

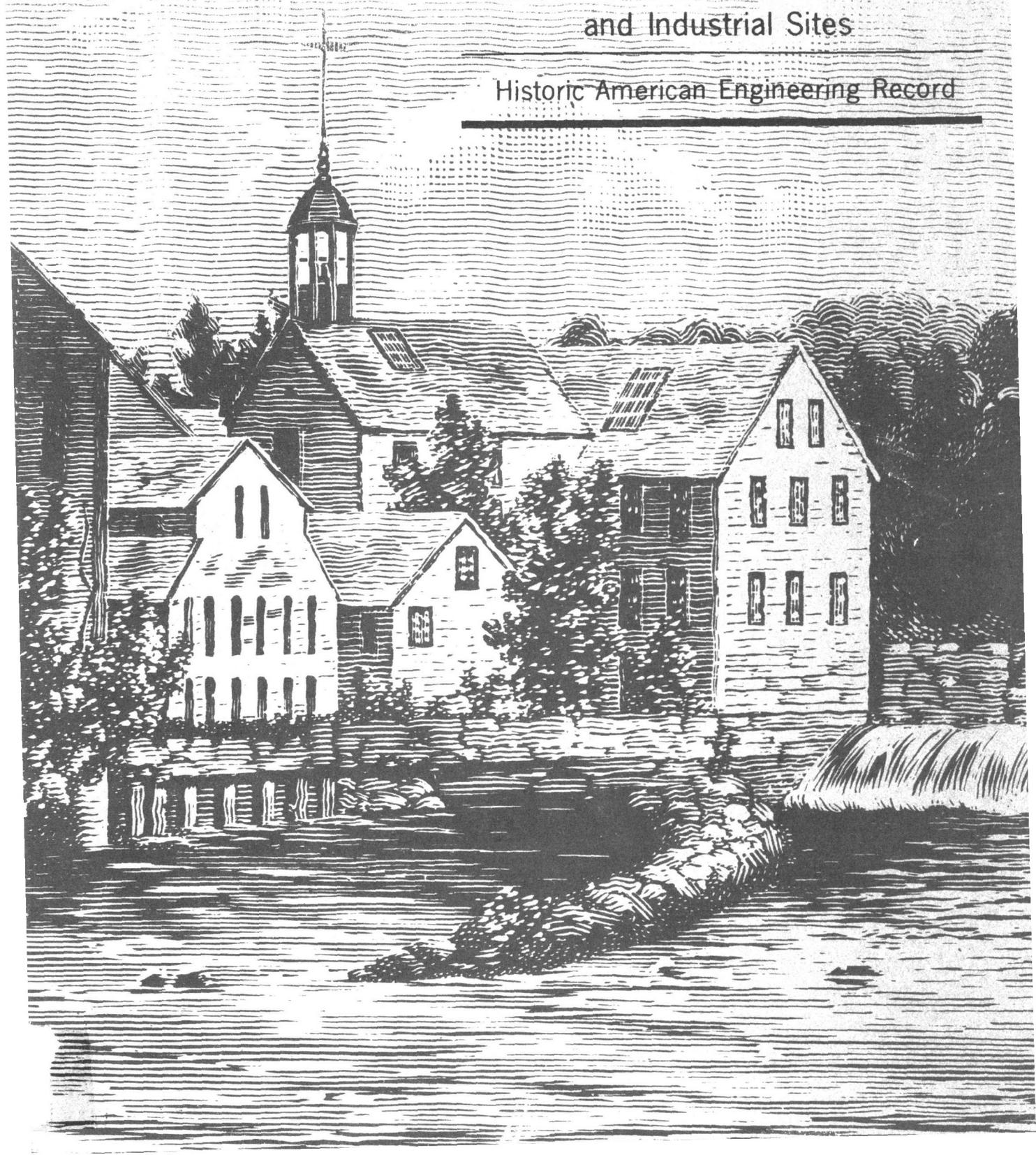
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RHODE ISLAND

An Inventory of Historic Engineering
and Industrial Sites

Historic American Engineering Record



RHODE ISLAND

An Inventory of Historic Engineering and Industrial Sites

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Written by: Gary Kulik and Julia C. Bonham

Editorial Assistance Provided by: Rhode Island
Historical Preservation Commission

This document is a copy of the original survey published in 1978.
It has not been corrected or updated.

Since the original publication:

- >additional properties have been entered on the National Register;
- >some financial incentives referred to in these pages are no longer available;
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U. S. Department of the Interior
Heritage Conservation and Recreation Service
Office of Archeology and Historic Preservation
Historic American Engineering Record
1978

The Rhode Island Historical Preservation & Heritage Commission is your state agency for historical preservation. The Commission identifies and protects historic buildings, districts, landscapes, structures, and archaeological sites throughout the State of Rhode Island.

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Cover: Old Slater Mill and Dam (c.1840)
Illustration Courtesy of the Slater Mill Historic Site

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THE HAER INVENTORY PROGRAM

The objectives of the HAER inventory are threefold. (1) It is the initial step in the HAER documentation process; historic engineering and industrial sites in a given geographic and political area are located and identified; (2) it assists states in evaluating these historic resources for planning purposes and for potential nominations to the National Register; and (3) it establishes a context for evaluation by the Office of Archeology and Historic Preservation of the historic engineering and industrial sites nominated by the states to the National Register, or for determinations of eligibility to the National Register of Historic Places.

HAER joins state and/or local organizations to conduct the review of an area's historic engineering and industrial resources. Agencies or individuals under HAER supervision complete a standardized inventory card for each site. In addition to photographic documentation and a narrative which recounts a brief history and significance of the site, the inventory includes basic descriptive information, such as location, ownership, date of construction, and physical condition.

When organizing an inventory, HAER often agrees to publish the information. Cosponsors are responsible for content as well as the camera-ready copy; HAER prepares the finished copy for processing by the Government Printing Office. The published inventory, available to the general public, is used in educational institutions to study technological, industrial, and engineering history, historic preservation, the history of urban planning, and urban geography. Published inventories are also distributed to state, county, and local planning offices, libraries, and preservation agencies. The HAER inventories thus expand the awareness of engineering and industrial history, demonstrate consistent methods of identification and evaluation, and stimulate public interest in a significant part of our American heritage.

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PREFACE

In the summer of 1975, the Slater Mill Historic Site and the Historic American Engineering Record (HAER) undertook to inventory the historically significant industrial and engineering sites of Rhode Island. The Slater Mill Historic Site provided office space for the project and its Curator, Gary Kulik, assumed the role of project director. The Historic American Engineering Record, a branch of the Office of Archeology and Historic Preservation, Heritage Conservation and Recreation Service, provided a share of the financial costs and offered both general and specific guidelines developed in the course of its national program of inventories. During the project, a close working relationship developed between the Rhode Island-HAER staff and the staff of the Rhode Island Historical Preservation Commission, the state agency responsible for preservation management and for research on Rhode Island's historic structures. This relationship was formalized in 1977 when the Commission agreed to provide clerical assistance, to share in publication costs, and to review the final manuscript.

The first stage of the project was the recording of individual sites on standardized inventory cards provided by HAER. Each card, which is kept on file in the HAER office, includes a brief history and description of the site, its location, the name of its current owner, photographs, a sketch map, and references. Locating each site was made more precise by the use of Universal Transverse Mercator (UTM) grid coordinates. This is a fifteen-digit reference which includes a global zone number, an east-west measurement and a north-south measurement.

The second stage of the project involved the transfer of the information contained on each card to the format found in this publication. The sites are first arranged by city or town and are then grouped according to HAER's Industrial Classification System. Each entry displays a heading consisting of seven elements. On the left side, the reader will find, in descending order, the name of the site along with the date of the earliest structure still standing on the site, a street address or geographic location, and the city or town. On the right hand side are listed, again in descending order,

the name of the United States Geological Survey map on which the site is located, the UTM reference, and the county. The text follows beneath the heading and references are listed beneath the text.

The sites selected for inclusion represent the varied industrial fabric of Rhode Island. The inventory includes a substantial number of surviving textile mills, as well as historically significant base-metal works, utilities, bridges, railroad-related structures, lighthouses, and an assortment of other industrial and engineering sites. In general, closest attention was paid to the earliest sites. Efforts were made to include all of the known seventeenth- or eighteenth-century sites, particularly the state's grist mills and sawmills, and the early nineteenth-century textile mills and machine shops. Otherwise, principles of selection varied. Many sites were included because they were nationally prominent, i.e., Corliss Steam Engine Works and Brown & Sharpe; because they were the largest of their kind; i.e., Union Wadding and Pawtucket Hair Cloth; because they were representative of the state's industrial base, such as the sites on the Warren waterfront; because they included important operating equipment, i.e., Pawtucket Pumping Station Number 4 and Grants Mill; or were part of largely intact mill communities i.e., Forestdale Mill and Lafayette Mill. Other sites were listed because they were important in business or technological history, i.e., the Ashton Mill and the Providence Tool Company; because their construction exhibited important engineering techniques, i.e., the Providence Station Viaduct and the Old Harbor Breakwater; because they were built by prominent engineers or architects, i.e., the Providence & Worcester Freight Station and the King Street Bridge; or because they are the earliest or most important state examples of particular industries, i.e., the Royal Mill in Pawtucket and R. & G. Cushman; or of particular, and relatively common, engineering forms, i.e., the United Wire and Supply Company and the Barrington Bridge. Consequently, the inventory has both a national and a local focus, and its primary purpose is to present a full range of Rhode Island's contributions to industrial and engineering history

The project director and senior author was responsible for the research and writing of the vast majority of sites in Pawtucket, Central Falls, Woonsocket, Smithfield, North Smithfield, Cumberland, Lincoln, Johnston, Cranston, East and North Providence, Glocester, Burrillville, Scituate, Warwick, West Warwick, Coventry, East and West Greenwich, Newport, Portsmouth, Tiverton, Little Compton, Jamestown, and for selected sites in Providence, Westerly, Bristol, New Shoreham, North and South Kingstown, Narragansett and Richmond. In addition the project director provided supplementary information for other sites, rewrote a number of other entries, and assumed the role of project photographer from 1976 to 1977. Julia C. Bonham of Brown University was responsible for the research and writing of a majority of the site descriptions in Warren, Bristol, Providence, Hopkinton, Westerly, and Richmond, and for selected sites throughout Washington County. In addition, she served as project photographer from 1975 to 1976, assisted in the editing of many of the entries, and shared in the necessary fieldwork. Patrick M. Malone, Director of the Slater Mill Historic Site, wrote the site descriptions for the Rhode Island Lace Works, the Mouscochuck Canal, the Standard Oil Company, the Queen's Fort, and the New England Wireless and Steam Museum, alerted the staff to a number of other sites, and freely offered his experienced advice and valued assistance throughout the course of the project. His constant collaboration has substantially enriched the inventory. John Abbott, formerly of Brown University, wrote initial drafts of the entries for Grants Mill, Union Station, and the Bridge Mill Power Plant.

The staff of the Rhode Island Historical Preservation Commission, under the direction of Eric Hertfelder, offered the benefit of their research and field experience, and also wrote initial drafts for a number of sites. David Chase, Deputy Director, wrote drafts of the Abbott Run, Church Street, Mill Street, Peacedale, Governor Sprague, Whipple, Broad Street, Washington, Standard Oil, Harrisville, Globe, Bernon, and Court Street Bridges; of the Peacedale Railroad Trestle, the A. T. Wall Building, the Doran-Spiedel Building, and of the What Cheer Garage. He also offered generous amounts of his time, suggested additional sites, corrected mistakes, and, in general, improved the quality

and coverage of the inventory. Susan Dynes provided advice on the Harrisville Mill and did the UTM coordinates for many of the additional sites. Robert W. Freeman provided important new information on a number of Cranston sites and wrote a draft of the Rhode Island Company Trolley Barn. Pamela Kennedy willingly shared information from her survey of Central Falls. Vivienne Lasky offered advice on Coventry and North Providence and wrote drafts of the Nasonville, Point Street, and Roosevelt Avenue Bridges; the Scituate Reservoir; the U.S. Gutta Percha Paint Company; the Pawtucket-Central Falls Railroad Station; and the United Wire and Supply Company. She also compiled information on a number of early twentieth-century bridges from the State Department of Transportation. Frederick R. Love wrote drafts of the Pawtuxet River Railroad Bridge and the bridges and transportation sites of Westerly and advised on a number of railroad and bridge sites in Providence. Ancelin Lynch provided information from her research of Foster. Bernard J. Mendillio read the entries and offered advice on style and grammar. Walter Nebiker arranged for a research trip to New Shoreham, advised on North Smithfield, and wrote drafts of the lighthouses at Sakonnet Point, Prudence Island, Conimicut, Pomham Rocks, and Warwick Neck; of the Woonsocket Reservoir Number 3 Dam; of Providence Harbor; of Slatersville Bridge; and of the bridges at Portsmouth. He also alerted me to the Perry/Carpenter Mill. Stephan J. Roper graciously shared research from his survey of Pawtucket. Edward Sanderson wrote a draft of the Earle Warehouse based on new research. Patricia Sheehan wrote drafts of the Herreshoff Company and Fort Adams while adding new information and correcting some initial errors. Elizabeth S. Warren wrote drafts of the "Old Dye House," Old Forge/Marble's Hall, and Atwood's, Gardner and Brown's, and J.J. Smith's Warehouses in Warren. Ellen Weiss shared her research on North Kingstown and contributed to a rewriting of the Shady Lea Mill. William McKenzie Woodward offered advice on the Dyerville Mill and, along with Susan Dynes, did the UTM coordinates for the additional sites suggested by the RIHPC. Julie Driscoll typed a draft of the manuscript and Paula Paquette typed the final copy. The project owes a large debt to both for their patience, skill, and conscientious work.

Throughout the course of the project, the HAER office provided critical guidance and support. HAER's continuing commitment insured the successful completion of the project. I wish to personally thank both T. Allan Comp and Eric Delony of the HAER office for their advice and encouragement. I also wish to thank Patrick Malone; David Chase; T.E. Leary, the director of HAER's Western New York Inventory; Barbara Melosh, Brown University; and T. Allan Comp, for reading and commenting on the introduction. T.E. Leary and Patrick Malone also read the full manuscript prior to publication and made a number of important suggestions and corrections. Needless to say, the final responsibility for errors of omission and commission lies with the authors.

Many others throughout the state contributed to the inventory, sharing willingly of their time and knowledge. Most are listed in the references for individual sites, but a few deserve special mention. I would like expressly to thank Michael Curtin, Walter Pulawski, Richard Longstreth, William Slater Allen, Virginia Innis, Elinor Larson, Joseph Conforti, Marsha Peters, Ruth DeAngelis, Dr. A.P. Thomas, Doreen Kramer, Robert Downie, the staff of the Gilbert Stuart Memorial and the members of the East Greenwich Preservation Society. I would also like to thank Marilyn Van Buskirk, who developed a number of the project's early photographs as well as all the current photographs which appear in this volume.

The largest part of the research was done at the Slater Mill Historic Site and at the Pawtucket Public Library. I owe a special debt to the staff of the latter institution for their kind and willing cooperation. Research was also done at the Rhode Island Historical Society, where Director Albert Klyberg graciously waived the customary use fees, at the Brown University libraries, at the Merrimack Valley Textile Museum, North Andover, Massachusetts, and at the public libraries of Providence and Westerly. The Providence Public Library contains a very valuable collection of textile mill and mill village photographs completed for the WPA in 1940. HAER provided a brief number of survey sheets completed for its New England Inventory, 1974, and the Rhode Island Historical Preservation Commission provided access to National Register and National Landmark forms, as well as its own survey sheets. The Allendale Mutual Insurance Company, Johnston, Rhode Island, and the Factory Mutual Engineering Corporation, Norwood, Massachusetts, both branches of the Factory Mutual System, graciously opened their collection of historic insurance records,

and made available a number of copies of insurance drawings. This was a major contribution to the inventory since it enabled the authors more precisely to describe and date many of the state's textile mills and factories. The State Department of Transportation, Bridge Design Section, willingly opened its files on the state's bridges, and the Planning Division of the State Department of Natural Resources made its files on dams freely available. I also wish to thank Richard Candee, formerly of Old Sturbridge Village, Sturbridge, Massachusetts, for making available the research files from his "Vernacular Architectural Survey of New England Mill Villages, 1790-1840," funded by the National Endowment for the Humanities.

Gary Kulik
Pawtucket, R.I.

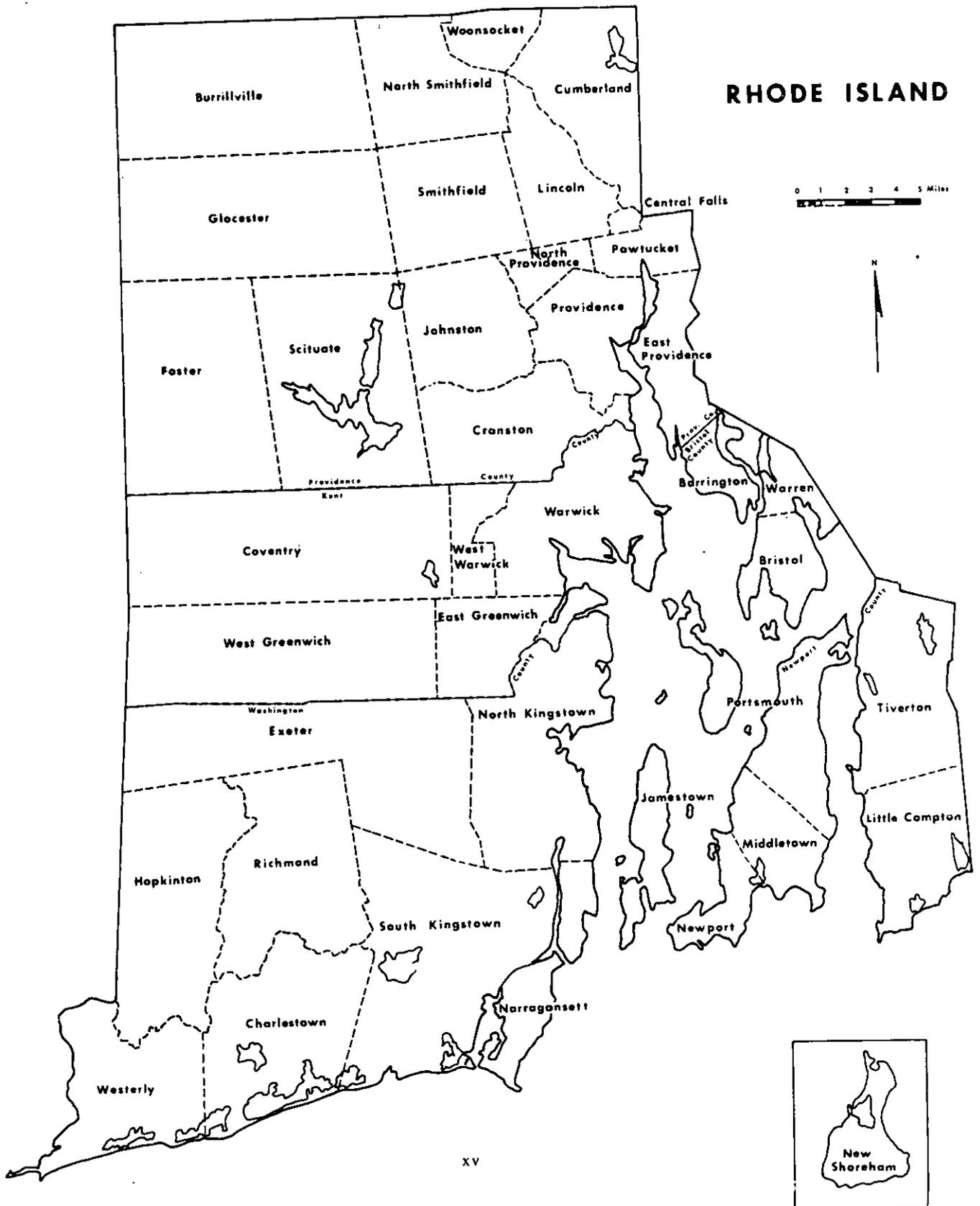
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RHODE ISLAND



INTRODUCTION

Rhode Island, the smallest state in the union, has had a long and impressive industrial history. It is a history with its origins in Indian artisan skills and in the transplanted talents of English stonemasons, millwrights, millers, shipbuilders, and iron-makers. Organized for most of two centuries around agriculture and maritime trade and the crafts they fostered, Rhode Island's economy emerged to national importance in the period from 1780 to 1820. Drawing on the skills of Pawtucket iron-makers, the capital of Providence merchants, and the experience of English immigrant Samuel Slater, the nation's water-powered textile industry got its start in Rhode Island in 1790. Slater's introduction of the Arkwright system of carding and spinning carried with it the seeds of the new factory system and fundamentally transformed the nature and scale of American life. From 1790 to the early 1950s, the textile industry, in its cotton, woolen, worsted, lace, silk, and synthetic branches, dominated Rhode Island's economic life. For over a century, its only serious rivals were the base and precious metals industries of Providence. The decline of the textile industry, which occurred throughout New England from roughly 1920 to 1955, curtailed Rhode Island's industrial prominence. The physical reminders of Rhode Island's industrial history; its textile mills, machine shops, transportation structures, dams and power canals, survive in substantial number throughout the state. The purpose of this introduction is to provide the connecting threads which link the individual site descriptions to the main contours of the state's industrial history.

AGRICULTURE, IRON-WORK, AND MARITIME TRADE

Only forty-eight miles long and thirty-seven miles wide, colonial Rhode Island consisted of a network of islands and inlets, a long and largely protected sea-coast, and a narrow strip of fertile land along the western shore of Narragansett Bay. Though there was also fertile land on the islands of Aquidneck and Conanicut, one did not have to go very far inland before the land turned hilly and rocky. For almost 200 years, Rhode Island's economic life centered on the sea and the

coastal plain. Proximity to the sea and the existence of several natural and sheltered ports gave rise to shipbuilding and maritime trade. Fertile coastal land, with the natural barriers of sea, salt marsh, and pond to protect against the bands of ravaging wolves which so afflicted other New England colonies, spurred the development of a commercial agriculture based on grain and livestock.

Rhode Island's industrial growth rested centrally on the artisan skills of the colonial housewright, miller, and blacksmith; skills which were fostered by an agricultural economy. The need for lumber, grain, scythes, and other iron tools and implements led to the building of water-powered sawmills and grist mills on the colony's swift rivers, wind-powered grain mills in Newport County, and the colony's first iron works at Pawtucket Falls. Of these seventeenth-century structures, only the remains of Newport's Old Stone Mill, built as a tower windmill in the 1670's, continue to stand. Most of Rhode Island's other surviving grist mills and sawmills were built in the eighteenth or early nineteenth centuries. The grist mill at Peckham Farm, Gloucester, for example, is part of an eighteenth-century farmstead with dwelling, outbuildings, and the surviving foundation of an up-and-down sawmill, set on characteristically rocky and sloping land. The buildings and setting provide a sense of the scale of eighteenth century rural life and reflect the period's close connection between farmers' and artisans' skills. Other eighteenth century grist mills survive at the Gilbert Stuart site in North Kingstown and on Moonstone Beach Road in South Kingstown. Up-and-down sawmills, incorporating the principles of the innovative millwright Oliver Evans, continue to stand at Grants Mill in Cumberland and at Greene Village in Coventry. In the southern half of the state, three smock windmills are extant; one on Conanicut Island, built in 1787; two on Aquidneck Island, in Portsmouth, built in the early nineteenth century.

The agricultural economy also fostered the skills of other artisans; tanners, coopers, weavers, masons, and ship carpenters. The colony's agricultural surplus had to be transported to market and seventeenth-century shipbuilders constructed shallops, pinnaces, and small barques at Portsmouth, Newport, Westerly, and Wickford. Rhode

Island's housewrights and masons used local lime mortar, some of which was extracted and processed at "Dexter's Lime Rocks," near the headwaters of the Moshassuck River in the present town of Lincoln. The site, once publicly owned, is still used as a lime quarry and is perhaps the oldest quarry in continuous operation in the United States.

Throughout the eighteenth century, local artisans built and operated iron furnaces. Using the ore deposits of Cumberland and Cranston, iron-makers were active in the present day area of Manville, in Cumberland, at Pawtucket Falls, in Warwick, and at Hope. The best known of these efforts was that at Hope, a furnace financed by the Browns of Providence. Archeological investigations here have yet to reveal significant remains, and no excavations have been made at other sites. At Hope, the Browns produced pig iron for sale to English and colonial ironmasters. Other furnaces cast holloware, cannon for the colonial wars, anchors, and ship hardware. Because of the scarcity of skilled labor, the low quality of Rhode Island ores, and competition from Pennsylvania and European furnaces in the late-eighteenth century, Rhode Island's blast furnaces never became nationally important. Quite the opposite was true of Rhode Island's iron fabricating industries.

With the migration of the Wilkinson family from Smithfield to Pawtucket in the 1780s, Pawtucket Village became one of the most important industrial areas in the United States. The Wilkinsons, a family of skilled blacksmiths, forged anchors, molded and turned the large iron screws used in fish and linseed oil works, manufactured cannon (cast solid and bored out with water power), and cast and finished the iron work for early textile machinery set up in Providence and East Greenwich. David Wilkinson, who made the castings for Slater's first carding machines, went on to become the American inventor of the industrial lathe, to experiment with early steam power generation, and to build the power loom which eventually dominated the early nineteenth-century textile industry. In company with the Jenks family, who had been active local iron-makers and fabricators since the mid-seventeenth century, the Wilkinsons critically assisted the development of the textile industry and trained the first

generation of New England's textile machinery makers, just as Samuel Slater trained the first generation of textile mill managers. Sophisticated and technically alert, Pawtucket's iron industry was located along Sargeant's Trench, a former fishway, which continues to survive beneath Pawtucket.

Rhode Island's industrial growth depended, not only on the skills of its artisans, but on the capital and business acumen developed by the colony's merchants. The merchants, especially those of Newport, were in turn dependent on the emergence of a particular form of commercial agriculture unique in New England. Benefitting from the absence of a religious hierarchy able to impose and interpret traditional religious sanctions against unrestricted economic activity, and from the substantial tracts of fertile land and protected pasturage along the shores of Narragansett Bay, Rhode Island developed an agricultural surplus sufficient to attract traders from New Amsterdam, Boston, and Salem as early as 1657. This was an agriculture dependent on large plantations and slave labor. Its primary agents were the politically powerful "Narragansett Planters" of the eighteenth century, whose life style superficially resembled that of the planters of the American South, or the eighteenth-century English gentry. It is fitting that the one surviving industrial site connected to the planters so well reflects that life style. Gilbert Stuart's snuff mill, built in 1753 by the portrait painter's father and the Newport physician and later Tory, Thomas Moffitt, catered to the "gentility" of the planter class. The current snuff mill is not the original but duplicates the placement of the original in the lower story of Stuart's gambrel-roofed house.

Drawing on the colony's agricultural surplus, as well as the African slave trade and West Indian commerce, the port of Newport expanded enormously in the early eighteenth century. By the 1760s, it was the major port in Southern New England and the north's principal slave mart. The port of Providence, with its less fertile hinterland, grew less rapidly through the early part of the eighteenth century, but quickened its growth thereafter. The commercial expansion of

both ports, as well as the rise of smaller ports like East Greenwich, Bristol, and Wickford, was assisted by the growth of a paper money economy. Maritime trade also fostered the continued growth of related industries; shipbuilding, ropemaking, candlemaking, and rum-distilling. Providence's prominent merchant family, the Browns, built a chocolate mill in 1752, a spermaceti candle works one year later, and a rum distillery that ceased production in 1762.

By the late-eighteenth century, Providence was growing in importance. Newport's maritime economy had been weakened by the British trade laws, the depression that followed the Seven Years War, and the decline of the "Narragansett Planters," whose agricultural production likely could not keep pace with the expansion of population. Occupied by the British during the Revolution and consequently suffering severe population loss through emigration, Newport never fully recovered. Providence emerged as Rhode Island's commercial, political, and transport center, a position which it continues to hold.

Providence merchants dominated Rhode Island's economic life from the late eighteenth century to the years of the Jeffersonian embargo. Carrying meat and tobacco from Connecticut, bricks from Taunton, and fish from the waters of Massachusetts Bay, Providence's merchants did a thriving business with England and the Carribean. Despite changing markets and the curtailment of trade with England, Providence merchants, like the Browns, emerged from the Revolution, the Confederation Period, and the depression of 1784-1786 in a fundamentally sound economic position. The decade of the 1790s was the highpoint of the state's shipbuilding industry, with Providence, Warren, and Pawtucket as its chief centers. From the 1790s to about 1808, the main avenues of Rhode Island's trade radiated from Providence to South America, the East Indies, the Baltic, and China. The China trade, in particular, offered the chance for impressive profits, and the firm of Brown & Ives was one of the five leading merchant houses in the United States involved in trade with China.

During the years of embargo and war, Rhode Island's trade with Europe was sharply limited and the state's shipbuilding industry virtually collapsed, not to revive again until the growth of the whaling industry in the 1830s. Though trade with China and South America continued during the War of 1812, and trade with Europe quickened once again after the war, Rhode Island's importance as a center of international trade was clearly on the wane. Duties at the Providence Custom House declined from \$400,000 in 1804 to \$100,000 in 1830. The decline was partly due to the uncertainties of foreign commerce during the Napoleonic years, but more importantly was the result of the growing dominance of New York, Boston and Philadelphia, larger ports with richer hinterlands. Although illegal efforts to revive the slave trade profited the less scrupulous merchants, and an active whaling industry functioned from 1826 into the 1840s, only to decline with the substitution of coal gas for whale oil, the great bulk of Rhode Island port activity, after the first decade of the nineteenth century, was confined to coastal freighting and fishing. Today, there are few late eighteenth-or early nineteenth-century structures which reflect the state's maritime economy. With the exception of the reasonably well-preserved Warren waterfront, with some structures dating from the 1840s, and small warehouses in Providence, Newport, Bristol and East Greenwich, most of what survives reflects a later period of seaborne commerce. The continued upgrading of port facilities, lighthouses, and breakwaters from the mid-nineteenth through the early twentieth centuries testifies to the continuing, though secondary, importance of the sea to Rhode Island's economic life. In a critical sense, the primary contribution of Rhode Island's maritime trade was the accumulation of capital for the emerging textile industry.

TEXTILE INDUSTRIALISM

The state's early industrial growth was far from rapid. Twenty-five spinning mills were erected in the period from 1790 to 1809, a rate of only three per year. Despite the favorable circumstances of capital, artisan skill, and available water-power, other factors militated against rapid industrialization. These factors included labor scarcity (one reason for the early

reliance on child labor), a slow rate of population growth, the retention of the "putting-out" system, and the influence of traditional values resistant to factory discipline and to the social and political consequences of industrial capitalism. The surviving textile mills from this period, of which the best examples are Pawtucket's Old Slater Mill and West Warwick's Lippitt Mill, are small, wood-framed structures with gabled, monitor roofs. Inheriting their architectural form from contemporary domestic and institutional models, these water-powered mills, with their original end-cupolas, blended quietly into the Rhode Island landscape, visual testaments to the tentative, and as yet insecure, nature of industrial capitalism. The earliest mill villages also borrowed heavily from eighteenth-century forms. Slatersville, with its village green and Federal-style houses arranged, not in rows, but according to the natural contours of the Branch River Valley, evokes the eighteenth century even as it represents the emergence of the planned industrial village.

Textile mill development quickened in the years after 1810. The hot-house effect of the embargo and the War of 1812 led to the construction of approximately seventy-five new cotton mills in the years from 1810 to 1815. Merchant capital seeking new outlets for investment promoted most of this growth, and the collapse of the shipbuilding industry accelerated the shift of metal-working artisans from the manufacture of ship hardware to the fabrication of textile machinery. The close connection between iron, textiles, and textile machinery is represented in the surviving Wilkinson Mill, built in Pawtucket in 1810-1811 by Oziel Wilkinson and used by his son David as a cotton mill and machine shop. Much of the rapid growth in this period, however, was artificial, and with the end of hostilities in 1815 and the subsequent "dumping" of British textiles on the American market, many of the early mills collapsed.

With the introduction of the power loom in 1817 and (contrary to most historical accounts) its relatively rapid diffusion throughout Rhode Island, the state's textile industry achieved greater stability. By 1831, there were 119 cotton mills in the state operating a total of 238,877 spindles and employing 8,595

workers. The centers of production were in the Blackstone and the Pawtucket Valleys; and Smithfield, Warwick, and Coventry were the state's chief cotton mill townships. Not far behind were Cumberland, which then included parts of present-day Woonsocket, and North Providence, which contained the village of Pawtucket. Mills were built, not only on the major rivers, but on many of the state's smaller rivers in the south and west. The Woonasquatucket, the Moshassuck, the Branch, the Chepachet, the Pawcatuck, and the even smaller rivers of North and South Kingstown, supported an extensive number of textile mills.

In this period, the state's small, wood-frame spinning mills were eclipsed by larger, stone-rubble and ashlar structures devoted to both spinning and weaving. More imposing than their earlier counterparts, the stone textile mills of the 1820s, with their exterior stair towers, presented a strong visual statement of the growing hegemony of industrial capitalism. The best examples are the mills at Slatersville, Alledale, and in the Bernon section of Woonsocket. The decade also saw the development of a new form of interior framing designed to reduce the hazards of fire. The use of oil for lighting and machinery lubrication, loose cotton in the air, and the high incidence of arson introduced unacceptably high fire risks. Mill owners like Zachariah Allen responded with the use of "slow-burning" plank-on-timber construction (thick flooring and beams of large cross-section) in place of traditional board-on-joist methods. The Number 1 Bernon Mill, built in 1828, is the earliest known example of this new form.

Rhode Island's mills were the focal point of numerous mill villages, such as those at Georgiaville and Lonsdale, generally located at individual water privileges scattered throughout the rural landscape. With their one-to-two-family worker houses, company store, owner's or superintendant's house, and occasional church, the state's mill villages differed from the large industrial cities being built along the Merrimack River in Massachusetts and New Hampshire. The latter, built by Boston capitalists on substantial water-power sites, were dominated by large, brick textile mill complexes and a distinctive labor system

involving the use of boarding houses and unmarried woman workers. Rhode Island mills relied instead on an informal system of family and child labor. This demographic difference formed the core of what later observers referred to erroneously as the "Rhode Island System." This is not the place for an extended discussion of that "System" or of its counterpart, the "Waltham-Lowell System." In general, differences between the two have been exaggerated and the lines of specific difference have been blurred. The reliance on family labor, for example, characterized those mill villages in Maine, central and western Massachusetts, New Hampshire, and Connecticut, as well as Rhode Island, where large-scale urban development was limited by a lack of capital and insufficient water power.

The years from 1820 to 1840 were the critical period of growth for the Rhode Island cotton textile industry. These years saw significant levels of mill expansion and increases in output, spurred by rising demand and the introduction of the power loom. Despite serious depressions in 1829 and 1837, the industry achieved partial stability as the stronger producers emerged to consolidate their power and influence in a mature textile economy. Assisted by depression, and the geographic diversity of the state's mills, textile entrepreneurs were able to diffuse the threat of labor militance, best expressed by a well-organized and partially successful strike in Pawtucket in 1824 (the first in which North American women ever participated). With the region's first labor organization, the New England Association of Farmers, Mechanics, and Other Workingmen, unable to effectively overcome its artisan base in order to organize in the mills, Rhode Island mill owners were able to strengthen their control over the work habits of mill laborers. During the 1830s and the 1840s mill owners began to standardize jobs, wages, and labor contracts, tighten standards of time discipline and productivity, require workers to tend more machines, and institute technical changes which reduced the power of skilled workers over the production process (the self-actor mule spinning frame) or compensated for the inattention of the unskilled (the drawing frame stop-motion).

Rhode Island's textile economy in the early nineteenth century was assisted by improvements in transportation, the growing commercial importance of Providence, and the development of the textile machinery and machine tool industry. For much of the early nineteenth century, roads and turnpikes formed the primary connections among Rhode Island's scattered villages. Often built for profit by mill owners, turnpikes greatly increased in number in this period. Sailing packets connected Providence with other large East Coast ports, as well as the smaller ports of Narragansett Bay, though steamship lines soon emerged to challenge for a part of this coastal traffic. The port of Providence served as an important center for receiving raw cotton and marketing finished goods, and the city itself soon solidified its position as the commercial, banking, and transport capital of the state.

The most ambitious effort to connect Providence with the markets of northern Rhode Island and central Massachusetts was the building of the Blackstone Canal between 1824 and 1828. The canal, running from Worcester to Providence, portions of which continue to survive, was beset with financial difficulties and its promise never achieved. Poor-planning, under-capitalization, the hostility of Blackstone River mill owners, who found themselves competing with the canal for scarce water resources, and the coming of the railroad, all spelled the canal's doom. Railroads eventually took the bulk of overland traffic, and Rhode Island's first line, connecting Boston and Providence, was completed in 1835. Two years later, the Stonington line from Providence to Pawcatuck was opened, forming Rhode Island's section of the Boston to New York route. The King Street Bridge in East Greenwich, built as part of the Stonington line, continues to survive, its solid stone arches evoking an early era in the state's transport history. By the late-1840s, a third line, connecting Providence to Worcester, formed the rail link for the textile towns of the Blackstone Valley.

Rhode Island textile mills benefitted from the coincident development of the textile machinery and machine tool industries. Both industries got their start in the small shops of the Wilkinson family in Pawtucket. By the early 1820s, Pawtucket's metal-working

industry was soon turning out textile machinery for the entire country. Important textile machinists like Ira Gay, later of Gay & Silver of North Chelmsford, Massachusetts; John Thorp, the inventor of ring spinning; Asa Arnold, who made critical improvements in the roving frame; George Draper, later a founder of the huge and innovative Draper Company of Hopedale, Massachusetts; James Brown, who subsequently ran his own machine shop in Pawtucket specializing in self-actor mule-spinning frames; and Thomas Hill, one of the founders of the Providence Machine Company, all worked in Pawtucket during the early period of textile machinery making. This was the skilled base on which Rhode Island's economy would be built for the better part of the nineteenth century. Important textile machine shops were to spring up in Central Falls, Providence, and Woonsocket. Other machinists and artisans turned their attention to machine tools, steam engines and boilers, and precision measuring instruments. The capital goods industries, which were to play such a large part in the Rhode Island economy, while enhancing the state's industrial reputation, had their origins in the years prior to 1840.

The period from 1845 to approximately 1865 witnessed important changes in the state's textile industry. By the 1840s improvements in woolen technology and sheep raising elevated the state's woolen industry to a place behind only cotton among Rhode Island's leading industrial producers. Concentrated in North and South Kingstown in the early 1830s, the center of woolen production later shifted to the north and northwest portions of the state. By the Civil War, Burrillville, Woonsocket, and the Olneyville section of Providence were the primary recipients of a growth spurred by war demand, the curtailment of the Southern cotton supply, and the effects of the Morrill Tariff. Important surviving woolen mills include the Allendale Mill, built by Zachariah Allen in North Providence in 1822; the Peacedale Mills of the Hazard family in South Kingstown; and the Sayles Mill of Burrillville. The period also saw the beginnings of substantial textile diversification with the expansion of finishing companies, like Cranston Print, and the formation of cotton thread (Greene & Daniels, Pawtucket), waste cotton (Union Wadding, Pawtucket), and hair cloth (Pawtucket Hair

Cloth, Central Falls), companies. Other important changes included the replacement of breast wheels by more efficient turbines, an increase in the number of mills powered exclusively by steam engines, and the beginnings of a decline in the number of separate cotton textile firms, indicative of a trend toward consolidation and the growing power of large, multi-unit firms. The problem of labor scarcity, which had afflicted textile mills since 1790, was finally resolved as the effects of Irish famine and British imperialism made themselves felt in the period after 1847. The Irish constituted the first wave of those peasant immigrants (French-Canadians, Italians, Poles, and Portuguese) who were soon to dominate the textile labor force.

THE INDUSTRIAL GROWTH OF PROVIDENCE

Textile mill development was slower in Providence than it was in the Blackstone and Pawtuxet Valleys. The city had only four cotton mills and 10,197 spindles in 1832. By 1840, however, thirty cotton mills were located in Providence, operating 76,554 spindles, and the city was second only to Smithfield as a center of cotton production. Much of this growth occurred along the lower water-power privileges of the Woonasquatucket River, but a smaller, though significant, portion of it was the result of improvements in steam-power generation. By 1850, however, the number of cotton mills in Providence had shrunk to eight and only one-half as many cotton textile workers remained in the city as were present a decade earlier. Providence was not alone. Warwick, Johnston, and Cumberland also experienced a similar decline. In general, the late 1840s were a difficult time for New England textile mills. The mills' primary problem was overproduction, the constant curse of an industry which never controlled its markets. Mill owners were also faced with the necessity of trying to assimilate the Irish, a new generation of pre-industrial migrants, to the work habits and inner discipline of industrial capitalism. Moreover, the diffusion of important new technologies such as the self-actor mule and the ring spinning frame, which may well have been beyond the economic grasp of the smaller mills, promoted consolidation and a general reduction in the number of cotton mills. Despite the depression of 1857, the city's

cotton industry revived by 1860, but by then it had to take its place along side the various metal-working companies which were changing the face of Providence.

Between 1850 and 1860, the number of metal working firms in Providence grew from twenty-five to ninety-four, while the industry's capital base increased from \$474,000 to \$2,977,000. Only Pawtucket, with numerous small shops, was a rival, but Providence far exceeded Pawtucket in amount of capital, number of workers, and value of production. Steam engines, machine tools, textile machinery, screws, files, and jewelry were Providence's primary products. This growth was the result of Providence's central location for the receipt of raw materials and the transport of finished goods by both sea and rail, and the spin-off effects of the textile industry, both in its demand for machinery and steam engines, requiring ever more versatile and complex machine tools, and in its creation of learning opportunities for skilled machinists and metal-workers.

Steam engines provided the motive power for most of these metal-working firms, and the construction of steam engines became a critically important part of Providence's economy. The business began on a significant scale in the early 1820s through the work of Robert Thurston and John Babcock. Located in the Fox Point section of Providence, Thurston and Babcock's firm, later incorporated as the Providence Steam Engine Company was the state's leading producer of steam engines in the early nineteenth century. By the mid-nineteenth century, however, it was displaced as the state's most important steam engine company by the Corliss Works, incorporated in 1856. George Corliss was the nationally-known inventor of the Corliss valve-system, a steam engine improvement which greatly increased the efficiency of engine operation. The establishment of the Corliss Works made Rhode Island the nation's leader in the building of steam engines. With the exception of the Nichols & Langworthy Company of Hope Valley, all the state's important engine works were located in Providence.

The machine tool industry formed another important sector of the city's economy. Brown & Sharpe, incorporated in 1863, was the city's major machine tool

company. In the 1860s and 1870s, the company achieved a national reputation as the inventor and producer of a series of critical machine tools, most importantly, the Universal Miller and the Universal Grinder. Brown & Sharpe also produced important measuring devices, the vernier and micrometer calipers, which greatly increased the ability of machinists to do precise and replicable work. The company's large Providence plant, once considered a model of machine shop construction, continues to survive in the shadow of the State House, though no longer used for the manufacture of machine tools.

Textile machinery continued to be an important product in Providence throughout the nineteenth century, and many of the city's machine shops continue to stand. Thomas J. Hill's Providence Machine Company (1846) specialized in English-pattern fly-frames, and the Phenix Iron Foundry (1848) built machinery for dye houses, bleacheries, and print works. The New England Butt Company, incorporated in 1842, manufactured braiding machines, along with assorted hardware and castings, and the City Machine Company (1868) built looms and loom accessories. The Providence shops, in company with Fales & Jenks of Pawtucket (its buildings since destroyed), James Brown of Pawtucket, Woonsocket Machine & Press and, in the late nineteenth century, Universal Winding of Cranston, formed a critical part of the country's textile machinery business.

Numerous other base-metal companies performed a variety of productive tasks. Among the most important were the Nicholson File Company, incorporated in 1864, a huge file-making firm with plants in Providence and Pawtucket as well as outside the state, and the massive American Screw Company, incorporated in 1860 in a merger of two earlier screw-making firms. Other important companies were the Rhode Island Locomotive Works (1865), the Providence Tool Company (1845), and the Fuller Iron Works (1869). All of these firms have structures which continue to stand.

Providence's jewelry industry formed another important industrial sector. A number of small jewelry shops were located in Providence as early as the late eighteenth century, most devoted to inexpensive consumer

items. The one major producer of high quality jewelry, flatware, and statuary was the company founded by Jabez Gorham in the early nineteenth century. The Gorham Manufacturing Company, still in operation, grew to substantial size during the 1860s, expanded again in the 1890s and continued its manufacture of luxury items in silver, gold, bronze, and brass. The bulk of the industry, however, remained committed to less-expensive goods. From eighty-six establishments in 1860, the Providence jewelry industry grew to 296 plants by 1910. Some of these firms built substantial, multi-story, brick buildings in the Chestnut Street area of the city which continue to survive. This area still forms an important core of the state's jewelry industry, though increasing numbers of firms are now located in Pawtucket, Central Falls, Cranston, and Warren. Local jewelry firms also spurred the growth of the jewelry-findings manufacture, largely located in the Providence-Pawtucket area in the late nineteenth-century, which provided the industry with the pin stems, catches, and assorted hardware necessary to the trade.

The existence of a diverse metals industry gave Providence an economic cushion denied to the textile towns of Woonsocket, Central Falls, and the numerous textile mill villages throughout the state. Though only the jewelry industry has maintained its strength to the present, Providence's industrial diversity enabled it to survive the fluctuations of the volatile textile industry and to maintain an industrial base for some time after the bulk of the state's textile mills either closed or moved South.

Providence also benefitted in the late nineteenth century from the development of the worsted industry. Delayed in the United States because of the scarcity of long-staple wool, technological improvements, such as the diffusion of the English Noble comb, led to the substantial growth of the American industry in the 1860s and 1870s. Worsted firms gradually took over a major share of the market once controlled by woolen goods producers because of tariff advantages, changes in fashion, and the superior adaptability of worsted yarn to standardization and high-speed production. Experiments in the worsted yarn manufacture occurred in Pawtucket as early as 1819, and Providence had at

least one worsted company by the 1840s, but large scale expansion did not occur until the years from 1860 to 1880. Worsted mill development centered in the Olneyville section of Providence, with the building of large mills such as the Riverside and the Providence and National Worsted and the conversion to worsted production in mills like the Weybosset and the Atlantic, which were formerly involved in either cotton or wool. A second important area of worsted manufacture in the city was Wanskuck Village on the Providence-North Providence line. The Wanskuck Mill was built in 1864, one of the first American producers of worsted suitings for men's wear. Though there were also worsted mills in Burrillville (Stillwater Worsted) and Pawtucket (the huge Goff Mills, specialists in worsted braid and mohair plush), Providence remained the center of the state's production into the 20th century.

THE TEXTILE ECONOMY, 1865-1900

In the period from the close of the Civil War to the beginning of the 20th century, Rhode Island's textile economy experienced a series of new pressures. In concert with textile mills throughout New England and the East, Rhode Island firms decreased in number while increasing in size. This growing trend toward monopolization, increasingly concentrating capital and resources in large, multi-unit firms, was visible, by the late nineteenth century, in the major industrial sectors of the American economy. While the giants of iron and steel, meat-packing, oil, and transportation were consolidating their control over raw materials and markets, the American textile industry was beset with increasing competition, constant crisis of overproduction, and a failure to control prices for finished goods. Unlike other large-scale industries, a textile mill and its necessary equipment could be purchased relatively cheaply. The result was a spiraling number of Southern producers, taking advantage of local tax breaks, lax factory inspection and child labor laws, proximity to the cotton supply, and the slow growth of trade unionism. Southern mills, since they were newly built, were also in a better position

to adopt important new technologies, such as the Draper loom and plant electrification. Concentrating on coarse goods production, they dispensed with the need for mule spinners, almost always the best organized and among the most militant of New England mill workers. The entire drama of the flight of New England's mills to the South in the twentieth century could be seen in embryo by the 1890s. It took only a weakened economy, the continuing problem of overproduction, and the revival of trade unionism among the unskilled in the 1930s, to convince New England mill owners to abandon the region which initially provided their fortunes in order to exploit the cheap labor made available by the long-term agricultural crisis of the South.

Rhode Island textile mills withstood Southern competition in the late nineteenth century, however, through the growth of massive firms like Goddard Brothers, the descendants of the famous Providence mercantile firm of Brown & Ives and the owner of mills in Lonsdale, Ashton, Berkeley, Phenix, Hope, and Blackstone, Massachusetts. In the latter village, the Blackstone Mill was torn down in 1904 and relocated in Rhode Island, just a few hundred yards south of its previous site, in order to take advantage of Rhode Island's less-stringent tax code. An even larger firm was that of B. B. & R. Knight, a company which bought up most of the holdings of the failed Sprague family, and controlled, by the early twentieth century, eighteen textile mills and over 420,000 spindles. The bulk of their Rhode Island holdings were in the Pawtuxet Valley. Woonsocket, a city which had emerged from a cluster of early nineteenth-century mill villages to a population of 20,000 by 1885, saw the Social Manufacturing Company gradually consolidate its control. By the 1880's it owned three large cotton mills in the city, the Social, the Nourse and the Globe, all since torn down. In the twentieth century, the company merged first with the Manville Company of Manville, and later with the Jenckes Spinning Company of Pawtucket. The American Woolen Company, a national giant incorporated in 1899, acquired the Weybosset, the Riverside, the National and Providence Worsted, the Manton, and the Valley Worsted Mill, all in Olneyville; as well as two mills in Burrillville.

A concentration on fine goods production also undercut the effect of Southern competition. New steam powered mills, all built by Goddard Brothers, at Ashton (1867), Berkeley (1872), and Lonsdale (1886), produced high-quality goods; cambric muslins, jack-onetts, and sateens. Worsteds, and fancy woolen goods of the type produced at the Harris Mills in Woonsocket continued to provide a significant market for Rhode Island in textile goods generally not produced in the South. No longer concentrating on course cotton goods, as they had in the early nineteenth century, firms in Pawtucket and Central Falls produced thread at Green & Daniels and the massive Coats and Clark complex; worsted braid at the Goff Mills; cotton batting at Union Wadding, and hair cloth at the Pawtucket Hair Cloth Company. This degree of textile diversification assisted Rhode Island firms well into the twentieth century in their efforts to combat the growing power and market influence of Southern textile production.

During the second half of the nineteenth century, important changes in mill construction contributed to productive efficiency. The most visible changes in Rhode Island were the substitution of brick for stone in the construction of exterior walls, and the gradual flattening of roof lines. The first change was largely the result of the growth of Barrington's huge Nayatt Brick Company after mid-century. The second change was the result of the increased availability of coal tar and tar-paper coatings which made it possible to construct water-tight, near-flat roofs with either gravel or tin. Eliminating the steeply-pitched gable roof made it possible to easily light the upper story, a problem whose earlier solutions ranged from the use of trap-door and clerestory monitors to skylights and dormers. A brief vogue in the 1860s for mansard-roofed mills, such as those at Crompton in West Warwick, was curtailed by the mutual fire insurance companies because the stylish roofs presented unacceptably high fire risks. Near-flat roofs did not come into widespread use until the 1870s, but an important early example is the Wanskuck Mill (1862-1864) in Providence. These new roofs enabled mills to be built wider in order to accommodate more machinery, and wider mills required larger windows so that more light might reach

the center of the mill. The increasing use of double windows after about 1880 reduced the amount of load-bearing masonry in the facade and promoted the wide spread use of brick piers, or pilasters, built out from the facade and extending nearly the height of the mill. Brick-pier mill construction had appeared as early as 1849 with the erection of the handsome, Romanesque, White Rock Mill in Westerly, but was not used extensively until after 1880. There were fewer changes in interior framing. "Slow-burning" construction remained the standard form, though cast-iron columns, superior to wood both in their durability and compressive strength, found increasing use. Cast iron columns, however, were much more susceptible to shearing stress than wood and, if poorly cast, or cooled too rapidly during a fire, tended to collapse. As a result, wood columns continued to be used in mills of advanced design. By the late nineteenth century, the influence of the powerful factory mutual fire insurance companies contributed to the development of a standardized factory form. The wide brick-pier mill, with its near-flat roof, segmental-arch windows, and general lack of architectural embellishment came to slowly dominate the state's industrial landscape.

OTHER INDUSTRIAL ACTIVITY

Despite the dominance of the textile industry, industrial and engineering activity in Rhode Island was visible in many other areas of the state's economy. In the rural western and southern townships, grist mills and sawmills, blacksmith shops, wagon-works, and cider presses continued to be built throughout the nineteenth century, reflecting the continuing needs of a small-scale rural economy. At the other end of nineteenth century life, the growing demands of highly concentrated urban populations for the delivery of water, heat and power produced a need for sophisticated new technologies. Water pumping stations, gas works, hydro-electric and electric generating stations became the characteristic expressions of nineteenth century "progress." Rhode Island's urban landscape still contains excellent examples of these municipal service structures.

The state continued to maintain its productive tie to the sea. The smaller ports of Warren, Bristol, East Greenwich, Wickford, Point Judith, Westerly, and Block Island were actively engaged in boat-building, fishing, fish-processing, and warehousing. The larger ports of Newport and Providence also saw extensive activity. Newport, a major Navy base, became, by the 1870s, the Navy's center for the manufacture and testing of torpedos. The port of Providence, in the same period, became increasingly important as a coal storage and transshipment center, and a series of harbor improvements helped to maintain the city's position as the largest coal-receiving port in New England. The state's sea lanes and harbors were protected by lighthouses, some built in the early nineteenth century and constantly upgraded, and by an impressive series of breakwaters constructed in the late nineteenth century.

Just as new construction was necessary to Rhode Island's seaborne transport, the state's railways and bridges required continued modernization. Throughout the nineteenth century, simple wooden spans were replaced by substantial stone-arch bridges, like those at Pawtuxet, Mussey Brook, and Division Street, Pawtucket. Metal-truss bridges increasingly found widespread use by the late nineteenth century, and the state still exhibits excellent examples of various truss types. Two of the best are in the village of Arkwright in the Pawtuxet Valley. One is a Pratt truss, built with Phoenix columns in 1888; the other is a small lenticular truss built by the Berlin Iron Bridge Company for the Interlaken Mills. The state also contains impressive examples of bridge technology from the first half of the twentieth century in the suspension bridge at Mt. Hope (1928-1929), the cantilever truss at Jamestown (1940), and the reinforced concrete, open-spandrel arch at Ashton (1934-45).

Though railroad and trolley line improvements occurred throughout Rhode Island in the late nineteenth century, Providence was the site of the most important new construction. In the 1890s, the old Providence Cove was filled in and the New York, New Haven & Hartford Railroad built a large new station and numerous connecting bridges. Approximately fifteen years later,

company road crews tunneled through the East Side of Providence, built an impressively engineered viaduct from the tunnel's west portal to Union Station, and a rolling lift bridge over the Seekonk River to connect the east portal to points south in Bristol and Newport Counties. Providence's railroad and harbor improvements solidified its position as the state's transport center.

Providence was not the only city or town in Rhode Island to display some level of economic diversification, though, with its extensive base and precious metals industries, it was by far the most important. Communities like Westerly, Pawtucket, East Providence, Bristol, and East Greenwich were able to strike an industrial balance more successfully than the textile towns of the Blackstone and Pawtuxet Valleys. Westerly had a significant series of granite quarries and a large printing press company which employed city residents though it was located on the Connecticut side of the Pawcatuck River. Pawtucket had numerous small metal working firms, including some devoted to jewelry findings. East Greenwich contained the Boston Wire Stitcher Company (1900), an important innovator in staplers for office and industrial use. Bristol had the huge National Rubber Company (1860), and large rubber plants were later constructed in Providence and Woonsocket as the industry enjoyed a limited statewide expansion. East Providence had a large percentage of non-textile employment with the development and growth of the Rumford Chemical Works, producers of baking sodas and phosphates, and the Washburn Wire Company, the state's only large steel works. Consumer goods industries, such as breweries, also employed sizable numbers of workers. Despite all this, Rhode Island's economic fate was tied inextricably to the continued success of an increasingly troubled textile industry.

THE TEXTILE ECONOMY IN THE TWENTIETH CENTURY

In the early 20th century, three important developments took place in the Rhode Island textile industry. First, the worsted industry expanded and strengthened itself with the introduction in Woonsocket of French and Belgian capital, French-speaking management, and French worsted spinning technology. Second, the silk industry became an important economic presence with the building of the massive Royal Mill in Pawtucket.

Third, changes in the tariff laws made it profitable to import English lace-making machinery, and the state soon became one of the important centers of lace manufacture in the United States.

At the same time, there were important changes in power transmission and building construction. The most visible change was the introduction of the saw-tooth-roof weave shed. Though it presented more severe leakage problems than the near-flat roof, the saw-tooth design provided for the diffusion of indirect, natural light the full width of the building. In textile production, this design was generally combined with the development of large, single-story weave sheds. These new structures not only provided excellent lighting, but reduced the effects of machinery vibration. Though the saw-tooth-roof weave shed was developed in the late nineteenth century, it was not widely used in Rhode Island until after 1900. One of the state's best and earliest examples is the weave shed built in 1900 by Frank Sheldon for Tiverton's Bourne Mill. A second change in building construction was the development of the reinforced-concrete factory. Strong, durable, and fire-resistant, reinforced concrete allowed for almost eighty per cent of building facade to be used for windows. It was not, however, widely used in the state's textile mills (the Harrisville Mill Number 4 is an interesting exception), though it was used in jewelry and other industries by the 1900s. Important early examples are the United Wire and Supply Company in Pawtucket (1906) and the A. T. Wall Building in Providence (1910).

The major change in power transmission was the increased use of electricity. In many textile mills, this simply involved attaching generators to the mills' existing steam engines and turbines and using electric power to drive the mills' existing belts and line shafts. However, it was also possible to attach individual electric motors to single machines. The Royal Mill in Pawtucket was said to be the first in the United States to drive its looms with individual electric motors. In general, plant electrification and the use of individual motors was less important in textile mills, where machinery lay-out was relatively standardized,

than it was in base-metal production where it allowed for a more rational placement of machine tools, placement previously dictated by the location of line shafting.

While building technology and power transmission were being modernized, while silk, lace and worsted production were still expanding and while experiments were beginning with synthetic yarns, the state's cotton industry was falling on increasingly hard times. Although there has been no serious effort to chronicle the decline of the state's cotton industry, or its other textile industries, for that matter, it is possible to make some general observations. In Rhode Island, as elsewhere in the country, the primary problem was overproduction, an overproduction spurred by the growth of Southern textile mills, and the intense efforts of mill owners to drive their workers harder (the "speed-up") and their machinery longer (the "stretch-out") in order to compensate for declining profits. Given an unstable and competitive industry, one in which numerous mill owners made individual decisions on the amount and kind of goods to be produced, one could only expect further increases in competition and further declines in profit margins through an inexorable and circular logic.

Increasing competition, and the growing importance of synthetic goods, affected the national cotton industry, both North and South, but New England firms were beset with additional burdens. Compared to Southern textile mills, New England mills paid out more in wages and local taxes, suffered from obsolete plant and equipment, and, according to some accounts, labored under inadequate management and the control of trustees and absentee owners preoccupied with high finance and not sufficiently attentive to the problems of production. Also, New England textile workers, over the course of the twentieth century, deepened a tradition of organized struggle first expressed in Pawtucket in 1824 and elaborated throughout the nineteenth century. With a work force divided by ethnicity, and consisting by the 1930's of Irish, English, French-Canadians, Poles, Italians, and Portuguese, among others, and also segmented by skill, age, and sex; the organization of textile unions was difficult and sporadic for most of

the nineteenth and early twentieth century. By the 1930s, however, with the mass upsurge of rank and file activity, symbolized by the rise of the CIO and by general unions of the skilled and unskilled, like the Industrial Trades Union of Woonsocket, the task of uniting textile workers in a single organization free from the limits and failures of the traditional craft unions seemed readily achievable.

But the unions had come to a position of strength just as the New England cotton industry was at its weakest point. It is a mistake, however, to blame the unions for the flight of the state's textile industry, an industry which had been chronically weak since the 1920s. The industry had enjoyed a brief and artificial boom during World War I, but fell into serious depression with the advent of peace. Five to seven years before the great world-wide depression of 1929-1939, the cotton textile industry in New England was on the verge of collapse. Between 1923 and 1929, textile mill employment declined by one-fifth in New Bedford, one-third in Fall River, and two-thirds in Lowell. Not even the efforts of the New Deal's NRA to limit production with the cooperation of mill owners was sufficient to stem the collapse. Cotton mill closings began in Rhode Island in the early 1930s. The Number 4 Mill in Lonsdale closed in 1930, and the huge Ann & Hope Mill followed four years later. In December of 1934, the Clyde Print Works in West Warwick was demolished. By 1936, three mills in Warren had closed, with a loss of 1,700 jobs, four mills in Pawtucket and Central Falls had closed, and six mills in West Warwick, the bulk of the former B. B. & R. Knight empire, had ceased operation. By 1938, only the Ashton and Hope Mills remained of what was once Goddard Brothers expansive holdings.

The cotton cloth industry in Rhode Island was largely dead by World War II. Cotton waste, narrow fabric, and yarn and thread companies continued to survive. The woolen and worsted industries struggled through the 1930s, enjoyed the benefits of war-time prosperity, and gradually collapsed in the early 1950s. Woonsocket was particularly hard hit. Twenty-nine textile plants closed in the greater Woonsocket area from 1948 to 1958, virtually all wool or worsted companies, and, in the same period, a total of forty-four

textile mills closed throughout the state. These included Providence's major worsted mills in the Olneyville area, the Wanskuck Company with 1,500 workers, and Lorraine Manufacturing of Pawtucket, with 1,337 employees, as well as numbers of smaller plants, such as Berkeley, Interlaken, and Slatersville. In the years from 1929 to 1954, the state lost approximately 40,000 textile jobs, an erosion of its industrial base from which it has never fully recovered. The collapse of the textile industry had a ripple effect throughout the economy. Textile machine firms, makers and distributors of mill supplies, and related iron-works were forced to either retool, seek new markets, or collapse, and many did the latter. With the decline of the mills, Rhode Island's reputation as an industrial state declined as well.

