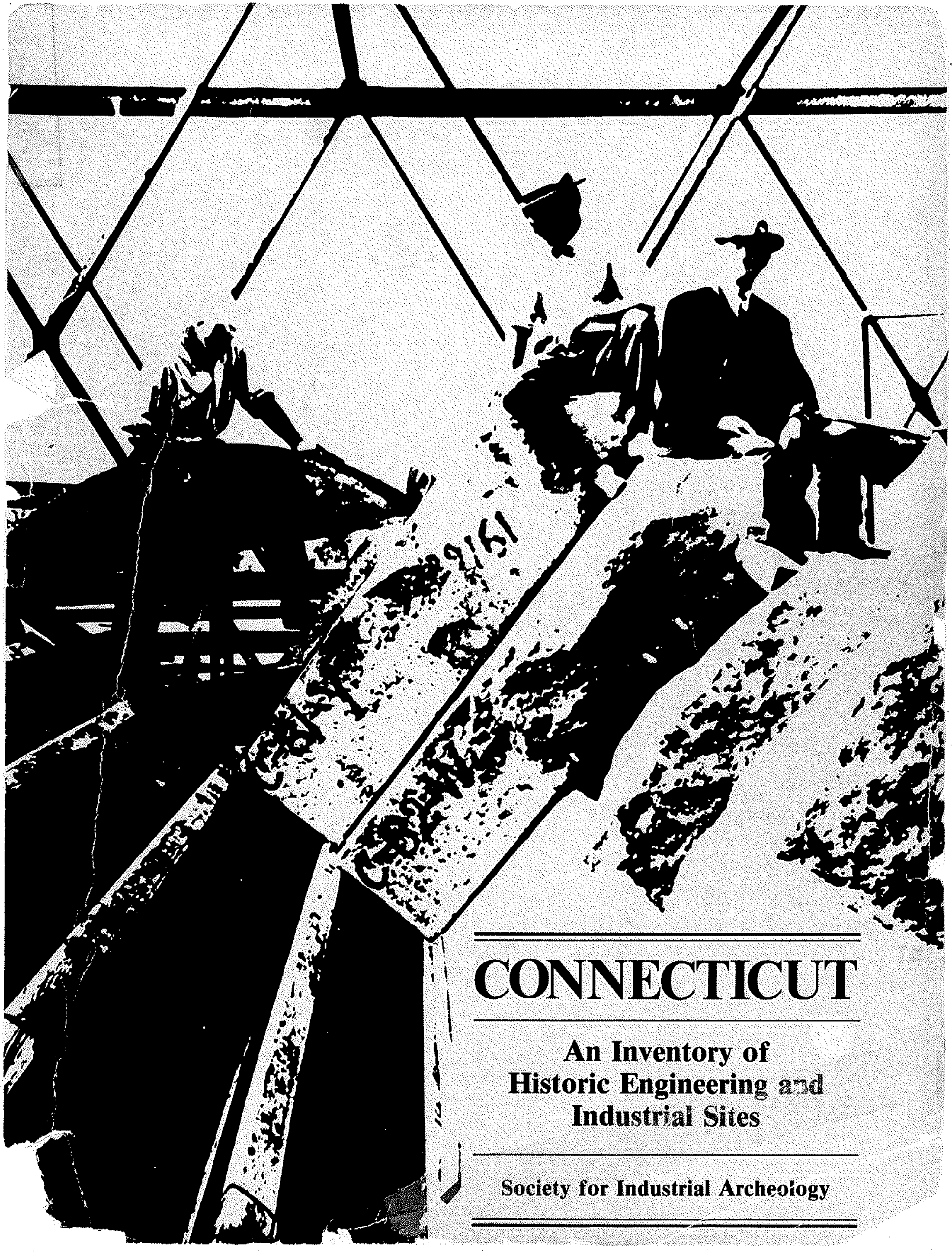

CONNECTICUT

An Inventory of Historic Engineering and Industrial Sites

Society for Industrial Archeology

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An Inventory of Historic Engineering and Industrial Sites

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Society for Industrial Archeology
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THE CONNECTICUT HISTORICAL COMMISSION is a state agency responsible for the preservation of Connecticut's heritage. The Commission contains the State Historic Preservation Office, which conducts and assists surveys to identify significant cultural resources, nominates properties to the National Register of Historic Places and administers programs providing financial assistance and federal income tax benefits to encourage the continued use of historic properties. In addition to these programs administered in conjunction with the Department of the Interior, the Connecticut Historical Commission operates several historic sites and carries out other heritage preservation activities under state law.

HISTORIC AMERICAN ENGINEERING RECORD joins state or local organizations to inventory an area's historic engineering and industrial sites. The inventories serve as planning tools for administration of state and federal preservation programs. Through distribution to libraries, museums, universities and the general public, the inventories expand the awareness of engineering and industrial history and stimulate interest in a significant part of our American heritage.

THE SOCIETY FOR INDUSTRIAL ARCHEOLOGY promotes the study of the physical survivals of our technological and industrial past. It encourages and sponsors field investigations, research, recording, and the dissemination and exchange of information on all aspects of industrial archeology through publications, meetings, field trips, and other appropriate means. The SIA also seeks to educate the public, public agencies, and owners on the advantages of preserving, through continued or adaptive use, structures and equipment of significance in the history of industry, engineering, and technology.

Beginning with the New England Textile Mill Survey in 1967, the MERRIMACK VALLEY TEXTILE MUSEUM has co-sponsored inventories, publications and tours designed to educate a wide audience about the importance of industrial history. By assisting with this inventory the Museum recognizes and participates in the ongoing work of industrial archeology.

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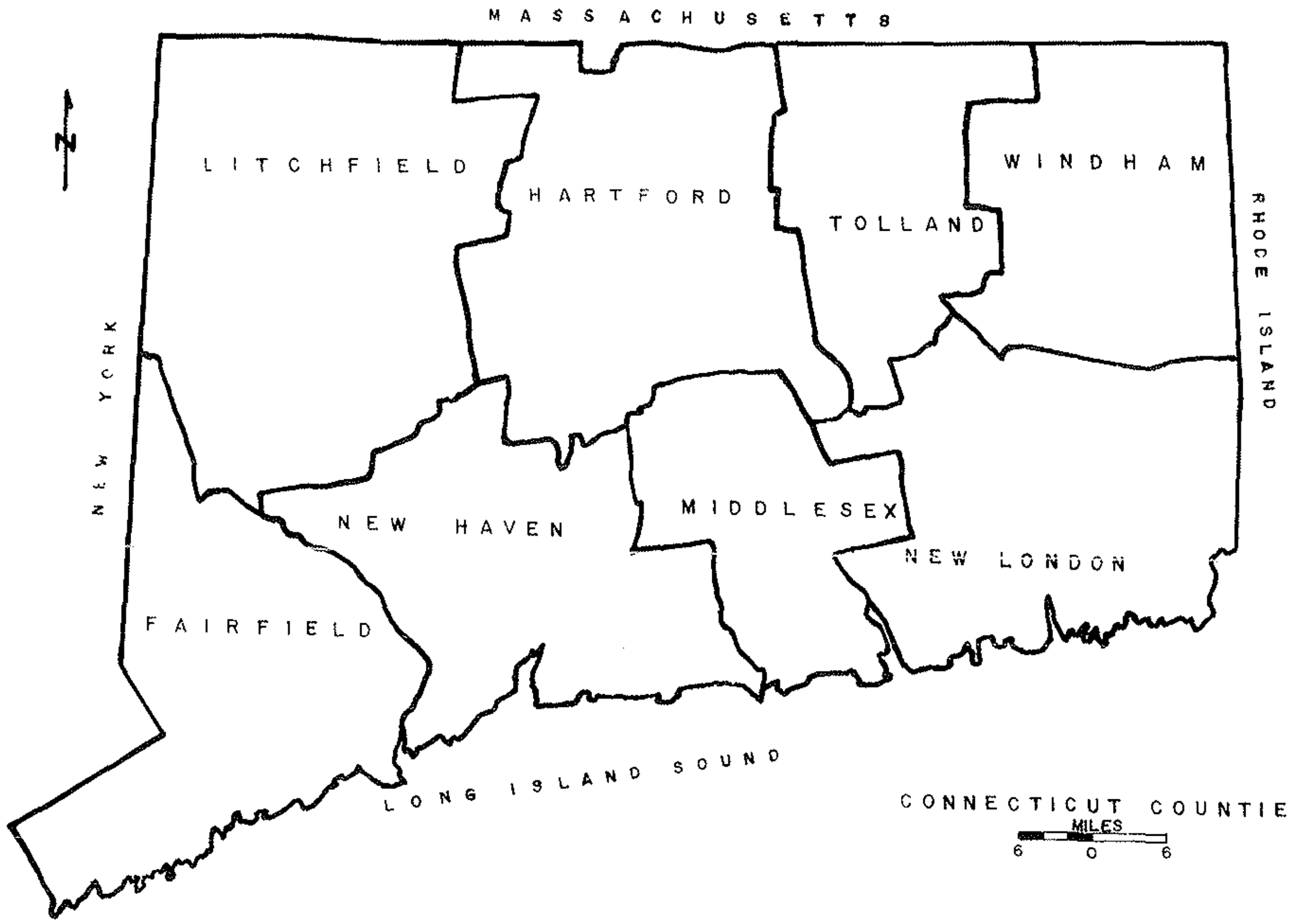

CONNECTICUT COUNTIES

PREFACE

In 1978 the Connecticut Historical Commission initiated the Connecticut Inventory Project. The Commission, which serves as State Historic Preservation Office for Connecticut, entered into a cooperative agreement with Historic American Engineering Record (HAER), U. S. Department of Interior, which provided technical assistance and supplies and hired Matthew Roth to serve as Project Director. Connecticut Historical Commission funded the project and provided office space.

In the first two years of the project some 450 historic engineering and industrial sites were recorded on HAER Inventory Cards, the standardized forms for the agency's national inventory program. Completed cards will be placed in the Library of Congress, in the HAER office, and in the Connecticut Historical Commission files. Each card features a brief history and description of the site, references, photographs, sketch map, ownership information and, for precise geographic location, the Universal Transverse Mercator (UTM) grid coordinates for the site.

In the fall of 1980 the Society for Industrial Archeology took on the task of publishing the inventory with funds provided by the Connecticut Historical Commission and HAER. In preparing the publication many entries were rewritten, and in some cases several individual card-entries were combined into one. About 50 entries for railroad stations and post-1900 steel highway bridges have not been included in the publication; selected examples of the latter appear with no text. Rewriting for the publication provided the opportunity to expand some entries in order to delineate more fully the course of industrialization in Connecticut. Information on the cards, however, does constitute the overwhelming majority of the entries in this publication.

Entries have been arranged by county in order to convey the regional specialization of Connecticut industry and to ease comparison between similar sites. Within counties entries are grouped according to HAER's Industrial Structures Classification, and within these classifications entries are listed by town. The left-hand side of the heading for each entry contains the name(s) of the site and the date of the earliest standing structure, the address or vicinity of the site, and the city or town. Many town designations have two names, such as Higganum/Haddam; in these cases the first name denotes an unincorporated village and the second name indicates the politically recognized town containing that village. Incorporated boroughs within towns, such as Rockville, have only the borough name. The right-hand side of each heading features the United States Geological Survey Quadrangle (7.5 Minute Series) on which the site is located and the UTM grid coordinates. Some entries that cover a linear system, such as a canal or railroad, have two sets of UTM coordinates, each representing one end-point of the system. References, in parentheses, follow the text of each entry.

The inventory presents the broad scope of historic industry in Connecticut; it is not a definitive list of historic engineering and industrial sites. The general criteria for site selection emphasized the inclusion of examples for each of the incredible number of industrial pursuits found in the state and, within each industry, the inclusion of examples of the various types and sizes of production unit. This work owes much to Gary Kulik for summarizing, in his Rhode Island: An Inventory of Historic Engineering and Industrial Sites (1978), more specific criteria that bear on site selection. These criteria have been adopted here, with some adjustment and additions to make them correspond more fully with the Connecticut experience. Sites were included because of their national prominence (Colt Armory, Seth Thomas Clock Co.), their importance in business, labor or technological history (Union Metallic Cartridge Co., Loewe Hat Factory, Collins Edge Tool Works), or their representation of a particular engineering form (Sharon Valley Lenticular Bridge, Malleable Iron Works). Other sites were selected because they are part of significant systems (Niantic River Bascule Bridge, Quebec Village), because they help to portray the variety of size and type of production unit in a particular sector (Harriman Aircraft Works, Atlantic Screw Works), or because they demonstrate unusual practice (King Post Bridge, Connecticut Gables). Still more entries are included because they are representative of the state's industrial base (Mt. Riga Blast Furnace, Cheshire Manufacturing Co.), because they were the largest of their kind (Scovill Brass, Bigelow-Hartford Carpet Mills) or because they were designed or built by prominent architects or engineers (New London Union Station, Seaside Park). In the belief that failure can be as instructive as success, an effort has been made to include enterprises which suffered early doom (Falls Village Canal, Paige Compositor). Finally, the highest priority for inclusion was accorded to those sites which retain significant operating equipment (Messerschmidt Hardware Mill, Gurleyville Grist Mill). In sum, the inventory takes national, state and local significance into account in the attempt to examine the fullest possible range of Connecticut's industrial and engineering history.

T. Allan Comp, Senior Historian at HAER before his transfer to other duties, played a crucial role in the Connecticut Inventory Project. He initiated HAER's participation, gave valuable critique of the work, and served as liaison between the

project and the HAER staff. Donald C. Jackson, Staff Engineer, provided technical advice. Marjorie Baer, Donna Ware and particularly Jim Green shepherded the project through administrative channels. Larry Lankton and Jean Yearby also gave important help when it counted. Midway through this project Robert Kapsch became chief of the new National Architectural and Engineering Record, under which HAER and the Historic American Buildings Survey maintain their separate identities and programs. He unfailingly supported this inventory and demonstrated his commitment to documentation projects by breaking precedent to allow the Society for Industrial Archeology to publish this volume.

John Shannahan, Director of the Connecticut Historical Commission, and Clark Strickland, Deputy Director, placed the considerable talents of their staff behind the inventory. John Herzan, Judith Paine and Thomas Fisher advised on architectural descriptions and, along with Marion Leonard, Linda Spencer and Herbert Darbee, read drafts of many entries. Staff Archaeologist David Poirier alerted me to innumerable sites and participated in many field trips. Eileen Biernacki handled the correspondence and clerical work with her customary aplomb. The Commission's survey program, headed by Judith Paine, brought many sites to the inventory. Of greatest impact were the surveys conducted in Middletown by the Greater Middletown Preservation Trust, under Joellen Kuhnlein and Barbara Ann Cleary; in Norwalk by the Norwalk Historical Society and Ralph Bloom; in Rockville by the Vernon Historical Society and S. Ardis Abbott; and in Plainfield by Hal Keiner and Bruce Clouette. The National Register program for Connecticut, administered by John Herzan, provided data on many sites. Particularly helpful were the National Register nominations by Renee Kahn and Stephen Hirschberg on Yale and Towne, Hal Keiner on Wauregan Mills, and George Adams on Cheney Brothers Silk Mills.

Esp. gd. NR; Yale & Towne, Wauregan, Cheney.

Bruce Clouette of the University of Connecticut has written most of the National Register nominations for Connecticut industrial sites. His work fulfills the important and intriguing potential of the merger between documentary and artifactual research. Many of his nominations were simply paraphrased or rearranged to fit the inventory format. The entries so constructed are: the iron furnaces of Kent, Sharon, Beckley and Roxbury, Gillette Grist Mill, Pitkin Glass Works, Stonington Harbor Lighthouse, Waterbury Union Station, Ponemah Mills and Boardman's, Lover's Leap, Comstock, Willimantic and Riverside Ave. Bridges. Major portions of the respective entries derive from his nominations for Colt Armory (with C. Anstress Paine) and Enfield Canal. Clouette also made site visits and bibliographical suggestions that shaped the entries for Schwartzmann Mill, Bridgeport Wood Finishing Co., Gurleyville Grist Mill, Norwich and Worcester Tunnel and National Thread Mill.

Clouette ✓

The Merrimack Valley Textile Museum deserves a large portion of the credit for this publication. From the start of the project, Librarian Helena Wright and Curator Laurence Gross facilitated my use of the collection of textile-mill insurance surveys held by their museum. They both edited the entire draft inventory, improving it immeasurably, and they arranged for Marion Hall of their staff to type the copy for publication, a trying effort which she executed with grace and skill. The advice, encouragement and resolve of Helena Wright are directly responsible for the publication of this work.

Special thanks are offered to Victor Darnell. The entries on lenticular trusses reflect his extensive fieldwork and his research in the papers of Berlin Iron Bridge Co. His engineering expertise informed many of the bridge entries and he wrote drafts for Berlin Iron Bridge Co. Plant, Berlin Construction Co. Plant, and Mill Hill Rd., Black Rock Turnpike and Berlin Plate Girder Bridges.

Ann Smith, Director of the Mattatuck Museum in Waterbury, allowed free access to the museum's research and collections on that city's industrial history. Particularly valuable was Cecelia F. Bucki's "Waterbury Industrial History, 1820-1920," prepared for the museum; combining rigorous primary research with the imperatives of public historical programs, this is the very best work of local history in Connecticut.

T. E. Leary, Director of the HAER Western New York Inventory, read the entire draft of this inventory. Any value this volume holds owes much to his detailed and perceptive criticism. Gary Kulik of the National Museum of American History, Smithsonian Institution, also read the entire completed draft, but his most significant contribution was in setting, with his Rhode Island Inventory, a standard of performance that has been helpful to emulate, if impossible to match. Patrick M. Malone of Slater Mill Historic Site, Pawtucket, RI, offered constant advice, most notably on the Terry Water Wheel, and permitted the use of rare books from the Slater Mill collections. The enormous and freely-offered files of Robert M. Vogel, National Museum of American History, gave the project its initial momentum, and his research on the Burdon Steam Engine and Cos Cob Power Plant formed the basis for those entries. Lou Magno researched in the Hartford City Records, as did Stephen Victor (Slater Mill Historic Site) in New Haven and Charles Brilvitch in Bridgeport. Victor and Brilvitch also aided with the fieldwork in their cities, and Brilvitch contributed his voluminous files of clippings from Bridgeport newspapers. Kenneth Larson and Ira Yellen identified many historic industrial sites in New Britain. Michael Raber wrote the initial draft for Farmington Canal and drew the map of Connecticut counties which appears herein. Robert Bickford wrote the initial draft for Warehouse Point Power House. Marlene Nicoll, Treasurer of the Society for Industrial Archeology, smoothed the all-important financial arrangements for the publication. Tink Henderson handled the printing arrangements.

Most of the documentary research was conducted at the Connecticut State Library, where the efforts of Ann Barry, Julia Crawford and Kristin Woodbridge were indispensable. Roger Parks and Richard Candee welcomed my use of the research files at Old Sturbridge Village from Candee's survey of Quinebaug Valley mills. The many town libraries that hosted this research are too numerous to list, although it should be noted that these repositories hold significant materials for the historian and industrial archeologist; Portland's Buck Library, for instance, has a collection of photographs depicting work in the town's quarries in the 1890s.

The complete roster of industrial employees and proprietors who gave their time, knowledge and access to records is also too long for individual mention, but the contributions of the following people compel acknowledgment: Harvey Lippincott, Peter Comstock, Charlie Messerschmidt, Bob McCandlish, Jack Bucklyn, Ray Jones, Don Sosebee, Fenelon McCollum, Jr., David Schoales and William Shanahan.

Of course, responsibility for any errors in fact or judgment lies with me.

Matthew Roth
Portland, CT

INTRODUCTION

After a brief period of Dutch control in the Connecticut River Valley, English-born settlers from the Massachusetts Bay Colony became the first permanent, white inhabitants of Connecticut in the 1630s. They first settled along the coast of Long Island Sound and in the valleys of the three river systems that form the state's most prominent landscape features: the Housatonic in the west, the Connecticut in the center and the Quinebaug-Shetucket-Thames in the east. Subsistence agriculture and a barter economy sustained the first generation of colonists; export of forest products prompted some mercantile and shipbuilding activity in the ports and lower river valley towns. By the early eighteenth century commercial agriculture began, based on stock-raising and market crops, and settlement reached the broad highlands between the river valleys. Population growth, the formation of new towns and increasing participation in the West Indian trade created new opportunities for commerce and production. Intermediate market centers were established between interior towns and ports. The basic crafts of the agricultural economy were turned to profitable enterprise, as each town had its blacksmith, carpenter, shoemaker and mason. Saw, cider and grist mills had served every town from initial settlement. Distilleries produced gin and rum for export or to stock the taverns that dotted the colony's growing road system.

The first half of the eighteenth century saw the beginnings of market-oriented production of consumer hardware such as buttons and household utensils. Shops throughout the colony turned out scythes, rakes and other farm implements. In the 1730s a bloomery began processing the rich hematite iron ore of northwest Connecticut around Salisbury. A Scottish tinsmith opened a shop in Berlin in the 1740s. Considerable economic growth occurred in the second half of the eighteenth century. When France and England went to war in 1754 and curtailed commercial shipping to their West Indian colonies, Connecticut merchants and seamen capitalized on this opportunity for export trade, bringing new wealth into the colony and increasing demand for the products of Connecticut's farms, forests and shops. During the Revolution Connecticut earned the nickname "provisions state" by supplying meat and produce to the Continental and French armies. The iron industry received a tremendous boost in filling orders for cannon, chain and shot for the American Navy. The Revolution left Connecticut relatively unscarred and with an improved road system due to repairs and new construction undertaken to facilitate movement of troops and supplies.

As a result of the even settlement of Connecticut, virtually all the agricultural land was occupied. Many family farms had been subdivided into minimal plots, and undivided farmsteads strained to support large families. Massive emigration ensued in the early decades of nationhood as Connecticut people moved to western New York, Pennsylvania and the Western Reserve (Ohio). Hartford and New Haven became regional distribution centers, and their rivalry for control of trade with the upper Connecticut River valley culminated in the construction of competing canals in the 1820s. Iron production accelerated in the northwest. Rhode Island-based textile entrepreneurs introduced factory production into Connecticut in 1807, building the state's first cotton mill in present-day Putnam. But of even greater significance for Connecticut, the textile industry had begun to demand machine-building capabilities that later would exert powerful influence on the production of metal goods and metalworking machinery. These sectors represent Connecticut's pre-eminent contribution to industrialization in the United States.

1st cotton mill in Conn 1807, Putnam

machine building

Hardware and Brass, 1800-1850

The central counties of Hartford, New Haven and Middlesex, where hardware manufactures came to concentrate, had none of the raw materials for hardware production. Some of the larger streams, such as the Farmington and the Naugatuck, would eventually power large factories, but generally the east and west highlands offered superior water power sites. Economic ambition and defensive independence--traits consistent with the small-scale manufacturing proprietorship--characterized the people. The only other factor that tended to encourage manufactures was the well-established itinerant marketing system of the peddlers. These hawkers reached all the states and much of the frontier, contributing not only a means by which hardware shops could sell their goods, but also acting as rudimentary market researchers, telling the producers which goods would sell in destination markets. The peddlers' importance passed quickly though, and by the mid-1830s the overwhelming majority of Connecticut's manufactures were sold through commission merchants in Hartford, New Haven, New York and more distant east-coast cities.

Manufactures grew quite slowly. Non-textile manufacturing establishments employed an average of less than 20 people before 1840; excluding Hitchcock's chair factory and the arms factories of Whitney, North and Starr, average employment per manufacturing establishment was considerably lower. And even including textiles and firearms, less than ten per cent of the state's population in 1845 (approximately 350,000 people) worked in manufacturing.

A tendency toward local specialization in products was apparent by the 1840s. The towns that would become hardware centers were not directed toward a particular field of manufacture by the presence of a raw material, because all these towns suffered from uniformly low resource endowments. Local specialization seems rather to have grown from a series of fortuitous choices and events of apparently small import that encouraged and maintained the accretion of particular skills and commercial connections in the towns. For instance, William Barton moved to East Hampton (probably from Springfield, Massachusetts) and opened a bell shop in 1808. His few workmen began their own shops after learning enough from Barton to do so, and they trained more local farmers' sons in bell production. The casting and finishing skills of bell-making were applied to other products as well, such as coffin trimmings, but the majority of the East Hampton shops made bells. By the 1830s East Hampton had a substantial skill base in the field, and merchants in the urban centers could depend on the East Hampton shops to fill orders for bells. Around 1800 three men from New Britain (which was not yet a town) each sent a son to learn casting at a Massachusetts foundry (again, probably in the Springfield area). Upon return they established small shops to make household and agricultural hardware, changing products upon the advice of the peddlers who sold for them. By the 1830s the production of builders' and cabinet hardware already predominated in the New Britain shops. Tinware production centered around Berlin, where the Scottish tinsmith, Edward (?) Pattison, had settled in the 1740s. Eli Terry, after learning the clockmaking trade in Norwich, set up a shop in Plymouth; one of his partners, Seth Thomas, who had been a carpenter, opened his own shop in the area. Chauncey Jerome, who also learned from Terry, brought clockmaking to Bristol.

In the Waterbury area several shops made buckles, buttons and other small metal items; another shop made wooden clocks. These manufactures attracted experienced local merchants, men such as the Scovill brothers and Aaron Benedict, whose contacts with shipping houses in the commercial centers helped solidify the ties to raw material sources and markets lacking in the local area. In the 1820s these men set Waterbury on the course that would make it the center of the American brass industry by deciding to enter primary brass production--making the alloy (with principal ingredients of copper and zinc) and rolling or drawing it into the basic forms of sheet, tube and wire for use as the material for hardware production in the Waterbury shops and for sale to shops in other localities. An ironworks in Litchfield rolled the first billet of brass alloyed in Waterbury. Then in 1829 Israel Holmes, who had a hand in the founding of five Waterbury brass mills, recruited a brass roller and die-cutter from England; these men gave the Scovill brothers primary brass production capability. Holmes again traveled to England in 1831 and returned with a brass caster, a roller, a wire-drawer and a tube maker, men who established the wire and brazed tube manufacture of Holmes and Hotchkiss, the forerunner to several later firms. Holmes also imported English rolling equipment. While the brass firms used the craft-based, English techniques for primary production throughout the nineteenth century, they directed considerable inventive activity to secondary, or fabrication, operations. In the 1830s two firms introduced stamping machinery to make butt hinges, and series of die-stamping operations were applied to button manufacture. The local availability of primary brass products helped the central Connecticut manufacturers of clocks, builders' and cabinet hardware, which used brass for their goods. Robert Wallace, a tableware producer, learned the formula for German silver (an alloy primarily of copper, zinc and nickel) in the 1830s. He made an ingot and brought it to Waterbury for rolling, after which the brass firms entered the primary production of that material.

The dynamism of Waterbury's brass industry--the early and extensive participation of merchants, the decision to make primary brass products, the importation of English machines and workers--was more pronounced than that of most hardware manufacturers in the first half of the nineteenth century, although throughout the hardware sector there existed a willingness to experiment with fabrication operations. A New Britain manufacturer engaged Levi Lincoln, who ran an iron works in Hartford, to design and build a machine to form hooks and eyes from wire. Small shops in Southington introduced a series of mechanized operations to form carriage bolts. Shops in lower Middlesex County that made ivory combs, buttons and notions, and later ivory keyboards, devised unique saws for that free-cutting but very brittle material.

The hardware manufactures did not emerge clearly from the agricultural economy and society until near mid-century. Proprietors and employees alike retained agricultural holdings, and landless workers often doubled as farmhands. The growth in national markets, the railroads which made them accessible to Connecticut manufacturers and increased capability in machine building would cause significant changes in the style of hardware production, changes which would obscure the origins of metal goods manufacture.

Most of the pre-1850 hardware mills that survive today stand in central and lower Middlesex County, an area bypassed by the first railroads. They display a less self-conscious industrialism than contemporary textile mills and reflect the continuity between the pre-existing agricultural society and this first generation of the hardware industry. The shop of C. L. Griswold, for instance, on a site which held hardware manufacture as early as the 1820s, stands in a residential area which predates any manufacturing use of the site; the shop fitted, literally, into the community which grew before it. The shop buildings themselves continued the vernacular architecture of the saw, grist and cider mills, the barns and houses of the farm-based society. Indeed, many shops occupied grist or saw mills. Porter's Grist Mill, for instance, held button production as well as grain milling in the first half of the nineteenth century. Among the shops built for manufacturing, frame construction predominated and scale remained small. Bevin Brothers' 1832 bell shop and Simeon Brooks' 1848 hook-and-eye shop, both nearly square in plan, have post-and-beam construction, board walls, gable roofs with no dormers or monitors, light floors carried on joists and no stair towers: they feature none of the structural techniques already characteristic of the more rapidly maturing textile industry. With one major exception (Collinsville), villages of worker housing do not accompany the pre-1850 hardware shops, indicating the initial reliance on locally available labor, or that the number of extra-local workers remained small enough not to require extensive residential construction.

Connecticut's first railroad consisted of six miles of the Providence and Stonington in the southeastern corner of the state. The first railroad entirely in the state opened in 1839 between Hartford and New Haven, where steamship connection was made to New York. The Hartford and New Haven Railroad marked a climax in the growth of the hardware manufactures. It gave producers along the route convenient transport to ship their goods and to bring in coal, particularly important in such towns as New Britain, where steam engines powered the hardware factories. Towns along the route became capitals of their industries, notably New Britain in builders' and cabinet hardware and Meriden and Wallingford in flat and hollow ware.

The next railroads to be built followed similar north-south routes to terminate at ports. The Norwich and Worcester (1840) ran between the head of navigation on the Thames River and Worcester, Massachusetts, providing rail service for the textile manufacturers of northeastern Connecticut. The primary iron industry of northwestern Connecticut gained rail service with the completion of the Housatonic Railroad (1842), running betweeen Bridgeport on Long Island Sound and the Berkshire Railroad in Massachusetts. The rock-cut tunnel on the Norwich and Worcester and the stone-arch bridges on the Housatonic represent the last remnants of Connecticut's earliest railroads.

The New York and New Haven Railroad, following the coast of Long Island Sound between those cities, opened in 1848. Immediately it became Connecticut's most important rail corridor because it controlled the entrance from southern New England into New York City. The Naugatuck Railroad connected with the New York and New Haven in 1849, running from the Sound north through Waterbury. The Naugatuck augmented the New York and New Haven's role as the gateway of southern New England. The Naugatuck also helped to resolve the problem of raw material supply for the primary brass producers. In 1850 four of the brass firms stabilized the copper supply by setting up the Waterbury and Detroit Copper Co., which operated smelter works in the Michigan copper range. Zinc was imported from overseas, and later from the western United States, through New York City metal brokers.

At mid-century, the brass and hardware manufactures had rail links to New York City and to more distant markets and raw material sources. They had substantial mercantile connections. And they had demonstrated a proclivity for mechanization of production process that would soon be equipped with superior machine-building capabilities from the arms and machine tool factories of Hartford.

Machine Building, Hardware and Brass, 1850-1900

The technological explosion that brought the Hartford metalworking community to international prominence occurred rapidly in the 1850s and 1860s, and it depended on techniques developed elsewhere in the first half of the century. The key precipitating incidents were the opening of two arms factories. Samuel Colt returned to his native Hartford in 1848 and operated in rented quarters until building his armory in 1853-54; the Sharps Rifle Manufacturing Co. opened its Hartford factory in 1852. The Sharps firm originated as a subsidiary of Robbins and Lawrence, the arms producer in Windsor, Vermont. Robbins and Lawrence set up the subsidiary to manufacture Christian Sharps' breechloading rifle, orders for which had exceeded the capacity of the Vermont operation, and chose Hartford as the site for expansion because of its greater access to markets and material.

Robbins and Lawrence built all of the production equipment for the Hartford factory, some 250 machines in all. Besides specialized arms-making apparatus, such as rifling and stocking machines, this machinery included lathes, drills, planers and milling machines--metalworking equipment with broad application beyond arms production. The work at Robbins and Lawrence had drawn from developments in textile-machine building as well as from gun making. Frederick Howe, for instance, who learned machine design and construction at the textile-equipment building shop of Gay, Silver and Co. in North Chelmsford, Massachusetts, collaborated with Richard Lawrence on designs for many machines, such as lathes and planers. Many of the techniques embodied in the Robbins and Lawrence machinery had been present in the arms factories of North, Fitch and Whitney (although recent scholarship in the history of technology has debunked the seminal role formerly ascribed to Whitney in the development of metal-working process). In Hartford in the 1850s, however, the Robbins and Lawrence machinery was used by other firms to form the basis for a production goods manufacturing sector: the machines themselves becamse the saleable products of manufacturing firms, not the arms made with the machines.

Colt Armory provided an immediate market for the nascent machine-building sector. By 1855 the aforementioned iron works of Levi Lincoln produced near-copies of the Robbins and Lawrence plain milling machines and sold them to Colt. The superintendent of the iron works, Francis Pratt, had apprenticed in a Lowell, Massachusetts machine shop and worked at Colt for two years. One of his contractors, Amos Whitney, had a similar background: apprenticeship in Lawrence, Massachusetts and several years at Colt in the early 1850s. These two men began their own machine-building shop in 1860. They benefited from the decision by Robbins and Lawrence not to produce machinery for sale, leaving the field open for the fledgling firm of Pratt & Whitney, which became Hartford's pre-eminent production-goods manufacturer. Many of Pratt & Whitney's earliest designs derived from Robbins and Lawrence machinery, although the work at Colt also elaborated the metalworking vocabulary and informed the business of Pratt & Whitney, which itself designed machines and measuring tools that brought the highest regard for their accuracy and fitness of design.

Colt Armory followed an eclectic approach to metalworking. Samuel Colt staffed his works with men from all fields of metalworking endeavor and adopted techniques as well from a range of industries. His works also benefited from the contributions of textile-machine building, both through the work of Robbins and Lawrence, and through men brought in from Connecticut textile-machine shops. Christopher Spencer, for instance, apprenticed in the machine shop at the Cheney Brothers' silk mills, a shop which challenged the most advanced practice in machine construction and control while producing many innovative devices for silk production. After working at Colt Armory, Spencer went on to work with Charles Billings (a veteran of Robbins and Lawrence) in the development of the board-drop press; and Spencer's screw machine would define the state-of-the-art in the cutting of threaded parts.

E. K. Root, who came from the edge-tool works of Collins Co. to serve as Colt's superintendent, was the most influential figure at the Armory from the field of formed metal-goods production. He contributed designs for many machines, such as a spliner and a chucking lathe (this lathe made use of another technique from Connecticut textile-machine building--the chuck developed by Simon Fairman of Stafford, Connecticut). Root also refined the process of drop-forging. Forging had constituted an important part of arms-making since the artisan gunmakers of colonial times and before, and Robbins and Lawrence had developed drop hammers for forging gun parts in the early 1850s, but Root devised multiple-drop, screw-operated hammers which, if not inherently more accurate than the prior equipment, allowed substantially faster forging. The aforementioned board-drop of Billings and Spencer advanced forging technique beyond that of Colt Armory by elevating the power applied in drop-forging with no sacrafice in accuracy, thus permitting the forging of larger pieces, and of pieces with greater depths of impression. The firm of Billings & Spencer, established in 1869, became another fixture in the production goods sector of Hartford.

The integration of Connecticut and New England machine-building traditions achieved in Hartford during the 1850s and 1860s contributed to the mechanization of production processes in the hardware industries. Graduate apprentices or workmen from Colt and Pratt & Whitney worked throughout Connecticut's metals industries, bringing with them knowledge of machine construction in such areas as bearings, clutches, drive linkages, gearing and lubrication. This increased awareness of machine-building techniques supplemented prior developments by many firms in the various hardware fields. Hardware shops did not necessarily use machines from Pratt & Whitney to make their products, but rather to make their own production equipment. At Messerschmidt Hardware Mill, for instance, the proprietor made most of his own manufacturing machinery. But he cut the parts for his unique equipment on a Pratt & Whitney milling machine, among other machine tools. The tremendous upsurge of inventive activity during the 1860s by the tinner's machinery makers in the Berlin area seems attributable to the introduction of superior machine-building practice from Hartford. Peck, Stow and Wilcox, the firm created when three of the tinner's machinery shops merged in 1870, gained pre-eminence in its field soon after.

The brass industry entered its period of fastest growth in the 1850s. Primary brass production at Scovill, indicative of the general trend, nearly doubled between 1850 and 1860 and nearly tripled in the next fifteen years. The integrated brass firms were able to consume increasing amounts of primary brass output themselves by diversifying their secondary production. Illuminating-gas systems provided a market for tubing, fittings and fixtures. Exploitation of petroleum in the 1850s created a market for kerosene lamps. The adaptation of metal-spinning, initially for manufacture of kettles, enlarged the use of brass for these and similar vessels.

Added to the mechanical talent already developed in the brass and brass products industries, the machine-building expertise from the Hartford arms and machine tool factories facilitated the proliferation of new fabricating equipment in the 1850s and 1860s. E. J. Manville, for instance, worked at Pratt & Whitney before opening his Waterbury machine shop, where he developed the "four-slide," a self-acting machine that formed wire into safety pins, hooks, button eyes and innumerable other small products. Machine-building firms such as Manville's, Blake & Johnson and Waterbury-Farrel combined with the machine shops of the integrated brass firms and the machine shops of the "cutting up" firms (makers of finished goods but not primary brass products) to provide Waterbury with a mature machine industry by the 1870s, a machine industry distinct from that of Hartford. The Hartford machine builders concentrated in general-purpose machine tools, while the Waterbury machine builders concentrated in special-purpose metal-forming machines.

