the opposite side of the Passaic River, looking southeast, 1913. Source: Haines Photo Company 1913.

Plate 3.37. View of the Mallory and Waverly mills from Van Houten Street, looking northwest, March 16, 1916. Source: New Jersey Historical Society, Manuscript Group 1361.

Plate 3.38. View of the Waverly and Passaic mills, looking north, *circa* 1916. Source: Paterson Museum.

Plate 3.39. View of the Waverly Mill, looking north northwest from Van Houten Street, *circa* 1927. Source: Heusser 1927:289.

Plate 3.40. View looking northeast and downstream from the falls of the Passaic River, *circa* 1920. Source: New Jersey Historical Society, Manuscript Group 1361. .

Plate 3.41. Photograph of George W. Cole, Jr., President of the Standard Silk Dyeing Company. Source: Heusser 1927:304.

original corporate founders (Arthur Rosen, personal communication, October 28, 2009). Like the National Silk Dyeing Company, formed over a quarter century earlier, Allied Textile Printers, Inc., was a combination of textile dyeing, printing and finishing firms which merged under a single management structure in 1938 in order to more effectively compete with the larger conglomerates which were increasingly dominating the industry. Chief among these large competitors was the United Piece Dye Works of Lodi, an already immense firm which approached monopolistic proportions in 1923 when it formally absorbed the Weidmann Silk Dyeing Company and its subsidiaries, the Lehigh Silk Dyeing Company and the Service Land Company. In February of 1928, the United Piece Dye Works went public in a deal structured by Lehman Brothers that demonstrated both its size and its dominance of its field (Lehman Brothers 1928).

Paterson's other silk dyers and other textile printers and finishers were gradually being marginalized. Although the process had already been underway since before the turn of the century, by the late 1930s, it had become apparent to all involved in the silk dyeing business that the age of the small textile shop had, to all practical purposes, come to an end. In 1938, confronted with the changes that were reshaping the face of an industry, a group of owners representing between 12 and 17 of the remaining small to mid-sized businesses agreed to merge their operations and form Allied Textile Printers, Inc. Most of these operations were situated in the immediate Paterson area, but one was located in Long Island City, while another was as far away as Warwick, Rhode Island. The operations of the merging firms were combined to form an integrated corporate structure, but the formal ownership of the individual firms was not initially altered and the real estate remained completely in the hands of the original owners (Arthur Rosen, personal communication, October 28, 2009).

Immediately upon the formation of the corporation, a process of consolidation was commenced. The first plant to be closed was the Long Island City factory owned by Irving Rosen and Charles Zabriski. Due to higher water and sewage costs, it was believed that the New York plant could not operate as effectively as its New Jersey counterparts. In the wake of this closure, some of the initial partners chose to back out of the arrangement fearing that if their plants were selected for closure, they would have no source of income to fall back on in the event of the potential failure of the larger concern (Arthur Rosen, personal communication, October 28, 2009).

After the early dust settled, the Allied Textile Printers ownership group consisted of Hyman Haber (President and General Manager), Morris Sugarman (in charge of labor relations), Irving Rosen, (New York sales manager), Adolph "Tanny" Tannenbaum (chief of the laboratory & chemistry department), Morris Blackman (plant manager), Charles Zabriski (in charge of engraving and an assistant to Morris Blackman) and Nat Sussner (salesman supervisor). Herman Geller and Robert Gilman also joined the ownership of the company shortly after its organization. Gilman was the owner of a New York-based mill equipment supplier who was given a share in the company by the other owners as a facilitator's fee in connection with an aborted attempt by Bear Stearns to acquire a controlling interest in the new company (Arthur Rosen, personal communication, October 28, 2009).

Allied Textile Printers undertook dyeing, printing and finishing activities. Initially, the business was heavily focused on silk and silk composite textiles, but some cotton and some rayon fabric were also processed. The relationships between the individual Allied Textile Printers plants were redefined during the 1930s and 1940s in order to improve the overall function of the business. Each of the plants generally had a process or group of processes that was its specialty and textiles were shipped between plants as they moved through various stages of dyeing, printing and finishing. Allied Textile Printers' Van Houten Street plant, unlike most of the other plants, continued to undertake all of the major processes (dyeing, printing and finishing) on site. By the end of the 1940s, a construction campaign

had expanded the footprint of the company's dye works in the former quarry site and had constructed physical links between nearly all of the buildings occupied by the company at that date (Arthur Rosen, personal communication, October 28, 2009).

Figures 3.13 and 3.14 demonstrate the extent to which the footprints of these facilities had expanded under the occupancy of the Allied Textile Printers organization. At the height of its operations, the annual production of the Van Houten Street facility was said to have been higher than that of all of the other Allied Textile Printers plants combined (Arthur Rosen, personal communication, October 28, 2009). It was during the early 1960s, that the Allied Textile Printers' Van Houten Street plant achieved its largest size. In 1957, the company leased and then, in 1959, acquired outright the Waverly Mill. From the 1920s until well into the 1950s the Tynan Throwing Company occupied the primary Waverly Mill building. This company manufactured organzine and "superorganzine" silk thread (Tynan Throwing Company 1921). These were threads used for warp in silk and composite fabrics. In 1962, the Todd Mill was also incorporated into the ATP facility (Figure 3.15) (Passaic County Deed A77/534). It was converted at this time from a largely unoccupied tenant mill into a storage facility. By this time all of the buildings on the ATP site had been integrated into a single cohesive textile processing plant (Figures 3.16, 3.17a-r, 3.18 and 3.19a-j; Plates 3.42-3.55).

Upon its acquisition by Allied Textile Printers the Waverly Mill was renovated to facilitate its integration into the larger plant. A substantial portion of this work involved changing floor levels to correspond to those in adjacent buildings and removing the large vaults and accompanying steel doors that had once secured the valuable silk stock (Arthur Rosen, personal communication, October 28, 2009).

Nearly all of the fabrics printed, dyed or finished at the Allied Textile Printing facility were owned by "converters." Textile conversion was a profession that came into being in the early decades of the 20th century and which, by the 1930s, had come to dominate Paterson's textile trade (Swan 1937:4). Converters were middle men and facilitators. They arranged contracts for the supply of textiles to garment manufacturers and of garments to retailers. They purchased plain-woven or semi-finished stock from textile mills and then took it to shops like that of Allied Textile Printers to be dyed, printed and finished in accordance with current fashion trends and the needs of the eventual retailers. Allied Textile Printers charged the converter a fee for producing the finished fabric that was based on the types of treatment which would be employed to produce it. Except in a few circumstances in which very risky processing techniques were involved, the converter retained ownership of the fabric throughout the entire process. Allied Textile Printers was responsible for reimbursing the converter for any loss or damage that resulted during the dyeing, printing and finishing processes (Arthur Rosen, personal communication, October 28, 2009).

The Van Houten Street facility was the primary Allied Textile Printers shop for print work. The plant utilized roller discharge printing. Discharge printing created patterned textiles through the application of chemicals and dyes to pre-dyed fabrics. It created patterns through the removal and chemical transformation of existing coloring rather than through the deposition of pigments on the surface of a fabric. Pigment printing, as it existed during this time period, produced a less desirable result. Pigment printing technology could not easily produce large uniform fields of color and was prone to the pigment caking on the surface of fabrics which produced a less desirable and less durable product. Colors produced through discharge printing permeated fully through the fabric. The introduction of reactive dyes at the Allied Textile Printers plant (after their invention in 1956) further improved the product by creating color molecules that became fixed to individual cotton, wool and nylon fibers. Discharge

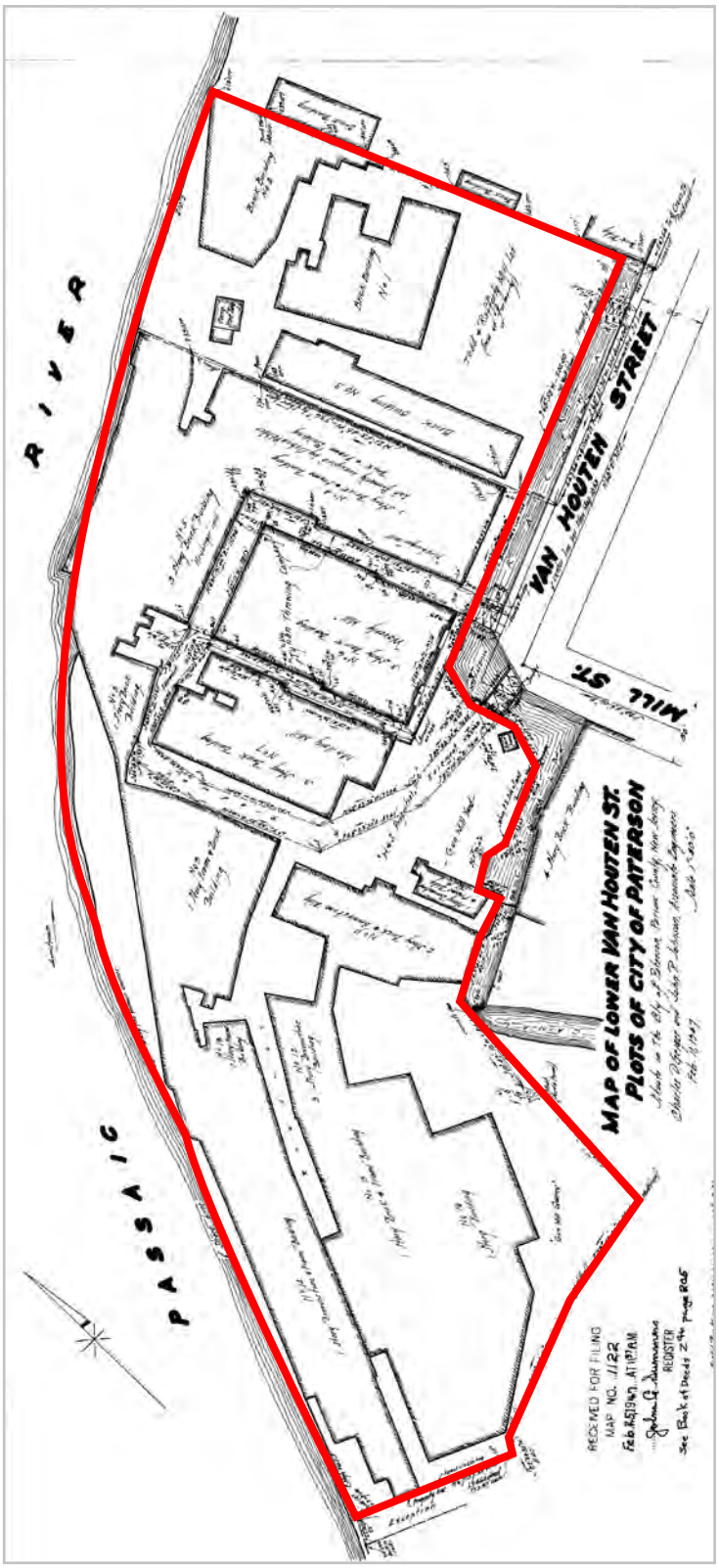


Figure 3.13. Geiger, Charles G. and John R. Johnson. *Map of Lower Van Houten St., Plots of City of Paterson, Situate in City of Paterson, Passaic County, New Jersey.* 1947. Scale: 1 inch= 85 feet (approximately). Limits of Allied Textile Printing site are outlined.

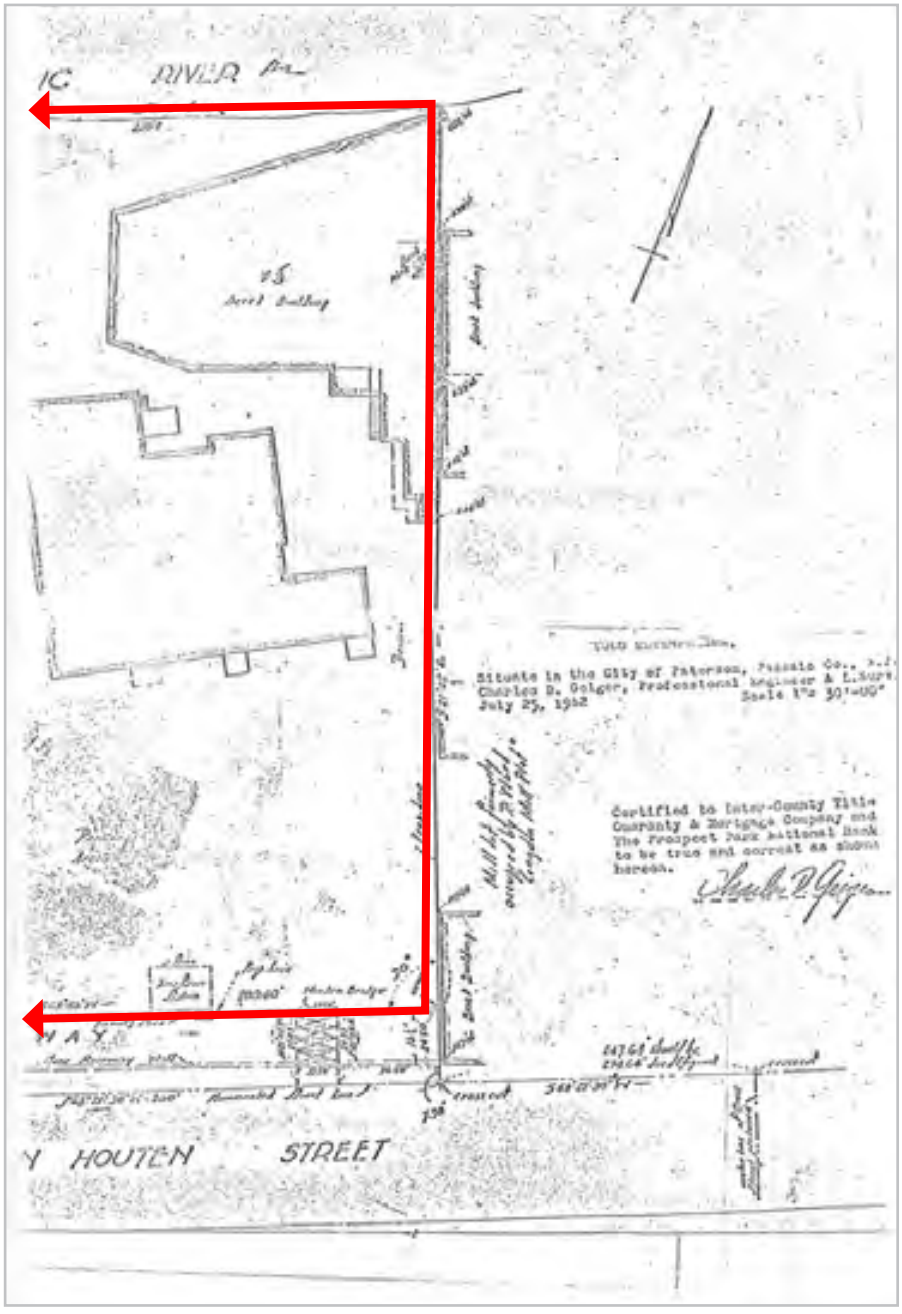


Figure 3.15. Geiger, Charles G. *Todd Enterprises* …. 1962. Scale: 1 inch= 45 feet (approximately). Limits of Allied Textile Printing site are outlined.

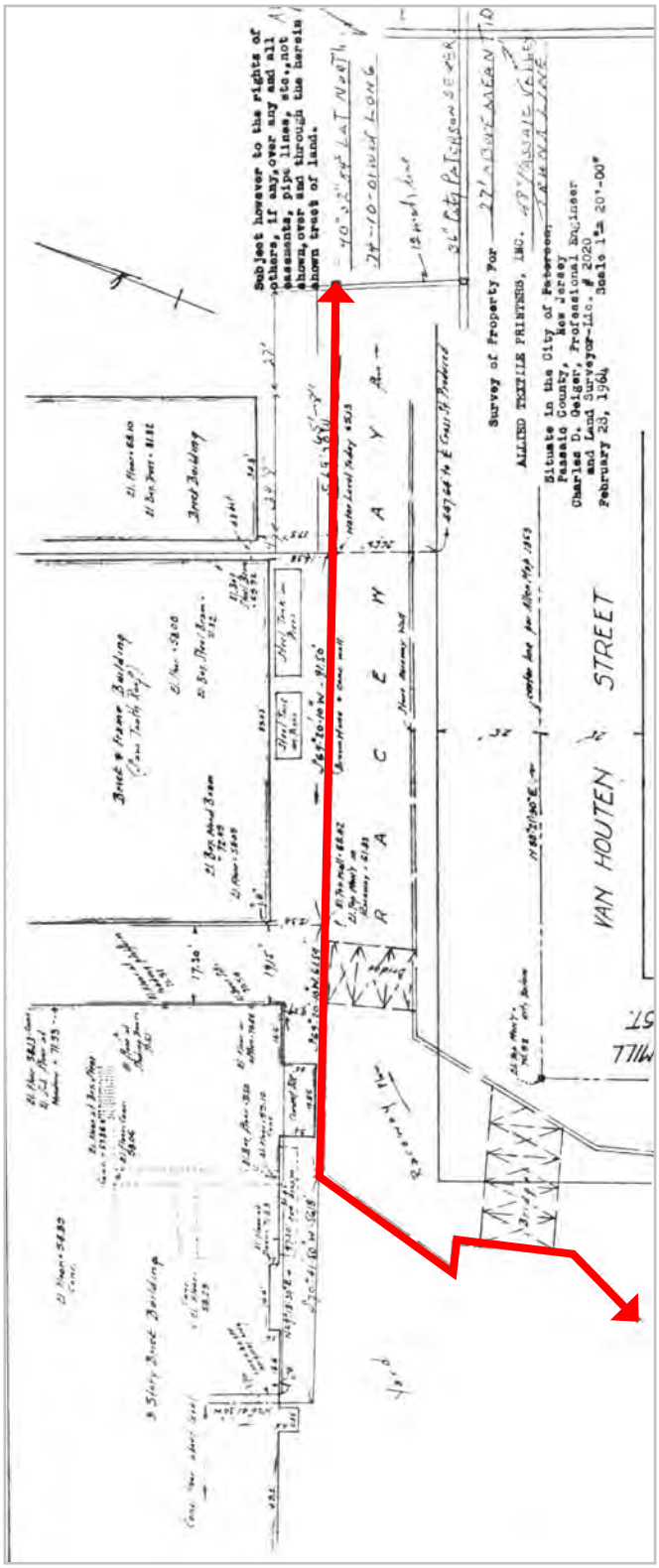


Figure 3.16.. Geiger, Charles G. *Survey of Property for Allied Textile Printers, Inc.* 1964. Scale: 1 inch= 90 feet (approximately). Limits of Allied Textile Printing site are outlined.

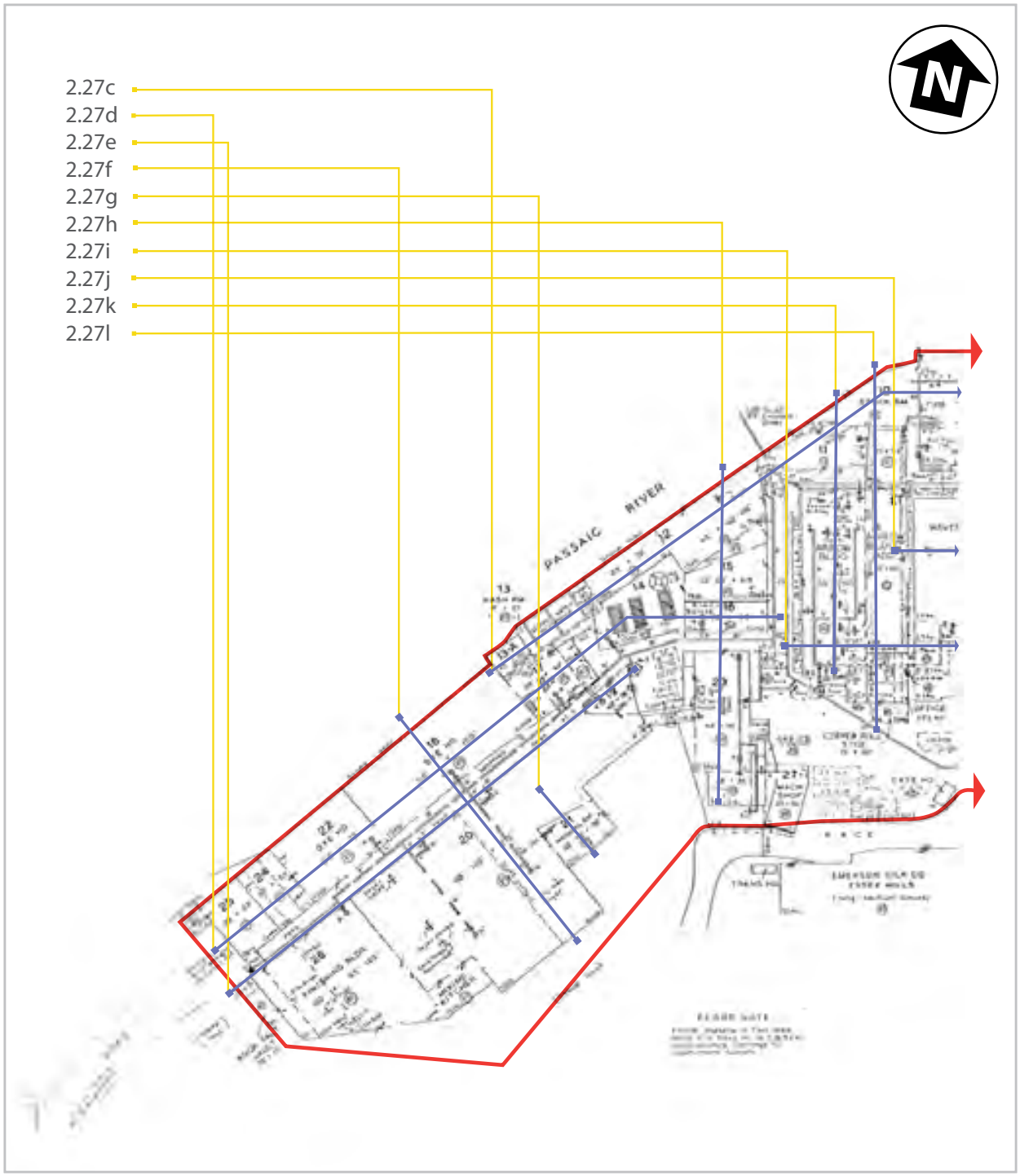


Figure 3.17a. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Western half of Allied Textile Printing site. Scale: 1 inch= 50 feet (approximately). Limits of site and locations of cross-sections are indicated.

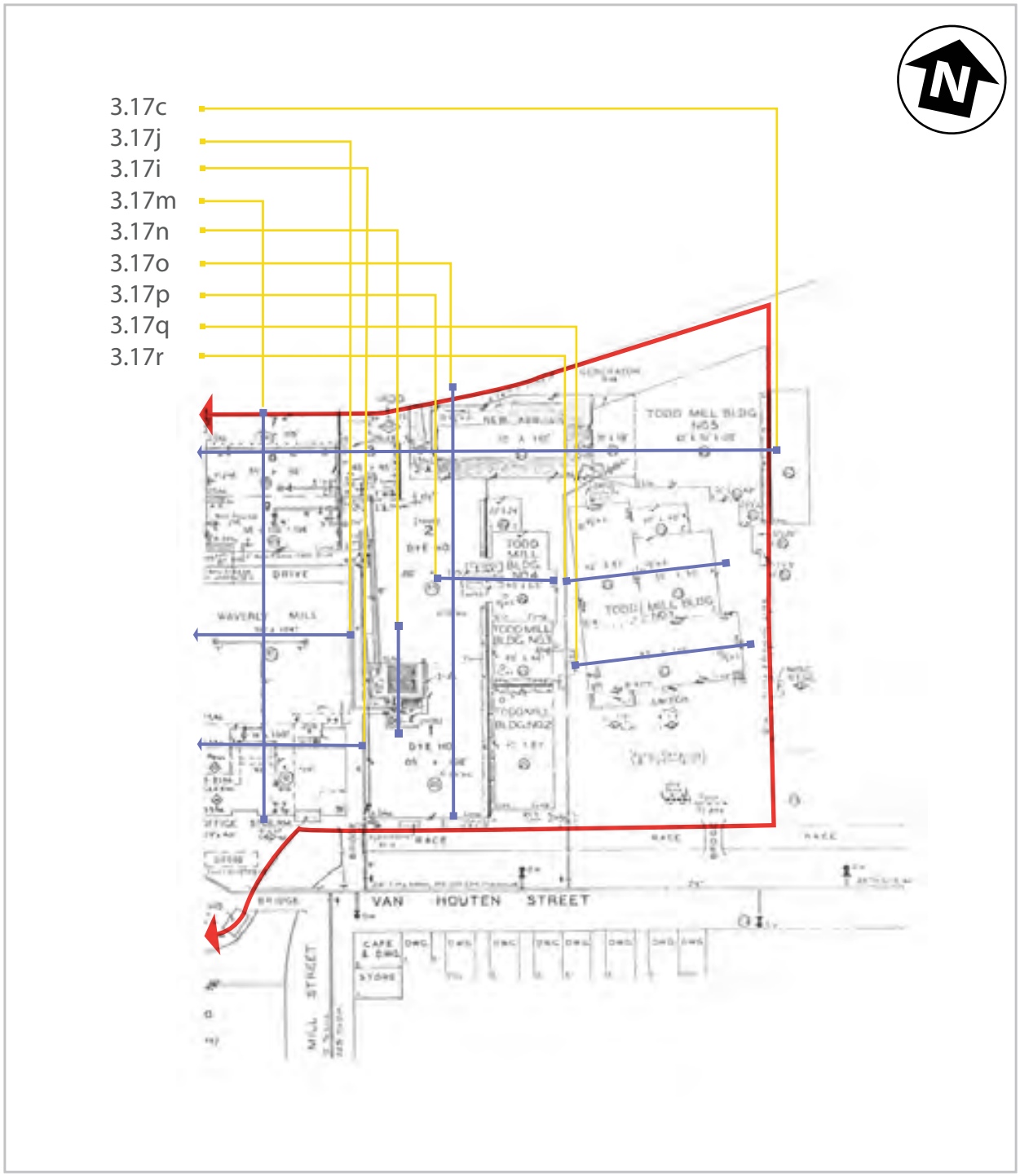
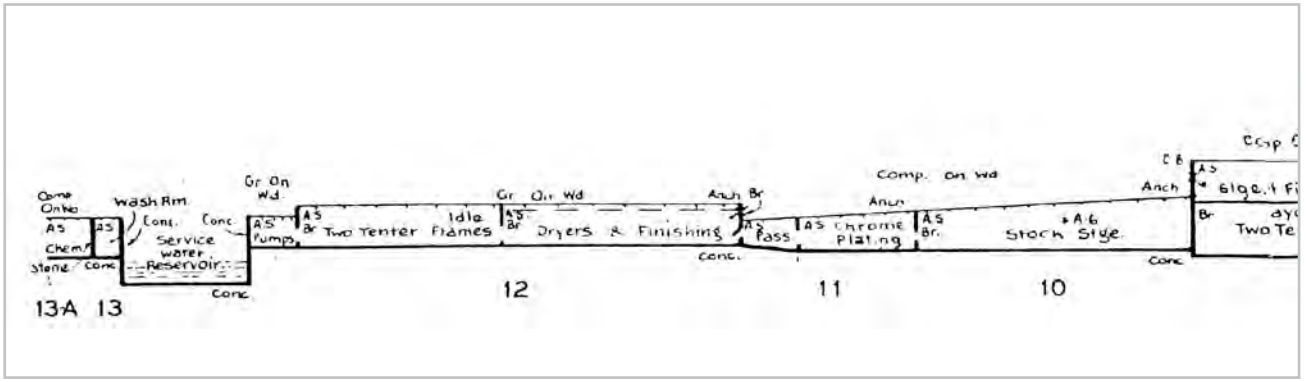


Figure 3.17b. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Eastern half of Allied Textile Printing site. Scale: 1 inch= 50 feet (approximately). Limits of site and locations of cross-sections are indicated.



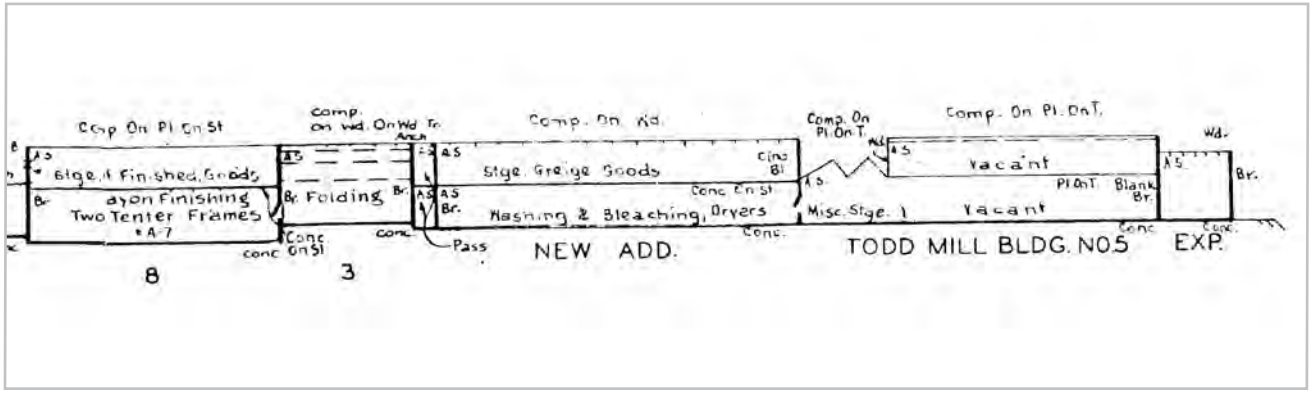
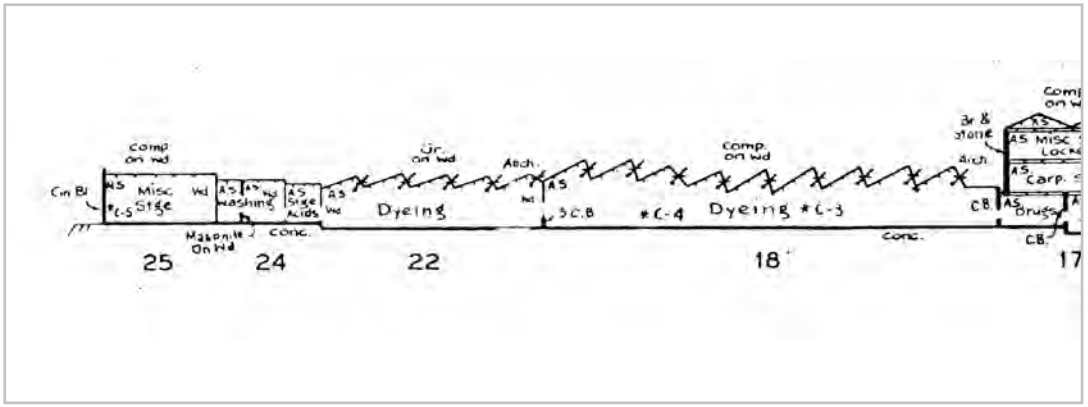


Figure 3.17c. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Southwest-northeast and west-east cross-section through Buildings 13-A, 13, 12, 11, 10, 8, 3, New Addition and Todd Building No. 5. Scale: 1 inch= 30 feet (approximately).



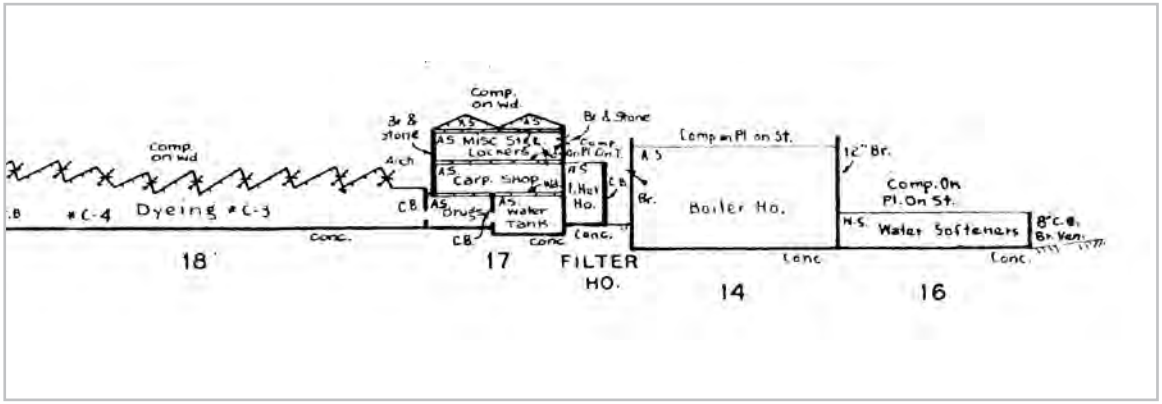


Figure 3.17d. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Southwest-northeast and west-east cross-section through Buildings 25, 24, 22, 18, 17, Filter House, 14 and 16. Scale: 1 inch= 30 feet (approximately).

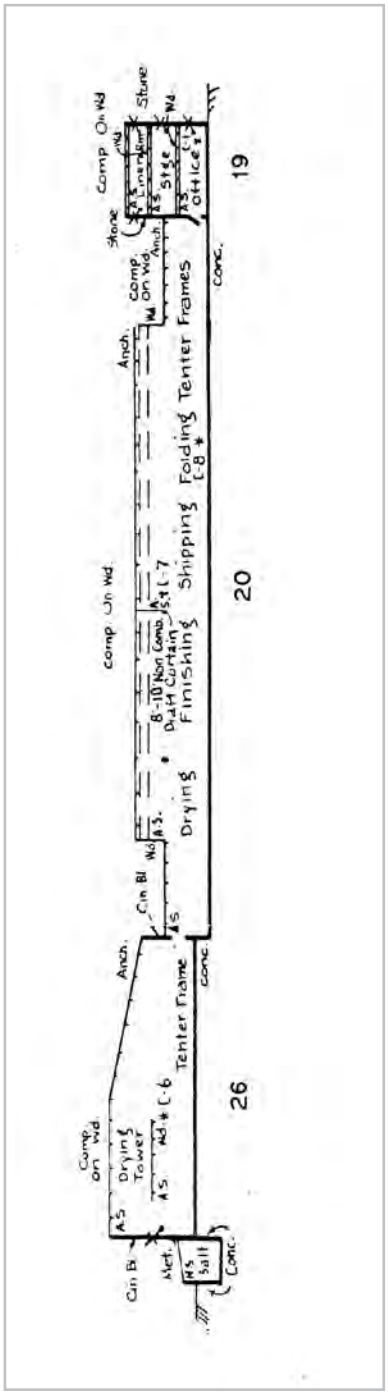


Figure 3.17e. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Southwest-northeast cross-section through Buildings 26, 20 and 19. Scale: 1 inch= 30 feet (approximately).

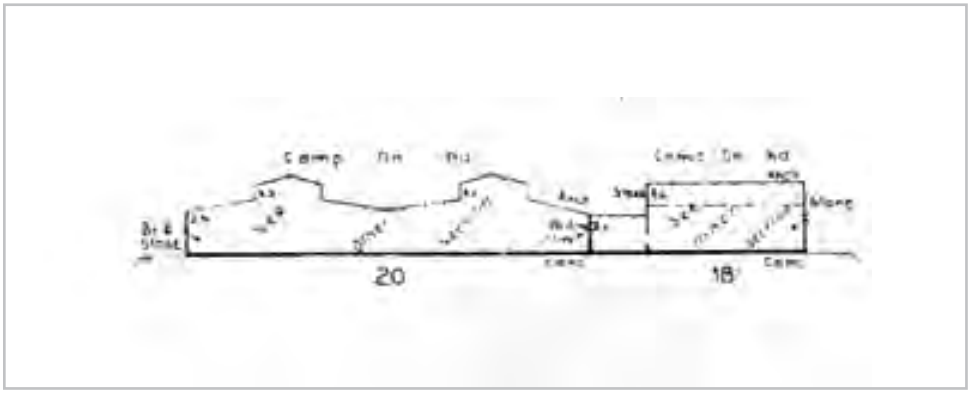


Figure 3.17f. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Southeast-northwest cross-section through Buildings 20 and 18. Scale: 1 inch= 30 feet (approximately).

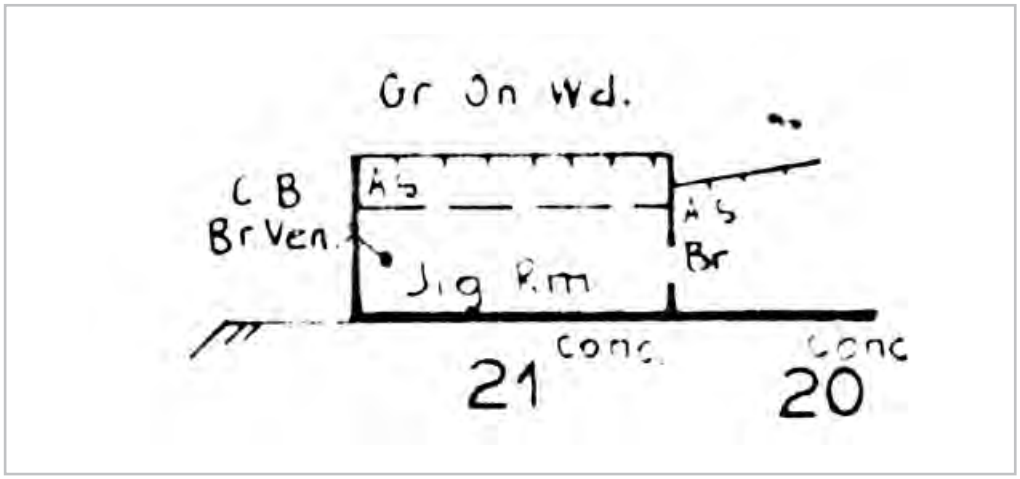


Figure 3.17g. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. Southeast-northwest cross-section through Buildings 21 and 20. Scale: 1 inch= 10 feet (approximately).

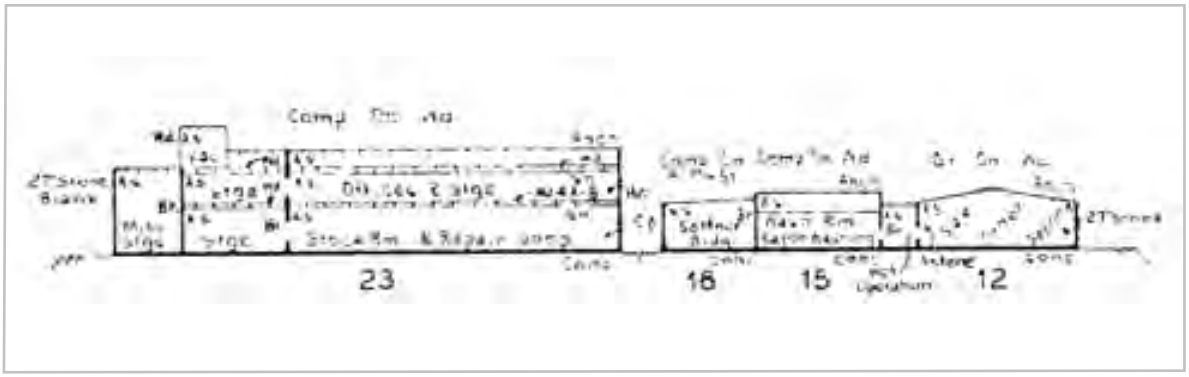


Figure 3.17h. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through Buildings 23, 16, 15 and 12. Scale: 1 inch= 30 feet (approximately).

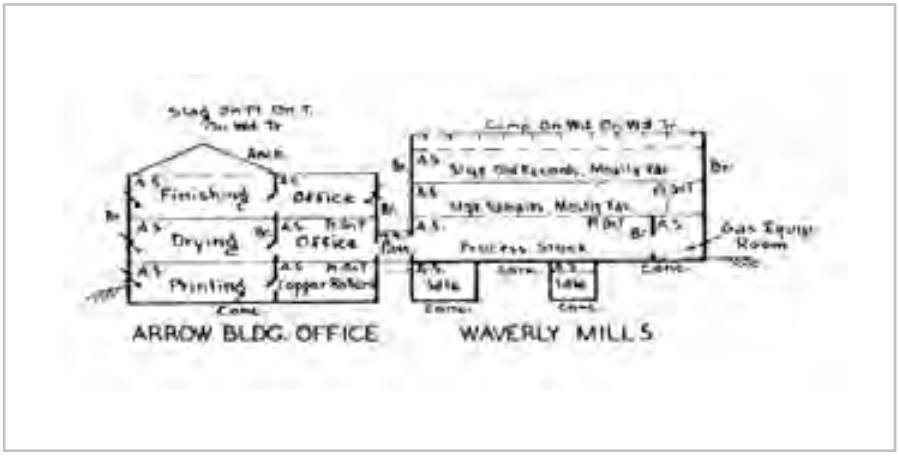


Figure 3.17i. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. West-east cross-section through the Arrow Building Office and the Waverly Mills. Scale: 1 inch= 30 feet (approximately).

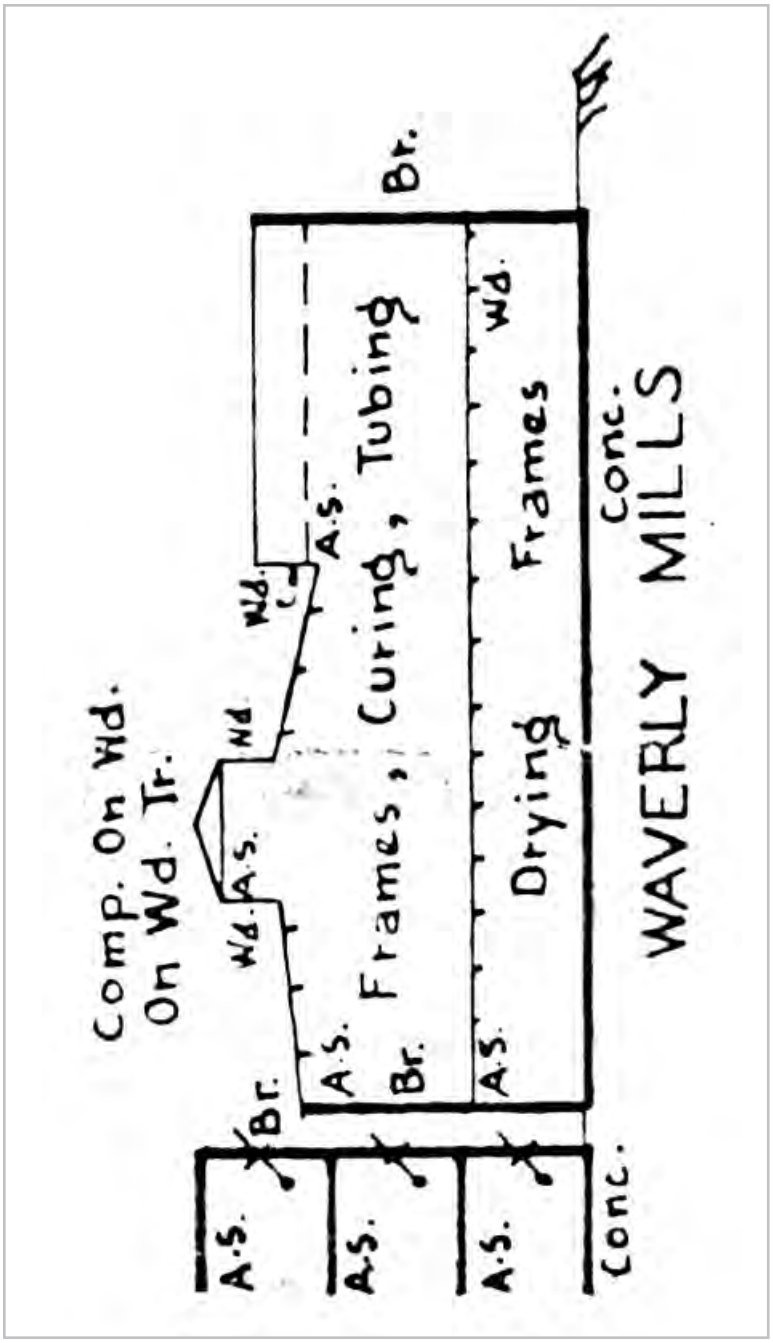


Figure 3.17j. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. West-east cross-section through the Waverly Mills. Scale: 1 inch= 10 feet (approximately).

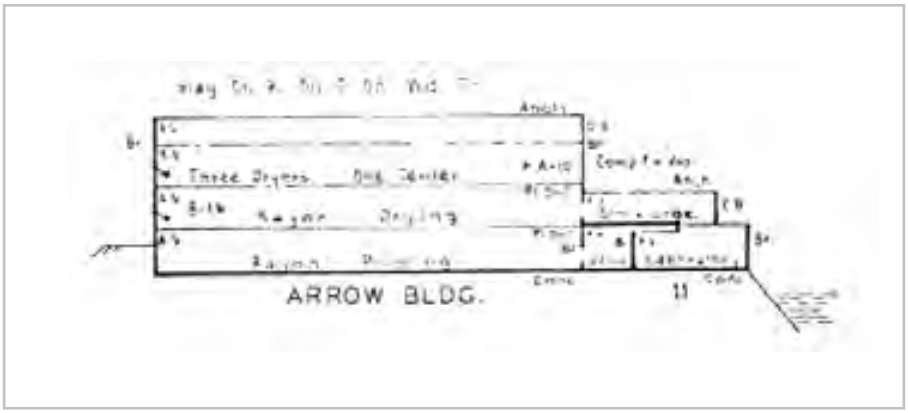


Figure 3.17k. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through the Arrow Building and Building 11. Scale: 1 inch= 30 feet (approximately).

Figure 3.17l. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through Office, the Arrow Building Addition and Building 10. Scale: 1 inch= 30 feet (approximately).

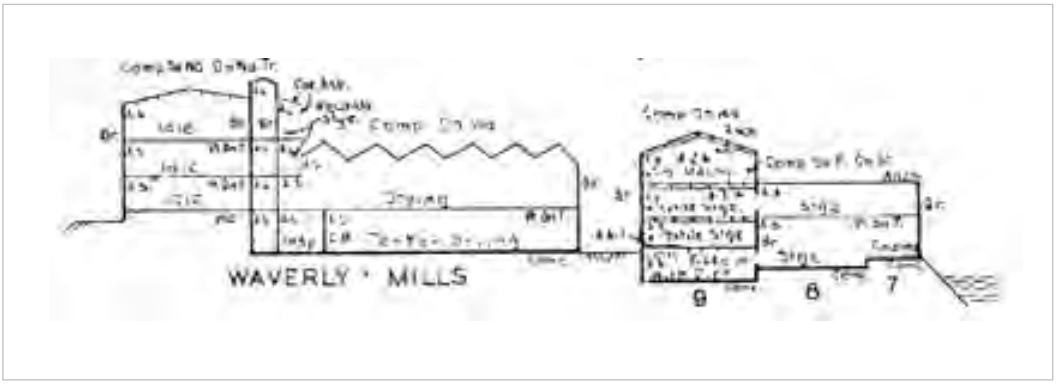


Figure 3.17m. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through the Waverly Mills and Buildings 9, 8 and 7. Scale: 1 inch= 30 feet (approximately).

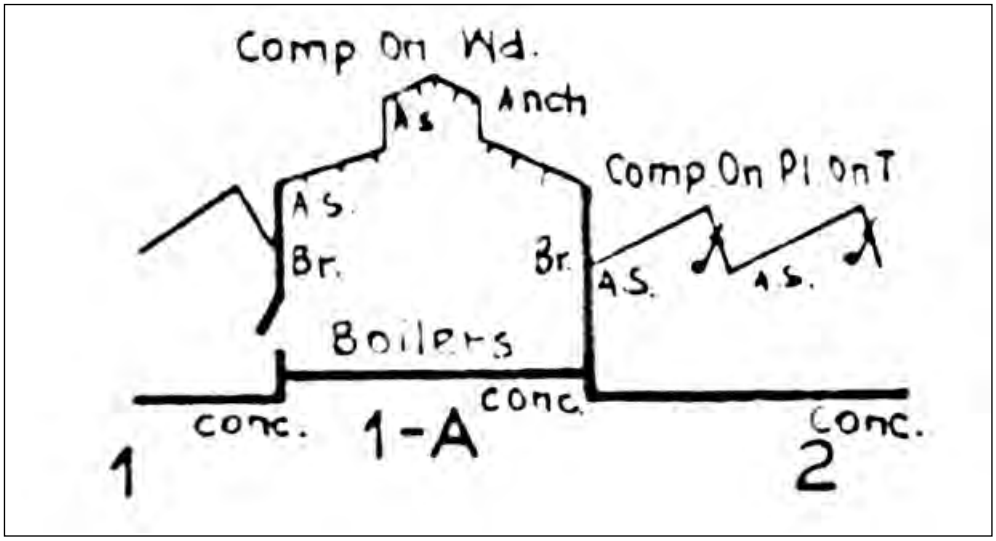


Figure 3.17n. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through Buildings 1, 1-A and 2. Scale: 1 inch= 10 feet (approximately).

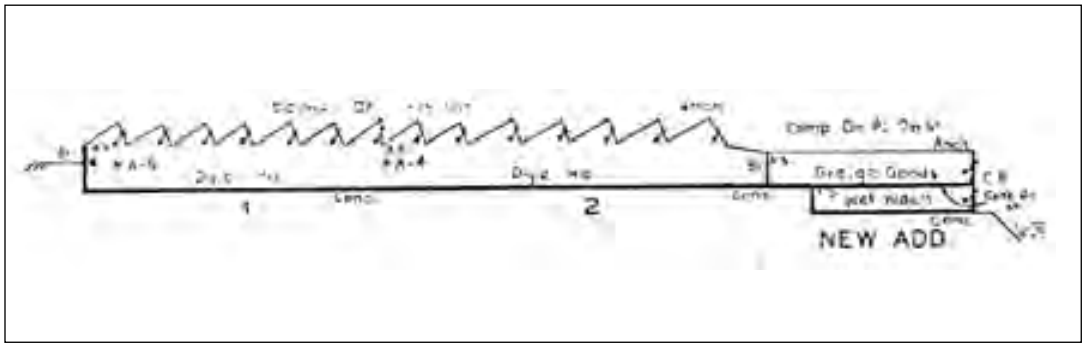


Figure 3.17o. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. South-north cross-section through Buildings 1, 2 and New Addition. Scale: 1 inch= 30 feet (approximately).

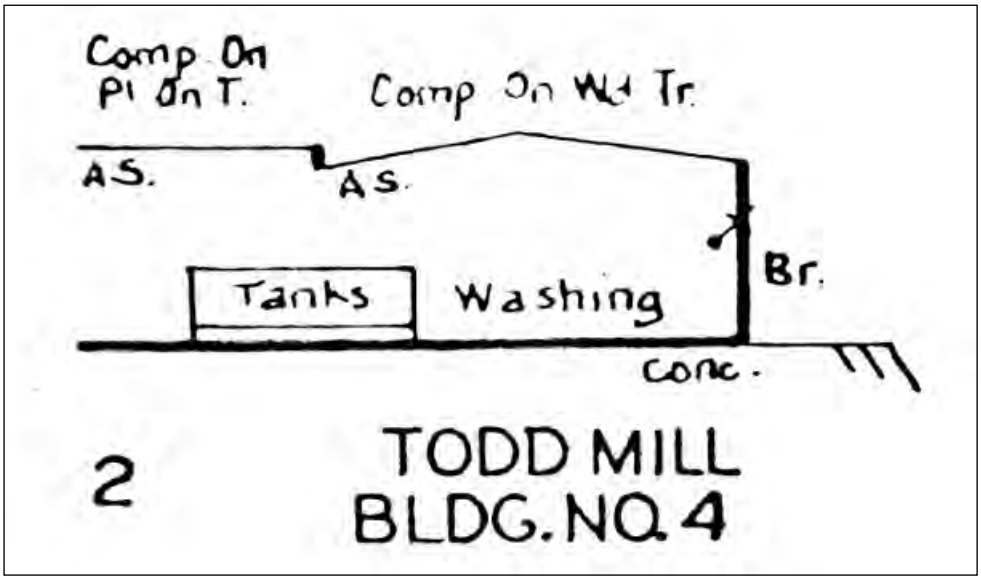


Figure 3.17p. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. West-east cross-section through Todd Building No. 4. Scale: 1 inch= 10 feet (approximately).

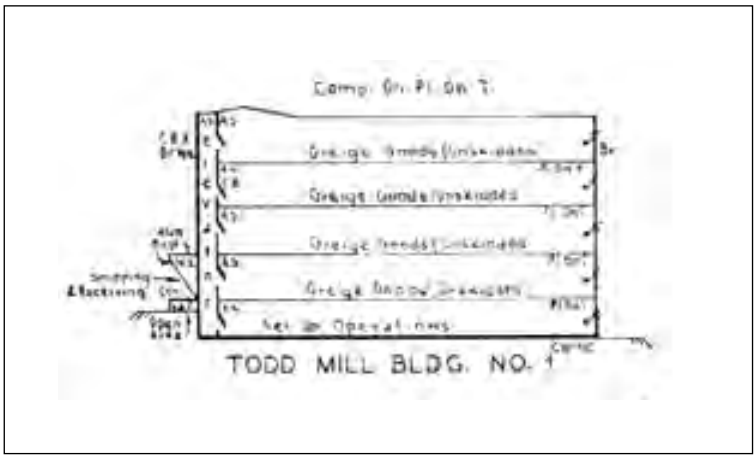


Figure 3.17q. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. West-east cross-section through Todd Building No. 1. Scale: 1 inch= 30 feet (approximately).

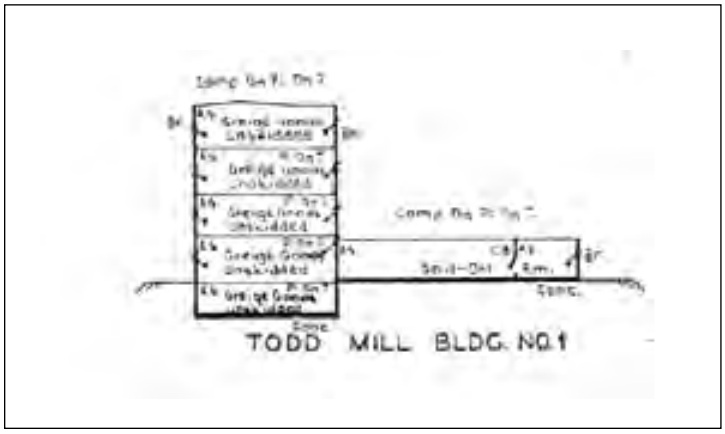


Figure 3.17r. Factory Mutual Insurance Co. *Mill Realty Co.* 1965. West-east cross-section through Todd Building No. 1. Scale: 1 inch= 30 feet (approximately).

KEY

1. Boilers
2. Finishing, Drying, Printing
3. Flocking, Color Room
4. Frames, Curing, Tubing, Drying
5. Dyeing
6. Storage - Copper
7. Offices, Color Room
8. Storage, Stock Processing
9. Machine Shop
10. Electric Shop
11. Oil Meters
12. Finishing, Dying
13. Water Softening
14. Make Up, Dry Box
15. Storage
16. Printing, Washing, Bleaching
17. Cloth Washing
18. Office, Labs
19. Make Up, Laboratory Testing
20. Storage, Customer Offices
21. Reservoir

Frame
Brick
Stone
Other
Street
Project Limit
Property Line

VALLEY OF THE ROCKS

PASSAIC RIVER

MALLORY MILL

WAVERLY MILL

TODD MILL

Allied Textile Printers Inc.

PASSAIC MILL No. 1

Standard Dyeing & Finishing Co. Inc.

GUN MILL

Lower Raceway (circa 1807)

VAN HOUTEN STREET

MILL STREET

Middle Raceway (circa 1800-1801)

MOUNT MORRIS

0 50 100 200

Feet

Prepared by: HUNTER RESEARCH, INC. September 2010

Factories Below The Falls

A Reconstructed Map of the Allied Textile Printers Site in 1975

Figure 3.18

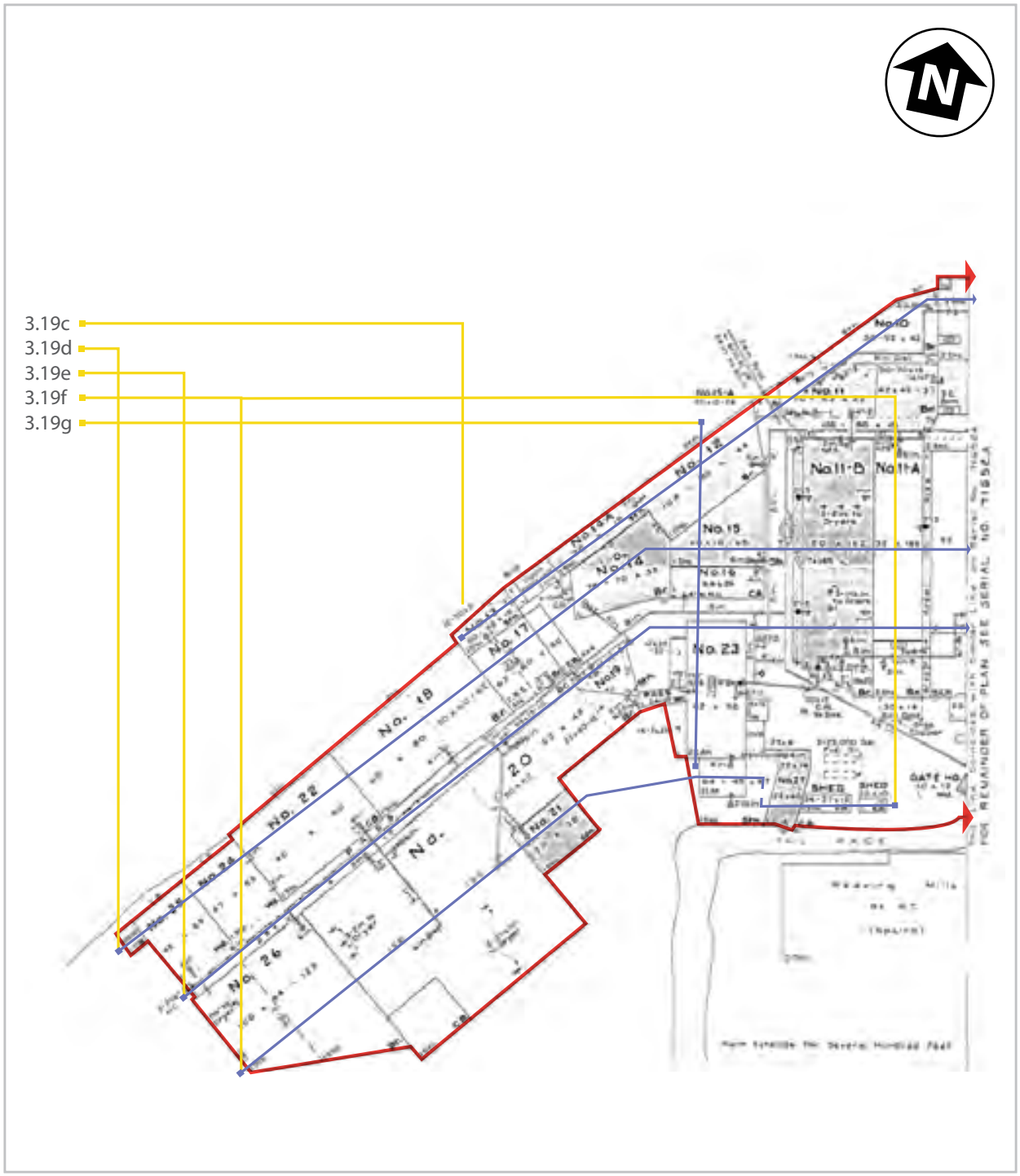


Figure 3.19a. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Western half of Allied Textile Printing site. Not to scale. Limits of site and locations of cross-sections are indicated.

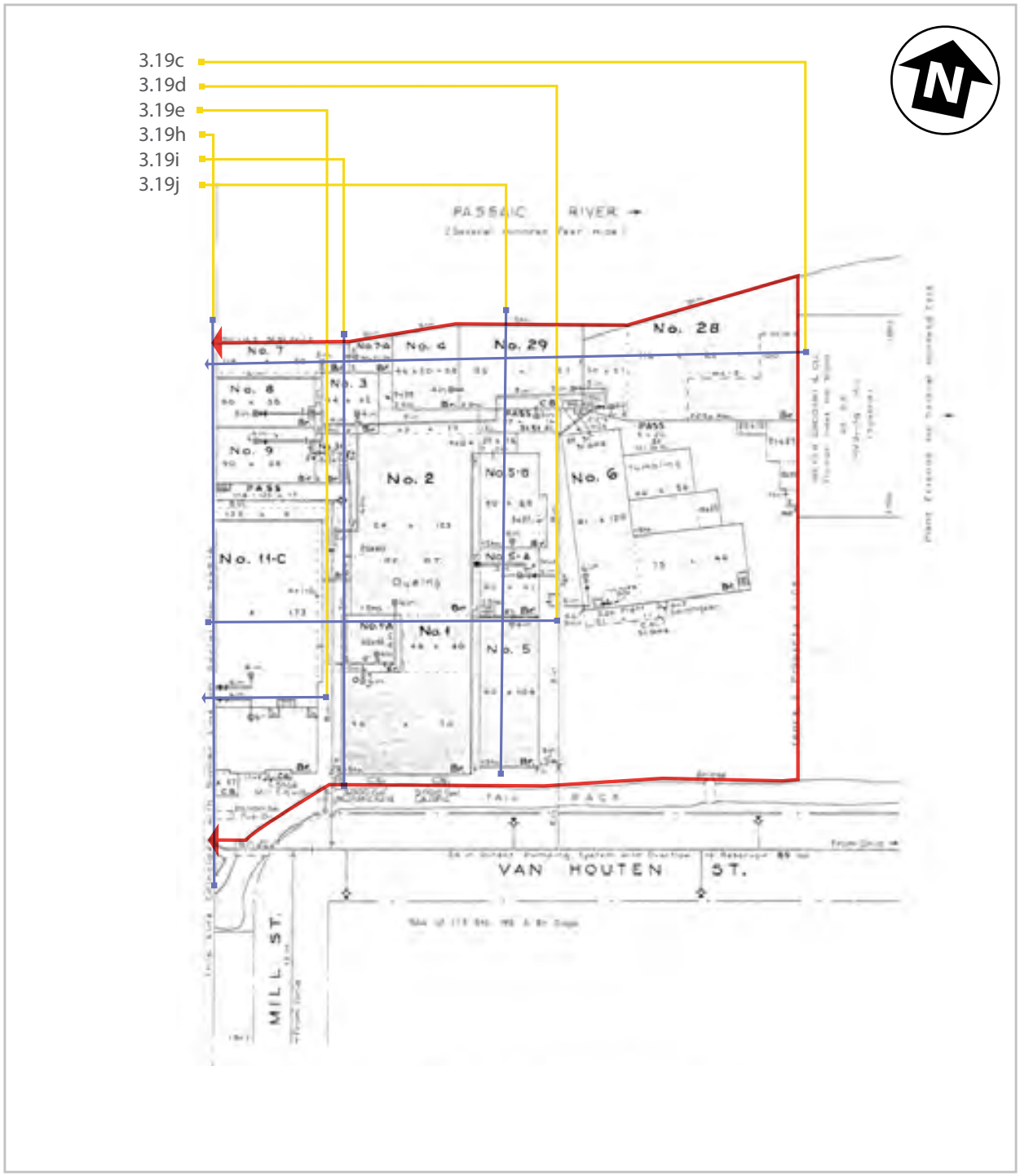
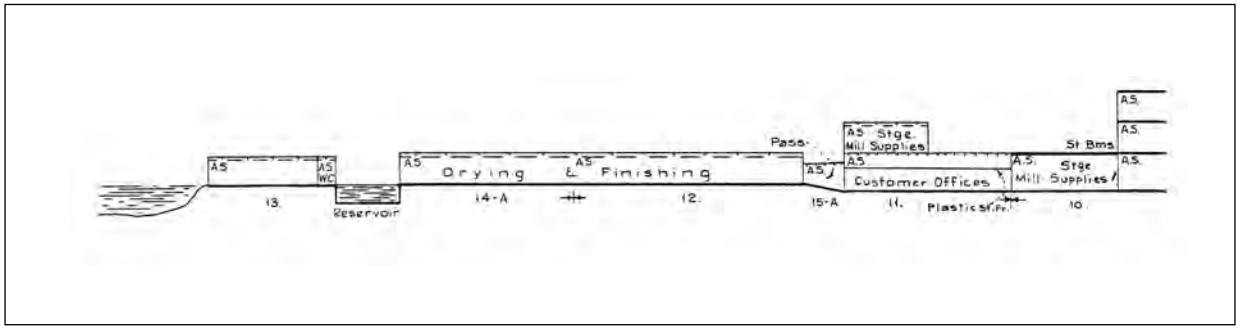


Figure 3.19b. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Eastern half of Allied Textile Printing site. Not to scale. Limits of site and locations of cross-sections are indicated.



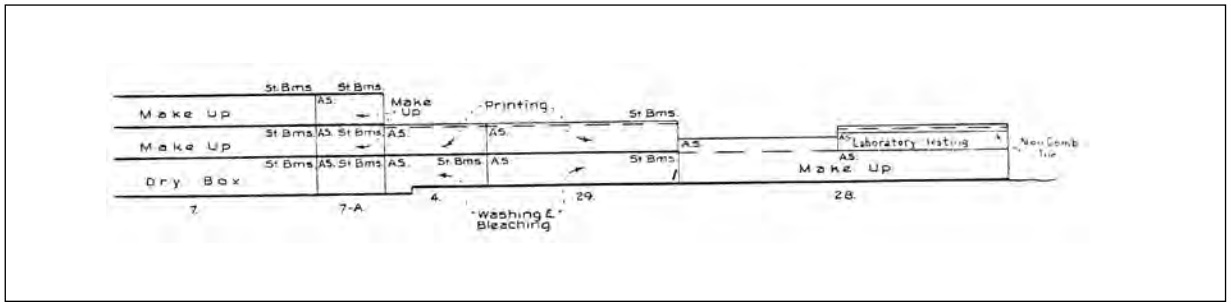


Figure 3.19c. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Southwest-northeast and west-east cross-section through Buildings 13, Reservoir, 14-A, 12, 15-A, 11, 10, 7, 7-A, 4, 29 and 28. Scale: 1 inch= 50 feet (approximately).

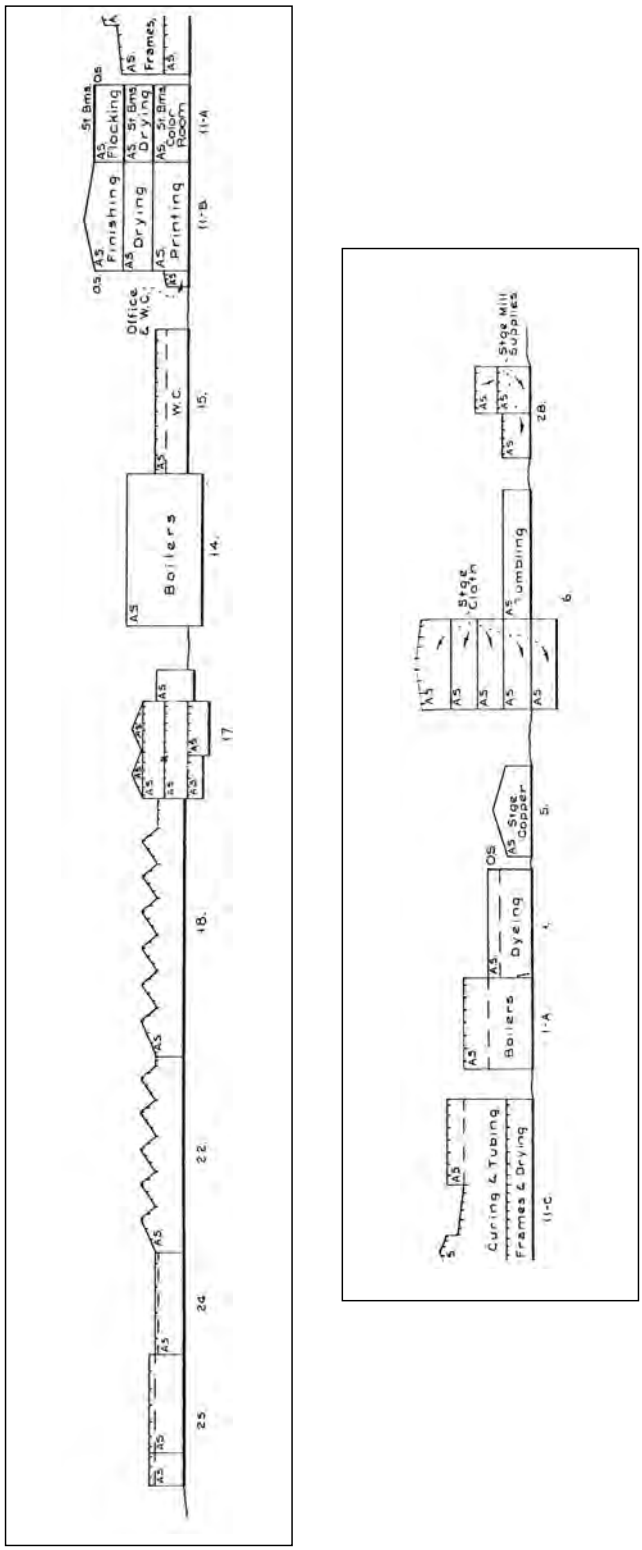


Figure 3.19d. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Southwest-northeast and west-east cross-section through Buildings 25, 24, 22, 18, 17, 14, 15, 11-B, 11-A, 11-C, 1-A, 1, 5, 6 and 28. Scale: 1 inch= 50 feet (approximately).

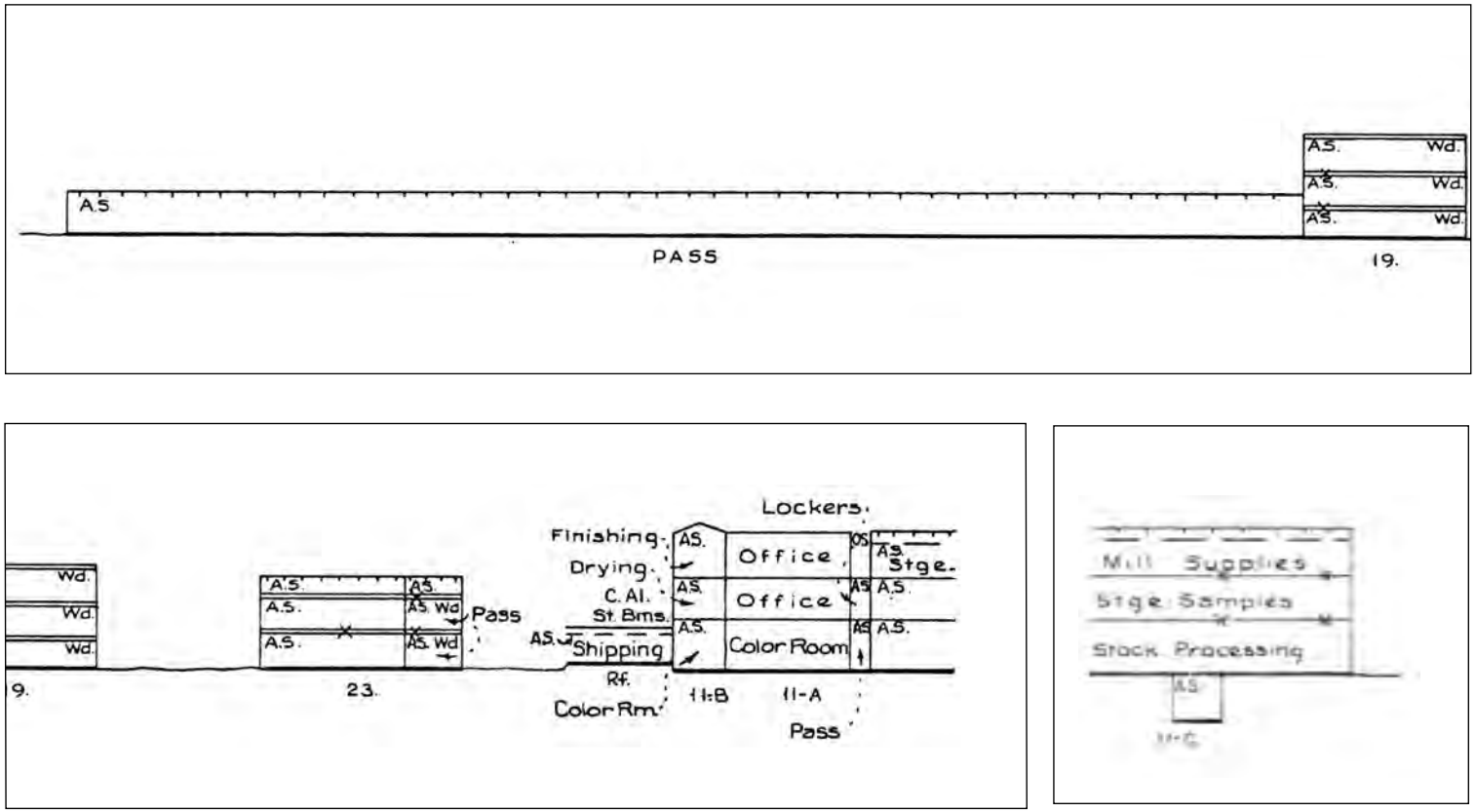


Figure 3.19e. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Southwest-northeast and west-east cross-section through Passage and Buildings 19, 23, Color Room, 11-B, 11-A and 11-C. Scale: 1 inch= 30 feet (approximately).

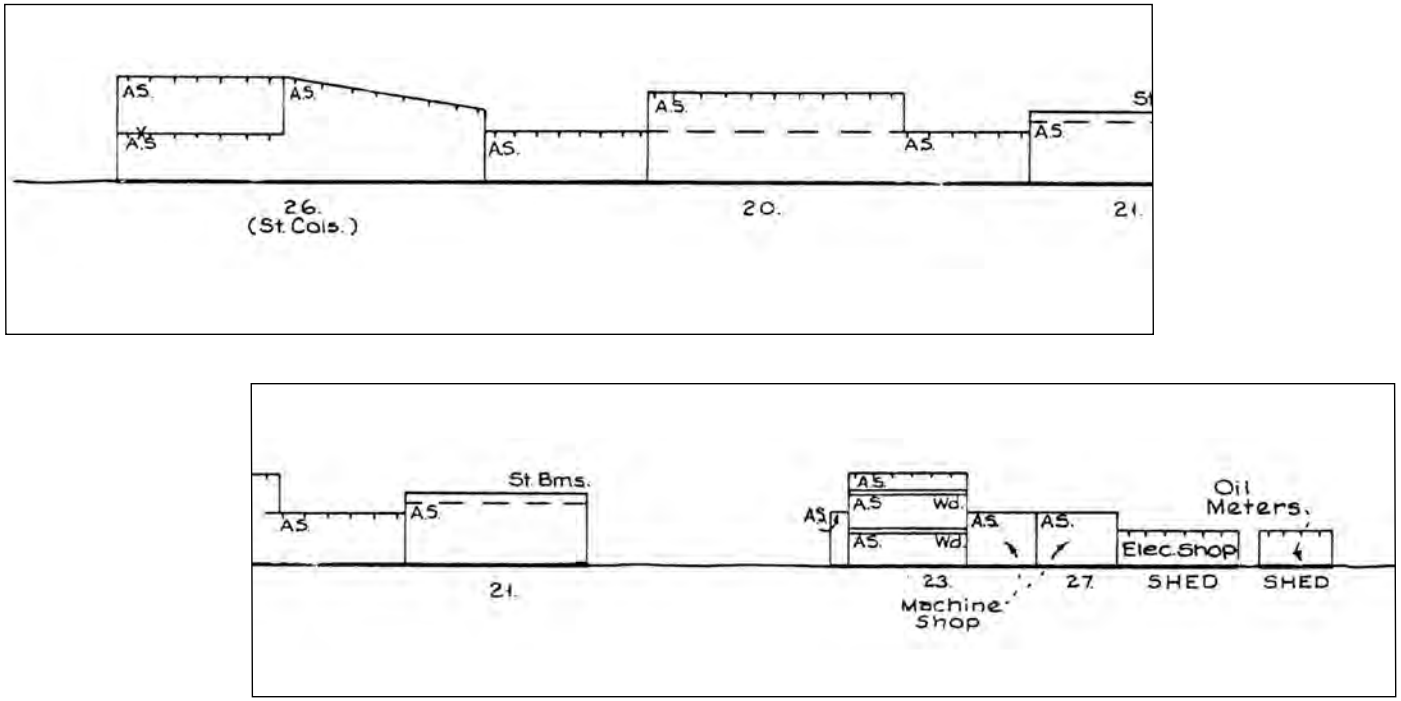


Figure 3.19f. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. Southwest-northeast and west-east cross-section through Buildings 26, 20, 21, 23, 27 and Sheds. Scale: 1 inch= 30 feet (approximately).

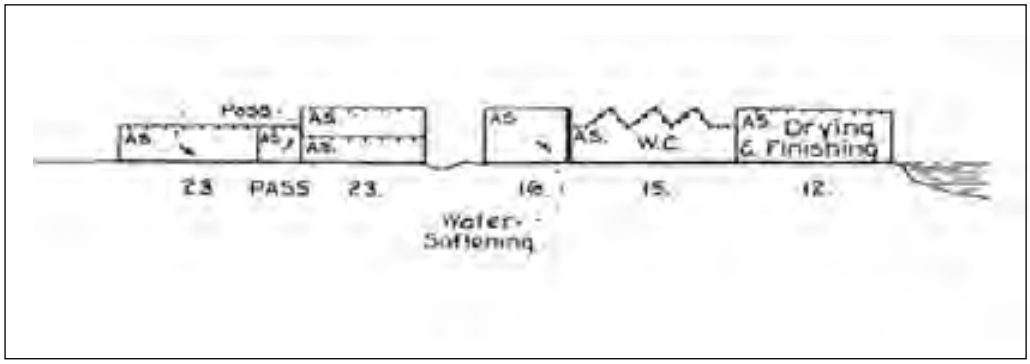
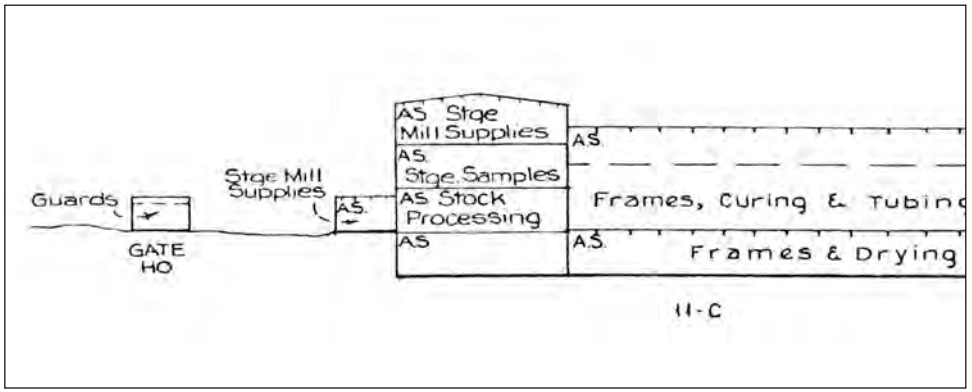


Figure 3.19g. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. South-north cross-section through Buildings 23, 16, 15 and 12. Scale: 1 inch= 30 feet (approximately).



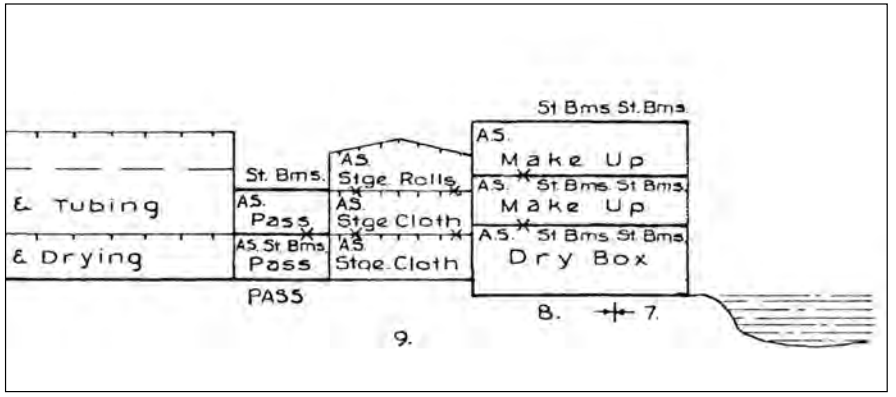


Figure 3.19h. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. South-north cross-section through Gatehouse and Buildings 11-C, 9, 8 and 7. Scale: 1 inch= 30 feet (approximately).

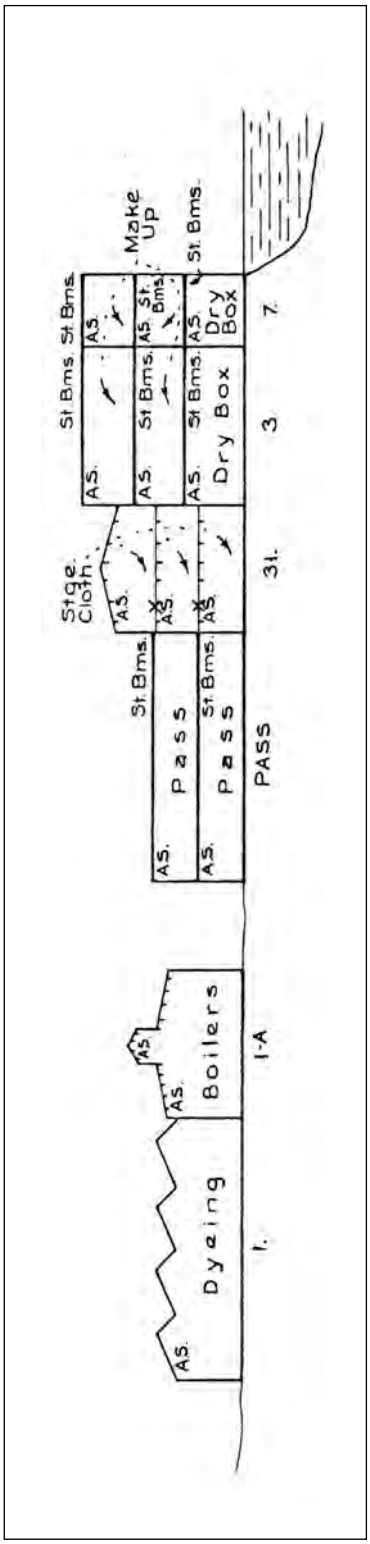


Figure 3.19i. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. South-north cross-section through Buildings 1, 1-A, 31, 3 and 7. Scale: 1 inch= 30 feet (approximately).

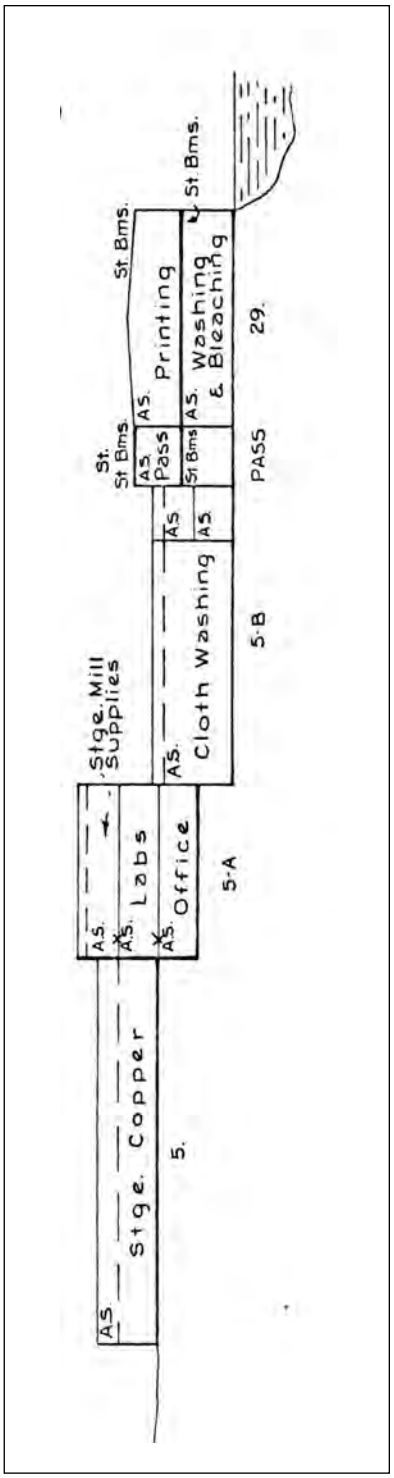


Figure 3.19j. Factory Mutual Insurance Company. *ATP Processors Ltd., Paterson, N.J.* 1981. South-north cross-section through Buildings 5, 5-A, 5-B and 29. Scale: 1 inch= 30 feet (approximately).

Plate 3.42. Aerial view of the Allied Textile Printing site from above Mount Morris, looking northeast and downstream, 1973. Source: Historic American Engineering Record, HAER NJ-17-1, 1973.

Plate 3.43. Aerial view of the Allied Textile Printing site from above Mount Morris looking north northeast and downstream, 1973. Source: Historic American Engineering Record, HAER NJ-1-8, 1973.

Plate 3.44. Aerial view of the Allied Textile Printing site looking north showing the Mallory, Waverly, Passaic and Todd mills, 1973. Source: Historic American Engineering Record, HAER NJ-1-9, 1973.

Plate 3.45. Aerial view of the Standard Silk Dying Company's works looking east from the falls of the Passaic River, 1973. Source: Historic American Engineering Record, HAER NJ-2-36, 1973.

Plate 3.46. Aerial view of the Allied Textile Printing site looking west northwest, 1973. Source: Historic American Engineering Record, HAER NJ-1-6, 1973.

Plate 3.47. Aerial view of the Gun Mill looking east, 1973. Source: Historic American Engineering Record, HAER NJ-17-7, 1973.