Like England, Rhode Island's industrial history is one of brilliant technological beginnings followed by stagnation and decline. Once monuments to proud and aggressive industrial capitalists, many of the state's textile mills became instead the pawns of financiers in a chess game played for high stakes, and stand now as artifacts of cost-benefit analysis. Rhode Island was simply too dependent on an inherently unstable industry. Diversification did not occur rapidly enough and the state's base in metal-working, as significant as it was, was not broad enough. Few of the companies which initially occupied the textile mills and base-metal works have survived; New England Butt, Brown & Sharpe, and Cranston Print are the most notable exceptions. Despite the collapse or migration of so many firms, the physical base of Rhode Island's industrialization remains substantial and well-preserved, and may yet figure prominently in the state's economic future. It is the surviving mills, dams, power canals, transportation structures, utilities, and assorted other industrial sites which provided the initial impetus for this study, and to those sites we now turn. These physical reminders of the state's proud and impressive industrial history speak eloquently, though in their own language, to the general themes elaborated in this introduction.

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HABS, Historic American Building Survey, Washington, D.C.

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NR, National Register of Historic Places, Washington D.C.

RIHPC, Rhode Island Historical Preservation Commission.

RIHS, Rhode Island Historical Society.

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Barrington

Bulk Products

RHODE ISLAND LACE WORKS (1904)
Bay Spring Avenue
Barrington

Bristol
19.304660.4624360
Bristol

Rhode Island Lace Works began as a small complex of wooden buildings in 1904. Design, drafting, weaving (actually a twisting process), and finishing have always been done in the plant. Leavers lace was, and still is, produced by huge English lace machines weighing up to twenty-six tons, with some 40,000 parts. The "twist hand" operates a single machine, the largest and most complex in the textile industry. The 1904 weaving mill with its original machines, the dye house, and the boiler house are still in use, but many other structures have been added. A 2-story, reinforced-concrete mill, 397 feet long, was built in 1920 with a second floor of flat slab construction on mushroom, or flaring, columns. The gypsum roof is supported by steel girder Pratt trusses. In 1948, a much smaller brick and concrete building was added for a process in which acetone is used to dissolve acetate threads that hold the bands of lace together in a "web". Until the late 1930s, lace webs were delivered to local families who pulled the draw threads. The thirty-nine lace machines in the complex vary in date of manufacture, but all but two were made by Jardine of Nottingham. Bleaching, dyeing and tentering equipment is relatively modern. The Seekonk Lace Company has owned the Rhode Island Lace Works since 1932 (see Seekonk Lace, Pawtucket).

(Associated Factory Mutual Insurance Drawing, 15 November 1950; "The Lure of Lace", American Fabrics, Number 23, Autumn, 1952; Interviews with George Ramsbottom, Kenneth Ratcliffe, Gordon and Robert Howe, Mario De Angelis, Rhode Island Lace Works.)

Transportation

MOUSCOCHUCK CANAL (c. 1848)
Brickyard Pond to Narragansett Bay
Barrington

Bristol
19.305210.4622280
19.304710.4622700
Bristol

The Mouscochuck Canal was a mile-long waterway and towpath formed from a natural creek by workers of the Nayatt Brick Company. The brickyard opened beside the blue clay deposits of Barrington in 1848. Soon barges were traveling from the brickyard to scows and other vessels waiting at the canal mouth on the upper Narragansett Bay. The company built a lock at the mouth to handle tidal levels but later moved it further inland with a deep channel to the bay. Nothing remains of either lock today. Wooden pilings stand along the channel, and bricks litter the beach, but the canal looks much like a creek again. The remains of two barges are said to rest in its bed, and Brickyard Pond covers other artifacts of the manufacturing days. Reincorporated in 1864 as the Nayatt Brick Company, the first brickyard produced an estimated 1,500,000,000 bricks by 1890. In that year, the New England Steam Brick Company built a nearby facility and by 1897, owned both brickyards, a rail spur, and its own narrow gauge railroad. In the early 20th century, rail transport replaced the canal. Rum-runners made some use of it during prohibition, and it has outlasted the brickyards which were demolished in the 1940s.

(Barrington: Two Hundredth Anniversary, Barrington, 1970; Thomas Bicknell, A History of Barrington Rhode Island, 1898; Interviews with Joseph DeAngelis, James Bianco, Nicholas Gizzarelli, Louis Azza, all of Barrington.)

Bridges

BARRINGTON BRIDGE (1914)	Bristol
Route 114	19.309020.4622800
Barrington	Bristol

This 5-span, concrete-arch highway bridge carries County Road over the Barrington River. Built by the W.L. Miller Company with design supervised by C.L. Hussey, State Bridge Engineer, the bridge is 334 feet long and 43 feet wide. Extensively repaired in 1966, the Barrington Bridge is an example of typical early-20th century concrete-arch construction.

(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #123.)

WARREN BRIDGE (1914)
Route 114
Barrington-Warren

Bristol
19.309570.4622940
Bristol

The Warren Bridge, a 3-span, concrete-arch highway bridge carries County Road over the Palmer River and connects the towns of Barrington and Warren. 228 feet long and 39½ feet wide, it was built at the same time, and by the same company, as the Barrington Bridge.
(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #124.)

Bristol

Bulk Products

POKANOKET AND NAMQUIT STEAM MILLS (1839-1843)	Bristol
125 and 345 Thames Street	19.310228.4615542
Bristol	19.310322.4615131
	Bristol

Though originally separate concerns, the two Bristol waterfront steam cotton mills, the first Pokanoket Mill (1839), and the second Namquit Mill (1843), had by 1880 become part of the Richmond Manufacturing Company. In 1891 and 1904 respectively, the two mills were purchased by the Cranston Worsted Mill to produce worsteds, mohair, and novelty yarns. By 1927, the Collins and Aikman Corporation, makers of automobile upholstery fabrics, used the buildings for weaving and dyeing. Today the 45' X 173' Pokanoket Mill, a 4-story, stuccoed-stone-rubble structure, with a pitched roof, rectangular windows, and a 4-story, 121' X 36' wing, is occupied, along with several 20th-century brick structures, by a rug manufacturer and retailer. The 170' X 45' Namquit mill, also a 4-story, stuccoed-stone structure with a pitched roof, tower, and rectangular windows, has been owned and used by a large thread manufacturing company since 1950. No old machinery or steam engines survive, with the exception of a Dillon boiler in the Pokanoket Mill.

(Chase; Sande; Hall; The Book of Rhode Island, 1930; interviews with Warner Tabor, Namquit Manager, and Emanuel Resse, Pokanoket Building Supervisor, 7 April 1976.)

Manufacturing

BURNSIDE RIFLE FACTORY/ (c.1853)	Bristol
HERRESHOFF MANUFACTURING COMPANY	19.310760.4614680
Burnside Street	Bristol
Bristol	

Ambrose Burnside, later a prominent Civil War general, built a rifle factory at this waterfront site in Bristol about 1853. By 1862, the Burnside Company had moved to Providence (see Rhode Island Locomotive Works) and one year later, John Brown Herreshoff began building small boats on the site. The Herreshoff Manufacturing Company initially specialized in the design and construction of steam vessels. The company built the Lightning, the U. S. Navy's first torpedo boat, in 1876;

and the firm's 94-foot Stilieto, built in 1885, was once considered the fastest boat in the world. Under the direction of Nathanael Green Herreshoff, the company produced light weight boilers and steam engines of advanced and efficient design as well as early gasoline engines. The latter Herreshoff formerly was an engineer at the Corliss Steam Engine Works in Providence (see separate entry) and superintended the erection of the famous Centennial Engine in 1876. From the 1890s through the early 20th century, the company's fame derived from the design and construction of sailing yachts. Herreshoff's cross-cut sails, hollow spars, and bulb keels were important innovations in yacht design, and the company's yachts successfully defended the America's Cup six times from 1893 to 1920. At the height of production, 300 workers followed their trades in the company's foundry, machine shop, boiler shop, sail loft, rigging loft, pattern shop, and paint shop. Bought by Rudolph Haffenreffer in 1924, the company continued under the same name, building 100 naval vessels in World War II, until its close 31 December 1945. Today, only the stone foundations of numerous construction sheds and wharves remain along the waterfront. However, several structures continue to survive on Burnside Street. A 3-story, clapboard building on the southwest end of the street, originally a warehouse, has recently been restored as the Herreshoff Marine Museum. The museum maintains a collection of original yachts, and intends to display them along side engines, fittings, photographs, and models. Next to the museum stands the Burnside factory, later used by the Herreshoffs as a machine shop. It is a 3-story, clapboard structure capped by an octagonal turret eight feet in diameter. To the east of the machine shop is a 2-story, wood-frame building, once the boiler shop, and recently used by a Herreshoff descendent for the making of small boats. On the north side of Burnside Street stands the 2-story, clapboard paint and pattern shop, also used as the sail loft. The old teamsters' cottage and the workmen's clubhouse also remain on the site. The buildings have been entered on the National Register of Historic Places. (NR, 1974; East Bay Window, 16-17 July 1975; Greene; S. Carter III, The Boatbuilders of Bristol, 1970; L. F. Herreshoff, Captain Nat Herreshoff, The Wizard of Bristol; 1953; "Herreshoff Marine Museum Brochure".)

NATIONAL RUBBER COMPANY (1860)
500 Wood Street
Bristol

Bristol
19.310855.4615820
Bristol

In the 1860's, Augustus Bourn established the National Rubber Company at this Bristol site. Bourn's workers first produced rubber boots and shoes in a stone production building, likely the 1-story, quarry-faced structure, 146' X 54' which still stands. This building and the company's 2-story, Italianate office, 77' X 44', were built in 1860. An additional 1-story, stone building, 77' X 64' with a monitor roof, was built in 1880. The company built eight new buildings in 1882 and expanded its product line to include rubber clothing, rubber belting and packing hose, rubber pharmaceutical utensils, and newly-introduced rubber-soled tennis shoes. In 1888, the firm was incorporated as the National India Rubber Company. By 1901, the complex included twenty-seven buildings on eighteen acres of land and was controlled by the United States Rubber Company. At this time, it was claimed to be the "largest and best equipped plant in the country for the manufacture of rubber goods" (Grieve and Fernald, p. 144), with 1200 workers producing 24,000 pairs of rubber boots and shoes daily. The plant then contained seventeen boilers, two pumping stations, one 1000-horsepower Corliss condensing engine, and several 200-horsepower steam engines. No historic machinery survives. The company grew in size during the 20th century, employing as many as 5000 workers during World War I. One of the largest industrial employers in the state, United States Rubber operated largely with Italian and Portuguese immigrants from the Bristol-Warren area. The shoe manufacturing division was closed in 1931, the result of the Great Depression, and insulated wire and cable became the primary product. In 1957, Kaiser Aluminum and Chemical Corporation bought the plant and continued the manufacture of insulated wire. Kaiser recently ceased production, and the complex, which covers four city blocks with numerous late 19th- and early 20th-century brick structures, is now vacant. (Hall; Grieve & Fernald; The Book of Bristol Rhode Island, Bristol Historical Society, 1955; East Bay Window, 2-3 February 1977; Interview with Domenic Grimo, May, 1976.)

MOUNT HOPE BRIDGE (1928-1929)
Bristol-Portsmouth

Bristol
19.311740.4612380
19.312060.4611580
Bristol-Newport

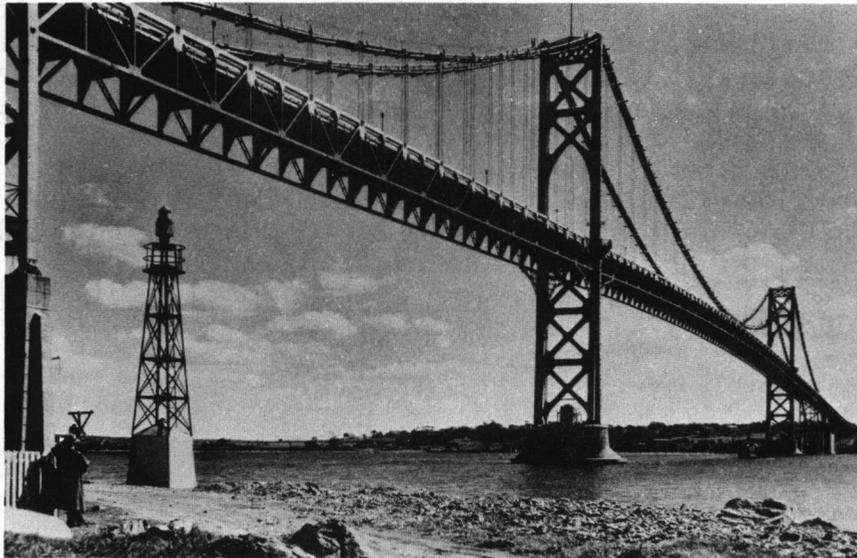
The Mount Hope Bridge, a highway suspension bridge 6,130 feet long, was dedicated 24 October 1929. It spans Mount Hope Bay, connecting Bristol with Portsmouth. At the time, it was the largest suspension bridge in New England. Its main span is 1200 feet and its main towers stand 283 feet above water level. The foundation, 85 feet below water level at its deepest point, was built by the Foundation Company. The McClintic Marshall Company of Pittsburgh built the superstructure, and Robinson and Steinman were the consulting engineers. (Data compiled from company records by Rob Moore, Brown University; Engineering News, 12 April 1928.)

Specialized Structures

DeWOLF WAREHOUSE (1818)
State and Thames Streets
Bristol

Bristol
19.310220.4616460
Bristol

This 2-story, slate and fieldstone warehouse with floors and roof of board-on-joist construction, was built by Bristol's leading merchant family, the DeWolfs, in 1818. Built in Greek Revival style, the building has a gable roof, quoined corners, and rectangular windows. The stone used in the warehouse construction is said to have been carried as ballast from Africa by Bristol slavers. No evidence exists to support this claim, though the DeWolfs did remain active in the illegal slave trade until 1820. The building is located west of the J.T. O'Connell Lumber Yard on the Bristol waterfront. (NR, 1972-74; P. Coleman, The Transformation of Rhode Island, 1790-1860, 1969.)



Top: Construction of the Mt. Hope Bridge, 1928
(Avery Lord, Collections of the RIHS).

Bottom: The Mt. Hope Bridge, 1936 (RIHS).

Burrillville

Bulk Products

HARRISVILLE MILL NUMBER 4 (1911)
Harrisville Village
Burrillville

Chepatchet
19.278460.4649060
Providence

This reinforced-concrete textile mill built in 1911 among a complex of earlier and later brick and wood-frame mills in Harrisville, is unique among Rhode Island textile mills, both in style and construction. It is three stories high with the first floor, and parts of the second, extended in wood. The rigid concrete and steel frame provides square enclosures for the large windows. The tower has asymmetrically placed windows and a peaked roof extending above battlements. The site was used for cotton production from the 1820s and was converted to wool by 1856 when the property was bought by William Tinkham and Job Steere. The main mill, built in 1853 by a previous owner, was expanded to produce fancy cassimeres and after 1881, fine worsteds. In 1894, a fire destroyed most of the complex. Rebuilding began a few years later and continued under the ownership of the Stillwater Worsted Company, a New York-based firm which bought the mills about 1914. The mills continued to produce worsted until very recently. They are now idle. The main mill and much of the complex are now vacant. Harrisville is a well-preserved mill village of the late 19th and early 20th centuries and is about to be nominated to the National Register.

(Bayles; T. E. Ryan, Burrillville, Rhode Island and the Catholic Church, undated; Interview with Marcus Thompson, Harrisville, November, 1975.)



Harrisville Mill Number 4
(Courtesy of Marion Spencer and the RIHPC).

MAPLEVILLE MILLS (1857)
Village of Mapleville
Burrillville

Chepachet
19.280720.4647340
Providence

Mapleville Mill Number 1 is located on the north side of Cooper Hill Road on the Chepachet River. A sawmill operated here until Darius Lawton built a stone, woolen mill in 1841. That mill burned in 1856 and was subsequently rebuilt by Oliver Tracy. The surviving stone structure was likely a part of the reconstruction. The wood and brick additions were built in 1871-1872 and later, while James Legg operated the mill. In 1890, the Legg family formed the Mapleville Manufacturing Company. The firm produced fancy cassimeres and cheviots, employing about 200 workers. In 1900, Joseph Fletcher bought the Mapleville property and, one year later, formed the Coronet Worsted Company. Fletcher built the surviving Number 2 Mill on the south side of Cooper Hill Road in 1900. The mill is brick, two stories high, and 300 feet long. Fletcher also built many of the nearby tenements. The Stillwater Worsted Company later owned both water-powered mills. The Number 2 Mill is still used for textiles; Number 1 contains a metal refinery. No historic machinery survives.

(Hall, illus. pp. 200-1, 202; Interviews with Harry Hughes and David Carroll, Mapleville, November 1976.)

SAYLES MILL/GRANITE MILL (1865)
Village of Pascoag
Burrillville

Chepachet
19.276000.4648120
Providence

Built on the site of an 1814 fulling mill, the present Sayles Mill was built in Pascoag in 1865 by Albert L. Sayles. The building is stone, three to four stories high, with a pitched and dormered roof. A line of ornamental iron work runs along the roof just above the eaves. The central tower, gabled on four sides, is now missing the tall, open belfry originally in place. The mill office, built in 1880 with a mansard roof, adjoins the west side. 20th-century additions have been built on the east end replacing an 1880 wing which was stone, three stories high with a mansard roof. After the 1880 addition, the mill operated 15 sets of carding machines on fancy cassimeres and employed 350 workers. The building is now occupied by a firm specializing in commission weaving and finishing. It is a handsome example of the medium-sized woolen mills of northwest Rhode Island. No old machinery for power generation or production survives.

(Bayles, engraving between pp. 580-581; Hall, illus. p.63; Sande.)

Bridges

HARRISVILLE STONE ARCH BRIDGE (1902) Chepatchet
East Avenue/Route 107 19.278320.4649190
Burrillville Providence

This barrel vaulted, single 50-foot span, granite highway bridge carries Route 107 over the Pascoag River near the Harrisville Mill complex. Built in 1902, the span itself consists of wet-laid stone, while the abutments are dry-laid. In 1952, state work crews added the steel deck sidewalks.

(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #306.)

NASONVILLE BRIDGE (1907) Georgiaville
Route 7/Douglas Pike 19.283300.4650430
Burrillville Providence

Built in 1907, this single-span, stone-arch highway bridge, 61 feet long and 29 feet wide, carries Victory Highway over the Branch River. The concrete guard walls were added in 1924.

(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #111.)

OAKLAND BRIDGE (1917-1918) Chepatchet
Victory Highway 19.280380.4648140
Burrillville Providence

Designed by C. L. Hussey and built by E. J. Hollen, this single-span, concrete-arch highway bridge carries Victory Highway over the Clear River. Built between 1917 and 1918, the bridge is 67 feet long and 25 feet wide.

(Rhode Island Department of Transportation, Bridge Design Section Files; Bridge #105.)

Central Falls

Bulk Products

CENTRAL FALLS WOOLEN COMPANY/(c.1865)
FARWELL WORSTED
521 Roosevelt Avenue
Central Falls

Pawtucket
19.302300.4639740
Providence

The Central Falls Woolen Company, incorporated in 1870 by Phetteplace & Seagrave of Providence and James L. Pierce, built this brick mill c. 1865. The mill, four stories high with a trap-door monitor roof, is located on the Blackstone River at Central Falls, just north of the Pawtucket Hair Cloth Company and south of the Pawtucket Thread Manufacturing Company and the Stafford Mill. Its end tower was removed when the front facade was thoroughly altered by 20th-century additions. Central Falls Woolen operated twenty-four broad looms in the production of cassimeres and doeskins. Frederick Farwell of Newfane, Vermont, bought the mill in 1894. Farwell was initially a weaver in Millville, Massachusetts, and later part-owner of mills in Harrisville and Olneyville, Rhode Island. In 1901, Farwell employed 525 workers in the production of worsted cloth. The mill ran by water power and was located on a canal, since filled in, which also powered part of the Stafford Mill, the Pawtucket Thread Manufacturing Company and the Pawtucket Hair Cloth Company. A 300-horsepower Harris-Corliss steam engine, since removed, supplemented Farwell's power supply. In the 20th century, Bryan Marsh Incandescent Light Company occupied the mill. It is presently owned by a manufacturer of narrow fabric and webbing. (Steere; Hall, illus. pp. 241, 242; Interview with Elliot Lifland, Elizabeth Webbing, January, 1977.)

KENNEDY/STAFFORD MILL (1824)
561 Roosevelt Avenue
Central Falls

Pawtucket
19.302320.4639860
Providence

Pawtucket artisan Sylvanus Brown built a dam near this site in 1780. The mill privilege was subsequently occupied by manufacturers of scythes, edged tools, chocolate, and leather. Stephen Jenks produced iron bolts and ship hardware here in 1807 and built a shop close by in 1811 to finish 10,000 muskets for the United States government. Stephen Jenks & Sons later used the building as a textile mill and machine shop. The Smithfield Manufacturing Company, formed in 1806-1807, also

did cotton spinning here, using a part of the old chocolate mill. None of these structures survive. In 1824, John Kennedy, in conjunction with Samuel Slater's partners, Almy & Brown, built a brick mill on the site for the manufacture of cotton cloth. The 4-story mill with an end tower and a clerestory monitor (the monitor windows have since been covered over), and brick additions on the north and west, stands gable end to Roosevelt Avenue. The mill, later operated by John Gardner and then by Rufus J. Stafford, is one of the oldest brick mills in New England. The floors consist of fast-burning board-on-joist construction and are carried on large wood beams and cylindrical wood posts. The load-bearing brick walls are constructed in nine-course American bond. In the 1860s, Stafford built the mill's east addition (brick, with slow-burning interior) and the right-angle stone dam. The dam is 10 feet high and has a rollway of 156 feet. Stafford also enlarged the existing power canal and built a new one with a separate entry gate, to provide exclusive power for the Stafford Mill. The older canal had its flow divided among the Stafford and three mills downstream, the former Benedict Mill, Central Falls Woolen, and the Pawtucket Hair Cloth Company (separate entries for each). Originally built in 1823, the canal's water power was divided into six privileges and carefully apportioned to prevent the kind of legal difficulties which were then embroiling Pawtucket (see Sargeant's Trench). In 1965, both canals were filled in and no water-power equipment survives. The Stafford Manufacturing Company, established in 1864, produced cotton yarn here into the 20th century. No longer used for textiles, the mill is now vacant.

(Steere; Hall, illus. p. 241; "Central Falls Dam, Inspection Report", 31 October 1946, on file at Department of Natural Resources, Planning Division; Interview with Elliot Lifland, Elizabeth Webbing, January, 1977.)

PAWTUCKET HAIR CLOTH MILL (1864)
Roosevelt Avenue at Central Avenue
Central Falls

Pawtucket
19.302320.4639700
Providence

The Pawtucket Hair Cloth Company built this 3½-story brick mill in 1864 from the designs of architect William Walker. The mill, 204' X 54' with an ell 75' X 25', has a gable roof with a fine brick cornice and a central tower with an open arch belfry. The original belfry roof has since been removed.

The mill's plank-on-timber framing is carried on both cast-iron and wooden columns. The company (reorganized as the American Hair Cloth Company in 1893), was the major producer of hair cloth in the United States. Used as upholstery and crinoline fabric, hair cloth was made with a black cotton warp and horse-hair filling obtained from the tails of Siberian and South American horses. The mill saw the first large-scale use of Isaac C. Lindsley's automatic feeder (1861 patent), designed to secure individual hairs for the notched lance, or "nipper-stick," of the hair-cloth loom. Lindsley's invention solved the problem of adapting the power loom to horse-hair weaving. During the late 19th century, this steam-and water-powered mill ran as many as 400 looms, each running at approximately fifty picks per minute, and with one weaver generally tending ten looms. In the same period, company president Daniel G. Littlefield used a portion of the mill for the production of silk and cotton mixtures. This new product led to the formation of the Royal Weaving Company and eventually to the building of the massive Royal Mill in Pawtucket (see separate entry). Prior to the construction of the Hair Cloth Mill, the company operated a small number of hand looms in Pawtucket's Old Slater Mill (see separate entry), the site of Lindsley's invention. Currently used as a warehouse, the Hair Cloth Mill contains no historic machinery or power generating equipment.

(Chase; Grieve and Fernald, illus. p. 100; Steere; J. Haley, The Lower Blackstone River Valley, 1936, illus. p. 89; Pawtucket Past and Present, 1917; Horace Greeley, et. al., The Great Industries of the United States, 1872; Stephan Victor, "The Pawtucket Hair Cloth Company and the Horse-Hair Loom", article in progress)

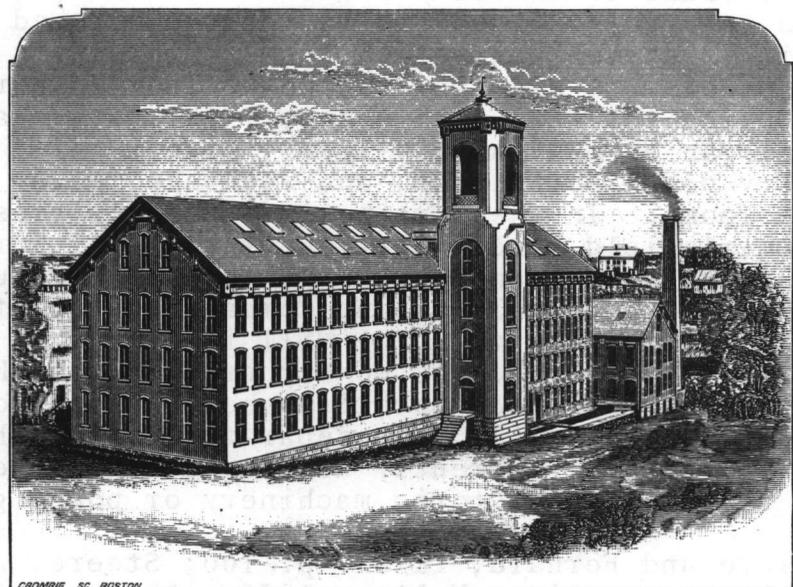
PAWTUCKET THREAD MANUFACTURING COMPANY/(1825) Pawtucket
BENEDICT MILL 19.302340.4639820
Roosevelt Avenue, south of Kennedy Mill Providence
Central Falls

The Pawtucket Thread Manufacturing Company, formed by Jabel Ingraham, Bosworth Walker, William Allen, and Uriah Benedict, built this rubble-stone mill in 1825. Originally four stories high, approximately 78' X 44' with a trap-door monitor roof, (the monitor has since been removed and the roof has been reduced in pitch), the mill produced thread, cloth, and textile machinery. The lower story was initially occupied by Fields & Jacobs who built machinery. Dwight Ingraham produced cotton cloth on the two upper stories, and the remaining space was



Pawtucket Hair Cloth Company,

PAWTUCKET, R. I.



CROMBIE SC BOSTON

Manufacturers of SUPERIOR Quality

HAIR SEATING.

LYMAN A. COOK, President.

OLNEY ARNOLD, Treasurer.



Metcalf & Littlefield, Agts.



(W. H. Munro, Picturesque Rhode Island. 1881)

used for yarn manufacture. By 1881, Horton & Wood occupied the mill for the manufacture of light sheetings, print cloths, thread, and yarn. It is now owned by a manufacturer of narrow fabric and webbing. No machinery of historic note survives, and much of the interior framing has been altered. (Steere; Hall, illus. p. 241; Interview with Elliott Lifland, Elizabeth Webbing, January 1977.)

UNITED STATES COTTON COMPANY/(1861-1863) Pawtucket
FALES & JENKS 19.302000.4640080
27 Foundry Street Providence
Central Falls

This 3-story, brick mill with a castellated central tower and altered clerestory monitor has had an impressive history. Built between 1861 and 1863 by the important textile machinery firm of Fales & Jenks, it was originally 300' X 63' with an ell 70' X 60', and was used as a machine shop. Fales & Jenks, one of the first companies to manufacture ring spinning frames (1845-1846) and the manufacturer of the Rabbeth spindle, the first high speed, self-centering spindle, occupied the shop for only two years. They subsequently moved to Pawtucket and built a large complex which has since been dismantled. The building was sold to the A. & W. Sprague Company, becoming part of their extensive holdings. The Spragues, one of Rhode Island's most powerful political-industrial families, produced linen until 1869 when they switched to print cloths. The Spragues failed in 1873 and the building was bought ten years later by the United States Cotton Company, incorporated 1885. The officers of the new firm were the direct descendents of the original owners. By 1917, the building housed 80 cards, 58,200 ring spindles and 1,600 looms. Aluminum paneling now covers the north extension. The building is currently used for the production of narrow fabric and has been owned by Murdock Webbing since 1955.

(Pawtucket Past and Present, 1917; Grieve and Fernald; Bayles; interview with Don Angelis, Murdock Webbing, September, 1975; Boston Manufacturers Mutual Fire Insurance Company Drawing, April, 1879)

VALLEY FALLS COMPANY (1849)
SE side of Broad Street Bridge
Central Falls

Pawtucket
19.301840.4641040
Providence

Samuel and Harvey Chace, sons of the Fall River mill owner Oliver Chace, built this 4-story, brick mill, with a helm-roofed central tower, in 1849. The mill was the site of the first use of American-made, Sharp & Roberts patent, self-actor mule spinning frames. They were built by James Brown of Pawtucket and installed in the mill's top floor. The Chaces specially designed the top story to accommodate the long mules. The floor contains no posts. The roof is supported instead by a type of king post truss with diagonal struts and vertical tie rods, similar to the later Waddell "A" truss. In July 1853, after the death of their father the Chace sons formed the Valley Falls Company. That same year the hewn-stone dam, gate house, and raceway were completed. The dam provided fourteen feet of head and replaced an earlier wood dam located upstream, the remains of which (along with the remains of a second, and earlier, wood dam) were photographed in 1939 during the repair of the stone dam. Also in the 1850s, the Chaces replaced the original breast wheel with four turbines. Today, only one early 20th-century, mixed-flow, vertical-shaft turbine, a 36" Hercules, is still in place. Sometime in the late 1860s, the small, stone picker house north of the mill was added. Built with heavy timber and slow-burning construction, the picker house is now in serious disrepair. In the same period, the first mill on the site, built by Abraham and Isaac Wilkinson in 1823, was dismantled. The Chace family owned or operated mills on both sides of the river from 1839 through the early 20th century. The Sayles Finishing Company owned the mills from 1917 to 1946, and the Sayles heirs still own the water rights. The mill on the Cumberland side, built by Crawford Allen in 1833 with additions built by the Chaces in 1868, was razed in 1934, though the gates and raceway survive. The Valley Falls Mill, last used for garnetting, may be the site of an adaptive reuse elderly housing project. (Steere; Grieve; Jenks and Ballou, "Report on the Samoset Dam," September 1952, in Department of Natural Resources, Planning Division; Associated Mutual Insurance Company Drawing, "Sayles Finishing Plants", 6 August 1915; J. W. Haley, The Lower Blackstone River Valley, 1936, photographs of Cumberland mill and its razing, facing p. 112 and between pp. 104 and 105; Interview with owner, Irwin Manekofsky, September, 1975.)

Manufacturing

AMERICAN SUPPLY COMPANY (1875)
1420 Broad Street
Central Falls

Pawtucket
19.301720.4641100
Providence

In 1870, Myron Fish, in partnership with a man named Grey, began the manufacture of weavers' reeds and harnesses in a room leased from the Valley Falls Company (see above). Five years later, Fish erected a building to house the company on the west side of Broad Street, south of the river. Sited gable end to the street, this 2½-story, wood-framed factory, with a trap-door monitor roof, continues to stand, directly opposite the remains of the Valley Falls Company mills. The original building, and its later additions on the south side, have been covered with aluminum siding. Myron Fish & Company produced oak belting, lace and picker leather, loom harnesses and reeds, shuttles, oil cans and wire heddles. The company also sold supplies for Jacquard looms. In 1883, Fish merged with the Kendrick Loom Harness Company to form the American Supply Company, capitalized at \$300,000. At the time, 125 workers were employed. The company continued to operate, supplying the state's textile mills, until it went bankrupt in 1961, a victim of the southern flight of Rhode Island's textile industry. The building is currently used for the manufacture of braid by a company which operates with early 20th-century, sixteen-carrier New England Butt braiders. Factory operation was originally powered by a Harris-Corliss steam engine. The engine has since been removed.

(Bayles; Hall; Munro, illus. and advertisement facing p.129; Interviews with Ed Pires, Central Braid & Rug Company, and Brig. Gen. Waldo Fish, grandson of Myron Fish, January, 1977.)

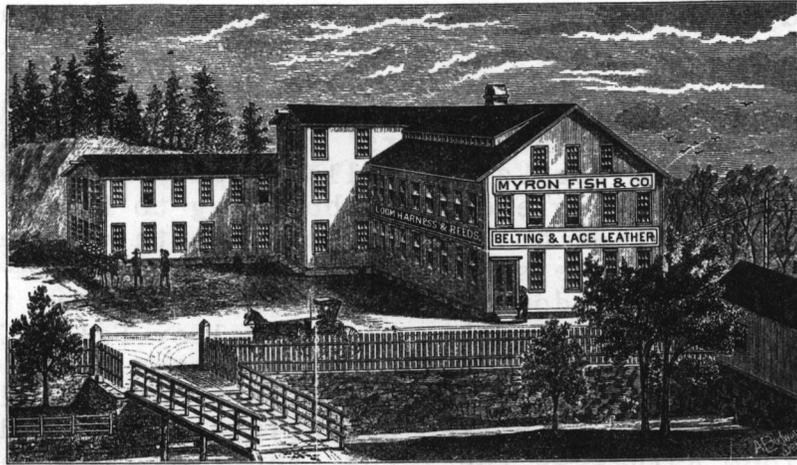
Bridges

BROAD STREET BRIDGE (1915)
Broad Street
Central Falls-Cumberland

Pawtucket
19.301700.4641140
Providence

The State Board of Public Roads built this 3-span, reinforced concrete-arch highway bridge in 1915. The bridge, faced with coursed granite ashlar, carries Broad Street over the Blackstone River and connects the towns of Cumberland and Central Falls.

(Rhode Island Department of Transportation, Bridge Design Section Files; Bridge #305.)



MYRON FISH & CO.,

MANUFACTURERS OF

Oak Belting, Lace and Picker Leather.

ALSO,

LOOM HARNES AND REEDS.

DEALERS IN SUPPLIES FOR COTTON, WOOLEN, AND SILK MILLS.

AGENTS FOR JOSEPH NOONE'S SONS' ROLLER, SLASHER AND CLEARER CLOTHS.

Agents for Roddick's Patent Improved Oil Cans. We have unequaled facilities for furnishing Shuttles and Heddle Frames, Wire Heddles and Wire Goods of all descriptions.

Special Notice to Worsted and Silk Mills.

We manufacture both worsted and cotton machine-knit Mail Harness for weaving fine worsted and silk goods. Also a full line of supplies for Jacquard Looms.

VALLEY FALLS, R. I.

(W. H. Munro, Picturesque Rhode Island, 1881).

Coventry

Bulk Products

ANTHONY MILLS (1810-1873)
Washington Street
Coventry

Crompton
19.288040.4618880
Kent

Cotton spinning began here on the Flat River in 1806 in a mill 80-feet long, owned by William and Richard Anthony and others. In 1810, a 6-story mill was built, the largest in the state. Three stories were of stone, and the upper three were of wood. In this period, the company played an important role in technological innovation. As early as 1809, five mules of 228 spindles each were in operation. The Anthonys also encouraged efforts to develop a power loom and had workable looms operating as early as 1817. William Anthony managed the mills until his death in 1845 when the company was acquired by Tully Bowen, and Cyrus and Stephen Harris. It was later owned by a corporation with John Warner, superintendent, and Stephen Harris, agent. In 1873, the old mills were taken down and a new factory was built. The 1810 mill lost its three upper stories, but it survived to be roofed over and used as a storehouse. The 5-story, 1873 mill is an unusually impressive stuccoed rubble-stone structure with quoined brick window surrounds. It is dominated by a large central tower with a tall open belfry. Stone & Carpenter designed the Anthony Mill, and construction was supervised by Thomas Sharpe. The mill had a capacity of 33,132 spindles and 736 looms. It is still used for textiles. Narrow fabric is produced here using Italian knitting machines and Italian and American needle looms. No steam engines survive, though they once were in place. One turbine plate casing, probably housing twin runners on a horizontal shaft, is still in place. Its generator, however, has been removed. (Cole; Interview with Tom Webster, Plant Engineer, June, 1976; King's Pocket Guide to Providence, 1883.)

ARKWRIGHT MILLS (1910)
Main Street
Coventry

Crompton
19.288120.4622520
Kent

The Arkwright Company was formed in 1809, taking its name from the English inventor, Richard Arkwright. A dam with a 23-foot fall was built across the Pawtuxet River and a mill was built on the river's south bank. The mill began operating in 1810. In 1822, another mill was built, 100' X 32', four and one half stories high, also situated on the south bank. The

first mill burned in August, 1851, and was not rebuilt. The last surviving section of the 1822 mill was torn down in 1976. However, a curved stone dam survives, approximately 250 feet above the current mill. It may duplicate the 1809 dam placement, but it is likely either a new dam or an extensively rebuilt and enlarged original. In the 1880s, the mill operated 6,656 spindles and 140 looms and made goods used as book cloth and Holland shades. The company changed its name to the Interlaken Mills when it incorporated in 1883. Interlaken, by the 20th century, operated both this site and the mills at Harris (see below). There are two buildings here today; a 1- and 2-story brick mill, with a saw-tooth-roof print room, on the south side of Main Street, built between 1910 and 1924; and a brick mill on the north side of the street, built in 1938, with some later additions. The mill continued to be a major producer of book cloth until quite recently. It is now producing graphics products and the manufacture of book cloth is being phased out. (Cole; Factory Mutual System Insurance Drawing, 21 November 1961; Interview with Hugh Loughran, Plant Engineer, June 1976.)

HARRIS MILL (1850)
618 Main Street
Coventry

Crompton
19.289040.4622080
Kent

This site on the north branch of the Pawtuxet River was occupied by a spinning mill, owned by Caleb Atwood & Son, in 1813. It stood on the west side of Main Street where a 2-story stone building now stands (formerly the Lanphear Machine Shop, 1846). In 1821, Elisha Harris bought land on the opposite side of Main Street and built a textile mill, 34' X 50'. This mill has since been destroyed. In 1850-1851, Harris built a new mill of stuccoed rubble-stone 174' X 48', with an ell, 43' X 42'. This mill, 3-stories high with a clerestory monitor, still stands gable end to the street, though it no longer has its Greek Revival belfry. H. R. Hitchcock claimed that the noted architect James Bucklin designed the mill. In 1860-1861, a new dam was built and a third mill was constructed, evidently at the same time. Incorporated as the Harris Manufacturing Company in 1865, the firm operated 16,928 spindles and 408 looms by the late 1880s in the manufacture of plain and twilled cloth. The 1860-1861 mill no longer stands. The dam, damaged in a flood in 1886, was later rebuilt to 150 feet in length. Two raceways still lead from it; one to the 1850 mill,

the other to the site of the 1860 mill. The former still carries process water used by the current occupants. A vertical turbine, once supplying direct mechanical drive, is still in place, though not used. The mill had two Corliss engines (since removed) to supplement water power during dry months. The mill was last used for textiles by the Interlaken Company in 1954. In 1956, the current owners, a wire and cable company, took possession and continue to use the mill for manufacture. Extensive early 19th-century worker housing exists on streets northeast of the mill. (Beers; Cole; H. R. Hitchcock, Rhode Island Architecture, 1939, plate 38; interview with Donald Langlais, Victor Electric Wire & Cable, June, 1976.)

HOPKINS HOLLOW GRIST MILL/(1847)
BLACKSMITH SHOP
Hopkins Hollow Road, Greene Village
Coventry

Oneco
19.270960.4615960
Kent

This 2-story, wood-frame grist mill was the third built on this site. It was constructed by Peleg Andrews in 1847 and continued to operate until the 1920s. The mill still contains the stones and hopper. It was driven by a horizontal turbine, probably built by James Leffel & Company, c. 1875, and still in place. The mill employed a conveyor system for moving the finished grain. Part of the system included a series of small scoops attached to a chain which carried grain from one floor to the next. The chain is enclosed in two hollow posts with openings to load and unload the scoops. The mill was fitted out as a museum by Edwin Arnold and contains numerous hand tools, including an excellent collection of wood planes. The blacksmith shop was entirely refitted by Arnold in the 1930s and is housed in a building, formerly used as an ice house, adjoining the grist mill. It contains a hoist for lifting oxen so that they might be more easily shod, as well as more common equipment, such as forge, anvil, and bellows. A section of the shop closest to the grist mill is said to be the second grist mill built on the site. The blacksmith shop also contains early hand tools collected and displayed by Mr. Arnold. Some of the collection was previously donated to Old Sturbridge Village. The site is no longer open to the public.
(See Hopkins Hollow Sawmill.)

HOPKINS HOLLOW SAWMILL (c. 1800)
Hopkins Hollow Road, Greene Village
Coventry

Oneco
19.270820.4616580
Kent

Parts of this up-and-down sawmill date from c.1800, or perhaps earlier. Originally built in Hopkington, Massachusetts, by Colonel James Mellen, the saw, carriage, and some of the heavy timber framing were moved to the present site about 1935 by Edwin Arnold. Arnold reconstructed the mill on a stone foundation and had it in operating condition before his death. With some repair, it could be operated again. The mill is driven by a pair of iron Rose wheels mounted on a horizontal shaft. It is not clear whether these were part of the equipment taken from Hopkinton. The water was carried to the wheels through an enclosed wooden sluice, rebuilt, along with the rest of the sluiceway, about seven years ago. The drop of water from the upper level of the sluice to the wheels is about seven feet. The saw, about six feet in length, appears to be in good condition. The shaft, or pitman, leading from the turbine shaft to the saw frame is still in place, as is the network of connecting arms, leading from the saw frame to the ratchet-controlled gig wheel. The latter mechanism controls the speed and movement of the carriage on which the logs are placed, the former controls the movement of the saw. The only part of the machinery in need of repair is the shaft and chain regulating the return of the carriage after the cut is made. The first sawmill on the site was built by Richard Rice between 1741 and 1745. In 1820, the mill was acquired by the Hopkins family. The original sawmill was taken down and a new one was built c. 1840. That mill survived on the bank opposite the reconstruction until the 1920s.

(M. & M. Zimiles, Early American Mills, 1973, photo p. 62; Mrs. Edwin Arnold, "Hopkins Hollow and Roaring Brook" ms. in author's possession; Interview with Mrs. Arnold and Howard Matteson, May, 1976; Interview with Sandra Daniels, Old Hopkington Village, Inc., May 1976.)

QUIDNICK MILLS (1848)
Quidnick Street
Coventry

Crompton
19.288600.4618580
Kent

Originally the site of a paper mill, cotton and woolen factories, and print works, this property was bought by A. & W. Sprague in the 1840s. In 1848, the Spragues built a stone mill which they later extended. By the late 19th-century,

the mill, 415' X 50', was four stories high with a clerestory monitor. The building survives though the belfry on its central tower was removed about four years ago, and the tower loading doors were replaced with glass. A second stone mill was built in 1869, 225 feet in length. It is three stories high with a pitched and dormered roof and stands 1,000 feet southeast of the 1848 mill. Horace Foster built both mills with granite from the Sprague-owned quarry at Oneco, Connecticut. When the Spragues failed in 1873, the mills became part of the Union Company. In 1884, the Quidnick Manufacturing Company, whose largest owners were William D. Davis and Henry A. Hidden, bought the site. They operated 31,460 spindles, 877 looms, and employed 500 in the manufacture of print cloths, sheetings, and twills. The site is now occupied by a chemical dye-stuff manufacturer. The 1848 mill is largely used for office space; the 1869 mill is used for storage. A building on the south side of the 1848 mill contains a turbine, or possibly a pair of turbines, housed in a casing nine feet long and nine feet in diameter. There are plans to scrap the turbine. Early examples of worker housing survive on streets east of the mill.

(Cole; Hall, photograph, p.231; Associated Factory Mutual Drawings, 25 July 1915, 26 July 1915; Allendale Insurance Company "Quidnick Mill One and Mill Two", Insurance Drawings, c. 1874, plan book, pp: 154-55. Factory Mutual System, Plan Division, "Fire Prevention and Extinguishment in Early Mills," unpub. ms. prepared by J. J. Crnkovich.)

Bridges

ARKWRIGHT BRIDGE (1888)	Crompton
North of Arkwright Mill Over Pawtuxet River	19.288160.4622740
Coventry	Kent

Dean & Westbrook of New York built this 125-foot, single-span through Pratt truss, with Phoenix columns, in 1888. The bridge carries a roadway over the Pawtuxet River just north of the Arkwright Mills. With its unusually light members, the Arkwright Bridge is one of the finest surviving truss bridges in Rhode Island. It is also the only Phoenix column bridge known to survive in the state. The Phoenix column, patented by Samuel Reeves in 1862 and resembling an earlier column developed by Wendel Bollman, consists of four

flanged wrought-iron segments bolted together, like barrel staves, to form a cylinder. Phoenix columns provided greater tensile strength than cast-iron columns and were widely used in buildings and bridges by the 1870s.

(C. Condit, American Building, 1968; C. Condit, American Building Art; The Nineteenth Century, 1960.)

FLAT RIVER RAILROAD BRIDGE (1910)
Route 117 at Flat River Reservoir
Coventry

Coventry Center
19.281260.4620000
Kent

This steel-beam railroad bridge spans the Flat River Reservoir and was built in 1910 by the Pennsylvania Steel Company of Steelton, Pennsylvania. It is approximately 50 feet long and stands 30 feet above water level. Its large abutments are constructed of cut stone. The bridge is a common type of early 20th-century railroad span. Once used by the New York, New Haven, and Hartford Railroad, it no longer carries tracks.

INTERLAKEN MILL BRIDGE (c. 1885)
South of Arkwright Mill
over Pawtuxet River
Coventry

Crompton
19.288400.4622500
Kent

The Berlin Iron Bridge Company, East Berlin, Connecticut, built this 100-foot long, single-span, lenticular truss bridge c. 1885. The bridge connected the new dye house and bleachery of the Interlaken Company on the north side of the Pawtuxet River with the former Arkwright Mills on the south bank. Interlaken, incorporated in 1883, owned the buildings on both sides of the river. The lenticular, or parabolic, truss was designed in 1878 by William O. Douglas of New York. The Berlin Company had a virtual monopoly on this bridge type. This is the only lenticular truss known to survive in Rhode Island. In scaled-down form, it replicates the principles of the five-span Aiken Street Bridge in Lowell, Massachusetts, built in 1883.

(Hall, photo, p. 315; D. Plowden, The Spans of North America, 1974.)

WASHINGTON BRIDGE (1919)
South Main Street/Nooseneck Hill Road
Coventry

Crompton
19.286360.461832
Kent

Designed by C. L. Hussey and built by R. Stoddard, this single-span, concrete-arch highway bridge crosses the south branch of the Pawtuxet River. Built in 1919, the bridge is 67 feet long and 40.3 feet wide.

Cranston

Extractive Industries

CRANSTON ORE BEDS (1767)
Along Furnace Hill Brook
West of Phenix Avenue
North of Hope Road
Cranston

North Scituate
19.291760.4625300
Providence

The Cranston ore beds were opened in 1767 when a company was formed to dig bog iron. The land was owned by Jeremiah Burlingame who entered into an agreement with Israel Wilkinson to provide ore for the newly-opened Hope Furnace, owned by the Brown Family of Providence, noted merchant/industrialists. The ore beds are located along Furnace Hill Brook, north of Hope Road and west of Phenix Avenue. The land in this area exhibits evidence of extensive working. The remains of one stone structure, a foundation for another, and the ruins of at least two dams survive. One of the dams, about ten feet high, was possibly constructed as a diversion dam. This site saw the first use of steam power in Rhode Island. A Newcomen engine, built by James Brown, was constructed here c. 1780. It pumped water from a well eighty feet deep and twenty-three feet wide. According to one description, the engine had a cylinder two feet in diameter and a beam four feet in diameter and twenty feet long. It was capable of raising seven hogsheads of water per minute. This was probably one of the first two successful Newcomens built in the United States. Elijah Ormsbee, who later went on to develop a steamboat with David Wilkinson, worked here and received his first introduction to steam power. The ore was dug in part by slaves and was raised in one-ton buckets by means of a capstan turned by an ox. The beds, also associated with Governor Stephen Hopkins, ceased operating sometime in the early 19th century.

(J. Hedges, The Browns of Providence Plantations, The Colonial Years, 1952; Transactions of the Rhode Island Society for the Encouragement of Domestic Industry in the Year 1861, 1862; P. Morrill & W. Winslow, Rhode Island Mines and Minerals, 1969; Bayles.)

Bulk Products

CRANSTON FURNACE AND DAMS (c. 1767) Providence
Furnace Hill Road 19.293140.4625400
Cranston Providence

Just west of Furnace Hill Road and south of Phenix Avenue are the 18th-century ruins of what may once have been the furnace for the Cranston ore beds. Only parts of the rubble-stone walls survive. The structure was at least two stories and was built into the side of a steep hill. Furnace Hill Brook, which runs by the site, is a narrow, rocky stream which drops sharply in the last 200 feet of its approach to the furnace. It is likely that the furnace was used only briefly, and that most refining of Cranston ore took place at Hope Furnace. In 1831, the structure appears on a map as the Union Dye House Mill. In 1855, it was called the Cranston Furnace, and in 1862, the Cranston Foundry. By 1895, it was apparently in ruins. The remains of three dams survive above the site and east of Phenix Avenue. The first dam spanned a narrow point of the brook just above the site. No evidence of gates or raceways survives. A second dam, upstream, is approximately twenty feet high and is built of rubble-stone with a top course of concrete, evidently added later. It no longer spans the brook, but a substantial section still survives. A third dam was built farther upstream, also of rubble-stone, but much smaller than the second dam. Only its abutments remain.

(J. Stevens, A Topographical Map of the State of Rhode Island, 1831.; H. F. Walling, Map of the State of Rhode Island, 1855; H. F. Walling, Map of the State of Rhode Island, 1862; Everts and Richards.)

CRANSTON PRINT WORKS (1862-1864) Providence
1381 Cranston Street 19.295520.4629180
Cranston Providence

William Sprague built a spinning mill on this site in 1807. The mill burned in 1815 and was immediately rebuilt. It is unlikely that any buildings survive from this period. Hand-printed calico cloth was produced here as early as 1824 and machine printing began, under the direction of James Doran, in 1837. The main buildings, stuccoed stone-rubble, two to three stories high, form a U facing Cranston Street. They were built in 1862-1864 and were used for machine printing,

calendering, engraving, and aging. The printing building has a characteristically high ceiling to permit the operation of the tall calico printing machines. Six out-buildings, one of cut stone, the others of rubble, survive at the north end of the site. Most were built in the early 1860s, though one 3-story, pitched-roof structure (Building 116) may be earlier. These buildings were used to house a blacksmith shop (Building 129), a carpenter shop (Building 131), a machine shop (Building 117), and a bleach house (Building 124). Buildings 115 and 116 were used for storage. Elevated railroad tracks lead into Building 115. Most other building construction dates from 1921 and later. The boiler house, rebuilt in 1921, contains a Harris-Corliss steam engine, c. 1890, approximately 24" X 48", with a fly wheel 15 feet in diameter. It generated electricity (a Crocker-Wheeler generator is still in place) and also provided direct mechanical drive (the steam engine was recently moved to a museum in Rockport, Maine). Two Skinner "uniflow" steam engines, installed about 1941, survive. The two oldest boilers were built by D. M. Dillon of Fitchburg, Massachusetts. The stack was built of yellow brick by the Alphons Custodis Company of New York. The Spragues, a leading industrial/political family, operated the works until their failure in the depression of 1873. The complex remained idle until 1888 when it was bought by the huge textile combine of B. B. & R. Knight. The Cranston Print Works Company was formed at this time. In 1920 the plant was bought by the William G. Rockefeller interests and it continues to produce print cloth to the present. The site also contains a dam, entry gates, and a raceway. Extensive mill housing remains on both sides of Dyer Street and the Sprague Mansion, on Cranston Street, also survives. (Bayles; Insurance Drawing, undated but c. 1971; A. B. Crandall, Blanchards of Rhode Island, 1942; Providence Journal, 3 December 1864.)

NARRAGANSETT BREWERY (1889-1911)
 New Depot Avenue
 Cranston

Providence
 19.296940.4630240
 Providence

The Narragansett Brewery Company built this complex of brick brewery buildings between 1889 and 1911. The first buildings on the site are those adjacent to the railroad tracks and abutting New Depot Avenue. These were used for brewing, hop straining, and fermenting. The tower, used as a malt grain bin, is still in place, though its ornate mansard roof has been covered with lead-sheeted copper. Further south along

the railroad line stands a 4-story, brick structure with small windows and hip-roofed tower on its northwest corner. This building, built in 1911, was used for fermenting and storage. Abutting it on the south is the 1898 ale department, a 4-story mill with pilasters and arched corbels at the roof line. Most of the production buildings are still in use and retain their original functions. The boiler house, built in 1890, 90' X 51', is located on New Depot Avenue. Its ornate brickwork, also prominent on other buildings, includes the use of large, round-arch brick headers and heavy granite insets. The first floor contains one Worthington and two Warren steam pumps, c. 1900, used to pump fuel oil. The Warren pumps are fitted with Fisher governors. In the basement there are two Ingersoll-Rand steam turbines, used as feed water pumps, generating 89 horsepower at 3500 rpm. A new power house was completed in 1948. It contains six Terry steam turbines, three for refrigeration and three for generating power. The brewery is still operating, though not too many years ago it went the way of most local breweries, and was bought out by a national chain (Everts and Richards; Factory Mutual System Insurance Drawing, (date unclear on copy, but c. 1940); Interview with Charles Ulmschneider, plant engineer, April, 1976.)

Manufacturing

UNIVERSAL WINDING COMPANY (c. 1900)	Providence
Elmwood Avenue near Pawtuxet River	19.298220.4625920
Cranston	Providence

The Universal Winding Company plant, built c. 1900, once covered twenty-seven acres of land. The buildings were previously occupied by the Atlantic Rubber Shoe Company and by the Maxwell Briscoe Motor Company. The latter firm, manufacturers of the Maxwell automobile, installed larger elevators, concrete floors, and new shafting and machinery in 1909. Universal Winding, incorporated in 1893, moved to the Elmwood Avenue site in 1914. The company specialized in making winding machines for the textile and electrical coil industries. The Universal Winder, adapted for yarn, cord, or twine, achieved an international reputation. It incorporated a new, self-supporting method of winding. Essentially, it operated without a revolving drum, winding instead on a tube placed on a positively-driven spindle. The textile exhibit at the Slater Mill Historic Site contains a Universal winder, built in 1926. The company employed 1,200 to 1,500 workers and was said to

be the largest firm in the world exclusively devoted to building winding machinery. The 3-story, brick-pier buildings, with windows running pier to pier, still stand on Elmwood Avenue. The company changed its name to Leeson in 1959, which is a derivation of the name of Joseph Leeson who founded and owned the company for many years. It moved to Warwick, Rhode Island in 1962. The original buildings are now divided among tenants.

(The Book of Rhode Island, 1930, illus., p. 234; International Correspondence Schools Reference Library, Vol. 89; Providence Journal, 21 July 1909)

Transportation

RHODE ISLAND COMPANY TROLLEY BARN (1912) Providence
1160 Cranston Street 19.296400.4629580
Cranston Providence

This trolley barn was built by William H. Hamlyn & Son of Providence from designs by H. H. Bronsdon, chief engineer of the Rhode Island Company. It was built to supplement the company's 1900 depot and repair shop (see below). It is a 2-story, brick building, 400' X 200', constructed on a concrete foundation. Originally serving as an operating trolley barn and light repair shop, it had a capacity for 96 40-foot trolley cars on twelve tracks. The cars entered the barn through huge openings in the southern wall. The pit room, 150' X 200', was constructed to allow repair crews to work under the cars. The repair shop, 120' X 20', housed a traveling crane, the tracks of which are still in place. The original repair pits have been covered and the south facade sheathed in aluminum. The building is now used by a company which manufactures centrifugal pumps and heating equipment.

(Board of Trade Journal, Providence, October 1912.)

UNITED TRACTION DEPOT & REPAIR SHOP (1900) Providence
Cranston Street 19.297100.4630580
opposite Narragansett Brewery Providence
Cranston

The United Traction & Electric Company built this imposing 2-story, brick-pier building as a street car depot and repair shop only six years after the last horsecars ran in Providence. The building has large blind arches, heavy granite lintels, and intricate corbelling. United Traction, chartered in

New Jersey in 1893, bought out three smaller companies; the Pawtucket Street Railway, the Providence Cable Tramway, and the Union Railroad, the latter originally organized by the Spragues, Cranston textile mill owners, in 1864. Nelson Aldrich, United States Senator from Rhode Island, played a key role in the consolidation. Part of the capital was supplied by the American Sugar Refining Company and since Senator Aldrich had previously sponsored legislation to benefit American Sugar, the press raised serious questions about the propriety of the transaction. Two years later, an even larger monopoly was created. The newly formed Rhode Island Company not only owned the city's trolley lines, but controlled as well the Providence Gas Company and the Narragansett Electric Lighting Company. In 1906, following the pattern of increasing monopoly control especially evident in this period, J. P. Morgan's New Haven Railroad bought out the Rhode Island Company. With the national demise of urban trolley lines, the Narragansett Brewery bought the depot about 1938 and converted it to use as a warehouse. Some street car tracks are still in place inside, though most of the original equipment and fittings have been removed.

(Scott Molloy, Division 618: Streetcar Employees Fight for a Union in Rhode Island, Providence, 1977.)

Bridges

ELMWOOD AVENUE BRIDGE (1918)	Providence
Elmwood Avenue	19.298370.4625930
Cranston-Warwick	Providence

This 3-span, reinforced-concrete deck-arch bridge, 153 feet long and 53 feet wide, carries Elmwood Avenue across the Pawtuxet River. Designed by C. L. Hussey and built in 1918, it was a model for many later state bridges. The bridge was widened in 1931.

(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #1.)

PAWTUXET BRIDGE (1883-1884)
Route 1-A
Cranston-Warwick

Providence
19.301220.4626120
Providence-Kent

This small double-arch stone bridge spanning the Pawtuxet River was built between 1883 and 1884. The engineer was J. A. Latham and the builders were Garvey Brothers and H. C. Macomber. Originally built about half as wide as it is now, the bridge was enlarged on its west side in 1932. Because of this enlargement, an additional arched opening, about 20 feet wide, had to be built on the northwest side. This was necessary because the river was approximately 190 feet wide at the newly built west abutments and only about 100 feet wide on the east. The third opening helped to prevent the danger of flooding and reduced water-flow stress on the center piling and the northwest abutment. The water entering that opening is carried into the main arch in a curved sluice. Except for this engineering feature, the bridge is typical of the small stone spans built in Rhode Island throughout the nineteenth century. It is on the National Register as part of the Pawtuxet Village Historic District.

(Location Plan 240, Final date, 28 September 1933, Rhode Island Department of Transportation, Bridge Design Section Files.)

PAWTUXET RIVER RAILROAD BRIDGE(c. 1915)Providence
Cranston-Warwick

19.297860.4625840
Providence-Kent

The New York, New Haven & Hartford Railroad built this modified, double-intersection Warren through-truss bridge about 1915. 100 feet long and visible from Interstate 95, the bridge carries tracks over the Pawtuxet River. It is still in daily use on Amtrack's Northeast Corridor Route.

Cumberland

Bulk Products

ANN & HOPE MILL/LONSDALE COMPANY (1886) Pawtucket
1 Mill Street 19.300960.4642560
Cumberland Providence

Built in 1886 by Providence mill architect and engineer Frank P. Sheldon, this massive 4-story brick mill, was known as the largest New England textile mill of its time. The main building, 498 feet long, has a bracketed low-pitched roof with central tower. The 2-story addition on the south was built in 1901. The boiler house at the center rear of the mill contained a 2,000-horsepower steam engine, but all the boiler house equipment was removed in 1950. The mill is located in the "new village" of Lonsdale and was owned by the Lonsdale Company. The "old village", also owned by the Lonsdale Company (see separate entry), is located just across the river in the town of Lincoln. In 1901, the mill produced cambric muslins, Hollands, and sheetings with 37,700 mule spindles and 27,700 ring spindles. The first floor contained 1,400 looms and all the weaving was done there. Carding machines occupied the second floor. Spinning, spooling, warping, and slashing were done on the third and fourth floors. As of 1907, the Lonsdale Company was the largest Rhode Island user of the recently patented Draper loom - a loom with an automatic bobbin changer. They were also among the loom's first users, putting themselves in the forefront of technological change. The mill is now used as a discount store and warehouse. An earlier mill complex, built by the company between 1861 and 1913, was located along Mill Street west of the railroad tracks. When the company ceased operations in the village in the early 1930s, that complex was demolished. A substantial number of mill houses, built between 1861 and 1890 still survive along Broad, Main and Blackstone Streets.

(Chase; Hall, photo p. 80; Labor Saving Looms, 3rd. Edition Hopedale, Mass., 1907.)

ASHTON MILL (1867) Pawtucket
Ashton Village 19.297980.4645700
Cumberland Providence

The Ashton Mill was erected by the Lonsdale Company in 1867. At that time, it was 348' X 90', four stories with a "french" roof. The roof has since been removed, though a mansard roof still surmounts the handsome 2-story office building built onto the southeast side of the mill. The mill is brick

with a central tower which has a peaked, hipped roof and bracketed eaves. There are triple round-head arches on each side of the tower belfry and the bell remains in place. Granite belt courses run under the recently bricked-over windows. The mill played a major role in 19th-century textile technology. It was the site of the first large-scale test of the high-speed Sawyer spindle, one of the first high speed spindles developed in the United States. The Ashton Mill placed an order for 4,000 of the new spindles in 1871. The Sawyer was twenty-five per cent faster and weighed one-third less than the common spindle. It eventually developed problems, however, as wear set in, and its promised speed could not be delivered. Improvements were eventually made sufficient to allow the high-speed spindle to play a major part in the replacement of mule spindles, requiring skilled male labor, with ring spindles which could be tended by unskilled females. The building is still used for manufacture but the dam is no longer used to provide power. The turbines are still in place, but the generators were removed in 1940-1941. The adjoining village of Ashton, containing 19th-century brick multi-family worker housing, survives virtually intact. (Bayles; T. Navin; The Whitin Machine Works since 1831, 1950; Interview with Thomas Milligan, engineer, Owens-Corning, May 1976.)