The brass firms of Connecticut produced more than 95 per cent of the rolled brass and German silver made in the United States in 1860. This percentage declined in subsequent decades, but the Waterbury firms alone still controlled some 60 per cent of the domestic markets for brass sheet, tube and wire in the 1890s. Ready access to primary brass products and to superior machine technology helped many of the Connecticut hardware producers achieve primacy in their fields. The Stanley Works in builders' hardware, R. Wallace and Sons in tableware, New Haven Clock Co. and Peck, Stow and Wilcox all originated in small shops in the first half of the nineteenth century. The surviving plants of these firms depict their positions of dominance in their industries during the late nineteenth and early twentieth centuries.

Connecticut's base in primary brass production and machine building also contributed to the state's attraction as a site for new manufacturing enterprise, and beginning in the 1860s many firms were established by financiers and industrialists from out of state. Other factors that drew manufactures in the late nineteenth century included: excellent marine and rail transportation facilities, especially after the Hartford and New Haven and the New York and New Haven consolidated in 1871 into the New York, New Haven and Hartford Railroad; well-endowed financial institutions willing to invest in manufacturing; the limited liability provisions of the state's incorporation law; and proximity to New York City, the nation's commercial capital and an important entry point for the immigrants who would comprise the largest portion of the workforce in late nineteenth-century hardware production. Diverse manufacturing firms located along the Sound between New Haven and New York, where these factors came together most favorably. Union Metallic Cartridge, Warner Brothers (corsets) and Eaton, Cole and Burnham (valves and fittings) came to Bridgeport; Malleable Iron Fittings Co. to Branford; Yale and Towne to Stamford. In Norwalk local partnerships established Norwalk Lock Co. and Norwalk Iron Works.

These firms skipped the era of small wooden mills and built multistory brick factories at their outset. Both the new hardware firms and the older firms that grew to serve national markets adopted the general building characteristics evolved in the textile industry, the first branch of manufacture to achieve mechanized factory production. These buildings were narrow in relation to length, the shape which maximized natural lighting and allowed the most efficient use of shaft-transmitted power. They featured brick bearing-walls, usually with timber post-and-beam framework, a structural format suitable to support machinery on every floor.

In the second half of the nineteenth century a new building form developed to house foundries, rolling mills and departments of large presses. The equipment for these processes, in their late nineteenth-century scale, was generally heavier than the machinery around which the textile mills evolved, and they required greater vertical clearance than textile machinery. The typical foundry, rolling mill or press department building remained long in relation to width, still the best shape for maximum natural light and efficient mechanical power transmission. It had only one story, because the weight of the equipment and the products militated against stacking these operations. The one story rose at least 25' to accommodate the equipment. Its roof was gabled or near-flat with a low, narrow monitor along the ridge. The monitor did not light an attic to create an additional work floor, like the formers in gable- or mansard-roofed textile mills or the earlier clerestory monitor. The foundry monitor lit and ventilated the one-story work area. Ventilation posed particular problems in foundries because of the heat and fumes from the cupola fires and the dust from the dirt floors and molding sand. By the mid-1880s this foundry-type building was commonly divided into three long bays, with the central bay under the monitor and lower side bays flanking it. Rows of structural columns divided the bays, leaving a large unobstructed floor space in the central area. Spencer Foundry in Guilford includes a frame building, probably from the early 1850s, which displays the roof form and height of the later foundries, but it is quite small and may represent one of the earlier examples of its type. The Collins Co. 1862 forge shop clearly has the characteristic high, one-story, monitor-roofed pattern. Atwood Machine Co. in Stonington remodeled an earlier stone-walled foundry in the mid-1870s to make it wider and higher and to add the low monitor to the gable roof. The surviving nineteenth-century brass rolling mills at Scovill (c.1885) and at Bristol Brass Works (c.1885) present further examples of this building type, as do foundries at Farrel Foundry and Machine Co. in Ansonia (c.1890) and Malleable Iron Fittings Co. (c.1890-1915) and forge shops at Scovil Hoe in Higganum (1880, 1887). These buildings represent the capital-intensive metals manufactures of the late nineteenth-century as clearly as the small frame shops depict the origins of Connecticut hardware production.

Connecticut Industry in the Twentieth Century

By 1900 Connecticut had become an urban, industrial state. Nearly half the population resided in cities with population of 25,000 or more: Hartford, New Haven, Bridgeport, Waterbury, New Britain, Meriden and Norwich. Nineteenth-century recruitment of foreign-born workers, skilled and unskilled, had resulted in a predominantly immigrant population, with only 40 per cent of the state's residents in 1900 claiming two American-born parents.

Corporate combinations after 1890 merged Connecticut manufacturers into giant holding companies or diversified industrial firms. Bigelow-Hartford Carpet Co. became the third largest corporation in New England. Three New Britain hardware companies merged to form American Hardware. American Brass Co. included five of the integrated brass firms of the Naugatuck Valley.

The New York, New Haven and Hartford Railroad stepped up its acquisition of competing and feeder lines, until by 1910 it controlled more than three-quarters of the trackage in the state. Rail planning became more comprehensive, as new stations, freightyards and bridges were built in the attempt to impose some order on the transportation activity of the industrial cities which had grown around the railroads.

The New Haven Railroad's electrification of the crucial rail corridor along the southern coast--the nation's pioneering effort in long-distance railway electrification--represented the most dramatic impact of electricity on the state's engineering and industrial technology, but its effects pervaded every area. New companies had been established in the late nineteenth century to manufacture electrical equipment such as Arrow Electric and Hart & Hegeman, and this trend continued in the twentieth century with the opening of such firms as Terry Steam Turbine. Older companies diversified into electrical equipment manufacture. Landers, Frary and Clark moved from production of hardware to electrical appliances. Copper wire formed a major new market for the primary brass producers. Generating stations became prominent additions to the cities with the formation of electric utility companies. Electric lighting and electric drive for machinery, with motive power transmitted through wires, freed factory design from the long and narrow form of the nineteenth century. Electrical devices such as field rheostats, solenoids and pole reversing switches replaced cams and gears as the means of machine control.

During World War I Connecticut produced some 54 per cent of the nation's munitions, and the already large arms, cartridge and brass plants multiplied in size. The majority of the factory space at the plants of Union Metallic Cartridge, Winchester, Scovill, Bristol Brass and Colt dates from the war years. Major new facilities were erected, such as the Russian Rifle Plant, reputed to have been the world's largest factory upon completion. War production also expanded non-munitions manufactures. The Naugatuck rubber factories made blankets, overshoes and tents, and R. Wallace and Sons supplied millions of mess kit utensils; substantial portions of these plants went up during World War I. The shoreline route of the New Haven Railroad gained its last significant capital improvements during the war, when the newest movable bridges on the line were built.

After the war the expanded factories suffered from excess capacity. Many firms tried to begin new manufactures to occupy the space and to service the huge debts from wartime construction programs. In 1926 Pratt & Whitney provided production space in one of its empty factories for Frederick Rentschler's aircraft engine manufacturing venture, marking the beginning of Connecticut's aircraft industry, now the largest employer in the state. Increased acquisition of Connecticut facilities by industrial colossi brought factories large and small under the control of DuPont, American Woolen, General Motors, U. S. Rubber and Anaconda.

The Second World War again stimulated production for the military contractors. Many of the industries, wary because of the overexpansion during the prior boom in the markets of destruction, would not build new plants without government assistance. The possibility of air strikes imposed the strategic goal of decentralization in armaments production, and led the federal government to build plants throughout the nation. As a result, and except for the aircraft factories, Connecticut's industrial fabric bears more sign of the First than of the Second World War.

Connecticut has benefited from the remarkable, even unique, diversity of its industry. The textile industry, the state's largest employer until being eclipsed by the brass and hardware sectors around 1890, moved almost completely out of Connecticut in the twentieth century, leaving as its principal legacies the vacant or tenanted mills and the chronically high unemployment of eastern Connecticut. The machinery, hardware and chemical industries, however, have continued substantial operations in Connecticut. The state still supplies significant portions of the nation's industrial staples, such as ball bearings and springs. The machine builders of Connecticut continue to equip factories across the nation and the world. The state's ongoing importance in military production is apparent from the plants of Pratt & Whitney Aircraft, Union Metallic Cartridge and Colt, as well as the Electric Boat Shipyard in Groton, which produced the first nuclear submarine.

In corporate boardrooms, however, the factories that represent Connecticut's proud industrial heritage are often seen as antiquated facilities. Steel-framed, one-story factories with prefabricated concrete-panel walls house increasing portions of industrial production. In recent years rising energy costs and the state's lack of fossil fuels have prompted relocations to the Sun Belt from Connecticut, the state where lack of resource endowments once presented but a temporary obstacle to emerging industries. The people of Connecticut embody the highest concentration of industrial skill and experience in the nation. More than any other factor, they assure the continued, if sometimes seemingly precarious, vitality of the state's manufactures. This volume addresses only indirectly the history of Connecticut's working people, but the structures described herein stand as testament to their experience.

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Census 1860	8th Census, as above.
Census 1870	9th Census, as above.
Census 1880	10th Census, as above.
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LLH	Lure of the Litchfield Hills
Middlesex Atlas	F. W. Beers and Co., County Atlas of Middlesex, Connecticut, NY, 1874.
MVTM	Merrimack Valley Textile Museum
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FAIRFIELD COUNTY

Bulk Products

BROOKFIELD LIMEKILN (1882)
934 Federal Hill Rd., rear
Brookfield

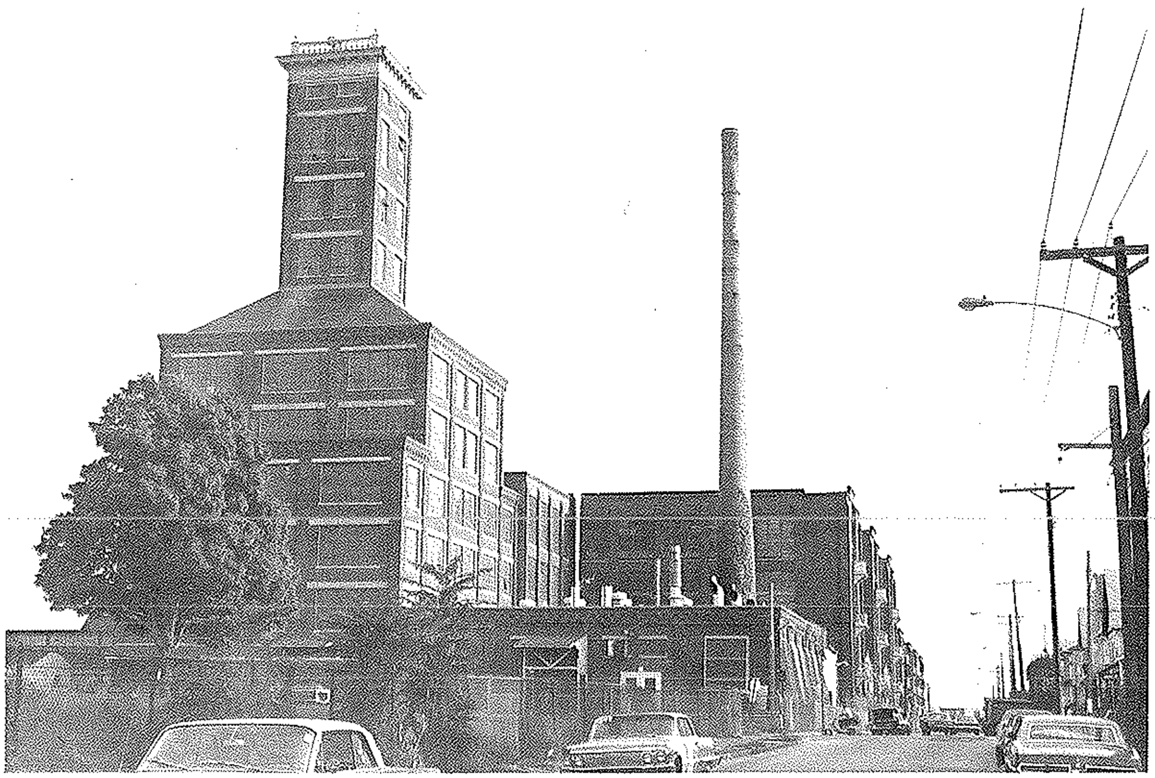
Danbury
18.632290.4594010

Brookfield's limestone deposits were exploited early in the 19th century for agricultural lime and flux for the nearby blast furnace (not extant). The lime-processing industry in town was established in the 1840s by Andrew Northrop, who ran a kiln on this site. Pierce, Lawrence and Vroman Co. bought the business in 1882 and built the extant kiln soon after. The round kiln (about 8' high, 12' diameter) sits on a 5'-high square base. Exterior walls of the kiln and the base are made from fieldstone blocks. Fire brick lines the interior. The top of the exterior wall has deteriorated, leaving the fire-brick interior structure exposed. An arched opening in the south side of this protruding fire-brick wall was used to load the limestone into the kiln. In the west wall of the base is a 5'-square opening that held the hearth. The kiln has not operated for over forty years.
(New York Atlas; Census 1850, 1860, 1870, 1880; Emily C. Hawley, Historical Sketch of Brookfield, 1907; Interview with Karl Roetzal, present owner, Nov. 1978.)

RADEL OYSTER HOUSES (1906)
132 Water St.
Norwalk

Norwalk South
18.633290.4550270

Andrew Radel Oyster Co.. founded in 1906, was one of the three largest oyster firms in Connecticut during the early decades of this century, when oyster production peaked in the northeastern United States. (H.C. Rowe and H.J. Lewis were the other large firms.) Radel worked 11,500 acres of oyster grounds in Connecticut waters and 6,500 acres off Long Island. These structures on the South Norwalk waterfront housed sorting, shucking and packing operations. There are two flat-roofed, 2-story buildings, each 38' x 16', and one gable-roofed, 2 1/2-story building, 56' x 38'; all are wood-framed. They stand on a wharf built out into the harbor. Until recent years a 4-story, gambrel-roofed oyster house stood at the end of the wharf, but it was demolished to the first-floor level in the late 1970s. Oysters were loaded from boats directly into the upper floors of the 4-story building and sorted there. Hopper cars, which ran on narrow-gauge tracks, were filled with sorted oysters, then pushed over chutes which led down to the shuckers, and dumped. Rails and chutes were lost in demolition but, reportedly, the hopper cars were saved. This site, under different ownership today, has one of the few active oyster operations in the state; it is conducted in an adjacent modern building.
(Osborn: CHC; John M. Kochiss, Oystering From New York to Boston, The American Maritime Library, vol. 7, 1974; Interview with Ralph Bloom, Norwalk Historical Society, Feb. 1980.)



Remington - Union Metallic Cartridge Co.,
Shot tower and factory (M. Roth)

Manufacturing

REMINGTON-UNION METALLIC CARTRIDGE CO. (c.1875) Bridgeport
939 Barnum Ave. 18.653080.4560890
Bridgeport

The establishment of Union Metallic Cartridge Co. by Marcellus Hartley in 1867 illustrates the changing relationship between financiers and technologists in the latter 19th century. Hartley, a New York City sporting-arms dealer who had served in Europe as arms procurement representative for the U.S. during the Civil War, foresaw the replacement of paper rifle cartridges by metallic ones and formed U.M.C. to capitalize on this change. Expert in marketing and finance, Hartley was nonetheless totally ignorant of production techniques, a defect he remedied by hiring Alfred C. Hobbs, former superintendent of Howe Sewing Machine Co., to develop manufacturing equipment. Most of the metal-forming operations that Hobbs installed were simply specialized refinements of known die-forming practice, but Hobbs' machinery for loading the shells was unique: a conveyor carried formed cartridges under a hopper, where each case was filled with an automatically measured charge of powder. By 1870 Hobbs' production line was producing 120,000 cartridges per day. Before U.M.C. and Hartley, who perceived a vast market and planned to develop and capture it suddenly, most Connecticut non-textile manufacturers that produced for civilian markets (which was Hartley's original intent) were founded by men who were experienced in the production techniques they used. Firms like the Stanley Works, Scovil Hoe and Pratt, Read & Co. (separate entries) were not built without attention to capital and markets but they grew, with their markets, from virtual cottage industries.

Ammunition is still produced on this site, first developed by Hartley in 1867, and the plant retains significant fabric from each stage of development through which it passed. The oldest building visible from a public road is the c.1875 brick-pier mill on Barnum Ave., 4-story and about 210' x 40'. The 10-story brick shot tower, still in use today, was Bridgeport's tallest building when it was completed in 1909. The operation is essentially unchanged. On the top floor are two kettles to melt the lead alloy, which is then piped into two steel pans with pin-holed bottoms. The shot, formed as the molten alloy passes through the holes, falls 133' to water tanks below, from which it is conducted back up to the ninth floor by a bucket conveyor. From there it travels down, fed by gravity, through a series of operations: sorting for roundness and size, cleaning, polishing and applying graphite.

In 1888 Hartley bought E. Remington and Son, arms manufacturers from Ilion, NY, and combined the firms as Remington-U.M.C., though mostly separate operations were maintained. During World War I both divisions were major contributors of Allied military material. Most of the current plant dates from 1914-1916, when it grew from 143 buildings with 16 acres of floor space to 313 buildings with 40 acres. Most of that new manufacturing space was in two complexes north and south of

Barnum Ave. Each of these consists of a long central building with pairs of factory wings extended out from its sides. The south group has a 4-story central section, 300' x 60', with three sets of 4-story, 125' x 60' wings. All parts are of brick-pier construction, with flat roofs and rectangular window openings with concrete sills and steel sash. Natural light is admitted to the production floors through courtyards between the wings that are as wide as the wings themselves. The north complex is identical except for dimensions: the central section is 625' x 60'; there are five sets of attached buildings, each 125' x 75' except for the south pair, which are 60' wide. In 1933, after three years of plummeting sales, Remington-U.M.C. offered controlling interest to E.I. DuPont de Nemours and Co. The Bridgeport plant has been a DuPont subsidiary ever since. Despite some demolition, new construction and alteration, this site continues to present, overall, the appearance of a World War I-era munitions plant. (Osborn; Census 1870, 1880; Alden Hatch, Remington Arms in American History, 1956; Remington Arms Co., In Abundance and On Time, 1944; Real Estate Atlas of Bridgeport, 1971.)

REMINGTON "RUSSIAN RIFLE" PLANT (1915) — Bridgeport
1285 Boston Ave. — 18.653420.4561990
Bridgeport

This plant illustrates both the tremendous expansion of munitions plants during World War I and the post-war problems of utilizing excess capacity. In 1915 Remington Arms-Union Metallic Cartridge Co. accepted an order from Russia's Czarist government for 1 million rifles and 100 million rounds of ammunition. Enormous construction projects were begun to expand the Remington plant in Ilion, NY and U.M.C.'s Bridgeport plant (separate entry). But the rifle order required a major new plant, so land was purchased two blocks north of the U.M.C. plant and this factory complex was built. The largest structure resembles the World War I-era additions to the U.M.C. plant but the scale here is much larger: the central 5-story spine is 2,375' x 65', with 13 pairs of transverse 5-story wings, each 140' x 75'. All the wings are of brick-pier construction and have large rectangular window openings with concrete sills and steel sash; at the ends there are balconies at each floor and false, stepped gables. Along the west side of this mammoth factory are four monitor-roofed forge shops, each 475' x 75'. The plant was designed to manufacture 5,000 rifles per day, an output achieved in February 1917. Later in 1917, after the fall of the Czar, the Kerensky government repudiated all contracts from the former regime. Remington-U.M.C. faced complete loss on the 750,000 rifles already produced. The U.S. government, which by then had entered the war, bought 600,000 of the rifles in order to maintain solvency in the country's armaments industry. During 1918 the Russian Rifle plant manufactured bayonets, Colt automatic

pistols, Browning machine guns and Browning automatic rifles. In the summer of 1918 management's attempts to institute scientific management and to modify machinery to require less skill in the production areas caused craft-based strikes, which started with the toolmakers and machinists at this plant and spread to the other arms plants in Bridgeport. After the war, with the collapse of the huge demand for weapons, Remington-U.M.C. sold this facility to General Electric, which still occupies it.
(Osborn; Cecelia F. Bucki, "Dilution and Craft Tradition: Bridgeport, Connecticut Munitions Workers, 1915-1919," Social Science History 4 (Winter 1980); Alden Hatch, Remington Arms in American History, 1956; Bridgeport Post, 15 March 1915, 27 June 1915; Real Estate Atlas of Bridgeport, 1971.)

IVES TOY FACTORY (1907) demolished Bridgeport
194 Holland St. 18.649540.4558950
Bridgeport

Edward Ives began producing iron toys in 1868. He came to specialize in mechanical (and later electric) trains and their accessories. Ives Manufacturing Co. was incorporated in 1902 and built this factory in 1907. The main building (2 1/2-story, gable roof, 154' x 50') is of typical mill construction except for the material in the masonry bearing walls. They are a coursed ashlar of "patent stone": cast-concrete blocks with rusticated faces, in imitation of rough-dressed stone. This building housed the machine shop on the first floor, assembly on the second and storage in the attic. A 35' x 18', 1-story wing held the japanning room. A gas engine powered the machinery; it was kept in another small wing behind the factory. Ives Manufacturing Co. survived until 1930; since then the buildings have served various industrial purposes.
(George C. Waldo, ed., History of Bridgeport and Vicinity, vol. 1, 1917; Louis Hertz, Messrs. Ives of Bridgeport, 1950.)

PACIFIC IRON WORKS (c.1875) Bridgeport
south of Arctic St. 18.651630.4560880
Bridgeport

Pacific Iron Works, established in 1853, was a foundry and machine shop that made many stock products and took jobbing work as well. Steam engines and boilers were a considerable portion of output. In 1860, with only 70 workers, Pacific made 15 engines and 25 boilers; in 1870 the 55 hands produced 13 engines and 22 boilers. Also in 1870, one-third of the foundry's 600-ton annual output was cast into building fronts and other architectural iron. In the 1880s Pacific cast and machined gears, pulleys, hangers and other mechanical power transmission equipment. The firm made various products under license from patent-holders, such as Greene automatic cut-off steam engines and Jeffers steam fire engines.

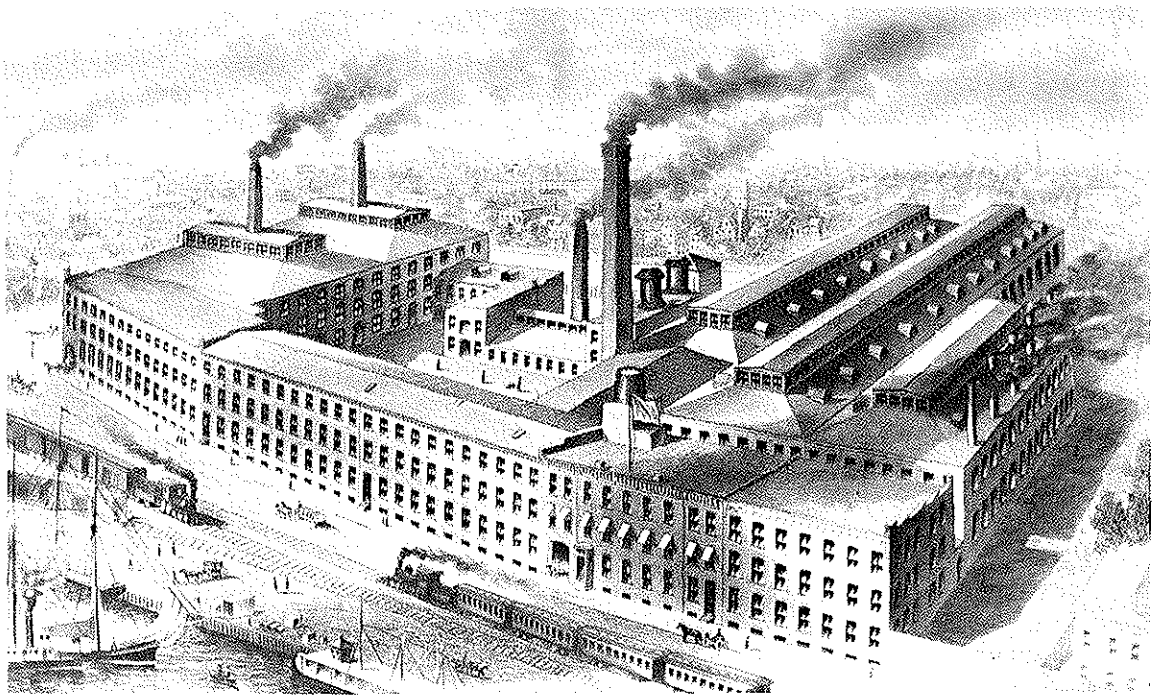
The surviving plant was built around 1875 and includes the foundry, 200' x 75', and boiler fabrication/blacksmith shop, 200' x 60'; the machine and pattern shop has been demolished. Both extant buildings are high 1-story, brick factories with gable roofs. The roof line of the foundry has been altered but that of the boiler shop appears to be original, having a monitor along the ridge; too low for lighting the work floor, the monitor was apparently used for ventilation. The plant now stands vacant.

(Census 1860, 1870, 1880; W.S. Webb and Co., Historic, Statistical and Industrial Review of the State of Connecticut, 1884; Samuel Orcutt, History of the City of Bridgeport, 1887.)

EATON, COLE AND BURNHAM FACTORY (1875) Bridgeport
510 Main St. 18.692060.4559310
Bridgeport

E.G. Burnham of Boston arrived in Bridgeport in 1864 and established a casting and machine shop to make iron and brass valves, cocks and other fittings for steam, water and gas systems. Burnham's original buildings do not appear to survive, though they may now be incorporated within subsequent structures. In 1875 Burnham merged with Eaton & Cole, a New York producer of similar goods; the new firm concentrated manufacturing in a new factory. This 3-story brick mill, 160' x 40' with near-flat roof, segmental-arch lintels and stone sills, housed machine operations. The 1875 foundry has been demolished or obscured. By 1880 Eaton, Cole & Burnham employed over 200 hands and employment more than doubled in the next decade. In 1887 the firm extended the machine shops with a 3-story, brick wing (135' x 40') and built a new brass foundry. The ground floor of the 3-story, 100' x 100' brick-walled foundry was used to store sand, coal, copper and brass; iron columns on this level supported the furnaces above. There were 60 small furnaces with aggregate capacity of three tons per day. Molders worked on the third floor, where their work was lit through two monitors, one along each ridge of the double hipped roof. The 1887 pattern shop (120' x 30') features a 3-story, brick-walled, iron-framed vault (30' x 13') where wooden patterns were stored for protection from fire. Other structures illustrating the history of hardware manufacture on the site include tumbling rooms, warehouses and various machine shops. In 1920 Alfred and Charles Jenkins bought Eaton, Cole and Burnham. Jenkins Valves still produces fittings for fluid systems in these buildings.

(Samuel Orcutt, History of the City of Bridgeport, 1887; E.N. Danenberg, The Story of Bridgeport, 1936; Sanborn-Perris Map Co., Insurance Maps of Bridgeport, 1898; The Bridgeport Standard, 11 May and 19 October, 1887.)



Eaton, Cole and Burnham
Samuel Orcutt, A History of the City of Bridgeport, 1887.

ARMSTRONG MANUFACTURING COMPANY (1872)
337 and 286 Knowlton Street
Bridgeport

Bridgeport
18.651900.4560940

Frank Armstrong and Henry House, who had both gained training and experience in Bridgeport's sewing machine factories, began making tools and hardware in 1870. Among their first products were steamfitter's tools and Armstrong's patented bit brace. In 1872 they built their first shop on Knowlton St., 2 1/2-story and 56' x 30' with gable roof. This frame structure held the firm for 11 years, during which time many new products were introduced, including the pipe-threading and cut-off machines that were the firm's most noted goods. Armstrong and House also made metal parts for garters and suspenders and did contract machining. In 1883 House left the firm and Armstrong built a new factory just south on Knowlton St.: 3 1/2-story, 150' x 40', brick-pier with gable roof. Armstrong employed about 50 workers in the 1890s.

Armstrong Manufacturing Company illustrates the diversity in size of Connecticut's metal-working manufacturers, as it stood virtually in the shadows of the huge sewing machine works of Wheeler & Wilson (demolished) and Howe (mostly demolished). Armstrong also illustrates the central role of Connecticut firms in the manufacture of producer's durable goods; the market for Armstrong's major products--pipe-threading and cut-off machines, steamfitter's tools--was nationwide but comprised mostly companies and tradesmen, not consumers. Like Geometric Tool Co. in New Haven (separate entry), Armstrong Manufacturing Co. made a limited line of goods with broad application in industrializing America. A beverage distributor now occupies these buildings.
(Osborn; Samuel Orcutt, History of the City of Bridgeport, 1887; George C. Waldo, comp., The Standard's History of Bridgeport, 1897; Sanborn-Perris Map Co., Insurance Maps of Bridgeport, 1898.)

WARNER BROTHERS CORSET FACTORY (1876)
325 Lafayette Street
Bridgeport

Bridgeport
18.651820.4558760

Warner Bros. was founded by two McGraw, NY physicians, Lucien and I.D. Warner, who introduced their so-called Health Corset in 1874. The Warners promoted their product as a less painful alternative to the garment worn by many of their female patients. They innovated shoulder straps which eliminated the need to support the entire corset at the laces, allowing more comfort at the waist. The Warners moved production to Bridgeport in 1876, choosing that city because of its proximity to their financial and marketing apparatus in New York City, its excellent rail and water transportation facilities, and its growing reputation as the home of skilled industrial workers. The first building was a 3-story, hip-roofed brick-pier factory, 100' x 40', at Atlantic and Lafayette Sts. It still stands, along with a 3-story brick-pier ell, 90' x 40', built in 1878 and a 3-story brick-pier extension, 145' x 40', built in 1880. Further additions up to 1893 occupied the entire block between Lafayette, Atlantic, Gregory and Warren Sts.

Warner Brothers developed corset stiffeners from tempered steel and cactus fiber to replace whalebone. The firm purchased cloth, sheet metal and cactus fiber and made all the component parts of corsets. In 1887 there were about 1,200 employees (90% of them women), who produced 6,000 corsets daily using mostly mechanized processes. The firm had 500 sewing machines, 200 "Coraline" machines to press, size and temper cactus fiber into stiffening material, and eyelet presses to form lacing grommets and other metal corset parts.

The firm profited from annual design changes incident to Late Victorian and Edwardian fashion, and the plant doubled in size during 1910-1912 as eight brick-pier factories covered the block west of Warren St. After that expansion Warner Brothers employed some 3,000 people (75% of them women) who produced 20,000 corsets per day. The relatively unharnessed "Flapper" style of the 1920s undercut the firm's market, and it began diversifying by acquiring shirt and other clothing manufacturers. No foundation garments are made at the Bridgeport plant today, but Warner Brothers still uses the buildings for paper-box production, offices, storage and a discount outlet. (Osborn; Census 1880; Samuel Orcutt, History of the City of Bridgeport, 1887; George C. Waldo, ed., History of Bridgeport and Vicinity, vol. I, 1917; Arthur W. Pearce, The Future Out of the Past: The Warner Brothers Co., 1964; Sanborn-Perris Map Co., Insurance Maps of Bridgeport, 1898.)

YALE AND TOWNE HARDWARE PLANT (1869) Stamford
Pacific St. 18.623010.4544550
Stamford

The Yale and Towne Manufacturing Co. industrial complex illustrates the firm's growth, reflects its manufacturing and management policies, and suggests its relationship to the rest of the city. With more than 50 buildings erected between 1869 and 1928, the plant covers 25 acres in Stamford's south end. It is bounded on the north by Market St., on the south by Henry St., west by Pacific St. and east by Canal St. The original building is now in the millyard, near the northwest corner. Several structures were built near it in the 1870s but only one remains. During major expansion in 1881 factories were extended south along Pacific St. and the brass foundry went up on Market St. By 1906 an unbroken row of factories ran south along Pacific to Henry St. and the 1906 iron foundry had completed enclosure along Market St. Major interior-yard structures included the 1883 crane shop, 1892 cabinet lock shop, and 1901 lock-assembly building. A new brass foundry blockaded the Canal St. side in 1913 and factories built in 1915, 1918 and 1920 completed the Henry St. facade. Since Yale and Towne relocated in the 1950s tenants have occupied some of the buildings, though others remain vacant.

Linus Yale, Jr. and Henry R. Towne founded the firm in 1868 as Yale Lock Manufacturing Co. Yale had developed and patented the pin-tumbler cylinder household lock. In the mid-1860s he ran a 60-man shop in Shelburne Falls, MA, producing several original lock designs. Thirty or so of Yale's employees comprised the original workforce of the Stamford plant. Towne, a Philadelphian, was an ambitious, young engineer with impressive credentials: apprenticeships at Port Richmond Iron Works and William Sellers and Co., education at the Sorbonne and under Robert Briggs. Yale died just months after joining Towne, so the firm they founded came to reflect the technical and managerial leadership of Towne, while Yale's lock provided the basis for initial success. Many products were added: post-office boxes and prison locks in 1871, safe deposit boxes in 1872, pulley blocks and winches in 1876, builder's hardware in 1878, padlocks in 1879, Yale Art Hardware (decorative builder's hardware) in 1882, Yale Time Locks in 1884 and electric hoists in 1904, to name some of the major products.

Towne's technical leadership was based on the application of the most up-to-date technology whenever possible. He supervised near-total mechanization of lock-part manufacture, installing high-production metal-forming machines, such as drop presses, and metal-cutting machines, such as automatic screw machines. No operating equipment remains to document Towne's adoption of the newest technology, but the buildings themselves feature the latest and best practice in the industrial architecture of their day. The original (1869) building, designed by Towne, displays many examples of state-of-the-art factory construction. Three stories high, 165' x 35', with a dormered mansard roof, it has brick-pier walls and timber framing. (The mansard roof, with abundant interior woodwork, was recognized as a fire hazard in the 1870s. No subsequent Yale and Towne building has such a roof.) The brick piers, or pilasters, between the windows maintained the necessary structural mass in the bearing walls while window space was maximized for lighting. Slow-burning, plank-on-timber flooring was installed and the ends of beams were beveled to prevent them from kicking out the walls if the beams burned through at the center and fell. Stairs were located in the office block projecting from the building's west end and fire doors at each floor were intended to prevent fire from spreading via the stairs. Door openings from production floors into the stairways are several inches higher than floor level to permit flooding of each floor in the event of fire. Buildings erected between 1870 and 1915 followed the general design of the original factory, except that building size increased and metal members were used in the structural framework. Iron members can be seen in the 1881 Welfare Department building and the 1881 factory adjoining it. Steel posts and trusses support the double-monitor roof of the 1906 iron foundry (1 1/2-story, 475' x 145'). The two 6-story factories (1918, 260' x 50'; 1920, 205' x 50') on Henry St., which completed enclosure of the southern end of the yard, were an abrupt departure in construction from prior buildings. Instead of masonry bearing walls with timber, iron or steel framing, these have the mushroom-column and flat-slab, reinforced concrete structural system patented by C.A.P. Turner in 1908. Exterior concrete piers and beams divide the facades into bays containing a low, brick curtain wall and steel-sash windows.

Towne and his successors divided production into the smallest and simplest tasks. The distribution of products and processes in the plant reflects this policy. Assembly of locks, for instance, was not organized as a general skill to be performed in one area by assemblers able to handle a wide range of products. Assembly was methodized into rigidly defined tasks that were grouped according to final product. This can be seen in the distribution of processes in the 1901, 190' x 95', brick-pier lock-assembly building in the center of the compound. The ground floor was used for storage; proceeding upward, the remaining four levels were for assembly of cylinder locks, padlocks, hinges and bank locks. Plating was also divided into separate spaces, according to the kind of finish applied to various products, which explains the apparently inefficient distribution of plating departments throughout the plant in 1906. There were plating floors in two of the buildings along Pacific St. and in one building on Market St., as well as others.

Machining operations were also decentralized, though the overall scheme of division remains unclear. In at least several instances departments were created of similar machines that made parts for all the products. In 1892 a production building that had grown piecemeal over the previous 15 years was gutted in order to house only automatic screw machines in a space 125' x 75'. Similarly, scattered power press operations were consolidated around 1905 in the giant 1883 crane shop in the center of the yard (1 1/2-story, 454' x 90' with monitor roof).

Task divisions enabled Yale and Towne to hire low-skilled and unskilled help and to offer relatively low wages. Piece-work rates were continually, though gradually, reduced before 1900 and day-work rates were cut 15% in 1876, then by 10% in 1893. To keep employees from fleeing to better-paying firms, Yale and Towne provided an extensive employee welfare program, including social activities, insurance and promotion of safety. For safety and productivity, shops were ventilated and well-lit. The monitor roofs of the foundries served both these purposes. In two 1881 factories along Pacific St. that housed plating and buffing, oversized brick piers contained ventilation shafts that vented the work areas through ducts (visible today) over the windows. Washrooms and lavatories were convenient to all departments and their use was required; this requirement prompted a strike in 1890 when the molders demanded to use their traditional washing buckets. At least two buildings were constructed solely for washrooms. Adjoining the 1901 lock-assembly building stands a 5-story, 50' x 50' wash house of brick-pier construction, and sandwiched between factories along Henry St. is a 1910 6-story brick-pier wash house which retains many of the original porcelain fixtures. Group health, accident and life insurance, as well as pensions, were available to all workers. Yale and Towne also sponsored dances, clubs, card parties, an employee newspaper, photo and hobby contests. The firm socialized foreign-born workers into U.S. industrial society through "Americanization" classes at the plant. All these programs were run from offices in the 1881 Welfare Department building, a 5-story, 65' x 65' brick-pier factory-like structure at Pacific and Market Sts., the northwest corner of the plant.