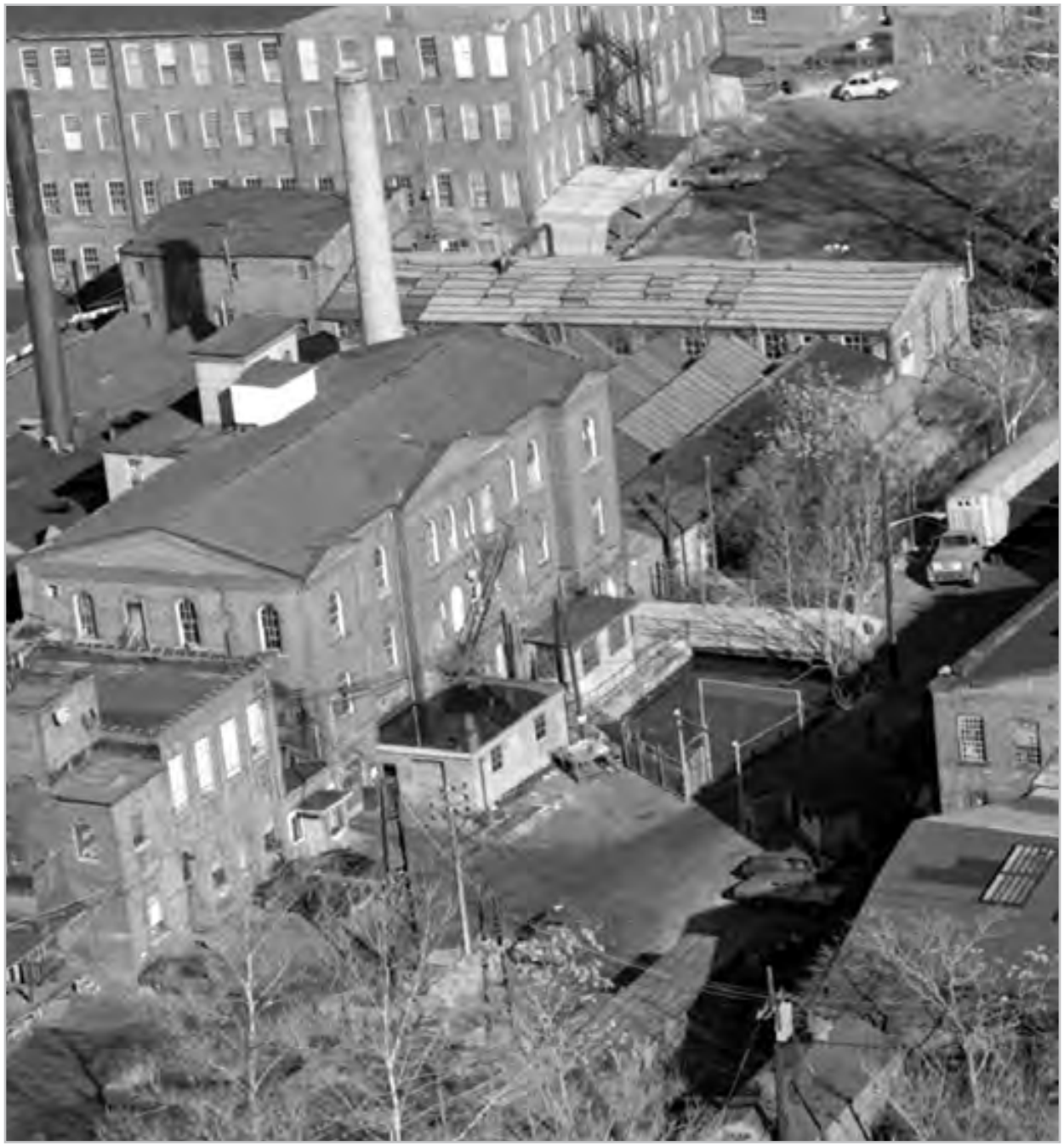


Plate 3.48. Aerial view of the Mallory, Waverly and Passaic Mills [left to right] looking northeast, 1973. Source: Historic American Engineering Record, HAER NJ-17-1, 1973.

Plate 3.49. Aerial view showing the Gun Mill, 1973 [bottom and left] and the Mallory Mill [top and right], looking north, 1973. Source: Historic American Engineering Record, HAER NJ-1-9, 1973.

Plate 3.50. Aerial view of the Waverly Mill looking north northeast, 1973. Source: Historic American Engineering Record, HAER NJ-1-9, 1973.

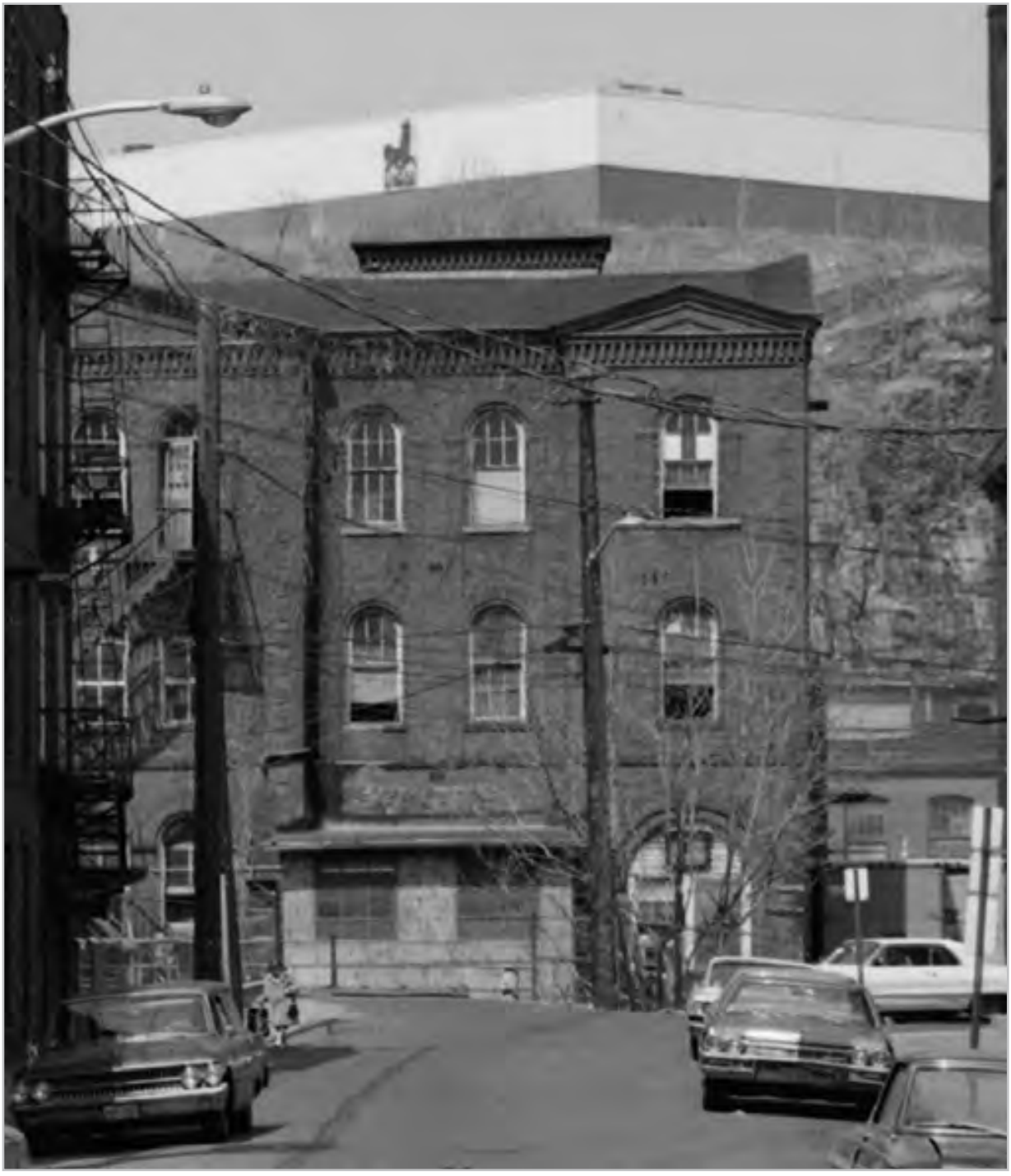


Plate 3.51. View of the façade of the Waverly Mill looking north, 1973. Source: Historic American Engineering Record, HAER NJ-1-12, 1973.

Plate 3.52. Aerial view of the Allied Textile Printing site looking south southeast showing the rear yards of the Todd and Rafferty Machine Company works and the Passaic and Waverly mills, 1973. Source: Historic American Engineering Record, HAER NJ-1-26, 1973.

Plate 3.53. Aerial view of the Todd and Rafferty Machine Company works looking north, 1974. Source: Historic American Engineering Record, HAER NJ-5-1, 1974.

Plate 3.54. View of the Todd and Rafferty Machine Company works looking north, 1974. Source: Historic American Engineering Record, HAER NJ-5-2, 1974.

Plate 3.55. Aerial view looking south southeast showing the rear of the Todd and Rafferty Machine Company lot, 1973. Source: Historic American Engineering Record NJ-1-10, 1974.

printing was a more expensive method that produced fabrics that could be sold for higher prices (Arthur Rosen, personal communication, October 28, 2009).

The actual printing machines used by Allied Textile Printers prior to 1977 were of the roller type. Sets of intaglio-engraved chrome-plated copper rollers were utilized to apply dyes to textiles. Each roller applied chemicals or dyes in a unique pattern which resulted in a different color appearing on the fabric. In most cases, the patterns were provided by and owned by the "converter" who had placed the order with Allied Textile Printers. Only in a few cases, such as those of standard-sized polka dot patterns, did Allied Textile Printers actually own the patterns. Blank copper rollers would be sent out to an outside engraver who would photo-mechanically cut the desired pattern onto the roller set and then send the set back to Allied Textile Printers who then chrome-plated the rollers at their own plant. After the initial use, Allied Textile Printers would store the roller sets at their facility awaiting additional orders from the converter. The ownership of the rollers by Allied Textile Printers discouraged converters from taking their business to other firms, although roller sets were sometimes loaned out for the use of other companies at the request of converters. When patterns were no longer wanted, roller sets could be planed down, re-cut and used again (Arthur Rosen, personal communication, October 28, 2009).

Roller printing technology permitted the continuous high-speed printing of extraordinarily long rolls of fabric. This was in contrast to standard screen-printing techniques which were labor intensive and could not produce a continuous product. Rotary screen printing machines which could produce continuously screen-printed textiles were introduced to the facility after 1977 (Arthur Rosen, personal communication, October 28, 2009).

With the outbreak of the Second World War, silk production in Paterson came to a standstill. Raw silk from the Orient was unobtainable. Production at the Allied Textile Printers plant shifted primarily to the manufacture of nylon parachutes and strapping for the war effort. Government inspection laboratories were established on site to monitor the quality of the product. Not only did the federal government represent an important client during this period but accepting government contracts was the only way in which the company could guarantee its access to sufficient supplies of fuel oil and other rationed commodities. Government orders were often received even though it was known from the start they would result in a loss. With the access to fuel and supplies facilitated by the government work, production could be maintained for the civilian population (Arthur Rosen, personal communication, October 28, 2009).

Following the close of the Second World War, silk never regained its pre-war prominence. Synthetics increasingly captured the wider market. As the science of synthetic textiles advanced, so did the number of different fabrics processed by the Allied Textile Printers company. Commensurate changes in the machinery, processes and chemicals employed were required. The 1950s and 1960s were an important period for Allied Textile Printers as New York City's worldwide supremacy in the textile and fashion industry solidified. Paterson's proximity to New York gave it a distinct advantage in the years before decreases in shipping costs and higher labor rates drove the industry to the American south and overseas. Paterson's proliferation of textile plants had also fostered the development locally of a whole range of companies that supplied materials, equipment and services to textile manufacturers and processors, providing a support infrastructure that could not be matched in other parts of the country. In order to bolster its own internal support system, Allied Textile Printers acquired the Tex-Chem Company of Fairlawn, New Jersey to produce adhesives and chemicals for its own operations, while at the same time marketing products to other industrial purchasers (Arthur Rosen, personal communication, October 28, 2009).

In the early 1960s, an important shift occurred in the company's ownership structure. The aging surviving partners decided to sell the company to an unidentified outside organization. In advance of the finalization of this arrangement, an alternative proposal was tendered by two groups comprised primarily of Allied Textile Printers plant foremen and younger members of the families of the original owners. An 11-member group offered to purchase the assets of the Allied Textile Printers company represented on the Todd, Passaic Mill No.1, Waverly and Mallory lots for an initial payment of $200,000 and a commitment to a ten-year payment plan for the remainder of the purchase price. Under their direction, this new company would continue to be known as Allied Textile Printers, Inc. The remaining component of the business, represented on the Gun Mill property and in the quarry lots, was purchased by another group of foremen and became known as the Standard Dyeing & Finishing Company (Arthur Rosen, personal communication, October 28, 2009).

The two organizations were loosely affiliated and shared some infrastructure. The Standard Dyeing & Finishing Company functioned as a largely independent plain dye works. Allied Textile Printers, Inc. operated what had come to be known as the Arrow and Regal Divisions. The Regal Division had been established principally to handle the intake and initial preparation and dyeing of textiles in preparation for further processing by the Arrow Division. The Regal Division undertook a small amount of stand-alone work, but most of textiles treated in its facilities were forwarded to the Arrow Division for further processing. The Arrow Division carried out printing and finishing as well the flocking and "burn-out" procedures. The term "burn-out" referred to a process whereby decorative holes or transparent areas in textiles were created through chemical treatment (Arthur Rosen, personal communication, October 28, 2009). The ownership of Allied Textile Printers considered both the flocking and burn-out processes to be among their firm's specialties and held a patent for a technique for color printing of flocked fabrics (Haber 1960).

The original Allied Textile Printers owners who had remained involved in the day-to-day operation of the business continued to work with the new owners of the firm in order to train the new partners. This arrangement was intended to last until the last installment payment on the purchase price was made. A relatively complicated management arrangement was put in place involving primary operating decisions being made at weekly meetings of the new ownership group at the Paterson plant with further decisions being made at monthly meetings of the original ownership group at the Allied Textile Printers sales offices in New York City (Arthur Rosen, personal communication, October 28, 2009).

The old owners retained many of the most important positions within the company while the training period progressed. The relationships on a day-to-day basis between the old and new owners within the management structure were quite complex. However, this situation was soon streamlined. Following the sale of the company to the new ownership group, there was an unexpected and substantial upswing in the profitability of the concern which resulted in the repayment of the outstanding balance approximately eight years earlier than had been anticipated. Although a few of the original owners continued on as paid employees, most retired from the concern (Arthur Rosen, personal communication, October 28, 2009).

In the early 1960s Allied Textile Printers thrived during a period of heightened demand for dyed textiles. Paterson companies were uniquely positioned to service New York City's garment market. Local manufacturers could respond very quickly to fashion trends and the market's needs. From the point an order was placed with Allied Textile Printers it took as little as two weeks for a fabric to be produced, shipped to a New York City fashion district manufacturer, cut and

assembled into a garment, and hung on a department store rack. This enabled retailers to be especially responsive to fashion trends and allowed them to order less of a given garment initially because they did not have to guess at which fabrics would prove popular. Sales of small orders of garments in different colors and patterns could be gauged quickly to facilitate the placing of larger orders for those combinations that sold best. Paterson's ability to quickly provide the requisite fabrics allowed New York City manufacturers to produce sufficient quantities of popular products before market demand subsided (Arthur Rosen, personal communication, October 28, 2009).

During this period, Allied Textile Printers, Inc. (and later Allied Textile Printers, Corp. as it was known following another name change) primarily produced popularly priced women's dress fabrics. For the most part, the firm produced neither discount nor economy fabrics nor high-end luxury goods. They specialized in several technologically advanced processes including the production of washable wool garments. Such garments became commonplace in the 1970s but Allied Textile Printers was one of the first firms to introduce the process. The company did occasionally produce textiles other than women's dress fabrics including, rarely, men's shirt fabrics, textiles for women's slippers and casket fabrics. They even continued, after World War II, producing some camouflage and other textiles for government contracts. Government work was not undertaken extensively because of the rigid specifications imposed on the final product. Because Allied Textile Printers specialized in women's garment fabrics, they were more apt to be impacted by current fashion trends than other producers. Rising hemlines, for example, resulted in a reduced need for fabrics. Peasant dresses meant more yards of fabric sold (Arthur Rosen, personal communication, October 28, 2009).

As discussed in Chapter 5 below, Allied Textile Printers sold steam manufactured in their boiler plants to other nearby manufacturing concerns. The adjacent Standard Dyeing & Finishing Company was one of the companies that purchased steam (Plate 3.56). However, the cost that Allied Textile Printers charged for this service gradually increased as operational costs rose and as the number of purchasing firms decreased with the overall decline of industrial Paterson. A dispute over the price of steam was ultimately one of the reasons behind the decision of the Standard Dyeing & Finishing Company's owners to abandon its Paterson home for a new location in Connecticut where it subsequently still failed (Arthur Rosen, personal communication, October 28, 2009).

Following the acquisition of the Todd Mill in the early 1960s, a fully integrated production plan was implemented in the Allied Textile Printers plant. In the following description of the company's textile manufacturing process, the building numbers supplied correspond with those shown on the Factory Mutual Insurance Company's plans of the ATP Processors Ltd. facility produced in 1981 (Figures 3.19a-j).

Raw, unfinished fabric, known as "greige goods," was delivered to the site by tractor trailer. These trucks entered the property by crossing the bridge over the Lower Raceway at the Todd Mill site (Plate 3.53) and their cargo was unloaded onto the loading dock that stood to the fore of the primary Todd Mill building (Plate 3.54). The front portions of the large brick mill (Building No. 6) had largely been converted to storage space for greige fabric (Figures 3.17b, 3.17q, 3.17r, 3.19b and 3.19d) and an elevator had been installed in the building to facilitate the movement between floors of the fabric carried in carts or "trucks." On the first floor of the building, greige fabrics were prepared for printing and dyeing. Rolls of fabric measuring hundreds of feet in length were sewn together to facilitate continuous processing (Arthur Rosen, personal communication, October 28, 2009).

In one part of the first floor of the Todd Mill, loosely hung rolls of broad silk were suspended in large tanks for weighting. The silk hung on wooden bars with a triangular cross section. As these turned, the rolls of fabric rotated slowly through the weighting solution.

Plate 3.56. View of the Gun Mill during its occupation by Allied Textile Printing, looking west, *circa* 1976. Source: Phillips and Wilson 1979:125.

Prior to the Second World War silk weighting activities had been confined to the dye houses on the western part of the site. Silks and other fabrics were also "boiled off" in tanks in the spaces on the first floor of the Todd Mill (Figure 3.17r). This removed the starches and "de-sized" certain fabrics as well. The process gave other more "modern" fabrics a "relaxed hand." Following weighting and boiling off, fabric was moved to the rear of the building where it was placed in one of several multi-chambered centrifugal extractors to dry before it was stored or processed further (Arthur Rosen, personal communication, October 28, 2009).

Certain fabrics were then moved to a single-story addition at the rear of the building which contained the tumbling department. Large devices similar to a commercial washing machine "tumbled" fabric to give it a wrinkled or crepe-like texture. Some of the goods were then taken up to the second floor of the Todd Mill building and carried though a bridge or passageway for storage in Building No. 29 (Plate 3.55). The first floor of Building No. 29 also contained finishing machinery used for wool processing (Figures 3.17b, 3.17c, 3.19b and 3.19c). The upper floors of Building No. 29 later were home to the company's three rotary screen printing machines. On its first floor, Building No. 28 contained dyeing facilities and some finishing machines utilized in the Regal Divisions' Plain Dye activities (Plate 3.55). In Building No. 28, tubular knit fabrics were prepared for processing. These fabrics used for garments such as men's undershirts were manufactured as a tube which had to be opened in most applications before the textile could be dyed or printed (Arthur Rosen, personal communication, October 28, 2009).

Greige goods not transferred to Building No. 29 passed instead from the Todd Mill to Building No. 5-B where they could be passed through tanks that mechanically removed sizing from the fabric (Figures 3.17b, 3.17p, 3.19b and 3.19j). Building No. 5-B also housed a secondary area for the joining of multiple lengths of fabric into a single long length of textile. Building No. 5-A contained offices and a laboratory facility where the properties of greige goods were studied prior to their processing. Building No. 5 was used for the storage of copper printing rollers (Figures 3.17b, 3.19b and 3.19j) (Arthur Rosen, personal communication, October 28, 2009).

After passing through Building No. 5-B, goods were then moved through an opening in the wall into Building No. 2 and Building No. 1 which together served as the Regal Division's primary dye house (Figures 3.17b, 3.17o, 3.19b and 3.19i). Wet processing occurred here in large dye boxes which stood on the floor under a large saw tooth roof. The work level in these buildings actually stood below the level of the Lower Raceway to facilitate the movement of water. Large drains in the floor carried waste and run-off into channels beneath the floor. Tanks ranged in size from three to 16 feet in width with catwalks ranged above them to permit the easy monitoring of their contents (Arthur Rosen, personal communication, October 28, 2009).

Following dyeing, bunched-up "ropes" of fabric were pulled through circular openings in the walls between Building No. 2 and Building No. 3. In Building No. 3, the fabric contained in these ropes was extended to its full width before passing over openings in vacuum pipes which sucked any remaining moisture from the textiles. From that point, the fabric passed into Building Nos. 7, 8 and 9 which functioned as the Regal Divison's "frame shop," where fabric was prepared in various processes prior to printing (Figures 3.17b, 3.17c, 3.17m, 3.19b, 3.19c, 3.19h and 3.19i; Plate 3.52). Several mechanical tentering frames were located in these buildings. Tentering frames were long devices that stretched, treated and heated/dried textiles in order to produce a desired width and then evenly fixed that width for the entire length of the fabric. Tentering frames were located in a number of locations across the ATP site. The frames in this particular building were installed in the early 1960s as part of an effort to improve integration of production. The floors on the

lower level of these buildings were leveled at this time to create a single unified work surface (Arthur Rosen, personal communication, October 28, 2009).

In Building Nos. 12 and 14-A, the processing of gray goods specifically intended for printing was undertaken (Figures 3.17a, 3.17c, 3.19a and 3.19c. At least two sets of gray washing machinery were situated in these buildings. One set was obsolete and was not used during the second half of the 20th century. Gray goods were fabrics used during the printing process to stabilize and protect the textiles actually being printed. They were affixed with adhesives to the obverse of the fabrics being printed and were separated from these fabrics after being run through the printing machines. They were then washed to remove residual chemicals, stretched to regain their original size and reused repeatedly (Arthur Rosen, personal communication, October 28, 2009).

Most of the actual printing took place in the nine roller printing machines which were located on the first floor of the Mallory Mill (Building No. 11-B) (Figures 3.17a, 3.17i, 3.17k, 3.17l, 3.19a, 3.19d and 3.19e; Plate 3.49). As fabric exited the printing machines, it traveled up in a long run to the second floor of the building. This run allowed the colors to dry slightly before encountering the first roller of the large drying machines which were located on the second floor of the mill (Figures 3.17i and 3.17k). Following drying, printed fabric was steamed or aged. Both processes facilitated the fixing of the final colors from the printing process (Figure 3.17j). In steaming, the fabric was interlaid with sheets of paper and then placed in a high-pressure vessel and exposed to steam. This took place on the second floor of Building No. 11. In aging, which also took place on the second floor of Building No. 11 and parts of Building No. 10, the materials were placed in enclosed box-shaped machines suspended from a rack system and kept in a hot, humid environment (Arthur Rosen, personal communication, October 28, 2009).

Following steaming or aging, fabric was then washed to remove the residue from printing chemicals and color mediums, and dried on the second floor of Building No. 11-A. The Van Houten Street front of Building No. 11-A also contained the company's executive offices (Figure 3.17l). At one point portions of Building Nos. 10 and 11 were also converted to office use. Colorists would bring customers to rooms in these buildings to approve the "strike-offs" from the initial print run of their fabrics (Figure 3.19c) (Arthur Rosen, personal communication, October 28, 2009).

The third story of Building No. 11-A was where the flocking and burn out processes took place (Figure 3.17l). Most of the flocked materials produced in the Allied Textile Printers plant was both flocked and "burned out." Rarely was one technique applied in the absence of the other. Both were accomplished utilizing a two-roller printing machine. The first roller applied patterns of acid suspended in a medium onto the textile to create the burn-outs. The second roller printed patterns in the adhesive. Following the application of the adhesive, the fabric passed immediately into an electrostatic chamber where flocking was sifted onto the fabric. The electrostatic charge would cause the flocking to stand on end and attach itself to the adhesive. Upon exiting the electrostatic chamber, the material was then placed in a dryer that cured the adhesive and stimulated the work of the acid in finalizing the "burn-outs." The fabric was finally removed to the dye house where it was washed and dried. In some cases, the fabric was returned to the Mallory Mill for additional printing over the flock in order to produced colored flock. Otherwise, it was prepared for shipping. Most of the fabric which was shipped out of the Allied Textile Printers plant was loaded onto trucks in loading bays situated in the alleyway between the Waverly and Passaic Mill No. 1 properties (Arthur Rosen, personal communication, October 28, 2009).

The Arrow Division's color shop was located on the first floor of the Mallory Mill (Building No. 11-A) along with copper roll storage and a few greige washing and finishing machines (Figures 3.17a, 3.17l,

3.19a, 3.19d and 3.19e). The mixing of coloring agents for the printing process was undertaken in this color shop. This was a slightly more complex process than that of preparing dye for use in the dye house as additional thickening agents and other chemicals were required in the printing operation. The finishing activities that took place in the Waverly Mill (Building No. 11-C) were all post-printing processes (Figures 3.17a, 3.17b, 3.17j, 3.17i, 3.17m, 3.19a, 3.19b, 3.19d, 3.19e and 3.19h). The second floor of the Waverly Mill overlooking the north end of Mill Street were the finishers' offices and finishing chemical storage and mixing rooms (Plates 3.50 and 3.51). To the north of the office space were rows of finishing machines, including tentering frames and "dry boxes." Dry boxes were machines which dipped fabric into solutions containing finishing chemicals and then removed the remaining liquids through heat and evaporation. In the northern end of the second floor of the Waverly Mill was the examination department where fabrics were checked for quality prior to shipping. In this location, the rolls of fabric were pulled across large examination tables where any imperfections on the textiles could be identified and marked so that they could be worked around during the garment manufacturing process (Arthur Rosen, personal communication, October 28, 2009).

A machine shop, pipe fitting shed, electrical shed and gate house with time clocks and electrical controls for the gate were all located in the forecourt of the Gun Mill (Figures 3.17a, 3.19a and 3.19f). Most of the dyeing machinery and dye boxes used on the ATP site during this period were constructed in this machine shop. The first floor of the Gun Mill (Building No. 23) functioned as the intake area for the greige goods utilized by the Standard Dyeing & Finishing Company (Figures 3.17a, 3.17h, 3.19a and 3.19g). The second floor of the mill had served as the unified laboratory for all of the plant prior to the division of the company into the Standard Dyeing & Finishing Company and the Allied Textile Printers, Inc. in the early 1960s. Standard's Laboratory was at that point moved to the second story of the triangular-shaped Building No. 19 (Plate 3.47). The first floor of Building No. 19 served as the corporate offices of the Standard Dyeing & Finishing Company (Figures 3.17a, 3.17e, 3.19a and 3.19e). The Arrow Division's chrome plating shops were situated in a building appended to the rear of the Gun Mill. Chrome plating was also done during the 1960s in Building No. 11 (Figures 3.17a, 3.17c, 3.19a and 3.19c) (Arthur Rosen, personal communication, October 28, 2009).

In the Standard Dyeing and Finishing Company's plant greige goods moved from the Gun Mill westwards into the facility's greige room for processing. This was situated in Building No. 20 (Figures 3.17a, 3.17e, 3.17f, 3.19a, 3.19e and 3.19f). Building Nos. 18, 22, 24 and 25 housed the Standard Dyeing & Finishing Company primary dyeing facility and contained the majority of the company's dye boxes (Figure 3.17a, 3.17d, 3.19a and 3.19d). Building No. 21 housed the firm's jig dyeing room (Figure 3.17a, 3.17g, 3.19a and 3.19f). Jig dyeing was a more mechanical, less labor-intensive method of dyeing that relied on machines to spool rolled fabric back and forth through a tank of dyestuff. It was a less expensive method of dyeing that was technically preferable in some specific instances. Finishing and drying took place in Building Nos. 20 and 26 (Figure 3.17a, 3.17e, 3.17f, 3.19a, 3.19e and 3.19f). These spaces contained tentering frames and a "sanfordizing" machine in addition to other equipment. Sanfordizing was a process that involved stretching, shrinking and fixing textiles in order to stabilize their lengths and widths, thus reducing future shrinkage (Arthur Rosen, personal communication, October 28, 2009).

Building No. 14 contained Allied Textile Printers' primary steam boilers. These were supplied with water that had passed through filters in Building No. 16 and softeners in Building No. 15 (Figures 3.17a, 3.17d, 3.17h, 3.19a, 3.19d and 3.19g). Some washing of rayon also occurred in Building No. 15 (Arthur Rosen, personal communication, October 28, 2009).

In 1976, Allied Textile Printers filed for bankruptcy following its inability to meet its electric bills at the peak of the 1970s energy crisis. The bankruptcy filing was also, in part, a result of pension law, as it then existed. If any one of the subsidiary plants had closed, the unfunded liability represented by its pension obligations would have shifted to the other plants and caused their collapse. Declaring a full bankruptcy was the only way to fully divest the company of this obligation. Believing an upturn in the textile market was imminent in 1977, the owners of the business reorganized as ATP Processors Limited and reopened the Van Houten Street plant. They were partially funded in this endeavor through loans made to the company by the United States Department of Commerce (Arthur Rosen, personal communication, October 28, 2009).

With these government funds, ATP Processors made a substantial investment in improved technology, purchasing three rotary screen printing machines at a cost of approximately $1,000,000 apiece. The company was able to remain in operation until 1982 when increased sewage fees and other expenses made the continuation of the business impractical. The equipment and other assets of the company were then liquidated to pay the balance of the outstanding government loans. Following the closure of the plant, the property owners, who by this time consisted of a group of former Allied Textile Printers owners and their heirs, attempted to sell the factory buildings, but could not find any buyers. The property was instead transferred to the ownership of the National Preservation Institute, an Alexandria, Virginia-based nonprofit organization founded in 1980 (Arthur Rosen, personal communication, October 28, 2009).

The National Preservation Institute, in cooperation with the locally based Paterson Renaissance Organization, sought to renovate and adaptively reuse the empty mill buildings. Unfortunately, a massive fire in 1983 effectively put an end to these plans (Plates 3.57 and 3.58). Over the intervening years nearly all of the remaining ruins have succumbed to the elements and subsequent fires. By the end of the 20th century, only scattered portions of broken buildings remained on the site. Principal among these were parts of the lowest sections of the façade of the Waverly Mill and more substantial parts of the lower two floors of the Gun Mill (Plate 3.59). In 2002, the New Jersey Historic Trust and Urban History Initiative funds paid for the stabilization of the surviving elements of the Gun Mill. This work primarily involved the disassembly of the surviving unstable portions of the Gun Mill's second floor and the stockpiling of the salvaged masonry (Plate 3.60).

Plate 3.57. View looking west from Van Houten Street showing the Allied Textile Printing site during the fire of 1983. Source: Avignone 1999.

Plate 3.58. View looking north showing the Waverly Mill following the fire of 1983. Source: Avignone 1999.

Plate 3.59. View looking northeast showing the Gun Mill prior to stabilization, *circa* 2000. Source: Paterson Historic Preservation Commission.

Plate 2.60. View looking west showing the stabilization of the Colt Gun Mill in progress, 2002. Source: Paterson Historic Preservation Commission.

Chapter 4

AN INDUSTRIOUS PEOPLE: LABOR, MANAGEMENT AND COMMUNITY

This chapter highlights the working life of men, women and children who arrived in Paterson in the 19th and 20th centuries from many parts of Europe. The Allied Textile Printers (ATP) site hummed with all manner of industrial enterprises, great and small, predominantly textiles and metal working. Many of the immigrant workers arrived with prior knowledge of their crafts that became the foundation of two of Paterson's most important enterprises, silk and machine tool manufacture. Paterson's workers had a well deserved reputation for contentiousness, in part thanks to their Old World traditions of egalitarianism and radicalism. The story of Paterson's labor struggles is the constant fight of workers against automation of their crafts, the regimentation of the shop floor and the devaluation of their skills. Several strikes, notably the Silk Strike of 1913, assumed national significance.

Workers from the ATP site no doubt participated in and were influenced by the important labor struggles that occurred in Paterson, but research in the numerous secondary sources finds few specific mentions of the ATP mills. With perhaps the exception of a city-wide iron molders strike over wages that began at the J.C. Todd machine works in 1886, the ATP site is not known as a place where events central to Paterson's labor history took place. The silk dyeing sector, in particular, had a reputation as having better management-labor relations than other sectors of the silk industry, particularly throwing and weaving. As the ATP site became increasingly devoted to dyeing and finishing processes during the late 19th and early 20th century this may have in fact isolated it to some degree from some of the most contentious events that pushed Paterson onto the national stage of the struggle of industrial workers to improve their wages, benefits and working conditions.

During research for this report, very few primary sources were identified that would shed light on the everyday routines of work on the ATP site. To date, no significant repositories for personnel records, first-hand worker accounts or even more than a handful of pre-1970 interior photographs have been located. Time-consuming research in other types of primary sources, such as local newspapers, for mention of Allied Textile Printers workers, work conditions or accident reports, was beyond the scope of work for the preparation of this report. At this point, our understanding of labor on the ATP site is mostly based on the large body of secondary literature that describes the trends in labor practice that impacted Paterson as a whole.

The most valuable and detailed information on everyday work on the ATP site comes from the memories of those still alive who worked there or knew individuals who worked there in the years after World War II, with the most vibrant memories coming from the Allied Textile Printers' last years of operation in the 1970s and early 1980s. In the final section of the chapter, the everyday working life of Allied Textile Printers employees from the not-so-distant past is examined through a selection of photographs by Michael Anthony.

A. FROM ARTISAN TO INDUSTRIAL WORKER, 1794-1860

Paterson's first industrial labor crisis occurred in 1794 when a cotton mill was built that required 125 employees to carry out all of its intended operations. With a scarcity of both skilled and unskilled personnel available in the neighborhood, managers of the Society for Establishing Useful Manufactures (S.U.M.) traveled far afield to build a suitable work force – as far as Great

Britain to recruit mechanics, especially men from the industrial districts of Lancashire, Yorkshire and the Midlands; and to the almshouses of New York City for unskilled workers, typically widowed mothers and their children (Trumbull 1882:38; Heaton 1951:519). Indeed, women and children were the backbone of the industrial textile work force with Paterson mill owners favoring the "family system" of employment, in which the work force was drawn from entire families, as opposed to the "boardinghouse system" practiced in Lowell, Massachusetts that recruited young single country women (Dodyk 1979:4-5).

The first Paterson cotton mill suspended operations in 1797. By this time, the population of Paterson had grown to 500 persons and then shrunk back down to 43. Despite this setback, Paterson continued to attract manufacturing and the outbreak of war with Great Britain in 1812 provided an important boost to domestic textile production. During this period Paterson's manufacturing sector, comprising some 11 cotton factories, a card and wire works, flax mill, rolling mill and saw mill, was operating at peak capacity. The village quickly expanded along with the industrial capacity and, by 1814, Paterson had about 1,500 residents. Then, the peace treaty of 1815 that ended the War of 1812 hostilities re-opened American markets to British products and the domestic textile industry collapsed (Trumbull 1882:40, 43).

Passage of the Tariff of 1816 increased the cost of British imports enough to encourage a resumption of American manufacturing. Further increases in tariffs on British imports in 1824 and 1828 allowed the cotton, flax, wool and iron working industries in Paterson to flourish further and the surging textile mills gave an important boost to the business of repairing and building machinery. In 1827 Paterson had three machine shops employing 84 men. Five years later, 404 mechanics resided in Paterson. Some machine shops were independent businesses, while others were attached to textile mills (Harris 1979:9). By 1830 Paterson had 17 cotton mills that employed 2,000 male and 3,000 female workers. Cotton manufacture in Paterson peaked in the 1840s when 35 cotton mills were in operation, and continued to be a major employer until the 1860s when silk manufacturing began to emerge in its place (Trumbull 1882:52, 62).

An initial demand for hand loom weavers in Paterson's growing early 19th-century textile industry touched off the first significant wave of European immigration into the town. Several hundred Protestant and Catholic Irish farmers, shopkeepers and artisans, particularly hand loom weavers, arrived between 1824 and 1836 (Harris 1990:575-576).

Hand loom weavers represented a mode of production that centered on the home or workshop. Entire families participated in home textile production. Traditionally, women produced and spun the yarn that men then wove into cloth. Men also found employment in small workshops run by master craftsmen. Putting in time as apprentices and journeymen held out the promise that one day these men would themselves become master craftsmen. Both these modes of production fostered a strong belief in individual freedom. However, as merchants built up capital they were able to set up larger shops and install power-driven machinery that increased production and undercut the value of skilled hand labor (Harris 1979:1-3).

Power-driven textile machinery was first applied to the spinning process. Weaving remained a product of home manufacture until the introduction of the power loom in the 1820s. In 1827, 12 percent of all the families in Paterson still had a hand loom in their home; within five years only two percent of families included home-based weavers (Harris 1979:7-8). Power looms required less skill and strength, opening more factory jobs to women and children. Nearly half of Paterson's textile work force in the mid-19th century was composed of children between the ages of eight and 16 years old. Economic expansion and the growth of mill production led to a rapid increase in population. Between 1824 and 1836 the population of the town nearly doubled to 9,085 people (Gish 1992:24).

In this critical period of transition from handcraft to industrial textile manufacture the old-style artisan was faced both with the discipline and regimentation of factory work and with the ongoing attempts by bosses to reduce costs and boost production by reducing skilled labor. Furthermore, factory work offered the children of artisans a future as unskilled, dependent wage earners and thus disrupted traditional family relationships. Increasingly militant relationships between workers and employers erupted into no less than six strikes between 1824 and 1836 (Harris 1979:16-17).

On July 19, 1828 mill hands and journeyman artisans walked off the job throughout Paterson when a coalition of mill owners and workshop bosses re-ordered the work day by changing the time and duration of the lunch break. Nicknamed "the children's strike," this was the second major factory strike in American history and lasted for three weeks. The men, women and children who went out on strike comprised a variety of crafts and ethnicities. Employers ignored their demand for a ten-hour day but restored the noon-time lunch break. To quell further unrest, employers blacklisted the strike leaders and accelerated the displacement of skilled workers with machinery (Gish 1992:31).

Widespread labor unrest continued during the 1830s as Paterson factory workers attempted to hold back the tide of social and economic change and improve working conditions, especially for their children. The 1835 strike involved over 2,000 factory workers and lasted six weeks. At issue were the long 12- to 14-hour work days of children, interrupted only by half-hour breakfast and 45-minute lunch breaks. Parents demanded a reduction of the children's work day to 11 hours. Negative publicity was broadcast in other cities about the mistreatment of children in Paterson's factories. Paterson workers received support from workers' organizations in New York, Boston and Newark. Workers turned to unions for the first time as a vehicle for their protests. The strike finally ended when the work day was reduced to 11½ hours (Harris 1979:17-18; Gish 1992:31-33;).

John Ryle, an English silk manufacturer, arrived in Paterson in 1839. He began producing silk in the Colt Gun Mill about 1840 (Trumbull 1882:3). Small spinning shops producing silk sewing thread and trimmings began operating in the 1840s and 1850s. During this same period the demand for railroad equipment, iron and machinery promoted the rapid growth of Paterson's iron working industries and numerous English immigrants arrived with skills in both textile manufacture and iron working. Many had previous entrepreneurial or supervisory experience in European mills. By 1850 English immigrants accounted for about one tenth of the city's population. The early silk industry was largely owned by Englishmen and about one-quarter of the work force was English-born (Margrave 1985:10).

Paterson was incorporated as a city in 1851. It experienced its most rapid population growth between 1850 and 1870, when its population tripled to a total of 33,579 people, emerging as the state's third largest city after Newark and Jersey City (Gibson 2008). In 1856 Paterson's four locomotive shops employed 1,650 men. Another 5,500 industrial workers found employment in one of the machine shops or in one of the cotton, paper, flax or silk mills (Trumbull 1882:52).

By the end of the 1850s, on the ATP site, 31 men and 110 women were employed by the Phoenix Manufacturing Company in the manufacture of cotton duck cloth (canvas) and yarn. James Nightingale, a cotton manufacturer, employed seven men and nine women at his mill. Elias Boudinot Colt employed 43 men and 110 women to make cotton fabrics and yarn. Benjamin Buckley employed 18 men to manufacture cotton spindles and flyers. Joseph C. Todd had a machine shop employing 100 men (U.S. Census Office 1860).

B. MELTING POT OF SILK WORKERS, 1860-1900

High tariffs were imposed on imported foreign-made products during the Civil War era. This economic adjustment helped to encourage Paterson's silk industry and spur the decline of the old established English silk centers of Coventry and Macclesfield. A large group of British master silk workers and entrepreneurs immigrated to Paterson between 1860 and 1880 (Margrave 1985:12). The technological information carried by these new arrivals enabled Paterson's silk industry to expand first into narrow goods, or ribbon-weaving production, and then later into broad silk weaving. Initially, Paterson manufacturers imported silk making machinery, but in the late 1860s local machine shops began making the necessary plant (Margrave 1985:19-21). Englishmen from Lancashire and Yorkshire established many of the machine shops that made and repaired textile machinery in Paterson. Some of these shops were attached to particular silk mills. Benjamin Buckley, for example, rented the first floor of the Gun Mill and had his own business in textile machinery (Margrave 1985:21-22).

The expansion of the silk industry hastened the decline of the stagnating cotton industry. Silk manufacturers took over many of the former cotton mills and their work forces. Throwing mills, where thread was spun, used the semi-skilled labor of women and children. Silk weaving had traditionally been a male occupation, but the development of semiautomatic looms opened the door for women to find skilled positions in Paterson's silk-weaving shops. Weaving mills thus employed both female weavers and warpers, although male weavers continued to predominate (Plates 4.1 and 4.2). Women also found work picking loose ends and knots from woven silk (Plate 4.3). Dye houses, however, only employed male workers (Plate 4.4). Despite the rising importance of the silk industry, cotton and other textiles were still produced in abundance in Paterson in the second half of the 19th century. In fact, the nation's largest mosquito net factory and largest jute factory were both located in the city. These factories were also large employers of women and children (Dodyk 1979:16-17).

In 1860 Paterson's four silk mills employed 590 workers. Fifteen years later, Paterson had 8,000 silk workers employed in its 48 silk mills and seven silk dyeing plants. Two-thirds of the workers were women and one worker out of every four was under the age of 16. A silk mill was considered a more desirable work environment than a cotton or jute mill. Silk mills were relatively clean and well-lit to assure production of high quality fabrics (Trumbull 1882:4; Gutman 1968:267-268; Dodyk 1979:18).

A distinctly northwestern English community feel took root in Paterson in the later 19th century with many immigrants hailing from the silk-manufacturing areas of Cheshire and Lancashire. However, between 1860 and 1900, English families in Paterson were also soon joined by other immigrant groups from all the major textile centers of Europe. Skilled silk workers emigrated from Lyon and St. Etienne in France, Krefeld in Germany, Zurich in Switzerland, Lodz, Warsaw and Bialystock in Poland, and Biella and Como in Italy (Sione 1992:139). In 1880 about two-thirds of Paterson's silk weavers were immigrants, mostly English, Swiss, German and Scottish (Margrave 1985:22-23). English immigrants continued to dominate the ranks of silk workers until 1890, especially in skilled and supervisory positions (Dodyk 1979:35-36). Most of the semi-skilled silk jobs were held by women and children, many of whom were English, Irish, Dutch, German and Swiss immigrants (Gutman 1968:268; Margrave 1985:24-26).

After 1890 increasing numbers of Eastern European Jews and Italians entered the silk work force. Italians became the largest immigrant group in the silk mills in the first decade of the 20th century. Northern Italian immigrants arrived in Paterson before southern Italians, the latter group immigrating in increasing numbers after the turn of the century. Northern Italians were more likely to obtain skilled positions, especially

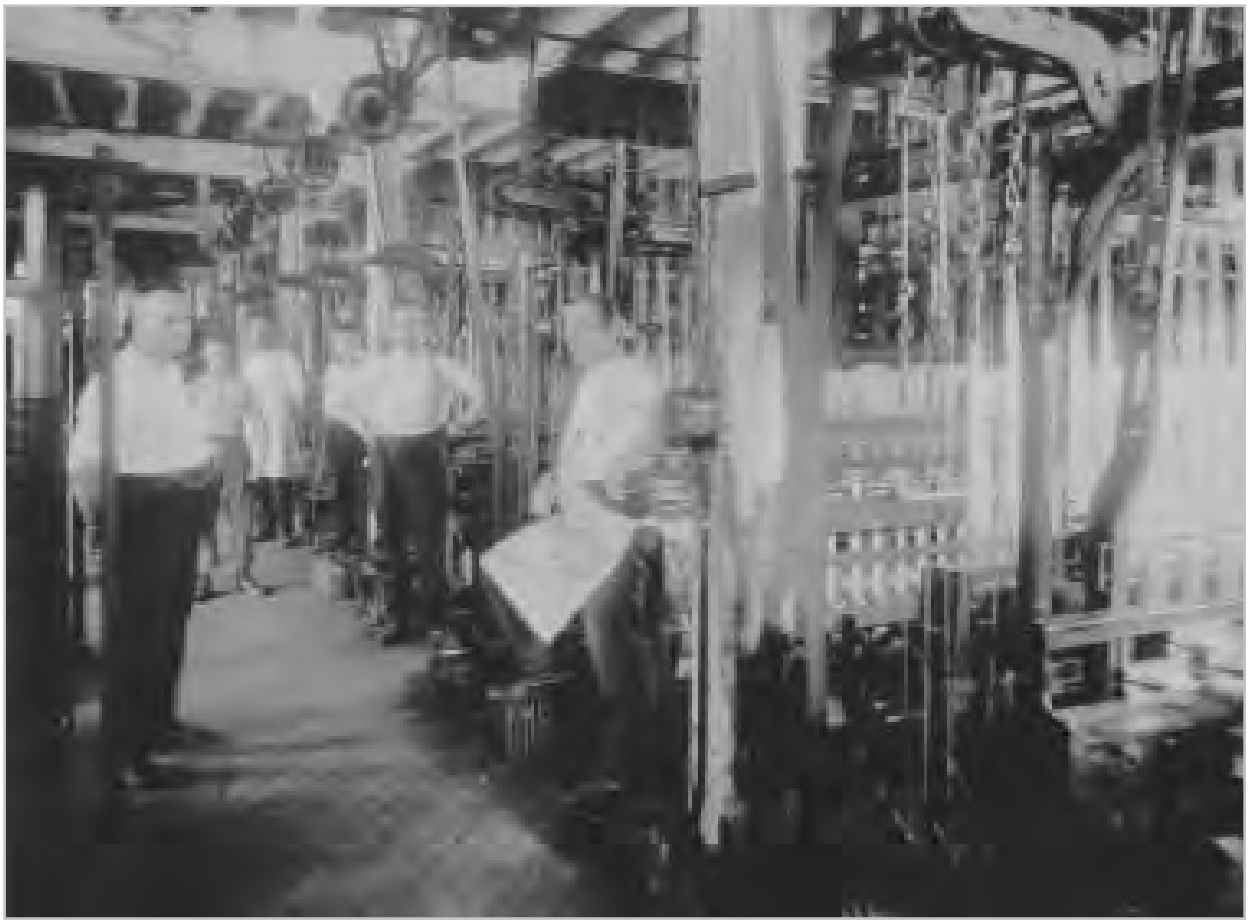


Plate 4.1. Weavers pose at their looms in an unidentified Paterson silk mill, undated. Source: American Labor Museum/Botto House National Landmark.

Plate 4.2. Both men and women were employed in skilled positions such as weavers and warpers, *circa* 1900. Source: American Labor Museum/Botto House National Landmark.

Plate 4.3. Women found work picking loose ends and knots from woven silk, *circa* 1900. Source: American Labor Museum/Botto House National Landmark.

Plate 4.4. Paterson dye workers in an unidentified silk dye house, undated. Source: American Labor Museum/ Botto House National Landmark).

in the dye houses, while most of the southern Italians filled unskilled jobs in the dye houses or semi-skilled jobs in weaving or throwing (Dodyk 1979:40; Sione 1992:127-129, 146).

The role that women played in the silk industry was in large part determined by their ethnic background. Customarily, English and American wives did not become mill workers, but their daughters worked until they married. Irish women filled unskilled jobs. German women (Catholic, Protestant and Jewish) held skilled positions, especially as weavers and warpers. Traditionally, Jewish women were expected to work and contribute to the family income, at least until marriage. Jewish women from Eastern Europe tended to occupy less skilled positions. Dutch workers held semi-skilled jobs and were frequently unmarried. Roughly equal numbers of married and single Italian women worked in the mills with many of the married Italian women being skilled workers. The average female silk worker who was single typically lived at home with a father who was not in the silk trade. The exception were northern Italian women, who often came from a family of silk workers (Dodyk 1979:6, 23-24, 36-42; Sione 1992:152-153).

C. UPWARD MOBILITY

It was a commonly held belief among the European immigrants, especially the English, that Paterson provided the opportunity for skilled workers to become successful manufacturers or workshop owners. Little capital outlay was required to start up a business, since both machinery and materials were available on credit. Small sections of mill buildings could also be rented. The specialization of the silk industry encouraged the growth of many small-scale businesses operated by a single family or closely held partnerships. In 1900 about a third of all firms had fewer than 50 looms, while in 1920 the majority had 24 looms or less. The commission system also allowed hand weaving to survive until the 1880s. A weaver could install a hand loom at home and tend it in shifts with his wife. Numerous immigrants from Germany, France and England wove at home as they had in their homelands. In 1880, hand looms still accounted for a third of total weaving machinery in the broad silk branch, while in the more skill-intensive narrow goods as much as 40% of machinery comprised hand looms (Margrave 1985:15-16; Sione 1992:114-115).

The path from Macclesfield silk weaver to prosperous Paterson mill owner was exemplified by Henry Doherty and Joseph Wadsworth. Both men immigrated to America in the late 1860s, worked as foremen for ten years in Paterson silk mills, and then began a one-loom operation in rented space. By the early 1890s, the firm of Doherty and Wadsworth employed nearly 1,000 workers (Margrave 1985:15-16).

One of the better known self-made men of Paterson was Joseph C. Todd. He arrived in Paterson in 1836 as a young carpenter and found work in the machine shops where he learned to make wooden patterns for machinery. In 1844 he formed a partnership with another skilled mechanic, rented a section of the old James Nightingale mill on the ATP site and set up a machine shop with two lathes and produced a variety of machinery for use in textile manufacture. In 1850 Todd took on another partner, Philip Rafferty, who injected enough capital into the business to enable them to establish a new machine works on the ATP site that employed 35 men. By 1870 he had a work force of 300 men laboring in his machine shop, foundry, and engine factory (U.S. Census Office 1850, 1870; Shriner 1890:195; Gutman 1968:266-267; Harris 1979:18-19).

After Rafferty died in 1872, Joseph Todd discovered his dear departed partner had defrauded him of a large share of the firm's profits. Despite this setback, Todd kept his business running by persevering through the legal system and hustling for work orders during the economic depression that gripped the nation from 1873 to 1879. Todd's tenacious hold on his business was evident in his dealings with his workers. In 1886

all the iron molders in Paterson demanded a wage increase. Joseph Todd's reaction was to immediately dismiss all of his molders. Todd sent his castings over to the Rogers Locomotive Works, but their molders refused to work on the Todd order and also went out on strike. As the castings moved on from one foundry to another, a total of 300 iron molders went out on strike. The strike ended after a workers' committee reached an agreement with foundry owners for a slight wage increase (*New York Herald*, November 13, 1886:2 and December 21, 1890:31; Shriner 1890:195; Nelson and Shriner 1920:357).

D. LABOR UNREST

The Panic of 1873 and the resulting depression crippled Paterson's economy. Textile workers experienced less unemployment than iron workers, but all industrial workers suffered through years of wage cuts. Strikes and protests aimed at preventing these wage cuts and improving working conditions became commonplace. In the summer of 1877 Paterson was hit by an unprecedented strike involving 2,000 mostly English, French and German ribbon weavers. The weavers successfully reached an agreement with the mill owners to get a pay cut reversed. The mill owners learned a powerful lesson: the community, including elected officials and the police department, proved sympathetic to the strikers. Mill owners would spend the ensuing years attempting to gain influence in municipal government and establishing their own private police forces (Gutman 1968:268-272).

Workers were largely unorganized, especially the female workers. Yet, skilled female ribbon weavers in the Waverly Mill did manage to organize a strike against a pay cut in 1888, which they won (*San Francisco Bulletin* December 7, 1888:4). Most unions were organized by skilled male craft workers. Their goals were to protect their skilled status, control entry into their craft and obtain higher wages. English, Scottish and Dutch machinists were especially active among the city's most organized work force. They established local chapters of the International Association of Machinists. In the 1880s a new form of labor organization called the Knights of Labor made its appearance in Paterson. The Knights stood for equal pay and membership regardless of sex, race, color or creed. Nearly 3,000 silk workers joined the Knights, organizing into locals based on the various crafts. However, Paterson workers tended to be more militant than the Knights of Labor and the latter's membership declined (Gutman 1968:268-269; Dodyk 1979:27; Herochik 1986:149; Sione 1992:212).

Several of the small silk craft unions formed a loose federation known as the United Silk Workers of America (USWA). The group could not get chartered by the American Federation of Labor (AFL) because the AFL had already given the United Textile Workers (UTW) jurisdiction over the silk industry. About 3,000 of Paterson's silk workers organized within the USWA by occupation and ethnicity. Locals included: male and female ribbon weavers of all nationalities; male and female English-speaking broad silk weavers; Italian broad silk weavers; male dyers and dyers' helpers; and male and female Jewish broad silk workers (Dodyk 1979:30). By the end of the 19th century, Paterson textile workers had successfully gotten their 13- to 14-hour work day reduced down to 10 hours. However, the machine assignments were increased. In general, development of power looms and standardized machine tools allowed the textile industry to increasingly turn to less-skilled, foreign-born workers (Dodyk 1979:5-6).

Paterson's silk mills were in competition with each other as well as with their European counterparts. Their products were vulnerable to the whims of fashion in a market where demand was high and prices irregular. The silk manufacturers developed a number of strategies to deal with the constant need to increase production and lower costs. Many of Paterson's silk manufacturers switched production to low-grade fabric using automatic machinery. Demand decreased for

skilled workers, work was speeded up and wages were lowered. These silk jobs were usually filled by semi-skilled female immigrants (Sione 1992:115, 122).

Dyeing remained a predominantly male occupation (Plate 4.4). The introduction of chemical dyes and mechanical devices eroded the need for a master dyer's skills. Traditionally, the master dyer oversaw one vat of dyeing liquids at a time. To cut costs, fewer master dyers were employed. In 1887 a master dyer had three vats to supervise with the help of six to 12 unskilled assistants. By 1897 a dyer was normally responsible for 10 to 100 vats (Sione 1992:116-117, 120-121).

Higher productivity and lower costs allowed the silk dye houses to greatly expand operations. The largest silk company employers in Paterson in 1913 were the Weidmann Silk Dyeing Company and the National Silk Dyeing Company. Silk dyeing had been established in Paterson later than the broad silk or ribbon weaving mills (Golin 1985:81). Strikes at the dye plants were much less frequent than at the weaving mills. Between 1888 and 1894 Paterson weavers mounted 30 strikes, while dyers had only two. The majority of dye house workers were unskilled helpers who could be easily replaced during a strike. The dye house strike of 1902 was Paterson's bloodiest, in which three Italian workers and a policeman were shot. The Italian workers immigrated with a strong tradition of radical ideology and opposition. In fact, Paterson served as the national center of anarchist activity in the 1890s and early 20th century. The strike ended in a stalemate, but introduced a new era of militant industrial unionism in Paterson. More importantly, it swung public opinion away from the workers because of fear of the anarchists and prejudice against Italians (Dodyk 1979:42; Golin 1988:26-27; Sione 1992:205-206).

Some of the larger silk mill owners began to relocate their throwing mills in the Pennsylvania countryside in the late 1880s. This move had the dual advantage of tapping the cheap unskilled labor supply of women and children in the coal mining region and securing mill operations away from the seemingly constant labor unrest in Paterson. Eventually some weaving operations were also located in the Pennsylvania silk mills, but only for low grade fabric, until after the 1913 silk strike. By 1900, Paterson silk manufacturers had 22 branch mills in the Pennsylvania countryside. Dyeing and ribbon weaving remained in Paterson. Broad silk weaving became equally distributed between town and country (Dodyk 1979:17, 26; Sione 1992:119-120).

The newly emergent Industrial Workers of the World (IWW) was radically different from the AFL and local craft unions. They made their first appearance in Paterson in 1905. Their main goal was ambitious and truly revolutionary – the organization of all the world's workers into one big union. Nicknamed the "wobblies," they viewed strikes as class warfare and as a means of fomenting the revolution they sought. The IWW attempted to organize in Paterson but until the 1913 strike, few silk workers, male or female, were attracted to the cause (Dodyk 1979:31).

E. THE SILK STRIKE OF 1913

In the period between 1901 and 1913 Progressive Era legislators courting the labor vote gave New Jersey workers increased control over wages, hours and working conditions. Paterson's textile unions added thousands of workers into their organizations. Union locals were able to negotiate city-wide wage and price agreements with the large mills and improve working conditions in the smaller shops. Child labor laws were passed limiting children to eight-hour work days and eliminating work on Sundays (Herochik 1986:26-30).

In 1913 Paterson's organized labor, with the help of the IWW, carefully planned a strike, confident in their strong position. Pro-labor legislation had been newly enacted, they had successfully negotiated for high wage scales for both skilled and unskilled workers, and their union membership was growing (Herochik 1986:148-

149). On January 27, 1913, 800 weavers at Henry Doherty's silk mill went out on strike to protest the firing of their negotiating committee (Dodyk 1979:44-45). A silk strike was called for February 24, 1913, a strategic time of year leading up to production of the important spring fashion season. The main grievance that precipitated the strike was the imposition of a four-loom work assignment for broad silk weavers who usually worked two looms simultaneously. Silk manufacturers had introduced the four-loom system into their Pennsylvania factories in 1905, but Paterson weavers had resisted the change. Other branches of the silk industry followed the broad silk weavers and issued their own set of demands. Ribbon weavers wanted to return to the one-loom system instead of two looms. Dye house workers wanted better pay. All the strikers wanted a reduction of the ten-hour day down to eight hours. The 1913 Silk Strike is noteworthy because of the unprecedented solidarity demonstrated by both labor and management (Golin 1985:74; Sione 1992:119-120).

By 1913 mill owners had succeeded in gaining enough local influence to control the police. In addition they hired private detectives to disperse strikers and protect strikebreakers. Strong-arm tactics by the police and the arrest of strike leaders caused even more workers to go out on strike. A rally held on March 12 drew 12,000 men, women and children (Plate 4.5). Strikers included all branches of the silk industry, from all ethnicities and skill levels. Soon the entire silk industry was at a standstill. Approximately 22,000 workers were affected (Dodyk 1979:49).

Helen Gurley Flynn, one of the IWW organizers, was put in charge of the women strikers. She publicized the women's working conditions that included poor sanitation, lack of heating, lack of compensation for serious injuries, and sexual harassment. While some skilled women earned good wages, many others were subjected to arbitrary fines that reduced take home pay. At one mill in Paterson, girls were required to sign a year's contract that allowed the owner to hold 50 percent of their pay until the end of the year, without interest. This amount was forfeited if they left his employment before the year was out (Dodyk 1979:64).

Paterson had about 300 silk companies, large and small. The only thing the owners could all agree upon was the absolute necessity of retaining complete control over their own businesses and keeping them free of unionists. Manufacturers thought they could solve the labor problem by separating their "impressionable" workers from the radical IWW leadership. They tried to incite patriotic fervor, hoping to get the American-born workers to separate from the foreign-born and the IWW (Golin 1985:85). They refused any attempts at collective bargaining and pressured strikers to negotiate individual shop settlements. Strikers became disillusioned with the IWW after a money-raising pageant held at Madison Square Garden failed to raise relief funds. After four months some employees started going back to work. The strike was officially called off on August 1. The strikers were unable to achieve any of their demands. The great advantage held by the manufacturers was their non-union plants in Pennsylvania (Dodyk 1979:50, 53-55; Golin 1985:73-74, 90).

F. AFTERMATH OF THE STRIKE

In the immediate aftermath of the 1913 strike, management reacted by cutting wages, laying off union leaders and accelerating the relocation of silk factories out of Paterson. The four-loom system was not introduced for another decade in an effort to prevent the weavers from striking (Herochik 1986:68-69). In 1916 business picked up due to wartime contracts. Silk remained Paterson's predominant industry. Silk workers won the nine-hour day in 1916 when they threatened a general strike. Patriotic nationalism followed by the Red Scare weakened the political influence of labor unions. Pro-labor legislation was declared unconstitutional and overturned. Wartime

Plate 4.5. Broad silk weavers, dyers' helpers, and ribbon weavers marched together during the Paterson Silk Strike of 1913. Source: American Labor Museum/Botto House National Landmark.

prosperity was brief. Layoffs and depression followed the armistice in 1918 (Dodyk 1979:88-89; Herochik 1986:41, 45-47; Goldberg 1989:107).

Strikes in January 1920 by ribbon weavers forced 1,500 silk jobbers to close their businesses. Manufacturers fired thousands of workers and cut the pay of the remaining employees. By the summer of 1922, Paterson had lost one-third of its mills to Pennsylvania and 40 percent of its silk workers were unemployed. Machine shops consolidated and followed the silk mills out of town (Herochik 1986:68). Manufacturers used anti-union sentiment stirred up by the Ku Klux Klan to blame unions for the depression in the silk and machine tool industries. The state's first major Klan branch was established in Paterson in 1920. Its first target was immigrant workers. Ethnic tensions grew between the city's skilled and unskilled work force. Labor unrest erupted in 1927 when Paterson silk manufacturers cut wages by 40 percent. Workers were out on strike for three months and returned in defeat (Herochik 1986:65-66, 74, 79).

G. ALLIED TEXTILE PRINTERS - THE 1970S

In the 1970s several hundred people were employed by Allied Textile Printers. The makeup department had 20 to 25 men who worked in two shifts. One of these men, Michael Anthony, was a talented photographer. Between 1972 and 1976, Anthony took about a hundred photographs of his work place and fellow workers (Plates 4.6-4.11). The men in the makeup department were responsible for locating and transferring raw material to the print shop. Allied Textile Printers did two types of printing. The first was a silk screen process carried out on a flat bed or large rollers. The Waverly Mill used a different, traditional printing process, using copper rollers over a hundred years old.

Allied Textile Printers was a union shop. Clear boundaries existed between management and labor. Front office and shop floor intersected at events such as retirement dinners, but not on a day-to-day basis. Co-workers socialized at work, complete with drinks, smokes and practical jokes. Men arrived in the locker room between 6:30 and 7:00 a.m. for the first shift. At 7:00 a.m. on the dot, they would proceed upstairs and clock in. An official 15-minute coffee break at 8:30 a.m. and a 20-minute lunch break at noon followed. If the boss was out of the building, lunch break would extend much longer. A lookout gave the men a warning. At exactly 2:50 p.m. the men went back to the locker room for an official 10-minute wash up. At 3:00 p.m. everyone lined up at the clock. If someone clocked out even one minute early, he was docked for a quarter hour of wages (Michael Anthony, personal communication, 2009).

Joseph Buenafuente, nicknamed "Puerto Rican Joe," because of his Spanish ancestry, was very hard working and believed in pushing to get the work assignment finished so that the crew could then relax until the end of their shift (Plate 4.6). He was still working a night job until recently at the age of 79. Joe was a "padman." He was responsible for coordinating and assembling the order of "greige goods" (rolls of raw fabric) in the Allied Textile Printers warehouse for transportation to the makeup department.

Nick Hrudny was the department "beamer" (Plate 4.7). He operated a beaming machine that clocked off yardage on the rolls of greige goods. Nick emigrated from Hungary in 1952. One of his favorite stories was how he avoided prison camp during World War II by telling the German invaders he was of German descent. Later when the Russians liberated Hungary, he became Hungarian/Russian. He perfected the art of "looking" for a specific lot of fabric that would be found just before the end of the shift.

Plate 4.6. Joe Buenafuente stabbing print tickets onto cartons of greige goods, *circa* 1974. Source: Michael Anthony/Circle M Studios © 2009.

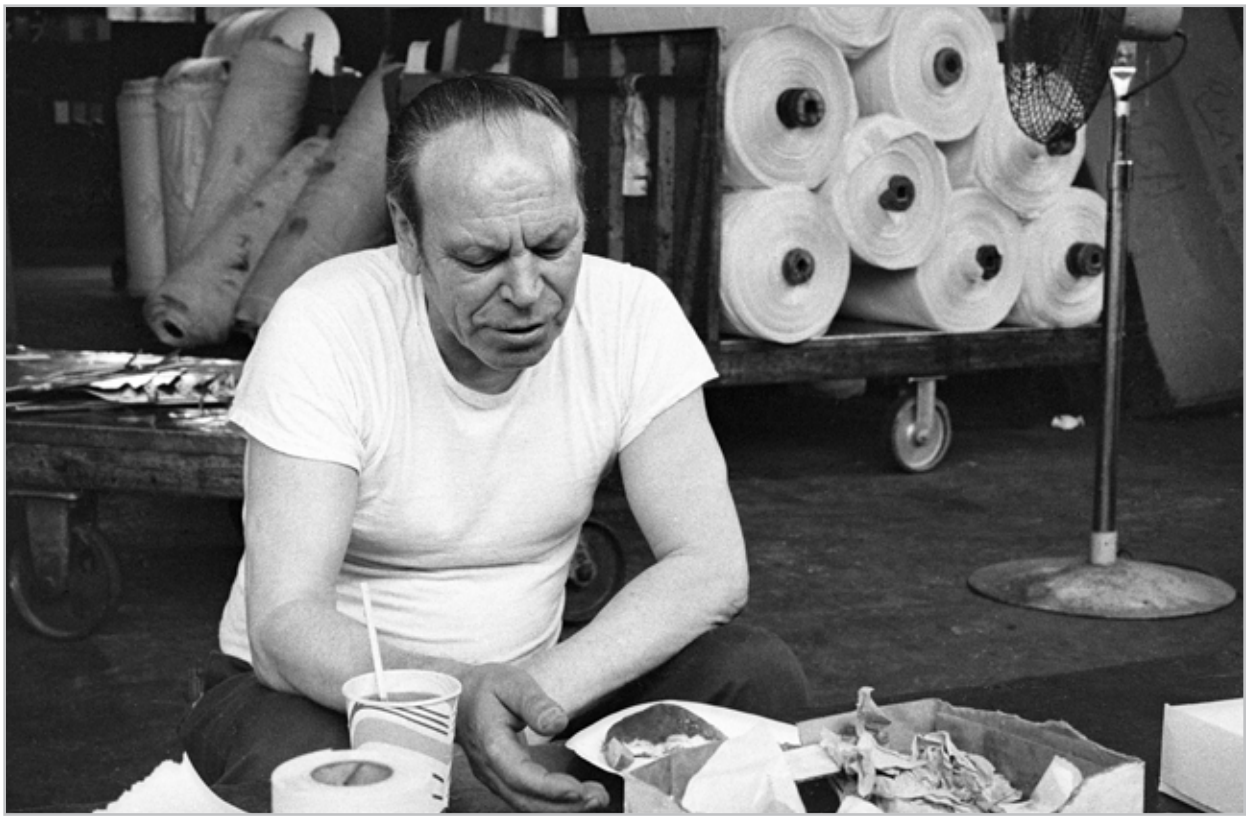


Plate 4.7. Nick Hrudny on dinner break in the makeup department, *circa* 1974. Source: Michael Anthony/ Circle M Studios © 2009.

Jimmy Carnevale was a "lugger" (Plate 4.8). He transported rolls of greige goods using a hand truck. He was the son of an Italian immigrant silk weaver in Paterson. By the age of 18 Jimmy was a dyers' helper. Locating Jimmy among all the cartons and rolls of fabric was easy – you just followed the aromas of a cigar and fresh brewed coffee.

George Haraka worked in the warehouse and was responsible for unloading cartons of raw material from incoming trucks, storing them on the multiple levels of the warehouse, and retrieving materials needed for the print shops (Plate 4.9). George was a first-generation Syrian-American. Members of the Haraka family are listed in the 1920 and 1930 census as silk weavers in Paterson. When the warehouse crew was not getting along with the makeup department, cartons would be buried in hard-to-find places or placed upside down with the identification numbers on the bottom. When things were good, the warehouse team would practically load the elevator.

Michael Anthony captured his co-workers candidly – working, taking a break, telling a story, smoking, clowning around, eating, napping (Plates 4.10 and 4.11). Some men had deep roots in Paterson's multi-ethnic work force. Others were immigrants themselves. They worked in old mill buildings with old machinery and used simple methods for handling material. Hand trucks were used to push material through the complex of buildings, including outside in the snow. These workers were part of the final chapter of Paterson's textile history. After Allied Textile Printers closed in the 1980s, some men found jobs at another dye house in Paterson. Others retired. Most have died, but photographs, the kind so rarely seen, have survived to tell the story of what it was like to be worker when the ATP site was still industrial.

Plate 4.8. Jimmy Carnevale hoisting a roll of greige goods in the makeup department, *circa* 1974. Source: Michael Anthony/Circle M Studios © 2009.

Plate 4.9. George Haraka looking out the warehouse window, *circa* 1974. Source: Michael Anthony/Circle M Studios © 2009.

Plate 4.10. Angelo Mendillo lugging a roll of greige goods past print tickets, *circa* 1974. Source: Michael Anthony/Circle M Studios © 2009.

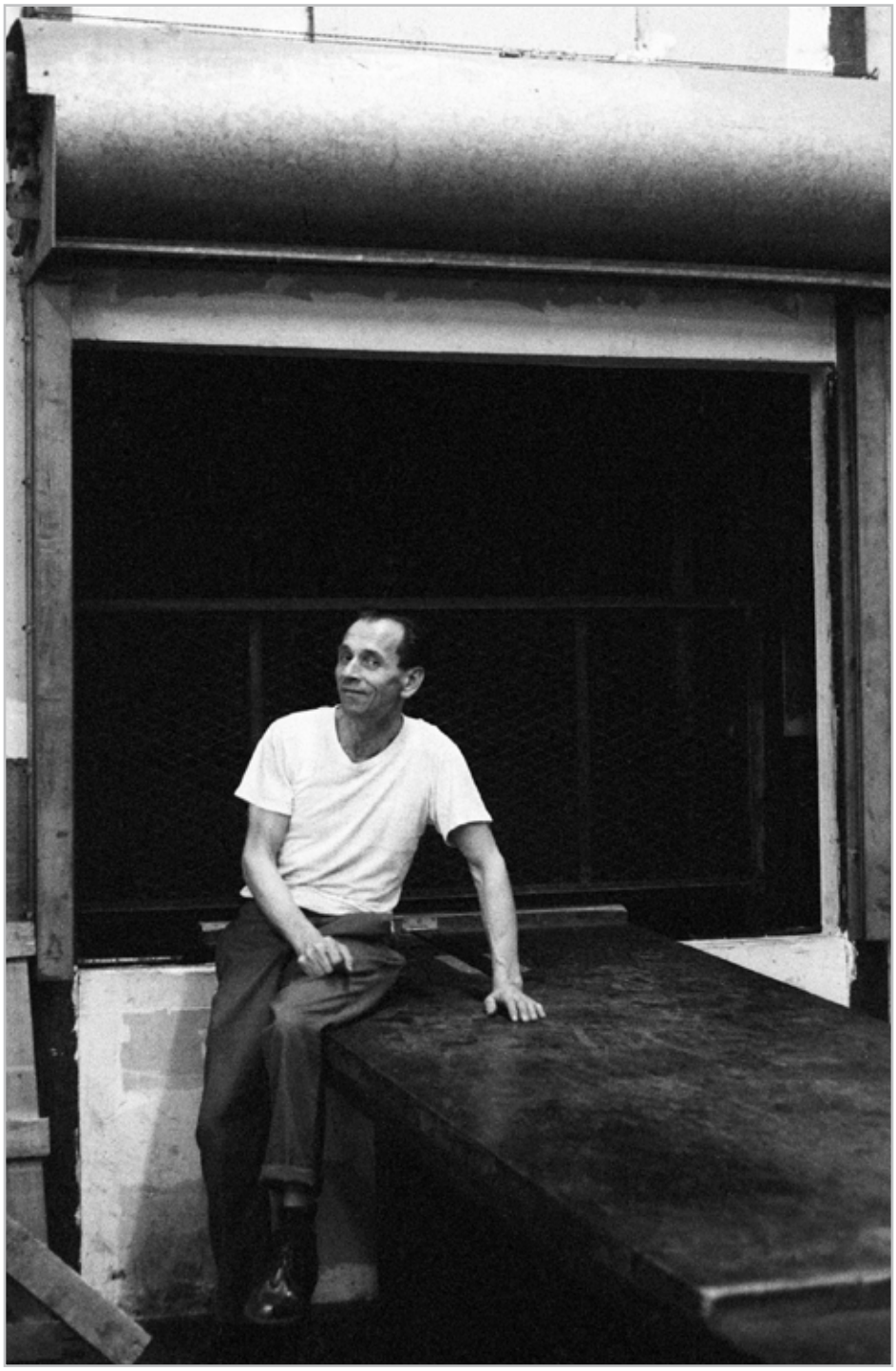


Plate 4.11. Pete Moscisko taking a break on the power-lift ramp that doubled as a dinner table, *circa* 1974. Source: Michael Anthony/Circle M Studios © 2009.

Part II

SITE HISTORIES

Chapter 5

WATER, STEAM AND ELECTRICITY: POWERING THE MACHINES OF INDUSTRY

Mechanical power has been known since ancient times but its widespread use was associated with industrialization, which had its beginnings in Great Britain in the mid-18th century and transference to the United States starting in the late 18th century. Industrialization concentrated production of all manner of goods in mills that employed machinery in place of manual skills and labor. The central role of mechanical power was recognized by contemporary American observers who desired to spread the British model of industrial progress to the United States. Secretary of the Treasury Alexander Hamilton was the leading national spokesman for this movement. Critics of industrialization, led by Thomas Jefferson, expressed concern that it did not release mill owners from the "expense of maintaining the laborer" as Hamilton optimistically put it. Instead, they opined, among other things, that the "dark and satanic" mills would create a working class of low-skill wage laborers who spent weary days tending the machines. Hamiltonians saw industrialization as contributing to the new nation's economic independence, while the Jeffersonians saw it as a threat to its democratic ideals of equality. Over the course of the next century, as industrialization took hold in places like Paterson, this fundamental tension played itself out in a myriad of ways from the conflict that grew between the industrial north and the plantation south to the long struggles of factory workers to organize and improve their working conditions. It goes without saying that historians have understood this technological change as one that transformed the nation (Hunter 1979:ix; Hindle and Lubar 1988).

At the core of the nation's early industrialization was the technology of waterpower. Concentrated, large-scale waterpower development was a defining characteristic of American industrialization in the first half of the 19th century when a score of industrial cities, following in the pattern of Paterson, grew at major drops on rivers, mostly located in the Northeastern United States. The Paterson Great Falls National Historic Landmark District represents a remarkably important instance of waterpower's application due to its age, scale and association with leading political figures and industrialists (Gordon and Malone 1994:87-105).

The first mills built on the ATP site in the early 1810s were powered by water delivered by the remarkable system of canals of the Society for Establishing Useful Manufactures (S.U.M.). Indeed, it was the tremendous potential energy of the Great Falls that attracted Hamilton and the other founders of the S.U.M. to Paterson. It was the first location in the United States where investors organized a corporation to deliver water to multiple factory sites. The necessary physical infrastructure of dams, canals and races, gates, flumes, spillways, wheel pits and waterwheels dictated a particular style of industrial development and use of space. This infrastructure is the glue that unites the Great Falls industrial district.

The landscape of waterpower remains evident in the layout of the ATP site despite its current state of ruin. The Lower Raceway, the third level of the S.U.M.'s power canal, demarcates the study area's southern boundary. Mills, lined up in a row along the raceway, once received water at the elevation of the race and dropped it approximately 22 feet through their now buried wheel pits. In the wheel pits, waterwheels and turbines transformed the energy in the falling water into rotary motion and transferred that motion through gears, shafts and belts to machines within the

mills. Tail races allowed the spent water to return to the Passaic River, which demarcates the study area's northern boundary. Much is known about the general plan of the waterpower system; less is known about the details of the technology employed, from the types and sizes of the waterwheels to the methods used to regulate water usage. No detailed original plans or drawings of these early waterpower features are known to exist. Archaeological investigations may yet reveal important features.

The five original waterpowered mills on the ATP site – the Gun, Mallory, Waverly, Passaic (Duck) and Todd (Home) mills – followed a complex path of technological evolution over the course of 130 to 170 years of operation. The mills were repeatedly re-tooled, modified, divided and expanded, and in some instances largely reconstructed, as owners and managers adapted to changing markets, opportunities to enhance productivity and lower unit costs, and openings for higher profitability through changes in division of labor and technology. Each mill's story of industrialization encompassed episodes of prosperity, cyclical economic downturn and return to growth, and eventual decline. Only in the latter stages of development was the site managed as a single unit by Allied Textile Printers. Prior to the mid-20th century, each mill lot had its own distinct history of use based on ownership, operations and processes, mostly related to textiles and machine tools. Many industrial processes took place on the ATP site over the years; the technology and economy of textile dyeing and printing differed in important respects from that of throwing silk, weaving cotton, or building machines, yet a constant throughout the site's history was the use of industrial power, first in the form of waterpower, transitioning to steam-power operations in the mid-19th century and to electric power in the early 20th century. Industrialists were constantly adjusting and balancing their power needs.

Waterpower was supreme through the middle decades of the 19th century but it was challenged and eventually surpassed by steam power. Steam from coal released industry from the geographic limitations of waterpower and led to the expansion of factories into previously undeveloped areas. Significantly, steam contributed to the rapid growth of urban industrial districts removed from the old sources of waterpower, but this new competition did not lead to the immediate decline of older waterpowered mills, like those on the ATP site. Steam created opportunities for mills to expand beyond utilization of waterpower that was approaching its limit. In the 1850s, for instance, John Ryle, the owner of the Gun Mill and a founder of Paterson's silk industry, supplemented the Colt's waterwheel with a steam engine (U.S. Census Office 1860). Water and steam power comfortably co-existed in the Gun Mill for the next half century. Most mills in the Great Falls district adopted steam power prompted by the falling cost of steam operations and the need to outgrow the available capacity of fixed water allotments from the S.U.M.. By the 1880s steam engines had surpassed waterwheels as the prime movers in the district, although the proportion of steam to waterpower varied greatly from mill to mill.

Electric power brought on the abandonment of power systems that relied on the direct drive of machinery by water and steam. Electric power became available in the mid-1880s when some mills installed electric lighting, but it did not become a viable option for powering all of the machinery in the mills for several more decades. By the late 1910s, spurred by the S.U.M.'s construction of a central hydroelectric plant at the base of the Great Falls, electric motors entirely replaced the remaining waterwheels and steam engines. Motor-drive systems offered mill operators the flexibility of delivering power anywhere by the installation of wiring and circuitry and appropriately matching a machine's power needs to the size of a relatively compact motor. The older direct-drive systems had limitations because long lengths of shafting lost power to friction and were difficult to maintain. Electric power allowed for more flexible use of space, contributing to the ability of the Standard Silk Dyeing Company, a predecessor to ATP, to expand its physical plant into the old quarry and to in-fill between the

older mills. Electric power allowed landlords to rent space in the mills to smaller manufacturers without the complications of distributing power from a central power source. In 1945, for instance, the Todd Mill was occupied by no less than 17 tenants. Several of these tenants were small silk weaving companies using electric motors to power their looms (S.U.M. Papers 1945).

At the ATP site, water not only supplied power, but it was necessary to textile dyeing and printing operations (Plate 5.1). Dyers highly valued Passaic River water because of its low levels of dissolved calcium and iron, minerals that when present in high levels interfered with the quality of the finished fabric (Heusser 1927). Maintaining adequate supply of clean water was a major challenge for the dyers who sought out surplus water from the S.U.M.'s raceways, the river and a special water line, appropriately called the dyers pipe. Passaic water was a factor in keeping the dyeing sector of the silk industry active in Paterson while other sectors, such as throwing and weaving, were in precipitous decline. Just as important as a supply of abundant fresh water was the ability to flush wastewater away from the factories. For most of the ATP site's history, the factories dumped wastewater directly into the Passaic or the tail race systems that emptied into the river. After 1924, wastewater was pumped from the ATP site and into the city sewer due to a tightening of state law (S.U.M. Papers 1924a). Water was also important to fire sprinkler systems, installed in the mills beginning in the late 19th century. The 1880s to 1910s were a particularly turbulent period of water supply management at the Great Falls because of competition among users of it for waterpower, industrial processing and public water supply. The various users eventually reached technological and financial accommodations to meet their needs. Electrification was a key technological component to restoring balance to the water supply system because it allowed the S.U.M. to supply power more efficiently, freeing up water for other uses.

Steam, the hot vaporous form of water, was used for textile finishing processes from degumming raw silk to drying cloth. Prior to 1899, boiler houses were built to supply steam to the Knipscher & Maass Silk Dyeing Company (rear of the Gun Mill lot, later Standard Silk Dyeing) and the Patton Silk Dyeing Company (rear of the Waverly Mill lot) (Sanborn- Perris Map Company 1899). There were also boilers at various times in the Gun, Passaic, Mallory and Todd mills that provided steam for power, heat and various processes. In the mid-20th century the greatly expanded Standard Silk Dyeing boiler house became the ATP's central steam plant. From 1958 to 1979, the ATP's boilers supplied steam to about a dozen mills in the Great Falls district (Sargent 1979:3).

The history of the ATP site can be classified into periods based on the types of industrial power in use (Figure 5.1). Prior to the 1850s, waterpower was the primary source of power and the mechanical foundation upon which the site was built. From the 1850s to 1910s, waterpower co-existed with steam power in a hybrid arrangement, and from the 1920s on, electricity powered the site. Overlapping the ATP's story of industrial power is a story of using water and steam for purposes other than power. This story became prominent as the site was increasingly devoted to textile finishing processes in the late 19th and 20th centuries.

A. THE LANDSCAPE OF WATERPOWER

The S.U.M.'s waterpower system was built in phases over a period from 1792 to 1846 (Figures 5.2a-d). The Society's founders and their engineer Pierre L'Enfant had in mind a waterpower system of significant scale, but there were differences of opinion as to the plan and its technical details. In the first phase of development, financial and managerial difficulties severely limited construction and required scaling back before the evolving plan could be more than even partially executed. In 1796, as a result of this experiment, the S.U.M. was near bankruptcy and construction stopped. In the early 19th century, activities resumed

Table 5.1. Key to Figure 5.1.

WATERWHEELS

A	Passaic Water Company, circa 1874-85
B	Colt Gun Mill , circa 1836-1915 (preceded by Colt rolling mill circa 1811-13, location unidentified)
C	Passaic Mill , circa 1851-80s
D	Waverly Mill, circa 1853-80s
E	Todd Mill, circa 1813-1900s. Two overshot wheels, circa 1870-1900s.
F	Mallory Mill, circa 1870s (conjectural, it may have originally been a turbine)

TURBINES

A	Neuberger (Passaic), two turbines, circa 1880s-1915
B	Mallory, one turbine, circa 1880s-1915
C	Colt Gun Mill, one turbine, circa 1880s-1915

BOILERS

A	Quarry boiler, circa 1870s-90s (steam for rock crusher engine)
B	Boiler in room adjacent to North Gates Waste Way outlet, circa 1890s (probably provided steam for pump engines, see Pump A)
C	Boiler in small building off of weave house, circa 1890
D	Knipscher & Maass dye house boiler room, west section, circa 1890-1915. Evolves into the larger Standard boiler house, circa 1915-1980
E	Knipscher & Maass dye house boiler, east section, circa 1890-1915. Evolves into the larger Standard boiler house, circa 1915-1980
F	Kohlhaas Bros silk ribbon weavers boiler, circa 1880s
G	Colt Gun Mill boiler, circa 1860-1900
H	Colt Gun Mill boiler, relocation to building off east side of mill, circa 1900-1915
I	Bunting & Patton Silk dye house boiler, circa 1880-1950 (upgraded prior to 1915)
J	Mallory boiler house, north section, circa 1880-1900
K	Mallory boiler house, south section, circa 1880-1900
L	Mallory boiler house, upgrade and relocation, circa 1900-15
M	Waverly boiler house, circa 1890 (unverified boiler by location of chimney)
N	Regal boiler house, circa 1910-1980
O	Todd boiler house, north section, circa 1890-1900
P	Todd boiler house, south section, circa 1860-1900

PUMPS

A	Location of Knipscher & Maass dye house pumps, circa 1890-1912. Four pumps with capacity of 1.5 million gallons, circa 1904. Possible location of earlier pump of the Passaic Water Company, circa 1857-67. Location of this pump house documented as “Colt Gun Mill” but exact location on lot not verified.
B	Sewage pump at end of tail races, circa 1924-1980
C	Passaic Water Company pump, circa 1874-85

STEAM ENGINES

A	Quarry rock crusher engine, circa 1870s-90s
B	Pump house engine(s) circa 1890-1912. See Pump A note.
D	Todd Mill engines, circa 1850s-1900s. Five engines in use in 1883 (exact locations unknown)
E	Kohlhaas Bros silk ribbon weavers engine, circa 1880s
F	Waverly/Mallory mill engine(s), exact location unknown, circa 1890-1915

NB – Dates given are approximate based on best available evidence from maps, photos, and documentary sources.

Waterwheel
Turbine
Boiler
Pump
Steam Engine
Electric Transformer

Steam Line Mains
Water Supply Mains
Project Limit
Structure (circa 1975)
Street

See Table 3.1 for Key to Numbered Symbols
Locations are Approximate

RIVER
PASSAIC
North Gates Wasteway
Middle Raceway (circa 1800-1801)
Lower Raceway (circa 1807)
Lower Raceway (circa 1807)
Dam (circa 1857)
Dam (circa 1903)
Gatehouse
Gatehouse
VAN HOUTEN STREET
MILL STREET

0 50 100 200
Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Industrial Power on the Allied Textile Printers Site

1850 - 1975

Figure 5.1

Plate 5.1. The ATP site, looking northeast and downstream from the Great Falls, *circa* 1927, by which time the site was largely devoted to textile dyeing and printing. Note the numerous roof-top water tanks. The tanks in the top right corner were installed *circa* 1908 to supply fire sprinkler systems in the Mallory and Waverly Mills. The smokestack with the SSD initials marks the location of the "Standard" boiler house. Source: Heusser 1927.

and the S.U.M. took on the role of waterpower and real estate developer. Generally speaking, the S.U.M. left manufacturing to those who purchased or rented land from it, although the Colt family that came to control the S.U.M. also invested in some of the mills. This important formative period in the S.U.M.'s history has been the subject of several historical studies based on original S.U.M. manuscripts and published sources from the 19th century and is covered elsewhere in this report (Herz 1939; Historic American Engineering Record 1974b; Fries 1975).