BERKELEY MILL (1872)
Berkeley Village
Cumberland

Pawtucket
19.298600.4644100
Providence

The Berkeley Mill, a 4-story brick building with a bracketed roof of slight pitch, was built in 1872 by the Lonsdale Company. At the time, it was 300' X 90' with a 3-story ell, 20' X 90', added in 1881. The central tower, of simplified Romanesque style, has characteristic freight door openings on each floor, brick drip moldings and a belfry with triple round-arch openings with granite insets. This architecturally handsome mill, with its surviving mill village, was named in honor of Bishop Berkeley. The company produced cambric muslins and fine shirtings. In 1891 the mill operated 927 looms and employed 600 workers. It was the site of a bitter strike over changes in piece rates and loom speeds in 1889. The mill is now used as a warehouse for a local transportation company. The handsome, company-built mill village has been entered on the National Register of Historic Places.

(Chase; Bayles; Berkeley Mill Scrapbook, Lonsdale Collection, Rhode Island Historical Society Library.)

GRANTS MILLS (1818)
Grants Mills
Cumberland

Franklin
19.299800.4653120
Providence

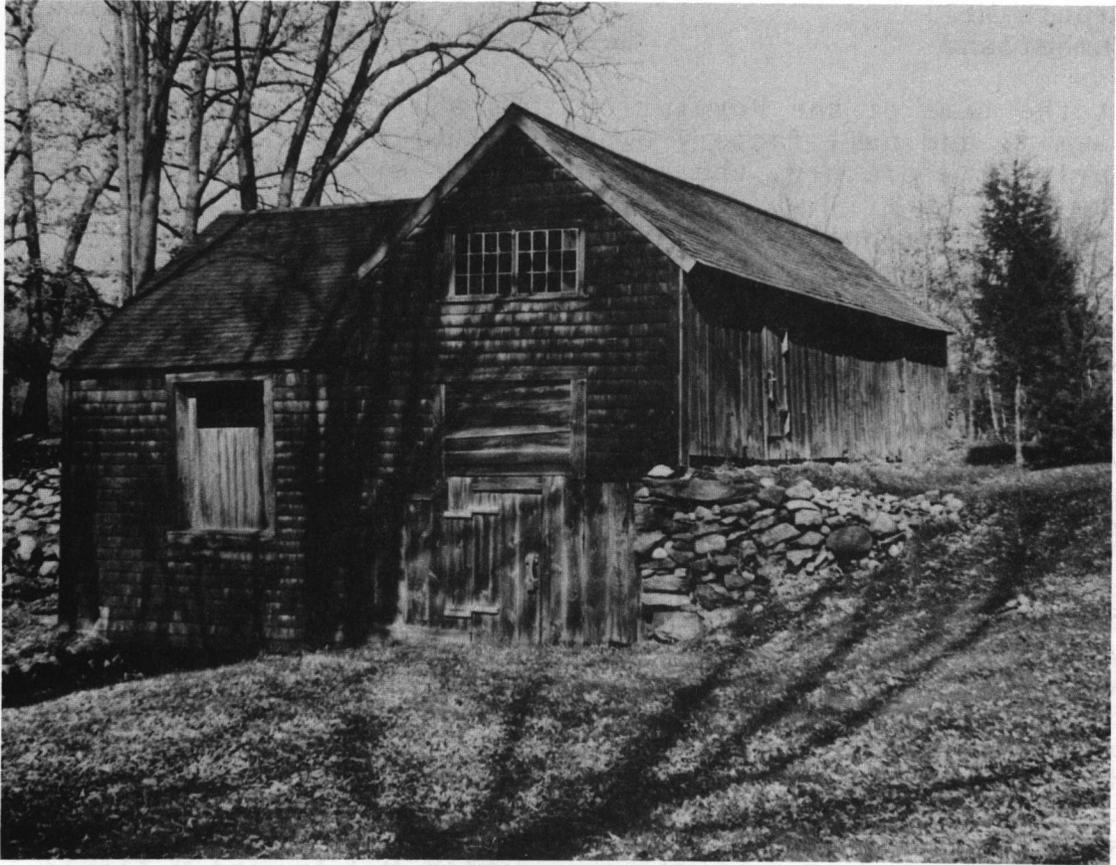
At the time of the Revolution this site was occupied by a sawmill and nail factory owned by the Tower family. In the early 19th century, the structure was swept away by flood. The current mill was built about 1818, 100 feet south of the original building, and was designed as a combination sawmill and grist mill. Part of the current sawmill may date from that period. The sawmill, with its reciprocating saw, was designed according to the principles articulated by the noted millwright, Oliver Evans. The saw is now linked with a connecting rod and crank to an iron impulse wheel. Mortices for the blades of either a tub or flutter wheel are cut into the vertical shaft which connects with the rack wheel. The earliest dated machinery on the site is a part of an adjustable saw dog which bears the markings, "H. Boyd & Son, 1844". The grist mill was placed in an addition on the west side and its machinery probably dates from mid-century as well. The mill was powered by an inward-flow turbine with wicket gates, manufactured by the Angell Water Wheel Company, Providence, and invented c. 1865 by Otis N. Angell & Son. Many structural changes were made before the mill ceased operation in 1932. The old wooden dam was replaced by a concrete one which does not duplicate the original sluice placement, though the tailrace still survives. The owner is currently engaged in restoration. (Bayles; Oliver Evans, The Young Mill Wright and Miller's Guide, 1975; Interview with owner; Asher & Adams' Pictorial Album of American Industry, 1876, reprinted by Rutledge Books, N.Y., 1976.)

Manufacturing

METCALF MACHINE SHOP (1825)
Arnold Mills
Cumberland

Pawtucket
19.301820.4649960
Providence

Built in 1825 by Joseph and Ebenezer Metcalf, this 2-story, wood building with oak flooring was originally used as a machine shop. The Metcalfs made cotton machinery and spinning frames. In 1840, the property passed to Mowry Taft and Charles B. Carpenter, and in 1850, Charles Metcalf became sole



Grants Mills (Gary Kulik).

owner. The machine shop continued in operation at least until 1870. Sometime after that, the building was used by the Nicholas Brothers for the manufacture of straw hats and also housed a blacksmith shop. In approximately 1912, the building was bought by Nathan Whipple who fitted it out as a gristmill. Most of the remaining machinery, including a Monarch grain mixer and two grinders, was put in place in this period. A 60-horsepower turbine c. 1912, is still in place. The teeth of one of the bevel gears (the mortice wheel) moved by the turbine are made of maple. In 1925, the mill was bought by the Pawtucket Water Works, but under lease it continued to grind feed grain into the 1960s. It is now occupied by a garden supply outlet. (Interview with Chief Parker, Cumberland Fire Department, and former employee, September, 1975; Bayles.)

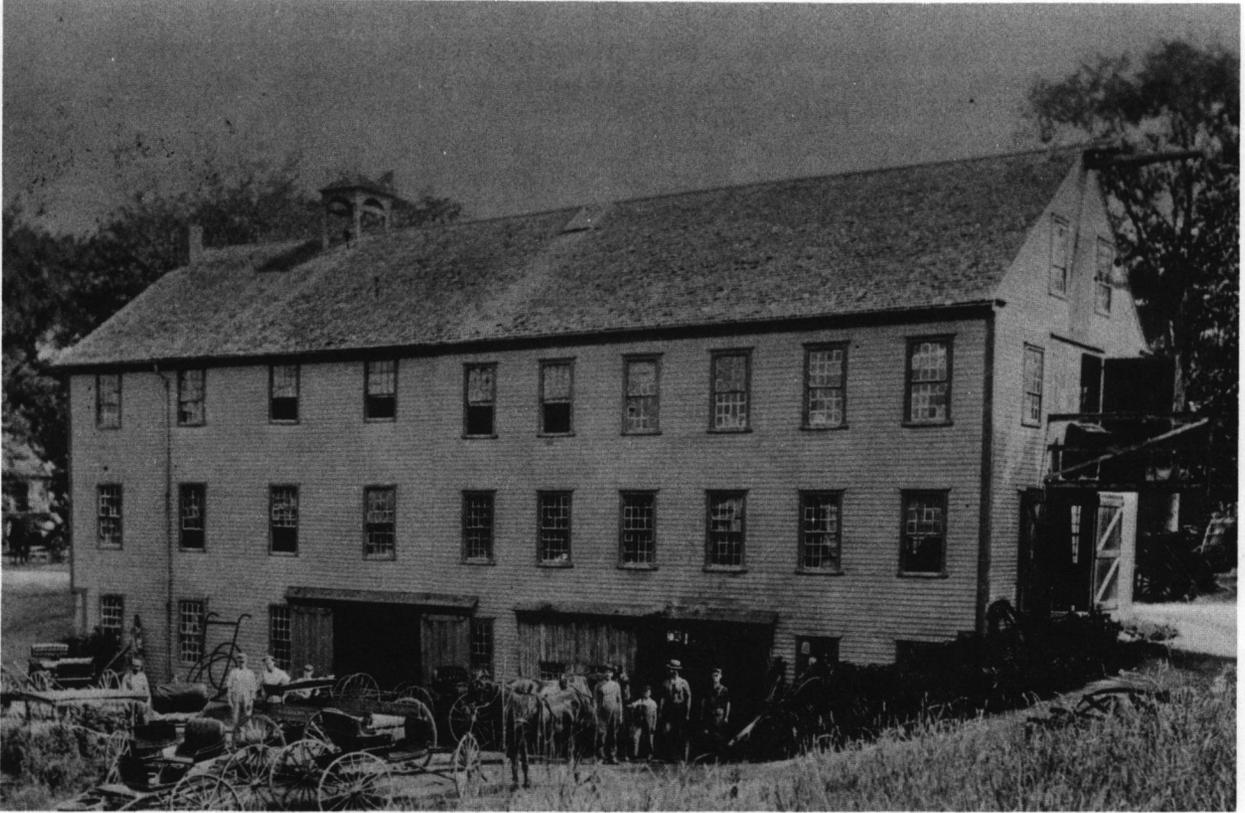
Utilities

PAWTUCKET PUMPING STATION NUMBER 3 (1888)	Pawtucket
Spring Street	19.302100.4641460
Cumberland	Providence

The Pawtucket Water Works erected its Number 3 Pumping Station in 1888. The building is brick and has a slate roof supported by a wooden truss with wrought-iron tie rods. The station contained a six-million-gallon-per-day Corliss steam pump and filter beds of eighteen inches of gravel and twelve inches of charcoal. The small filtration building survives and is adjacent to the pumping station on its north side. In 1921, a five-million-gallon-per-day, electrically-driven Delaval pump was installed. The Corliss was deactivated in 1932 and removed. The building is still used by the Pawtucket Water Supply Board.

(Interviews with Robert White, Director, and Mike Gula, Supervisor of Pumping Stations, September, 1975; Records of the Water Supply Board; The Pawtucket Times Historical Magazine, 8 October 1921.)

...the machine shop continued in operation at least until 1870. Sometime after that, the building was used by the McHenry brothers for the manufacture of steel nails and also housed a blacksmith shop. It approximately 1912 the



...subject to the purchase action on its north side. In 1911, a five-acre section was electrically driven by a

**Metcalf Machine Shop when it was used as
Neil McKenzie's blacksmith shop, c. 1900 (RIHS).**

...Supply later. The first of these was the White, Director, and Mike Gals, Super-
...of 4 being 2nd one, September, 1917; Records of the
...with Capital Bank, the Payroll of Third Historical Magazine,
...3 October 1917.

Bridges

ABBOTT RUN RAILROAD BRIDGE (1874) Pawtucket
Abbott Run at Spring Street 19.302060.4641210
Cumberland Providence

The Abbott Run Railroad Bridge was built to carry a double track of the New England Railroad across the Abbott Run at its confluence with the Blackstone River. It is a wet-laid, granite ashlar structure with a single barrel-vaulted span of 40 feet and a rise of 20 feet. The tracks are carried on an earth-fill roadbed some ten feet above the top of the masonry. In 1877, the New York & New England Railroad, a consolidation of numerous lines which in Rhode Island dated back as early as 1846, completed a link via Valley Falls from their main line in Franklin, Massachusetts to Providence. The Abbott Run Bridge formed part of that branch. It now carries a single track and continues in use.

BROAD STREET BRIDGE (1890) Pawtucket
Broad Street at Pleasant Street 19.301300.4642380
Cumberland Providence

The Broad Street Bridge was built in 1890 by the Pencoyd Bridge Company, Pencoyd, Pennsylvania, on the border of two mill communities, Valley Falls and Lonsdale. It is a single-span, Pratt truss with riveted lattice girder posts. The top chords and end posts are combination plate and lattice girders. The bridge carries a roadway over the railroad track of the Providence & Worcester, a line which serviced all the textile mills along the Blackstone River. (Everts and Richards.)

CHURCH STREET BRIDGE (c. 1882) Pawtucket
Church Street 19.301560.4642050
Cumberland Providence

This narrow, iron truss highway bridge built about 1882 carries Church Street over the tracks of the Providence & Worcester Railroad. It was designed and constructed by the Boston Bridge Company; D. H. Andrews was the engineer in charge. The bridge is a single, double-intersection Warren through truss

with riveted connections. It is 108 feet long, 20 feet 4 inches wide, and has a clearance of 17 feet 4 inches above the deck. Sidewalks six feet wide are cantilevered from the sides of the truss and have iron lattice guard railings mounted with cast-iron gaslight standards. The bridge deck is two-inch spruce planking; the sidewalks have two-inch hard pine decks.

LONSDALE RAILROAD BRIDGE (1893-1894) Pawtucket
& DAM 19.300200.4642720
New Pond Providence
Cumberland

In 1893-1894, the Lonsdale Company built this combination curved dam and railroad bridge north of its bleachery. The bridge formed a rail link between company mills located on opposite sides of the river. The dam, constructed of stone rubble faced with granite ashlar, provided a 12-foot fall to supplement the company's existing water power capacity. Five stone piers, each five feet thick, supported a single track railroad. A short, through truss (Warren, with verticals) carried the tracks over the spillway at a height approximately eight feet above the crest of the dam. The bridge remained in service until the hurricane of 1954. The dam's flashboards were removed two years later. The abandoned structure, no longer in use, is now in deteriorated condition.

(Engineering News, 14 March 1895, plates, pp. 166-7; J. P. Frizell, Water Power, New York, 1901; Interview with Edward J. Hayden, Cumberland Town Administrator, November, 1975.)

MILL STREET BRIDGE (c. 1890) Pawtucket
Mill Street 19.302080.4641310
Cumberland Providence

This single-span, Pratt pony truss highway bridge, fabricated by the Boston Bridge Works, carries Mill Street over the Abbott Run.
(Everts and Richards.)



Lonsdale Railroad Bridge and Dam, c. 1894 (RIHS).

East Greenwich

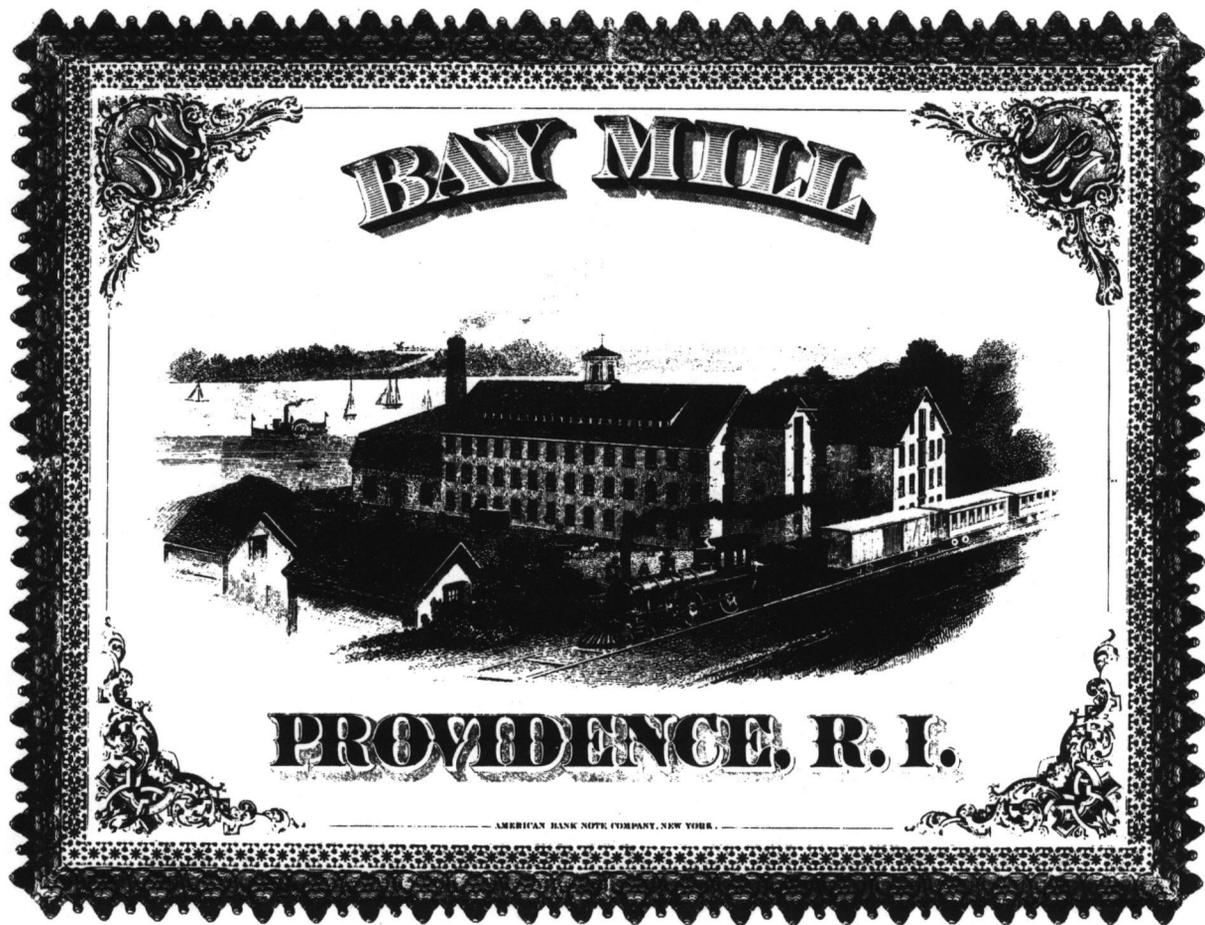
Bulk Products

BAY MILL/SHORE MILL (c. 1840)
King Street
East Greenwich

East Greenwich
19.296300.4614920
Kent

This 3-story, stuccoed-stone textile mill, with a pitched roof and trap-door monitor, was built c. 1840 on the ruins of an earlier cotton mill burned in February, 1839. The first mill, built in 1827, was four stories high, 50' X 100' and ran 7,000 spindles and 20 looms on steam power. It was one of the state's first exclusively steam-powered mills. The owners, the East Greenwich Manufacturing Company, went bankrupt prior to the fire. The property changed hands twice before the current mill was finally constructed by Pierce, Salisbury, and Company. It is approximately the same size as the first. The mill, with its pitched-roof end tower, is substantially intact - only the central cupola has been removed, and new posts and collar beams have been added to the attic framing. J. C. Peckham bought the mill in 1845 and sold it four years later to Providence machinist, Thomas Hill. Hill and his sons operated the mill at least until 1898. The addition on the south and the mansard-roofed office on the east were built by the Hills. In 1905, the mill was occupied by the Hill and Lacross Company, makers of novelty elastic braid. The Ruckert Company, in business since 1890, has occupied the mill since before 1934. The mill still produces jewelry, tool, and instrument cases under the Ruckert name. No steam engines survive, but the company continues to use the mill's squat, square, brick smokestack. A water-tube boiler built by Edward Kendall & Son, Charles River Iron Works, Cambridgeport, Massachusetts, continues to survive but is no longer used. Located adjacent to the Providence-Stonington rail line (built in the mid-1830s and still in use), the Bay Mill is a key element in the East Greenwich National Register Historic District.

(Cole; M. McPartland, The History of East Greenwich, Rhode Island, 1670-1960, 1960; Program, 250th Anniversary of the Founding of East Greenwich, 1927, photograph, p. 47; Interview with Gil Medeiros, plant manager; East Greenwich, Statewide Preservation Report, RIHPC.)



Bay Mill, Cloth Label, c. 1870 (courtesy of Mrs. Elinor Larson).

FRY'S CIDER MILL (1857)
South County Trail
East Greenwich

East Greenwich
19.292060.4613980
Kent

This 2-story, wood-frame cider mill was built in 1857 at a cost of \$175.40. It was owned by Thomas Fry and produced cider for the local market. Fry also used the cider as partial payment for his day laborers. The mill saw its greatest use in the fall at the conclusion of apple-picking season. Customers paid two cents per gallon for the use of the mill. Fry also produced vinegar, as well as the customary sweet and hard cider. The grinder, press, vat, and large wooden screws are no longer in place, though bits and pieces of the equipment still survive. The horse-driven sweep which activated the grinder is no longer connected, but still exists inside the mill. The mill stopped operating about 1915. The building is still owned by a member of the Fry family. It may be the last example in the state of this small-scale rural industry. It is now undergoing repair.

(Interview with owner, Marion Fry, October, 1975; East Greenwich Packet, Fall, 1973.)

Manufacturing

BOSTON WIRE STITCHER COMPANY (1868)
Duke and Division Streets
East Greenwich-Warwick

East Greenwich
19.296120.4615140
Kent

In 1836, a woolen mill was built on this site by Ezra Pollard. The property was later bought by Richard Howland, who built a brick mill after fire destroyed the original wooden one. A second fire occurred in 1868. In the same year, Howland rebuilt the mill now standing. It is brick, three and one-half stories high, with a pitched roof. The 1-and-2-story additions along Duke and Division Streets were added later. In 1900, Thomas Briggs of Boston invented a new machine using a horizontal wire feed for the stitching of catalogues and magazines. Its advantage was that it had a simple adjustment to compensate for varying thicknesses of paper. Briggs organized a company in 1902 and moved to the East Greenwich site in 1904. In 1906-1907, a foot-powered staple binder, using pre-formed staples, was introduced, and in 1923, the company brought out the

Bostitch Paper Fastener. By 1930, eighteen types of staplers were made here, some with batteries of a dozen or more heads. Bostitch later left the area, only to recently return, though not to the same building. During World War II, the mill was used by Royal Little, the founder of the huge conglomerate Textron, to make parachute cloth. In 1955, it was bought by the Edward Bosler Company. Bosler buys and sells yarn and rents warehouse space. No machinery of historic note survives.

(Cole; M. R. McPartland, The History of East Greenwich, Rhode Island, 1677-1960; 1960; The Book of Rhode Island, 1930, photo, p. 157; Interview with owner, Edward Bosler, March 1976.)

Bridges

KING STREET RAILROAD BRIDGE (1835-1836)	East Greenwich
King Street	19.296260.4614960
East Greenwich	Kent

This double-arched, stone railroad bridge was built between 1835 and 1836 for the Providence & Stonington Railroad, and it still carries Amtrack's mainline in the Northeast Corridor. Major William Gibbs McNeill, a West Point graduate and the uncle of the painter, James McNeill Whistler, was the chief engineer. Immediately prior to undertaking this project, McNeill and Major George Washington Whistler, the painter's father, completed the 615-foot long Canton Viaduct for the Boston & Providence Railroad. McNeill was also engineer for the construction of the Moscow-St. Petersburg Railroad in 1837. Construction in East Greenwich was supervised by Thomas Sharpe, a young Yorkshire immigrant, under contract to a Mr. McManus, probably an agent of the Providence-Stonington Railroad. Sharpe had charge of thirty-six men who quarried and cut the stone and built the bridge. He was paid slightly over \$1,000. The bridge survives as a tribute to his, and his worker's, craft. It is substantially built and handsomely detailed. No more than 60 feet long, it has openings for drainage on both sides. Six stone piers (three on each side) run from the parapet wall, built out the same distance as the piers, to the foundation. Sharpe also built dams at Clayville and Riverpoint, cut the stone for dams at Phenix and Crompton, worked on Fort Adams at Newport and built mills at Hope and Coventry. The King Street Bridge is a key element in the East Greenwich National Register Historical District.

(East Greenwich Packet, Fall, 1973; Thomas Sharpe, "In Memoriam", typescript prepared from undated ms. by Mrs. Margerite Sharp, Santa Ana, California; East Greenwich, Statewide Preservation Report, August, 1974; David Plowden, Bridges, The Spans of North America, 1974.)

Specialized Structures

MATTHEWSON WAREHOUSE (c. 1800)	East Greenwich
East Greenwich Harbor	19.296380.4614980
off Water Street	Kent
East Greenwich	

The Matthewson Warehouse, built c. 1800 on the East Greenwich waterfront, is a 2½-story, gable-roofed building, approximately 30' X 40'. The structural system consists of a heavy timber frame with pinned mortise and tenon joints. The two most important interior features are the "ship's knee" braces connecting the posts to the plates at the level of the attic floor; and three threaded holes, (numbered 1, 2, and 3) about 8" in diameter, and cut into the underside of the east-west summer beam in the building's eastern half. The holes may possibly have been a part of a screw press used in the processing of fish and whale oil. Though detailed historical evidence is lacking, it is likely that the warehouse was built after 1795, the year a Mr. Matthewson was granted use of this wharf in exchange for building the county jail, located just behind the warehouse. This small warehouse, once a key part of the local maritime economy, is the oldest structure on the East Greenwich waterfront. It is currently being restored for use as a tavern and the new owners have done extensive reshingling. The key interior elements, however, remain intact and will be preserved. (David Chase, "The Matthewson Warehouse," RIHPC Report, November, 1974; Interview with Marian Fry, October, 1975; Interview with Jeremiah Fain, July, 1977.)

NEW ENGLAND WIRELESS & STEAM MUSEUM	Slocum
Tillinghast Road	19.290660.4610920
East Greenwich	Kent

The New England Wireless and Steam Museum houses extensive collections in the fields of steam power and wireless telegraphy and radio. Among the many steam engines on display

are a Baxter engine, c. 1868; an American Ball engine, c. 1905, with a direct-connected 100 KW AC generator; and a 150-horsepower Harris-Corliss engine with a twelve-foot fly wheel. The museum will soon move and erect one of two Corliss engines, built by the Corliss Steam Engine Works in Providence, known to have survived. Already in the collection is the only relic left from Marconi's first Cape Cod transmitter. Hundreds of items of early radio and telegraph equipment are exhibited, including a complete replica of a shipboard radio room of 1920. ("The New England Wireless and Steam Museum, Inc.", Brochure; Interview with Robert Merriam, Director, July 1977.)

East Providence

Bulk Products

RUMFORD CHEMICAL WORKS (c. 1858)
39 Newman Avenue
East Providence

East Providence
19.304540.4624420
Providence

In 1854, George F. Wilson and Harvard University science professor E. N. Horsford formed a company to produce a phosphate-enriched baking powder. Four years later, the company moved from Pleasant Valley, Rhode Island to the Seekonk Plains area, then a part of Massachusetts. Despite the opposition of local residents who considered the chemical works a nuisance, the company laid out a farm and erected a substantial number of buildings. In 1858, Wilson and Horsford formed the Rumford Chemical Works, Inc., named for Count Rumford, the scientist who endowed Horsford's chair at Harvard. Rumford Chemical maintained an office in Providence, a small manufacturing site in the Riverside section of East Providence, which they closed sometime prior to 1895, and a larger manufacturing site in Seekonk Plains, an area which became part of Rhode Island in 1862. The company produced Rumford Baking Powder, Horsford's Bread Preparation, Rumford Yeast Powder, Horsford's Acid Phosphate, fertilizers, and other chemicals. Numerous wood, brick, and metal-frame buildings still stand in Seekonk Plains. A 1½-story shingled structure with a gable roof, opposite the fire station, is thought to be the original production building. It was used for a time as a museum while Rumford Chemical still operated the works. The building appears now to be used for storage. A 1½-story brick structure, c. 1918, had the company name on it and was located just north of the original building. It has recently been torn down. Running along the east side of Greenwood Avenue, on a northwest-southeast axis, are a 5-story brick mill, built in 1928, used for packing and shipping; a 1-story shingled building with a gable roof and stone foundation; a 3-story brick mill, c. 1895, with copper eaves, pilasters, and an elaborate brick cornice, later used as a laboratory; and a 2-story wood-frame building with a gable roof. Rumford Chemical ceased operation in the 1960's when the site was bought by the Essex Chemical Company. It is now occupied by tenants, and some of the buildings will be torn down. (Hall, illus. pp. 26-27; Horace Greeley, et. al., The Great Industries of the United States, 1872; East Providence, Statewide Preservation Report, RIHPC, 1976; S. Reznick, "The European Education of an American Chemist and its Influence in 19th Century America," Technology and Culture, Vol. 1, No. 3, July, 1970; Interview with Joseph Conforti, historian, May, 1976.)

STANDARD OIL REFINERY (1919-1920)
Wampanoag Trail
East Providence

East Providence
19.305400.4628460
Providence

The East Providence refinery of the Standard Oil Company of New York was set up in 1919-1920 as a major manufacturing plant for petroleum products. The acquisition of other refining facilities in Texas in the 1920s caused the company to scale down its plans for significant expansion at this site, but the plant remained in operation until 1975. The original pier on the Providence River is still in place, though modified for present terminal activities; and most of the riveted storage tanks, some insulated since the 1930s with a covering of ceramic blocks, are still being used by Mobil Oil. Stills from the old batch refining process have also survived, after years of adaptive reuse for the storage of asphalt. The fireboxes, the crude shell stills, and the bases of the batch process condensers are all in place. In addition, the reinforced-concrete and brick-tile buildings which housed the machine shop, boiler shop, boiler house, pump house, and other operations are still in good condition. The refinery primarily produced heavy petroleum distillates, although some gasoline was also made. Thermal cracking stills were built in the mid-1920s after modifications of the batch process were tried. Despite the development of more effective catalytic cracking in 1937, the thermal cracking process was used on this site until after World War II. From 1950 until 1975, asphalt production was the major activity, and much of the thermal cracking equipment was converted for asphalt. A thermal process furnace, later used for asphalt processing, survives relatively unchanged. No manufacturing is done today, but the site is an active storage and transfer terminal of Mobil Oil, a direct descendent of the Standard Oil Company of New York.
(Providence Magazine, September, 1920; Interview with A. H. Fuller, Mobil Oil.)

WASHBURN WIRE COMPANY (1893)
Bourne Avenue
East Providence

East Providence
19.303080.4634320
Providence

This company, founded by Eugene Phillips, began production in a small barn on Clifford Street in Providence. Originally

known as the American Electrical Works, (incorporated, 1882), the firm produced insulated wire and cable for the rapidly developing telephone industry. After outgrowing two structures in Providence, the plant moved to East Providence in 1893. The earliest buildings, an 1893 brick office, and two brick production buildings, c.1895 and c. 1900, are now owned by the Okonite Company, a producer of copper wire and cable. About 1900, American Electrical merged with Washburn Wire of Worcester. Subsequently, the company acquired two tilting open-hearth furnaces, built by the Wellman Sievers Company of Worcester. They operated in a large brick building now used by Washburn as a melt shop. The company used open-hearth furnaces until 1969 when they were removed and replaced by electric arc furnaces. In 1907, the company acquired a hand-caught rod mill from a plant in Auburn, Rhode Island. The mill was still operating in the summer of 1976 in Building 72. About the same time, the company added two 3-hi continuous roughing mills; one, a six-stand, 16-inch mill; the other, an eight-stand, 10-inch Belgian mill. Both were recently operating; the former in Building 86, the latter in Building 72. Both mills were once powered by a pair of Corliss steam engines, since removed. The company added new machinery in the period 1927-1935. A 3750 KVA Westinghouse steam turbine and generator was installed (it has recently been removed), and a new copper rod mill, a 10-inch rod mill, and a 34-inch, 2-hi, reversing blooming mill were started. The blooming mill, built by United Engineering and Foundry of Pittsburgh, is located in building 89. It is powered by a 2100-horse power DC General Electric Motor. Three steam turbines with DC generators (1934) and three Babcock & Wilcox boilers also remain in place, but are not used. A billet mill, built c.1908 by the Morgan Company of Worcester, stands in the parking lot waiting to be scrapped. In July 1976, Washburn Wire filed for court protection under Chapter 11 of the federal bankruptcy laws and its future is uncertain.

(Ms. on the history of Washburn Wire, Washburn Wire Company; The Book of Rhode Island, 1930, illus. p. 248; Interview with Paul Tetrault, Plant Engineer, June, 1976. Associated Factory Mutual Drawings, 18 December 1929, 6 June 1936, 8 May 1967 ; Providence Sunday Journal, 10 October 1976.)

Utilities

EAST PROVIDENCE PUMPING STATION, (1893) East Providence
FILTRATION PLANT AND DAM 19.305100.4633040
Hunts Mills Road Providence
East Providence

The pumping station of the East Providence Water Works is a handsomely designed building built in 1893. It was privately owned until the 1920s. It is a 1-story stone structure, with a slate-covered hipped roof. Its side walls are 24 inches thick and rest on a 36-inch rubble foundation. It contains a vertical Leffel turbine equipped with a Woodward governor (last patent 1914). It once transmitted power by means of a General Electric AC generator. The turbine is no longer used and the station itself has not been used to pump water since 1970. There are, however, four electric pumps in the station still capable of operation. The purification room, on the south side of the station, contains seven Jewell Subsistence Gravity Filters, 15 feet in diameter, built by the New York Filter Manufacturing Company. One of the filters may be original, a second was in place by 1903, and the others were added later. They are no longer used. The dam, 150 feet upstream of the station, was built at the same time. It is curved, 85 feet long, three feet wide on top, and constructed of ashlar. Each stone was drilled to hold a dowel pin. The gates were constructed of grooved and splined spruce bolted to vertical side supports and to one vertical upright in the center to which a rack and pinion was attached. Only one is still in place. The gate chamber (17' X 22', constructed of stone and brick) and the flume (six feet in diameter, 150 feet long, made of 3/16-inch steel plate, lap riveted) are both still in place but are no longer used. A second dam, built in the 1930s, at the southern end of Central Pond, a half mile north of the station, still stands, but its gates and flume are no longer in use.

(Inventory of Property, East Providence Water Supply Board, 31 December 1924.)

Transportation

POMHAM ROCKS LIGHTHOUSE (1871) East Providence
Pomham Rocks 19.303020.4627620
East Providence Providence

Built in 1871 on an island on the east side of the Providence River, the Pomham Rocks Lighthouse is a square wood tower with an iron dome and cowl. The tower, which originally had a lantern 69 feet above mean sea level, rises from the keeper's house, a 1½-story, late Victorian mansard-roofed building. Deactivated in 1974, it is currently maintained by the Rhode Island Historical Society.

(Inventory of Federal Archives in the States, Series X, #58, 1938; First Coast Guard District Files.)

Bridges

EAST PROVIDENCE RAILROAD BRIDGE (1884) East Providence
Roger Williams Avenue 19.303800.4633920
at the Ten Mile River Providence
East Providence

The railroad bridge at the Ten Mile River consists of four spans totaling 400 feet in length. At the northeast and southwest ends there are two double-arch stone spans with brick rowlock arches, built in 1884. Between these two spans, and carried on the stone abutments, are two steel-beam bridges, joined by a center piling in the middle of the river. The steel sections are later additions, replacing two earlier spans. At one time, the bridge carried two sets of tracks which necessitated another pair of steel spans. These have been removed and only the large bolts which once held these sections to the stone abutments and center piling remain. The bridge, formerly a part of the India Point Division of the New York, New Haven, & Hartford Railroad, still carries one set of tracks.

STANDARD OIL COMPANY BRIDGE (1919) East Providence
Pawtucket Avenue 19.303550.4621830
East Providence Providence

The Standard Oil Company of New York built this concrete deck-arch highway bridge in 1919 to carry a public highway

over their private rail spur. The bridge is 50 feet long, 65 feet wide, with a span of 32 feet and a rise of 27 feet. (Rhode Island Department of Transportation, Bridge Design Section Files, Bridge #158.)

Specialized Structures

CRESCENT PARK CAROUSEL (c. 1895)	East Providence
Bullock's Point Avenue	19.303780.4625240
East Providence	Providence

The Crescent Park Carousel was built and operated by German immigrant, Charles Looff, who was originally trained as a furniture maker and worked in New York. He began his career as a manufacturer of carousels at Brooklyn's Coney Island. The circular staging of the Crescent Park Carousel is fifty feet in diameter and includes sixty-two horses, four chariots, and a camel, all of different design, all hand-carved. The carousel shed has fourteen sides, is wood-framed and rises to an onion-domed peak. It too was designed by Looff. A German manufacturer, A. Ruth & Son, built the intact organ. The carousel operates by means of a major ring gear, leather-belted slip clutches and a series of gears attached to the moving sculptures. It was originally powered by steam, but is now driven by a fifteen horsepower, 550 volt, 3-phase motor. Looff, who built numerous carousels in a workshop originally attached to the shed, was a craftsman of genuine talent. His work at Crescent Park, which he used as a demonstration piece, survives as a noteworthy example of folk art and engineering skill. (NR, 1976; Libby Hirsch and Alden Garrett, "The Crescent Park Carousel", unpub. paper, Brown University.)

EAST PROVIDENCE WATER TOWER (1902-1903)	East Providence
Walmer Avenue at Dover Avenue	19.304020.4630360
East Providence	Providence

The standpipe of the East Providence water works was built in 1902-1903 by the Riter Conley Manufacturing Company of Pittsburgh, Pennsylvania. It stands on Kent Heights, 376 feet above water level. The tank itself is 70 feet high, 50 feet in diameter and has the capacity to hold one million gallons. It is carried on steel supports 95 feet

tall which weigh about 500 tons. The conical roof rises 27 feet, 6 inches above the tank. The total height of the structure is 165 feet; the total weight, at full capacity, is 5,328 tons. When built, it was said to be the second largest of its kind in the world. It replaced an earlier standpipe 142 feet high, 40 feet in diameter with a capacity of 1,200,000 gallons. Built by the Cunningham Iron Works of South Boston, it burst in 1894. (Engineering News, 10 November 1904.)

Exeter

Bulk Products

LAWTON MILL (c. 1830)
Rt. 102 and Hallville Road
Exeter

Slocum
19.285700.4606160
Washington

In 1795, Sam Bissell built a snuff mill on this site which was converted into a cotton mill by Alan Bissell and George Palmer, Jr. in 1825. When the building burned a few years later, T. A. Lawton purchased the property and constructed the present mill for the manufacture of warp yarns. At Lawton's death, Mowery Phillips converted the 2-story, clap-board mill with a granite foundation, a clerestory monitor and rectangular windows into a sawmill and grist mill. In 1915, a steel, overshot water wheel, and a wood-and-concrete sluiceway, were installed. Though the wheel does not survive, the main horizontal shaft, the iron perimeter gear, the bearings and guide on both sides of the wheel pit, the transfer gear to the large pulley and sections of the spokes and rims remain. Also surviving are shafts, pulleys, and clutches in the 1915, shingled, frame structure attached to the wheel pit, north of the c. 1830 building. The water wheel never provided power for the earlier structure. On the west side of the buildings runs a dry-stone-masonry tailrace. The owner intends to restore the c. 1830 mill, which is presently vacant, and the water wheel, which he hopes will provide power for a generator to produce electricity for his home.
(Cole; Sande; Interview with William Warner, owner, 7 April 1976.)

Specialized Structures

QUEEN'S FORT (1675-1676)
South of Stony Lane
Exeter

Slocum
19.289860.4607020
Washington

The Queen's Fort is a hilltop position fortified with stone walls, a semi-circular bastion, and a v-shaped flanker. Historical evidence strongly suggests that it was constructed during King Phillip's War (1675-1676) by the Narragansett Indians. Stone-Wall John, a renowned Indian stone mason and fort builder, is assumed to have been the engineer. He and Queen Quaiapen were killed in 1676 after apparently

leaving their well-hidden and ably-constructed fort. The fort is roughly square in outline with low walls approximately 200 feet long on three sides and an almost impassable mass of boulders on the fourth. The dry-laid fieldstone walls tie into natural rock formations at a number of points. Use of the bastion and flanker may be a result of European influence; but, despite an erroneous legend that Stone-Wall John was a renegade English engineer, the Queen's Fort is Indian in origin and demonstrates the impressive technological skills of the Narragansetts. (Patrick M. Malone, "Changing Military Technology Among the Indians of Southern New England, 1600-1677," American Quarterly, XXV/1, March, 1973.; Sidney S. Rider, The Lands of Rhode Island, Providence, 1904.)

Glocester

Bulk Products

CHEPACHET MILL (1814)
Chepachet Village
Glocester

Chepachet
19.278520.4643440
Providence

Once part of a small complex of carding and grist mills, later converted to textiles, this 2-story, stuccoed - stone structure, only five bays long, has an 1814 datestone on its south side. Built for the production of cotton yarn by Lawton Owen, it was, in 1858, converted to wool. The new owners, Horace A. Kimball, Jr. and Warren Arnold produced satinets and later, fancy cassimeres. The wood-frame section extending to the east is a later addition. The mill was last powered by a horizontal C.P. Bradway turbine, located on the north side of the addition and exposed to the elements. (The Bradway Works in West Stafford, Connecticut recently closed, and its machinery, turbines, and patterns were to be sold. The Slater Mill Historic Site acquired some small turbines from the works.) A wooden flume carries water underground approximately 400 feet from gates located on the Chepachet River across Route 44 and southwest of the wheel pit. A small dam, built of wood and stone in a stepped configuration, also survives. The mill is currently being renovated for use as a craft center and the stone section has been painted blue. (Bayles; Interview with Gil Peterson, Chepachet resident, November, 1975.)

PECKHAM MILL (c. 1770)
Snake Hill Road
Glocester

Clayville
19.276460.4638640
Providence

This combination grist mill and sawmill, L-shaped and wood-framed, operated as recently as 1966. The grist mill section, on the west end, was built in the late 18th century. Some of the beams are sawn, some hewn. The framing is held together by both wood pins and hand-made nails. A circular wooden gear (a lantern pinion), no longer in place, remains in the wheel-pit. It has wooden teeth, is held together by wood pins and crude iron bands, and has an opening for a diamond-shaped shaft. The millstones and hopper are in place and the mill contains numerous hand-tools used for shaping the furrows in the stones. The sawmill section,

added later, contains a circular saw. Both the sawmill and grist mill are powered by a turbine built by James Leffel and Company of Springfield, Ohio. According to the owner, the turbine can still be operated and has been idle only because of lack of water. The remains of a dam used by an earlier up-and-down sawmill are visible just north of the site.

(Interview with current owner, Wally Tower, November, 1975: Records of the RIHPC.)

STEERE SAWMILL AND ELECTRIC PLANT (1863) Chepachet
Steere's Pond off Route 102 19.279100.4644580
Glocester Providence

This sawmill site was first developed c. 1810 by Anthony Steere, a "wealthy property holder" (Bayles, Volume II p. 545), in both Glocester and Chepachet. Originally an up-and-down sawmill, the building was torn down in 1863 by George W. Steere, Anthony's son, who erected the current structure in the same year. It is approximately 100 feet long, wood frame, set on a stone foundation, with vertical plank siding and a gable roof. In 1863, the reciprocating saw was replaced with a circular saw (the current saw is much later, but parts of the carriage probably date from the 1860s). Planing machines, matchers and joiners were also put in place and twelve to fifteen men were employed by the 1890s. At one time, the structure housed carding machines for the local production of cotton batting and shoddy. The mill, equipped with a turbine, generated electric power for local consumption through part of the early 20th century. According to the owner, electric generation ceased in 1931, but the sawmill operated until 1955. The turbine remains in place. Repair work on the structure is now underway and the owner intends to operate the sawmill again. (Bayles; Interview with George Steere, owner, November, 1975.)

Hopkinton

Bulk Products

ASHAWAY LINE (1882) & TWINE MANUFACTURING COMPANY Village of Ashaway Hopkinton	Ashaway 19.266590.4589238 Washington
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In 1824, Captain Lester Crandall began manufacturing cotton and linen fishing line on the west side of the Ashaway River. By 1838, Crandall had built a dam to provide water power for a 108-foot linewalk. In 1876, the Ashaway Line & Twine Manufacturing Company (incorporated in 1883) leased the old Ashaway Woolen Company, located near Main Street on the west side of the river, which had burned and been rebuilt in 1846. Portions of the wool complex may survive, but the main building on the site, a 3-story structure, 50' X 88', covered with aluminum siding, was built in 1882 by Ashaway Line & Twine. By 1903, a 725-foot linewalk was completed on the east side of the river and new braiding machines were installed for the manufacture of silk fishing line. The linewalk is constructed of 10-inch wide vertical boards. It has two rows of small, rectangular windows, a pitched roof, and is raised on granite blocks. The 2-story, wood-frame building, now covered with aluminum siding and attached to the north side of the linewalk, was built, according to insurance drawings, in 1894, though the company claims that it is the original 1824 structure. Other buildings on the site include three late-19th century, 1- and 2-story wooden buildings, and a 1-story brick structure, as well as several small stuccoed-stone buildings. The complex is still actively engaged in the production of line and twine. (Sande; Providence Sunday Journal-Bulletin, 8 December 1974; Associated Factory Mutual System Insurance Drawing, 23 November 1970.)

CENTERVILLE COTTON MILL (1865) Route 138 near Newberry Lane Hopkinton	Hope Valley 19.270878.4500160 Washington
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The Centerville Cotton Mill was built in 1865 on the site of an earlier textile mill which burned in the same year. The new mill, bought by the Rockville Manufacturing Company

before its completion, is brick with a central tower and segmental arch windows with granite sills. Originally three stories, it is now only two. In 1877, the mill housed sixty-eight looms for the production of cotton goods. During World War II, the building was used to produce the Johnson Automatic, a rifle designed for military use. The first floor is now used by a company which markets spools and bobbins from the area's textile industry as candle-holders and decorator items. The second floor, the site of an adaptive reuse project, now contains an apartment. There are plans to generate electricity at the site with both solar energy and water power, the latter using portions of the existing water-power system.

(Chase; Griswold; Sande; Interview with Bill Johnson, owner, 1976.)

ROCKVILLE MILLS (1844-1851)	Voluntown
Old Rockville Road	19.269650.4599970 (1844 Mill)
and Rockville Road	19.269860.4600100 (1851 Mill)
Hopkinton	Washington

The Rockville Mills consist of two buildings located within one-half mile of each other. The mill built in 1844 stands just east of the Old Rockville Road on Moscow Brook. It is a 2-story, granite mill with a central tower and a granite belt course separating the first and second floors. The pitched roof and clerestory monitor are of frame construction and finished in clapboard. Lewis Kenyon used this water-powered mill for the manufacture of satinets while the lower story was occupied by O. M. Stillman, a manufacturer of loom temples and other accessories. A second mill, built in 1851, is located on the Rockville Road, northeast of the first mill. This 2-story, stone-rubble mill, with a low-pitched roof and quoined corners, recently burned. It was originally used as a weave shop. The 1844 mill, which survives in excellent condition, though no longer used, subsequently became a dye house and beaming room.

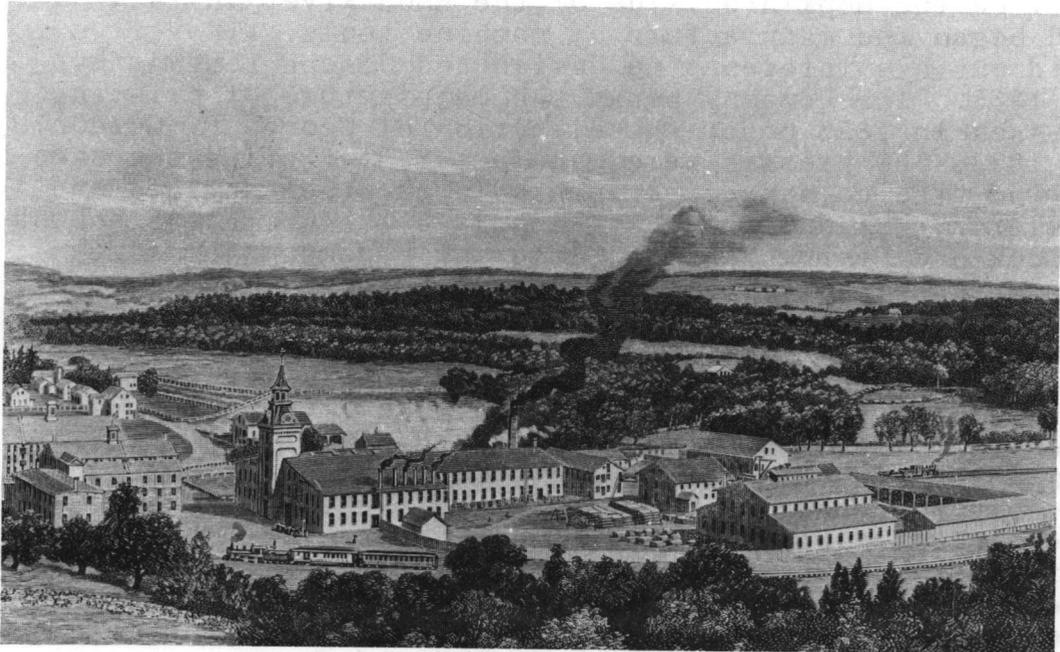
(Chase; Sande; Griswold.)

Manufacturing

NICHOLS & LANGWORTHY MACHINE COMPANY (1869) Hope Valley
Mechanic Street 19.273250.4495800
Hopkinton Washington

Gardiner Nichols and Russel Thayer bought the Crandall Mill on the Hopkinton side of the Wood River in 1824 and began the manufacture of machine tools. Thayer sold out his interests to Josiah and Joseph Langworthy in 1835. The company began the manufacture of printing presses in 1853 under the direction of George P. Gordon. By 1872, 600 presses were manufactured. During the same period, the company experimented with steam engines and boilers. While working at Nichols & Langworthy, Stephen Wilcox and George Babcock, later to become major manufacturers of boilers, produced a slide-valve engine and a water-tube boiler. This expansion of the product line caused new facilities to be built in 1869. Both Babcock and Wilcox and the Gordon Printing Press business moved to New Jersey in 1872, leaving Nichols & Langworthy with the steam engine business. During the late 1870s, the company produced a high-speed engine which employed a Nichols governor. At the height of their business, Nichols & Langworthy employed 150 hands. Though earlier buildings have been destroyed, the 1869, 1-story, brick machine shop, 240' X 65', is extant. It has a pitched roof, segmental-arch windows, granite sills and a corner tower. Behind the shop is a large wood-frame structure, with a monitor roof and large loading doors, which was probably used as an erecting room for the two steam yachts built by the company in 1876. It is now covered with shingles. A dam, gates, and power canal, as well as the ruins of the Arnold Mill on the Richmond side of the river, also survive.

(Griswold; Tercentenary Map and Description of Early Hope Valley and Wyoming, Hopkinton Tercentenary Committee; Interview with Richard Keryssig, 29 November 1975; Hall.)



Nichols & Langworthy Machine Company (RIHS).

Jamestown

Bulk Products

JAMESTOWN WINDMILL (1787)
North Road and Weeden Lane
Jamestown

Prudence Island
19.301880.4598580
Newport

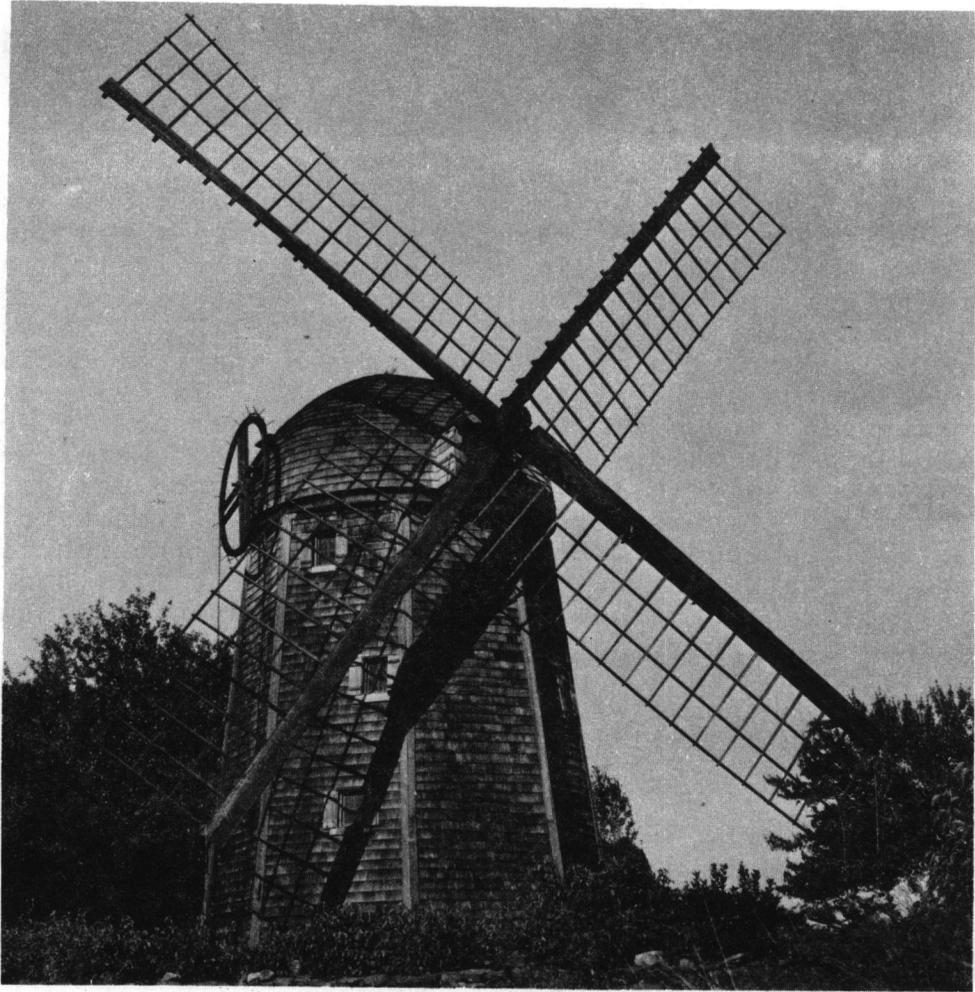
This shingled, octagonal smock mill, thirty feet high, ground corn meal here on Conanicut Island for 109 years. It was built in 1787 and changed hands eleven times until it ceased operation in 1896. It subsequently fell into disrepair and its interior was gutted. Restoration began in 1904 under the direction of Rear Admiral E. D. Taussig. Under the supervision of the Jamestown Historical Society, restoration and maintenance has continued. In 1914, a new, latticed wooden arm was built, two other arms were repaired and the main shaft was strengthened. Major repair was necessary in 1954 because of hurricane damage. New white oak timbers were installed and the arms were completely replaced. Other repairs included the rebuilding and strengthening of the main body of the mill and the installation of a new windshaft, new vanes, and new shingles. Iron gears have also replaced the original wood gearing in the bonnet, and the bonnet is now "fixed" to face the southwest wind. The grind stones, 5½ feet in diameter, are still in place. The mill is open in the summer as a museum, and has been entered on the National Register of Historic Places. (Desiree Caldwell, "Some Rhode Island Windmills," 1976, ms. at Slater Mill Historic Site.)

Transportation

BEAVERTAIL LIGHTHOUSE (1856)
Beavertail Point, Conanicut Island
Jamestown

Narragansett Pier
19.299530.4591210
Newport

Beavertail Point, at the southern tip of Conanicut Island, divides the east and west passages of Narragansett Bay. A watch house and beacon were located here in the early 17th century, and the first lighthouse, a 58-foot wooden tower, was built in 1749, under the direction of the prominent Newport merchant and architect, Peter Harrison. After a fire in 1753, Harrison supervised the construction of a 64-foot fieldstone tower, completed two years later. Burned by the British army in 1779, it was repaired in 1783-1784



Jamestown Windmill (Marilyn Van Buskirk).

and used until 1856, when the current lighthouse was built. The tower, ten feet square, is constructed of large granite blocks, of two different lengths, arranged to create a quoined effect at the corners. The cupola houses an electric lamp installed in 1931. The site also contains a brick keeper's house, 1856; an assistant's house on the west end of the site, 1896; and an early 20th-century signal house. The dwellings have been vacant since the light was automated in 1972. The current fog horn rests on the stone foundation of the second Beavertail Light. This may have been the first lighthouse to experiment with gas illumination (1817-1818). It was also the site of the first use of C. A. Daboll's compressed air fog whistle and fog trumpet (1851), during the tenure of keeper Mrs. Demarius H. Wheaton. A steam whistle was first installed in 1857, but was not successfully employed until 1881. A lighthouse of significant historic importance, Beavertail has been recently nominated to the National Register of Historic Places. (NR, 1977; A Nation In Motion: Historic American Transportation Sites, United States Department of Transportation, 1976.)

Bridges

JAMESTOWN BRIDGE (1940)	Wickford
Jamestown-North Kingstown	19.298460.4600140
	19.300420.4599680
	Newport-Washington

The Jamestown Bridge spans Narragansett Bay between Conanicut Island and North Kingstown. It was opened for traffic 27 July 1940. Merritt-Chapman and Scott of New York contracted for the sub-structure and the Harris Structural Steel Company of New York built the steel superstructure. William H. Bruce and Tom Iverson were the resident engineers. Bridge construction was funded by the Public Works Administration. The bridge consists of two approach roads with a reinforced concrete deck supported on piers. The 640-foot center cantilever span stands 135 feet above mean high water. The span has an open-grate steel deck. The total bridge length is 6982 feet.

(Data compiled by Rob Moore, Brown University; Souvenir Program, Dedication of the Jamestown Bridge, August 2-3-4, 1940.)

it was reduced to its present height about 1958. Cooper also built mill housing, which continues to survive, and sponsored a brass band, a cricket team, and a football (soccer) team for his largely English work force. He was also the first Rhode Island employer to introduce the Saturday half-holiday. The Victoria Mill, its flooring carried on two rows of large wooden posts, was originally steam powered. No machinery of historic note survives. In 1941, the R. C. Berker Company bought the mill. They produced, under their own patent, textile machinery for the introductory processes of worsted and synthetic yarn manufacture. The mill is still owned by the Berker Company, which continues to operate a machine shop, largely for job-order textile-machine work, on the first floor. Other space has been rented. Two other mill buildings are separately owned by a foundry and by a dye company. (Bayles; "Johnston", Preliminary Report, RIHPC, 1976; Interview with James Berker, July, 1977.)

100' X 48', it housed 108 power looms and continued in operation until the late 1870s. It was replaced by a 5-story, brick mill built in 1909 and located in the middle of the current complex of connected buildings. A second mill was built in 1830 by George Wilkinson, Abraham's son. Called the "Green Mill", this wood-frame structure, 120' X 40', two stories high with a clerestory monitor, was dismantled in the early 1870s. Half of it was moved into the adjacent village to be used as a tenement. The tenement survives as a multi-family residence on School Street, approximately 150 yards west of the mill site. Adjoining the 1909 mill on the north is a 5-story addition, built in 1921. Both 20th-century sections have bracketed roofs and brick segmental headers over the windows. Adjoining the 1909 mill on the south is a 5-story brick structure with heavier brackets and rectangular windows with cast-iron lintels and sills. It was built in two sections and was originally four stories. The first section, 120' X 72', was built c. 1850, and the second, a 100-foot addition to the south, was completed in March, 1874. A fifth story was also added by the latter date. Spinning was done on the top three floors (mule spinning was located on the fourth floor) and looms occupied the first two floors. In the 1870s, a 14-foot fall generated 380 horsepower and ran over 26,000 spindles and 464 looms. The basement contains three pairs of inward-flow turbines mounted on horizontal shafts, a Fales and Jenks water pump for the mill's drinking water and a post-1915 steam engine, with a single, fifteen inch cylinder and a twenty-two inch stroke, used to control humidity. The site also includes a wooden gate house with manually operated rack and pinion hoists, and an impressive dam (inscribed "Valley Falls Company 1916"). The mills are now used for luggage manufacture.

(Steere; Interviews with Homer Detonnancourt and Les Carpenter, American Tourister, September, 1975; Factory Mutual Insurance Company, "Albion Cotton Mill", sheet number 637, bound, c. 1860; Blackstone Manufacturers Fire Insurance Company, "Albion", p. 164, 1874; Associated Mutual Insurance Company Drawing, 28 June 1892.)

the Blackstone Canal on the west side of the complex, later used as a power canal. (Both structures separately recorded).

Bayles; W. Bagnall, The Textile Industries of the United States, 1893; T. Navin, The Whiting Machine Works Since 1831, 1950; The Book of Rhode Island, 1930; Allendale Insurance Company, Plan Book, c. 1870s, "Lonsdale Number 3 Mill", p. 111.)

SAYLES BLEACHERY (1854)
Walker Street at Route 126
Lincoln

Pawtucket
19.300040.4640740
Providence

A small print works stood on this site in 1847 when it was bought by W. F. Sayles and converted into a bleachery. Fire forced new construction in 1854. The 1-story brick building with a bracketed, pitched roof and an end tower with arched, double windows was built in that year. In 1863, with the entry of Frederick Sayles to the firm, the company was styled W. F. & F. C. Sayles. The Sayles family, politically powerful and industrially active, also had interests in the Lorraine Mills, the Slater Cotton Company (see separate entries), the Moshassuck Valley Railroad, and two local banks. The 1854 mill was eventually enlarged, and new construction continued through the 19th century. By 1901, both the upper and lower bleacheries, occupying extensive land and multiple buildings, could turn out 3000 pounds of bleached cotton goods per day. It was said to be the largest bleachery in the world. In 1934, a bitter organizing strike forced the calling out of the National Guard. The buildings are now divided among tenants.

(Sande; Chase; Hall, engraving p. 279.)