The industrial complex stands apart from the surrounding city. Rows of factories along the west and south sides form an unbroken wall. Purposeful isolation of the plant is accentuated on the south side by a 19th-century cast-iron fence, mostly intact, which runs the length of the block. Alleys between buildings afford access into the yard on the north side, and a truck passage, with gate, breaks the east side. There is no clearly defined main entrance. The works resemble a fortress, an appearance consonant with Towne's insistence on total managerial control.
(Osborn: Daniel Nelson, Managers and Workers: Origins of the New Factory System in the United States, 1880-1920, 1975; Siegfried Giedion, Mechanization Takes Command, 1948; Stamford Advocate Tercentenary Edition, 7 June 1941; Sanborn-Perris Map Co., Insurance Maps of Stamford, 1906; Henry R. Towne, "The Engineer as an Economist," ASME Transactions 7 (1886); Henry R. Towne, "Gain-Sharing," ASME Transactions 10 (1889); NR.)

NORWALK LOCK WORKS (1870) — Norwalk South
18 Marshall St. — 18.632790.4550820
Norwalk

Norwalk Lock Co., founded by local investors in 1856, was the first large firm to build in the harbor district of South Norwalk. Before 1856 Norwalk's manufacturers, mostly hat producers, located on streams for water power. Using steam power from the start, the lock entrepreneurs were able to locate their plant convenient to transportation, with the harbor one block to the east and the New Haven Railroad running along the south boundary of the works. By 1860 the firm employed 100 workers producing locks and knobs. Despite mechanization of some operations, Norwalk Lock Co., unlike Yale and Towne (separate entry) depended greatly on skilled manual labor. In 1870 the firm employed 230 people but owned only 110 machine tools: 50 lathes, 20 polishers, 10 milling machines and 30 other miscellaneous machines. Workers from England and Germany filled many of the crucial skilled jobs. The largest extant structure is the 1870 brick factory, 3-story and 190' x 32', which housed the manual and machine operations performed before polishing. It features stone lintels and sills and paired brackets at the eaves; the central stair tower has lost its mansard roof. There were two foundries, one for brass and one for ferrous metals. Both are of brick (110' x 62'; 125' x 48') and have flat roofs with monitors. The brick, 3-story warehouse/packing department and 1-story, sawtooth-roofed press room, built around the turn of the century, also survive. Norwalk Lock operated here until after World War II, although by that time Segal Lock and Hardware Co. owned the company. In recent years the complex has been converted to offices and studios. No lock-making equipment survives.
(Census 1860, 1870, 1880; D.W. Ray and G.P. Stewart, Norwalk, 1979; Norwalk After 250 Years, 1902; Carl Lobozza, Pictures From the Past, 1974; Sanborn Map Co., Insurance Maps of Norwalk, 1922; CHC.)

NORWALK IRON WORKS (1866)
North Water Street
Norwalk

Norwalk South
18.632970.4551000

Norwalk Iron Works Co. was established in 1866 by a group of local investors headed by the same entrepreneurs who had founded the Norwalk Lock Co. ten years earlier. The 1866 firm built a plant on Water St. in South Norwalk and bought George Dwight's steam pump works, of Springfield, MA, to occupy it. Four years after operations began, Norwalk Iron Works produced 350 steam pumps and 98 steam engines in one year. Thirty-five men worked in the iron foundry, a 1-story brick building (near-flat roof, 120' x 55') which held two cupolas; the brass foundry, with four men to run four small furnaces, was in the same building. Machine and pattern shops were in the adjacent gable-roofed brick factory (3 1/2-story, 175' x 45'), which has a flat-roofed stair tower centered on the long east wall, rubble foundations, and window openings with stone sills and projecting segmental-arch lintels. In 1870 the Iron Works employed 110 machinists and pattern-makers. In the 1880s and 1890s two wings (1-story, 45' x 40'; 2-story, 108' x 35') and another foundry were erected (high 1-story, 190' x 52'). This foundry has large, round-arched window openings with pilasters between them. By the turn of the century the firm was producing air and gas compressors and no longer made steam engines or pumps. In 1900 a large brick-pier factory (2-story, 240' x 132') was built just south of the original plant; the firm employed 350 men, and their wages comprised one-seventh of the manufacturing payroll in the town. Today the Norwalk Co., descended from the original firm, still manufactures air and gas compressors in the south building. The north complex houses industrial tenants.
(Census 1870, 1880; CHC; D.W. Ray and G.P. Stewart, Norwalk, 1979; Norwalk After 250 Years, 1902; Sanborn Map Co., Insurance Maps of Norwalk, 1922; Connecticut Bureau of Labor Statistics, Annual Report, 1900.)

R & G CORSET FACTORY (1887)
21 Ann St.
Norwalk

Norwalk South
18.632760.4551050

R & G Corset Co. commenced operation in 1880 with a workforce of 125 women, most of whom operated sewing machines, 37 children and 15 men. The firm outgrew its first factory (not extant) on Water St. in 1887 and erected the main building of this complex. U-shaped in plan, with two ells (4-story, each about 100' x 60') connected by a central section (4-story, about 80' x 40'), the factory has a mansard roof, segmental-arch lintels and stone sills. The firm built two major additions in the early 1900s: 3-story and about 100' x 60'; 1-story and about 140' x 80'. All buildings are of brick. Tenants now occupy the buildings and no historic machinery survives.
(Census 1880; CHC; Norwalk After 250 Years, 1902; Connecticut Bureau of Labor Statistics, Annual Report, 1900.)

MALLORY HAT FACTORIES (c.1890)
Rose Hill Ave.
Danbury

Danbury
18.628490.4583770

Mallory & Co. was one of the few Danbury hatting firms to start as a cottage industry (in the 1820s) and survive to industrial maturity in the 20th century. Hatting was an extremely volatile trade, subject to fashion-dictated shifts of demand. Also, in the 19th century, mechanization of various production processes by different firms caused abrupt changes in firms' competitive positions. Hundreds of companies failed due to dislocations in markets or productivity. Mallory succeeded, in part, because of ready adoption of mechanized techniques. Ezra Mallory, Jr., for instance, introduced the first sewing machine into a Danbury hat shop in 1861. He also recognized changing fashions and acted accordingly, such as when bonnets were superseded by formed hats as <u>de riqueur</u> women's headwear in the 1850s. No machinery existed to make the new style, so Mallory recruited older hatters skilled in the hand techniques. Within several years Mallory adapted mechanized processes to the new product, again rendering obsolete the skills of the older hatters. Several large firms, Mallory among them, dominated Danbury's hat industry by the 1920s. These firms each employed hundreds of men and women to produce hundreds of thousands of hats annually. Smaller shops continued to open, and some enjoyed brief success by riding a market trend or production innovation, but their prospects for prolonged success were slim. In 1895 there were 33 producers in Danbury, of which only six survived to number among the 50 hat firms running in 1925.

The extant remnants of Mallory's plant were built between 1890 and 1923. Though the company occupied the Rose Hill Ave. site since 1861, the earlier frame mills have been demolished or burned. Portions of the 1-story, brick, monitor-roofed factory (327' x 57') were built in the 1890s; this building was probably used for the preliminary processing of fur. These techniques included steam-heated cleaning and chemical processing, operations for which the advantage of ventilation provided by the monitor can be appreciated. Animal skins were cleaned, slit and trimmed, then the top growth of hair was removed to leave the soft, dense under-fur used for hats. This fur was then "carrotted," a chemical process that raised the tiny barbs on each hair which bound them together during "felting," the actual making of the hat fabric. Adjaçent to this building stands the brick boiler house (1-story, monitor roof, about 50'x 35') which also dates to the 1890s. The 6-story, flat-roofed factory, with reinforced concrete posts and beams, housed felting, forming and finishing operations. Construction started in 1920 but the building was redesigned twice, once to double its height and once to extend it by 60'; the 220' x 60' mill was completed in 1923. The hat trade has suffered in recent decades as the fashion in hats increasingly became one of no hat at all. Tenants now occupy Mallory's mills; Stetson Hat Co. uses the brick structures for their original purpose.
(Osborn: New York Atlas; Census 1850, 1860, 1870, 1880; Edward M. Woolley, <u>A Century of Hats and the Hats of the Century</u>, 1923; C.O. Brown, <u>Map of the City of Danbury</u>, 1906; Danbury Assessor's Records.)

LOEWE HAT FACTORY (1880)
89 Rose Hill Ave.
Danbury

Danbury
18.628630.4583900

D. E. Loewe and Co.'s factory survives as one of the few Danbury had shops in recognizable condition. This medium-sized firm, which employed less than 200 people at peak operation, is historically important because it was the primary target of the Danbury Hatter's Strike, which began in 1902. Locally, the strike obliterated all vestiges of paternalistic labor relations in the hat trade. Nationally, the resolution of a strike-related lawsuit by the U. S. Supreme Court in 1908 altered union tactics by applying the restraint of trade provisions of the Sherman Anti-Trust Act, originally aimed at corporate combinations, to declare illegal the union strategy of secondary boycotts.

Loewe built this shop in 1880, one year after commencing manufactory of soft fur hats. The 3 1/2-story, gable-roofed mill (140' x 36', with a 30' x 16' wing) has a rubble-stone foundation which serves as one wall of a canal containing the Still River in its course adjacent to the mill. Framing is timber throughout, and the clapboarded walls (now covered with siding) are broken by single-width window openings, spaced very tightly, on all four sides. The narrow bays (10' between posts) and low ceilings create a cramped atmosphere that the many windows do little to alleviate. Two c.1890, 4-story additions (40' x 25', 40' x 30') have shallower-pitched roofs, cast-iron columns, and triple-width window openings, but are otherwise similar to the 1880 mill. The buildings are now used as warehouses.
(Osborn; U.S. Reports: Cases Adjudges in the Supreme Court, vol. 208, 1908; C.O. Brown, Map of the City of Danbury, 1906; Danbury Assessor's Records.)

REID MACHINE WORKS (c.1875)
Maple Ave.
Danbury

Danbury
18.629250.4583990

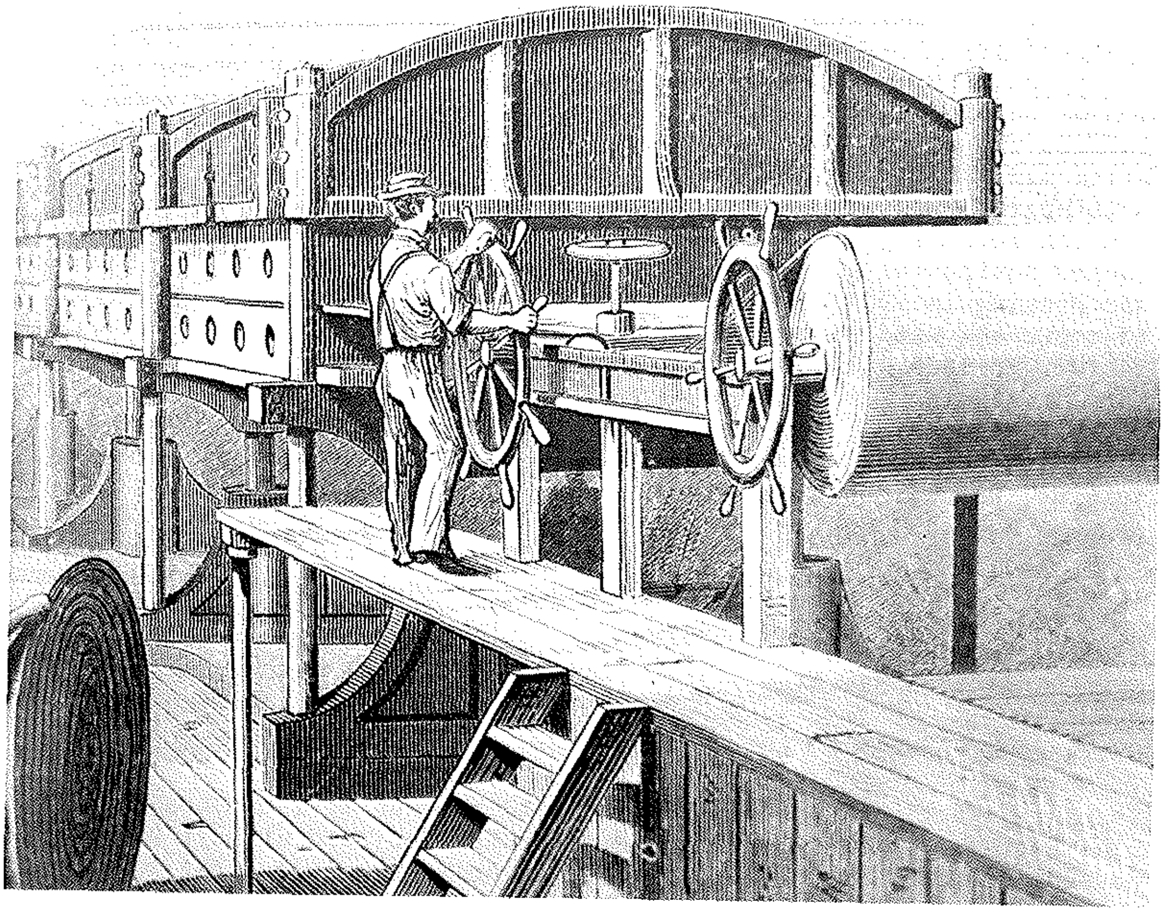
This 2-story, frame building housed Charles Reid Machine Works during the late 19th century. The long, tapering mill fits tightly in the triangular space between Maple Ave. and the former Danbury and Norwalk Railroad. Walls of the pitch-roofed structure are 125', 48', 118', and 25' long with a 3-story pyramidal-roofed stair tower at the shortest side. A 2-story, 60' x 48' frame wing was added c.1880. After a machinist's apprenticeship at Scovill Mfg. Co. (separate entry) in Waterbury, Reid sold his patent for a 2-jaw, self-centering drill chuck and moved to Danbury in the 1860s. Before opening his own shop Reid worked for Marlin and Fanton, makers of sewing machines for hat manufacturers. Reid's works made patent hatting machines, many of which were first attempts to mechanize hat production, like his powered hat-rounder,

or which increased the mechanical control of previously mechanized techniques, like his machines for sandpapering and ironing hat crowns. After Reid's death in 1903 his nephews, the Doran brothers, assumed control and expanded production to thirty machines, including fur blowers for the felting process, crown pouncers for the finish operations on hat crowns, steam-chamber felt softeners and hat-clipping machines. In 1919 the firm moved to new quarters in Danbury, where it continues to operate as Doran Brothers. Reid's frame shop is presently tenanted.
(Osborn; Doran Brothers, Inc., Our First 100 Years, 1968; Danbury Assessor's Records.)

NEW YORK BELTING AND PACKING FACTORY; (1856) Newtown
FABRIC FIRE HOSE FACTORY 18.644000.4588130
Glen Rd.
Sandy Hook/Newtown

Josiah Tomlinson started the Goodyear Rubber Packing Co. around 1850. The firm was bankrupt by 1856 when the plant was sold to New York Belting and Packing Co., which built the extant brick factory, 4-story and 200' x 64' with an ell 80' x 34'. The shallow-pitched gable roof is supported by Howe trusses and the brick walls, leaving the fourth floor unobstructed by posts. The fourth floor is borne by timber posts on the story below, and cast-iron columns hold the second and third floors.

New York Belting and Packing Co. made laminates of vulcanized rubber and cotton duck into fire hoses, transmission belts and packing for steam joints. Rubber was processed from its raw state, while the duck was purchased. The firm built much equipment specifically designed for use here: high-speed saws to cut raw rubber; calendars to roll out bulk rubber into strips and to laminate rubber and cloth; long, narrow steam-heated ovens to vulcanize lengths of belt and hose. U. S. Rubber bought New York Belting and Packing in 1900 and moved it to Passaic, NJ. In 1901 U. S. Rubber moved another subsidiary, Fabric Fire Hose Co., to the Sandy Hook plant. Though idle and bereft of equipment the plant is in good condition, particularly the water power system, which has been altered greatly since the 1850s. The masonry buttress dam and open headrace, both of which were built by New York Belting and Packing, show no leaks. Fabric Fire Hose converted the system to generate electricity. The single-runner S. Morgan Smith turbine and Crocker-Wheeler alternator remain in good order.
(Osborn; "India Rubber and Its Manufactures," Scientific American, 10 September 1859; D.H. Hurd, History of Fairfield County, vol. 1, 1881; Newtown Past and Present, 1955.)



New York Belting and Packing Co.
D. H. Hurd, History of Fairfield County, vol. 1, 1881.

UPPER RUBBER FACTORY (c.1870)
Glen Rd.
Sandy Hook/Newtown

Newtown
18.643550.4587270

Meyer and Poppenhusen built a rubber mill here in the early 1850s. All that remains of their mill are the rubble-walled wheelpit and foundation with arched tailrace openings. New York Belting and Packing Co. (separate entry), occupants of the next downstream mill privilege, bought this site in the late 1860s and built a new mill on the old foundations. The c.1870 brick mill, 74' x 44' with gable roof, has timber framing in the three floors above grade and cast-iron columns in the basement. Segmental-arch lintels and brick sills frame the window openings. There is no stair tower but a brick-walled cupola carries the stairs one story above the level of the roof. A 1-story brick ell, 172' x 31', extends north of the main mill. New York Belting and Packing revamped the water power system, rebuilding the dam and replacing the overshot waterwheel with a Rodney Hunt double-runner horizontal turbine. After U. S. Rubber bought New York Belting and Packing in 1900 the upper factory was used as a reclaiming plant to reprocess used rubber products. Thor Plastics Corp. bought the factory in 1928 and for over 30 years made a variety of plastic products, including Parcheesi games and bakelite electrical components. Today the building is a warehouse. The owner has built a concrete retaining wall for the dam and plans to generate electricity with the turbine, which is now being restored.
(New York Atlas; Census 1850, 1860, 1870, 1880; L. Fagan, Map of the Town of Newtown, 1854; Factory Insurance Association, "The Thor Corp.," insurance survey, 1948, courtesy Gerald Curtis.)

GILBERT AND BENNETT WIRE PLANT (1874)
Main St.
Georgetown/Redding

Bethel
18.631560.4568480

Industrial activity on this site evolved from an artisan shop to mechanized factory production. In 1818 shoemaker Benjamin Gilbert began making household sieves from woven animal-tail hair strung in light wooden frames. In the 1820s he moved the shop from his home to a sawmill on the Norwalk River, developed machinery for picking and twisting the hair, and began making stuffing for carriage cushions. In 1837 Gilbert wove wire cloth on a carpet loom and started using this material in his sieves and for window and shade screens. A wire-drawing mill was built in 1863 and power looms for weaving wire in 1865, by which time responsibility for the firm had passed to relatives of Gilbert. Fire destroyed the works in 1874; the earliest parts of the present plant date from the subsequent rebuilding. The 1874 mill is a 2-story brick-pier structure, about 300' x 50', with segmental-arch lintels and stone sills. The near-flat roof has a monitor along its ridge. The dam was rebuilt in 1874 and the 19'-high masonry structure still stands, as does

the open headrace. In 1909 the firm built another brick-pier factory, 4-story and about 240' x 50'. Its double windows have stone sills and flat lintels of brick. The plant assumed its present extent in 1922 with additions to the two main mills. Gilbert and Bennett Manufacturing Co. still produces wire products in these buildings.
(Osborn; Census 1850, 1860, 1870, 1880; Charles B. Todd, The History of Redding, Conn., 1906; Elsie N. Danenberg, The Romance of Norwalk, 1929; D.H. Hurd, History of Fairfield County, Conn., 1881.)

BRONSON WINDMILL (1894)
3015 Bronson Rd.
Fairfield

Westport
18.643260.4559130

Bronson Windmill, a "Corcoran Storm-Defying Windmill," was built in 1894 by Andrew Corcoran's Jersey City-based pump works. The windmill, underground cistern and wooden tank in the windmill tower were the central components in the water-supply system of Frederic Bronson II, a financier who maintained a large dairy farm at his Fairfield estate. Farming ceased decades ago; residences and a school now occupy the area. The windmill represents the agricultural engineering that abetted the "gentleman farmer" of the 19th century. Octagonal in plan, the 80'-high windmill tower rests on eight locust-wood pilings which are joined to the superstructure at each corner with steel rods. Yellow-pine timbers frame the tower, and walls are finished with fish-scale shingles. Squared shingles cover the ogee-shaped roof. A timber frame atop the roof supported the operating equipment: vanes, axle, tail and crank. The roof and mechanical apparatus have been removed temporarily for repair. Inside the tower are the windlass for feathering the mill and much of the pump hardware. After restoration the mill will be operated without load for tours and school groups.
(NR; E.V.H. Banks, This is Fairfield, 1960; E.B. MacRury, More About the Hill, 1968.)

COS COB POWER PLANT (1907)
West bank of Mianus River
Greenwich

Stamford
18.617880.4542760

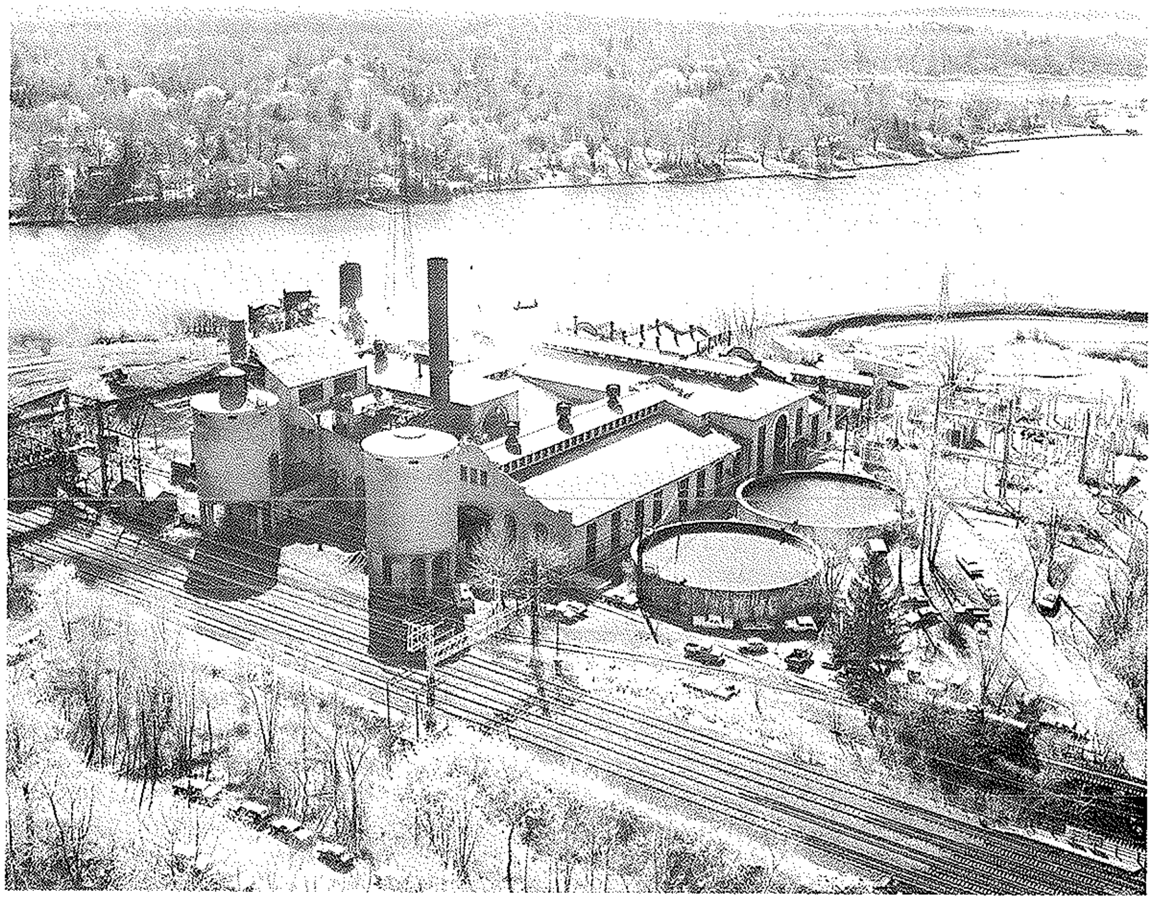
Cos Cob Power Plant, built 1905-07, supplied power to the first main-line, long-distance electrified railway in the U.S.--the Shoreline (formerly New York) Division of the New York, New Haven and Hartford Railroad. Electrification was initiated in response to the New York State Legislature's requirement, enacted in 1903, that locomotives within New York City be powered by some means not requiring combustion on the train itself. Both lines affected by the law, the New York Central and the New York, New Haven and Hartford, extended the zone of electrification because heavy traffic in the city would have been complicated further by changing between steam and electric traction at the city limits.

The New York Central electrified the 13 miles of its line between Grand Central Terminal and Woodlawn, NY using low-voltage direct current, picked up by the locomotives from a side-mounted third rail. Electricity was generated as high-boltage alternating current, transmitted to substations located about five miles apart along the track. At these it was converted to the 666-volt direct current of the third rail.

The New York, New Haven and Hartford, however, envisioned electrification as far east as New Haven, 66 miles from Woodlawn. Earlier experience with the electrification of short sections of the system gave evidence that over such a distance the use of high-voltage alternating current for both transmission and operation would be more economical. Besides offering lower operating costs, such a system obviated the need for substations. The system, completed in 1907, set the standard for power characteristics in American railroad electrification: single-phase alternating current at 11,000 volts and 25 cycles.

Cos Cob power house still serves its original purpose, though most equipment has been replaced and additions have hidden or eliminated many details of the Spanish Mission-style exterior. Walls of the plant (original dimensions 248' x 112') are plain-faced concrete blocks made with gneiss excavated on the site. All interior columns are of concrete blocks, except for steel columns in the boiler room. Steel trusses, carried on interior pilasters, support the roof, which is reinforced cinder concrete faced with tile. Initially the railroad electrified the 21 miles of track between Woodlawn and Stamford, CT, extending it 45 miles eastward to New Haven in 1911-1914. With the extension the powerhouse doubled in size by the addition of a wing to the west. Some early auxiliary equipment survives: two c.1912 overhead, weighing larry cars and the c.1907 reinforced concrete, cylindrical feedwater tank (600,000 gallon) by the building's northwest corner. The future of the plant is uncertain.

(Osborn; Robert M. Vogel, "A Brief Historical Evaluation of the Cos Cob Power Plant," unpub. typescript, Smithsonian Institution, courtesy of the author; Wastinghouse Electric and manufacturing Co., New York, New Haven and Hartford Railroad Electrification, 1924; Warren O. Rogers, "Extension of the Cos Cob Plant," Power 41, 16 March 1915.)



Cos Cob Power Plant (J. Boucher)
Courtesy DeLeuw, Cather/Parsons

NEW HAVEN RAILROAD ELECTRIFICATION PROJECT (1907)
Shoreline Division
Greenwich to New Haven

Glenville
18.612840.4540000
New Haven
18.676250.4576900

The New York, New Haven and Hartford Railroad mainline between New York and New Haven was a working laboratory for railroad electrification. Besides the generating systems (see entry for Cos Cob Power Plant), engineers from the railroad and from Westinghouse Electric and Manufacturing Co. designed transmission and signaling systems as well as means of structural support for the power and signal wires. Capital expenditure by the railroad decreased sharply after the 1920s, so today the line retains significant material from this important electrification project, with examples of successive stages of development for the various sub-systems. The catenary bridges that carry the overhead wires between Woodlawn, NY, and Stamford, CT, were constructed in the simple catenary method, which is briefly characterized as having the power wires suspended from the bridges. From Stamford to New Haven the compound catenary system was used, with wires running over the bridges. For a short stretch in Stamford there are arched catenary bridges, an experimental design that was tried during the transition from simple to compound. The hangers, insulators, power wires and virtually every other piece of hardware throughout the system was designed specifically for use on this line. The signaling system east of Stamford retains many pre-1920 components, such as the automatic semaphore signals. There are several rare examples of early interlocking plants, such as the Johnson mechanical interlock in Norwalk and the Union Switch and Signal Co. Type F interlock in Stamford. The entire railroad between New York and New Haven, which has been called an "operating museum," merits further study. See separate entries for movable bridges on the line.
(Osborn; Westinghouse Electric and Manufacturing Co., New York, New Haven and Hartford Railroad Electrification, 1924; William S. Murray, "Electrification of the New York, New Haven and Hartford Railroad," CSCE, 1913; "The Installation of Electric Traction on the New York Terminal Section of the New Haven Railroad," Engineering News, 58, 5 September 1907.)

INNER HARBOR LIGHT; "BUGLIGHT" (1891)
Welles Tongue
Bridgeport

Bridgeport
18.652840.4558610

"Buglight" stands on the eartern tip of Welles Tongue, a 1,100'-long breakwater that separates the inner and outer harbors of Bridgeport. Both breakwater and lighthouse were built in 1891. The round, black-painted lighthouse is made of metal plates. It is 12' in diameter at the base and supported on a concrete foundation. The tapering walls are 22' high to the railing around the light cupola. Inside the

railing a narrow walkway, carried on cast-iron brackets, projects outward from the walls. The cast-bronze fog bell at the southeast corner of the base no longer functions, as the rocker mechanism that actuated it has rusted almost completely away, but the bell itself is in good condition. The lighthouse is still in use with modern electrical lamps.
(Bridgeport Standard, 16 January 1891.)

FAYERWEATHER ISLAND LIGHT (1823)
Seaside Park
Bridgeport

Bridgeport
16.649600.4555780

The first lighthouse at Fayerweather Island was a frame and clapboard tower built in 1808 under the auspices of the U. S. Treasury Department. The present structure was built in 1823 after a storm destroyed the earlier light. It is an octagonal stone tower about 40' high with 8' sides at the base. Walls are a coursed ashlar of sandstone blocks lined with mortared rubble. An iron railing surmounts the corbeled brick cornice and surrounds the light cupola, which was installed in the early 20th century when the light was electrified. Within 200 yards of the lighthouse are foundations of the 1808 oil vault and 1808 light-keeper's dwelling. The light no longer functions.
(U. S. Treasury Dept., "Request for Proposals for Construction...," 6 August 1807, Bishop Collection, Bridgeport Public Library; U. S. Treasury, Fifth Auditor's Office, "Report of Lieutenant George M. Bache," 22 November 1838, Bishop Collection.)

STRATFORD POINT LIGHT (1881)
Stratford Point
Stratford

Milford
18.659130.4557140

Stratford Point Light stands on a peninsula in Long Island Sound at the mouth of the Housatonic River. The first light here was established in 1822. The present structure was erected in 1881. In size, form and materials it is virtually identical to Bridgeport's Inner Harbor Light (separate entry). Stratford Point Light still functions.
(U. S. Coast Guard, Light List: Atlantic and Gulf Coasts of the U. S., 1952.)

ARCH STREET TUNNEL (1895)
under railroad tracks
Greenwich

Stamford
18.619910.4543080

This tunnel allows automobile traffic to pass through an embankment which carries the mainline of the former New York, New Haven and Hartford Railroad. The 94'-long tunnel is 11' high and 14' wide. The south end of the tunnel (about 65') is made of brownstone blocks with wing walls at the portal and no internal buttressing. For about 30' at its north end the tunnel consists of granite blocks, and the inside walls extend inward up to the springing point of the arch; this extension provides a shelf-like buttress about 6" wide. There are no north wing walls.
(PC)

Bridges

RIVERSIDE AVENUE BRIDGE (1871)
over railroad tracks
Greenwich

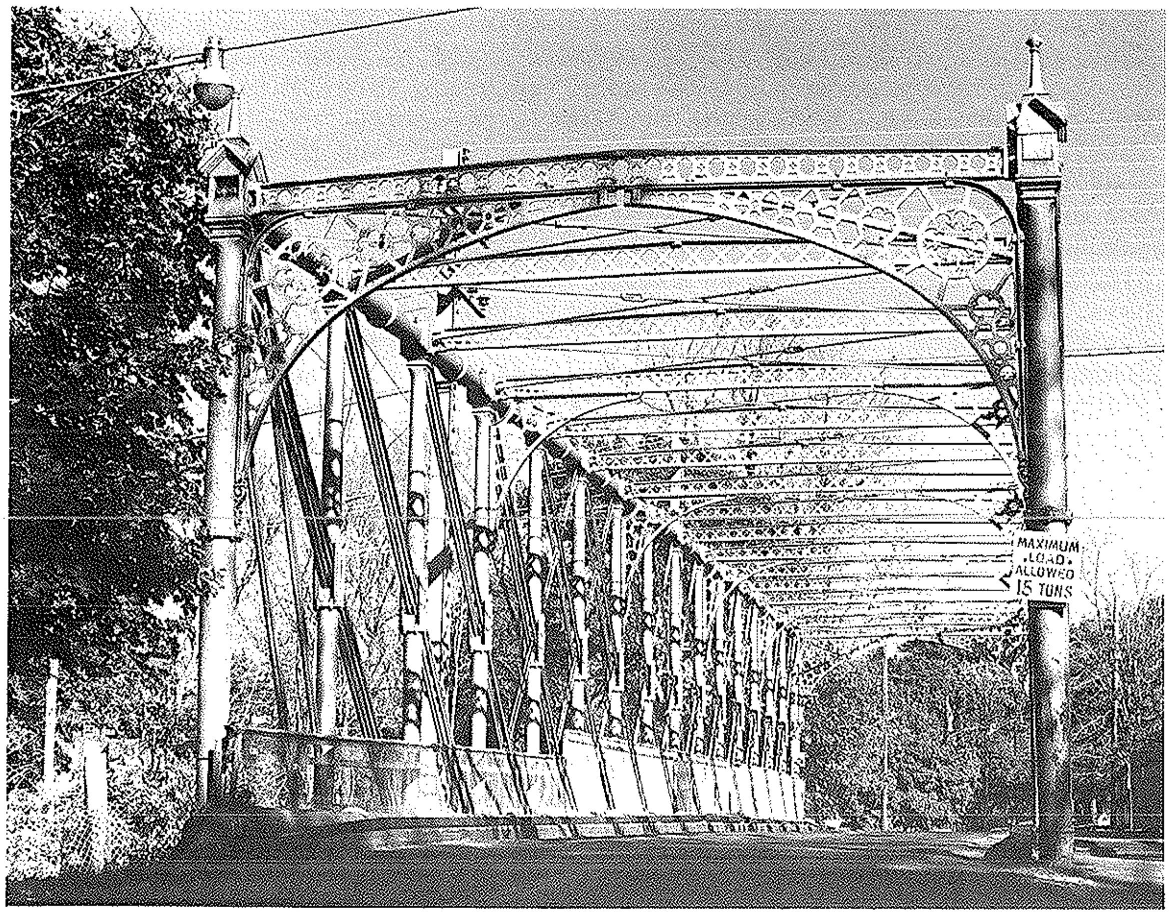
Stamford
18.618660.4543010

Riverside Avenue Bridge is one of but a handful of cast-iron truss bridges still in use. Designed by F. C. Lowthrop and built by Keystone Bridge Co. in 1871, the structure was originally part of a six-span, double-track bridge over the Housatonic River in Stratford, CT. That bridge was replaced in 1884 and some ten years later this single span was re-erected near Riverside Station in Greenwich. The double-intersection Pratt through truss, with vertical end posts, is 164' long and 22' wide. The top chord consists of hollow cast-iron cylinders, two per panel, which flare to over one-foot diameter where they are joined. Verticals are similar, but instead of being joined in the middle they are connected by ribbed boxes through which the diagonals pass. Diagonals are groups of wrought-iron rods, varying from 2 1/8" diameter at end panels to 1 1/2" at the middle panels, bolted into connecting blocks at top and bottom panel points. The lower chord consists of threaded wrought-iron rods, except for the end panels where a cast-iron cylinder is substituted. Top lateral bracing is achieved by cast lattice-girder struts and wrought tie rods. Elaborate curved brackets brace between the uprights and struts at the portals and at every third panel. Abutments are a random ashlar of rough-surfaced brownstone. Floor system of plate-girder cross beams and steel stringers was built around 1925. This bridge reveals the increasing understanding of statics in bridge design in the 19th century; the graduation in size of the diagonals, for instance, shows recognition that shearing stress increases toward the abutments. Lowthrop patented three improvements on this type of bridge, and two are seen here: the junctures at the bases of the verticals and the ribbed boxes through which the diagonals pass. (NR; PC; Consolidated Rail Corp., New York Engineering Office, File 1300 New Haven, Overhead Bridge #30.26, including two letters from Lowthrop, four measured drawings; Connecticut Railroad Commissioners, Annual Report, 1872, 1885; U.S. Patent Office, Annual Report of the Commissioner of Patents, 1857, 1860, 1967.)

COS COB RAILROAD BRIDGE (1904)
over Mianus River
Greenwich

Stamford
18.618120.4542920

Cos Cob Bridge was built by the American Bridge Co. in 1904, replacing an earlier movable bridge. Brownstone-masonry piers and abutments support ten fixed spans and one 107' long Scherzer rolling lift bascule span.



Riverside Avenue Bridge (Bruce Clouette)

The fixed spans are: three double-intersection Warren deck trusses, each 105' long; four similar deck trusses, each 120' long; three deck-girder spans of 64', 36', and 56'. Operating equipment (motors, brakes, transfer gearing) is mounted below track level at the bearing end of the movable span. The bridge carries two tracks.
(NR; PC.)