The S.U.M.'s first water-powered mill, which began operations in 1793, was located about 500 feet south of the ATP site near the intersection of today's McBride Avenue and Mill Street (Figures 2.2 and 5.2a) (Historic American Engineering Record 1974b:46). Expansion of the waterpower system to serve other mills was slow until an economic boom was spurred by an embargo against British manufactured textiles associated with events leading up to the War of 1812. By this time the S.U.M. had two levels of canal, and by the mid-1830s three levels of canal were powering numerous mills (Figures 5.2b and 5.2c). Significantly, the mill lots that comprised the ATP site were connected to the waterpower system during an early phase of expansion prior to 1808.

1. The S.U.M.'s Middle and Lower Raceways, 1800-1807

The arteries of the S.U.M.'s waterpower system are the three canals known as the Upper, Middle and Lower Raceways. The Middle Raceway, the oldest of the canals from the mid-1790s, was extended from the S.U.M.'s mill to the northern edge of the ATP site in 1800-01 (Figure 5.2b). The immediate purpose of the Middle Raceway's northern leg was to supply the Yellow Mill (1803), later expanded and known as the Essex Mill (1873), an extant mill that abuts the ATP site on its northern boundary. The Middle Raceway eventually also served the Colt Gun Mill (*circa* 1836), and perhaps before that a rolling mill (*circa* 1811-13), via a flume that branched from its east side (Plates 5.2 and 5.3).

The Middle Raceway terminated in a waste weir (spillway), known as the North Gates Waste Way, at the northeastern tip of the rock outcropping called Mount Morris (located west of the Gun Mill). Mount Morris was subsequently carved away by years of quarrying making it less than obvious today how the Middle Raceway actually followed a line of elevation around the outcropping's base. The purpose of the waste weir was to establish the maximum level of water in the Middle Raceway and return excess water to the Passaic River. The original 1800-01 location of this weir has been confirmed by deeds to have flowed across the Gun Mill lot in line with the Middle Raceway and was relocated to the west when the Gun Mill was built *circa* 1836, accounting for the bend in the course of the wasteway shown in later maps (Essex County Transcribed Deed D/27). Later photographs show the spillway at the top of the weir as a timber flume with gatehouse (Plate 5.4). The North Gates Waste Way remained in use until *circa* 1916-17 when it was abandoned and filled following the abandonment of the raceway for waterpower.

In 1807 the S.U.M. built the Lower Raceway parallel to Van Houten Street along the southern boundary of the ATP site (Plate 5.5) (Historic American Engineering Record 1974b:49). The Lower Raceway was fed from the tail races of the mills on the Middle Raceway, and from an approximately 22-foot-high spillway located between the Essex Mill and the Gun Mill. This spillway is extant and discharges water from the Middle Raceway to the Lower Raceway (Plates 5.6 and 5.7). The S.U.M.'s purpose in building the Lower Raceway was to open to development a series of mill lots between the raceway and the Passaic River as far east as Prospect Street. The lots eventually became the sites of the Mallory, Waverly, Passaic and Todd mills, and others located to the east of the Todd Mill. The lots were laid out in long rectangles with their short ends on the Lower Raceway and the

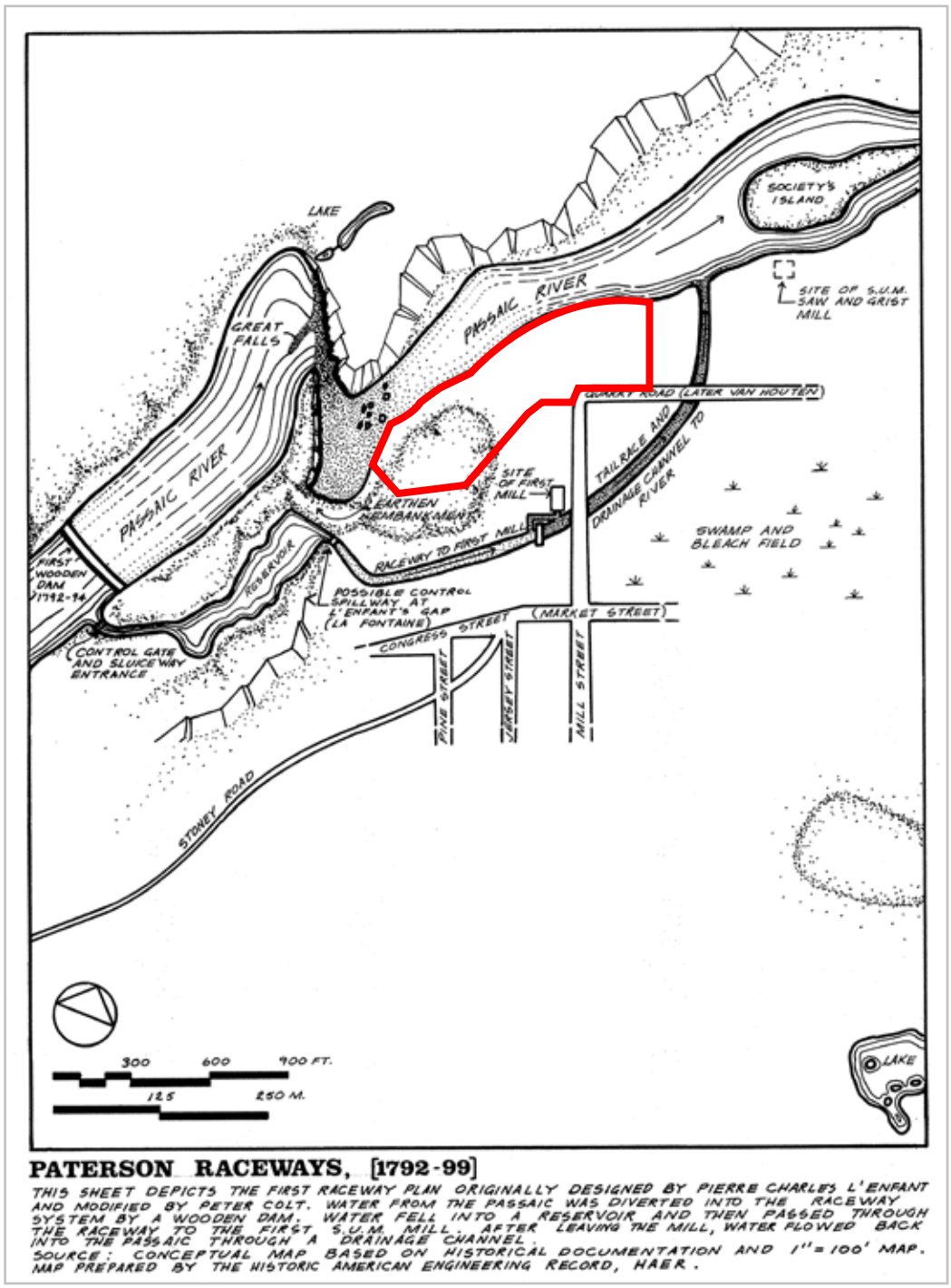


Figure 5.2a. Evolution of the S.U.M. Power Canal System. Source: National Park Service, Historic American Engineering Record, HAER NJ-2, 1974.

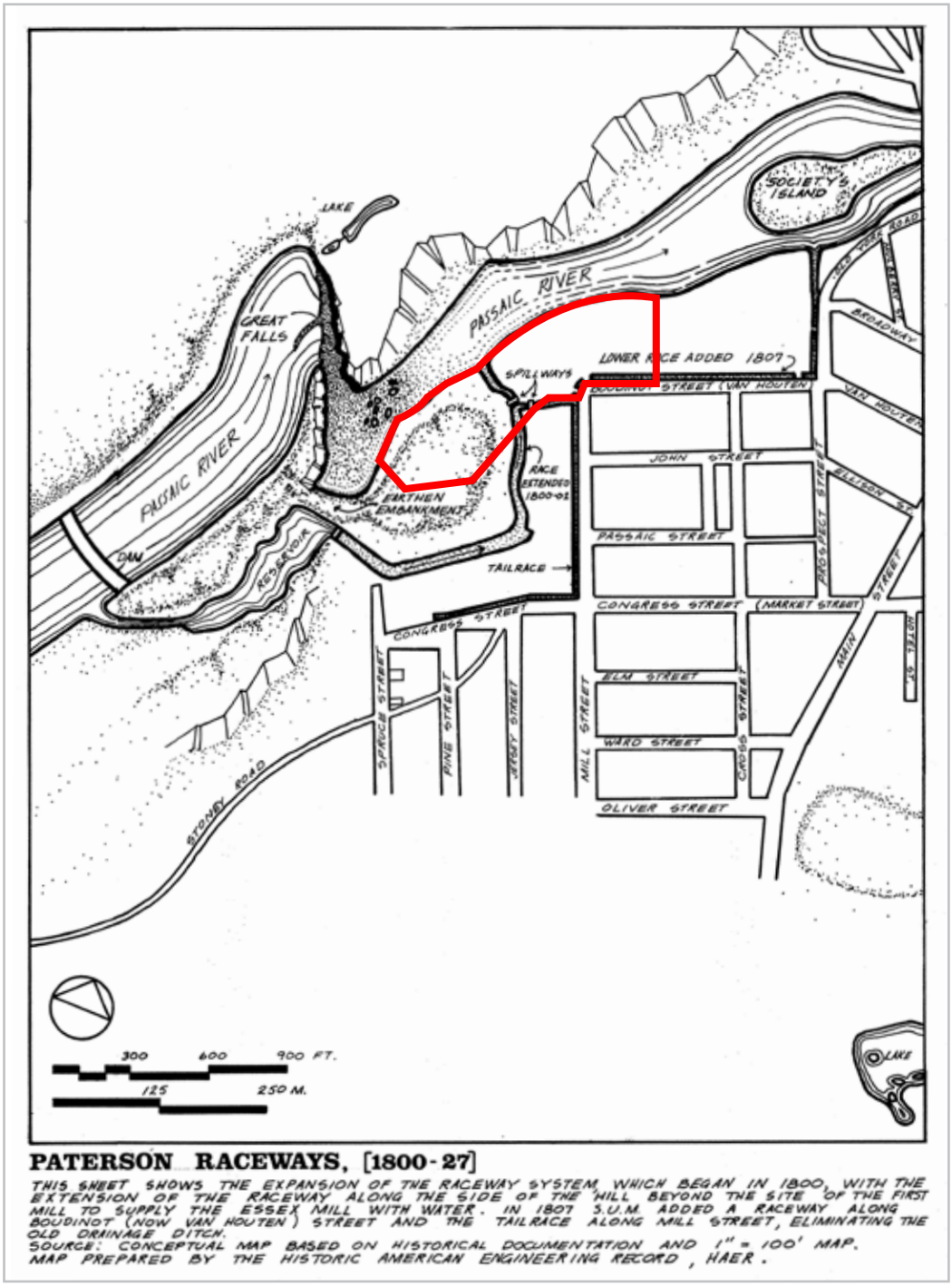


Figure 5.2b. Evolution of the S.U.M. Power Canal System. Source: National Park Service, Historic American Engineering Record, HAER NJ-2, 1974.

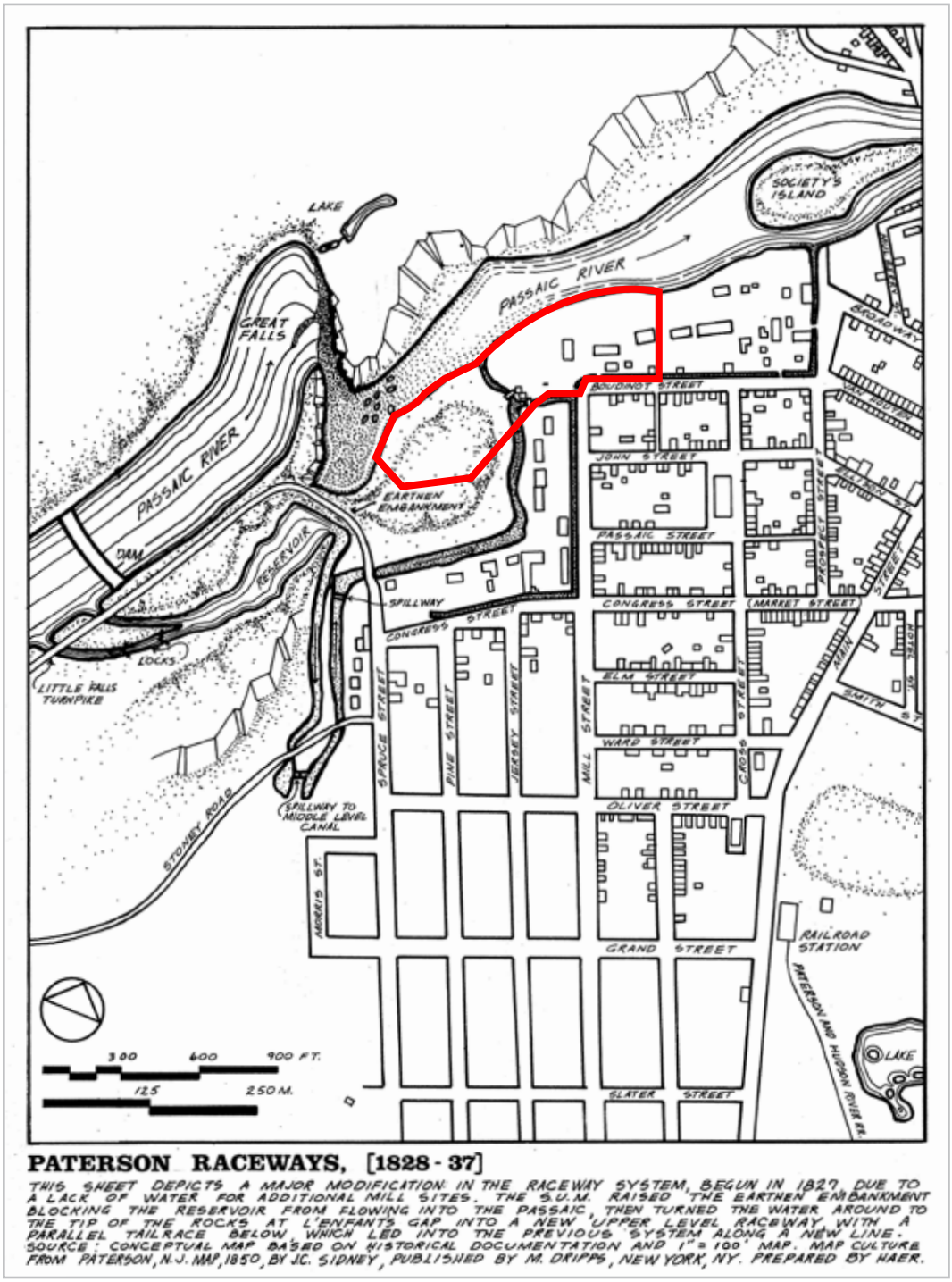
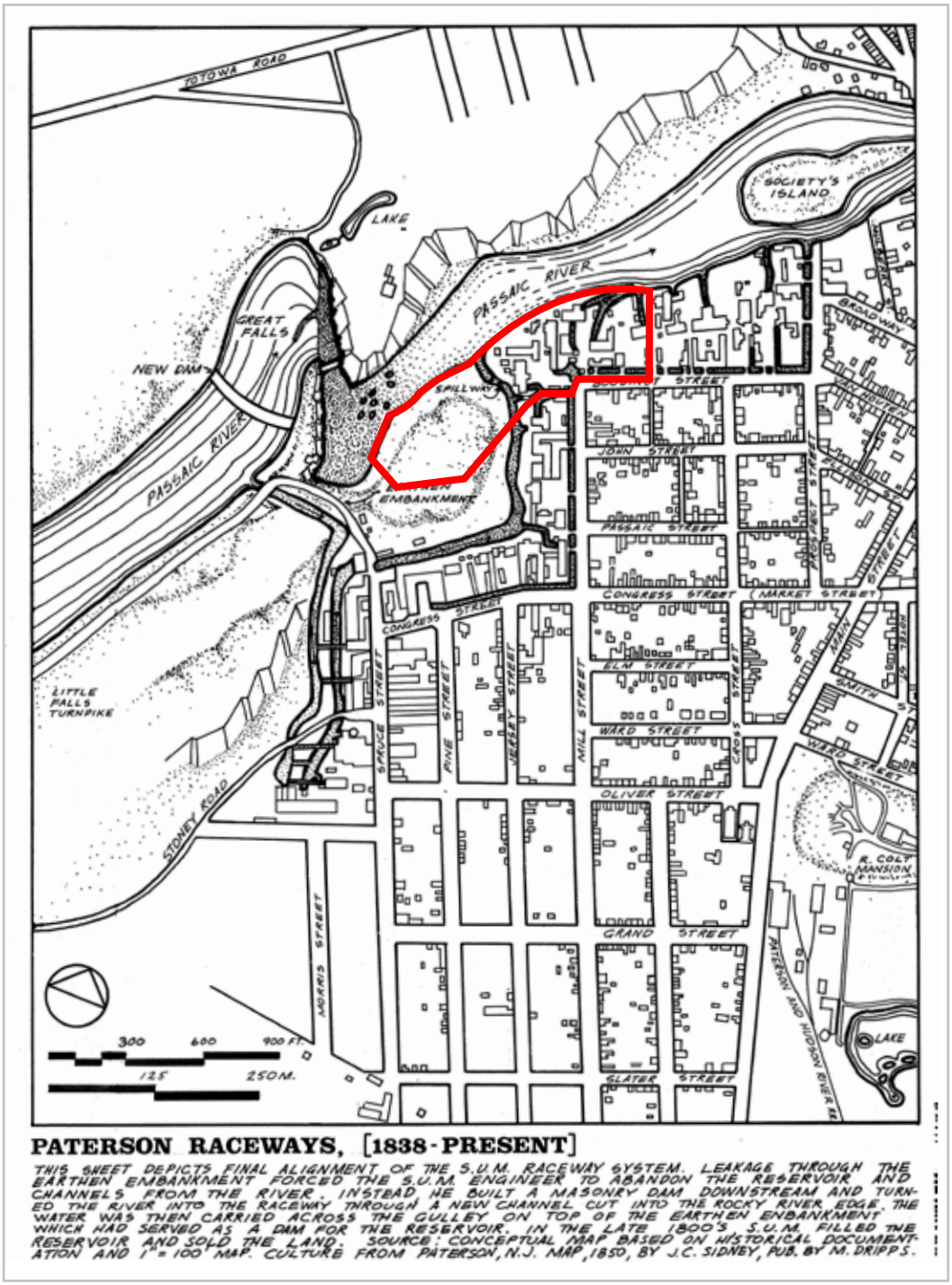


Figure 5.2c. Evolution of the S.U.M. Power Canal System. Source: National Park Service, Historic American Engineering Record, HAER NJ-2, 1974.



PATERSON RACEWAYS, [1838-PRESENT]

THIS SHEET DEPICTS FINAL ALIGNMENT OF THE S.U.M. RACEWAY SYSTEM. LEAKAGE THROUGH THE EARTHEN EMBANKMENT FORCED THE S.U.M. ENGINEER TO ABANDON THE RESERVOIR AND CHANNELS FROM THE RIVER. INSTEAD, HE BUILT A MASONRY DAM DOWNSTREAM AND TURNED THE RIVER INTO THE RACEWAY THROUGH A NEW CHANNEL CUT INTO THE ROCKY RIVER EDGE. THE WATER WAS THEN CARRIED ACROSS THE GULLEY ON TOP OF THE EARTHEN EMBANKMENT WHICH HAD SERVED AS A DAM FOR THE RESERVOIR. IN THE LATE 1800'S S.U.M. FILLED THE RESERVOIR AND SOLD THE LAND. SOURCE: CONCEPTUAL MAP BASED ON HISTORICAL DOCUMENTATION AND 1" = 100' MAP. CULTURE FROM PATERSON, N.J. MAP, 1850, BY J.C. SIDNEY, PUB. BY M. DRIPPS.

Figure 5.2d. Evolution of the S.U.M. Power Canal System. Source: National Park Service, Historic American Engineering Record, HAER NJ-2, 1974.

Plate 5.2. View of the Middle Raceway looking north toward the Gun Mill, *circa* 1927. Note the gatehouse (right). The S.U.M. steam pipe is also visible. It was installed *circa* 1916 to supply steam from the S.U.M. steam plant (at what is now Overlook Park) to the Mallory/Waverly mill complex. Source: Heusser 1927.

Plate 5.3. The spillway gate at the north end of the Middle Raceway, looking north, 1974. Note the steam lines in the background. These lines connected the Standard boiler house with other mills in the district. Source: Historic American Engineering Record, HAER NJ-2, 1974.

Plate 5.4. Undated early 20th-century view looking south showing detail of the North Gates Waste Way. This flume and gatehouse allowed the S.U.M. to release excess water from the Middle Raceway to the Passaic River. It was one of two control points at the north end of the Middle Raceway; the other fed the Lower Raceway (see Plate 3.3). Source: Paterson Historic Preservation Commission.

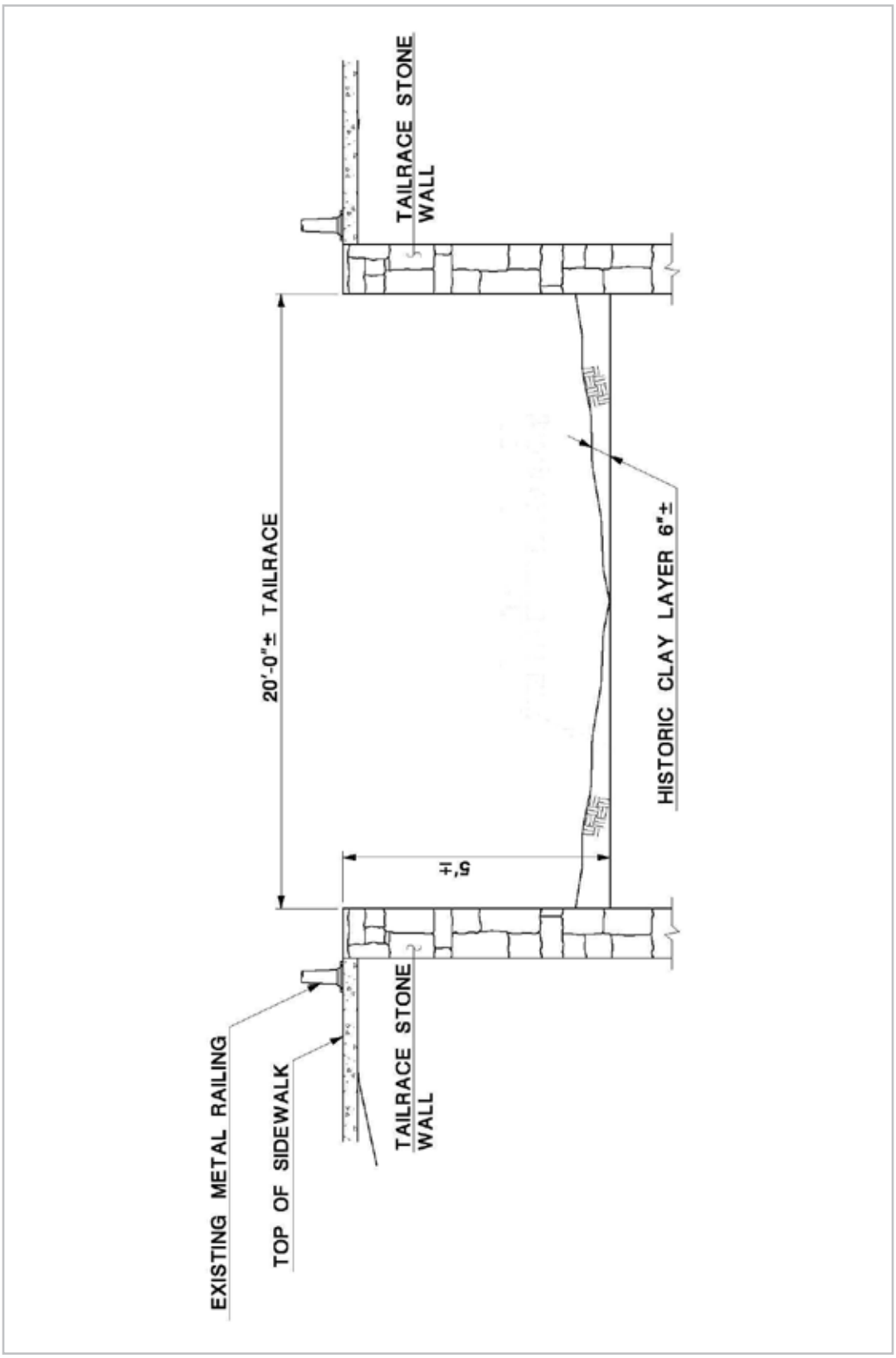


Figure 5.3. Typical Cross Section of the Middle Raceway, Vicinity of the Passaic Street Bridge. Note the layer of gray clay used as a liner to limit leakage. Source: TranSystems, December 2009.

Plate 5.5. The Lower Raceway, looking west, 1974. The headrace for the Todd Mill begins at the concrete gate structure in the foreground at right. Source: Historic American Engineering Record, HAER NJ-2, 1974.

Plate 5.6. The spillway gate at the north end of the Middle Raceway, located between the Essex Mill and the Gun Mill, view looking north northwest, 1974. In earlier times, there was a gatehouse located to the east of this gate. This was an important point for regulating the flow and height of water in the Middle and Lower Raceways. The S.U.M. attempted to keep a sounding (depth) of water of 3 feet in the raceways to meet its contractual obligations to supply water for power. Source: Historic American Engineering Record, HAER NJ-2, 1974.

Plate 5.7. View of the spillway between the Middle Raceway (far) and the Lower Raceway (near), looking west southwest, 1974. The top of the first fall appears to be the location of an earlier S.U.M gatehouse; the gate beyond was added later, probably after 1930. Source: Historic American Engineering Record, HAER NJ-2, 1974.

Passaic River; this maximized the number of lots and eventually created a spatial pattern of narrow, multi-story mills. The S.U.M. sold these lots and leased water to prospective industrialists, the first of whom was John Parke who purchased Lot No. 8 for his Phoenix Mill in November 1807 (Historic American Engineering Record 1973a:38).

The S.U.M.'s three raceways are man-made channels with a difference in elevation of approximately 22 feet between each level. The raceways have somewhat irregular, rectangular cross sections. The dimensions of the Middle Raceway, as measured at Passaic Street, are approximately 20 feet wide and 5 feet deep from the top of the retaining walls to the footings (Figure 5.3) (A.G. Lichtenstein 1997). During years of operation the sounding (depth of water) in the raceways was typically two to three feet (S.U.M. Minute Books, 12 February 1829; U.S. Census Office 1885:648).

Most of the raceway retaining walls are rubble masonry, although there are some sections of earthen embankment or rock outcropping. Concrete repairs, mostly dating to the first half of the 20th century, are evident, particularly in the area of gates and spillways, which required frequent maintenance. In 1911, for example, the S.U.M. constructed a concrete wall along the Lower Raceway at the Gun Mill tail race. The wall was built using 30 bags of cement and a load of crushed stone (S.U.M. Papers 1911a).

Modern investigations of both the Middle and Upper raceways have found that the bottoms were lined with approximately six inches of gray clay that serves as a water barrier to limit leakage. Damage and lack of maintenance has worn away the clay in some places. (A.G. Lichtenstein 1997; Lichtenstein Consulting Engineers 2006).

2. Mill Placement

The placement of mills to maximize use of water was one of the most important decisions that waterpower developers could make. Among the ATP site's most significant features are the building foundations (footprints), wheel pits, head races and tail races that define the placement of the original waterpowered mills (Figure 5.1). The S.U.M.'s records for the early 19th century are fragmentary and leave much to speculation. The Historic American Engineering Record's research, among the most comprehensive to date, suggests that the 1800-01 and 1807 expansion of the raceway system to the north of the S.U.M.'s original cotton mill was a fulfillment of the ideas of Pierre L'Enfant and Peter Colt, and a natural progression based on the topography (Historic American Engineering Record 1974b:49). This is a logical conclusion, yet no documentation directly confirms this speculation, and both L'Enfant and Colt had departed Paterson by 1796. A plan drawn up by L'Enfant and mentioned in S.U.M. minute books has been lost to history.

The ideal way to supply water to a large number of mills was to build a canal system that left the river above the falls and re-entered some distance downstream. Where topography made this distance short and the fall high, such as at a large natural drop in the river like the Great Falls, construction costs were lower per unit of power generated. By keeping the level of water in the canal close to that of the river above the falls, a large difference in height between the canal and river could be maintained. The land between the canal and river became a location on which a number of mills could be placed in a line. A multiple-level canal opened up a much larger area for manufacturing since mills on the upper levels could discharge water into the lower levels, where it could be used again before returning to the river. Due to the local topography of trap rock ridges at the Great Falls, the ideal was difficult to achieve at Paterson and required canals that twisted to follow levels of elevation. Significantly, the ATP site was the closest point

downstream of the Great Falls on the south side of the Passaic River that mills could be practically built that adjoined the river. The great drop in the river between the top of the falls and this point (about 66 feet) provided ample head for several levels of canal.

In the 1790s there was no precedent for this arrangement of mills and canals in the United States. Hydrology and fluid mechanics were in their infancy as sciences. American millwrights worked by tradition and rule-of-thumb, an accumulation of experience mostly associated with rural gristmills and sawmills. There was precedent for larger scale power systems in Great Britain, with the famed cotton mills of New Lanark, Scotland, perhaps the best known example. At New Lanark, the power canal paralleled the River Clyde with several mills built in a line between the river and canal. Prior to this time, tradition dictated the placement of a mill perpendicular to the river or the canal that powered it, a placement that worked well for one mill but not for several mills sharing the same drop (Syson 1980:55). Curiously, the orientation of the original S.U.M. cotton mill as shown in the well-known Historic American Engineering Record documentation appears to have followed the traditional pattern of a single mill with its wheel parallel to the river, not the innovative perpendicular orientation that would have been necessary to arrange several mills along the raceway (Figure 5.2a) (Historic American Engineering Record 1974b). If correct, this interpretation raises some questions as to what exactly the builders had in mind for later expansion.

The S.U.M. did not achieve a more optimal layout of its power canals until the construction of the Lower Raceway in 1807 (Figure 5.2b). Even though this occurred 16 years after the establishment of the S.U.M., it was still likely the earliest such arrangement in the United States providing space for at least a half dozen mills lined up and sharing water from the same raceway. It predated by nearly a decade the two brick mills at Waltham, Massachusetts, constructed by the Boston Manufacturing Company in the mid-1810s. The Waltham mills have been cited as the model for Lowell (Malone 2009:4-5). By comparison, Paterson reportedly had a remarkable 11 cotton mills in 1814, although few of the enterprises were able to survive the economic flood of cheap British textiles that entered the country in 1815 (Scientific American 1859:298; Trumbull 1882:43-51). Two of these early mills, the Colt rolling mill and the Home cotton mill, are known to have been on the ATP site. By 1824 the textile trade had revived and 12 mills were in operation. By 1832 the number had grown to an impressive 21 mills (Gish 1992:24).

Prior to 1814 Samuel Colt, John Colt and Nicholas Delaplaine established a rolling mill, nail and wire factory on the future Gun Mill site (Susan Maxman Architects 1996:D64). (Various sources list a date of construction of 1811, 1812 or 1813.) Located at the juncture of the Middle and Lower Raceways, adjacent to the spillway and the waste weir, this mill may have been oriented with its tail race perpendicular to the Passaic River or to the Lower Raceway. When the Colt Gun Mill was built to replace the nail factory in 1836, its tail race discharged into the Lower Raceway, and there is some evidence from Freeman's map of 1835 that the Colt Gun Mill followed the pattern of the earlier rolling mill. Due to its association with an industry (nail manufacturing) that in the early 19th century was transitioning from manual to mechanical production, the rolling mill and its waterpower system is of more than passing interest; unfortunately, documentation is scarce (Susan Maxman Architects 1996:D66).

The Home Mill was a cotton mill on the site of the future Todd Mill at the east end of the ATP site. In 1813 the S.U.M. sold the mill lot to Roswell Colt, a chief stockholder in the S.U.M., who then sold it to David Parish. Several months later, Parish sold it to Daniel Holsman at considerable profit, likely indicating that Parish had built a mill. The Home Mill followed a more predictable waterpower layout than the Colt rolling mill since it had no choice but to take water from the Lower Raceway and discharge it into the Passaic River. Later evolution of the Todd Mill

site, however, has made it difficult to precisely site the mill. In 1829 and 1850 the Home Mill was enlarged, and in the 1870s reportedly "reconstructed" resulting in the L-shaped building that was known as the Todd Mill. In 1890, there was a fire that reportedly caused another major rebuilding episode (*New York Times* 1890). In 1850 machine builders Todd & Mackey reported sufficient waterpower to drive 20 lathes and machine tools (U.S. Census Office 1850). The Todd Mill's principal facade sat at a slight angle to the Lower Raceway (not parallel), suggesting that it and its predecessor Home Mill may have taken advantage of a natural rock shelf that underlies the site and is closer to the river at the east end of the site. Orienting the mill to this shelf may have limited the amount of excavation required to build the wheel pit and the tail race (Historic American Engineering Record 1974a; Susan Maxman Architects 1996:D103).

3. Head and Tail Races

Head and tail races are very telling indicators of mill placement. They lead, usually in a fairly direct line, to the rooms and pits that housed the wheels. The purpose of a head race was to carry water from the S.U.M.'s power canal to the mill with a minimal loss of fall. The tail race, as the name implies, carried water discharged from the wheel, with energy largely spent, back to the river. Each mill had at least one head and tail race and perhaps multiple races if there was more than one wheel or a change in wheel location. Changes in the race system are often indications of the evolution and improvement of waterpower technology, such as the substitution of metal pipes, called penstocks, to deliver water to a turbine that has replaced a less efficient waterwheel. Today, the ATP site's head and tail race system is evident only in the gate openings located on the north side of the Lower Raceway's walls and in the tail race openings located along the river. Much of the system survives buried *in situ* since, except for the Gun Mill, all of the mills received water at the level of the Lower Raceway. The Gun Mill's head race was in the form of a timber flume located off of the Middle Raceway.

Prior archaeological investigations of the Todd Mill yard by Edward S. Rutsch and Historic Conservation and Interpretation, Inc. have provided cross sections of that mill's races. Two head races were identified: an eastern race angling toward the Todd Mill from the Congdon Mill lot and a central race leading at a right angle to the mill from the Lower Raceway. The eastern race was unexpected because it does not show on maps, a caution that the ATP site's waterpower system may have secrets yet to reveal. It was not conclusive whether the eastern head race supplied the Todd Mill or was an older race, perhaps associated with the Home Mill. It is also possible that the Todd Mill supplemented its water supply with water leased from the adjacent Congdon Mill. The race, now filled, consisted of two rubble masonry sidewalls with a cross section of approximately four feet wide by four feet deep. The bottom of the race had a layer of iron slag topped by a layer of gray clay (Figure 5.4) (Historic Conservation and Interpretation, Inc. 1997d).

The Todd Mill's central head race is a cement channel with one-foot-thick side and bottom walls. The cross section of the waterway opening measures 3.9 feet wide by 4.1 feet deep (Figure 5.5). The central head race is at a right angle to the Todd Mill but this mill was set at an angle to the Lower Raceway and thus does not intersect the Lower Raceway at a 90-degree angle. Rutsch estimated that the head race was 135 feet long from the Lower Raceway to the wheel pit, and that the corresponding tail race was 145 feet long from the wheel pit to the river. The location of the wheel was not observed due to the collapsed state of the mill (Historic Conservation and Interpretation, Inc. 1997d).

The Todd Mill has two tail races that are arched culverts. The eastern tail race is rough undressed brownstone with a width of 4 feet and a height at

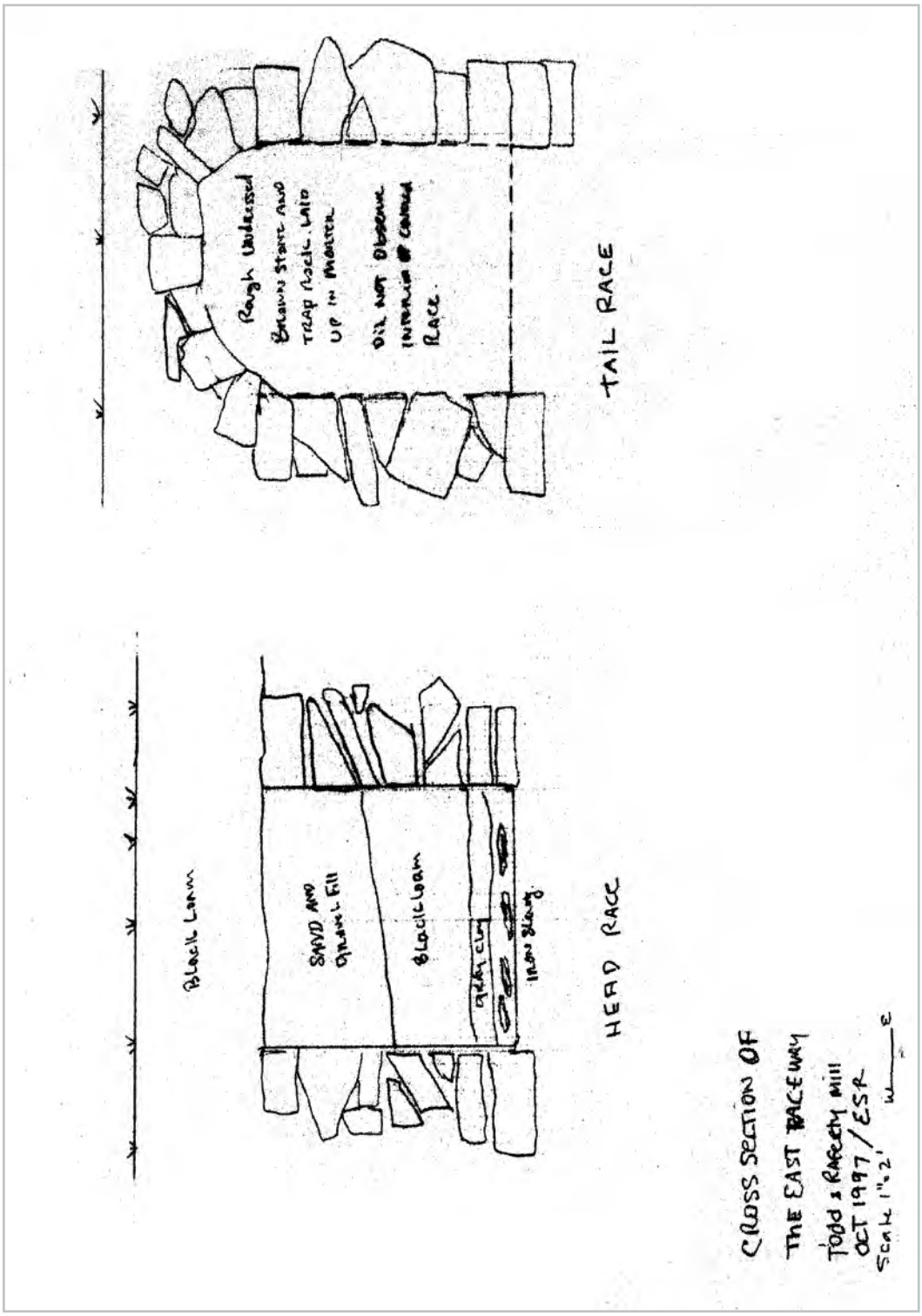


Figure 5.4. Cross Section of the "East" Head and Tail Race at the Todd Mill. Source: Edward S. Rutsch 1997.

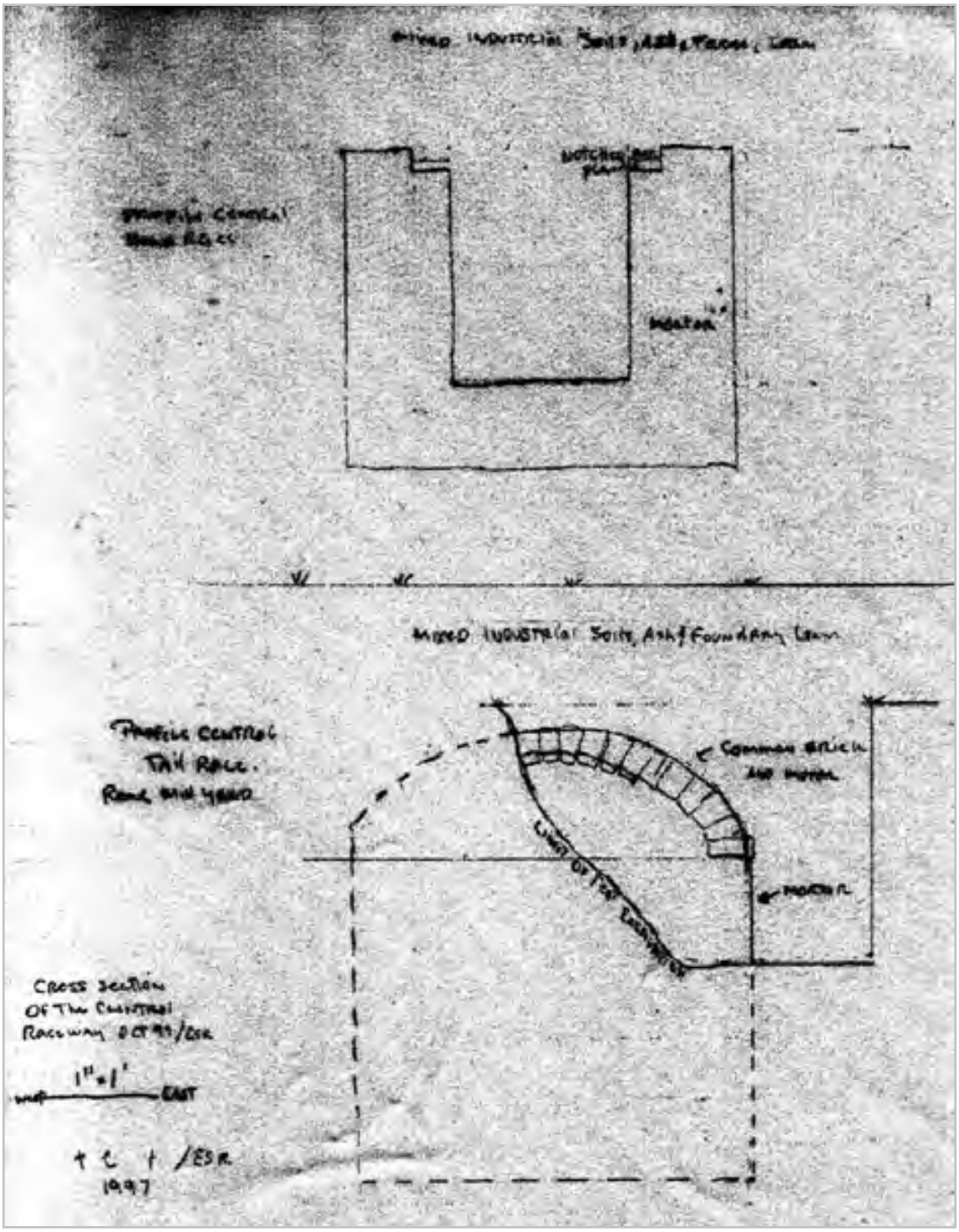


Figure 5.5. Cross Section of the "Central" Head and Tail Race at the Todd Mill. Note the arch culvert design used for the tail race suitable to support fill or a building over the race. Source: Edward S. Rutsch 1997.

the crown of approximately 5 feet (Figure 5.4). The central tail race is a brick arch with a width of approximately 3 feet (Figure 5.5) (Historic Conservation and Interpretation, Inc. 1997d). The arched construction of the tail races is an indication that they were built to support the load of fill and buildings above them, but they may have originally been open channels.

The head races of the adjacent Mallory and Waverly mills reflect those mills' later mid-19th-century history of construction. The Mallory and Waverly mills were built on a lot subdivided from the Gun Mill lot in 1853 and the Mallory Mill was rebuilt in the 1870s as an expansion of the Waverly's textile printing business. The head races were located off of a forebay (now filled) that was excavated west of the bend in the Lower Raceway at the west end of Van Houten Street. The shared history of these two mills was reflected by a flume or race located between the two mills shown in the 1887 Sanborn map. This crossover race apparently directed water from the Waverly's original head race to a wheelhouse then located between the Mallory and Waverly mills, but later incorporated into the footprint of the Mallory. It possibly indicates the abandonment or placement on standby of the Waverly Mill's original 1850s wheels for a more efficient turbine centrally located between the two mills (Sanborn Map and Publishing Company 1887).

The Mallory, Waverly and Passaic mills had a system of three tail races that converged into a single tail race. The single race was angled to the river with its opening located at the far northeast corner of the Passaic Mill lot. This arrangement clearly had the advantage of carrying water away from the mills to the furthest downstream point at an angle closely parallel to the flow of the river. This would have allowed the mills to place their waterwheels at the lowest possible point, thus gaining head (and potential power), as well as limiting backwater that interfered with the efficiency of the wheels.

4. Waterwheels

The waterwheel was the hydraulic prime mover, and thus the heart, of any waterpower system. In basic form a waterwheel was a circular structure around the circumference of which was arranged paddles or buckets (sometimes called floats) at regular intervals. These captured a given volume of falling water, and thus a portion of the water's energy, as it fell from a higher to a lower level. The measured height through which the water fell was called the "head." The greater the head, the greater the potential energy of the water, and, theoretically, the power that could be produced.

Evidence of the types of wheels used at the ATP site and throughout the Great Falls district is of importance to understanding the evolution of waterpower technology in the United States. Prior to 1850, the design of a waterwheel was a craft that required the skills of an experienced millwright. The millwright selected the type and dimensions of a timber wheel based on the head, the volume of water available, and an estimate of the power required to operate the mill's machinery. Decisions were based on tradition, observation and, by modern standards, crude calculations. The more numerous the machines operated by the wheel, the greater the load and the more power required from the wheel. Establishing a system that could balance the available water supply, the design of the wheel and the operating needs of the mill was critical.

By the mid-19th century, waterwheel design was increasingly based on scientific evidence, theoretical and experimental, related to the subject of hydraulics and practiced by a small but increasingly influential number of professional engineers. This led to the transition toward ever more efficient designs, particularly iron waterwheels and turbines. In many instances, wood waterwheels were replaced by iron turbines to improve efficiency and horsepower available from a limited volume of water. Some industrial cities, like Lowell and Holyoke, Massachusetts, were

known as hotbeds of waterpower innovation. The S.U.M. never rose to the level of progressive scientific water management exhibited by Lowell's Proprietors of Locks and Canals, but the timing at which Paterson manufacturers chose to adopt improved waterwheel technology has not been systematically studied. The S.U.M. does not appear to have employed a full-time professional hydraulic engineer until the hiring of John M. Cook sometime after 1886.

In the early 19th century when the ATP's first mills were built, two types of wood waterwheels were in prevalent use – the overshot wheel and the breast wheel (Figure 5.6). The Todd Mill reportedly had two overshot wheels in operation as late as the 1880s, but the original wheel types used in the ATP's other mills have not been documented. Both overshot and breast wheel types were vertical wheels with horizontal shafts. They were efficient for heads of eight feet to a practical limit of about 30 feet, well within the average 22-foot head of the S.U.M.'s three-tier canal system.

The overshot wheel was an ancient design and the predominant type of bucket wheel favored by most traditional millwrights in the early 19th century. The water was directed over the top of the wheel to its downstream side, and after a short freefall filled the buckets causing the wheel to turn by the force of gravity. An overshot waterwheel could reach a level of efficiency of about 60 percent (that is extracting 60 percent of the potential energy inherent in the falling water). A wheel of 20-foot diameter, such as might have been found in one of the ATP's mills during the first half of the 19th century, usually produced from 20 to 30 hp, which may seem rather insignificant from a modern perspective, but in its day represented a powerful source of work, theoretically equivalent to 80 to 120 horses or 500 to 750 men working 24 hours per day (Hunter 1979:60-67; Reynolds 1983:172-184).

In the early 19th century, the overshot wheel gave way in some locations to a superior modification in design called the breast wheel. Breast wheels admitted water on the upstream side of the wheel, thus reversing the direction of the overshot wheel. A close-fitting timber apron or "breast" held the water in the wheel's buckets through almost its entire fall, unlike the overshot wheel which began to lose both water and efficiency in the lower quarter of its turn. Breast wheels apparently originated in England, where the apron was commonly masonry, but in America the apron was more commonly timber.

A very carefully built breast wheel could achieve an efficiency of about 75 percent, a considerable improvement over an overshot wheel. It also offered the important advantage of turning in the direction of the current, instead of against it. This was particularly relevant in circumstances where backwater, due to flooding, irregular flow in the races, or seasonal high water built up in the tail race and created additional friction against which a wheel would have to work. Backwater was most likely to impact mills on the ATP site when the Passaic was in flood. In addition, a breast wheel tended to provide more flexibility in adjustment of revolving speeds to work requirements and changes in water supply. Breast wheels were often referenced in period literature, such as Oliver Evans's famous treatise, *The Young Millwright and Miller's Guide* (1795), as the ideal form of wheel for powering larger mills. They were often associated with cotton mills and were, for example, the exclusive wheel type of choice in Lowell, Massachusetts, beginning in 1822. The breast wheel's level of use in the United States, however, has been questioned because they did require greater care and cost in construction. Evidence of an early breast wheel at the ATP site, or anywhere else in the Great Falls, would be significant because it would suggest adoption of progressive design and use of advanced waterwheel technology (It should be noted that contemporary observers sometimes classified breast wheels as a variation of the overshot despite the significant technological differ-

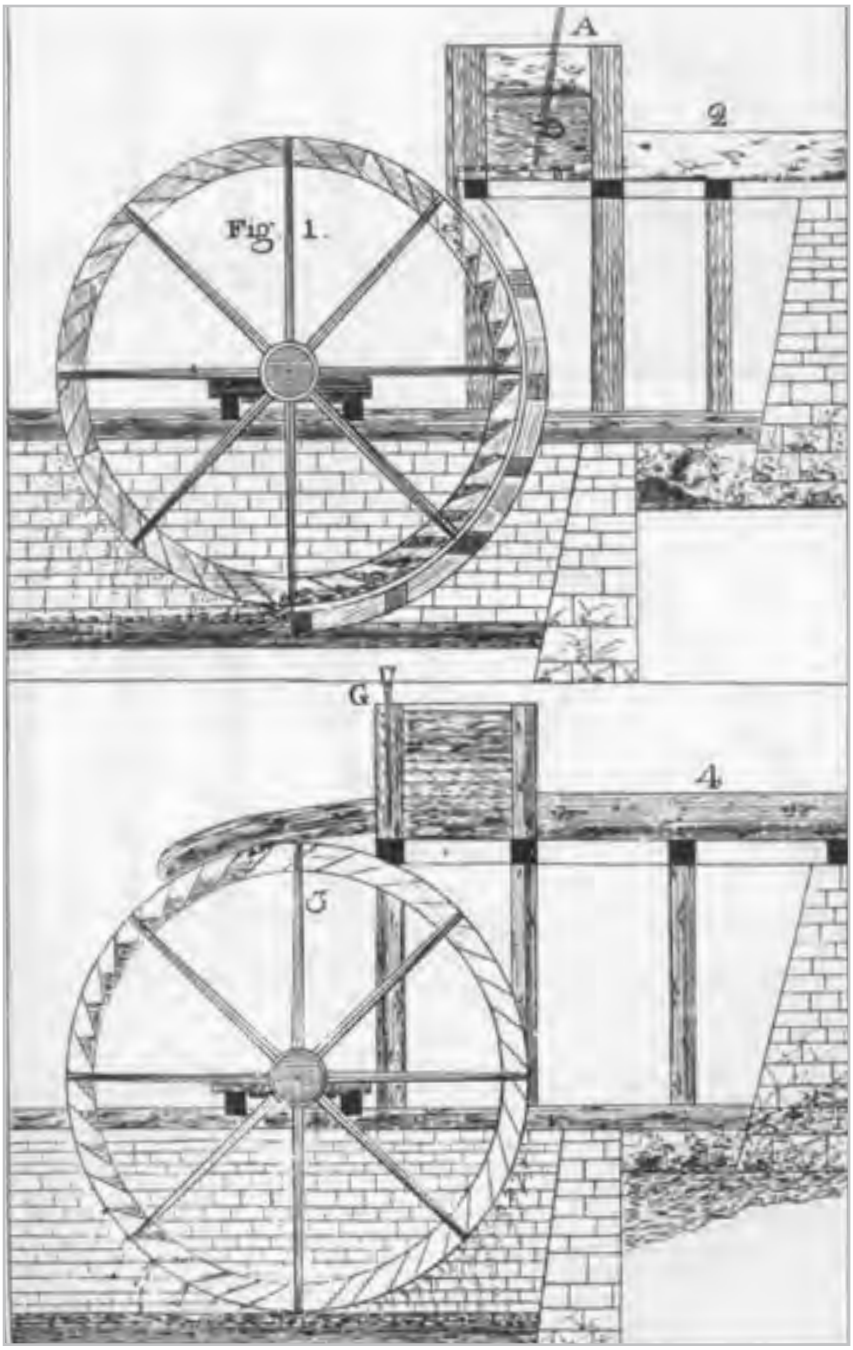


Figure 5.6. Typical Cross Section of a Breast Wheel (top) and Overshot Wheel (bottom). Evidence of the ATP's waterwheels is fragmentary but these were likely the two alternatives employed. The Todd Mill had two overshot wheels, but nomenclature in the 19th century was not always consistent and in some locations breast wheels were considered a form of overshot wheel. Note the timber gate mechanisms. The S.U.M. used a one-square-foot gate opening as its unit of measurement for water leases. Source: Evans 1795.

ences. Documentary records, such as census records that sometimes list the type of wheel, should be not taken as conclusive.) (Hunter 1979:67-71).

Rotating speeds of a waterwheel varied inversely with the diameter of the wheel (a larger wheel turned more slowly). A wheel of about 20-foot diameter, which would have been typical of the wheels in the Great Falls district, operated at about 8 to 12 rotations per minute. Gear ratios were established to step up from the relatively slow motion of the wheel to the higher speeds required of the machines. Wheel speed could be modified by opening or closing gates to control the volume of water hitting the wheel. By the early 19th century, American millwrights had imported from Britain the flyball governor, an automatic "feedback" device which through variations in centrifugal force reacted to changes in the load on the wheel, such as from the starting or stopping of machines. The governor responded immediately to changes in load by opening or closing the wheel's gate to maintain a steady speed.

Power in mills was transmitted from the waterwheel through shafts, gears and belts to individual machines. Numerous iron gears and long lengths of shafting were inefficient due to loss of energy from friction, and they were also difficult to maintain, so in the late 1820s to 1840s an important innovation in some mills was expanding the use of long leather belts to transmit power to multiple belt-drive systems (Figure 5.7). Transmission systems give clues to the placement of machines, their design and the speed at which they may have run. For example a gang of identical machines running at the same speed may share a single shaft. A range of diverse machines may have more counter shafts to account for a variety of operating speeds and direction of operation and rotation changes. Unfortunately, almost all evidence of this, which could possibly have been deduced by studying scarring of beams for placement of shafts, screws, and bolts, has been lost from the ATP site (Howard 1997).

Each of the original mill lots that comprise the ATP site initially had its own waterwheel (or turbine for mills built in the 1850s or later) and power transmission system. Even in an area of dense waterpower development, such as found in the Great Falls district, it was typical for each mill to have its own waterwheel. Multiple waterwheels for independent operation of various shops and processes were not uncommon in larger mills (Malone 2009:56-57). Unfortunately, the documentation for each of the ATP's mill systems is fragmentary, especially for the period of development form the 1810s to 1850s. Much of the best evidence for the details of the individual mill waterpower systems is based on later fire-insurance maps (Sanborn Map and Publishing Company 1887; Sanborn-Perris Map Company 1899; Sanborn Map Company 1915).

The ATP site has five locations where there were wheel pits or wheelhouses: the Todd, the Passaic, Waverly, Mallory and Gun mills (Figure 5.1). In addition there was a sixth waterwheel installation on the north bank of the Passaic River opposite the Gun Mill lot. This wheel, installed *circa* 1874, was not to power mill machinery but to pump water (see below, section on water processing).

Two overshot wheels existed in the Todd Mill from at least 1870 to 1889. According to the 1870 U.S. Census schedule, the wheels were capable of producing 30 hp each, which is consistent with wheels of about 20-foot diameter and 6 feet wide. In the 1880 census the Todd Mill reportedly had two overshot wheels of 18-foot head and 12-foot diameter operating at eight revolutions per minute and 40 hp (Figure 5.8). Based on this information, it has been inferred that the wheels were rebuilt when the Todd Mill was reconstructed in the 1870s, but it is also possible that this is just a variation in data recorded by census takers. Prior to its collapse, it was noted that the Todd Mill had a brown sandstone block with the inscription of 1822 located in the basement. This suggests that earlier foundations and wheel pits were incorporated as the mill was expanded and reconstructed several times over the

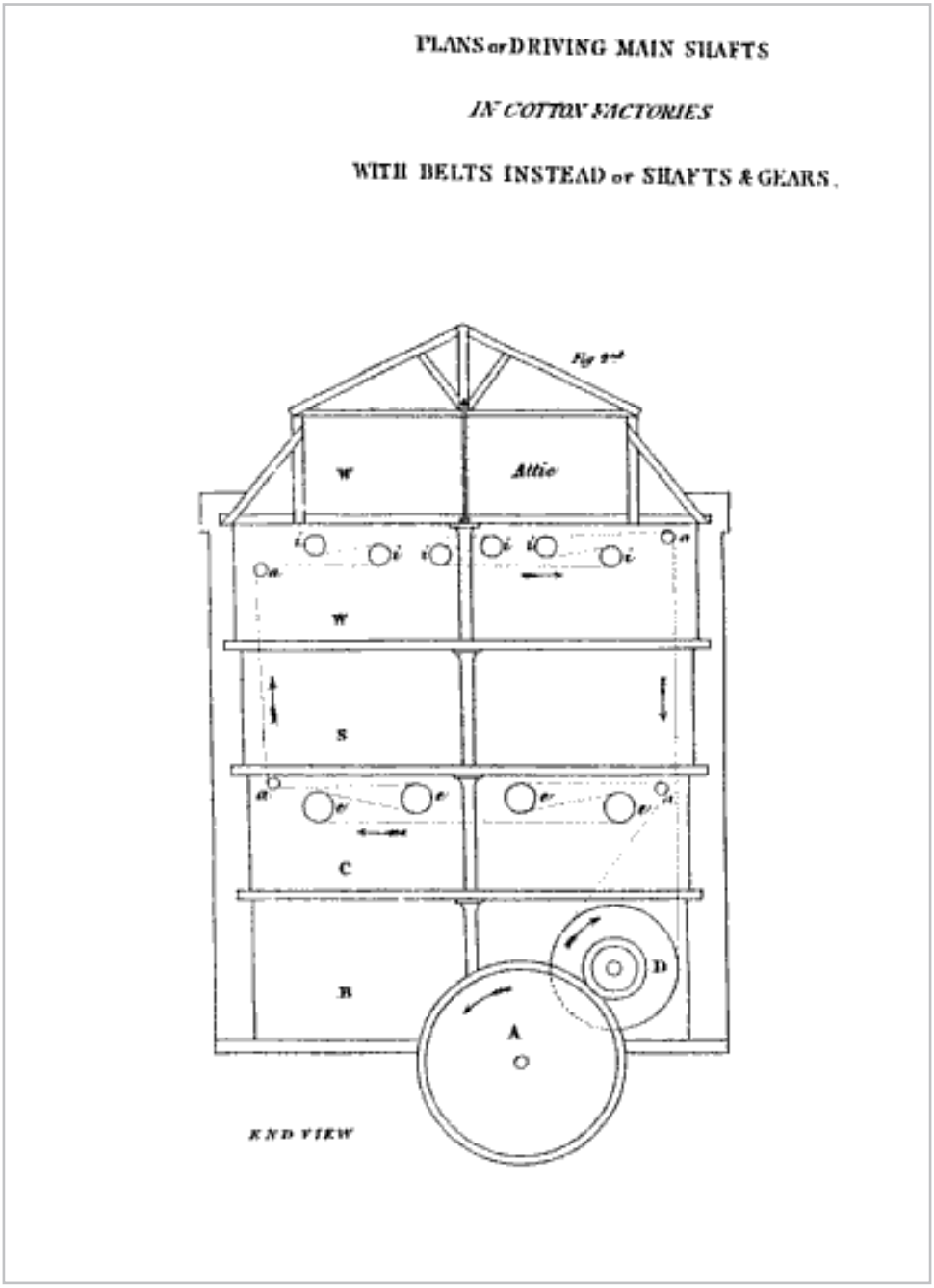


Figure 5.7. Typical Cross Section of an American Cotton Mill Showing General Lay-out of a System of Transmitting Power Using Leather Belts, Shafting and Pulleys. British observers were impressed with the American practice, adopted in the 1830s, of substituting belts for bevel gears and vertical shafting to transmit power from the wheel to the upper floors of mills. This reduced friction and made for more efficient use of power. This system likely was employed in the mills at the ATP site. Source: Montgomery 1840.

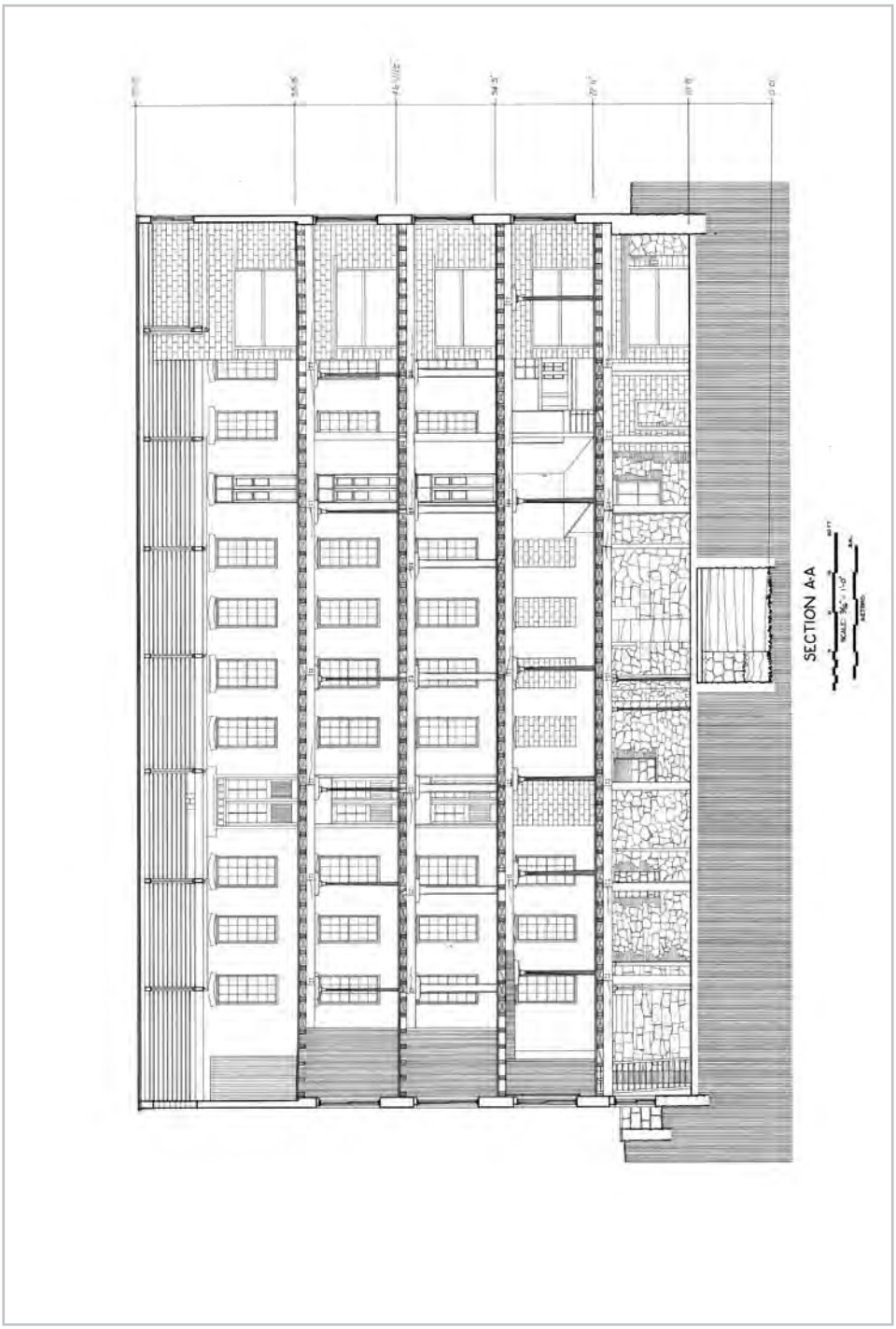


Figure 5.8. Cross Section of the Todd Mill. Note the lower level that represents the wheelpit. Source: National Park Service, Historic American Engineering Record, HAER NJ-5, 1974.

course of its history (U.S. Census Office 1850, 1870, 1880; Sanborn Map and Publishing Company 1887; Susan Maxman Architects 1996:D102).

The Gun Mill likely had an overshot wheel from its early days of operations but this is based on a general understanding of period technology and the orientation of the wheelhouse to the Middle Raceway, not primary documentation. In 1850 the U.S. Census schedule reported that the Gun Mill had waterpower capacity to power 1,500 spindles, a common measure used to report the size of a textile spinning mill. Based on comparative figures, a 1,500-spindle operation would typically have required a 25-35 hp waterwheel, which is an approximate match for a 20-foot diameter wheel. By 1887 the Gun Mill was operating a turbine that had replaced the waterwheel. Archaeological investigations of the wheelhouse by Rutsch in the mid-1990s suggested that most of the physical evidence of the earlier wheel had been lost, likely during the installation of the turbine and 20th-century conversion of the wheelhouse to other uses (U.S. Census Office 1850; Sanborn Map and Publishing Company 1887; Susan Maxman Architects 1996:D66; Howard 1997).

The Passaic (1851), Waverly (1853) and Mallory mills (*circa* 1870s) had wheel pits but the types of wheels originally used are not known. These mid-19th-century mills date from the transition period in waterwheel technology when it would have been possible to install iron wheels or turbines instead of traditional timber waterwheels. If this were the case, the decision to install a turbine instead of a waterwheel would be clearly evident in the design of the wheel pit. The Waverly Mill reportedly had two approximately six-foot-diameter bricked-in, circular openings in the basement that may have corresponded to openings in the wall for the intake of water from the head races. The Passaic Mill was operating a turbine by 1870 and the Waverly Mill was operating one by 1887 (U.S. Census Office 1860, 1870; Sanborn Map and Publishing Company 1887; Susan Maxman Architects 1996:D93).

5. Turbines

In the 1840s news of an alternative to traditional waterwheel designs was making its way to the United States from France. This new technology was the hydraulic turbine, a remarkable advance over waterwheels in respect to size, cost, efficiency and operating characteristics. In a turbine, water under pressure entered a wheel from above through a conduit called a penstock and was directed through the turbine by curved guides that rapidly spun a central shaft. Penstocks and turbine housings were usually wood in the mid-19th century but transitioned to tubular iron pipes in the later 19th century (Figures 5.9 and 5.10). One of the most important characteristics of a turbine, aside from its efficiency in extracting the potential energy from the falling water, was that it could operate underwater and was thus not affected by the drag of water in the bottom of a wheel pit (Figure 5.11). Turbines were also much more compact than overshot or breast wheels, thus requiring smaller wheel pits and were less of an operating hazard. (Note: turbines and waterwheels were both often referred to simply as "wheels" in period literature, making the distinction not always clear.)

The three primary classifications of turbine were the Fourneyron outward-flow turbine, the Francis inward-flow turbine (named after the two engineers most associated with their development) and the American mixed-flow turbine. It is worth noting that turbine development was not based so much on the tradition of millwrights as it was the experiments and observations of scientists and engineers, as well as mechanics and machinists, mostly located near industrial centers that were challenged with ways to increase the capacity of the power supply. The 1840s and 1850s were a significant period in the evolution of turbine technology with much transfer of information through the publication of the results of scientific experiments. Surviving turbines of this age are highly valued as artifacts. Following the initial pre-Civil War period of turbine development, there was a great increase in

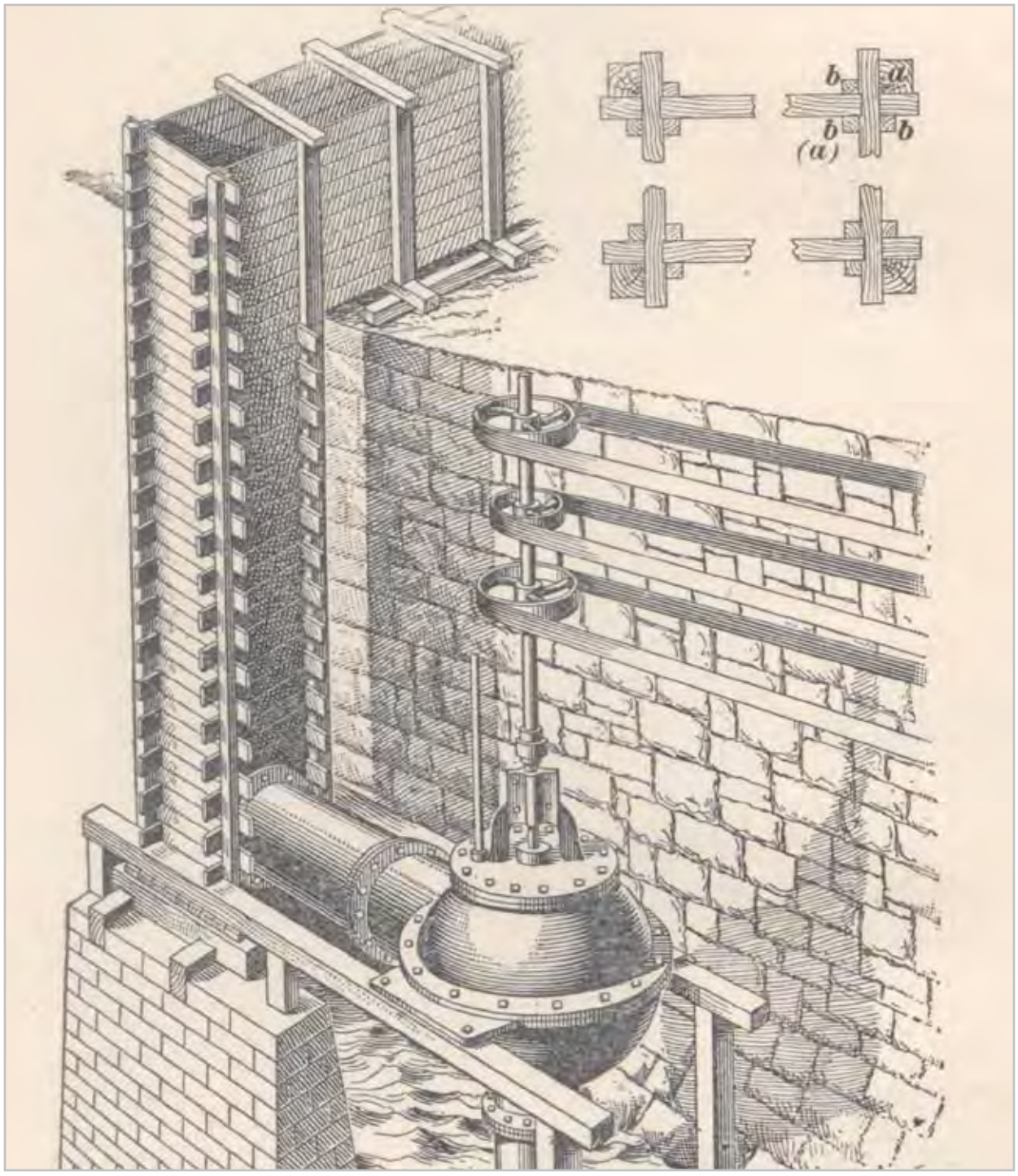


Figure 5.9. Isometric View of Turbine in Stone-lined Wheel Pit. This example uses both a timber flume and upper vertical penstock section connected to a horizontal riveted iron penstock and turbine within its casing. Such an arrangement may have been used at the Gun, Mallory/Waverly and Passaic Mills. Source: International Correspondence Schools 1897.

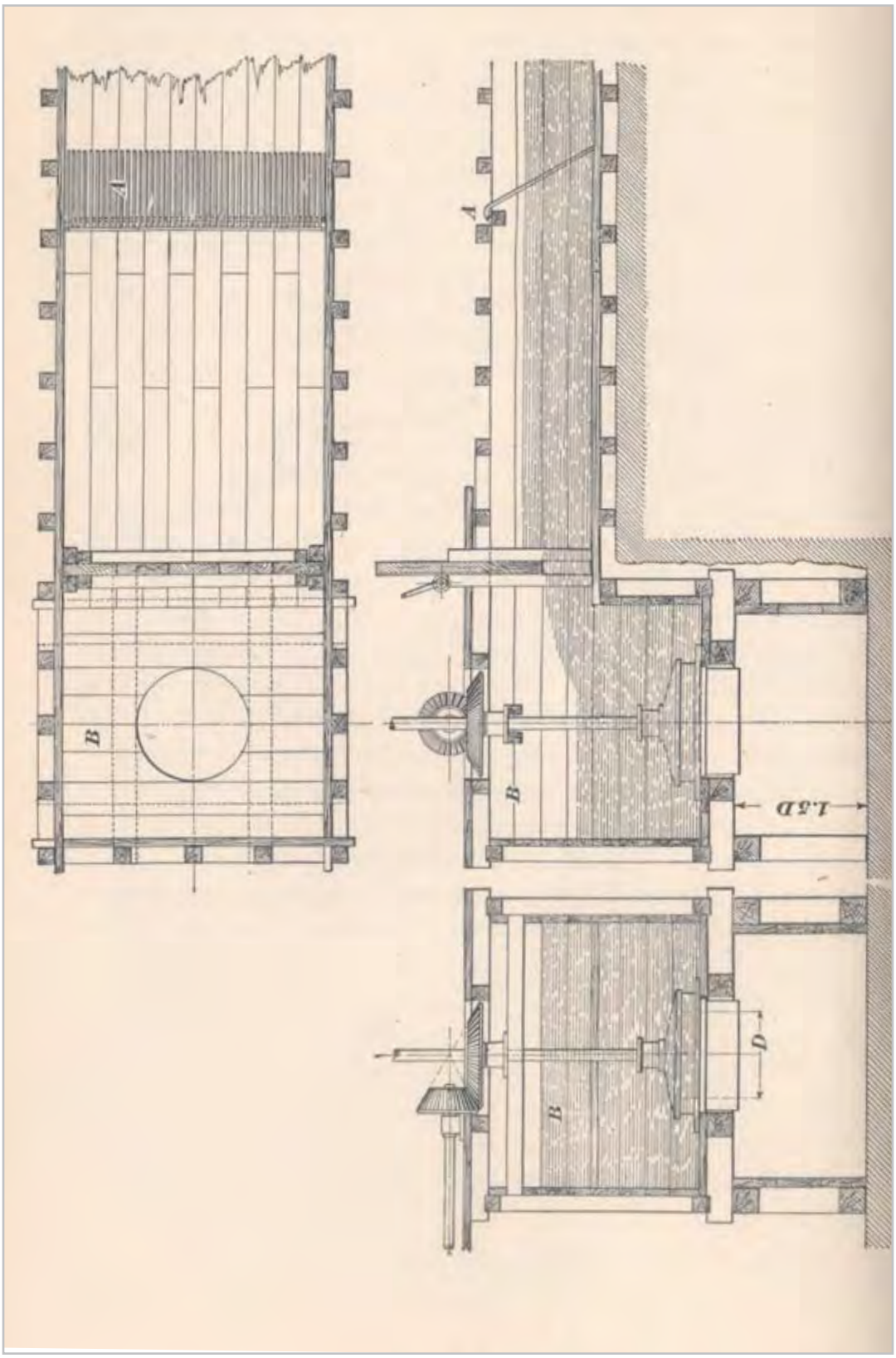


Figure 5.10. Typical Cross Section of Turbine with Timber Flume. Note vertical shaft with bevel gears and timber gate for regulating flow. ATP mills would have had a greater head than this low-head example but construction may have been very similar. Source: International Correspondence Schools 1897.

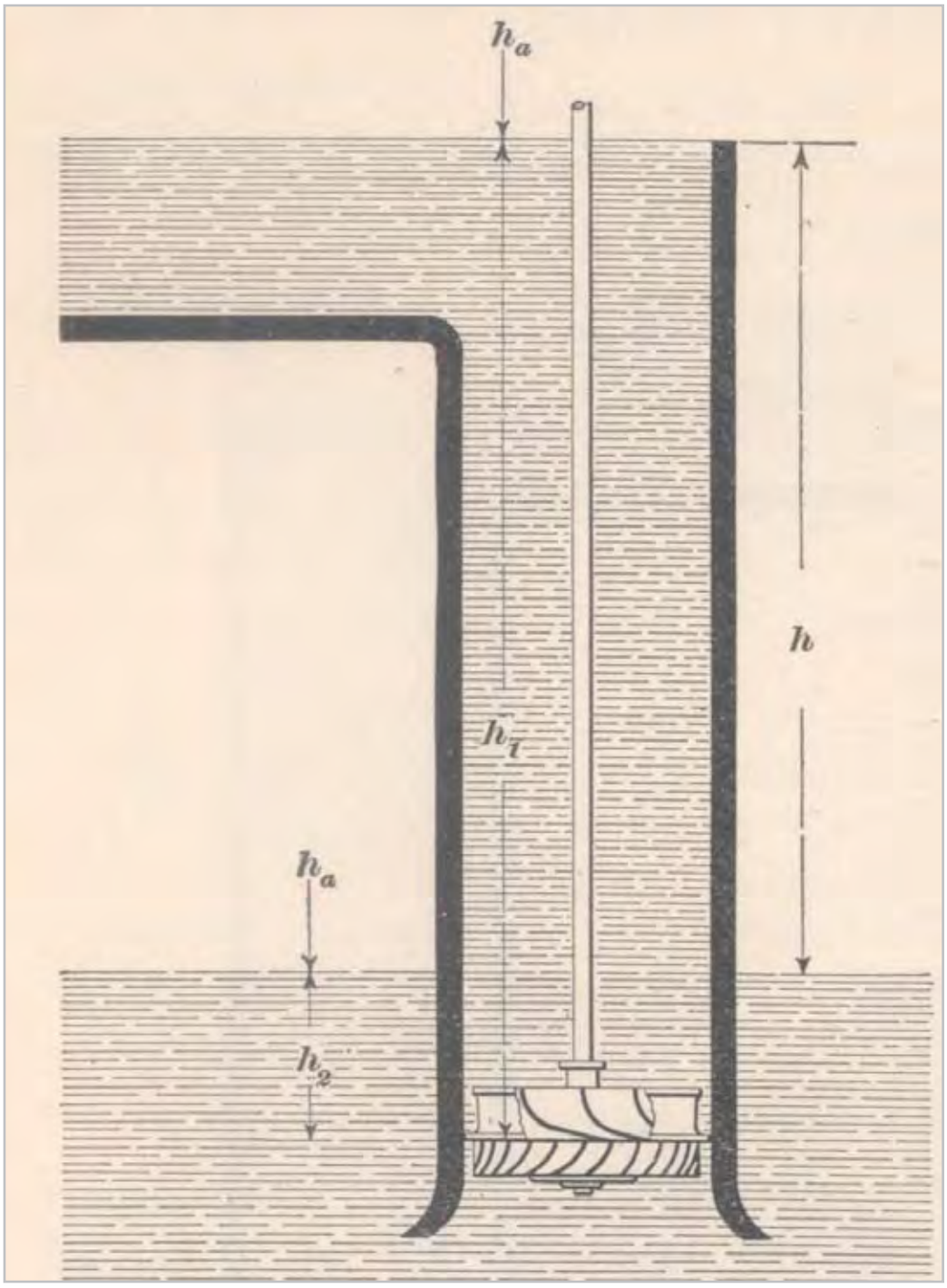


Figure 5.11. Cross Section of Turbine Illustrating the Advantage of Submerged Operation and Its Contribution to Maximizing Head with the Head Race (top) and the Tail Race (bottom). The distance "h" is the head. Turbines had advantages at the ATP site in that efficiency would not be adversely impacted by backwater in the tailrace when the Passaic was in flood. Source: International Correspondence Schools 1897.

the turbine-building industry. Most turbine manufacturers produced stock-pattern turbines and traded on the merits of the shape, dimensions or proportions of a dizzying number of patented, proprietary designs. To sell their turbines, makers often resorted to heavy advertising (Hunter 1979:347-349).

When the turbine technology made its earliest appearance in Paterson is not known for certain, but it was being enthusiastically adopted in some mills by the late 1850s and 1860s. *Scientific American* reported in 1859 that the Phoenix Mill had a turbine that measured 10 to 25 percent more efficient than an overshot wheel in the Passaic No. 1 Mill. In 1865 a massively powerful 265 hp Boyden turbine was installed in the Ivanhoe Wheelhouse. In 1869 John H. Chase of the Union Manufacturing Company reportedly installed a turbine of his own design (Clayton and Nelson1882:456).

Turbines were installed in at least three mills on the ATP site: the Passaic, the Mallory/Waverly and the Gun mills. In the case of the Passaic and Gun mills the turbines appear to have been installed in older wheel pits that were modified to accept the more compact turbines. In 1870 the Franklin Manufacturing Company (calico prints) reported a 60-inch diameter turbine of 120 hp in its Waverly Mill (U.S. Census Office 1870). The 1887 Sanborn map shows two turbines in the Passaic Mill, a single turbine in the Gun Mill, and a single turbine in the Waverly/Mallory mill complex. Curiously, the Waverly/Mallory turbine appears to be located on a race that angles between the two mills and is not perpendicular to the Lower Raceway. The angled race is on a line that would suggest its purpose is to divert water from the original Waverly head race (Sanborn Map and Publishing Company). Did the Franklin Manufacturing Company reconfigure the Waverly/Mallory mill complex to operate from a central wheelhouse, abandoning an older waterpower system?

Turbines remained important components of the ATP site's waterpower system until that system was abandoned in the late 1910s. As late as 1915 the Gun Mill was using a 100 hp turbine, confirmed by timber framing for supporting the turbine that remained in place during investigations in 1997 (Sanborn Map Company 1915; Howard 1997). After abandonment, the wheel pits were filled and covered with concrete slab floors in the Waverly, Mallory and Passaic mills. The wheel pit of the Todd Mill could be viewed from walking up the tail race as late as 1998 (Soo 1998). Archaeological investigation of wheel pits may provide new information on the history of waterpower development. Evidence to watch for includes depth (head), bearings, framing, wheel aprons, and remnants of gearing and shafts. It is even possible that turbines remain in place if they were not removed for scrap prior to the filling of the wheel pits.

6. The Measurement and Regulation of Water

The S.U.M. contracted to deliver water in specified amounts to each mill. As such, it was legally bound to the mill operators to provide dependable power. When the S.U.M. sold a mill lot to a prospective manufacturer that mill lot came with a lease of water; this was nothing more than a rental of water, the lease did not convey any riparian rights in the traditional sense. During the early years of the S.U.M., this arrangement of leasing water was without precedent in the United States, and its development is thus of more than passing historic interest.

As early as 1807, the S.U.M. adopted the "square foot of water" as its standard unit of measurement in water leases. The S.U.M. continued to use this measurement into the early 20th century. At least as early as the 1840s, and probably earlier, the S.U.M. was using "governors" or gauges, openings of set dimensions placed at the intersection of a mill's headrace and the S.U.M.'s main raceways. The size of the gauge opening corresponded to the square footage of water specified in the lease (Halsted 1849:128). According to later documentation, the S.U.M. measured a square foot of water as the area of the gate opening in a

head race or flume under three foot of head delivered through an opening six inches high at the bottom of its canals (U.S. Census Office 1885:650). The square foot was not by modern standards remotely accurate because it measured neither volume nor velocity (flow). It is perhaps best to think of the square foot unit as a practical approach adopted at a time when an accurate flow meter had yet to be invented (the modern unit of measurement is cubic feet per second and good mechanical flow meters were not available until the late 19th century).

The S.U.M.'s methods were practical since it was not until the late 1830s and 1840s that Lowell's Proprietors of Locks and Canals, largely regarded as the first organization to apply scientific management to a waterpower system, began to come to grips with an accurate way of measuring flow through a series of labor-intensive and painstaking experiments undertaken by chief engineer James B. Francis. One of Francis's key insights was that flow varied across a raceway's cross section depending on width, depth, and friction against the walls and bottom; he developed an accurate formula that took these variables into account, publishing it in *Lowell Hydraulic Experiments* in 1855. The Francis formula became widely recognized as the most accurate for establishing the flow of water in flumes and canals and was used well into the 20th century (Malone 2009:138-142).

The S.U.M.'s management was not unaware that flow was an important and useful measurement. As early as the 1820s, J.L. Sullivan measured flow by timing how long it took floating objects to move set distances in the raceways (S.U.M. Minute Books, 18 February 1822). He multiplied the recorded time by the cross-sectional area of the channel to arrive at cubic feet per second flow at predetermined locations. These calculations provided a rough estimate of flow but were not as precise as the later Francis method. The S.U.M. used flow data to inform its decision to expand the waterpower system during the planning and construction of the Upper Raceway *circa* 1828-29. It also recorded flow data to track seasonal variations in the water supply and estimate the capacity of the system in normal and low water conditions. It seems plausible, even likely, that the S.U.M. measured flow at the mill headraces, but it never applied flow as the unit of measurement for leasing water even when more reliable methods became available in the later 19th century (S.U.M. Minute Books, 12 February 1829; Malone 2009:125-127).