Manufacturing

MOFFITT MILL (c. 1812)
Great Road on the Moshassuck River
Lincoln

Pawtucket
19.298860.4641880
Providence

The Moffitt Mill, located on the Moshassuck River in Lincoln, is a 2½-story, wood-frame building with a gable roof and stone foundation. Possibly built by George Olney about 1812, it was originally a water-powered machine shop, and retains important early machinery. Arnold Moffitt bought the mill from Stephen Clark 1 April 1850, and the building has remained within the Moffitt family since. Arnold Moffitt

Transportation

BLACKSTONE CANAL (1824-1828)
Ashton to Scott Pond
Lincoln

Pawtucket
19.298000.4645840
19.300420.4642040
Providence

The Blackstone Canal was built between Worcester, Massachusetts, and Providence, Rhode Island, between 1824 and 1828. Benjamin Wright, who also worked on the Erie Canal, was Chief Engineer and Holmes Hutchinson oversaw the work. Five hundred men were employed in Rhode Island alone. Forty-five miles long, it originally had forty-nine locks, all but one constructed of granite. Today only one lock, in Millville, Massachusetts, survives. The canal entered and left the Blackstone River a total of sixteen times, and used the river for approximately ten per cent of its distance. Because of this, it drew water from textile mills located on the river and reduced the mills' power potential. Conflict, legal and extra-legal, between mill owners and boatmen eventually resulted in a court case lost by the canal owners. The Blackstone Canal collected its last toll one year after the Providence & Worcester Railroad opened in 1847. The longest surviving section of the canal runs four-and-one-half miles on the west bank of the Blackstone River from Ashton to Scott Pond, Lonsdale. During the late 19th century, it was used as a power canal for the old mills at Lonsdale and provided twenty-three feet of head. In Pawtucket, along Lockbridge Street, an altered section of canal exists which formerly connected Sayles Pond and the Moshassuck River. The final section of the canal in Providence still exists. It follows the course of the Moshassuck River through the North Burial Ground and along Canal Street before emptying into Providence Harbor.

(Once in a Hundred Years: A Pictorial History of Lincoln, Rhode Island, 1971; An Account of the Proposed Canal from Worcester to Providence, 1822.)

MUSSEY BROOK BRIDGE (1856)
River Road at Mussey Brook
Lincoln

Pawtucket
19.295820.4647760
Providence

The stone-arch bridge over Mussey Brook was built in 1856 by the combined efforts of two textile firms, the Manville Company and the Albion Company. The bridge, constructed of rubble stone, is 53 feet long, 47 feet wide, including the parapets, and has a span of 10 feet. It was built in conjunction with a two-mile road from Albion to Manville, designed to connect the textile mills in each village. Built for private purposes, the road was later accepted by the town of Smithfield as a public highway and the textile companies were reimbursed for their expenses. The State of Rhode Island later assumed responsibility for the bridge, and, in September, 1927, state work crews repointed parts of the bridge and added concrete top courses on each parapet. Near the bridge, Mussey Brook drops sharply in its final descent to the Blackstone River. In the 18th century, the brook provided power for the forge and trip-hammer shop of John Wilkinson. John's son, Oziel, operated the forge before moving to Pawtucket in 1780 to set up the family's iron works, textile mills and machine shops. The forge has since been destroyed.

(Rhode Island Department of Transportation, Bridge Design Files; Steere.)

WHIPPLE BRIDGE (1916)
Route 122
Lincoln-Cumberland

Pawtucket
19.300680.4642480
Providence

This three-span, reinforced-concrete deck-arch highway bridge over the Blackstone River occupies an 18th-century bridge site. It is 200 feet long, 38 feet wide, and has two 5-foot sidewalks carried on reinforced concrete brackets.

(Rhode Island Department of Transportation, Bridge Design Files: Bridge #117.)

Mills of Georgiaville in 1907, and the Jenckes Spinning Company of Pawtucket in 1923.
(Steere; Once in a Hundred Years; A Pictorial History of Lincoln, Rhode Island, 1971.; F. Kelly, Nine Lives for Labor, 1956; James Leffel Catalogue, 1875.)

Narragansett

Transportation

POINT JUDITH BREAKWATER (c. 1890)	Kingston
Point Judith Harbor	19.289680.4582180
Narragansett	Washington

Point Judith is located at the western entrance to Narragansett Bay. The harbor is protected by a 6,970-foot main breakwater, built on part of Squid Ledge and detached from shore. Two jetties extend from shore 2,240 feet on the east and 3,640 feet on the west. This configuration created two harbor entrances, one of 1,200 feet, the other of 1,500 feet. The breakwaters are rubble-mound types and crest eight to ten feet above mean low water. Portions of the east and west jetties were completed c. 1890. In 1905, the west jetty was extended and the east jetty was strengthened. Despite the opposition of at least one engineer, the long detached arm was completed in 1914. It was feared (as it turned out, without strong foundation) that the arm would never hold against storms and currents from the southwest and that it would eventually block the east entrance. The breakwater created a harbor of refuge for boats threatened by storm. During 1961-1963, the main breakwater and the east jetty, damaged by previous storms, were extensively repaired.

(United States Army Corps of Engineers, Water Resources Development in Rhode Island, 1975; Harbors of Refuge at Point Judith,...Letter from the Secretary of War, House of Representatives, 58th Congress, Second Session, Document 60.)

POINT JUDITH LIGHTHOUSE (1816)	Narragansett Pier
Old Point Judith Road	19.292400.44581620
Narragansett	Washington

On the western side of the entrance to Narragansett Bay stands the Point Judith Lighthouse, an octagonal, battered structure of cut stone. Though the tower was completed in 1816, it was rebuilt in 1857. The 1816 stone inscription, however, still remains embedded in the wall of the lighthouse. In 1857, the tower housed a 2,400-candlepower, fixed white light which flashed every twenty seconds. The dwelling which was constructed then no longer exists. Today, the brown-and-white lighthouse



Point Judith Lighthouse (Patrick M. Malone).

Newport

Bulk Products

NEWPORT STEAM MILL (1831)
449 Thames Street
Newport

Newport
19.306700.4594540
Newport

This 3½-story, quarry-faced granite mill, 48' X 120' was built in 1831 as one of four steam-powered textile mills designed to bolster Newport's economy, weakened by British occupation during the Revolution, the rise of Providence as the state's primary port, and the general movement of merchant capital into the water-powered textile industry. The mill produced cotton cloth until the depression of 1857. One year later, it was sold and refitted for warp manufacture. In 1892, the building was bought by the Newport Illuminating Company. In 1902, a power plant to run street cars was built adjacent to the mill on its west side. The plant, enlarged in 1937, is a 4-story, brick building with a bracketed roof. It still generates power with two vertical steam turbines and three Westinghouse steam turbines. The 1831 mill is used only for storage.

(Interviews with John H. Baker, Manuel C. Dias, and George McGowan, Newport Electric Company, May, 1976; Associated Factory Mutual System Insurance Drawing, "Newport Steam Mill" sheet #927, bound in album; NR., 1971; HABS, 1970.)

OLD STONE MILL (c. 1670)
Touro Park, Bellevue Avenue
Newport

Newport
19.307120.4695080
Newport

The origins of the Old Stone Mill have been shrouded in controversy since the 19th century. Long thought to be the remains of a 17th-century tower windmill, local historians and antiquarians have also argued that the mill is the surviving section of a Norse Church, or a watch tower built by Portuguese sailors in the 16th century. The best evidence, involving soil and mortar samples, supports the claim that it was built as a windmill, sometime in the 1670s by Newport resident, Benedict Arnold. The stone tower, with its arched openings at the base, resembles an observatory built in 1632, from the designs of Inigo Jones, on the estate of Sir Edward Peyto in Warwick County, England. Peyto's observatory was

later converted to a windmill. The Old Stone Mill burned sometime in the 18th century and its remains were soon after converted to use as a haymow. During the British occupation of Newport during the American Revolution, the mill was used as a powder magazine. An excellent example of 17th-century masonry, the Old Stone Mill survives as an important Newport landmark.

(A. Downing & V. Scully, The Architectural Heritage of Newport, Rhode Island, 1640-1915, 2nd Edition, 1967.)

PERRY MILL (1835)
337 Thames Street
Newport

Newport
19.306680.4594900
Newport

The Perry Mill was built in 1835 by a Scottish stonemason, Alexander McGregor. The 3-story, random-ashlar mill is a handsome example of McGregor's skill. Originally four stories, with a monitor roof and a Greek Revival wood tower, the mill has since been modified. It now contains offices and some production space. Like the Newport Steam Mill, and two other textile mills built in the same period, the Perry Mill was originally powered by steam. Despite the concentrated efforts of the 1830's, Newport never became an important textile-producing center.

(NR, 1971; HABS, 1970.)

Transportation

CASTLE HILL LIGHTHOUSE (1890)
Castle Hill
Newport

Newport
19.302620.4592520
Newport

This lighthouse, marking the entrance to Narragansett Bay at the western end of Newport Neck, was built in 1890. It is situated on the side of a stone cliff and is circular in form, tapering to the top. A black wrought-iron railing enclosed the light, fixed within its cupola. The small lighthouse is constructed of quarry-faced stone, the top third of which is painted white.

Specialized Structures

BOWEN'S WHARF SHIP CHANDLERY Newport
AND WAREHOUSE 19.306700.4695260
(late 18th to early 19th century) Newport
Newport

The most distinctive feature of these two buildings on Bowen's Wharf is the presence of windlasses in the upper stories of both. The 2-story, shingled, pitched-roof ship chandlery, 36' X 24', sited gabled end to the street, was built prior to 1807. The building was moved about five years ago from a site on the wharf twenty-five yards west of the current site. A 3-story, gambrel-roofed warehouse, 30' X 20', with a clapboard exterior, stands just east of the ship chandlery. It was built in the late 18th or early 19th century. Both buildings were restored in 1969-1970 and are used for commercial purposes, though the warehouse also contains an upper story apartment. Built after Newport's maritime economy was in decline, these two structures still reflect Newport's 19th-century dependence on the sea. (HABS, 1969, Rhode Island - 304-305, Interview with Bart Dunbar, 1976.)

FORT ADAMS (1824) Newport
Brenton Point 19.304720.4594260
Newport Newport

Fort Adams, located on Brenton Point, a peninsula west of Newport Harbor, guards the entrance to Narragansett Bay. Construction began in 1824 and continued to mid-century. While supervising the planning and construction of the fort, Colonel Joseph G. Totton, Chief of Engineers and leading United States military engineer, conducted studies on hydraulic lime which led to the publication of his important technological work, Hydraulic and Common Mortars. One of the primary consulting engineers was Simon Bernard of France. The overall plan of fortification was thoroughly indebted to theory and experience developed by the Ecole Polytechnique. The fort was designed to defend the bay from sea attacks; but its design also provided excellent defense for land attacks on the fort itself. Constructed of Maine granite, Fort Adams

assumes the configuration of an irregular pentagon. The entire fort covers 21½ acres, with a perimeter of 1,739 feet. It was designed to garrison over 2,400 men and to mount 468 cannon, making it one of the largest forts of its type built in the United States and a vital link in the eastern coastal defense system. Significant details of the main enciente include three rather than two tiers of cannon along the seafront curtain with the casemates on that curtain being designed to accommodate two cannon rather than one; and unusual parabolic arched entrances to various areas of the fort. The tenailles, a feature of the southern exterior front, not included in any other United States fort, are low works located before the curtain and between the two flanks of the bastion which serve to mask the scarp wall. A system of listening galleries or tunnels runs beyond the counterscarp with access from the enciente and exterior front. Two redoubts exist whose construction is patterned after the main work. One is a covered, elongated pentagon. The second, an advanced redoubt, is a larger casemated structure with several levels surrounded by a dry moat with drawbridges and tunnels providing access. Designed to defend against wind-powered ships mounting small, smooth-bore cannon, Fort Adams became obsolete with the development of shallow-draft steam warships and more powerful cannon. The fort and its interior and exterior buildings are being restored by the state as a museum and recreational center. Fort Adams is now a National Historic Landmark.

(Willard B. Robinson, "Report on the Restoration of Fort Adams", 1972, ms. at RIHPC; Newport: This Week, 14 May 1976.)

UNITED STATES NAVAL TORPEDO (1870)	Newport
AND GUN COTTON STORAGE	19.304480.4596240
Rose Island	Newport
Newport	

The United States Naval Torpedo Station was originally located on Goat Island, now largely occupied by a resort hotel. This island in Newport Harbor was used from 1869 until the end of World War II as the Navy's torpedo research and production center. The buildings, which at one time included a gun-cotton factory (built in 1881, burned with loss of life in 1883), were largely removed in the mid-1960s. In the late 19th century, the Navy

also developed Rose Island, 2200 feet northwest of Goat Island, for the production and storage of gun cotton. The Fort Hamilton bunker, built on the south end of the island c. 1870, still survives. It was used as a gun-cotton magazine and is the only 19th-century structure used by the torpedo station still in existence. Much of the island is now privately owned. Rose Island Light, on the island's southwest corner, was built in 1869 and was recently acquired by the University of Rhode Island for oceanographic research. Gould Island, about one mile north of Rose Island, was occupied by the Navy during World War II as a torpedo testing and overhaul station. The Navy acquired the island in 1918 and, until World War II, used it simply for storage. Some storage bunkers on the island were built c. 1920. Major construction, including the overhaul building and torpedo testing pier, dates from 1942 and still survives. The latter is still used by the Naval Underwater Systems Center.

(Interview with Frederic J. Lamoureux, Deputy Head of Facilities, and Gary Steigewald, Naval Underwater Systems Center, June, 1976; "History of the Naval Torpedo Station", Volumes 1-VIII, 1946, ms. in Public Affairs Office, Naval Underwater Systems Center.)

New Shoreham

Transportation

BLOCK ISLAND NORTH LIGHT (1867)	Block Island
North end of Corn Neck Road	19.284070.4567020
New Shoreham	Washington

The North Light, constructed by John Beattie of Fall River in 1867, is the fourth lighthouse built on Sandy Point at the north end of Block Island. Earlier lights built in 1827, 1837, and 1857, were either too close to the ocean, or too far from it. They were rendered useless by the island's shifting sands. The present light, originally called the Sandy Point Light, stands 61 feet above sea level and is visible 15½ miles out to sea. It was originally equipped with a fixed white light and was constructed to guide vessels clear of the sandy point extending out to sea more than a mile. The severely symmetrical 2½-story main building, 30' X 33', is constructed of 18-inch-thick granite blocks. A one-story kitchen ell is visible at the rear. The fireproof, octagonal cast-iron tower stands at the north end of the gable, and is of a type standard in the late 19th century. The kerosene Fresnel lantern, built in Paris, is comprised of a complex set of prismatic lenses. The original French lenses remain, though the clock mechanism, turntable, and burner have been removed. Re-installation has been considered as part of a restoration plan. The light was abandoned in 1970.

(NR, 1974; Nicholas Ball, Lighthouses, 1890; Edward R. Snow, Famous New England Lighthouses, 1945; Annual Report of the Light-House Board to the Secretary of the Treasury for the Year 1875, Washington, 1875; Rhode Island Pendulum, 1 November 1895.)

BLOCK ISLAND SOUTHEAST LIGHT (1873-1876)	Block Island
Southeast Light Road	19.4558620.285780
New Shoreham	Washington

The Southeast Light, standing 100 feet above the ocean, was completed on 1 February 1876, though a Congressional bill was proposed as early as 1857 for a lighthouse station on the south end of Block Island. T. H. Tynan of Staten Island began construction in 1873 after a bill was passed allotting \$75,000 for that purpose. The battered, octagonal brick tower with an iron balustrade

is attached to a 1-and 2-story, T-shaped, brick house, which has two small wings off the main section of the building. Both the tower and the house have rock-faced granite foundations. The brick pattern of the tower is common bond, whereas the house is a modified Flemish bond. The house has paired, narrow, segmental windows on the gable ends and single, segmental windows on the sides. The granite ridge and eaves have been covered with copper flashing. The light, built in 1880 and still operating, was designed by Henry-Lapaute of Paris and was constructed by L. Sauteer and Company. It is octagonal in shape, six feet in diameter, and is supported by a brass base. Today, a 1,000-watt bulb shines light 35 miles out to sea, creating 237,000 candle power. The Southeast Light is said to be the most powerful on the Atlantic coast. Given its picturesque setting and its architectural quality, it is one of the state's finest lighthouses.

(Annual Report of the Light-House Board to the Secretary of the Treasury For the Year 1875, Washington, 1875; Nicholas Ball, Lighthouses, 1890; Providence Sunday Journal, 18 April, 1876; Interview with Michael Lavoie, keeper, 16 April 1976.)

GREAT SALT POND BREAKWATER (c. 1895)	Block Island
Great Salt Pond	19.282600.4563820
New Shoreham	Washington

The breakwater at Great Salt Pond consists of two jetties. The north jetty extends approximately 500 feet, including both the land and water mass. The south jetty runs about 1,500 feet, 300 feet of that past the shoreline. As early as 1868, the Federal Government considered building a harbor on the west side of the island. There was, however, a sandy strip of beach between the ocean and Great Salt Pond. Several cuts were made but sand movement eventually closed them. Work was started on a permanent channel and the south jetty about 1895. At this time, a channel, 300 feet wide and 12 feet deep, was dredged by the Hartford Dredging Company and a 500-foot jetty was built by S. & E. S. Belden of Hartford. A new federal survey in 1895 recommended carrying on the work, and the first appropriation was made in 1896. The channel was subsequently widened to 600 feet and deepened to 25 feet. The south jetty was extended to the 18-foot contour and a small, north jetty was built by the State of Rhode Island.

While the work was being done, however, shoaling continued, and a decision was made to further extend the south jetty. Plans were drawn up in 1903 projecting the jetty to the 21-foot contour. The work was eventually completed. The north side could not be extended, however, because it would then interfere with free access to the pond. By 1903, over \$180,000 had been spent and a committee appointed by Governor Lucius Garvin indicted the entire project as unnecessary and essentially motivated by self-interested parties seeking to transfer the island's business center to Great Salt Pond.

("Harbor...., Report of the Committee Appointed by the Governor, May 25, 1904 to Act with the Town of New Shoreham", Providence, 1904; Newport Daily News, 3 July 1895.)

OLD HARBOR BREAKWATER (1870)
Old Harbor
New Shoreham

Block Island
19.285660.4560920
Washington

The Old Harbor Breakwater consists of two jetties. One, protecting the east side of Old Harbor, extends approximately 500 feet from shore in a northeast direction. A 500-foot arm then extends east forming an L. The Harbor entrance, thus created, is about 300 feet wide and is marked by two beacons at the end of each jetty. Work began on the breakwater 27 October 1870 when the first stones were put overboard from the schooner, D. H. Baldwin. By the end of 1872, 30,000 tons of "riprap" (broken stones loosely thrown together with no definite order) were used, not counting the filling supplied by the island. About 90,000 tons were used before the work was completed. Hundreds of oak piles were driven to an average depth of seven feet helping to increase the stability of the crib work. One-and-one-third acres of basin were dredged in 1872 to a depth of seven feet at mean low water. 15,000 cubic yards of fill, most of it clay, was removed by blasing with powder and dualin. An electric battery was used to trigger the blast. The New York Times called it "one of the most extensive engineering works undertaken of late" in the northeastern part of the country. The project originally involved only the construction of the east jetty, but in order to protect men and materials, the northwest arm was

built also. By 1895, the loose rubble was no longer keeping sand from the basin and the stone-work had settled to such an extent that the jetty no longer protected the basin from waves. Additional riprap and small stones used as chinking were necessary. This, along with new dredging, was accomplished c. 1902. Improvements have continued to the present. The breakwater is within the Old Harbor National Register District.

(Charles R. Suter, Colonel, Corps of Engineers, "Block Island Old Harbor Map", 30 October 1903; Reverend Samuel T. Livermore, History of Block Island, 1877, diagram of improvements, p. 16, The New York Times, 5 May 1879.)

North Kingstown

Bulk Products

GILBERT STUART SNUFF (c. 1757)	Wickford
AND GRIST MILL	19.295940.4599140
Gilbert Stuart Road	19.295920.4599160
at the Pettaquamscutt River	Washington
North Kingstown	

This site prior to 1687 contained a variety of milling operations. There is evidence for the existence of an early grist mill and some indication that a sawmill and fulling mill operated here as well. Thomas Moffitt, a Scottish immigrant who, according to J. R. Cole, could not make a living as a physician because his "dress and manners (were) ill suited to the plainness of the inhabitants", encouraged Gilbert Stuart, a millwright, to immigrate from Scotland. In 1753, Stuart, the father of the noted portrait painter, built a snuff mill in partnership with Moffitt, who was looking for another form of "genteel subsistence". The water-powered mill was originally located on the lower story of the gambrel-roofed house still standing. The present snuff mill is not the original, but one presumably of the same type, built c. 1800 and brought from Sheffield, England in 1932. Norman Isham oversaw the restoration which includes an undershot wheel, 15 feet in diameter. The wheel drives a shaft connected to a wooden pegged gear which interfaces with a smaller wood gear, also pegged. The latter gear connects to a lantern pinion which drives, by means of a connecting leather sleeve and iron roller, the pestle. The pestle rotates at 75-100rpm within the mortar and grinds three-to-five-year-old tobacco into snuff. The wood-frame grist mill on the site was built c. 1757 and has been partially restored. By 1812, it was known as Hammond's Mill. An overshot wheel remained in place until the hurricane of 1959. A vertical turbine survives in the race with both a wooden pulley and a bevel gear connected to the shaft. The stones, vat, hopper, and hooks still survive. The entire site, which includes restored and furnished rooms on the upper floor of the snuff mill, is operated as a museum by the Gilbert Stuart Memorial, Inc.

(Brochures distributed at the site; Cole; The Providence Sunday Journal, 12 September 1971; M. and M. Zimiles, Early American Mills, 1972, photo of gristmill p. 43.)

HAMILTON WEB COMPANY (1866-1880)
Village of Hamilton
North Kingstown

Wickford
19.296520.46023400
Washington

This mill site in North Kingstown, located at the point where the Annaquatucket River empties into the tidal flats of Bissel Cove, was once occupied by a sawmill, a grist mill, and fulling mill. In 1866, Joseph W. Greene, whose family had been in the textile business since 1794, bought one-half interest in a small cotton spinning mill located on the site. Incorporated in the same year as Vaughn & Greene, the new firm built a large addition to the mills already in place. By 1873, when Greene bought out his partner, the mills housed fifty narrow fabric looms. In 1880, further expansion led to the erection of a new weave shed. The hurricane of 1938 destroyed the oldest mills on the site, built in 1838 and 1850. The 1866, 2-story, frame structure, with an unusual double clerestory monitor roof, continues to survive, along with the 1880, 2-story, brick mill with central tower, segmental-arch windows, and a northwest corner covered in clapboards. The company is still engaged in weaving and finishing, using Crompton & Knowles dobby and jacquard looms (none of which pre-date 1935). Remaining historic machinery includes a Pratt & Cady pump (patent dates, 1878-1882) and a single cylinder steam engine built by the Skinner Engine Company of Erie, Pennsylvania (patent dates, 1898-1918). Worker housing survives in the village of Hamilton immediately south of the mills.

("Hamilton Web Company", in Textile Age, October, 1944; Interview with Ray Pitchon, Hamilton Web Company.)

LAFAYETTE MILL (c. 1877)
Ten Rod Road
North Kingstown

Wickford
19.292800.4605040
Washington

This mill site was first occupied c. 1800 by a snuff mill and tannery later converted to a yarn spinning mill. The spinning mill, owned by Greene and Hawkins, was a 3-story, wood building, 28' X 33'. A new water wheel and raceway were added in 1824. Parts of the raceway survive, but the wooden mill and wheel have since been removed. Cotton goods were produced here though the early 19th century as the mill frequently changed

owners. In December, 1847, the site was sold to Robert Rodman who shifted to woolen production one year later. In 1877, Rodman built the brick mill which still stands. It is 316' X 55', three stories high with two mansard-roofed towers. Rodman also built a brick storehouse and a number of houses and tenements in the village. Besides the storehouse, three other out-buildings remain - at least one of which may date from earlier construction. The mill remained in the Rodman family and continued to produce woolen cloth until 1947. According to the owner, no machinery or power-generating equipment remains. The site is now occupied by small tenants - a retail lumber company, a wood-working shop, an antique shop, and an electric switch manufacturer. The mill village of Lafayette, stretched out along Ten Rod Road, an 18th-century highway, is well preserved and has been nominated to the National Register of Historic Places. (Cole; Interview with Tom Dixon, Schwartz Lumber, and Morton Curry, North Kingstown, May, 1976.)

SHADY LEA MILL (c. 1820)
Village of Shady Lea
North Kingstown

Wickford
19.294500.4600762
Washington

Located on the Mattatuxet River, the Shady Lea Mill was in operation as early as the 1820s. The current mill includes a 2-story, clapboard section with a pitched roof, a central tower, and a granite foundation. Constructed in at least two stages, it exhibits early 19th-century window frames and is likely the c. 1820 mill with some later modifications. A 2-story brick wing also built in two stages, abuts the wood-frame section on the north. The portion nearest the original mill dates from the mid-to-late 19th century, while the northern section was added later. The site also includes a carpenter shop, a waste room, a raw materials room, a forge shop, a boiler house, and a turbine house. Most prominently associated with the Rodman Manufacturing Company, a large Washington County textile firm which bought the mill in 1859, the Shady Lea Mill continued to produce textiles into the 20th century. The mill is now owned and occupied by a staple manufacturing firm. Two Corliss steam engines were located here about fifteen years ago, but were subsequently removed. Remaining machinery

includes a Warren steam pump, a turbine, two Worcester boilers, and a c. 1901 Western Electric ampere meter. A mill pond and raceway continue to survive as well as worker housing located northeast of the mill.

(Hoag, Wade, & Company, History of the State of Rhode Island, 1878; Chase; Sande; Factory Mutual System Insurance Drawing, 5 December 1890; Book of Rhode Island, 1930; Interview with Ambrose B. Reisert, owner, May, 1976; Information from Ellen Weiss, RIHPC.)

Transportation

PLUM BEACH LIGHTHOUSE (1898)	Wickford
West Passage, Narragansett Bay	19.299290.4600200
North Kingstown	Washington

This 3-story, cast-iron and steel lighthouse stands on a rock outcrop just north of the Jamestown Bridge. Cylindrical and slightly tapered in form, it is ringed by balustrades at the first- and third-story levels. It was manned until 1938, but became obsolete with the construction of the Jamestown Bridge and was abandoned by 1941. (RIHPC Survey of Lighthouses, 1973.)

WICKFORD HARBOR & BREAKWATER (1900)	Wickford
Wickford Harbor	19.296620.4604340
North Kingstown	Washington

The original engineering project at Wickford Harbor was initiated in 1873 and modified in 1896. By 1900, boulders had been removed and a channel nine feet deep and sixty feet wide at its central part had been dredged. The two breakwaters at the entrance to the outer harbor were completed by 1964. A channel twelve feet deep and one hundred feet wide, from Wickford Harbor into Mill Cove, and an anchorage in Mill Cove were completed at the same time. The harbor, consisting of an outer harbor and three small coves, is used by recreational craft and small fishing boats.

(United States Army Corps of Engineers, Water Resources Development in Rhode Island, 1975.)

Bridges

CLARENCE HUSSEY BRIDGE (c. 1925)	Wickford
Boston Neck Road at Wickford Cove	19.295540.4604500
North Kingstown	Washington

The Clarence L. Hussey Bridge is a small, reinforced-concrete, through-arch span connecting Boston Neck Road to the village of Wickford. Built by L. E. McLaughlin, Inc. and designed by Clarence Hussey, state bridge engineer, it is 84 feet long, 38 feet wide, with a rise of 80 feet. Built in concrete in order to protect against salt water corrosion, it is the only concrete through-arch bridge in the state.

(State Department of Transportation, Bridge Design Files: Bridge #11.)

Building Technology

QUONSET POINT- (1939-1942)	Wickford
DAVISVILLE NAVY BASES	19.297320.4608160
Quonset Point	Washington
North Kingstown	

The Quonset Point Naval Air Station, built between 1939 and 1941, at a cost of approximately \$35 million, played a key role in the United States' mobilization for, and participation in, World War II. Merritt, Chapman, & Scott and the George Fuller Company contracted to dredge a deep-water channel to fill 400 acres of land; and to build the airfield, hangars, aircraft and maintenance facilities, an aircraft carrier pier, and housing and related structures for about 3,000 people. Fuller also erected Building Number 16, a reinforced-concrete warehouse specially designed, according to standards developed by the Navy's Bureau of Yards and Docks, to efficiently accommodate the use of fork-lift trucks and a storage system employing 4' X 4' wooden pallets. Albert Kahn, Inc. of Detroit, the noted and innovative industrial design firm, best known for its automobile factories, designed the hangars, the administration building, the hospital, the barracks, and a number of other structures. In order to conserve scarce building materials, the Kahn

Company developed a special structural system incorporating steel framing with wood sheathing and exterior brick veneer. Immediately north of the Naval Air Station is the historically-important Davisville Naval Construction Battalion Center. Activated in 1942 as an advanced base depot, Davisville was the training center for the Navy construction units known as the "Seabees". The famous Quonset Hut, designed at Quonset Point by the George Fuller Company, was tested and shipped from Davisville. For a time, it was manufactured here as well. This standardized building form, inexpensive to manufacture and assemble, easy to transport, and versatile in its uses was the ideal pre-fabricated unit for overseas military needs. The best-preserved Quonset Huts, built as classrooms in 1942, are buildings S-20 thru S-23, T-1 thru T-19, A-12, and B-11. They survive as significant examples of engineering history and represent noteworthy contributions to allied victory in World War II. Davisville, the Navy's construction material testing center, also developed the standard pontoon bridge. Both the Quonset Point and Davisville bases, after being deactivated by the Navy in the early 1970s, figure prominently in the state's plans for future economic development. The most important structures have been recommended for preservation.

(D. Chase, "A Historical Survey of United States Navy Property in Rhode Island", RIHPC, August 1974; Building the Navy's Bases in World War II, History of the Bureau of Yards and Docks and the Civil Engineer Corps, 1940-1947, USGPO, 1947.)

North Providence

Bulk Products

ALLENDALE MILLS (1822)	Providence
494 Woonasquatucket Avenue	19.294020.4635900
North Providence	Providence

Built in 1822 by Zachariah Allen, the original section of the Allendale Mill is a 4-story, stone-rubble structure, 160' 6" X 37' 6", capped by a distinctive, dormered roof. On its north side, the roof line is marked by a stepped gable and on the northeast and northwest corners there are heavy buttresses arranged in diminishing tiers. The central tower once supported a round-arch belfry. From early line drawings, it would appear that the original roof contained a simple clerestory monitor which was later modified by dormered windows. Construction of the mill, its outbuildings (including the Greek Revival company store still standing) and the dam was supervised by the Providence architect, John Holden Greene. The raceways were constructed of dry-stone masonry and they survive as testaments of a dying craft. The mill first produced woolens, and later cottons. It is historically noteworthy as the first mill to use the power loom for the manufacture of broad-cloth and the first to use a rolling process in order to impart a gloss finish to cloth. The mill's claim to being the earliest known example of "slow-burning" construction (beams of large cross section, heavy plank-ing and shingles set in mortar) has recently been challenged. Later additions include the stone boiler and storage buildings adjacent to the tail race (1844); the engine room on the south side of the main mill (1864); Mill Number 2, a stone structure on the east side of the main mill (1880); and the brick addition on the south-east (1910). In 1934, the complex ran 10,200 spindles and 28 box looms in the production of worsted cloth and employed 143 workers. Allendale continued to produce textiles until the winter of 1976. The complex is currently used for a variety of manufacturing and commercial purposes, and there are plans to reactivate the water-power system.

(Associated Factory Mutual Drawing, 4 January 1934; Chase; Sande; New England Textile Mill Survey, 1971, line drawing p. 134; Interview with Abraham Nathanson, February, 1977.)

GREYSTONE MILL (1904)
Greystone Avenue
North Providence

Providence
19.293300.4637360A
Providence

Olney Arnold, Peleg Williams, and Matherson Latham built a cotton mill here on the Woonasquatucket River in 1813. Three years later, they sold the mill to Richard Anthony, an owner of the Coventry Mill. Anthony produced cotton yarn and cloth here until 1835. The mill was subsequently used by various owners to produce yarn, paper, grain, and wool shoddy. Burned and rebuilt twice, in 1872 and 1877, it was last used as a textile storehouse. It is now in ruins with its raceways filled in, though a small dam continues to survive upstream. In 1904, Joseph Benn & Company of Bradford, England contracted with F. P. Sheldon, a Providence mill engineering firm, to build a large new mill adjacent to the earlier one. This 4-story, brick-pier mill, with two distinctive towers dividing the front facade into thirds, produced mohair and alpaca. A large weave shed, with a saw-tooth roof, stands south of the main mill. The Benn Company recruited textile workers from Yorkshire and Lancashire and built extensive worker housing (though the housing closest to the mill was built earlier), a social club, and a cricket pitch. The most interesting housing includes the row-houses (1904-1910) built on Oakleigh Avenue and the Whitehall Building (1911) facing Waterman Avenue. The latter, a large 3-story building with front and rear balconies, contained housing for overseers, an assembly hall, and stores. A form of worker housing unique in Rhode Island, the Whitehall Building is likely derived from English antecedents. The Benn Company ceased operations in the 1930s, but the main Greystone Mill is still used for textiles and houses one of the last full-production worsted plants in New England. No historic machinery survives.

(Vivian Lasky, "North Providence Preliminary Survey", RIHPC, 1977; Bayles; Factory Mutual Insurance Drawing "Worcester Textile", 15 November 1960; Interviews with Marcus Thompson and Raymond Gregson, Worcester Textile, 1976.)

LYMAN MILLS/ (1885)
LYMANVILLE COMPANY
184 Woonasquatucket Avenue
North Providence

Providence
19.294400.4634620
Providence

The first building on this site was erected in 1809 by Daniel Lyman. This small mill, since dismantled, was the site of the first successful use of power looms in Rhode Island. Lyman contracted with a Scottish mechanic, William Gilmour, to construct twelve looms. The patterns were Gilmour's but the work was actually done by David Wilkinson of Pawtucket. The looms were set up in 1817, and were soon proved superior to those constructed by the Boston Manufacturing Company of Waltham, Massachusetts. By the late 1820s the "Scotch loom" was the dominant loom in New England textiles. There was additional construction c. 1845, but with the exception of a 2½-story, random-stone, pitched-roof outbuilding, nothing survives from the ante-bellum period. The 3-story, brick-pier mill now on the site was built in 1885 for A. Albert Sack, the owner, from his own design. It has segmental-arch double windows and was built in the shape of a cross, 370 feet in one direction, 312 feet in the other, and 80 to 100 feet wide. The firm, organized as the Lymanville Company in 1884, produced worsted yarns, coatings and suitings. The building is still used for manufacturing. A number of small, varied firms now occupy the structure.

(Sande; Hall; William Bagnall, The Textile Industries of the United States, 1893; Grieve & Fernald.)

Bridges

CENTERDALE BRIDGE (1920)
Putnam Pike
North Providence-Johnston

Providence
19.293500.4636900
Providence

Designed by C. L. Hussey and built by Bowerman Brothers, the Centerdale Bridge is a single-span, reinforced-concrete deck-arch, 66 feet long and 48.3 feet wide. It carries Putnam Pike over the Woonasquatucket River.

North Smithfield

Bulk Products

BLACKSTONE MILL (1904)
Tripp Street
North Smithfield

Blackstone
19.289180.4654140+
Providence

The original Blackstone Mill, 211' X 40', built in 1809 on the Massachusetts side of the Blackstone River on a site just north of the present mill, was one of the largest spinning mills in North America. The company, controlled by the merchants, Brown & Ives, expanded with additional mills in 1841, 1845, 1847 and 1854. None of these mills survive. The only mill structure from this period of Blackstone's history is a 2-story, stone storehouse, c. 1840, with brick cornice. It stands adjacent to the tracks of the Providence & Worcester Railroad, east of Mendon Road. In 1904, for tax purposes, the company demolished its stone mills on the Massachusetts side of the river and moved about 500 feet south to build a new brick mill on the Rhode Island side. This mill, 453' X 130', is three to four stories high, with a central tower. The roof, of slight pitch, is gravel covered plank-on-timber. Other surviving buildings include the picker house, for preparation of cotton, which adjoins the main mill on its northeast side; a 1-story storehouse, now used as a maintenance building by the current owners; a 7-story storehouse, 104' X 75', built on a slope; and a badly deteriorating engine, boiler and wheel house. Four mixed-flow, vertical turbines and three boilers remain in place. A Corliss-type, cross-compound steam engine, still exists with most of its fittings and its maker's plate removed. One connecting rod is still attached to the flywheel, which is approximately eighteen feet in diameter. In 1926, the mill, still owned by the Lonsdale Company (a continuation of Brown & Ives), ran 55,552 spindles, 922 plain looms and 228 dobby looms and employed 550. At that time, the mill operated on 50 per cent water power and 50 per cent electricity. Later the mill was bought by Textron and in 1953 was purchased by its present owners. It is no longer used for textiles, but continues to be employed in manufacturing. The surrounding village of Blackstone, Massachusetts, contains numerous examples of worker housing, some

from the early 19th century. The village also contains a company store (at Main and Church Streets); boarding houses (Butler Street); overseer's housing (Mendon Road); and the Superintendent's House. In the eastern part of the town, there are examples of 19th-century middle-class housing. The village survives virtually intact as an excellent example of New England mill towns in the 19th and 20th centuries.

(Interview with Tony Bacon, Plant Manager, Tupperware, April 1976; Records of the Blackstone Manufacturing Company, Rhode Island Historical Society; Associated Factory Mutual Drawing, 13 August 1926.)

FORESTDALE MILL (1860)
Forestdale Village
North Smithfield

Georgiaville
19.287500.4652360
Providence

Situated along the Branch River, just west of a site originally occupied by a scythe and saber factory (1824) destroyed in the early 20th century, the Forestdale Mill was built in 1860 for the manufacture of cotton cloth. The 1860 section is a 3-story, stone building, 166' X 68' before additions, with a pitched roof and dormers. The large and distinctive central tower, with an open, round-arch shingled belfry and peaked roof, was enlarged about 1885, at the same time as the building of the brick extension on the west end. In the early 20th century, the tower was used to house the large tanks containing the mill's water supply. The bracketed, wood-frame mill office also survives. The 1860 mill was run by Mansfield & Lamb who drew 250 horsepower from a fourteen foot dam and supplemented it with a steam engine of 80-horsepower. The mill, now vacant, last produced the yarn filler used in baseballs. No old machinery or power generating equipment remains, though the dam is still in place. The Forestdale Mill is the focal point of an intact mid-19th-century industrial village which includes vernacular Greek Revival worker housing, a store, post office, and school. The village has been entered on the National Register of Historic Places.

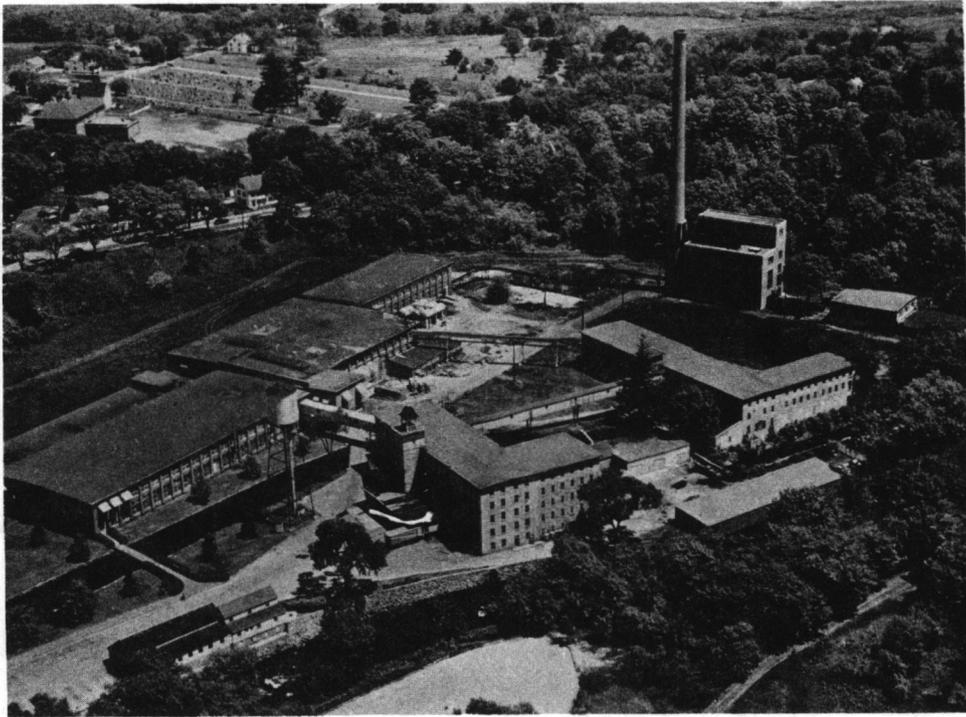
(Steere; Hall, photo p, 174; Interview with Walter Nanni, plant manager, Stamina Mills, January, 1976.)

SLATERSVILLE MILL (1826)
Slatersville Village
North Smithfield

Georgiaville
19.286480.4652700
Providence

Almy, Brown & Slater built the first mill on this Branch River site in 1806-1807. Portions of the current wood office building may survive from this period. The main mill, constructed in stone, burned in 1826 and was replaced the same year by the mill now standing. This stone structure, 4-stories with a flat roof (originally the roof was pitched and had a clerestory monitor), has a 5-story central tower (also much modified) with a small, open belfry. It is now used for storage by the current owners. The Western Mill, built in 1821, rebuilt and enlarged in 1843 after a fire, and dismantled in the 20th century, was located about 400 feet upstream of Mill Number 1. Its picker house still survives, as does a stone storage building, now used as the local library. Mill Number 3, a 3-story, stone building, directly east of the main mill, was built in 1843. Its wheelhouse, now exposed, contains a late 19th-century horizontal turbine connected to pulleys which once provided direct mechanical drive for the mill's machinery. A brick weave shed (1894) overlooks the well-preserved raceway. It was powered for a time by an above-ground shaft running approximately 300 feet from the wheelhouse of the Western Mill. The village, containing early 19th-century worker housing (modified with the addition of porticoes and side porches in 1915) commercial blocks from the mid-19th century, and churches from 1838 and 1872, may be the first planned textile community in the United States and has been entered on the National Register of Historic Places.

(NR, 1973; Associated Mutual Insurance Company Drawing, 9 August 1894; Walter A. Nebiker, History of North Smithfield, 1976; North Smithfield Centennial, 1666-1971, painting c. 1860, p.50, photos pp. 46 & 52.)



Slatersville Mills, c. 1940 (SMHS).

Bridges

SLATERSVILLE BRIDGE (c. 1855)	Georgiaville
Railroad Street	19.286360.4652690
North Smithfield	Providence

In June, 1855, the town of North Smithfield appropriated \$2,000 to build a stone arch bridge over the Branch River in the village of Slatersville to replace an early 19th-century wood bridge. The current twin-arch ashlar bridge was built soon after. The bridge is 150 feet long, 29 feet wide, and the arches have a span of 40 feet and a rise of 20 feet. The sidewalk on the west side was added in 1940. In excellent condition, the bridge is an important element in the Slatersville National Register Historic District.

(NR. 1973; Rhode Island Department of Transportation Bridge Design Files.)

Specialized Structures

SLATERSVILLE POWER CANALS (c. 1806)	Georgiaville
AND DAMS	19.285010.4652700
South of Slatersville Road	19.287060.4652700
North Smithfield	Providence

The water power system at Slatersville is complex and worthy of further study. There are two power canals, an upper (c. 1843) and a lower (c. 1806), drawing at different points from the Branch River. The entry gates of the upper canal are approximately one mile upstream of the Slatersville Mills (see separate entry). The upper dam, 15 feet high, provided 18 feet of head for the now dismantled Western Mill and generated 220 horse power. The lower power canal draws water from above a smaller dam located just above the site of the Western Mill. It also received water from the upper canal after it was used by the Western. The water was then carried in the lower level canal to Mills 1 and 3, which in 1880 used 20 feet of head and about 250 and 130 horsepower respectively. As long as there was sufficient flow in the

upper canal the entry gates of the lower could be kept closed. An intermediate dam, built in 1849, and located about 500 feet above the lower dam stands 21 feet above the stream bed. It was built of local stone with a rollway of 160 feet. The new dam took five months to build, cost \$10,000 and ponded an area of 150 to 175 acres. It was built and maintained as a reservoir dam and functioned to reduce the danger of serious flood damage. Sometime in 1872, a new dam was built at the upper reservoir replacing the one previously built. The three dams and the lower level power canal are well preserved, and the two sets of gates are reasonably preserved. Parts of the upper power canal remain, but its last section, nearest the mills, has been filled in.

(See Slatersville Mill for references.)

WOONSOCKET RESERVIOR (1895)
NUMBER 3 DAM
North Smithfield-Smithfield

Pawtucket
19.293330.4646380
Providence

The dam at Woonsocket Reservoir Number 3 was designed in 1894 and built one year later to provide water for Woonsocket's residents. Byron Cook was the project's superintendent and engineer. Originally, the dam was 1200 feet long, earth-filled with a concrete core wall on the south and a spruce-plank core on the north. A 25-foot-wide, granite-faced concrete spillway, was incorporated into the dam 300 feet from its southern end. North of the spillway, two 20-inch pipes run from the reservoir under the wall and through gate chamber valves in the gate house, a 12' X 15' wood and stone structure with a hip roof. In 1925, the dam was lengthened to 2,000 feet and the spruce planking was replaced with concrete. The dam was also increased six feet in height. Two-foot high flashboards were used until 1955, when a two-foot concrete extension was built. The present dam, 2000 feet long, 15 feet wide, stands at a maximum height of 26 feet above the streambed, and ponds a reservoir of 263 acres with a capacity of 1,140 million gallons of water. It continues to provide drinking water for the city of Woonsocket, though the current pumping station has no historic interest.

(Woonsocket Annual Report, 1894; 1943 Maguire & Associates Report, 1955 Metcalf & Eddy Report, Woonsocket Engineer's Office.)

Pawtucket

Bulk Products

AMERICAN TEXTILE COMPANY MILL (c.1900) Providence
250 Esten Avenue 19.300600.4636920
Pawtucket Providence

The American Textile Company Mill, once the largest lace-making plant in the United States, is located on Esten Avenue near the line of the former New York, New Haven & Hartford Railroad. The company, incorporated in 1899, built the mill about the same time. This 3-story, brick mill, with a hip-roofed tower and a weave shed on the north end, was the first leavers lace plant in Pawtucket. In 1917, it operated 66 lace machines and employed 500 workers. The company stayed in production until the early 1970s, when changes in women's fashion finally closed it. Since 1973, the main building has been owned by a textile converter and quilting manufacturer and some of the floor space has been leased for jewelry manufacture. The brick building on the west side of Esten Avenue, now owned by a dyer, was once part of American Textile. The company dyed and finished its lace on the premises; and the remains of a conveyor, once linking the production and dyeing departments, is visible on the north end of the 3-story section. No historic machinery survives. (Pawtucket Past and Present, 1917, illus. p. 30; Providence Sunday Journal, 9 February 1975; Interview with Harry E. Mantes, Controller, Harry Ball & Son, February, 1977.)

CONANT THREAD/ (1870-1919) Pawtucket
COATS AND CLARK MILLS 19.301300.4639160
Pine, Conant, and Carpenter Streets Providence
Pawtucket-Central Falls

This multi-building mill complex is situated on approximately fifty acres overlapping the Pawtucket-Central Falls line. Hezekiah Conant, a versatile inventor of improvements in thread dressing and winding, founded the firm in 1868. Conant very quickly affiliated with the large British thread manufacturer, J. & P. Coats (later Coats & Clark), and became a key part of the Coats-dominated "thread trust". In 1869, the production of Coats' six-cord spool-cotton began in a 2-story, wood-frame

mill, 96' X 41', located on Pine Street. The mill was demolished about 1922 when a brick finishing mill was erected in its place. The company built Mill Number 2, a 4-story brick building, 283' X 68', in 1869. With its twin end towers, continuous monitor, and hipped roof, it stands just southeast of the company's brick bleachery constructed in 1870. In 1872, Mill Number 3 was built just north of the Number 2 Mill. Used exclusively for spinning, Mill Number 3 is three stories high, 364' X 105' with a slightly-pitched roof and a mansard-roofed central tower. Mill Number 4, a 4-story brick structure, 364' X 105', with imposing mansard-roofed twin end towers was built in 1875. It stands to the north of Mill Number 3 and east of Mill Number 5, the latter built in 1881 in a style similar to Mill Number 4. All of these mills were powered by non-condensing Corliss steam engines located in adjoining engine houses. No steam engines survive. In 1877, Conant added a 2-story, brick dye house, 160' X 45½', located southwest of Mill Number 2; and a 2-story, brick box shop, 192' X 50', on the southern edge of the site. Other buildings from this period include picker and boiler houses adjoining the main mills, a wood frame carpenter shop, and a long row of store houses along Pine Street. In 1917, the company ran 105,000 spindles and employed 2,500 workers. At that time, it was the largest industrial complex in Pawtucket, and the largest single-site textile firm in the state. In 1919, the company built two additional 4-story brick mills (Numbers 6 and 7) for spinning and twisting. Standard early 20th-century mills devoid of architectural detail, they contrast sharply with the architecture of the earlier mills. In 1921, a brick recreation building was erected overlooking Coats' athletic field. The building contained a restaurant capable of seating 2,000, an entertainment hall, bowling alleys, pool tables, and baths. Though the field is now a parking lot, the recreation building survives as a discount department store on Lonsdale Avenue. The site also contains an electric powerhouse, and a scattering of other early 20th-century structures. The buildings were vacated by Coats & Clark in 1965 and are currently used for a variety of manufacturing purposes. (Illustrated Souvenir, Conant Thread Company, 1876; Pawtucket Past and Present, 1917; Grieve and Fernald; Goodrich; Bayles; Book of Rhode Island, 1930, illus. p. 212.)

GREENE & DANIELS (1860)
MANUFACTURING COMPANY
Central Avenue
Pawtucket

Pawtucket 00
19.302460.46396801
Providence 00
27
15

This 4-story, brick, spool-cotton mill was built in 1860 and has been substantially altered since. Originally 5-stories high, with a dormered mansard roof and two twin towers, it was enlarged to 407' X 67' in 1866. The fifth story is now gone, as are the tower roofs. Benjamin F. Greene founded the company and also assisted in technical developments by taking out a patent for dressing thread. The firm was incorporated as the Greene & Daniels Manufacturing Company in 1877. At that time, the mill ran 22,000 spindles and produced ivory-finished three-cord thread. Because of the increased use of sewing machines, the soft-finished six-cord threads, like those of J. & P. Coats, came into extensive use. Because of this, Greene & Daniels was forced into new product lines. Using the new English system of carding and combing, the company began to produce high quality yarns, which they dyed themselves, for women's dresses. By 1893, the mill employed 400 workers. It is now used for warehouse space.

(J. W. Haley, The Lower Blackstone River Valley, 1936, photograph c. 1880, p. 89; Goodrich; Grieve & Fernald; Chase; Sande.)

HOPE WEBBING COMPANY (1889-1912)
1005 Main Street
Pawtucket

Providence
19.300660.4637020
Providence

The Hope Webbing Company built the first section of this brick mill in 1889-1890. The building, 260' X 80' with an ell 60 feet square, was located between Warren Avenue and Larned Street with its narrow end facing Main Street. The factory assumed its present shape between 1895 and 1913, spreading out along Main Street and leaving an open space in the middle where Larned Street formerly ran. The Main Street section is 2-stories with a flat roof and has a central entrance with a wrought-iron gate. At each side of the central section, 3-story additions were built, connected by twin towers. There are four 1-story wings, all used as weave sheds, extending back from Main Street. The outer two were built between 1904 and 1908.

The company built the preparing mill on Esten Avenue in 1903, and added the power, bleach, and dye houses, also on Esten Avenue, between 1908 and 1912. All the roofs are gravel-covered plank-on-timber. In 1917, the company operated 1,000 narrow fabric looms and 250 braiders in the manufacture of dyed and bleached cotton, worsted, linen, and silk narrow fabric. It was said to be the largest narrow fabric plant in the United States. Hope Webbing still occupies the building in company with numerous smaller tenants, and continues to use early 20th century New England Butt braiders and one c. 1910 skein winder. No original equipment survives in the boiler house.

(Pawtucket Past and Present, 1917; Everts and Richards; Associated Factory Mutual Drawing, 16 April 1908; Interview with Ray Houle, Hope Webbing, August 1977.)

LEBANON MILL (1901)
10 Front Street
Pawtucket

Pawtucket
19.302400.4638950
Providence

Lebanon Knitting, originally Thayer & Gage, was founded in 1858. They operated a mill on the eastern border of Pawtucket until the mill burned in 1888. The company located for a time at 106 Broad Street, Pawtucket, but in 1901, five years after incorporation, they built a 4-to 5-story, steam-powered, brick mill on the Blackstone River adjacent to the Rhode Island Cardboard Company (see separate entry). Here they produced rubber linings, astrakhans, jersey cloths, knitted fabrics, flat-rib underwear, cloths for sweaters, golf vests, cardigans, and sweater coats with 170 spring-needle knitting machines, 15 latch-needle knitting machines, and 100 sewing machines. The company made additions to the mill between 1907 and 1921, and sold the building about 1939 to Vesta Underwear. From 1939 to 1975, Lebanon continued in business at a modernized brick complex on School Street. A jewelry company bought the Blackstone River mill in the early 1960s and continues to operate it. No historic machinery survives.

(R. Grieve & J. Fernald, Pawtucket Past & Present, 1917; Factory Mutual Insurance Drawing, 8 December 1944; Interviews with John McGuire and David Wright, J. & K. Sales, July, 1977.)

LORRAINE MILLS (1868)
593 Mineral Spring Avenue
Pawtucket

Providence
19.300200.4638220
Providence

On the site of a small cotton mill close by the Moshassuck River and on the south side of Mineral Spring Avenue, C. D. Owen erected a brick worsted mill in 1868 designed to run by either water power or steam. Owen manufactured both Italian cloth and zephyr yarn and employed 280 workers by 1876. The mill used nine Noble combs and scoured 3000 pounds of wool per day. In 1881, the W. F. & F. C. Sayles Company bought the mill, built additional plant and incorporated as Lorraine Manufacturing Company. By 1897, the company employed 1,100 workers and produced 7,500,000 yards of fine worsted and cotton dress goods, shirtings and linings per year. The main mill, c. 1881, is brick, four-stories with a near-flat roof and two, non-identical towers. The 1868 mill is that section that adjoins the main building on its southwest side. Originally built three-stories with a pitched roof, the building was altered sometime after 1901. The buildings are now used for various purposes, including food sale and the manufacture of ring travelers for textile spinning frames.
(Pawtucket Past and Present, 1917; Goodrich; Hall.)

MANVILLE JENCKES (c. 1900)
COMPANY MILLS
Between Conant and Barton Streets
Pawtucket

Pawtucket
19.301240.4638760
Providence

This complex of 4-story brick mills and 1-story weave sheds, located between Conant and Barton Streets in Pawtucket, was once part of the Manville Jenckes Company. The company's founder, Nathan Hicks, began producing ring travelers (the c-shaped metal clips which replaced the flyer arms in the change from throstle to ring spinning) in 1854 in the Old Slater Mill. About 1870, he was joined by Edwin and Joseph Jenckes of Woonsocket, and during the 1880s, construction began at the present site the mills facing Barton Street were built about 1900. The oldest section, built gable end to the street, housed the Jenckes Knitting Machine Company, separately incorporated in 1903. Between 1916 and 1919, the company built the 4-story, brick-pier mill facing Conant Street.

Designed to contain 53,000 spindles for the production of tire fabric, the mill was formally controlled by the Tamarack Company, a firm which was simply a part of the expanding Jenckes Company. In 1923, the Jenckes Spinning Company merged with the large Manville Company to become Manville Jenckes. By 1930, the firm controlled the mills in Pawtucket as well as mills in Manville and Woonsocket (the Social, Nourse, Harrison, and Globe Mills), and Georgiaville, Rhode Island. The firm's Southern holdings included the famous Loray Mill of Gastonia, North Carolina scene of a bloody and bitter strike in 1929. Besides tire fabric and knitting machines, Manville Jenckes produced knitting yarn, hosiery, and silk, cotton, and synthetic cloth. Later taken over briefly by Textron, the Pawtucket mills are now divided among numerous tenants, some of whom are still involved in textiles.

(The Book of Rhode Island; Grieve and Fernald; Pawtucket Past and Present.)

OLD SLATER MILL (1793)
Roosevelt Avenue
Pawtucket

Pawtucket
19.302220.4638700
Providence

The Old Slater Mill, built by Almy, Brown & Slater in 1793, is the oldest cotton factory in America. It was the first American spinning mill to use the water-powered Arkwright system. English immigrant, Samuel Slater built the carding and spinning machines with the help of Pawtucket artisans like David Wilkinson, Sylvanus Brown, and John Field, and with the financial assistance of Providence merchant, Moses Brown. The 2½-story wood-frame building, with a gable roof and trap-door monitor was restored in the 1920s to its appearance c. 1835. The 1793 mill, 43' X 29', 2½ stories high, survives as a center section incorporated into the current structure. Additions were built to the west by 1801, to the east by 1817, and the bell tower on the south was added between 1823 and 1835. In 1805, the mill contained one of the first spinning mules to be built in the United States. It contained 92 spindles and was constructed by an Englishman named Blackburn. In 1824, the mill, along with the rest of Pawtucket, experienced the first textile strike in the United States, a strike which was also the first in which American women participated. In 1829, Samuel Slater sold his interest in the mill to William Jenkins and William Almy

who continued to produce textiles. Subsequently, the mill was owned by several different parties and leased for a variety of purposes. In the 1850s, two important companies got their start here. In 1854, Nathan Hicks began producing ring travelers (see Manville-Jenckes, Pawtucket) in the mill's upper stories. The business was later known as E. Jenckes & Company and it remained in the mill until after 1890. From 1856 to 1863, the Pawtucket Hair Cloth Company (see separate entry) operated hand looms here before moving to a newly built mill in Central Falls. The mill was also occupied in the latter half of the 19th century by a maker of casket ornaments, by manufacturers of wire goods and jewelers' tools, by a bicycle riding academy, and by the Pawtucket Steamboat Company. On 31 December 1923, the Old Slater Mill Association bought the mill from S. Willard Thayer in order to preserve it as a monument to the textile industry. Since 1955, the building has been used as a museum and contains an exhibit of operating textile machinery on the first floor and a handcraft exhibit on the second. Two vertical turbines and a portion of the race survive. One of the turbines is a c. 1860 Jonval, designed for low-head operation, with a register-gate and a vertical shaft extending the height of the mill; the other is a Hercules, patented in 1876, with a cylinder-gate and belt-drive capacity. The Hercules represents the first true example of the "American", or mixed-flow design and is the direct ancestor of most hydro-electric turbines. The Old Slater Mill is part of the Slater Mill Historic Site which includes the Wilkinson Mill (see separate entry), the Sylvanus Brown House, the Old Slater Mill Dam, (see separate entry), and over two and one-half acres of riverfront park. (Transactions of the Rhode Island Society for the Encouragement of Domestic Industry in the Year 1861, 1862; Grieve and Fernald; W. Bagnall, The Textile Industries of the United States, 1893; D. Tower, "History of the Old Slater Mill", 1953 and J. Abbott, "The Old Slater Mill to 1835; Sequence of Construction", 1975, unpub. mss. at the Slater Mill Historic Site.)

RHODE ISLAND CARDBOARD COMPANY (1880) Pawtucket
163 Exchange Street 19.302420.4638940
Pawtucket Providence

Ray Potter, a controversial Baptist minister, began the cardboard industry in Pawtucket in 1844. Henry Dexter and George Clark bought the business in the early 1860s and formed the Rhode Island Cardboard Company. Originally located on East Avenue, this was the only cardboard firm in the United States to manufacture by machinery. In 1880, the company moved to Exchange Street and built the 4-story, brick mill which continues to stand. Incorporated in 1886, Rhode Island Cardboard produced paper collars, on which they made substantial profits, photographic materials, tags, wedding stationery, and stock for art calenders and boxes. In 1889, output was 8,000 pounds per day. Because of the stability of the cardboard industry, Rhode Island Cardboard ran full-time through all the depressions of the late 19th century. The Emerson family, with an interest in the firm since the 1880s, ran the mill until 1976. The building, under new management, is now involved in paper converting and coating. The boiler room contains an "Improved Greene" single-cylinder steam engine, with a ten-foot fly wheel, built by the Providence Engineering Works. It once provided direct mechanical drive for the building's machinery. One Stewart boiler, built in Worcester in 1916, and two Kendall boilers are still in place. Only one of the boilers is still used, and the steam engine no longer operates.
(Pawtucket Past and Present, 1917; Interview with Steve Steidle, Rhode Island Converting, July 1977.)

ROYAL MILL (1900-1914) Attleboro
Central Avenue and Sabin Street 19.303240.4639520
Pawtucket Providence

The Royal Weaving Company built this large 2-story structure between 1900 and 1914. Built in long brick wings, with floor space covering twenty acres, this was one of the largest silk mills in the world. Joseph Ott, a German immigrant who introduced silk technology to Pawtucket at an East Avenue site in 1888, started the company with the help of local capitalists, Daniel Littlefield and Darius Goff. This was the first mill in the

United States, according to Lamb's Textile Industries, to attach individual electric motors to its looms. In March 1901, 170 looms were connected to one-third horsepower Oerlikon motors, imported from Europe. The mill's 5,000-horsepower electric plant is still standing. By 1930, the mill operated 2,400 looms and employed 1,800 to 2,000 workers in the production of broad silks, lining satins, and mixtures of silk and cotton, rayon and silk, and rayon and cotton. During the 1930s, the mill's workers played a prominent part in the area's labor struggles. A strike at Royal in 1931 called forth the organizing skills of Ann Burlak, the "red flame", a well-known member of the National Textile Workers' Union of America. The mill closed in 1949 after a continuing dispute between workers and managers over production quotas. It is now used for a variety of purposes, including housing the offices of a local drug store chain.

(The Book of Rhode Island, 1930, illus. p. 246; Associated Factory Mutual Drawing, 27 April 1915; Lamb's Textile Industries of the United States, Volume I, 1911; Speech of Ann Burlak to the Rhode Island Labor History Forum, October, 1976; Obituary of A. C. Fine, Providence Sunday Journal, 4 April 1976.)