OLD NORTH STAMFORD ROAD LENTICULAR BRIDGE (1892) Stamford
over Rippowam River 18.622120.4652120
Stamford

Built in 1892 by Berlin Iron Bridge Co., this pony truss has been out of service since the 1930s when Merritt Parkway truncated Old North Stamford Rd. It is a short bridge (53' long), though wide (21'), and the pinned endpost connections resemble those in Berlin lenticulars with similar dimensions, such as Sheffield Ave. Lenticular Bridge (separate entry). The top chords and endposts (riveted box-sections of plates and channels), web verticals (tapered, angles and lacing bars) and bottom chords (double eyebars) are all wrought iron. This crossing is now on private land. See entry for Berlin Iron Bridge Co. Plant.

MAIN STREET LENTICULAR BRIDGE (1888) Stamford
over Rippewam River 18.622190.4545340
Stamford

Built in 1888 by Berlin Iron Bridge Co., this bridge is Connecticut's only wrought-iron lenticular truss remaining on a major artery in an urban center. It is also the widest (37') Berlin lenticular in the state. There are two pony-truss spans, each 60' long. All connections, between the box-section top chord, double-eyebar bottom chord, and tapered verticals, are pinned. This bridge retains its endpost decorations (orb-shaped castings), features that have been removed from most of the other extant pony trusses that had them. See entry for Berlin Iron Bridge Co. Plant.

PULASKI STREET LENTICULAR BRIDGE (1887) Stamford
over Rippowam River 18.622270.4544460
Stamford

Stamford's Pulaski St. Bridge, a wrought-iron lenticular through truss, was built in 1887 by Berlin Iron Bridge Co. At 148' long it is the third longest extant Berlin lenticular in the state. It stands in a densely settled residential and industrial district, carrying heavy traffic daily. The trusses no longer function, as timber crib-work and concrete footings now support the deck. Despite this alteration the bridge has a 4-ton weight limit, which, along with the narrow lanes, makes it a prime candidate for replacement. Pinned connections secure each joint in the trusses, which have box-section top chords, double-eyebar bottom chords, and straight-sided verticals fitting inside the chords. See entry for Berlin Iron Bridge Co. Plant.

CORTLAND AVENUE BRIDGE (1897)
over railroad tracks
Stamford

Stamford
18.624650.4547290

Cortland Avenue Bridge is a pin-connected Pratt through truss carrying two lanes of traffic over the tracks of the former New York, New Haven and Hartford Railroad. Three types of steel members comprise the webs: eyebar diagonals and lower chord, laced-girder verticals, and box-section upper chords and inclined endposts. The struts connecting the webs over the roadway consist of laced girders tapered to rise at the center. This 131'-long span was built in 1897, during construction to widen the railway to four tracks.
(DOT; PC.)

SOUTH NORWALK RAILROAD BRIDGE (1896)
over Washington and Main Streets
Norwalk

Norwalk South
18.633290.4550270

South Norwalk Bridge, sandwiched between commercial buildings in the densely built-up South Norwalk business district, carries the two-track mainline of the former New York, New Haven and Hartford Railroad. Three trusses, each a pin-connected Pratt, support two integral through-truss spans. Truss diagonals and lower chords are die-forged steel eyebars. Verticals and top chords consist of steel channel sections connected with riveted lacing. The bridge spans 146' between masonry abutments and allows 12' clearance for street traffic. The bridge dominates the view and adds immeasurably to the character of this well-preserved, turn-of-the-century commercial streetscape.
(NR; PC.)

NORWALK RIVER RAILROAD BRIDGE (1896)
over Norwalk River
Norwalk

Norwalk South
18.633900.4550040

The Norwalk River Bridge, built in 1896, is the oldest movable bridge on the Northeast Corridor rail line in Connecticut and the only one of its type--a deck-truss rimbearing swing bridge. Its three fixed spans (each 120' long) and one swing span (202' long) each consist of four parallel, double intersection Warren deck trusses. The riveted steel trusses rest on masonry substructure. Load on the swing span is carried by a circular drum girder, to which load is transmitted from the deck trusses through cross girders at the center of the span. The drum, which rotates with the span, is supported by 96 rollers around its circumference. Recent repairs have not damaged the historical integrity of the bridge, which bears heavy daily usage on the busiest rail corridor in the state.
(NR; PC.)

SAUGATUCK RIVER RAILROAD BRIDGE (1905)
over Saugatuck River
Westport

Sherwood Point
18.636080.4553940

Saugatuck River Bridge, built in 1905, carries two tracks on the busy Shoreline route. It is one of two deck-girder Scherzer rolling lift bridges on the northeast rail corridor (Cos Cob Bridge is the other). All six spans are deck girders; from west to east, span lengths are 91', 91', 48', 98' (bascule span), 91', 35'. There are two bascule leaves, one for each track, operated independently by diesel engines. (NR; PC.)

WESTPORT SWING BRIDGE (1884)
Rte. 136
Westport

Sherwood Point
18.636870.4553440

Central Bridge Works of Buffalo, NY built this hand-operated swing bridge over the Saugatuck River. There are two spans, both supported by pin-connected wrought-iron Pratt through trusses. The fixed span is 144' long. The 142'-long swing span consists of two 71'-long through trusses which are tied together with wrought-iron eyebars at the upper portal joints. When the bridge is closed, these eyebars do not function; when the bridge is open, they resist the downward moments at the ends of the span. The mechanical apparatus is very simple: a ring gear on a drum below the movable span engages two pinion gears, each of which is mounted on a square shaft which extends upward to the level of the roadbed. To move the span, key wrenches are placed over the ends of these shafts and rotated. Piers and abutments are made of granite blocks, though the abutments have been faced with concrete. The bridge, posted with a 10-ton weight limit, bears heavy daily use.
(DOT; "Westport's New Bridge," Bridgeport Standard, 16 July 1884.)

BLACK ROCK TURNPIKE BRIDGE (1890)
over railroad tracks
Fairfield

Bridgeport
18.648290.4558090

Black Rock Turnpike Bridge carries two lanes of traffic over the railroad. A pin-connected Pratt pony truss, its most notable feature is the use of Keystone columns for web verticals and inclined endposts. These are hollow, octagonal-section members made from four wrought-iron segments riveted together. They are similar to Phenix columns, another proprietary pattern of structural compression members; Phenix columns make a circle when assembled, while the Keystones are octagonal. The columns of this bridge have spacers of varying thickness between the rivet flanges so that the columns are wider at the middle than at the ends, a puzzling technique which leaves spaces too small for paint to get in but more than ample for corrosion-producing moisture to enter. Iron castings at each joint terminate the columns. A plate and two channels riveted together

form the top chord, and the diagonals are eyebars. The 54'-long bridge was built in 1890.
(PC; C.L. Strobel, ed., Pocket Companion Containing Useful Information and Tables, 1890.)

MILL HILL ROAD BRIDGE (1890)
over railroad tracks
Fairfield

Westport
18.644350.4555530

This bridge, a pin-connected Pratt pony truss, is virtually identical to Black Rock Turnpike Bridge (separate entry). Both are 54' long; both were erected in 1890; and both have the same joints and members, including Keystone-column verticals and endposts.
(PC; C.L. Strobel, ed., Pocket Companion Containing Useful Information and Tables, 1890.)

PEQUONNOCK RIVER BRIDGE (1902)
over Pequonnock River
Bridgeport

Bridgeport
18.652100.4560450

The Pequonnock River Bridge is one of two through-girder Scherzer rolling lift bascule bridges on the Northeast Corridor rail line. Its superstructure is steel; the piers are stone and the main pier is concrete with stone facing. From north to south, the bridge consists of two through girder spans, each 88' long; the through girder bascule span, 126' long; and a 55'-long deck girder approach span. Machinery for bridge operation is suspended from the deck girder span. Each of the two track-carrying bascule leaves has identical equipment: drive motor, integral gear box drive and three sets of reduction and transfer spur gears. The bridge remains in daily use.
(NR; PC; "Pequonnock River Bridge," Railroad Gazette 38, 17 March 1905.)

PLEASURE BEACH BRIDGE (1908)
Lewis Gut
Bridgeport

Bridgeport
18.653680.4558580

Pleasûre Beach is on a narrow spit of land in the Long Island Sound off Bridgeport and Stratford. Spanning the estuary at the western end of the peninsula, the bridge consists of two causeway approach spans, each several hundred feet long, and a central swing span. The causeway decks rest on steel stringers supported by timber bents; the swing span is a riveted, steel Warren through truss, approximately 75' long. Pleasure Beach Ferry Co. originally operated a street railway over the bridge, which now carries two lanes of automobile traffic.
(Bridgeport Post, 25 May 1905, 3 August 1908, 23 September 1908.)

SANDY HOOK IRON BRIDGE (1880)
over Pootatuck River
Sandy Hook/Newtown

Newtown
18.643530.4686900

Dean and Westbrook, an engineering firm from New York, erected this bridge in 1880. The pin-connected Pratt through truss, about 80' long, is made entirely of wrought iron. Phenix columns form the verticals, top chords and inclined end posts. The lower chords consist of rolled girder sections. Loop-welded eyebars serve as the diagonals. Stone abutments carry the truss about 20' above the stream. The bridge is now closed.

Specialized Structures

BARNUM INSTITUTE OBSERVATORY (1891)
804 Main St.
Bridgeport

Bridgeport
18.651940.4559610

Just before his death in 1891, P.T. Barnum bequeathed $100,000 to the Fairfield Historical Society and the Bridgeport Scientific Society for a building to house their collections and offices. The architects, Longstaff and Hurd, believing that an astronomical observatory would enhance the scientific reputation of the institute, included one in the plans at their own expense. To eliminate vibration, the structural system for the roof-top observatory was designed to be entirely independent from the rest of the building. The footing is a 12'-square concrete bed covered with closely rammed ashes, which were intended to dampen street-traffic vibration. Four Phenix columns, 50' high, support the stone floor of the observatory work area. Clear space was left between this floor and the roof of the main building so that heat from the building would not expand materials and alter the position of the observatory. The masonry-walled, domed observatory tower (18' diameter) rises 12' above the roof. Though no longer used, it remains intact.
(Florence S. M. Crofut, Guide to the History and Historic Sites of Connecticut, 1937; Bridgeport Standard, 16 May 1891, 30 September 1891.)

SEASIDE PARK (1864)
Atlantic Ave.
Bridgeport

Bridgeport
18.651980.4558060

In the 1860s industrial growth in Bridgeport, soon to accelerate, had not yet wrought the demographic and environmental changes that so clearly marked nearby New Haven and New York. But city leaders recognized the portents. An editorial in the Bridgeport Standard of 1 October 1863 counseled awareness of "the negligence of other places," and urged the citizens to "proceed at once to locate one or more public parks which will be an ornament to the city... The Housatonic Railroad terminates here. Manufactories of various kinds will centre in this city... and there ought to be no time lost in making those great public improvements which not only add to the attractions of the place, but are essentially necessary for the comfort, enjoyment and health "of the population." The Parks Commission was soon established and Olmsted, Vaux and Co., designers of New York's Central Park, were hired to execute plans. The original 44 acres of Seaside Park, buttressed by earthen dikes and a masonry sea wall, were mostly open, grassy space with promenades and carriage roads.

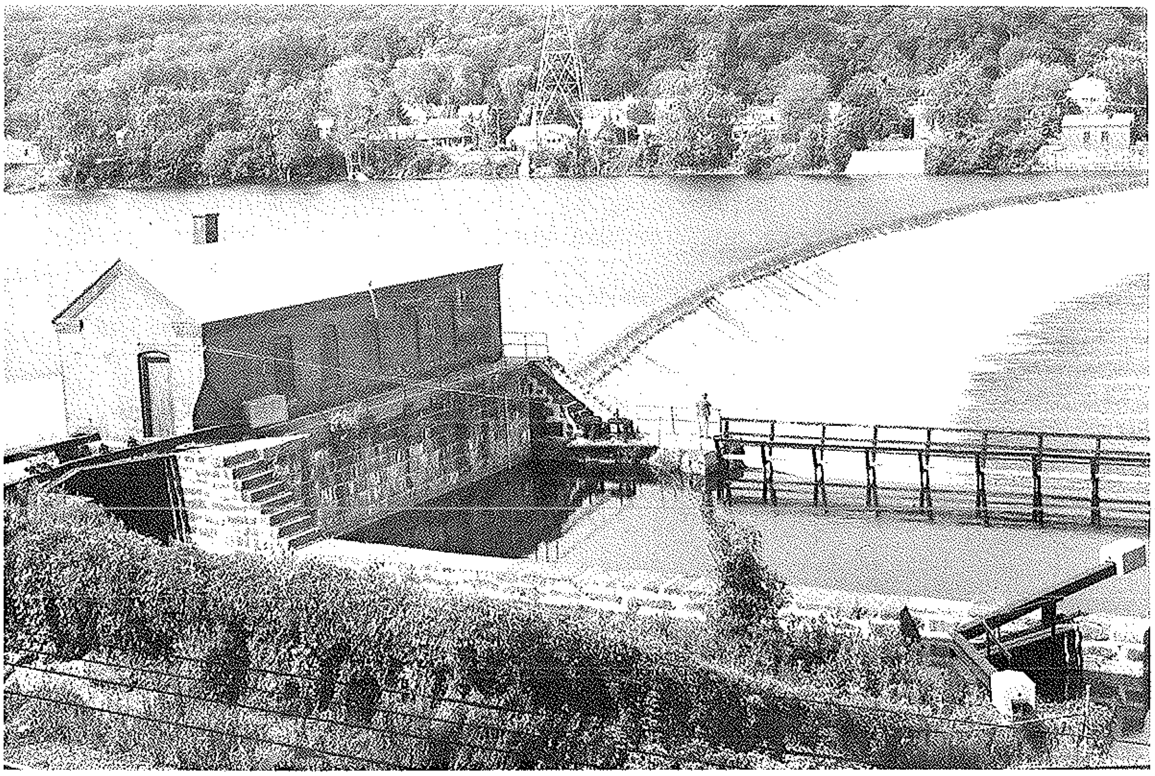
In 1878 P.T. Barnum bought 33 acres of salt marsh directly west of the park and began conseruction of an earthen dike to reclaim the acreage from tidal floods. By 1885 the 1,000'-long dike, 120'wide at the base and 45' wide at the top, was complete. Barnum donated it, with the enclosed land, to Bridgeport upon condition that the city landscape it to his specifications. Accordingly, a pond was excavated, the marshes filled and roadways constructed. Seaside Park was extended eastward in 1894-1895 with erection of a masonry sea wall 5,054' long. As with prior projects, the newly protected space was filled with rubble and soil to create firm ground for strollers, cyclers and ballplayers. The park assumed its present layout in 1917-1922, after the city had purchased Fayerweather Island, west of the Barnum dike. The island had been a narrow spit that erosion had separated from the mainland. In 1847 a stone breakwater had been built along the island to prevent further erosion and to protect Black Rock Harbor, to the west. This breakwater was extended 1,600' shoreward in 1917-1918 to rejoin the island to the shore. Dikes were fanned east and west from the breakwater and fill was loaded behind them, doubling the size of the park.

As predicted in the 1860s, industries and people came to Bridgeport, today the most populous city in Connecticut. Seaside Park, a monumental work of civil engineering undertaken over 58 years, is the largest open space in this densely settled city of factories and neighborhoods. Running east from Fayerweather Island for some 2 1/4 miles along Long Island Sound, the park offers the largest concentration of municipally owned shoreline in Connecticut.
(New York Atlas; Bridgeport Post, 4 January 1895, 24 May 1899, 25 May 1899, 18 May 1917, 16 December 1918; Bridgeport Standard, 11 September 1963, 1 October 1863, 18 August 1865, 26 August 1865, 7 October 1865, 15 January 1867, 17 May 1870, 21 March 1878, 3 March 1885, 5 March 1885, 6 March 1885, 1 July 1911.)

SHELTON CANAL INDUSTRIAL DISTRICT (1867) — Ansonia
northwest of Rte. 110 — 18.659600.4575600
Shelton

In the years 1867-1880 the rural farming and fishing village of Huntington was transformed into the industrial city of Shelton. Damming the Housatonic River provided thousands of horsepower. Water privileges were leased and developed, factories built, workers recruited and housed, and a commercial district constructed in just 13 years. An 1838 attempt to dam the river at this site had foundered due to lobbying on behalf of the shad fisheries. In 1864 Ousatonic Water Co., headed by Edward Shelton, was able to convince the State Legislature that a high dam need not impede the river-spawning shad, and was granted a charter for the project. Construction began in 1867 under Chief Engineer H.T. Potter, and much of his design survives.

The curved gravity dam, made of solid masonry, is 870' long and 22' high. Headgate structures feed water into canals on both banks. The west canal, by far the longer, was used for power and navigation. One lock survives at the upstream end; its brownstone walls are original but the gates are recent replacements. Over its 5,600' length the canal is 60' wide at water surface and 12' deep; along most of its course it



Shelton Dam (M. Roth)

is walled on both sides with unmortared masonry. For 2,000' below the dam a steep knoll occupies the land between canal and river. Below that the ground is more level and the canal cuts inland, leaving abundant space for factories.

Ousatonic Water Co. leased water and land to manufacturers, and by 1880 there were twelve factories. There was little structural variation in these mills, despite the widely varying processes and materials used in them. Except for one made of stone, all were brick-walled, multistory rectangular mills with timber and iron framing. About 2,000 horsepower were consumed daily. Over 1,000 people worked in the fifteen firms which occupied the twelve mills: Wilkinson Brothers, paper and pulp; Star Pin Co.; Spring Horse Shoe Co.; Wilcox and Howe, carriage hardware; Robert Adams, cotton cloth; D.M. Bassett, bolts; Derby Silver Co., flat and hollow ware; Maltby, Stevens and Curtis, plated flatware; Birmingham Corset Co.; Shelton Co., bolts and tacks; Osborn and Cheesman, brass; Radcliffe Brothers, woolen cloth; E.C. Maltby, dippers and hollow ware; New York Desiccating Co., dried cocoanut; and A.B. Ruggles, toys. The canal proprietors purposely leased to diverse industries in order to minimize the effect of a downturn in one sector upon the city they were creating.

Portions of the canal now run underground, and some buildings at the north and south ends have succumbed to fire and demolition, but an unbroken line of mills, about 3,000' long, still stands. Some of the mills are vacant but most are tenanted; none are occupied by original lessees. Water power is no longer used. Inspectors for the State Fish Commissioners noted shrinking shad counts in the early 1870s. By the turn of the century there was no shad run in the Housatonic River. (Water Power Report; Census 1870; CHC; Samual Orcutt and Ambrose Beardsley, History of the Old Town of Derby, Connecticut, 1880; Connecticut Commissioners of Fisheries, Annual Report, 1871, 1878, 1885, 1886, 1887, 1888, 1890, 1894; Connecticut Commissioners of Fisheries and Game, Biennial Report, 1895-6, 1901-2, 1905-6; James Leffel and Co., Construction of Mill Dams, 1881.)

HARTFORD COUNTY

Extractive Industries

SIMSBURY COPPER MINE (c.1802)
NEW GATE PRISON
New Gate Rd.
East Granby

Windsor Locks
18.686830.4647800

The Company of Proprietors for Simsbury Copper Mines, chartered in 1706, was the first mining company in Connecticut and one of the earliest in North America. The company mined copper ore until 1745. Then the property was idle until 1773 when the Colony of Connecticut bought it to use as a prison. From 1775 to 1782 prisoners of war, Tories and other political prisoners were held at New Gate Prison. After the War the state confined felons here until a new prison was built in 1827. Brutal conditions and practices characterized New Gate, with prisoners quartered in the mine shafts at night and shackled to workbenches and forges by day. The most feared and hated prison job was the treadmill, powered by prisoners for 11-minute shifts punctuated by 6-minute breaks, which left them in twitching depletion after a day's duty. After 1827 sporadic attempts to mine the ore (1830-37, 1850-57) met with little success. The site was idle when the state bought it in the 1960s to use as a museum. The two main shafts used to quarter the prisoners can be seen today, as can the ruins of four c.1802 structures: stone wall around the yard, 16' high, 4'-6' thick; 4-story brick and stone cellblock and treadmill house, 62' x 28'; 1 1/2-story brick guardhouse, 58' x 30'; 1- and 2-story brick building, 150' x 35', which held the smith and cooper shops.
(Noah Phelps, History of Simsbury, Granby and Canton, 1845; Richard Phelps, A History of Newgate of Connecticut, 1860; Creel Richardson, "A History of Simsbury Copper Mine," M.A. Thesis, Trinity College, 1928; New Gate Property File, courtesy Marion Leonard, Superintendent of Historic Properties, CHC.)

BIGELOW-HARTFORD CARPET MILLS (1883)
Pleasant and Main Sts.
Thompsonville/Enfield

Broad Brook
18.698620.4652220

Surviving portions of this enormous carpet plant date from 1883 to 1923, a period during which two mergers catapulted the firm into the position of third largest corporation in New England, exceeded only by two other textile firms. Hartford Carpet Co., result of an 1854 reorganization of the Thompsonville Carpet Manufacturing Co. of 1828, merged in 1901 with E. S. Higgins Carpet Co. of New York City. Bigelow Carpet Co. of Lowell and Clinton, MA joined the combination in 1914, resulting in the Bigelow-Hartford Carpet Co. The oldest structure was built in 1883 for expanded production of pile carpets, such as moquettes and Axminsters. The 2-story brick-pier mill, 139' x 59', has a near-flat roof with skylights. As later production facilities were built, this mill was used for machine shops. In scale it is one of the few structures here to suggest the more limited operations which preceded the advent of corporate capital. By contrast, the mills built in 1901-05 after the first merger are huge, reflecting changes in the style of production and accumulation. The 3-story, brick, 1901 Tapestry Mill measures 897' x 100'. Its flat roof with monitor and segmental-arched windows with stone sills were duplicated in the 1903 Worsted Yarn Mill, 3-story and 648' x 110'. This construction program also included new dyehouses, color house, filling mill and scouring mill, extension of the ingrain (a flat-weave carpet) mill, and demolition of the original 1828 structures. The 1-story Brussels (a pile carpet) Weave Shed was extended in 1911. The original structure, brick-pier and timber-framed, was 290' x 110' with two monitors along the flat roof. Reinforced concrete posts and beams frame the 230' x 175' brick-pier, sawtooth-roofed extension; inside the extension remain overhead rails that were used for moving the broadlooms. The largest building erected after the 1914 merger is the 1923 Axminster Mill, a 5-story, 470' x 130' brick-pier factory. A third merger in 1929 combined Bigelow-Hartford with Stephen Sanford and Sons of Amsterdam, NY to form the nation's largest carpet producer, Bigelow-Sanford Carpet Co., which employed up to 13,500 people here before closing in the 1960s. Demolition has taken many of the industrial structures, including the power house, several storehouses and the spooling mill. Extant, however, are hundreds of company-built houses, the freight depot, about one mile of rail sidings, a social club and an athletic club, as well as the mills noted above. Planning is presently underway for adaptive reuse of the empty factories.
(John S. Ewing and Nancy P. Norton, Broadlooms and Businessmen, 1955; A. H. Cole and H. F. Williamson, The American Carpet Manufacture, 1941; Connecticut Bureau of Labor Statistics, Annual Report, 1901, 1903, 1904; Associated Factory Mutual Fire Insurance Co., survey #17850, 1923 and Bigelow-Sanford Carpet So., "Map Showing Properties of Bigelow-Sanford Carpet Co.," 1945, both courtesy Martin Levitz, present owner.)

WINDSOR LOCKS MILLS (1876)
Main St.
Windsor Locks

Windsor Locks
18.696750.4644400

By 1880 thirteen manufacturers operated plants in Windsor Locks on land between Enfield Canal (separate entry) and the Connecticut River. The two that remain today--The Dexter Corp. and The Montgomery Co.--both descended from earlier Windsor Locks firms. The two plants parallel the canal, with Dexter south of Bridge St. and Montgomery to the north.

J. R. Montgomery established a woolen mill here in 1871. The company developed machinery for "metallizing" natural fibers to make "novelty yarns," similar to what is now called tinsel. Initially intended as decorative trimming for garments, the novelty yarn was later used for wiring in telephones and radios. The earliest Montgomery structure is the 1891 brick mill, 5-story and 124' x 75', at the north end of the complex; it features a near-flat roof, segmental-arched lintels and stone sills. Ten years later the company built the attached 5-story brick-pier mill, 5-story and 172' x 62' with near-flat roof, segmental-arched lintels and stone sills. The 5-story, flat-roofed reinforced concrete factory, 265' x 67', dates from 1920.

The Dexter family ran grist and saw mills in this area in the 18th century. In the 1830s C. H. Dexter pioneered in producing paper from rope fiber; this manila paper became the company's principal product, although C. H. Dexter and Sons continued to mill grain and lumber until the late 19th century. The oldest extant structures stand near the south end of the complex. They include an 1876 brick factory, high 1-story and about 110' x 90', that held paper machines (Dexter used both cylinder and Fourdrinier processes); two 1898 brick factories, 2-story and 52' x 25, 4-story and 140' x 50'; and an 1898 brick powerhouse, 1-story and 52' x 50'. The entire complex consists of some 40 buildings, with brick factories or power houses from 1906, 1907 and 1920, and flat-slab reinforced concrete factories from 1919, 1927 and 1928, as well as many more recent structures. Dexter used water power through the 1950s and much equipment survives: a c.1910 double-runner, 30"-diameter horizontal turbine with Crocker-Wheeler alternator; a double-runner, 33"-diameter horizontal turbine with General Electric generator, both purchased used in 1943; and a 1926 General Electric generator. At least four underground races survive. Dexter Corp. recently assumed ownership of the canal and is presently studying the reinstallation of water power here.
(Osborn; Water Power Report; Windsor Locks Assessor's Records.)

MERWIN PAPER COMPANY MILL (c.1900)
Stevens Mill Road
Rainbow/Windsor

Windsor Locks
18.691800.4642440

A series of water privileges at the confluence of Mill and Farmington Rivers was occupied by paper manufacturers from the mid-19th century. The buildings of Hodge & Son, L. Brainard & Co. and Springfield Paper

Co., all there by 1864, have been demolished. About one-half mile downstream from these the Soper & McKinney cotton factory stood from c.1850 to c.1865. In the 1870s, William P. English established a paper mill there but was out of business by 1880. The paper factory of G. J. Merwin then occupied the site until Stevens Paper Company bought it in the 20th century. Extant structures built by Merwin date from c.1900. Surviving process buildings, all contiguous and made of brick, are: beater room, 2-story and 40' x 71' with flat roof; machine room, 2-story and 37' x 170' with gable roof; finishing room, 2-story and 52' x 150' with gable roof; and stock house, 2-story and 35' x 48' with shed roof. The wood-framed office building stands just northeast of the factory. The millpond is mostly empty now, and all other traces of the water power system have been demolished or buried. The present occupant manufactures paper using the cylinder process with modern operating equipment.
(Hartford Atlas; Water Power Report; Factory Insurance Association, Eastern Regional Office, "The Stevens Paper Mills, Inc., Windsor, Conn.," survey map, 1955, courtesy David Schoales; Interview with David Schoales, present owner, July 1979.)

TARIFFVILLE MILL (c.1845)
1 Tunxis Rd.
Tariffville/Simsbury

Tariffville
18.685670.4641880

Tariff manufacturing Co. first dammed the Farmington River at this site in 1824 to power its carpet and woolen mill. Orrin Thompson of the Thompsonville Carpet Manufacturing Co. bought the Tariff mill in 1840 and sold the property in 1867 after fire destroyed the factories and part of the village. Four c.1845 Greek Revival workers' houses are the only structures from the days of carpet production in Tariffville. Connecticut Screw Co. bought the property in 1867 and erected the 1 1/2-story brick-pier mill, 225' x 82' with gable roof and segmental-arched windows set in corbeled panels. The arched tailrace opening, now closed with cinder blocks, is visible from the outside, but the headrace opening must be seen from inside the basement. The production floor is unobstructed by structural elements, as 26 Warren trusses support the roof and four courses of brick arches in the basement support the floor. Hartford Silk Co. bought the mill in 1881 and sold it soon after. Since then a succession of hardware and textile firms have used the mill, which now stands vacant.
(John S. Ewing and Nancy P. Norton, Broadlooms and Businessmen, 1955; William M. Vibert, Three Centuries of Simsbury, 1670-1970, 1970; Water Power Report.)

Tariffville Mill (M. Roth)

BROAD BROOK MILLS (1842)
Main St.
Broad Brook/East Windsor

Broad Brook
18.703420.4643150

Epaphroditus and Bethuel Phelps erected the first mill in this woolen manufacturing complex in 1840-43. The gable-roofed mill, 4 1/2-story and 169' x 44', has walls of random-coursed brownstone blocks. The Phelps brothers defaulted on their loans in 1848 and the property was deeded to the Broad Brook Co., which was organized by the Phelps' creditors to operate the plant. The mill was extended in 1867 with a 4 1/2-story gable-roofed wing, 106' x 44', also with random-coursed brownstone walls. A brick extension, 58' x 44' with dormered gable roof, was built in 1880. Other extant structures include the 1878 brick office, 2 1/2-story and 55' x 39' with gable roof; the 1882 brick storehouse, 2-story and 119' x 33' with hip roof; and several dwellings along both sides of Main St., east of the mills. The present dam and headgates were built in 1892, when 4,100' of underground penstock, also extant, were laid. Broad Brook Co. was in business until after World War II, when an aircraft parts manufacturing firm bought the plant. The major extant 20th-century wool-process building is the 1929 brick spinning mill, 3-story and 142' x 42' with a 2-story ell, 107' x 77'.
(Hartford Atlas; Water Power Report; Barlow's Insurance Survey, #4227, 1876, MVTM; Factory Insurance Association, Survey #4328, 1953, courtesy Peter Brookman, present owner; K. J. Borrup, "History of the Broad Brook Site," n.d., typescript in the archives of United Technologies Corp., East Hartford, courtesy Harvey Lippincott.)

PITKIN WOOLEN MILL; (1834)
HILLIARD WOOLEN MILL
Adams and Hilliard Sts.
Manchester

Manchester
18.703420.4638500

Woolen production began here in 1794 with Aaron Buckland's fulling mill. The Pitkin family bought the mill early in the 19th century. By 1840 Elisha Hilliard, a former Pitkin employee, owned the mill and produced woolen cloth. The Pitkins' 1834 frame mill, 2-story and 95' x 32', continues to stand. Extensions on the mill have enclosed the c.1870 brick picker house, 2-story and 41' x 30'. The firm that Hilliard founded built additional mills in 1896 (frame, 3-story and 119' x 59') and in 1909 (brick, 1-story and 101' x 49'). A trapezoidal, 3-story brick factory, with walls 77', 197', 82' and 231' long, completed enclosure of the millyard in 1925. Now tenanted, these buildings have been altered with asphalt siding and various additions. The race is filled in but the masonry dam, across Bigelow Brook, still stands.
(Barlow's Insurance Survey, #5274, 1878, MVTM; Hughes and Bailey, <u>Aeroview of Manchester, Connecticut</u>, 1914; Mathias Spiess and Percy Bidwell, <u>History of Manchester, Connecticut</u>, 1924.)

PITKIN GLASS WORKS (1783)
11 Parker St.
Manchester

Manchester
18.707250.4628060

This 1783 glass works was built by the same Pitkin family that ran several industries in Manchester: iron forge, powder, cotton and woolen mills. After initial difficulties, including the recruitment and subsequent dismissal of German workers, the Pitkins reaped substantial profits from bottle manufacture, especially from flasks, demijohns and large carboys used in the West Indian trade. Around 1830 the works closed, in part due to lack of wood for fuel. Ruins of the glass house are the only structural remains of the works. These ruins reveal a square plan, 40' on a side. The 2' thick walls are a rubble of coarse, flat, grey granite stones. The east wall has four arched openings at ground level with rectangular windows above; the west wall has one arched opening with rectangular window above; the south wall has one rectangular doorway and three rectangular windows at ground level. Plans for the site include stabilization of the ruins, limited public access, and interpretive signs.
(NR; Kenneth M. Wilson, New England Glass and Glassmaking, 1972; J. M. Williams, "The Old Pitkin Glass Works," D.A.R. Magazine 64, August 1930.)

CHENEY BROTHERS SILK MILLS (c.1865)
Elm Street
South Manchester

Manchester
18.705400.4626600

Cheney Brothers Manufacturing Co. grew from a small silk mill in 1838 to the nation's largest silk producer by the 1880s. Besides the huge increase in national markets in that period, the firm's success was based on innovations in production technique, such as waste-silk spinning and Grant's reel, and on its ability to capitalize on shifts in international trade policies in order to buy raw silk cheaply and to attract skilled foreign workers. Cheney Brothers labor policies attracted national attention, first because of the particular benevolence of the firm's paternalism. Then in the 20th century Cheney Brothers retained H. L. Gantt, an acolyte of F. W. Taylor, to introduce "scientific management" in the mills, and W. D. Scott, the pioneer industrial psychologist, to formulate aptitude and performance ratings.

The extant mills were built between 1886 and 1916. All have brick walls and most have green-painted trim. Floors are generally two-ply, supported on timber beams and cast iron posts. The 1886 Spinning Mills are three parallel, 3-story buildings, each about 300' x 60' with near-flat roofs; an ornate stair and clock tower rises at the west end of the center mill. The 30'-wide spaces between the mills were later enclosed for more production space. The 1901 Velvet Mills are also three parallel 3-story buildings with near-flat roofs, each about 300' x 60'; they are linked by 3 1/2-story stair towers. The Weaving Mills are similar to the Velvet Mills in construction and age; the major difference is the elaborate corbeling in the Weaving Mill cornices. The

3-story Dressing Mill, about 400' x 50' with near-flat roof, has a large stair tower at its north end and two smaller wouth towers. The Velvet Weave Shed, about 250' x 90', has one high story and a sawtooth roof. The Dye House and Ribbon Mills also continue to stand.

Along the South Manchester Railroad (separate entry) north of the mills are two structures that were built to protect valuable raw silk shipments. The c.1910 Silk Storage Vault is a 3-story, windowless brick block divided into seven irregular bays, each with a heavy steel door as its only access. The 1919 Rail Car Vault, also brick and without windows, is a 1-story rectangle with steel double door in its south end. A rail car full of raw silk that arrived when the Storage Vault was full would have been rolled into the Rail Car Vault for temporary storage. These structures demonstrate the massive raw material inventories required by Cheney Brothers, a requirement that crippled the firm in the 1920s when the price of raw silk dropped from $20 per pound to $1 per pound, devaluing the huge silk stockpile with each reduction.

Cheney Brothers built extensive tracts of tenant houses between 1865 and 1910 for a series of immigrant groups: English, French, German, Swiss, Scandinavians, northern Italians. The first mass influx occurred in the mid-1860s, after duty-free admission of French silks into England created unemployment among English silk-throwers and weavers. Cheney Brothers hired many of these skilled workers and built dwellings for them east of the mills, along present-day Eldridge St. Twelve of these continue to stand; they are simple 2-story frame houses with gable roofs. Substantial clusters of 1880s and 1890s houses survive west of the mills along High St. and to the north between Park and Laurel Sts. Also extant are some 150 workers' houses built 1890-1910, west of the mills between Division, Cooper Hill and Campfield Sts. Among these are several 4-entry dwellings, the largest of the Cheney workers' houses. The workers used Cheney Hall, a handsome 1867 2 1/2-story brick building with mansard roof, for lectures, political meetings and concerts; the company used the Hall for trade shows.

The 1920s saw the firm's sales decline sharply due to industry-wide over-production and new competition from rayon; Cheney Brothers faced bankruptcy in 1937. In borrowing from the Reconstruction Finance Corp. the firm was ordered to sell its non-industrial holdings, including schools, utilities, recreation facilities and houses. Through World War II the company survived by making parachutes. Ultimately unable to stave off competition from synthetics, Cheney Brothers sold out to J. P. Stevens Co. in 1954. Stevens destroyed all the machinery that made goods which competed with those of other Stevens-owned mills, leaving only some 50 c.1910 velvet looms, made by Cheney Brothers machine shop, and associated equipment such as warping machines and some dyeing apparatus. Stevens soon closed the mills. Several mills are now occupied by tenant firms, including a velvet producer which uses the historic Cheney equipment; several others stand empty. Though the village is now latticed by black-top roads, and while garages and other modern

additions abound, the workers' community has outlasted the company, as the solidly built houses are mostly occupied.
(NR; L. P. Brockett, The Silk Industry in America: A History, 1876; Henry L. Nelson, "The Cheney's Village at South Manchester, Connecticut," Harper's Weekly 34, 1 February 1890; Mathias Spiess and Percy Bidwell, History of Manchester, Connecticut, 1924; National Industrial Conference Board, Industrial Relations at Cheney Brothers, 1929; William Buckley, A New England Pattern: The History of Manchester, Connecticut, 1973; Daniel Nelson, Managers and Workers: Origins of the New Factory System in the United States, 1880-1920, 1975; Thomas R. Lewis, Silk Along Steel: The Story of the South Manchester Railroad, 1976.)

BURNSIDE PAPER MILLS (1835)
Forbes St.
East Hartford

Manchester
18.698800.4627450

By the early 19th century the manufacture of paper had become the predominant industry in the Burnside (formerly known as Scotland) section of East Hartford. There are three tightly spaced water privileges on the Hockanum River here. The publishers of the Hartford Courant, Hudson and Goodwin, manufactured newsprint and book paper at the middle and upper privileges from 1811 to 1863-64, working in concert or separately at various times. During the Civil War all three millseats were acquired by Hanmer and Forbes, who retained only the lower mill for their own use. The upper site, which has passed through a succession of owners, presently houses the last vestige of paper production in the locality. The middle privilege is now derelict. The lower site continues to be used by industry following the tenure of Hanmer and Forbes and the Taylor-Atkins Co.