A description of the pre-1850 evolution of the S.U.M.'s regulation of water usage can be surmised from an 1849 court case, *The S.U.M. vs. Catharine Holsman, et.al.* Holsman was the widow of Daniel Holsman, who in 1813 purchased the Home Mill and a lease of one square foot of water. (The Home Mill was located on the east end of the ATP site and preceded the Todd Mill). According to testimony, the S.U.M. came to suspect that the Home Mill was taking more than one square foot of water. In 1827, the S.U.M. reminded Holsman of the terms of the lease, also stating that the amount of water was to be measured at the point from which it was taken from the Lower Raceway. This latter stipulation was apparently the first time that the S.U.M. had made Holsman aware of where it intended to measure water. Holsman replied that he was taking no more than the contracted amount but no gauging mechanism was installed where the Home Mill's head race met the Lower Race. Holsman died later in 1827 and his widow leased the mill. Fifteen years passed with no change in the situation, then in 1844 the S.U.M. built a stone wall across the entrance to the Home Mill's head race and installed a cast-iron aperture of 144 square inches (one square foot). The S.U.M. claimed that this was necessary because the mill was taking not one but three square feet of water, although it provided no evidence of how it had come to this conclusion. The S.U.M. testified that this excess usage was placing at risk its ability to meet its contractual obligations to other mills. The S.U.M.'s gauge was subsequently torn down by order of Catharine Holsman or her tenants. The S.U.M. sought an injunction against Holsman but the courts

refused to grant it. The appellate judge's opinion was that the parties in the suit lacked the "judgment, facts and scientific information" to deal with "the nature of the element [water]" (Halsted 1849:126-136). A description of the S.U.M.'s leasing policy published a decade later in 1859 similarly described it as "as much [water] as could be drawn through an aperture one foot square or 144 square inches." The one-square foot lease was available at the rate of $500 per year on a lease of 21 years, renewable every 21 years on the same rate on a payment bonus of $500; or an absolute right in fee simple for $10,000 (Vanderhoven, Irish and Company 1859: 7-8). Long-term leases were favorable to manufacturers who might have been reluctant to invest in mills without a long-term guarantee of water to power the mill; they also locked the S.U.M. into agreements to supply water which would eventually become problematic as demand for water increased within the region.

The S.U.M. compensated in some measure for the drawbacks of leasing water by the square foot by relying on a level of equilibrium built into its leases and the overall design of the three-level power canal system. Once the full build out of the waterpower system was complete in the mid-1840s, leases from each level of the race system were typically reported as roughly equal. In 1880, for example, the S.U.M. reported leasing 36 square foot of water from its Upper Raceway, 38.5 square foot from its Middle Raceway and 36.5 square foot from its Lower Raceway (U.S. Census Office 1885:649). This combined with the roughly equal lengths of each of the raceways and the 22-foot head between each level meant that if all mills were running and using their allotments that theoretically there would be water moving through the system in the required amount. The S.U.M. must have opened the headgates at the Upper Raceway to allow slightly more water into the system than was required. Excess water would flow over the spillways from one level to the next, presumably making up for losses due to leakage and friction. Too much water in the system, however, was also undesirable. More flow meant higher current in the raceways. This could cause an abrupt drop in head. The S.U.M.'s raceways with their rough edges and abrupt turns added to the friction.

To compensate for imbalances that might occur and to prevent manufacturers from losing power and having to shut down machinery, the S.U.M. had only its gatehouses to compensate. The two gatehouses at the end of the Middle Raceway adjacent to the ATP site were critical to maintaining the system's balance when mills were using either more or less water or friction head losses began to lower the level of water in the raceways. The North Gates Waste Way at the end of the Middle Raceway eliminated excess water from the system (Plate 5.4). The spillway behind the Gun Mill provided a means of regulating the level of water in the Lower Raceway (Plates 5.3 and 5.6). It must have taken considerable experience to anticipate changes in water level depending on seasonal supply and the rhythms of work in the mills.

The North Gates Waste Way was a visually striking feature on the landscape with a fall of more than 20 feet over the cliff behind the Colt Gun Mill. In 1859, Vanerhoven, Irish & Company's *Guide to the Passaic Falls* provided the following description of the waste way:

Standing on the piazza of the Cottage which overlooks the Valley of the Rocks, a pitch will be seen where the waste water is discharged into the river, back of Ryle's Silk Mill (once known as the Gun Factory [Mill]). The fall was formerly 20 feet and hundreds of tons of water rushed down every minute. When the Mills are not at work, the water still empties out of this pitch with great impetuosity and in an immense volume, forming a sort of curve in its descent. There is a foot path along the race …which is now open to the public. Miss Lemar, a respectable young lady, unfortunately fell in, some years since, was carried down the curve, and although immediate assistance was rendered, in two minutes life was extinct. The weight of the water had killed her (n.p.).

Today, the North Gates Waste Way is no longer clearly evident having been filled in after the waterpower system closed down in the late 1910s but the cliff face over which the water tumbled is still clearly defined behind the Colt Gun Mill.

The S.U.M. faced a potential problem if for any reason one or more of the mills took significantly more water than its allotment. Given the technology and methods employed by the S.U.M., it would have been difficult to identify the offending mills, let alone prove the offense. If one mill were taking excess water, other mills on that level might not get enough power. If demand exceeded supply, the level of water in the raceway would begin to fall. Potentially, this situation could also release extra flow into lower level raceways causing backwater conditions in tail races. This set up a negative feedback system because those mills would then draw on ever more water to compensate for the loss of power caused by backwater. By the late 19th century, the S.U.M.'s method of leasing water was not considered efficient by trained hydraulic engineers. In 1885 the U.S. Census Office's report on waterpower commented that the "… power [in Paterson] is only roughly controlled compared with the care which is exercised in Lowell, Lawrence, and other places" (U.S. Census Office 1885:649).

In 1880 the ATP mills collectively leased 12 square feet of water, representing about nine percent of the total 111.5 square feet of water leased by the S.U.M. in Paterson. The Franklin Manufacturing Company (Waverly/Mallory) leased seven square feet, Todd & Rafferty leased three square feet, and John Ryle (Gun Mill) leased two square feet. By contemporary accounts, a square foot of water equaled 21.25 hp with a fall of 22 feet giving a rough estimate of power usage in each mill. The S.U.M. charged $750 a year per square foot of water, which was considered a rather high rate as compared to other places (U.S. Census Office 1885:649). Changes in the amount of water leased by each mill can be important indications of changes in technology. For example, in 1846 John Ryle purchased an additional one square foot of water for the Gun Mill, expanding on an earlier lease of 1.5 square feet originally granted to the Paterson Manufacturing Company (S.U.M. Minute Books, 3 April 1838). This may have been an indication of expanding power needs as he grew his new silk spinning business.

In the late 19th and early 20th centuries, landlords of some of the ATP's mills were sub-leasing the waterpower to tenants, a practice that was apparently common throughout the Great Falls district. In 1913, for example, the John Ryle Real Estate Company, leaseholders of the Gun Mill, had four tenants using waterpower for direct drive of machinery. Benjamin Buckley's Son leased the mill's first floor and 15 hp; the Nurseman [?] Silk Company leased one-half of the second floor and 4 hp; M. Rosenthal leased the other half of the second floor and 5 hp; and the Sunset Silk Company leased the third floor and 8 hp (S.U.M. Papers 1914a). In 1904 Baker & Scofield, silk weavers, rented a portion of the Waverly Mill and their lease included the use of 40 hp from the mill's turbine (S.U.M. Papers 1911b).

A critical challenge facing the S.U.M. was seasonal variation in the flow of the Passaic. In dry weather, about three months out of the year, there was less water in the river than the S.U.M. needed. As early as 1837, the S.U.M. had responded to water shortages by building a dam above the Great Falls (Figure 5.2d). This dam allowed the S.U.M. to pond water in the river's channel and relieved water shortages for the time being. A guide to Paterson, published in 1859, commented that "… the character of the stream being such that not three days in twice as many years is any difficulty experienced from scarcity of water …." but that new mills sites remained to be developed (Vanderhoven, Irish and Company 1859: 7-8). In 1864 the S.U.M. dam was raised by three feet creating a reservoir in the Passaic River about two miles long with a width of about 400 feet. The ponding allowed the S.U.M. to build up overnight enough water to sup-

ply the mills from 6 a.m. to 7 p.m. except under the driest of circumstances. The daily schedule meant that the S.U.M.'s managers had to prepare each morning to restart the system. This may not have always been easy to accomplish in a timely manner; for example, a Waverly Mill silk weaver wrote the S.U.M. to complain that he had not been able to start his looms until 7:30 a.m. (Trumbull 1882; U.S. Census Office 1885:649; S.U.M. Papers 1911b).

7. Decline of the S.U.M.'s Waterpower System

From the 1880s to early 1910s, there were constant signs that the waterpower system was being placed under tremendous pressure because of competition for the Passaic's water. Simply put, as nearby population centers grew so did the demand for potable water, much of it taken directly from the Passaic watershed. There was also growing demand for processing water from the silk dyeing sector (see below). As the demand for water increased, so did its value as a commodity to be bought and sold, and Passaic River water levels became increasingly less predictable, prompting the S.U.M.'s managers to worry about the corporation's ability to meet its contractual obligations to manufacturers. The S.U.M. became involved in several complicated law suits in attempts to defend its rights to water. At several points, Paterson's manufacturers called for the construction of new reservoirs to ensure them a steady supply of water. In 1912, for instance, some mills were deprived of water for 43 days, and the S.U.M. was forced to reimburse the owners (S.U.M. Papers 1912a).

Since the late 1890s the S.U.M.'s managers, particularly Vice President Edmund L. Gardner and Chief Hydraulic Engineer John H. Cook, had been discussing ways to meet the S.U.M.'s contractual obligations. In 1894 the S.U.M. had come under the control of the New Jersey General Security Company, a trust company that also controlled about a half dozen water companies supplied from the Passaic watershed. The trust company attempted to rationalize and maximize profits from selling water, and, generally speaking, the long-term industrial power leases of the S.U.M. were not as profitable as selling the water in other markets. By 1900, the S.U.M. was systematically purchasing waterpowered mills when they came on the market so that it could regain control of the leases and negotiate more favorable terms with tenants. In 1904 the S.U.M. reacquired the lease to the Mallory/Waverly mill complex as part of this effort (Herz 1939:124).

In 1912 the S.U.M.'s management determined that the time had come to terminate the long-standing practice of leasing water from the raceways for industrial power. The genesis of this decision was long in coming and dated to at least the late 1890s when the S.U.M. had begun considering the feasibility of building a hydroelectric plant at the base of the Great Falls. It was eventually determined that a modest size hydroelectric plant could produce three times the power of the individual mill power systems using less than half the water (S.U.M. Papers 1899, 1910). From an economic point of view, the unit price of water was rising at the same time that the unit price of an alternative form of power – electricity – was falling. From the S.U.M.'s perspective the tipping point in the cost/benefit curve had been reached. The S.U.M. hydroelectric plant went into operation in late 1914 and shortly thereafter the S.U.M. negotiated to end its waterpower leases, which included the remaining users of waterpower on the ATP site.

B. WATER FOR OTHER USES ON THE ATP SITE – PUBLIC WATER SUPPLY, INDUSTRIAL PROCESSING AND SEWERAGE

By the mid-19th century the ATP site's physical infrastructure was being shaped not just by waterpower but by other uses for water, including drinking water, water for industrial processing and water to carry away industrial waste and sewage. As these demands for water increased, it forced the various stakeholders

to adjust to a dynamic situation where the value of water was increasing. This brought into question the efficiency of older power technologies and methods of delivering water to the site through canals. Various attempts to redistribute water among the competing interests caused the ATP site's manufacturers to move beyond reliance on the S.U.M. and seek out other organizations and methods of ensuring that they had access to adequate water supplies.

1. Public Water Supply

The Gun Mill played a brief but significant role in the establishment of a public water supply in Paterson doubling as the Passaic Water Company's first pump house. By the late 1840s the city's population was outgrowing rudimentary supplies of potable water from wells. In 1849 a group of local businessmen established the Passaic Water Company to provide the city with drinking water but due to financial difficulties they did not immediately begin construction of a waterworks. In the early 1850s the task was taken up by John Ryle, the founder of Paterson's silk industry and owner of the Gun Mill. Ryle purchased a controlling interest in the water company and proceeded to negotiate with the S.U.M. for the right to take water from behind a dam to be constructed across the Passaic River opposite the Gun Mill (Plate 5.8). The dam was to pool water no higher than one foot below the level of the North Gates Waste Way so as not to interfere with the S.U.M.'s ability to discharge water from the Middle Raceway.

A pump was installed in or near the Gun Mill powered by a steam engine. Water intakes were reportedly located upstream in the vicinity of the quarry, but it is unclear from contemporary accounts how these underground pipes traversed the quarry and the outflow channel of the North Gates Waste Way (Plate 5.9). From the Gun Mill the water was pumped to a reservoir located on the bluff above the north bank of the Passaic. From the reservoir, water returned to the city via a gravity line that crossed the Passaic on a timber-truss bridge, colloquially known as the "broomstick" bridge for its thinness (Plate 5.10). Around 1867 this bridge washed away and was replaced by underground pipes. Ryle also purchased excess water from the S.U.M.'s power canal system, taking the water only when supplies were plentiful and at night when the mills were not operating (Fries 2008:6-17).

To say the least the process of pumping water from the Gun Mill to a reservoir near the top of the falls was not efficient. In 1862 the Passaic Water Company began construction of a new pump house located on the north bank of the Passaic River just above the falls and below the S.U.M.'s dam. By 1867 the new pump house was in full operation. For some years, the Gun Mill reportedly remained on back-up status and then ceased to operate as a pump house. Buried water mains have, however, crossed the Passaic River at the Gun Mill lot and passed through the mill's yard ever since.

In 1874 the Passaic Water Company made another short-lived attempt to pump water from the below the falls, this time powered by a waterwheel located on the north bank of the Passaic River opposite the Gun Mill. This waterwheel apparently was built in response to an expansion of the company's reservoir and operated only when the pump house above the falls could not meet demand. Recovering even a small volume of water from below the falls was necessary when the Passaic was low and the S.U.M. was diverting essentially all of the river's flow.

In 1887 the S.U.M. reached a financial agreement with the Passaic Water Company to allow a certain amount of flow over its dam at night and on Sundays when the mills were not operating. A more permanent solution was not reached, however, until the Passaic Water Company arrived at an agreement to augment its water supply from Little Falls in the early 1900s. A more coordinated approach to regional water supply was taken with the establishment of the North Jersey District Water Supply Commission

Plate 5.8. Knipscher & Maass silk dye house, view looking east, *circa* 1890. Note the many pipes and outlets in the river wall and foundation for waste water. The dam (right foreground) was constructed *circa* 1857 to pond water for pumping by the Passaic Water Company. The three-story structure to the south of the dam is believed to be the pump house, also later used by Knipscher & Maass. Source: Paterson Historic Preservation Commission.

Plate 5.9. View looking south southwest and upstream showing the Knipscher & Maass dye house, North Gates Waste Way, and the quarry, *circa* 1890. Dams have been placed in the stream to pond water for pumping to supply the Passaic Water Company and the dye house with water. Source: Paterson Historic Preservation Commission.

Plate 5.10. View looking south southwest and upstream showing the "Broomstick Bridge," *circa* 1865. The broomstick bridge carried the Passaic Water Company's water supply line. Source: Paterson Historic Preservation Commission.

in 1916, leading eventually to the construction of the Wanaque Reservoir, opened in 1930 (Shriner 1890; Herz 1939:109-114; Historic Conservation and Interpretation, Inc. 1973:34; Fries 2008:26).

2. Water for Industrial Processing

Industrial water delivery systems requiring pumps, storage tanks, and extensive piping were not a major factor in the development of the ATP site until firms that specialized in silk dyeing located there (Plate 5.11). As early as the 1840s John Ryle dyed silk in the Gun Mill yard and several others set up dyeing operations in the following decades, but these were relatively small-scale operations. In 1889 Knipscher & Maass (K&M) moved into a cluster of buildings formerly housing a ribbon manufacturer north of the Gun Mill. K&M was highly successful in developing methods of weighting silk, i.e., adding tin phosphate and other minerals to silk yarn. This allowed weavers to use less silk in their products, making it more affordable, although the resulting fabrics wore out more quickly.

To carry out their work, dyers needed abundant, clean, fresh water. Passaic water was considered ideal for silk dyeing because it had little or no calcareous or ferrous impregnation. Paterson's silk dyers traded on the reputation of the high quality of their dyeing process and the belief that the Passaic offered one of the best locations in the world to carry out the work. In the basic water preparation process as it had evolved at K&M and other Paterson silk dyers, the water was pumped into tanks that contained zeolites, sand and charcoal for filtering, softening and purifying. Water was then used in a variety of processes including degumming raw silk in boiling soap and water, bleaching silk to make it white, dyeing the silk in copper-lined vats mixing dyes and mordents in the soapy liquor from the degumming process, and rinsing the dyed silk clean with water at the end of the process (Heusser 1927; Eastern Inspection Bureau 1950).

Silk dyers were located all along the Passaic River in Paterson, but the many demands on the water, as well as dyers' own propensity for dumping waste into the river made ensuring an adequate supply a constant challenge. The ATP site was in a relatively favored location since it was the upstream-most of Paterson's dyers, but even this was no guarantee of a constant supply of fresh water. By the late 19th century this stretch of the river was often completely dry due to the diversion of water from above the falls (see above Plate 3.26). In the late 1880s K&M (and prior to that an earlier dye works) entered into an agreement with the Passaic Water Company to take water from the company's pipes that crossed the river at the Gun Mill lot. In 1898 this agreement was formalized as an amount not to exceed 75,000 gallons per day at a price of $45 per million gallons. However, this supply was not sufficient or perhaps too expensive since K&M supplemented it by taking water directly from the river from behind a dam they built at the upstream end of the quarry (Plate 5.9). From this dam, the water ran by gravity to a small pump house located adjacent to the North Gates Waste Way. The dyers also drove wells located in the vicinity of the pump house. Around 1903 K&M had four pumps with a combined capacity of 1,560,000 gallons/day (S.U.M. Papers n.d.). In 1912 the S.U.M. demolished the dam as part of its project to clear the river's channel downstream of the new hydroelectric plant. The Standard Silk Dyeing Company, which had acquired K&M in 1909, promptly filed suit in court but lost its case since the S.U.M. had retained all riparian rights to the quarry and Gun Mill properties (S.U.M. Papers 1915).

In 1905 K&M also began taking water from the so-called dyers pipe. The pipe was laid by the Passaic Water Company at the insistence of the dyers who were alarmed by an extended drought that had occurred in the summer of 1904. The inlet was above the Great Falls, between the S.U.M. dam and the water company dam, far above the dyers' own waste streams. The gravity-fed main was a 42-inch to 48-inch diameter steel pipe that ran along the north bank of the Passaic River to the Auger & Simon dye

works. From there, it followed North 1st Street before crossing under the river at Lowe Street and then following East Fifth Street to Weidman's dye works about two miles downstream of the falls. The dyers pipe was extended further downstream to the Gaede dye works in 1914. K&M received water from the dyers pipe via a 16-inch diameter pipe connection that branched from the main line on the north side of the Passaic opposite the Colt Gun Mill lot and crossed under the river. Water from the pipe was used for fire protection and manufacturing purposes (S.U.M. Papers 1913, 1915; Sanborn Map Company 1915; Heusser 1927:295).

Another source of water to the dyers was the S.U.M.'s raceways. Prior to 1904, the dye room at the rear of the Waverly Mill lot had made a 10-inch-diameter pipe connection to the Lower Raceway, apparently drawing on a portion of the mill's lease (S.U.M. Papers 1904a, 1904b). In 1925 when the Standard Silk Dyeing Company renewed its lease on the Waverly Mill, the lease still included rental of water for dyeing but the S.U.M. reserved the right to abandon the canal at no harm to the S.U.M. (S.U.M. Papers 1925). Water consumption from the raceway at the Mallory/Waverly mills was 65,000 cubic feet of water quarterly in 1924 (S.U.M. Papers 1924b). By the mid-20th century, Allied Textile Printers was taking water from the Middle Raceway via a cast-iron water main that connected to the company's storage and filter tanks located in the old K&M dye house where the water was filtered and softened and then made available as process water or boiler feed water. Water was also pumped for storage to numerous tanks, including roof-top tanks where it was fed by gravity to where it was needed. In 1932, the Standard Silk Dyeing Company reported having one 25,000-gallon tank and two 2,500-gallon tanks (Standard Silk Dyeing 1932; SEA Consultants, Inc. 1994:12, 22; Susan Maxman Architects 1996:D69, D102).

3. Water for Sewerage

Common practice in most mills of the 19th century was to dump waste into the tail races to have it carried off to the river. Waste was never intentionally dumped into head races where it could foul waterpower systems, so this posed a particular issue for mills on the upper races of the multi-tiered S.U.M. canals, but not so for the mills located on the ATP site. Toilets were often located over the tail races, as were openings for dumping process waste water. The dyers located their drains over the tail races or ran pipes to them. Numerous examples of these drain pipes were observed during prior archaeological investigations of the site (Historic Conservation and Interpretation, Inc. 1996:9). In the mid-1990s, former ATP plant manager Arthur Rosen pointed out that the Waverly and Mallory mill tail races could be located by following the drains in the concrete floor that lined up over them (Susan Maxman Architects 1996:D95). When tail races were not convenient, pipes and outlets were placed in the walls and foundations facing onto the river (Plate 5.8).

The amount of waste dumped into the river from the ATP site increased exponentially in the late 19th century as dyeing operations expanded. Reciprocally, so did complaints about the harmful effects of the waste. In 1902 the State of New Jersey established a Passaic Valley Sewerage Commission to build sewer lines and establish regulations governing the disposal of wastes into the river, reflecting the public concern focused mostly in the impact of sewage on public health. The commission progressively tightened its control over industrial wastes. In 1924, the S.U.M. was forced to address waste water from its Waverly, Mallory and Passaic mills, which it was then renting to the Standard Silk Dyeing Company among others. Paterson's sanitary engineer wrote the S.U.M. to notify it that it was in violation of state law. To remedy the situation, the S.U.M. decided to collect the waste in a sump at the point where the mills' three tail races joined together. From there, the dye-laden sewage was pumped to the

city's sewer line on Van Houten Street. Although this removed a major source of pollution from the site, it was evident that minor violations continued. In 1926 the Standard Silk Dyeing Company wrote the S.U.M. to complain that workers in the Colonial Silk and Essex mills were observed dumping buckets of waste into the S.U.M.'s raceways and fouling the Standard's water feed. Ironically, that same year the S.U.M. warned Standard against allowing its workers to use silk as toilet paper, causing the sewage pumps to clog (Susan Maxman Architects 1996:D95; S.U.M. Papers 1924a, 1924c, 1926a, 1926b).

4. Fire Protection

Fire was a constant threat in the mills due to the flammable materials present (dust, fibers, oils, etc.), the timber-framed construction of the mills and the presence of flame for heating and lighting. The risk from fire is illustrated by no less than nine documented fires at mills on the ATP site from 1828 to 1915 (Table 5.2). In the second quarter of the 19th century, the most common adaptation to fire protection in mills was the use of slow-burning construction using a continuous, thick wood floor of splined or tongue-and-grooved planks that retarded combustion. This technique was promoted by fire insurance companies that also popularized designs such as fire doors and isolated stairways that would retard the spread of a fire. In the latter half of the 19th century, many mill owners turned to the use of new structural materials such as iron, steel and reinforced concrete framing as a substitute to wood. The Todd Mill, for example, has fluted cast-iron columns that likely date to its reconstruction in 1872. However, most of the ATP mills remained predominately masonry with timber framing until steel came into use for new construction during the 1910s to 1960s (Sanborn Map and Publishing Company 1887; Sanborn-Perris Map Company 1899; Sanborn Map Company 1915, 1951).

The earliest fixtures for fighting fires in the mills were water buckets that could be used in an emergency. In theory, these buckets were kept at strategic locations and were to be filled with water at all times.

Table 5.2. Fires on the ATP Site, 1828-1915 (Source: Corbett 2010).

DATE	DESCRIPTION
3/12/1857	Mallory and Waverly Mills
12/20/1865	Waverly Mill, loss of about $10,000
7/24/1889	Kohlhaas Bros., Gun Mill, loss of $12,700, insurance of $11,500
7/20/1890	J.C. Todd Machine Shop, loss of $50,000, insurance of $61,000
11/3/1891	J.C. Todd Works, loss of $41,560, insurance of $81,250
6/28/1896	J.C. Todd Mill, loss of $84,868, insurance of $148,900
1/26/1901	Mallory Mill, loss of $31,881, insurance of $253,000
7/21/1906	F. Shumacker & Co., Waverly Mill loss $26,313, insurance of $145,000
4/2/1915	Robert Muller & others, Todd Mill, loss of $104,000, insurance of $191,200

This method was still in use in the Waverly Mill in the early 20th century as evidenced by a note in the S.U.M. records warning the Neuberger Silk Company for not having its pails filled and at the ready (S.U.M. Papers 1909). By 1887, all of the ATP mills were also supplied with fire hydrants, both inside and out, as evidenced by Sanborn Fire Insurance Company maps (Sanborn Map and Publishing Company 1887). This system certainly originated after John Ryle established the Passaic Water Company in the 1850s. Fire sprinkler systems came to be standard in the mills between *circa* 1890 and 1915. In 1908, for example, the S.U.M. installed a sprinkler system in the Waverly and Mallory mills. Water was supplied from a wood tank raised 15 feet above the Waverly's highest floor. This was only done after a careful analysis of the investment by the S.U.M. and the decision to assess the tenants an additional $500 per year rent to recoup the cost (S.U.M. Papers 1908).

C. STEAM

There were two stages of steam technology development on the ATP site. The first, which lasted from about the 1850s to 1910s was the use of steam to power engines as a supplement or back-up to waterpower. This hybrid system was typical of many 19th-century mills that originally grew at waterpowered sites but found that steam provided a means to expand their operations. The second stage of steam technology development was the establishment and expansion of boiler houses that primarily supplied steam for heat and processing in the dyeing and printing industries. This stage began in the late 1880s and reached its peak in the 1930s when the Standard Silk Dyeing Company's boiler house became the central steam plant for the site.

1. Steam for Power

In the 1850s and 1860s mills on the ATP site supplemented their waterpower systems with steam power. Steam complemented waterpower by providing a prime mover that could act as insurance when water supplies ran low. It also allowed manufacturers to expand their capacity beyond the S.U.M.'s waterpower leases.

None of the ATP site's mills was an early or innovative user of steam-power technology. By the early 19th century steam power was an already technologically viable alternative to waterpower, but efficient steam engines were not cheap and had high continuous operating costs of buying fuel and paying skilled labor to tend the engines. In places where waterpower was limited, some mills installed hybrid systems with steam engines that could keep a factory running during shortages of water. One such notable example was the Wilkinson Mill in Pawtucket, Rhode Island, that opened in 1811 with both a breast wheel and a steam engine (Malone 2009:176). In places like Paterson, where waterpower was relatively abundant in the early stages of development, there was little incentive to invest in expensive steam power. Once the S.U.M. and the owners of the mills had made the investment in waterpower, the costs to maintain that source of energy were relatively low. As a consequence, steam power was usually not adopted until the opportunities for improving the output from waterpower were exhausted and a mill's operations required the additional power.

The point at which Paterson's mills outgrew the capacity of the S.U.M.'s waterpower system can be judged by the timing of the adoption of steam-power technology. Between 1850 and 1860 some mills began to install steam engines (U.S. Census Office 1850, 1860). During the next decade, the situation changed rapidly. In 1868, Paterson's *Daily Guardian and Falls City Register* reported, "There is hardly a mill which does not make use of steam" (as quoted in

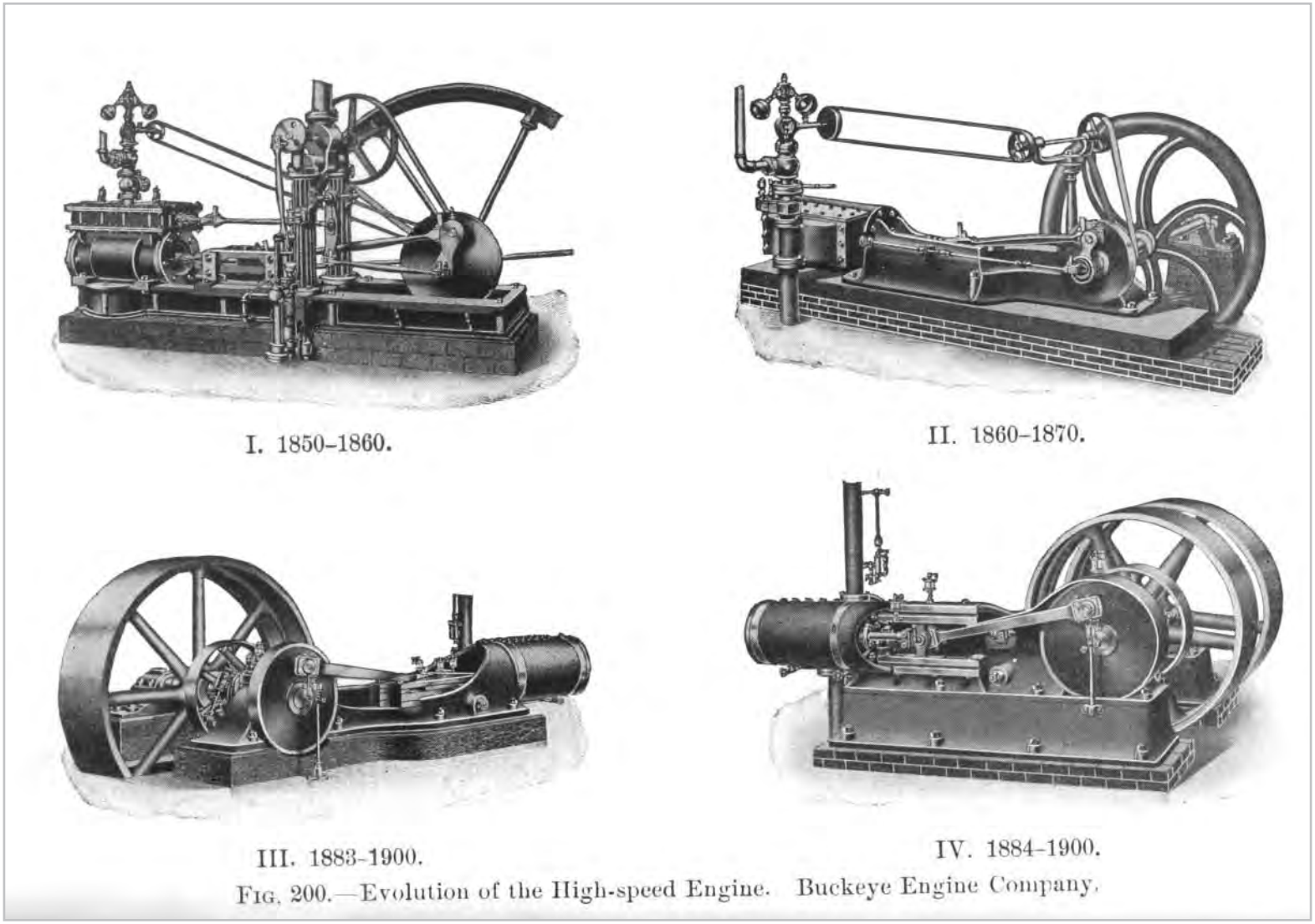


Figure 5.12. Typical Stationary High-speed Steam Engines Used for Mill Work, *circa* 1850-1900. There were many variations but this was the basic form of the engines likely to have been used at the ATP site. Source: Heck 1907.

Herz 1939). In the Great Falls district, steam served as an auxiliary or supplement to waterpower, allowing mills to have emergency back-up when water supplies ran low or to expand beyond the limits of the available waterpower. Steam power was almost never a replacement for waterpower.

At the center of a mill's steam-power system was typically a high-speed stationary engine (Figure 5.12). In operation, steam was used to push a piston sliding inside a cylinder to turn a crank shaft that converted the back and forth motion of the piston into rapid rotary motion. A flywheel, perhaps the most visually striking component of an engine, steadied the rotation of the shaft because of the uneven torque applied as the piston pumped. Energy was then transferred to machines through gears, shafts, pulleys, and belts in the same fashion as a waterwheel, although primary gear set ratios would be adjusted to make up for the difference between the high rotary speed of a steam engine as compared to a waterwheel. Heat to produce steam was obtained by burning a fuel, usually coal in the 19th century with transition to oil in the 20th century. Heat was transferred to the water in a boiler (Figure 5.13). The basic form of high-speed stationary steam engines did not change radically from the 1850s to 1900s, although there were refinements in the design of components such as bed plates, valves, guides, etc.

Numerous makes and models of steam engine were available. Much like turbines, engine builders advertised various, mostly minor, variations in operating features and details to distinguish their engines as superior to those of other builders. Operating speed and power output were critical to matching an engine to a mill's specific power needs and machinery. By the 1850s, hundreds of shops across the country were marketing steam engines, including the Todd & Mackey Company. Todd was an established maker of textile machinery and branched out to fabricate steam engines, including marine engines for ships and stationary engines for mills. This was a natural transition since Todd's machine shop and foundry offered the same tools and skills needed to fabricate and assemble an engine. In 1857 Todd reportedly manufactured its first engine (Susan Maxman Architects 1996:100). An etching illustrates a stationary steam engine in the Todd Mill's yard, but since this engine is not protected by a roof, it is presumed to be a finished engine being readied for shipping (Figure 5.14).

Evidence of the year of installation and make of stationary engines in use on the ATP site is fragmentary. In 1860 the U.S. Census Office schedules reported that the Gun Mill had a steam engine supplementing its waterwheel. This corresponds with reports that John Ryle had installed an engine in 1857 to pump water for the Passaic Water Company. Miller's 1874 map of Paterson notes that the Gun Mill had an 80 hp engine, and the 1887 Sanborn map documents a 100-foot-high chimney at the southeast corner of the mill adjacent to the boiler house. The 1915 Sanborn map confirms that the hybrid steam and waterpower system remained in operations with a 100 hp waterwheel and a 75 hp engine (U.S. Census Office 1860; Miller 1874; Sanborn Map and Publishing Company 1887; Sanborn Map Company 1915).

Curiously, the 1860 census schedule does not report steam power in use at the Todd Mill even though that company built engines and in some company histories is stated to have adopted steam power in the mid-1850s. The 1870 census schedule lists a 10 hp engine in use at the Todd Mill in addition to the two 30 hp waterwheels. During the next decade, the use of steam power expanded rapidly at the Todd Mill. An inventory of the site taken in 1883 lists five steam engines in service along with two additional engines and a boiler presumably manufactured by Todd but unsold. The 1887 Sanborn map shows the Todd Mill's boiler house as located in an addition to the rear of the crook of the L-shaped main mill building. The in-service engines included four stationary engines with strokes from 15 inches to 24 inches indicative of high operating speeds suitable for powering machine tools. Todd also had a fifth portable engine with a 12-inch stroke, which presumably could be moved about

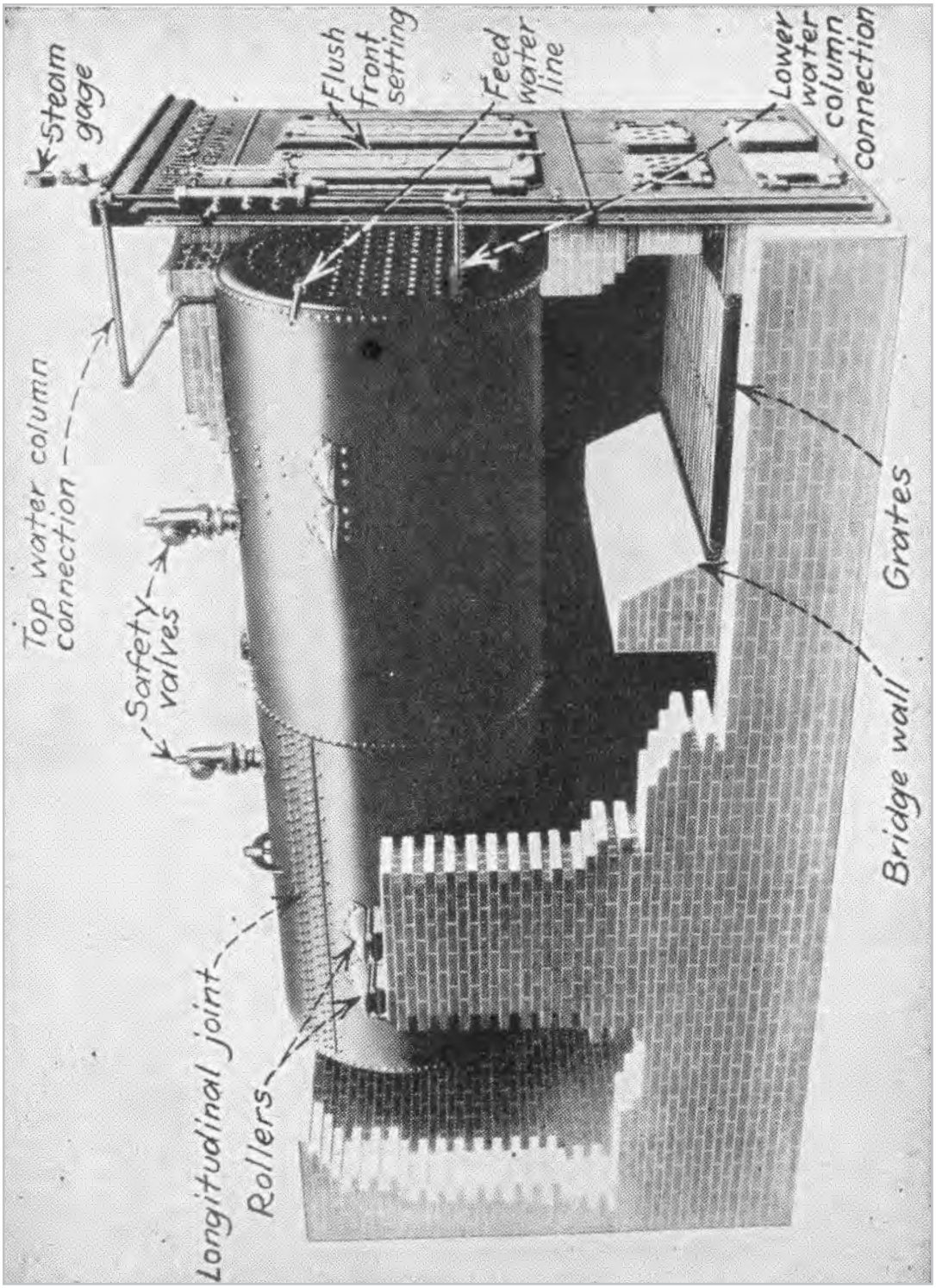


Figure 5.13. Typical Horizontal-tube Boiler with Nomenclature. Boilers similar to this were found on the ATP Site. Several boilers of similar design were often employed to provide steam to the dye houses. Source: Woodruff and Lammers 1950.

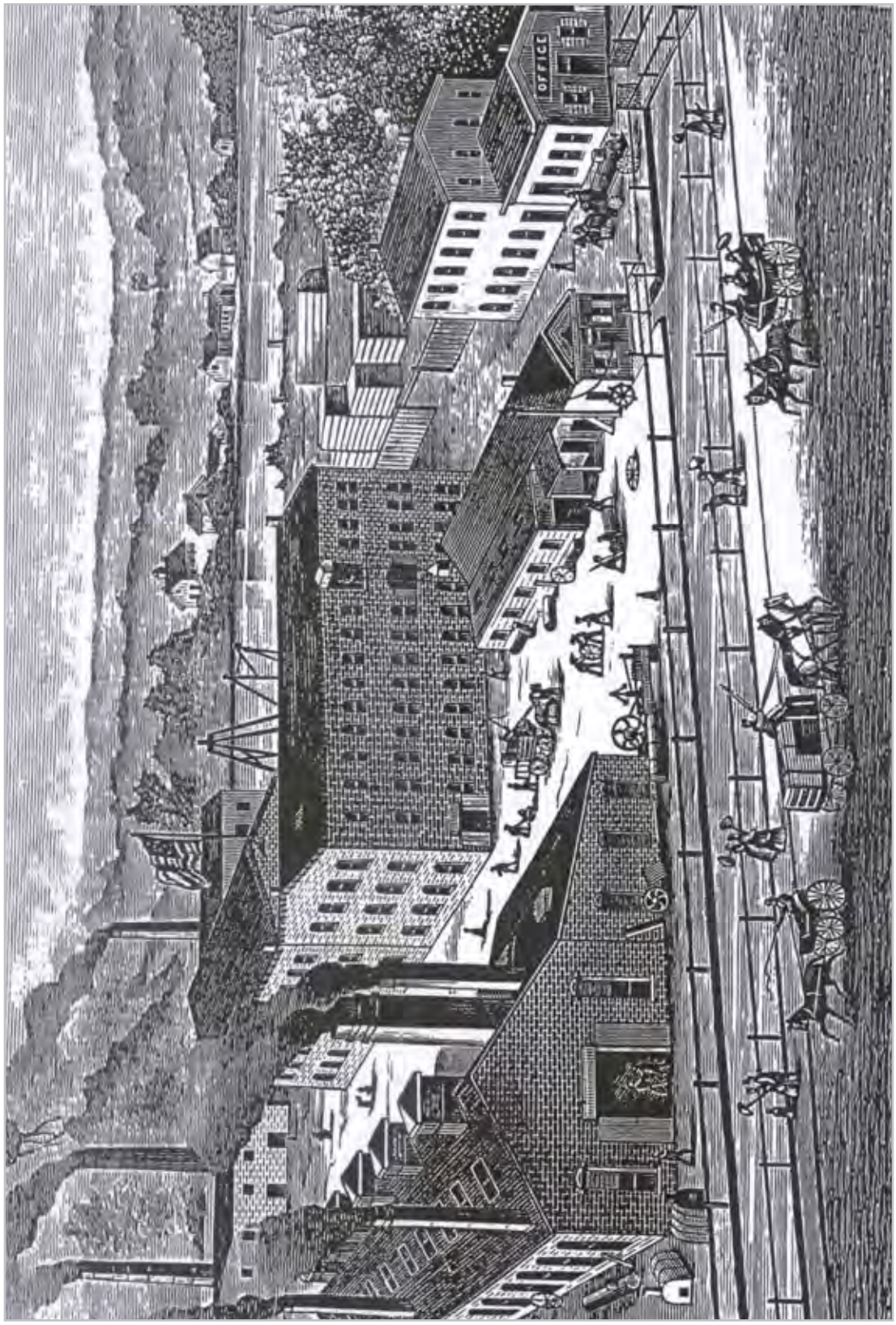


Figure 5.14. Etching of the Todd & Rafferty Machine Works. Note the stationary steam engine in the mill yard, discernible by its distinctive flyball governor. It is likely this engine is not in operating position but is in the yard being readied for shipping or was added by the illustrator as an indication of one of the products of the works. Source: Trumbull 1882.

the yard as needed (U.S. Census Office 1860, 1870; Sanborn Map and Publishing Company 1887; Passaic County Deed Q7/29).

There is far less accurate documentation for the use of steam power in other mills on the ATP site (Figure 5.1). The Passaic Mill would appear to have always relied on waterpower. The 1887 and 1899 Sanborn maps show no boilers, and the 1915 Sanborn map shows two boilers but there were probably to provide steam for processing in the Standard Silk Company's dye house. By 1874 a boiler house had been built in the alleyway between the Mallory and Waverly mills, but the number of boilers (six) is suggestive that its primary purpose was steam supply for processing, not powering a steam engine, although that too was a possibility. Also in 1887, the Kohlhaas Brothers silk ribbon weave shop in the complex of buildings along the river on the Gun Mill lot was employing a vertical boiler, presumably for powering an engine that ran the looms. There was also a boiler in a small building adjacent to the North Gates Waste Way outlet that may have been used to power an engine that drove a water pump. The rock crusher in the quarry also ran on a steam engine (Sanborn Map and Publishing Company 1887; Sanborn-Perris Map Company 1899; Sanborn Map Company 1915).

There seems to be little exceptional about the use of hybrid water and steam power systems at the ATP site in the last half of the 19th century. The expansion of steam power was in keeping with trends in New Jersey, as was the continued reliance on waterpower. Between 1870 and 1880, waterpower declined from producing 44 percent of industrial power in New Jersey to providing about 27 percent of power. Nonetheless, in 1880 there were 2,226 waterpowered establishments in New Jersey with 1,213 wheels. There were 1,619 steam engines and 2,253 boilers (U.S. Census Office 1883:493-497).

2. Steam for Heating and Processing

In the years between 1880 and 1915, the use of steam on the ATP site transitioned from being used mostly for power to being used mostly for "hot" processes associated with the dyeing and printing of silk and other fabrics (Plates 3.26 and 5.1). In these processes, the various washes and chemicals applied to the textiles either had to be applied with heat or the textiles themselves had to be kept warm and moist for workability. In fact, silk worked better when warm and moist; silk works often kept the thread and yarn in steam chests. Boiler houses expanded in size and became among the most visually dominant features of the site. By 1915, the principal boiler houses were located: 1). on the west side of the Passaic Mill, then being used as a dye house by the Standard Silk Dyeing Company (S.U.M. Papers 1909); 2). on the west side of the building to the rear (against the river) of the Waverly Mill, also being used as a dye house by Standard (S.U.M. Papers 1917a); and 3). in the complex of buildings to the rear of the Gun Mill in the former Knipscher & Maass facility, then being operated by the Globe Dye Works (Sanborn Map Company 1915). The boiler houses remain to this day among the most readily identified components of the site because of the remains of the boilers and the two tall smokestacks (Plate 5.11).

Boilers are closed vessels in which water, under pressure, is transformed into steam by heat. Boilers come in a variety of sizes and designs, but the basic features are a firebox in which fuel is burned to create heat and a series of tubes through which the heat flows. Boilers can be of either the "fire-tube" variety in which the heat flows through the tubes and is surrounded by water or the "water-tube" variety in which the heat is forced to pass around a number of small tubes filled with water. Boilers are also classified by the orientation of the tubes either horizontal or vertical. It is usual for the boiler to be clad in an insulating material, like asbestos.

Plate 5.11. Standard Boiler House. Source: Patrick Harshbarger, 2009.

During the 19th century boiler design evolved to address improvements in safety, capacity, and efficiency and economy of operation. Boilers were also adapted to a variety of fuels, most commonly coal or oil. In the mid-1920s, the Standard Silk Dyeing Company's boilers were still fired by coal but by 1951 the boilers had been converted to fuel oil, which was stored on site in underground tanks. The trend in boiler design over time was toward larger boilers and fewer of them. For example, though the 1887 Sanborn map shows 11 boilers on the ATP site and the 1915 map shows the number has only increased to 14 boilers, the later boilers were much larger and higher capacity (Sanborn Map and Publishing Company 1887). It was general practice in steam-plant design to match boilers so that they were the same size, type and capacity for uniform operating procedures.

The purpose of the boiler house smokestacks was to carry away the smoke from burning fuel. The Standard Silk Dyeing Company brick stack with its distinctive "SSD Co" initials is 120 feet high with a diameter of 10.5 feet at the base (Susan Maxman Architects 1996:D74-D75). A properly operating boiler burned at a high temperature and actually created very little visible "black" or heavy white smoke unless using a poor quality fuel with a high level of non-combustibles. Burning cleanly was very important at textile finishing operations because soot from the stack could quickly ruin the finished product. In 1924, for example, the manager of the Standard Silk Dyeing Company wrote the S.U.M. to complain that the S.U.M.'s steam plant (located just upstream) had belched black smoke with the pollution ruining a lot of silk. The S.U.M. replied that this was a rare event, that Standard's boiler plant operated in a similar manner, and that it had been observed also emitting black smoke from time to time (S.U.M. Papers 1924d, 1924e).

From about 1916 to 1958, steam was also supplied to the Waverly, Mallory and Gun mills from a central steam plant operated by the S.U.M. (Eastern Inspection Bureau 1950; SEA Consultants, Inc. 1994:23). The S.U.M. owned these mills and supplied steam to the tenants, which were mostly silk weavers and throwsters in these years, although some floors were also rented out to the Standard Silk Dyeing Company (Plate 5.12) (S.U.M. Papers 1931, 1932). The S.U.M.'s steam plant was located upstream of the ATP site at what is now the Overlook Park (Plate 5.13). The concrete foundations of the plant are all that remains today. The plant was built in 1915 as the auxiliary to the S.U.M.'s hydroelectric plant. The primary purpose of the coal-fired plant was to generate steam for electric generation when the hydroelectric plant could not meet demand due to low water. It also provided steam to about a dozen factories. Steam was delivered to the factories via a system of pipes. The easterly arm of the S.U.M.'s steam line ran along the Middle Raceway, crossing over the spillway to the south of the Gun Mill and then over to the Mallory and Waverly mills (Plates 5.2 and 5.3).

By the mid-1950s, the Allied Textile Printing Company had consolidated its steam-plant operations in the plant at the rear of the Gun Mill property. This boiler house was known as the "Standard" to differentiate it from the "Regal" boiler house (named after the Regal Dye & Print Works, a subsidiary of Standard), which was attached to the Passaic Mill. The Regal was operated only on stand-by when the Standard boiler house was down for maintenance. In 1958 the City of Paterson, which had purchased the S.U.M.'s properties in 1945, shut down the S.U.M.'s central steam plant, reportedly following a lightning strike that fused an aperture. It was also evident that the plant was not profitable. The dozen or so mills formerly served by the S.U.M.'s plant were subsequently served by the Standard boiler house, which in effect became the central steam plant for the Great Falls district. The Standard boiler house used the S.U.M.'s old steam lines via a connection that was made at the north end of the Middle Raceway. The connecting line appears to have run up and over the roof of the Gun Mill. In the 1970s only about two percent of the Standard's steam production was piped to mills not on the ATP site (Sargent 1979:4).

Plate 5.12. Interior view of the Standard Silk Dyeing Company, *circa* 1927. Note the numerous pipes for delivery of steam and water. Source: Albert H. Heusser, *The History of Silk Dyeing Industry in America*, 1927.

Plate 5.13. The S.U.M. steam plant under construction, looking southeast, *circa* 1915. The steam plant's primary purpose was to generate electricity in back-up of the hydro-electric plant when water flow in the Passaic was low. It also supplied steam for heating and processing to about a dozen mills, including the Waverly/Mallory mill complex. After the steam plant shut down in 1958, the ATP's Standard boiler house took over as the central steam plant for the district. Source: Paterson Museum Collection.

D. ELECTRICITY

1. Electric Lighting

The first use of electricity on the ATP site was for electric lighting. Mill operators were among the earliest and most enthusiastic customers of electric utility companies. Lighting had long been a thorny challenge in mills. Traditional forms of lighting from candles to oil lamps, and even later gas lighting, which was introduced to Paterson in the 1850s, had the drawback of introducing a source of possible combustion into a working environment full of flammable materials, particularly the dust and lint from textiles. Fire was the mill owners' greatest fear. The architecture of mills evolved to prevent or slow down fires with thick, tightly-formed, slow-burning timber floors and the adoption of iron framing. It also evolved to allow as much natural light as possible to enter the mills with long strips of windows and clerestory or saw-tooth roofs, but some form of artificial light was still necessary.

During the 1880s improvements in electric lighting technology allowed it to spread throughout the mills in the Great Falls district. Reportedly, the first attempt to introduce electric light in Paterson was made at the Gun Mill in 1883. Two tenants of the mill, George F. Matthews and John F. Noonan, installed a small dynamo for arc lighting that was apparently operated by power taken from the Gun Mill's water or steam power systems. After a short time, for unknown reasons, this apparatus was removed to the Barbour Flax Spinning Company where it ran off of waterpower and supplied electric light to the Barbour and adjacent mills. In 1886 this operation was formally organized as the Paterson Electric Light Company with a new power station built on Dale Avenue.

Although a pioneer in electric lighting in Paterson, the Paterson Electric Light Company went out of business in 1890 in large part due to competition from the Edison Electric Illuminating Company, a firm synonymous with electric lighting due to its association with Thomas A. Edison and his improvements in light bulbs and electric generation and transmission systems. Formed by Edison and investors in 1880-81, the Edison company had its first installation in New York City. The success of this venture resulted in franchises in other cities due to the demand for electricity. In 1888, Paterson businessmen, including William T. Ryle, invested in an Edison company plant located on Paterson Street in the former facilities of the Weidmann Silk Dyeing Company. It soon outgrew this plant and relocated into a larger facility built at the corner of Van Houten and Prospect streets, not far from the ATP site. In 1903 this plant was purchased by the Public Service Company as part of its consolidation of regional utilities (Nelson and Shriner 1920:420-21).

The various mill owners and tenants of the ATP site in characteristic fashion did not adopt electric lighting at the same time but transitioned to it over the course of several decades. Despite the obvious advantages of electric lighting, it did require a modest capital investment, toward which the mix of landlords and tenants likely had varying attitudes. By 1899 electric lights were in use exclusively in the Todd, Waverly and Mallory mills. The dye house of Knipscher & Maass was using a combination of electric and gas lighting. Gas lighting was still in use exclusively in the Passaic Mill and the Gun Mill, which, ironically, had been the first to briefly have electric light in 1883. While most of these mills purchased electricity from the local utility, the firm of Baker & Scofield, silk weavers who occupied several floors of the Waverly and Mallory mills from about 1904 to 1925, reported having their own electric generator for lighting. This generator was run off the steam engine. By 1915, all of the site's mills had electric lighting (Sanborn-Perris Map Company 1899; S.U.M. Papers 1914b; Sanborn Map Company 1915).

2. Electricity for Industrial Power

Electric motors adapted to industrial purposes were somewhat slower to develop than the electric lighting technology and met with greater skepticism by factory managers. The first use of an electric motor in a factory was usually for its elevator, since this was far superior to steam or hydraulics for this application, and widely promoted by the Otis Elevator Company. Applying electric power to the direct-drive of textile machinery, in particular, was made difficult by the different power and speed requirements of particular processes, and most textile machines required steady speeds, meaning that motors had to be carefully regulated and able to quickly adjust to variable loads. Installation required considerable technical knowledge as well as willingness to modify mills to a system of numerous motors supplied by electric current as opposed to the original design of centralized, direct waterpower and steam drive. Much incremental improvement in electric transmission and motor technology was required and much of the knowledge to be successful was not readily available in the 1880s or 1890s. Direct-current systems (DC), initially promoted by Edison, also posed a problem in mills since DC motors sparked, causing a potential fire hazard. The preferred alternative was powerful alternating-current (AC) induction motors, but these were not commonly available until the early 1900s (S.U.M. Papers 1914c; Gordon and Malone 1994:317-19).

Textile mill operators traditionally resisted complete conversion to electric drive either because they were satisfied with the direct-drive waterpower systems or had no desire to make the investment. Thus it is not surprising that the textile-dominated Great Falls district and the ATP site were rather slow to convert to electric power. One of the earlier ATP site concerns to use electric power in limited fashion was likely the Liberty Silk Dyeing Company, located in the dye house adjacent to the river at the rear of the Waverly Mill lot. In 1906 Liberty reported that it had a dynamo, operated off of a steam engine, used to supply electricity through new wiring to three drying machines (S.U.M. Papers 1906). As late as 1915 the Todd Mill was the only mill on the ATP site to have completely converted to electric power operations (Sanborn Map Company 1915).

Textile mills in the Great Falls district and ATP site may have resisted electric conversion well into the 1920s, as did their counterparts in cities like Lowell, Massachusetts, except for the decision of the S.U.M. to build a central hydroelectric plant that began supplying the district in 1914-15. The S.U.M.'s managers had been debating the benefits of a hydroelectric plant at the Great Falls since at least 1899 but had moved ahead cautiously. In 1894 the S.U.M. had become a subsidiary of the New Jersey General Security Company, which also owned water-supply companies in the region, including the Passaic Water Company that supplied the City of Paterson. The concerns of the S.U.M.'s managers stretched beyond supplying power to the mills to a host of other considerations associated with maximizing the efficient use, and profit from, the Passaic's waters (S.U.M. Papers 1899, 1910, 1913, 1930; TranSystems Corporation 2008:8-9).

After considerable study of the situation, the S.U.M.'s hydraulic engineer, John H. Cook, began advocating the construction of a hydroelectric plant. In 1903, the S.U.M. made an initial venture into generating electric power by installing a large dynamo run by waterpower at the Ivanhoe Mill, but the ultimate goal was a large plant located at the base of the Great Falls. Cook reported that a plant at the Great Falls could produce the same horsepower as the factory waterwheels using 43 percent less water. This would free up 170 cubic feet per second of water for other uses. The wildcard in this equation was whether such a plant could be profitable, especially in light of the considerable capital outlay for construction (about $500,000) and the seasonal variations in the Passaic's flow (S.U.M. Papers 1899, 1903, 1911c).

In 1910-11, the S.U.M. commissioned an independent study of the hydroelectric capacity by consultants Westinghouse-Church-Kerr & Company. They reached the conclusion that an auxiliary coal-fired steam plant would be necessary since the water volume over the falls would be insufficient to produce enough electricity to supply the S.U.M.'s industrial customers some fifty days annually. A dependable central-steam supply was also critical to the success of the venture for another reason. As mentioned earlier, most of the factories at the Great Falls relied on a combination of steam and waterpower. The factories had boilers supplying steam to engines and various industrial processes that required heat. While electricity might replace the factories' power needs, it could not replace the steam needed for heating the buildings and the hot processes. To convince the mill operators to switch to electricity, the S.U.M. strengthened its position if it were able to also offer steam at a cost that was lower than the mills could produce it themselves. The argument was that the S.U.M.'s central steam plant would be more efficient and would allow the factories to shut down their boilers. Factory managers could cut their operating costs since they wouldn't have to buy coal or employ the firemen and engineers who tended the engines and boilers. The argument persuaded some but not all of the factory managers. The Standard Silk Dyeing Company, for example, purchased steam from the S.U.M. to operate facilities in the S.U.M.-owned Waverly and Mallory mills in which Standard was a tenant, but maintained its own steam plants to supply other parts of the site (S.U.M. Papers 1910, 1911c).

Construction of the S.U.M. hydroelectric plant was completed in 1914 (Plate 5.14) and was followed by the opening of the S.U.M. steam plant in 1915. The construction had a direct impact on the west end of the ATP site since the S.U.M. deepened the river's channel several hundred yards downstream from the falls to increase the head at the power plant and provide unobstructed flow of the water away from the tail race. This construction involved tearing down the Standard's dam upstream of the old quarry and eliminating that intake as a source of water for processing. Standard sued but lost in court since the S.U.M. held the riparian rights. The S.U.M. also used the old quarry as an area to dump waste rock from its construction (S.U.M. Papers 1912b; Engineering Record 1913).

The S.U.M. used a variety of tactics to convince its industrial customers to give up their direct-drive systems and switch to electricity. It offered favorable rates and financial or technical assistance to electrify in exchange for renegotiation of existing long-term water leases that relinquished the water back to the S.U.M. where it could then be diverted to other more profitable uses (S.U.M. Papers 1914c). By the late 1910s, the S.U.M. had largely achieved the goal of converting the Great Falls district to electricity. The Standard Silk Dyeing Company, for example, installed 30 electric motors aggregate of 44 hp in June 1917. Interestingly, Standard initially failed to install motors that were in phase with the S.U.M.'s electric system, perhaps an indication of how poorly the textile industry understood the new power technology. The S.U.M. specified 3 phase, 60 cycle, 440v motors up to 50 hp (S.U.M. Papers 1917b, 1917c). As an aside, although the S.U.M.'s purpose in building the hydroelectric plant was to supply power to the mills, according to the S.U.M.'s own records about three-quarters of the electricity produced at the Great Falls Power Plant from the late 1910s to 1920s actually was sold to the Public Service Company for distribution to the grid (S.U.M. Papers 1918). This was because the plant was capable of producing far more power than needed by the S.U.M.'s customers during favorable periods of high water flow. The main purpose of electrification, however, was to rebalance water distribution with more water going to non-power uses. In 1924 the S.U.M. reported that more than 83 percent of the water above the Great Falls was being diverted to non-power generating uses (Herz 1939).

Motor drive systems did eventually prove advantageous to the owners and tenants of the ATP's mills (Plates 5.15 and 5.16). Within the mill buildings, there

Plate 5.14. The S.U.M. Great Falls Power Plant, looking west, *circa* 1915. The hydroelectric plant opened in 1914. Electrification allowed the S.U.M. to convert the mills from waterpower to electricity, with a substantial savings in water, since the power plant could produce as much power with half the water. It was a major factor in the abandonment of the direct-drive mill water and steam-power systems at the ATP site. Source: Paterson Museum Collection 2009.

Plate 5.15. Electric drop on a silk throwing mill, 2007 [Klotz Throwing Mill, near Cumberland, Maryland]. The electric drops at the ATP site are now in the rubble, but electrification allowed for electric lighting and the powering of machines by individual motors. Source: Patrick J. Harshbarger 2009.

Plate 5.16. A silk throwing machine with electric motor, 2007. [Klotz Throwing Mill, near Cumberland, Maryland]. Compact motors allowed mill operators greater flexibility in locating machines. Electric power had been applied to machines at the Todd Mill prior to 1915. The other mills at the ATP site fully electrified after the S.U.M. power plant opened in 1915. Electric operations also allowed landlords of the ATP's mills the flexibility of renting out space to tenants without having to regulate central direct-drive power systems. By 1915, all of the ATP's mills were tenant mills. Source: Patrick J. Harshbarger, 2009.

were substantial savings from the reduction or elimination of shaft drives that required constant maintenance and lost energy to friction. Small motors were portable and allowed managers to change a plant's layout quickly and inexpensively. The motors also gave a wider choice of operating speeds and feeds, thus better control of machinery. Landlords, like the S.U.M. and the John Ryle Real Estate Association, found it easier to rent space in the mills to small operators without having to worry how to transmit and divide power from a central direct-drive system. The larger textile dyeing and printing concerns, like Standard, no doubt found it easier to expand their facilities into areas like the quarry and in-between older mill buildings due to the increased flexibility.

The S.U.M.'s power plant was a profitable enterprise at least until the Great Depression when its industrial customers began to feel the effects of the economic downturn. The Standard Silk Dyeing Company, for example, went bankrupt in 1931 owing the S.U.M. over $10,000 in back payments for electricity (S.U.M. Papers 1931, 1932). In 1945 the City of Paterson purchased the S.U.M.'s assets and entered into an agreement with Public Service Corporation (PSC), renamed Public Service Electric & Gas (PSE&G) in 1948, to operate the hydroelectric power plant, at which point the ATP site began purchasing electricity from the utility. PSC had emerged as northern New Jersey's regional electric and gas utility with the amalgamation of more than 400 electric, gas, and transportation companies nearly a half-century earlier in 1903. It seems worth noting that the S.U.M. power plant was considered a very minor component in PSE&G's operations. As with most power utilities, the trend at PSE&G was toward ever larger central facilities, not small plants, like the S.U.M.'s. In 1969, PSE&G chose not to renew its lease with the city, citing as reasons the plant's age, need for capital improvements and limited generating capacity (TranSystems Corporation 2008:19-20).

E. SYNTHESIS

In 1791 Alexander Hamilton and the directors of the S.U.M. made a profound decision to harness the power in the Great Falls to industrial purposes. This transformative decision set in motion an incredible series of historical events, intended and unintended, that continue to lead us toward an appreciation of the evolving story of man's fascination with exploiting natural energy resources for productive applications. The core of this story is technological, but its tendrils reach out to touch upon many topics economic, social and political.

One of the threads that can be followed through the history of the ATP site is the evolving use of industrial power to drive machines. The ATP site's most significant historic asset may be the remaining evidence of the waterpower system on which all that followed was established. These assets include the power canals constructed by the S.U.M., the mill head races and tail races, the wheel pits, and the footprints of the early waterpowered mills. These were the location for the development of important textile and machine tool industries that played a significant role in the development of Paterson. Now that the ATP site is in ruins, this early waterpower layer is open to industrial archaeology and potentially to interpretation.

This style of waterpower development, which was loosely coordinated by the S.U.M. once the investment had been made in the three-level power canal system, may be in fact more typical of American waterpower development than the one found, for example, in Lowell, Massachusetts, where a close organizational relationship existed between the power system and the mills allowing for a very high degree of coordination and the development of an extraordinarily advanced waterpower system. Significantly, the S.U.M. never strove for this level of control nor applied as high a level of scientific management to its operations. In Paterson, as illustrated by the ATP site, a more diverse pattern of industrial use developed with individual

manufacturers adjusting, as opportunity permitted, to alternative power technologies while at the same time recognizing the value of maintaining a fixed investment in waterpower.

Later development of steam and electric power at the ATP site followed typical, even if generally complex, patterns. In the 1850s mills began to install steam engines but this was to supplement existing waterpower, not replace it. Even as late as 1915, some mills were running primarily on waterpower. In 1883 electric power came into use, first in the form of generators for electric lights at the Gun Mill. But again, technological transitions often overlapped or were uneven and, as late as 1915, several mills were still using gas lights either alone or in combination with electric lights. In the 1890s direct-drive electric motors became available as the prime movers of machinery, but it was not until the construction of the S.U.M.'s 1914-15 hydroelectric plant that all manufacturers switched to electricity. The timing of adoption for a new power technology was particular to each manufacturer with, for instance, the Todd machine shop installing a steam engine while the adjacent Passaic silk mill was upgrading to a turbine. These choices reflected different approaches to achieving the same end of increasing usable power. Unfortunately, much of the physical evidence of the ATP's later steam and electric power development now lies in complete ruins.

The competition for water resources at the ATP site is a compelling story that intertwines with the story of industrial power. As early as the 1850s, the Gun Mill played an important role in supplying the city with potable water. The Passaic Water Company vied with the S.U.M. and other water companies up and down the Passaic for control of the river's waters. During the 1880s silk dyeing concentrated at the ATP, adding another demand on water resources that were already stretched thin and heavily compromised by pollution. Out of a chaotic period of competition for water resources, a relatively balanced system was re-established by a re-allocation of water resources, including finding adequate water supplies for the silk dyeing industry. Electrification was a piece in the puzzle of returning balance to the system since it freed up water for other uses. Today, we live in a time when society is once again examining energy needs and ways of supplying and delivering power. It is important to recognize that these choices are not new and that technological adaptation and creativity has at times provided the ability to adjust and successfully rebalance.

Chapter 6

THE MILL SITES

A. THE MOUNT MORRIS QUARRY

A large rock outcrop known as Mount Morris once occupied the western end of the ATP site. The Society for Establishing Useful Manufactures (S.U.M.) may have established a quarry here as early as the 1790s. Pierre L'Enfant noted in a letter written to Alexander Hamilton in 1792 that "stone is extracting from the quarry" (quoted in Fries 1975:84). Tradition holds that Mount Morris was the location of this early quarry, as the S.U.M. owned this property in 1792 (Passaic County Deed F2/100) and quarrying operations were certainly occurring at this location in the 19th century (see Table E.1. for chain of title). The gradual reduction of Mount Morris by quarrying activity through the 19th century paved the way for industrial development of this part of the ATP site by the end of the century (Plate 3.18).

Though the S.U.M. didn't formally sell any of the quarry property until 1853, a letter written from Samuel Colt to Christopher Colt in 1836 indicates that when the Patent Arms Manufacturing Company acquired the rights to the Gun Mill property in 1836, the company also acquired rights to 450 feet of land between the ridge and the Passaic River (University of Rhode Island University Archives, Group 78, Box 11, Series II, Folder 3). The Colts' actual or intended use of this property remains unknown, however. There is no evidence that buildings were constructed on any part of this property before 1887. In that year, the only building in this location was a steam-powered rock-crushing mill that had certainly operated in conjunction with the Mount Morris quarry (Figure 6.1a; Plate 3.16).

The first industrial concern to occupy the quarry property was the silk dyeing business of Knipscher & Maass. In 1887, W.E. Knipscher started his dyeing business in the riverfront buildings at the rear of the Gun Mill (Shriner 1890:206). The company occupied the site until 1908 during which time they expanded to the south and west across the Middle Raceway with the construction of new dye houses, storehouses, boilers, an office and a vault (Figures 3.9 and 3.10) (Susan Maxman Architects 1996:D78). During this time the property suffered damage from the great flood of 1903, but the buildings were repaired by 1907 (Susan Maxman Architects 1996:D81).

In 1908, Knipscher & Maass and four other silk dyeing companies merged to form the National Silk Dyeing Company (Parsons 1928:315). It is unclear whether the National Silk Dyeing Company continued to use the quarry site. A.H. Mueller's *Atlas of the City of Paterson, New Jersey* (1915) (Figure 3.11) shows the National Silk Dyeing Company occupying the buildings on the west side of the Middle Raceway under lease from the John Ryle Real Estate Association, while the Sanborn Map Company's *Insurance Maps of Paterson, New Jersey* published the same year (Figure 6.2a) labels all of the buildings west of the raceway as vacant.

Another silk dyeing enterprise, the Standard Silk Dyeing Company, occupied the site by 1927. By then, this company already had a presence elsewhere on the ATP site, having previously occupied the old Passaic Mill and the dye houses behind the Waverly Mill (Susan Maxman Architects 1996:D87). By 1927 the Standard Silk Dyeing Company occupied the former Knipscher & Maass/National Silk Dyeing Company buildings and began to expand the site westward. They

Figure 6.1a. Sanborn Map and Publishing Company. *Insurance Maps of Paterson, New Jersey.* 1887. Scale: 1 inch= 75 feet (approximately). Quarry portion of Allied Textile Printing Site is outlined.

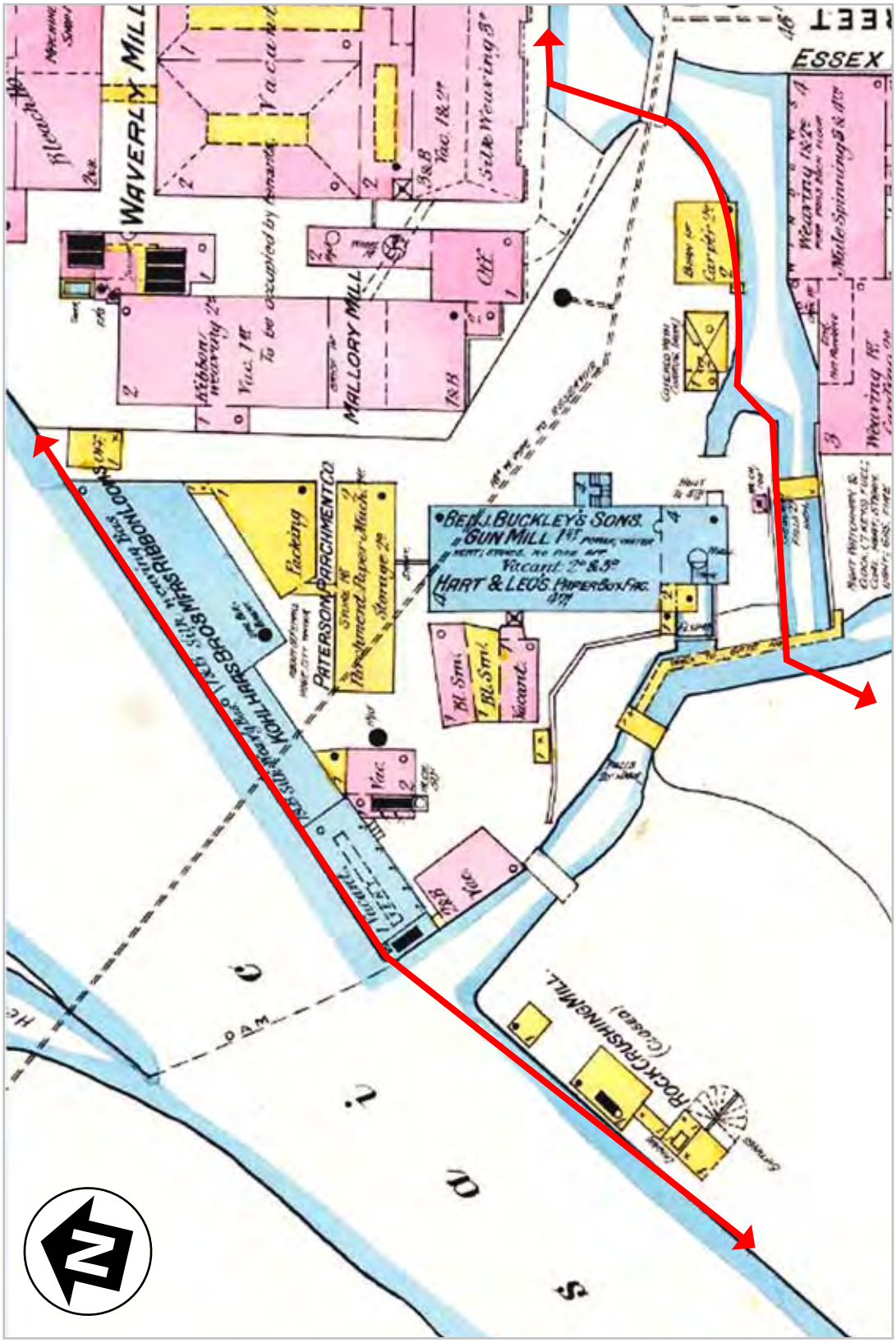


Figure 6.1b. Sanborn Map and Publishing Company. *Insurance Maps of Paterson, New Jersey.* 1887. Scale: 1 inch= 75 feet (approximately). Gun Mill and Mallory and Waverly Mills portions of Allied Textile Printing Site are outlined.

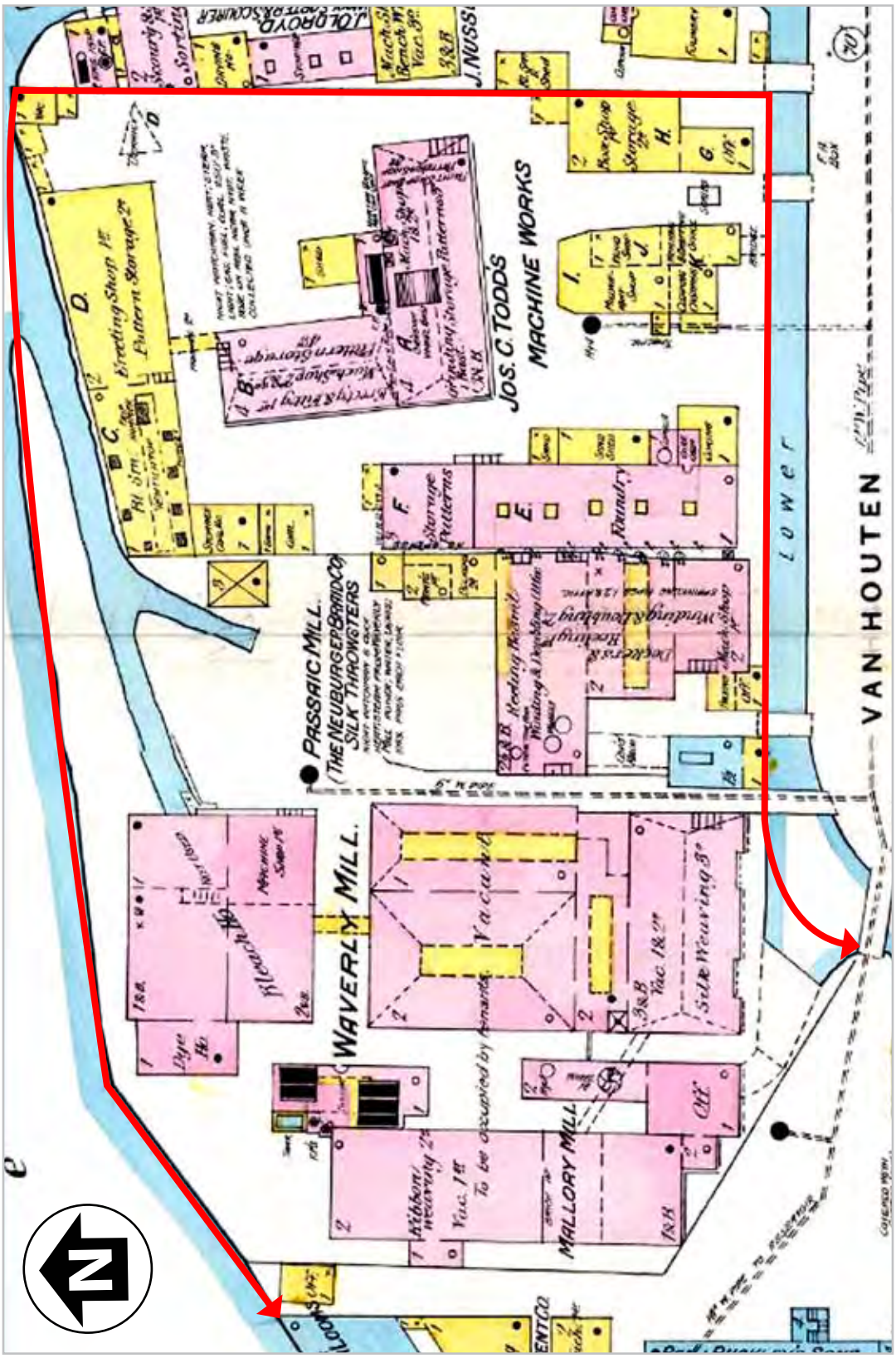


Figure 6.1c. Sanborn Map and Publishing Company. *Insurance Maps of Paterson, New Jersey.* 1887. Scale: 1 inch= 75 feet (approximately). Mallory and Waverly Mills, Passaic Mill and Todd Mill portions of Allied Textile Printing Site are outlined.

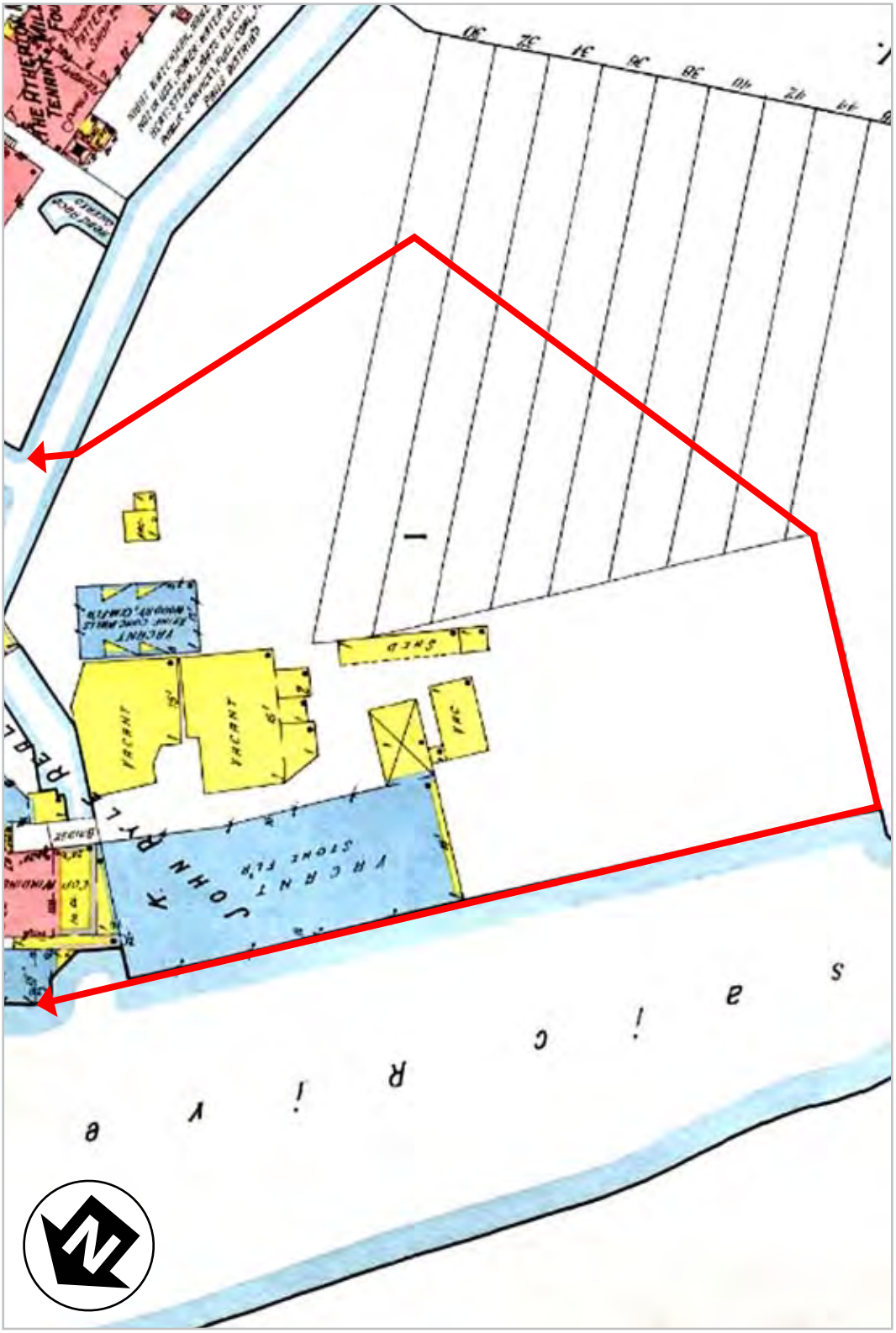


Figure 6.2a. Sanborn Map Company. *Insurance Maps of Paterson, New Jersey.* 1915. Scale: 1 inch= 75 feet (approximately). Quarry portion of Allied Textile Printing Site is outlined.

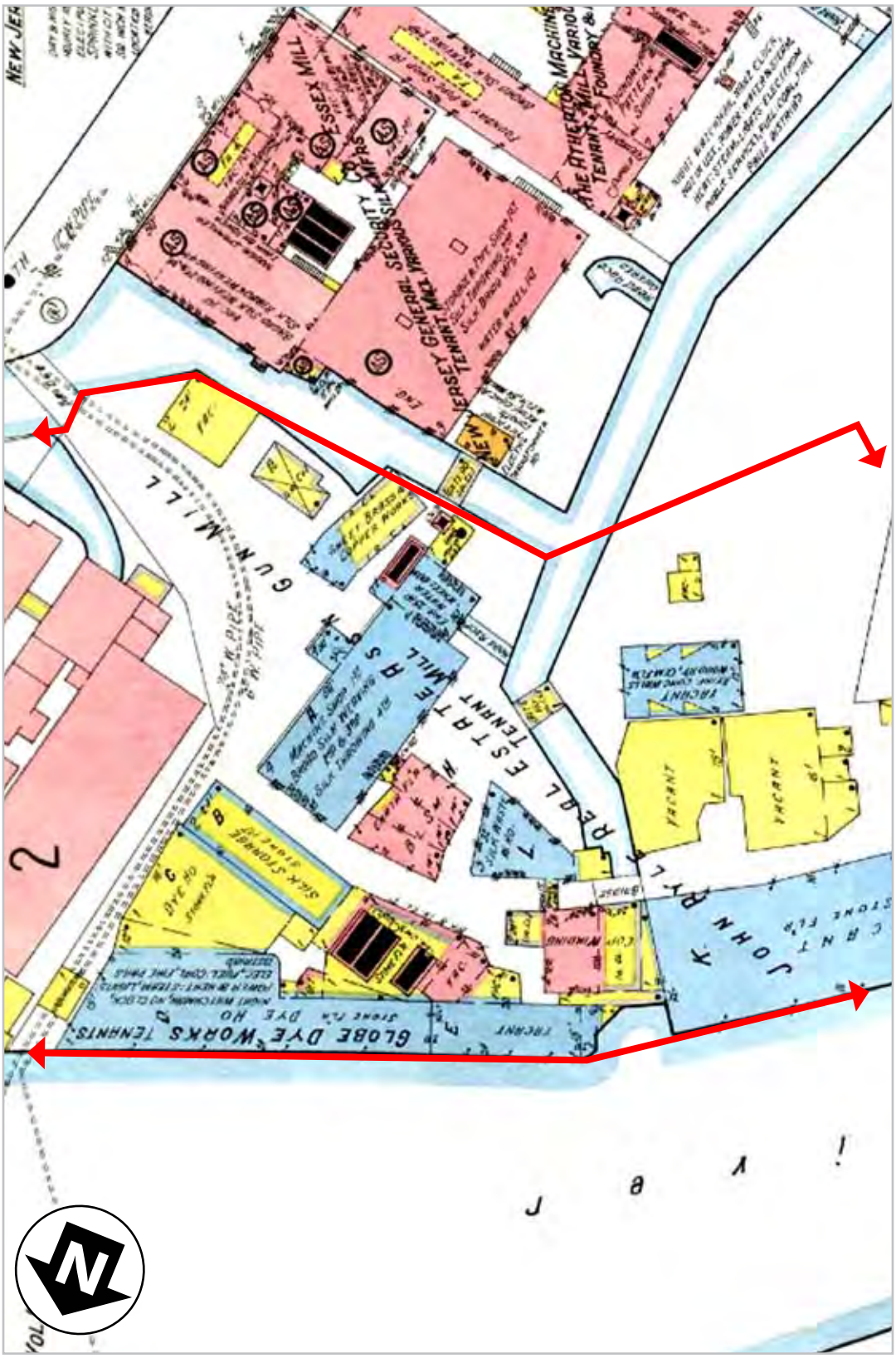


Figure 6.2b. Sanborn Map Company. *Insurance Maps of Paterson, New Jersey.* 1915. Scale: 1 inch= 75 feet (approximately). Gun Mill portion of Allied Textile Printing Site is outlined.