SEEKONK LACE COMPANY (1909-1910)
659 Armistice Blvd.
Pawtucket

Attleboro
19.305060.4638380
Providence

The Seekonk Lace Company, incorporated in 1909, built a mill on this site in 1909-1910. The original building, a 2-story, brick section on the corner of Tobie Avenue and Waterman Street, was enlarged shortly afterward. In the early 1950s, the company built additions on both the north and south sides. Currently the largest lace company in Rhode Island, Seekonk acquired the Rhode Island Lace Works in West Barrington in 1932 (see separate entry). Both plants are still in operation producing leavers lace, though only the West Barrington works contains dyeing and finishing capacities. The Pawtucket mill operates thirty-four lace machines imported from the works of John Jardine, of Nottingham, England. All but five of these machines were built between 1910 and 1914. Because of high import duties, few lace machines, larger and more complex than any other type of textile machinery, were brought to America prior to 1910. About that date, Rhode Island

Senator Nelson Aldrich succeeded in his efforts to lower duties on lace-making machinery, and Rhode Island soon became the lace-making center of the United States. In its early years, the industry depended upon skilled English weavers to operate the leavers lace machines, and up until the 1930s, retained a form of cottage industry. The final product, continuously woven, had to be separated into long strips by hand in order to be sold. This work was done by women in their own homes. This labor was eliminated in the 1930s when the industry developed a dissolving acetate draw thread. The current president, George R. Ramsbottom, has been with the company since 1910 when he was employed as a bookkeeper.

(Pawtucket Past & Present, 1917; Providence Sunday Journal, 9 February 1975; Interview with George R. Ramsbottom, and Ned Barlow, Seekonk Lace, February, 1977.)

SLATER COTTON COMPANY (1863)
Church Street at Pine Street
Pawtucket

Pawtucket
19.301640.4638460
Providence

This company began producing twills, sateens, and fine quality bleached cotton cloth in 1869 in a 2½-story, brick, pitched-roof building, 300' X 50', built in 1863' and originally used as a file factory. This structure remains and, with its multiple ells, covers a city block directly north of the main building, a 5-story, brick mill, 340' X 92', built in 1881-1882. This imposing structure, with its twin end towers, slightly pitched-roof and fine brick dentils contained 1,475 looms in 1891 and employed 600 workers. Both towers were originally built with peaked hipped roofs (now removed). During the late 19th century, the company produced four million yards of cloth annually with some of the best machinery available - Whitin revolving flat cards, Howard & Bullough electric drawing frames, Carter combers, Fales & Jenks spinning frames and Whitin looms. Each room was equipped with patent automatic sprinklers, and the weave room contained a German-patent Aerophor air moistening machine. The old mill was powered by a 325-horsepower Corliss engine and was lighted electrically by the Waterhouse arc system. The new mill was powered by a 600-horsepower Harris-Corliss and a 250-horsepower Greene engine and, by 1891, was lighted by the Edison incandescent system-

a relatively early factory use of Edison's new electrical system. No historic machinery survives. (Grieve; Goodrich; Grieve and Fernald, line drawing, p. 21; Interview with owner of 1881 mill, Joseph Sousa, Slater Realty Company, August, 1975.)

UNION WADDING COMPANY (1847-1870)	Pawtucket
125 Goff Avenue	19.301780.4638880
Pawtucket	Providence

The earliest structure on this site was built in 1847. At that time, a 2-story, stone steam mill, 200' X 40', was erected to carry on the production of cotton wadding from waste purchased from the Lonsdale Company. Originally founded by Darius Goff, the firm took the name of the Pawtucket Steam Wadding Mill until 1862, when it was given its current name. Because of the nature of the waste cotton business, the danger of fire was serious and constant. Prior to 1870, at least three fires occurred, forcing the company to rebuild and redesign. The 1847 foundation is still visible on the southeast end. On the northwest end is a brick section, c. 1860, with pitched roof and partially bricked-over windows. The largest part of the present structure, however, was built c. 1870 and later. It is brick, two to three stories in height with segmental-arch windows and granite sills. The fire hazard has been reduced by the skillful use of fire walls and empty spaces separating each production room. This work was done in the 1860s and 1870s. In 1876, the company produced 250 bales of wadding per day with power generated by a 300-horsepower steam engine. In 1891, according to local historians, the firm was twice the size of any wadding manufactory in the world. At that time, it employed 400 workers. It continues to produce wadding to the present day. No historic machinery survives, but an 1870 "Union Wadding Carding Machine", donated by the Company, is on display at the Slater Mill Historic Site. (Grieve and Fernald; Goodrich; Interview with Company Vice President, Richard Merrill, 28 August 1975; Hall, engraving p. 275.)

WILKINSON MILL (1810-1811)
Roosevelt Avenue at Main Street
Pawtucket

Pawtucket
19.302220.4638700
Providence

The noted Pawtucket artisan, Oziel Wilkinson, built this 3½-story stone mill, adjacent to the Old Slater Mill (see separate entry) in 1810-1811. Oziel's son, David, put the machinery in place and built the steam engine which originally supplemented the mill's water power capacity. The Wilkinson Mill was the first steam-powered textile mill in the state, and one of the first in the country. David Wilkinson was an important and creative machinist, the American inventor of the industrial lathe, and a key figure in the development of the power loom. It was Wilkinson who built the most successful of the early American power looms, the so-called "Scotch Loom", from patterns supplied by the inventor, William Gilmour. Wilkinson operated a machine shop in the mill from 1811 to 1829 when he, along with other members of his family, went out of business in the depression of that year. Initially, the upper floors of the mill produced cotton yarn, but in 1819, the English immigrant William Wilson Wood, working for David Wilkinson, began the production of worsted yarn on a 72-spindle spinning frame. The mill was thus one of the first worsted manufactories in the United States. After 1829, the mill was used for a variety of purposes: woolen manufacture, knitting, braiding and the manufacture of leather machinery and jewelers' tools. In the 20th-century, the mill has been owned by the Pawtucket Electric Lighting Company and by a furniture warehouse. In the early 1970s, the Old Slater Mill Association undertook the mill's restoration and adaptive reuse. The belfry on the c. 1840 brick end tower, the windows, the east wall, and the trap-door monitor were all restored. The second and third floors now contain offices and storage space for the Slater Mill Historic Site. The first floor contains an operating machine shop equipped with a valuable collection of 19th-century machine tools. It is open to the public. An important archaeological excavation underway on the wheel-pit and raceways and has so far yielded considerable information on 19th-century water power. The Slater Mill Historic Site plans to build an historically-accurate breast wheel and governor, and operate the machine shop once again on the power of the Blackstone River.

("David Wilkinson's Reminiscences", Transactions of the Rhode Island Society for the Encouragement of Domestic Industry in the Year 1861, 1862.; C. Pursell, Jr., Early Stationary Steam Engines in America, 1969; W. Bagnall, The Textile Industries of the United States, 1893; 1820 Census of Manufactures, Rhode Island and Massachusetts; Records of the Slater Mill Historic Site.)

Manufacturing

JAMES S. BROWN MACHINE SHOP (1847-1848) Pawtucket
483 Main Street 19.301640.4638580
Pawtucket Providence

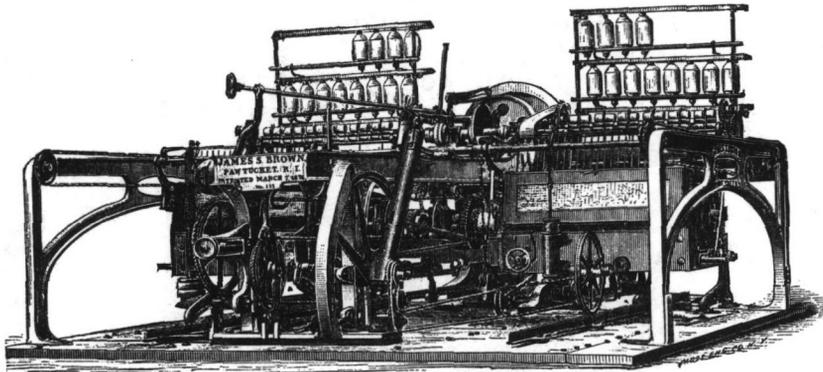
The first building in this complex, the foundry, was constructed in 1847 on property now owned by the Haskell Manufacturing Company. It has since been dismantled except for a small 1-story, pitched roof section. The 2-story, brick machine shop, with a pitched roof and a basement half its length, was built 400' X 60' in 1848. Its south facade has been sharply altered. A stepped gable has been added and much of the original brickwork has been covered over. James S. Brown, the son of Sylvanus Brown-skilled millwright and patternmaker who worked for both Samuel Slater and David Wilkinson, was the original owner. A skilled machinist and inventor, James Brown invented a lathe slide rest in 1820 capable of adjusting the height of the cutting tool while the lathe was in motion. In 1832, he patented a machine for cutting bevel gearing; in 1838, a machine for boring the tubes of speeder flyers; and in 1842, a lathe for irregular forms. The new machine shop saw the invention of a machine for grinding spindles (1874), a machine for drilling rollers for spinning frames (1875-1876), and an improvement in spinning mules (1876). By 1876 the shop was powered by a steam engine of 56-horsepower and employed 300 men. The building now houses a jewelry manufacturer. No historic machinery survives. (Hall, engraving p. 253; J. L. Bishop, History of American Manufactures from 1608 to 1860, 1864; Brendan F. Gilbane, "Pawtucket Village Mechanics, Iron, Ingenuity, and the Cotton Revolution", Rhode Island History, 34/1, February, 1975; Grieve.)

JAMES BROWN,

Successor to James S. Brown,

Manufacturer of

COTTON MACHINERY,



SPINDLES & GRAY IRON CASTINGS.

IMPROVED ENGLISH PARR MULE,

From $1\frac{3}{16}$ to $1\frac{3}{4}$ Gauges.

SPEEDERS, BALL WINDING MACHINES, for Balling Twine, Cotton or Wool
Yarns, Silk, Etc., Etc.

I AM MAKING PREPARATIONS TO BUILD WET OR DRY TWISTERS.

287 MAIN ST., PAWTUCKET, R. I.

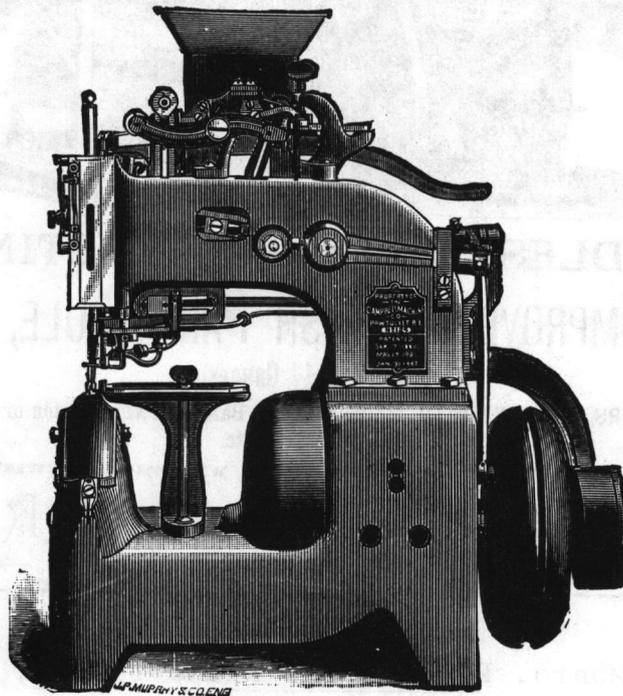
W. H. Munro, Picturesque Rhode Island, 1881.

CAMPBELL MACHINE SHOP (1888-1889)
21 Commerce Street
Pawtucket

Pawtucket
19.301860.4638740
Providence

This 5-story, brick building with segmental-arch windows, granite lintels, and a roof of slight pitch, housed the Campbell Machine Shop during the late 19th century. The firm was organized in 1880 and the present building was erected in 1888-1889. The shop's principal product was a lock-stitch, wax-thread sewing machine, the invention of Duncan H. Campbell. This was the first machine capable of forming a lock-stitch with wax thread and was used by shoe and harness manufacturers. The machine was capable of 400 stitches per minute in the hands of a skilled operator. The invention was important enough to develop a European market, and a branch of the firm was established in Leicester, England. The company also built a knitting machine capable of knitting irregular shapes for use by hosiery and underwear manufacturers. The building is presently occupied by the Parkin Yarn Mill.

(Grieve and Fernald; Pawtucket City Tax Records; Everts and Richards; Barlow & Bancroft Insurance Survey, 24 May 1892.)



Campbell Lock-Stitch Wax-Thread Sewing Machine
(R. Grieve and J. Fernald, The Cotton Centennial,
1790-1890, 1891).

R & G. CUSHMAN COMPANY (c. 1860)
Front Street at Central Avenue
Pawtucket

Pawtucket
19.302420.5639600
Providence

This 2-to 3-story brick building, now much altered, was built c. 1860 by Robert and George Cushman. The business was started by Robert Cushman in 1847 in Central Falls as a specialty wood-working company designed to meet the needs of the Rhode Island textile industry. He moved to the current site in 1857 and occupied a stone structure since removed. Cushman manufactured spools, web rolls, winder and braider bobbins. It is one of the oldest specialty spool shops in the United States. Not able to purchase machines, or special cutting tools, Cushman and his workmen invented and constructed their own. Cushman also invented the adjustable features of the pivot-hanger for shafting and several improvements on knitting machines. He sold out in 1875, after which the firm became known as Atwood-Crawford & Company. In 1876 they employed forty workers, used twelve sets of machines and consumed 500,000 to 800,000 feet of wood per year, most of it white birch. The present owners, small-scale manufacturers of wood and plastic products, such as bowling pins and joints for medical dolls, have plans to remove much of the machinery and tools. A Holt, Shattuck & Company band saw, c. 1880, a wood lathe designed to cut spools, c. 1880, along with the lathe's specialized cutting tools, and a pedestal grinder, c. 1900, all used in the shop, were recently acquired by the Slater Mill Historic Site and are on display in the machine shop of the Wilkinson Mill.

(Interview with George McCommisky, American Products, Fall, 1975; Beers; Grieve.)

GEORGE H. FULLER & SON (1880)
151 Exchange Street
Pawtucket

Pawtucket
19.302380.4638980
Providence

The firm of George H. Fuller began in South Attleboro, Massachusetts, in 1858 and moved two years later to the Payne & Taylor Building on East Avenue, Pawtucket. The present building was constructed in 1880 (Stone & Carpenter, architects; Patrick Farrell, mason; Kenyon, Whittaker, & Smith, carpenters). At that time it was a

3-story, wood-frame building, 35' X 100', with a pitched roof. Since then additions have been built to the south end and aluminum siding has been added. From its founding to the present day the company has produced jewelers' findings (pin stems, joints, catches and split rings) the hardware of the jewelry trade. Located close to the center of the jewelry industry, the company supplied many of the small firms located in Providence. At the present time the company uses early 20th-century foot presses. (Industries and Wealth of the Principal Points In Rhode Island, 1892; Grieve; Interview with Otto Hanich, company employee, 12 September 1975; American Architect & Building News, 6 March 1880.)

WILLIAM HASKELL MANUFACTURING COMPANY Pawtucket
Main and Commerce Streets (c. 1860) 19.301700.4638660
Pawtucket Providence

The Haskell Manufacturing Company, the oldest continually operating bolt and cold-punched nut plant in the United States, developed from a small shop started by Stephen Jenks at Pawtucket Falls. Jenks began making bolts about 1820 and was the first artisan in Pawtucket to introduce cold-punching from bar iron. In 1835, Tinkham, Haskell, and Company bought the business and sold it one year later to W. H. Haskell. Haskell moved to the current site about 1860, at approximately the same time that James Brown was building his adjoining machine shop (see separate entry). A 2-story, brick building, 162' X 40', survives from that period. The mansard roof over the south end was added later. The building now contains patterns for bolt and nut machinery of Haskell's own manufacture. The large 2-story, brick building extending along Commerce and Bayley Streets was built in 1885 and continues to be used for production. Operating machinery includes a row of c. 1912 double-tool-post shavers, built by the Pawtucket Manufacturing Company; a 15-inch universal shaper (1916), built by Potter & Johnson of Pawtucket (see separate entry); and a ½-inch-lag screw, gimlet pointer (1918), built by National Machine of Tiffin, Ohio. The forge room, located on the Bayley Street side of the building, contains a 7/8-inch hammer-heading forging machine (1917), built by the Pawtucket Manufacturing Company. The company also has a battery of Brown & Sharpe screw machines. Other machinery, from the 1930s, includes

Landis threading machines; stamping presses and shearing presses built by Haskell; and Waterbury-Farrel single die, double stroke, cold headers. The latter machines are located in a 1920 concrete and brick building on the southwest edge of the site. With its long and distinguished history, and its continued use of early 20th-century machinery, the Haskell Manufacturing Company is one of the most important operating industrial sites in the state.

(R. Grieve and J. Fernald, Pawtucket Past and Present, 1917; Property Account Books, Haskell Manufacturing Company; Interview with Edward M. Brown, Haskell Manufacturing Company, August, 1977.)

NARRAGANSETT MACHINE SHOP (1889)
Esten Avenue
Pawtucket

Providence
19.300500.4637300
Providence

The Narragansett Machine Company, established in Providence in 1882, built its first building on this site, in the South Woodlawn section of Pawtucket, in 1889. The building, a 2-story brick structure stands directly east of Interstate 95. There the company built foot-power lathes for home use and gymnasium equipment. By the early 20th century, the company specialized in the manufacture of gymnasium products, acquiring a virtual monopoly of the nation's YMCA business. By 1923, numerous brick and wood machine, pattern, sheet-metal, and light forging shops covered an area of five acres, with 208,000 square feet devoted to manufacturing space and an additional 50,000 square feet used as a lumber yard. The company also made lockers, did the wood turnings for tennis rackets, and built fenders for street railway cars. Today the few buildings that remain are occupied by tenants and there is little to indicate that this was once a large and integrated machine shop providing work for numbers of skilled machinists.

(Everts and Richards; Albert E. Thornley, "A Business Which Has the World for its Market," Pawtucket Magazine, September 1923.)

POTTER & JOHNSON MACHINE COMPANY (1899) Attleboro
1027 Newport Avenue 19.304600.4639220
Pawtucket Providence

This 2-story, brick-pier building with a rock-faced foundation was constructed in 1899. Since then it has been substantially enlarged and partially modified. The front facade now exhibits a 2nd-floor oriel window done in copper. A fine brick cornice and corner pinnacles provide handsome detailing. The firm was organized by Scottish immigrant and inventor James C. Potter who was also responsible for the formation of the Potter & Atherton Machine Company, Pawtucket, and the noted Howard & Bullough textile machine works of Attleboro, Massachusetts. The Newport Avenue works manufactured turret lathes, shapers, and automatic clutching and turning machines. Power was supplied by electricity. The building is now owned and occupied by a toy manufacturer.

(Hall, photo p. 262; Richards' Standard Atlas of the Providence Metropolitan District, Volume 2, 1917; Pawtucket Past and Present, 1917.)

Utilities

BRIDGE MILL POWER PLANT (1893-1894) Pawtucket
Main Street at Southwest corner 19.302140.4638580
of Main Street Bridge Providence
Pawtucket

This electric power plant, built in 1893-1894, could be powered by either steam or water. The building is brick, two-to-three stories high, with round-arch windows. The firm of Shedd & Sarle of Providence was responsible for the site's hydraulic engineering. They constructed a dam (see Pawtucket Falls Dam) and an underground conduit, 130' X 17½', both of brick. Everson and Liddle of Providence constructed the granite retaining wall at river's edge while Stone, Carpenter, and Willson of Providence designed the flat-roofed gate, power, and boiler houses. The five pairs of 33-inch McCormick turbines-still in place though one has a broken shaft-were installed by the Rodney Hunt Machine Company of Orange, Massachusetts as were the flumes which measure ten feet in diameter and thirty feet in length. The turbines operated with

seventeen feet of head and produced 1300 horsepower. Five Lombard governors also remain in place. The plant's steam power generation came from two Westinghouse compound automatic engines, with cylinders of 15 inches and 27 inches respectively and 16 inch strokes. Two Heine water tube boilers provided the steam. Both the engines and boilers have been removed. Electricity was last generated here in the 1960s.

("Electric Lighting: The Bridge Mill Power Plant of the Pawtucket, R.I. Electric Company" The Electrical Engineer, Vol. XXII, No. 451, 23 December 1896; Interview with Frank MacManus, Property Maintenance Foreman, Blackstone Valley Electric, October, 1975.)

PAWTUCKET PUMPING STATION(1877-1878)	Pawtucket
NUMBER 1	19.302420.4640360
Branch Street at the State Line	Providence
Pawtucket	

The city of Pawtucket built this rectangular brick pumping station, with a hipped roof and granite belt courses, now adjacent to Pumping Station Number 4, between April 1877 and February, 1878. Until 1947, it contained a Corliss steam engine capable of pumping three million gallons of water per day. The engine was started for the first time 31 January 1878. Water was carried along Abbott's Run in a gravity flow line 30-inches in diameter and about 3,700 feet long. The building continues to be used by the Pawtucket Water Supply Board, housing offices as well as two modern electric pumps. Artifacts in the basement include a huge wooden valve pattern. The original settling basin, now partially filled, also remains. (Interviews with Robert White, Director, and Mike Gula, Supervisor of Pumping Stations, September, 1975; Records of the Water Supply Board, The Pawtucket Times Historical Magazine, 8 October 1921; Plan of Pumping Station Number 1, Pawtucket Water Works, April 1896, (tracing made in February 1964) on file in City Engineer's Office, City Hall, Pawtucket; Grieve, photo p. 219.)

PAWTUCKET PUMPING STATION (1907-1908) Pawtucket
NUMBER 4 19.302420.4640360
Branch Street Providence
Pawtucket

This large brick building, on the same site as Pumping Station Number 1, was put into service 26 September 1909. Construction on the building began as early as 1907, from the date inscribed in the triangular pediment over the front door. The building has a hipped roof with wide eaves, granite belt courses, rectangular windows with granite sills and lintels on the first floor, and double and single, round-arch windows on the second floor. Inside is a huge triple-expansion totative steam pump built by the R. D. Wood Company of Philadelphia and capable of pumping 15 million gallons per day. The engine has not been operated since the 1950s and is missing numerous fittings. It is scheduled for demolition. The building, however, will be saved and it will continue to be used by the Pawtucket Water Supply Board.

(Interviews with Robert White, Director, and Mike Gula, Supervisor of Pumping Stations, September 1975; Records of the Water Supply Board; The Pawtucket Times Historical Magazine, 8 October 1921.)

TIDEWATER POWER PLANT (1907) Providence
Thornton Street 19.302280.4637620
Pawtucket Providence

This was the second site of electric power generation in Pawtucket. The station was put in service in 1891, with eight 150-horsepower boilers, two AC generators and two DC dynamos. In 1901, a steam turbine of 2000 horsepower was added and a second turbine was put in place in 1907. The station currently contains three generators, two built by Westinghouse, the third, and oldest (c. 1900); built by Allis-Chalmers-Parsons and capable of generating 4,500 KW at 1,800 rpm. Fourteen boilers remain in place four of which were installed during the 1920s. The boilers were made by Babcock & Wilcox and operate with Foster Super-heaters. They were used as recently as June, 1975. The main building, a massive brick rectangle with two columns of paired windows divided by a single brick pilaster on the front facade, was built in 1907. The boiler room and its stack were recently demolished. The building is

used by Blackstone Valley Electric.
(Interview with Frank MacManus, Property Maintenance
Foreman, Blackstone Valley Electric, October, 1975;
Pawtucket Times Historical Magazine, 8 October 1921.)

Transportation

PAWTUCKET-CENTRAL FALLS (1916)	Pawtucket
RAILROAD STATION	19.302000.4139370
Broad Street	Providence
Pawtucket-Central Falls	

This two-level, brick-veneered, Beaux-Arts railroad station was built in 1916 over the tracks of the Providence & Worcester Railroad at the Pawtucket-Central Falls city line. The tracks were lowered and relaid, in order to eliminate most grade crossings. The station features an imposing vaulted concourse entered by descending broad flights of stairs from open lobbies at either end. It cost \$250,000 to build and once handled an average of 70,000 departures monthly. It has been vacant since 1959.

(Pawtucket and Central Falls Survey Files, RIHPC.)

Bridges

DIVISION STREET BRIDGE (1876-1877)	Providence
Division Street at Blackstone River	19.302080.4638140
Pawtucket	Providence

The city of Pawtucket built this large stone-arch bridge across the Seekonk River, one-third of a mile below the Pawtucket Falls, between 1876 and 1877. The bridge, the longest of its type in the state, has nine segmental arches, each spanning approximately forty feet. The arches are formed with brick, faced with granite, and are carried on tall granite piers. Cushing & Company, and later Cushing & Shedd, served as consulting engineers, Horace Foster was general contractor, and Crowell and Sisson of Providence built the iron railing. Total cost was \$95,000. The Division Street Bridge, with its fine stone work and attractive iron railings, is the most impressive stone arch bridge in Rhode Island.

(Grieve; Bayles; J. W. Haley, The Lower Blackstone River Valley, 1936, photo opposite p. 65.)

LONSDALE AVENUE BRIDGE (1907) Providence
Lonsdale Avenue at Harrison Street 19.300860.4638300
Pawtucket Providence

The Berlin Construction Company, Berlin, Connecticut, built this through, double-intersection Warren truss bridge with sub-verticals in 1907. Built on a skew and located on Lonsdale Avenue in the Woodlawn section of Pawtucket, the bridge carries a roadway over tracks once owned by the New York, New Haven & Hartford Railroad. It is constructed of riveted lattice girders and each side is approximately 150 feet long. It is scheduled to be replaced.

(Interview with John Varo, State Department of Transportation, 15 December 1976.)

MAIN STREET BRIDGE (1858) Pawtucket
Main Street at Pawtucket Falls 19.302240.4638660
Pawtucket Providence

The first bridge over the Blackstone River at Pawtucket Falls was built in 1713 at the joint expense of the colonies of Massachusetts and Rhode Island. Connecting Massachusetts and Rhode Island until the boundaries were redrawn in 1862, the Main Street Bridge was rebuilt c. 1730, 1741, c. 1807, 1817, 1832, and 1843. All these early bridges were constructed of wood. The present, double-arch, cut-stone bridge, designed by Samuel Cushing of Providence and built by Fall River mason Luther Kingsley opened to traffic 4 November 1858. 20th century improvements include a widening of the roadbed on either side of the bridge. The roadbed extensions are supported by substantial steel brackets. The Main Street Bridge is believed to be the oldest major highway bridge still in use in Rhode Island.

(Grieve and Fernald, S. Roper, "Pawtucket, Historical Preservation Report", RIHPC, in draft.)

Specialized Structures

OLD SLATER MILL DAM (c. 1850) Pawtucket
Blackstone River 19.302240.4638660
at the Old Slater Mill Providence
Pawtucket

Almy, Brown, and Slater built the first dam at this location in 1793 to power the Old Slater Mill. The raceway was later extended to provide power for the Wilkinson Mill in 1810-1811. Earlier, in 1796, the construction of the "swift flume" connected the original power canal with Sargent's Trench, an 18th-century fishway later used to power a variety of metal-working shops. The dam was rebuilt sometime between 1844 and 1869, and continued to be used to generate power well into the 20th century. The current dam, seven feet high, retains its 19th-century sills and framing. The dam's interior, however, now consists of a concrete spillway built in 1944 as part of an extensive repair project. The dam is a central part of the Slater Mill Historic Site's water power project, and will be used, along with the raceways and a reconstructed breast wheel, to once again generate power in the Wilkinson Mill. (See separate entries for Old Slater mill, Wilkinson Mill, and Sargent's Trench.)

(W. Bagnell, The Textile Industries of the United States, Volume 1, 1893; "Slater Mill Dam, Special Inspection Report", 31 October 1946, Rhode Island Department of Natural Resources, Planning Division; Pawtucket Times, 15 August 1944.)

PAWTUCKET FALLS DAM (1893) Pawtucket
Pawtucket Falls at Main Street 19.302240.4638660
Pawtucket Providence

Pawtucket Falls generated power for Joseph Jenks' forge in the late 17th century and continued to provide power for small-scale forges, grist mills and saw mills for more than a century. The mills and forges operated in conjunction with wing dams built out from each bank. A dam the full width of the river was not constructed until the late 18th century. Its erection was a major source of conflict between industrial and agrarian



Repairing the Old Slater Mill Dam, 30 August 1944 (SMHS).

interests (see below). By the 1820s, the dam powered textile mills on both sides of the river. The current 17-foot dam, built in 1893-1894 for the Bridge Mill Power Plant (see separate entry), was constructed of vitrified brick with a cap log of Southern pine and covering planks of white oak. The mortar consisted of both Portland cement and concrete. In 1945, a repair crew from Blackstone Valley Electric repointed the brick on the down-stream side, respiked and rebolted the planking on the upstream side, and installed new wearing planks the entire length of the dam. (Depositions in the case of Tyler, et. al. v. Wilkinson, et. al., Federal Case Number 14,312,4 Mason 397; "Special Inspection Report, Lower Dam, Pawtucket", 31 October 1946, Rhode Island Department of Natural Resources, Planning Division; R. Grieve, An Illustrated History of Pawtucket, Central Falls, and Vicinity, 1896.)

SERGEANT'S (SERGEANT OR SEARGENT) TRENCH Pawtucket
Slater Mill Historic Site (1714) 19.302200.4638680
to Main Street Providence
Pawtucket

Cut as a fishway around Pawtucket Falls in 1714, Sargeant's Trench was used, by the mid-18th century, to power forges, blacksmith shops, and a fulling mill. Its conversion to industrial purposes marked a stage in the conflict between industrial and agrarian interests over the uses of the Blackstone River. Millers and iron workers, and later, textile mill owners wanted the river for power, while farmers and fisherman wanted to maintain the river free of obstructions to reduce the risk of flood and to allow the seasonal fish runs to continue. Industrial interests were eventually victorious, and by the early 19th century, the Trench generated new and intense conflict among competing industrial users. In 1796, the "swift flume" connected the mouth of Sargeant's Trench with the recently built power canal of the Old Slater Mill, thereby diverting water previously used by the occupants of the Pawtucket Falls privilege. After a prolonged court case, a settlement was reached apportioning the river's flow among the various litigants. The Trench, 40 to 60 feet wide and 15 to 20 feet in height, has undergone extensive repairs and alterations

since it was first built. It is now completely covered over and runs from the Hodgson-Rotary Park on the Slater Mill Historic Site under Main Street to a 42-inch conduit which runs to the Bridge Mill Power Plant (see separate entry).

(Pawtucket Times, 27 June 1967; Depositions in the case of Tyler, et. al. v. Wilkinson, et. al., Federal Case Number 14,312,4, Mason 397; "Sargent's Trench Location Plan", 2 February 1932, Blackstone Valley Gas & Electric Company, Engineering Department.)

Building Technology

UNITED WIRE & SUPPLY COMPANY (1906)	Pawtucket
381 Roosevelt Avenue	19.302340.4639400
Pawtucket	Providence

The United Wire & Supply Company, fabricators of brass and copper tubing, built this 2-story, reinforced-concrete structure in 1906 from the designs of Adolph Sück, engineer. It is located behind a 3-story, wood-frame building, built by the company in 1895 and now substantially altered on its front facade. The concrete structure, 105' X 75', may be the earliest surviving reinforced-concrete building in Rhode Island. It has a concrete roof and floors, a brick end wall on the east, and two small wood extensions on the same side. The building is now occupied by a maker of tools for the jewelry industry.

(Board of Trade Journal, Providence, May, 1907; Associated Mutual Insurance Drawing, 4 April 1919.)

Portsmouth

Bulk Products

BOYD'S WINDMILL (1810)
288 Mill Lane
Portsmouth

Prudence Island
19.310680.4605240
Newport

This octagonal, smock windmill was built in 1810 by retired sea captain John Peterson. Though its arms were destroyed in the 1938 hurricane, it operated with a diesel motor located in a shed west of the mill until 1946. The motor is still in place. The owner would not allow entry, but the stones and gearing are said to be still operable. The mill is shingled, supported by dry-laid stone piers, and is thirty feet high. The bonnet measures fifteen feet in diameter and is now covered by asphalt roofing shingles.

(Interview with Lynn and Barry Dufault, May, 1976;
Desiree Caldwell, "Some Rhode Island Windmills", 1976,
manuscript at Slater Mill Historic Site.)

PRESCOTT FARM WINDMILL (1812)
2009 West Main Road
Portsmouth

Prudence Island
19.308940.460540
Newport

The windmill now located on Prescott Farm was originally built in Warren in 1812 and used to grind malt for a distillery. At an undetermined date, it was moved to Quaker Hill, Portsmouth, by Robert Sherman. It was operated by Sherman and later by Jacob Almy. The main shaft twisted off in a snow storm in 1876. In 1922, it was bought by Benjamin Hull who moved it to Lehigh Hill. It continued to operate, under leasing arrangements, and was powered, for a time, by a gasoline engine. It was moved in 1972 for a fourth time. It now stands at Prescott Farm, partially rebuilt and refitted. Like the other wooden windmills of Newport County, it is a shingled, octagonal, smock mill. Its shaft, built of yellow pine, replaced an oak shaft which broke in the 1920s. It drives, by means of spur gears, two sets of stones, one set of 3,000 pounds each, the other of 2,000 pounds each. Metal cranes for hoisting the runner stones are operable and the stones are still sharpened by hand. The newly constructed hopper is made of stainless steel. The bonnet is manually rotated on a rack and pinion gear.

In this way, the sails, rebuilt two years ago, can be turned to face the wind. The bonnet, supported by curved joists, contains a vertical, oak face-gear, which transmits power from the wind shaft to the main drive. The brake, regulated except in emergencies from the outside, serves to slow the speed of the face gear. Grain is still ground here and the mill is open to the public during the summer.

(Desiree Caldwell, "Some Rhode Island Windmills", 1976, manuscript at Slater Mill Historic Site; Interview with Tom Silveira, Prescott Farm, May, 1976.)

Transportation

PRUDENCE ISLAND LIGHTHOUSE (1852)	Prudence Island
Sandy Point, Prudence Island	19.308020.4608380
Portsmouth	Newport

The Prudence Island Lighthouse at Sandy Point marks the west side of Narragansett Bay's east passage. Built in 1852, it is a cut-granite, octagonal structure with battered walls. The tower rests on a stone pier, and its walls are two-feet thick at the base and one foot, eleven inches at the parapet. The dome and cowl are copper-lined iron frames, and the balustrade and outside gallery are wrought iron. The lighthouse is now automated, and the 1,400 candlepower light stands thirty feet above sea level.

(Inventory of Federal Archives in the States, Series X, #58, 1938; First Coast Guard District Files, Boston.)

Bridges

SAKONNET RIVER RAILROAD BRIDGE (c. 1898)	Fall River
Sakonnet River	19.315590.4611820
Portsmouth-Tiverton	Newport

The first railroad bridge at this point was built in 1864 by the Old Colony & Newport Railroad Company. Damaged in 1898, it was replaced by the current swing bridge shortly after. The bridge consists of a fixed, through truss (modified Baltimore) on the west side and a metal-truss swing section, 220 feet long, formerly powered by

a steam engine. The engine was located in a surviving engine house mounted on top of the swing section. The bridge was later electrified. The line, owned by the New York, New Haven & Hartford Railroad, discontinued its passenger runs about 1937. The bridge is still used for occasional freight runs. (Sakonnet Times, 19 February 1970, 1 April 1971; Interview with John Pierce.)

STONE BRIDGE REMAINS (1907)
Sakonnet River
Portsmouth-Tiverton

Fall River
19.315380.4610360
Newport

This site on the Sakonnet River was the location of a 17th-century ferry service and of an 800-foot-long bridge, with a draw section, built in 1795. One of the longest bridges in the country, it washed away repeatedly. By 1815, the rebuilt bridge had a narrow draw span and long, earth-filled stone causeways on the Portsmouth and Tiverton sides. Repairs continued to the Stone Bridge throughout the 19th century. Between 1905 and 1907, the state of Rhode Island, using the plans of J. Herbert Shedd, replaced much of the stone causeway and built eight 45-foot truss spans, with a 100-foot central draw span. In 1956, the construction of a new bridge eliminated the need for the old, and the 1907-1909 structure was subsequently dismantled. Today only the early 20th-century stone causeways, now used as fishing piers, survive. They are the only reminder of one of the state's historic transportation sites.

(Providence Journal, 12 April 1905; Rhode Island Historical Society Library, "Scrapbook 32", p. 11, "Howland's Ferry"; Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #250; Interview with John Pierce, July 1977.)

Providence

Bulk Products

ALLEN PRINT WORKS (c. 1830)	Providence
25 and 27 Dryden Lane	19.299880.4634900
Providence	Providence

Phillip Allen & Sons established a print works on this site in 1830-1831. Crawford Allen purchased the company in 1857. The firm was known as the Woonsocket Company Print Works until 1871 when it was incorporated as the Allen Print Works. At that time, the plant covered a large area in the northeast part of Providence. Over 350 workers manufactured calico goods which were sold primarily in the south and west. The company owned the first Boulton-Watt low pressure, condensing steam engine built in Providence and was said to be the first American textile firm to import the improved English bobbin and fly frame. The main brick mill on the site stands three to four stories high. The section north of the 5-story central tower was built in 1874 and measures 115' X 51'- 54'. The section south of the tower, 54' X 79'- 62', was built three years earlier. The back of the north section is largely stone, suggesting that an older structure was incorporated into the 1874 wing. A jerkinhead roof covers both the 1871 and 1874 wings. A small, 2-story, stone and brick structure, with a trap-door monitor roof, stands to the east of the main mill. Perhaps the oldest building on the site, it may well be the original 1830 mill. Other than two steam pumps, no old machinery remains. The buildings are now tenanted.

(The Industrial Advantages of Providence, Rhode Island, 1899; Factory Mutual Drawing, "Wanskuck Company Finishing Plant", 4 May 1920; Providence Journal, 18 December 1865; Interview with Malcolm Bromberg, owner.)

ATLANTIC MILLS (1851-1852)	Providence
120 Manton Avenue, Olneyville	19.296700.4632310
Providence	Providence

The Atlantic Mills, also known as the Atlantic Delaine Company Mills, had a national reputation for its worsted and cotton warp fabrics, which were used primarily for

womens' dress goods. In the late 1880s, the Atlantic Mills, which then employed 2,100 operatives, housed expensive specialized machinery, mainly of foreign manufacture. Steam engines powered 41,620 worsted spindles, 34,368 cotton spindles, 58 double cards, 47 combs, and 2,160 looms. None of the machinery remains. The main 3½-story, brick mill is extant. It was built in two stages: the east wing, 162' X 205', in 1871, and the west wing, 162' X 206', in 1882. The structure has twin cylindrical towers which have domes with copper-trimmed cupolas. Both domes are now painted in red and white stripes, and a granite balustrade separates the domes from the brick towers. The owner plans to restore the front facade. The original 1851-1852 building, 310' X 70', remains, though it has been heavily altered with only one floor left standing. It is now a supermarket. Built at the east side of the 1871 mill is a complex that was used for dyeing, finishing, and crabbing (crabbing is a machine operation using alternating hot and cold running water to reduce shrinkage in worsteds and woollens). The mill, built c. 1871, is a 4-story, brick structure, 210' X 104'. Another worsted mill was constructed behind the domed mill in 1893. It is a 3-story, brick building, 244' X 100'. The newest mill on the site was completed in 1899 and is located on Hartford Avenue. This 4-story, brick building has segmental-arch windows, granite sills, and a near-flat roof. Two storage houses remain on Aleppo Street. One is an 1852 circular structure, fifty feet in diameter and originally used as a gas holder; the other is a 1-story brick building, 138' X 32'. The main mill is now used as a retail store. (The Industrial Advantages of Providence, Rhode Island, 1899; Interviews with Peter Parisi, Leo Brynes, 20 February 1976; Associated Mutual Insurance Company Drawings: 6 July 1897, 17 December 1910.)

DYERVILLE MILL (c. 1845)
610 Manton Avenue
Providence

Providence
19.295500.4633140
Providence

The Dyerville Mill, built c. 1845, is an L-shaped, stuccoed-stone structure with a gable roof and skylights. Its end tower has an impressive Greek Revival open belfry with a hipped roof. A wooden walkway connects the tower to a

building on Manton Avenue, formerly used as an office. A stone picker house is located on the southwest side of the mill, and a 1-story, brick extension on the south, originally used as a weave shed, is now connected to a modern concrete addition. The wooden wheel house and a brick and wood boiler house still survive on the northwest. A long raceway formerly ran from a wooden dam on the Woonasquatucket River to power the mill. The dam is still in place, but the gates have been removed, and the race is only visible near the wheel house. A horizontal turbine and belt-driven generator also remain in place, but no steam engines survive. The yellow-brick stack displays the name of the Joslin Manufacturing Company, a Providence-based firm with mills in Providence and Scituate (see Merino Mills Providence). Joslin produced shoe laces, glazed braid, and corset laces, and owned the Dyerville Mill at the turn of the century. This is an important early textile mill for which little historical information is available. It is currently owned by a jewelry company, and parts of the complex are occupied by tenants. Worker housing survives along Manton Avenue.

(Hall; Sande; Interviews with Robert and William Leonard, Combined Industries, July, 1977.)

FLETCHER MANUFACTURING COMPANY (1869) Providence
Charles Street 19.299710.4633692
Providence Providence

The Fletcher Manufacturing Company was founded in 1793 by Thomas Fletcher, a cotton weaver newly arrived from Manchester, England. Trained in the weaving of narrow fabrics, tapes, rufflings, and lamp wicks, Fletcher produced these goods in Boston until he moved his business to Providence in 1808. In 1844, the first mill of the new 4-acre complex was completed and the manufacture of boot, shoe and corset lacings, twine, yarns, and spindle bandings was started. By 1865, the year of incorporation, the use of kerosene oil for lamps was common enough to create an increased demand for lamp wicks. Fletcher helped fill this demand to such an extent that by 1891 the Fletcher Manufacturing Company was known as "the largest works, in the line of goods manufactured, in this country" (Grieve and Fernald. P. 130). The only remaining building of the once-large complex is a

3½-story, brick office building which has been recently gutted by fire. This 1869 structure has a mansard roof with dormers, a smaller flat-roofed, 3-story back section and segmental-arch windows with granite insets in each arch and granite sills. The Fletcher building is presently under consideration for redevelopment. (Grieve and Fernald: Greene; Providence Sunday Journal, 24 August 1975; G. M. Hopkins, City Atlas of Providence Rhode Island, 1875.)

GRANT MILL (c. 1910)
299 Carpenter Street
Providence

Providence
19.298100.4632200
Providence

The original Grant Mill, a 4-story, stone textile mill with a central tower and a 2-story, wooden weave room on the west, stood on this Carpenter Street site sometime before 1880. Owned by the Hebron Manufacturing Company, the Grant Mill was a part of the B. B. & R Knight textile combine. In 1896, the Knights owned eighteen textile mills, twelve of them in Rhode Island (Grant, Arctic, Cranston Print, Jackson, Clinton, Natick, Fiskville, Royal in Warwick, Valley Queen, Pontiac, Lippitt in Warwick, and White Rock in Westerly) and controlled a total of 290,000 spindles. Sometime between 1908 and 1918, the present Grant Mill, a 4-story, brick structure fronting directly on Carpenter Street, was built. The new mill completely replaced the earlier one. In 1935, with the decline of the state's textile industry a jewelry firm bought the Grant Mill. This same firm, Blacher Brothers, continues to operate the mill. The mill's basement contains two inactive steam engines: one, a cross-compound Corliss with a 16-foot flywheel, a 4-foot stroke, a 24-inch cylinder on the high pressure side, and a 40-inch cylinder on the low pressure side; the other, a small Fleming engine from Harrisburg, Pennsylvania, connected to a 125 KW generator and previously used for emergency lighting. The Corliss once provided direct mechanical drive and was probably installed when the new mill was built. It is currently connected to a 450 KW generator, but it has not operated for a number of years.

(Munro; Hall, illus. pp. 40-1; L. J. Richards & Company, Atlas of Providence, Rhode Island, 1908; G. M. Hopkins Company, Plat Book of Providence, Rhode Island, 1918.)

MERINO MILLS (1851)
End of Ponagansett Avenue
Providence

Providence
19.295895.4632576
Providence

John Waterman built the first textile mill on this site in 1812. He first spun wool, but soon after switched to cotton. A fire in 1841 destroyed the mill. The Franklin Manufacturing Company bought the property in 1847 and built the current mills four years later. The buildings are built of stuccoed stone and are four stories high. The mill on the southwest side has a dormered mansard roof. In 1891, the complex contained 30,000 spindles and employed 325 workers in the production of cotton goods. The Joslin Manufacturing Company, incorporated in 1892, used the Merino Mill for the finishing of tubular and flat shoe laces, glazed braids, and corset laces. By 1901, the Joslin Company owned four additional mills in the Scituate area, all of which were connected to the Merino Mill by the Providence-Danielson Trolley Line. Joslin operated a total of 28,000 spindles and 2,800 braiders, making it one of the largest braiding companies in the region. The mill is still used for the manufacture of braid and operates with New England Butt Company braiders (see separate entry). Once powered by the flow of the Woonasquatucket River, the mill still contains a single turbine-in place, but no longer used.

(Bayles; Hall; Interview with Julius Freedman, Lincoln Lace & Braid Company, 6 March 1976.)

OAKDALE MANUFACTURING COMPANY (1891-1894) Providence
161 South Main Street Providence 19.300134.4632728
Providence Providence

With the consolidation of the Providence Dairy Company, the What Cheer Dairy Company and the old Oakdale Company, the new Oakdale Manufacturing Company was incorporated in 1891 for the manufacture of margarine and butter. By 1901, this company was one of the largest plants of its kind in the country. Two hundred employees were involved in the production of 100,000 pounds of butter daily. The plant was powered by a Rice & Sargent, 150-horsepower steam engine connected to two horizontal boilers. In 1894, the Oakdale Building was enlarged to 4,000 square

feet. The 1891 brick structure was extended to six stories, and a new 6-story building was added to the south side of the old section, giving the two structures the appearance of one. The north side of the factory apparently was not altered in 1894. There are two vertical rows of freight doors and cast-iron window hinges. The granite store-front facade and the south side of the building with its two large freight doors date from 1894. A huge boiler house and a 1-story electric plant with copper lintels and granite sills are located at what was then the back of the building. The building is now used as a furniture store. (The Industrial Advantages of Providence, Rhode Island, Together with an Account of Her Material Development and Progress, 1899; Hall;)

ORIENTAL MILLS (c. 1860)	Providence
Admiral and Whipple Streets	19.299120.4634590
Providence	Providence

The Oriental Mills, which were also known as J. P. Campbell & Company, were noted for their production of white cotton goods. By 1901, these mills produced 1,500 pieces of white goods a week, with sixty yards to a piece, and employed 250 workers. The machinery included 20,000 spindles, fifty looms, six cards and three pickers. The original 3-story, brick building which was built c. 1860 now stands alone. It has a low-pitched roof and two projected central towers in front and back. Only one tower has its original, bracketed helm roof. No machinery or power-generating equipment survives. (Chase; Hall; G. M. Hopkins, City Atlas of Providence Rhode Island, 1875.)

PROVIDENCE AND NATIONAL WORSTED MILLS	Providence
166 Valley Street,	(c. 1887) 19.297239.4632538
Olneyville	Providence
Providence	

Founded in 1876, the Providence and National Worsted Mills, though originally separate concerns, both owe their existence to one man, Charles Fletcher. After the old mills burned c. 1885, Fletcher had new mills erected immediately so that, by 1889, there were six mills on the ten acre site, each mill separate from the others with respect to

power and machinery. The mills were powered by eight Corliss steam engines which produced 2,600 horsepower and a water privilege producing 65 horsepower. The engines do not survive. The Providence Worsted Mill spun worsted, mohair and genappe yarns, while the National Worsted Mills wove suitings, over-coatings, and cloakings. Two storehouses, a dye house, a machine shop, and a mansard-roofed office building completed the complex, which became part of the American Woolen Company in 1899. The plant, once considered to be the most extensive single plant devoted to worsted in the world, remains largely intact, covering about two city blocks with 1-2-and 4-story brick buildings. Several varied firms now occupy the buildings.

(The Industrial Advantages of Providence, Rhode Island Together with an Account of Her Material Development & Progress, 1889, Industries & Wealth of the Principal Points in Rhode Island, 1892; Grieve and Fernald; Interview with Harry Blacher, Blacher Brothers, 27 August 1975.)

RIVERSIDE MILLS (1863)
Aleppo Street
Providence

Providence
19.296526.4632420
Providence

Though established in 1863, the Riverside Mills were not incorporated until 1865. This company quickly acquired a reputation for fine grades of astrakhan and other cloakings for women's wear. The Riverside Mills also made worsted goods for men's wear. It has been claimed that this worsted plant was the only one in the country to employ teasel cross-jigs and English-made self-acting mules at the turn of the century. Moreover, the Riverside Mills were the first in the United States to use the cold-air drying process and the third textile complex in the country to adopt electric arc lights. In 1865, a fire destroyed several buildings on the site. Expansion led to the acquisition of a new name-The Riverside Worsted Mills-in 1878. In 1889, the company joined with the Oswego Falls Manufacturing Company and formed the Riverside and Oswego Mills. The firm changed its name to the Riverside Worsted Company in 1891. By 1899, the American Woolen had purchased the Riverside Mills, then a 7½-acre plant. Today the Riverside complex covers several city blocks with 1-2-3-and 4-story brick buildings. (Hall; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875.)

SILVER SPRING BLEACHING & DYEING COMPANY (1850-1880) Providence	Providence 19.299251.4635000 Providence
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Although incorporated in 1864 as the Silver Spring Bleaching and Dyeing Company, the old Silver Spring Bleachery began operating in 1850. The bleachery derived its name from the copious and pure springs just west of the works which provided a necessary source of clean water to the bleach and dye houses. In 1877, the company engaged in textile printing, turning out 14,000 pieces a week by 1891. Corliss steam engines and electric motors provided 3,300 horsepower for the 5½-acre complex. There were two separate boiler plants, one which remains. It has huge arched windows and buttressed walls, and once contained three mammoth boilers. Only the conveyor belts of the chain-grate stoking system can be observed inside. The complex as a whole has not been changed greatly, though several of the old 1, 2, and 3-story brick structures have been destroyed. Several small firms now occupy the site. (Grieve and Fernald; Hall; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875.)

STILLMAN WHITE BRASS FOUNDRY 47 Charles Street (1871-1876) Providence	Providence 19.299770.4633760 Providence
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One of the oldest brass foundries in Rhode Island, the Stillman White Foundry was established in 1856. The firm acquired a reputation for the manufacture of all kinds of light and heavy brass, bronze, and composition castings. The specialty of the firm was the "S. White Lining Metal" which was used in the bearings of light and heavy engines. By 1886, according to Welcome Greene, this product had become the "lining metal in more use than any other." In 1896, six furnaces, a melting kettle, and a core oven, which could produce 1,500 pounds of finished metal product per day, were in operation. The remaining building, a small, 1- and 2-story brick structure, was built between 1871 and 1876. The structure provided offices for the Research and Design Institute (REDE), the group responsible for the building's adaptive reuse.

REDE was originally set up as a non-profit research institute focusing on energy conservation. The foundry was refitted to conserve energy and, in the process, exterior alterations, such as the installation of new thermal windows, and the replacement of granite lintels with cement, were made.

(Industrial Advantages of Providence, Rhode Island, 1889; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875; Greene; Ronald Beckman, "The Stillman White Bras Foundry: Experiments in Energy Conservation", Historic Preservation, January-March 1975.)

UNITED STATES GUTTA	(1906)	Providence
PERCHA PAINT COMPANY		19.300000.4631300
Dudley and Eddy Streets		Providence
Providence		

J. William Rice, a seventh-generation Rhode Islander who was active as a paint, chemicals, and dye-stuff dealer in 1861, founded the United States Gutta Percha Paint Company in 1886. The first plant was located at West Exchange and Mathewson Streets, but was later outgrown. Rice built the 4-story, brick-pier building on Dudley Street, from designs by Perry Whipple, in 1906. The plant manufactured "barreled sunlight", a white interior paint produced by the "Rice Process", and advertised to have non-yellowing properties. It was made from resins found in Malay gum trees and was an early form of latex paint. The company also made a white lead paint, "Rice's Crown German White Lead", enamels, and oil-based paints. Eighty-five per cent of its production was for interior use, though by 1930, the company was developing a new exterior paint. The firm managed a network of 170 distributors and 7,500 retail dealers, and also did a significant export business. They vacated the building prior to 1962, and the structure is currently used by a manufacturer of chemicals for the textile and paper finishing industries. No historic machinery survives. (The Book of Rhode Island, 1930, photograph p. 224; Hall; Interview with Charles Biliouris, CNC Chemical Company, August, 1977.)

VALLEY WORSTED MILLS (1866)
45 Eagle Street
Providence

Providence
19.297685.4633035
Providence

The Valley Worsted Mills were founded in 1842, one of the first worsted mills in the country. Worsted yarns were spun for consumption by hand knitters during the early years when the machinery was powered by oxen. The plant was destroyed by fire in 1866 and was immediately rebuilt to house 1,000 braiding machines. In 1899, the mills became part of the American Woolen Company. At this time, the Valley Worsted Mills were equipped with twenty-three sets of worsted cards, nineteen Noble combs and 9,840 spindles, along with reeling, winding, and spooling machines. Over 450 employees were involved in the production of 100,000 pounds of worsted yarn a month. Three Greene engines, of 250 horsepower each; three upright boilers and five horizontal boilers provided the power. Today the two main brick buildings, which originally were three and one-half stories high, are arranged one behind the other. The top floor of the second structure has been removed. The unaltered mill has segmental-arch windows with brick sills and a low-pitched roof. One of the two wooden storehouses remains but is covered with a simulated brick facing. The 1-and 2-story, brick buildings located behind the main mills are also part of the Valley Worsted complex. These smaller buildings were used for scouring, drying, and dyeing. Several varied firms now occupy the buildings. (G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875; Hall; The Industrial Advantages of Providence, Rhode Island Together with an Account of Her Material Development & Progress, 1889; Industries & Wealth of the Principal Points in Rhode Island, 1892.)

WANSKUCK MILLS (1862-1864)
725 Branch Avenue
Providence

Providence
19.298200.4636140
Providence

The main building at this site, a 5-story, brick mill with a bracketed, low-pitched roof, was built between 1862 and 1864. It has segmental windows with granite sills, and a central tower with round arches and an octagonal open belfry covered with a copper-domed roof. The company first produced fancy cassimeres, but in 1869

switched to worsteds. In January, 1870, the "first case of American made worsted goods, for men's wear was shipped from the mill" (Book of Rhode Island, p. 197). The 4-story building on the west was built between 1874 and 1875, specifically for worsted production. It was originally 348' X 71' and also contained the power plant and dye house. Numerous outbuildings, housing blacksmith shops, picker, engine and boiler houses, are still present, located in the mill yard north of the main mill. Mill Number 3, four stories high, stands east of the worsted mill. Mills 4 and 5 are both three stories and stand at the northern edge of the site. The circular brick building in the mill yard with a rubble stone foundation was used as a gas holder for the mill's own gas supply. A 20th-century extension is visible on the east end of the complex. An office, an ornate meeting hall, and rows of worker housing, all mid-19th century, also survive. In 1930, the company ran 362 looms, producing 1,300,000 yards of worsted goods yearly. 1,100 workers were employed. Numerous small concerns now occupy the buildings. The company also owned and operated the Steere Worsted Mill, located just north of the site (Providence 19.297580.4636520) at Wild Street and Branch Avenue. This is a 3-story, brick mill with pilasters and a central tower capped by a hipped roof and copper ridge ornament. The mill made its first shipment of yarn in July, 1884, and in 1930 operated 39 worsted cards, 28 worsted combs, 10,696 spindles and employed 395. It is now occupied by a luggage manufacturer. Wanskuck also built the Geneva Mill (1896), a brick complex on Douglas Avenue at the North Providence-Providence line (Providence 19.297140.4636520). It operated 96 looms and the necessary preparatory equipment for the manufacture of woolen and worsted goods. The 1896 building is three stories, with large segmental-arch windows and a nearly flat roof. Adjoining this building is the pre-1855, stone Cowing & Heaton Mill, the first mill at this site. It now has a nearly flat roof, brick window enframements and quoined corners. All three of Wanskuck's mills had an interconnected water-power system, large portions of which continue to survive. (The Book of Rhode Island, 1930, photo p. 197; Hall; Chase; American Mutual Insurance Company Drawing, 18 August 1911.)

WEYBOSSET MILLS (1836-1881)
Troy and Dike Streets
Providence

Providence
19.297200.4631920
Providence

Built by John Waterman in 1836, the Weybosset Mill first produced cotton cloth. 1866 brought a change of ownership, the introduction of cassimere manufacture, and the construction of a second mill for scouring, picking, and dyeing. A third mill, completed in 1881, housed carding and spinning machinery. The American Woolen Company, which bought the complex in 1899, produced worsteds, cassimeres, overcoatings, cloakings, and fancy colored fabrics. At that time, the Weybosset Mills made from 1,100,000 to 1,500,000 yards of fabric per year. Today the large central tower of the 1836 4-story, stuccoed-stone mill, 280' X 50', is obscured by a small brick building built directly in front of it. Two large 1872 4-story, stuccoed-stone ells, 157' X 51' and 107' X 49', protrude at the rear of the main mill. The 1866, 3-story brick mill and a later 1-story weave shed with saw-tooth roof, are located behind the main mill. The third mill, a 4-story, stone structure, 168' X 59', is located on Oak And Dike Streets. It has been greatly altered with only the first floor showing sections of the original stone construction. No old machinery remains.
(Hall; G. M. Hopkins, City Atlas of Providence Rhode Island; Factory Mutual Drawing, 11 December 1963.)

Manufacturing

BARSTOW STOVE COMPANY (1850)
118 Point Street
Providence

Providence
19.300018.4631937
Providence

Established by Amos C. Barstow in 1836, the Barstow Stove Company, which was the first foundry of its kind in Providence, was not incorporated until 1859. The company manufactured many styles of stoves but was best known for the "Bay State" and "Model Grand" styles. In 1900, the Barstow Stove Company acquired the patterns and stock of the Spicer Stove Company in order to increase the number of models from which customers could choose. At that time, the stove foundry occupied numerous buildings

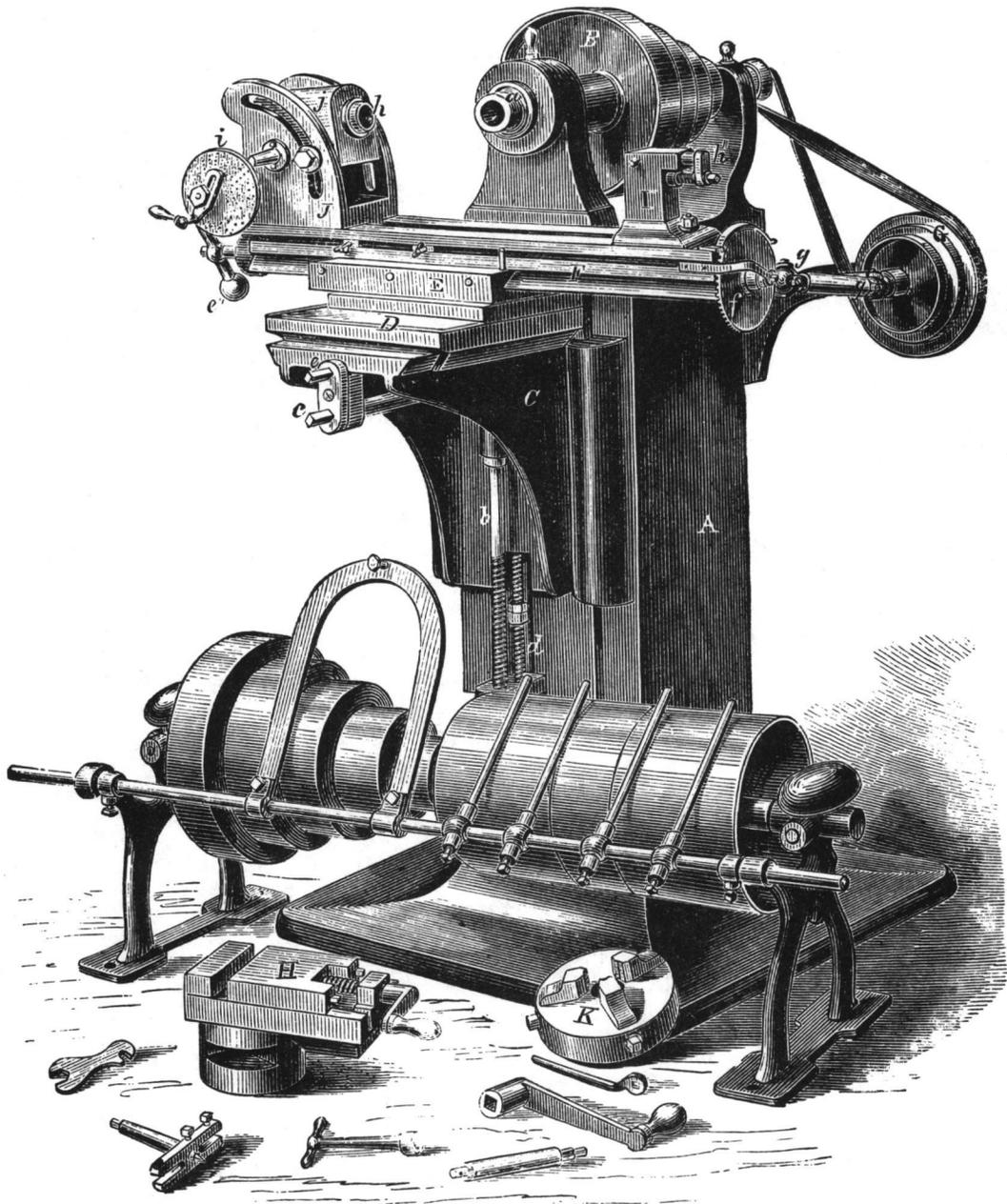
covering the entire city block. Today only two of these buildings remain: an 1850 3½-story, brick structure with a pitched roof and a clerestory monitor; and an 1855 4½-story, brick structure with a jerkinhead roof, which appears flat from street level. Both buildings have rectangular windows with granite sills and lintels. An electric supply company now occupies the buildings. (Factory Mutual Drawing, 21 December 1915; Hall; Rhode Island Industries Catalogued and Illustrated, 1904; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875.)