At the upper privilege are several brick buildings constructed in 1835: the beater room, 1-story and 77' x 56'; wheel house, 2-story and 24' x 20'; and two storehouses, 1-story and 34' x 31', 3-story and 56' x 47'. There are two larger 1-story brick process buildings, one from the mid-19th century (147' x 56') and one built c.1900 (126' x 95'). The remaining storage and auxiliary buikdings were erected in the 20th century. Large portions of the dam have been rebuilt in concrete. At the middle privilege the dam is the only substantially intact structure; built of masonry and about 10' high, it is of late 19th-century vintage. The earliest building at the lower privilege is the c.1870 brick-pier factory, 3-story and 172' x 48'. A large brick-pier ell, 2-story and 121' x 100' was added in the 1890s. Between the earlier section and the river stands an irregularly shaped 1-story frame and brick shed with overall length of about 150'. The stone-block dam survives in good condition, complete with trash rack and headgate at its north end and waste gate near the south abutment.
(Joseph O. Goodwin, East Hartford: Its History and Traditions, 1879; Lee Paquette, Only More So: The History of East Hartford, 1783-1976, 1976; Charles W. Burpee, History of Hartford County, Connecticut, vol. 2, 1928; Hartford Atlas; East Hartford Assessor's Records.)

HUBBARD AND BROADHEAD TANNERY: (1854)
ROSER TANNERY
911 New London Turnpike
Glastonbury

Glastonbury
18.700400.4619500

Hubbard and Broadhead built this tannery on Hubbard Brook in 1854 to process pig and cow hides. Of the three buildings remaining from that time two are frame (1-story and 60' x 31'; 3-story and 50' x 36') and one is brick (2-story and 91' x 25'). The brook was used for process water and to drive the bark mill. The firm ceased operation in the 1870s and was sold in 1886 to German immigrant Herman Roser. The males in the Roser family had been tanners since 1695; Herman had apprenticed in the family tannery and had worked as a journeyman in Switzerland, France and Belgium before moving to the United States. In Glastonbury Roser limited his product to pig skins and maintained, for a time, the craft tradition of European tanning. He personally supervised the work and reserved for himself the key step of trimming the finished hides. Machine-based techniques were gradually adopted; paddlewheels were put in the tanning vats and revolving drums were installed to wash skins. After World War I mechanization proceeded more rapidly, with the addition of larger vats, machines for shaving and splitting the hides and a steam engine to drive them. The 1-story brick engine house, 43' x 38', was built in 1918. Production space more than doubled in 1928 with construction of a 4-story brick factory, 100' x 46' with flat roof. Among the new customers for Roser pigskin leather in the 1920s were the makers of the Pierce-Arrow automobile, which had the firm's leather covering its seats. The tannery closed in 1968 and the plant is now occupied by a machine shop. The buildings are mostly intact, although with some structural alterations and synthetic siding on the walls. The 16'-high masonry dam with concrete wing wall continues to stand.
(Hartford Atlas; Census 1860, 1870; J. H. Roser, A Tradition in Tanning, 1954; Glastonbury Assessor's Records.)

WILLIAMS SOAP FACTORY (c.1880)
Williams Street
Glastonbury

Glastonbury
18.699880.4619540

James B. Williams started making "Williams Genuine Yankee Soap" in the late 1830s as an adjunct to his pharmacy business in Manchester. A decade later Williams' father-in-law gave him a mill site in Glastonbury, north of Williams St. on Hubbard Brook, and Williams began his soap manufacturing company there. He also made ink, blacking, and toiletries. The primary use for water power was to run presses that formed the bulk soap into cakes. South of Williams St. was a bark mill that Williams' father-in-law had used in his tannery business; this mill was rented by Williams' son, David W., in 1880 to

manufacture laundry and mill soaps. In 1885 the two firms merged and incorporated as J. B. Williams Co. A fire in 1890 destroyed much of the plant south of the street; most of the brick complex that stands there now was built in the next two decades. The buildings north of the street were condemned and demolished in 1977, except for a c.1880 2 1/2-story frame building, 80' x 25' with gable roof, vertical-board siding and brick foundations. The earliest building south of the street is an 1897 brick-pier 4-story factory, 180' x 51' with near-flat roof and central stair tower with pyramidal roof. Windows are segmentally arched with stone sills. Except for the tower, the architecture of this mill is duplicated in the factories built in 1906 (4-story, 163' x 50' with a 4-story ell, 30' x 50') and 1911 (4-story, 82' x 51'). The 1902 office is an elaborate 3-story Georgian Revival brick building now occupied by the Glastonbury Board of Education. The only remnants of the water power system are the c.1880 masonry dam and the empty pond behind it. The 1904 brick power house, 109' x 42', and yellow-brick stack remain from the company's era of steam. There are four workers' houses on Williams St.: two c.1875 ell-shaped, frame houses with gable roofs and two 1924 frame, hip-roofed houses. On Hubbard St. stands a 2-story, gable-roofed duplex that housed supervisory personnel. The mill complex is being converted to apartments.
(Osborn; NR; S. H. Williams, Shaving Soap Manufacturing in the 1870s, 1949; Connecticut Bureau of Labor Statistics, Annuel Report, 1905; Lockwood, Greene and Co., Survey #3321, 1922 and Factory Insurance Association of Hartford, Survey #5179, 1940, both courtesy Robert Henderson, Glastonbury.)

AMERICAN PAPER GOODS FACTORY (1893) — New Britain
Main Street — 18.684980.4610930
Kensington/Berlin

Ajax Envelope Co. of New York City and Howard Manufacturing Co. of Jersey City formed American Paper Goods Co. in 1893 and moved operations to Berlin, Connecticut. The firm consolidated water rights at this privilege on the Mattabessett River, which had been used by grist, saw and cement mills and by a shop that made steelyards. The only extant 1893 structures are the 3-story factory and office building and the dam. The 45' x 38' brick building has a flat roof with monitor; the building's west end is in the shape of a half-circle, an architectural conceit that was apparently unrelated to the use of the structure. The curved gravity dam, about 15' high, consists of stone blocks. Headgates and trash rack survive as well but the water power system is not currently in use. Extending east from the 1893 building are four 4-story, flat-roofed brick factories, built in 1900 (172' x 41' and 89' x 41'), 1903 (77' x 65') and 1914 (130' x 65'). The 1915 brick, monitor-roofed boiler house contains a 1920 Bigelow horizontal fire-tube boiler. At peak operation American Paper Goods

employed some 350 workers. Products included waxed paper bags, envelopes and paper cups. Continental Can Co. bought this plant in 1954 and sold it five years later. A tool company now operates here.
("APG History in Berlin," New Britain Herald, 12 July 1959; Berlin Assessor's Records.)

BRISTOL BRASS WORKS (c.1885)
580 Broad St.
Bristol

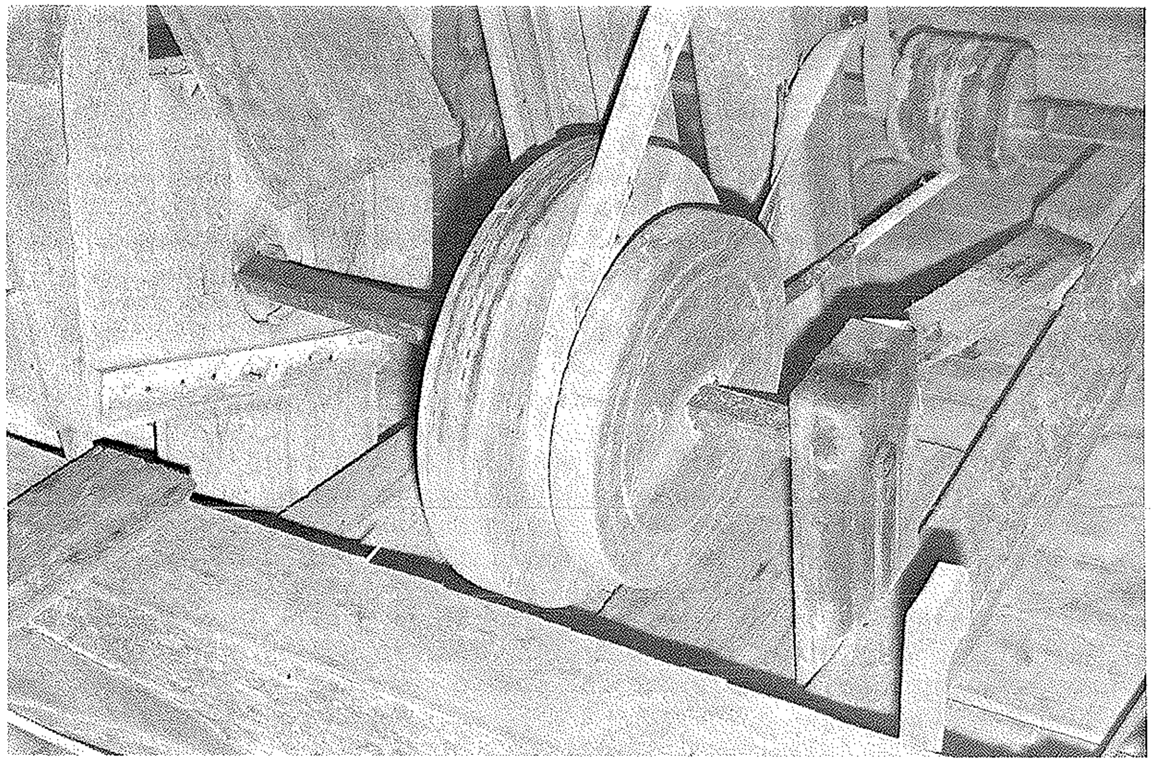
Bristol
18.673240.4615100

Bristol Brass and Clock Co. was founded in 1850 by a partnership consisting of clock manufacturers from Bristol and brass entrepreneurs from the Naugatuck Valley. For forty years the output of brass was entirely consumed in clock production at this plant and other clock factories in Bristol. Around 1890 the firm discontinued production of its own clocks to concentrate solely on primary brass production, making the alloy and then rolling it into sheet or rod. The surviving plant is divided by Broad St.; for the most part, 19th-century buildings are north of the street and 20th-century buildings to the south. The earliest structure is the c.1885 mill originally used for rolling rod. The 181' x 135' brick mill has a single high story and moderately pitched gable roof; the monitor has been removed from the roof. Two similar wings also housed rolling operations. Smaller brick buildings held machine shops, annealing and boiler rooms. The 1891 brick office has two sections, one with hip roof and one with gable roof. Most of the plant south of Broad St. was erected for military production in 1915-18. The 1915 rolling mill is 638' x 62' with a single high story and a near-flat roof topped by a monitor along its length. The walls are reinforced concrete for half their height and glass above. The 300' x 195' casting shop with sawtooth roof was built in 1915-16. Its walls are brick to a height of 6' and glass for the rest of the single high story. In 1917-18 another rolling mill was built, 347' x 168' with corrugated steel walls over a steel-girder skeleton. There are some 15 smaller buildings, most erected during World War I. Bristol Brass Co. (so named in 1903) still operates here.
(Sanborn Map Co., Insurance Maps of Bristol, 1928; Epaphroditus Peck, A History of Bristol, Connecticut, 1932; L. M. Bingham, "Brass and Copper," Connecticut Industry 12, July 1934; Bristol Assessor's Records.)

SCHWARTZMANN MILL (c.1795)
Foote and Vineyard Rds.
Burlington

Collinsville
18.669410.4627340

This water privilege on Burlington Brook was an active mill site from c.1781 to 1972. The present structure consists of five frame sections built at different times. The 2 1/2-story, gable-roofed east section is possibly the original mill but more likely represents an early rebuilding; it has wings to the south and west. Grist milling was the



Shafting and pulleys at Schwartzmann Mill
(M. Roth)

original use, but saw, shingle, and cider milling were later added. Operating equipment for all these functions remains. There are also elements of power generation and transmisssion systems from several periods. The rubble dam and rubble-lined headrace likely were built in the mid-19th century. The concrete bulkhead for the headgate is a 20th-century installation. Inside the mill the operating equipment reflects the tenure of the Schwarzmanns, father George and son William, who ran the mill from the late 19th century to 1972. The Schwarzmanns added new machinery as well as reusing pre-existing equipment. They installed the vertical turbine c.1900. Besides round, steel line shafting there remain sections of square-section, wrought iron shafts, and hexagonal wooden shafts. There are pulleys of cast iron and wood, and flat belts of leather, cloth and laminated rubber. Three runs of stone were used for grain milling, one each for corn, wheat and buckwheat. All were made c.1870 by the Edward Harrison Grinding Wheel Co. of New Haven. They have cast-iron hoppers and cases with 30"-diameter stones. Two winnowers and a screening cylinder also remain. The stones and auxiliary equipment were once integrated into a continuous system linked by Oliver Evans-type bucket elevators. Since grinding ceased the configuration of transmission and milling equipment has been disturbed. Several of the machines stand in no apparent relation to the power system and some of the elevators lead to empty space. Enough survives, however, so that the system could be mostly reconstructed. Sawmill equipment is preserved in place. The circular saw was installed in the 1880s or 1890s. Shingle saw, shingle dressing wheel, and the cider press remain in operating position. The two newest wings on the mill, built c.1905, contain three wooden cider casks, the largest one having 5,000-gallon capacity. Outside the mill is a c.1900 Fairbanks wagon scale. The building is deteriorated but the Burlington Historical Society is working to stabilize the structure while planning its eventual restoration. Some of the equipment will be put in operating order and the mill will become a museum. (Census 1880; NR; Interviews with Lois Humphrey and Bill Reid, Burlington Historical Society, November 1979; Illuminated Catalogue of Edward Harrison's Grinding Mills, 1860.)

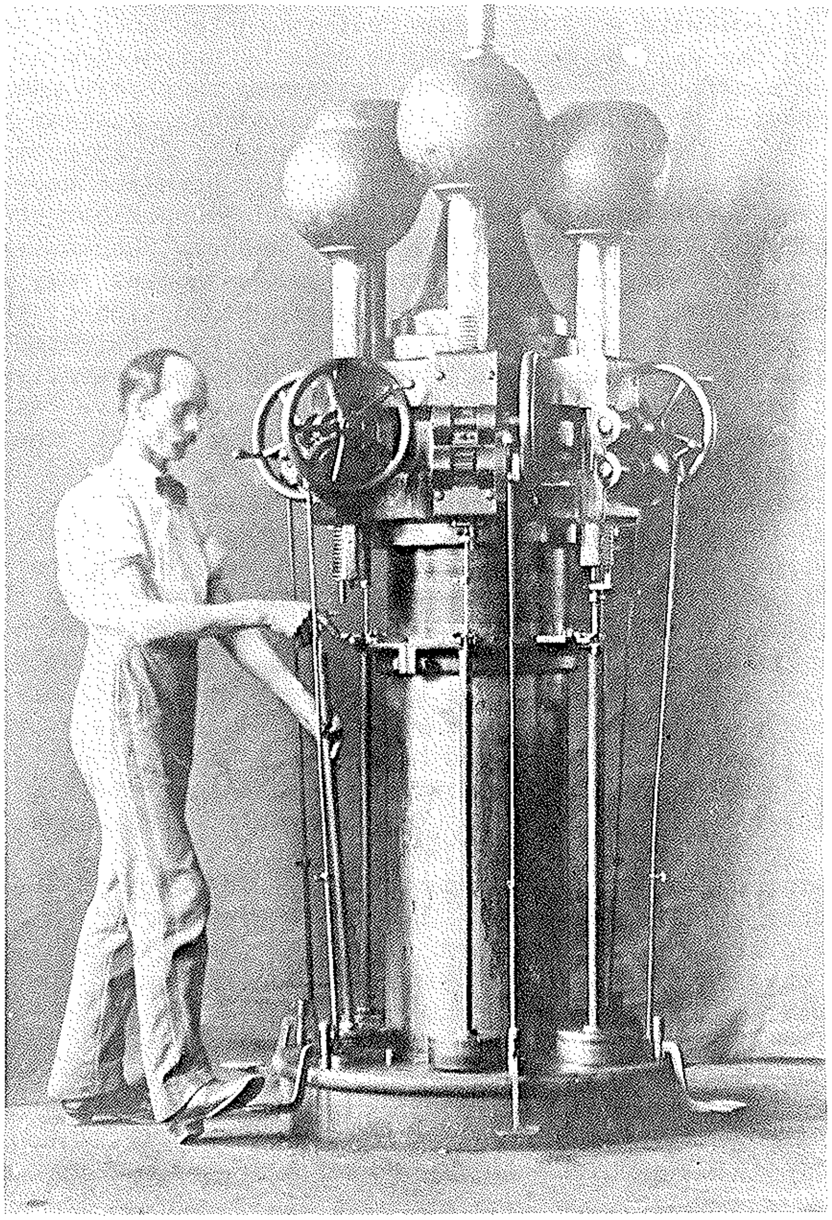
Manufacturing

COLT ARMORY (1865)
Van Dyke Ave.
Hartford

Hartford North
18.694300.4625080

Samuel Colt and his armory claim a place of central importance in the nation's history. His revolver has been one of the most influential pieces of hardware in American experience, first as a tactical advantage in mounted warfare on the western plains, then as a preferred sidearm for the military, for law enforcement officers and for lawbreakers. Today the Colt revolver is a primary icon of our frontier mythology. Furthermore, Colt's manufacturing processes constitute a crucial episode in the development of metalworking technology. The work begun at Colt's in the 1850s under superintendent E. K. Root drew from prior developments in production of textile machinery, firearms and consumer hardware to create a synthesis of technique that provided the basis for metalworking innovations into the 20th century. One measure of the profound influence exerted by veterans of Colt's Armory on American metalworking is the list of men who trained or worked there and who went on to found their own machine-tool building companies: Francis Pratt, Amos Whitney, Christopher Spencer, Charles Billings, E. P. Bullard, among others.

The remains of the plant illustrate the scope of Colt's vision, revealing his successful attempt to transplant the plan of the textile mill village to the urban environment. The works stand south of Hartford's center, on former swampland reclaimed by Colt with the building of a 2-mile-long dike along the Connecticut River. Portions of the dike probably survive beneath Interstate 91, east of the works; willow trees helped to retain the earthen dike, and a line of several of these can be seen west of the I-91 Airport Rd. exit (southbound). The earliest portions of the plant date from 1865, when it was rebuilt as a facsimile of the original structure of 1855, which had burned. The H-shaped plan of the works, credited to Colt and Root with architect (and Colt nephew) H. A. G. Pomeroy, resembled Amos D. Lockwood's 1854 design for Wauregan Mills (separate entry), with two long, parallel factories connected by a central, perpendicular section. Unlike Lockwood's textile mill, which had wheelpits for water power beneath the central section, the Colt works was powered by six Porter-Allen vertical steam engines. These prime movers were no less integrated with the entire facility than were the wheelpits of the textile mill: in a literal merger of structure and power, the steam-engine cylinders doubled as load-bearing volumns. Only one of the parallel factories survives: 3 1/2-story with gable roof, brick walls and brownstone trim. Five pedimented cross-gable bays adorn the roof. Above the central crossing bay rises a blue, onion-shaped dome, the Hartford skyline's most distinctive feature. Smaller wings extended from the central portion of the plant, but only one of these still stands: the high 1-story building, with gable roof and random-coursed brownstone walls, probably held forging or heat-treating operations.



"Barrel Machine" at Colt Armory, c.1870
Colt Collection, Picture Group 460, State Library, Hartford

Of the 50 brick workers' houses that Colt built in 1855-56, only 10 survive. Half of them have flat roofs and probably housed 6 families; the other half have gable roofs and probably held 4 families. Nine single-family houses, known as Potsdam Village, stand along Curcombe Ave. southwest of the factory. Colt built these before 1860 for German willow-ware workers, whom Colt recruited when he sought to capitalize on the willows retaining his dike by using them as raw material for manufacture. The German craftsmen came only when Colt agreed to provide surroundings that would echo their Potsdam home. The houses have half-timbered first floors and board-and-batten siding above. Most of the decorative woodwork has been removed, but several of the houses retain the original spade-shaped bargeboard moldings and window trim. The brick armory-workers' houses--relatively drab and certainly more crowded than the Potsdam houses--may well reflect those workers' roles in the specialized production of the armory. While the armory both attracted and trained the most talented mechanicians to design and build production equipment, the operatives who tended that highly specialized equipment faced repetitive tasks requiring much less skill and responsibility. In contrast, the spacious and fanciful Potsdam dwellings housed skilled craftsmen who apparently exercised some bargaining power.

Most of the extant industrial complex consists of 4-story and 5-story reinforced concrete factories with flat or monitor roofs. They date from World War I, an origin which focuses attention on the crucial importance of violence and war in the development of the firm. Colt's armory supplied arms to both sides in such conflicts as the Crimean and American Civil Wars, and sold guns to subversives as well as to governments, numbering Irish Fenians and radical abolitionists among its customers. Hartford's social elite disapproved of Samuel Colt's personal peccadilloes and his flamboyant disregard to Yankee reserve. But this very moralistic Hartford society, which supported temperance, abolition, Sabbath observance and missionary work, did not criticize Colt's firm for its indiscriminate sale of arms to belligerents or its unquestioning complicity with violence. Another celebrated Hartfordite, Mark Twain, hinted at this blind spot of Yankee moralism in the first sentence of a paragraph in which he described Colt's armory for a California newspaper: "They have the broadest, straightest streets in Hartford that ever led a sinner to destruction." (As cited in The Twainian.)

A recent visitor from the Smithsonian Institution photographed the Porter-Allen steam engines, still in place, but most of the historic machinery has been scrapped. Colt Industries, Inc. still houses some production in this "revolver establishment" that transformed American metalworking and solidified Connecticut's still-current importance in weapons production.

(NR; Joseph W. Roe, English and American Tool Builders, 1916; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; "A Day at the Armory of Colt's Patent Fire Arms Company," United States Magazine, 4 March 1857; "'(Twain's) American Travel Letters Series Two,' Ninth in Series in Alta California," The Twainian 7, September-October 1948; Phyllis Kihn, "Colt in Hartford," Connecticut Historical Society Bulletin, 24, July 1949; Files of Robert M. Vogel, National Museum of American History, Smithsonian Institution.)

ATLANTIC SCREW WORKS (1902)
Charter Oak Ave.
Hartford

Hartford North
18.693700.4625380

Atlantic Screw Works started in Castleton, NY in 1877 and failed after two years. In an effort to salvage his investment, the chief creditor moved the firm to rented quarters at Colt Armory. David Tilton, superintendent of Atlantic Screw, also moved to Hartford; he ran the shop and contributed designs for metal-forming production equipment. Atlantic Screw made wood screws primarily, in contrast to Hartford Machine Screw Co. (see entry for Capitol Ave. Industrial District), which made screws for precision mechanisms and used metal-cutting processes. Tilton bought Atlantic Screw in 1887, and in 1902 built the first factory on this site, 2-story and 152' x 55' with a 1-story wing, 85' x 55'. Both brick-pier, timber-framed structures have near-flat roofs and segmental-arched windows with stone sills. In 1910 Atlantic Screw built the attached 3-story, flat-roofed brick addition, 85' x 45'. A slightly later addition, 3-story and 83' x 55', also has brick walls and a flat roof. All the buildings have slow-burn flooring (two plies of floorboards with no joists), and this plant demonstrates the success of that technique in minimizing structural damage from fire. In 1975 a fire raged for several hours through the 1902 section of the vacant plant. In recent renovation work the contractors found the load-bearing capacity of the building virtually unimpaired; some floorboards required replacement, but the charred beams and posts suffered only negligible decrease in strength.
(Samuel Hart, ed., Representative Citizens of Connecticut, 1916; David Ransom, untitled typescript on Atlantic Screw Works, 1980, courtesy of the author; Don Hammerberg Associates, "Hartford Square West, Phase I," renovation plans, 1980, courtesy Carl Steiner; Interview with Carl Steiner, present owner, October 1980.)

CAPEWELL HORSE NAIL FACTORY (1903)
60 Governor St.
Hartford

Hartford North
18.693500.4625410

George J. Capewell founded Capewell Horse Nail Co. in 1881. He utilized original metal-forming machinery to make nails with rolling processes. Most of the present plant dates from 1903. A 3-story brick-pier factory, 320' x 100', dominates the complex. It has a flat roof with monitor and flat-arched, steel-reinforced windows with stone sills. At the west end a pavilion with large, round-arched openings provides entry, and a pyramidal-roofed tower rises from the roof. Brick shipping room and boiler house are attached to the factory. Major detached structures include two 1-story metal-clad buildings originally used for heat-treating and for the large rolling operations that prepared the stock. Capewell, under different ownership, still produces metal goods here today.
(B. S. White, ed., Hartford in 1912, 1912; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; Hartford Assessor's Records.)

BILLINGS AND SPENCER PLANT (1892)
Russ and Lawrence Sts.
Hartford

Hartford North
18.692220.4625750

Charles Billings and Christopher Spencer established their firm in 1869. Both had apprenticed at leading metalworking shops, Billings at Robbins and Lawrence in Windsor, VT, and Spencer at the machine shop for Cheney Brothers silk mills (separate entry), and both had worked at Colt's Armory before forming their own company. The two principals collaborated on the development of the board-drop hammer, an elaboration of die-forging as practiced at Colt. Spencer left the firm in 1874 to refine his automatic screw machine and form Hartford Machine Screw Co. Billings continued to run Billings and Spencer, which came to specialize in forged mechanic's hand tools. The company began building this complex in 1892. Prominent 1890s structures include the brick-pier factory that consists of two 225' x 45' sections meeting at right angles. Both wings were 2-story originally, and later each gained a floor. Both feature segmentally arched windows with stone sills on the first two levels; the top-story windows of the section along Lawrence St. duplicate the lower ones, while the section along Russ St. features flat-arched windows with steel shelf angles. An office block with tower, built in 1906, joins the two wings. The plant also includes a c.1900 1-story brick factory, about 235' x 45' with gable roof, and a slightly later 2-story brick-pier factory, about 240' x 55' with a flat roof topped by a monitor. By 1920 Billings and Spencer had moved to new facilities (demolished) and Hartford Automotive Parts Co. occupied this plant. After several years Hart and Hegeman moved here. This firm, established in 1890, made an early version of the enclosed light switch for household use; by the time it moved here Hart and Hegeman made an extensive line of electrical hardware, such as relays and junction boxes. After a period of vacancy, the plant is presently being converted to housing. (Osborn; Joseph W. Roe, English and American Tool Builders, 1916; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; George H. Horton, "'Controlling' Mechanized Warfare," Connecticut Circle 6, January 1943; "The Arrow-Hart and Hegeman Electric Co.," Connecticut Circle 11, January 1948.)

MERROW MACHINE COMPANY (1894)
28 Laurel St.
Hartford

Hartford North
18.691450.4625500

In the 1870s Joseph B. Merrow developed a crocheting/sewing machine for finishing the edges of half-hose and underwear produced in his father's knitting mill in Mansfield, CT. In 1892 the company moved to Hartford and abandoned knitting to concentrate on refinement and production of the crocheting/sewing machine and the later shell-stitch machine. Upon incorporation as Merrow Machine Co. in 1894 the firm erected the first part of this plant. The 3-story brick-pier factory (100' x 48') has a flat roof, corbeled cornice, corner stair tower, and rectangular windows paired between pilasters. Power was supplied by a steam engine

(not extant) in a shed behind the shop and was transmitted with shafting, belts, and pulleys. The last of the shafting was removed in the early 1970s. Additions made in 1910 were a 64'-long, 3-story extension to the factory and a 1-story power house, both in brick. A 48' x 40', 3-story brick wing for offices and drafting rooms was added to the northeast corner of the original structure in 1914. The shops were extended another 96' in length in 1917. In all additions the architectural details of the 1894 shop were continued. Merrow Machine Co. manufactures industrial over-stitch sewing machines in these buildings today.
(Osborn; American Appraisal Co., "Retrospective Appraisal Report: The Merrow Machine Co.," August 1923, and Merrow Machine Co., "Composite First Floor Plan," n.d., both courtesy Merrow Machine Co.; Interview with Jack Washburn, President, Merrow Machine Co., October 1978.)

CAPITOL AVENUE INDUSTRIAL DISTRICT (c.1890) Hartford North
Capitol Ave. 18.692000.4625900
Hartford

The firms that occupied these buildings combined with Colt Armory in establishing Hartford's reputation as a fountainhead of innovation in 19th-century metalworking technology. Sharps Rifle Manufacturing Co., an offshoot of Robbins and Lawrence of Windsor, VT, built the first factory here in 1852, followed by Pratt and Whitney (gauges and machine tools) and Weed Sewing Machine Co. in the 1860s, Pope Manufacturing Co. (bicycles) and Hartford Machine Screw Co. in the 1870s, and Pratt and Whitney Aircraft in the 1920s. The earliest structures do not survive, and those that continue to stand now house offices and warehouses.

The factories form an almost continuous wall along the north side of Capitol Ave. The Park River defined the northern boundary of the factory district; recent construction to channel the river underground caused demolition of many industrial structures. Starting from the east, the first building is a 4-story, flat-roofed factory, 178' x 65', with an irregular-shaped wing about 150' long. When Hart and Hegeman (see entry for Billings and Spencer Plant) built the factory in 1905 and 1912 it had brick-pier walls, which the current occupant, the state government, has covered with coarse stucco. Next to the west stand three attached brick buildings built between 1890 and 1912 by Pratt and Whitney for its small tool division. The largest, about 200' x 50', features brownstone trim and a flat roof; top-story windows are segmentally arched, while lower ones have brownstone lintels. Two brick wings extend north from this building: 3-story with flat roof and 4 1/2-story with gable roof. West of these stands a 1973 office building, followed by two buildings erected by Pope Manufacturing Co. and now under renovation for offices. The rear building, 3-story and 160' x 65', brick-pier and timber-framed, dates from c.1895. The street-facing factory, 4-story and 192' x 72', built in 1912, combines flat-slab reinforced concrete structural system with brick-pier curtain walls. Pratt and Whitney Aircraft (separate entry) made its first Wasp engines in these two buildings in 1925-29. The final two factories, both brick-pier (1-story with gable roof, 3-story with flat roof), were built by Hartford Machine Screw Co. after 1880; they now hold offices. (G. M. Hopkins, City Atlas of Hartford, Connecticut, 1880; L. J. Richards and Co., Atlas of the City of Hartford, Connecticut, 1896; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; Merle Kummer, ed., Hartford Architecture, Volume Two: South Neighborhoods, 1980; Hartford Assessor's Records.)

ARROW ELECTRIC PLANT (1912)
Hawthorn St.
Hartford

Hartford North
18.691260.4625780

Charles Perkins of Hartford began manufacturing electric switches in the 1880s. New investors joined him in 1905 to incorporate the business as Arrow Electric Co. In 1912 Arrow built the first factory on this site, along the New York, New Haven and Hartford Railroad. The flat-roofed brick-pier factory, about 185' x 50' with 125' x 90' wing, continues to stand, although obscured by later brick and reinforced concrete factories. The brick additions date from 1919, 1927 and 1929. Hart and Hegeman (see entry for Billings and Spencer Plant), another electrical manufacturer whose products had a reputation for higher quality than Arrow's, resisted takeover attempts by Arrow until 1928, when the firms merged. The Arrow plant grew to some 25 acres of floor space with erection of reinforced concrete factories during World War II, in 1948 and in 1950. Arrow-Hart, now a division of Crouse-Hinds Corp., still operates here.
(Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; George H. Horton, "'Controlling' Mechanized Warfare," Connecticut Circle 6, January 1943; "The Arrow-Hart and Hegeman Electric Co.," Connecticut Circle 11, January 1948; Merle Kummer, ed., Hartford Architecture, Volume Three: North and West Neighborhoods, 1980.)

PRATT AND CADY PLANT
Capitol Ave. at Laurel St.
Hartford

Hartford North
18.691320.4625740

Pratt and Cady began in 1878 as the Steam Boiler and Appliance Co., making steam traps and check valves papented by Rufus N. Pratt, a relative of Francis Pratt of Pratt and Whitney. For several years the firm acted merely as a sales office and sub-contracted all production. Pratt and Cady began its own manufacturing in 1882, making gate valves with renewable asbestos seats and other steam-system hardware. In 1883 the firm built its first factory at this location. A 1903 factory once occupied by Pratt and Cady stands on Capitol Ave., east of Laurel St. and just west of the highway for which the rest of the plant was demolished. The brick factory, about 155' x 110' with

a 65' x 55' wing, features a flat roof, flat-arched windows on the first floor and segmental-arched windows on the second floor. The octagonal corner stair tower resembles a medieval castle, with pinnacles and battlements around the roof. Sills, cornice and other trim consist of pre-cast concrete. Industrial and commercial tenants now use the buildings.
(Hartford Board of Trade, Hartford, Connecticut as a Manufacturing, Business and Commercial Center, 1889; P. Henry Woodward, "Manufactures in Hartford," in Willis I. Twitchell, ed., Hartford in History, 1899; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; Merle Kummer, ed., Hartford Architecture, Volume Three: North and West Neighborhoods, 1980.)

CUSHMAN CHUCK FACTORY (1910) Hartford North
806 Windsor St. 18.693700.4628800
Hartford

A. F. Cushman married the daughter of Simon Fairman, who in 1830 received the first U. S. patent for a chuck, a work-holding device used, in this case, on a lathe. Fairman developed the chuch while making machinery for the fledgling textile manufactures in Stafford, CT. Cushman started making his own versions of Fairman's chucks in Hartford in 1862, hiring as his first employee Adrian Sloan, a veteran of Colt Armory; Sloan became Works Manager of the growing concern by 1870. Cushman's first factory (demolished) was near the site of Pratt and Cady (separate entry), but in 1910 the firm moved to a new building on Windsor St., where it still operates as Cushman Industries. The brick-pier, flat-roofed factory, about 200' x 70', has segmental-arched windows with stone sills. In 1915-19 the company built a large addition designed by Ford, Buck and Sheldon of Hartford; the 1-story brick addition, about 300' long, has a flat roof.

In the 1930s Connecticut could fairly claim to have produced some 80% of the chucks in use in the U. S. Besides Cushman, two other major Connecticut producers traced their origins to Fairman and the Stafford textile industry: E. Horton and Son and D. E. Whiton Machine Co., both founded by men who had worked for Fairman.
(Osborn; L. M. Bingham, "Chucks," Connecticut Industry 13, February 1935; Merle Kummer, ed., Hartford Architecture, Volume Three: North and West Neighborhoods, 1980.)

TERRY STEAM TURBINE WORKS (1908) Hartford North
2852 Main St. 18.693750.4629060
Hartford

After establishing the Oil City Generating Stateion (separate entry), E. C. Terry devoted his experimental work in power generation to steam turbines, receiving patents for high-speed versions in 1893 and 1899, and for low-speed designs in 1900, 1903, 1905 and 1908. He incorporated Terry Steam Turbine Co. in 1906. Early orders included eight 300-horsepower turbines that drove boiler feed pumps at New York Edison Co.'s

Waterside No. 2 Plant. In 1907 Terry engaged mill architect George B. Allen to design this plant and Berlin Construction Co. (separate entry) to build it. Completed in 1908, the high 1-story factory, originally 200' x 80', has steel framing and brick-pier walls; there are three long bays with a monitor over the central bay. After Terry died in 1908 his son James ran the firm. James Terry tapped the military market, selling vertical turbines to the Navy for driving forced draft fans in destroyers. The plant was lengthened by 230' in 1911 to accommodate expanded production from Navy orders. Terry Steam Turbine Co. operated here until the mid-1960s. Furniture and lumber businesses now occupy the factory.
(William H. Corbin, Edward Clinton Terry, Ph. B, 1943,)

FULLER BRUSH PLANT (1922) — Hartford North
3580 Main St. — 18.694350.4629960
Hartford

Alfred Fuller moved his brush-making business from Somerville, MA, to Hartford around 1910. The most singular characteristic of Fuller Brush Co. was its factory-to-consumer marketing system, with all salesmen and distributors working directly for the firm. Fuller Brush built this plant in 1922 to house the majority of its manufacturing operations. An immense 3-story, flat-roofed brick-pier factory, at least 400' x 75', faces the street. It has a central stair tower with Gothic details, such as battlements at the roof. Additional structures include a 3-story wing attached to the main factory, and two 1-story, sawtooth-roofed, brick-pier factories to the rear. The buildings now house tenants.
(Osborn.)

ROYAL TYPEWRITER FACTORY (1907) — Hartford North
150 New Park Ave. — 18.690400.4624500
Hartford

The typewriter firms of Royal and Underwood Elliott Fisher both built large plants in Hartford in the early 20th century. Royal came in 1907, one year after its first shop opened in Brooklyn, NY, and six years after Underwood's arrival. Both firms cited the city's skilled labor pool as a primary attraction. Certainly this manufacture required skilled mechanics, toolmakers and machinists, but their importance far outweighed their numerical presence in the typewriter factories' workforces. Royal claimed in 1934 that only a third of the employees were "skilled workmen." These skilled workers did not make typewriters, but rather made special-purpose machinery for typewriter production, such as Royal's "39-spindle machine," which drilled, tapped and reamed all the holes in a typewriter frame in a single clamping of the piece. Since the recent demolition of "The Underwood," formerly the city's largest typewriter plant, the Royal factory stands as Hartford's pre-eminent material remain of this industry.