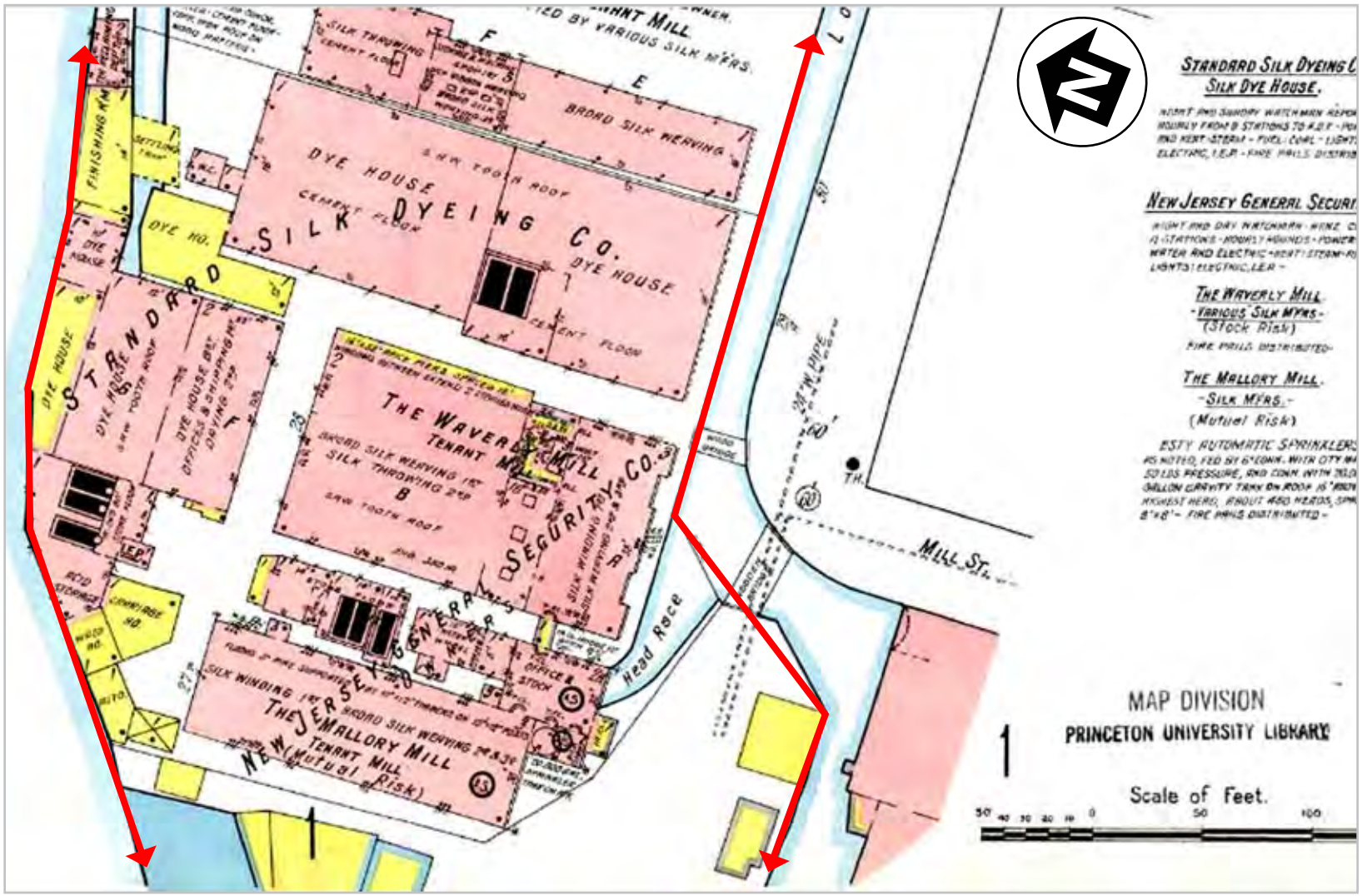


Figure 6.2c. Sanborn Map Company. *Insurance Maps of Paterson, New Jersey.* 1915. Scale: 1 inch= 75 feet (approximately). Mallory and Waverly Mills and Passaic Mill portions of Allied Textile Printing Site are outlined.

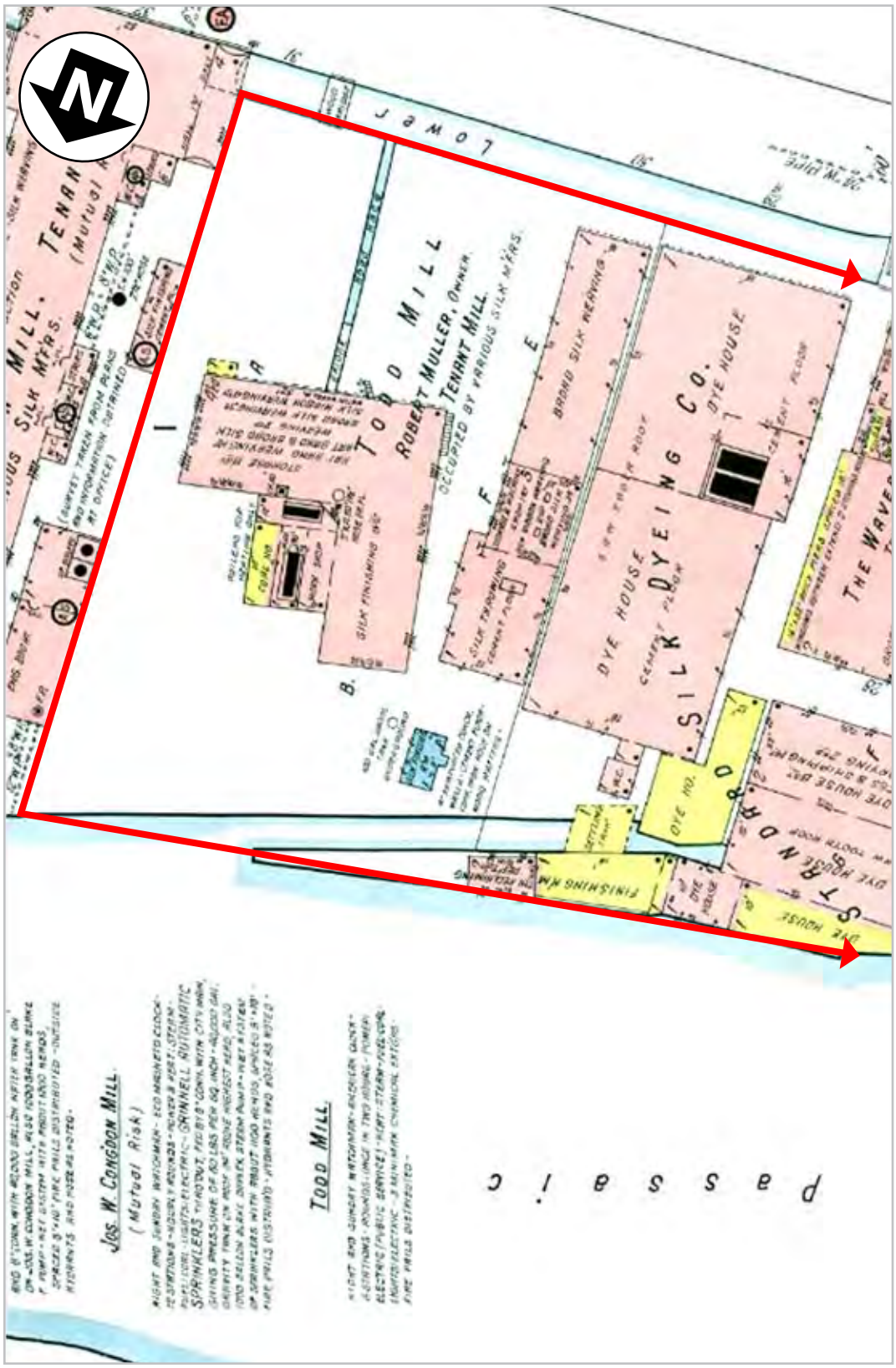


Figure 6.2d. Sanborn Map Company. *Insurance Maps of Paterson, New Jersey.* 1915. Scale: 1 inch= 75 feet (approximately). Passaic Mill and Todd Mill portions of Allied Textile Printing Site are outlined.

renovated older buildings and built several large new dye houses, often incorporating existing buildings into the footprints of these new more expansive structures. Another wave of expansion occurred in 1937 when the Standard Silk Dyeing Company added a machine room and printing plant to the west of the dye houses and a frame storage building at the southwestern end of the site (Susan Maxman Architects 1996:D85-D86).

In 1938, the Standard Silk Dyeing Company was absorbed into Allied Textile Printers, Inc. who owned the property through H.S. Properties in 1947 (Passaic County Deed Z46/205). In 1951 the large complex of buildings at the quarry site was occupied by the Standard Dyeing and Finishing Division of Allied Textile Printers and consisted of several large dye houses in addition to a building used as a textile printing, boiler room and storage facility (Figure 5.3a; Plates 2.59 and 2.62). Allied Textile Printers occupied the site until 1983 when ownership was transferred to the Paterson Renaissance Organization, a development corporation operating in Paterson under agreement with the National Preservation Institute (Passaic County Deed Q111/208). The Paterson Renaissance Organization planned a $20-million development of the Great Falls Historic District (Society for Industrial Archaeology 1983). These plans never materialized however, and the City of Paterson acquired the property through foreclosure.

B. GUN MILL

By 1813, construction was completed on the first building to stand on the Gun Mill lot – the rolling mill of Samuel Colt & Company (the firm created by Samuel Colt, John Colt and Nicholas Delaplaine) (Nelson 1881-1883:18; Trumbull 1882:43; Historic American Engineering Record 1973c:3). According to a later account by John Colt, in its early years the firm employed a dozen men making shovels, spades, camp kettles, frying pans and other tools and met with early success due to the demand for plate metal goods and other ironwork supplies during the War of 1812. In 1814 the company also began to manufacture nails (Nelson 1881-1883:18).

When Samuel and John Colt and Nicholas Delaplaine purchased the property from the S.U.M. in 1813 (see Appendix E, Table E.2 for the chain of title), the property was 1.7 acres in size and included what would later be known as the Mallory Mill lot (Essex County Transcribed Deed D/27). Samuel Colt & Company also purchased the adjacent property (later known as the Waverly Mill lot) in 1813 (Essex County Deed W/310). The likelihood that the company erected a textile mill around this time on the Mallory/Waverly portion of their property is discussed in the following section of this chapter. Delaplaine sold his interest in all of the above property to Samuel Colt and John Colt in 1818 (Essex County Transcribed Deed C/329). John Colt purchased Samuel Colt's interest in 1822, thus leaving the Gun Mill lot entirely in John Colt's hands (Essex County Transcribed Deed F/121). Fisher's census of Paterson, taken in 1825, reported that "John Colt's Rolling and Nail Factory employed 30 hands to manufacture 7 tons of metal products a week" (quoted in Historic American Engineering Record 1973c:3).

There is some discrepancy in secondary sources as to the date that John Colt suspended operations at his nail factory. L.R. Trumbull says the mill closed in 1826 (Trumbull 1882:59), while William Nelson places this event two years earlier – in 1824 – and states that Colt rented the mill out to others (Nelson 1881-1883:18). The Historic American Engineering Record's analysis points to John Colt continuing on the Gun Mill lot until at least 1832 (Historic American Engineering Record 1973c:3). Regardless, John Colt most likely had suspended his operations at the rolling mill and nail factory by 1829 when he transferred the bulk of the land to the Paterson Manufacturing Company, of which he was President and a major stockholder (Essex County Deed B3/395; Trumbull 1882:59). The Paterson Manufacturing Company did not occupy the factory on the Gun Mill lot; instead, they leased it to various concerns. U.W. Freeman's *Map of the*

Town of Paterson, New Jersey (1835) shows Afflek & Company's machine shop on the site (Figure 2.9). The Paterson Manufacturing Company purchased the remainder of the Gun Mill lot from the S.U.M. in 1836 (Essex County Transcription Deed L/630).

In 1836, the Paterson Manufacturing Company leased the entire Gun Mill lot to the Patent Arms Manufacturing Company (Essex County Transcribed Deed L/624) (see Appendix E, Table E.3. for lease agreements). Here, the Patent Arms Manufacturing Company immediately began erecting a large stone mill for the manufacture of the Colt repeating firearm (Trumbull 1882:167). The mill was four stories high with an attic and a tall tower in front. A number of smaller buildings were attached to the main mill and an office was positioned over the raceway. A blacksmith shop was built in 1837 (Trumbull 1882:167-168). In 1882 historian L.R. Trumbull described the architectural details of the building: "on the spire which surmounted the bell-tower was a vane very elaborately made in the design of a finished gun, and in front of the mill was a fence, each picket being a wooden gun, and the whole was beautifully painted" (Trumbull 1882:167).

In 1838, Samuel Colt's brother Christopher Colt received permission to place a small silk plant on the fourth floor of the Gun Mill. Though Colt's attempt at silk manufacture was short-lived – during the two or three months he operated the plant he processed only one bale of raw silk – this limited effort represented the very beginning of the silk industry in Paterson (Clayton and Nelson 1882:465; Trumbull 1882:171). In 1840, George W. Murray purchased Christopher Colt's machinery and floor space in the Gun Mill and installed John Ryle, an English silk worker, as manager of the plant. Three years later Ryle partnered with Murray in the firm of Murray & Ryle. Trumbull claims that Murray & Ryle manufactured the first skein of sewing silk ever produced in this country (Trumbull 1882:172; Shriner 1890:198; Susan Maxman Architects 1996:D64).

In 1840, the Paterson Manufacturing Company sold the Gun Mill lot to the S.U.M. (Passaic County Deed H/426). The S.U.M. sold the property one month later to Roswell Colt (Passaic County Deed D/198) who shortly thereafter transferred the lot to the Estate of Robert Oliver (Passaic County Deed D/244). In the meantime, the Patent Arms Manufacturing Company (who continued to own the leasehold) encountered financial difficulties. The company had given at least 13 mortgages on their plant totaling $18,141.62 (Historic American Engineering Record 1973c:4). In 1842, the company was forced into foreclosure and the lease on the Gun Mill was sold to John Ehlers, the company's largest investor (Passaic County Deed F/536; Trumbull 1882:169). Ehlers immediately sold one-fourth of his interest in the property to Thomas Emmet, another creditor (Passaic County Deed F/540).

Throughout the 1840s a number of industrial concerns operated out of the Gun Mill. After the Patent Arms Manufacturing Company collapsed, the first two floors remained vacant for several years. In 1842, H.M. Low & Company (Henry M. Low, John Edwards, Abram Prall and Abraham H. Godwin), cotton spinners, occupied the third story. By 1845 this firm had been renamed A. Prall & Company and moved into the second floor of the mill (Trumbull 1882:56, 173; Shriner 1890:198). A. Prall & Company bought Emmet's one-fourth interest in the plant (Passaic County Deed I/364). All the while, Murray & Ryle still operated out of the fourth floor of the Gun Mill and by 1846 they had refitted the attic with a skylight and utilized that space as a weaving shop as well (Trumbull 1882:173; Historic American Engineering Record 1973c:4).

In 1846, George Murray retired and John Ryle purchased his interest in the plant. Shortly thereafter Ryle, with the assistance of his brother, William Ryle, purchased John Ehlers' three-quarters interest in the Gun Mill (Passaic County Deed L/36; Clayton and Nelson 1882:465). After Ryle purchased the mill, he occupied the lower floor, which had been vacant since the Patent Arms Manufacturing Company collapsed.

He built a two-story stone mill on the western side of the original mill. Soon after, he erected a building between the old mill and the Passaic River, its walls nearly encroaching on the river. This building was 167 feet long, 100 feet of this length being 40 feet wide and 67 feet being 20 feet wide, and it also had a dye house attached (Trumbull 1882:174; Historic American Engineering Record 1973c:5). At this point, Ryle employed 500 to 600 hands at his silk mill and was processing 25 to 30 bales of raw silk a week. According to Clayton and Nelson, this was the most productive silk mill in Paterson for at least ten to 15 years (Clayton and Nelson 1882:466).

In 1853, Ryle completed his acquisition of the Gun Mill leasehold with the purchase of Abraham Godwin's one-quarter interest (Abstract of the Title of S.U.M. as to Gun Mill Lot n.d.). However, during the general financial panic of 1857, the Ryle silk works failed. Thereafter, Ryle formed a new partnership with his nephew, William Ryle, which continued profitably for two years (Trumbull 1882:180-181). In October 1857 he sold the leasehold to the Gun Mill to Reuben and William Ryle (Passaic County Deed C2/114). This was probably part of the reorganization, as John Ryle continued to use the Gun Mill, and Reuben and William Ryle returned the mill to him in 1859 at their original purchase price (Passaic County Deed F2/198).

As in the previous decade, throughout the 1850s a number of industrial concerns operated out of the Gun Mill. In 1853, John Birchenough briefly rented one room in the mill. In 1858, A. Prall & Company moved into the Godwin Mill, leaving the lower floors of the Gun Mill vacant until two cotton manufacturers filled them in 1859. Osborne, Buckley & Company began operations in 1859, running 1,152 spindles and consuming 3,000 pounds of raw cotton weekly. Snyder, Rae and Company (Andrew Snyder, Alexander Rae and Andrew Vreeland) ran 1,728 spindles and consumed 4,500 pounds of cotton (Historic American Engineering Record 1973c:5).

In the 1850s the Gun Mill also played a brief, but significant, role in the establishment of a public water supply in Paterson. In the early 1850s, John Ryle had purchased a controlling interest in the Passaic Water Company and took up the task of supplying Paterson with a reliable supply of potable water. He negotiated with the S.U.M. for the right to take water from behind a dam to be constructed across the Passaic River opposite the Gun Mill. A pump was installed in or near the Gun Mill powered by a steam engine. Water intakes were reportedly located upstream in the vicinity of the quarry. From the Gun Mill the water was pumped to a reservoir located on the bluff above the north bank of the Passaic from which it was returned to the city via a gravity line. Because this process was so inefficient, in 1862 the Passaic Water Company began construction of a new pump house located on the north bank of the Passaic River. After the new pump was put in operation in 1867, the Gun Mill reportedly remained on back-up status and then ceased to operate as a pump house (see above, Chapter 5).

Though Ryle owned the rights to the Gun Mill until he died, he reportedly left the mill and moved all of his business to the Murray Mill in the early 1860s (Clayton and Nelson 1882:466; Shriner 1890:198). A number of industrial concerns then used portions of the Gun Mill for different purposes. Snyder, Rae and Company (renamed May, Rae and Company and then again as the Enterprise Manufacturing Company) continued in the Gun Mill on the second floor until 1881. Benjamin Buckley & Company continued to use the lower floor of the Gun Mill for cotton manufacture until 1873. Benjamin Buckley & Company's space was then filled by Joshua Mason's machine shop, where he produced steam-heating radiators. From 1870 to 1873, Albert King rented one of the outbuildings for his dye works. From 1873 to 1874, John Swinburne and Company produced cotton goods in the mill. Around 1877, C.B. Auer and Company and Pierre Thonnereaux and J. Hiedenrich, silk manufacturers, made brief appearances on the site (Historic American Engineering Record 1973c:5; Susan Maxman Architects 1996:D65).

Meanwhile, the Ryle Silk Manufacturing Company continued operating until 1872 when it became insolvent and was reorganized as John Ryle and Sons. In 1876 this new firm merged into the Pioneer Silk Company which then operated a branch of its business – the manipulation of silk waste and pierced cocoons – out of the Gun Mill until 1880 (Trumbull 1882:181, 232-233). While this list of industries in the Gun Mill is extensive, due to the ephemeral nature of many of the industries utilizing the space, it is by no means complete.

The Sanborn Map and Publishing Company's insurance maps of 1887 do, however, provide a complete snapshot of the site at that particular point in time (Figure 6.1b). Kohlhaas Brothers, manufacturers of ribbon looms, occupied most of the riverfront building while the westernmost end of that building sat vacant. The Paterson Parchment Company used the building between the main mill and the river for the processing, packing and storage of parchment paper. Benjamin Buckley's Sons continued to operate on the first floor of the Gun Mill, Hart and Leo's paper box factory was on the fourth floor, while the second and third floors sat vacant. Three blacksmith shops, one vacant, were attached to the Gun Mill, while several other ancillary structures also remained vacant.

After John Ryle died in 1887, his children formed the John Ryle Real Estate Association, which acted as a holding company for the family's property. The administrators of Ryle's estate sold his estate lease to the Gun Mill to the John Ryle Real Estate Association in 1892 (Passaic County Deed C11/93). The Association continued to lease space to many manufacturers, as had been the practice on the site throughout the 19th century. In 1899, the Knipscher & Maass Silk Dyeing Company utilized the riverfront buildings previously occupied by Kohlhaas Brothers, as did the Globe Dye Works and National Silk Dyeing Company in 1915 (Figures 3.9 and 3.11).

Again, the Sanborn Map Company's insurance maps provide a complete view of the site's use in 1915 (Figure 6.2b). The Globe Dye Works took over the riverfront building previously occupied by Kohlhaas Brothers. The buildings between the river and the Gun Mill were used as dye houses and for silk storage. Though the map does not provide additional company names, it does show that the first floor of the Gun Mill was occupied by a machine shop, the second and third floors were used for broad silk weaving, while the upper floor was used for silk throwing. To the west of the mill sat a blacksmith shop, a silk waste house and a building for cop winding, while the Gun Mill yard held a sheet brass and copper works and several vacant buildings.

The 20th century witnessed many changes to the Gun Mill. When the John Ryle Real Estate Association renewed the lease to the Gun Mill in 1920, the deed of lease stipulated that in place of the right to use two feet of water from the Middle Raceway, the John Ryle Real Estate Association could take electric power from the hydroelectric power station and auxiliary steam power station (see Passaic County Deed O37/147). There were structural changes to the mill and lot as well. In the 1920s its upper two floors were deemed unsafe for heavy machinery and demolished. Sometime before 1931 the blacksmith shop was demolished and between 1931 and 1937 additional building elements were constructed on the south and west facades of the Gun Mill, altering the building's footprint (Susan Maxman Architects 1996:D65).

In 1933, the John Ryle Real Estate Association sold the lease to the S.U.M., which ended the leasehold and vested full title in the S.U.M. (Passaic County Deed O37/147). Thereafter, the S.U.M. leased portions of each mill at different times. For example, in 1934 the S.U.M. leased the part of the Gun Mill property known as Building A and the copper shop to the Habsug Holding Company for 13 years and 6 months (Passaic County Deed X38/557). Prior to 1937, a portion of

the property had been leased to the Vulcan Print Works and to the Audubon Piece Dye Works, Inc. (see Passaic County Deed S39/108).

By 1951, Allied Textile Printers' Standard Dyeing and Finishing Division occupied the Gun Mill (see Figure 6.3a). Like other portions of the site, the Gun Mill remained in use until a series of fires occurred in 1983. Thereafter, ownership transferred to the Paterson Renaissance Organization, a development corporation operating in Paterson under agreement with the National Preservation Institute (Passaic County Deed Q111/208). The Paterson Renaissance Organization planned a $20-million development of the Great Falls Historic District (Society for Industrial Archaeology 1983). These plans never materialized however, and the City of Paterson acquired the property through foreclosure.

C. WAVERLY AND MALLORY MILLS

In 1873, John Colt told historian William Nelson that during his childhood a sawmill stood on land opposite the northern end of Mill Street. It was accompanied by a one-and-a-half story house made of squared logs that stood to the east of the location now occupied by the Gun Mill. According to John Colt, the sawmill had been built by the S.U.M. prior to 1794 and measured "20 or 30 feet by 20 feet in area" (Nelson 1881-1883:7). This mill was probably the first building erected on the Waverly or Mallory Mill lots, and possibly on the entire ATP site.

In early land transactions, the Mallory Mill lot, Waverly Mill lot and part of the Gun Mill lot were sold together (see Tables E.4-E.7 for chains of title and lease agreements). Samuel Colt, John Colt and Nicholas Delaplaine purchased the Mallory Mill lot, part of the Gun Mill lot and the Waverly Mill lot from the S.U.M. in two transactions in 1813 (Essex County Deed W/310; Essex County Transcribed Deed D/27). Although the early history of what later became the Mallory and Waverly mill lot is obscure and could bear further research, there is a strong possibility that a mill, most likely a cotton mill, was erected on the eastern portion of the larger tract shortly after 1813. This speculation is based on the sketch produced by Joshua Rowley Watson in August of 1816 which shows what appears to be a three-story mill building in this location (Plate 2.8).

Nicholas Delaplaine sold his interest in the Gun Mill lot, Mallory lot and Waverly lot to Samuel Colt and John Colt in 1818 (Essex County Transcribed Deed C/329) and John Colt purchased Samuel Colt's interest in 1822 (Essex County Transcribed Deed F/121). John Colt transferred all of the land to the Paterson Manufacturing Company, of which he was President and a major stockholder, in 1829 (Essex County Deed B3/395; Trumbull 1882:59). The Paterson Manufacturing Company sold the Mallory Mill lot to Roswell L. Colt in 1831 (Essex County Transcribed Deed M/482). The date of the subsequent sale of the Waverly Mill lot remains unknown.

In 1831, John Barrow & Sons (John Barrow, Sr., John Barrow, Jr. and Lawrence Barrow) leased the Mallory Mill from Roswell L. Colt and opened a woolen factory on the lot (see Passaic County Deed D/580). This business may have made use of the earlier mill conjectured to have stood on this site. According to historians W.W. Clayton and William Nelson, while the Barrows were the first company to attempt large-scale woolen manufacturing in Paterson they also manufactured satinets and "negro cloth" that was sold to slaves in the south. They "fitted up some frame building for their use, just back of the present Waverly Mill," installed 27 power looms and 13 hand looms and were in operation by 1832 (Clayton and Nelson 1882:455; Nelson and Shriner 1920:339). The location of this early mill is shown on U.W. Freeman's *Map of the Town of Paterson, New Jersey* (1835) (Figure 2.9). At this time the Waverly Mill lot was vacant. The John Barrow & Sons woolen mill only operated for two years and the Barrows sold their leasehold to Ziba Parkhurst in 1834 (Essex County Transcribed Deed L/190; Clayton and Nelson 1882:455).

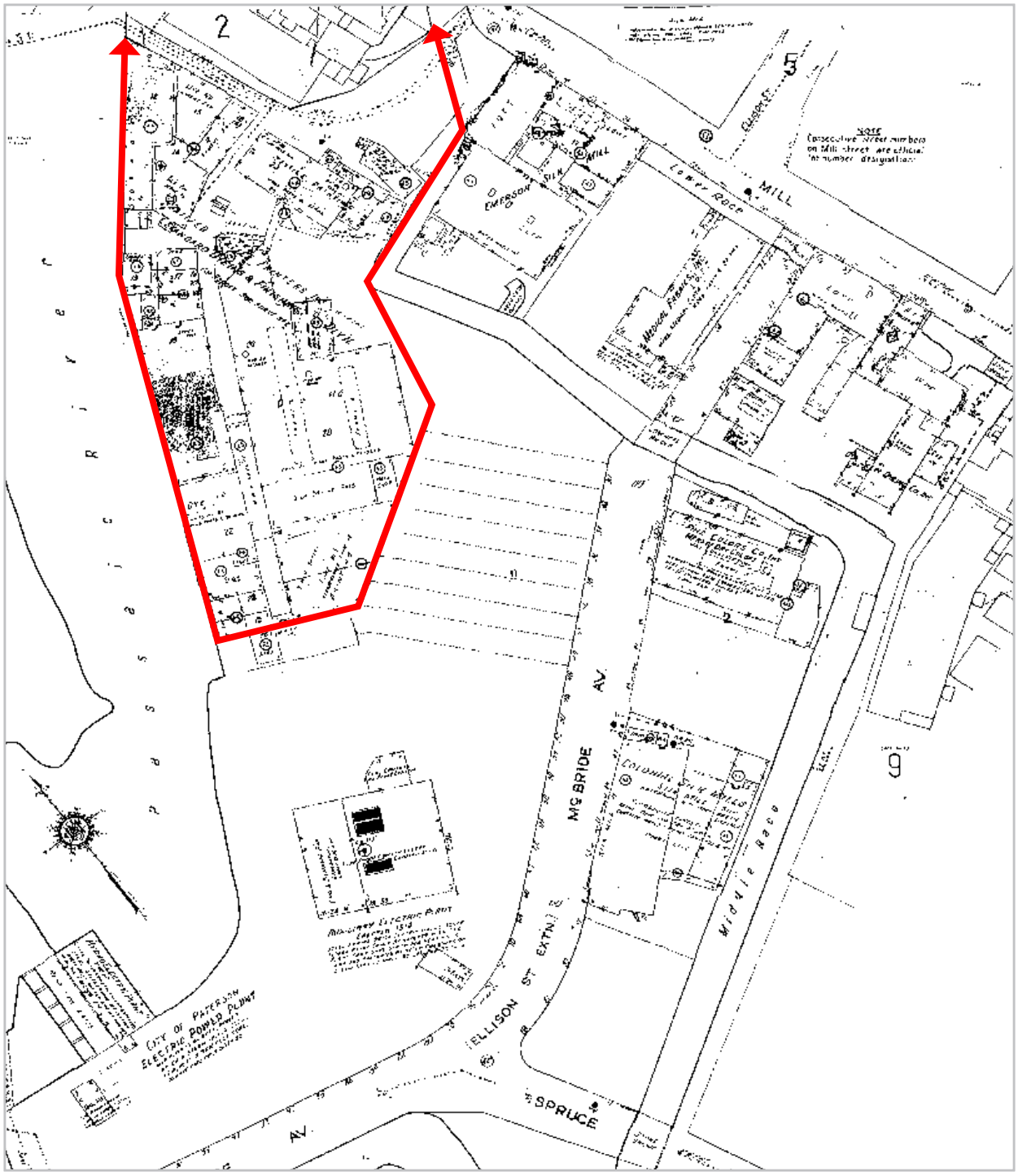


Figure 6.3a. Sanborn Map Company. *Insurance Maps of Paterson.* 1915, updated to 1951. Scale: 1 inch= 150 feet (approximately). Quarry and Gun Mill portions of Allied Textile Printing Site are outlined.

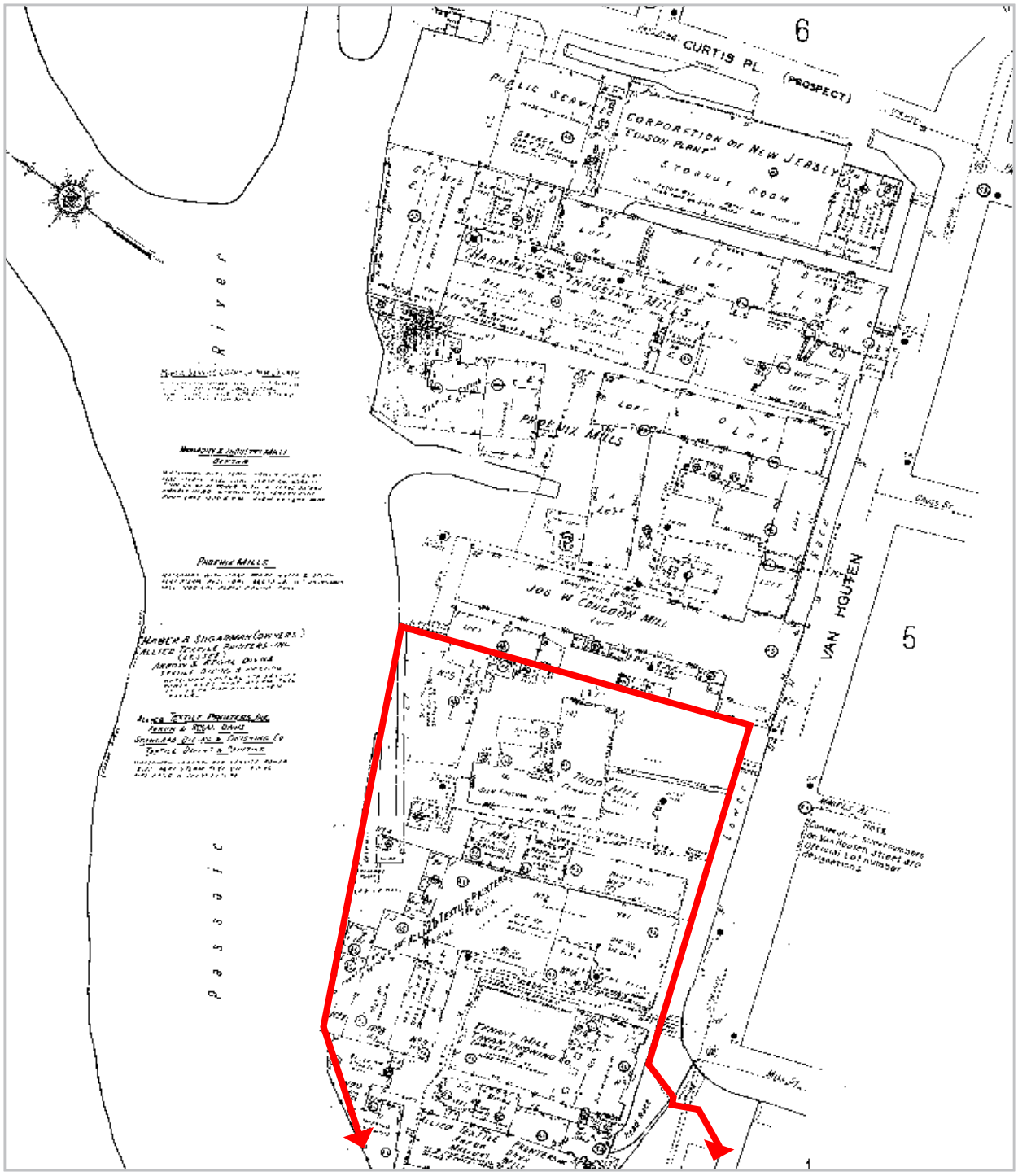


Figure 6.3b. Sanborn Map Company. *Insurance Maps of Paterson.* 1915, updated to 1951. Scale: 1 inch= 150 feet (approximately). Mallory and Waverly Mills, Passaic Mill and Todd Mill portions of Allied Textile Printing Site are outlined.

Clayton and Nelson state that Stephen R. Parkhurst was the next manager of the Mallory Mill, although "there was a good deal of evasion and mystery as to the real ownership. At last it fell into the hands of Richard M. Rand, or Johnson, Rand & Company, the 'Company' probably being Mr. Parkhurst" (Clayton and Nelson 1882:455). This is in part supported by the chain of title. The leasehold indeed changed hands a number of times before 1845 (see Essex County Transcribed Deeds L/190, L/223, L/283, L/492 and M/408; Passaic County Deed D/580), but no "Richard M. Rand" or "Johnson, Rand & Company" is found in the chain of title. However, Stephen R. Parkhurst did purchase the leasehold to the property in his own name in 1840 (Passaic County Deed D/580), although he apparently failed to renew the lease which was set to expire in 1852 (see Passaic County Deed I2/601).

The occupants of the Mallory Mill lot in the 1850s also remain a "mystery." Clayton and Nelson claim that possession of the Mallory Mill passed to Elisha Boudinot Atterbury in 1845 (Clayton and Nelson 1882:455). This claim is not supported by the chain of title. Moreover, J.C. Sidney's *Map of Paterson, N.J.*, published in 1850, shows the outline of a building labeled "Jackson & McGinnis" on the Mallory Mill lot (Figure 3.1). A building of the same shape, size and arrangement appears on William Perris's map *Paterson Mills 1854* (Figure 3.2) and is shown as being occupied by William Inglis. Indeed, Clayton and Nelson write that William Inglis occupied the lower floor of the Mallory Mill in 1850 which at that time stood "on the site of the present [as of 1882] office and printing-room of the Waverly Mill" (Clayton and Nelson 1882:418). Inglis carried on business there for two years before creating a partnership with James Jackson under the name William Inglis & Company. They supposedly occupied the entire Mallory Mill until it burned in 1856 when they suspended business (Clayton and Nelson 1882:419). However, a lease for the premises was executed by the Estate of Thomas Oliver to James Jackson and William Inglis in 1857 (see Passaic County Deed I2/601).

To further complicate matters, previous research had concluded that the Waverly Mill lot was not occupied until David Gavin Scott constructed a mill there in 1853 (Historic American Engineering Record 1973d:3). Yet a building labeled "E. Atterbury" (who was the supposed occupant of the Mallory Mill) is clearly shown on the Waverly Mill lot on J.C. Sidney's *Map of Paterson, N.J.* in 1850 (Figure 3.1) and a building of the same size, shape and arrangement appears on William Perris's map *Paterson Mills 1854* (Figure 3.2).

Regardless, the history of both the Mallory and Waverly mills after David Gavin Scott purchased the leases to them is more clearly known. David Gavin Scott began weaving and bleaching towels and diapers in 1849. He purchased the Franklin Mill in 1851 and a lease to the Waverly Mill lot in 1853 (Humphreys n.d.) where he supposedly built the Waverly Mill. The Waverly Mill accidentally burned down in 1857, but was soon rebuilt, after which it was "rated as one of the most complete in every respect and most thoroughly equipped of any establishment in this branch in the United States, the machinery being all of the very best description" (Trumbull 1882:71). Scott reportedly purchased a strip of land on the west side of the Waverly Mill lot in order to accommodate construction of the larger mill building, but no deed of sale for that land was made until 1890 (see Passaic County Deed A10/1). In that year David Gavin Scott expanded his operations at Paterson and leased the Mallory Mill lot and the land between the Mallory Mill lot and the Passaic River (Passaic County Deed P4/520; Abstract of the Title of New Jersey General Security Company n.d.). By 1874 he built a third factory on the Mallory Mill lot and soon after abandoned the Franklin Mill lot (Trumbull 1882:71).

In 1861 Scott transferred the leases to the Mallory and Waverly mills to the Franklin Manufacturing Company (Passaic County Deed I2/601), which he had incorporated in 1854 "for the purpose of manufacturing woolen, silk, cotton, and flax, and dyeing, bleaching,

and printing the same" (State of New Jersey 1854:241). Scott managed the Franklin Manufacturing Company until his death in 1863 after which management passed to his son, William G. Scott (Trumbull 1882:71). The Franklin Manufacturing Company operated the Waverly and Mallory Mill lots until 1889 when the leases were transferred to Walter H. Lewis, an agent for Lewis Brothers (Passaic County Deed M9/93). During this time, the mills were used, at least in part, for silk weaving and bleaching, though in 1887 parts of both the Waverly and Mallory mills sat vacant, but were to be occupied by tenants (Figure 6.1c).

By 1890, all rights to the lease had passed to Henry and Walter Lewis (Passaic County Deed B10/157). Later that year, a deed between William Ryle *et al.* and Henry Lewis and Walter Lewis effected a transfer of the triangular lot at the northeast corner of the Gun Mill lot and the triangular lot at the southwest corner of the Mallory Lot (Passaic County Deed X9/629). Therefore after 1890, the triangular lot at the southwest corner of the Mallory Mill lot ran with the leasehold title to the Gun Mill lot and what was formerly the triangular lot at the northeast corner of the Gun Mill lot passed with the title to the Mallory Mill lot. Also, in 1890, a 12.91-foot-wide strip of land on the east side of the Waverly Mill lot was sold from the owners of the Passaic Mill Lot No. 1 to the owner of the Waverly Mill lease and thereafter ran with the title to the Waverly Mill lease (see Passaic County Deed A10/1). This transfer may have merely made official a transfer that had actually occurred in 1857.

The leases passed to the Lyons Silk and Tapestry Company in 1890 (Passaic County Deed A10/1) then to the Hitchcock Mending Manufacturing Company in 1893 (Passaic County Deed E11/247), to Walter M. Gallant and Frederick C. Gallant in the following year (Passaic County Deed T11/428), and then to James Warren Thayer in 1898 (Passaic County Deed P13/277). Though they had sold the lease in 1898, Robinson's *Atlas of the City of Paterson and Haledon* (1899) (Figure 3.9) shows that the Gallant Brothers, silk manufacturers still occupied the property. Perhaps they had sold the lease due to financial concerns as in 1900 the company went bankrupt (*New York Times*, November 26, 1900).

In 1901, the Mallory Mill burned. At the time, the brick structure was 150 by 50 feet and was described as "the oldest structure of the kind in the city" (*New York Times*, January 27, 1901). At the time of the fire, the mill was occupied by H.C. Hopping, wool scourer, and Jacob Dime, silk throwster (*New York Times*, January 27, 1901). While costly, the fire did not destroy the mill. Maps dating to just before and after the fire show little change to the footprint of the building (Figures 3.9 and 3.10).

By 1915, the Standard Silk Dyeing Company occupied the buildings along the Passaic River, behind the Mallory and Waverly mills, as well as Passaic Mill No. 1. Owned by the New Jersey General Security Company, the Waverly and Mallory mill buildings were occupied by various silk manufacturers. The first floor of the Waverly Mill was used for silk winding and weaving and its upper floors for silk throwing and weaving. The first floor of the Mallory Mill was used for silk winding, while its upper floors supported silk weaving (Figure 6.2c).

In 1930, the New Jersey General Security Company sold its lease to the Mallory and Waverly mills to the S.U.M., effectively ending the leasehold estate and vesting full title in the S.U.M. (Passaic County Deed A36/461). Thereafter, the S.U.M. leased portions of each mill at different times. For example, in 1934, the S.U.M. leased the dye house property of the Waverly Mill to the Habsug Holding Company for 14 years 1 month (Passaic County Deed X38/555) and in 1936 the Habsug Holding Company also leased the Mallory Mill for a period of 12 years and one month with no clause for renewal (Passaic County Deed Q39/65).

By 1951, Allied Textile Printers' Arrow Division occupied the Mallory Mill, but the Waverly Mill was owned by the Tynan Throwing Company which had purchased the lot from the City of Paterson in 1948

(Figure 6.3b) (Passaic County Deed A47/359). This deed specifically reserved to the City of Paterson all water rights that had formerly been associated with the property. Like other portions of the site, the Waverly and Mallory mills remained in use until a series of fires occurred in 1983. Thereafter, ownership transferred to the Paterson Renaissance Organization, a development corporation operating in Paterson under agreement with the National Preservation Institute (Passaic County Deed Q111/208). The Paterson Renaissance Organization planned a $20-million development of the Great Falls Historic District (Society for Industrial Archaeology 1983). These plans never materialized however, and the City of Paterson acquired the property through foreclosure.

D. PASSAIC MILL NO. 1 (DUCK MILL)

The first mill to be erected on the Passaic Mill No. 1 lot was a wire factory operated by Oshea Wilder as early as 1813. In that year a deed was executed for the neighboring Todd Mill lot in which the western boundary of the lot was described as "the lot now occupied by Oshea Wilder" (Essex County Deed V/219). A later deed issued for the Passaic Mill No. 1 lot describes the property as "being the same lot formerly occupied by Oshea Wilder as a wire factory" (Essex County Deed B3/395) (see Table E.8. for chain of title). Secondary accounts of the history of the mill lot also place Oshea Wilder's wire factory on the lot around 1813. Historians Clayton and Nelson claim that the mill later known as Passaic Mill No. 1 was built in 1813 or 1814, while L.R. Trumbull claims that Wilder opened his wire factory in 1812 (Clayton and Nelson 1882:456; Trumbull 1882:43).

It remains unknown how long Wilder's wire factory was in operation on the mill lot, but by 1815 John Colt had begun the manufacture of yarns and twine from flax in the mill (Trumbull 1882:43; McLane 1969[1833]:161). In 1817 Colt added 60 hand-looms to the mill and began to make flax sail duck – cloth used for making sails – which he sold to the United States government (Trumbull 1882:268). At this time, the mill was owned by his father, Peter Colt (see Passaic County Deed H4/81), but John Colt purchased the mill lot outright in 1823 (Essex County Deed P2/258).

Shortly thereafter, around 1824, John Colt abandoned flax as he began to manufacture sail-duck from cotton, a conversion that would gain him (and the Passaic Mill No. 1) nationwide eminence (Trumbull 1882:268). Clayton and Nelson wrote, "one of the most notable incidents connected with the cotton manufacture up to this time was the success of John Colt in making cotton duck from doubled and twisted Cotton yarn" (Clayton and Nelson 1882:413). Colt was the first person in the world to successfully substitute cotton for flax in the manufacture of sail duck and to use power looms in the production of this material. The United States government used Colt's duck on all American ships (Clayton and Nelson 1882:413).

In 1828, the Paterson Manufacturing Company was incorporated as a successor to John Colt, who became the company's President and majority stock holder (Trumbull 1882:59). In the following year the Passaic Mill No. 1 lot (along with the Gun, Mallory and Waverly Mill lots) was officially transferred to the company (Essex County Deed B3/395). The Paterson Manufacturing Company thrived in Paterson for several years. In 1833, the company, in the form of John Colt, was reported as owning two cotton mills in Paterson that employed 196 men and children and used 501,000 pounds of cotton to make 465,000 yards of cotton canvass sail cloth (McLane 1969 [1833]:162). The Passaic Mill No. 1 (Duck Mill) was one of these mills; the other was likely the mill on the Mallory mill lot a short distance to the west (Figure 2.9). The Passaic Mill No. 1 was one of only two cotton mills in the city that survived the financial panic of 1837 (Trumbull 1882:53). By 1848 Colt employed 170 workers on 4,372 spindles for spinning and twisting cotton yarn and 84 power looms for weaving. The company turned 831,800 pounds of cotton into 677,000 yards of material annually (Hunt 1848:114-115).

The general decline in Paterson's cotton industry at the end of the 1840s in the face of the emergent silk industry affected the Paterson Manufacturing Company and its operations at Passaic Mill No. 1 (Trumbull 1882:53). Between 1856 and 1857, the Paterson Manufacturing Company gave at least five mortgages totaling nearly $10,000 to Catherine W. and E. Boudinot Colt (Passaic County Mortgages G/458, H/188, H/191, H/193 and H/196). By 1859 the company's production was only around one third of its 1848 output (Scientific American 1859). Later that year, after the company failed to meet its financial obligations, and the mill was put up for sale by the Passaic County sheriff and purchased by John Colt's son, E. Boudinot Colt (Passaic County Deed F2/344).

In 1860, E. Boudinot Colt, William E. Toler and Samuel Borrowe incorporated the Passaic Manufacturing Company "for the sole purpose of manufacturing cotton or other fibrous material" (State of New Jersey 1860:459). The Passaic Mill No. 1 lot was then transferred to this newly formed corporation, of which E. Boudinot Colt was also a director (Passaic County Deed H2/350). According to L.R. Trumbull, the Passaic Manufacturing Company suspended operations in 1869 (Trumbull 1882:59). However, the company did not transfer ownership of the property until 1871 when they sold it to the Franklin Manufacturing Company (Passaic County Deed G4/306).

The Franklin Manufacturing Company had been active on the ATP site since 1861 when it purchased the leases to the Waverly and Mallory Mills (Passaic County Deed I2/601). Though Trumbull writes that the Franklin Manufacturing Company purchased the Passaic Mill No. 1 because they required additional space for their dyeing and printing business (Trumbull 1882:70-71), the actual extent of this company's use of the Passaic Mill remains unknown. Between 1861 and 1874 the mill had been completely reconstructed, ostensibly by the Franklin Manufacturing Company (Figures 3.4 and 3.5). Trumbull relates that up to 1882, "the printing of calicoes alone has entirely occupied the attention of the company for some years" (Trumbull 1882:71). However, William A. Miller's map *Paterson, New Jersey*, published in 1874 (Figure 3.5), identifies the main mill building as a "Fire Engine Building" and makes no mention of the cotton industry.

Though Trumbull seems to suggest otherwise, it is probable that the Franklin Manufacturing Company did not actually occupy the Passaic Mill No. 1. William Nelson writes that in December 1871, William H. Hayes moved from the Franklin Mill to the Duck Mill where he and Richard Harell, formed the Paterson Steam Fire Engine Company, constructed fire engines. This partnership remained active until 1874 (Clayton and Nelson 1882:451; King 1896). Clayton and Nelson's history is corroborated by Miller's abovementioned map.

By 1882, the mill building was at least in part occupied by the Neuburger Braid Company, a manufacturer of silk thread and ribbons that had been founded in 1879 by Swiss textile entrepreneur Albin Wietlisbach (Holmes 1988:85). The Neuburger Braid Company, later known as the Neuburger Silk Company, continued to occupy the mill as a lessee until 1891 when Herman Neuburger and Isidor Neuburger, trading as Neuburger Silk Company, purchased the property outright (Figures 3.8 and 6.1c) (Passaic County Deed N10/125).

Between 1899 and 1915, the mill building was greatly expanded or reconstructed by the Standard Silk Dyeing Company, who leased the property from the New Jersey General Security Company (Figures 3.9 and 3.11) (Passaic County Deed F22/110). The company built two large connected brick dye houses with saw-tooth roofs and cement floors on the main part of the mill property and also occupied buildings along the river behind the Waverly Mill (Figure 6.2c). These buildings remained relatively unchanged in the first half of the 20th century (Susan Maxman Architects 1996:D98).

In 1938, Standard Silk Dyeing Company was absorbed into Allied Textile Printers, Inc. who owned the property through H.S. Properties in 1947 (Passaic County Deed

Z46/205). In 1951 the large complex of buildings on the Passaic Mill No. 1 lot was occupied by the Regal Division of ATP (Figure 6.3b). Allied Textile Printers remained on the site until a series of fires occurred in 1983. Thereafter, ownership transferred to the Paterson Renaissance Organization, a development corporation operating in Paterson under agreement with the National Preservation Institute (Passaic County Deed Q111/208). The Paterson Renaissance Organization planned a $20-million development of the Great Falls Historic District (Society for Industrial Archaeology 1983). These plans never materialized however, and the City of Paterson acquired the property through foreclosure.

E. TODD MILL

The Society for Establishing Useful Manufactures (S.U.M.) sold the Todd Mill lot to Roswell L. Colt in 1813 (Essex County Deed V/319) (see Table E.9. for chain of title). The lot, 200 feet wide, fronted on Boudinot Street and extended to the Passaic River. The aforesaid dimensions have remained intact to the present; however, over the past two centuries, many changes have taken place in the ownership and in the size and scope of the buildings and business operations on the property.

The first mill on the property, a cotton mill called the Home Mill, was built by David Parish, who purchased the lot from Roswell Colt on January 20, 1813 (Essex County Deed U/424). Language in Parish's deed of sale to Daniel Holsman nine months later provides evidence that a mill was on the property at that time. The property was sold with "all improvements and buildings thereon erected" (Essex County Deed W/76). Moreover, the property sold for triple Parish's purchase price, strongly implying that Parish was responsible for the mill's construction (Essex County Deeds U/424 and W/76).

This first mill was part of the massive industrial expansion that followed the outbreak of the War of 1812 and according to historian L.R Trumbull, Holsman's facility was one of only two mills to survive the depression following the end of the war (Trumbull 1882:41). But not only did Holsman's mill survive, his business also prospered. By 1825, he owned two mills in Paterson that together housed nearly 6,000 spindles and 150 employees (Clayton and Nelson 1882:412). Holsman's business was in fact so prosperous that in 1829, he reconstructed and enlarged the building footprint of the Home Mill to approximately 40 feet by 75 feet (Historic American Engineering Survey 1974a:4). In 1833, Holsman's two mills employed 202 workers and produced 345,000 pounds of yarn out of 420,000 pounds of cotton annually. Holsman's goods were sent primarily to markets in Philadelphia and New York (McLane 1969 [1833]:149-150). Sometime in the 1830s Holsman removed his business from the Home Mill and leased the building to the spinners Benson & Rutan (Trumbull 1882:55; Historic American Engineering Record 1974a:3). Holsman retained ownership of the land, however, until his death in 1840.

Holsman died intestate, leaving a widow Catherine and six children. Catherine Holsman was left to handle a lingering legal dispute with the S.U.M. concerning water rights for the mill lot. As early as 1827, the S.U.M. had given notice to Daniel Holsman that he had been drawing more than his allotment of water from the S.U.M's Lower Raceway. Despite several notices being given to both Daniel and Catherine Holsman, and their lessees, nothing was done to correct the perceived problem. Thus, in 1844 the S.U.M. constructed a stone wall in the raceway at the head race inlet and installed within it a cast iron aperture of 12 inches to limit the flow. This wall was immediately perforated on the order of Catharine Holsman. Though the S.U.M. sued in the Court of Chancery for an injunction against Holsman, the motion was denied (Halsted 1849:126-136).

Catherine Holsman continued to own the mill lot until 1850 when she sold it to Joseph C. Todd, Philip Rafferty and Daniel Mackey who were then partners in the firm of Todd, Mackey & Company (Passaic County Deed P/454; Historic American Engineering Record 1974a:3). Todd had worked with Daniel Mackey in the manufacture of flax and hemp machinery in the James Nightingale Mill since 1844. The partners moved from there to the Bradley Mill in 1846 and in 1849, Philip Rafferty joined the company as a moneyed partner (Shriner 1890:196-197).

Todd, Mackey & Company began to expand their operations immediately after they purchased the Holsman Mill. Between 1850 and 1854 they erected a new foundry on the site of a small building in the southwest corner of the property that had previously been used by McGinnis and Jackson and they attached another building to the back of the main mill (Figures 3.1 and 3.5). In 1855, Todd, Mackey & Company supplemented the mill's waterpower with steam for either power or heating purposes. Later that year, Mackey retired from the company, which was thereafter known as Todd and Rafferty. By 1857 Todd and Rafferty had expanded their company's product line to include steam engines as well as flax, hemp, silk, jute and bagging machinery. Their products were sold all over the world, and machinery in at least a dozen factories in England, Scotland and Ireland was designed and built by Todd, Mackey & Company (Shriner 1890:197; Historic American Engineering Record 1974a:4; Susan Maxman Architects 1996:D102). Though he had retired in 1855, Mackey did not sell his interest in the business to Todd and Mackey until 1859 (Passaic County Deed E2/221).

The Historic American Engineering Record describes Todd and Rafferty's growth during the 1860s as "extraordinary," citing evidence from the Census of 1870. By 1870 the company employed 281 workers who converted $219,000 of raw materials into $297,000 worth of engines and textile machinery (Historic American Engineering Record 1974a:4). The company shared their extraordinary profit with their employees. Records of credit reporting agency R.G. Dun & Company from May 1872 show that Todd and Rafferty distributed stock to certain employees (Volume 66).

Also in 1872, Todd and Rafferty merged with another of Todd's businesses – the boiler works of Rafferty, Smith and Company – and the new enterprise was named the Todd and Rafferty Machine Works. Joseph Todd served as President and took charge of the works in Paterson, while Philip Rafferty held the position of Treasurer and operated the company's store and office in New York City (Stewart 1879:255; Shriner 1890:197; Susan Maxman Architects 1996:D102). Ownership of the mill lot was officially transferred to the new company on April 5, 1872 (Passaic County Deed M4/492).

The entire mill complex was reconstructed and altered at this time, resulting in the large L-shaped principal mill structure that survived largely intact into the late 20th century. The foundry was enlarged, new buildings were put in place in the southeast corner of the property and a blacksmith shop, yard building and box shop were built (Figure 3.5). According to historian L.R. Trumbull, the office was the only part of the old mill structure that remained after the reconstruction (Trumbull 1882:86).

Todd and Rafferty's partnership was dissolved upon the latter's death later in July 1872. Thereafter, it was discovered Rafferty had embezzled nearly $30,000 from the company prior to 1869. In 1876, Joseph Todd sued the administrators of Rafferty's estate for an account of the profits obtained illegally. The case was in the court system into the 1890s, and the Court of Chancery ultimately allowed Todd only a portion of the profits he believed legally due to him (Stewart 1879:254-263; Desty 1915:589-591).

Todd and Rafferty failed in 1877, possibly due to the economic depression that followed the Panic of 1873. The company went into receivership and after 18 months of idleness, Joseph C. Todd leased the

machine-making part of the mill from the receiver, while Samuel Smith leased the boiler-making branch (Trumbull 1882:87). Todd reorganized the business as the J.C. Todd Machine Company. He bought the mill lot in 1883 (see Passaic County Deed Q7/29, which also contains a complete inventory of the Todd Mill property) and continued business until the mid-1890s, when Todd was again beset by financial difficulties.

Todd's financial distress may have been caused in part by a large fire at the machine works on July 20, 1890 that entailed a loss of nearly $150,000. A *New York Times* article described the inferno: "[i]t was utterly impossible to check the progress of the flames until the numerous buildings were well-nigh consumed. Several venturesome firemen were overcome by smoke and had to be carried from beneath the falling walls. It took five hours to subdue the flames." The reporter concluded that the "works may not be rebuilt" (*New York Times*, July 21, 1890). However, historic map evidence contradicts the extent of the damage as maps produced in 1887 and 1899 show very little change in the number and arrangement of buildings standing on the property (Figures 3.9 and 6.1c).

Regardless, by 1898 J.C. Todd was in dire financial straits and his property was confiscated by the City of Paterson for back taxes (Passaic County Deed I18/484). The City sold the property to the law firm of Pennington & Kireker in 1904 (Passaic County Deed N16/193, which also contains a complete inventory of the Todd Mill property) who sold it to Robert Muller, Jr. in 1907 (Passaic County Deed T18/319). The Sanborn Map Company's *Insurance Maps of Paterson, New Jersey*, published in 1915, shows that Muller operated it as a tenant mill and leased space to various silk manufacturers (Figure 6.2d). A survey taken that year revealed that only the main mill and foundry remained from the 1870s. A 35 by 84-foot, one-story frame mill replaced the box shop in the southeast corner of the lot (Historic American Engineering Record 1974a:6; Susan Maxman Architects 1996:D102).

In 1916 the mill lot passed to the Todd Mill Realty Company (Passaic County Deed M25/431), which held it until 1932 when ownership reverted to the S.U.M. (Passaic County Deed H37/26). In 1945, the Todd Mill lot was part of a large transfer of land from the S.U.M. to the City of Paterson (Passaic County Deed O45/47). The following year the City of Paterson sold the lot, excluding all water rights, to the Todd Mill Realty Company (Passaic County Deed P46/565). Sometime before 1947 a large brick building was built on the northeast corner of the property (Figure 3.13). In 1951, the Todd Mill, still a tenant mill, was occupied by a number of different silk manufacturers (Figure 6.3b).

The Todd Mill Realty Company reorganized as Todd Enterprises, Inc. and in 1962 ownership of the Todd Mill lot was transferred to this new company (Passaic County Deed A77/534). By 1974, Allied Textile Printers, Inc. used the main mill building as a warehouse, while the large brick building at the rear of the property was used for textile printing and dyeing (Susan Maxman Architects 1996:D102). After a series of fires in 1983, the site closed and ownership was transferred to the Paterson Renaissance Organization, a development corporation operating in Paterson under agreement with the National Preservation Institute (Passaic County Deed Q111/208). The Paterson Renaissance Organization planned a $20-million development of the Great Falls Historic District (Society for Industrial Archaeology 1983). These plans never materialized however, and the City of Paterson acquired the property through foreclosure in 1991 (Passaic County Deed L130/222).

Part III

HISTORICAL ANALYSIS

Chapter 7

CONTEXT AND SIGNIFICANCE

A. THE ATP SITE IN PERSPECTIVE

There are two principal aspects to an industrial site – structures and processes. The structures are the static works – the buildings, power canals, utilities, roadways, bridges, etc. The processes are the dynamic and largely transitory machines, the source of finished products sustained by supplies of raw materials and the workers who tended them. These machines operated and were continually replaced as they wore out or were made obsolete by newer models. The structures were designed to house the machines and work spaces, provide space for the storing of raw and finished products, resist loads, support the distribution of power, and to stand as long as they were needed.

Above ground, the ATP site does not obviously retain a strong measure of integrity of either structures or processes. Remnants of the neglected structures remain, mostly in the shells of mill buildings, crumbling walls and traces of waterpower-related infrastructure, more of which may be rediscovered through archaeology. There is also the occasional abandoned machine on the ATP site, but evidence of the dynamic processes, characterized by the movement and conversion of raw material into product, has been obscured or otherwise lost. These comments should not be taken to mean that the history of the site cannot be successfully conveyed, interpreted and commemorated by what is left or that there is still not much to be gained through the physical study of the site.

Among the most important contributions that this context document and its related cultural resource studies can make to the ATP site is advancing an understanding and appreciation of what structures remain there, what *might* remain under layers of accumulated earth and detritus, what was certainly once there and now gone, and evidence of particular industrial processes – all essential to our understanding of the site's significance. These considerations will loom large as the various stakeholders charged with preserving and interpreting the ATP site consider its future. The overall context for this activity must be able to inform priorities, and one means of doing this is placing the site into appropriate broader industrial and technological perspectives.

The ATP site is most important for its associations with the Great Falls/Society of Useful Manufacturers National Historic Landmark District (and other historic designations) and all that these entail, including the S.U.M.'s waterpower system, the many Colt family enterprises and Paterson's silk industry. In and of itself, however, the ATP site does not easily lend itself to many superlatives when compared to other industrial sites either in the historic district or within the region, or across the nation. In part this is because the narrative of the site is fragmentary, multi-layered, and lacking – other than in a few instances such as the Duck Mill of John Colt's Paterson Manufacturing Company and the Gun Mill of Samuel Colt's Patent Arms Manufacturing Company – clear connections to familiar touchstones in industrial history.

Many industrial processes took place on the ATP site over the years and the technology and economy of 20th-century textile dyeing and printing differed in important respects from that of mid-19th-century throwing of silk, weaving of cotton or machine building. Developing a cohesive narrative of industrial development for the ATP site is challenging due to the complex history of the multiple manufacturers and industrial processes that occurred across the prop-

erty over nearly two centuries of operations. Specific manufacturers clearly stand out for their products or associations, but so many of these manufacturing operations were short-lived and occupied only a small portion of the overall site. In its current state, the ATP site is exceedingly difficult to interpret to a general audience because of the challenge of merely identifying the structural remnants of the mills, let alone trying to describe the various processes that once occurred within them. Some particular mills, such as the Gun Mill, stand out for a variety of structural and contextual reasons, but the rest are far less distinct as individual entities.

B. HISTORICAL THEMES

Eight principal historical themes are identified as being represented at the ATP site and are briefly discussed below. These themes are ordered roughly chronologically and not in terms of their relative importance. They are also not all-inclusive. There are many minor themes of some interest – for example, the late 19th-century intensified quarrying of Mount Morris, which is reflected most notably in the operation of a rock-crushing plant, and the late 19th- and 20th-century systems of human and industrial waste disposal, which mostly entailed disgorgement into the Passaic River. Such minor themes are obviously relevant to the historical significance of the ATP site, but are not viewed as major front-line topics critical to the site's future archaeological and historic architectural study and interpretation.

1. Late 18th-Century Improvement of the ATP Site

The earliest years of the S.U.M.'s involvement with the ATP site are shrouded in some mystery but still, in the form of archaeological data and through further archival study, may offer the potential for significant information about the site. The initial S.U.M. action on the site appears to have involved the construction of a roadway around the northern end of Mount Morris to access stone quarried along the river's edge. This roadway was likely installed under the direction of Pierre Charles L'Enfant as part of his involvement in Paterson's early construction program. The ATP site was not the main focus of Paterson's earliest industrial development, but still fulfilled an important secondary role as the location of some vital ancillary action. In addition to the quarrying activity and the exploitation of Mount Morris as a source of building material, the S.U.M. chose to construct a sawmill on the site to supply lumber for local construction. This sawmill is believed to have been powered by the tail waters of the S.U.M.'s first cotton mill located on Mill Street on the site of the later Hamilton Mill. A log house dating from this period, possibly the home of the sawmill or quarry operator, was also located on the ATP site, probably within the later Gun Mill lot. Archaeological traces of any of these late 18th-century site elements are potentially of great value in unraveling this earliest phase of S.U.M. activity within Paterson.

2. Development of the S.U.M. Waterpower System and Later Power Sources

The ATP site has a high level of significance for its association with the early, innovative attempts by the S.U.M. and the Colt family to develop a waterpower system that could support multiple manufacturers. The placement of mills to maximize use of water was one of the most important decisions that Paterson's waterpower developers made. The ATP site sits at the critical junction of the Middle and Lower Raceways where in the first decade of the 19th century the S.U.M. and the Colts took concrete steps in laying out a tiered power canal system and surveying lots that could be sold or leased to prospective manufacturers. Among the ATP site's most significant surviving features are the building foundations (footprints), wheel pits, head races and tail races that define the placement of the original water-powered mills. These features, because they are the lowest layer of development on the site, may yet provide significant archaeological

data. Better understanding of the evolving design and function of the North Gates Waste Way and the supply of water to the Gun Mill and its predecessor rolling mill, is of particular interest since they relate directly to our understanding of the S.U.M.'s and the Colt's early expansion of the raceway system to accommodate more than one mill.

In broader perspective, the founders of the S.U.M. aspired to change America's status from that of a colony tied to European mercantile policies to that of a nation state on a par with Great Britain, the leading industrial nation of the day. The technology of large-scale waterpower, transferred from Great Britain and modified to meet local conditions, was a defining characteristic of early American industrialization. Paterson represents a remarkably important instance of waterpower's application in the American context due to its age, scale and association with leading political figures and industrialists. It was precedent setting, and even though it has often been noted that it did not live up to all of the grand aspirations of Hamilton, L'Enfant, and others, it did lay the ground work for an industrial community that grew by fits and starts in the first two decades of the 19th century. During this period, Paterson had no other contemporary parallels in the United States because of its multi-tiered waterpower system capable of supporting a dozen or more mills, including the ATP's Home Mill and the Colt rolling mill. The ATP site is directly associated with this national story, although it cannot be understood in isolation from the Great Falls district as a whole. The industrial story of the ATP site also cannot be told with any measure of comprehensiveness without also addressing the various other sources of power which began to replace hydropower beginning as early as the 1850s. These primarily include the generation, distribution and application of steam and electricity for various textile and ironworking processes.

3. Management of Water Resources and the Commoditization of Water

The ATP site also fits within a broader context of water management and the commoditization of water. Its primary relationship to this story is its association with the S.U.M.'s significant precedent-setting efforts to regulate and lease water for industrial power purposes. Early efforts by the S.U.M. were hampered by a lack of understanding of fluid dynamics and the technology to accurately measure and regulate water flows, as shown in the case of the *S.U.M. vs. Catherine Holsman* (1849) over the supply of water to the Home Mill on the ATP site.

Secondarily, the ATP site relates to other uses of water, including the early efforts of the Passaic Water Company to provide Paterson's municipal water supply by pumping directly from the river at the Gun Mill in the 1850s. This system was soon replaced by a more efficient system of drawing water from above the Great Falls, but active water main pipes, an inheritance of this early municipal system, still cross the ATP site in the vicinity of the Gun Mill. The dyers' use of water for processing is an interesting sub-chapter in the history of the Passaic's waters, but is by no means unique to the ATP site. This is part of a much larger story of the Passaic watershed and the extreme pressures placed upon it as the source of water for cities in northern New Jersey (Brydon 1974; Fries 2008).

4. Colt Family Entrepreneurialism

One cannot gain a full understanding of the early history of Paterson and the ATP site without taking into account the contributions and goals of the several branches of the Colt family that were so significantly involved with the city's development. The underlying concepts behind the idea of Paterson, as it first took shape in the 1790s, were forged in the unique brand of patriotic capitalism that lurked within a relatively select group of merchants and financiers who had

been active during the Revolutionary War. These individuals had inherited much of the responsibility for the administration of the young United States of America and held no qualms about seeking to profit from their positions of influence. Peter Colt was both a member and an agent of this group. Along the way he also became patriarch of a dynasty of entrepreneurs who focused much of their attention on the ATP site as they attempted to utilize government and family connections to secure their own personal fortunes.

Peter (1744-1824), Roswell (1779-1857), John (1785-1877), Samuel (1771-?), Samuel (1814-1862), Christopher Colt (1812-1855) and Elias Boudinot Colt (1828-?) all played roles in the development and history of the ATP site. The raceway system, the rolling mill and nail factory and the Duck Mill, all provided tangible evidence of their efforts to shape the physical and fiscal landscape of industrial Paterson. However no monument to the achievements of the Colt family looms larger than the iconic Gun Mill. Situated at the heart of the ATP site, the Colt Gun Mill offers an important industrial and technological association that rises above the ordinary through its involvement in the early manufacture of Colt revolvers in the mid-1830s, an association that helped to lay the groundwork for the development of a significant new industrial sector. After a few years Colt relocated to Hartford, Connecticut, eventually establishing the Colt armory that became synonymous with a revolution in the mechanization of small arms manufacture and the goal of interchangeability of parts with widespread influences on American manufacturing practice in general. Ironically for the ATP site, it was Colt's early failures here and elsewhere that convinced him that poor quality was inherent in hand labor and that success depended on mechanization of as many steps in the process as possible (Hounshell 1984:46-47).

5. The ATP Site Manufacturers as Custom and Batch Production Specialists

The traditional focus on individual firm and mill histories does not necessarily provide a satisfying lens through which to view the totality of the ATP property's history or link it to themes that provide broader meanings and comparisons. A potentially useful context in bringing clarity to the ATP site's historical narrative is thinking of the industries that occupied it as representing the "custom and batch production sector" described by business historian Philip Scranton in his seminal article, *Diversity in Diversity: Flexible Production and American Industrialization*. The custom and batch production sector manufactured a diverse range of products – machine tools, locomotives, ships, structural steel, steam engines, jewelry, furniture, specialty metals, dyes, pharmaceuticals, books, and specialty textiles and fashion apparel, inclusive of silk. It was characterized by markets "where product character and quality were keys to capturing sales, even as products (and demand for them) changed readily" (Scranton 1991:29). Batch specialists understood that demand for their products was narrow and often short-lived. Todd & Rafferty, for example, was not likely to sell textile machinery to the same customer year after year (the machines did not wear out that quickly), nor could silk weavers or dyers be content repeating styles or colors due to seasonal changes in fashion apparels. Scranton focused on the period from 1880 to 1930, but the industries in which he was interested clearly had precedents and antecedents, and his rubric of custom and batch production covers many of the industries associated with Paterson in general, and the ATP site in particular.

Scranton draws an important distinction between the custom and batch production sector and the mass production sector. The latter is what usually comes to mind when thinking about the classic story of American industrialization because it includes the class of goods that remained fixed for long periods of time, allowing for the development of highly efficient mass production techniques, like those

used to manufacture staple cotton textiles in Lowell, Massachusetts; steel rails in Pittsburgh, Pennsylvania; automobiles in Detroit, Michigan; or small arms in Hartford, Connecticut. Mass production industries were among those that tended to vertically and horizontally integrate, creating ever larger corporations with widespread name recognition. Custom and batch production sectors rarely reached this level of integration because production runs were limited and seldom provided the occasion for massive economies of scale. This lack of vertical integration and the manufacture of goods that were made by custom order or in batches characterize most of the industries that occupied the ATP site. Only the Standard Silk Dyeing Company, and later Allied Textile Printers, Inc., exhibited signs of horizontal integration, combining with other similar nearby firms for greater control of the market and economies of scale.

Custom and batch production sector manufacturers tended to rely on machinery and tools that could be adapted to changing tasks and products, and on arrangements of machinery that could be adjusted for greater or lesser production based on demand. Todd & Rafferty's machine inventory, for example, included mostly generalized tools that would have allowed it to meet customers' orders for almost any machine needed in a textile mill. Most of these machines could be idled when orders were slow or be quickly brought into production when orders increased. It is likely that Todd & Rafferty built very few machines in advance of receiving an order from its customers. Todd & Rafferty was in its time an important maker of hemp and rope machines, steam engines and boilers, and copper rollers for printing. It represented an important facet of the East Coast's regional industrial landscape – mechanics and machinists with a high-level of skill and ability to adapt to customers' needs for specialized, custom-order machines, but the firm was by no means unique. This type of manufacturer relied on talented employees with the range of skills and flexibility to carry out the work. These workers often rose to important positions within the firms or left to start their own shops. This pattern is seen over and over again at the ATP site, particularly in the dyeing sector where a veritable "who's who" of Paterson dyers initially worked in the Gun Mill yard only to spin off their own businesses in other parts of the city.

Paterson's silk industry was a classic example of the custom and batch production sector characterized by flexible technological and organizational strategies that produced a variety of intermediate goods, like the skeins of dyed silk that Knipscher & Maass produced for use in hundreds of styles of fashion apparel. Manufacturers in this sector tended to locate in proximity to one another. Rather than acting in direct competition, they often specialized to intersect with neighboring firms in a fairly complex productive sequence. The ATP site, indeed Paterson's silk industry as a whole, tended to represent this approach where spinning, weaving, dyeing, and printing were divided among an extensive network of partial-process firms. During the last quarter of the 19th century, only a few of Paterson's silk manufacturers, such as Dexter, Lambert and Company, operated large integrated mills. The economic vulnerability of these mills was demonstrated by their lack of access to capital during economic downturns and by labor unrest, particularly the Great Strike of 1913, after which many of Paterson's large silk manufacturers closed or relocated their mills. From the 1920s to 1950s, Paterson's silk sector was dominated by smaller partial-process firms known locally as "cockroach shops," some of which rented floor space from the owners of the ATP mills. These relationships can be clearly seen at the ATP site, especially in the 1890s to 1910s when the Waverly, Mallory, Passaic and Gun mills housed numerous silk sector specialists. Each specialist, working for varied customers, tried to sustain enough orders to remain profitable. Unanticipated changes in market conditions could often result in business failures and causing a need to reorganize; this is a story told repeatedly at the ATP site and many other Paterson industrial sites as silk-related manufacturers rotated in and out of the various mills.

Although custom and batch production sector industries were found throughout the United States, they often concentrated in particular cities or regions of the Northeast, some of which became synonymous with specific products, especially as this model of industrial development spread throughout the late 19th century. Providence, Rhode Island, for example, became closely associated with jewelry; Barre, Vermont and surrounding towns with precision machine tools; and Paterson with silk. Some large urban areas, like Philadelphia (The Workshop of the World) or Trenton (Trenton Makes and the World Takes) developed around a wide range of custom and batch production sector industries from textiles to specialty metal products.

The implications of this model for Paterson and the ATP site are interesting. Paterson is often compared with Lowell, Massachusetts, and a score of other textile-oriented waterpower industrial developments in New England and a few later developments in the South. Indeed, Paterson's early waterpower development and concentration on cotton textiles supports this comparison to a certain extent, but the comparison ends with the inclusion of Paterson's greater manufacturing diversity – locomotives, steam engines, machine tools, and specialty textiles like hemp, flax, and silk – that by the 1830s to 1850s were thriving or beginning to thrive in the city. This suggests that Paterson "changed course" in the second quarter of the 19th century, superimposing on its water-powered cotton textile-dominated origins, a model of industrial development that fit more closely the regionally dominant model of diverse, custom and batch production sector products like silk, locomotives and machinery.

6. Cotton and Wool Manufacture

During the early 19th century, both cotton and wool factories were erected on the ATP site. Wool manufacture never represented an especially important sector of industrial activity at the ATP site or in Paterson as a whole. One short-lived woolen mill, apparently the first large-scale woolen manufactory in Paterson, is documented on the site of the Waverly and Mallory mills in the early 1830s. Cotton, however, played an entirely different, more lasting and far more significant role. The first major phase in the industrial development of Paterson was centered on the cotton industry. Although the principal original goal of the S.U.M. was the establishment of a cotton manufactory, it was not until *circa* 1810-13 that the industry successfully took root on the banks of the Passaic.

Bolstered by shortages of imported cotton goods linked to a trade embargo and the War of 1812, Paterson experienced what can only be described as an explosive period of growth in textile manufacture between 1807 and 1815. According to published accounts, 11 cotton mills were constructed along the S.U.M.'s raceways during this period. With the rapid increase in the price of cotton textiles, entrepreneurs and investors quickly sought to capitalize on these market forces (Scientific American 1859:298; Trumbull 1882:43-51). In Paterson, they found advantages that no other location in the United States could offer. Close proximity to the nation's largest markets in New York and Philadelphia was one major benefit but, more important, Paterson could offer a fully developed industrial hydropower system that was dramatically underutilized. Prospective mill proprietors did not have to worry about the expense and delay of constructing their own raceways or entering into legal arrangements to ensure sufficient water levels in their own raceways. At Paterson, a fully completed waterpower system stood ready and waiting for hook-up. All a manufacturer needed to do was to sign a lease with the S.U.M. and erect a mill.

Although statistics are lacking, this boom period around the time of the War of 1812 may well have placed Paterson at the very forefront of the cotton industry in the United States. However, after the end of hostilities with the British in 1815, there was an immediate influx of cheap English and European goods and Paterson's cotton industry collapsed. After

a brief lull the local cotton mills were reinvigorated and continued to grow and expand, but not with such vigor as in New England. The city never again assumed such prominence in the country's cotton manufacturing sector.

Nevertheless, in the 1820s and 1830s, prior to the introduction of the silk industry to Paterson by Christopher Colt and John Ryle in the 1840s, cotton dominated the city's textile output and employed a large percentage of the city's work force. During this period the large textile mills that lined the edges of Mill Street and Boudinot (Van Houten) Street continued as the epicenter of cotton manufacture in Paterson and represented the industrial heart of the city. On the ATP site, John Colt's duck manufactory on the Passaic Mill lot was an important supplier of sail cloth for the American navy and produced a substantial proportion of the national output of this critical naval commodity. However, with a few notable exceptions (the Duck Mill being one), Paterson's cotton mills did not introduce the integrated methods of production (combining all manufacturing steps in a single plant) that were employed so effectively in New England. Rather, local spinners enjoyed a profitable symbiotic relationship with weavers in Philadelphia where Paterson yarn was shipped and woven into finished product. This particular relationship made the business quite profitable for Paterson's cotton mill proprietors in the short term but ultimately retarded the growth of the industry in the city (Garber 1968:35). Cotton spinning and weaving, and the related pursuits of bleaching, dying and printing, however, all continued to play an important role in the city's manufacturing activities well into the third quarter of the 19th century, although seldom in a fully integrated production system.

7. Silk Manufacture

From the perspective of regional history, one of the most important associations of the ATP site is its role in the development of Paterson's leading custom and batch production sector industry – the manufacture of silk. The Gun Mill has long been generally recognized as the "birthplace" of silk production in Paterson. Its structural remnants deserve consideration of preservation for this reason, as well as the obvious Colt association. The circumstances of silk's introduction to Paterson appear to be one of those happenstances of history. The spinning of silk sewing threads by power was developed in England in the early 18th century, but did not become a successful American industry until the 1820s and 1830s when a number of throwing mills opened in Connecticut, Massachusetts, New York, Pennsylvania, and New Jersey. It just so happened that Christopher Colt had an interest in a silk mill in Hartford, Connecticut, and moved some machinery to Paterson in the late 1830s. Though Colt's operation failed, it attracted the attention of John Ryle, an immigrant English silk worker who made a successful restart in the Colt Gun Mill with financing from George Murray, a paint manufacturer. It was here around 1840 that John Ryle successfully introduced the up-to-date English technology of silk spinning to Paterson. Ryle's business venture allowed him to soon expand into larger facilities and hire workers, some of whom eventually started their own businesses, attracting still more workers, many lured from English silk mills in the Macclesfield area near Manchester. This is a classic story of transfer of technology and entrepreneurship which lies at the root of Paterson's becoming within 30 years the center of American silk manufacturing. Interestingly, John Ryle and his heirs continued to maintain an interest in the Gun Mill, using it primarily as rental property.

In the post-Civil War years, the mills or sections of mills on the ATP site that housed silk throwing or weaving processes followed in the pattern of the silk industry in Paterson as a whole, with little occurring in the silk processes that did not occur in other locations in the city. A series of firms moved in and out of the buildings, many of them as tenants, none of them particularly notable in comparison to the better known firms in Paterson. The mechanization of silk production, unlike cotton in New England and the

South, did not result in the establishment of many large integrated mills. Throwing was largely separated from weaving, which was even separated at times from firms that specialized in warping. Investment in enough silk machinery to start a business was not particularly capital-intensive, and many small operators owned only a few machines and relied on loans from middlemen in the New York City fashion districts for the initial purchase of the highly valuable silk. During the 1910s and 1920s, small silk shops, the so-called "cockroach shops," grew rapidly, more than doubling the number of broad-silk shops in Paterson from about 250 in 1915 to over 600 by 1928 (Wood 1939:20-21). A number of these shops were located in ATP site mills.

In national perspective, silk is a sub-topic within the greater realm of textiles, but it had its own patterns and tendencies due to the nature of the market for fashionable silks and labor needs ranging from semi-skilled throwsters to highly skilled broad-loom weavers. Silk has been a particularly fruitful area of inquiry for American labor historians because of the frequency of labor unrest and the tension between artisanal traditions and modern factory production methods (Goldberg 1989:19-23).

8. Textile Dyeing and Finishing

The consolidated silk dyeing sector came to vary over time from the fragmented throwing, warping and weaving sectors, although it too shared most of the characteristics of a typical custom and batch production industry. The dyeing sector, which also began with John Ryle in the Gun Mill yard in the 1840s, gradually came to be dominated by a small number of larger firms. By the late 1910s, among the largest of these firms was the Standard Silk Dyeing Company, which occupied most of the western half of the ATP site. Its principal competitors were Weidmann Silk Dyeing and the National Silk Dyeing Company. Together these and other Paterson dyers controlled about 80% of the country's silk dyeing in the 1910s and 1920s (Goldberg 1989:23). By the late 1920s, the National Silk Dyeing Company was Paterson's largest employer with over 2,500 workers. The dyeing companies were steady moneymakers, at least until the onset of the Great Depression. This gave them the financial capacity to invest in improved equipment and infrastructure. This is readily evident in the evolution of the ATP site with the numerous 20th-century building additions associated with the expansion of the Standard Silk Dyeing works. Reliance on Passaic River water, which was ideal for dyeing due to its softness, meant that the dyers were reluctant to leave Paterson, even as other sectors of the industry declined or relocated to places like eastern Pennsylvania to take advantage of cheaper unskilled labor. The workforce, made up of a small number of master dyers and the larger number of semi-skilled dyers assistants enjoyed a fairly stable wage structure. The dyers had fewer labor troubles than other sectors of the silk industry. In the 1920s, the dyers and printers adjusted their processes to new synthetic fabrics, particularly rayon, and thus even insulated themselves from the silk industry's collapse during World War II when supplies of silk from the Far East were cut off.

Perhaps most interesting in the context of the ATP site is the number of leading Paterson dyers who worked in and around the Gun Mill during the mid- to late 19th century. The community of dyers seems by the mid-1920s to have regarded the Gun Mill as a place where many a dyer had been able to get his start and then move off to establish his own, usually larger, works. Most of the master dyers were immigrants who brought the highly valued and technical knowledge of dyeing with them from Europe. Various refinements in process, including weighting of silk and the dyeing of silk before or after it was woven, were associated with the dyers who occupied the ATP site. The Silk Dyers' Association of America featured the Gun Mill and expressed pride and confidence in their industry in the commissioned volume *The History of the Silk Dyeing Industry* (1927) by Albert H. Heusser.

C. ANALYTICAL UNITS

The following framework of analytical units, emanating from the historical research undertaken for this historic context study, is intended to guide and focus the other work components of the broader cultural resource investigation of the ATP site, in particular archaeological field investigations that are the subject of a separate archaeological research design (URS and Hunter Research, Inc. 2010). This framework adopts an approach to the ATP site's resources that is part geographic and part diachronic. The topography of the site and its adaptation for water-powered industrial use supply one structural lattice upon which to arrange and consider the multiplicity of resources; the evolving land use of the site over time provides another. With this approach, which sees some overlap in the analysis of individual resources, the warp and weft of history on the ATP site can be bound into a coherent narrative, providing a fabric that can sustain preservation treatment and historic interpretation.

Original early 19th-century property lines, extended north to the current river edge, are purposely retained as boundaries for five of the seven analytical units (Figure 7.1). These govern the vast majority of the subsequent cadastral activity on the site with each of these lots generally displaying their own self-contained systems of land use and industrial operation until well into the 20th century. Four of these five analytical units correspond in essence to original mill lots on the site and mesh well with the underlying waterpower network (which is its own analytical unit), since each of these lots is serviced with its own raceway system. The Waverly and Mallory mills are treated together as they jointly occupy a single original mill lot and had an interconnected raceway system. The naming of these mill lot-based analytical units makes use of the dominant mill names used in the ATP site's history. Finally, these five analytical units based on early 19th-century property lines also conveniently mirror the organizational framework of the Maxman report, which will facilitate back-referencing to this key study.

Superimposed over the five early 19th-century property-based analytical units are two other units: one focused on the early S.U.M. period, prior to 1800, when the pattern of land use was not governed by the three-tiered waterpower system; the other consisting of the waterpower system itself and its various component parts as it existed within the limits of the ATP site. The bulleted outline below provides a fleshed-out summary of each analytical unit, highlighting its key components.

1. Early S.U.M. Site Elements Analytical Unit
- Quarrying of Mount Morris
- Roadway
- Sawmill & Hydropower System
- Log House

2. S.U.M. Waterpower System Analytical Unit
- S.U.M. Ownership, Development and Operation
- Middle Raceway
- North Gates Waste Way
- Lower Raceway
- Head Gates in Middle and Lower Raceways
- Gate Houses
- Mill Head Races
- Mill Waterwheel Pits
- Mill Turbine Pits
- Mill Tail Races
- Dams in Passaic River
- Water Supply Infrastructure
- Other Power Infrastructure (Steam, Electric)

3. Mount Morris Quarry Analytical Unit
- Geological Landform
- Quarry
- Wastewater
- Fabric Dyeing
- Knipscher & Maass Silk Dyeing Co. (Silk Dyeing)

- Standard Dyeing & Finishing Co. (Silk Dyeing and Finishing)
- Allied Textile Printers (Silk Dyeing and Finishing)

4. Gun Mill Lot Analytical Unit

- Colt Rolling Mill and Nail Factory
- Colt Patent Arms Manufacturing Company
- Ryle Silk Spinning and Weaving
- Passaic Water Company
- John Ryle Real Estate Association (Multiple Textile & Ironworking Use)
- Knipscher & Maass Silk Dyeing Company (Silk Dyeing)
- Standard Dyeing & Finishing Company (Silk Dyeing and Finishing)
- Allied Textile Printers (Silk Dyeing and Finishing)

5. Waverly and Mallory Mill Lot Analytical Unit

- Barrow Woolen Mill
- Scott Mill (Multiple Textile Use)
- Franklin Manufacturing Company (Multiple Textile Use)
- Standard Dyeing & Finishing Company (Silk Dyeing and Finishing)
- Allied Textile Printers (Silk Dyeing and Finishing)

6. Passaic Mill Lot Analytical Unit

- Wilder Wire Factory
- Colt/Paterson Manufacturing Company (Duck Mill)
- Passaic Manufacturing Company/Neuburger (Multiple Textile Use)
- Standard Dyeing & Finishing Company (Silk Dyeing and Finishing)
- Allied Textile Printers (Silk Dyeing and Finishing)

7. Todd Mill Lot Analytical Unit

- Holsman Cotton Mill (Home Mill)
- Todd Machine Works (Multiple Ironworking Use)
- Muller/Todd Mill Realty Company (Multiple Silk Weaving, Dyeing and Finishing)
- Allied Textile Printers (Silk Dyeing and Finishing)

D. PROPERTY TYPES AND HISTORIC INTEGRITY AT THE ATP SITE

Three decades ago, the ATP site offered a very different expression within the cultural landscape. Many buildings on the site, some of considerable age, were still intact and even in use. The historic architecture and industrial character of the site were plain to see and assessment of its historic integrity could be contemplated with relative ease within the National Park Service's evaluative parameters of location, design, setting, materials, workmanship, feeling and association. Today, the site's environment is radically different. Any assessment of site integrity now has less than 5% of the architectural fabric of the site to consider compared with what was available in the 1970s. From being a strongly expressed historic architectural resource with a largely unknown contributing archaeological component 30 years ago, the site must now be viewed as a predominantly industrial archaeological resource, still mostly unknown in terms of its subterranean content, with a dramatically reduced historic architectural component.