BEAMAN & SMITH COMPANY (1898)	Providence.
20 Gordon Avenue	19.299142.4631100
Providence	Providence

The Beaman & Smith Company was established in 1886 by Elmer A. Beaman and George H. Smith for the manufacture of metal-working machine tools. In 1898, the company was incorporated and the Gordon Street plant constructed. The Beaman & Smith specialties included milling and boring machines, some weighing up to sixty-five tons. At the turn of the century, the plant employed 75 to 100 workers and covered one city block with 1- and 2-story buildings. The main 2-story structure has a steel framework filled with brick and glass. An extension at the rear was used for stock rooms and a blacksmith shop. An electric crane was used in the erecting room. The 1-story pattern storage building, constructed in the same style, is located on the north side. These buildings are used presently as a printing plant. No old machinery remains. (Hall.)

BROWN & SHARPE MANUFACTURING COMPANY	Providence
Promenade and Holden Streets(1876-1916)	19.298980.4633392
Providence	Providence

This famous company was founded by David Brown and his son, Joseph, in 1833. Although only a tiny shop during the 1840s, the firm produced its first important product during that time, a vernier caliper (1851). In 1853, Lucian Sharpe became Joseph Brown's partner in the business. During the 1850s, Brown and Sharpe manufactured Wilcox & Gibbs sewing machines; and during the 1860s



Brown & Sharpe Universal Milling Machine
(J. Rose, Modern Machine Shop Practice, 1888).

and the 1870s, the company broadened its product line to include important inventions such as the Brown & Sharpe Screw Machine, the micrometer caliper, the Universal Milling Machine, the Universal Grinding Machine, and a formed-tooth gear cutter, which made possible the mass production of gears. In 1872, the company moved to a new site which today covers over two city blocks. The 3-to 5-story buildings, dated from 1876 to 1916, are constructed largely of brick. Following the hollow-square plan of factory construction, the Brown & Sharpe plant was generally regarded as an outstanding example of industrial construction, building arrangement, and efficiency. Brown & Sharpe still occupies a small part of the complex including the brick foundry which was erected in 1902 to replace an earlier wood structure. The main building, a 5-story, brick-pier structure with a corbeled cornice, two granite belt courses and segmental arch windows, was completed in 1876 and measured at that time 295' X 51'. The site still contains an Ingersoll-Rand horizontal cross-compound steam turbine (last patent August 1909) connected to a Westinghouse turbo-generator (last patent January 1910). The engine and the turbine-generator set last ran in 1965. It is likely that all the power plant equipment will soon be scrapped. (J. W. Roe, English and American Tool Builders, 1916; Hall; Munro; G. M. Hopkins, City Atlas of Providence Rhode Island, 1875; Associated Factory Mutual System Insurance Drawing, 27 September 1943; H. R. Hitchcock Rhode Island Architecture, 1939, (illus. plate 79); D. Nelson, Managers and Workers, Origins of the New Factory System in the United States, 1880-1920, 1975.)

CITY MACHINE COMPANY (1868)
Harris Avenue and Acorn Street
Providence

Providence
19.298340.4633145

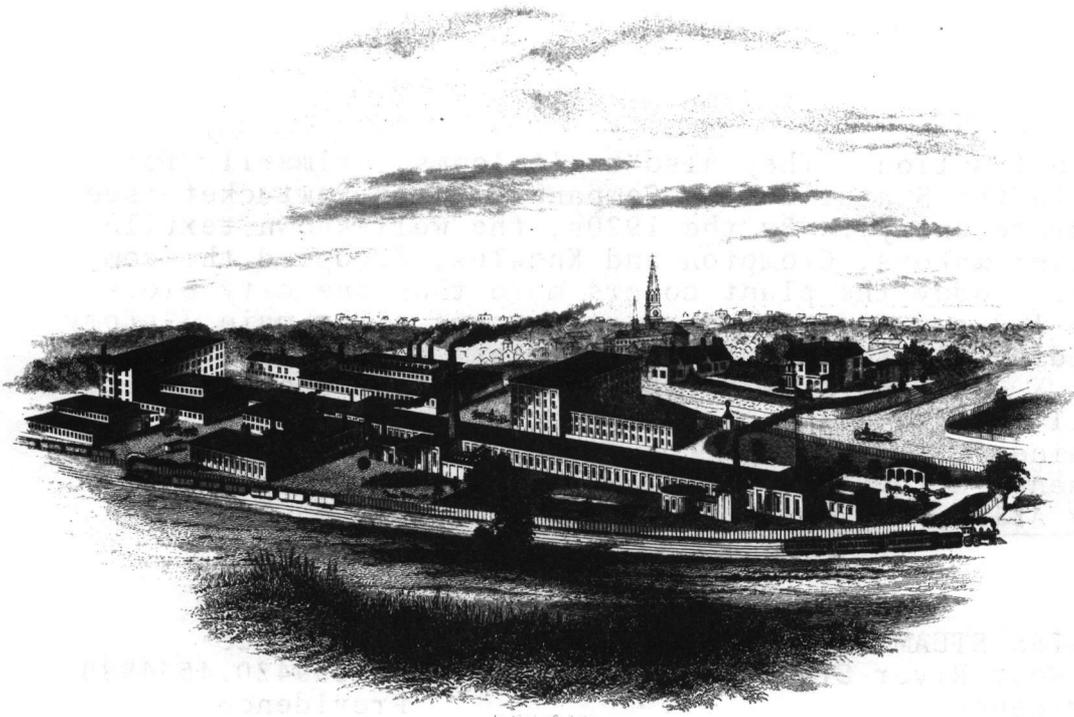
In 1868, the City Machine Company was organized to build cotton and woolen machinery. In 1889, the George W. Stafford Manufacturing Company, which had been established eight years earlier, bought the plant to manufacture Jacquard machines, dobbies and "witches". The latter two devices regulate the harness movements of looms. The new plant's 30,000 feet of floor space allowed the company to expand its product line to include the Morton

let-off motion. They also built looms, primarily for use in the Slater Cotton Company Mill of Pawtucket (see separate entry). By the 1920s, the well-known textile machine makers, Crompton and Knowles, occupied the complex. Today the plant covers more than one city block with 1-2-and 3-story brick structures. The main 3-story building, 145' X 45', remains, along with a pattern shop, 100' X 24', and part of the wood erecting shop. Several small manufacturing firms now occupy the plant. No old machinery remains.

(Greene; Grieve and Fernald; Bayles; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875.)

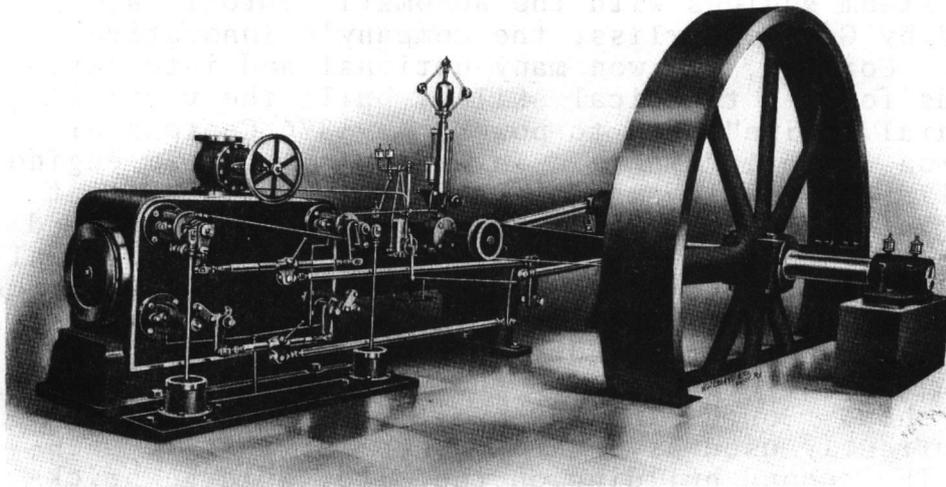
CORLISS STEAM ENGINE COMPANY (1880)	Providence
146 West River Street	19.299420.4634880
Providence	Providence

Having outgrown its first plant on India Street, the Corliss Engine Company began construction at its new site on West River Street in 1848. By 1889, thirty-three years after incorporation, the company had grown to encompass nine acres and had become the most celebrated steam engine works in America. The plant produced stationary steam engines with the automatic cutoff valve patented by George Corliss, the company's innovative founder. Corliss, who won many national and international awards for his technical skills, built the vertical "Centennial Engine" used to power the 1876 Centennial Exposition in Philadelphia. In addition to steam engines, the Corliss Works also manufactured the Corliss Patent Tubular Water Leg Boiler, which was especially designed for compound and triple-expansion engines. The original Corliss structures no longer survive. The 1-story, brick structure on the site was built in 1880 and probably served as the Corliss foundry. In the 1930s, the Franklin Machine Company used the building as a light machine shop. Bought in 1949 by its present owner, it is currently used as a repair shop for textile machinery. The second building on the site, a large brick-



CORLISS STEAM ENGINE CO.

PROVIDENCE, R. I.



Top: (W. H. Munro, Picturesque Rhode Island, 1881).
Bottom: Valve-Gear Side, Harris-Corliss Single Cylinder
Steam Engine (SMHS).

pier structure, with a single story thirty-five feet high, was built in 1907. The building has been extensively altered, and aluminum siding now covers the spaces between the piers. It is currently occupied by a granite cutting company that continues to use a multiple-blade gang-saw bought from the Westerly Granite Company in 1955 (see Sullivan Granite Company, Westerly).

(The Industrial Advantages of Providence, Rhode Island; 1889; Greene; The Steam Engine As It Was And As It Is, 1857; Factory Mutual Drawing, "Franklin Machine Company," 23 December 1931; Munro.)

DAVOL MANUFACTURING COMPANY (1875)	Providence
14, 16, 18 Point Street and	19.300069.4632092
419 Eddy Street	Providence
Providence	

This company was established by Joseph Davol in 1874 as the Perkins Manufacturing Company and incorporated in 1882 as the Davol Manufacturing Company. In 1885, the company produced fine rubber goods for use in the drug, dental, and stationery trades. At that time, the firm's name was changed to the Davol Rubber Company. By 1891, Davol employed about 275 workers. Today the original 3-story, brick building, 100' X 200', with large arched windows separated by piers, is still used in the manufacture of Davol products. It has been heavily altered by a fourth story constructed of glass and a large modern addition which looms beside it. A second plant which was built in 1880 is located nearby on Eddy Street. This 4-story, brick structure has three sets of granite belt courses running above rectangular windows. Cast iron columns support the building on the ground level. This building was originally employed in the jewelry industry. (Bayles; Hall; Rhode Island Industries Catalogued and Illustrated, 1904.)

FULLER IRON WORKS (1869)
25 Pike Street
Providence

Providence
19.300590.4632050
Providence

In 1840, Frederick Fuller purchased the wooden buildings of the Fox Point Foundry Company and began the manufacture of iron castings. By the year of incorporation, 1894, the Fuller Iron Works were producing iron castings, steam and gas flanged pipe and fittings, and general machinery castings. The company's 3-story, brick building, which was erected in 1869, has a low-pitched roof, segmental-arch windows with granite sills and a tall central window on the front facade which is round arched and was installed in the 1960s when the structure was converted to use as an office building. The glass and steel machine shop, which is attached to the back of the brick building, was constructed in 1893. It was the first steel frame structure of its kind built in Providence. Today most of the glass curtain walls are covered with shingles. The 1901 steel and glass foundry, though greatly altered, is located on the east side of the brick building.

(Hall; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1975.)

GORHAM MANUFACTURING COMPANY (1890)
333 Adelaide Street
Providence

Providence
19.298020.4629636
Providence

The Gorham Manufacturing Company was founded in 1818 in a one-room shop by Jabez Gorham, maker of jewelry. By the year of incorporation, 1863, Gorham had become a large complex of workshops, forges, and furnaces, and had a world-wide reputation for gold-and-silver-smithing. Beginning the manufacture of silver objects in 1831, by 1885 the company had separate departments to manufacture statuary and memorial works in silver, gold, brass, bronze, stone, and wood. Over twenty different trades were carried on within the Gorham complex, then located on North Main Street. Steam engines powered machines for rolling, shearing, punching, shaping, embossing, dye stamping; for lathes, drills, planing machines; and for the foundry. The present Gorham complex, which is primarily comprised of 3-story brick buildings with segmental-arch windows

and flat roofs, includes one of the largest foundries in the world for this business. Gorham moved to the new facilities in 1890. The large E-shaped factory faces the main Amtrack rail line and is fronted by a bronze statue of Vulcan. The complex also includes a "casino" built around 1895 and enlarged in 1906 which served as a dining room and recreation center for workers. Gorham was the only large Providence firm to engage in "welfare work" among its workers. An elaborate brick stable remains on the grounds near the railroad tracks, but the station which was once here has been demolished. (Hall; Greene; Munro; D. Nelson, Managers and Workers, Origins of the New Factory System in the United States, 1880-1920, 1975.)

JOHN & THOMAS HOPE COMPANY (1882)
1 Mashapaug Street
Providence

Providence
19.298070.4630315
Providence

Established in 1856, the John and Thomas Hope Company achieved a reputation for their new pantograph system of engraving fabrics which replaced the use of dyes, clamps, and machine work. John Hope is given credit for producing the first effective pantograph engraving machinery. By the late 1880s, John and Thomas Hope supplied all the calico-printing establishments in the country. The system, according to Welcome Greene, was described as follows: "The pattern to be engraved, enlarged to any desired dimensions by a camera, is laid upon a table, over which the operator guides the stylus. This is connected with an ingenious mechanism, by which a number of gravers or diamond points are brought in contact with the roller, and trace upon its surface the exact copy of the pattern...the rollers are covered with varnish, and the gravers mark out the pattern in the varnish, cutting through and slightly into the surface of the metal. The next process is to rotate the roller in nitric acid, and in this bath it remains until the metal has been eaten away to the required depth, the varnish preserving the surface from any action of the acid except at the places where the diamond points have penetrated to the metal surface of the roller." In 1882, the firm moved to the building on Mashapaug Street, a 3½-story structure built of brick with granite sills,

segmental-arch windows, and a low-pitched roof. The building is now used to store furniture. (Greene; Bayles.)

NEW ENGLAND BUTT COMPANY (1865)	Providence
Pearl, Rice, Perkins Streets	19.298845.4631870
Providence	Providence

Incorporated in 1842, the New England Butt Company is one of the oldest and most extensive hardware manufacturers in New England. Today only small portions of the company's c. 1842 buildings survive. They have been either destroyed or greatly altered to make room for a more modern 1-story structure. The main building, a 3-story, brick structure, 131' X 38', built in 1865, is located at the corner of Pearl and Perkins Streets. It has segmental-arch windows with granite sills, an altered trap-door monitor, and a steeply pitched roof. In 1901, the company employed 200 skilled workmen in the manufacture of machinery, hardware specialties, butt hinges, and fine castings. Among the products of New England Butt were braiding machines for silk, worsted and cotton braid as well as for telephone, electric light, and crinoline wire. (A small, New England Butt braider, built in the mid-19th century, is exhibited at the Slater Mill Historic Site.) In the hardware line, the company specialized in cast butt-hinges. Between 1910 and 1913, New England Butt became one of the few Rhode Island firms to experiment with "scientific management". In these years, Frank Gilbreth, a noted follower of Frederick Taylor and a specialist in time and motion study, redesigned the firm's work process. According to the state's labor press, Gilbreth wished to "eliminate false moves and drive the worker into a stride that would be as mechanical as the machine he tends." New England Butt continues to produce braiding machines here and also occupies the buildings of the former Providence Steam Engine Company (see separate entry). With the exception of a very small number of early 20th-century machine tools, no historic machinery survives. (Hall; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875; Labor Advocate, 30 November 1913.)

NICHOLSON FILE COMPANY (c. 1864)
23 Acorn Street
Providence

Providence
19.298219.4633258
Providence

Incorporated in 1864, the Nicholson File Company had become "the largest file-making company in the world" by 1893 (Hall, p. 20), employing over 250 persons and producing over 1,500 files and rasps daily. Prior to the efforts of William R. Nicholson, the founder, all attempts to establish a machine-cutting file factory in this country had failed. By 1891, Nicholson claimed ninety-eight patents, including a few for files used in Providence's thriving jewelry industry. In 1901, the company's six plants, which included several out-of-state factories, produced over 10,000 files and rasps a day and employed nearly 2,500 workers. In addition to the acquisition of other plants, including one in Pawtucket, Rhode Island, the 1890s brought the expansion of the main complex in Providence. Today the Nicholson complex remains substantially intact. It covers an entire city block with 1- and 2-story, pitched-roofed brick buildings. The main building is a 2-story, brick structure with a pitched roof, a central cross-gable on the side street, segmental-arch windows, and a corbeled cornice. A 2-story, brick office building with a mansard roof is also extant. No old machinery or steam engines survive.
(Hall; Rhode Island Industries Catalogued and Illustrated, 1904; Greene.)

OSTBY & BARTON COMPANY (1903)
118 Richmond Street
Providence

Providence
19.299720.4632390
Providence

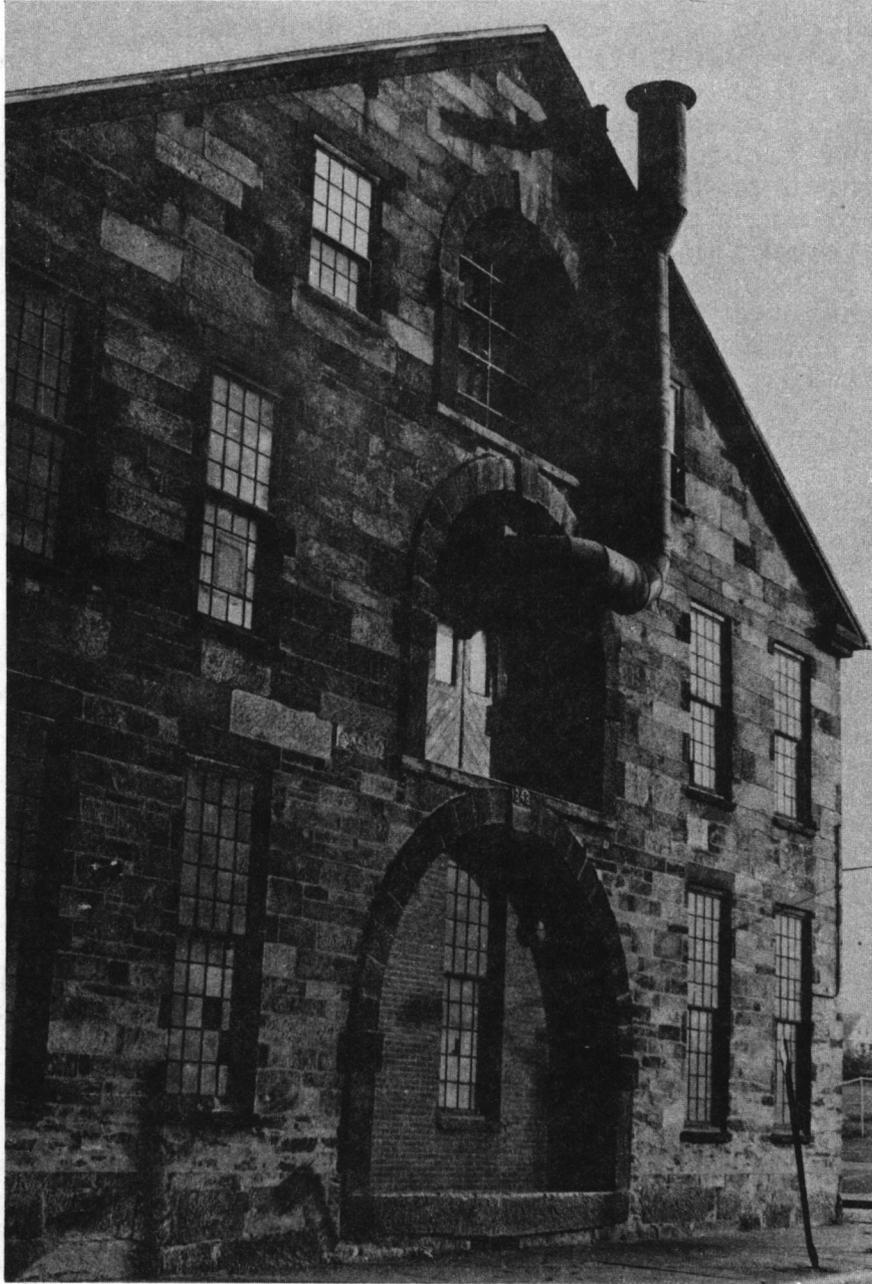
The Ostby & Barton Company was established in 1879 by Engelhart C. Ostby and Nathan B. Barton for the manufacture of gold rings. Soon after its incorporation in 1893, this firm was said to be "the largest ring factory in the world" (Hall, p. 101). Between 1891 and 1901, the number of employees increased from 90 to 400. This expansion led to the construction of a new factory in 1903. The Ostby & Barton Building is a 6-story, brick structure with a large, cut-stone doorway, segmental-arch windows and a corbeled cornice. One of the largest and most important buildings in the Providence jewelry district (see below), it is still occupied by jewelry and plating firms. (Hall; Bayles.)

PHENIX IRON FOUNDRY MACHINE SHOP (1848) Providence
 Imperial Place and Elm Street 19.299679.4631990
 Providence Providence

The Phenix Iron Foundry was the pioneer establishment in its line in Rhode Island, making both machine-shop and foundry products with specialties in castings for gears and shafts, machinery for dyeing and bleaching, and machinery for print works. By the latter part of the 19th century, "nearly every bleachery in the United States had been fitted up by this company" (Hall, p. 181). George D. Holmes organized the company in 1830, and in 1832 it was incorporated as the phenix Iron Foundry. The first building was erected in 1830 on the Eddy and Elm Street site, which later became a two-acre complex. The only remaining building is the 2-story, stone machine shop, constructed in 1848. It has a pitched roof, a trap-door monitor, tall rectangular windows, an ell on Elm Street, and three freight doors (with colossal granite sills) which are graduated in size one above the other on each end of the building. A keystone inscribed "1848" is set into one of the Elm Street freight-door arches. In 1863, the company expanded its facilities to include another machine shop, foundry, wood-working shop, and blacksmith shop. The building is currently owned by a luggage manufacturer. (Hall; Greene.)

PROVIDENCE JEWELRY DISTRICT (c. 1860-1920) Providence
 Pine, Chestnut, Dyer Street Area E. 19.300100.4631700
 Providence W. 19.299620.4632440
 N. 19.299900.4632800
 S. 19.299880.4631920
 Providence

The jewelry industry got its start in the Providence area in the late 18th century. From a small-scale artisan trade, the industry grew substantially from 1875 to 1910, and gradually concentrated in an area of Providence roughly bounded by Pine, Dorrance, Chestnut, and Eddy Streets. This was an industry which included the costume jewelry trade, lapidary shops, precious metal refineries, plating shops, and manufacturers of jewelry findings, tools, and machinery. By 1880, Providence was the leading jewelry producer in the country. Despite the industry's growth,

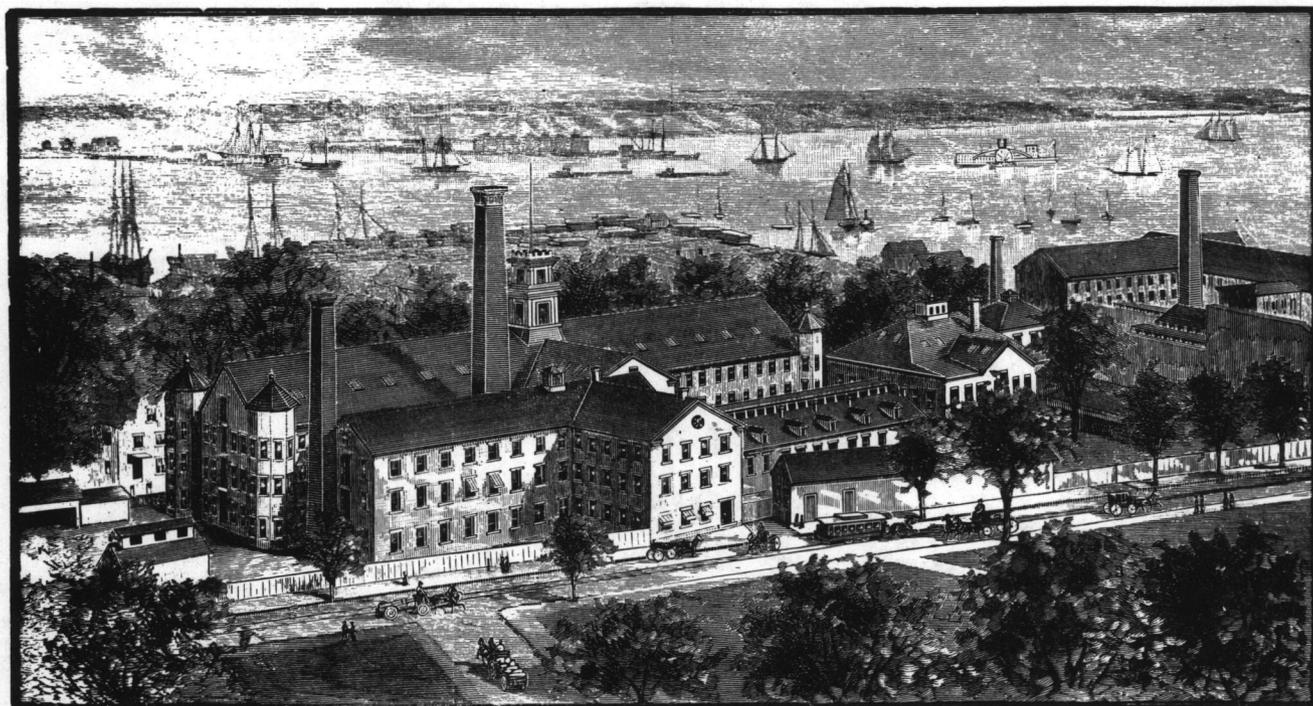


Phoenix Iron Foundry (Julia C. Bonham).

individual units of production remained small. In 1910, each local firm employed an average of only thirty-two workers, most of whom were recent immigrants. Because of the nature of production, women and children did substantial amounts of jewelry work in their homes and continued to do so well into the 1930s. Some of the largest structures, 5-to 7-story brick buildings, continue to survive. They were generally built to house a number of separate firms. The most important buildings, include the Champlin Building (1888) at 116 Chestnut, the Doran Building (1907) at 150 Chestnut, The Irons-Russell Building (1904) at 95 Chestnut, the Jesse Metcalf Building (1896) at 144 Pine Street, the Ostby & Barton Building (1903) at 118 Richmond Street (see separate entry), the Remington Building (1888) at 91 Friendship Street, and the Palmer & Capron Building (1866) at 167 Dorrance Street. A smaller, but especially interesting, building is that built for the Langelier Manufacturing Company (1888). It is a 3-story structure with a steel frame and brick in-fill. The district also includes a number of 20th-century reinforced-concrete factories such as the Coro Building (1929) at 167 Point Street and the Doran-Speidel (1912) Building at 70 Ship Street (see separate entry.) Most of these buildings continue to be used for jewelry manufacture. (Charles MacFarlene, "Rhode Island Jewelry Manufacture", unpub. seminar paper, Brown University, 1976; Providence Sunday Journal, 15 February 1976.)

PROVIDENCE MACHINE COMPANY (1846)	Providence
Crary Street between Allens Avenue	19.300042.4631680
and Eddy Street	Providence
Providence	

The Providence Machine Company was originally part of the Providence Steam Cotton Manufacturing Company, which was controlled by Samuel Slater & Sons. Thomas J. Hill, one-time laborer at the Old Slater Mill and later a partner of Samuel Slater, became the sole owner of the machine shop in 1846 (see Elizabeth Mill, Warwick, and Bay Mill, East Greenwich). At this time, he had new buildings constructed on the present site. The shop manufactured all kinds of cotton machinery as well as some machinery for the woolen industry. In particular, the company manufactured English fly frames and American roving frames.



WORKS OF THE PROVIDENCE MACHINE COMPANY.

(R. Grieve and J. Fernald, The Cotton Centennial,
1790-1890, 1891).

The 2-acre complex included two main buildings, a foundry, a pattern shop, several storehouses and an office building. Today only the main building remains. It is a 3-story, brick structure with a pitched roof. Originally, the mill had four octagonal, castellated corner towers, only one of which survives, in much-altered condition. Major additions and changes have been made to the entire structure.

(Hall; Grieve and Fernald, engraving p. 133; Sande; Chase.)

PROVIDENCE STEAM ENGINE COMPANY (1845) Providence
South Main and Pike Streets 19.300520.4632128
Providence Providence

John Babcock, Sr., an early steamboat builder, is said to have worked on this waterfront site as early as 1821. In 1830, Babcock's son joined with Robert L. Thurston to form what later became the Providence Steam Engine Works. Within eight years, the company was the major producer of steam engines in the state, supplying half the engines used in Newport and seventeen of the twenty-three at work in Providence. In 1841, the firm, then known as Thurston, Green and Company, bought the patent rights to the Sickles "cut-off" valve. Later, the firm unsuccessfully charged George Corliss, the noted inventor of the Corliss steam engine-valve system, with infringement on the Sickles patent. Incorporated in 1863 as the Providence Steam Engine Company, the business substantially expanded its plant in the following year. In 1899, the company merged with the Rice & Sargent Engine Company to form the Providence Engineering Works. The new firm continued the manufacture of marine and stationary steam engines (especially the Greene and the Rice & Sargent). Two hundred and fifty skilled machinists worked with specialized machine tools such as large-capacity metal planers. The surviving structures include a stuccoed-stone, pitched roof building on the northwest, 170' X 57', built in 1845, and framed with chamfered beams and small joists; a 3-story, brick building on the northeast, built in 1864; and two brick additions on the southeast and southwest, built in 1893. The site contains two twenty-five-ton Case electric cranes, one in the 1864 building, the other in the 1893 wing on the southeast. Both buildings were originally built to accommodate large

cranes. The 1864 structure has interior brick pilasters and a wooden track supporting its crane. The buildings are now used by New England Butt (see separate entry) for the manufacture of wire stranding machinery. The company still uses early 20th-century machine tools, such as a vertical boring mill built by the Niles Tool Works, Hamilton, Ohio, and a Mitts & Merrill broaching machine, both used originally by Providence Engineering. A large collection of plans and blueprints was recently donated to the National Museum of History and Technology, Smithsonian Institution. (Hall; Bayles; Factory Mutual Drawing, 5 November 1948; C. Pursell, Early Stationary Steam Engines in America, 1969; Shop Photo, 1918, at New England Butt.)

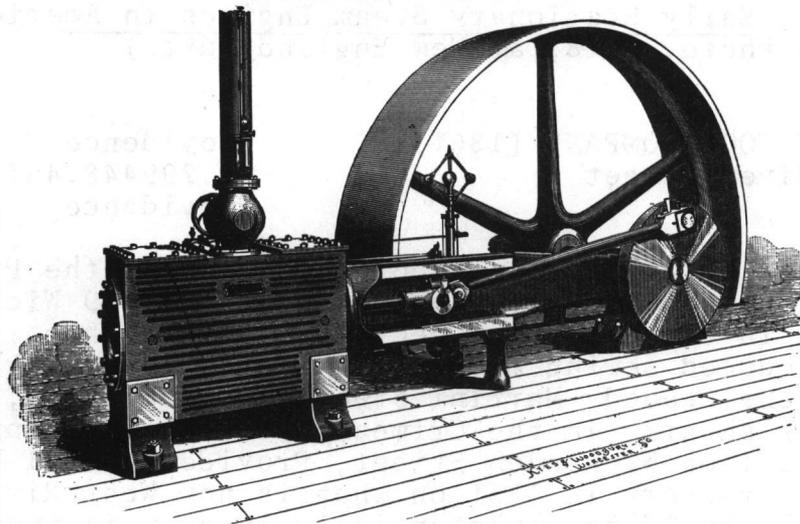
PROVIDENCE TOOL COMPANY (1861)	Providence
148 West River Street	19.299448.4635000
Providence	Providence

Established in 1845 and incorporated in 1847, the Providence Tool Company was originally located at 29 Wickenden Street in the Fox Point section of Providence. The company produced sewing machines, ship chandlers' hardware, and the Peabody-Martini breech-loading rifle, used by the Turkish army in the Crimean War. While maintaining its plant on Wickenden Street, Providence Tool built a new brick factory in 1861 on what is now West River Street. The building, substantially intact, is two stories high with an Italianate central tower, and first-story brick piers. The original gable roof was subsequently removed and the roof is now sharply reduced in pitch. The 1-story, brick-pier wing on the north was added in 1863, and a six-bay extension of the second floor was built over a portion of that wing subsequently. The 3-story, brick structure on the west and the current foundry were also added later. The prominent inventor, Frederic Howe, joined the company about 1853. Howe developed a close working relationship with Joseph Brown, of Brown & Sharpe (see separate entry) and persuaded Brown to re-equip Providence Tool at the onset of the Civil War. On 14 March 1862, Providence Tool became the first company to use Brown & Sharpe's Universal Miller, and later became one of the first firms to produce twist drills. In 1863, Howe designed for the company a prototype of his "Howe Miller" for milling the compound curves of musket lockplates. Howe left the firm to join Brown

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AUTOMATIC CUT-OFF,

Flat Slide Valves, both Steam and Exhaust; Steam Closing Mechanism; Safety Stop on Regulator.



SIMPLE, ECONOMICAL, DURABLE.

Providence Steam Engine Company,

SOLE BUILDERS,

PROVIDENCE, R. I.

H. W. GARDNER, PRES'T AND TREAS.

T. W. PHILLIPS, SEC'Y.

(W. H. Munro, Picturesque Rhode Island, 1881).

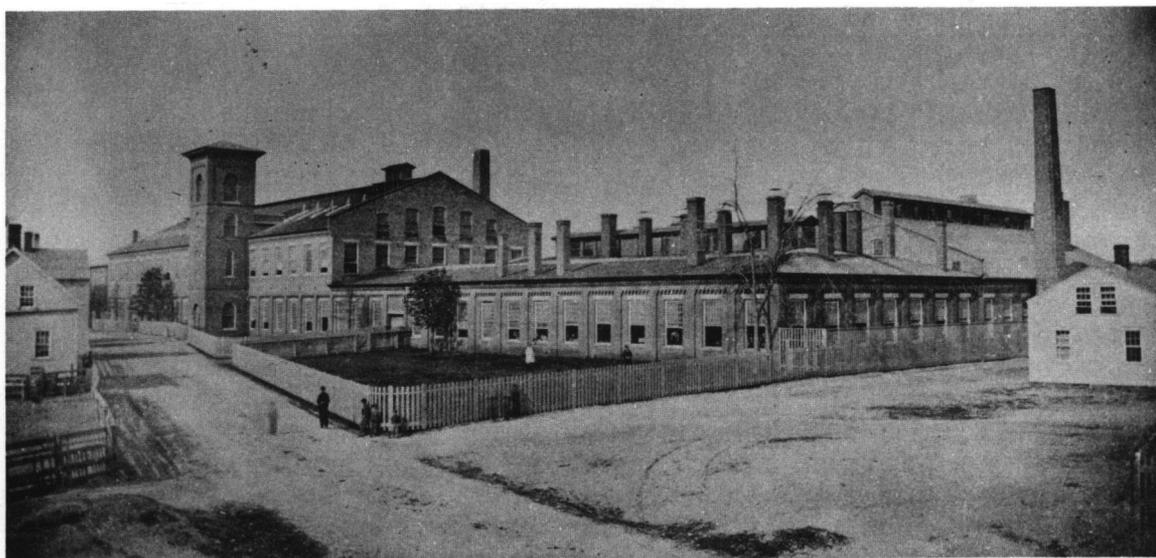
& Sharpe in 1868. In 1883, Providence Tool reorganized and two new firms were created. The Household Sewing Machine Company continued the manufacture of sewing machines on Wickenden Street in a building that has since been destroyed. The Rhode Island Tool Company was formed to operate the 1861 plant for the production of job-order machinery, bolts, nuts, and assorted tools. Rhode Island Tool still owns the building and currently produces drop forgings, upset forgings, and special industrial fasteners.

(Munro; Bayles; Hall; Providence Directory, 1860 and 1861; Graphics Collection, RIHS; L. T. C. Rolt, A Short History of Machine Tools, 1965.)

RHODE ISLAND LOCOMOTIVE WORKS (1880)	Providence
Hemlock and Valley Streets	19.4633402.298025
Providence	Providence

Known as the Burnside Rifle Company in 1862, this nine-acre complex was incorporated as the Rhode Island Locomotive Works in 1865. By 1889, the plant produced four locomotives a week, and had made 2,200 locomotives since its founding. Over 1,000 skilled workmen were employed in the machine and erecting shops, the iron and brass foundries, the blacksmith and hammer shops, the dry house, the pattern and carpenter shops, the engine house, the boiler and tank shops, and the tender shop. They turned out high-quality locomotives for use in the United States and Canada. Today only one of the 19th-century structures remains; an 1880 2-story, brick building, 40' X 68'. It has a hipped roof and corbeled cornice. 20th-century structures dating from 1907 to 1951 complete the site. Last occupied by a rubber company, the complex has been vacant since 1975. No old machinery remains.

(The Industrial Advantages of Providence, Rhode Island, 1899; Munro; Associated Factory Mutual System, Insurance Drawing, "Uniroyal, Inc. Providence", 1 March 1956.)



Providence Tool Company, c. 1870 (RIHS).

1926 G. E. turbine is also in place, though no longer used. Narragansett Electric also operates a generating station at Manchester Street (see separate entry), a c. 1924 substation on Dyer Street, and uses the former Battery Station, located near the Dyer Street substation for storage.

("Narragansett Electric Company History," in manuscript, at the Narragansett Electric Company; Interviews with Louis DeAngelis and George Hayden, Narragansett Electric; Board of Trade Journal, Providence, December, 1913; Factory Mutual Insurance Drawing, 26 December 1929; The Book of Rhode Island, 1930, photo p. 265.)

Transportation

PROVIDENCE & WORCESTER RAILROAD (1847-1848)	Providence
FREIGHT STATION	19.299682.4633520
Canal Street	Providence
Providence	

This railroad freight station is the only remaining structure of the Providence & Worcester Railroad's first major depot, which was one of the earliest large-scale railroad terminal complexes in the country. It was one of two freight stations designed by Thomas A. Telford in 1847-1848. The southerly freight station was demolished in 1973. The remaining building is a long, 1-story, brick structure. The east side has been altered to form a track loading dock with square freight doors. The west side, which has not been altered, contains twenty-three tall arches set at regular intervals to form a blind arcade. Doorways and windows alternate in the arches. The windows are accented with brownstone sills. A wooden loading dock runs along the length of the west wall adjacent to a railroad siding. Originally the ends had large, round-arch, central openings with smaller, round-arch doorways on each side. The large freight car openings have been bricked in, and the interior width of the structure has been reduced by several yards. The interior space is largely open. Tracks no longer run through the building.

(C. Meeks, The Railroad Station: An Architectural History 1956; NR, 1972; HABS, 1973.)

flow of sewage it was necessary to pump the sewage, which was seventeen feet below mean high water, to a height which would force a flow into the receiving basins and precipitation tanks. Today the sewage pumping station remains an active part of the Providence sewage disposal system. The 1½-story, brick building which has a hipped roof and a marble cornice, stands below street level. The roof has copper trim on the ridge and eaves, and the windows are surrounded on all four sides by marble trim. A large arched doorway, also of marble, and a small gable dormer above it adorn the front facade. Several small structures of the same construction are located on the site. The original equipment does not survive, though 19th-century sewer lines continue in use.

(Report of the City Engineer for the Drainage of a Portion of the 8th and 9th Wards, June 1, 1882; R. Grieve, "Modern Providence," New England Magazine, 1896.)

SOUTH STREET GENERATING STATION (1908) Providence
Eddy and South Streets 19.300040.4632120
Providence Providence

The Narragansett Electric Company, incorporated in 1889, built the South Street Station in 1908 to replace an earlier generating station (1888-1891) on the same Providence Harbor site. In 1913, the company built a new brick and steel frame boiler room, 150' X 80', with four stacks, eleven feet in diameter and 217 feet high, connected by steel braces. The boiler room contained sixteen Babcock & Wilcox boilers, Foster super heaters, automatic stokers built by the American Engineering Company of Philadelphia, and Westinghouse pumps and fans. The complex has since expanded and the main brick building now supports seven stacks, six connected by steel braces. The original generating equipment has been removed. In 1930, Narragansett Electric operated with seven steam turbo-generators. Today, the South Street Station contains one topping turbine unit, producing 106 megawatts, installed in 1952. It exhausts into a low-pressure steam turbine built by Westinghouse in 1919. Another 1919 Westinghouse turbine survives, no longer used and stripped of some of its parts. A

Two new plants were built in 1870 and 1877, one at the foot of Globe Street and the other at the foot of Public Street. Shortly after the opening of the Globe Street Station, in 1870, the Pike Street plant closed. The Public Street and Pike Street Stations no longer exist, but the Globe Street Station, which is now rented out as commercial space, remains. It is a 2-story, brick structure with segmental-arch windows. The original mansard roof has been removed. Also on the site is a 2-story, brick structure with large freight doors. No equipment survives, except a hand-operated elevator. A few blocks away on Blackstone Street stands a c. 1910 heater and regulator house. The 1-story, brick building has rectangular windows with granite sills and lintels, and a pitched roof. This building, along with the four c. 1910 1- and 2-story, monitor-roofed structures on Allens Avenue, now the company's headquarters, are scheduled for demolition. The steam engines in these structures have been dismantled. A metal-frame gas holder at the Blackstone Street site was recently demolished, but two large gas holders, of similar type, continue in use at the Allens Avenue site. Two of the company's cylindrical gasholder houses also survive; one is a large, brick-pier structure, c. 1870, at 42 Westfield Street, now minus its original dome and used as an electrical supply store; the other, a small brick structure, c. 1852, is a part of the Atlantic Mill site (see separate entry).

(Hall; G. M. Hopkins, City Atlas of Providence, Rhode Island, 1875; Interview with A. H. Leeming and Manny DiMondo, Deluxe Realty, 20 June 1976; and David Korn, David Korn & Son.)

PROVIDENCE SEWAGE PUMPING STATION	Providence
37 Ernest Street (c. 1896)	19.300758.4629559
Providence	Providence

The construction of this sewage pumping station was the result of the plan developed in 1884 by Samuel Grey, the city engineer, to correct the problem of using rivers as receptacles for raw sewage. The plan allowed for the disposal of sewage by chemical precipitation. The system called for the main sewers to follow the lines of natural drainage along river valleys. Lateral sewers were to flow into these main lines which would then convey crude sewage to Field's Point at the mouth of Providence harbor. To provide sufficient grade to allow for the

Utilities

MANCHESTER STREET GENERATING STATION	Providence
Eddy Street (1903)	19.300200.4631880
Providence	Providence

The Manchester Street Generating Station was built in 1903 by the Rhode Island Company, a firm with interests in trolley lines and gas works as well as electric generation (see entry for United Traction Depot and Repair Shop, Cranston). Two years later, a new 6,000-horse-power vertical steam engine was installed in the company's power house. In 1913, the station contained one 15,000 KW steam turbine-generator unit, one 2,500 KW steam turbine-generating unit, two 2,500 KW engine-driven units, and two 1,500 KW engine-driven units. In the same year, the Rhode Island Company built a turbine and a boiler room, 75' X 145', on the west side and a switch house, 28' X 175', on the north side. The turbine room was built to contain one 15,000 KW turbine unit, a condenser, and a 10,000-gallon-per-minute priming pump. Though none of this equipment survives, the station itself remains largely intact. Bought by the Narragansett Electric Company in 1926, the Manchester Street Station continues in operation with two G.E. 50,000 KW steam turbine units installed in 1940 and 1949, and one Westinghouse steam turbine unit, also 50,000 KW, installed in 1945. One G. E. steam turbine, installed about 1918 and used to generate power for the street railway system, continues to survive though no longer in use. A substantial brick building, the Manchester Street Station is located on the Providence waterfront, just south of the South Street Station (See separate entry).

(see references for South Street Station; Interview with Clarence Atwood, Narragansett Electric; Providence Journal Almanac, 1904 and 1905.)

PROVIDENCE GAS COMPANY (1870)	Providence
Globe Street, Blackstone Street, and Allens Avenue	19.301020.4629860
Providence	Providence

The Providence Gas Company erected a small plant on Pike Street and began producing and distributing coal gas in December, 1848, charging \$4.00 per 1,000 cubic feet.

PROVIDENCE HARBOR (c. 1895-1942)
Providence

Providence
19.301620.4629660
Providence

Improvements to the modern port of Providence began in the 1890s when the city laid out Allens Avenue from downtown Providence to Field's Point. The project involved the filling of several shallow coves and marked the beginnings of a shift of port activity from the old port, close to the city and now substantially altered, to the west side of the Providence River. Between 1911 and 1916, more coves were filled, two piers were built, and about 2 million dollars were spent for improvements. State Pier #1 was built in 1910, 600 feet long, 120 feet wide, with a 2-story structure, 400' X 110', for passengers, baggage, and freight. Both the pier and the shed were rebuilt in 1931 after the original structures were destroyed in a fire. In 1912, the city began work on a 3000-foot wharf. Roy H. Beattie of Fall River was the contractor and the project required extensive dredging and filling. During World War II, when much of the port was taken over for military use, the municipal wharf was extended and additional docks were built. Thirty-two Liberty Ships were built here by the Rheem Shipbuilding Company between 1942 and 1944. Most of the war-era docks have been removed, but the municipal wharf, extended in the 1960s, remains. Though numerous changes have been made since the original construction, the basic configuration of Providence Harbor reflects the work done between 1911 and 1916.

(Providence Department of Public Works, Files; J. Cady, The Civic and Architectural Development of Providence, 1957.)

UNION PASSENGER STATION (1896-1898)
Exchange Terrace
Providence

Providence
19.299561.4632018
Providence

The Union Passenger Station was built between 1896 and 1898 as a replacement for an earlier station designed by Thomas Tefft. The new station comprised five buildings, extending 870 feet end to end; a 3-acre train shed; and extensive viaducts on which the facilities were built. Providence architects Stone, Carpenter, and Willson designed the new structures, which were raised

on pilings sunk in the recently-filled Providence Cove. The Passenger Station was built on an overpass above Francis Street. Its main floor is at the level of the elevated tracks, with access provided by a series of ramps and stairways. Marble colonnades, now gone, connected the Passenger Station to two flanking buildings housing a restaurant, baggage areas, and offices. The structures are of yellow-brick and terra-cotta with Connecticut Valley sand-stone trim. The Passenger Station has a low-hipped roof and its front facade is dominated by a clock tower. The eastern unit, which housed the freight offices, burned in 1941. Other changes include the destruction of the original train shed and the reconstruction of the basement story with a flat roof for a trucking area. The station is currently undergoing renovation and has been entered on the National Register of Historic Places. (J. H. Cady, The Civic and Architectural Development of Providence 1636-1950, 1957; NR, 1975.)

UNION STATION SWITCHING TOWER (1909)	Providence
East of Union Station	19.299700.4633140
Providence	Providence

Providence's Union Station Switching Tower, built in 1909, is a 3-story, concrete structure with steel reinforcement and a Mediterranean-style hipped roof. Shortly after it was placed in operation, the local press claimed that it was the largest electric switching tower in the world. Built at a cost of \$75,000, it originally had a control panel with seventy-six levers wired to small motors placed beside the tracks. The tower controlled 266 track movements from the Smith Street Bridge (see separate entry) to Union Station (separate entry) and including all traffic passing through the East Side Railroad Tunnel (separate entry). It drew power from its own dynamos, as well as from the Bristol-Warren line and Narragansett Electric. The tower replaced the railroad's need for hand-operated switches in the immediate vicinity of Union Station. Hand-operated switches survived at Orms Street and Brayton Avenue until the 1940s, however. The tower, with electrical equipment largely from the 1940s and later, now controls the main Amtrack line from Massachusetts to Cranston.

(Providence Sunday Journal, 18 July 1909; Interview with Bill Coutanche, Tower Operator, July 1977.)

WHAT CHEER GARAGE (1910)
160 Benefit Street
Providence

Providence
19.299920.4633440
Providence

The What Cheer Garage, located in an upper-middle class residential district, was likely the first commercial automobile garage in Providence. It drew its name from part of an Indian phrase of greeting supposedly uttered when Roger Williams first arrived in the colony in 1636. Built in 1910, the original section of this reinforced-concrete garage is three stories high, 110' X 50' and was designed to hold ninety cars. Each floor was supplied with gasoline, oil, and air pumps, as well as car-washing facilities. The basement was designed to garage trucks. In 1923, a reinforced-concrete and brick addition was built on the southwest, and a second addition on the south was likely completed later in the 1920s. These additions replaced the firm's livery stable. The additions included a system of continuous ramps connecting the floors of the garage which replaced the original system of moving cars by elevator. The garage continues in use.

(Board of Trade Journal, Providence, August, 1911; September, 1911.)

Bridges & Viaducts

INDIA POINT RAILROAD BRIDGE (1902)
India Point at the Seekonk River
Providence-East Providence

Providence
19.301600.4631980
Providence

The Boston Bridge Works built this through-truss, swing bridge over the Seekonk River in 1902. Designed by the New York, New Haven & Hartford Railroad, the bridge carried a rail line between Providence and East Providence. Built of steel, and set on a granite pier, the bridge ceased to be used in 1974.

(Providence Journal Almanac, 1904.)

POINT STREET BRIDGE (1927)	Providence
Point Street	19.300320.4632140
Providence	Providence

The Point Street Bridge, an electrically-driven steel-truss swing bridge, is the third span constructed at this site over the Providence River. Built by the Boston Bridge Works with steel rolled at the Phoenix Ironworks, Pottstown, Pennsylvania, this 1,200 ton span, 284 feet long, 60 feet wide, cost more than \$550,000.

(Rhode Islander Magazine, 27 November 1949.)

PROVIDENCE STATION VIADUCT (1909)	Providence
Promenade to Canal Street	19.299910.4633258
Providence	19.299584.4633060
	Providence

The engineering department of the New York, New Haven & Hartford Railroad, under the direction of Chief Engineer Edward Gagel, built the Providence Station Viaduct in 1909 to connect the Central Passenger Station and Canal Street. The viaduct joined with the old viaduct which carried the Boston tracks. Designed to carry five to seven tracks, the structure is approximately 1,200 feet long, and from 50 to 75 feet wide, rising about 20 feet above street level. It has a solid steel and concrete floor with long transverse and oblique plate girders up to 100 feet long, supported on vertical steel columns from 10 feet to 30 feet apart in straight and curved rows. The steel work was designed according to 1901 railroad specifications with maximum unit stresses of 12,000 pounds tension and 10,000 pounds compression. The light overhead steel framework that supported the electrical wires no longer exists. Because of its oblique route and numerous changes in elevation, the viaduct is unusually irregular with few duplicate pieces. It continues in use. (Engineering Record, Vol. 59, No. 14, "Different Erection of the Providence Viaduct."; Engineering Record, Vol. 62, No. 17, "The Providence Viaduct.")

RED BRIDGE (1895)	Providence
Waterman Street at the Seekonk River	19.300280.4633060
Providence-East Providence	Providence

The Red Bridge, a metal-truss, swing bridge officially known as the Central Bridge, is the fourth bridge to cross the Seekonk River at this point. Designed primarily for the use of Union Railroad trolley cars connecting Providence to East Providence, it was opened 12 December 1895, 103 years after the completion of the first bridge located on or near the site. The abutments of an 1872 bridge were lengthened and raised two and one-half feet, granite piers were constructed on pile foundations, and a steel superstructure was erected with a trussed swing section operated by two electric motors of about eight horsepower each. The roadway is thirty feet wide with sidewalks six feet wide. The two fixed deck spans (Warren trusses with verticals) on either side are 88 feet 3 inches long, and the central swing span is 210 feet long. The operating machinery includes a heavy cast-steel segmental gear (cast with and forming a part of the track on which the bearing rolls travel) anchored to the pier masonry; two bronze pinion gears, one hand-operated and the other power-driven, meshing into the large segmental gear; a spur gear attached to the upper end of the shaft of the hand-operated pinion; and gearing and shafting to connect the power-driven pinion gear to the motors. Between the motors and the pinion gear is a friction clutch which acts as a break. Much of the electrical equipment, gearing and shafting remains in place. Scheduled for demolition, the Red Bridge no longer carries traffic.

("Specifications, 9 November 1894," City Engineer's Office, Bridge Department; Providence Sunday Journal, 21 September 1975.)

SCHERZER ROLLING LIFT BRIDGE (1907)	Providence
Crook Point at the Seekonk River	19.300140.4632820
Providence-East Providence	Providence

The Phoenix Bridge Company, of Phoenixville, Pennsylvania, built this single leaf, bascule railroad bridge over the Seekonk River in 1907. Approached by deck plate-girder spans resting on cut-stone piers, the lift portion

spans 200 feet. The bridge was designed by the Scherzer Rolling Lift Bridge Company of Chicago and carried the tracks of the Providence, Warren & Bristol line. Rolling lift bridges of this type were first developed in Chicago in the early 1890s. The bridge, the only one of its type in the state, is still in use.

("Plans of Operating Machinery," New York, New Haven & Hartford Railroad, 21 November 1907, located in bridge control house; D. Plowden, Bridges, The Spans of North America, 1974.)

SMITHFIELD AVENUE BRIDGE (c. 1900)	Providence
Smithfield Avenue between Route 95	19.299860.4636420
and Spring Street	Providence
Providence	

The Smithfield Avenue Bridge was originally owned by the Hartford Division of the New York, New Haven & Hartford Railroad and was located over the Connecticut River. When it was moved to Providence in 1916, the railroad shortened the bridge by the removal of two panels from each truss. Built by the Boston Bridge Works, the bridge is approximately 745 feet long and consists of seven through Pratt truss spans. It contains both plate and lattice girders and weighs seventeen tons. The bridge carries a roadway over the main line of the former New York, New Haven & Hartford. It is scheduled for replacement.

(Drawings, "Cemetery Street Viaduct," 18 October 1917, revised 27 June 1918.)

SMITH STREET BRIDGE (1890-1891)	Providence
Smith Street near Canal Street	19.299632.4633644
Providence	Providence

This through Pratt truss bridge carries a roadway over railroad tracks once owned by the New York, New Haven & Hartford Railroad. Construction began 15 April 1890 and was completed 15 June 1891. The Boston Bridge Works provided the steel work. The bridge is approximately 95 feet long, 46 feet wide, with two 15-foot-long sidewalks, and 16 feet, 8 inches high. Built at a cost of \$54,000, it was part of the extensive terminal improvements undertaken by the New York, New Haven, & Hartford in the early 1890s. Like most of the turn-

of-the-century truss bridges in the greater Providence area, it is scheduled for replacement.

(George B. Francis, "Railroad Terminal Improvements at Providence, Rhode Island," Journal of the Association of Engineering Societies, XLII/5, May, 1909.)

UNION STATION RAILROAD BRIDGE	Providence
Promenade Street (1892-1893)	19.299520.4633120
at the Woonasquatucket River	Providence
Providence	

This 100-foot, deck-truss railroad bridge was built in 1892-1893 for the New York, New Haven, & Hartford Railroad. It was designed to carry twelve tracks at an angle over the Woonasquatucket River immediately north-east of Union Station. It consists of twenty-seven parallel trusses, each a modified Warren with verticals. The connections are pinned and the main supporting members consist of eyebars and riveted lattice girders. The lower chord of each truss contains five pairs of eyebars pinned together. Most of the trusses were built square across the river, though the end truss on the south side is skewed to follow the line of the bridge. The deck consists of a solid flooring of six-inch hard pine. The bridge covers an area of 47,000 square feet and weighs 1,500 tons. It was built in connection with the new Union Station and its network of box-girder bridges (completed at the same time) over Promenade, Gaspee and Francis Streets. All this new construction was necessary because of the filling in of Providence Cove in 1892, the relocation of the passenger station, and the consequent re-routing of the Woonasquatucket and Moshassuck Rivers. The bridge, unique in Rhode Island, is historically important because of its large number of parallel trusses. The bridge is in poor repair, some of the pins are frozen, some of the lattice work is thoroughly rusted away, and in places rust has resulted in a loss of section. There are plans to dismantle it and replace it with a new bridge.

(George B. Francis, "Railroad Terminal Improvements at Providence, Rhode Island," Journal of the Association of Engineering Societies," XLII/5, May 1909;

Interviews with John Varo, State Department of Transportation and Jack Bell, N. E. Corridor, Amtrak, 15 December 1976; J. H. Cady, The Civic and Architectural Development of Providence, 1636-1950, 1957.)

WASHINGTON BRIDGE (1930-1971)	Providence
Route 195	19.301690.4632200
Providence	Providence

The Washington Bridge, built in 1930 and located on a 1793 bridge site, is a reinforced-concrete, deck-arch bridge, 1864 feet long and 85 feet wide. It consists of twelve granite-faced spans and a steel girder central span added in 1971. The latter replaced a double-leaf draw span, 124 feet long. The Phoenix Bridge Company provided the steel superstructure for the draw span which was electrically powered with a steam power system in reserve. The granite-faced operator's house on the southeast side of the bridge is still in place. Merritt-Chapman & Scott supervised construction, and the Clarence Hudson engineering firm designed the bridge. In 1971, a "twin" bridge was erected next to the Washington Bridge on its north side. The new bridge carries westbound traffic on Interstate 195, while the Washington Bridge now carries only eastbound traffic.

(Rhode Island Department of Transportation, Bridge Design Section Files : Bridge #200.)

Specialized Structures

EARLE WAREHOUSE	Providence
(early to mid-19th century)	19.300423.4632586
369 South Main Street	Providence
Providence	

Built between 1815 and 1857, the Earle Warehouse (commonly and erroneously known as the "Slave Pen" or the Christopher Sheldon Warehouse) is a small 3½-story structure of uncoursed stone construction with a slated, gable roof. Freight doors remain on its south elevation, and an intact windlass is housed in the attic. The interior's original plaster finish has been removed, and

the heavy-timber framing has been sand-blasted clean. The South Main Street facade was rebuilt in brick between 1889 and 1893 and its first story contains two simple cast-iron store fronts. The warehouse is now being renovated for use as a restaurant and office. Until recently, it was assumed that the building was built in 1784 because that date is inscribed on a broken date stone incorporated into the west facade. Tax records, however, indicate that the current building was not erected until after 1815. (HABS, Rhode Island-218; Federal Direct Tax, Providence, 1798 and 1814; H. F. Walling, Map of Providence, 1857; Everts & Richards, Atlas of the City of Providence, 1889 updated to 1893; Interview with James Reynolds of The Plantations, June, 1976.)

EAST SIDE RAILROAD TUNNEL (1908)	Providence
Benefit Street to Seekonk River	19.300000.4633115
Providence	19.301470.4632980
	Providence

In 1903, the New York, New Haven, & Hartford Railroad adopted a railroad tunnel plan, under consideration for thirty years, in which all traffic from Fall River and the eastern shore of Narragansett Bay would be brought directly to Union Station, in the center of Providence, without a time-consuming transfer at Fox Point. After removing several buildings, excavation began simultaneously at both portals. Drilling and blasting were done in ten hour shifts, with eighteen men to a shift. They averaged 160 feet per month, digging out a tunnel ten feet wide. The tunnel alignment is tangential except for a short section at the west portal where the axis of the tunnel is on an eight-degree curve. Thin seams of graphite necessitated heavy timbering which was removed after the two-foot-thick concrete roof was in place. East of Benefit Street, these graphite seams demanded unique construction techniques involving building from the top down. The Union Station Viaduct (see separate entry), passing over two rivers and three streets, meets the west portal, while a Scherzer Rolling Lift Bridge (see separate entry), crossing the Seekonk River, adjoins the entrance to the east portal. The tunnel was completed 26 October 1908 and the Fox Point Terminal was subsequently closed. The tunnel

continues in use.

(Edwin P. Dawley, "The East Side Tunnel and Its Approaches, Providence, Rhode Island," Journal of the Association of Engineering Societies, July, 1907.)

EAST SIDE TROLLEY TUNNEL (1914)	Providence
South Main Street to Thayer Street	19.299910.4633181
Providence	Providence

The East Side Trolley Tunnel was built to facilitate transportation between the East Side, a hilltop residential area, and the business center of Providence. Working under a large brick structure and under heavy residences in soft ground created a difficult engineering problem for the Rhode Island Company engineer in charge of design and construction. The methods of timbering, concreting and excavation that Heaton P. Robertson employed were similar to European methods and according to the Engineering News, made a "notable addition to American practice." The tunnel is twenty-five feet wide and seventeen and one-half feet high. Two lines of concrete-covered, four-way conduit are located behind each sidewall of the tunnel. Construction was broken down into several sections: the 95 feet of special construction under the Rhode Island School of Design, the 112 feet of soft ground under two heavy houses, the 1585 feet of tunnel tangent, and the grading and concrete at the approaches. The west portal is a brick double arch, the east portal is a concrete single arch. The final cost was estimated at \$700,000. The tunnel is still used by buses of the Rhode Island Public Transit Authority.

(Heaton R. Robertson, "East Side Tunnel of the Rhode Island Company, Providence," Engineering News, Volume 17, Number 15, April 19, 1914.)

FALL RIVER IRON WORKS WAREHOUSE	Providence
231 South Main Street (c. 1850)	19.300397.4632718
Providence	Providence

Though this 3½-story, brick Greek Revival building, with a pitched roof, corbeled cornice and granite store front, dates from the middle of the 19th century, no reference

to its function can be found until 1870 when the Fall River Iron Works used it, probably as a warehouse. In 1881, the Fall River and Providence Steamboat Company occupied the building; and the Rumford Chemical Works (see separate entry) took it over in 1885. It was later the Philips Lead Company building, a plumbing supply house. It was renovated for the Rhode Island School of Design Department of Architecture in 1976-1977. (Providence Preservation Society Files, South Main Street Collection: G. M. Hopkins, City Atlas of Providence Rhode Island 1875; Interview with James Reynolds, President, The Plantations Company, 20 June 1976.)

FOX POINT HURRICANE BARRIER (1966)	Providence
Fox Point	19.300400.4631840
Providence	Providence

The Fox Point Hurricane Barrier, built by the United States Army Corps of Engineers and dedicated 19 March 1966, was the first barrier of its kind built in the United States. It is 3,000 feet long and consists of rock and earth dikes, 12 feet high on average; concrete walls; gates for sewerage, river traffic, and cooling water (the latter used by the nearby Narragansett Electric Company Plant); and a pumping station. The barrier, designed against disasters like the 1938 hurricane, is capable of protecting 280 acres of Providence from tidal flooding. The barrier itself functions as a dam to retard tides, while the pumping station removes water from behind the barrier. The station's five electric pumps are each 20 feet in diameter, 54.7 feet high, and are capable of discharging 7,000 cubic feet of water per second. The pumps have operated approximately twelve times a year since 1966. Despite its recent date, it is a large and unique site of significant engineering importance.