The Royal factory consists of five parallel brick-pier wings, 4-story and 5-story, each about 240' long and ranging in width from 45' to 60'. The two eastern wings went up in 1907, and the others followed in 1917 and 1920. Overall the wings repeat the same exterior characteristics, with hip-roofed towers at the corners of the facades and crenellated battlements concealing near-flat roofs. Window treatments vary slightly among the wings, with some set in multi-story recessed panels and others simply set in the walls. The side windows of the 1920 wing, the furthest west, feature flat lintels with steel shelf angles, while segmental arches form the lintels in the other wings. Royal no longer manufactures typewriters here, although the plant apparently still serves warehousing and shipping functions for the firm.
(Osborn; B. S. White, ed., Hartford in 1912; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; L. M. Bingham, "Office Machines," Connecticut Industry 12, September 1934.)

BARTHOLOMEW AVENUE FACTORIES (c.1890) Hartford North
Bartholomew Ave. at Park St. 18.690920.4625060
Hartford

This concentration of buildings represents the first four decades of factory construction in the Parkville section of Hartford. The land remained mostly open through the 1870s. John Gray's Hartford Rubber Works moved here in 1881, but the earliest standing structures date from c.1890 and were probably erected by Pope Manufacturing Co. (see entry for Capitol Ave. Industrial District), which bought Hartford Rubber Works in 1892 to make bicycle tires. The c.1890 buildings range south from Park St. on the west side of Bartholomew and include a 3 1/2-story brick-pier factory, about 100' x 60' with gable roof and a wing about 60' x 35'; two parallel brick-pier factories, each about 275' x 55' with gable roof; and several smaller brick structures. South of these, and still west of Bartholomew, stand portions of the c.1895 plant established by Albert Pope to manufacture steel tubing for his bicycle frames; the major structure is a high 1-story brick factory, about 240' x 75' with a flat roof; five monitors atop the roof terminate in stepped gables along the east wall.

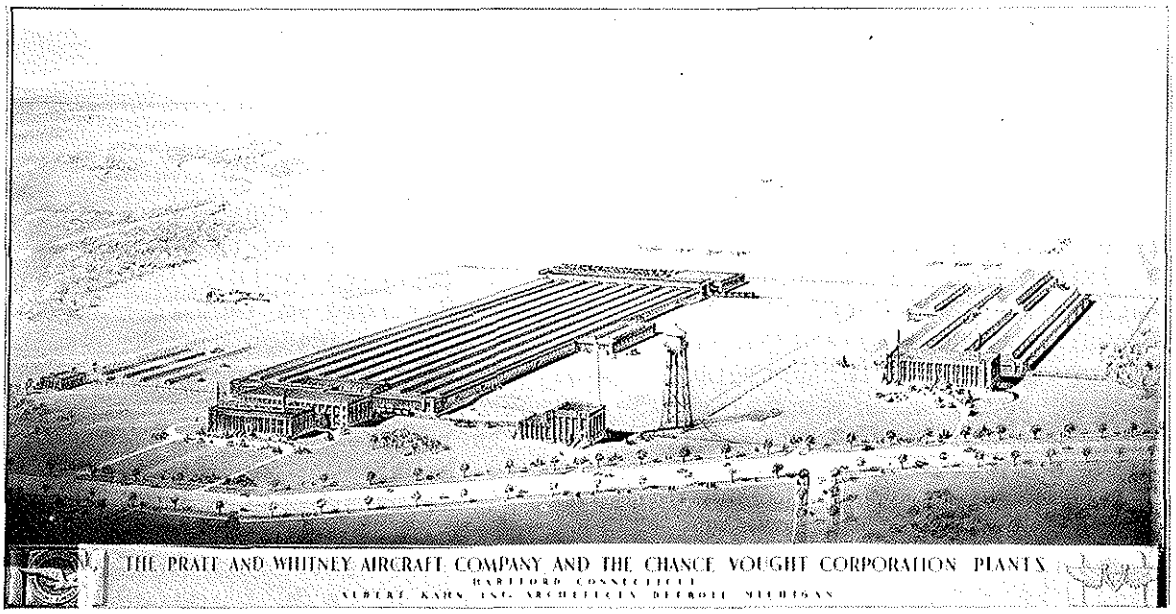
In 1899 the Pope interests chartered a subsidiary, Rubber Goods Manufacturing Co., to manage rubber production. This firm erected two brick-pier factories east of Bartholomew Ave. c.1900: 3 1/2-story, about 150' x 45' with gable roof, central stair tower and segmentally arched windows with stone sills; and 3-story, about 160' x 50' with flat roof and similar windows. As the Pope Manufacturing Co. moved into automobile production in the early 20th century, Rubber Goods Manufacturing Co. retooled to make tires for these vehicles, introducing the "Clincher" double-tube tires in 1903 and "Bailey Tread" anti-skid tires in 1905. U. S. Rubber Co. bought Rubber Goods Manufacturing Co. in 1917, and three years later erected the most prominent building in this district, the 6-story, flat-slab, reinforced

concrete factory, 300' x 150'. The architects, Lockwood, Greene and Co., obviously designed the factory to be lit electrically, because natural light from the windows would not have reached the centers of the floors in such a wide building. Exterior concrete piers and beams create enclosed panels, each containing a low, brick curtain wall and large windows. Shallow arcades of brick, surrounded by concrete moldings, surmount each vertical row of panels. In recent years the buildings in this district have held various industrial and commercial tenants.
(Osborn; L. J. Richards, Atlas of the City of Hartford, Connecticut, 1896; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; Merle Kummer, ed., Hartford Architecture, Volume Two: South Neighborhoods, 1980.)

PRATT AND WHITNEY AIRCRAFT PLANT (1929) Hartford Horth
400 South Main St. 18.696400.4624400
East Hartford

Frederick Rentschler founded Pratt and Whitney Aircraft Co. in 1925. Rentschler and his cadre of engineers and managers had all worked at the Wright-Martin aircraft factory during World War I and at Wright Aeronautical Corp. after the war. Rentschler chose Hartford for his new venture, and the company gained its name, because Pratt and Whitney Machine Tool Co. offered space and money. The first production facilities of Pratt and Whitney Aircraft were in the complex that had grown around the Sharps rifle factory, in a building that had first housed manufacture of Pope-Hartford automobiles. (See entry for Capitol Ave. Industrial District.) Beginning with 30 employees, Rentschler's stated goal was to design and produce an aircraft engine to the highest technical and performance standards. He apparently succeeded, as the radial, aircooled Wasp engine, with the exceptional rating of 410 horsepower at only 650 pounds total weight, found an immediate market in the U. S. military as well as with commercial aircraft producers here and abroad. In 1928, three years after starting design work, Pratt and Whitney Aircraft manufactured 2,000 engines. The company purchased land in East Hartford and hired Albert Kahn's architectural firm to design a new factory. Adjacent facilities were also built for Hamilton Standard, manufacturer of propellors, and for Chance Vought Corp., which made naval aircraft.

Like Kahn's later Detroit automobile plants (such as Building B at River Rouge, 1917), the East Hartford factories are 1-story steel-framed buildings. The Pratt and Whitney factory, 975' x 400', has ten monitors on its flat roof and walls principally of glass with brick at the cornice and water table. The engineering building, 2-story and 210' x 67', is reinforced concrete with brick curtain walls, as is the 2-story, 180' x 53' administration building. The Chance Vought factory is similar to Pratt and Whitney's, though smaller at 545' x 245' with wings 235' x 75' and 75' x 50'. The 472' x 250' Hamilton Standard factory is also similar. Pratt and Whitney moved into



Architect's rendering, courtesy United Technologies Corp.

the Hamilton Standard factory in 1939 and into Chance Vought in 1952. The facility has been greatly expanded, and today it is the largest aircraft engine factory in the world.
(Pratt and Whitney Aircraft Co., The Pratt and Whitney Aircraft Story, 1950; Building Data Files, and United Aircraft and Transport Corp., Site Plans, c.1930, both in United Technologies Corporate Archives; Interview with Harvery Lippincott, Corporate Archivist, United Technologies, November 1978.)

GOETZ CRACKER FACTORY; (1903) — Manchester
CARLYLE-JOHNSON MACHINE COMPANY — 18.705490.4629700
52 North Main St.
Manchester

Goetz Cracker Co.'s North Main Street plant burned in 1901. Construction began immediately on the brick-pier factory complex that survives. By 1909 Goetz had vacated and the plant was occupied by Carlyle-Johnson Machine Co., which had started operation in Hartford in 1902 to manufacture Moses Carlyle-Johnson's patented compact friction clutch. Carlyle-Johnson later patented a gasoline marine engine and marine reverse gears which were also made at the Manchester shops. The firm's move to the bakery/plant and its success there emphasize the common architectural imperatives of machine-based industries, whether they produced crackers or clutches, when power was transmitted mechanically. The long, narrow floors of the factories, 203' x 40' (2-story) and 160' x 36' (1-story), allowed the most efficient installation of line shafting. The office building (1-story, flat roof, 32' x 30') also survives. Several post-World War II additions were built by Carlyle-Johnson Machine Co., which still operates on this site.
(Hughes & Bailey, Aeroview of Manchester, Conn., 1914; Mathias Spiess and Percy Bidwell, History of Manchester, Connecticut, 1924; William Buckley, A New England Pattern: The History of Manchester, Connecticut, 1973; Manchester Assessor's Records.)

MATHER ELECTRIC COMPANY; (1885) — Manchester
ORFORD SOAP WORKS — 18.705260.4629500
Hilliard St.
Manchester

The Mather Electric Co. built this light-bulb factory in 1885 and went bankrupt 12 years later. The plant's next occupant, Orford Soap Co., was founded in Glastonbury in 1885 to make "mineral soap." In 1891 advertising impressario W. H. Childs contracted as sales agent. He boosted sales through intensive advertising which included naming the product "Bon Ami." Childs bought the firm and maintained Orford Soap Co. as the production division of Bon Ami Co., his holding company and distribution agency. Orford Soap moved into the vacant Mather plant around 1895 and remained there for over 50 years. The main factory,

2-story and 248' x 40', has a gable roof and two 3-story towers at the corners of the street-facing end. The decorative features of this towered facade, notably the recessed panels with corbeled heads and the round-arched window openings, contrast with the unadorned sides and rear of the factory, and with the three contiguous brick factories: 2-story, 54' x 39'; 1-story, 54' x 31'; and 1-story, 40' x 28'. Now vacant, the plant has been damaged by fire and vandals but the structures appear to be sound.
(Hughes & Bailey, Aeroview of Manchester, Conn., 1914; Mathias Spiess and Percy Bidwell, History of Manchester, Connecticut, 1924; William Buckley, A New England Pattern: The History of Manchester, Connecticut, 1973; Manchester Assessor's Records.)

CONNECTICUT ARMS AND MANUFACTURING COMPANY (1863) Glastonbury
122 Naubuc Ave. 18.698150.4620800
Glastonbury

This site on Salmon Brook had been used for production of kitchen utensils since 1850, but the present brick factory complex was erected during the Civil War by Thomas J. Vail's Connecticut Arms and Manufacturing Co., a rifle producer. The complex consists of eight buildings, including three contiguous gable-roofed, 3 1/2-story factories, 80' x 40', 70' x 59' and 60' x 46'. A detached factory, 2-story and about 120' x 40', has a 4-story, hip-roofed stair tower. Vail apparently overextended his firm in construction of these buildings, and went bankrupt in 1869. Williams Brothers Silver Co. bought the property in the 1870s. Silver and flatware were made here until after World War II, when the present owner, a furniture producer, bought the site. Much of the 1863 fabric remains sound despite extensive alterations and additions.
(Census 1850, 1860, 1870; Untitled article on manufacturing in the Naubuc area of Glastonbury, Connecticut Historical Society Bulletin 22, April 1947; Glastonbury Assessor's Records.)

HARRIMAN AIRCRAFT WORKS (1913) Glastonbury
1123 Main St. 18.699760.4616780
Glastonbury

Frank Harriman moved his marine-engine business from Hartford to a former cooper shop on this site in 1907. In 1909 he designed and built an aircraft engine, then built several aircraft and started a flying school. Harriman Motors Co., Connecticut's first aircraft-engine manufacturing firm, incorporated in 1912, and the next year built a new shop and foundry. Harriman made 30-horsepower and 50-horsepower (both 4-cylinder) and 100-horsepower (6-cylinder) in-line engines with early application of several important features: overhead cam system, removable valve cages, and silver-plated crankshaft bearings. Only 100 or so engines were made before 1921 when Harriman went bankrupt. Since then a series of light industries has occupied the buildings. The 1-story, 40' x 60' reinforced concrete shop originally had a gable roof, which was replaced with a flat roof in 1955. The coarse concrete is extremely tough, as it was made with feldspar rather than the more commonly used trap rock. The walls and shed roof of the 2-story foundry (39' x 23') were also made of this concrete. Railway T-rails were used for rafters and for reinforcing the concrete roof-slabs. (Glenn D. Angle, Aerosphere, 1939: World's Aircraft Engines with Aircraft Directory, 1939; Harvey Lippincott, "Connecticut Aircraft Propulsion Manufacture History," n.d., typescript in United Technologies Archives; Photograph collection of the Connecticut Aeronautical History Association, courtesy Harvey Lippincott.)

CLARK BROTHERS EARLY FACTORY (1893)
South Main St.
Milldale/Southington

Southington
18.675400.4604050

William Clark opened a shop to make cold-pressed nuts in 1851. By 1854 he was also producing carriage bolts made on forming equipment developed by employees Micah Rugg and Martin Barnes. From 1840 to 1849 Rugg and Barnes had run their own bolt shop, where they first developed several of the metal-forming techniques that led to complete mechanization of carriage-bolt manufacture. The first step was the "hammer lathe," which featured a treadle-operated hammer that headed a bolt at the same time the threads were being cut. They also devised dies for trimming bolt heads and several other powered operations before the business was sold. Clark and his workmen expanded and refined the machine-based processes with equipment such as presses for rounding and pointing, and later, rolls for forming threads. In 1864 Clark constructed machines to form carriage bolts from round stock, rather than from the square bars used previously. Before that process was developed the square shoulder of a carriage bolt was simply the portion of the square stock that was neither headed nor rounded for the threads; in Clark's method the square shoulder was upset and formed from the round stock. The square shoulder was necessary to anchor the carriage bolt in wood; this shoulder could not be turned on a lathe, which is one reason why the mechanization of carriage-bolt production followed a path of development that was based on metal-forming. (In contrast, the elements of a machine screw were all concentric, therefore they could be cut on a lathe; the screw machine, a complex and specialized form of lathe, culminated the 19th-century development of metal-cutting techniques in manufacture of threaded parts.)

In 1893 Clark's earliest shops were destroyed by fire, whereupon the extant factories were built. The main factory, 1-story and 259' x 57', is built of brick with timber framing and has a near-flat roof.

The other 1-story brick factory was originally 190' x 84' but has gained large wings at both ends. West of the plant (across South Main St.) stands the Clark dam, about 10' high and made from brownstone blocks. In 1911 Clark Brothers Bolt Co., so named upon incorporation in 1903, moved from this site into a new plant (separate entry) alongside the New Haven and Northampton Division of the New Haven Railroad. The older plant is now occupied by a chemical firm.
(Osborn; Hartford Atlas; Census 1860, 1870, 1880; William Wilbur, History of the Bolt and Nut Industry of America, 1905; Clark Brothers Bolt Co., 100th Anniversary Catalog, 1954; Southington Assessor's Records.)

CLARK BROTHERS NEW FACTORY (1911)
Canal St.
Milldale/Southington

Southington
18.674850.4603660

In 1911 Clark Brothers Bolt Co. moved from their South Main St. shop to a new, steam-powered factory along the tracks of the New Haven and Northampton Division, about one-half mile southwest of the old plant. The new plant consisted of four brick buildings: 1-story manufacturing building, 144' x 98' with saw-tooth roof and a 68' x 47' ell; 1-story machine shop, 97' x 48' with sawtooth roof, where much of the production equipment was built; 1-story warehouse, 97' x 48' with sawtooth roof; and 2 1/2-story office and shipping department, 82' x 40' with gable roof. A second manufacturing building, 1-story and 122' x 99' with sawtooth roof, was added in 1916, along with monitor-roofed shops with one high story for heat-treating (65' x 31') and forge shop (71' x 60'). The boiler and engine houses were built in 1918. In this period plow bolts, carriage bolts, rivets and other fasteners comprised most of the firm's production. Clark Brothers still operates here.
(Barlos's Insurance Survey, #18536, 1919, courtesy Clark Brothers Bolt Co.; Clark Brothers Bolt Co., 100th Anniversary Catalog, 1954.)

SMITH HARDWARE FACTORY (1882)
24 West St.
Plantsville/Southington

Southington
18.675150.4606030

H. D. Smith's hardware works began in the late 1850s as a supplier to New Haven-area carriage makers. Smith had been an educator before he entered manufacturing. For product designs and refinements in manufacturing processes he relied on workmen with experience in the hardware shops of Meriden and Southington. Employee F. B. Morse, for instance, patented forming dies for king bolts, carriage steps, thill irons, whiffletree bolts and many other carriage parts.

The first shop was in Meriden but after several years there Smith moved the business to leased quarters in the village of Plantsville, town of Southington. In 1882 the existing building was erected. It was the north wing of a U-shaped complex, the rest of which is gone.

The brick structure has two parts: a 2-story, 52' x 50' office block and a 1-story, 151' x 41' factory which is attached to the west end of the office. Windows in both sections are in segmentally arched openings with stone sills. The brick-pier factory has a low-pitched gable roof and a stair tower on its south side. The office has a hip roof topped with a cupola and a porch across the east facade. Smith and Co. grew from 30 employees in 1860 to 65 in 1870, 80 in 1880 and about 125 in the 1890s. In the 1890s the main product of carriage hardware was supplanted by bicycle parts. In 1910 two new factories replaced parts of the 1882 complex; both are 1-story brick-pier structures, 215' x 42' and 178' x 42'. Smith and Co. folded in the early 1930s and the plant was vacant until 1938, when it was purchased by its present owner, a garden-tool manufacturer.
(NR; Census 1860, 1870, 1880; Herman R. Timlow, Ecclesiastical and Other Sketches of Southington, Conn., 1875; Francis Atwater, comp., History of Southington, Connecticut, 1924; Southington Assessor's Records.)

PECK, STOW AND WILCOX MAIN PLANT (1912) | Southington
Center St. | 18.676430.4607560
Southington

The area around Berlin had been a center of tinware manufacture since the 1740s, when Scottish tinsmith Edward(?) Pattison settled there. Just as machine-tool builders grew in Hartford around the arms industry, and producers of roll-mills and special-purpose forming equipment grew in the Naugatuck Valley to serve the brass industry, many producers of tinner's equipment began in the area around Berlin. Seth Peck started making tinner's tools in 1816, producing Parsons' patented roll-swaging machine among other items. Solomon Stow, who first manufactured clock parts, started making tinner's tools in the early 1830s. Also in the 1830s Samuel Wilcox established a tinware factory; some 15 years later he opened a shop to make tinner's tools. These three were among the largest of several dozen local producers by the 1850s. After a decade of intense competition during which each of the three developed many new machines in an effort to capture larger markets, they merged in 1870, substituting financial manipulation for technological innovation as the motor of growth. With the merger Peck, Stow and Wilcox was able to offer a complete line of tinner's equipment that cut across the patent barriers erected during the prior competition. The 1871 catalogue, for instance, listed Double Seaming Machines and Adjustable Bar Folders, both patented by O. W. Stow, as well as patented Grooving Machines for which Roys and Wilcox held the license. The catalogue also offered machines for virtually any operation performed on sheet metal: beading, burring, roll-forming, tube-forming, crimping, shearing, punching. Tinner's hand tools were also made, including shears, snips and a variety of hammers, stakes and swages. Finally, Peck, Stow and Wilcox produced consumer hardware: rivets, decorative moldings, candlesticks, pulleys, hinges, saddle trim and more. In 1880 the firm's three factories employed 380 people in tool and machine production and 125 in production of consumer hardware.

Stow's shops no longer stand. The Roys and Wilcox plant in Berlin was rebuilt starting in 1885 (separate entry). The main plant on Center St. in Southington, where Peck's factory had been, was rebuilt in the early 20th century, by which time Peck, Stow and Wilcox was the largest institution in the local economy. The earliest standing structures were built in 1912. These include a 5-story brick-pier factory, 256' x 51' with flat roof and a large ell; a brick, sawtooth-roofed forge shop, 392' x 67', now sheathed in metal siding; and a 1 1/2-story brick-pier power house, 114' x 40' with monitor roof. Early additions include the 1918(?) 1818 foundry and a 1-story factory appended to the 5-story building of 1912. The Quinnipiac River, retained in masonry walls, bisects the complex. South of the plant Center St. crosses the river on a 1907 plate girder bridge built by Berlin Construction Co. Ownership of Peck, Stow and Wilcox changed in 1953, 1963 and 1976. The last purchaser moved all manufacturing operations out of Connecticut. A wire and screw products manufacturer now occupies the plant.
(Osborn; Hartford Atlas; Census 1870, 1880; Francis Atwater, comp., History of Southington, Conn., 1924; Frank G. White, "A Checklist of Tinner's Tools Manufacturers," Chronicle of the Early American Industries Association 32, September 1979.)

PECK, STOW AND WILCOX BERLIN PLANT (1885) — Middletown
Berlin Street — 18.690450.4609800
Berlin — East Berlin

The tinner's tool factory of Roys and Wilcox occupied this water privilege on the Mattabessett River in Berlin from the 1840s until 1870, when the firm became part of Peck, Stow and Wilcox. The Roys and Wilcox plant was continued in operation by Peck, Stow and Wilcox; in 1880 some 250 people worked here in production of tools, machines and hardware. Peck, Stow and Wilcox began rebuilding the complex in 1885 and substantial portions of the rebuilt plant continue to stand. There are 15 brick buildings from the 1880s, the largest being the 1 1/2-story, monitor-roofed forge shop, 115' x 33', and a 2 1/2-story brick-pier factory, 182' x 35', which is actually three connected buildings. Numerous wings were added before 1890. In 1920 a 1 1/2-story, monitor-roofed factory, probably a forge or foundry, was erected north of the 19th-century complex. Portions of the stone-block dam remain from the water power system that included five turbines in 1880; races have been filled. A chemical manufacturer now uses the complex. See entry for Peck, Stow and Wilcox Main Plant.
(Osborn; Hartford Atlas; Census 1850, 1860, 1870, 1880; Francis Atwater, comp., History of Southington, Conn., 1924.)

BERLIN IRON BRIDGE COMPANY PLANT (1891) Middletown
Berlin Street 18.690470.4609500
Berlin East Berlin

Berlin Iron Bridge Co. (BIB Co.) grew from the Berlin tinware industry, an unusual origin for a structural fabricator. One direction taken by Roys and Wilcox (see entries for Peck, Stow and Wilcox Main Plant and Berlin Plant) in its development of metal-forming machinery was to increase the size and horsepower of roll-forming equipment. By the late 1860s the firm had developed rolls capable of forming corrugated iron (not the first to do so). American Corrugated Iron Co. was organized in 1868 to pursue this manufacture. It was succeeded in 1871 by Metallic Corrugated Shingle Co., which changed to the Corrugated Metal Co. in 1873. The evolving firm's business was based on production of corrugated sheet iron and manufacture of shutters, shingles and roofs. Entry into structural iron work began in the early 1870s when the firm made iron roof trusses to support its heavy building materials. In 1878 or 1879 the Corrugated Metal Co. acquired rights to build a lenticular (lens-shaped) bridge truss patented by William Douglas in 1878. This new field soon dominated the shop's work and in 1883 the company was renamed Berlin Iron Bridge Co. By 1889 nearly 600 of the patented spans had been erected in the northeast, midwest and Texas. Hundreds more were built in the next ten years; BIB Co. also fabricated structural iron (and steel in the 1890s) for buildings. The firm became the largest structural fabricator in New England, with 400 workers in the fabrication shops and sometimes an equal number in erection crews. American Bridge Co. bought BIB Co. in 1900 and the buildings of the fabrication plant were soon demolished or moved. The only standing remnant of the plant is a small, frame office building now used as a residence.

only 1 sm frame bldg remains

The lenticular truss became a virtual trademark for BIB Co., though the firm did build some bridges using more standard configurations, such as New Haven's West River Bridge and the plate girder bridge in Waterbury (separate entries). One advantage of the lenticular form was that it used about 10 per cent less iron than a comparably sized Pratt or Warren. To its disadvantage, the ends of the chord segments in one bridge all had to be machined to different angular specifications. Lateral stability of the lenticular was also an area of concern, and William Douglas received a second patent in 1885 for a method of bracing that was intended to increase resistance to lateral loading at the roadway level (see entries for Almyville and Moosup Lenticular Bridges). BIB Co. promoted the lenticulars aggressively, often not settling for a single sale in one town, but rather continuing sales pressure until every crossing in the town had its own lenticular bridge. Multiple lenticulars are found today in New Milford, Stamford, Waterbury and Plainfield (separate entries). By the late 1890s it appears that the lenticulars became more difficult to sell; the 1895 Lover's Leap Bridge (separate entry) is the latest one in Connecticut. Since most lenticulars were wrought iron, this decrease in sales was probably caused as much by the replacement of steel for wrought iron as by problems with the truss pattern. Nonetheless, in the last few years before American Bridge Co. bought BIB Co., the firm erected bridges with more common trusses, such as Toelles Rd. Bridge (separate entry).

The lenticular truss has a unique profile. Many bridge designs use a curved or segmental top chord, but only in the lenticular does the bottom chord form a mirror image of the top, which symmetry lends a graceful appearance. BIB Co. used variations of members and details within the lenticular form. Web verticals, usually four angles with lacing bars, were sometimes tapered from the bottom chord to fit inside the top (generally on spans under 75' long), and sometimes were parallel-sided and either narrower or wider than the chords. In spans shorter than 40' the bottom chord had two round rods, while in longer spans rectangular-section bars were used. Pinned connections were used for all joints except at the endposts of trusses under 75', where the bottom chord rods or bars were threaded, projected through a casting on top of the endpost and secured with nuts. Most of the transverse floor beams were riveted and tapered from their midpoint to the suspending bars at the webs; later bridges had riveted or rolled beams with parallel flanges.

Less than ten per cent of the BIB Co. lenticulars still stand, and at least twenty-two of the survivors are in Connecticut. They are found carrying city traffic at Washington Ave. in Waterbury and Main St. in Stamford, as well as on rural roads and private crossings. There are seventeen pony trusses (from 30' to 78' long) and five through trusses (105' to 188'). The oldest is Waterbury's Washington Ave., which was built c.1881 by the Corrugated Metal Co.
("The Plant of the Berlin Iron Bridge Co. at East Berlin, Conn.," _Engineering News_, 3 October 1891; Berlin Iron Bridge Co., _Catalog, 1889 and c.1894_; Sanborn-Perris Map Co., Survey #3-8118, 1895, _Berlin Bridges and Buildings_, 1898-1900, monthly promotional magazine issued by the firm; Victor Darnell, "Lenticular Bridges from East Berlin, Connecticut," _IA_ 5, 1979; Interviews with Victor Darnell, 1979 and 1980.)

BERLIN CONSTRUCTION COMPANY SHOPS (1902) New Britain
Depot Street 18.686300.4611350
Kensington/Berlin

When American Bridge Co. acquired Berlin Iron Bridge Co. in 1900, three of the latter company's officials formed the Berlin Construction Co. Until 1902 the new firm's fabrication was done in Pottsville, PA although the primary sales area centered around Connecticut. In July 1902 operations were moved to the present plant. Berlin Construction Co. fabricated and erected structural steel for bridges and buildings; Many of the firm's bridges are included in this inventory. Coal-handling systems for power plants were a major portion of the firm's work, and special projects included a banana loader sent to Guatemala

and an iron ore loader sent to Chile. The fabricating shop is a steel-framed building with one high story. The framing was erected in 1902 but its sheathing has been changed several times; the present walls are corrugated fiberglass and transite. Several additions have been made to form the present 241' x 40' shop. The template shop, a 1-story 90' x 45' frame structure, and the boiler house, a 1-story 59' x 46' brick-pier structure, were also built in 1902. Several storage buildings and one for offices have been added. The techniques of riveted steel construction have been replaced by welding and high-strength bolts, so the original 1902 machinery for fabricating riveted members has been replaced. Most of the steel fabricated now is for buildings in Connecticut. The company changed its name to Berlin Steel Construction Co. in 1962.
(Interview with Victor Darnell, retired Vice-President, Berlin Steel Construction Co., September 1890; Berlin Assessor's Records.)

THE STANLEY WORKS (1872)
Myrtle St.
New Britain

New Britain
18.683750.4615180

Frederick T. Stanley first ventured into hardware manufacture in the early 1830s when he formed a partnership with his brother William and three other men to produce plate locks. Stanley had withdrawn by 1840 and new partners joined the firm, which became Russell and Erwin Manufacturing Co. (separate entry) Stanley entered the hardware field again in 1843 by founding Stanley's Bolt Manufactory in a small shop on Lake St. After ten years it was incorporated as The Stanley Works and production expanded to include trunk and builder's hardware. In 1871-72 the firm built a 3 1/2-story brick mill, 202' x 40' with gable roof, on Myrtle St. Since then The Stanley Works has grown through expansion in original areas of production, development of new products and processes, and acquisition. William H. Hart, treasurer from 1854 to 1884 and president from 1884 to 1915, fostered many innovations in marketing and manufacturing. Increased use of stamping machinery led Hart, in 1871, to introduce the cold-rolling of wrought iron strips in order to assure uniform thickness of the stock for hinges. In the 1880s this process was adapted for mild steel and Stanley became the first producer to substitute steel for wrought iron in builder's hardware. In 1920 The Stanley Works acquired Stanley Rule and Level Co., a New Britain firm founded in 1850 by Augustus and Gad Stanley (distant relatives of Frederick) and T. A. Conklin. Stanley Rule and Level had purchased Leonard Bailey's patents for planes in 1869, and the tool produced under these patents (and subsequent patents assigned to Stanley Rule and Level, primarily by Justus Traut) became the standard for woodworking planes to the present day. By buying other firms Rule and Level had expanded until a complete line of carpenter's and mechanic's tools was offered.

Today The Stanley Works owns scores of factories worldwide, but the center of operations remains in the 26-acre complex that grew

around the 1872 mill. The first major additions, in the 1880s, were 3 1/2-story brick mills, 130' x 40' and 120' x 40', on either side of the 1872 mill. After World War I all three underwent extensive reconstruction: foundations were replaced, pilasters added, attics removed and two floors were added to each. In 1899 the firm built its first factory west of Curtis St.; 1-story, brick, 144' x 80', it housed the heavy metal-forming machine tools for hinge production. The 1902 rolling mill, 2-story and 275' x 137', is no longer used for its original purpose, but tunnels for the line shafting that drove the rolls are in place under the floor. The Stanley complex features a broad array of the styles and materials of industrial architecture: brick mills and frame sheds from the 19th and early 20th centuries; early 20th-century multi-story reinforced concrete factories and warehouses; steel-framed factories with brick or cinder-block walls; and recent steel-framed structures with walls of prefabricated concrete panels.
(Osborn; E. A. Moore, Four Decades with The Stanley Works, 1950; Frederick T. Stanley, "Historical Reminiscences of New Britain," New Britain News, 8 January 1875; Factory Mutual Engineering Association, Survey #75234, 1967, courtesy The Stanley Works.)

RUSSELL AND ERWIN MANUFACTURING COMPANY (1887) — New Britain
Myrtle and Washington Sts. — 18.684400.4615300
New Britain

Russell and Erwin, New Britain's largest 19th-century hardware producer, had dozens of buildings covering several city blocks in the center of New Britain, north of Main St. Tenants now occupy the only remnants of the plant, this 3-story brick-pier factory and 2-story reinforced concrete factory. The 93' x 45' brick structure, built in 1887, has a hip roof and segmental-arched windows. The 1926 reinforced concrete factory (360' x 60') utilizes flat-slab construction; concrete piers and beams frame exterior panels, which have steel-sash windows above 3'-high brick curtain walls. Russell and Erwin specialized in builder's hardware. Two other New Britain firms, P. & F. Corbin, makers of diverse hardware such as hooks, screws and handles, and Corbin Cabinet Lock Co., merged with Russell and Erwin in 1902 to form American Hardware Corp. Neither Corbin plant survives.
(Osborn; Hartford Atlas; David N. Camp, History of New Britain, 1889; New Britain Assessor's Records.)

FAFNIR BOOTH STREET PLANT (1880) — New Britain
Booth and Orange Sts. — 18.684000.4615350
New Britain

Howard S. Hart founded Fafnir Bearing Co. in 1909 to manufacture ball bearings. Hart had already been active in New Britain's manufacturing industries: he had co-founded Hart & Cooley Co., producers of warm-air

registers, and was vice-president of American Hardware Co. when he started Fafnir. Hart's inspiration for the Fafnir venture came during his stewardship of the ultimately unsuccessful attempt by American Hardware to produce and market the Corbin automobile between 1903 and 1912. The trouble and expense of obtaining ball bearings from Germany and England for the automobile led him to found Fafnir, named for the sorcerer/dragon in Wagner's Siegfried to lend a Germanic ring to the firm. The first production space was in Hart & Cooley buildings at the corner of Orange and Booth Sts. Six pre-Fafnir structures remain, including an 1880 brick factory, 4-story and 61' x 52'. Buildings erected by Fafnir came to cover the entire block. Major World War I-era additions include two 3-story flat-roofed brick mills (1915, 224' x 51'; 1918, 232' x 51') and a 1918 brick, monitor-roofed hardening room (high 1-story, 80' x 49'). After 1925 Fafnir built reinforced concrete factories, using C.A.P. Turner's flat-slab method; notable structures of this type are the 6-story, flat-roofed factories built in 1925 (231' x 56') and 1929 (120' x 60'; 251' x 60'). All these and dozens of later buildings comprise the Fafnir Booth St. Plant, which is joined in New Britain by the John St. Plant, started in 1924, and the Grove St. Plant, which includes a 5-story brick-pier mill built by American Hardware in 1907. Now part of Textron, Fafnir still produces ball bearings in these plants.
(Osborn; Fafnir Bearing Co., The Fafnir Story, 1956; Stanley M. Cooper, "Fafnir Spins Profits...," The Christian Science Monitor, 24 December 1957; New Britain Assessor's Records.)

LANDERS, FRARY AND CLARK PLANT (1908) — New Britain
321 Ellis St. — 18.685700.4614030
New Britain

Landers, Frary and Clark began its evolution from a hardware and cutlery manufacturer to an appliance manufacturer in 1898, when it introduced the Universal food chopper, a hand-driven kitchen tool. The firm soon brought out a bread mixer and other mechanical household devices. As electricity reached increasing numbers of homes in the early 20th century, Landers, Frary and Clark participated in the transformation of the American household by producing electrical apparatus for home use. By 1912 the Universal line of electrical appliances included stoves, dishwashers, coffee pots, irons and vacuum cleaners. Demand for these products exceeded the capacity of the two original plants on East Main St. and on Center St., so Landers, Frary and Clark built a new plant on Ellis St., south of the center of New Britain. The two earlier plants were demolished in the 1960s for highway construction.

The first Ellis St. factory was built in 1908; brick with timber framing, the 1-story, 135' x 104' structure has a sawtooth roof. A 124' x 104' addition was built in 1912. Brick-pier factories with timber frames were added in 1917 (4-story and 120' x 50'), in 1920 (6-story and 154' x 80') and in 1923 (4-story and 145' x 55'). The

1-story, 200' x 123' monitor-roofed shop built in 1928 has reinforced concrete posts and beams. These factories, all north of Ellis St., were augmented by another complex south of Ellis St. Construction began here in 1916 with a 5-story factory, 230' x 60', brick-pier with timber framing. The 1919 brick-pier forge shop, 230' x 60' with a single high story, and 1924 brick-pier factory, 6-story and 161' x 67', feature steel reinforcing under the timber beams. The 5-story, 190' x 60' brick factory built in 1936 was the last structure erected here by Landers, Frary & Clark, and the first to use steel posts. General Electric bought the Universal line of appliances in the 1960s. These buildings are now occupied by another manufacturer.
(Hartford Atlas; Osborn; David N. Camp, History of New Britain, 1889; James Shepard, New Britain Patents and Patentees, 1901; K. A. Larson, A Walk Around Walnut Hill, 1975; New Britain Assessor's Records.)

NATIONAL WIRE MATTRESS FACTORY (c.1890) New Britain
27-33 Columbus Boulevard 18.684160.4615100
New Britain

The National Wire Mattress Co. was organized in 1872. The firm purchased wire, sheet and bar stock to fashion into mattress springs and underframes for mattresses. None of the initial buildings survive, but a c.1890 3-story brick-pier factory, 118' x 44' with flat roof, and c.1890 boiler room, 1-story and 44' x 37' with hip roof, continue to stand. The company failed in 1897 and was reorganized in 1898 as National Springbed Co., which added brick-pier factories with flat roofs in 1900 (4-story and 106' x 44') and 1910 (5-story and 85' x 44'). National Springbed lasted until 1918. Various manufacturers have used the buildings since.
(David N. Camp, History of New Britain, 1889; New Britain Herald, 5 March 1881, 18 June 1898; New Britain Assessor's Records.)