It is not technically feasible to fully evaluate the historic integrity of the ATP site as an industrial archaeological resource at the present time. Not enough is known about the subsurface condition of the site. Certainly, the site's location at the foot of the Great Falls and its natural and cultural setting, wedged in between the precipice of the "Valley of the Rocks," the quarry face of Mount Morris and downtown Paterson, impart a large measure of historic integrity and likely will continue to do so for many years, if not centuries, to come. A case may also be made perhaps for historic integrity being retained within

Waterwheel
Turbine
Boiler
Pump
Steam Engine
Electric Transformer

Early 19th-century Property Line (Analytical Unit Boundary)
Early 19th-century Property Line Extended to River (Analytical Unit Boundary)
ATP Site Boundary
Steam Line Mains
Water Supply Mains
Structure (circa 1850)
Street

Locations are Approximate

RIVER
PASSAIC
MOUNT MORRIS
QUARRY
Dam (circa 1857)
Dam (circa 1903)
North Gates Wasteway
Gatehouse
Gatehouse
GUN MILL
LOG HOUSE (c. 1793)
MALLORY MILL
WAVERLY MILL
SAW MILL (c. 1793)
PASSAIC MILL No. 1
TODD MILL
Middle Raceway (circa 1800-1801)
Lower Raceway (circa 1807)
Lower Raceway (circa 1807)
VAN HOUTEN STREET
MILL STREET

0 50 100 200
Feet

N

Prepared by: HUNTER RESEARCH, INC. September 2010

Map Showing Locations of Analytical Units
Allied Textile Printers Site

Figure 7.1

the overall industrial feeling imbued in the site and in the site's broad association with the evolution of Paterson's waterpower and street systems, the S.U.M. and many prominent personalities in Paterson history from national figures like Alexander Hamilton, Pierre Charles L'Enfant and innumerable Colt family members to local entrepreneurs such as John Ryle and John C. Todd. Yet, with the recent loss of so much architectural fabric and with so little still known about the site's archaeological condition, it is both difficult and premature to assess such qualities as design, materials and workmanship, and to consider associative aspects in detail.

Instead, at this early stage of cultural resource analysis and preservation planning, a preliminary attempt is made here to broadly articulate the kinds of physical and associative attributes that can be used to assess the historic integrity of those property types known or suspected to be present at the ATP site. Table 7.1 identifies the major property types in evidence at the ATP site, organized within the eight principal historical themes outlined in Section B of this chapter. In assessing the historic integrity of each property type, six measures or yardsticks of potential integrity are recognized, which may be applied as the site is studied in the future by archaeologists, architectural historians and historians:

[within the category of integrity of design]:

- Does the property have the ability to convey important information about ***the size and configuration of a particular building or structure*** that contributes to the significance of the ATP site and its future historic interpretation?

[within the category of integrity of design]:

- Does the property have the ability to convey important information about how ***a particular industrial building was supplied with power or water for manufacturing purposes*** that contributes to the significance of the ATP site and its future historic interpretation?

[within the category of integrity of design]:

- Does the property have the ability to convey important information about ***the technical process occurring within an industrial building*** that contributes to the significance of the ATP site and its future historic interpretation?

[within the category of integrity of design]:

- Does the property have the ability to convey important information about how ***a particular building or structure relates to the overall layout and operation of the site*** and thereby contributes to the significance of the ATP site and its future historic interpretation?

[within the category of integrity of materials]:

- Does the property have the ability to convey important information about ***the age, mode of construction, evolution and function of a particular building or structure*** that contributes to the significance of the ATP site and its future historic interpretation?

[within the category of integrity of association]:

- Does the property contain ***structural remains or artifacts that can be associated with events or persons*** relatable to the significance of the ATP site and its future historic interpretation?

E. CONCLUSION

This historic context document serves as a blueprint for future archaeological, historic architectural and archival study of the ATP site. It provides an overview of the site's history, defines the principal historical themes embedded within its long and complex sequence of land use, presents a framework of analytical units and property types upon which archaeological investigations can be designed, and offers some guidance as to the attributes most likely to indicate whether or not the site retains meaningful historic integrity. Despite the depredations of recent decades and substantial, although not total, loss of architec-

TABLE 7.1. ATP SITE - PROPERTY TYPES AND ATTRIBUTES INDICATIVE OF HISTORIC INTEGRITY.

HISTORICAL THEME AND APPLICABLE PROPERTY TYPE	INTEGRITY OF DESIGN				INTEGRITY OF MATERIALS	INTEGRITY OF ASSOCIATION	ANALYTICAL UNIT
	Size & Configuration of Building or Structure	Power or Water Supply to Industrial Building	Technical Processes within Building	Overall Site Layout & Operation	Age, Mode of Construction, Evolution & Function of Building	Structural Remains or Artifacts Associated with Events or Persons	
Late 18th-century Improvement of ATP Site							
Quarry				x			1
Roadway				x			1
Raceway	x	x		x			1
Waterwheel Pit	x	x	x	x			1
Sawmill	x	x	x	x	x	x	1
Domestic Site	x			x	x		1
Development of S.U.M. Waterpower System & Later Power Sources							
Raceway	x	x		x		x	2, 4, 5, 6, 7
Gate & Gate House	x			x	x	x	2, 4, 5, 6, 7
Waste Way	x			x		x	2, 4
Waterwheel/Turbine Pit	x	x	x	x		x	2, 4, 5, 6, 7
Boiler House/Steam Infrastructure	x	x		x	x		3, 4, 5, 6, 7
Electricity Infrastructure		x		x			3, 4, 5, 6, 7
Water Resources Management & Commoditization							
Dam in Passaic River	x			x			2
Raceway	x			x		x	2, 4, 5, 6, 7
Gate & Gate House	x			x		x	2, 4, 5, 6, 7
Waste Way	x			x		x	2, 4
Water Supply Infrastructure	x			x			2, 4, 5, 6, 7
Colt Family Entrepreneurialism							
Raceway	x	x		x		x	2, 4, 5, 6, 7
Gate & Gate House	x			x		x	2, 4, 5, 6, 7
Waste Way	x			x		x	2, 4
Waterwheel/Turbine Pit	x	x	x	x		x	2, 4, 5, 6, 7
Rolling Mill/Nail Factory	x	x	x	x	x	x	4
Cotton Mill/Duck Mill	x	x	x	x	x	x	5, 6
Gun Mill	x	x	x	x	x	x	4
Storage Building	x			x	x	x	4, 5, 6, 7
Office Building	x			x	x	x	4, 5, 6, 7
Custom & Batch Production							
Wire Factory	x	x	x	x	x	x	6
Machine Shop	x	x	x	x	x	x	4, 7
Foundry	x	x	x	x	x	x	7
Smith Shop	x		x	x	x	x	4, 7
Carpenter/Pattern Shop	x		x	x	x	x	4, 7
Bleachery	x		x	x	x	x	5
Dye Works	x	x	x	x	x	x	3, 4, 5
Print Works	x	x	x	x	x	x	5, 6
Laboratory Building	x	x		x	x	x	7
Storage Building	x			x	x	x	3, 4, 5, 6, 7
Packing Building	x			x	x	x	6
Stable	x			x	x	x	3
Office	x			x	x	x	3, 4, 5, 6, 7
Cotton and Wool Manufacture							
Wire Factory	x	x	x	x	x	x	6
Cotton Mill	x	x	x	x	x	x	5, 6, 7
Woolen Mill	x	x	x	x	x	x	5
Bleachery	x		x	x	x	x	5
Dye Works	x	x	x	x	x	x	3, 4, 5
Print Works	x	x	x	x	x	x	5, 6
Machine Shop	x	x	x	x	x	x	4, 7
Storage Building	x			x	x	x	3, 4, 5, 6, 7
Packing Building	x			x	x	x	6
Office	x			x	x	x	3, 4, 5, 6, 7
Silk Manufacture							
Silk Mill	x	x	x	x	x	x	4, 5, 6
Dye Works	x	x	x	x	x	x	3, 4, 5
Print Works	x	x	x	x	x	x	5, 6
Machine Shop	x	x	x	x	x	x	4, 7
Smith Shop	x		x	x	x	x	4, 7
Carpenter Shop	x		x	x	x	x	4, 7
Storage Building	x			x	x	x	3, 4, 5, 6, 7
Packing Building	x			x	x	x	6
Stable	x			x	x	x	3
Office	x			x	x	x	3, 4, 5, 6, 7
Textile Dyeing and Finishing							
Bleachery	x		x	x	x	x	5
Dye Works	x	x	x	x	x	x	3, 4, 5
Print Works	x	x	x	x	x	x	5, 6
Storage Building	x			x	x	x	3, 4, 5, 6, 7
Packing Building	x			x	x	x	6
Stable	x			x	x	x	3
Office	x			x	x	x	3, 4, 5, 6, 7

Note: Waterpower, water supply and other power-related property types will apply for all industrial process themes, but are omitted for sake of brevity

tural integrity, the history of the site is so compelling and its setting so unique that significant physical and interpretive value still resides there amongst the ruins, both above ground and below.

Within the site limits are several key properties, either reduced to ruins or to the category of known or suspected archaeological resource. The most important of these are: the Gun Mill (stabilized ruins and archaeological site); the duck mill (potential archaeological site); the Todd Mill and Home Mill (unstable ruins and potential archaeological site); the older sections of the dye works located along the riverbank (unstable ruins and potential archaeological site); and the late 18th-century sawmill site (potential archaeological site). Spread throughout the site are the various arteries of the S.U.M. waterpower system – the raceways, gates and wheel pits – which may have significant archaeological expression.

To highlight some of the historical themes that make the ATP site so special, of particular note are the following: the site's crucial function within the design and operation of the S.U.M. waterpower system; its participation in the concentrated burst of cotton manufacture in Paterson, *circa* 1807-15, certainly the earliest, large, coordinated push toward domestic textile production at a single waterpower site up to that time in the United States ; the specialization in the manufacture of duck (sail cloth) in the 1820s and 1830s on the Passaic Mill lot; the site's role as Paterson's first locus for the spinning and weaving of silk; on-site manufacturers' use of the custom and batch production system within both the textile-related machine tool business and the silk manufacturing industry, a characteristic feature of Paterson industry in the mid- and late 19th century; and the site's conversion in the 20th century into a modern integrated silk dyeing and finishing plant.

The site has many important associations with prominent figures in American history: most directly with several members of the Colt family, notably with Roswell and John Colt (for their involvement with the S.U.M. waterpower system, the duck mill and the Paterson Manufacturing Company) and Samuel Colt (the Gun Mill and the Patent Arms Manufacturing Company), and also with John Ryle (early silk manufacture and the city's water supply system) and James Mayer (who established Paterson's first custom dye house). The site has identifiable links with national figures such as Pierre Charles L'Enfant and Alexander Hamilton, while not to be forgotten are the countless nameless and faceless workers whose labors on the site were so productive through floods, fires and strikes.

Finally, the ATP site's historic designation on both the national and the state levels derives from its inclusion in the Great Falls of the Passaic/Society for Establishing Useful Manufacturers Historic District. The National Register of Historic Places nomination form prepared by Russell I. Fries in 1973 for this historic district identified the area as being of national significance with a period of significance extending from 1792 to 1924. The first of these dates reflects the commencement of the Society for Establishing Useful Manufactures' activities and the later date reflects the 50-year cut-off point typically applied in determining the eligibility of properties for inclusion in the National Register of Historic Places. While the date chosen for the beginning of the period of significance is clearly appropriate, the closing date is quite arbitrary and is based on a procedural guideline rather than on the chronology of the events that made the historic district significant. At the time of this writing, the period of significance for the Great Falls of the Passaic/Society for Establishing Useful Manufacturers Historic District is being amended to extend to 1945, a contextually based terminal date based on the dissolution of the S.U.M. and the conveying of the S.U.M.'s property to the City of Paterson. Conveniently, the year 1945 also coincides with the end of World War II and a major watershed in U.S. history that had important implications for the decline of older established manufacturing sectors such as those found in downtown Paterson.

The ATP site's period of significance clearly relates to that of the wider district. Archival research suggests (but does not absolutely confirm) that the first improvements to the ATP site were made by the S.U.M. in 1793 through the construction of a roadway, sawmill, residence and tail race, making the ATP site contemporaneous with the S.U.M.'s Bull Mill. Following a lull in activity between 1796 and *circa* 1813, the site was continuously engaged in activities related to the manufacture of textiles (in addition to other pursuits) from 1813 to 1982. The 20th-century consolidation of the formerly separate components of the site under the banner of the Standard Silk Dyeing Company and later, still more completely, under the aegis of the Allied Textile Printers Corporation reflects important trends in the wider textile manufacturing sector. With regard to the understanding of the history and the development of the site, the decline of the industry and the terminal years of the ATP operation are a significant part of the story. The dissolution of the S.U.M. in 1945 marks an important date in the ATP site's history just as it does in the history of the Great Falls/S.U.M. Historic District as a whole. In 1945, the S.U.M. relinquished its long-standing involvement with the ATP site by selling the quarry and five original mill lots to the City of Paterson, which in turn sold the lots to a realty company allied with Allied Textile Printers Corporation. The S.U.M. had ceased to be a driving force on the ATP site long before 1945, but it nonetheless exerted an influence as landlord and was certainly not in a financial position to support improvements throughout much of the first half of the 20th century. It is recommended that the ATP site's period of significance is 1793 to 1945 to coincide with the period of significance of the Great Falls/S.U.M. Historic District.

After the S.U.M. ceased to exist, the ATP site entered a final phase of industrial development that represented a discrete chapter in its history. From 1947 to 1982, Allied Textile Printers Corporation took the site through one last industrial re-shaping, tearing down and replacing some buildings but mostly building out and filling in around the pre-existing structures to accommodate upgraded machinery and improved product flow and efficiency. These efforts in retrospect may seem a vain attempt to arrest the final decline of an aging industry but certainly at the time they were viewed as necessary. At present, there is not enough perspective to judge this final chapter's significance, especially from the regulatory perspective since the closing of the ATP site in 1982 is not yet 50 years past. A novel without its final chapter is of diminished value, but for the time being it is an open question whether the ATP site's recent past may in the future justify another extension to the Great Falls/S.U.M. Historic District's period of significance.

REFERENCES

A.G. Lichtenstein & Associates, Inc.
1997 Restoration of the Passaic Street Pedestrian Bridge over the Middle Tailrace in the Great Falls National Historic District. Plans on file, TranSystems Corporation, Paramus, New Jersey.

Abstract of the Title of New Jersey General Security Co. and The Society for Establishing Useful Manufactures as to Mallory Mill Lot
n.d. On file, Paterson Museum, Paterson, New Jersey.

Abstract of the Title of Society of Useful Manufactures as to Gun Mill Lot
n.d. On file, Paterson Museum, Paterson, New Jersey.

Abstract of the Title of the Society for Establishing Useful Manufactures (John Ryle Real Estate Association)
n.d. On file, Paterson Museum, Paterson, New Jersey.

Abstract of the Title of Society of Useful Manufactures as to Mallory Mill Lot
n.d. On file, Paterson Museum, Paterson, New Jersey.

Abstract of the Title of Todd Mill Realty Corporation, A New Jersey Corporation
n.d. On file, Paterson Museum, Paterson, New Jersey.

Allen, A.B. (editor)
1845 Farm and Villa of Mr. Colt. *American Agriculturalist* IV (V):151-154.

Anonymous
1820 *A Map of the Village of Paterson in Essex County, State of New Jersey*. Retraced by the Works Progress Administration.

Avignone, June
1999 *Images of America: Downtown Paterson*. Arcadia, Charleston, South Carolina.

Barber, John, and Henry Howe
1844 *Historical Collections of the State of New Jersey*. S. Tuttle, New York, New York.

1868 *Historical Collections of New Jersey: Past and Present*. New Haven, Connecticut.

Berg, Scott W.
2007 *Grand Avenues: The Story of the French Visionary Who Designed Washington, D.C.* Pantheon Books, New York, New York.

Bevan, J., and F.V.J. Slator
1860 *Map of Paterson, New Jersey*. Land & Laing Lith., New York, New York. Retraced by the Works Progress Administration.

Bishop, J. Leander
1868 *A History of American Manufactures from 1608 to 1860*. Edward Young & Co., Philadelphia, Pennsylvania.

Blesso, F.J.
1993 The Great Falls Project, Paterson, New Jersey. Unpublished manuscript in support of nomination for Chrysler Award for Innovation in Design. Copy on file, Hunter Research, Inc., Trenton, New Jersey.

Boston Evening Transcript
1913 To Control Silk Dyeing and Printing. November 18, p. 4. Boston, Massachusetts.

Brockett, Linus Pierpont
1876 *The Silk Industry in America: A History Prepared for the Centennial Exposition*. George F. Nesbitt & Co. (printers), New York, New York.

Brown, Virginia Alleman
1983 Andrus-Delaplaine. *Genealogical Magazine of New Jersey* 58:144.

Brydon, Norman F.
1974 *The Passaic River, Past, Present, Future*. Rutgers University Press, New Brunswick, N.J.

Caemmerer, H. Paul
1970 *The Life of Pierre Charles L'Enfant.* Da Capo Press, New York, New York.

Clayton, W.W., and William Nelson (compilers)
1882 *History of Bergen and Passaic Counties, New Jersey*. Everts & Peck, Philadelphia, Pennsylvania.

Colt, John
1833 Letter to Roswell Colt. October 21, 1833. Copy in possession of Glenn Corbett.

1834a Letter to Roswell Colt. April 19, 1834. Roswell L. Colt Papers, Box 2, Folder 54, Historical Society of Pennsylvania, Philadelphia, Pennsylvania.

1834b Letter to Roswell Colt. April 14, 1834. Roswell L. Colt Papers, Box 2, Folder 54, Historical Society of Pennsylvania, Philadelphia, Pennsylvania.

1835 Letter to Samuel Colt. August 18, 1835. Colt Papers, Box 1, Folder 4, Connecticut Historical Society, Hartford, Connecticut.

Colt, Peter

c.1792 Essay urging development of American industry. Colt Family Papers (1777-1913), Special Collections and University Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

1821 Some memorandum of the life and employment of Peter Colt [transcription]. Colt Family Papers (1777-1913), Special Collections and University Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

Colt, Samuel

1835a Letter to Roswell Colt. May 2, 1835. Colt Papers, Box 1, Folder 3, Connecticut Historical Society, Hartford, Connecticut.

1835b Assignment of rights to Joseph D. Selden. August 8, 1835. Colt Papers, Box 1, Folder 4, Connecticut Historical Society, Hartford, Connecticut.

1836 Letter to Christopher Colt. May 30, 1836. Colt Family Papers, Manuscript Group 78, Series II, Box 11, Folder 3, University of Rhode Island Archives, Kingston, Rhode Island.

Corbett, Glenn

2010 List of Fires on the ATP Site from 1828 to 1915. Provided via comments to the New Jersey Historic Preservation Office. July 19, 2010. On file, Hunter Research, Inc., Trenton, New Jersey.

Davis, Joseph Stancliffe

1917 *Essays in the Earlier History of American Corporations, Numbers I-III*. Harvard University Press, Cambridge, Massachusetts.

DeBow, J.D.B. (editor)

1853 *DeBow's Review and Industrial Resources, Statistics, etc.* J.D.B. DeBow, New Orleans, Louisiana and Washington, D.C.

Desty, Robert (editor)

1915 William Pennington *et al*., Admrs. of Philip Rafferty, Deceased, *Appts*., v. Joseph C. Todd, *Respt*. In *The Lawyers Reports Annotated Book XI 1891*. The Lawyers Co-Operative Publishing Company, Rochester, New York.

Digges-L'Enfant-Morgan Papers

On file, Manuscript Division, Library of Congress, Washington, D.C.

Doddridge, Joseph E.

2001 Statement of Joseph E. Doddridge, Acting Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior, Before the Subcommittee on National Parks, Recreation ad Public Lands, House Committee on Resources, Concerning H.R. 146, to Authorize the Secretary of the Interior to Study the Suitability and Feasibility of Designating the Great Falls Historic District in Paterson, New Jersey, as a Unite of the National Park System, and for Other Purposes. http://www.nps.gov/legal/testimony/107th/grtflsnj.htm, accessed January 11, 2010.

Dodyk, Delight W.
1979 Winders, Warpers, and Girls on the Loom: A Study of Women in the Paterson Silk Industry and their Participation in the General Strike of 1913. Master's Thesis, Women's History, Sarah Lawrence College, New York, New York.

Dreiser, Theodore
1916 *A Hoosier Holiday*. John Lane, New York, New York.

Eastern Inspection Bureau
1950 Complete [Insurance] Report, Allied Textile Printers (Duck Gun and Mallory Mills). On file, Hunter Research, Inc., Trenton, New Jersey.

Engineering Record
1913 Hydroelectric Development Replacing Old Power Canal System. *Engineering Record* 67(8):200-202.

Essex County Deeds
On file, New Jersey State Archives, Trenton, New Jersey.

Essex County Transcribed Deeds
On file, New Jersey State Archives, Trenton, New Jersey.

Evans, Oliver
1900 [1795] *The Young Millwright and Miller's Guide*. Reprint Edition. Oliver Evans Press, Philadelphia, Pennsylvania.

Factory Mutual Insurance Company
1965 *Mill Realty Co.* Factory Mutual System, Norwood, Massachusetts.

1981 *ATP Processors Ltd., Paterson, New Jersey*. Factory Mutual System, Norwood, Massachusetts.

Field Operations
2008 Great Falls State Park, Paterson, NJ: Paterson's New Outdoor Living Room. www.state.nj.us/dep/parksandforests/parks/great_falls_state_park_draft_master_plan_overview.pdf, accessed January 11, 2010.

Fitton, R.S.
1989 *The Arkwrights: Spinners of Fortune*. Manchester University Press, Manchester, England.

Fleming, Thomas
2009 Wall Street's First Collapse. *American Heritage Magazine* 58 (6). www.Americanheritage.com, accessed January 19, 2010.

Ford, Gerald
1976 Remarks at Dedication Ceremonies for the Great Falls National Historic Site in Paterson, New Jersey. In *The American Presidency Project* [online], edited by John T. Woolley and Gerhard Peters, www.presidency.ucsb.edu/ws/?pid=6091, accessed January 11, 2010.

Freeman, U.W.
1835 *Map of the Town of Paterson, N.J.* On file, Passaic County Historical Society, Paterson, New Jersey. Retraced by the Works Progress Administration.

Fries, Russell I.
1975 European vs. American Engineering: Pierre Charles L'Enfant and the Water Power System of Paterson, N.J. *Northeast Historical Archaeology* 4(1 and 2):68-96.

2008 To the Health and Comfort of the Citizens: John Ryle, The Passaic Water Company, and Water Supply for Paterson, NJ, 1790-1900. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

Garber, Morris William
1968 The Silk Industry of Paterson, New Jersey, 1840-1913: Technology and The Origins, Development, and Changes in an Industry. Ph.D. Dissertation, Rutgers University, New Brunswick, New Jersey.

Garrison, Winton C.
1906 *The Industrial Directory of New Jersey*. Trenton, New Jersey.

Geiger, Charles D.
1962 *Todd Enterprises, Situate in the City of Paterson, Passaic County, New Jersey*. On file, Passaic County Clerk's Office, Paterson, New Jersey.

1964 *Survey of Property for Allied Textile Printers, Inc. Situate in the City of Paterson, Passaic County, New Jersey*. On file, Passaic County Clerk's Office, Paterson, New Jersey.

Geiger, Charles D., and John R. Johnson
1947 *Map of Lower Van Houten Street in the City of Paterson, Passaic County, New Jersey*. On file, Passaic County Clerk's Office, Paterson, New Jersey.

Genocchio, Benjamin
2007 Gun Making as an Art as Well as a Business. *New York Times*, January 21. New York, New York.

Gibson, Campbell
1998 *Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990*. Population Division Working Paper No. 27. U.S. Census Bureau, Population Division. www.census.gov/population/www/documentation/twps0027.html, accessed January 8, 2010.

Gish, Clay
1992 The Children's Strikes: Socialization and Class Formation in Paterson, 1824-1836. *New Jersey History* 110 (3-4):21-40.

Goldberg, David J.
1989 *A Tale of Three Cities: Labor Organization and Protest in Paterson, Passaic, and Lawrence, 1916-1921*. Rutgers University Press, New Brunswick, New Jersey.

Golin, Steve
1985 The Unity and Strategy of the Paterson Silk Manufacturers during the 1913 Strike. In *Silk City: Studies on the Paterson Silk Industry, 1860-1940*, edited by Philip B. Scranton, pp. 73-95. New Jersey Historical Society, Newark, New Jersey.

1988 *Fragile Bridge: Paterson Silk Strike, 1913*. Temple University Press, Philadelphia, Pennsylvania.

Gordon, John Steele
1999 The Great Crash (of 1792). *American Heritage Magazine* 50(3). www.Americanheritage.com, accessed January 19, 2010.

Gordon, Robert B., and Patrick M. Malone
1994 *The Texture of Industry: An Archaeological View of the Industrialization of North America*. Oxford University Press, New York, New York.

Graf, Edward M.
1969 The (Paterson) Tornado of 1903. Passaic County Historical Society Publication 1969(1). www.lambertcastle.org/tornado.html, accessed January 11, 2010.

Griffith, Joshua
n.d *Views of New Paterson*. Joshua Griffith, Paterson, New Jersey.

Gutman, Herbert G.
1968 Class, Status, and Community Power in Nineteenth-Century American Industrial Cities – Paterson, New Jersey: A Case Study. In *The Age of Industrialism in America: Essays in Social Structure and Cultural Values*, edited by Frederic Cople Jaher, pp. 263-287. The Free Press, New York, New York.

Haber, H.
1960 *U.S. Patent No. 3,099,514*. U.S. Patent Office, Washington, D.C.

Haines Photo Co.
1913 *Birdseye View of Paterson, N.J.* Haines Photo Co., Conneaut, Ohio.

Halsted, George B.
1849 The Society for Establishing Useful Manufactures v. Catherine Holsman et al. In *Reports of Cases Decided in The Court of Chancery, The Prerogative Court, and, on appeal, in The Court of Errors and Appeals, of the State of New Jersey, Vol. I*, pp. 126-136. E. Sanderson (printer), Elizabethtown.

Hamilton, Alexander
1791 *Report of the Secretary of the Treasury of the United States, on the Subject of Manufactures: Presented to the House of Representatives, December 5 1791*. Childs and Swain, Philadelphia, Pennsylvania.

1913 [1791] *Report on Manufactures: Communication to the House of Representatives, December 5, 1791*. Senate Document no. 172. Presented by Mr. Smoot, Washington, D.C.

Harris, Howard
1979 Artisans Into Millhands: Early Labor Conflicts In Paterson, New Jersey, 1828-1835. Paper presented at the Second Annual Lecture Series, Great Falls, Development Corporation, SUM Historic District. Unpublished manuscript on file, American Labor Museum/ Botto House, Paterson, New Jersey.

1990 "The Eagle to Watch and the Harp to Tune the Nation:" Irish Immigrants, Politics and Early Industrialization in Paterson, N.J., 1824-1836. *Journal of Social History* 23(3):575-597.

Harrison, Walter
1775 *A New and Universal History, Description, and Survey Of The Cities Of London and Westminster, The Borough of Southwark, And Their Adjacent Parts*. Printed for J. Cooke, at Shakespeare's Head, Pater-Noster-Row, London.

Haven, Charles T., and Frank A. Belden
1940 *A History of the Colt Revolver and the Other Arms Made by Colt's Patent Fire Arms Manufacturing Co., from 1836 to 1940*. William Morrow & Company, New York, New York.

Heaton, Herbert
1951 The Industrial Immigrant in the United States, 1783-1812. *Proceedings of the American Philosophical Society* 95(5):519-527.

Heck, Robert C.H.
1907 *The Steam-Engine and Other Steam-Motors, Volume II*. D. Van Nostrand Company, New York, New York.

Herochik, Shelley Glotzer
1986 Yours for the Good Fight: The Effects of Industrial Decline in the Hatting, Textile, and Machine Tool Industries in Orange and Paterson, New Jersey, in the 1920s. Ed.D. dissertation, Rutgers University, New Brunswick, New Jersey. University Microfilms International, Ann Arbor, Michigan.

Herz, Robert
1939 The S.U.M.: The History of a Corporation. Master's thesis, New School for Social Research, New York, New York.

Heusser, Albert H. (editor)
1927 *The History of the Silk Dyeing Industry in America*. Silk Dyers' Association of America, Paterson, New Jersey.

Hills, John
1781 *A Sketch of the Northern Parts of New Jersey.* Reprinted from the original in the Library of Congress. Portolan Press, Brielle, New Jersey.

Hindle, Brooke, and Steven Lubar
1988 *Engines of Change: The American Industrial Revolution, 1790-1860*. Smithsonian Institution Press, Washington, D.C.

Historic American Engineering Record (National Park Service)
1973a Great Falls S.U.M. Survey. A Report on the First Summer's Work. Washington, D.C. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

1973b Essex Mill, HAER No. NJ-6. Historic American Engineering Record, National Park Service, Department of the Interior, Washington, D.C.

1973c Allied Textile Printers (The Gun Mill), HAER No. NJ-17. Historic American Engineering Record, National Park Service, Department of the Interior, Washington, D.C.

1973d Franklin Manufacturing Company: Waverly Mill, HAER No. NJ-7. Historic American Engineering Record, National Park Service, Department of the Interior, Washington, D.C.

1974a Todd and Rafferty Machine Company, HAER No. NJ-5. Historic American Engineering Record, National Park Service, Department of the Interior, Washington, D.C.

1974b Great Falls S.U.M. Power Canal System, HAER NJ-2. Historic American Engineering Record, National Park Service, Department of the Interior, Washington, D.C.

Historic Conservation and Interpretation, Inc.
1973 Archeological Survey of the Valley of the Rocks, Great Falls Historic District, Paterson, New Jersey. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

1996 Proposed Research Design for a Cultural Resources Survey of the Allied Textile Printing (ATP) Site in Paterson's National Historic Landmark District. On file, New Jersey Historic Preservation Office, Trenton, New Jersey.

1997a Cultural Resources Survey of the Allied Textile Printing Site, In-Progress Report No. 1. Prepared for Regan Development Corporation, Yonkers, New York. On file, New Jersey Historic Preservation Office, Trenton, New Jersey.

1997b Cultural Resources Survey of the Allied Textile Printing Site, In-Progress Report No. 2. Prepared for Regan Development Corporation, Yonkers, New York. On file, New Jersey Historic Preservation Office, Trenton, New Jersey.

1997c Cultural Resources Survey of the Allied Textile Printing Site, In-Progress Report No. 3. Prepared for Regan Development Corporation, Yonkers, New York. On file, New Jersey Historic Preservation Office, Trenton, New Jersey.

1997d Todd & Rafferty Mill Head Races. Manuscript and sketches on file at Hunter Research, Inc., Trenton, New Jersey.

Holmes, Madelyn

1988 *Forgotten Migrants: Foreign Workers in Switzerland before World War I.* Associated University Presses, Cranbury, New Jersey.

Hopkins, G.M.

1861 *Paterson: Extracted from the Map of the Counties of Bergen and Passaic, New Jersey*. G.H. Corey, Philadelphia, Pennsylvania. Retraced by the Works Progress Administration.

Hounshell, David A.

1984 *From the American System to Mass Production 1800-1932: The Development of Manufacturing Technology in the United States*. Johns Hopkins University Press, Baltimore, Maryland.

Howard, Robert A.

1997 Letter, Robert A. Howard to Edward Rutsch. June 17, 1997. On file at Hunter Research, Inc., Trenton, New Jersey.

Hughes, R.S.

1877 Letter, R.S. Hughes, Receiver for E.B. Morgan, to A.M. Humphrey, Esq. May 3, 1877. Copy on file, Glenn Corbett.

Humphreys, John B.

n.d. Search Against Property of James Warren Thayer, to Premises Situate in the City of Paterson, New Jersey. On file, Paterson Museum, Paterson, New Jersey.

Hunt, Freeman

1848 *The Merchant's Magazine and Commercial Review, Volume 19, from July to December 1848*. New York, New York.

Hunter, Louis C.
1979 *A History of Industrial Power in the United States, 1780-1930. Volume One: Waterpower in the Century of the Steam Engine*. University Press of Virginia, Charlottesville, Virginia.

Hyde, E.B.
1877 *Atlas of Passaic County, New Jersey*. E.B. Hyde and Co., New York, New York.

International Correspondence Schools
1897 *A Textbook on Civil Engineering: Water-Wheels, Hydraulic Machinery, Water Supply and Distribution, Irrigation*. International Textbook Company, Scranton, Pennsylvania.

Irwin, Douglas A.
2004 The Aftermath of Hamilton's "Report on Manufactures." *The Journal of Economic History* 64(3):800-821.

Johnston, Henry P. (editor)
1889 *The Record of Connecticut Men in the Military and Naval Service During the War of the Revolution, 1775-1783*. Case, Lockwood & Brainard Co., Hartford, Connecticut.

Kellner, William L.
1968 On Samuel Colt and the Patent Arms Manufacturing Company of Paterson, New Jersey. Unpublished Master's Thesis. On file, Paterson Free Public Library, Paterson, New Jersey.

King, William T.
1896 *History of the American Steam Fire-Engine*. The Pinkham Press.

Lehman Brothers
1928 United Piece Dye Works, List of Deals. Lehman Brothers Collection, Deal Books, Baker Library, Harvard Business School, Cambridge, Massachusetts.

Lichtenstein Consulting Engineers
2006 Restoration of the Upper Raceway Park in the Great Falls National Historic District. Plans on file, TranSystems Corporation, Paramus, New Jersey.

Low, George C.
1915 *The Industrial Directory of New Jersey*. S. Chew and Sons Co. (Printers), Camden, New Jersey

Malone, Patrick M.
2009 *Waterpower in Lowell: Engineering and Industry in Nineteenth-Century America*. Johns Hopkins University Press, Baltimore, Maryland.

Margrave, Richard D
. 1985 Technology Diffusion and the Transfer of Skills: Nineteenth-Century English Silk Migration to Paterson. In *Silk City: Studies on the Paterson Silk Industry, 1860-1940,* edited by Philip B. Scranton, pp.9-34. New Jersey Historical Society, Newark, New Jersey.

McLane, Louis
1969 [1833]*Documents Relative to The Manufactures in the United States*. Augustus M. Kelley, New York, New York.

Miller, William A.
1874 *Paterson, New Jersey*. Insurance Map.

Montgomery, James
1840 *A Practical Detail of the Cotton Manufacture of the United States; and the State of Cotton Manufacture of that Country Contrasted and Compared with that of Great Britain; with Comparative Estimates of the Costs of Manufacturing in Both Countries*. John Niven, Jr., Glasgow, Scotland.

Moody, Elliott G.
1903 *Twentieth Annual Report of the Department of Factory and Workshop Inspection of the State of New Jersey 1902*. The Unionist-Gazette Association (printers), Somerville, New Jersey.

Mueller, A.H.
1915 *Atlas of the City of Paterson, New Jersey*. A.H. Mueller, Philadelphia, Pennsylvania.

Nelson, William
1881-1882 *History of Paterson* [Manuscript]. On file, Manuscript Group 43, New Jersey Historical Society, Newark, New Jersey.

1881-1883 Conversation with John Colt. On file, Manuscript Group 23, New Jersey Historical Society, Newark, New Jersey.

1887 The Founding of Paterson as the Intended Manufacturing Metropolis of the United States. *Proceedings of the New Jersey Historical Society* 2(9):175-191.

Nelson, William, and Charles A. Shriner
1920 *History of Paterson and its Environs (Silk City): Historical, Genealogical, Biographical*. Lewis Historical Publishing Company, Chicago, Illinois and New York, New York.

New York Herald
1886 Knights Rejoicing. November 13, p. 2. New York, New York.

1890 Sifting Crooked Profits. December 21, p.31. New York, New York.

New York Times

1890 A Large Fire in Paterson. The Todd Machine Works – Consumed, Entailing Great Loss. July 21, p 1. New York, New York.

1900 New Jersey Silk Concern's Methods: Desperate Efforts of the Gallant Brothers to Avert Failure. November 26, p. 1. New York, New York.

1901 Pioneer Silk Company's Affairs. June 4, p. 6. New York, New York.

1901 Mallory Mill at Paterson Burned. January 27, p. 6. New York, New York.

1903 Gallant Brothers' Assets Not Concealed. March 12, p. 10. New York, New York.

1906 $45,000 Mill Fire in Paterson. July 22, p. 2. New York, New York.

1929 Fight Second Cole Will: Widow and Daughter Allege Insanity in Action Over $5,000,000 Estate. June 9, p. 60. New York, New York.

Parsons, Floyd W.

1928 *New Jersey: Life, Industries and Resources of a Great State*. New Jersey State Chamber of Commerce, Newark, New Jersey.

Passaic County Deeds

On file, Passaic County Clerk's Office, Paterson, New Jersey and New Jersey State Archives, Trenton, New Jersey.

Passaic County Historical Society

1956 Roswell L. Colt and his Estate. *Bulletin of the Passaic County Historical Society* 4(6):30.

Passaic County Mortgages

On file, Passaic County Clerk's Office, Paterson, New Jersey.

Paterson Board of Trade

1910 *Paterson, New Jersey: A Modern City*. Paterson Board of Trade, Paterson, New Jersey.

Paterson Evening News

1915 *Paterson and its Prominent Men*. Paterson Evening News, Paterson, New Jersey.

Paterson Friends of the Great Falls

n.d. The Great Falls/S.U.M. National Historic Landmark Historic District is now a National Park! www.patersongreatfalls.org, accessed January 9, 2010.

Perris, William
1854 *Paterson Mills 1854.* William Perris, New York, New York.

Phillips, Phillip R., and R.L. Wilson
1979 Paterson Colt Pistol Variations. Published for Woolaroc Museum by Jackson Arms, Dallas, Texas.

Quakenbush & Company
1907 *Paterson*. Quakenbush & Company, Paterson, New Jersey.

R.G. Dun & Co.
1871-1889 Volume 66. R.G. Dun & Co. Collection. On file, Baker Library, Harvard Business School, Cambridge, Massachusetts.

Ransom, James M.
1966 *Vanishing Ironworks of the Ramapos*. Rutgers University Press, New Brunswick, New Jersey.

Read, Philip M.
2003 *Images of America: Paterson*. Arcadia, Charleston, South Carolina.

Reps, John W.
1992 *The Making of Urban America: A History of City Planning in the United States*. Princeton University Press, Princeton, New Jersey.

Reynolds, Terry
1983 *Stronger Than a Hundred Men: A History of the Vertical Waterwheel*. Johns Hopkins University Press, Baltimore, Maryland.

Robinson, E.
1899 *Atlas of the City of Paterson and Haledon*. E. Robinson, New York, New York.

Robinson, E., and R.H. Pidgeon
1884 *Atlas of the City of Paterson, New Jersey*. E. Robinson, New York, New York.

San Francisco Bulletin
1888 Business and Industrial. 7 December, p. 4. San Francisco, California.

Sanborn Map and Publishing Company
1887 *Insurance Maps of Paterson, New Jersey*. Sanborn Map and Publishing Company, New York, New York.

Sanborn Map Company
1915 *Insurance Maps of Paterson, New Jersey*. Sanborn Map Company, New York, New York.

1951 *Insurance Maps of Paterson, New Jersey*. Sanborn Map Company, New York, New York.

Sanborn-Perris Map Company
1899 *Insurance Maps of Paterson, New Jersey*. Sanborn-Perris Map Company, New York, New York.

Santomauro, Angelica M., and Evelyn M. Hershey
2008 *Images of America: Around Haledon: Immigration and Labor*. Arcadia Publishing, Charleston, South Carolina.

Sargent, Felicity
1979 Historical and Structural Survey of the S.U.M. Steam Line, City of Paterson, New Jersey. Report prepared for the Department of Community Development, City of Paterson, New Jersey. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

Scharf, J. Thomas, and Thompson Westcott
1884 *History of Philadelphia, 1609-1884*. L.H. Everts & Co., Philadelphia, Pennsylvania.

Scientific American
1859 The Manufactures of Paterson, N.J. *The Scientific American* 1:282-283, 298-299, 314-315.

Scranton, Philip
1991 Diversity in Diversity: Flexible Production and American Industrialization, 1880-1930. *Business History Review* 65 (Spring):27-90.

SEA Consultants, Inc.
1994 Preliminary Assessment of the Former ATP Processors, Ltd Site. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

Seyer, Joseph
1922 *U.S. Patent No. 1,446,860*. U.S. Patent Office, Washington, D.C.

Shriner, Charles A.
1890 *Paterson, New Jersey: Its Advantages for Manufacturing and Residence: Its Industries, Prominent Men, Banks, Schools, Churches, etc*. The Press Printing and Publishing Company, Paterson, New Jersey.

Sidney, J.C.
1850 *Map of Patterson [*sic*], N.J*. M. Dripps, New York. Retraced by Works Progress Administration.

Sione, Patrizia
1992 Industrial Work, Militancy, and Migrations of Northern Italian Workers in Europe and in Paterson, N.J., 1880-1913. Ph.D. Dissertation, State University of New York at Binghamton. UMI Dissertation Services, Ann Arbor, Michigan.

Smyk, Edward (editor)
1966 Index and Abstract: Society for Establishing Useful Manufactures/Gledhill Papers. Originally compiled by W.P.A. Historical Records Survey, c. 1935. On file, Passaic County Historical Society, Paterson, New Jersey.

Society for Industrial Archaeology
1983 Paterson's Landmark Mill District Torched. *Society for Industrial Archaeology Newsletter* 12(2-3):1.

S.U.M. (Society for Establishing Useful Manufactures) Minute Books
1791-1840 Volume 1. On file, Paterson Museum, Paterson, New Jersey

S.U.M. (Society for Establishing Useful Manufactures) Papers
On file, Paterson Museum, Paterson, New Jersey

n.d. Knipscher & Maass. Folder 615.

1792 Letter, William Hall to the S.U.M., July 9, 1792.

1899 Letter, John H. Cook to E. LeB. Gardiner. December 30, 1899.

1903 Letter, William Ryle to E. LeB. Gardiner. February 25, 1903.

1904a Letter, John H. Cook to Liberty Silk Dyeing Company. March 16, 1904. Folder 270.

1904b Letter, John H. Cook to Liberty Silk Dyeing Company. December 3, 1904. Folder 270.

1906 List of Equipment in Dye Room of the Waverly Mill. February 1906. Folder 270.

1908 Letter, John H. Cook to E. LeB. Gardiner. March 26, 1908. Folder 270.

1909 Neuberger Mill File. Folder 391.

1910 Letter, E. LeB. Gardner to Charles L. Corbin. April 7, 1910.

1911a Letter, John Ryle Real Estate Association to the S.U.M. December 6, 1911. Folder 758.

1911b Letter, Baker & Scofield to John H. Cook. January 7, 1911. Folder 270.

1911c Letter, E. LeB. Gardner to Charles L. Corbin. March 17, 1911.

1912a Letter, S.U.M. to the John Ryle Real Estate Association. December 2, 1912. Folder 758.

1912b Letter, John Cook to the John Ryle Real Estate Association. July 2, 1912. Folder 758.

1913 Historical Data Relating to the Associated Water Companies in New Jersey, controlled by the New Jersey General Security Company. February 19, 1913. Folder 865.

1914a Rents at Gun Mill. October 29, 1914. Folder 758.

1914b John H. Cook to Baker & Scofield. November 24, 1914. Folder 270.

1914c S.U.M. Memorandum on Installation of Electric Power in the Mallory Mill, November 25, 1914.

1915 National Silk Dyeing Company vs. Jersey City Water Supply Company, *et al*. Folder 966.

1917a John H. Cook to Standard Silk Dyeing Co. January 22, 1917.

1917b John H. Cook to Standard Silk Dyeing Co. June 15, 1917.

1917c John H. Cook to Standard Silk Dyeing Co. December 21, 1917.

1918 S.U.M. Records of Electric Current Sold.

1924a Letter, Wm. Gavin Tayler to New Jersey General Security Company. October 9, 1924.

1924b Letter, John H. Cook to Wm. G. Taylor. September 15, 1924.

1924c Letter, John H. Cook to Wm. G. Taylor. December 10, 1924.

1924d Standard Silk Dyeing Company to S.U.M. October 30, 1924

1924e Letter, S.U.M. to Standard Silk Dyeing Company. November 5, 1924.

1925 Letter, S.U.M. to Standard Silk Dyeing Company. July 8, 1925.

1926a Memorandum, John H. Cook to Tenants of the Mallory and Waverly Mills. April 6, 1926.

1926b Letter, Standard Silk Dyeing Company to John H. Cook. June 17, 1926.

1930 Annual Report of the S.U.M. to the New Jersey Department of Banking.

1931 Standard Silk Dyeing Company Bankruptcy Proceedings. Folder 270.

1932 Sale of Dye Plant of Standard Silk Dyeing Corp. Folder 270.

1945 S.U.M. Mill Rentals as of July 1, 1945. Folder 727.

Soo, David

1998 Memorandum from David Soo to File, Re: ATP Site – Todd Mill – Wheelhouse. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

State of New Jersey

1854 An Act to incorporate the Franklin Manufacturing Company. In *Acts of the Seventy-Eighth Legislature of the State of New Jersey, and Tenth Under the New Constitution,* pp. 241-244. Moreton A. Stille (printer), Mount Holly, New Jersey.

1860 An Act to incorporate the Passaic Manufacturing Company. In *Acts of the Eighty-Fourth Legislature of the State of New Jersey, and Sixteenth Under the New Constitution*, pp. 459-463. Andrew Mead (printer), Paterson, New Jersey.

Stewart, John H. (Reporter)

1879 Joseph C. Todd v. Administrators of Philip Rafferty, Deceased. In *Reports of Cases Decided in The Court of Chancery, The Prerogative Court, and, on appeal, in The Court of Errors and Appeals, of the State of New Jersey, Vol. III*, pp. 254-263. MacCrellish & Quigley (printers), Trenton, New Jersey.

Susan Maxman Architects

1996 Historic Industrial Site Analysis, ATP Site, Paterson, New Jersey. Prepared for the National Park Service Chesapeake/Allegheny System Support Office and the City of Paterson, New Jersey. On file, Paterson Historic Preservation Commission, Paterson, New Jersey.

Swan, Herbert S.

1937 *The Plain Goods Silk Industry*. A Survey for The Industrial Commission of the City of Paterson, New Jersey.

Swank, James M.

1884 *History of The Manufacture of Iron in all Ages.* James M. Swank, Philadelphia, Pennsylvania.

Syrett, Harold C. (editor)

1966a *The Papers of Alexander Hamilton, Volume X, December 1791 – January 1792*. Columbia University Press, New York, New York and London, England.

1966b *The Papers of Alexander Hamilton, Volume XI, February 1792 – June 1792*. Columbia University Press, New York, New York and London, England.

1967 *The Papers of Alexander Hamilton, Volume XII, July 1792 – October 1792*. Columbia University Press, New York, New York and London, England.

1969 *The Papers of Alexander Hamilton, Volume XIV, February 1793 – June 1793*. Columbia University Press, New York, New York and London, England.

Syson, Leslie
1980 *The Watermills of Britain*. David & Charles, London, England.

The Textile World Official Directory of the Textile Industries also the Yarn Trade Index
1902 Guild & Lord, Boston, Massachusetts.

Tímár-Balászy, Ágnes, and Dinah Eastop
1998 *Chemical Principles of Textile Conservation*. Butterworth-Heinemann, Boston, Massachusetts.

Time
1927 Science: Salvage. August 22.

Toman, Rolf, Markus Bassler, Achim Bednorz , Markus Bollen, and Florian Monheim
2007 *Neoclassicism and Romanticism: Architecture, Sculpture, Painting, Drawings, 1750-1848* (English Edition). Ullmann & Kӧnemann, Cologne, Germany.

Trachtenberg, Marvin, and Isabelle Hyman
1986 *Architecture: From Prehistory to Post-Modernism*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey and Harry N. Abrams, Inc., New York, New York.

TranSystems Corporation
2008 Preservation and Interpretive Plan for the S.U.M. Great Falls Powerhouse. On file, Paterson Municipal Utilities Authority, Paterson, New Jersey.

Trumbull, Levi R.
1882 *A History of Industrial Paterson*. Carleton M. Herrick (printer), Paterson, New Jersey.

Tucker, Barbara M., and Kenneth H. Tucker
2008 *Industrializing Antebellum America: The Rise of Manufacturing Entrepreneurs in the Early Republic*. Palgrave MacMillan, New York, New York.

Tynan Throwing Company
1921 A little book about the new and better throwing and the profit and satisfaction which it brings to the manufacturer. Tynan Throwing Company, Paterson, New Jersey. On file, American Textile History Museum, Lowell, Massachusetts.

United States Census Office
1850 Seventh Census of the United States. Census Reports and Schedules. Products of Industry in Township of Paterson in the County of Passaic, State of New Jersey.

1860 Eighth Census of the United States. Census Reports and Schedules. Products of Industry in City of Paterson in the County of Passaic, State of New Jersey.

1870 Ninth Census of the United States. Census Reports and Schedules. Products of Industry in City of Paterson in the County of Passaic, State of New Jersey.

1880 Tenth Census of the United States. Census Reports and Schedules. Products of Industry in City of Paterson in the County of Passaic, State of New Jersey.

1883 Report on the Manufactures of the United States at the Tenth Census. Government Printing Office, Washington, D.C.
1885 *Reports on the Water-Power of the United States. Part I*. Government Printing Office, Washington, D.C.

URS and Hunter Research, Inc.
2010 Archaeological Research Design, Culutral Resource Investigation, Allied Textile Printing Site, Paterson, New Jersey. On file, New Jersey Historic Preservation Office, Trenton, New Jersey.

Vanderhoven, Irish and Company
1859 *Visitors' Guide to Passaic Falls: a careful description of the mural wonders about Patterson and its vicinity : also, a record of accidents and an authentic account of the Indian and Revolutionary reminiscenses*. New York, New York.

Van Wagoner, C.G.
1840 *Map of the Town of Paterson, New Jersey*. Haywards Lith, New York, New York. Retraced by the Works Progress Administration.

White, George S.
1836 *Memoir of Samuel Slater.* Philadelphia, Pennsylvania.

Whitman, Edward C.
2003 John Holland: Father of the Modern Submarine. *Undersea Warfare* (Summer). Available online http://www.navy.mil/navydata/cno/n87/usw/issue_19/holland.htm, accessed January 29, 2010.

Williams, H.A., and W.H. Williams
1886 Abstract of Title, Search Against Passaic Mill as to Lien of Certain Mortgages Herein Dated. On file, Paterson Museum, Paterson, New Jersey.

Wood, James E.
1939 Employment Experience of Paterson Broad-Silk Workers, 1926-1936. Works Progress Administration, National Research Project, Report No. L-3. Philadelphia, Pennsylvania.

Woodruff, Everett B., and Herbert B. Lammers
1950 *Steam-Plant Operation*. McGraw Hill Book Company, New York, New York.

Wright, Robert E. and David J. Cowen
2006 *Financial Founding Fathers: The Men Who Made America Rich*. University of Chicago Press, Chicago, Illinois.

Appendix A

PROGRAMMATIC AGREEMENT OF 2002

PROGRAMMATIC AGREEMENT
AMONG
NATIONAL PARK SERVICE,
THE NEW JERSEY HISTORIC PRESERVATION OFFICE,
THE CITY OF PATERSON,
NEW JERSEY HISTORIC TRUST, AND THE
ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING ACTIVITIES ON THE
FORMER ALLIED TEXTILE PRINTING SITE,
GREAT FALLS/SOCIETY OF USEFUL MANUFACTURERS
NATIONAL HISTORIC LANDMARK DISTRICT,
PATERSON, NEW JERSEY

WHEREAS, the National Park Service - Philadelphia Support Office (NPS) has determined that the proposed activities on the former Allied Textile Printing (ATP) site and that completion of these activities will enable future use of the site, both of which may have a potential adverse effect upon the Great Falls/Society of Useful Manufacturers National Historic Landmark (NHL) District (the District), and has consulted with the New Jersey Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (the Council), and the interested public pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and Sections 110(f) and 110(k) of the same Act (16 U.S.C. 470h2(f)); and

WHEREAS, the New Jersey Urban History Initiative (UHI) funds placed in the Fiscal Year 1992 budget of the NPS, provides $4.147 million to the City of Paterson (the City) to conduct historic preservation programs that encourage economic development; and

WHEREAS, the City and the NPS have signed a Cooperative Agreement to implement the Paterson UHI, under the terms of which the Federal funds that are the subject of this Programmatic Agreement may be transferred to the City, and the City is therefore a signatory to this agreement; and

WHEREAS, on May 8, 1997, the Core Advisory Group, a group consisting of City officials, the Paterson Historic Preservation Commission (HPC), the New Jersey State Historic Preservation Office (SHPO), representatives of the business community and interested citizens, to advise the NPS on the expenditure of the Paterson UHI funds, determined that $1,674,750.00 of UHI funds will be spent "for 'historic and public site elements' of development including: pavement, Belgian block curbs, walkways, demolition/earthwork/grading/site preparation/subgrade rubble, historic foundations and walls/use with new construction, landscaping, Waverly Mill Stabilization, smoke stack/plaza, river walk rehabilitation, historic river walk, Colt Mill Plaza, refurbish Middle Race and Colt Mill Stabilization;" the location of these elements as noted in the "Historic Industrial Site Analysis" drawing entitled "Requirements and Recommendations, March 1996" attached as Appendix A to the agreement; and

WHEREAS, in a letter from the City's Redevelopment Director to the NPS dated January 14, 1998, the City identified their "proposed prioritization of funding and implementation of the historic/public elements" to be: "1) Preparation and implementation of a demolition plan consistent

with the Phase I report from Historic Conservation Resources, Inc.; 2) Preparation and implementation of the stabilization of the Waverly Mill, smokestack, and riverwall (it is likely that items 1 and 2 will be combined.); 3) Gun Mill stabilization (This work will be funded with N.J. Historic Trust funds and UHI funds not included in the $1,674,750, and may also be done simultaneously with 1 and 2.); 4) Design and construction of the public utilities and roadway improvements (to be paid from UEZ [Urban Enterprise Zone] funds); and 5) Design and construction of public walkways including the river walk, interpretation of the Middle Raceway and other public walkways and plazas on the site," the location of these elements as noted in the "Historic Industrial Site Analysis" drawing entitled "Requirements and Recommendations, March 1996;" and

WHEREAS, as described in the "Settlement Agreement, Mutual Release and Reservation of Rights By and Between the City of Paterson and Regan Development Corporation (RDC)," the City may use funds placed in an escrow account by RDC for the purposes of the Phase I Cultural Resource Survey ($13,000.00) and "for the purpose of addressing potential remedial issues arising out of any digging, excavation, soil drilling, soil sampling, construction, demolition, architectural or archeological surveys or any other act which might have caused any physical disturbance on the [ATP]site in question at the six identified geotechnical investigations '1, 2, 3, 4, 7 and 8' ($21,460.00);" and

WHEREAS, the City was awarded a $500,000 matching grant from the State of New Jersey Department of Environmental Protection "Green Acres Program" for the stabilization of the riverwall and to construct a river walk; and

WHEREAS, the New Jersey Historic Trust (the Trust) has granted the City a $359,000 state matching grant through the New Jersey Historic Preservation Bond Fund, for the stabilization of the Colt Gun Mill ruins within the ATP site, and will hold a historic preservation easement on the Gun Mill for a period of twenty (20) years from the completion of the project, and is therefore a signatory to this Agreement; and

WHEREAS, the City is a Certified Local Government, one that has been certified by the SHPO as having established its own historic preservation commission and has a preservation program meeting Federal and State standards; and

WHEREAS, the City has a Historic Preservation Commission (HPC) which functions under a City ordinance to review alterations, new construction and demolition in the District, and acts as the City's preservation advocate and expert on the technical aspects of historic preservation projects, and, as such, will play a significant part in the City's role as described in the following stipulations; and

WHEREAS, a number of individuals, citizen groups and historic preservation groups have participated in the consultation and have been invited to concur in this Programmatic Agreement and sign as "concurring parties" and have no legal obligations to fulfill as parties to this agreement; and,

WHEREAS, the following documents are applicable throughout this document and are attached hereto, do not bind any of the signatories of this Programmatic Agreement to these documents unless they are original parties to those documents, and are incorporated by reference herein:

A) The Cooperative Agreement of September 30, 1993, as modified and amended, between NPS and the City, which establishes the framework for the UHI, of which this undertaking forms a part, and provides the mechanism by which UHI funds are transferred to the City;

B) The Historic Industrial Site Analysis of the ATP Site of April, 1996, prepared by Susan Maxman Architects under contract to NPS (also referred to as "the Maxman Report"), which identified historic elements on the site and made recommendations for their treatment in accordance with the Secretary of the Interior's "Standards for the Treatment of Historic Properties" (rev. 1992);

C) The minutes of the May 8, 1997 meeting of the Paterson UHI Core Advisory Group, specifying conditions to which the proposed use of UHI funds to support "historic and public" aspects of the ATP Site development would be subject;

D) The archaeological research design for a cultural resources survey of the ATP Site, prepared for Regan Development Corporation by Historic Conservation & Interpretation, Inc. and dated December 1996;

E) The January 14, 1998 letter from City of Paterson Redevelopment Director Francis J. Blesso, expressing the City's intent to independently undertake the a historic and public aspects of preparing the site for development;

F) Paterson City Council Resolution #01:741, September 25, 2001, "Resolution Authorizing a Mutual Termination and Settlement of All Pending Claims Regarding Contract with Regan Development Corporation, Inc."

These documents are also available at the City Clerk's Office, Third Floor, City Hall, 155 Market Street, Paterson, New Jersey, and at the Danforth Memorial Library, 250 Broadway, Paterson, New Jersey, during their respective regular business hours. Consulting parties must contact the City if they wish to have personal copies of the document and make arrangements with the City regarding the delivery or pick-up of the documents. The City may charge for costs of duplicating these documents and for shipping costs above $5.00.

NOW, THEREFORE, in consideration of the mutual covenants contained herein the NPS, New Jersey SHPO, the City, the Trust and the Council, the "signatories" to this agreement with legal obligations as parties to this agreement, agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties:

STIPULATIONS

NPS will ensure that the following measures are carried out. Failure to meet these stipulations will constitute a violation of this agreement. Stipulation 10 addresses how and when the agreement may be terminated.

1. This agreement must form an attachment to all contracts for professional services for work on and/or related to the ATP site, and must be incorporated by reference to such contracts.

2. Responsibilities of City

Within twenty (20) days from the date of this agreement, the City will provide to the NPS a written description of how the City proposes to address each of the requirements and recommendations in the Historic Industrial Site Analysis, including anticipated sequence(s) of actions with responsible individuals identified by name or position, a description of all tasks, intermediate completion points, estimated costs, and priorities for use of the UHI funds. The City will use the draft "Historic Industrial Site Analysis Recommendations Table, February 1, 2000" prepared by the NPS and provided to the City as the basis of this description.

This information will be updated for the NPS when the sequence of actions changes and when amendments are made to the Historic Industrial Site Analysis.

To assist in the implementation of these stipulations, the HPC must provide technical assistance to the City's Planning Board and the general public on the National Historic Preservation Act, as amended, the Section 106 process, the interpretation of the Secretary of the Interior's "Standards for the Treatment of Historic Properties," the interpretation of the design guidelines for the historic district and how these standards and processes can be integrated into future plans for the ATP site.

With the exception of emergency activities, the City shall ensure than no site cleanup or clearing, cultural resources survey fieldwork, hazardous material abatement or stabilization of elements on the site occurs until such contracts for this work as specified in this agreement are executed.

3. Oversight of work on site

Within ninety (90) days of the date of this agreement, the City will send a contract to the Municipal Council for their authorization for the professional services of a firm to act as project manager. The Project Manager will develop all plans for and oversee the execution of the City's contracts for site clearing, cultural resources survey, hazardous materials abatement and stabilization of elements on the site covered by this PA. The Project Management firm may also be considered for selection as the Research Team to conduct the Cultural Resource Survey of the site upon submission of a qualified proposal. The HPC will participate in the selection process for these services. Prior to any negotiations by the

City to contract for these services, the NPS will verify that the firms submitting proposals to the City have the requisite expertise to conduct all activities regarding or having the potential to affect historic buildings and structural elements pursuant to this PA. The work must be carried out by, or be under the direct supervision of, a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications - Standards for Historic Architecture" and/or "Standards for Historian" (proposed revised standards, 62 FR 33708, June 20, 1997) and that all activities regarding or having the potential to affect archeological resources pursuant to this PA are carried out by or under the direct supervision of a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications - Standards for Archeology" (proposed revised standards, 62 FR 33708, June 20, 1997), with at least 5 years experience in industrial archeology.

The scope of services for this contract will be developed by the City in consultation with NPS for approval in writing by NPS and the SHPO and must include:

a) a plan of work that will detail how each of the applicable Historic Industrial Site Analysis requirements and applicable recommendations will be met throughout the site, including anticipated sequences of actions with responsible individuals identified by name or position, and a description of all tasks, intermediate completion points, estimated costs, and priorities for use of the UHI funds,

b) provisions for direct communication on technical issues between the NPS and those providing historic architectural and archaeological expertise for the project as determined necessary by the architectural and archeological professionals,

c) authority for the project manager to directly contact the City of Paterson to request that work on the site be halted if any activity conflicts with the requirements of the Historic Industrial Site Analysis or the Secretary of the Interior's "Standards for the Treatment of Historic Properties," and to simultaneously notify the NPS in writing that such a request has been made.

4. Cultural Resource Survey of Site

The Research Team conducting this work shall include, but not be limited to, persons with experience and expertise in industrial archeology, history, architectural history, historic architecture, historic cultural landscapes and engineering. One team member may have expertise in more than one field. The persons on the Research Team must meet the requisite minimum disciplinary qualifications defined in the Secretary of the Interior's "Professional Qualifications Standards" for their subject area (Historian, Architectural History, Historic Architecture, Historic Landscape Architecture, proposed revised standards, 62 FR 33708, June 20, 1997). All activities regarding or having the potential to affect archeological resources pursuant to this PA must be carried out by or under the direct supervision of a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications - Standards for Archeology" (proposed revised standards, 62 FR 33708, June 20, 1997), with at least 5 years experience in industrial archeology. The HPC will participate in the selection process for these services. Prior to any negotiations by the City

to contract for these services, the NPS will verify that the firms submitting proposals have the requisite expertise to conduct all activities regarding or having the potential to affect historic buildings and structural elements pursuant to this PA.

The scope(s) of services will be developed in consultation with NPS for approval in writing by NPS and the SHPO prior to initiation of work and must include:

a) Research and Fieldwork

1. Completion of the full Cultural Resources Survey described in the 1996 archeological research design by HCI, including necessary research as well as archeological fieldwork as part of a comprehensive data recovery program. This work was identified in the "Historic Industrial Site Analysis" as necessary to complete the documentation of the site. Within 150 days from the date of this agreement, the City will send a contract to the Municipal Council for their authorization for the professional services of a firm to conduct the cultural resource survey of the site.

2. An archeological assessment of the impact of the geotechnical testing undertaken on the site on November 19, 20 and 25, 1997 of the following areas identified in Historic Conservation and Interpretation, Inc. (HCI)'s report of December 8, 1997: Geotechnical Tests 1, 2, 3, 4, 7 and 8. The assessment should include a thorough review, supported as necessary by field testing. The assessment must also include a determination of the impact on resources resulting from the 1997 testing and a determination as to whether the effected resources are archeologically significant. If significant resources are found to have been adversely effected than a plan designed to mitigate the effect of the 1997 testing must be included. The scheduling of the investigations may need to vary from the sequence proposed by HCI to assess the impact of the geotechnical tests and to coordinate with other work on the site; if so, the approval of the NPS archeologist and the SHPO are required. All pertinent and applicable safety procedures should be followed during these investigations.

3. Provision for periodic public access to the site to observe ongoing fieldwork. The Research Team will propose an appropriate number and timing of these visits so that they may be coordinated with the fieldwork.

4. Provision for emergency consultation in the field as necessary by the Research Team, SHPO, NPS archeologist, HPC, and the City.

5. Provision of all draft and final archeological and historic research reports resulting from actions pursuant to this agreement to NPS, the SHPO, the Council and the NJ Trust. The NPS and SHPO will have final approval of the final reports. The review period(s) will be no more than 45 days. Copies of the final reports will be submitted to the National Park Service, SHPO and

National Technical Information Service (NTIS). All such reports must be responsive to contemporary professional standards, and to the Department of Interior's format Standards for Final Reports of Data Recovery Program (42 CFR 5377-79). Precise locational data will only be provided in a separate appendix, and may not be publicly released.

b) The requirement for the Research Team to review the recommendations of the "Historic Industrial Site Analysis" and to propose revisions and/or additional recommendations related to their fields of expertise. Upon completion of the research and archeological fieldwork, and acceptance of the final reports by the NPS and the SHPO, the Research Team shall review the recommendations of the "Historic Industrial Site Analysis" and verify their validity, recommend revisions or propose additional recommendations. This report will be reviewed and approved by the NPS and the SHPO. Stipulation 5 describes the process by which public comments on these revisions are submitted.

c) The provision for direct involvement by the Research Team in the development of plans and specifications for all aspects of work on the site conducted under this PA to ensure appropriate steps to safeguard historic material are incorporated into these documents at the project development stage.

d) The provision for the disposition of archeological artifacts and data as determined by the City, the HPC, SHPO and NPS in consultation with archeologists performing site preparation and other experts as determined as necessary. Accessibility of the collection and data for study will be a criterion in the selection of a curation facility.

5. Review and Comment on Submittals

a) All documents prepared for review and approval pursuant to the terms of this agreement shall be sent to the NPS and SHPO. These documents will be made available by the City for review by the public and consulting parties concurrent with the reviews described above. Comments on these documents by the pubic and consulting parties will by considered by the SHPO and NPS in their review and approval.

Copies of all documentation will be made available at the City Clerk's Office, Third Floor, City Hall, 155 Market Street, Paterson, New Jersey, and at the Danforth Memorial Library, 250 Broadway, Paterson, New Jersey, during their respective regular business hours. The City will notify consulting parties in writing as each of these documents becomes available for review; the City must obtain a record of receipt of this notification. Consulting parties must contact the City if they wish to have personal copies of the document and make arrangements with the City regarding the delivery or pick-up of the documents. At the discretion of the City, documents in addition to those specified on Stipulation 5.b below, may be made

available by electronic mail or posted on the Internet. The City may charge for costs of duplicating these documents and for shipping costs above $5.00.

b) Copies of the interim and final reports of the Cultural Resources Survey and the revised recommendations to the "Historic Industrial Site Analysis" will be made available on the Internet.

c) The review period for the final report of the Cultural Resources Survey and for the revised recommendations to the "Historic Industrial Site Analysis" will be 45 days from the date of receipt of the City's notification letter, with a public meeting and site visit held after the documents have been available for 30 days. Any site visit must meet the City's requirements to address safety and liability. The City shall invite the ACHP and the NJHT to provide comments on these reports.

d) For all other documents, reviewers shall have 30 calendar days from the date of receipt of the City's notification letter to conduct such reviews. The failure of a party reviewing the documents to provide comments in accordance with this stipulation will be taken to indicate concurrence with the pertinent document by the reviewing party. Comments shall be submitted to the City. As appropriate and/or required, the City will forward comments to the reviewing agency/agencies.

e) SHPO review and approval of documents shall be consistent with the New Jersey Register of Historic Places Act.

6. Alterations to Project Documents

The City shall not alter any plan, scope of services, or other documents that have been reviewed and approved pursuant to this agreement, except to finalize documents commented on in draft, without first affording NPS and the SHPO the opportunity to review and approve the proposed changes.

7. Report and Review

a) On or before June 30th and December 31st of each year until NPS, the Council, and the SHPO agree in writing that the terms of this agreement have been fulfilled, the City shall prepare and provide a report to the NPS and the SHPO addressing the following topics:

1) Progress in demolition and site preparation.

2) Status of any interim protection of historic properties.

3) Progress in archeological monitoring and data recovery.

4) Any problems or unexpected issues encountered during the year.

5) Any changes the City believes should be made in the implementation of this agreement.

b) The process of notification of availability of these reports and timeframes for submitting comments on these reports are found in Stipulation 5, Review and Comment on Submittals.

c) Based on the review of this report, the NPS and SHPO shall determine whether this agreement shall continue in force, be amended or terminated.

8. Resolving Objections

a) Should any signatory (as defined in the Advisory Council's regulations, 36CFR Section 800.6.c) to this agreement object to any action carried out or proposed by another signatory with respect to the development of the ATP site or to the implementation of this agreement, NPS shall consult with the objecting party to resolve the objection. If after initiating such consultation, NPS determines that the objection cannot be resolved through consultation, NPS shall forward all documentation relevant to the objection to the SHPO, including NPS's proposed response to the objection. Within 30 days after receipt of all pertinent documentation, the SHPO shall exercise one of the following options:

1) Advise NPS that the SHPO concurs in NPS's proposed final decision, whereupon the NPS will respond to the objection accordingly; or

2) Provide NPS with recommendation, which NPS shall take into account in reaching a final decision regarding its response to the objection; or

3) Notify the NPS that the objection will be referred for comment to the Council, pursuant to 36 CFR Section 800.6(b), and proceed to refer the objection and comment to the Advisory Council on Historic Preservation (the Council).

b) Should the SHPO not exercise one of the above options within 30 days after receipt of all pertinent documentation, the NPS may assume the SHPO's concurrence in its proposed response to the objection.

c) NPS shall take into account the SHPO's recommendations or comments provided in accordance with this stipulation with reference only to the subject of the objection. All responsibilities under this agreement that are not the subject of an objection shall remain unchanged.

d) At any time during implementation of the measures stipulated in the agreement, should an objection pertaining to the agreement be raised by a member of the public, NPS shall notify the signatories to this agreement and take the objection into account, consulting with the objector and with any of the signatories to this

agreement to resolve the objection. Upon receipt of such notification, should a signatory agree with the objection raised, the signatory will notify the NPS. The NPS will then follow the process in Stipulation 8.a. All responsibilities under this agreement that are not the subject of an objection shall remain unchanged.

c) Based on the outcome of the process described in Stipulation 8.a, NPS and the SHPO shall determine whether this agreement shall continue in force, be amended, or terminated.

9. Amendments

Any signatory to this agreement may propose to NPS that the agreement be amended, whereupon NPS shall consult with the other signatories to this agreement to consider such an amendment. 36 CFR Part 800.5(c) shall govern the execution of any such amendment.

10. Termination

a) Per 36CFR800.6(c)(8): "If any signatory determines that the terms of a Memorandum of Agreement cannot be carried out, the signatories shall consult to seek amendment of the agreement. If the agreement is not amended, any signatory may terminate it. The Agency Official shall either execute a Memorandum of Agreement with signatories under §800.6(c)(1) or request the comments of the council under §800.7(a)." 36CFR800.14(b)(3) regulates the development of Programmatic Agreements and states that the undertaking shall follow 36CFR800.6.

b) If the terms of this agreement have not been implemented by October 29, 2004, this agreement shall be considered null and void, and the NPS, if it chooses to continue with its participation in the development, shall re-initiate its review in accordance with 36 CFR 800.

11. NPS Review of Future Plans

The NPS shall review and approve any plans for the ATP site until September 30, 2008, the expected termination date of a new Cooperative Agreement with the City providing for the expenditure of the remaining UHI funds for the ATP site.

Execution of the agreement and implementation of its terms evidence that NPS has taken into account the effects of the undertaking on historic properties.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed by their authorized representatives the day and year written below.

NATIONAL PARK SERVICE – PHILADELPHIA SUPPORT OFFICE

By: _____ Date: 4.24.02

J. Keith Everett, Superintendent

STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: 6/10/02
Dorothy P. Guzzo, Administrator

CITY OF PATERSON

By: _____ Date: 6-26-02
Martin G. Barnes, Mayor

NEW JERSEY HISTORIC TRUST

By: _____ Date: 7-15-02
Harriette C. Hawkins, Executive Director

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: _____
John Fowler, Executive Director

CONCURRING PARTIES

Paterson Historic Preservation Commission

By: _____ _____ Date: 8/06/02
Cesar Acosta, Chairperson Michael Wing, Executive Director

Great Falls Development Corporation

By: _____ Date: _____

Flavia Alaya, Past Chair, Paterson Historic Preservation Commission

_____ Date: _____

Patricia Condell, member, Society for Industrial Archeology

_____ Date: _____

Joseph P. Havasy

_____ Date: _____

Paterson Economic Development Corporation

By: _____ Date: _____

STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: 6/10/02
Dorothy P. Guzzo, Administrator

CITY OF PATERSON

By: _____ Date: 6-26-02
Martin G. Barnes, Mayor

NEW JERSEY HISTORIC TRUST

By: _____ Date: 7-15-02
Harriet C. Hawkins, Executive Director

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: _____
John Fowler, Executive Director

CONCURRING PARTIES

Paterson Historic Preservation Commission

By: _____ Date: _____

Great Falls Development Corporation

By: _____ Date: 7-31-02

Flavia Alaya, Past Chair, Paterson Historic Preservation Commission

_____ Date: _____

Patricia Condell, member, Society for Industrial Archeology

_____ Date: _____

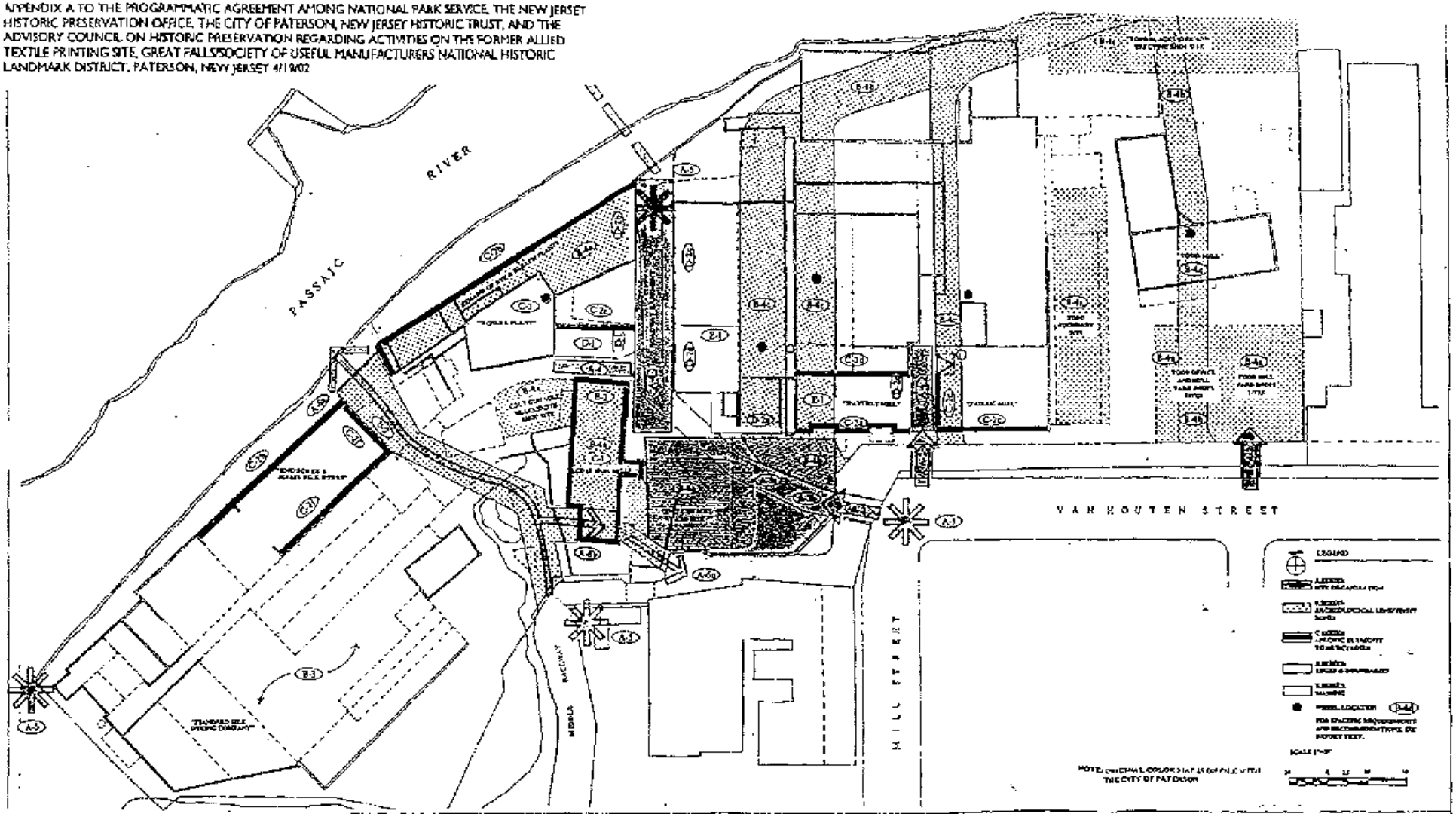
Joseph P. Havasy

_____ Date: _____

Paterson Economic Development Corporation

By: _____ Date: _____

APPENDIX A TO THE PROGRAMMATIC AGREEMENT AMONG NATIONAL PARK SERVICE, THE NEW JERSEY HISTORIC PRESERVATION OFFICE, THE CITY OF PATERSON, NEW JERSEY HISTORIC TRUST, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION REGARDING ACTIVITIES ON THE FORMER ALLIED TEXTILE PRINTING SITE, GREAT FALLS/SOCIETY OF USEFUL MANUFACTURERS NATIONAL HISTORIC LANDMARK DISTRICT, PATERSON, NEW JERSEY 4/19/02



HISTORICAL INDUSTRIAL SITE ANALYSIS
ALLIED TEXTILE PRINTING SITE
Paterson, New Jersey
NATIONAL PARK SERVICE
U.S. Custom House, Philadelphia, Pennsylvania 19106

RECOMMENDATIONS AND RECOMMENDATIONS

Appendix B

AMENDED PROGRAMMATIC AGREEMENT OF 2005

AMENDMENT TO
PROGRAMMATIC AGREEMENT
AMONG
NATIONAL PARK SERVICE,
THE NEW JERSEY HISTORIC PRESERVATION OFFICE,
THE CITY OF PATERSON,
NEW JERSEY HISTORIC TRUST, AND THE
ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING ACTIVITIES ON THE
FORMER ALLIED TEXTILE PRINTING SITE,
GREAT FALLS/SOCIETY OF USEFUL MANUFACTURERS
NATIONAL HISTORIC LANDMARK DISTRICT,
PATERSON, NEW JERSEY

WHEREAS, the State of New Jersey has proposed the creation of a new urban state park in the Great Falls/Society for Useful Manufacturers National Historic Landmark District area of the City of Paterson; and

WHEREAS, the State of New Jersey will be holding a design competition to design the new urban park in Paterson; and

WHEREAS, the findings of the cultural resource survey to be undertaken under the Programmatic Agreement will inform the park design competition and any future development of the site; and

WHEREAS, the National Park Service, the State of New Jersey, and the City of Paterson are working cooperatively to better understand the history of the Allied Textile Printing Site (ATP site) and the area immediately west of the ATP site to the existing Hydroelectric Plant; and

WHEREAS, completing the cultural resource survey, stabilizing historic elements of the site, clearing the site of hazardous material including underground storage tanks, removing non-contributing debris, and ensuring the integrity and stability of the River Wall will protect both the environment and the historic resource.

NOW THEREFORE, the signatories to this agreement agree that the existing Programmatic Agreement (PA) will be amended as follows:

1. The State of New Jersey will assume the following responsibilities from the City of Paterson:
    - Comply with Stipulation 1.
    - Completing Stipulation 3.
    - Completing Stipulation 4.
    - Completing Stipulation 5.
    - Comply with Stipulation 6

- Satisfying the reporting requirements of Stipulation 7.

2. The City of Paterson and the National Park Service shall amend their existing Cooperative Agreement to provide for the transfer of the remaining Urban History Initiative Funds allocated for the cultural resource survey to the State of New Jersey. The NPS and the State of New Jersey shall execute a Cooperative Agreement to provide for the transfer of these funds to the State.

3. The remaining Stipulations of the PA remain in force as originally drafted.

4. The State of New Jersey will work with the City of Paterson to provide access to the site as described at Stipulation 4. a) 3. and , 4 a) 4. of the existing PA. The State of New Jersey will provide interested parties with the opportunity to review and comment on submittals as set forth in Stipulation 5 of the original PA.

5. The NPS review and approval of projects at the ATP site through September 30, 2008 set forth by Stipulation 11 of the existing PA shall be binding on any projects the State of New Jersey may undertake on the ATP site.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed by their authorized representatives the day and year written below.

NATIONAL PARK SERVICE – NORTHEAST REGION

By: _____ Date: _____
Joseph DiBello, Manager, Partnerships Program

STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: _____
John S. Watson, DSHPO

CITY OF PATERSON

By: _____ Date: _____
Jose Torres, Mayor

NEW JERSEY HISTORIC TRUST

By: _____ Date: _____
Barbara Irvine, Executive Director

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: _____
John Fowler, Executive Director

United States Department of the Interior

NATIONAL PARK SERVICE
Philadelphia Support Office
200 Chestnut Street
Philadelphia, PA 19106-2878

IN REPLY REFER TO:

H30(PHSO/S&P-PA)

SEP 13 2002

Mr. Don Klima, Director
Office of Planning and Review
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 809
Washington, DC 20004

Attention: Martha Catlin

Dear Mr. Klima:

Over the past three years the Philadelphia Support Office of the National Park Service (NPS) has been working with your office (the Council), the City of Paterson, the New Jersey Historic Preservation Office (SHPO) and other parties to develop a Programmatic Agreement (PA) for proposed work on the Allied Textile Printing (ATP) site within the Great Falls/Society of Useful Manufacturers National Historic Landmark (NHL) District in Paterson, New Jersey. The Federal undertaking was redefined last year when the City of Paterson released Regan Development Corporation from their contract to construct housing on the site (see our letter of November 26, 2001). The PA was changed to reflect the revised undertaking, a public meeting was held on January 25, 2002, to solicit public comment, and eight persons submitted written comments on the revised PA. Our office reviewed these comments and considered them in developing the enclosed revised PA. Our responses to the written comments were circulated to all parties in copies of our letter of April 24, 2002, to Ms. Dorothy Guzzo, Deputy State Historic Preservation Officer, New Jersey Historic Preservation Office.

The final PA has been circulated for signature to the SHPO, the City of Paterson, and the New Jersey Historic Trust, who have all signed as signatories. In order for the NPS to demonstrate the general support of the revised PA by the concurring parties, we chose to circulate the final PA to these parties for signature prior to our submission of the final PA to the Council for signature. The final PA was circulated concurrently to the concurring parties who were given ten business days to respond after the day of receipt of our letter. Eight of the concurring parties have signed the PA, six parties never responded, and one party returned the PA with a note explaining that she would not be signing the document. We have enclosed the PA pages with the signatures of the concurring parties. We have also enclosed a chart with a list of all concurring parties, the dates they signed for the letter, the date a response was due to the NPS, whether or not a response was received, and whether or not the party signed the PA.

Our letter to you of November 26, 2001, describes the work on the ATP site that will be conducted using federal Urban Historic Initiative funds. The area of potential effect is the Great Falls NHL District. Maps of the District were included in our mailings of February 25, 1999. The District was the nation's first planned industrial city, and contains the original waterpower system of raceways and many 19th-century industrial structures. It has been listed as a Priority 1 Threatened NHL since 1988, in part because of the destruction by fire of most of the structures on the ATP site, which is now owned by the City of Paterson.

We have applied the Criteria of Effect and Adverse Effect found in 36 CFR 800.5 of the Council's regulations and have determined that the undertaking has the potential to have an adverse effect on the ATP. This determination is based on the fact that the existence and integrity of any remaining resources on the site are unknown so appropriate treatments cannot yet be determined for the resources. The PA describes a process by which all parties can agree to proceed on conducting a cultural resource survey of the ATP site, remove underground storage tanks, stabilize some building ruins, provide for the development of a public river walk, and allow for the City and the citizens of Paterson to meet to discuss changes to their Master Plan for the City and the Design Guidelines for the District that will determine the future of this site. It also provides for amendments to the Agreement should we need to clarify steps in the process that are not foreseen at the moment.

The NPS Federal Preservation Officer (FPO), Katherine H. Stevenson, has asked that I be the Secretary's delegate for purposes of Section 800.10 of the Council's regulations. We have been consulting with the FPO at appropriate steps in the process.

Accordingly, we enclose for your signature the PA. Please return it to Alisa McCann, Architectural Historian so that the fully executed Agreement may be circulated to the other signatories and all interested parties.

As you are aware, due to a homicide on the ATP site in July, the City of Paterson issued a Declaration of Emergency for the site. The City is working to secure the site from any use until the work required by the PA begins. The first phase of the work will include the securing of the existing chain link fence and installation of additional fencing as necessary, the installation of security lighting on existing poles, the removal of brush and trees with no ground disturbance (trees will be cut two feet above ground) and the removal of debris, such as mattresses and trash. This work will be paid for by City funds and the City and the NJ SHPO are working together to meet all review requirements under the State Register Review Act. The City is the point of contact for this work and review and they will be circulating copies of all correspondence to the interested parties.

Additional work proposed for the site using Urban History Initiative funds that has been approved by the Core Advisory Group includes the demolition of one non-contributing historic structure and the stabilization and securing of two remaining structures currently used as housing by the homeless. The City is working with a consultant to develop a final approach to this work that will eventually lead to the development of plans and specifications. As soon as we have a final package of information to

submit to the SHPO for purposes of review under Section 106 of the National Historic Preservation Act, we will circulate all the documentation to all of the interested parties. Enclosed are copies of newspaper articles regarding this event and this on-going and proposed work.

If you have any questions about this material, please call Alisa McCann, Architectural Historian at (215) 597-0651.