(Mark Rosati, "Fox Point Hurricane Protection Barrier," unpub. paper, Brown University, 1976.)

LADD OBSERVATORY (1891)
Observatory Avenue
Providence

Providence
19.300760.4634460
Providence

Brown University built the Ladd Observatory in 1891 and named it after its donor, Rhode Island Governor Herbert Ladd. Located at the highest point in Providence, approximately 200 feet above sea level, the observatory is a small brick building with sandstone trim and a wood-frame wing on the east side. The steel-framed and copper-covered dome rotates on a manually-operated circumferential rack. Within the dome is a twelve-inch refractor telescope with a barrel fifteen feet long. John Alfred Brasher of Pittsburgh built the telescope and G. N. Saegmuller of Washington, D. C., built the telescope's equatorial mounting. The observatory, under the direction of the late Charles H. Smiley from 1938 to 1969, gained prominence as a teaching and research center. Still used by the Brown University Physics Department, the Ladd Observatory also contains a collection of 19th-century clocks, chronometers, quadrants, sextants, and transit telescopes. It is open to the public on a regular basis.

(Providence Journal, obituary of Charles H. Smiley, 27 July 1977; Providence Journal, 4 December 1975; Interviews with Jack Breetvelt and Hendrick Gerritsen, Brown University Physics Department and with Roger Menard, Ladd Observatory.)

MERCHANTS' COLD STORAGE WAREHOUSE (1893) Providence
160 Kinsley Avenue Providence 19.298590.4633260
Providence Providence

The Merchants' Cold Storage and Warehouse Company built this large, and architecturally impressive, warehouse in 1893, and continues to operate it. The warehouse is brick with recessed Gothic arches, corbeled belt courses, and drip mouldings. Opened for business in June 1894, the building originally contained 300,000 cubic feet of refrigerated space carried on substantial wood beams and posts, a framing system which remains intact. Located in the middle of Providence's produce district, the warehouse was primarily used for the storage of eggs, butter, cheese, apples, and assorted dry fruits. With

its storage space increased to 3,000,000 cubic feet by 1910, Merchants' was the largest cold storage plant in New England outside of Boston. Refrigeration was maintained through a system of brine circulation involving the use of three brine tanks; three ice machines, or compressors, driven by steam engines; an extensive network of circulating pipes; and an assortment of pumps, boilers, and auxiliary equipment. Two of the three Linde Ice Machines (patent dates, 1880 and 1884), built by the Fred W. Wolf Company of Chicago, are still in place though no longer used. The Number 2 machine, 15" X 25" with 75-tons capacity, was driven by a Harris-Corliss high-pressure steam engine, 18" X 42". This steam engine-compressor set, which remains in place, was installed in 1893. In 1910, a larger set was installed and that too survives. The ice machine is 16" X 30" with a 100-ton capacity and the Harris-Corliss is 32" X 42" with a 14-foot flywheel. The two steam engine-compressor sets, recently painted and with their brass fittings polished, are exceptionally well-preserved. Brine circulation is still employed, though the system now uses York automatic compressors, installed in the late-1950s, with a 500-horsepower Carrier centrifugal compressor, c.1946, in stand-by. The original hydraulic elevators continue in limited use. After World War II, the company converted its cooling units to freezers to meet the growing market for frozen foods. With modernized hatcheries eliminating the seasonal nature of the egg business, Merchants' no longer stores shell eggs. The warehouse, with its own active rail spur, currently stores meat, poultry, and cranberries. Merchants' is an excellent surviving example of 19th-century cold storage technology. (Board of Trade Journal, Providence, September 1910, illustrations; Interview with Carl Johnson, manager, August, 1977; Jenks and Ballou, "List of Apparatus and Notes on Design, Operation and Management of the Power Plant of the Merchants' Cold Storage and Warehouse Company," February, 1953.)

SEACONNET COMPANY COAL UNLOADING TOWERS	Providence
Allens Avenue near Blackstone Street	19.300360.4631280
(c. 1912)	Providence
Providence Harbor, Providence	

These three wood-frame coal-unloading towers sit on a trestle-work pier which extends approximately 400 feet into Providence Harbor. The Seaconnet Coal Company, a Sprague Company holding, had a pier and unloading facility here before 1908. The present structure was built about 1912. Each of the three booms operated with a 2-ton "clam shell" bucket and was capable of unloading 200 tons of coal per hour. Two Mead-Morrison direct-drive steam engines, still in place, provided power. The larger engine ran the hoist, the smaller powered the trolley which ran beneath the booms. The Sprague Company still owns the pier and towers, but has not operated the towers since 1974. A single wood unloading tower, built close to shore, survives just south of the Sprague property, adjacent to O'Connell Street. Once owned by the Hardwell Coal Company, it has been idle since the early 1960s. Its single Mead-Morrison steam engine is still in place, but is missing many of its fittings. The towers are scheduled for demolition. (Interview with Fred Day, Supt. of Yard, C. H. Sprague & Son, January 1977; L. J. Richards & Company, Atlas of the City of Providence, Rhode Island, 1908.)

Building Technology

DORAN-SPEIDEL BUILDING (1912)	Providence
70 Ship Street	19.299830.463150
Providence	Providence

The James C. Doran Company, manufacturing jewelers, built this reinforced concrete factory in 1912 near their first factory, built in 1907 (see Providence Jewelry District). A comparison of the two buildings illustrates important changes in early-20th century building technology. The 1907 structure has brick load-bearing walls and interior wood-framing. The 1912 factory is concrete and features the mushroom column and flat-slab technique of C.A.P. Turner (see A. T. Wall Building).

The latter is 170' X 60' with a 60' X 40' ell on Elbow Street and a 1964 addition, of slightly larger size, on Bassett Street. Monks & Johnson of Boston designed the 1912 building, and the Turner Construction Company of New York built it. The exterior is a pier and spandrel grid with large rectangular window openings. The interior columns, similar to those of A.T. Wall, are octagonal and contain two six-inch diameter utility holes in each column capital for pipes and wires. When built, the largely fireproof Doran-Speidel building incorporated the latest changes in building technology. It is now used by Spiedel, a watch-band manufacturer and subsidiary of Textron.

(C. Condit, American Building Art, 1961: Board of Trade Journal, Providence, June 1912, February 1913; Sanborn Insurance Atlas, 1921; Interview with Bernie Rogan, Director of Public Relations; Speidel Maintenance Department Blueprint Files.)

EQUITABLE BUILDING (1872)	Providence
Weybosset and Custom House Streets	19.299860.4632840
Providence	Providence

The Equitable Building, built in 1872 by the Equitable Insurance Company and attributed to the prominent local architect, William R. Walker, is one of the finest cast-iron-front buildings constructed in Providence. Four and one-half stories high, the basement and first story feature the use of large plate glass windows set between engaged columns with foliated capitals, while the upper stories have smaller windows and columns. The Builders Iron Foundry of Providence cast the ornate iron facade. Brick bearing walls carry the building's other sides and the flooring is supported by wood beams and cast-iron posts. A basement bar contains a single cast-iron post with a modestly detailed capital. Now painted in grey, tan, and red hues, the Equitable Building is an attractive example of cast-iron-front building technology. As part of the Custom House Historic District, the building is on the National Register of Historic Places.

(NR, 1975)

STATE HOUSE (1895-1904)
90 Smith Street
Providence

Providence
19.299421.463343
Providence

Construction of Rhode Island's Capitol began in 1895, following the designs of McKim, Mead, & White. Though the structure was occupied in 1900, final details and landscaping were not completed until 1904. The State House, 333' X 180', is of brick and iron-beam construction, faced with white Georgia marble. Off the east and west sides of the main section of the building are wings, both the same height as the central structure. The main area carries a dome on a colonnaded drum, which is flanked by four smaller cupolas carried on open colonnades. The dome rises 235 feet above foundation level and is of self-supporting "dynamic voussoir" marble construction. It is said to be the second largest structure of its kind in the world; St. Peter's in Rome is the only larger marble dome.

(Rhode Island Development Council, A Background History of Rhode Island's State Capitol.)

A. T. WALL BUILDING (1910)
162 Clifford Street
Providence

Providence
19.299610.4632100
Providence

This 4-story building in the Providence Jewelry district (see separate entry) is the earliest known Rhode Island example of reinforced-concrete construction using the mushroom column and flat-slab technique developed by the engineer, C. A. P. Turner, in 1905-1906 and patented by him in 1908. Built by the Thomas F. Cullinan Company of Providence and designed by the Bowerman firm of Boston, the building is approximately 134' X 120' with a 1-story annealing house, 50' X 40', and a boiler house 50' X 29'. The thirty-inch octagonal columns were designed with utility holes in the capitals to accommodate pipes and wires running floor to floor. The exterior walls are concrete, with pier and spandrel detail, and large glass curtain walls. Reinforcing rods extend from both the roof and the north elevation to facilitate building enlargement. Built for the jewelry firm of A. T. Wall, the structure housed four separate

manufacturing jewelry companies in 1911, one of which, Clark & Combs, continues to occupy the building. (C. Condit, American Building Art, 1961; Board of Trade Journal, Providence, February, 1910, October, 1911; Providence City Directory, 1909-1913; Sanborn Insurance Atlas, 1899, corrected to 1918; and 1921, corrected to 1924.)

Richmond

Bulk Products

CAROLINA MILLS (1841)	Carolina
Carolina Village	19.277400.4592950
Richmond	Washington

Rowland Hazard built a cotton textile mill on this Pawcatuck River site in 1841. The mill became a part of the Peacedale Manufacturing Company in 1863 (see separate entry), and in 1872 was deeded to the Carolina Mills Company and converted to woolen production. Despite the change of names, textiles were manufactured here under the auspices of the Hazard family until 1930. Today, the mill buildings are vacant, fire-damaged, and severely deteriorated, but important machinery and much of the water power system continue to survive. A collapsed machine shop, located near the highway, contains what may be the earliest known example of a Daniel's planer, now turned on its side and exposed to the elements. A 20th-century wood structure, with large continuous windows, still contains small jack spoolers built by the Cleveland Machine Works in 1888. The site also contains dye vats, finishing machinery, assorted other textile machinery and machine tools, and two vertical turbines; one, a mixed-flow design with a cylinder gate, perhaps built by Rodney-Hunt; the other a Leffel with wicket gates. Located over the surviving headrace is a stone mill which is likely the original. It appears to have been powered by a breast wheel and the large tailrace opening, a three-centered stone arch, is still intact. An archeological investigation might well reveal the 1840s wheel pit, and yield valuable information about 19th-century water power. The dam, headgates, and waste way continue to survive, as does the well-preserved mill village of Carolina, a district entered on the National Register of Historic Places. (Sande; J. Irish, Historical Sketch of the Town of Richmond, 1877; NR, 1974; Interview with Paul M. Broomfield, owner, January, 1976.)

KENYON MILLS (1844)	Carolina
Kenyon Village	19.280541.4591363
Richmond	Washington

In 1844, Abiel Kenyon built a stone mill here for the manufacture of woolen and cotton goods. This 2-story, stuccoed-stone building, 133' X 24', has a low-pitched roof and a 1-story stuccoed-stone extension. Elijah

Kenyon bought this mill in 1862 and erected a quarry-faced stone store, which is now attached to an 1889, frame, hipped-roof structure, 48' X 80'. A second stuccoed-stone mill was constructed in 1866. This 2-story structure has a pitched roof with a clerestory monitor. Its large, 4-story, square, central tower has quoined corners and a mansard roof, which is not original. By 1876, the mills operated by steam power and housed four sets of woolen cards, forty-eight looms, and had a 1,000-spindle capacity. In 1893, a 2-story, stuccoed-stone mill located behind the other mills was completed. It has a low pitched roof, segmental-arch windows and a square central tower with quoined corners and round-arch windows. The complex is now used as a textile dye works.

(Associated Factory Mutual System Insurance Drawing, 16 December 1970; New England Underwriters Insurance Drawing, 31 March 1938; R. Irish, Historical Sketch of the Town of Richmond, 1877; Sande; Interview with Brian Curtis, 13 December 1975.)

SHANNOCK MILL (1848)
Shannock Village
Richmond

Carolina
19.279700.4591580
Washington

The Shannock Mill, built on a Pawcatuck River privilege occupied earlier by a sawmill and grist mill is a 1-to 2-story stone structure with a brick extension on the west. The 2-story section, built in 1848 by Simeon P. and Charles Clark, now has a bracketed gable roof of slight pitch and an open central cupola with a hipped roof (both recent reconstructions.) The 1-story stone and brick sections, added later, have larger windows and a saw-tooth roof. A horseshoe-shaped dam, with intact head gates, waste gate, and raceway, is located just upstream. The raceway flows between a shingled house and shed, both with 1707 plaques. The mill, last occupied by Columbia Narrow Fabric, closed in 1969. The interior, partly fire damaged, is vacant but for dismantled sections of line shafting and assorted mill supplies. The current owner intends to renovate the mill for apartments, a restaurant, and stores, and may reactivate the water-power system, using the mill's surviving turbine. The surrounding village of Shannock consists of a striking set of early 19-century mill houses, painted white with black trim.

(Sande; Chase; Cole; Interview with Robert F. Bennett, Shannock, August, 1977.)

Scituate

Bulk Products

HOPE MILLS (1807)
Main Street
Scituate

Crompton
19.286880.4622700
Providence

The village of Hope was originally the site of the Hope Furnace (1765). The furnace, owned by the Browns of Providence, cast cannon and manufactured bar iron and nails, both before and during the Revolution. The furnace was located on a steep bank above the current gate house, dam, and raceway. Nothing of significance survives above ground but the site has potential archaeological significance. Cotton manufacturing evidently began here as early as 1806-1807. A 2-story wood-frame building, 44' X 22', with a pitched roof and clerestory monitor, built in 1807, stands adjacent to Main Street. Another mill was built in 1825 by Ephraim Talbut. Sometime after that, the property was bought by the Providence merchants, Brown & Ives, and the Hope Company was formed. The 1825 mill burned in 1844, and a new stone mill was built in the same year. David Whitman was the mill engineer, and Thomas Sharpe supervised construction. The mill continues to stand, four stories high, 183' X 55'. The Number 2 mill, 151' X 95', was added to the north side in 1871. Its basement contains a set of horizontal turbines with Lombard governors, c. 1902. Later additions to the east were built in 1871, 1916, 1960, and 1972. The saw-tooth-roofed weave shed on the south was built in 1916 and currently houses lace looms. They were idle in December, 1975, but plans exist to operate them again. North of the mill stand two rows of mansard-roofed worker houses built in 1872. The dam, gatehouse, gates, and raceway survive in good condition. Tenants now occupy the complex. A recent fire has damaged the 1844 mill.
(Bayles; Sande; Associated Factory Mutual System Insurance Drawing, c. 1973; Interview with Jesse Motta, December, 1975, Maintenance Supervisor.)

JACKSON MILLS (c. 1825)
Jackson Flat Road
Scituate

Crompton
19.287580.4623200
Providence

The Jackson Mills on the north branch of the Pawtuxet River were built c. 1825 by Governor Charles Jackson. By the late 1880s, the mill was owned by Christopher Lippitt & Company and produced sheeting. Fifty workers were employed and 120 broad looms were in operation. By 1901, the mill was owned by B. B. & R. Knight and stood three to four stories high. The Knights went out of business c. 1928-1929. In 1932, the site was bought by the father of the current owners who operate a linen-supply business. Today, only a one-story, stone outbuilding and some smaller structures survive. However, the 15-foot dam, gates, and raceway are still in place, and two vertical turbines survive. (Cole, illus., p. 41; Interview with James Falvey, owner, May 1976.)

Utilities

SCITUATE RESERVOIR DAM (1920-1926)
AND HYDRO STATION
Scituate Reservoir
Scituate

North Scituate
19.285060.4625400
Providence

Located at the north branch of the Pawtuxet River, the Scituate Reservoir supplies drinking water to metropolitan Providence. Built by the Providence Water Supply Board between 1920 and 1926, the reservoir has a water surface area of 5.3 square miles. Beneath its waters lie the remains of a number of Scituate's 19th-century textile mills. The major dam, located along Route 12 and named for former Providence mayor, Joseph H. Gainor, is 3,200 feet long and 640 feet wide at its base. The dam was constructed of earth-fill, rip-rapped on the upstream side and covered with loam and grass downstream. It is supplemented by a 4,000 foot dike, an average of fifteen feet high, on its east side, and a masonry spillway on its west. A horseshoe-shaped regulating dam is located at the upper end of the reservoir close to the Danielson Pike. Water is carried by gravity-feed from the reservoir to the revamped Purification Plant in twin 60-inch conduits which converge into a single

94-inch conduit. The Purification Plant is powered by the reservoir's hydro-electric station which uses a vertical S. P. Morgan turbine. The turbine, with a 100-foot shaft and an eleven-ton flywheel, operates with 80 feet of head and generates 2,400 horsepower at 300 rpm. It is connected to a Westinghouse generator (1875 KVA, 2300 Volts.) The system generally operates only four hours per day, and excess power is transmitted and sold to the Narragansett Electric Company via two transformer banks. From the Purification Plant, water is conveyed by gravity-feed to two distribution centers, one built in 1968-1970.

(Board of Trade Journal, Providence, August, 1925;
Interview with Edward Bondarevskis, Principal Engineer,
August, 1977.

Smithfield

Bulk Products

ESMOND MILLS (1906)
340 Waterman Avenue
Smithfield

Providence
19.293600.4638620
Providence

This 3-story, brick-pier mill with segmental double windows and bracketed eaves was built in 1906. The handsome and unusually narrow tower has a flat, bracketed roof. Clarence Whitman, the mill's owner, bought the entire surrounding village of Enfield and later changed its name to Esmond. The mill manufactured European-style Jacquard blankets and established a reputation as a technologically-advanced fine goods producer. New construction continued into the 1920s as the company took advantage of improvements in conveyor handling. By the late 1920s, the mill's primary products were blankets of fine camel's hair, pure wool, cotton, and wool and cotton mixtures. The buildings are now used as warehouses. The weave shed still contains about 300 early 20th-century Jacquard looms, most built by Crompton & Knowles of Worcester, Massachusetts, as well as Jacquard card-punching machinery.

(The Book of Rhode Island, 1930, photo p. 218; Chase.)

GEORGIAVILLE MILLS (1853)
15 Higgins Street
Smithfield

Georgiaville
19.292000.4640120
Providence

The first mill on this site was built in 1813. It was three stories, 80' X 36', stuccoed-stone with a trap-door monitor and an open belfry. The mill was dismantled in 1951. In 1828 and again in 1846, additions of similar size were built. They survive, though greatly altered, on the north side of the main building. The main mill was built in 1853 by the noted inventor-entrepreneur, Zachariah Allen. It is four stories, the first three of stuccoed-stone, the fourth (added later) of brick, with small, centrally-located, pedimented gables on the south east, and west. Two 3-story boarding houses of stone rubble (1853-1855), built in the same style, also survive, as do numerous examples of worker housing, some c. 1813. In 1854, Allen experimented with hollow shafting, running at three times the rpm of solid shafting, and drove machinery by placing belts directly on the shaft, dispensing with the use of pulleys. Although the experiment attracted international attention,

the system never became widespread. The buildings are still used for manufacture, but no historic equipment survives.

(Zachariah Allen, Diary, 1853, Library of the Rhode Island Historical Society; H. R. Hitchcock, Rhode Island Architecture, 1939, photo, 1813 mill, plate 31, photo, 1853 mill, plate 37; Steere; Interview with Robert Kalberer, part-owner, Industrial Machine Corp.)

POOKE AND STEERE MILLS/(1846)	Georgiaville
WINSOR MILL	19.286800.4639340
715 Putnam Pike (Route 44)	Providence
Smithfield	

This 3-story, stuccoed-stone mill with a trap-door monitor roof and a 4-story, flat-roofed central tower was built in 1846. In the previous year, a combination grist mill and sawmill on the site was converted to textile production, but it no longer survives. By 1855, the mill was owned by W. Pooke (also spelled Pook) and A. Steere who operated a woolen mill into the 1870s. In 1888, the property passed to J. P. & E. K. Ray of Woonsocket. They produced plain cotton goods and employed fifty workers. The structure was then known as the Winsor Mill. There are now numerous late 19th- and 20th-century additions. The building is now used for making furniture.

(Sande; Bayles; Beers; Everts and Richards.)

Bridges

ESMOND STREET BRIDGE (1888)	Georgiaville
Esmond Street at the	19.292360.4639060
Woonasquatucket River	Providence
Smithfield	

The Berlin Iron Bridge Company, East Berlin, Connecticut built this modified Pratt, pin-connected, pony truss in 1888, ten years after the company applied for a patent on the bridge type. The bridge consists of three panels per side, with inclined top chords and vertical end posts at each end. It carries a roadway over the Woonasquatucket River in the village of Esmond. Scheduled

for demolition, the Esmond Street Bridge is an excellent example of the small, metal-truss highway spans so extensively used in the late 19th century.

Specialized Structures

ALLENVILLE MILL STOREHOUSE (1813)
5 Esmond Street
Smithfield

Georgiaville
19.292340.4639060
Providence

This 2-story, stone-rubble structure, 30' X 30', with a pitched roof and attic, was built in 1813 as the Allenville Mill storehouse. Only slight changes have been made since then. The cotton mills here were originally owned by Phillip Allen (Rhode Island Governor, 1851-1853), who sold them in 1857 to Earl Mason, Henry Lippitt and others. In 1867, the Smithfield Manufacturing Company was formed. Ownership changed again in 1879 (Enfield Mills), and also in 1906 (Esmond Mills). By 1937, the storehouse was being used as a post office. The building is now vacant. It remains as the earliest-known example of a cotton mill storage building. It was long considered to be the original Allenville Cotton Mill until National Register research was completed in 1972.

(Bayles; Beers; Everts and Richards; NR, 1972.)

South Kingstown

Bulk Products

GLEN ROCK MILL (mid 19th century)	Slocum
Glen Rock Road & James Trail	19.282480.4599140
South Kingstown	Washington

The mill site at Glen Rock, in the northwest corner of South Kingstown, has seen a number of uses since the Barker family built a sawmill here, sometime in the mid-18th century. The Barkers added a grist mill later, but both the mills were destroyed in 1815. Some time shortly after 1815, Daniel Rodman built a combination sawmill and grist mill and a woolen mill here and, in the same period, Gardner Smith built a carding mill above Rodman's mills. Today only one mill survives. It is a small structure built of quarried stone with a recently-altered roof. The present owner believes, on the basis of title research, that it was built in 1752, but it was more likely built after 1840. A small, stone addition on the front clearly exhibits the markings of a steam quarrying drill and was probably built after 1850. The basement of the mill contains a 20-horsepower, 12-ton, metal overshot water wheel installed, according to the owner, in 1882 when the building saw use as a shingle mill. It is eighteen feet in diameter, five feet wide, and has a perimeter gear which connects to a 14-inch spur gear. The belts and pulleys remain, and once drove a set of grist stones which survive in the upper story. The wheel is now displayed behind a glass enclosure and will not be reactivated, through the headrace still survives. The mill is now used for the production and sale of handcrafted stoneware.

(Cole; Interview with Oliver Greene, owner, 7 April 1976.)

KENYON GRIST MILL (1886)	Slocum
Glen Rock Road	19.282240.4697740
Village of Usquepaugh	Washington
South Kingstown	

The village of Usquepaugh, on the Queen's River, overlaps the Richmond-South Kingstown line. There was a grist mill here as early as 1708, a wool carding mill prior to 1820, and a small textile mill, producing cheap cloth

for sale in the South, built in 1836. A series of fires and at least one flood destroyed the mills on this site in the 1880s. John Tarbox built the current 2-story, clapboard grist mill, with a stone foundation and a slightly pitched roof, in 1886. In 1909, Charles Kenyon bought the mill with the intention of grinding "johnny cake meal," from local Indian white-cap flint corn, and selling it to local grocers. Kenyon bought a new turbine, built the addition on the south side, and added two new sets of stones, one from the Westerly Granite Company, to complement the set already in place. The mill continues to operate with three sets of stones and still produces "johnny cake meal" as well as a variety of other stone-ground flours and meals. A small, 4-foot high dam is still in place as well as a vertical turbine (c 1909) in a wheel house on the east side of the mill; but the race is now overgrown and the river no longer generates power. An "Improved Baldwin's American Fodder Cutter," (last patent, 1872), and a "Kelly Duplex Grinding Mill," built by the O. S. Kelly Manufacturing Company, Iowa City, Iowa, still survive, though no longer used, on the mill's grounds. The Kenyon Grist Mill is an excellent operating example of the late 19th-century grist mills which served the needs of Rhode Island's rural economy. Its survival, however, is the result of linking the state's rural economy to mail order and supermarket sales. (Oliver H. Stedman, Usquepaugh, Biography of a New England Mill Community, Queen's River Press, 1976; Interviews with Peter W. Smith and Charlie Walmsley, Kenyon Corn Meal Company, 1977.)

PEACEDALE MILLS (1847)
Peacedale Village
South Kingstown

Narragansett Pier
19.291400.4591600
Washington

Rowland Hazard, a South Kingstown merchant descended from large landowners, began his involvement at this Saugatucket River site in 1804 with the purchase of one-third interest in a carding machine located in a mill which then stood near the site of the current dam. About 1808, Hazard bought the labor of local hand-spinners and weavers who produced a cotton-warp and wool-weft fabric, which Hazard then sold. In March, 1812,

he became full-owner of the carding mill, and a linseed oil mill on the same privilege. Soon after, Hazard installed a water-powered, 30-spindle jack in the carding mill, and in 1813, set up four "Rotary" looms, invented by Thomas R. Williams, a Newport clockmaker, in the old oil mill. Designed to weave boot, suspender, and saddle-girth webbing, these were likely the first water-powered looms operated in North America. According to one account, however, they proved unsuccessful and Hazard responded by installing hand looms in the same mill. By the mid-1820s, the company, controlled by Hazard's sons, was manufacturing kerseys with power looms. Incorporated as the Peacedale Manufacturing Company in 1847, the mills expanded throughout the 19th century and specialized in the production of woolen shawls, serges, and worsteds. In the late 19th-century the Peacedale Company was best known for its labor policies. The company built a surviving library and meeting hall (1891), engaged in extensive "welfare work," and in 1887, introduced one of the first profit-sharing plans in the United States. The plan continued in effect until 1909. On 1 July, 1918, the Hazards sold the complex to M. T. Stevens of North Andover, Massachusetts, later integrated into the J.P. Stevens Company. Stevens moved out in 1947, removing its machinery to North Carolina. The mill buildings are now owned by two separate firms, one of which is a textile dyeing and finishing company. The earliest building on the site is an 1847 2-story, stone structure with an east facade, of the same date, which gives the appearance of a 1-story mill with a clerestory monitor. North of this stands a 3-story, carding and combing mill, 117' X 57', built between 1856 and 1888. Further north, a 4-story, stone, spinning mill, 155' X 60', survives. Behind these structures is a 3-story, stone, finishing plant erected in 1868. Most of the other buildings were built in the late 19th or early 20th centuries. No old machinery or steam engines survive, though the dam and portions of the raceway do. The site also contains an ornate office, an 1856 boarding house opposite the library, and an unusual wood, multi-family row house for workers northwest of the complex. The latter has front porches more typical of Southern mill housing than of New England. This is an important and reasonably well preserved mill village with a long and significant history.

(Hall; L. Hoxie, "The History of Peacedale, Rhode Island," undated pamphlet, Wakefield Library; Factory Mutual System Insurance Drawing, 12 June 1937; W. Bagnall, The Textile Industries of the United States, 1893; A. Cole, The American Woolen Manufacture, Volume I, 1926; D. Nelson, Managers and Workers, Origins of the New Factory System in the United States, 1880-1920, 1975.)

PERRY/CARPENTER GRIST MILL (1716)
Moonstone Beach Road
South Kingstown

Kingston
19.284690.4685260
Washington

This small, shingled grist mill, set on a stone foundation, was reportedly built by James Perry in 1716 at another location on Mill Pond. It was moved to its current site, adjacent to Moonstone Beach Road, sometime prior to 1789. It operated as a grist mill under a variety of owners including Thomas Hazard, 1789-1806, Solomon Littlefield, 1806-1815; and the Watson family, 1820-1874. Wanton R. Carpenter bought the mill in 1874 and it remained in the Carpenter family for ninety years. The mill continues to grind grain, though not on a regular basis. A shed addition on the east end houses the turbine and power transmission equipment, installed in the early 20th century and still operating. A small race carries water to the turbine. The mill is carried on hand-hewn and pegged framing, though repairs have continued to the present. The framing also employs a variety of different nails, some hand-cut. The west side has been recently jacked and is now carried on a concrete foundation. The stone foundation on the other sides is dry laid, but for the east wall, which is mortared. The grind stones and hoist remain in place, but are likely not the original equipment, and the interior walls and ceiling have been modified. The Perry/Carpenter Mill exhibits relatively little of its 18th-century origins, but it survives as an excellent example of the small grist mills which served the rural needs of Rhode Island's southern townships well into the 20th century.

(Providence Sunday Journal, 30 July 1972; Interviews with C. Foster Browning, Leroy Whitford, and Rowland Robinson, July, 1977.)

RODMAN MILL (c. 1843)
Route 108 at Rocky Brook
South Kingstown

Kingston
19.290700.4692000
Washington

Samuel Rodman bought this mill site at Rocky Brook in 1837 and manufactured coarse woolen goods in two small mills, one of which saw previous use as a carding mill. With stones taken from a nearby meadow, Rodman built a stone mill about 1843. This 2-story structure, 90' X 38', with a pitched roof, central tower, and clerestory monitor, is still standing. Rodman sold most of his woolen goods in the South, and when the Southern market collapsed during the Civil War, his business collapsed with it. The mill continued to operate under other owners. In 1876, part of the mill burned, along with a nearby mill built by Rodman in 1858. No longer used for textiles, the building is now occupied by a bonding and laminating firm.
(Sande; Cole.)

WAKEFIELD WOOLEN MILL (c. 1820-1840)
Post Road at the Wakefield Bridge
South Kingstown

Narragansett Pier
19.291025.4591020
Washington

The Wakefield Mill was established in 1821 for the protection of woolen goods on a mill site which had been occupied as early as 1738. James Rodman bought the privilege in 1824. A 2-story, stone structure on the east bank of the Saugatucket River continues to stand, now heavily altered for use as an automobile showroom. It is likely the remains of the c. 1820 mill. A second mill was built in 1840, probably by Attmore Robinson. This 3-story, stone mill, 81' X 50', stands on the west bank of the river. In 1862-1863, Gideon Reynolds bought the property and formed the Wakefield Manufacturing Company. By 1866, Robert Rodman owned the mills. Rodman produced Kentucky jeans and doeskins and employed seventy workers in 1889. The Rodman Manufacturing Company, incorporated in 1883, controlled the mills at Wakefield as well as mills at Lafayette, Silver Spring, and Shady Lea (see separate entries for Lafayette and Shady Lea.) The 1840 Wakefield Mill was still being used for textile production in the spring of 1976, though its

closing was imminent. With the exception of a 1912 boiler, no historic machinery remains. (Cole; Factory Mutual System Drawing, 17 April 1963; Interviews with Scott Brady and Phil Zannini, H. Manufacturing Company, 16 May 1976.)

Transportation

KINGSTON RAILROAD STATION (1875)	Kingston
Route 138	19.286100.4695500
South Kingstown	Washington

This largely unaltered Victorian railroad station, built in 1875, is a wood-frame structure set on an unobservable masonry foundation. Measuring 76' X 30', it is seven bays long and three bays wide. A 2-story, flat-roofed central pavilion divides the 1-story, gable-roofed building. The pavilion has a heavy cornice supported on large, curved brackets. The segmental-arch windows are surmounted by heavy molded cornices with dentils. The interior has recently been repainted and restored with "period" light fixtures. This is the last small-scale, 19th-century railroad passenger station still operating in Rhode Island and it has been entered on the National Register of Historic Places. (R. B. Harrington, "Kingston Railroad Station." ms. at the RIHPC.)

Bridges & Trestles

PEACEDALE BRIDGE (c. 1890)	Narragansett Pier
Peacedale Village	19.291420.4591670
South Kingstown	Washington

This stone arch highway bridge carries Kingstown Road over the Saugatucket River. Its single, three-centered arch has a span of twenty-four feet. Built in the late 19th century, the bridge became state property in the early 1920s. State work crews repointed the bridge and added a sidewalk in 1930-1931. (Rhode Island Department of Transportation, Bridge Design Section Files: Bridge #206.)

PEACEDALE RAILROAD TRESTLE (c. 1876) Narragansett Pier
Peacedale Village 19.291280.4591570
South Kingstown Washington

This trestle carries the single track of the Narragansett Pier Line over the Saugatucket River and Kingstown Road. 162 feet long and elevated 20 feet above the roadway, the railbed is carried by six cross-braced bents on mortared stone foundations.

(Rhode Island Department of Transportation, Bridge Design Section Files: Bridge # 179.)

Tiverton

Bulk Products

BOURNE MILL (1881)
Mill Street, North Tiverton
Tiverton.

Fall River
19.318560.4615100
Newport

Built in 1881 in a marshy area just south of Cook Pond, the Bourne Mill is located in Rhode Island though its economic ties were to Fall River. A typical Fall River mill, the Bourne is a 5-story, coursed-ashlar structure, 320' X 84', with an imposing, mansard-roofed central tower. The tower has four clocks framed by Neo-Classical pediments and pilasters. A 4-story ell, 101' X 52', extends to the east. Like the main mill, it is coursed ashlar with a near-flat roof. Interior framing consists of plank-on-timber construction carried on two rows of cast-iron columns. A 2-to 3-story brick building, with bonded-arch windows, is located on the northeast corner and formerly housed a machine shop and picker room. A 3-story brick storehouse, with rowlock arch windows, is located on the western edge of the site, and the large brick stack and stone engine house survive on the east. The boiler house has since been destroyed and the mill's two steam engines were removed in the early 1950s. The 1-story, stone weave shed, 320' X 325', was designed by Providence mill architect Frank P. Sheldon in 1900. It is one of the state's earliest saw-tooth-roof weave sheds. The Bourne Mill, owned by Fall River entrepreneurs, operated 91,258 spindles and 2,640 looms in 1906 for the production of "odd count" cotton goods. The company began a profit-sharing plan in 1889 and continued it into the early 20th century, though no profits were paid to workers during the 1904 general strike. The Bourne Company maintained cotton production here until about 1953 when the mill was bought by Berkshire-Hathaway. Under new ownership, the mill produced cotton cloth until 1961. It has since been used for warehouse space, though parts of the complex have been leased to various small firms. No machinery survives.
(H. M. Fenner, History of Fall River 1906; H. H. Earl, Fall River and its Manufactories, 1803-1890, 1890; Interviews with Guido Zanelli, building manager, and Henry Ibbotson, September, 1977.)

WARREN MANUFACTURING COMPANY (1896)	Bristol
9 North Main Street	19.309753.4622710
Warren	Bristol

John Waterman of Providence and Captain George Wheaton established the Warren Manufacturing Company in 1847, and by 1875, their company had become one of the largest textile mills manufacturing sheetings, shirtings, and jaconets in Rhode Island. The mills housed 58,000 spindles and 1,400 looms and employed 850 people. The steam plant, built about 1890, held fifteen boilers and one 2,000-horsepower, compound condensing engine with a 32-foot fly wheel. On 3 October 1895, the company's three mills, one stone (1847) and two brick (1860-1873), were destroyed by fire, leaving behind only the 3-story, Italianate tower with a double round-arch belfry. Fire damage amounted to \$853,000, the Factory Mutual Insurance System's largest loss to date. The new complex was built in three stages - 1896, 1902, and 1907. The three major 1896 structures, a large weave shed (now destroyed), a 3-story brick building, 128' X 489', and a 2-story, brick addition, 139' X 71', remain. The 1907 3-story, brick mill, with segmental windows and a flat roof, is attached to the north end of the 1896 structure. The Warren Manufacturing Company remained in the complex until 1934 when Berkshire-Hathaway occupied the plant to make spinning frames, repair machinery, finish cloth and produce curtains. It is now occupied by a luggage manufacturer, and contains several steam pumps and two early 20th-century Heine fire-tube boilers.

(Warren, Rhode Island, Statewide Preservation Report, RIHPC, 1975; Factory Mutual System Insurance Drawing, "American Luggage Works," February 27, 1975; Interview with Kent Ellinwood, Inventory Control, American Tourister, 14 June 1976; The Factory Mutuals, 1835-1935, 1935.)

Manufacturing

OLD FORGE/MARBLE'S HALL (c. 1820)	Bristol
405 Water Street	19.309890.4621700
Warren	Bristol

Built about 1820, this 2-story, Greek Revival gable-roofed structure was originally a forge. The stone walls, almost

two feet thick, contain five brick flues built into the exterior. For many years, a large statue of Vulcan adorned the entrance. Francis Marble, a Warren merchant, operated "Marble's Hall" on the second floor for the entertainment of seamen. In 1906, Potter and Collamore maintained a foundry here. Following World War II, the present owner bought the building for the processing and dyeing of flock fibres for the textile industry. At the same time, the new firm built the large cinderblock addition to the west. The building is a part of the Warren Waterfront National Register Historic District.

(Warren, Rhode Island, Statewide Preservation Report, RIHPC, 1974; Interview with president, Ray-Cot Fibres, August 1977.)

Specialized Structures

ATWOOD'S OYSTER HOUSE (c. 1898)	Bristol
321 (rear) Water Street	19.309810.4621990
Warren	Bristol

John Stubbs began a thriving oyster industry in Warren about 1880. In April 1897, Stubbs bought Carr's Wharf, a pre-Revolutionary ferry landing, from the Carr family. This simple, 2-story, gable-roofed building dates from that period. In 1905, the D. Atwood Oyster Company occupied the structure, and just before World War I the building became a part of the Warren Boat Yard. During the last two decades, the structure has been used for fish processing, small yacht building, and boat repair. Atwood's is the best-preserved oyster storage house to survive in this area. The building is a part of the Warren Waterfront National Register Historic District.

(Warren, Rhode Island, Statewide Preservation Report, RIHPC, 1975.)

GARDNER & BROWN WAREHOUSE (1842)
383 Water Street
Warren

Bristol
19.309880.4621800
Bristol

Joseph Gardner and Charles Brown, whaling entrepreneurs, built this 3-story, stone-rubble warehouse on the Warren waterfront in 1842. The building has a gable roof and rectangular windows with granite sills and lintels. By 1851, it was converted to use as a sail loft, and by the 1930's it was part of the holdings of the Narragansett Bay Oyster Company. F. Nelson Blount bought the property in 1943 and the Blount Seafood Corporation, a clam-processing firm, continues to use the building. It is an integral part of the Warren Waterfront National Register Historic District.

(Warren, Rhode Island, Statewide Preservation Report, RIHPC, 1975.)

J. J. SMITH WHALE OIL WORKS (c. 1845) Bristol
325 Water Street
Warren

19.309880.4621910
Bristol

Built about 1845, this 2-story, gable-roofed, stone structure is identified as "J. J. Smith's Oil Works" on the 1851 map of Warren Village. Smith was Warren's most prominent whaler and its wealthiest citizen. The walls are two feet thick with large sills and lintels, typical of Warren's stone warehouses of this era. The interior displays the use of large, hand-hewn beams and cast-iron columns, the latter added later. In 1887, Joseph Stubbs bought the property as part of his extensive oyster business. The building is now owned by a local marina, and is a part of the Warren Waterfront National Register Historic District.

(Warren, Rhode Island, Statewide Preservation Report, RIHPC, 1975.)

Warwick

Bulk Products

ELIZABETH MILL (1875)
Jefferson Boulevard
Warwick

East Greenwich
19.296660.4622200
Kent

Thomas J. Hill bought a large tract of land in Warwick in 1863, and subsequently built an iron works (see Rhode Island Malleable Iron Works), The Elizabeth Mill, a railroad depot, a school, and numerous houses for workers. The area came to be known as Hill's Grove. Hill, born in Pawtucket in 1805, was apprenticed to the textile machinists, Pitcher & Gay, from 1822 to 1830. In 1830, he became Samuel Slater's master machinist at the Providence Steam Cotton Manufacturing Company. Fifteen years later, Hill went into business for himself, building the Providence Machine Company for the manufacture of textile machinery (see separate entry). Hill, and his family, also owned the Bay Mill in East Greenwich (see separate entry). In 1875, he built the Elizabeth Mill which he named after his wife. The mill, a prominent part of Hill's Grove, is a 3-story, brick structure with a central tower and a picker house on the southwest corner. In 1909, a 70-foot extension was added to the north side of the main mill, increasing its size to 392' X 74'. In 1912, the Elizabeth Mill contained 31,104 ring spindles and employed 346 workers in the production of fine yarn. Worker housing continues to stand on streets west of the mill. The structure is now used by a manufacturer of electrical wiring devices.

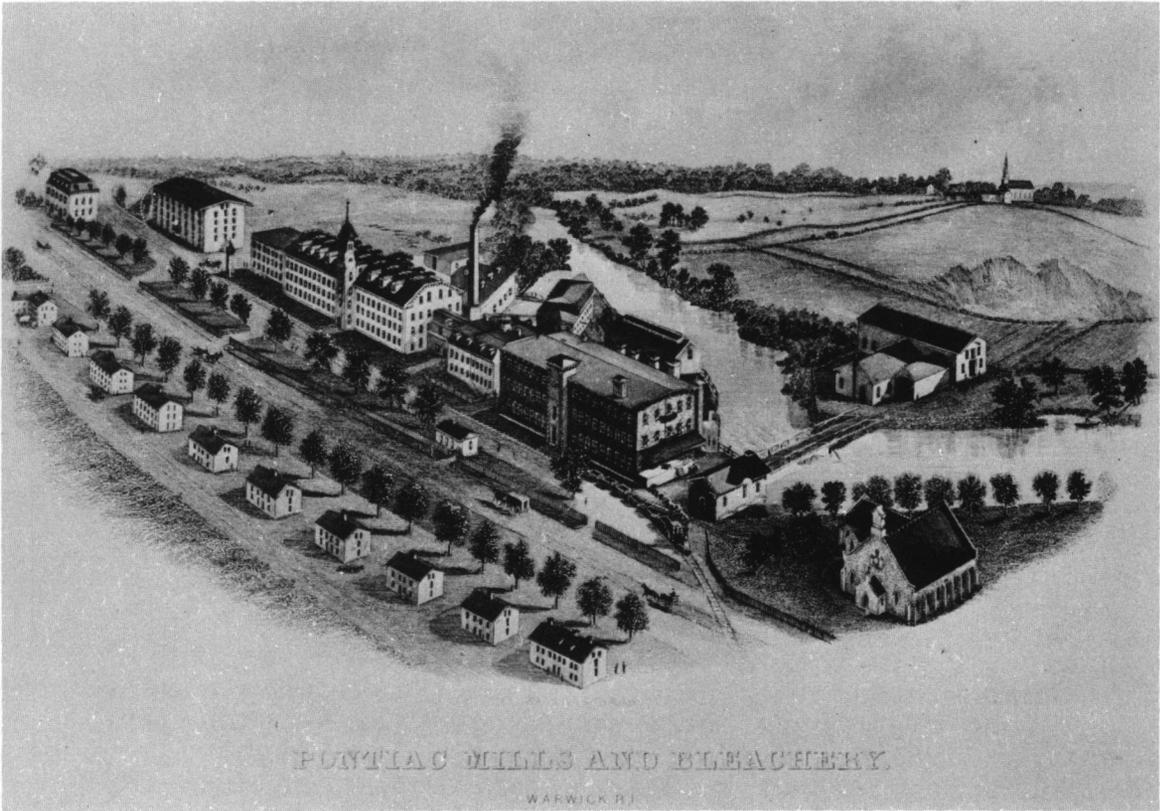
(Grieve and Fernald; Associated Factory Mutual Drawing, 10 October 1912.)

PONTIAC MILLS (1863)
Knight Street
Warwick

E. Greenwich
19.294500.4622160
Kent

In 1810, this site on the Pawtuxet River contained a sawmill, a grist mill, a wool carding mill and a cotton spinning mill. The land was sold by Horatio Arnold in 1827 to Rice Brown, Jonathan Knowles, and Samuel Fenner, whose partnership collapsed in the depression of 1829.

It was bought at auction by John H. Clark, later a United States Senator, who built a stone mill in 1832 and a bleachery in 1834. In 1850, Zachariah Parker and Robert Knight bought the mills. Two years later, the company of B. B. and R. Knight was formed, later to develop into one of the largest textile combines in the United States. The firm manufactured under the well-known trade name "Fruit of the Loom." The surviving structures include a 4-story, brick mill, 200' X 67', with an ell 90' X 40', built in 1863. This building was originally two stories with a pitched and dormered roof. The mansard-roofed company store at the east end of the complex was built in 1866. In 1870, a new bleachery was built, 160' X 53', replacing the old one which had burned in the same year. This 3-story, stuccoed stone-rubble structure stands to the west of the main mill. On either side of it are stone additions. The 3-story, east addition was built prior to 1874 and housed a machine shop, weave room, and slasher and drawing-in rooms. A 2-story, brick wing on its west side now houses the Warwick Museum. The mills' smokestack and water-tower, prominently visible from Interstate 95, also survive. In the late 1880s, the company employed 1,500 workers to operate 27,000 spindles. At the same time, there were 170 tenements, of which 120 were company owned. Most of these still survive on streets adjacent to the mill. The dam, gates, and parts of the raceway also survive. The Knight family owned the complex until 1920, and the plant continued to be used as a textile finishing mill until 1970. The new power plant was built in 1948. In 1973, the property was bought by the current owners. It is now occupied by about thirty tenants. No machinery of historic note survives. The Pontiac Mill complex has been entered on the National Register. (Cole; "Data on Pontiac Plant," company manuscript, 12 September 1955; Allendale Insurance Company, Plan Book, c. 1870s, p. 167.)



Pontiac Mills (J. D. Van Slyck, New England
Manufacturers, 1879).

RHODE ISLAND MALLEABLE IRON WORKS
Jefferson Boulevard (1867-1918)
Warwick

East Greenwich
19.296740.4622340
Kent

Thomas Hill built the Rhode Island Malleable Iron Works in 1867 for the production of malleable iron castings. The business was a key element in Hill's development of this section of Warwick, later named Hill's Grove (see Elizabeth Mill). The 1-to 2-story, brick-pier buildings were rebuilt in 1918 and are located adjacent to the Elizabeth Mill. The buildings are still used by a foundry company.

(Grieve and Fernald; Associated Factory Mutual Drawing, 10 October 1912.)

Transportation

CONIMICUT LIGHTHOUSE (1868)
Conimicut Point
Warwick

Bristol
19.304860.4620790
Kent

The Conimicut Lighthouse, built in 1868, is a cast-iron cylindrical structure located on the Conimicut Point shoals. Replacing an earlier wooden beacon, it marks the west side of the entrance to the Providence River. Conimicut Light operated with a system of kerosene illumination until July, 1960. It was the last lighthouse in the United States to be electrified.

(Inventory of Federal Archives in the States, Series X, #58, 1938.)

WARWICK NECK LIGHTHOUSE (1932)
Warwick Neck
Warwick

East Greenwich
19.301970.4615300
Kent

The current Warwick Neck Lighthouse, a cast-iron cylindrical tower, was built in 1932 on a lighthouse site first established in 1826. A second lighthouse was built in the 1850s, and that has since been converted to a keeper's house. Warwick Neck Light marks the north entrance to Greenwich Bay. The 1938 hurricane undermined its foundation, and the light was subsequently moved farther from shore.

(Inventory of Federal Archives in the States, Series X, #58, 1938; Providence Evening Bulletin, 6 August 1932; Providence Journal, 18 June 1938.)

Bridges

OCEAN POINT RAILROAD BRIDGE (1835)	East Greenwich
Ocean Point Road	19.296240.4615920
Warwick	Kent

This single-arch, stone railroad bridge was built in 1835 as part of the Stonington line, Rhode Island's section of the rail route from Boston to New York. It still carries Amtrack's main line in the Northeast Corridor. (See entry for King Street Bridge, East Greenwich.)

Westerly

Extractive Industries

DIXON GRANITE COMPANY (c. 1870)	Ashaway
Granite Avenue	19.264640.4585480
Westerly	Washington

Jonathan and Ephraim Lampheur began mining granite here on Cormorant Hill in the 1870s. Several years later, this granite works became the N. F. Dixon Company. It was known for granite used in the making of stone posts, curb stones, sidewalks, and flagging. Although no major company buildings survive, the quarry is still visible. A derrick, manufactured by the F. R. Patch Company of Rutland, Vermont, remains on the site. It was used to lift stone from the quarry. The wooden mast, supported by steel guy wires, stands approximately 100 feet high and is attached to a revolving base. The boom, fixed to the bottom of the mast, was raised and lowered into place by a set of pulleys. Also on the site is an electrically-driven water pump manufactured by the Chicago Pneumatic Tool Company and located in a small pump house above the quarry. The development of the Dixon Company coincided with the extensive growth of granite quarrying in the Westerly area during the late 19th century. The granite quarries brought large numbers of immigrant laborers to Westerly; first Irish, English, and Scottish, and later, Italian; and in the 1880s, witnessed the emergence of active and important assemblies of the Knights of Labor. Largely dependent on the market for monumental statuary, the Westerly granite quarries remained a major part of the local economy until the late 1940s.

(Denison; Everts and Richards, Atlas of Southern Rhode Island, 1895.)

RHODE ISLAND GRANITE WORKS (1866)	Watch Hill
Ledward Avenue	19.264250.4583710
Westerly	Washington

George Ledward opened this granite quarry in 1866. Later sold to J. G. Batterson, the quarry operated for a time as Batterson & Ledward. By 1877, it was known as the Rhode Island Granite Works, with J. G. Batterson as

president. This firm, with its business headquarters at the New England Granite Works in Hartford, Connecticut, produced fine white granite. Its most famous 19th-century work was the "Antietam Soldier," cut from a 60-ton block of granite, and designed by Carl Conrads to stand at the Antietam battlefield. The once-numerous buildings of this company are now gone, except for three small granite structures on the south side of Ledward Avenue. Both of the company's quarries are visible east of the Smith Granite quarry (see below). The quarries, 100 feet to 125 feet deep, are now filled with water and trash. The company's private rail spur, known as Batterson's Branch Railroad in 1870, has since been dismantled.

(Denison: Hall; Beers; Everts and Richards, Atlas of Southern Rhode Island, 1895.)

SMITH GRANITE COMPANY (1845-1847)
Granite Street
Westerly

Watch Hill
19.264090.4584000
Washington

Orlando Smith discovered this quarry on the top of Rhodes Hill in 1845 and opened it in 1847. The Reverend Frederic Denison, in his history of Westerly, referred to it as the town's first granite quarry. Known as the Smith Granite Company, the quarry acquired a reputation for producing the country's highest quality white granite for fine statuary. By 1901, the company employed 200 workers, most of whom were of English, Swedish, Italian, German, and Scottish descent. Only two of the company's buildings survive. A 1-story, granite structure, built in 1884, stands at the corner of Granite and Tower Streets. Used as the company store, the building has granite sills and lintels, stone dentils under the eaves, a gable roof with small cross-gables on the north and south, and round-arch windows on the east and west. Now used as a gas station, it is heavily altered, particularly on the south side. A 1-story, granite structure, built in 1883 and likely used as a stone cutting shed, stands southeast of the first building. This long, low structure has a gable roof with a small trap-door monitor on the northeast. It has been heavily altered and is now used as a commercial block. The company's water-filled quarry is located near the 1884 building.

(Denison; Hall; The Book of Rhode Island, 1930, illus.p.296; Everts and Richards, Atlas of Southern Rhode Island, 1895.)

SULLIVAN GRANITE COMPANY QUARRIES
Quarry Road Area (1834-1920s)
Westerly-Charlestown

Carolina
19.271160.4583000
Washington

This area overlapping the Westerly-Charlestown border just south of Bradford Village was the site of a number of the 19th- and 20th-century quarries. The oldest quarry, said to be in operation in 1834, was owned by Alexander G. Crumb from February, 1864 to May, 1907, when it was sold to the Crumb Quarry Company. This is the water-filled quarry at the southwest end of Quarry Road. The remains of two wood-frame structures, badly fire-damaged, and a stone garage survive adjacent to the quarry. In 1910, the company opened the John B. Sullivan Quarry, located just east of the Crumb Quarry and named for the firm's first president. In 1911, under the direction of Frank A. Sullivan, the former president's son, the company bought the Joseph Newall (also Newhall) & Company Quarry; the "Klondike" Quarries, then operated by the Gourley Granite Works; and the Thompson-Reinhalter Quarry. The Newall Quarry is located immediately east of the John B. Sullivan. Inactive for a considerable time, the Newall was recently reopened and uses the derrick formerly in place at the Crumb Quarry. The "Klondike" Quarries are located east of Cookestown Road in Charlestown, and the Thompson-Reinhalter is the small quarry abutting the Crumb on the latter's west side. These quarries, along with the first two holdings, were consolidated under the Sullivan Granite Company, organized 1 October 1921. The company was the exclusive producer of "extra fine grained blue-white" Westerly granite, used in the construction of memorials. The remains of Sullivan's stone-cutting shed, powerhouse, and crusher survive, as impressive industrial ruins, at the southeast end of Quarry Road adjacent to the John B. Sullivan Quarry. The cutting shed survives only as a parallel series of tall, badly-charred, wooden posts set on concrete piers. The framework continues to support an electrically-driven crane which carried stone from the quarry's edge into the shed. Formerly located on another site, the shed was originally a World War I-era aircraft hanger. The remains of a long-wire two-cut saw, built by the Dessureau Machine Shop of Barre, Vermont, survives within the framework of the shed. Installed in February 1958, this saw worked with a combination of wire movement and the

cutting action of an abrasive. A stone and concrete structure, adjacent to the shed framework, contains the foundations for two gang saws built by Patch-Wagner of Rutland, Vermont. One of these saws was sold in 1955 and is currently used by Castelluchi & Sons of Providence, located in the former erecting shop of the Corliss Steam Engine Works (see separate entry). The other saw was removed sometime prior to 1936. A gutted electric powerhouse, which still contains the foundation for a twin-angle, compound air compressor, survives next to the saw foundations. Though electricity provided the major source of power, the Sullivan Company continued to use Mead-Morrison steam engines to power its derricks until 1956. The large, reinforced-concrete crusher, built in 1927, also survives, but the company's 4' X 4' breaker, conveyor belt, and rail spur (the latter built in 1924) are no longer in place. The crusher produced crushed granite from waste stone and operated until approximately 1952, when state highway standards changed to permit the use of cheaper crushed gravel in building state roads. A badly fire-damaged, wood-frame structure still remains, and portions of the dismantled derrick can be found in the heavy underbrush near the quarry. Last operated by the Westerly Granite Company, the John B. Sullivan Quarry closed in 1969. As the most important surviving quarry in the state, the Sullivan works continue to provide a sense of the extent and scale of Westerly quarrying. (The Book of Rhode Island, 1930, illus. p. 294; Beers; Everts and Richards, Atlas of Southern Rhode Island, 1895; Interviews with Richard Paquet, Dessereau Machine Shop; Linda Montillio, Monti Granite Company, Quincy, Massachusetts; and John Algiers, former employee, Sullivan Granite, September, 1977; Extra Fine Grained Blue-White Westerly Granite, Sullivan Granite Company, 1922.)

THOMPSON & PLATT QUARRY
 Pound Road (late 19th-century)
 Westerly

Ashaway
 19.266680.4584240
 Washington

This small granite quarry, southeast of the intersection of Pound Road and the Westerly-Bradford Road, was developed sometime after 1870. By 1895, it was known as the Thompson & Platt Quarry. The site contains a water-filled quarry, scattered examples of unfinished quarried stone,

and the remains of a derrick used to lift stone from the quarry. The latter is similar to, but considerably smaller than, the derrick at the Cormorant Hill site of the Dixon Granite Works (see separate entry). The square, wooden mast, supported by steel guy wires, rises approximately fifty feet into the air. The boom is no longer in place. On the opposite side of Pound Road is a small, water-filled quarry owned by G. W. Cottrell in 1870 and by Murray, Thackaray & Company by 1895. A third quarry, just east of the latter, was owned by Lazzari and Barton in 1895. (Beers; Everts and Richards, Atlas of Southern Rhode Island, 1895.)

Bulk Products

BRADFORD MILL (1864)
Bradford Village
Westerly

Ashaway
19.270061.4587418
Washington

Following the burning of the first textile mill located on this site in 1846, a new wooden structure was immediately constructed. It no longer survives. In 1864, a quarry-faced stone mill, still standing, was built by Wager Weeden. From 1866 to 1868, the Niantic Woolen Manufacturing Company occupied the plant and expanded the facilities. A British dye company took over the complex from 1910 to about 1961, when the plant was purchased by the present owners for cloth dyeing. The 1864 mill has a low-pitched roof and rectangular windows with granite lintels. The original cast-iron columns remain inside. A clapboard extension probably dates from the early 1870s. Also dating from the 1870s is a 3-story, brick building with a curved roof. The site now contains numerous 20th-century structures. (Denison; Interview with Paul Gullicksen, New Bedford Dyeing Association, 11 January 1976.)

POTTER HILL MILLS (1835)
Village of Potter Hill
Westerly

Ashaway
19.266200.4588300
Washington

In 1810, Joseph Potter began manufacturing cotton cloth at the Potter Hill site. It was the first cotton cloth produced in Westerly. A 2-story, wood-frame mill was erected in 1835 for cotton spinning and dressing. It has a gable roof with dormers, a 3-story central tower, rectangular windows, and a wide flat-plank cornice. The last occupant used this building for finishing and inspection rooms, and some belting and shafting remains. In 1840, an impressive red granite mill was constructed. This 3-story, Greek Revival structure has a gable roof, pedimented end-gables, a central tower without its belfry, and smooth-faced granite sills. The masonry is worked in alternating smooth-ashlar courses and narrower quarry-faced courses. The building was last used for carding, spinning, and warping. At the rear of the granite mill, on the river, is a 1-story, wooden structure which houses Johnson & Bassett self-acting jacks (a type of wool spinning frame similar to the cotton mule). A 1-story, brick building was used as a weave shed and still contains Crompton & Knowles drop-box looms with dobbies. The loom harnesses have since been removed and, like the rest of the surviving machinery, the looms are in deteriorating condition. A 2-story, brick boiler house remains and contains two Babcock & Wilcox water-tube boilers and one older vertical boiler. Several shingled buildings are located next to the granite mill. They were last used as machine and blacksmith shops. The former contains two lathes, an 1870s miller, a drill press, two pedestal grinders, and a band saw. The latter contains a furnace, swages, and other assorted tools. The mill also houses Davis & Furber cards (some 1891 patent), Davis & Furber nappers (some from 1935), dye vats, drying machines, and warpers. The mill's machinery last operated about 1958, and the mill was evidently closed hastily. Woolen cloth remains on some of the nappers, and time sheets and production records are scattered on the floors. A turbine, with gears and pulleys for direct mechanical drive, is also in place and the dam, gates, and raceway are largely intact. Some power was generated electrically for the looms

have individual electric motors. Because of its surviving machinery and impressive architecture, Potter Hill is one of the finest extant textile mills in the state. (Chase; Denison; Sande.)

STILLMANVILLE MILLS (1848)
Canal Street
Westerly

Ashaway
19.263090,4585061
Washington

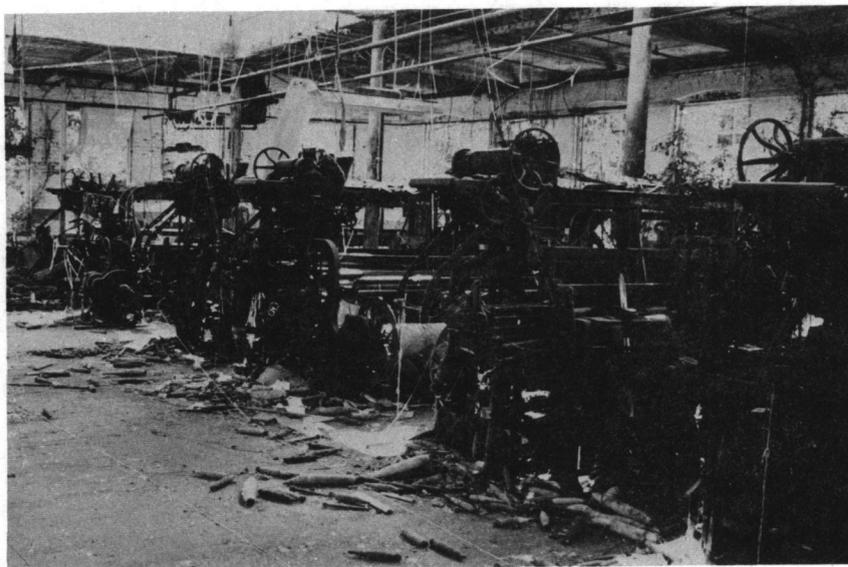
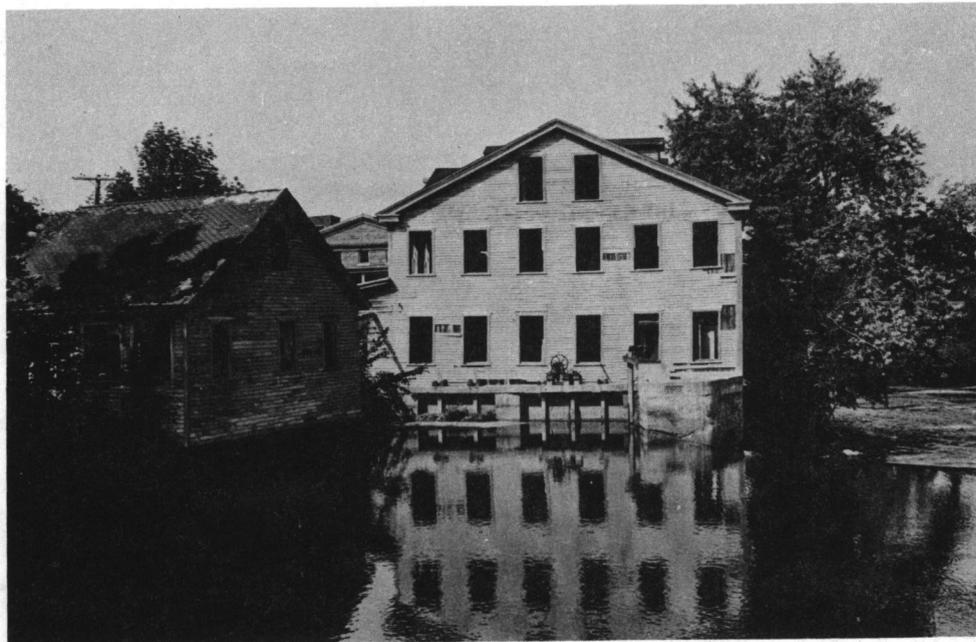
The Stillmanville Mills consist of two main buildings, one on the Rhode Island side of the Pawcatuck River and the other on the Connecticut side. The Rhode Island structure was erected by Babcock and Morse, who bought out the original owners of the privilege, the White Rock Company. Babcock and Morse retained the White Rock Company name. In 1862, the owners built a large addition at the Rhode Island site. By 1875, new owners, W. O. and L. W. Arnold, erected more additions and employed 450 workers. At that time, the complex on both sides of the river was called the Westerly Woolen Company. The Rhode Island Mill, which is presently occupied by the Westerly Casting Company, is a 3-story brick structure with a pitched roof, rectangular windows granite sills and lintels, and a granite foundation. Additions on both ends and on the street side prevent a clear view of the mill except from the river. The Connecticut mill, with unique tear-drop windows in the end gable, also survives. Both mills bear a resemblance to the architecturally-impressive White Rock Mill (see below).