PARKER SHIRT FACTORY (1899) New Britain
34 Walnut St. 18.684540.4614840
New Britain

Julius Parker began making men's stocks in 1847. These were pieces of silk or satin on bone or metal frames; they attached around the neck and covered the chest and collar area. Bulky, unwieldy and tight, stocks fell from fashion in the 1850s, so Parker started making men's dress shirts. Parker Shirt Co. continued successfully into the 20th century, run by Parker's son Charles after the founder's death in 1898. Substantial portions of the plant, built in 1899-1908, survive. There are three main buildings: 4-story, 56' x 42'; 3-story, 59' x 32'; 3-story, 104' x 27'. All are of brick and have flat roofs, segmental-arched lintels, corbeled cornices and granite trim. Since the 1930s

these buildings have had a succession of occupants, including New Britain Undergarment Co., a knitwear manufacturer. They now serve as warehouses for a plumbing supplier.
("The Parker Shirt Co.," New Britain: The Hardware City 1, March 1926; New Britain Assessor's Records.)

SESSIONS HARDWARE FACTORY (1907)
273 Riverside Ave.
Bristol

Bristol
18.672100.4615080

J. H. Sessions ran a wood-turning shop in Bristol from 1858 to 1870. He then bought his brother's hinge shop and expanded it to produce a full line of trunk hardware, such as hasps, locks and trim. In 1879 he bought Bristol Foundry Co. to supply his own castings in iron and brass. The foundry was also expanded and by the turn of the century it was producing castings for lamps, clocks, machine tools, locomotives, sugar refineries and heating plants, as well as for trunk hardware. The hardware fabricating shop and the foundry were run as one operation until 1902, when J. H. Sessions, Jr. formed the separate firms of J. H. Sessions and Son and Sessions Foundry Co. In 1907 a separate plant was built on Riverside Ave. for J. H. Sessions and Son. (The historic foundry buildings on Farmington Ave. have been demolished or substantially altered.) The manufacturing buildings are all multi-story brick or brick-pier factories with timber framing, stone foundations, near-flat roofs and segmental-arched windows with stone sills. The factories are 4-story and 146' x 42'; 4-story and 98' x 52'; 4-story and 103' x 53'; and 2-story, 74' x 65'. Two brick buildings, 188' x 44' and 55' x 44', each with one high story and monitor roof, were built for thermal processes: forging, casting, heat-treating and steam power generation. J. H. Sessions and Son still occupies these buildings.
(Osborn; Frederick C. Norton, comp., Bristol, Connecticut, 1907; Epaphroditus Peck, A History of Bristol, Connecticut, 1932; Bristol Assessor's Records.)

SESSIONS CLOCK FACTORY (1885)
61 East Main St.
Bristol

Bristol
18.675200.4615400

Clock production on this site began in 1835 with J. C. Brown's Forestville Manufacturing Co. After Brown's bankruptcy in 1857 his chief creditor, Elisha Welch, bought the plant. Welch continued clock production until his death in 1887, after which the plant was idle for ten years. A partnership of local men tried to reinstitute clock production but they were near bankruptcy in 1902 when William E. Sessions, president of Sessions Foundry Co., bought the business. Much of the surviving plant was built by Sessions, although several buildings remain from the last years of Welch's proprietorship. The earliest is the

1885 3-story brick mill, 108' x 36'; its original gable roof has been flattened. In 1887 Welch's firm built two 3-story brick-pier mills, 105' x 39' and 122' x 39'. Windows on the bottom two floors have segmental-arched lintels and stone sills; third-floor windows have round-arched lintels. Sessions added a fourth story to each of these factories in 1907, and built a 1-story, 160' x 39' brick-pier wing. In 1902-04 Sessions added three more brick-pier factories, all 3-story, with dimensions of 162' x 50', 168' x 50' and 118' x 50', as well as numerous smaller auxiliary buildings. The brick office building was erected in 1926. At peak employment in the 1920s some 550 people worked at Sessions Clock Co. The firm specialized in tambour scroll clocks and school clocks. Sessions also made reproductions of 19th-century designs, such as "Banjo" wall clocks and Chippendale-style shelf clocks. Industrial tenants now occupy the plant. (Osborn; Frederick C. Norton, comp., Bristol, Connecticut, 1907; Bristol Assessor's Records.)

WALLACE BARNES SPRING FACTORY (1918) | Bristol
Main and South Sts. | 18.671300.4614800
Bristol

Spring production in Bristol grew out of the requirements of local clock manufacturers. Companies such as those of Edward Dunbar (1847) and Wallace Barnes (1857) subsequently broadened their output to include springs for machinery and vehicles, as well as such products as hoops for crinoline skirts and trouser leg-guard springs for bicyclists. No 19th-century production facilities from either the Dunbar or Barnes works have survived. The oldest extant building is the 1918 Wallace Barnes Administration Building, a flat-slab reinforced concrete structure, 5-story and 109' x 66' with an 84' x 45' ell. Brick curtain walls and steel-sash windows fill the exterior panels. The Barnes and Dunbar companies merged for a second time in 1923 (they had operated as one firm from 1857 to 1866). Extant from the post-merger 1920s is a 4-story flat-slab reinforced concrete factory, 241' x 61', east of the Administration Building. These buildings (and many more recent ones) are occupied by Associated Spring Division of Barnes Group, Inc., which is descended from the merged spring company of 1923. (Epaphroditus Peck, A History of Bristol, Connecticut, 1932; L. M. Bingham, "Springs," Connecticut Industry 12, April 1934; Bristol Assessor's Records.)

NEW DEPARTURE PLANT (c.1895) | Bristol
North Main and Center Sts. | 18.670800.4615750
Bristol

Albert Rockwell began his career in Bristol in 1888 by manufacturing clock-work doorbells, but he rode to prominence on production of ball bearings for bicycles and automobiles. Entry into bearing manufacture began in 1898 when Rockwell's firm, New Departure Manufacturing Co., brought out a bicycle coaster brake that used steel balls for friction reduction, and accelerated as New Departure supplied bearings for automobiles made by Bristol Engineering Co., a subsidiary organized in 1907. In 1919 General Motors acquired New Departure, which continued to make bicycle parts and to sell bearings to other automobile firms.

Most of the plant was built between 1900 and 1930, although one c.1895 2-story brick-pier factory (131' x 41') still stands. Originally used for manufacturing, it was converted to personnel offices and the plant hospital when later factories were erected. The 5-story, 212' x 63' brick building at the southeast corner of the complex held offices and the Endee Inn, where unmarried workers boarded. Built in 1911-12, its white brick facade has trim of tile and precast concrete; the back and sides are red brick. Much of the plant was built in 1919-21, including the 1-story reinforced concrete Annealing Building, 222' x 195' with sawtooth roof; the 3-story Model Shop, 232' x 92' with brick walls and near-flat roof; and the 1-story, 312' x 102' brick factory that housed machining and forming processes. The largest factory was built in 1930; 5-story and 402' x 128', it has reinforced concrete framing and brick-pier exterior walls. With completion of this factory New Departure had 50 acres of floor space. At full capacity the company employed some 7,000 workers who produced 225,000 ball bearings per day. In the 1920s and 1930s New Departure and other Connecticut firms, notably Fafnir (separate entry), the Torrington Co., Marlin-Rockwell Corp. (formed by Rockwell after leaving New Departure) and Norma-Hoffman Bearings Corp., made more than half of the ball bearings in the world, and New Departure was the world's largest producer. New Departure moved into a new factory in Bristol in 1971. Tenants occupy the North Main St. plant.
(Osborn; Epaphroditus Peck, A History of Bristol, Connecticut, 1932; L. M. Bingham, "Bearings--Anti-Friction," Connecticut Industry 12, May 1934; Bristol Assessor's Records.)

SIMSBURY FUSE FACTORY (1860) — Avon
660 Hopmeadow St. — 18.682100.4637300
Simsbury

William Bickford, from the Tuckingmill mining district of Cornwall, England, developed "Miner's Safety Fuse" to replace fuses of straw or goose quill that were used to detonate black powder. He was granted a Royal Patent for his invention in 1831. Bickford's process, called "fuse-spinning," derived from rope manufacture. A long spinning bench (30'-40') held vertical-axis bobbins at one end and traveling "jennies" drew and twisted together cotton yarn from the bobbins. Before the twist tightened, powder was fed by gravity into the center of the strands through a leather funnel. In the second step, "countering," a second set of strands was twisted around the fuse in the opposite direction from the first twist to prevent unraveling and powder leakage. Then the large spool of several hundred feet of fuse was wound onto smaller spools for distribution. The last operation, "varnishing," was to draw the fuse through molten tar, for waterproofing, and talc, to prevent sticking.

Richard Bacon brought Bickford's fuse to Connecticut in the 1830s. Bacon was a partner in Phoenix Mining Co., which had resumed copper mining at nearby New Gate (see entry for Simsbury Copper Mine/New Gate Prison). He obtained exclusive rights to sell fuse in the United States and in 1836 he convinced the English firm to establish a manufacturing subsidiary--Bacon, Bickford and Eales. Eales was an Englishman sent to set up the machinery and supervise production. Joseph Toy, sent from England in 1839 to oversee the operation, gained full control of the firm by buying the shares of Bacon and Eales. When Toy died in 1887 his son-in-law, R. H. Ensign, became managing partner and renamed the firm Ensign Bickford & Co.

An explosion and fire in 1859 destroyed the plant, so the earliest extant buildings date from 1860. These include several support shops and at least one fuse spinning mill. Built of brownstone in random ashlar, as is most of the complex, the fuse mill is a 2-story structure, 120' x 35' with gable roof. Typically for these mills, the walls are heavy masonry and the "blow-off" roof is light wooden frame and shingle; fuse-making machinery was on the first floor with powder magazine on the second. Most of the surviving buildings date from the early 20th century. A 1906 fuse mill, 160' x 30' with similar functional design as the earlier mills, is separated by masonry fire walls into nine separate production spaces, each presumably safe in the event of fire or explosion in another. Ensign Bickford still occupies the plant, though the products have changed.

The Simsbury Historical Society holds significant examples of 19th-century fuse-making equipment. A fuse machine like those in use in the 1830s has been assembled from parts of several machines. Except for the iron rack-gear that the jenny advanced upon, the frame and transmission elements are all made of wood. Revealing what were apparently American design changes, the 1870 "Simsbury type" machine is an upright fuse spinner with cast-iron frame. The museum's countering and varnishing equipment has also been assembled from parts of several machines. This machinery is on permanent exhibition.
(Hartford Atlas; Ensign Bickford Co., Bickford, Smith & Co., Ltd., 1931; Ensign Bickford Co., One Hundred Years: Being the Story of Safety Fuse in America Since 1836, 1936; Ensign Bickford Co., "Factory Grounds," survey map, 1978, courtesy E-B Industries, Inc.)

CLIMAX FUSE PLANT (1906)	Avon
Avon Park	18.679700.4630800
Avon	

Fuse production in Avon began in 1852, but hazards inherent in the industry have obliterated all traces of 19th-century facilities: the works were destroyed in both 1883 and 1905. Climax Fuse Co. was incorporated to rebuild the ruins after the first fire. Ensign Bickford & Co. (see entry for Simsbury Fuse Factory) bought half-interest in Climax in 1892, and the two firms merged after the second fire. Like

the Simsbury plant, the buildings here have walls of random-coursed brownstone blocks and wood-framed roofs. The main fuse-spinning mill, 290' x 25' with gable roof, is a series of rooms separated by fire walls. Numerous testing buildings and support shops ranging in size from 25' x 15' to 80' x 30' survive, as does the dam and system of races for water power. Manufacturing ceased here in the mid-1960s and the plant now houses an unusual combination of functions. Town offices occupy several of the buildings. The smaller structures are leased for offices and retail businesses. The main fuse-spinning mill is home for Farmington Valley Arts Center, with spaces for studios, offices, and exhibitions. Essential building fabric and the open races have been retained.
(Ensign Bickford Co., One Hundred Years: Being the Story of Safety Fuse in America Since 1836, 1936; Herbert McIntyre, "A Century of Safety Fuse," LLH 11, December 1951; Associated Mutual Insurance Co., Survey #18,490, 1924, courtesy E-B Industries, Inc.)

COLLINS EDGE TOOL WORKS (1846) — Collinsville
Rte. 179 at the Farmington River — 18.672400.4630600
Collinsville/Canton

The edge tool works begun in 1826 by Samuel Collins, David Collins and William Wells became one of Connecticut's most famous, successful and influential manufacturing firms. Under E. K. Root, superintendent from 1832 to 1849, Collins Co. developed machine-based metal-forming processes which, along with a highly elaborated division of labor, achieved huge levels of output. Edge tool production did not require precision tolerances, but when Root went on to serve as superintendent at Colt Armory (separate entry), he supervised a merger of forming processes with the precision die-making and machine-building capabilities of Yankee armory practice. The resulting technique of precision die-forming constituted a key element in the mechanization of production in innumerable industries, from builder's hardware to automobiles.

By 1860 the Collins Co. workforce numbered some 350 men and boys and production exceeded 490,000 axes, machetes, mattocks and picks. Collins Co. made bayonets during the Civil War and in the 1860s introduced cast-steel plowshares. The 1870 workforce of 650 people turned out some 615,000 implements. At the height of operations, in the early 20th century, Collins Co. employed nearly 1,000 men. The village of Collinsville came to include some 195 dwellings owned by the firm as well as company-built stores and community buildings.

The oldest standing structure in the millyard is a 3-story 1846 factory, 136' x 55' with gable roof and walls of random ashlar masonry. Among other early factories that remain are the c.1850 brick building, 157' x 34' with slate-covered gable roof and the 1862 brick forge shop, 1 1/2-story and 247' x 54' with monitor roof. Arrayed along the forebay at the north end of the yard are 2-story and 3-story frame factories, one built in 1867 (187' x 42') and two built in 1904 (120' x 45' and 91' x 43'). These last two structures replaced the original Collins shops, including the grist mill in which the enterprise began.

The water power system features two dams and a complex of open and below-ground races. The main dam was rebuilt in 1870; it is 26' high and made of stone blocks. In 1912-13 the company built an 18'-high concrete dam on the Farmington River about one-half mile below the plant. The first turbines were installed in the late 1860s, but none of these survive. There is, however, a c.1890 Holyoke Machine Co. single-runner turbine, in place and operating with 1915 Lombard governor. Two c.1920 Allis-Chalmers single-runner turbines (96" diameter) were used to generate electricity for power and light in the factories; the turbines are in place and under rehabilitation but the original electrical equipment is gone.

Collins Co. closed in 1967. The present owner of the complex occupies some space in the dozens of buildings and rents other portions. Extant Collins machinery includes a c.1910 "bulldozer," a horizontal press that formed the eyes in axe-heads. Also here are many machines from the C. P. Bradway Machine Works of West Stafford, CT: a vertical boring mill, a shafting lathe and several smaller lathes, among others. This equipment and many turbines manufactured by Bradway were purchased and moved here when Bradway closed in the mid-1970s.

(Osborn; Hartford Atlas; Census 1850, 1860, 1870; William T. Davis, ed., The New England States, vol. 2, 1897; The Collins Co., One Hundred Years, 1926; Associated Factory Mutual Fire Insurance Co., Survey #18,495, 1950, courtesy Thomas Perry; Paul Uselding, "Elisha K. Root, Forging, and the "American System,'" Technology and Culture 15, October 1974; Interviews with Thomas Perry and Henry Obermeyer, The T. M. Perry Co., present owner, September 1980.)

Utilities

OIL CITY GENERATING STATION (1898)
off Rainbow Rd.
Rainbow/Windsor

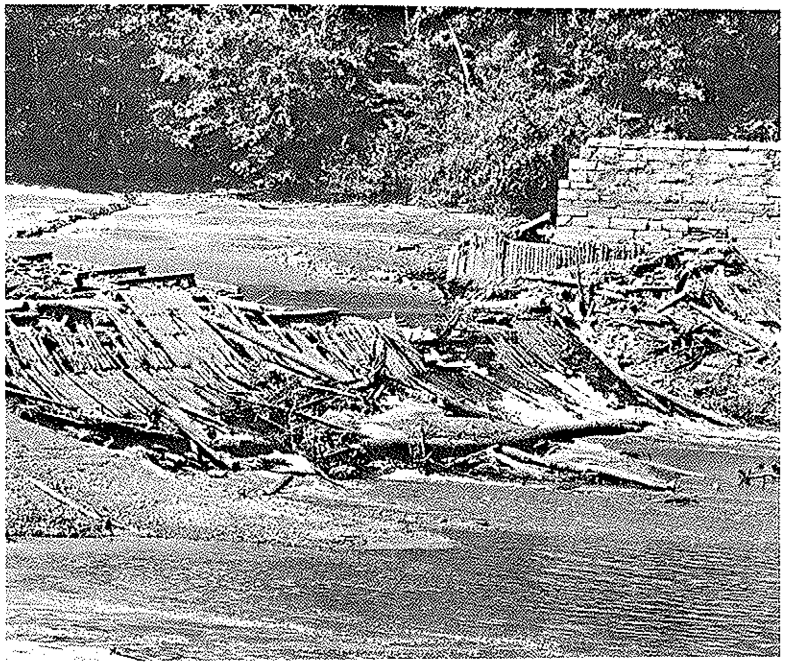
Windsor Locks
18.690500.4642500
(approximately)

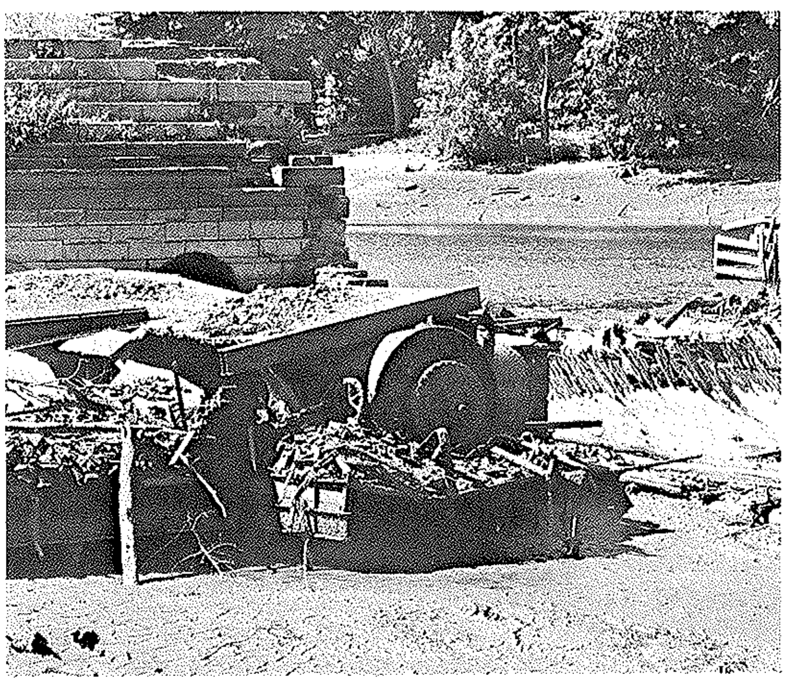
This pioneering generating facility has been totally submerged since 1925, when the dam for Rainbow Hydroelectric Plant (separate entry) backed water up over this site. When the dam for the latter facility was drained in 1976, a photographer recorded substantial remains of the Oil City Plant, including portions of turbines, dam and power house. These remains command interest because of the role played by this plant in experiments with low-head generation and long-distance transmission of electricity. E. C. Terry organized the Farmington River Power Co. in 1890 to supply electricity to Hartford Electric Light Co., generating here and transmitting over 11 miles to Hartford. Equipment was changed frequently in the early years, as the plant served more as laboratory than generating facility. In 1893, for instance, Hartford Electric Light paid for installation of a 3-phase, 133-cycle alternating current system based on H. F. Weber's system in Lauffen, Germany. The extant equipment, installed in 1898, includes two 60-cycle Westinghouse generators and two McCormick & Rodney Hunt turbines.
(William H. Corbin, Edward Clinton Terry, Ph.B, 1943; Glenn Weaver, The Hartford Electric Light Co., 1969; Richard Daley Studios, Hartford, 1976 photographs of exposed plant, courtesy Richard Daley and The Stanley Works.)

RAINBOW HYDROELECTRIC PLANT (1925)
347 Rainbow Rd.
Rainbow/Windsor

Windsor Locks
18.691240.4642720

The Stanley Works (separate entry) bought the Farmington River Power Co. in 1916 to provide electricity for its hardware factories in New Britain. In 1925 Stanley built a new dam and power house, which remain intact with mostly original operating equipment. The concrete dam is 53' high and 400' long. The brick, flat-roofed power house (102' x 74') contains two General Electric alternating current generators, each powered by an S. Morgan Smith turbine. Each turbine, operating under head of 59', generates a maximum of 6,680 horsepower. The Power Construction and Engineering Corp. of Worcester, MA, designed the plant, which still provides between one-half and two-thirds of the electricity fot the New Britain factories and offices of the Stanley Works.
(Power Construction and Engineering Corp., "Power House Sections," and "Power House Layout," 1925, courtesy The Stanley Works; The Hartford Daily Times, 24 October 1925; Interview with James Griskewicz, technician for Farmington River Power Co., July 1979; "The Farmington River Power Co.," Stanley World, employee newsletter, September-October 1964.)





Oil City dam and power house remains, 1976
(Richard Daley Photography, Inc.)

SOUTH MEADOW POWER PLANT (1917)
Reserve Rd.
Hartford

Hartford South
18.695150.4624450

Hartford Electric Light Co. began construction of South Meadow Power Plant in 1917; the flat-roofed brick structure gained several additions before reaching its present dimensions of 435' x 165' in 1949. Hartford Electric Light installed the world's first turbine that ran on mercury vapor, instead of steam, at the nearby Dutch Point Power Plant (demolished) in 1923, and in 1928 installed a similar unit at South Meadow. Despite the high cost of mercury and the lethal danger from mercury fumes, the equipment operated successfully until 1947. The plant now contains two General Electric steam turbines from 1942 and 1949 and two 1960 boilers. Also here is an 1883 Armington-Sims 50-horsepower steam engine that was originally used at the Hartford Electric Light Pearl St. Station. South Meadow has not operated since the mid-1960s.
(Glenn Weaver, The Hartford Electric Light Co., 1969; South Meadow data files, courtesy Northeast Utilities.)

TROUT BROOK RESERVOIR SYSTEM (1864)
Farmington Avenue
West Hartford

Avon
18.684000.4624100

The City of Hartford Board of Water Commissioners (renamed Metropolitan District Commission in 1930) first supplied water to the city in 1855 by pumping from the Connecticut River to Lord's Hill Reservoir on Garden St., and thence to the distribution system. These facilities no longer exist. By 1860 the Board sought to increase supplies and reserves. City voters were given the choice of expanding pumping facilities at the Connecticut River or tapping the water of Trout Brook and its tributaries, west of the city. In an 1864 referendum the voters chose Trout Brook, the altitude of which permitted gravity-fed distribution to the city. For 50 years the Board was able to meet demand with water from the Trout Brook basin.

Reservoir 1 was built in 1864-66. The dam is an earth embankment with masonry core and riprap facing, 650' long, 43' high, 200' wide at base and 25' wide at top. The Water Board built four more reservoirs on Trout Brook with similar dams in 1868, 1875, 1880 and 1884. In 1891-85 Reservoir 6 was built on Tumbledown Brook, a Trout Brook tributary; three earth embankments with masonry cores and riprap facing contain it. Reservoir 6 completed development in Trout Brook basin. In the early 20th century Water Board facilities expanded west and north into the Farmington River watershed. Except for Reservoir 4 (1880) the Trout Brook reservoirs are still in the metropolitan water supply system. They impound a total of 4,380 acre-feet and are used as reserve water supply, except for Reservoir 1, water from which is used to generate electricity for the West Hartford Treatment Plant.

This treatment plant uses the "slow-sand' filtration process. The eight original beds were built in 1920-22; others were added in 1937-38, 1941, 1948-49 and 1960-62. The 12'-deep underground beds have concrete floors and walls. At the bottom of each bed is the underdrainage system, consisting of perforated pipes (concrete or glazed tile) connected to a central conduit leading to a cast iron main which feeds filtered water to a holding reservoir or directly to the distribution system. Above the underdrainage system is a 1'-deep layer of stones, decreasing in size from 2" at the lowest stratum to 1/8" at the highest. Above the stones is a 27"-deep layer of sand, graded to average grain size of 1/75" diameter. Above the sand stands the water (6' deep) to be filtered, its level maintained by float-operated valves. As the water seeps down through sand and stone it loses iron and manganese oxides as well as particles of dirt, plants and fish. A 1/2-acre bed filters two million gallons of water per day. Beds are cleaned periodically by harrowing and washing.

Electricity required for filter wash-water pumps and for lighting the filters, buildings and grounds is produced in the 1922 generating station at the outlet of Reservoir 1. A short penstock leads to the brick gate house, 1-story and 20' x 12' with hip roof. The adjacent brick power house, 1-story and 38' x 29' with flat roof, was fitted with two generating units: an S. Morgan Smith 15" turbine and an S. Morgan Smith 9" turbine, both direct-connected to Western Electric alternators. The case of the smaller turbine burst in 1951 and the entire unit was later removed. The large unit remains in operation. Manually operated valves control flow from the reservoir into the penstock. These are located at the origin of the penstock, some 35' into the reservoir from the dam. Access to the valve house is provided by a 5'-wide, 1922 bow-string arch through truss bridge made of rivet-connected steel angles.

(Hartford Atlas; M. N. Baker, ed., Manual of American Water-Works, 1889, 1897; Metropolitan District Commission, Yesterday and Today: 100 Years of Water Supply, 1955; Board of Water Commissioners, Annual Report, bound vols. 1-3, 1854-1909; Metropolitan District Commission, "Statistical Returns to Extra-Mural Agencies on Technical and Financial Matters," 1964, "Schedule of Water Bureau Facilities," Ref. No. 2601, 1978, "Filtration Plant Schematic Layout," 1958, "Specifications for Hydraulic Turbine and Generator for Filtration Plant," n.d., all in Engineering Division files, courtesy Metropolitan District Commission; Interviews with Richard Allen, Plant Engineer, West Hartford Treatment Plant, and Peter Revill, Chief Engineer, Water Supply, Metropolitan District Commission, June 1979.)

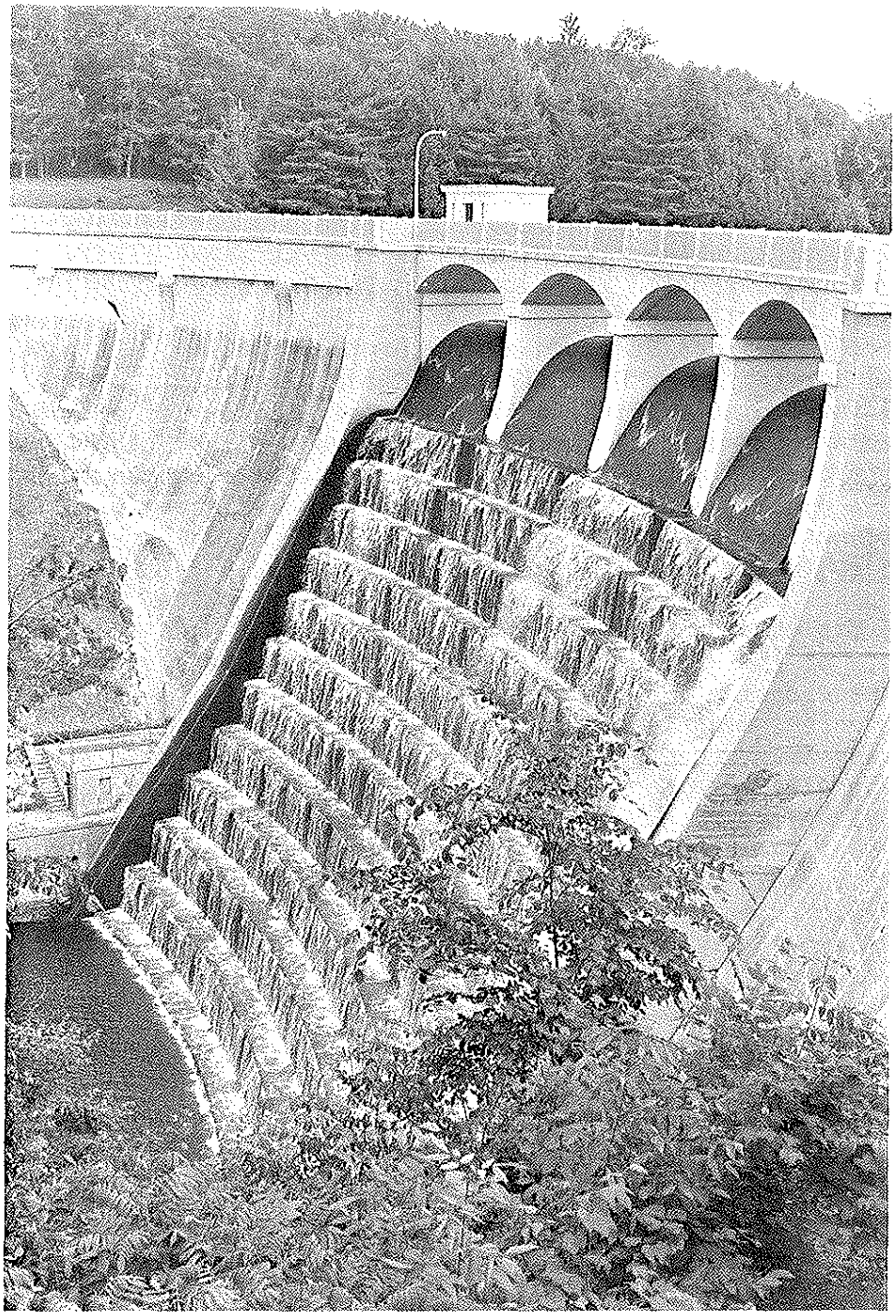
NEPAUG RESERVOIR DAMS (1914)
TALCOTT MOUNTAIN TUNNEL
west of Rte. 179
Burlington

Collinsville
18.670900.4632450
(Reservoir)

Nepaug Reservoir, built in 1914-18, was the first facility built by the Hartford Board of Water Commissioners in the Farmington River drainage area, west of the Trout Brook basin which had supplied the city's water until then. Initial studies of the Farmington basin had begun in 1877 but attempts to exploit this supply were postponed until the first years of the 20th century, when several years of below-average rainfall coincided with rapid population growth in Hartford. The Board's proposal to dam the Nepaug River (a Farmington River tributary) was defeated in the State Assembly due to opposition from downstream mill owners on the Farmington. Approval finally came in 1911 when the Board agreed to build the Compensating Reservoir for the mill owners (separate entry).

Caleb M. Saville, who joined the Hartford Water Works in 1912 as chief engineer, directed the design and construction of Nepaug Reservoir and Barkhamsted Reservoir (separate entry), two major development projects in the Farmington River watershed. Nepaug Reservoir is formed by three dams, Nepaug Dam, Phelps Brook Dam and East Dike, which were built concurrently by separate contractors. It impounds water over 951 acres at 35' depth. Nepaug is a reinforced concrete, curved gravity dam, 600' long, 113' high, 100' wide at base and 22' wide at top. It was built by Fred. T. Ley & Co. of Springfield, MA in 1914-18. The other two dams are earthen with concrete core walls. Phelps Brook Dam (1,250' long, 67' high, 365' wide at base, 15' wide at top) was built by Pierson Engineering and Construction Co. of Bristol, CT in 1914-16. East Dike (600' long, 26' high, 230' wide at base, 15' wide at top) was built by L. Suzio of Meriden, CT in 1915-17. Hartford received its first water from Nepaug Reservoir in 1922. The Farmington and Trout Brook systems were joined by Talcott Mountain Tunnel. Built by Stobaugh Contracting Co. of New York City, the tunnel is 2,400" long, 6' high and 5 1/2' wide. The concrete water conduit is 3,600' long, 5' high and 4 1/2' wide.

(Metropolitan District Commission, Yesterday and Today: 100 Years of Water Supply, 1955; Board of Water Commissioners, Annual Report, bound vols. 4 and 5, 1910-1921; Metropolitan District Commission, "Statistical Returns to Extra-Mural Agencies on Technical and Financial Matters," 1964, "Schedule of Water Bureau Facilities," 1978, Ref. No. 1501, all in Engineering Division files, courtesy Metropolitan District Commission.)



Nepaug Dam (M. Roth)

BURDON STEAM ENGINE (c.1853) New Britain
at The Stanley Works (separate entry) 18.683750.4615180
New Britain

Despite the lack of positive information on the production date of this Burdon horizontal, single-cylinder mill engine, it seems likely that The Stanley Works purchased it new in c.1853. Frederick T. Stanley founded Stanley's Bolt Manufactory in 1843. It was a small operation with few workers besides Stanley and his brother William. In 1852 the Stanleys and several other New Britain men recapitalized the firm with $30,000 and incorporated it under the name The Stanley Works. The product line was expanded to include hinges and butts and the work force grew to over 20 men. Purchase of new capital equipment, such as this steam engine, would certainly have been consistent with the state of the business in 1852-1853.

Burdon could not have made this engine before 1843, the first year his name appears in Brooklyn directories at 102 Front St., Brooklyn, NY, the address which is cast into the engine's bed. And the decorative elements of the engine, such as the fluted integral supports on the slide-valve casing and the vase-shaped throttle-valve housing and governor supports, are not consistent with Burdon engines as depicted in advertising literature from the late 1850s, when the firm's engines were becoming plainer. So c.1853 is the best probable date for Burdon to have made the engine and for Stanley to have purchased it.

Members of The Stanley Works engineering staff restored the engine in 1968. It is well-oiled, free of rust and operable under compressed air for exhibit purposes.
(Holley's Railroad Advocate, 10 January 1857; Interview with Charles Larcom, Power Superintendent, The Stanley Works, May 1979; Robert M. Vogel, Research notes on Burdon engine, National Museum of American History, Smithsonian Institution.)

Transportation

ENFIELD CANAL (1829)
along west bank of Connecticut River
Suffield and Windsor Locks

Broad Brook (north end)
18.698080.4651220
Windsor Locks (south end)
18.696980.4642040

The Connecticut River was central New England's most important artery of commerce and transportation in the nation's early decades. Canals were built to bypass falls in 1795 at South Hadley, MA, in 1800 at Turner's Falls, MA, and in 1802 at Bellow's Falls, VT. When two smaller projects were completed above Bellow's Falls in 1810, the falls at Enfield, CT, presented the only obstruction to smooth-water passage over the 220 river miles between Hartford and Barnet, VT. Pole-propelled flatboats could surmount Enfield Falls; sixty of these freighted regularly between Hartford and upriver communities by 1820. The passage was difficult though, requiring one poleman per ton of freight and thereby limiting Hartford's upriver trade. New Haven businessmen, in rivalry with Hartford for commerce with the upper valley, sought to capitalize on the situation by building an inland canal from Northampton, MA, to New Haven (see entry for Farmington Canal), and they received a charter for the project in 1822. Hartford's business community responded by forming the Connecticut River Co. in 1824.

The firm apparently appreciated the potential of steam navigation. Its first act was to sponsor design competition for steam-powered river-boats, and in 1826 the results were dramatized by the upriver passage of the sternwheeler Barnet. The canal itself was designed specifically for steam navigation, with masonry walls along the banks to withstand the turbulence from the paddlewheels of steam vessels. Canvass White, who had worked on the Erie Canal, served as chief engineer for construction, which lasted from June 1827 to November 1829. Four hundred men, mostly recent arrivals from Ireland, were recruited for the effort. This marked the beginning of a substantial ethnic presence in Connecticut.

Enfield Canal is 5 1/2 miles long and runs generally parallel to the west bank of the river in the towns of Suffield and Windsor Locks. It has been modified many times, with most major alterations being made in the 1880s. For most of its length the canal is about 5' deep and 80' wide, though it narrows in the industrial area of Windsor Locks. The original dam was a wing extending 700' from the west bank. In 1849 a wing was built out from the east bank and the two were joined in 1881. The masonry bulkhead was reconstructed in the 1880s, with seven sluice gates replacing the original fourteen; the bulkhead has since been repaired with concrete. There is one lock at the upstream entrance to compensate for the 30' average difference between the levels of river and canal. Its walls resemble all the masonry in the canal: random-coursed red sandstone blocks in hydraulic cement. Also like the other masonry, the lock has been rebuilt, probably in the 1880s. About two miles below the dam the canal crosses Stony Brook on a 104'-long aqueduct. Six masonry piers on each side carry the 102'-wide trough, which consists of large timbers lined with two layers of tongue-and-groove planking. The aqueduct was widened in 1882-83, but the west piers may retain material from initial construction in the 1820s. There are three masonry-walled locks at the downstream entrance of the canal, each 90' long and 18' wide with a lift of 10'; the lowest lock has been reconstructed with concrete.

From its inception the Connecticut River Co. considered the water power potential of the canal, and by the 1830s several mills were located on the land between canal and river. Even as river transportation declined after completion of the Hartford and Springfield Railroad in 1844, industrial growth accelerated in Windsor Locks, the town which grew around the canal. The alterations made to the canal in the 1880s were in large part intended to modify the transportation structure to one more suited for power generation. Thus the wings of the dam were joined to divert more water into the canal; the entire dam was also raised 15 inches, which backed water up at Holyoke, the next upstream dam, and led to a legal battle between the two water companies. The widening of the aqueduct was likewise undertaken to increase flow to the mills, not as an aid to transportation. In the 1880s five textile mills, five machine works and three paper mills powered their operations from the Enfield Canal (see entry for Windsor Locks Mills).