Sincerely,

Keith Everett
Superintendent
Philadelphia Support Office

Enclosures

cc:
J. Sprinkle, NPS, WASO
City of Paterson: Mayor Jose Torres, Marilee Jackson, Frank Blesso, Paul J. Forsman (Assist. Corp. Counsel)
President, City Council (for distribution to Council members)
Paterson Historic Preservation Commission, c/o Michael Wing
NJ Historic Preservation Office: Dorothy Guzzo
Harriett Hawkins, NJ Historic Trust
Michael Blanchfield, Passaic County Historical Society
Sandra Norman, Society for Industrial Archeology
Paul Bartczak, President, Roebling Chapter, Society for Industrial Archeology
Peggy Robertson, Great Falls Development Corporation
Flavia Alaya, Past Chair, Paterson Historic Preservation Commission
Robert Barth, President, Canal Society of New Jersey
Patrick S. Blanchfield
Patricia Condell, Society for Industrial Archeology
John Cullinane, consultant to Regan Development Corp.
Joseph P. Havasy
Jose Hernandez, Jr.
Deborah Hoffman, Paterson Economic Development Corporation
Stan Lacz, Great Falls Preservation
Mike Lemme, President, Preservation Paterson
Lance Metz, Society for Industrial Archeology, Roebling Chapter
Thomas Piccoli
Lisanne Renner
Arthur Rosen
Ed Rutsch, Society for Industrial Archeology
Anthony Scally
Barbara A. Small
David Soo
Nick Sunday
Ed Smyk, Passaic County Historian
U.S. Representative Bill Pascrell
Keith Roachford, Deputy COS, Office of Sen. Robert Torricelli

Appendix C

SCOPE OF WORK

Exhibit B

ATP Site SCOPE of WORK for Cultural Resource Survey

The State of New Jersey, Department of Environmental Protection, Natural & Historic Resources Group, Historic Preservation Office is soliciting Proposals for a Cultural Resources Survey (Survey) for the Allied Textile Printing (ATP) Site and the area immediately west of the ATP site to the existing Hydroelectric Plant ("Project Site"), located within the Great Falls/Society for Useful Manufacturers National Historic Landmark District in Paterson, Passaic County, New Jersey.[1] The Survey will include research, historic context development, existing conditions assessment including a cultural landscape study, fieldwork, and culminate in development of treatment recommendations. It will complete documentary research initiated with the *Historic Industrial Site Analysis, ATP Site, Paterson, New Jersey* (1996) by Susan Maxman Architects (Historic Industrial Site Analysis) and the *Cultural Resource Survey of the Allied Textile Printing Site, In-Progress Reports No. 1, August 22, 1997, No. 2, September 11, 1997, and No. 3, October 15, 1997*, prepared by Historic Conservation and Interpretation, Inc. The goal of the Survey is to guide the future development of the site which is currently owned by the City of Paterson. The western end of the site will be an interpreted part of the newly designated Great Falls State Park. The Great Falls State Park Master Plan proposes that the entire ATP site be made part of the State Park, however, a final determination for the future use of that part of the ATP site has not been determined at this time.

The Survey will provide written evaluation criteria and written recommended preservation treatments for both architectural remains and archaeological features. It will provide a management tool consisting of written reports and digital geo-spatial and tabular data to guide treatment of cultural resources for future development of the site. This management tool will provide the reasoned and consistent assessment of all the analytical units by the set of researchers who will have conducted intensive background research, developed the appropriate historic contexts, and consulted with numerous experts and stakeholders about the ATP site. It will provide for future site management by informing interested parties about what is known to date about each unit, the relative importance/significance of each, and the challenges and opportunities each unit will present when respective locations are considered for projects in the future. The tool will be dynamic in that as additional site work is completed, the tool will be updated.

Due to the historic industrial uses that took place on the ATP site, an investigation (and possible remediation) of soil, ground water and surface water, in accordance with the NJDEP Technical Requirement for Site Remediation, N.J.A.C. 7:26E, is required to insure the safety and health of the proposed Park's visitors. This will include the investigation of areas located adjacent to and within the footprints of historic buildings and archeological remains. The NJDEP's Office of Brownfield Reuse has divided the investigation of the ATP

[1] See Project Site Maps and Information in Map in Attachment A.

site into two parts: 1. Open spaces investigation, which has been completed with the final report expected to be submitted by January 15, 2009 and 2. Interior spaces investigation, which is pending. Due to the degraded condition of many of the buildings and the presence of debris within foundation areas, it is unsafe and infeasible to conduct the required investigations. Therefore, the survey effort must include an evaluation of these buildings/foundations to identify which are appropriate for demolition or stabilization. This evaluation must occur prior to conducting the investigation/remediation of these areas.

Completion of the Survey is stipulated in a "Programmatic Agreement Among the National Park Service (NPS), the New Jersey Historic Preservation Office (NJHPO), the City of Paterson, the New Jersey Historic Trust, and the Advisory Council on Historic Preservation regarding the activities on the Former Allied Textile Printing Site, Great Falls/Society of Useful Manufacturers National Historic Landmark District, Paterson, New Jersey," signed June 10, 2002 and amended March 24, 2005.[2]

This Survey will be carried out by an interdisciplinary team (Research Team) consisting of persons with experience and expertise in industrial archaeology, history, architectural history, historic architecture, historic cultural landscapes and engineering, with team members (a member may have experience in more than one area) meeting the requisite minimum disciplinary qualifications defined in the Secretary of Interior's "Professional Qualifications Standards" (36 CFR Part 61). All activities regarding, or having the potential to affect, historic buildings and structural elements must be carried out by, or under the direct supervision, of a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications – Standards for Historic Architecture", "Standards for Historic Landscape Architecture," "Standards for Architectural Historian", or "Standards for Engineering" (proposed revised Standards, 62 FR 33708, June 20, 1997) with at least five (5) years experience in projects involving industrial archaeology. Proposals must include vitae in support of qualifications. All activities regarding, or having the potential to affect, archaeological resources must be carried out by, or under the direct supervision of, a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications – Standards for Archeology," with at least five (5) years experience in industrial archaeology. Proposals must include documentation in support of qualifications. The Research Team should also include an individual with past experience in public outreach who can coordinate the public involvement contemplated by this scope.

Survey efforts should follow the New Jersey Historic Preservation Office Requirements for Phase I Archaeological Survey at N.J.A.C. 7:4-8.4. Reports of archaeological survey results should conform to the Requirements for Archaeological Survey Reports – Standards for Report Sufficiency at N.J.A.C. 7:4-8.5. All work must be in accordance with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, 1983.* (www.nj.gov/dep/hpo/1identify/suryarkeo.htm) and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (48 CFR Part 190; www.nps.gov/history/local-law/arch_stnds_9.htm). Written

[2] See Attachment B.

documents will be submitted in hard copy and digitally to the NPS, City of Paterson, and NJHPO.

Project Location

The Allied Textile Printing (ATP) Site is located within the eastern end of the Great Falls/Society of Useful Manufacturers (SUM) National Historic Landmark District in Paterson, Passaic County, New Jersey. The District contributes to the City's designation as the nation's first planned industrial city and contains the original waterpower system of raceways and many 19th-century industrial structures.

The ATP Site occupies approximately seven acres of the larger eighty-nine acre SUM NHL District. The ATP site is bordered to the north by the Passaic River, to the west by Overlook Park, to the south by the City-owned parking lot, the Essex Mill and Lower Race fronting Van Houten Street, and to the east by the property line of the Congdon Mill. The site currently contains the ruins, in the form of physical and/or archaeological elements, from west to east, of the Mount Morris Quarry site, Knipscher and Maass Dye House, Colt Gun Mill, the North Channel of the Middle Race, Lower Race, Mallory Mill, Waverly Mill, Passaic Mill and Todd & Rafferty Mills locations. The ATP site is owned by the City of Paterson. The Passaic River; the Falls of the Passaic (a National Natural Landmark); and the Great Falls Raceway and Power System (a National Historic Mechanical and Civil Engineering Landmark) are three of the most important features of the site as they are critical for understanding the development of the site through time. In particular, they enable an understanding of the selection of Paterson as the location for the Society for the Establishment of Useful Manufactures[3], the manner in which the mills at the ATP site obtained power for their operations, and the long-term success of the industrial operations that occurred on the site.

Recent Site History/Pending Projects

The ATP site has deteriorated from intact mill buildings to ruins since the 1970's when NPS's Historic American Engineering Record (HAER) documentation was completed.[4] Since 1988, this National Historic Landmark District has been listed as a Priority 1 Threatened NHL, in part because of the destruction by fire of most of the structures on the ATP site, which is now owned by the City of Paterson. Federal Urban History Initiative funds (UHI) totaling $4.147 million were appropriated to the City in FY1992. In 2005, a Programmatic Agreement was amended whereby the State of New Jersey was given the responsibility of completing the Survey using a portion of the UHI funds.

---

[3] The Society for the Establishment of Useful Manufacturers (S.U.M.) was organized to promote the incorporation of a new type of American community that would be devoted to industry and end the United States' dependence on imported goods. The S.U.M. purchased 700 acres above and below the falls, and implemented a plan for the layout of the town and the raceway system to capture available water power. Ultimately, the S.U.M. leased their land and the water power of their raceway system.

[4] See Attachment A for historic HAER images and current aerials.

The Historic Industrial Site Analysis states, "The ATP site in its current condition is recognized as one of the most problematic areas within the larger Historic District, yet its ultimate treatment is critical to the future of the historic district."

The Historic Industrial Site Analysis included a set of requirements and recommendations for use in developing an appropriate plan for the future use of the site.[5] The Historic Industrial Site Analysis recommended the completion of a cultural resource survey for areas where the development plan for the site indicates construction impacts may occur. The Historic Industrial Site Analysis also recommended that industrial archeological information should be gathered in the site development process as soon as possible so that developers/ planners proceed with knowledge of what they should avoid and/or what mitigation procedures they should expect to employ before the work is carried out.".

Subsequent to the Historic Industrial Site Analysis, limited cultural resource survey work was undertaken in 1997 by Ed Rutsch of Historic Conservation and Interpretation, and was reported in three in-progress reports. This work was completed for the Regan Development Corporation in anticipation of the redevelopment of the ATP site. The subsurface testing documented in these progress reports was limited to the Todd and Rafferty Mill yard. Two headraces were identified in the Todd and Rafferty Mill yard through reconnaissance level survey. Subsurface testing reported in these progress reports included one excavation unit in the cupola/furnace area at the Todd and Rafferty Mill and several excavations that uncovered portions of two distinct power raceways. The purpose of these excavations was to: 1) locate any remains of the cupola furnace and associated equipment and 2) locate raceway features present on the property, and document the details of their construction, size, and layout, if located. Copies of these in-progress reports are included as Attachment D.

The Consultant for the investigation of the site for contamination, The Whitman Companies, Inc., under contract to the City of Paterson, will complete site investigation for contamination at the site. The site investigation will consist of testing for contamination within the ruins of former buildings. The site investigation will be undertaken concurrently with the field stage of the Cultural Resources Survey. The Research Team will have to meet with representatives of the City, NJHPO, NJDEP Site Remediation, and the Whitman Companies, to develop a plan for coordinated investigation of the ATP site.

As part of a separate project, the City of Paterson has contracted with the Louis Berger Group, Inc. to prepare plans for the stabilization of the river wall. The City has approved schematic plans and received the necessary DEP permits, but due to funding issues, has not yet authorized the preparation of final plans for bidding. Plans showing extent of proposed River Wall stabilization are included as Attachment E.

Scope of Services

[5] The Historic Industrial Site Analysis is available at the NJHPO and at the City of Paterson. See copy of Section F, Requirements and Recommendations in Attachment C.

Investigations at and analysis of the ATP site will be conducted in four primary stages:

I. **Development of a Historic Context.** The historic context will be developed based upon background research and produce findings and subsequent archaeologically-driven investigative questions, including digital geo-spatial and tabular data; and

II. **Development of an Existing Conditions Assessment Report.** This document will provide a full assessment of existing site conditions and define the in-field testing strategy. The assessment will culminate in the coordination of the development of plans to stabilize contributing ruins and remove non-contributing ruins;[6] and

III. **Completion of Field Investigation and Report.** This investigation will include in-field archaeological investigations and evaluation of significance, producing a full technical report encompassing site findings, synthesis and evaluations developed into a site management tool for future land-use projects; and

IV. **Development of Preservation Treatment Recommendations.**

I. Historic Context Development

Following background research, a historic context for the SUM Historic District will be developed to evaluate the significance and integrity of all cultural resources that remain on the ATP site and to identify the remaining landscape features that give the site its historic character.

The historic context will cover the theme of industrial development during the operation of the Society for the Establishment of Useful Manufacturers (1791-1946). The historic context will be based on data gathering and documentary research directed toward understanding the eighteenth century embryonic industrial planning and development of Paterson at the ATP site, development and evolution of the site milling industry (including, e.g. information on the rise and decline of industries on the site in the context of larger historical economic trends and patterns, innovations in technology and engineering, mill building use of space and power source(s) over time, and the lives of the mill workers and managers), and evolution of the cultural landscape over time as the mills were consolidated.

The historic context will draw on New Jersey and National Historic Contexts.[7] A list of sources that shall be consulted as part of the background research is included as Attachment F. The historic context will incorporate and expound upon, but not duplicate, the research presented in Susan Maxman's Historic Industrial Site Analysis supplemented by additional research conducted on the ATP site. Research will focus on the unique aspects of

[6] The plans for the shoring/stabilization/removal will be prepared by The Whitman Companies where archaeological [and site investigation for contamination] is not currently possible because of dangerous site conditions including unstable structures, ruins etc.

[7] Please see list in Attachment F.

the ATP site within Paterson for future interpretation rather than duplicate existing comparative documentation.[8] The research shall be sufficient to establish the historical context(s) and period(s) of significance associated with the ATP site and its cultural landscape.

Goals of this stage shall include identification and justification of what the appropriate analytical units will be. In some instances, for example, perhaps an entire mill building will comprise the unit. In most cases, however, considerations such as locations of segments of the raceway system, different periods of construction and modification within the mills, and different contemporary conditions and considerations (e.g, physical integrity of remains above and below ground; site contamination issues; and resource location relative to the Passaic River, other ATP site elements, and the remainder of Paterson) will likely require that each larger element be broken down into smaller analytical units, with many of these units overlapping vertically and/or horizontally.

The historic context will include a site plan keyed to a set of more detailed site plans and historic maps. For ease of analysis and use, the research design should be presented in outline rather than narrative format. The site plan shall be based on a comprehensive base layer of polygon GIS data delineating the extent of each analytical unit (for example, SUM lot, specific segments of the raceway system or individual factory buildings), and containing attributes for each unit that provide at minimum a unique identifier and consistent referencing system for use throughout the project. Each analytical unit presented on the site plans should correspond to a specific section within a standardized outline format. The cultural landscape study would encompass the entire site but its findings may also be adapted to the standardized outline format.

The historic context shall:

1) Describe the significance of the industrial, technological, engineering, social, labor and landscape evolution of the ATP site within the context of the history of Paterson. The ATP site should be placed in context through the inclusion of a concise review of general economic, social, and technological national (and international) trends.
2) Investigate the extent to which elements of the early development of the site remain, including whether Paterson's street grid as designed by Pierre L'Enfant radiated from the ATP site, L'Enfant's original industrial design concepts for the raceway system, and implementation, if any, at the ATP site.
3) Investigate the Colt family impact on the ATP site.
4) Describe the development of the canal system and use of water in the manufacturing processes at the ATP site. Research questions should include, but not be limited to the following: how water was delivered, how much water was delivered, how much water may have been promised to the businesses,

[8] Susan Maxman Report, NPS Special Resource Study, John Milner Associates, Inc's *With Hope and Labor: Everyday Life in Paterson's Dublin Neighborhood* [1999], etc.

height of the fall, types of water wheels or turbines used and by which businesses, how exhaust water was returned to the river or raceway system, and the treatment of polluted water and sewage. Describe any disputes over the use of water from the canal system, how the raceway system influenced development of the industries in the 19th century. Describe how the canal system was similar to or different from other contemporary industrial canal systems.

5) Describe the changes and transitions in sources of power over time (such as steam, electric, etc.) and the re-use of the raceways for uses other than power.
6) Describe the types of industries that were located on the ATP site and why they were located in Paterson and on this site specifically.
7) Describe the types of technologies and processes used in the various industries. Analyze production, goods, and trade development at the ATP site. Describe how any of these events were unusual or part of a larger movement.
8) Discuss the evolution and adaptive re-use of structures over time and the influence of the changing economic and social landscape.
9) Describe trends in industrial development, including consolidation of industries on the site in the 20th century, and the declines of these industries in the northeast.
10) Describe the historic characteristics and features of the cultural landscape and how it changed over time as a result of human interaction with the landscape. Landscape characteristics that shall be examined include: natural systems and features, spatial organization, land use, cultural traditions, cluster arrangement, circulation, topography, vegetation, buildings and structures, views and vistas, constructed water features, and small-scale features. This information must be integrated into the overall context, not be developed as a separate context.
11) Discuss the economic, social, and ethnic characteristics of the ATP labor force, dynamics between labor and management and changing aspects over time.
12) Develop a period (or periods) of significance for the site based on industrial, economic, social and labor criteria.
13) Define the property types associated with the themes of the context and justify the specific physical and associative attributes and condition that an individual property or feature must possess to retain its historic integrity. Present in table format.
14) Include a series of maps of the site showing the development of the site over time. These must be at the same scale and developed as a series of overlays to demonstrate (within the margin of error of historic the maps) the historic sequence of the site's development. Copies of historic maps and site plans from which the overlays are developed must be included.
15) Include a comprehensive site plan dividing the project site into separate analytical units. Analytical units shall be organized as individual units for future, localized preservation planning needs (see below under A.1).

16) Include GIS data upon which all mapping shall be based, defined as follows: a GIS data layer in ArcView shapefile format (NAD 83, NJ State Plane Feet coordinate system), containing, at minimum, the following attributes: identification number (unique to each unit); name; mapping source (GPS, aerial photo, digital historic map, etc…); mapping date; and GIS operator, and accompanied by digital geospatial metadata conforming to Content Standard for Digital Geospatial Metadata (CSDGM) set by the Federal Geographic Data Committee Separate tabular data containing additional attributes for the analytical units shall be developed as needed in support of the variety of mapping and analytical objectives of this study. Such tabular data can be joined to the GIS layer based on the established unique identifiers.
17) Include any additional unique industrial, commercial, urban, or social aspect(s) of the project site contributing to a better understanding, significance and interpretation.
18) Draft an interim technical report incorporating the findings of the historic context containing detailed tables, maps, illustrations and analytical units with pertinent research questions to be addressed during the in-field archaeological testing phase.
19) Include a preliminary assessment of the location where geotechnical testing undertaken on the site on November 19, 20 and 25, 1997 as identified in HCI's report of December 8, 1997: Geotechnical Test 1,2,3,4,7and 8 may have impacted site remains. The goal of this assessment shall be to determine if significant resources were adversely affected. Include recommendations for in-field testing if necessary to make this determination.
20) Include a bibliography.
21) Include photographs (35mm or Digital photographs meeting the draft National Register Nomination standards) of sufficient visual quality and clarity to accurately convey the subject matter.

A. Deliverables

1. Historic Context and Interim Technical Report

All data collected during the course of the historic context phase will be analyzed and presented in an interim technical report (Report), which will be submitted for review and approval. The historic context and interim technical report will include, but not be limited to, all of the information outlined in items I. 1) through 21) above. The technical report will also contain comprehensive and detailed photographs of all on-site ruins, tables, historic maps, photo key maps, appropriate appendices, and bibliography. The interim report will be written according to the NJHPO's Requirements for archaeological survey reports – standards for report sufficiency at N.J.A.C. 7:4-8.5 and will meet the standards and guidelines set forth by the U.S. Secretary of the Interior for Archeology and Historic Preservation, September 29, 1983.

The report shall also contain the following elements, in part, to guide the in-field site investigation to follow:

Information and analysis for analytical units presented in an outline and/or table format and illustrated on keyed maps and graphics. Information and analysis for each analytical unit shall include, but not be limited to the following:

a) applicable research objectives;
b) applicable research questions;
c) professionals and specialists to be involved/consulted in respective investigations, including the necessary professional qualifications for each;
d) known or suspected (specify which) impediments to investigation such as toxicity, access, or safety issues;
e) identified or likely coordination with non-cultural resource management specialists necessary for the investigation (for example to investigate toxicity or provide access or structural stability of ruins);
f) depth below surface (known or approximated - specify which) that significant deposits will be encountered and basis for the depths specified;
g) approximate dimensions/square footage of respective analytical units;
h) detailed methodologies including types of tools, equipment, and analyses, recommended trench dimensions and likely depths, etc.;
i) strategies for student participation and other public involvement;
j) appropriate outcomes of the work such as professional reports; popular reports; on-site interpretation;
k) anticipated appropriate archaeological investigation method(s) (e.g., hand, machine, remote sensing)
l) appropriate treatments, for example, preservation in place, feature restoration or stabilization; demolition after investigation/data recovery (see the Advisory Council on Historic Preservation's guidance, at achp.gov/archguide.html);
m) likely appropriate curation and artifact stabilization;
n) potential to contribute to presentation/interpretation of the historic cultural landscape;
o) relative priority for investigation (for example, high, medium or low) solely for purposes of research and interpretation;
p) recommendations for Regan site infield testing/mitigation.

Two bound hard copies of the report, prepared in accordance with the formatting requirements at N.J.A.C. 7:4-8.5 shall be submitted to the NJHPO and NPS.

Two digital copies of the report prepared in accordance with the requirements of N.J.A.C. 7:4-8.9(a)2 shall be submitted to the NJHPO. NJHPO shall make this report available on its website when it is received.

Once the interim technical report has been submitted to the NJHPO and NPS for review, a public presentation of draft historic context shall be conducted (as required by PMOA).

2. Final Historic Context and Technical Report

Upon completion of review and public presentation, the Historic Context and Interim Technical Report shall be revised to address comments received from the National Park Service and the NJHPO. The resulting document will be the final Historic Context and Technical Report. The final technical report will be written according to the NJHPO's Requirements for archaeological survey reports – standards for report sufficiency at N.J.A.C. 7:4-8.5 and will meet the standards and guidelines set forth by the Secretary of the Interior for Archeology and Historic Preservation.

Two bound hard copies of the report, prepared in accordance with the formatting requirements at N.J.A.C. 7:4-8.5 submitted to the NJHPO.

Two digital copies of the report prepared in accordance with the requirements of N.J.A.C. 7:4-8.9(a)2 submitted to the NJHPO. NJHPO shall make this report available on its website when it is received.

Hard bound copies of the final technical report shall be provided to the Advisory Council on Historic Preservation, the National Technical Information Service (NTIS), the City of Paterson, and the New Jersey Historic Trust. Precise locational data will only be provided in a separate appendix, and may not be publicly released.

B. Reviews and Approvals

Copies of the interim technical report shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the interim technical report within 30 days of the date of submission. Copies of the interim report must be provided to the Advisory Council on Historic Preservation, the City of Patorson, the National Technical Information Service (NTIS), and the New Jersey Historic Trust.

Copies of the final technical report shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the interim technical report within 45 days of the date of submission.

II. Existing Conditions Assessment Report

Using the information from the historic context document above, an existing conditions assessment shall be prepared that will identify, record, and assess the integrity of significant identified resources within the limits of the ATP site. The study will create an overall synthesis of the cultural landscape, building and waterpower structures, and evolution(s) across the ATP Site landform. It will also identify priority locations for archaeological investigations in order to effectively integrate questions regarding standing architecture and subsurface archaeological components. As a result, the existing conditions assessment, together with the findings of the historic context report will guide the infield archaeological investigations detailing the research objectives and questions, locations, and methodologies of the archaeological investigations. It shall also form the basis for report recommendations as to what landscape characteristics (see Documentation of Landscape Characteristics; available at nps.gov/history/nr/publications/bulletins/nrb30/nrb30_12.htm) should be retained and/or restored on the ATP site.

While the scope of the historic context and existing conditions assessment stage will develop an overall interpretation of the ATP site, a standardized outline shall also be updated after this stage for each of the ATP site's analytical units. These outlines (per I.A.1.a.-p. above) will be used to facilitate the planning of all future activities within the ATP site and will include information such as the appropriate treatments for the extant remains and priorities for interpretation and further investigations developed in IV. Preservation Treatment Recommendations.

The existing conditions assessment stage shall be conducted by the same qualified interdisciplinary Research Team that prepared the historic context. A structural engineer, and/or geophysical expert shall be added to the team to assess the structural integrity of the ruins of buildings on the site.

A. The Existing Conditions Assessment shall:

1) Incorporate the results of the on-site inspection, conducted by the Research Team, together with representatives of City, NPS, and NJHPO, of those areas and features that are safely accessible. Written context and maps completed in draft will be available for review and comment by all participants prior to site walk through. If necessary, binoculars shall be used to observe any areas and features that are determined unsafe, and telephoto lenses shall be used to photographs these areas and features.

2) Identify, record, map, photograph and assess the integrity of significant identified resources within the limits of the ATP Site's existing cultural landscape, raceway systems and mill buildings.

3) Based on the table of property types and their physical and associative characteristics found in the approved historic context (see I.13), each area and feature of the site will be evaluated for historic integrity. In addition, each area and feature will be evaluated against National Register Criterion D, "that have yielded, or may be likely to yield, information important in prehistory or history."

4) Assess the mill buildings and raceway system for evidence of repair, alteration, adaptive re-use and/or expansion that could demonstrate the evolution of the mill's use, where the mill machinery was located, and how the power shafting was placed in the mill.

5) Evaluate evidence for repair, alteration, adaptive re-use and/or expansion of the mill buildings and raceway system to determine those significant building and waterpower remains that must be retained and interpreted as part of the future development of the ATP Site (subject to site remediation findings).

6) Examine the existing conditions of the landscape to identify and document the landscape characteristics and to determine their significance in the context of the cultural landscape as a whole.

7) Include a map presenting recommendations regarding which landscape features should be retained/restored on the ATP site.

8) Evaluate the historic integrity of the cultural landscape to determine if the characteristics that define the cultural landscape during its period(s) of significance are still present.

9) Photographs for all landscape features shall include "registration points" or visual reference points to indicate the precise location and orientation of features. These points will correspond to significant forms, features, and spatial relationships within the landscape and its surrounds and may also correspond to historic views to illustrate the change in the cultural landscape.

10) Survey will identify large scale artifacts (e.g., tanks, boilers) that are significant and that can be retained on site for interpretive purposes.

11) Assess the stability of the structural remains on the site

12) Determine what steps are necessary to make the ATP site safe for the completion of archaeological investigation and investigation of the site for contamination.

13) Establish any special techniques that will be necessary to sufficiently and safely investigate potentially significant resources, such as the power settings for each mill.

14) Include a plan for documentation of any non-contributing remains to be demolished and/or removed.

15) Based upon the recommendations and analysis outlined in 11 through 14 above, develop a plan for the remediation of contaminated soils on the site with provisions for appropriate concurrent archaeological investigation.

16) Development of an archaeological research design for Phase I/II archaeological survey. The goals of the Phase I/II archaeological survey shall be to investigate the integrity of cultural resources prioritized for investigation by the historic context and existing conditions assessment , and if they do exist, to record the location, stratigraphic relationships, condition, size, layout, construction and function for evaluation of integrity. The archaeological research design shall include provisions for the following:

(a) All archaeological investigations being carried out by, or under the direct supervision of, a person or persons meeting at a minimum the Secretary of the Interior's "Professional Qualifications Standards for Archeology," with at least five (5) years experience in industrial and/or urban archaeology.

(b) Examination of those areas prioritized for investigation during the historic context development stage.

(c) Incorporation of the results of previous archaeological excavations on the ATP site into the current undertaking and a synthesis of the result into the final technical report.

(d) Use of an archaeological excavation strategy driven by specific questions generated during the research stage. All areas recommended for archaeological testing shall be delineated on a map. The archaeological research design must also specify the research goals that each test location will address, the justification of these research goals, and the schedule for the infield archaeological investigations.

(e) Establishment of a permanent universal reference grid for use of all recordation of artifacts and features. Establishment and documentation of permanent benchmarks sufficient to ensure reestablishment of horizontal and vertical control at a future date. The North American Datum of 1983 (NAD83) is required for mapping in the horizontal plane. The North American Vertical Datum of 1988 (NAVD 88) should be used when possible rather than the older National Geodetic Vertical Datum of 1929(NGVD29).

(f) Include provisions to judiciously incorporate as many of the previously unmonitored geotechnical testing locations (Geotechnical Tests 1, 2, 3, 4, 7 and 8) undertaken on-site (see Historic Conservation and Interpretation, Inc. 1997 report *Industrial Archeological Observations of Environmental Soil Tests Made at the Allied Textile Printing Site in the Great Falls/ S.U.M. National Historic Landmark District, Paterson, NJ*) into the Infield Archaeological Investigations testing strategy to assess if one or more of these locations will likely facilitate maximizing useful information pertaining to the ATP site.

(g) Provisions for conducting excavations in compliance with OSHA excavation and shoring standards, and confined spaces rules. Testing shall not be conducted in locations deemed unsafe during the existing conditions assessment phase.

(h) Recommendations for retention of artifacts and stabilization plans and procedures, developed by a conservator meeting the minimum Professional Qualification Standards for Conservation set forth by the National Park Service at http://www.nps.gov/history/local-law/gis/html/quals.html.

(i) Processing and cataloguing retained artifacts in accordance with the Secretary of the Interior's *Standards for Curation*. Curation procedures will be in accordance with the *New Jersey State Museum Curation Policy*.

(j) Identify the New Jersey State Museum as the repository for the artifact collection, and explain how and when the artifact collection will be transmitted to the New Jersey State Museum.

(k) Accomplishing all excavation and handling of materials in accordance with applicable hazmat procedures and regulations.

(l) Production of scale drawings with site elevations, plan and profile drawings for each identified resource and testing area, overall site plan showing current and previous archaeological testing locations, and site photography.

(m) Site photography, with in-picture scales, shall document overall site topography, significant elements of the cultural landscape, each test unit, including identified resources and stratigraphy, significant subsurface structural remains, and contextual shots linking any above ground resources with subsurface resources.

(n) A plan for providing periodic public access to the ATP site during the fieldwork, including an appropriate number of field visits and their timing.

(o) Provisions for emergency consultation in the field, including a definition of the circumstances that may warrant such an emergency consultation, and the specification that the emergency consultation includes, at a minimum, the research team, the NJHPO, the National Park Service archaeologist, the Paterson Historic Preservation Commission, and the City of Paterson.

(p) All survey work will conform to both the Historic Preservation Office's Requirements for Phase I archaeological survey at N.J.A.C. 7:4-8.4 and the Secretary of the Interior's *Standards for Archeology and Historic Preservation.*

(q) All reporting will conform to the NJHPO's Requirements for archaeological survey reports – standards for report sufficiency at N.J.A.C. 7:4-8.5

(r) Copies of the archaeological survey report shall be submitted to the National Park Service and the NJHPO for review and comment. Copies of the archaeological survey reports shall also be provided to the New Jersey Historic Trust and the Advisory Council on Historic Preservation.

17) Revise the historic context report based upon the results of the existing conditions assessment.

B. Deliverables

1) Existing Conditions Assessment report
2) Archaeological Research Design for Phase I/II investigations

C. Reviews and Approvals

Copies of the existing conditions assessment shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the existing conditions assessment within 30 days of the date of submission.

Copies of the archaeological research design shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the archaeological research design within 30 days of the date of submission.

III <u>Field Investigation</u>

Infield Archaeological Investigations will be conducted in accordance with the archaeological research design as reviewed and approved under the existing conditions assessment phase above. No deviations from the approved archaeological research design will be made without prior written approval from the NJHPO.

Evaluations assessing the National Register eligibility of all analytical units shall be made during this phase, and shall be in keeping with the standards and guidelines set forth in the National Park Service's National Register Bulletins, *How to Apply the National Register Criteria for Evaluation* and *Guidelines for Evaluating and Registering Archeological Properties* (2000) with significance determined by compliance with one or more of the Criteria of Significance for inclusion on the National Register of Historic Places (nps.gov/history/nr/publications/bulletins.htm) and the seven aspects of integrity. This information is necessary to evaluate the respective resource's significance, integrity of historic fabric, and to evaluate and plan for future projects and interpretation within the ATP site.

A. Deliverables

1. Updated Standardized Outline formulated for each of the analytical units based on results and analysis of infield testing.

2. Final Report
All data collected during the course of the Infield Archaeological Investigations will be analyzed and presented in a final report with Evaluations of Significance. The report will be written in accordance with the NJHPO's Requirements for archaeological survey reports – standards for report sufficiency at N.J.A.C. 7:4-8.5 and will meet the *Standards and Guidelines for Archeology and Historic Preservation* set forth by the Secretary of the Interior. It will be professionally documented and illustrated, containing original photographs. In addition to hard copies of the report, digital copies including photographs and graphics will be submitted for ease of distribution to interested public, for potential future web site applications, and for future site interpretation.

Two bound hard copies of the report, prepared in accordance with the formatting requirements at N.J.A.C. 7:4-8.5 submitted to the NJHPO.

Two digital copies of the report prepared in accordance with the requirements of N.J.A.C. 7:4-8.9(a)2 submitted to the NJHPO. NJHPO shall make this report available on its website when it is received.

Hard bound copies of the final report shall be provided to the Advisory Council on Historic Preservation, the National Technical Information Service (NTIS), the City of Paterson, and the New Jersey Historic Trust. Precise

locational data will only be provided in a separate appendix, and may not be publicly released.

3. Artifacts

It is not the purpose of this cultural resources survey to create a large artifact collection. Nevertheless, a collection will be generated as a result of test excavations. Any artifacts recovered during the Infield Archaeological Investigations of the ATP site will be cleaned, identified, cataloged, and labeled to indicate provenience. They will be classified according to chronology, cultural affiliation, technology, and function. As discussed above, a defensible plan for retention, stabilization and curation shall be developed for approval as part of the field investigation. Artifacts identified for retention in accordance with the approved plan shall be stabilized to prevent deterioration will be afforded such procedures. Provision will be made for the permanent storage of the artifact collection and records at the New Jersey State Museum.

B. Reviews and Approvals

Copies of the final report shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the final report within 45 days of the date of submission.

A public meeting shall be held after the document has been available for 30 days.

Copies of the final report must also be provided to the Advisory Council on Historic Preservation, the City of Paterson, the National Technical Information Service (NTIS), and the New Jersey Historic Trust.

IV. Preservation Treatment Recommendations

The completed cultural resources survey will serve as a site management tool for the future development of the ATP Site. At this time, the future uses on the site have not been identified and may change over time. The completed survey will allow all parties to evaluate and plan for proposed projects within the site by identifying the levels of effort necessary to investigate, treat, preserve, and/or restore the significant features, deposits, and ruins in areas being considered for use. It will also identify significant viewsheds, ruins, and features that should be accommodated in any plans for site development and will establish priorities for interpretation and investigation independent of existing plans for active or passive site uses. The survey will allow for consistency of evaluation and approach for the cultural resources across the entire site.

The Research Team shall review the recommendations of the "Historic Industrial Site Analysis" prepared by Susan Maxman Architects. Each recommendation shall be reviewed and revised as necessary. Additional recommendations shall be developed based on the historic context and infield investigations.

Recommendations shall be made for specific historic and archeological preservation treatments for areas and features, for overall preservation planning for the site, and for interpretation of the site. The Research Team shall develop a list of priorities related to existing conditions and significance assessed during earlier phases of work for projects to be undertaken at the ATP site. This list of priorities should identify at-risk resources and develop a timeframe within which preservation treatments shall be accomplished.

A. Deliverables

1. Report conforming to the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* that includes:

   a. Preservation treatments for individual areas and features shall be presented in table format.

   b. Amended and updated analytical unit outline if necessary based on information derived from the updating of the Historic Industrial Site Analysis and comments received on the draft final report.

2. Maps/graphical/analytical units delivered in the GIS format specified in I. above.

B. Reviews and Approvals

Copies of the preservation treatment recommendations shall be submitted to the National Park Service and the NJHPO for review and comment. The National Park Service and the NJHPO shall review and comment on the preservation treatment recommendations within 45 days of the date of submission.

A public meeting shall be held after the document has been available for 30 days.

V. OTHER

A. Changes to Research Team personnel

Any changes to the personnel of the Research Team shall be reviewed and approved by the NJHPO and the National Park Service, in consultation with the City of Paterson.

B. On-site facilities and signage

The Research Team will provide on-site facilities necessary for the completion of the work.

C. Schedule

6/24/2009 – Contract awarded

7/6/2009 – Historic Context and Interim Technical Report phase of work begins

9/17/2009 – Historic Context and Interim Technical Report submitted to NJHPO and NPS for review
Existing Conditions Assessment phase begins

11/2/2009 – Comments on Historic Context and Interim Technical Report due
Existing Conditions Assessment Report and Archeological Research Design submitted to NJHPO and NPS for review

11/16/2009 - Final Historic Context and Technical Report due

12/17/2009 - Comments on Existing Conditions Assessment Report and Archaeological Research Design due

12/07/2009 - Final Existing Conditions Assessment Report and Archeological Research Design due

1/5/2010 Archaeological Field Investigation begins

3/21/2010 Archaeological Field Investigation Report due
Preservation Treatment phase begins

4/20/2010 Preservation Treatment Report submitted to NJHPO and NPS

4/21/2010 Public meeting

5/5/2010 Comments on Archaeological Field Investigation Report due

5/19/2010 Final Archaeological Field Investigation Report due

5/21/2010 Public meeting

6/4/2010 Comments on Preservation Treatment Report submitted to NJHPO and NPS

6/18/2010 Final Preservation Treatment Report due

Appendix D

AN ACT TO INCORPORATE THE CONTRIBUTORS TO THE SOCIETY FOR ESTABLISHING USEFUL MANUFACTURES

LAWS

OF

THE STATE

OF

NEW JERSEY,

REVISED AND PUBLISHED UNDER THE AUTHORITY OF

THE LEGISLATURE,

BY

WILLIAM PATERSON.

NEW BRUNSWICK:
PRINTED BY ABRAHAM BLAUVELT.
M,DCC,XCC.

A. D. 1790.

son or persons, whose lands and tenements, are by this act annexed to either of the counties aforesaid, from any judgment, or execution, in consequence of any action, which may have been instituted, or from the payment of any tax or taxes, which have been, or may be assessed, before the publication of this act; and that the sheriffs, constables, and collectors in each of said counties, may proceed to collect the said taxes, and to raise the money on such executions, in the same manner, as if this act had not been passed.

But such partition not to affect antecedent taxes, judgments, and executions.

An ACT *for fixing a permanent seat of government in this State, and for altering the place of the first meeting of the legislature after the annual elections.*

Passed the 25th of November, 1790.

Seat of government at Trenton.

BE IT ENACTED *by the Council and General Assembly of this State, and it is hereby enacted by the authority of the same*, That Trenton, in the county of Hunterdon, shall henceforth be considered as the seat of the government of this State, and that the first meeting of the legislature, after the next, and every future annual election for the members thereof, shall be at Trenton, in the county of Hunterdon.

An ACT *to incorporate the contributors to the society for establishing useful manufactures, and for the further encouragement of the said society.*

Passed the 22d of November, 1791.

Preamble.

WHEREAS it is represented to this legislature, that a subscription has been made, for the purpose of introducing and establishing useful manufactures, to an amount which already exceeds two hundred thousand dollars; AND WHEREAS the State of New-Jersey, having been deemed by the contributors the most suitable for carrying the same into effect, the aid of the legislature has been requested, in promotion of the views of the said contributors; and whereas it appears to this legislature, that the granting such aid will be conducive to the public interest; therefore,

The subscribers for carrying on manufactures incorporated.

I. BE IT ENACTED *by the Council, and General Assembly of this State, and it is hereby enacted by the authority of the same*, That all those persons, who have already subscribed, and who, according to the terms hereafter mentioned, shall subscribe for the purpose of establishing a company, for carrying on the business of manufactures in this State, their successors, and assigns, shall be, and they are hereby incorporated, by the name of, "The Society for establishing useful manufactures," and by the same name, they and their successors, and assigns, are hereby constituted a body politic and corporate, in law, and shall be able and capable to acquire, purchase, receive, have, hold, and enjoy, any lands, tenements, hereditaments, goods, and chattels, of what kind or quality soever, to an amount in value, not exceeding four millions of dollars, and the same, or any part thereof to sell, grant, demise, alien, and dispose of; also to sue or be sued, implead and be impleaded, in courts of justice, or any other place whatever, to make and use a common seal, and the same to alter and renew at their pleasure; and also to ordain, establish, and put in execution, such by-laws, ordinances, and regulations, as shall seem necessary and convenient, for the government of the said corporation, provided the same are not contrary to the laws and constitution of the United States, or of this State.

Their name.

The society may hold property not exceeding four millions of dollars, may use a common seal, and make by-laws.

Capital stock not to exceed 1,000,000 dollars.

II. AND BE IT ENACTED *by the authority aforesaid*, That the original, or capital stock of the said society or company, shall not exceed the sum of one million of dollars, to be employed in manufacturing or making all such commodities or articles, as shall not be prohibited by law, and to that end in purchasing such lands, tenements, and hereditaments, and erecting thereupon such buildings, and digging and establishing such canals, and doing such other matters and things, as shall be needful for carrying on a manufactory or manufactories of the said commodities or articles.

III. AND

A. D. 1791.

III. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said corporation shall not deal, nor trade, except in such articles as itself shall manufacture, and the materials thereof, and in such articles as shall be really and truly received in payment or exchange therefor.

Restrictions respecting trade.

IV. AND the more effectually to encourage so useful and beneficial an establishment; *Be it further enacted by the authority aforesaid*, That all the lands, tenements, hereditaments, goods and chattels, to the said society belonging, shall be, and they are hereby declared to be free, and exempt, from all taxes, charges and impositions whatsoever, under the authority of this State, whether for State or county uses, or for any other use whatsoever: PROVIDED ALWAYS, That the said exemption shall not be construed to extend to the private or separate property of any member of the said corporation, in his or her individual capacity; and as touching the lands, tenements, and hereditaments, of the said society, shall continue in force for the term of ten years only, after which term it shall be lawful to lay such taxes, for the use of the State upon the said lands, tenements, and hereditaments, as shall be laid upon other lands, tenements, and hereditaments, of like value, nature or description. PROVIDED NEVERTHELESS, That in case the said taxes shall be laid by way of assessment, it shall be according to a certain rate per centum, to be prescribed in the law, laying such taxes, of the true and absolute value of the lands, tenements, or hereditaments, whereupon the same shall be laid or assessed, and shall not extend directly or indirectly to the monies, goods, or chattels, whether in possession or action, or to the profits, real or supposed, of the said society.

Lands and goods of the society exempt from taxes.

But such exemption not to extend to the private or separate property of the members; and to continue for ten years only as to the lands of the society.

V. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That all artificers and manufacturers, in the immediate service of the said society, shall be free and exempt from all poll and capitation taxes, and taxes on their respective faculties or occupations, and from all taxes in the nature of general assessments, upon their persons, faculties or occupations: PROVIDED, That this shall not be construed to exempt their property of whatsoever kind, from taxes of a specific and definite nature per quantity, or per article, or according to a certain rate per centum of the true and absolute value thereof.

Artificers and manufacturers in the service of the society exempted from certain taxes.

Proviso.

VI. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the original or capital stock aforesaid shall consist of one hundred thousand shares, each share being one hundred dollars, and that any person, copartnership, or body politic, may subscribe for such number of shares, in the stock of the said company, which yet remain to be subscribed, as he, she, or they, shall think fit, until the whole number of shares subscribed, shall amount to five hundred thousand dollars, after which it shall be in the discretion of the directors to permit or not, further subscriptions, from time to time, and in such proportions, as shall seem to them expedient, not exceeding on the whole, the said sum of one million of dollars. And it shall be lawful for subscriptions to the said stock to be continued in the same manner, and under the same direction, as they have been heretofore conducted, until the day herein after named, for the first election of directors, after which it shall be the province of the said directors, to regulate the manner of receiving further subscriptions. And in case it should happen, that the subscriptions, which may be made after the passing of this act, together with those made prior thereto, should exceed the sum, which, in the judgment of the said directors, should be sufficient in the first instance to constitute the stock of the said society, not being less than five hundred thousand dollars, it shall be lawful for the said directors, to make a proportional reduction from the number of shares, which, after the passing of this act, shall have been subscribed by any person, copartnership, or body politic, so as to reduce the total amount of the sums subscribed, to the sum by them deemed sufficient as aforesaid, not being less than five hundred thousand dollars; all which subscriptions, made prior to the said first election of directors, shall be payable, one half in the funded six per cent stock of the United States, or in the three per cent stock, at the rate of two dollars of such stock for one, and the other half, in what is commonly called deferred stock, or at the option of the party subscribing, such subscriptions may be paid for in specie, computing the said six per cent stock at par, and the said deferred stock, according to the present value thereof at the time of payment, which value shall be determined by a calculation founded upon a rate of interest of six per centum per annum, during the period for which the payment

Number of Shares, and amount of each share.

Manner of receiving subscriptions how regulated.

A proportional reduction to be made in case of an excess of subscription.

A. D. 1791.

of interest upon the said deferred stock is suspended; and the payments for such subscriptions, as shall be made prior to the first election of directors, shall be made in four equal parts, that is to say, the first within forty five days after the period of such first election, the second within six calendar months after the time of the first, the third within six calendar months after the time of the second, and the fourth within six calendar months after the time of the third payment, and such subscriptions as shall be made, after the said first election of directors, shall be payable according to such regulations, as shall have been previously prescribed by the directors of the society, for the time being; PROVIDED, That nothing herein contained shall prevent any subscribing party from paying, with consent of the said directors, the whole amount of his, her, or their subscription at one payment.

Times of payment.

Proviso.

Stock consisting of public debt, to be placed on the books of the treasury of the United States.

VII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That so much of the capital stock of the said company, as may consist of public debt, shall be placed on the books of the treasury of the United States, in the name of the said corporation, except so much thereof as may be converted into stock of the bank of the United States; and that it shall be lawful for the directors thereof to invest any monies, which may be received on account of the said capital stock, in the purchase of such debt, and likewise to invest both the said debt, and monies in stock of the bank of the United States, in the name of the said corporation; and that in either case, the said directors, on the request of any stockholder, shall grant to him a license, to inspect and examine the amount of stock, which may at any time stand in the name of the said corporation, either on the books of the treasury of the United States, or on the books of the bank of the United States.

Dividend of profits, when to be made.

VIII. AND BE IT FURTHER ENACTED, That there shall be a yearly dividend, for the first five years immediately ensuing the last day of December next, and thenceforth a half yearly dividend, of so much of the profits of the said society, as to the directors thereof shall seem expedient.

The stock of the society how to be invested or transferred.

IX. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the stock of the said society may be invested, secured, assigned, and transferred according to such rules, as shall be instituted in that behalf, by its laws and ordinances.

First election of directors.

X. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That there shall be holden an election of directors of the said corporation, on the last Monday of this present month of November, at Trenton, in this State, which election shall begin between the hours of twelve and two in the afternoon of the same day, and may be continued by adjournment, from day to day, for three days, counting the first as one, and may be conducted under the superintendance of any three persons, whom the stockholders, then and there convened, may, by majority of voices, nominate for that purpose; and there shall be holden, on the first Monday of October next ensuing the said time of the said first election, and on the first Monday of each succeeding October, an election for directors of the said society, at such place as shall have been previously appointed for that purpose, by some law or ordinance of the said society; and the directors, chosen at one election, shall be capable of serving, by virtue thereof, until another election shall have been had; and each stockholder shall be entitled to one vote, in person or by attorney, for each share he or she may hold; but neither the United States, nor any State, which may become a subscriber, shall be entitled to more than one hundred votes.

Succeeding directors when to be chosen.

Number of directors to be chosen.

XI. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That at every such election, thirteen directors shall be chosen by ballot; and the directors, so chosen, shall, at the first meeting after their election, not less than a majority of the whole number being present, elect, from among themselves, one person to be governor, and another, to be deputy governor: that any five of the directors, the governor, or deputy governor, being one, shall constitute a board for the transaction of business, except as hereafter excepted, but that if it shall at any time happen, that there are two separate meetings, of five or more directors each, but in neither of such meetings a majority of the whole, and the governor be present at one, and the deputy governor at the other, that shall be deemed the legal board, at which the governor shall be present; and that if it shall happen, that the gover-

Number to constitute a board.

nor

nor and deputy governor, are both absent, seven of the said directors shall constitute a board for the purpose aforesaid: that no director shall receive any emolument on account of his office, unless the same shall have been allowed by the stockholders, at a general meeting; but the directors may appoint such officers, and assign such compensations as they shall think fit, not less than a majority of the whole number of directors being present, when the same shall be done. A. D. 1791.

May appoint officers, and assign compensations.

XII. And be it further enacted *by the authority aforesaid*, That there shall be a stated meeting of the directors of the said society at the place, which shall have been chosen and designated as the principal seat of the manufactories, to be carried on by the said society, on the first Tuesday in the months of January, April, July, and October, annually; but the governor, or in his absence, or inability, the deputy governor, or in case of their refusal, any three of the directors may, from time to time, by writing under his or their hands, directed to the other directors, and left at their respective places of abode, at least fourteen days prior to the time of meeting, or by advertisements, printed in one public gazette of this State, and in one of the public gazettes printed in the cities of Philadelphia and New-York, respectively, thirty days prior to the time of meeting, convene special meetings of the directors, for the transaction of business, and the directors at such stated or special meetings, shall have power to make all by-laws, ordinances, rules, and regulations, requisite for conducting the affairs of the corporation, and to transact such other business, as may be necessary, touching the same: Provided, That no by-law shall be made or altered, nor any new manufactory undertaken by any board of directors, at which less than a majority of the whole number shall be present; And provided further, That the stockholders, lawfully convened at any general meeting, may alter or abolish any by-laws, rules, or regulations, which may have been made by the directors, and may make and establish such by-laws, rules, and regulations, as to them shall seem meet; and that no by-law, rule or regulation, which may have been abolished by the stockholders, at any general meeting, can be re-established by the directors; and further, that no by-law, rule, or regulation, which may have been ordained by the said stockholders, at a general meeting, can be altered or repealed by the directors.

Times of stated meetings of the directors.

Of special meetings, how to be obtained.

Power to make by-laws at such meetings.

The power to make by-laws by the board of directors, how restricted.

XIII. And be it further enacted *by the authority aforesaid*, That any board of directors shall have power to call a general meeting of the stockholders, giving thirty days previous notice thereof, in three public gazettes, one printed in this State, and one in each of the cities of Philadelphia and New-York respectively; and that each stockholder, being present at any general meeting in person, or by attorney, shall be entitled, in all questions and cases whatsoever, to one vote for each share such stockholder may hold.

Directors may call a general meeting of stockholders, who may vote in person, or by attorney.

XIV. And be it further enacted *by the authority aforesaid*, That every treasurer or cashier of the said corporation, shall, before he enters on the duties of his office, give sufficient security to the satisfaction of the directors, in a sum not less than twenty thousand dollars.

Cashier to give security.

XV. And be it further enacted *by the authority aforesaid*, That at every annual meeting of the stockholders, for the purpose of choosing directors, the directors shall lay before them a general state of the affairs of the company, exhibiting the amount of its stock, debts, and credits, the different kinds of manufactures carried on, the number of persons employed in each, and their respective compensations, and an account of the profit and loss. And that the stockholders may, if they think fit, at any general meeting, elect, by ballot, any five of their number, for the purpose of examining into the state of the affairs of the said company, who shall have a right of access and examination, to, and of all the books of the said company; and the said persons or a majority of them may, at any time, call a general meeting of the stockholders, giving the like notice, as is above directed to be given by a board of directors for the like purpose. And that the United States, or any State, which shall subscribe for not less than one hundred shares, may appoint a commissioner, who shall have a right at all times to inspect the proceedings of the corporation, and the state of its affairs, but without any authority to control; and such commissioner shall have the like right of access and examination, as is herein before assigned to the five persons, who may be appointed by the stockholders.

At annual meeting of stockholders, directors to lay before them a state of affairs of the company.

Stockholders may at a general meeting appoint examiners.

Their duty.

United States, or any State may appoint a commissioner.

His duty.

XVI. And

A. D. 1791.

In what manner the corporation may be dissolved.

XVI. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said corporation may be dissolved at a general meeting, specially summoned for that purpose; provided at least three fourths in value of the stockholders shall be present, or represented therein; and upon such dissolution, the directors for the time being, and the survivors and survivor of them, shall be ipso facto trustees for settling all the affairs of the said corporation, disposing of its effects, recovering and paying its debts, and dividing the surplus among the stockholders, in proportion to their respective interest in the stock, unless the stockholders, at such general meeting, shall appoint other persons, not less than nine nor more than thirteen in number, for such purpose, in which case the persons so appointed, and the survivors and survivor of them, shall be trustees and trustee for the purpose aforesaid.

Lands may be surveyed, rivers cleared, and navigable canals cut.

XVII. AND WHEREAS it may be necessary for the beneficial extension of the aforesaid plan, to cut canals, and clear and improve the channels of rivers, the advantages of which will not be confined to the members of the said society, who ought therefore to be authorized to receive a reasonable toll to defray the expenses of improvements ultimately so valuable to the State; *Be it enacted*, That it shall be lawful for the directors of the said society, their engineers, artists, and laborers, to enter upon and survey all such land, and land covered with water, as shall appear to them most practicable and convenient for effecting navigable canals, for the purpose of transporting goods, wares, and merchandizes, to and from some manufactory by them established, and also such parts of such rivers, and other waters, as they may propose to open and clear, doing as little damage to the grounds and enclosures as shall be possible; and thereupon shall certify to the governor of this State, in writing, as well the courses and distances of any such canal as they may propose to cut, and of the part of any such river, as they may propose to clear and open, as the width and probable depth thereof, and shall transmit, with such certificate, a draught or plan of such intended canal, or of the part of such river, so intended to be cleared or opened; and in like manner shall certify to the said governor, from time to time, such alterations in the intended course of such canal, as the quality of the ground or other causes may occasion; whereupon it shall be lawful for them, their engineers, artists, and laborers, to enter upon all such land, and land covered with water, as shall be necessary for effecting such navigable canal or canals, or for opening or clearing such river or rivers, and to contract and agree with the owners of any lands and tenements, for the purchase of so much thereof, as shall be necessary for the purpose of making, digging, and perfecting such canal or canals, or opening and clearing such river or rivers, and of erecting and establishing all the necessary locks, works, and devices, to such navigation belonging; if they can agree with such owners; but in case of disagreement, or in case the owner thereof shall be feme covert, under age, non compos mentis, or out of the State, then it shall and may be lawful to and for the said directors, to apply to two of the justices of the supreme court of this State, who, upon such application, are hereby authorized and empowered, enjoined and required, to frame and issue one or more writ or writs, as occasion shall require, in the nature of a writ ad quod damnum, to be directed to the sheriff of the county, in which such lands and tenements shall be, commanding him, that, by the oaths and affirmations of twelve good and lawful men of his bailiwic, who shall be indifferent to the parties, he shall inquire, whether the person or persons, owning any lands and tenements, necessary to be used by the said directors, or which may be injured in establishing the said canal or canals, or in opening or clearing such river or rivers, which person or persons shall be named, and which lands and tenements shall be described in such writ or writs, will suffer and sustain, and what damages, by reason or means of taking any lands, tenements, mill, mill pond, water, watercourse, or other real hereditament, necessary for the use of any such canal, or for the opening of the navigation of any such river, and the locks and works thereto belonging, and to return the same writ, together with the finding of the said jury, to the next supreme court of this State, after such finding, and upon such writ being delivered to the said sheriff, he shall give at least twenty days notice in writing, to all and every the owners of the lands and tenements in the said writ described, or to so many of them as can be found, or to the agent or agents of such owners, of the time of executing the same, and shall cause to come upon the premises, at the time appointed, twelve good and lawful men of his bailiwic, who shall be selected in such manner, as struck juries usually are, to whom he shall administer an oath or affir-

mation,

A. D. 1791.

mation, that they will diligently inquire concerning the matters and things, in the said writ specified, and a true verdict give, according to the best of their skill and judgment, without favor or partiality; and thereupon the said sheriff and inquest shall proceed to view all and every the lands and tenements in such writ specified, and having considered the quantity of land, and land covered with water, mills, buildings, or other improvements, that shall be necessary to be vested in the said company, for the purposes aforesaid, and any watercourse then existing, the use whereof will be necessary for the purposes aforesaid, they shall cause the same to be minutely and exactly described by metes and bounds, or other particular descriptions, and shall value or appraise the injury or damages, if any, which the owner or owners of the said lands, tenements, mills, water, watercourses, buildings or improvements, will, according to their best skill and judgment, sustain and suffer, by means of so much of the said lands and tenements being vested in the said company, or by means of such improvements being destroyed or rendered useless, or of less value, or by means of the said company being permitted to turn such water to fill their canal and locks, or by means of said company being permitted to enlarge any mill-pond, mill-race, or other watercourse, and to use the same as, and for part of such canal and navigation, or by any other means what, soever, defining and ascertaining as well all such lands and tenements, liberties and privileges, so to be vested in the said company, as the several sums at which the said injuries and damages shall be so assessed; and the said sheriff and jury shall make an inquisition, under their hands and seals, distinctly and plainly setting forth all the matters and things aforesaid; and the sheriff shall forthwith return the same, together with the said writ, to the office of the supreme court, and at the first supreme court, which shall be held next after the return of any such writ, the justices of the said court shall examine the same; and if the said writ shall appear to have been duly executed, and the return thereof be sufficiently certain to ascertain the lands and tenements, rights, liberties, and privileges, intended to be vested in the said company, and the several compensations awarded to the owners thereof, then the said court shall enter judgment, that the said company, paying to the several owners as aforesaid, the several sums of money in the said inquisition assessed, or bringing the same into the said court, over and besides the costs of such writ, and of executing and returning the same, shall be entitled to have and to hold, to them, and their successors, and assigns, for ever, all and every the lands, tenements, rights, liberties, and privileges, in the said inquisition described, as fully and effectually, as if the same had been granted to them by the respective owners thereof; and if any return so to be made, shall not be sufficiently certain for the purposes aforesaid, the said court shall award an inquisition, de novo; and upon payment or bringing into court all such monies, as by such judgment shall be required to be paid, or brought into court, all such lands, tenements, rights, liberties and privileges, shall be fully and absolutely vested in the said corporation, which shall become seized and possessed thereof in like manner, as the then late owner or owners was or were seized or possessed thereof. PROVIDED ALWAYS, That no greater quantity of land shall be in such writ directed to be set out, or shall be set out by any such jury, than shall be sufficient for such canal and navigation, and to leave on each side of any canal intended to be cut, or water intended to be rendered navigable, a space or distance not exceeding two hundred and fifty feet, for the better maintaining and repairing of such canal and the locks, or other works and buildings, which it shall be necessary to erect and maintain, for the purpose of such canal, or other navigable water.

Where fords are to be made, and bridges built at the expense of the corporation.

XVIII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That wherever such canal shall cross any public or private laid out road or highway, or shall divide the ground of any person into two parts, so as to require a ford or bridge to cross the same, the jury, who shall inquire of the damages to be sustained, in manner herein directed, shall find and ascertain whether a passage across the same shall be admitted and maintained by a ford, or by a bridge; and on such finding, the said directors shall cause a ford to be rendered practicable, or a bridge fit for the passage of carts and waggons to be built, and for ever hereafter maintained and kept in repair, at all and every the places so ascertained by the said jury, at the cost and charges of the said company: but nothing herein contained shall prevent any person from erecting and keeping in repair any foot or other bridge across the said canal, at his own expense, where the same shall pass through

A. D. 1791.

his ground; PROVIDED the same shall be of such height above the water, as shall be usual in the bridges erected by the company; AND PROVIDED ALSO, That such foot or other bridges, so to be erected by the owners of such land, shall not interfere with any of the locks, buildings, or other works of the company.

In what manner the directors and their agents may enter on lands contiguous to a river, or intended canal.

XIX. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That it shall and may be lawful to and for the said directors, their engineers, artists, and laborers, with carts, waggons, wains, and other carriages, with their beasts of draught and burden, and all necessary tools and implements, to enter upon the lands contiguous, or near to the said tract of such intended canal or canals, or to such parts of any river or other water, as they may propose to clear, and render fit for navigation; and also, to dig and carry away any stone, gravel, sand, or earth there being most conveniently situate, for making, repairing, or improving such canal or navigation, and the same to use in carrying on the said work, first giving notice of their intention, to the owners of such lands, and doing as little damage thereto as possible, and repairing any breaches they may make in the enclosures thereof, and making amends for any damages that may be sustained by the owners of such ground, according to a reasonable agreement with the owners, if they can agree, or if they cannot agree, then according to an appraisement to be made, upon the oath or affirmation of three, or if they disagree, any two indifferent freeholders, to be mutually chosen, or if the owners neglect or refuse to join in the choice, then according to an appraisement to be made, upon the oath or affirmation of twelve good and lawful men of the bailiwic, to be summoned, sworn, and empaneled, by virtue of a warrant from any one justice of the supreme court of the State, or any one justice of the peace in and for the county, in which such lands may lie, who, at the request of the said society, or their lawful agent, is authorized and required, to issue his warrant to the sheriff of the said county, commanding him that, by the oaths of twelve good and lawful men of his bailiwic, he make the said appraisement, and return the same forthwith, under their hands and seals to the said justice.

Damages, how to be ascertained.

Collectors of toll to be appointed, and rate of toll to be fixed.

XX. AND BE IT FURTHER ENACTED, *by the authority aforesaid*, That it shall and may be lawful to and for the said directors, so soon as any mill, canal or any part thereof shall be perfected, or any river shall be rendered navigable, in any part where the same was not before navigable, to appoint such and so many collectors of tolls, for the passage of boats and vessels, in, through, and along the same, and at such places as they shall think proper; and that it shall and may be lawful to and for such toll collectors, and their deputies, to demand and receive of and from the persons having the charge of all boats and vessels, and rafts of timber, boards, plank or scantling, passing through such canal, and the part of such river rendered navigable, and the locks thereto belonging, such tolls and rates, for every ton weight of the ascertained burden of the said boats and vessels, and for every hundred feet cubic measure of timber, and twelve hundred feet board measure of boards, plank or scantling, in rafts, as the said directors shall think proper; PROVIDED, That the whole amount of such tolls and rates, in one year, shall not exceed fifteen per centum on the sums expended in making and establishing such canal, or in opening and clearing such river, over and above the expenses of maintaining and repairing the same, together with the necessary works, and of collecting the said tolls and rates.

But the amount of such tolls not to exceed 15 per cent on the sum expended.

Tonnage of boats, how to be ascertained, and their toll, when to be paid.

XXI. AND in order to ascertain the tonnage of boats using the said canal navigation, and to prevent disputes between the supercargoes or skippers, and collectors of tolls, concerning the same; *Be it further enacted by the authority aforesaid*, That upon the request of the owner, skipper or supercargo, of such boat or raft, or of the collector of the said tolls, at any lock or place, upon any such canal or water rendered navigable, it shall and may be lawful for each of them to choose one skilful person to measure and ascertain the number of tons, which the said boat or vessel is capable of carrying, and to mark the same in figures, upon the head and stern of the said boat, in colours mixed with oil, and that the said boat or vessel so measured and marked, shall always be permitted to pass through such canal or water rendered navigable, and locks, for the price per ton, to which the number of tons so marked on her shall amount, agreeably to the rates fixed in the manner aforesaid; and if the owner, skipper or supercargo, of such boat or vessel shall decline choosing a person, resident within four

miles

A. D. 1791.

miles of the place where such toll is payable, to ascertain the tonnage thereof, then the amount of such tonnage shall be fixed and ascertained by the person appointed for that purpose by the said directors, or chosen by the said collector of tolls for the said company, and the toll shall be paid according to such measurement, before any such boat or vessel shall be permitted to pass the lock or place, where such toll shall be made payable by the said company.

For any injury done to a canal or lock, four fold damages shall be recovered.

XXII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That if any person or persons whomsoever shall wilfully and knowingly do any act or thing whatsoever, whereby such canal or navigation, or any lock, gate, engine, machine or device thereto belonging, shall be injured or damaged, he or they, so offending, shall forfeit and pay to the said company, fourfold the costs and damages so sustained by means of such known and wilful act, together with costs of suit in that behalf expended, to be recovered by action of debt, in any court having jurisdiction competent to the sum due.

Collectors may stop boats until toll be paid or distrain part of the cargo.

XXIII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the collectors of tolls, duly appointed and authorized by the said directors, may stop and detain all boats and vessels, using the said canal and navigation, until the owner, skipper, or supercargo of the same shall pay the tolls, so as aforesaid fixed, or may distrain part of the cargo therein contained, sufficient, by the appraisement of two credible persons, to satisfy the same; which distress shall be kept by the collector of the tolls, taking the same, for the space of five days, and afterwards be sold by public auction, at the most public place in the neighborhood, to the highest bidder, in the same manner and form, as goods distrained for rent are by law sold, and saleable, rendering the surplus, if any there be after payment of the said tolls, and the costs of distress and sale to the owner or owners thereof.

Directors to make return to the legislature, triennially, of the sums expended in erecting canals, and rendering waters navigable.

XXIV. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said directors shall, at the expiration of every third year, from the date of their incorporation, lay before the legislature of this State, an abstract of their accounts, touching such canals and waters rendered navigable, shewing the whole amount of the capital expended in purchasing real estates, and in digging, erecting, and establishing the whole of such canals, locks and works, and in rendering such waters navigable, and the whole income and profits arising from the said tolls, for and during the said periods, together with the exact amount of the contingent charges of supporting, maintaining, and keeping the same in repair, for the said periods, to the end, that the clear annual profits may be known; and if at the end of any such period, it shall appear from such abstract, that the clear profits and income of the said company, as touching the said canals and waters rendered navigable, will bear a dividend of more than fifteen per centum per annum, as above limited, then and in such case, the said tolls shall be reduced so much as will reduce the said clear profits and income to a dividend, not exceeding the said rate of fifteen per centum per annum; and the surplus, which may have at any time accrued, shall be paid to the order of the legislature of this State, to be applied in their discretion to the encouragement of literature, arts and sciences within this State.

The society authorized to raise by lottery, 100,000 dollars.

XXV. AND WHEREAS the first attempts towards the establishment of manufactories by the said society, may be attended with loss, so as to impair and diminish the capital thereof, and the said society have prayed that this legislature would authorize them to raise by lottery certain sums for their indemnification against such losses; in compliance with the said request, and for the further encouragement of the said establishment; *Be it enacted by the authority aforesaid*, That the said society be, and they are hereby authorized and empowered, by one or more lotteries, to be drawn within this State, according to such scheme or schemes, and upon such terms as the directors of the said society shall institute, publish and declare, and under the management of such persons, as the said directors shall for that purpose appoint, to raise for the benefit of the said society a sum or sums not exceeding in the whole, one hundred thousand dollars, over and above such charges and expenses, as shall have been incurred in and about the management and drawing of the said lottery or lotteries.

XXVI. AND

A. D. 1791.

Inhabitants within a district, not exceeding six miles square, may be incorporated.

XXVI. AND WHEREAS it is deemed important to the success of the undertaking aforesaid, that provision should be made for incorporating, with the consent of the inhabitants, such district not exceeding in content the number of acres contained within six miles square, as may become the principal seat of the intended establishment; *Be it further enacted by the authority aforesaid*, That at any time after the directors of the said society shall have made choice of a suitable place, for the principal seat of their said manufactories, and shall have certified the same to the governor of this State, for the time being, it shall be lawful for the said directors, by advertisement, in one or more of the public gazettes, printed in this State, and also by advertisements affixed in the most public and notorious place within such district, to give notice, that it appears to them conducive to the interest of the said society, if agreeable to the inhabitants of the said district, that the said inhabitants should be, and become a body politic and corporate, and if within sixty days after such public notification, a majority of the taxable inhabitants of the said district, shall not express their dissent from the incorporation of the said district in writing, signed with their names, addressed and delivered to the governor of this State, it shall be deemed and taken to be evidence of the assent of the said inhabitants to be; and they shall thereupon be created and become a body corporate and politic, in deed and law, by the name and title of, "The Corporation of the Town of Paterson," to have perpetual succession; and they and their successors shall at all times be able and capable in law to have, hold and enjoy, any lands, tenements, and hereditaments, goods and chattels, of whatsoever kind or quality, and the same to sell, grant, alien and dispose of, to sue, and be sued, implead, and be impleaded in courts of justice, or any place whatsoever; to make and use a common seal, and the same to alter and renew at pleasure; and also in manner hereafter mentioned, to ordain, establish, and put in execution, all necessary and convenient by-laws, ordinances and regulations; PROVIDED the same are not contrary to the laws and constitution of the United States, or of this State.

Name and title.

The corporation may hold property and lands, may sue and be sued, may use a common seal, and make by-laws.

An enumeration of the taxable inhabitants to be taken, if any of them signify their dissent to being incorporated.

XXVII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That if any number of the said taxable inhabitants shall signify their dissent in manner aforesaid, and if the said society shall controvert the same, being a majority of the said taxable inhabitants of the said district, it shall be lawful for the governor of this State, upon application made to him by the said society in that behalf, to issue a writ to the sheriff of the county, in which the major part of such district shall be, commanding him to make or cause to be made, an enumeration of the taxable inhabitants of the said district, and to return the same within a certain time to be expressed therein, not more than three, nor less than one calendar month, after the teste of the said writ, and the same writ to renew in case of default, until the said enumeration shall be duly made and returned; and if upon such enumeration, it shall appear, that the number of persons, who have signified their dissent, are less than a majority of the whole number of the taxable inhabitants, then the dissent so signified shall be void and of no effect.

Mayor, recorder, aldermen, assistants, and town clerk to be appointed by the legislature, and amenable to the same.

XXVIII. AND BE IT FURTHER ENACTED, *by the authority aforesaid*, That for the well ordering of the affairs of the said corporation, there shall be a mayor, recorder, twelve aldermen, and twelve assistants, and town clerk, who shall be appointed by the Council and General Assembly of this State, in joint meeting, and commissioned by the governor of this State, in the same manner as the judges and justices of the peace, and clerks of the inferior court of common pleas, and quarter sessions of the peace throughout the State, are appointed and commissioned, and shall be in like manner amenable to the Council and General Assembly; and all other officers and ministers of the said town, whose appointments are not hereinotherwise provided for and prescribed, shall be chosen by the inhabitants of the said town, at their annual town meetings, which shall be held at the same time, that the annual town meetings, in the other townships in the county, shall by law be held; that the sheriff and coroner, being elected by the said inhabitants, freeholders within the said town, and commissioned by the said governor, upon a certificate of their election, signified by the mayor or recorder, with any three or more of the aldermen, and being so commissioned, shall or may continue in office, one year thereafter, and shall be vested with all the power and authority during said year, and entitled to all the privileges respectively within the said town, and subject to all the penalties for neglect of duty, which the sheriffs and coroners, in the several counties within this State, are vested with, entitled or subject to,

Which officers shall be elected, and when, by the inhabitants of the town, and their duration in office.

IR

in like cases and circumstances, and shall be subject to such further penalties for neglect of duty, as he or they may be subjected to by the by-laws made and passed by the corporation of the said town, and shall give security for the due performance of their respective offices, in like manner; and the assessors, collectors, and overseers of the poor, so chosen as aforesaid, shall be vested with all the powers and authorities, and entitled to all the privileges within the said town respectively, and be subject to all the penalties for neglect of duty, which the like officers in the several townships of this State are vested with, entitled or subject to, in like cases and circumstances; and also that the said mayor, recorder, aldermen, and assistants, in common council assembled, shall and may, from time to time, elect, nominate, and appoint, constables, and such other subordinate officers of the town aforesaid, not herein named, as they or the greater number of them, the mayor or recorder being one, shall think necessary, for the better ordering and governing the said town, which officers, so appointed, shall continue in office, until others shall be appointed to succeed them, and be sworn or affirmed into office. PROVIDED ALWAYS, That the several officers appointed pursuant to the directions of this act, before they severally take upon them the execution of their respective offices, shall take and subscribe the oath or affirmation of allegiance to this State, and also take the oath or affirmation of office.

A. D. 1791.

Common council to elect constables and subordinate officers.

Town officers to take the oath of allegiance and of office.

XXIX. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said town clerk, who shall be called clerk of the town of Paterson, and his successors for ever, shall act and do all things within the town aforesaid, which any town clerk of and in any borough or town corporate, by virtue of his office, can or ought to do: that the clerk of the said town, for the time being, shall also be clerk of the said court of common pleas, to be held as aforesaid, and also clerk of the peace, and of the sessions of the peace, for and in the said town, and all and singular those things which to the office and offices of such clerk do, and shall appertain to do, execute and perform; and also shall and may acquire, demand, take, accept, hold, keep, and enjoy, all fee, perquisites and profits, which to any clerk of the peace and sessions of the peace, or to any clerk of any court of common pleas, in any county of this State, do or ought to belong: that the said town clerk and his successors, clerk as aforesaid, upon their appointment, shall take the oath or affirmation of allegiance to the State, and also the usual and legal oath of affirmation of office, before the mayor, or recorder of the said town, for the time being, either of whom is hereby authorized to qualify into office as aforesaid such clerk of the said town; that the said clerk, for the time being, shall be, and hereby is, authorized and empowered, to administer the oath or affirmation of allegiance aforesaid, and also the usual and legal oaths or affirmations of office, to the mayor, recorder, aldermen, assistants, sheriff, coroner, and all and every other officer and minister, who shall be appointed or elected to serve in and for the said town; but in case the said clerk shall be absent, dead, or removed, the said mayor or recorder shall and may administer the oaths or affirmations aforesaid, to all such officers, when duly elected, or appointed, and report the same to the said clerk, or his successor, to be enroled.

Town clerk to be clerk of the peace, and of the courts of quarter sessions, and common pleas.

The said clerk to administer the oath of allegiance and of office to all persons, who shall be elected into office for the town.

XXX. AND BE IT ENACTED *by the authority aforesaid*, That in case of a vacancy in the offices of mayor and recorder, by death, resignation, or removal, or otherwise, during the recess of the legislature, that in such case, the governor of this State, for the time being, is hereby authorized to supply such vacancies, and commission them accordingly; which said commissions shall continue in force, till the legislature of this State, at a joint meeting, shall appoint persons to fill said offices, and the said person or persons, so appointed, be duly commissioned and qualified to execute the same.

Vacancy in the office of mayor or recorder, how to be supplied.

XXXI. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That it shall and may be lawful for the said mayor, recorder, aldermen, and assistants, to make such by-laws, ordinances, rules and regulations, not inconsistant with the laws and constitution of the United States, or of this State, as to them shall appear necessary and beneficial for the good government of the said district, and the same to put in execution, revoke, alter, and make anew, as occasion shall require, and to impose such fines and amerciements upon persons transgressing such by-laws, rules and ordinances, as shall appear to them reasonable, to be levied by distress and sale of the goods of the party offending, by warrant under the hand and seal of the said mayor or recorder, or by such other warrant or process,

The common council may make by-laws, impose fines, and the same mitigate or release.

A. D. 1791.

as shall have been prescribed by the laws or ordinances of the said corporation, to be recovered by action, for the use of the inhabitants of the said district; and upon the submission of the parties, the said mayor, recorder, aldermen, and assistants, shall have powers to mitigate or release such fines and amercements. PROVIDED ALWAYS, That not less than a majority of the whole number of the said officers, of whom the mayor or recorder to be one, shall be competent to constitute a legal board, or meeting for the purpose of making or altering any by-law, or ordinance, or of appropriating any of the monies of the said corporation; and that not less than seven, of whom the mayor or recorder to be one, shall be competent to form a board for any other purpose.

What number requisite to constitute a board for certain purposes.

The mayor, recorder, aldermen, and assistants, created justices of the peace.

XXXII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said mayor, recorder, aldermen, and assistants, for the time being, shall severally and respectively have all the powers and authorities of justices of the peace, and shall have full power and authority to enquire of, hear, try, and determine, agreeably to the laws and constitution of this State, all larcenies, forgeries, perjuries, assaults and batteries, riots, routs, and unlawful assemblies, and all other offences, which may or shall be committed within the said district, which would otherwise be cognizable in the court of general quarter sessions of the peace, of the county or counties, wherein such district is situated, and to punish all persons so convicted, agreeably to the laws of this State; and also to enquire of, hear, try, and determine, all offences committed in the said district, against any of the by-laws, rules, and ordinances, made, ordained, and established, in pursuance of this act, and to punish such offenders, as by the said by-laws, rules, and ordinances, shall be directed; and also to impose and levy fines on jurymen and others, according to law; to award process, take recognizances, and commit to prison, as occasion shall require, without being accountable to the State, for any fines or amercements, to be imposed for the said offences, except such as are, or shall by law be made payable into the treasury of this State, for offences against the State; and that they, in their said court of quarter sessions, shall have the sole, only, and exclusive right and power of licensing all and every innkeeper, tavernkeeper, and retailer of spirituous liquor, inhabiting within the said town, as to them shall seem convenient, and from them, and every of them, so to be licensed, to require and take recognizance, agreeably to the laws of this State, and every other license for such purpose within the said town, granted by any other court, shall be, and is hereby declared to be null and void, and generally to do all such matters and things, as any court of general quarter sessions of the peace of and for any county within this State, may or can lawfully do within such county; and for the purposes aforesaid, the said mayor, recorder, aldermen, and assistants, or any seven of them, of whom the mayor or recorder to be one, shall have full power and authority to hold and keep a court of record, within the said district, four times in each year, by the style and title of "The court of quarter sessions of the peace of the town of Paterson," for enquiring, hearing, trying, and determining, the pleas and matters aforesaid; and doing all such matters and things, as, in pursuance of this act, shall be cognizable in the said court; which court shall have power to adjourn from day to day, and to hold special sessions, when to the said mayor, recorder, aldermen, and assistants, it shall appear necessary; and all proceedings in the said court, may be removed by writ of error, certiorari, or other writs, in like manner, as the proceedings in any court of general quarter sessions of the peace of any county in this State, are by law removable.

The mayor, recorder, aldermen, and assistants, may hold a court of sessions quarterly, and also special courts when necessary.

XXXIII. AND BE IT FURTHER ENACTED *by the authority aforesaid*, That the said mayor, recorder, aldermen, and assistants, or any seven of them, of whom the mayor or recorder to be one, shall also have full power and authority to hold and keep, on the first Monday in every calendar month, and the same, if need be, to adjourn from day to day, for the term of four days, counting the first as one, one other court of record by the style and title of, "The court of common pleas of the town of Paterson," with power to hold pleas of all such civil actions, suits and controversies, as are cognizable in the several county courts within this State, to summon and empanel juries in the said actions or suits, to give judgment thereon, and to carry such judgments into execution, in as full and ample a manner, and by all such ways and means, as any court of common pleas within this State may or can do; and the proceedings in the said court shall be, as nearly as may be, the

The mayor, recorder, aldermen and assistants, may hold a court of common pleas on the first Monday of every month.

A. D. 1797.

the same with those of the several courts of common pleas within this State, and may be removed by habeas corpus, writ of error, or other writ, in like manner, as the proceedings in any such court of common pleas are by law removable."

Seal of the court of common pleas.

XXXIV. And be it enacted *by the authority aforesaid*, That the said court of common pleas of the town of Paterson shall have a seal, with such device, as shall appear to the said court proper, and all writs, issuing thereout, shall be under the said seal, and tested in the name of the mayor or recorder of the said corporation.

The court of sessions of the county not to have jurisdiction within the said town.

XXXV. And be it further enacted *by the authority aforesaid*, That the justices of the court of general quarter sessions of the peace of the county or counties, in which such district is situated, or any of them, shall not have any power or jurisdiction within the said district, except to compel the attendance of witnesses.

What artificers and manufacturers are exempted from military duty.

XXXVI. And be it further enacted *by the authority aforesaid*, That all artificers and manufacturers within the said district, in the immediate service of the said society, shall be exempt from all military duty, except in cases of actual invasion, or imminent danger: Provided always, That the clerk of the said town of Paterson shall keep a book, in which he shall enter the names of all the artificers and manufacturers, in the immediate service of the said society, at the direction of the said court of general quarter sessions of the peace, in and for the said town; and that no person shall be exempt from any taxes whatever, or from militia duty, except his name shall be entered in the said book as aforesaid.

This act to be construed favorable for the corporation.

XXXVII. And be it further enacted *by the authority aforesaid*, That this act shall in all things be construed in the most favorable manner for the said respective corporations, nor shall any nonuser of the privileges, hereby to the said corporations respectively granted, create any forfeiture of the same; and notwithstanding the members of the said respective corporations should fail to meet and hold their elections as is hereby specified, the said elections may be afterwards holden and made in such manner, as shall have been prescribed by the laws and ordinances of the said respective corporations, and the officers, for the time being, shall continue to hold and exercise their office, until others shall be duly elected to succeed them, at some subsequent meeting.

Nonuser not to create any forfeiture.

This act a public act.

XXXVIII. And be it further enacted *by the authority aforesaid*, That this act shall be deemed and taken to be a public act, and as such to be taken notice of by all persons and courts of justice whatsoever within this State.

The district, which has been selected, by the directors of the society, for the principal seat of their manufactories, lies in the counties of Bergen and Essex. It begins at the mouth of Third River, formerly called Yonckaw, where it empties into Passaic river; thence north, fifty one degrees and sixteen minutes west, five hundred and seventy chains, along marked trees, marked with a blaze, and the letters P. A. to a stake and stones; thence north, twenty five degrees east, across Passaic river, above the upper part of the little falls, fifty chains, to a large Chestnut tree, marked as before; thence north, forty nine degrees east, four hundred and thirty five chains and twenty nine links; thence due east, one hundred and forty four chains; thence south, ten degrees east, four hundred and fifty chains, to near Saddle River bridge; thence south, nineteen degrees west, two hundred and sixty six chains, thence north, fifty one degrees and fifteen minutes west, twenty eight chains, to the place of beginning; and contains thirty six square miles, equal to six miles square. The inhabitants of the district have been incorporated pursuant to the 26th and 29th sections of this act.

See a supplemental act of the 29th of November, 1792.