(Sande; Richard Wheeler, "Historical Sketch of Stonington and Westerly", Westerly Weekly, 28 January 1886; Interview with Westerly Tax Assessor, 13 December 1975.)

WHITE ROCK MILL (1849)
Village of White Rock
Westerly

Ashaway
19.262560.4586900
Washington

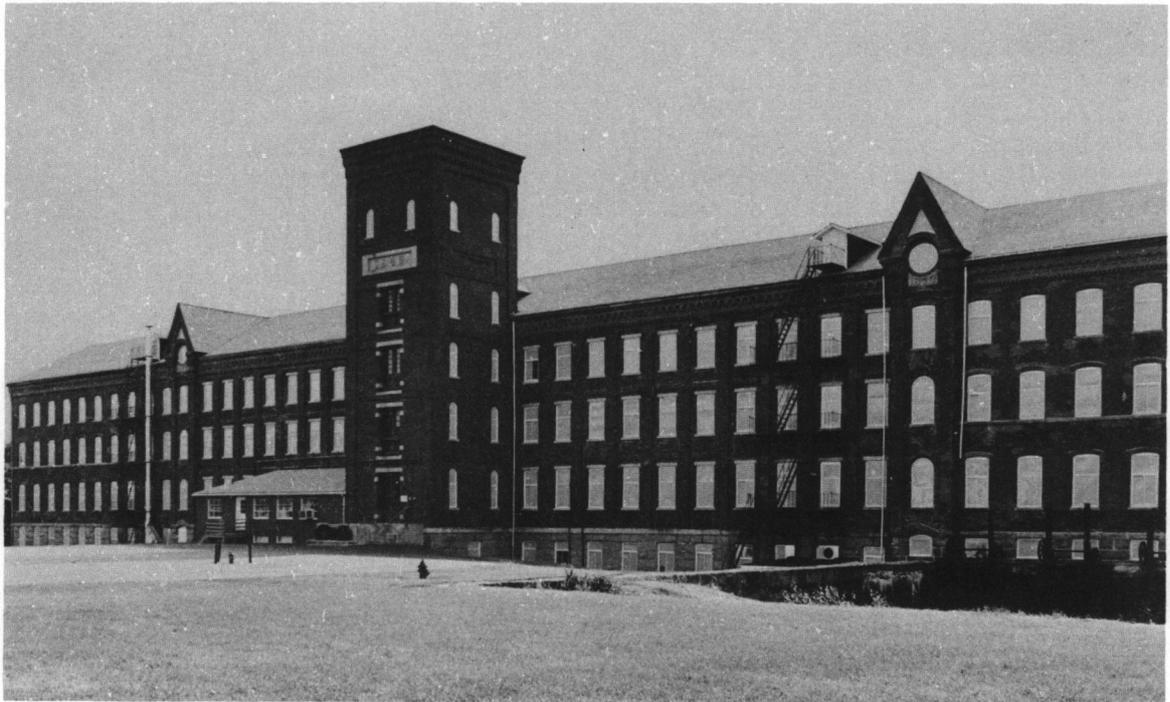
In 1849, the second White Rock Company, owned by Rowse Babcock and Jesse L. Moss, erected the White Rock Mill, along with twelve double-houses, on an 18th-century grist mill and sawmill site north of Westerly. The 3-story, brick mill, 185' X 50', has a cut-stone basement, a gable roof, and a square central tower ninety feet high. Rigidly symmetrical, and with elaborate Romanesque details,



Top: Potter Hill Mills
Bottom: Crompton & Knowles Looms, Potter Hill Mills.
(Patrick M. Malone).

the White Rock Mill is one of the state's most impressive textile mills. B. B. & R. Knight acquired the mill in 1875, and two years later, built 90-foot additions on either side of the main mill. Projected bays with cross-gable roofs separate the additions from the original mill. The Knights used the mill for the production of fine shirtings and rolled jaconets, and installed steam engines to supplement the mill's water power capacity. The Knights filed for bankruptcy in 1926 and sold to the Knight Financial Corporation in 1931, a type of financial move designed to protect the interests of stockholders and former owners and which, on occasion, accompanied the liquidation of New England's textile mills in the 1920s and the 1930s. Since 1958, the mill has been owned and occupied by a textile printing firm. The mill's Pawcatuck River dam continues to survive as well as its 4,000-foot long raceway. The long and unusually wide (approximately 45 feet) raceway was built to accomodate the peculiar qualities of the Pawcatuck River, a river with a substantial rate of flow but with little drop. The 2,000-foot long headrace culminates in two right angle turns; one is now simply a cul-de-sac, the other carried water through the 1877 wing on the north side. The tailrace, only 400 feet long in 1895, was subsequently lengthened about 1,600 feet in order to increase the amount of drop. No steam engines or turbines are said to survive, but the village remains intact. A company store and the original vernacular Greek Revival mill houses continue to stand opposite the mill. A 19th-century schoolhouse, now vacant, is located just south of the mill. White Rock is one of the most attractive and best-preserved mill villages in the state.

(Sande; Chase; Denison; R. Wheeler, "Historical Sketch of Stonington and Westerly," Westerly Weekly, 28 January 1866; Everts and Richards, Atlas of Southern Rhode Island, 1895; Land Evidence Records, Westerly City Hall.)



White Rock Mill (Patrick M. Malone).

Transportation

HIGH STREET SWITCH AND SIGNAL TOWER	Ashaway
High Street	(c. 1912) 19.263810.4584970
Westerly	Washington

This 2-story, stuccoed, hollow-core clay-tile building, with Mediterranean-style roof, is one of a number of standard-design switch and signal towers built by the New York, New Haven & Hartford Railroad between 1900 and 1920. Here at Westerly, the 10' X 15' tower was built to control the semaphore signals and power-operated track switches in the freight yard as well as the critical track connections between the yard and the main line. Originally equipped with a lever-operated interlocking machine, the tower has been electrified since the 1940s. The first floor housed the interlocking machinery whose manually-operated levers projected to the second floor. The first floor is now used for storage, while the second houses the electrical panel. (Preliminary Survey Files, RIHPC.)

WATCH HILL LIGHT (1858)	Watch Hill
Watch Hill Point	19.260661.4576263
Westerly	Washington

The Watch Hill Lighthouse, sixty-one feet above the water, marks the north side of the east entrance to Fisher's Island Sound, sending its 20,000 candlepower beam thirteen miles out to sea. The first lighthouse on Watch Hill Point was built in 1807 of wood and shingles and had a bank of ten lamps for its beam. The present square, gray-granite tower, surrounded at the base by large granite blocks that resist the wave action around the point, was built in 1858, two years after the first tower was destroyed. During the latter part of the 19th century, mariners began to confuse the lighthouse's steady white beam with street lights, causing the beam to be changed to a ten-second white light followed by two short red flashes. The 1808-1809 diaphragm fog horn is still

operational. Connected to the landward side of the tower is the keeper's 2-story, brick house, which is painted white. It has a hipped roof and rectangular windows with granite sills. Though the four-acre plot was purchased by the United States Lighthouse Service in 1806, the Coast Guard did not take charge of the Watch Hill Lighthouse until 1939. (Edward R. Snow, Famous New England Lighthouses, 1945; Munro; Watch Hill Light, Coast Guard pamphlet, undated.)

WESTERLY RAILROAD STATION (1912)	Ashaway
Canal Street and Railroad Avenue	19.263320.4584730
Westerly	Washington

The only one of its type in Rhode Island, this Mediterranean-style concrete, terra-cotta, and tile railroad station was built by the New York, New Haven & Hartford Railroad in 1912. The style is similar to a number of stations in Connecticut built by the same line. Composed of four structures, three of which are arcaded shelters arranged around the 30' X 50' main block, the Westerly Station includes a small, Classical Revival ticket office on the main floor. The interior has recently been painted in brilliant and contrasting hues as part of the upgrading project in Amtrack's Northeast Corridor. The station continues in active use. (Information from F. R. Love, RIHPC.)

Utilities

LEDWARD STREET STANDPIPE (1910)	Watch Hill
Ledward Street	19.264320.4584078
Westerly	Washington

Built in 1910 by the Aberthaw Construction Company of Boston for an estimated price of \$18,722, this reinforced-concrete standpipe measures forty feet in diameter and seventy feet to overflow. The concrete is a mixture of vulcanite cement, crushed granite, and bank sand. The roof is a "Guastavino Dome" of dark red

glazed tile and supports a cupola, also of red tile. This water tower was one of the first concrete standpipes in the country and was constructed of concrete rather than steel partially for aesthetic appeal. The Ledward Street Standpipe was part of a public waterworks project begun in 1896 to replace Westerly's private water company organized in 1886.

(Interview with James Crowley, Water Supt., Westerly, December 1975; First Annual Report of the Water Commissioners of the Town of Westerly, Rhode Island, May 1, 1898; T. McKenzie "The Standpipe at Westerly, Rhode Island," Journal of the New England Water Works, Volume XXIX, Number 2.)

TOWER STREET STANDPIPE (1886)
Tower Street
Westerly

Watch Hill
19.264180.4584039
Washington

This wrought-iron standpipe was constructed in 1886 as part of a private water company formed at that time. Robinson Boiler Works of Boston built the structure. It is thirty feet, six inches in diameter and seventy feet to overflow. It has a capacity of 380,000 gallons. Erected without a roof in 1886, an iron roof, with a balustrade, was added, in 1898. The roof was removed in the 1960s when pits developed in the iron which caused leakage.

(Interview with James Crowley, Water Supt. Westerly, December 1975; First Annual Report of the Water Commissioners of the Town of Westerly, Rhode Island, May 1, 1898.)

WESTERLY PUMPING STATION #1 (1897)
White Rock Road
Westerly

Ashaway
19.262525.4586348
Washington

Built in 1897 by contractor Frederick E. Shaw of Providence, this water-pumping station replaced an earlier station which was closed in 1898. At that time, the gravity-flow system developed by a private water company in 1886 was abandoned. The new station housed two vertical compound condensing pumping engines and boilers contracted for with Henry R. Worthington of Brooklyn. In May 1896, twenty-nine 2½-inch driven wells were completed by B. F. Smith & Brother of Boston. They

produced a yield of 1,000,000 gallons per day. Some of these wells are still visible behind the station. The pumping station is a 1-story, brick structure with a steep, copper-trimmed, hipped roof. None of the original equipment remains, though the pumping station is still in use.

(Interview with James Crowley, Water Supt., Westerly, December 1975; First Annual Report of Water Commissioners of the Town of Westerly, Rhode Island, May 1, 1898.)

Bridges

BRIDGE STREET BRIDGE (1906)	Ashaway
Bridge Street, White Rock Village	19.262370.4586550
Westerly	Washington

This 2-span, steel-truss bridge, built for the Norwich Traction Company by the Phoenix Iron Works, crosses the Pawcatuck River and the White Rock Mill trench. Each span consists of three parallel trusses creating two separate roadways - one for trolley tracks and one for wagons and automobiles. The short east span crossing the mill trench has three Pratt trusses creating what is in effect a three-part pony truss. The longer west span crossing the river required a more substantial structure. Its north truss, on the outside of the wagon road, is a Warren with verticals. The middle truss, supporting both wagon road and the trolley tracks, is a Baltimore. The south truss is a Pratt and is connected overhead to the middle truss to create an eccentric through truss. The trolley line ceased operation in the 1930s, and the bridge was acquired by the towns of Westerly and Pawcatuck, Connecticut, on the opposite shore of the river. The old trolley section of the bridge eventually was used to carry a watermain. Severely deteriorated, the bridge has been closed since 1976.

(Interview with James H. Crowley, Westerly Public Works Director; 1977;

PAWCATUCK RIVER RAILROAD BRIDGE (1909) Ashaway
Pawcatuck River 19.263140.4584600
Westerly-Pawcatuck, Connecticut Washington

Built as part of a project which involved the replacement of an earlier bridge over the Pawcatuck River, and the construction of the Westerly Station and the Canal Street Bridge (1910), this 200-foot riveted steel span consists of four parallel Warren trusses supported on cut-stone piers. Designed by the bridge department of the New York, New Haven & Hartford Railroad, the bridge carries two tracks and continues in daily use as part of Amtrack's Northeast Corridor route.

WEST STREET BRIDGE (c. 1913) Ashaway
West Street 19.263580.4584840
Westerly Washington

Spanning the main line of the New York, New Haven & Hartford Railroad, this through Pratt truss highway bridge, approximately 120 feet long, was built about 1913.

West Greenwich

Bulk Products

HOPKINS MILL (c. 1867)
Route 3 at the Nooseneck River
West Greenwich

Coventry Center
19.280740.4611500
Kent

The Hopkins Mill, located on the Nooseneck River, was built c. 1867, probably by David Hopkins. Hopkins, a local mill owner and politician, spun yarn in nearby Nooseneck Village as early as 1822. A blacksmith shop and a carding mill, operated by a flutter wheel, were originally located at the site. Neither structure survives. The Hopkins Mill is a 1-story, wood-frame building with a clerestory monitor. It is vacant and beginning to deteriorate. Its interior construction (slow-burning beams, 2½ inch floor planking, hewn rafters, and stone foundation.) is exposed to view. The remains of a stone picker-house on the southwest side of the mill are visible, as are parts of the raceway. The mill is typical of earlier forms of mill construction and is an excellent example of the small rural mills located on Rhode Island's minor streams. The Hopkins Mill remained in the Hopkins family and produced sash cord, warp, twine, and carpet yarn until 1905-1906. In 1915, Henry Lippitt converted it to a cattle barn, and from 1931 to 1968, William R. Halliwell used it for storage. In 1968, the state acquired it with the intention of tearing it down in order to build a new reservoir.

(Cole; The New England Textile Mill Survey, Selections from the HABS, Number 11, 1971; Interview with Tom Yatman, Water Resources Board, State of Rhode Island, May, 1976.)

West Warwick

Bulk Products

ARCTIC MILL (1852-1865)
Factory Street
West Warwick

Crompton
19.290280.4619980
Kent

This textile mill site was first developed in 1834 by Rufus Wakefield who produced woolen goods. Wakefield's stone mill, 60' X 40', passed through a number of hands until it was finally torn down by A. & W. Sprague, who bought the site in 1852 for \$11,400. The Spragues built a large stone cotton mill, four stories, 312' X 70', with an ell, 50' X 92', for the machine shop, dressing and lapper rooms. They also built the large stone dam, providing themselves with a 29½-foot fall. The dam survives, but the mill burned 17 March 1865. It was rebuilt, using the surviving walls, in the same year. The rebuilt mill had a pitched roof, a trap-door monitor and a domed, central tower. The roof line has since been flattened and the dome has been removed. A railroad depot, associated with the mill, and a stone office survive on the west side of the river. In 1885, the property was bought by B. B. & R. Knight, who operated 35,824 spindles and 1,039 looms. The Knights withdrew from textiles in the 20th century, but the mill continued to be used for textile manufacture at least until 1939. It is now owned by a maker of flight bags. Three horizontal turbines, no longer in use, survive in the basement. One provided direct mechanical drive. The other two, made by the Holyoke Machine Company c. 1920, remain attached to Allis-Chalmers generators. The site also includes extensive worker housing located on streets east of the mill. (Cole; Associated Factory Mutual Drawing, 1 June 1939; Factory Mutual System, "Arctic Mill", insurance drawing February, 1879, sheet number 673, bound in album; Interview with Warren Galkin, Valley Industries, April, 1976.)

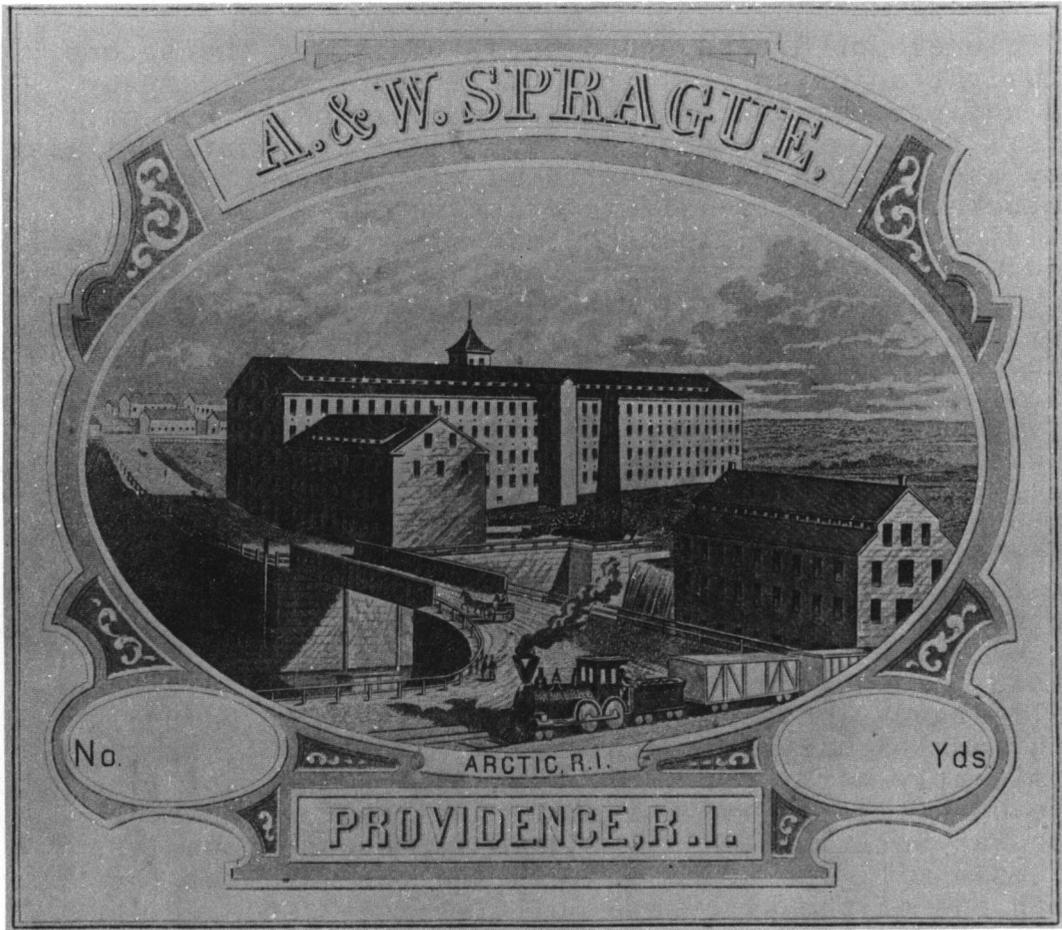
CENTERVILLE MILLS (1807)
Bridal Avenue
West Warwick

Crompton
19.2900220.4619000
Kent

The south branch of the Pawtuxet River flows through the middle of Centerville. On its west bank in 1794, a spinning mill of two stories, 40' X 26', was built

by Colonel Job Greene and others. This was the second Arkwright spinning mill in Rhode Island. The company did not prosper and in 1797 began looking for new partners. Two years later, the Providence merchants, William Almy and Obadiah Brown, partners with Samuel Slater in Pawtucket, bought a half interest in the mill. The building they used, located on a site now owned by the Agawam Dye Works, no longer survives. In 1807, Almy, Brown, and others formed the Warwick Manufacturing Company and built, on the east bank, a wood-frame mill of three stories. Construction was supervised by John Allen. This mill, once called the "Green Mill," still survives though in altered and deteriorated condition. It was moved in 1873-1874 to the northeast corner of the site to be used as a storehouse. In 1821, the mills on both sides of the river were united under one company controlled by Almy and Brown. Shareholders changed constantly until 1852 when William D. Davis of Providence bought the entire company. He immediately sold the "Green Mill" to Benedict Lapham of Burrillville, Rhode Island. Lapham built a 3-story addition in 1861 which still stands, adjacent to the dam. In 1871, he built with local stone the 4-story mill, 303' X 70', which prominently marks the site. The towers and roof line have been altered and a 1-story addition on the south side was built in 1965. A stone storehouse opposite the main mill was added in 1896 and the mills at the north end of the site were built between 1907 and 1909. By the early 20th century, the mill was owned by Robert B. Treat and contained 31,000 spindles, 700 broad looms and employed 350 persons. It was powered by two vertical and two horizontal turbines, generating 750 horsepower, and a 600-horsepower single-cylinder condensing Greene engine. The two vertical turbines still survive. The dam, gates, and raceway are preserved. The complex is now occupied by several tenants.

(Cole; Hall, photo p. 169; Providence Daily Journal, 23 August 1859; Associated Factory Mutual System Insurance Drawing, 13 October 1965; Interview with Warren Galkin, Valley Industries, April , 1976.)



Arctic Mill, Cloth Label, c. 1870 (RIHS).

CROMPTON MILLS (1807)
Pulaski Street at Manchester Street
West Warwick

Crompton
19.289600.4617720
Kent

In 1807, the Providence Manufacturing Company built a stone mill on the east side of the Pawtuxet River. The mill, called the "Stone Jug", was three stories, 117' X 33', and was very likely the first stone textile mill built in Rhode Island. Today, on the site of that mill, stands a 3-story stone structure, 143' X 37', identified on insurance drawings as the 1807 mill. The walls appear to be the only element surviving from that date. The interior has cast-iron columns and exhibits slow-burning construction. The second floor beams are 14" X 14", the ones on the third floor are slightly smaller. The low-pitched roof was modified prior to 1900. The company failed in 1816, and the mill was apparently idle until 1823 when Seth Wheaton, Edward Carrington and Benjamin Cozzens bought the property and formed the Crompton Company. A bleachery was built and the firm began calico printing in that year. Additional cotton mills were added in 1828 and 1832. The 1828 mill had 4-stories, measured 96' X 35', with an addition, 60' X 21'. The 1832 mill was 2-stories, 109' X 42'. Both mills survive on the west bank of the river, now capped by mansard roofs added c. 1860. The property was sold in 1846, and the print works were separately leased in 1852. In 1866, George M. Richmond of Providence obtained the property and produced print cloth, and later velveteens and corduroys. A new 5-story mill, 260' X 70' with a large castellated central tower, was built about 1881, from designs by the Providence architectural firm of Stone & Carpenter. By the late 1880s, the mill ran 40,000 spindles, 1,000 looms, and employed 600 workers. Power was supplied by six turbines, fed by two power canals and two separate dams, on both sides of the river. The canal on the west runs about 1,500 feet from its dam to the wheel pit. One turbine survives in the basement of Mill Number 1, along with a Deane Steam Pump. There are five boilers, three built by the Cunningham Iron Company of South Boston (1899) and two by D. M. Dillon of Fitchburg, Massachusetts. Four of them are still operating in a Boiler Room, built in 1870 and located west of Mill Number 1. The buildings are still used for manufacture, but are largely occupied by tenants.

(Cole; Hall, line cut, p. 179; Associated Factory Mutual Drawings, 27 December 1950, 14 April 1927.)

GREENE/ROYAL MILLS (1876-1919)
Providence Street
West Warwick

Crompton
19.290600.4620740
Kent

Here at Riverpoint, where the north and south branches of the Pawtuxet River meet, a spinning mill was built in 1812, probably on the northeast bank. The mill was two-stories, sixty-five feet long, and started in operation with four throstle frames and two mule-spinning frames. The firm, organized by two physicians, Stephan Harris and Sylvester Knight, in company with three others, styled itself the Greene Manufacturing Company. In 1816, the company failed, but the mill started up again two years later, with eight power looms, under the sole ownership of Harris. A fire in 1827 did considerable damage, but the mill was rebuilt and enlarged. In 1836, a second mill was built, probably at the upper privilege on the west bank of the river. It was subsequently enlarged. A third mill was built in 1844, and in 1855 it too was enlarged. By the 1870s, the site contained three mills: Number 1, three stories high with a clerestory monitor; Number 2, stone, four stories high with a pitched and dormered roof; and Number 3, stone, four stories high with a clerestory monitor. The mills later became part of the B. B. & R. Knight chain. By the late 1880s, the company operated 15,904 spindles and 501 looms. In 1889, Mill Number 1 was replaced by a 5-story, stone mill called the Valley Queen (see separate entry). Under the Knights, the 1836 and 1844 buildings were joined by a 4-story, stone connector which lengthened the mill to 420 feet. The roof was also flattened and two massive towers were built. On 27 January 1919, the mill, then producing cotton sheeting, was destroyed by fire at a loss of \$1,200,000. The fire started in a tower and spread quickly throughout the mill - despite the mill's length, it had no dividing walls to contain the fire. Adding to the danger, one of the massive towers collapsed, destroying part of the sprinkler system, which reduced water pressure in the rest of the system. Only the outer walls survived. The mill was rebuilt between 1919 and 1921, and continues to be used by tenants for light manufacture. The dam and raceway also survive, no longer in use, and worker housing still exists along and adjacent to Providence Street.

(Cole; The Factory Mutuals, 1835-1919, 1919, photos, pp. 160, 161, 162; Factory Mutual System, "Green Manufacturing Company," insurance drawings, sheets number 908, 909, bound in album.)

LIPPITT MILL (1809-1810)
825 Main Street
West Warwick

Crompton
19.289760.4621560
Kent

This 3-story, wood-frame textile mill, built between 1809 and 1810 on the north branch of the Pawtuxet River, is one of the oldest and most important mills in the state. It may well be the oldest American textile mill still in operation. Christopher and Charles Lippitt, Benjamin Aborn, George Jackson, and Amasa and William H. Mason were the first owners. The mill was originally built for spinning. Weaving was done by hand-loom in the countryside, as was typical of all Rhode Island mills prior to 1817. Unlike other mills, however, the Lippitt contracted to have some of its weaving done by inmates of the Vermont State Prison. The firm incorporated as the Lippitt Manufacturing Company in 1853. By 1887, the mill ran 10,640 spindles and 238 looms. Though altered and enlarged, the mill largely preserves its original appearance. Sited gable-end to the street, its Federal-style cupola is located over the northeast entrance, giving the mill the appearance of a New England meeting house. Its clerestory monitor is one of the earliest examples of this form of mill lighting. Interior construction appears to have been modified about 1830 to decrease the fire hazard. The current owner is a dyer and bleacher of lace. No historic machinery survives.

(Cole; H. R. Hitchcock, Rhode Island Architecture, 1939, (plate p. 39); The New England Textile Mill Survey, selections from the HABS, number 11, 1971.)

PHENIX MILLS (1821-1882)
Main Street, near Fairview Avenue
West Warwick

Crompton
19.289440.4621640
Kent

In August, 1809, the Roger Williams Manufacturing Company formed, and built a spinning mill on this site shortly after. In May, 1821, the mill burned. One year

later, a new group of investors formed the Phenix Company and built a new stone mill. A second stone mill was built in 1825, and a new raceway was excavated by Rufus Wakefield in the same year. Midway between the two mills, a small stone structure was built containing a water wheel and force pump, connected to a stationary iron pipe and hose. It served as much-needed fire protection. In 1829, the company, then controlled by Benjamin Harris and Edward Walcott, failed. In 1830, Crawford Allen became an owner and was joined seven years later by his noted brother, Zachariah, and by David Whitman, an early consulting mill engineer. They produced what was said to be the first 2½-to 3-yard wide sheeting made in the country. In 1839 half the real estate was sold to the Lonsdale Company and in subsequent years the mills were operated under a variety of leasing arrangements. An addition on the east end of the old mill was built in 1860, and seven years later, all the property was bought by the Hope Company, a continuation of the Lonsdale Company, and, before them, of the merchant firm of Brown & Ives. In May, 1882, the company began building a stone connector between the mills. This resulted in a single building, 328' X 43', capable of operating 21,536 spindles and 430 looms. The 4-story, stuccoed-stone mill, with its distinctive Greek Revival wood belfry, still stands. The dam which once provided nineteen feet of head, and the gates, gatehouse, and raceway are still in place. The mill has not been used for textiles since the late 1950s and has been divided among tenants since the 1940s. It is now owned by Thomas Quinn, whose father, Patrick Henry Quinn, was a prominent Rhode Island organizer for the Knights of Labor. Examples of worker housing exist on the north side of Main Street. (Cole; S. Lincoln, Lockwood Greene: The History of an Engineering Business, 1832-1948, 1960; Manufacturers' and Farmers' Journal, 18 August 1829; Interview with Thomas H. Quinn, June, 1976.)

VALLEY QUEEN MILL (1889)
Providence Street
West Warwick

Crompton
19.291000.4620860
Kent

B. B. & R. Knight built this 5-story, stone mill in 1889 on the site of what was probably the first mill of the Greene Manufacturing Company (1812). Known as the Valley Queen, the mill was a part of the Knights' vast textile holdings. In 1922, the mill's workers played a prominent role in a textile strike which closed virtually all the mills in the Blackstone and Pawtuxet Valleys. The Knights owned the mill until 1931 when it was bought by its present owners, the Original Bradford Soap Works. This firm, founded in Providence in 1876 by English immigrants James Rodgers and William Murgatroyd, produced soaps for the textile industry. With the collapse of the Rhode Island textile industry in the mid-20th century, Original Bradford diversified by producing chemical and cosmetic soaps. The main production building, in excellent condition, is 200' X 45' with floors and roof constructed of plank-on-timber. The large central tower has a peaked hip roof with dormers and, like the mill roof, is slate-covered. No historic machinery survives, but the gates, dam, and raceway are intact and the owners are interested in the restoration of the water power system.
(Hall, illus. p. 41; Providence Sunday Journal, 3 October 1976)

Woonsocket

Bulk Products

BALLOU MILL/LIPPITT WOOLEN MILL	Blackstone
Main and Bernon Streets (1836)	19.291580.4652700
Woonsocket	Providence

The oldest surviving mill on this site was built in 1836 by Dexter Ballou. It is a 3-story, rubble-stone structure with a pitched roof and a wood-frame, Greek Revival tower. Known in the early 19th century as the Harrison Cotton Mill, the building was sold to the Lippitt Manufacturing Company in 1865 and was then converted to woolen production. In 1870-1871, an earlier brick mill, built by Hosea Ballou in 1827-1828 was demolished and a mansard-roofed, brick structure was built in its place. This building, with its distinctive use of double windows framed by abutting granite lintels and brick pilasters, still stands on the corner of Main and Bernon Streets. In 1889, the Lippitt Mills operated twenty sets of cards and ninety-four broad looms while employing 300 workers in the production of fancy cassimeres, worsteds, and silk-mixed coatings. The buildings are now vacant. The remains of the Lyman Arnold Trench (see separate entry) run under the mill.

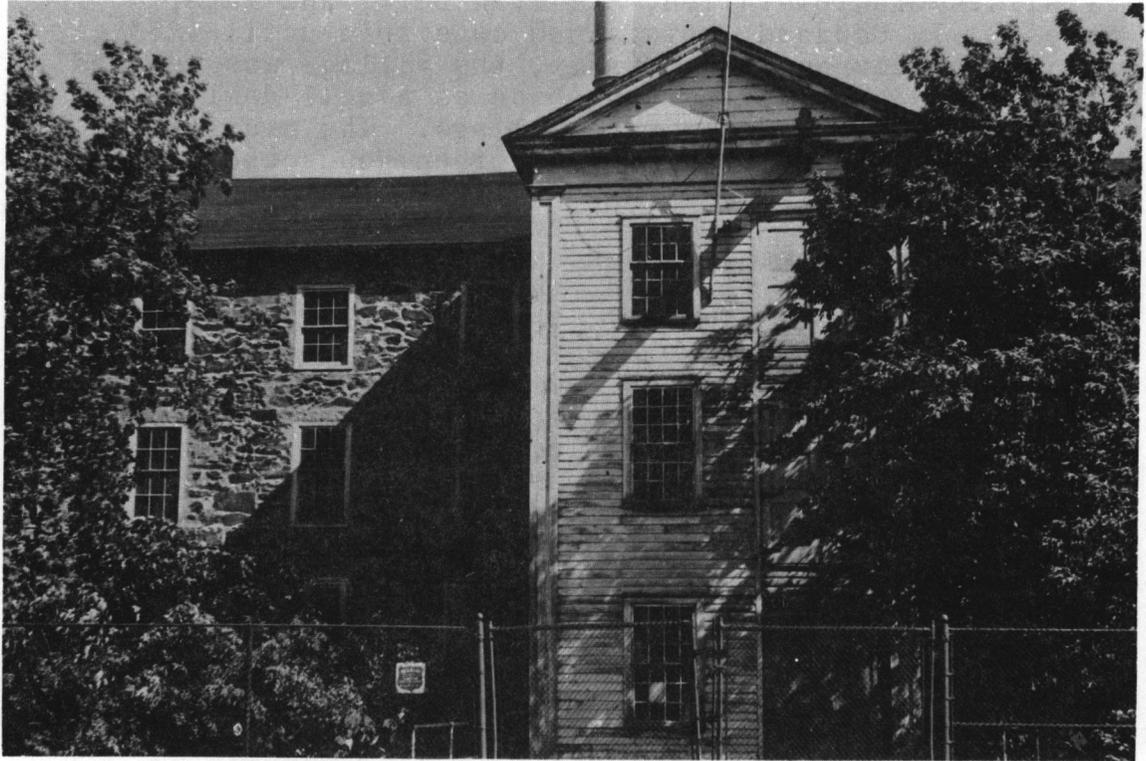
(Bayles; Richardson; H. R. Hitchcock, Rhode Island Architecture, 1939, plates 32 & 40.)

BERNON MILLS (1827-1859)	Blackstone
100-115 Front Street	19.291900.4652780
Woonsocket	Providence

Johnathan Russell and Dan Daniels built the first mill on this site in 1827-1828. Originally part of the Russell Manufacturing Company, this uncoursed granite mill is three stories high with a clerestory monitor roof. With its substantial interior beams and thick flooring, it is one of the earliest-known examples of "slow-burning" construction. After lying idle since the depression of 1829, the mill passed into the hands of the Woonsocket Company in 1832. One year later, the company built Mill Number 2, a random-coursed ashlar structure, four stories high. It features striking Greek Revival details. Unlike the 1827 mill, the Number 2 Mill was built with wood-joist floor construction and

a classically correct, but non-functional, windowless pedimented gable roof. The third surviving textile mill on the site, Mill Number 4 (Mill Number 3, built in 1835, was demolished about 1910) was built in 1859. It is stone, one to three stories high, with dormers. The Woonsocket Company, controlled by prominent industrialists Crawford Allen, Sullivan Dorr, and later Moses B. I. Goddard, maintained ownership until 1883. During the company's ownership, the village was renamed Bernon, and achieved a reputation as a well-designed, attractive, and orderly mill village. The area is now an indistinguishable part of urban Woonsocket and only scattered mill housing survives. The house of mill agent, Samuel Greene, a Pawtucket-trained machinist and hydraulic specialist, who ran the mills from 1832 to 1868, continues to stand, though much altered, at 106 Greene Street. In 1887, the Woonsocket Electric Machine & Power Company bought the mills and the 300-horsepower water privilege and built a power generating station here, though Mill Number 2 was leased to the Valley Falls Company. The Blackstone Valley Electric Company, the successor of Woonsocket Electric Machine & Power, still owns Mills 1 and 4 as well as the surviving brick generating station, built about 1900. Mill Number 2 is owned by a manufacturer of aluminum doors and siding, though the upper floor is still used for textile manufacture. Power generating equipment was removed in the 1930s, and the dam, located just above the Bernon Street Bridge, has also been removed. The gates and headrace, rebuilt in 1911, still survive. One of the most important textile mill complexes in the state, the Bernon Mills have been entered on the National Register of Historic Places.

(NR, 1973; New England: Textile Mill Survey, Selections from the HABS, Number 11, 1971; Bayles; Richardson; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976; Dr. A. P. Thomas, Woonsocket, Highlights of History, 1800-1976, 1976.)



Ballou/Lippitt Mill (Julia C. Bonham).

JULES DESURMONT WORSTED MILL (1907)	Blackstone
Fairmount Street	19.291060.4653020
Woonsocket	Providence

Jules and George Desurmont, of Jules Desurmont et Fils of Tourcoing, France, built this 4-story, brick and concrete mill in 1907. The Desurmont Mill was an important part of that export of French and Belgian capital, management, and technology which dominated Woonsocket's worsted industry in the early-20th century. (see entry for Lafayette Mill). The Jules Desurmont Worsted Company, incorporated in 1909, was the largest spinning plant in Woonsocket exclusively using the French system of worsted spinning. In 1930, the mill, constructed of concrete with brick facing, operated 38,400 mule spindles and 12,000 twisting spindles while employing 625 workers. In 1931, a group of the mill's Belgian mulespinners founded the International Textile Union. Later known as the Industrial Trades' Union, the ITU drew partly on the traditions of French and Belgian syndicalism and presaged the CIO's mass organizational drives of the mid-1930s. Organized as a general union of workers in the Woonsocket area, the ITU grew to a position of impressive strength by the 1940s. With its base in the textile industry, however, the union's strength lapsed with the flight of Woonsocket's worsted mills to the South in the early 1950s. The Desurmont Mill is now used by a luggage manufacturer. (The Book of Rhode Island, 1930, photo p. 174; Gary Gerstle, "The International Textile Union of Woonsocket, Rhode Island, 1931-1946," unpub. seminar paper, Harvard University, 1976.)

FRENCH WORSTED COMPANY (1906-1910)	Blackstone
153 Hamlet Avenue	19.292920.4652720
Woonsocket	Providence

The two impressive 5-story, brick mills, built in a style similar to that of the former Lafayette Worsted mill on the opposite side of Hamlet Street, were constructed by the French Worsted Company between 1906 and 1910. Remaining construction was generally completed prior to 1924. Incorporated in Rhode Island, the French Worsted Company was the American branch of Charles Tiberghien and Sons of Tourcoing, France - a

large and prominent company with interests in Austria and Czechoslovakia as well as the United States. Woonsocket was selected as a site because earlier spinning plants used French technology had already been established and sufficient skilled labor was available. The mills produced worsted yarns along with specialty yarns made of wool, cashmere, camel hair, and silk blends. In 1930, twenty-four worsted carding machines, fifty worsted combs, and fifty mules with 28,000 spindles were operated by 600 workers. The building space is now divided among a number of small tenants, some of whom are still involved in textiles (novelty yarns and weaving). No original machinery or power generating equipment survives.

(The Book of Rhode Island, 1930, photo p. 166; Interview with John Guerin, Florence Dye Works, October 1975; Interview with Emile Benoit, Crimptex of Rhode Island, Inc., April, 1976.)

HARRIS MILL NUMBER 2 (1840-1842)
55-69 Main Street
Woonsocket

Blackstone
19.291620.4652780
Providence

Mill Number 2 of the Harris Woolen Company (incorporated 1862) was built in 1840-1842 by Edward Harris, a major woolen entrepreneur whose company owned scattered and extensive property in Woonsocket. The building, visible from the rear of the Main Street address, has five stories and a basement and is built of stuccoed-stone with quoined corners and a brick cornice. The roof is slightly pitched except over the ell where it is hipped. The mill produced wool cassimeres in fancy patterns. In 1889, three mills at the site ran 11,000 spindles with 125 workers. None of the other buildings survive. A commercial block, c. 1897, was built onto the mill on its northwest side. No historic machinery survives. (Bayles; Richardson; Sande.)

JENCKES MILL (1822-1828)
96 Mill Street (Number 1)
767 Social Street (Number 2)
Woonsocket

Blackstone
19.292900.4654320
19.292820.4654210
Providence

Job, Luke, and Moses Jenckes built the Number 1 Jenckes Mill in 1822 at the upper privilege of the Peter's River. This 3-story, stone structure, 72' X 35', has a pitched roof and clerestory monitor and is now largely obscured by 20th-century additions (1905-1965), some of which were built by the Dunn Worsted Company. Originally built for the production of cotton cloth, it is Woonsocket's oldest industrial building. A small dam is located upstream, but the mill's raceway has been filled in. The Jenckes family built the Number 2 Mill in 1828. Located just downstream, it is a random-coursed ashlar structure, three stories high with a clerestory monitor roof. A hipped-roofed wood belfry surmounts the mill's end tower. The belfry and the building's west side are now obscured by aluminum siding. The mill's dam, redone in concrete, survives adjacent to the Number 1 Mill, but the gates have been removed and the raceway filled in. In 1896, the mill was occupied by the Guerin Spinning Company. Joseph Guerin, a Belgian immigrant, was among the first to bring French textile technology to Woonsocket and likely the first to begin the social experiment of French-speaking management (See Lafayette Mill). The secretary of the Guerin Company in 1895 was Aram Pothier, later Rhode Island governor, and the major promoter of French investment in Woonsocket. Mill Number 1 is now used for light manufacture; Number 2 is used by a tire company. No machinery of historic note survives at either site. The Jenckesville district includes two mill worker houses, at 752 and 842 Social Street, and the 3-story, brick Federal mansion of the Jenckeses at 837-839 Social Street, built in 1828 and since altered with the addition of a 3-story front porch.

(Hall, photos pp. 303-4; Bayles; Sande; The Woonsocket Call, 12 August 1975, 25 August 1975; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976.)

LAFAYETTE WORSTED COMPANY (1889)
Hamlet Avenue
Woonsocket

Blackstone
19.292920.4652900
Providence

The Lafayette Worsted Company first began production in 1889 in a 4-story building on Hamlet Avenue. The complex grew rapidly and by 1930 occupied 567,200 square feet in four large buildings of three-to-five stories on the north side of Hamlet Avenue. The complex was designed by French mill engineer, Charles Loridan, and includes two small, 1½-story, mansard-roofed office buildings which are carefully and elaborately ornamented. The impressive brick mills with pilasters, segmental-arch windows and granite sills abutting each pilaster, were run by owners from France and Belgium. This was part of a conscious effort by the local elite to attract French ownership in order to more effectively manage a largely French-Canadian workforce. This was the first firm to import French technology, the Roubaix system, for the spinning of worsted yarn. Unlike the English or Bradford system, the French method sorted wool by fiber fineness, used no oil in the combing process, prepared roving without twist, and spun on mules. The company also had equipment for dyeing and Vigoreux printing, but did no weaving. In 1930, 800 workers were employed and produced over 300,000 pounds of yarn per week. The buildings are now sub-divided and are used for wire manufacture, and small-scale textile production and finishing. The wire company operates with new, high-speed Wardwell braiders, first invented c. 1907 by Simon Wardwell of Rhode Island. No original power generating equipment remains.

(Hall; The Book of Rhode Island, 1930, illus. p. 177.)

RIVER SPINNING COMPANY (1894)
Florence Drive and Villa Nova Street
Woonsocket

Blackstone
19.292800.4653000
Providence

W. F. & F. C. Sayles, prominent Rhode Island mill owners, built the River Spinning Company Mills in 1894 from the designs of C. R. Makepeace & Company, a Providence mill engineering firm. Built on a ten-acre lot and using 110,000 square feet for production, River Spinning manufactured fine yarn of merino and

wool mixtures with French, English and American machinery. A 300-horsepower Harris-Corliss steam engine provided power. River Spinning owned the entire complex until 1928-1929 when part of it was sold to the Florence Dye Works. The latter firm, a commission dyer of cloth, yarn, raw wool, and synthetic fibers, continues to occupy the 1-to 2-story brick structure on Florence Drive. The main mill, a 4-story, brick-pier building with a 6-story tower, remained River Spinning until the late 1930s. It is now occupied by a manufacturer of filters, scouring pads, and industrial mesh wire. No historic machinery survives.

(Hall, photo p. 218; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976; Interview with J. Guerin, Florence Dye, July 1977.)

Manufacturing

ALICE MILL (1889)
Fairmount Street
Woonsocket

Blackstone
19.291040.4652040
Providence

The Woonsocket Rubber Company built this impressive 4-story, brick mill, with Italianate-style twin towers of six stories each, in 1889 and named it after the mother of owner, Joseph Banigan. Originally 360' X 82', with two wings, each 250' X 50', and built on a granite foundation, this was the largest rubber footwear plant in the world according to one early 20th-century source. In the same period, the mill employed 1,500 workers in the production of rubberized fabric shoes and boots. The Woonsocket Rubber Company, established in 1864 by Lyman Cook, S. S. Cook, and Irish immigrant Joseph Banigan, had its origin on Island Place, once occupying the Metcalf Machine Shop building (1846). Another plant in Millville, Massachusetts, was erected in 1882 prior to the purchase of twenty acres at the Fairmount Street site. In 1892, the mill was sold to the United States Rubber Company, who maintained rubber production here until 1932. It is presently owned and occupied by Tech Industries, makers of plastic caps for the cosmetic industry. (Hall; Bayles; The Woonsocket Call, 3 February 1975, 3 March 1975; Factory Mutual System Insurance Drawing, 17 November 1955.)

WARDWELL SEWING MACHINE COMPANY	Blackstone
TAFT-PIERCE MANUFACTURING COMPANY	19.291900.4653660
Mechanic Avenue and (1858-1942)	Providence
Pond Street	
Woonsocket	

Originally the site of the Elliot Lumber Yard and Planing Mill, the Wardwell Sewing Machine Company occupied this brick complex by 1895. The Wardwell Company incorporated in 1886, was named for Simon Wardwell, the company's first superintendent and a prolific inventor. Wardwell, in a career that stretched into the 20th century, held important patents on sewing machines, the Universal winder, and the high-speed braider. He left the firm within a year and Edwin J. Pierce became the new superintendent. In the 1890s, the company manufactured sewing machines and the Columbia Bar-Lock Typewriter with 200 skilled machinists. By 1901, the plant's ownership had changed to the Taft-Pierce Manufacturing Company but Edwin Pierce remained as agent and superintendent. Taft-Pierce operated a job order machine shop in three and one-half acres of floor space. The company built machines for Universal Winding of Cranston (see separate entry), American Knitting of Woonsocket, the Lanston Monotype-Machine Company of Washington, D. C., the Tabulating Machine Company of Washington D. C., and the McTammany Ballot Company of Providence. Taft-Pierce continues to occupy the brick complex, most of which was built in the period from 1898 to 1919, though some sections are earlier. Taft-Pierce also built the 5-story, reinforced-concrete and brick Bancroft Building in 1916. Located on Bancroft Court, immediately west of Taft-Pierce, the building is now owned and occupied by a manufacturer of tennis rackets. Taft-Pierce still makes machine tools and precision measuring instruments, but no pre-1920 machinery is said to survive.

(Bayles; Hall, illustration p. 76; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976; Interview with F. Steele Blackall, III, Taft Pierce, July, 1977.)

WOONSOCKET MACHINE & PRESS COMPANY
533 Second Avenue (1891-1895)
Woonsocket

Blackstone
19.290600.4653160
Providence

Once a large and important textile machine shop, only the 3-story, stone and brick building facing Second Avenue now survives. Willis and Lyman Cook started the business in 1825, and the company went by a variety of names until it was incorporated as Woonsocket Machine & Press in 1884. The company moved to the Second Avenue site in the Fairmount section of Woonsocket six years earlier. In 1879-1880, they built a stuccoed-stone machine shop here. Once attached to the south side of the surviving structure, it has since been destroyed. After buying out the well-known Providence Machine Company (see separate entry) in 1888, Woonsocket Machine & Press followed a policy of aggressive expansion. In 1891, they built the surviving stuccoed-stone section to house the fly frame and pattern departments. In 1895, the company added the brick section on the north end for the use of the setting-up and shipping departments. In the same year, a pattern storage building was added on the east end of the site, and by 1901, the grounds contained an extensive network of buildings, including a foundry, engine room, and hanger department. None of the post-1895 buildings now survive. The company achieved its greatest prominence for improvements in the gearing, drive, and tension regulation of fly frames in the early 1890s, and employed 650 workers by 1901. A textile waste company now owns the surviving building.
(Bayles; Hall; illus. p. 285.)

Utilities

WOONSOCKET GAS COMPANY GASHOLDER HOUSE Blackstone
313 Pond Street (c.1860) 19.291980.4653680
Woonsocket Providence

Originally part of the Woonsocket Gas Company (organized February, 1852) this twelve-sided, brick gasholder house, one of four owned by the company, was constructed c. 1860 by Gardiner and Emory Warren, the builders of

the entire gas works. The structure, the only one left in Woonsocket, is similar to others in the late 19th century, and was designed to shelter iron gas-holders from the elements (ice formation could prevent the vertical movement of the holders, necessary to meet the changing volume of gas). Since c. 1925 it has been occupied by a specialty wood-working company. At that time, the gasholder's interior guide rail was removed, a floor was built, and openings were created for windows and doors. The brick and plaster basement pit with its convex floor was partially filled in with dirt. In the early 1950s, a ceiling was added covering the solid spruce hip beams and iron-truss work framing the domed roof. The twelve beams are approximately forty-five feet long and measure 7" X 14". The roof is slate and the iron cupola, minus its peak, is still in place. The structure is approximately seventy feet in diameter and twenty-two feet high (measured from floor to top of brickwork). It is the best preserved gasholder house in the state. (Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC; Bayles; Interview with current owner, February 1976; R. Vogel, Ed., A Report of the Mohawk-Hudson Area Survey, 1973.)

Transportation

HARRIS WAREHOUSE (1855)	Blackstone
61 Railroad Street	19.291740.4653060
Woonsocket	Providence

This 3-story, stone-rubble structure, with a brick cornice, was built with a distinct curve to accommodate railroad tracks. Built by Edward Harris, a prominent local industrialist, in 1855, the building was used as a wool warehouse through the 19th century. A railroad spur, from the main line of the Providence & Worcester entered the warehouse through the large opening on the south side and is plainly visible on a map of 1870. By 1895, the spur had been dismantled, but the building was still in use. The interiors are plastered and have heavy framing supporting the plank floors. The Harris Warehouse, entered on the National Register of Historic Places, has been converted to use as an office and workshop by the owner of a contracting firm. (Beers; Everts and Richards; NR, 1976.)

WOONSOCKET RAILROAD STATION(1882-1883)Blackstone
 North Main and High Streets 19.291840.4653000
 Woonsocket Providence

The Providence & Worcester Railroad built the first station on this site in August, 1847 and remodeled it in the summer of 1872. Ten years later (January 1882) a fire destroyed the structure. Work began on the current passenger station in July, 1882. The plans were drawn up by John W. Ellis, and Cutting and Bishop of Worcester supervised construction. It opened for service 11 March 1883. The building is brick, 164' X 47', two stories in front with freestone trim and a slated Gothic roof. Stone piers, constructed in 1846-1847, support the elevated tracks on the north side of the station. Rehabilitated in 1971-1972 by Develco Inc., the station now houses a restaurant and the Providence and Worcester Company headquarters. (Bayles; Engineering News, 19 March 1887; Woonsocket Evening Reporter, 26 July 1882.)

Bridges

BERNON STREET BRIDGE (1912) Blackstone
 Bernon Street 19.291820.4652670
 Woonsocket Providence

This 3-span, reinforced-concrete bridge, designed by Woonsocket City Engineer Frank H. Mills, carries a highway across the Blackstone River. Built in 1912, it is 199 feet long and 50 feet wide. Two of its three-centered arches have a span of 53 feet. It is in poor condition and is scheduled for replacement. (Woonsocket City Engineer's Files, Woonsocket Rhode Island, Statewide Preservation Report, RIHPC, 1976.)

COURT STREET BRIDGE (1895) Blackstone
 Court Street 19.291960.4652870
 Woonsocket Providence

The Court Street Bridge, built by Dean & Westbrook of New York in 1895, consists of four pin-connected, Pratt deck trusses. 509 feet long, and supported on large

granite abutments and piers, the bridge carries a highway 60 feet above the Blackstone River. The roadbed consists of open steel grating and was installed in 1938. Further repairs, including the addition of new guard rails, were undertaken in 1960.

(Woonsocket City Engineer's Files; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976.)

GLOBE BRIDGE (late 19th century-1903) Georgiaville
South Main Street 19.291440.4652530
Woonsocket Providence

The Globe Bridge carries a highway over the Blackstone River just below Woonsocket Falls. The first bridge at this site was built in 1726. The present bridge consists of two arched spans. The west span, built in 1903, is a barrel-vaulted, masonry-faced concrete section, 44 feet long. The segmental-arch, 60-foot east span incorporates a masonry section, probably built in the latter half of the 19th-century, with a concrete extension added in 1903 to provide greater width. The central pier rests on a rocky outcrop in the river. Frank H. Mills, Woonsocket City Engineer, designed the 1903 improvements.

(Woonsocket City Engineer's Files; Woonsocket, Rhode Island, Statewide Preservation Report, RIHPC, 1976.)

Specialized Structures

LYMAN-ARNOLD TRENCH (c. 1827) Georgiaville-Blackstone
Under and beside Main Street 19.291440.4652600
Woonsocket 19.291800.4652920
Providence

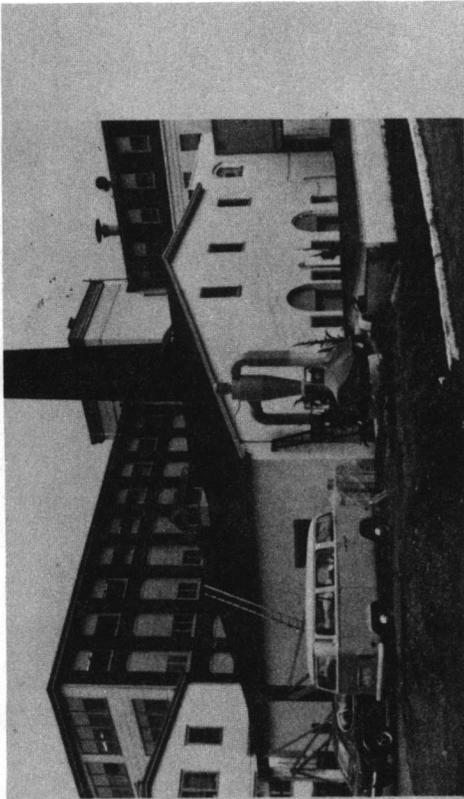
Built about 1827 and expanded and improved later, the Lyman-Arnold (or Main Street) Trench once powered a series of textile mills located close to Woonsocket Falls. The water power at the falls had been first developed in the 1690s when Richard Arnold built a small sawmill. In the 18th century, John Arnold's grist mill and carding mill and the "Winsokett Iron Mill," a bloomery owned by a group of Quakers, used the power of the falls. All of these structures were destroyed

in the flood of 1807. The following year, James Arnold began the construction of a series of six, small wood-frame mills which he completed prior to 1818. Space in these structures was rented to Welcome Farnum, Dexter Ballou, and others who began limited textile production. In the 1820s, larger and more substantial mills were erected; the Ballou Mill, on the "sawmill lot," 1821; the Bartlett Mill, a 4-story, stone structure which continues to stand on Bernon Street, 1827; and Hosea Ballou's brick mill, located on the site of the current Ballou/Lippitt Mill, 1827 (see separate entry). These larger mills required greater power and new raceways had to be built. The Lyman-Arnold Trench seems to have originally powered the Ballou/Lippitt Mill, though it later provided power for other textile mills. Now partially covered over, the trench consists of a main spillway paralleling Main Street, and a series of short right-angle power canals and wasteways which once emptied into Clinton Pond, since filled in. It was a key element in Woonsocket's complex and interconnected water power system, a system complicated by the proximity of two Blackstone Canal locks (see separate entry). Along with a portion of the Bartlett Mill power canal, the Lyman-Arnold Trench is the oldest surviving element of Woonsocket's water-power system. By the late 19th century, the trench provided power for the Number 2 generating station of the Blackstone Valley Electric Company, located in a part of the former Buckland Building (c. 1897) and for the Main Street Power and Electric Company, located in the basement of the Commercial Building (1902). Used for power generating until the 1930s, the Lyman-Arnold Trench now contains only ground water.

(Bayles; Richardson; Woonsocket, Rhode Island, Statewide Preservation Report; Dr. A. P. Thomas, Woonsocket, Highlights of History, 1800-1976, 1976, Photos, pp. 18-24.)

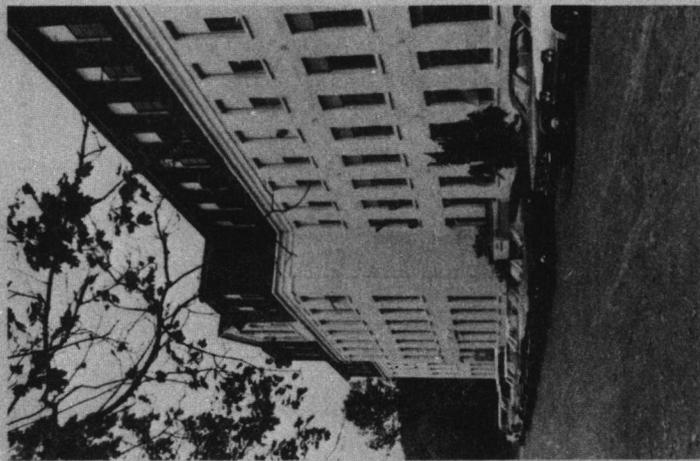
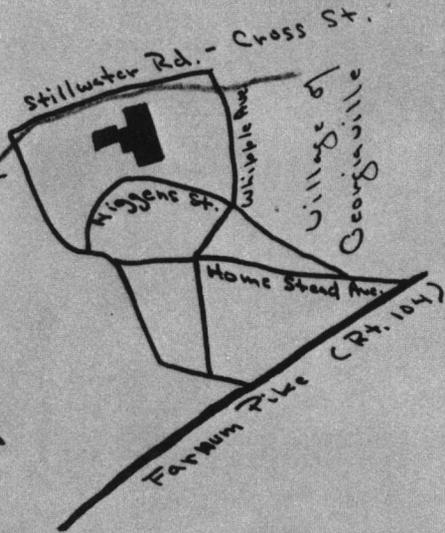
HAER Sample Card

EXISTING SURVEYS	DATA	DWGS	PHOTOGRAPHS	STATES	SUB-CLASSIFICATION
<h1>HAER INVENTORY</h1>					
1. NAME OF STRUCTURE Georgiaville Mills	2. DATE 1853	3. NATURE OF STRUCTURE cotton mill	4. INDUSTRIAL CLASSIFICATION BULK; TEXT: COTTON 15.0	5. USGS QUAD MAP & UTM GRID REF. Georgiaville	
5. LOCATION: STREET & NUMBER 15 Higgins Street	CITY OR TOWN Smithfield	COUNTY Providence	STATE RI	19.292000, 4640120	
7. OWNER OF PROPERTY Industrial Machine Corporation	ADDRESS Same as #5	8. CONDITION: <input type="checkbox"/> EXCELLENT <input checked="" type="checkbox"/> GOOD <input type="checkbox"/> FAIR <input type="checkbox"/> DETERIORATED <input type="checkbox"/> RUINS <input type="checkbox"/> UNEXPOSED <input checked="" type="checkbox"/> ALTERED <input type="checkbox"/> ACCESSIBLE TO PUBLIC			
9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE. ENGINEER; ARCHITECT; DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.					
<p>The first mill on this site was built in 1813. It was three stories, 80x36, stuccoed stone with a trap-door monitor and an open belfry. The mill was dismantled in 1951. In 1828 and again in 1846, additions of similar size were built. They survive, though greatly altered, on the north side of the main building. The main mill was built in 1853 by the noted inventor-entrepreneur, Zachariah Allen. It is four stories, the first three of stuccoed stone, the fourth (added later) of brick, with small, centrally located, pedimented gables on the south, east, and west. Two three story boarding houses of stone rubble (1853-5), built in the same style, also survive, as do numerous examples of worker housing, some c1813. In 1854 Allen experimented with hollow shafting, running at three times the rpm of solid shafting, and drove machinery by placing belts directly on the shaft, dispensing with the use of pulleys. Although the experiment attracted international attention, the system never became widespread. The buildings are still used for manufacture.</p>					
10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.					
11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTO GRAPHIC RECORDS) CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS Zachariah Allen, Diary, 1853, Library of the R.I. Historical Society. H.R. Hitchcock, Rhode Island Architecture, 1939, (photo 1813 mill, plate 31, photo 1853 mill, plate 37). T. Steere, History of the Town of Smithfield, 1881. Interview with Robert Kalberer, part-owner, Industrial Machine Corp., Nov., 1975.					
12. DANGER OF DEMOLITION OR DAMAGE <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
NATURE OF THREAT					
14. EXISTING SURVEYS <input type="checkbox"/> NHL <input type="checkbox"/> NR <input type="checkbox"/> HAER <input type="checkbox"/> STATE <input type="checkbox"/> COUNTY <input type="checkbox"/> LOCAL <input type="checkbox"/> OTHER					
AND DATES:					
15. INVENTORIED BY: YOUR NAME G.B. Kulik ADDRESS Slater Mill Historic Site AFFILIATION Slater Mill Historic Site DATE 16 Dec 75					
PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240					
BUILDING TECHNOLOGY (BLD TECH) SPECIALIZED STRUCTURES (SPEC STRUC) BRIDGES TRANSPORTATION (TRANS) POWER SOURCES & PRIME MOVERS (PS & PM) COACH PLANTIES (PLN)					



Wormsley Park River

(North east side)



(South Side)

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U. S. administration.