Appendix E

TABLES OF OWNERSHIP AND LEASEHOLD FOR MILL SITES ON THE ATP SITE

Table E.1. Mount Morris Lot: Quarry Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
First and Second Tract						
1792 - 1853	Society for Establishing Useful Manufactures	Passaic County Deed F2/100	280 pounds 16 shillings	28.08 acres: includes the Gun Mill Quarry and a portion of the steam power plant		
This land may have previously been used by the Gun Mill owners as a letter written by Samuel Colt to Christopher Colt dated May 30, 1836 indicates that an additional 450 foot long property between the bluff and the river was included with the lease at no additional rent (University of Rhode Island University Archives, Group 78, Box 11, Series II, Folder 3).						
1853 - 1887	John Ryle	Passaic County Deed S/518	$2,000.00			
1887 - 1900	John W. Griggs and William Ryle (executors of John Ryle)		by will			
1900	John Ryle Real Estate Association	Passaic County Deed I14/469	$1.00			
Exception to First and Second Tract						
1900 - 1917	John Ryle Real Estate Association					
1917	Society for Establising Useful Manufactures	Passaic County Deed U26/40	$1.00			
Third Tract (Gun Mill Quarry)						
-1792	Anthony Van Blarcom					
1792 - 1917	Society for Establising Useful Manufactures	Passaic County Deed F2/100	280 pounds 16 shillings	28.08 acres: includes the Gun Mill Quarry and a portion of the steam power plant		
1917	John Ryle Real Estate Association	Passaic County Deed R26/465	$1.00			
Fourth Tract						
-1792	Anthony Van Blarcom					
1792 - 1854	Society for Establishing Useful Manufactures	Passaic County Deed F2/100	280 pounds 16 shillings	28.08 acres: includes the Gun Mill Quarry and a portion of the steam power plant		
1854 - 1857	John Ryle	Passaic County Deed Q8/189	$1.00	Passaic County Deed Q8/189 was made on March 23, 1887 to confirm a lost and unrecorded deed of November 10, 1854		
1857 - 1859	Rueben Ryle and William Ryle	Passaic County Deed C2/114	$100,000.00			
1859 - 1887	John Ryle	Passaic County Deed F2/198	$100,000.00			
Fifth Tract						
-1792	Anthony Van Blarcom					
1792 - 1851	Society for Establishing Useful Manufactures	Passaic County Deed F2/100	280 pounds 16 shillings	28.08 acres: includes the Gun Mill Quarry and a portion of the steam power plant		
1851 - 1887	John Ryle	Passaic County Deed Q/198	$750.00			reserving a passage way as now used over the lot

Table E.1. Mount Morris Lot: Quarry Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
First through Fifth Tracts						
	John Ryle Real Estate Association					
1933 - 1945	Society for Establishing Useful Manufactures	Passaic County Deed O37/145	$1.00			with rights acquired by John Ryle Real Estate Association under the Electric Power Agreement between S.U.M., New Jersey General Security Company and Passaic Water Company dated June 24, 1916 with rights acquired by John Ryle Real Estate Association under the agreement between the John Ryle Real Estate Association and the Passaic Wter Copmany dated April 23, 1921 in which John Ryle Real Estate Association acquired the right to pump up water from the river with rights mentioned in an easement dated March 28, 1872 between S.U.M and John Ryle (M4/132) subject to terms of a lease
Quit Claim Deeds were issued the to Society for Establishing Useful Manufactures from the following for all of the above land except the third tract: Edith May Ryle MicTighe Passaic County Deed U45/47 (May 3, 1945), Jemima Ryle Passaic County Deed O45/42 (May 7, 1945), Margaret R. Fayerweateher Passaic County Deed O45/31 (May 8, 1945), Jemima R. Roberts Passaic County Deed O45/35 (May 9, 1945), John RylePassaic County Deed O45/29 (May 10, 1945), Sarah C. Kiernan Passaic County Deed O45/28 (May 11, 1945), Arthur Roberts Passaic County Deed O45/33 (May 12, 1945), William C. Ryle Passaic County Deed O45/41 (June 9, 1945), Sophia Cramp Van Dolsen (exec. Of William Walling Van Dolsen) Passaic County Deed O45/39 (September 12, 1945), Harry J. Ahlheim (exec. of Annie C. Roberts) Passaic County Deed O45/37 (September 7, 1945).						
1945 - 1947	City of Paterson	Passaic County Deed O45/47				
1947 - 1957	H.S. Properties	Passaic County Deed Z46/205	$100,000.00	Block 850 Lots 6, 26	Reserving to the party of the first part all water rights and privileges which may be considered as appurtenant to the land	subject to lease between S.U.M. and Haber and Sugarman dated October 1, 1941 subject to the rights of the City of Paterson, New Jersey Bell Telephone Company, Passaic Valley Water Commission and Public Service Electric and Gas to maintain cables, wires and lines subject to rights granted by John Ryle to Passaic Water Company on January 9, 1857 to lay pipes to the center of Mill Street in front of Building No. 11 (Passaic County Deed L2/335) subject to rights granted by John Ryle to Passaic Water Company on October 1, 1898 to lay a water pipe 25 inches in diameter (Passaic County Deed P13/257)

Table E.1. Mount Morris Lot: Quarry Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
1957 - 1982	Mill Realty Company	Passaic County Deed D69/115	$1.00	Block 850 Lots 6, 26	same water rights as given or reserved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205 with right to easements granted by Tynan Throwing Company (Passaic County Deeds V63/465 and P64/245) subject to agreement between City of Paterson and H.S. Properties made February 21, 1947 (Passaic County Deed Z46/226) subject to easement granted by H.S. Properties to Tynan Throwing Company on August 15, 1955 (Passaic County Deed P64/250) subject to lease between H.S. Properties and Allied Textile Printers dated July 19, 1955
1982 - 1983	National Preservation Institute	Passaic County Deed U110/481	$0.00	Block 850 Lots 6, 26	same water rights as given or researved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205
1983 -	Paterson Renaissance Organizaton, Inc.	Passaic County Deed Q111/208	$162,500.00	entire ATP complex in three tracts, the first tract is the Todd Mill site		subject to agreement between National Preservation Institute and Paterson Renaissance Organization, Inc. to cooperate in a program of restoration and adaptive re-use of the ATP complex

Table E.2. Gun Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
GM						
-1792	Abraham Van Houten, Cornelius Van Houten and John A. Van Houten					
1792 - 1813	Society for Establishing Useful Manufactures	Passaic County Deed F2/102	66 pounds 17 shillings	45.79 acres; all of the Gun Mill Lot, land of John Ryle Real Estate Association, Mallory Mill and Waverly Mill, Neuberger Mill, Todd Mill and Phoenix, Harmony and Industry Mills		
1813 - 1818	Samuel Colt, John Colt and Nicholas Delaplaine	Essex County Transcribed Deed D/27	$3,000.00	Gun Mill/Mallory Mill lot, approximately 1.7 acres	with the right to 12 inches square of water from the upper canal	
1818 - 1822	Samuel Colt and John Colt	Essex County Transcribed Deed Deed C/329	$5,000.00	Gun Mill/Mallory Mill lot, Waverly Mill lot*inter alia*	with the water privilege appertaining to the mill lot	
1822 - 1829	John Colt	Essex County Transcribed Deed F/121	$100.00	Gun Mill/Mallory Mill lot, Waverly Mill lot*inter alia*	with the water privilege appertaining to the mill lot Society for Establishing Useful Manufactures leased to John Colt an additional 1 square foot of water (Essex County Transcription Deed I/15)	
1829 - 1840	Paterson Manufacturing Company	Essex County Deed B3/395	$56,000.00	Gun Mill/Mallory Mill lot, Waverly Mill lot, Passaic Mill lot	with the right of taking 12 inches square of water from the upper canal	
In 1836, Paterson Manufacturing Company purchased additional land and water rights (12 inches square of water from the former upper canal, now known as the middle canal) from Society for Establishing Useful Manufactures. This deed reserved S.U.M the right of a passage or way to the quarry situate to the south of said premises at reasonable working hours (Essex County Transcription Deed L/630).						
1840	The Society for Establishing Useful Manufactures	Passaic County Deed H/426	$22,000.00	Gun Mill lot	with water privilieges attached thereto	
1840	Roswell Colt	Passaic County Deed D/198	$125,000.00	Gun Mill lot *inter alia*	with 2 feet of water	Subject to the several leases
1840	Estate of Robert Oliver	Passaic County Deed D/244	$125,000.00	lots, mill lots, mill sites, etc. and buildings thereon		Subject to leases
1840 - 1871	Emily Gibbes (wife of Robert Morgan Gibbes)	Abstract of Title		2/8s interest in Robert Oliver's land which includes the Gun Mill site *inter alia*	with 2 feet of water to be used on said lot	
1871	Margaret O. Post (wife of Edwin A. Post), Sarah B. Gibbes, and Emily O. Gibbes (daughters of Emily Gibbes)	by will (see Abstract of Title)		1/4 interest to Margaret O. Post, 1/4 interest to Sarah B. Gibbes and 2/4s interest to Emily O. Gibbes		17 Apr 1871, the trustee of Emily Gibbes and her children under will of Robert Oliver closed the trusts (G4/358)
GM1 (1/4 interest)						
1871	Emily O. Gibbes	by will of Emily Gibbes		1/2 interest in Gun Mill Lot *inter alia*		
1871 - 1875	Edwin A. post and Sarah Gibbes, in trust	Passaic County Deed N5/255	$1.00	1/4 interest in Gun Mill Lot *inter alia*		
1875 - 1883	New York Life Insurance Company, in trust	Passaic County Deed T7/477	$1.00	1/4 interest in Gun Mill Lot *inter alia*		
1883 -	Emily O. Gibbes	Passaic County Deed T7/485	$1.00	1/4 interest in Gun Mill Lot *inter alia*		
GM2 (1/4 interest)						
1871	Sarah B. Gibbes	by will of Emily Gibbes		1/4 interest in Gun Mill Lot *inter alia*		
1871 - 1875	Edwin A. Post and Emily O. Gibbes, in trust for Sarah B. Gibbes	Passaic County Deed N5/261	$1.00	1/4 interest in Gun Mill Lot *inter alia*		
1875 - 1883	New York Life Insurance and Trust Company, in trust	Passaic County Deed T7/468	$1.00	1/4 interest in Gun Mill Lot *inter alia*		
1883 - 1892	Sarah B. Gibbes	Passaic County Deed T7/459	$1.00	1/4 interest in Gun Mill Lot *inter alia*		

Table E.2. Gun Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
1892 -	Emily O. Gibbes	by will of Sarah B. Gibbes		1/4 interest in Gun Mill Lot*inter alia*		
GM3 (1/4 interest)						
1871	Emily O. Gibbes	by will of Emily Gibbes		1/2 interest in Gun Mill Lot*inter alia*		
1871 - 1875	Edwin A. Post, Emily O. Gibbs and Sarah B. Gibbes, trustees for George Morgan Gibbes	Passaic County Deed N5/258	$1.00	1/4 interest in Gun Mill Lot*inter alia*		
1875 -	Margaret O. Post (wife of Edwin A. Post)	by will of George Morgan Gibbes and Passaic County Deed S5/352		1/4 interest in Gun Mill Lot*inter alia*		
GM4 (1/4 interest)						
1871 -	Margaret O. Post (wife of Edwin A. Post)	by will of Emily Gibbes		1/4 interest in Gun Mill Lot*inter alia*		
GM1 and GM2						
-1907	Emily O. Gibbes			1/2 interest in Gun Mill Lot*inter alia*		
1907 - 1916	Barnard College	by will of Emily O. Gibbes		1/2 interest in Gun Mill Lot*inter alia*		
1916 -	New Jersey General Security Company	Passaic County Deed O25/451	$1.00	1/2 interest in Gun Mill Lot (same description as L25/256) *inter alia*	with 2 feet of water	
GM3 and GM4						
-1887	Edwin A. Post and Margaret O. Post					
1887 - 1896	August Belmont, sold by executors	Passaic County Deed X8/502	$1.00	1/2 interest in Gun Mill lot (as described in H8/157)		
1896 - 1915	Lady Rosalie Malvina Steele (widow of General Sir Thomas Montagu Steele), sold by executors	Passaic County Deed H12/132	$1.00	1/2 interest in Gun Mill lot*inter alia*	with 2 feet of water	
1915 -	New Jersey General Security Company	Passaic County Deed L25/258	$1.00	1/2 interest in Gun Mill lot	with 2 feet of water from middle canal	
GM1 - GM4						
-1930	New Jersey General Security Company	Passaic County Deeds L25/258 and O25/451				
1930	Society for Establishing Useful Manufactures	Passaic County Deed E36/389	$1.00	Gun Mill Lot	2 feet of water	
1945 - 1947	City of Paterson	Passaic County Deed O45/47	$1.00	Gun Mill Lot*inter alia*		
1947 - 1957	H.S. Properties	Passaic County Deed Z46/205	$100,000.00	Block 850 Lots 6, 26	Reserving to the party of the first part all water rights and privileges which may be considered as appurtenant to the land	subject to lease between S.U.M. and Haber and Sugarman dated October 1, 1941 subject to the rights of the City of Paterson, New Jersey Bell Telephone Company, Passaic Valley Water Commission and Public Service Electric and Gas to maintain cables, wires and lines subject to rights granted by John Ryle to Passaic Water Company on January 9, 1857 to lay pipes to the center of Mill Street in front of Building No. 11 (Passaic County Deed L2/335) subject to rights granted by John Ryle to Passaic Water Company on October 1, 1898 to lay a water pipe 25 inches in diameter (Passaic County Deed P13/257)

Table E.2. Gun Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
On July 19, 1955, H.S. Properties leased the property to Allied Textile Printers. The lease began on August 1, 1955 and ended on September 30, 1965 with the option to renew for five years (see Passaic County Deed D69/115).						
1957 - 1982	Mill Realty Company	Passaic County Deed D69/115	$1.00	Block 850 Lots 6, 26	same water rights as given or reserved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205 with right to easements granted by Tynan Throwing Company (Passaic County Deeds V63/465 and P64/245) subject to agreement between City of Paterson and H.S. Properties made February 21, 1947 (Passaic County Deed Z46/226) subject to easement granted by H.S. Properties to Tynan Throwing Company on August 15, 1955 (Passaic County Deed P64/250) subject to lease between H.S. Properties and Allied Textile Printers dated July 19, 1955
1982 - 1983	National Preservation Institute	Passaic County Deed U110/481	$0.00	Block 850 Lots 6, 26	same water rights as given or researved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205
1983 -	Paterson Renaissance Organizaton, Inc.	Passaic County Deed Q111/208	$162,500.00	entire ATP complex		subject to agreement between National Preservation Institute and Paterson Renaissance Organization, Inc. to cooperate in a program of restoration and adaptive re-use of the ATP complex

Table E.3. Gun Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
Note: There is an exception in the leasehold title. A triangular portion forming the northeast corner of the Gun Mill lot was conveyed to the lessee of the Mallory Mill lot in 1890 (Passaic County Deed X9/629). From that time it was transferred along with the leasehold title to the Mallory Mill Lot. In exchange, a triangular portion forming the southwest corner of the Mallory Mill lot was conveyed to the lessees of the Gun Mill lot in 1890 (Passaic County Deed X9/629). From that time, it was transferred along with the leasehold title to the Gun Mill lot. The owners of the fee failed to recognize the transfer of these triangles (see Abstract).						
	Paterson Manufacturing Company					
1836 - 1842	Patent Arms Manufacturing Company	Essex County Transcribed Deed L/624	$1,100.00	lease for the Gun Mill lot for 21 years	with two feet of water	with right to use buildings, flumes, furnaces, wheels, fixtures and machinery (except the nail machine and blackmsith tools which are to be removed) and the right to use or take down any part of the buildings with right to use the passageway situated easterly of the west line of Mill street subject to rights of passage and drawing of water from the premises granted to Roswell L. Colt on April 5, 1831 reserving to S.U.M the right of passage to the quarry situated to the south of said premises
May 1, 1836: S.U.M. confirmed the lease and granted additional (undescribed) rights to Patent Arms Manufacturing Company (see Passaic County Deed I/364). This may be the land referred to in a letter written by Samuel Colt to Christopher Colt dated May 30, 1836 which indicates that an additional 450 foot long property between the bluff and the river was included with the lease at no additional rent (University of Rhode Island University Archives, Group 78, Box 11, Series II, Folder 3).						
In 1842, the Gun Mill leasehold was sold by virtue of a Court of Chancery decree to John Ehlers (Passaic County Deed F/536).						
1842	John Ehlers	Passaic County Deed F/536	$3,600.00	lease for the Gun Mill and rights to the ground between the stone quarry and the Passaic River	with two feet of water 1844: S.U.M leased an additional one foot of water to John Ehlers (see Passaic County Deed L/36)	
GML1 (1/4 interest)						
1842 - 1845	Thomas A. Emmet	Passaic County Deed F/540	$900.00	1/4 part of leasehold estate and right to the ground between the stone quarry and the Passiac River	2 feet of water	
John Ehlers and Thomas A. Emmet executed a sublease to Henry M. Low, John Edwards and Edwin T. Prall and another part of the same to George W. Murray and John Ryle (see Passaic County Deed L/36)						
1845 -	Abraham H. Godwin and Abraham Prall	Passaic County Deed I/364	$2,250.00	1/4 part of leasehold estate		
There is no record of any assignment or conveyance by Abraham Prall of his interest in the leasehold, but it must be assumed that such conveyance was made, but never recorded, and that Abraham H. Godwin became seized of the full 1/4 part of the leasehold estate.						
1852	John Ryle	Abstract of Title	$4,500.00	1/4 part of leasehold estate		
GML2 (3/4 interest)						
1846 -	John Ryle	Passaic County Deed L/36	$6,750.00	3/4 part of leasehold estate		subject to two leases to Henry M. Low, John Edwards and Edwin T. Prall and to George W. Murray and John Ryle
May 1, 1857: John Ryle renewed lease from the trustees of Emily Gibbs for 21 years (see Passaic County Deed H8/157).						
GML1 andGML2						
1857 - 1859	Rueban and William Ryle	Passaic County Deed C2/114	$100,000.00	leasehold of gun factory *inter alia*		
1859 - 1881	John Ryle	Passaic County Deed F2/198	$100,000.00	same description as C2/114 *inter alia*		
1881 -	William Ryle, in trust for John Ryle	Passaic County Deed D7/161	$1.00	Gun Mill and Murray Mill leases		

Table E.3. Gun Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
September 1, 1885: William Ryle renewed the lease from Edwin A. Post, Sarah B. Gibbes and Emily O. Gibbes (Passaic County Deed H8/157).						
-1892	William Ryle and John Griggs, executors of John Ryle					
1892 - 1933	John Ryle Real Estate Association	Passaic County Deed C11/93	$121,800.00	Gun Mill and Murry Mill*inter alia*.		
May 1, 1920: John Ryle Real Estate Association renewed the lease from New Jersey General Security Company (Passaic County Deed O29/47). In this lease, the two parties agreed that in place of the right to use two feet of water from the raceway, the John Ryle Real Estate Association could take electric power from the Hydro Electric Power Station and Auxiliary Steam Power Station (see Passaic County Deed O37/147)						
1933 - 1934	Society for Establishing Useful Manufactures	Passaic County Deed O37/147	$1.00	lease for Gun Mill lot; with this deed, the leasehold estate ends and full title is vested in S.U.M.		Subject to rights granted to the Passaic Water Company to lay and maintain water pipe through the Gun Mill yard (Passaic County Deeds L2/335 and P13/257)
In 1934 S.U.M. leased part of the Gun Mill property known as Building A and the Copper Shop to Habsug Holding Company for 13 years and 6 months (Passaic County Deed X38/557).						
In 1937 S.U.M. leased part of the Gun Mill property to Habsug Holding Company. This part of the property was formerly leased to Vulcan Print Works and to Audubon Piece Dye Works, Inc. (Passaic County Deed S39/108).						
May 1, 1937: S.U.M. allows Habsug Holding Company a quantity of water not to exceed 150,000 gallons in a day for $60 per month to be used on that portion of the Gun Mill property leased by Habsug Holding Company for a period of 10 years. The water is to be taken from S.U.M.'s second level canal (Passaic County Deed S39/107).						

Table E.4. Mallory Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
-1792	Abraham Van Houten, Cornelius Van Houten and John A. Van Houten					
1792 - 1813	Society for Establishing Useful Manufactures	Passaic County Deed F2/102	66 pounds 17 shillings	45.79 acres: Gun Mill Lot, lands of John Ryle Real Estate Association, Mallory Mill and Waverly Mill, Neuberger Mill, Todd Mill and Phoenix, Harmony and Industry Mills		
1813 - 1818	Samuel Colt, John Colt, Nicholas Delaplaine	Essex County Transcribed Deed D/27	$3,000.00	Gun Mill/Mallory Mill lot	with right to 12 inches square of water from upper canal	
1818 - 1822	Samuel Colt and John Colt	Essex County Transcribed Deed C/329	$5,000.00	Gun Mill/Mallory Mill lot and Waverly Mill lot *inter alia*	with water privilige	
1822 - 1829	John Colt	Essex County Transcribed Deed F/121	$100.00	Gun Mill/Mallory Mill lot and Waverly Mill lot *inter alia*	with water privilige	
1829 - 1831	Paterson Manufacturing Company	Essex County Deed B3/395	$56,000.00	Gun Mill/Mallory Mill lot, Waverly Mill lot, Passaic Mill lot	with right to 12 inches square of water from upper canal	
1831 -	Roswell L. Colt	Essex County Transcribed Deed M/482	$8,000.00	Mallory Mill (100 feet front)	with right to 1 foot of water from the raceway on the rolling mill lot in front of this lot	with right of way to the lot from Boudinot and Mill Streets which passage is not to be built upon
The deed from Roswell L. Colt to the S.U.M. for the Mallory Mill lot is attached to the original lease of the premises made by Roswell L. Colt to John Barrow *et al* (see Abstract)						
-1840	Society for Establishing Useful Manufactures					
1840	Roswell L. Colt	Passaic County Deed D/198	$125,000.00	same description as given in Essex County Transcribed Deed M/482 *inter alia*		
1840	Charles Oliver, Thomas Oliver and Robert M. Gibbes (executors of Robert Oliver)	Passaic County Deed D/244	$125,000.00	same description as given in Essex County Transcribed Deed M/482 *inter alia*	with right to 1 foot of water	
1840 - 1849	Thomas Oliver	Abstract of Title		same description as given in Essex County Transcribed Deed M/482 *inter alia*		
M1 (1/2 interest)						
1849 - 1866	Robert Oliver		by will of Thomas Oliver	1/2 interest in mill lot	with right to 1 foot of water	subject to lease from James Gallatin, executor of Thomas Oliver to James Jackson and William Inglis
1866 - 1908	Elizabeth Oliver	Passaic County Deed E3/221	$5,542.00	same description as given above	with right to 1 foot of water	
1908 - 1909	H. Oliver Thompson and Charlotte M. Thompson (neice and nephew of Elizabeth Oliver)		by will	same description as given above		
1909 - 1926	Charlotte M. Thompson	Passaic County Deed B20/166	$5.00	H. Oliver Thompson sold his interest to Charlotte M. Thompson		
1926	H. Oliver Thompson (brother of Charlotte M. Thompson)		by will	same description as given above		
1926 - 1945	New Jersey Security Company (sold by trustees in dissolution)	Passaic County Deed H33/61	$1.00	same description as given above		
M2 (1/2 interest in Mallory Mill)						
1849 - 1904	Thomas H. Oliver		by will of Thomas Oliver			
1904	William W. Berdan	Passaic County Deed L16/224	$1.00	1/2 interest in mill lot	with right to 1 foot of water	subject to lease by Thomas and Elizabeth Oliver to James Jackson (see Passaic County Deed W13/245)

Table E.4. Mallory Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
1904 - 1926	Alice Lloyd Oliver	Passaic County Deed L16/227	$1.00	same description as given above	same water rights as given in Passaic County Deed L16/224	same easements and rights as given in Passaic County Deed L16/224
1926 - 1945	New Jersey Security Company (sold by trustees in dissolution)	Passaic County Deed H33/357	$1.00	same description as given above		
M1 and M2						
1945	Society for Establishing Useful Manufactures	Passaic County Deed A45/513	$1.00			
1945 - 1947	City of Paterson	Passaic County Deed O45/47	$1.00			
1947 - 1957	H.S. Properties	Passaic County Deed Z46/205	$100,000.00	Block 850 Lots 6, 26	Reserving to the party of the first part all water rights and privileges which may be considered as appurtenant to the land	subject to lease between S.U.M. and Haber and Sugarman dated October 1, 1941 subject to the rights of the City of Paterson, New Jersey Bell Telephone Company, Passaic Valley Water Commission and Public Service Electric and Gas to maintain cables, wires and lines subject to rights granted by John Ryle to Passaic Water Company on January 9, 1857 to lay pipes to the center of Mill Street in front of Building No. 11 (Passaic County Deed L2/335) subject to rights granted by John Ryle to Passaic Water Company on October 1, 1898 to lay a water pipe 25 inches in diameter (Passaic County Deed P13/257)
1957 - 1982	Mill Realty Company	Passaic County Deed D69/115	$1.00	same description as given in Passaic County Deed Z46/205	same water rights as given or reserved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205 with right to easements granted by Tynan Throwing Company (Passaic County Deeds V63/465 and P64/245) subject to agreement between City of Paterson and H.S. Properties made February 21, 1947 (Passaic County Deed Z46/226) subject to easement granted by H.S. Properties to Tynan Throwing Company on August 15, 1955 (Passaic County Deed P64/250) subject to lease between H.S. Properties and Allied Textile Printers dated July 19, 1955
1982 - 1983	National Preservation Institute	Passaic County Deed U110/481	$0.00	same description as given in Passaic County Deed Z46/205	same water rights as given or researved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205
1983 -	Paterson Renaissance Organizaton, Inc.	Passaic County Deed Q111/208	$162,500.00	entire ATP complex in three tracts, the first tract is the Todd Mill site		subject to agreement between National Preservation Institute and Paterson Renaissance Organization, Inc. to cooperate in a program of restoration and adaptive re-use of the ATP complex

Table E.5. Mallory Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
Note: There is an exception in the leasehold title. A triangular portion forming the northeast corner of the Gun Mill lot was conveyed to the lessee of the Mallory Mill lot in 1890 (Passaic County Deed X9/629). From that time it was transferred along with the leasehold title to the Mallory Mill Lot. In exchange, a triangular portion forming the southwest corner of the Mallory Mill lot was conveyed to the lessees of the Gun Mill lot in 1890 (Passaic County Deed X9/629). From that time, it was transferred along with the leasehold title to the Gun Mill lot. The owners of the fee failed to recognize the transfer of these triangles (see Abstract).						
	Roswell L. Colt					
1831 - 1834	John Barrow, John Barrow, Jr. and Lawrence Barrow (sold by sheriff)	(see Passaic County Deed D/580)			with use of 1 square foot of water	
1834	Ziba Parkhurst	Essex County Transcribed Deed L/190	$6,935.00	lease for mill lot (100 feet front)	same water rights as given above	
1834 - 1835	Ziba Parkhurst and James Travers	Essex County Transcribed Deed L/223	$3,567.50	Ziba Parkhurst sold 1/2 undivided interest in leasehold to James Traverse	same water rights as given above	
1835	James Travers	Essex County Transcribed Deed L/283	$3,200.00	same description as given in Essex County Transcribed Deed L/190	same water rights as given above	
1835 - 1836	John Lorimer Graham, Joseph Lawrence and James B. Taylor	Essex County Transcribed Deed L/492	$55,000.00	same description as given in Essex County Transcribed Deed L/190	same water rights as given above	
1836 - 1840	Abijah Fisher, Eli Goodwin and William Spencer	Essex County Transcribed Deed M/408	$10,000.00	same description as given in Essex County Transcribed Deed L/190	same water rights as given above	
1840 -	Stephen R. Parkhurst	Passaic County Deed D/580	$2,500.00	same description as given in Essex County Transcribed Deed L/190	same water rights as given above	one room in mill being subject to a five year lease to Thomas Gwynne
Stephen R. Parkhurst apparently failed to renew the lease which was to expire in 1852. In 1857 a new lease for the premises was executed by the Estate of Thomas Oliver to James Jackson and William Inglis for 21 years (see Passaic County Deed I2/601).						
1857	James Jackson and William Inglis	Abstract of Title		Mallory Mill leasehold	right of drawing 1 square foot of water from the raceway on the lot formerly known as the Rolling Mill	
James Jackson sold a sublease to David Gavin Scott in 1857. James Jackson (and later his heirs) continued to renew the original lease from the owners of the Mallory Mill lot (see Passaic County Deed T28/254). The sublease represents the tenants who actually occupied the mill and is followed below:						
1857 - 1861	David Gavin Scott	Abstract of TItle			on August 1, 1859, S.U.M. leased an additional 288 square inches of water to David Gavin Scott for use on the Mallory Mill lot	subject to an agreement dated August 29, 1857 between John Ryle and David Gavin Scott regulated boundaries between their properties
May 1, 1857: S.U.M. leased all the land lying between the Mallory Mill lot and the Passaic River to David Gavin Scott for 18 years and 6 months (Passaic County Deed P4/520). Thereafter, the lease for this piece of ground ran with the chain of title to the Mallory Mill lease. Title to the land remained with S.U.M.						
1861 - 1889	Franklin Manufacturing Company	Passaic County Deed I2/601	$14,965.40	Mallory Mill leasehold and leasehold premises between Mallory Mill and Passaic River*inter alia*	same water right as above	subject to agreement as above
In 1878, Franklin Manufacturing Company renewed the above sublease by deed from Samuel Smith *et al.* , trustees of the Estate of James Jackson.						
1889	Walter H. Lewis	Passaic County Deed M9/93	$34,000.00	same description as given in Passaic County Deed I2/601	same water right as above	
Thereafter, Walter H. Lewis joins with Henry Lewis, Joseph W. Lewis, John L. Boardman, George W. Wharton, George B. Duren and Grinnell Wills in the firm of Lewis Brothers and Company						
1889	Cornelius N. Bliss	Passaic County Deed R9/49	$1.00	all the property of Lewis Brothers and Company is assigned to Cornelius N. Bliss	same water right as above	

Table E.5. Mallory Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
1889	Joseph W. Lewis, John L. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Wills, trading as Lewis Brothers and Company	Passaic County Deed U9/625	$1.00	property is re-assinged to Joseph W. Lewis *et al*	same water right as above	
1890	Henry Lewis and Walter Lewis	Passaic County Deed B10/157	$1.00	Joseph W. Lewis, John K. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Willis sold their interest in the property to Henry and Walter Lewis	same water right as above	
On April 10, 1890 a deed between William Ryle*et al* . and Henry Lewis and Walter Lewis effected a transfer of the triangular lot at the northeast corner of the Gun Mill lot and the triangular lot at the southwest corner of the Mallory Lot (Passaic County Deed X9/629). Therefore after 1890, the triangular lot at the southwest corner of the Mallory Mill lot ran with the leasehold title to the Gun Mill Lot and vice versa.						
1890 - 1893	Lyons Silk and Tapestry Company	Passaic County Deed A10/1	$34,472.73	leasehold premises known as Mallory Mill (except triangular lot at southwest corner thereof), land between Mallory Mill and the Passaic River and triangular lot at northeast corner of Gun Mill lot *inter alia*		
1893 - 1894	Hitchock Mending Manufacturing Company	Passaic County Deed E11/247	$5.00	same description as given in Passaic County Deed A10/1	same water right as above	
1894 - 1898	Walter M. Gallant and Frederick C. Gallant	Passaic County Deed T11/428	$1.00	same description as given in Passaic County Deed A10/1		
November 1, 1896: Walter M. Gallant and Frederick C. Gallat, partners under the name "Gallant Brothers" renewed the lease to the land between the Mallory Mill and the River from S.U.M. (Passaic County Deed L16/182).						
1898 - 1904	James Warren Thayer	Passaic County Deed P13/277	$1.00	same description as given in Passaic County Deed A10/1		
James Warren Thayer renewed the sublease in 1899 from James Jackson, in whom the estate and interest of the original lessor was vested (Passaic County Deed W13/173).						
1904 - 1930	New Jersey General Security Company	Passaic County Deed L16/173	$20,000.00	same description as given in Passaic County Deed A10/1	right of drawing 1 square foot of water from the raceway on the lot formerly known as the Rolling Mill	
1930 -	Society for Establishing Useful Manufactures	Passaic County Deed A36/461	$1.00	same description as given in Passaic County Deed A10/1	right of drawing 1 square foot of water from the raceway on the lot formerly known as the Rolling Mill	
Thereafter, S.U.M.and subsequent owners leased various portions of the property:						
November 20, 1936: S.U.M. leased the Mallory Mill to Habsug Holding Company for a period of 12 years and 1 month with no clause for renewal (Passaic County Deed Q39/65).						

Table E.6. Waverly Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
-1792	Abraham Van Houten, Cornelius Van Houten and John A. Van Houten					
1792 - 1813	Society for Establishing Useful Manufactures	Passaic County Deed F2/102	66 pounds 17 shillings	45.79 acres: Gun Mill Lot, lands of John Ryle Real Estate Association, Mallory Mill and Waverly Mill, Neuberger Mill, Todd Mill and Phoenix, Harmony and Industry Mills		
1813 - 1818	Samuel Colt, John Colt, Nicholas Delaplaine	Essex County Deed W/310	$3,000.00	Waverly Mill lot (75 feet front)	with right of taking 12 inches square of water from the canal in Boudinot Street	
1818 - 1822	Samuel Colt and John Colt	Essex County Transcribed Deed C/329	$5,000.00	same description of Waverly Mill lot as given in Essex County Deed W/310 *inter alia*	with water privilige appertaining to lot	
1822 - 1829	John Colt	Essex County Transcribed Deed F/121	$100.00	same description of Waverly Mill lot as given in Essex County Deed W/310 *inter alia*	with water privilige appertaining to lot	
1829 -	Paterson Manufacturing Company	Essex County Deed B/395	$56,000.00	same description of Waverly Mill lot as given in Essex County Deed W/310 *inter alia*	with right of taking 12 inches square of water from the canal in Boudinot Street	
pre 1853 - 1945	Society for Establishing Useful Manufactures	Passaic County Deed A36/461	$1.00	Waverly Mill Lot (94 feet front) *inter alia*	same water rights as given in Essex County Deed B/395	
1945 - 1947	City of Paterson	Passaic County Deed O45/47	$1.00	same description as given in Passaic County Deed A36/461 *inter alia*		
On February 21, 1947, the City of Paterson sold the land to Henry J. Tynan, Ella M. Tynan and John A. Anderson, individually and trading as Tynan Throwing Company for $31,500.00 (Passaic County Deed A47/359). On June 1, 1948, Ella M. Tynan (who was then widowed) and John A. Anderson sold their interest in the land as individuals to the Tynan Throwing Company for $1.00 (Passaic County Deed O49/289). Thus by 1948 ownership of the land was vested fully in the Tynan Throwing Compnay.						
1948 - 1957	Tynan Throwing Company	Passaic County Deed A47/359		Block 850 Lot 5	excepting all water rights and privileges which may be considered as appurtenant to the land	with right to maintain a bridge over the raceway and right in common with owner of Mallory Mill to pass over the bridge (Passaic County Deed A47/359) and responsibility to maintain the foundation and walls of the raceway under the bridge and keep it free and clear (Passaic County Deed A47/379) with right to use existing sewer line running northeasterly from a point under the Waverly Mill to a sewage pit and pumphouse on the northeast corner of the Neuburgere Mill (Passaic County Deed A47/359) with right to all electrical and steam equipment except certain power watt hour meters and light watt hour meters, electric wires and equpment supporting them and steam lines (Passaic County Deed A47/359) with right to use and maintain a sprinkler line (Passaic County Deed A47/359) with right to a wooden bridge extending from the west wall of building no. 6 to the east wall of building no. 7 (Passaic County Deed A47/359) subject to the month-to-month tenancy of Barbara Fabrics, Inc. (Passaic County Deed A47/359)

Table E.6. Waverly Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and Other Rights
1957 - 1959	Ira J. Schuster, trustee	Passaic County Deed A68/519	$1.00	same description as given in Passaic County Deed A47/359		subject to easements, covenants etc. as previously granted (Passaic County Deeds A47/359, A47/379 and P64/250)
1959 - 1982	Waverly Realty Co.	Passaic County Deed E72/385	$57,750.00	same description as given in Passaic County Deed A47/359		subject to easements, covenants etc. as previously granted (Passaic County Deeds A47/359, A47/379 and P64/250) subject to lease of property dated November 27, 1957 between Ira J. Shuster and Allied Textile Printers
1982 - 1983	National Preservation Institute	Passaic County Deed U110/476	$0.00	same description as given in Passaic County Deed A47/359		subject to easements, covenants etc. as previously granted (Passaic County Deeds A47/359, A47/379, V63/465 and P64/250) subject to agreement between Waverly Realty Co. and Allied Textile Printers which extended ATP's lease to May 31, 1974 (Passaic County Deeds F80/53 and F80/384)
1983 -	Paterson Renaissance Organization	Passaic County Deed Q111/208	$162,500.00	entire ATP complex in three tracts, the second tract is the Waverly Mill site		

Table E.7. Waverly Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
	Society for Establishing Useful Manufactures					
1853 - 1861	David Gavin Scott	Abstract of Title		lease of Waverly Mill lot for 22 years and 3 months	with right to take 2 square feet of water from the lower canal in Boudinot Street May 1, 1856: David Gavin Scott leased an additional 144 square inches of water from S.U.M. (Passaic County Deed Z/361)	agreed that the front of the lot shall be reserved and kept open and unobstructed for the purpose of a road or passageway for the joint use of said lot and Mallory Mill lot
1861 - 1889	Franklin Manufacturing Company	Passaic County Deed I2/601	$95,523.83	lease of Waverly Mill lot for 22 years and 3 months *inter alia*	same water rights as given above	agreement as given above also with the right to occupy the ground formerly owned by Paterson Manufactring Company on
In 1875, Franklin Manufacturing Company renewed the lease given from S.U.M. to David Gavin Scott by deed from S.U.M. dated August 1, 1853 for a term of 21 years (Passaic County Deed S6/464). They also renewed the lease for an additional 144 square inches of water on November 1, 1875 (see Passaic County Deed M9/93).						
1889	Walter H. Lewis	Passaic County Deed M9/93	$34,000.00	lease of Waverly Mill lot *inter alia*	same water rights as given above	
Thereafter, Walter H. Lewis joins with Henry Lewis, Joseph W. Lewis, John L. Boardman, George W. Wharton, George B. Duren and Grinnell Wills in the firm of Lewis Brothers and Company.						
1889	Cornelius N. Bliss	Passaic County Deed R9/49	$1.00	all the property of Lewis Brothers and Company is assigned to Cornelius N. Bliss	same water rights as given above	
1889	Joseph W. Lewis, John L. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Wills, trading as Lewis Brothers and Company	Passaic County Deed U9/625	$1.00	property is re-assinged to Joseph W. Lewis *et al*	same water rights as given above	
1890	Henry Lewis and Walter Lewis	Passaic County Deed B10/157	$1.00	Joseph W. Lewis, John K. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Willis sold their interest in the property to Henry and Walter Lewis	same water rights as given above	
In 1890 a 12.91 foot strip of land on the east side of the Waverly Mill lot was sold from the owners of the Passaic Mill Lot No. 1 to the owner of the Waverly Mill lease and thereafter ran with the title to the Waverly Mill lease (see Passaic County Deed A10/1)						
1890 - 1893	Lyons Silk and Tapestry Company	Passaic County Deed A10/1	$34,472.73	leasehold of Waverly Mill lot with 12.91 foot wide strip of land adjacent to the east *inter alia*	same water rights as given above	Regarding the 12.91 foot strip of land: reserving to the party of the first part an easement of light and air on land south of the south wall of the brick building on the rear of the Waverly Mill Lot Regarding the 12.91 foot strip of land: also reserving an easement of right of way for horses, vehicles, etc. but not the right to load and unload vehicles Regarding the 12.91 foot strip of land: also reserving an easement of light and air on land north of the south wall of the brick building while allowing the party of the second part the right to maintain a stairway on the east side of Building G
1893 - 1894	Hitchock Mending Manufacturing Company	Passaic County Deed E11/247	$5.00	same description as given in Passaic County Deed A10/1	same water rights as given above	subject to same easements and rights as given or reserved in Passaic County Deed A10/1
1894 - 1898	Walter M. Gallant and Frederick C. Gallant	Passaic County Deed T11/428	$1.00	same description as given in Passaic County Deed A10/1	same water rights as given above	subject to same easements and rights as given or reserved in Passaic County Deed A10/1
In 1896, Walter M. Gallant and Frederick C. Gallant renewed the lease from S.U.M. (Passaic County Deed L16/186).						
1898 - 1904	James Warren Thayer	Passaic County Deed P13/277	$1.00	same description as given in Passaic County Deed A10/1	same water rights as given above	subject to same easements and rights as given or reserved in Passaic County Deed A10/1

Table E.7. Waverly Mill Lot: Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
1904 - 1930	New Jersey General Security Company	Passaic County Deed L16/173	$20,000.00	same description as given in Passaic County Deed A10/1	same water rights as given above	
1930 -	Society for Establishing Useful Manufactures	Passaic County Deed A36/461	$1.00	same description as given in Passaic County Deed A10/1; with this deed, the leasehold estate ends and full title is vested in S.U.M.	same water rights as given above	subject to all existing leases
Thereafter, S.U.M.and subsequent owners leased various portions of the property:						
1934: S.U.M. leased the Dye House Property of the Waverly Mill to the Habsug Holding Company for 14 years 1 month (Passaic County Deed X38/555).						
November 27, 1957: Ira J. Shuster leased the Waverly Mill to Allied Textile Printers (see Passaic County Deeds E72/385, F80/53, F80/384).						

Table E.8. Passaic Mill Lot: Chain of Title and Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
-1792	Abraham Van Houten, Cornelius Van Houten and John A. Van Houten					
1792 - 1813	Society for Establishing Useful Manufactures	Passaic County Deed F2/102	66 pounds 17 shillings	45.79 acres; all of the Gun Mill Lot, land of John Ryle Real Estate Association, Mallory Mill and Waverly Mill, Neuberger Mill, Todd Mill and Phoenix, Harmony and Industry Mills		
1813	Roswell L. Colt	Essex County Deed V/321	$2,000.00	lot on Boudinot Street, 100 feet in front	right of taking 12 inches square of water from the canal in Boudinot Street	
1813 - 1823	Peter Colt	Passaic County Deed H4/81	$2,500.00	same description as given in Essex County Deed V/321	same water rights as given in Essex County Deed V/321	
1823 - 1829	John Colt	Essex County Deed P2/258	$8,000.00	same description as given in Essex County Deed V/321	same water rights as given in Essex County Deed V/321	
1829 - 1859	The Paterson Manufacturing Company (sold by sheriff)	Essex County Deed B3/395	$56,000.00	same description as given in Essex County Deed V/321 *inter alia*	same water rights as given in Essex County Deed V/321 May 1, 1844 Paterson Manufacturing Company leased an additional 216 square inches of water from S.U.M. for a period of 21 years (see Passaic County Deed V2/440) Previous to May 1, 1844 Paterson Manufacturing Company had also leased	
1859 - 1860	E. Boudinot Colt	Passaic County Deed F2/344	$400.00	same description as given in Essex County Deed V/321	with right of taking 1 square foot of water from the canal in front of the lot	
1860 - 1871	The Passaic Manufacturing Company	Passaic County Deed H2/350	$1.00	same description as given in Essex County Deed V/321 *inter alia*	same water rights as given in Essex County Deed V/321 by assignment or conveyance, the Passaic Manufacturing Company became entitled to the water privilege leased to Paterson Manufacturing Company in 1844 and on May 1, 1865, the Passiac Manufacturing Company renewed the lease for 216 square inches of water for 21 years (Passaic County Deed V2/440)	
1871 - 1889	Franklin Manufacturing Company (sold by sheriff)	Passaic County Deed G4/306	$50,000.00	same description as given in Essex County Deed V/321	same water rights as given in Passaic County Deed F2/344 with the two abovementioned water leases, each for an additional 216 square inches of	subject to the right of S.U.M. to access the underground wasteway running through the lot subject to an easement granted to David G. Scott on December 17, 1857
1889	Walter H. Lewis	Passaic County Deed M9/93	$34,000.00	same description as given in Essex County Deed V/321 *inter alia*	same water rights as given in Passaic County Deed F2/344 with the additional leasehold of 216 square inches of water leased to Franklin Manufacturing Company on May 1, 1865	with all rights of the Franklin Manufacturing Company by virtue of certain contracts between S.U.M. as to modifications in the manner of drawing taking and using water privileges with rights relative to the boundaries between between the lot and the land of John Ryle set forth in an agreement between said Company and John Ryle dated August 29, 1857
Thereafter, Walter H. Lewis joined with Henry Lewis, Joseph W. Lewis, John L. Boardman, George W. Wharton, George B. Duren and Grinnell Willis in the firm of Lewis Brothers and Company						
1889	Cornelius N. Bliss	Passaic County Deed R9/49	$1.00	all the property of Lewis Brothers and Company in Pennsylvania and elsewhere is assigned to Cornelius N. Bliss	same water rights as given in Passaic County Deed M9/93	same rights as given or reserved in Passaic County Deed M9/93

Table E.8. Passaic Mill Lot: Chain of Title and Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
1889	Joseph W. Lewis, John L. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Willis, trading as Lewis Brothers and Company	Passaic County Deed U9/625	$1.00	all property is re-assinged to Joseph W. Lewis *et al*	same water rights as given in Passaic County Deed M9/93	same rights as given or reserved in Passaic County Deed M9/93
1890 - 1891	Henry and Walter Lewis, trading as H. and W.H. Lewis	Passaic County Deed B10/157	$1.00	same description as given in Essex County Deed V/321 *inter alia* (Joseph W. Lewis, John K. Boardman, George W. Wharton, John Williamson, George B. Duren and Grinnell Willis sold their interest in the property to Henry Lewis and Walter Lewis)	same water rights as given in Passaic County Deed M9/93	same rights as given or reserved in Passaic County Deed M9/93
In 1890 a 12.91 foot strip of land was sold from the owners of the Passaic Mill Lot No. 1 to the owner of the Waverly Mill lease and subsequently was sold along with the Waverly Mill lease (see Passaic County Deed A10/1)						
1891 - 1911	Herman Neuburger and Isidor Neuburger, trading as Neuburger Silk Company	Passaic County Deed N10/125	$22,000.00	same description as given in Essex County Deed V/321, except a 12.91 foot wide strip of land on the western side of the property (see Passaic County Deed A10/1)	same water rights as given in Passaic County Deed M9/93	subject to agreement between Henry Lewis and Walter Lewis and Lyons Silk and Tapestry Company on April 15, 1890
1911 - 1930	New Jersey General Security Company	Passaic County Deed F22/110	$25,000.00	same description as given in Passaic County Deed N10/125	right of taking 1 square foot of water from the canal in front of the lot, using it on the lot, and discharging it into the Passaic River	same rights as given or reserved in Passaic County Deed N10/125
1930 - 1945	Society for Establishing Useful Manufactures	Passaic County Deed A36/457	$1.00	same description as given in Passaic County Deed N10/125	same water rights as given in Passaic County Deed F22/110	
In 1934 S.U.M. leased the property to Habsug Holding Company for 14 years 1 month (Passaic County Deed X38/555).						
In 1941 S.U.M leased the property to Hyman Haber and Morris Sugarman, as Haber and Sugarman for 10 years commencing on October 1, 1941 (see Passaic County Deed Z46/205)						
1945 - 1947	City of Paterson	Passaic County Deed O45/47	$1.00	same description as given in Passaic County Deed N10/125 *inter alia*		
1947 - 1957	H.S. Properties	Passaic County Deed Z46/205	$100,000.00	Block 850 Lots 6, 26	Reserving to the party of the first part all water rights and privileges which may be considered as appurtenant to the land	subject to lease between S.U.M. and Haber and Sugarman dated October 1, 1941 gives and reserves several easements of passage and rights to maintain sprinkler, oil, steam, electric and sewage lines subject to the rights of the City of Paterson, New Jersey Bell Telephone Company, Passaic Valley Water Commission and Public Service Electric and Gas to maintain cables, wires and lines subject to rights granted by John Ryle to Passaic Water Company on January 9, 1857 to lay pipes to the center of Mill Street in front of Building No. 11 (Passaic County Deed L2/335) subject to rights granted by John Ryle to Passaic Water Company on October 1, 1898 to lay a water pipe 25 inches in diameter (Passaic County Deed P13/257)
On July 19, 1955, H.S. Properties leased the property to Allied Textile Printers. The lease began on August 1, 1955 and ended on September 30, 1965 with the option to renew for five years (see Passaic County Deed D69/115).						

Table E.8. Passaic Mill Lot: Chain of Title and Lease Agreements.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
1957 - 1982	Mill Realty Company	Passaic County Deed D69/115	$1.00	Block 850 Lots 6, 26	same water rights as given or reserved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205 with right to easements granted by Tynan Throwing Company (Passaic County Deeds V63/465 and P64/245) subject to agreement between City of Paterson and H.S. Properties made February 21, 1947 (Passaic County Deed Z46/226) subject to easement granted by H.S. Properties to Tynan Throwing Company on August 15, 1955 (Passaic County Deed P64/250) subject to lease between H.S. Properties and Allied Textile Printers dated July 19, 1955
1982 - 1983	National Preservation Institute	Passaic County Deed U110/481	$0.00	Block 850 Lots 6, 26	same water rights as given or researved in Passaic County Deed Z46/205	with rights given and reserved in Passaic County Deed Z46/205
1983 -	Paterson Renaissance Organizaton, Inc.	Passaic County Deed Q111/208	$162,500.00	entire ATP complex		subject to agreement between National Preservation Institute and Paterson Renaissance Organization, Inc. to cooperate in a program of restoration and adaptive re-use of the ATP complex

Table E.9. Todd Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
-1792	Abraham Van Houten, Cornelius Van Houten and John A. Van Houten					
1792 - 1813	Society for Establishing Useful Manufactures	Passaic County Deed F2/102	66 pounds 17 shillings	45.79 acres - Gun Mill Lot, lands of John Ryle Real Estate Association, Mallory Mill and Waverly Mill, Neuberger Mill, Todd Mill, Phoenix Mill, and Phoenix, Harmony and Industry Mills		
1813	Roswell Colt	Essex County Deed V/319	$2,500.00	tract of land or mill lot on Boudinot Street, 200 feet in front	right to take 12 inches square of water from the canal in Boudinot Street	
1813	David Parrish	Essex County Deed U/424	$3,750.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
1813 - 1840	Daniel Holsman	Essex County Deed W/76	$12,000.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
1840 - 1850	Catharine Holsman, as widow and as guardian to hiers of Daniel Holsman, Clement C. Barclay and James Barclay	(see Passaic County Deed P/454)	by inheritance	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
Catherine Holsman leased the lot (except a 35 foot strip on the eastern side) to Stark and Parsons on October 19, 1841 for three years. After that lease expired, Stark and Parsons continued to lease the premises under a parol agreement at least through 1845 (Halstead 1849:126-136).						
1850 - 1859	Joseph C. Todd, Phillip Rafferty and Daniel Mackey	Passaic County Deed P/454	$18,000.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
1859 - 1872	Joseph C. Todd and Phillip Rafferty	Passaic County Deed E2/221	$1.00	same description as given in Essex County Deed V/319 (Daniel Mackey sold his 1/3 undivided interest to Joseph C. Todd and Phillip Rafferty)	same water rights as given in Essex County Deed V/319	
1872 - 1883	Todd & Rafferty Machine Company	Passaic County Deed M4/492	$101,700.00	same description as given in Essex County Deed V/319 *inter alia*	same water rights as given in Essex County Deed V/319	
The Todd & Rafferty Machine Company went into receivership and was sold by Robert S. Hughes, receiver.						
1883 - 1898	Joseph C. Todd	Passaic County Deed Q7/29	$60,000.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
1898 - 1904	City of Paterson	see Passaic County Deed I18/484	confiscated for back taxes			
1904 - 1907	Pennington & Kireker	Passaic County Deed N16/193	$6,000.00	same description as given in Essex County Deed V/319 *inter alia*	same water rights as given in Essex County Deed V/319	
1907 - 1916	Robert Muller Jr.	Passaic County Deed T18/319	$45,000.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	subject to taxes and assessments that may have become leins after August 13, 1907
1916 - 1932	Todd Mill Realty Corporation	Passaic County Deed M25/431	$20,000.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	
1932 - 1945	Society for Establishing Useful Manufactures	Passaic County Deed H37/26	$1.00	same description as given in Essex County Deed V/319	same water rights as given in Essex County Deed V/319	subject to rights of present tenants subject to right of N.Y. and N.J. Telephone Company to erect and maintain poles and wires in the yard of the Todd Mill lot (Passaic County Deed S18/25) subject to right of adjacent owners and the public in the part of the premises lying north of the concrete bulkhead subject to rights of owner on west side whose building encroaches on premises
1945 - 1946	City of Paterson	Passaic County Deed O45/47	$1.00	same description as given in Essex County Deed V/319 *inter alia*		

Table E.9. Todd Mill Lot: Chain of Title.

Date	Name	Reference	Consideration	Description	Water Rights	Easements and other Rights
1946 - 1962	Todd Mills Realty Co.	Passaic County Deed P46/565	$63,500.00	tract of land or mill lot, 200.4 feet in front	excepting all water rights and privileges including riparian rights and right to draw water from the canal	same as given or reserved in Passaic County Deed H37/26 with right to maintain a bridge across the canal and easement to pass over the bridge with right to all steam and electrical equipment on the property except three power transformers and one light transformer located in mill yard to south of Brick Building No. 1 with primary electrical equipment associated with transformers, all meters, electrical wires and conduits running from northwest corner of Brick Building No. 1 to sewage pump house on Neuberger Mill lot, and various electric power meters and light meters
1962 - 1973	Todd Enterprises, Inc.	Passaic County Deed A77/534	$1.00	same description as given in P46/565	same water rights as reserved in Passaic County Deed P46/565	same as given or reserved in Passaic County Deed P46/565
1973	Allied Textile Printers	Passaic County Deed O94/537	$1.00	same description as given in P46/565	same water rights as reserved in Passaic County Deed P46/565	same as given or reserved in Passaic County Deed P46/565
1973 - 1983	Todd Enterprises, Inc.	Passaic County Deed S94/341	$1.00	same description as given in P46/565	same water rights as reserved in Passaic County Deed P46/565	same as given or reserved in Passaic County Deed P46/565
1983	National Preservation Institute	Passaic County Deed U110/468	$0.00	same description as given in P46/565	same water rights as reserved in Passaic County Deed P46/565	same as given or reserved in Passaic County Deed P46/565
1983 -	Paterson Renaissance Organization	Passaic County Deed Q111/208	$162,500.00	entire ATP complex in three tracts		
(Paterson Renaissance Organization and Paterson Renaissance Partners are likely the same organization operating under different names).						
-1991	Paterson Renaissance Partners					
1991 - present	City of Paterson (acquired through foreclosure)	Passaic County Deed L130/222		Block 850 Lot 4		

Appendix F

RESUMES

DAMON TVARYANAS
Principal Architectural Historian/Historian, M.S.

EDUCATION

M.S. Historic Preservation, University of Pennsylvania, 1993

B.A. Fine Arts, New York University, 1991

EXPERIENCE

1996- Principal Architectural Historian/Historian
Hunter Research, Inc., Trenton, NJ

Technical and managerial responsibilities for survey, evaluation and recording of buildings and structures for selected historic architectural projects. Technical and managerial responsibilities for historical research. Participation in:

- Historic structures survey and evaluation
- Preparation of Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentation
- Overall site direction and day-to-day management
- Oversight of historical and archival research for all company projects
- Report and proposal preparation

1992-1996 Historic Preservation Consultant
Brandywine Conservancy, Chadd's Ford, PA and Eagle's Mere, PA Historic Committee

Assisted the Conservancy and Historic Committee in numerous preservation activities. Participation in:

- Historic structures survey and evaluation
- Preparation of National Register of Historic Places Nomination
- Historic research, boundary delineation and mapping
- Preparation of state application for determinations of eligibility
- Public outreach

1991-1992 Museum Assistant
Carpenter's Hall, Philadelphia, PA

Assisted curator in development and implementation of systems for the recording and conservation of museum's artifact, furnishing, art and tool collections.

1992 Intern
Architectural History Foundation, New York, NY

Prepared comprehensive, annotated bibliography of non-serial publications pertaining to pre-1865 American architectural history.

EXPERIENCE, cont.

1991 Intern
Allaire State Park, Allaire, NJ

Performed interpretive duties at the working blacksmith and carpenter shops of a 19th-century iron furnace complex interpreted as a living history museum. Developed guided tour of the park to introduce basic architectural concepts to school and youth groups.

SELECTED PUBLICATIONS

"Trenton Textiles and the Eagle Factory: A First Taste of the Industrial Revolution." *New Jersey History* [2009], forthcoming (with Richard Hunter and Nadine Sergejeff).

"Parallel or Precedent: Patterned Brickwork Architecture and Quaker Needlework." *Folk Art* [2004], Spring/Summer, pp. 42-53.

PROFESSIONAL AFFILIATIONS

Historical Society of Pennsylvania
New Jersey Historical Society
National Trust for Historical Preservation
Preservation New Jersey
Archaeological Society of New Jersey
Burlington County Historical Society
Camden County Historical Society
Gloucester County Historical Society
Salem County Historical Society
Cumberland County Historical Society
Trenton Historical Society (Treasurer, 2009-present)

HUNTER RESEARCH

Richard W. Hunter PRESIDENT
Ian C. Burrow VICE PRESIDENT

CHERYL HENDRY
Historian, MA

EDUCATION

M.A., American History, Certificate in Museum Studies, University of Delaware, Newark, Delaware, 2005
B.A., History, University of Delaware, Newark, Delaware, 2003

EXPERIENCE

October 2006-present — Historian,
Hunter Research, Inc., Trenton, New Jersey

Execution of research in support of historic, historic architectural and archaeological studies including:

- review of primary and secondary source materials
- title research
- genealogical investigation
- review of historic cartographic material
- selected contribution to reports

February 2006-October 2006 — Education Assistant
Fonthill Museum, Bucks County Historical Society, Doylestown, Pennsylvania

- developed, implemented, and evaluated family and summer camp programs
- worked as part of a team to research, design, and install exhibits
- assisted with interviewing, training and supervision of volunteers

June 2005-October 2005 — Historic Interpreter
Batsto Village, Wharton State Forest, Hammonton, New Jersey

- coordinated and delivered programs to adult and student groups
- led guided tours of Batsto Village to varied audiences
- trained volunteer and staff interpreters

Sept 2004-April 2005 — Archival Assistant
Historical Society of Delaware, Wilmington, Delaware

- arranged and described a portion of the Congressional papers of United States Senator William V. Roth, Jr.
- assisted in preparing the collection's finding aid

June 2004-August 2004 — Intern
Elfreth's Alley Association, Philadelphia, Pennsylvania

- led guided tours of the Elfreth's Alley historic site to varied audiences
- drafted a Collections Management Policy for the intellectual and physical care of the Association's archival and artifact collections

June 2003-May 2004 — Intern
Historical Society of Delaware, Wilmington, Delaware

- worked with the curator on all aspects of collections management
- assisted with the installation of six museum exhibits

June 2002-
Dec 2002 Stewart Intern
Historic Houses of Odessa, Odessa, Delaware
- researched and reported on the Underground Railroad as it existed in Odessa
- redeveloped tour scripts to incorporate African-American history

Sept 2000-
May 2002 Research Assistant
University of Delaware, Newark, Delaware
- catalogued and stored archaeological artifacts

PROFESSIONAL AFFILIATIONS
American Society for Environmental History

SPECIAL SKILLS
Proficient with Microsoft Office Suite, DeedMapper and Citation reference software

HUNTER RESEARCH

Richard W. Hunter PRESIDENT
Ian C. Burrow VICE PRESIDENT

KATIE RETTINGER
Cartographer, B.A.

EDUCATION

B.A. Cartography, Chinese minor, Rutgers University, 2008

EXPERIENCE

2008-present — Cartographer
Hunter Research, Inc., Trenton, New Jersey

- creates maps and plans using ArcGIS
- generates field drawings (plans and profiles) using Adobe Illustrator
- produces high quality graphics for inclusion in technical reports

2008 — Intern
New Jersey Geological Survey, Ewing, New Jersey

- edited a map of the hydrologic unit codes in New Jersey in GIS
- contributed to research and cartographic representation of current and historic canals and water raceways of New Jersey

PUBLICATIONS

"A Survey of the Canals and Water Raceways of New Jersey," Co-authored with Jeffrey L. Hoffman and Ted Pallis, New Jersey History 124(1):107-115.

SKILLS

Proficient with ArcGIS, Adobe Illustrator CS2 and CS3, ERDAS Imagine, Microsoft Office Suite, SAS (Statistical Analysis Software)

Proficient in Mandarin Chinese

RICHARD W. HUNTER
President/Principal Archaeologist, Ph.D., RPA

EDUCATION

Ph.D., Geography, Rutgers University, New Brunswick, New Jersey, 1999.
Dissertation Title: *Patterns of Mill Siting and Materials Processing: A Historical Geography of Water-Powered Industry in Central New Jersey*

M.A., Archaeological Science, University of Bradford, England, 1975

B.A., Archaeology and Geography, University of Birmingham, England, 1973

EXPERIENCE

1986-present President/Principal Archaeologist
Hunter Research, Inc., Trenton, NJ

Founder and principal stockholder of firm providing archaeological and historical research, survey, excavation, evaluation, report preparation, historic exhibit development and public outreach services in the Northeastern United States. Specific expertise in historical and industrial archaeology (mills, iron and steel manufacture, pottery manufacture), historical geography, historic landscape analysis, historic interpretive design and public outreach products. Participation in:

- Project management, budgeting and scheduling
- Proposal preparation and client negotiation
- Hiring and supervision of personnel
- Supervision of research, fieldwork, analysis and report preparation
- Historic exhibit development, popular and academic publications and public presentations

1999-present Faculty Member, Certificate in Historic Preservation
Office of Continuing Education, Drew University, Madison, NJ

Courses: The Role of Archaeology in Preservation
25 Years of Public Archaeology in New Jersey

1983-1986 Vice-President/Archaeologist
Heritage Studies, Inc., Princeton, NJ

Principal in charge of archaeological projects. Responsibilities included:

- Survey, excavation, analysis, and reports
- Client solicitation, negotiation, and liaison
- Project planning, budgeting, and scheduling
- Recruitment and supervision of personnel

1981-1983 Principal Archaeologist
Cultural Resource Group, Louis Berger & Associates, Inc., East Orange, NJ

Directed historical and industrial archaeological work on major cultural resource surveys and mitigation projects in the Mid-Atlantic region. Primary responsibility for report preparation and editing.

1979-1981 Archaeological Consultant, Hopewell, NJ

1978-1981 Adjunct Assistant Professor, Department of Classics and Archaeology, Douglass College, Rutgers University, NJ

1978-1979 Research Editor
Arete Publishing Company, Princeton, NJ

Prepared and edited archaeological, anthropological, and geographical encyclopedia entries (*Academic American Encyclopedia*, 1980).

1974-1977 Archaeological Field Officer
Northampton Development Corporation, Northampton, England

Supervised archaeological salvage projects executed prior to development of the medieval town of Northampton (pop. 230,000).

Experience included:

- Monitoring of construction activity
- Supervision of large scale urban excavations
- Processing of stratigraphic data and artifacts
- Preparation of publication materials

1969-1970 Research Assistant
Department of Planning and Transportation, Greater London Council

SPECIAL SKILLS AND INTERESTS

- water powered mill sites
- canals and urban water powers
- iron and steel manufacture
- pottery manufacture
- historic cartography
- scientific methods in archaeology
- historic sites interpretation and public outreach

PUBLICATIONS

"On the Eagle's Wings: Textiles, Trenton, Textiles, and a First Taste of the Industrial Revolution." *New Jersey History* 124, Number 1, 57-98 [2009] (with Nadine Sergejeff and Damon Tvaryanas).

"The Historical Geography and Archaeology of the Revolutionary War in New Jersey." In *New Jersey in the American Revolution*, edited by Barbara J. Mitnick, pp.165-193. Rutgers University Press [2005] (with Ian C.G. Burrow).

"Lenox Factory Buildings Demolished." *Trenton Potteries* 6(2/3):1-19 [2005].

Fish and Ships: Lamberton, the Port of Trenton. New Jersey Department of Transportation and Federal Highway Administration [2005] (28-page booklet).

Power to the City: The Trenton Water Power. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet).

Rolling Rails by the River: Iron and Steel Fabrication in South Trenton. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet).

Quakers, Warriors, and Capitalists: Riverview Cemetery and Trenton's Dead. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet) (with Charles H. Ashton).

"Keeping the Public in Public Archaeology." In: *Historic Preservation Bulletin*, pp. 6-9. New Jersey Department of Environmental Protection, Division of Parks and Forestry, Historic Preservation Office [2004].

"A Coxon Waster Dump of the Mid-1860s, Sampled in Trenton, New Jersey." In: *Ceramics in America*, edited by Robert Hunter, pp. 241-244. University Press of New England [2003] (with William B. Liebeknecht and Rebecca White).

"The Richards Face – Shades of an Eighteenth-Century American Bellarmine." In: *Ceramics in America*, edited by Robert Hunter, pp. 259-261. University Press of New England [2003] (with William B. Liebeknecht).

"The Pottery Decorating Shop of the Mayer Arsenal Pottery Company." *Trenton Potteries* 4(2):1-7 [2003].

"Minutes of the Potters Union (Part 2)." *Trenton Potteries* 4(1):1-5 [2003].

"Minutes of the Potters Union (Part I)." *Trenton Potteries* 3(4):1-5 [2002].

"Eighteenth-Century Stoneware Kiln of William Richards Found on the Lamberton Waterfront, Trenton, New Jersey." In: *Ceramics in America*, edited by Robert Hunter, pp. 239-243. University Press of New England [2001].

"William Richards' Stoneware Pottery Discovered!" *Trenton Potteries* 1(3):1-3 [2000]. Reprinted in *Bulletin of the Archaeological Society of New Jersey* 59:71-73 [2004].

"Trenton Re-Makes: Reviving the City by the Falls of the Delaware." *Preservation Perspective* XVIII (2): 1, 3-5 [1999]

"Mitigating Effects on an Industrial Pottery." *CRM* 21(9):25-26 [1998] (with Patricia Madrigal).

From Teacups to Toilets: A Century of Industrial Pottery in Trenton, Circa 1850 to 1940, Teachers Guide sponsored by the New Jersey Department of Transportation, 1997 (with Patricia Madrigal and Wilson Creative Marketing).

"Pretty Village to Urban Place: 18th Century Trenton and Its Archaeology." *New Jersey History*, Volume 114, Numbers 3-4, 32-52 [Fall/Winter 1996] (with Ian Burrow).

Hopewell: A Historical Geography. Township of Hopewell [1991] (with Richard L. Porter).

"Contracting Archaeology? Cultural Resource Management in New Jersey, U.S.A." *The Field Archaeologist* (Journal of the Institute of Field Archaeologists) 12, 194-200 [March 1990] (with Ian Burrow).

"American Steel in the Colonial Period: Trenton's Role in a 'Neglected' Industry." In *Canal History and Technology Proceedings* IX, 83-118 [1990] (with Richard L. Porter).

"The Demise of Traditional Pottery Manufacture on Sourland Mountain, New Jersey, during the Industrial Revolution." Ch. 13 in *Domestic Potters of the Northeastern United States, 1625-1850.* Studies in Historical Archaeology, Academic Press [1985].

PROFESSIONAL AFFILIATIONS

Registry of Professional Archeologists (RPA) [formerly Society of Professional Archeologists]
(accredited 1979; certification in field research, collections research, theoretical or archival research)
Preservation New Jersey (Board Member, 1994 - 2003)
New Jersey State Historic Sites Review Board (Member, 1983 -1993)
Society for Historical Archaeology
Society for Industrial Archaeology
Society for Post-Medieval Archaeology
Historical Metallurgical Society
Council for Northeast Historical Archaeology
Archaeological Society of New Jersey (Life Member)

OTHER AFFILIATIONS

Trenton Downtown Association (Board Member, 1998 – present; Board Chair, 2007 - 2008)
Port of Trenton Museum Foundation (Board Member 2003 – present)
Hopewell Township Historic Preservation Commission (Member, 1998 - 2006; Chair 2003 - 2004)

J. Patrick Harshbarger
Senior Historian

Education

M.A., History and Museum Studies
University of Delaware, Hagley Program in Industrial History & Heritage, 1990

M.P.A., Public Administration
Florida International University, 1988

B.A., History, magna cum laude
Brown University, 1984

Affiliations & Memberships

Society for Industrial Archeology, Editor and Board Member

Vernacular Architecture Forum, Member

Society for the History of Technology, Member

Association for Preservation Technology, Member

Years of Experience	25
Years with Firm	18

PROFESSIONAL EXPERIENCE

Mr. Harshbarger is a historian and preservation planner with extensive experience in cultural resources management and interpretation including working with heritage corridors. He has worked on numerous projects surveying, evaluating, interpreting, documenting, and rehabilitating historic properties with a specialty in historic transportation, engineering, and industrial resources. Patrick is a nationally recognized authority on historic bridges and roadways. He regularly conducts field recordation and photography of buildings and structures, and understands how to read and interpret cultural landscapes. For the past 18 years, Patrick has been Senior Historian at TranSystems. He has advanced numerous transportation projects through the Section 106 and 4(f) regulatory processes, building an excellent track record of working with engineers, architects, planners, preservationists, and the public. During that time, he has conducted statewide historic bridge surveys in ten states and prepared histories of their state transportation departments, transportation systems (roads, canals, and railroads), and thousands of bridges. Prior to joining TranSystems, he worked as a museum and historic sites administrator for the Slater Mill Historic Site in Pawtucket, Rhode Island, a textile mill and machine shop. He also served two years as assistant to the Vice President of Florida International University, Miami, Florida, working primarily in the development of cultural and continuing education programming. Maintaining his interest in museums and historic sites, he frequently works on public interpretation and exhibit development, and he maintains a keen interest in educational outreach to the public. Patrick has designed exhibits, outdoor interpretive signs, and interpretive brochures/flyers. He has researched and written National Register of Historic Places Nominations and National Park Service HABS/HAER/HALS documentation projects,. He has been the national editor of the Society for Industrial Archeology Newsletter since 1996. Patrick meets the Secretary of the Interior's Professional Qualifications in History and Architectural History.

SELECTED PROJECTS

National Cooperative Highway Research Program Task 25-29A, Transportation Research Board. National Guidelines for Historic Road Corridors. Mr. Harshbarger is historian on the research team that is currently developing national guidelines for the evaluation and treatment of historic road corridors. He has been the primary author of the report's section on how to identify historic roads with a focus on using appropriate historic contexts to identify those specific features of the road that contribute to its historic significance and integrity. He has also been supporting the team's engineers in the development of rehabilitation options and treatments that meet current AASHTO guidance and the use of flexible values and context-sensitive solutions.

Lehigh Canal Lock #32, Delaware & Lehigh Canal Heritage Corridor, Special Purpose Study, Allen Township, Pennsylvania. Mr. Harshbarger was the historian to develop an interpretive plan for the lock and associated features including the site of a locktender's house, mule barn, ice house, and waste gate. The plan included identification and evaluation of historic features through field survey and research in historic maps and plans of the canal. The interpretation included recommendations for interpretive programs including outdoor signs, trail brochure, and guided tours, within the parameters established for the NPS-sponsored Delaware & Lehigh Canal Heritage Corridor. Mr.

Harshbarger assisted engineers with the development of appropriate treatments to stabilize the lock, canal prism, and towpath.

National Cooperative Highway Research Program, Task 25-25. Transportation Research Board. National Guidelines for Historic Bridge Rehabilitation or Replacement. Mr. Harshbarger was senior historian on the engineering-historian team that developed national guidelines for addressing the prudence and feasibility of replacing or rehabilitating historic bridges using the project development process and national best practices. AASHTO's subcommittee on bridges (i.e., all 50 state bridge engineers) unanimously endorsed the guidelines in 2008.

Lock #60 Interpretive Plan, Schuylkill River National Heritage Corridor, Mont Clare, Pennsylvania. Mr. Harshbarger was part of a multi-disciplinary team of architects, museum professionals, and historians who developed an interpretive plan for the Lock #60 locktender's house, lock, and towpath. The program included children's activities using model canal systems and outdoor activities. Also included were planning for the restoration of period rooms in the locktender's house, the development of a workshop for model-boat building, outdoor interpretive signage directed at hikers and bikers, and interpretation of canal-side features along a several mile-long reach of the historic canal, including adaptive re-use of one former canal-side building as a community arts gallery. Planning was for the private not-for-profit Schuylkill Canal Association coordinated within plans for the Schuylkill River National Heritage Corridor.

Delaware Historic Bridge Survey & Book. Mr. Harshbarger was historian for Delaware DOT's project to update its historic bridge inventory and was the editor-in-chief and historian for a book on the state's historic bridges and transportation contexts. The first phase of the project was preparing historic contexts and conducting research to determine the historic significance and integrity of bridges for National Register eligibility as part of Section 106 planning. The second phase of the project was compiling the information into a professionally designed, heavily illustrated, 278-page book directed at an audience of DelDOT employees and the general public to increase their appreciation of the state's bridges and transportation history including canals and railroads.

Architectural Historian Services, Maine Dept. of Transportation, Statewide. Mr. Harshbarger was the senior historian for an open-end contract with Maine DOT for Sec. 106, 4(f) identification and evaluation services. The contract included work on more than 40 highway improvement projects throughout the northern part of the state including preparing reports and survey forms in formats as specified by Maine DOT's and SHPO's policies and procedures for architectural survey, including mapping, photography, and justifiable eligibility evaluations. Hundreds of properties were surveyed including houses, commercial and industrial buildings, barns and agricultural outbuildings, and airports.

Historic Bridge Inventories & Management Plans, DE, GA, ME, MI, NC, NJ, PA, OH, SC, VT. Since 1991, Mr. Harshbarger has been the historian on statewide historic bridge inventories and/or management plans in ten states. Each of these projects has included the preparation of statewide historic contexts that are not just limited to bridge technology but place the bridges within larger historic transportation and landscape contexts, with a focus on the impact of automobiles and state highway systems from the 1910s to 1960s. The bridge inventories have also included an assessment of thousands of bridges within their settings for historic district status, based both upon review of National Register survey files and field work. This opportunity has given Mr. Harshbarger a wide-ranging appreciation for how to evaluate various landscapes from industrial to residential, from rural to urban, and from colonial to the recent past. In each of these efforts, he has become familiar with how state agencies in different states approach the application of the National Register criteria. He understands what works well in terms of the development of historic contexts and guidance for evaluating numerous alike resources, typical of mid-20th-century development. In most instances, the best approaches do not simply recount history, but distinguish that which is significant from that which is not, and then relate it to the physical fabric identified through survey and field work.

Interpretive Plan, Upper Raceway, Great Falls National Historic Landmark District, Paterson, New Jersey
Mr. Harshbarger was a member of the team that developed planning for the rehabilitation of the Upper Raceway and the primary author of the interpretive plan making recommendations for signage, tours, and activities for the park and its buildings on the primary theme of waterpower.

Ohio DOT Cultural Resources Services, Statewide

Mr. Harshbarger is currently the historian on a team for on-call services, which will include an update to ODOT's historic bridge inventory for bridges built through 1961 and a historic bridge management plan. Mr. Harshbarger has also undertaken architectural surveys for Ohio DOT, including an Amish rural landscape as part of the construction of a buggy way.

NATIONAL REGISTER NOMINATIONS

Route 1 Extension (Pulaski Skyway), Hudson County, N.J. [historic road corridor]
Michigan's Prestressed Concrete Bridges, Multiple Property
Metal Truss Bridges of Somerset County, N.J., Multiple Property

INTERPRETIVE SIGNS & PLAQUES

Garrettsville Downtown Historic District, Ohio Historic District Outdoor Interpretive Sign. Ohio Department of Transportation.
Great Falls Hydro-electric Plant Powerhouse, Outdoor Interpretive Signs and Take-home Flyer. Paterson Municipal Utilities Authority, Paterson, N.J.
Lusted Road Metal-Truss Bridge, Historic Bridge Plaque Design, Clackamas County, Ore., Clackamas County Engineer.
Pavonia Streetcar Line. Outdoor Interpretive Sign, Jersey City, N.J. for the New Jersey Department of Transportation.

HISTORIC INTERPRETIVE PLANS

Allied Textile Printers Site (Colt Gun Mill & Waterpower System), Paterson, N.J. N.J. Department of Environmental Protection.
Bartram's Garden, Fairmount Park Commission, Philadelphia, Pa.
Great Falls Hydroelectric Station, City of Paterson, N.J.
Green Bank Mill Historic Site, Newport, Del.
Iron Hill Museum. Iron Hill Museum Board of Directors, Newark, Del.
Lukens Steel Company, Coatesville, Pa.
Lukens Steel Company, Finding Aid for Collecting for the Future Museum of American Steel, Coatesville, Pa.
Old Fort Bedford, Bedford [Pa.] Historic Society.
The 1719 William Trent House, Trenton, N.J.
Washington's Crossing State Park. Pennsylvania Historical & Museum Commission, Bucks County, Pa.

HISTORIC EXHIBITS

"Explosive Science." Gunpowder Testing Equipment Exhibit. Hagley Museum & Library, Wilmington, Del. [research, design, and installation]
"Goods for Everybody," Trade Catalogue and Artifacts Exhibit, Hagley Museum & Library, Wilmington, Del. [research, design, and installation]
Mifflinburg Buggy Museum. Permanent Orientation Exhibit. Mifflinburg, Pa. [research and design]
Rawson Road Historic Metal Truss Bridges. Design and Fabrication of Exhibit Installed in the Cumberland County Courthouse. Rhode Island Department of Transportation.
Somerset County Agricultural History Exhibit Plan. Somerset County [Pa.] Historical Society. [research and design]
Trent House Museum Orientation Exhibit, the 1719 William Trent House, Trenton, N.J. [research and design]
Zook Farmhouse, History Exhibit, Exton Mall & Exton Chamber of Commerce, Exton, Pa. [research and design]

HISTORIC DOCUMENTATIONS

14th Street Steel Truss Viaduct. Historic Recordation and Community Participation in Context-Sensitive Design, Hoboken, N.J. Hudson County Freeholders.

Adams Street Arch Bridge, Troy, Ohio. Ohio Department of Transportation.
Railroad Passenger Car No. 102. [1887 Wood Passenger Car]. Delaware Historical Society, Wilmington, Del.
Collingswood Traffic Circle, Camden, N.J., N.J. Department of Transportation.
Crossways Place Historic Steel Girder Bridge Documentation, New Jersey Transit.
Double Trouble [N.J.] Cranberry Bog, Separator & Cleaning House, Historic Documentation of Machinery.
Historic Haupt Cast- and Wrought-Iron Metal Truss Bridge Documentation, Ardmore, Pa. Pennsylvania Department of Transportation.
Steel Girder Bridge 68, Rockland, Del., Delaware Department of Transportation.
Lukens Steel Workers' Cooperative Store, Huston Foundation, Coatesville, Pa.
Massachusetts Historic Bridges Project, Historic American Engineering Record of the National Park Service, Massachusetts Highways Department & Harvard University School of Design, Boston, Mass.
Oak Tree Road Steel Girder Bridge. Rockland County (N.Y.) Engineers Office.
Ocean City-Longport Bascule Bridge. Cape May County (N.J.) Engineers Office.
Oldsmobile Car Dealership, Art Deco Showroom, Wilmington, Del.
Red Top Reinforced-Concrete T Beam Bridge, Historic Documentation. Arizona Department of Transportation.
Route 1/9 (Pulaski Skyway), America's First Superhighway, Historic American Engineering Record Documentation, Jersey City-Newark, N.J., New Jersey Department of Transportation.
Thomas Grist Mill. Exton (Pa.) Township.

PUBLICATIONS

National Guidelines for Historic Bridge Rehabilitation or Replacement. Washington, D.C.: National Cooperative Highway Research Program/Transportation Research Board, Mar. 2007. [Published by the American Association of State Highway Officials in 2008.]
Society for Industrial Archeology Newsletter, Editor. Mr. Harshbarger has been the editor of the SIA's quarterly newsletter editor since 1996. The SIA, with more than 1,800 members, is an organization dedicated to the interpretation and preservation of the industrial heritage in the U.S. and Canada. In his capacity as newsletter editor, he has become familiar with the issues and challenges associated with survey, evaluation, and interpretation of industrial and engineering sites throughout North America.
"Defining Historic Roads." Proceedings of the 6th Preserving the Historic Road in America Conference. Albuquerque, N.M., 2008.
"Two Pioneering American Motorways." Engineering History and Heritage. [Forthcoming, accepted for publication, September 2009.]
"Strategies for Historic Evaluation of Standard Highway Bridges, 1920-1960." Proceedings of the Preserving the Recent Past 2 Conference, Philadelphia, October 2000.
"So Your Dualized Highway is 50 Years Old? Is It Historic?" Proceedings of the Preserving the Historic Road in America Conference. Morristown, New Jersey, April 2000.
Editor and Historian, Delaware's Historic Bridges: Survey and Evaluation of Historic Bridges with Historic Contexts for Highways and Railroads. 2nd Ed. Revised. Dover: Delaware Department of Transportation, 2000.
Editor. "Abstracts of American Truss Bridge Patents, 1817-1900." Society for Industrial Archeology, 2009.
"Defining Historic Roads." Proceedings of the 6th Preserving the Historic Road in America Conference. Albuquerque, N.M., 2008.
"Metal Truss Bridges and Their Builders in Historical Perspective: Some Thoughts from A Case Study of the Phoenix Bridge Company." Spans of Time. Ithaca, New York: Historic Ithaca, 1999.
Robert John Prowse, New Hampshire State Bridge Engineer. New Hampshire State Historic Preservation Monograph Series. 2009.

Ingrid Wuebber

Research Historian

Areas of Expertise

Section 106 of the National Historic Preservation Act
Historic Preservation
Research
Public Outreach

Years of Experience

With URS: 10 Years
With Other Firms: 19 Years

Education

B.A./1979/Douglass College, Rutgers University/Archaeology

Overview

Ms. Wuebber has over 25 years experience researching, analyzing, and writing contextual and site-specific histories for industrial, military, transportation, commercial, and residential properties in the Northeast, Mid-Atlantic, Southeast, and Midwest.

Project Specific Experience

Route 21 Cultural Resources Mitigation, Passaic County, New Jersey. Public outreach program included a museum display, walking tour brochure and high school history curriculum unit. Researched and wrote walking tour brochure for an ethnically diverse industrial neighborhood in Passaic. For the New Jersey Department of Transportation.

Monograph on Robert J. Prowse. Researched and co-authored monograph on noted New Hampshire bridge engineer active with the state's bridge division between 1933 and 1969. For the New Hampshire Department of Transportation.

Phase II Archaeological Study for the Replacement of the Dover-Milton Road Bridge (County Bridge 930) Jefferson Township, Morris County, New Jersey. Study of nineteenth century mill complex in the village of Milton. Conducted for the Morris County Division of Engineering.

Multi-Modal Transportation History Study, Borough of Washington, Warren County, New Jersey. Historical study of the various modes of transportation that affected the development of a large town in northwestern New Jersey. The study included an architectural survey of historic transportation-related resources. For the New Jersey Department of Transportation.

Cultural Resource Tasks, FERC Relicensing of Muddy Run Pumped Storage Project and Conowingo Hydroelectric Project, Pennsylvania and Maryland. Historian, documented cultural resources (architectural and archaeological resources) in PECO-owned land using textual, cartographic, and photographic research for contextual write-up. Work conducted for Exelon.

Woodrow Wilson Bridge Project, Jones Point Park, Alexandria, Virginia, conducted for the Federal Highway Administration, Virginia Department of Transportation and the National Park Service. Research Historian for Phase III research and report preparation for over 200 years of history involving Jones Point, site of a rope walk and shipworks.

U.S. 130, Craft's Creek Bridge, Burlington County, New Jersey. Study of roadway and roadside resources along a three-mile section of an early state highway, formerly an integral part of the transportation corridor along the East Coast. For the New Jersey Department of Transportation.

Historic Structure Report, Liberty Island Seawall, Statue of Liberty National Monument, New York, New York, conducted for the National

Park Service, Denver Service Center. Research Historian responsible for documentary, cartographic and photographic research for preparing the historical background, context, and chronology of development and use of the seawall built to protect Fort Wood.

Phase IA Archeological Investigation, Rehabilitate Battery Weed Seawall and Dock, Fort Wadsworth Unit, Gateway National Recreation Area, Staten Island, New York, conducted for the National Park Service, Denver Service Center. Research Historian responsible for documentary, cartographic and photographic research for Battery Weed in Fort Wadsworth, Staten Island, New York. Battery Weed, a casemated fort and submarine mining operation.

Modified Phase IA Cultural Resources Inventory, Floyd Bennett Field, Jamaica Bay Unit, Gateway National Recreation Area, Brooklyn, New York, conducted for the National Park Service, Denver Service Center. Research Historian responsible for documentary, cartographic and photographic research for developing a cultural resources inventory. Wrote the historical context for the municipal airfield, once an industrialized island devoted to waste management.

Raritan River Crossings Historic Study, Middlesex County, New Jersey. Conducted background research for history of all types of crossings between Raritan Landing and Raritan Bay. For the New Jersey Department of Transportation.

Route 9A Reconstruction Project, New York, New York. Historian for a contextual study of 19th-century manufacturing sites along Manhattan's West Side. Report prepared for the New York State Department of Transportation in cooperation with the Federal Highway Administration and The City of New York.

Edison National Historic Site, West Orange, New Jersey. Ethnographic overview and assessment for the Thomas Edison National Historic Site. For the National Park Service.

Professional Societies/Affiliations

Society for Industrial Archaeology – National, Roebling Chapter and Oliver Evans Chapter
New Jersey Archaeological Society
National Genealogical Society

Chronology

1999–present: URS Corporation
1983–1999: Louis Berger

Appendix G

PROJECT ADMINISTRATIVE DATA

APPENDIX G

Project Administrative Data

HUNTER RESEARCH, INC.
PROJECT SUMMARY

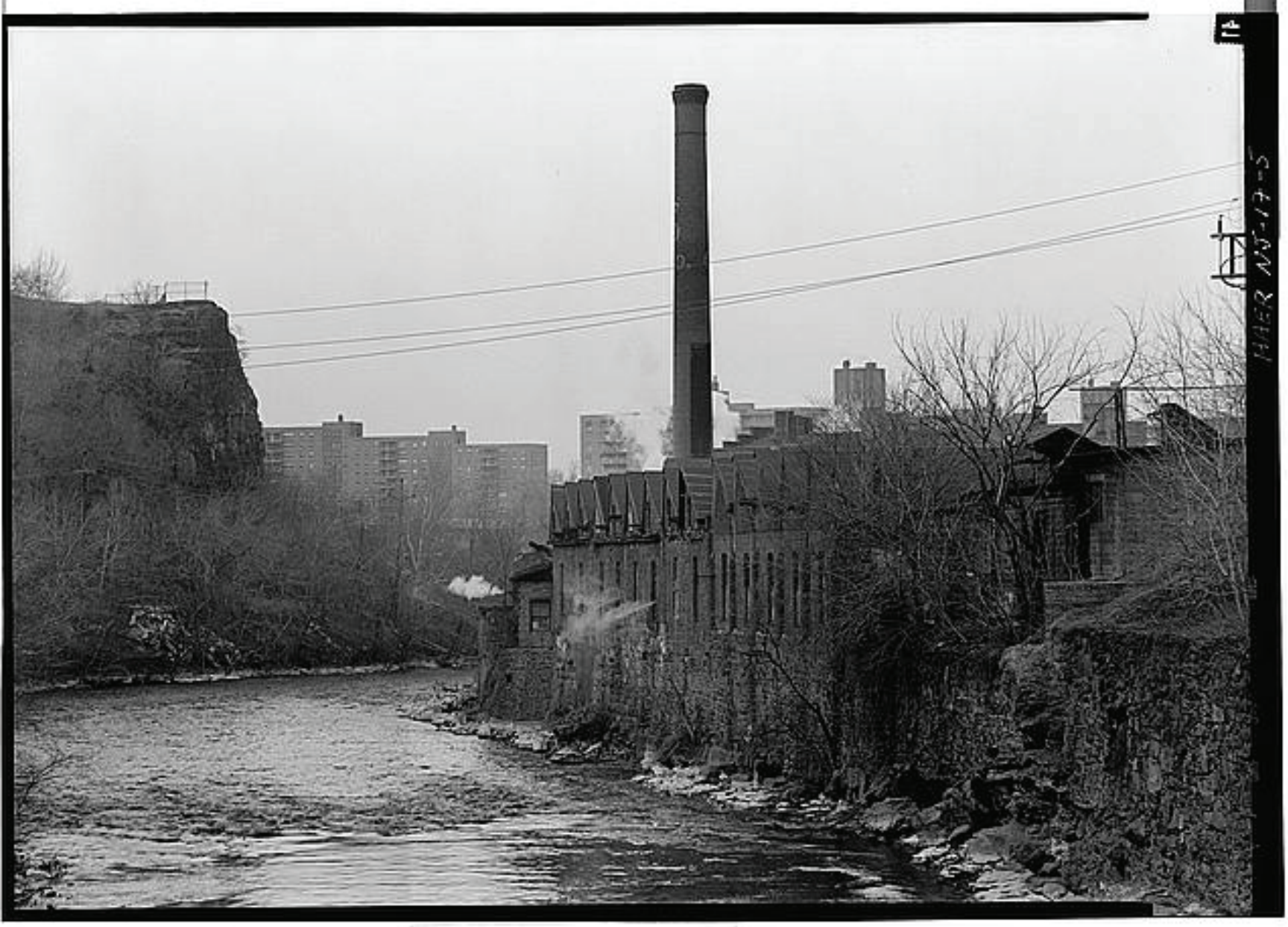
Project Name:	Factories Below the Falls: Paterson's Allied Textile Printing Site in Historic Context, City of Paterson, Passaic County, New Jersey
Level of Survey:	II
HRI Project Reference:	09032
Date of Report:	September 2010
Client:	New Jersey Department of Environmental Protection
Prime	Farewell Mills Gatsch Architects
Review Agency:	New Jersey Historic Preservation Office
Agency Reference:	
Artifacts/Records Deposited:	n/a

PROJECT CHRONOLOGY

Date of Contract Award:	9/1/2009
Notice to Proceed:	9/1/2009
Background Research:	September 2009 to September 2010
Fieldwork:	n/a
Analysis:	n/a
Report Written:	November 2009 to January 2010, September 2010

PROJECT PERSONNEL

Principal Investigator(s):	Richard Hunter, Damon Tvaryanas**GG**
Background Researcher(s):	Cheryl Hendry
Field Supervisor(s):	n/a
Field Assistant(s):	n/a
Analyst(s):	n/a
Draftperson(s):	Kaite Rettinger, Marjan Osman, Melody Lee-Imhof
Report Author(s):	Damon Tvaryanas, Cheryl Hendry, Richard Hunter, Patrick Harshbarger (TranSystems), Ingrid Weber (URS Corporation)



Conservation Solutions Inc.
ETM Associates
Hunter Research Inc.
TranSystems
URS Corporation

200 Forrestal Road
Princeton, NJ 08540
T 609.452.1777
F 609.452.7192
www.fmg-arch.com

FMG
Farewell Mills Gatsch
architects LLC