Like few other structures in the state, Enfield Canal symbolizes many of the social changes which occurred in the 1820s: the transportation revolution, commercial and industrial growth, technological innovation and ethnic diversity. Its continued industrial importance, and masonry walls, have allowed the canal to survive in recognizable condition. At present, a paper manufacturer at Windsor Locks uses the canal for process water, and consideration is being given to reviving its water power function.
(Water Power Report; Charles F. Harte, "Connecticut's Canals," CSCE, 1938; Carroll J. Noonan, Nativism in Connecticut, 1829-1860, 1938; Harry S. Drago, Canal Days in America, 1972; Edward E. Lanati, A Brief Account of the Windsor Locks Canal, 1976, NR.)

WAREHOUSE POINT POWER HOUSE (1901)
Depot Hill Rd.
Enfield

Broad Brook
18.697860.4645600

This power house was built in 1901 during completion of the trolley link between Hartford and Springfield on the east side of the Connecticut River, and was planned with sufficient capacity to serve the then-projected line on the west side of the river. Designed by E. F. Kitsfield of Boston and built by J. W. Bishop Co. of Worcester, the 2-story power house has a flat roof, corbeled cornice and round-arched windows with brownstone sills. A fire wall divided the plant into two large bays. The south bay, 88' x 51', contained two cross-compound steam engines made by Robert Weatherall Co. of Chester, PA, and two General Electric direct-current generators. The north bay, 88' x 49', held

the Babcock and Wilcox boilers. The chimney, now gone, rose from this room. The trolley company went bankrupt in 1919 and the power house was decommissioned in 1924. The operating equipment was removed at that time. Now used as a bus garage, the building is mostly intact except that garage doors have been added and the coal opening in the northeast corner has been bricked up. The adjacent office building and car barn have been demolished.
(Michael DeVito, "Diary of a Trolley Road," Transportation Bulletin, no. 80, January-December 1973.)

SOUTH MANCHESTER RAILROAD (1869)
Elm Terrace
Manchester

Manchester
18.705300.4627100
(Freight Station)

When the South Manchester Railroad (SMRR) was chartered by the Connecticut General Assembly in 1866 the stockholders were all members of the Cheney family. The line was to provide rail service to the rapidly growing Cheney Brothers silk manufacturing complex. Jarvis Construction Co. of Providence, RI, built the road, finishing in 1869. Its 2.25 miles of main line and .96 mile of siding made the SMRR the shortest independently-owned railroad in the U. S. Northern terminus was the Hartford, Providence and Fishkill Railroad's Manchester Station, and the railyard at the southern terminus was in the Cheney Brothers mill complex in South Manchester. Upon completion the Cheneys sold the line to the Hartford, Providence and Fishkill Railroad but bought it back in 1879, when two more miles of siding were laid and the roundhouse built. The SMRR carried freight and passengers, the majority of the latter being commuting Cheney Brothers workers. When Cheney Brothers began divesting its non-manufacturing holdings in the 1930s the New York, New Haven and Hartford Railroad agreed to buy the SMRR and maintain freight service when permission was granted to discontinue passenger runs. The passenger station, engine house, and three-stall round house have been demolished, but the round house foundation can still be seen just north of the surviving freight station, a 1-story frame structure, 35' x 16' with hip roof. Intermittent freight trains still use the line.
(Thomas R. Lewis, Silk Along Steel: The Story of the South Manchester Railroad, 1976; William E. Buckley, A New England Pattern: The History of Manchester, Connecticut, 1973.)

RENTSCHLER FIELD (1931)
400 South Main Street
East Hartford

Hartford North
18.697300.4625000

Pratt and Whitney Aircraft (separate entry) dedicated Rentschler Field in 1931. Originally 165 acres of turf with no runways, the airport was for flight testing of Vought airplanes, Hamilton Standard propellors and Pratt and Whitney engines. It also served as Hartford's airline

terminal from 1932 to 1940. There are two 1931 hangars, 159' x 125' and 124' x 80'. Both were designed by Albert Kahn, Inc. and are steel-framed with glass and brick walls. The airport, which abuts the Pratt and Whitney plant, was expanded in 1941 and the hangars were moved to their present location to make room for factory expansion. Today there are 427 acres with two macadam runways of 5,420' and 5,250'. The field is too small for flight-testing modern jet aircraft but still accommodates the air transportation of the firm. It is the largest privately owned airport in New England.
(Rentschler Field Data Files, United Technologies Corporate Archives; Interview with Harvey Lippincott, Corporate Archivist, November 1978.)

HARTFORD UNION STATION (1889) — Hartford North
Union Place — 18.692680.4626500
Hartford

The New York, New Haven and Hartford Railroad built Union Station in 1887-89, combining the construction with a project to improve the grade crossing at Asylum St., just south of the station. An iron bridge (since replaced) eliminated the grade crossing and a covered platform was built behind the station to provide access to the newly elevated tracks. The station itself consists of three sections, all of Portland brownstone (see entry for Portland Brownstone Quarries). The central portion, 170' x 70', is some 30' wider than the 145'-long wings. All sections had gable roofs, but after fire gutted the station in 1914 the railroad installed a flat, steel-girder roof over the central portion while retaining the steep gable roofs on the flanks. Large, round-arched door openings break the central facade. The wings feature rows of tightly spaced, flat-headed windows; small, round-arched windows in the gable ends; and octagonal corner towers with domed roofs. A private partnership now controls the station and rents space to Amtrak for ticket windows and waiting rooms.
(Hartford Courant, 22 February 1914, 24 February 1914; Sanborn Map Co., Atlas of the City of Hartford, Connecticut, 1920; Robert Bickford, Hartford's Union Station and Union Place, n.d.)

BULKELEY BRIDGE (1908)
Rte. 84
Hartford

Hartford North
18.694000.4626600

Bulkeley Bridge, crossing the Connecticut River between Hartford and East Hartford, opened in 1908 after ten years of planning and design and three years of construction. Engineers John Henderson, Edward Bush and Alfred Boller and architect Edmund Wheelwright designed the structure under direction of Chief Engineer Edwin Graves. The construction firm of McMullen, Weand and McDermott built it. Nine masonry arches, ranging in span from 68' to 119', carry the roadway. Including abutments the bridge is 1,192' long. To excavate the riverbed down to bedrock, timber-walled caissons were sunk and pumped full of air to evacuate the water and sustain the men working inside. After bedrock was reached the caissons were filled with concrete to form the footings. Then granite masonry was laid up to the springing points of the arches, falsework installed, and the arches were built. Each arch was designed as a true ellipse, with all joints between voussoirs radial to the curve of the arch. Dimensions for the stone were specified with superfluous accuracy as tolerances were, in some cases, smaller than the width of mortar between voussoirs. Concrete was poured around the extended upper ends of the stones in the arches to bind them. Then the interior of the bridge between the spandrel walls was filled with river sand, upon which the asphalt paving was laid. The durability of the structure is apparent from its current use, carrying Interstate 84 over the Connecticut River. Approaches, abutments and roadway were modified to accommodate the modern highway. (George E. Wright, Crossing the Connecticut, 1908; Charles W. Burpee, History of Hartford County, Connecticut, 1928; Edward W. Bush, "Construction of the Bulkeley Bridge...," Photographs taken during construction, Picture Group 475, Pictorial Archives, State Library, Hartford; DOT.)

HARTFORD RAILROAD BRIDGE (c.1915)
Riverside Park
Hartford

Hartford North
18.694600.4627400

Built c.1915 by the American Bridge Co., this bridge carries a single track of the former New York, New Haven and Hartford Railroad over the Connecticut River. There are seven spans, each a steel Warren (with verticals) through truss about 150' long. All connections are riveted except the eastern lower portal joints, which are pinned. The masonry piers and abutments have been capped with concrete. Several trains per day still cross the river on this bridge. (PC.)

MAIN STREET BRIDGE (1833)
Main St.
Hartford

Hartford North
18.693280.4625740

"The city is rather irregularly laid out and is divided at the south part by Mill or Little River. Across this stream a fine bridge of free stone has been thrown which connects the two parts of the city. This structure is 100 feet wide, supported by a single arch 7 feet in thickness at the base, and 3 feet 3 inches at the center, the chord or span of which is 104 feet; elevation from the river to the top of the arch, 30 feet 9 inches." (Barber, Connecticut Historical Collections.) The brownstone bridge, almost 150 years old, still carries Main St. The river, more recently known as the Park, has been channeled underground and the bridge now crosses a highway access road. The east side of the bridge was partially rebuilt in 1954 during construction of the adjacent Hartford Public Library, but the west side remains virtually intact.
(John W. Barber, Connecticut Historical Collections, 2nd. edition, 1836; Hartford Courant, 26 September 1954.)

WINDSOR RAILROAD BRIDGE (1867)
Pleasant St.
Windsor

Hartford North
18.695740.4636500

Built in 1867 to carry two tracks of the Hartford and Connecticut Valley Railroad, this brownstone-arch bridge is still in service. Each arch spans about 36' and rises about 25'. The southernmost arch spans Pleasant St. and the other six arches cross the Farmington River.
(NR; PC.)

EAST WINDSOR LENTICULAR BRIDGE (1888)
Melrose Rd.
East Windsor

Broad Brook
18.703320.4645640

Built in 1888 by the Berlin Iron Bridge Co., this wrought iron pony truss carries unpaved Melrose Rd. over the Scantic River. Rte. 140 has superseded Melrose Rd., which accounts for the continued existence and good condition of this one-lane bridge. The 63'-long span contains many of the firm's characteristic structural features including tapered floor beams and web posts and threaded bottom-chord bars nut-connected through castings at the endposts. Free of modern intrusions, this site offers one of the best opportunities to view a Berlin lenticular in a relatively uncompromised setting. See entry for Berlin Iron Bridge Co. Plant.

ROUTE 315 BRIDGE (1894)
over Farmington River
Simsbury

Tariffville
18.683800.4640220

J. H. Buddington of New Haven designed and built this bridge in 1894. The through truss, a pin-connected Parker supported on brownstone abutments, is 158' long. The built-up box section top chords and inclined end posts, the lattice-member web verticals and the eyebar diagonals are commonly found on truss bridges. But the bottom chords, consisting of two channels riveted back-to-back to form an I-section, are unusual for tension members. Buddington's 1890s bridges are all characterized by this idiosyncrasy. This bridge still carries traffic. (DOT.)

DRAKE HILL ROAD BRIDGE (1892)
over Farmington River
Simsbury

Avon
18.682560.4637320

Also built by J. H. Buddington, this span resembles his bridge on Rte. 315 except that this one is about 135' long. The only other variation between the two is that the lateral bracing between the webs and below the top chord on the Rte. 315 bridge consists of deep lattice members, while paired channels are used here.

CANTON BRIDGE (1893)
Town Bridge Rd.
Canton

Collinsville
18.672040.4632140

Canton Bridge, crossing the Farmington River, is another of J. H. Buddington's pin-connected Parker through trusses. About 160' long, it resembles in all details the 1894 Rte. 315 bridge in Simsbury.

COLLINSVILLE LENTICULAR BRIDGE (1888)
in millyard
Collinsville/Canton

Collinsville
18.672400.4630600

Built by Berlin Bridge Co., this 41'-long, wrought iron pony truss crosses a headrace on the grounds of the Collins edge-tool works (separate entry.) Each bottom chord of two loop-welded rods is nut-connected through castings at the endposts. Tapered verticals and floor beams and box-section top chords and end posts do not vary from standard techniques of the firm during this period. See entry for Berlin Iron Bridge Co. Plant.

KENSINGTON RAILROAD BRIDGE (1870) New Britain
Kensington Rd. and Rte. 71 18.685850.4611060
Kensington/Berlin

This eight-arch masonry bridge crosses the Mattabessett River just south of Berlin Station. Built of brownstone blocks, its only alteration is a concrete wall which guides the stream away from the southernmost archway. The bridge is till in service. This line is the former Hartford Division of the New York, New Haven and Hartford Railroad.

Additional Bridges:

PALISADO AVENUE BRIDGE (1916) Hartford North
over Farmington River 18.696000.4636370
Windsor

ROUTE 191 BRIDGE (1925) Broad Brook
over Scantic River 18.701970.4642550
East Windsor

HAZARDVILLE BRIDGE (c.1920) Broad Brook
Powder Hill Rd. over Scantic River 18.703770.4650500
Hazardville/Enfield

COLLINSVILLE RAILROAD BRIDGE (c.1910) Collinsville
over Farmington River 18.672530.4630300
Collinsville/Canton

MATTABESSETT RIVER BRIDGE (1921) Middletown
Berlin St. 18.690520.4609780
Berlin

PAIGE COMPOSITOR (1893)
351 Farmington Ave.
Hartford

Hartford North
18.691060.4626280

The second, and last, compositor built under the specifications of James W. Paige stands today in exhibition at the Mark Twain Memorial. Mark Twain saw Paige's first machine in the mid-1880s, when Paige was completing it at the Pratt and Whitney factory in Hartford. The complexity of this "mechanical miracle," with some 18,000 moving parts, captivated Twain, leading him to invest tens of thousands of dollars in Paige's efforts to perfect and market the machine, which set and justified type, and returned it to the type cases. Ottmar Mergenthaler's linotype process, which remelted type instead of redistributing it and which was operational by the mid-1880s, proved to be the more successful approach to mechanization of typesetting, and it doomed Paige's efforts. Near financial ruin because of this and a similarly ill-fated publishing enterprise, Twain stopped investing in Paige's project in 1891. In 1893 Twain persuaded another investor to pay for completion of a second Paige machine, which ran successfully during a 60-day test at the Chicago Herald, but which nonetheless did not equal the dependability or economy of the Linotype. The Linotype Co. bought both machines and Paige's patents in 1897. The first machine was scrapped during World War II and the second resided in a Linotype Co. warehouse until recent years, when the Mark Twain Memorial obtained it.
(Henry Nash Smith, Mark Twain's Fable of Progress: Political and Economic Ideas in "A Connecticut Yankee in King Arthur's Court," 1964; Justin Kaplan, Mr. Clemens and Mark Twain, 1966; John F. Kasson, Civilizing the Machine: Technology and Republican Values in America, 1976.)

SELDEN AUTOMOBILE (1901)
Connecticut State Library, Capitol Ave.
Hartford

Hartford North
18.692560.4625780

In 1879 George Selden, a Rochester, NY patent attorney, applied for a patent on a road vehicle powered by an internal combustion engine; it was granted in 1895. The claim was specified broadly enough to invite the interpretation that any vehicle remotely resembling what we now know as an automobile was subject to licensing under Selden's patent. In 1899 Hartford's Columbia and Electric Vehicle Co., controlled by the Pope interests, obtained exclusive license to the patent and began collecting royalties from automobile manufacturers. No vehicle (except for the patent model) had ever been made to Selden's specifications until Columbia and Electric Vehicle, in 1901, assigned Henry Cave to build one, probably to prove that a vehicle could indeed be constructed by following the patent. But Cave, an

English-born mechanical engineer, included features that went beyond the Selden design: water-jacketed engine, change-speed gears and pneumatic tires. This vehicle, the Selden-Hartford, became an exhibit in the celebrated patent suit brought in 1903 by Columbia and Electric Behicle against Ford Motor Co. Henry Ford refused to pay royalties, contending that the patent did not cover the automobiles his company produced. Ford prevailed when the suit was resolved in 1911. The court found that Selden's patent implied the use of a Brayton-type two-stroke engine, while Ford (and virtually every other automobile manufacturer) used an Otto-type four-stroke, and that the patent specifications could not have yielded a workable vehicle without the improvements added by Cave. The decision ended the patent's influence in the developing automobile industry. (Many conflicting assertions have been made as to the date of the Hartford-Selden. This account is based on an interview with Henry Cave, conducted in 1963 by the Chief Librarian of the Connecticut State Library. Cave stated emphatically that he built the Selden-Hartford in 1901, and further claimed that the confusion over the date originated with erroneous statements made by Selden's sons during the patent trial.)

The Museum of Connecticut History obtained the Selden-Hartford in the early 1960s and maintains it now on permanent exhibition. The Henry Ford Museum owns its only counterpart, the Selden-Rochester, built by Selden's sons in 1905. The Museum of Connecticut History also holds substantial collections of the state's industrial products, including buttons, clocks and firearms.

(John B. Rae, American Automobile Manufacturers: The First Forty Years, 1959; William Greenleaf, Monopoly On Wheels, 1961; Eugene W. Christen, "The Selden Patent," General Motors Engineering Journal, April-June 1964; Collections files at the Museum of Connecticut History, State Library, Hartford, including the transcript of the 1963 Henry Cave interview, courtesy Kathleen Plourd, Curator.)

STONEHOUSE (1860)	New Britain
940 High Rd.	18.684220.4611100
Kensington/Berlin	

Stonehouse, built by N. A. Moore in 1860, represents an early application of poured concrete as a structural material in residential architecture. The Moore family was among the earliest settlers of Kensington, and in their nine generations in the area the Moores had been involved in numerous enterprises, including a cement mill from about 1830 to 1855. Although the cement business was no longer active in 1860, the kiln and grinding stones were operable and limestone was still abundant locally. With these facilities Moore made 150 barrels of cement for Stonehouse. Moore made forms by laying iron bars across the foundation, overhanging it by 3 or 4 inches on each side. Planks were then placed upright on the bars, and more iron bars were placed across the tops of the planks. Threaded iron rods were run (vertically) through holes at the ends of the bars and, held there by nuts, secured the form-work. The form was

filled with local trap rock, with the flat faces of the rocks against the planks. Concrete made of brown sand and Moore's cement was then poured in and worked down and around the stones until the form was solidly filled. After the cement hardened the rods and planks were removed, the iron bars were driven out, and the forms were re-assembled to pour the next section. Apart from its unique wall construction Stonehouse is a fairly typical late Gothic Revival Cottage, with steep gable roof, bay windows and incised bargeboards. The walls retain impressions of the plank edges and several of the 2" x 5/8" holes created by the iron bars.
(Ethelbert A. Moore, Tenth Generation, 1950; Hartford Atlas.)

LITCHFIELD COUNTY

Bulk Products

MT. RIGA BLAST FURNACE (1810)
Mt. Riga and Cemetery Rds.
Salisbury

Bashbish Falls
10.627140.4651350

Mt. Riga (formerly Taconic Mountain) has been associated with iron production since the mid-18th century, when its charcoal pits supplied fuel to the blast furnace in Lakeville, about four miles to the southeast. In the 1780s a bloomery on the mountain processed ore from Ore Hill Mine in Lakeville. Title to the land atop the mountain passed through the hands of many speculators before 1803, when King and Kelsey began building a blast furnace and dam. Bankruptcy prevented completion until 1810, when Holley, Coffing and Pettee finished construction of the ironworks, which included the furnace and dam, two forges and a triphammer. Joseph Pettee leased the works and produced household cast and wrought ironware and larger pieces such as anchors. Over the next 15 years a village grew around the works, with some 100 frame houses, a store, school and post office. Business dwindled in the 1830s, probably due to depletion of the hardwoods for charcoal. Mt. Riga remained in blast intermittently until 1850, but by that time most of the skilled workers had departed. By the 1870s second-growth timber was sufficient to supply charcoal to Barnum-Richardson Co.'s furnaces at Lime Rock and East Canaan (separate entries), but no iron was made at Mt. Riga.

Except for the furnace remains, dam, several houses and numerous cellar holes, little structural fabric remains of the once-thriving industrial community. The dam is a 17'-high earth buttress with rubble masonry spillway. The furnace has been altered, in the name of restoration, at least twice (late 1930s, early 1960s). Its walls, 30' x 24' and 24' high, consist of rubble masonry reinforced at two levels with timbers and iron tie-rods. There is no sign of fire brick in the hearth or stack. Both are lined with vitrified clay, but original lining may well have been removed. The hearth is 3 1/2' wide and the stack is 10' wide at the bosh. The cold blast was delivered by a single tuyere.
(Keith and Harte; Litchfield Atlas; W.H.C. Pynchon, "Iron Mining in Connecticut," Connecticut Magazine 5, nos. 1, 4 and 5(1899); Julia Pettee, "Mt. Riga, The Furnace and Village," LLH 13, 5(1956); L. Twynham and E. Bollman, "Salisbury, A Lasting Monument to Peace," 6, 4(1942).

Mt. Riga Blast Furnace (M. Roth)

LIME ROCK IRON WORKS (c.1865)
Rte. 112
Lime Rock/Salisbury

Sharon
18.633460.4643570

Lime Rock was the headquarters of Barnum-Richardson Co., the firm which came to dominate the Connecticut iron industry in the second half of the 19th century. Iron production here commenced in 1734 with a bloomery. Milo Barnum arrived in 1820, intent on running a store. A blast furnace (not extant) was built in 1825 and Barnum bought it in 1830 with his son William and son-in-law Leonard Richardson as partners. From the start they manufactured finished products, such as plow castings and clock weights, not just pig iron. In the 1840s Barnum's foundry began making the chill-cast railroad car wheels that became the firm's major product. (The designation "chill-cast" denotes that part of the mold was iron rather than sand; the molten iron that contacted the iron portions of the mold cooled more quickly and took a close-grained structure that was more resistant to wear than normal cast iron. The tread and flange of the wheel, subject to wear because they were in contact with the track, were the parts that were commonly chill-cast.) Barnum-Richardson Co. prospered in filling the demand for car wheels that attended the growth of the railroads. Lime Rock village became a company town. The company owned the sawmill, gristmill, store, and most of the houses. The wooded hills were stripped for charcoal. In the 1850s the company acquired interest in the Salisbury ore beds, which it later owned completely, and bought the Beckley blast furnace in East Canaan (separate entry). In the 1860s Barnum-Richardson built a second blast furnace at Lime Rock and purchased a foundry in Chicago. In 1870 the Lime Rock foundries produced 10,000 car wheels. By the end of the century the firm had concentrated pig iron production at East Canaan and the Lime Rock furnace was out of blast, although car-wheel casting continued at Lime Rock and the furnace may have been converted to remelt pig iron for casting.

Since the last car wheel was cast in 1923 most of the Lime Rock facilities have been destroyed or demolished. Third-growth trees have covered the hills. Extant are parts of the 1864 blast furnace and dam, several hundred feet of stone walls, the company office building and several dwellings. The furnace has walls of coursed, rough-dressed granite blocks with iron tie-rods and anchor plates. It is 32'-square at the base and tapers to a height of 32'. The hearth opening is a pointed arch about 14' high constructed of fire brick. Bosh diameter is 9'. Charcoal was the only fuel used for primary iron production. The oven that heated the blast, the casting shed, materials sheds and the frame structure that surrounded the blast furnace are gone. The masonry dam is deteriorated. The stone walls supported terraces on which wagons ran downhill to the blast furnace; they are built of the same stone as the furnace, though

Lime Rock Blast Furnace
(Connecticut Historical Commission)

unsquared and uncoursed. The office is a Federal-style brick building. Only foundations remain of the foundry buildings.
(Keith and Harte; Litchfield Atlas; Census 1870; Richard Moldenke and Salisbury Iron Co., Charcoal Iron, 1920; Barnum-Richardson Co., Salisbury Iron: Its Composition, Qualities and Uses, 1878; J.R. Asher and G.H. Adams, Pictorial Album of American Industry, 1876.)

BECKLEY FURNACE (1896)
Lower Rd.
East Canaan/North Canaan

Ashley Falls
18.641380.4652180

John Beckley and William Pierce built the first blast furnace on the bank of the Blackberry River in 1847. Ten years later Barnum-Richardson and Co. bought it along with the nearby Forbes Furnace (not extant). Barnum-Richardson built a third furnace, Canaan #3, on the Blackberry River in 1872 (not extant). Company offices and foundries remained at Lime Rock while these furnaces in East Canaan produced most of the pig iron for Barnum-Richardson's chill-cast railroad car wheels. In the late 19th century the blast furnace complex included rail spurs and trestles, water power system, office, dwelling houses, storage sheds for charcoal, charging house atop the stack and casting house below. Many of the structures are gone but the central element in the iron-making process, the stack of the blast furnace, survives.

Barnum-Richardson modified the furnace in 1896 to its present dimensions: 40' high, 30' square at the base and 20' square at the top, with 9' bosh diameter. Rough-dressed limestone blocks laid in courses form the walls. Iron plates and tie-rods reinforce at the corners. Four arched openings, outlined with finished limestone blocks, break the walls. Except for some deterioration of the fire brick in the hearth area the stack remains in good condition. Between the furnace and the road to the north stands a retaining wall of the same limestone masonry, and across the road is a masonry abutment that supported one end of a trestle. The 15'-high masonry dam survives mostly intact about 100 yards upstream; at its north abutment are a penstock and the wheelhouse foundations. Across the river from the furnace rise huge mounds of slag, at the foot of which lie the remains of an iron structure, perhaps a trestle, and some ore- or slag-handling equipment, including wheeled carts and a conveyor.

In rebuilding the stack in 1896 Barnum-Richardson changed the process considerably, raising the blast temperature and doubling its pressure. The firm probably installed a plate-iron, water-cooled hearth, since these refinements were present at Canaan #3. Output nearly doubled to between 100 and 150 tons per week. Barnum-Richardson persevered until 1920 before selling out to Salisbury Iron Co., a new firm which lasted but three years before closing the last of the Connecticut iron furnaces. Salisbury Iron Co. provided a poignant, if unintentional, epitaph for the Litchfield

County iron industry in one of its last catalogs, which advertised "an iron made, not in large tonnage furnaces, but in small, open-top furnaces, an iron of high strength and quality, made in the old-fashioned way of our forefathers." (Note: There has been some confusion between the names of the East Canaan furnaces. Forbes and Beckley were renamed Canaan #1 and Canaan #2, respectively, when Canaan #3 was built in 1872. Beckley, or Canaan #2, is the lone survivor. C.R. Harte, an otherwise authoritative chronicler of the Connecticut iron industry, implied that Beckley was discontinued, rather than sold, in 1857. Subsequent authors have repeated the error. Beckley has also been confused with Canaan #3, an easy misapprehension because, when both were extant, Beckley may well have appeared to be the newer because of its 1896 remodeling.) (Keith and Harte; Litchfield Atlas; Barnum-Richardson Co., Salisbury Iron: Its Composition, Quality and Uses, 1878; Richard Moldenke and Salisbury Iron Co., Charcoal Iron, 1920; J.R. Asher and G.H. Adams, Pictorial Album of American Industry, 1876; Census 1860, 1870, 1880; NR.)

KENT BLAST FURNACE (1864)
Rte. 7
Kent

Kent
18.627280.4621680

Stuart, Hopson and Co. built the first blast furnace here in 1826. It was 28' high, charcoal-fired and used cold blast. The ore, a hematite yielding 60% iron, was dug from a mountainside in South Kent; charcoal and lime were also produced locally. In 1864, with additional investors, Kent Iron Co. was formed and a slightly larger, hot blast furnace replaced the earlier stack. Charcoal supply was a problem by this time, as the 1864 furnace was fired by a mixture of charcoal and anthracite. Kent Iron Co. rebuilt the stack to its present dimensions in 1870. Its battered walls, made of rough granite blocks in random ashlar, were 32' high in 1870, but erosion and vandalism have destroyed the upper 8'. Iron tie-rods reinforced against expansion. Arched openings break three of the walls, with the 14'-high hearth opening on the south side. Inside, bosh diameter is 9'; two layers of fire brick are partially intact and a great deal of brick and other debris has accumulated at the bottom of the furnace. None of the blast system remains except for a vague depression that was once the power canal which carried water from the dam (across the Housatonic River) to the wheelhouse, where a breast wheel drove the blowing tub. The sheds that stored charging materials are gone, as are the frame structures that surrounded the operating furnace: the charging house atop the stack and casting house below. Foundations are all that remain of the saw and grist mills run by the iron company. Depletion of local charcoal and surface ore at South Kent caused the operation to slow to a halt in 1892.

Today the stack is on the grounds of the Sloane-Stanley Museum, which features a section-view model of the furnace, a diorama depicting the site in the 19th century, and iron-making artifacts including a slag fork and a cooling coil for a tuyere.
(Keith and Harte; Litchfield Atlas; Laura B. Newton, "The Iron 'Ore Pots' of Kent," LLH 6, 3(1941); William T. Hopson, "Resume of the Kent Iron Industry," LLH 8, 4(1945); J.A. Bolles, "Connecticut Iron Furnaces," New Milford Gazette, 25 March 1887.)

BULLS FALLS BLAST FURNACE (1857)
South of Bulls Bridge Rd.
Kent

Dover Plains
18.624440.4614270

The original Bulls Falls Iron Works blast furnace, built in 1826, was 30' high with 8' bosh diameter. The furnace operators rebuilt the stack in 1844 to 40' high with 14' bosh diameter, enormous dimensions for a Connecticut blast furnace. Hot blast was installed in 1844 but the stack was still fired with charcoal. This furnace was apparently too large for the water power afforded by the Housatonic River at this site, and in 1857 it was rebuilt to the more modest height of 34' with 9 1/2' bosh diameter. From then until the furnace was abandoned c.1886, anthracite was used for fuel. Today the blast furnace is extremely deteriorated. Exterior walls of rough-dressed granite blocks have fallen to the level of the hearth, and remains of the fire-brick lining are only slightly higher. Evidence of the charging bridge survives: an earthen ramp, with retaining wall of granite blocks, which approaches the furnace from the north.
(Keith and Harte; Litchfield Atlas; Francis Atwater, History of Kent, Connecticut, 1897.)

ROXBURY IRONWORKS (1866)
Hodge and Mine Hill Rds.
Roxbury

Roxbury
18.638850.4602140

The ironworks at Mine Hill is the best preserved and least typical of Connecticut's 19th-century iron production sites. Mine Hill is a granite ridge with a deep fissure, 8' to 10' wide, filled with siderite, or spathic ore (a carbonate of iron), and small amounts of copper, lead, zinc and silver. Efforts to extract the silver began in the early 18th century. While no significant profit was ever realized, speculation was feverish. The sale, division, and recombination of shares and leases of property and mineral rights created a legal morass that precluded clear title to the lands until 1865, when Shepaug Spathic Iron and Steel Co. bought the property from the victorious claimant.

Shepaug Spathic planned to produce steel here with a puddling process, an unusual technique that was destined for failure. The firm built a blast furnace, ore roasters, engine house, and a puddling furnace. The major extant structure, the blast furnace, measures 30' square at the base. Its battered granite walls are 35' high. There are four arched openings in the walls at ground level, with the south one, presumably the hearth, slightly larger than the others. Iron tie-rods, wedge-connected through iron anchor plates, bind the masonry together. The fire-brick lining is well-preserved, so little can be seen of the interior air and water passages. Outside, near the top of the east wall is a sheet-metal duct that was probably the opening for the cold blast, which was generated by a steam engine and blower. Near the top on the west wall is the tunnelhead arch, a small opening for venting flue gases that were used to fire the steam boiler.

Southeast, at a level several feet lower than the furnace, stand the granite foundations of the casting house, puddling house, engine house and a deteriorated brick smokestack. West of the furnace, going up the hill, is another terraced level for the charging floor. Here lies rusting a large cone of sheet-metal screening (12' long) mounted on an axle; apparently it formed part of an ore-washing apparatus. About 100' further up the hill stand two ore-roasting ovens, each about 25' high and 25' square at the base. They are built of roughly-shaped granite, with tie-rods, and are about 10' apart with their rear walls joined together. Fire brick lines the cylindrical interiors.

An embankment which carried narrow-gauge track runs about 3/4-mile uphill from the roasters to the lowest mine adit. The mine has three levels of horizontal tunnels, about 7' wide and 9' high, with larger rooms at intervals. Vertical shafts connect the unshored tunnels. Ore from the upper levels was dumped down the shafts to the lowest tunnel for removal to the roasters. Narrow-gauge track runs throughout the tunnels. Estimates of total tunnel length vary but it is no less than 2,000'.

The furnace was in blast barely five years. Early on, trouble with the steam engine caused failure of the blast, thus solidifying the charge. The hearth had to be ripped down, to remove the "salamander," and rebuilt. The puddling operation did not work, was rebuilt once, then dismantled and moved to Bridgeport. Under the reorganized firm of American Silver Steel Co. the furnace ran steadily for three years until 1871 when it was converted to heated blast. The change should have increased production but problems multiplied, output plummeted and operations ceased. Although details of the many failures are not known, it seems likely that there was simply not enough depth of experience to run the puddling or blast furnaces with the carbonate ore. Primary iron production was a leading industry in Litchfield County in the 19th century, employing thousands of people over several generations, but all the other furnaces smelted hematite or limonite, oxides of iron. The spathic ore was beyond the ken of local ironworkers, and the Mine Hill enterprise folded before the necessary experience could be developed. (Keith and Harte; Litchfield Atlas; Daniel Hull, Bewitched Mine Hill, 1966; "Furnace Falling to Ruin," Waterbury Sunday Republican Magazine, 17 May 1931; NR.)

SHARON VALLEY IRONWORKS (1863) — Sharon
Sharon Station Rd. — 18.624885.4638010
Sharon

Primary iron production in Sharon Valley began in 1825 when Lyman Bradley built a charcoal-fired, cold-blast furnace (8' bosh diameter) by the Webatuck River. The remains on the site date from the rebuilding of 1863, when the furnace was enlarged to 12' bosh diameter and fitted with hot blast; use of charcoal fuel continued. The furnace has almost completely disappeared: only some limestone rubble, iron tie-rods, and fire-brick arches remain above ground. Other visible remains include some limestone foundations or retaining walls, the wheelpit foundation with arched tailrace opening, and mounds of slag. The race leads upstream, between earthen embankments, about 1500' to the remains of the dam, which is rubble with iron tie-rods. Also around 1863, worker housing and a company office were built. The two extant dwellings are small, 1 1/2-story houses with two small attic windows on the long side, side entrances and low lean-to's across the rear. The office is a Gothic Revival cottage with quatrefoil peak ornaments and jig-sawn trim along the open porch. After Bradley the furnace was operated by Horace Landon until c.1873, then by the Sharon Valley Iron Co., which sold out in 1898 to Barnum-Richardson & Co., the dominant Connecticut iron producer (separate entries). Barnum-Richardson apparently had an interest in the furnace at least 20 years before purchasing it, as three c.1880 iron-workers' dwellings, on Sharon Station Rd. adjacent to the houses noted above, are nearly identical to houses built by Barnum-Richardson at the firm's ironworks in East Canaan (separate entry): L-shaped plan with entrance in the ell, open porch with curved, overhanging roof, corner brackets, carved rafter ends. Barnum-Richardson closed the furnace at Sharon Valley soon after buying it in 1898.
(Keith and Harte; Litchfield Atlas; Barnum-Richardson Co., Salisbury Iron: Its Composition, Qualities and Uses, 1878; Lawrence Van Alstyne, "Manufacturing in Sharon," Pocunnuck Historical Society Collections, no. 1, 1912; NR.)

SHARON VALLEY LIMEKILN (c.1880)
Sharon Station Rd.
Sharon

Sharon
18.624700.4638195

This kiln stands on land owned during the 19th century by sheepraiser Chauncey Moorehouse and his family. The Moorehouses leased this land, along with several nearby limestone quarries, to Sharon Valley Ironworks (separate entry). Processed lime from the kiln could have been used in ironmaking, but it probably was not, because raw, crushed limestone worked just as well, as it was turned to lime as part of the reaction inside the blast furnace. The ironmakers probably built the kiln to profit from their excess limestone by selling processed lime to farmers. The kiln is 15' square and 17' high, with two courses of timber reinforcement around all four sides. There are two arched openings, one each on the east and west sides, and a rectangular opening (now blocked in) on the south side. Heavy brush obstructs access to the interior, but preliminary inspection reveals that the arched openings held fires to heat the kiln and the lime was drawn off through the other opening. In the 19th century, commercial quarrying and burning of limestone took place throughout the northwest part of the state. This kiln is one of the few remnants of that once-important industry.
(Fred H. Moore, Marbles and Limestones of Connecticut, 1935; Lawrence Van Alstyne, "Manufacturing in Sharon," Pocunnuck Historical Society Collections, no. 1, 1912; NR.)

BRIDGEPORT WOOD FINISHING CO. KILNS (1881)
Pumpkin Hill Rd.
New Milford

New Milford
18.632700.4600270

Bridgeport Wood Finishing Co., maker of mineral abrasives, moved from Fort Ann, NY, to this site in 1881. The firm blasted the wheelpit and races out of solid bedrock. Besides power, this location at the Housatonic and Still Rivers offered several large deposits of silica-bearing rock within a few miles. The firm made silica abrasives through a combination of thermal and mechanical (crushing and grinding) processes. Factory buildings are destroyed except for foundations, but two kilns survive. The larger kiln, about 18' high and 12' square at the base, has fieldstone outer walls. The smaller, about 14' high and 10' square at the base, has common brick outer walls. Both open-top furnaces are lined with fire brick. The foundation of the largest building, 120' x 40', was designed for heavy loading: a center course of footings stands between and parallel to the long foundation walls, and the entire foundation is made of granite blocks no smaller than 3' x 3' x 6'. It seems likely that this building housed the grinding equipment, which was very heavy, consisting of a pavement of stone blocks with movable blocks above.
(Water Power Report; U.S. Geological Survey, Mineral Resources of the United States, 1906.)

GILLETTE GRIST MILL (c.1850)
Maple Hollow Rd.
New Hartford

New Hartford
18.664020.4633510

Gillette Grist Mill stands on the west bank of the Nepaug River. Set on a deep foundation/wheelpit of mortared rubble, it is a 2-story frame building with gable roof. The earthen and rubble-walled head-race, leading from the ruins of a dam upstream, is mostly filled in. The underground masonry tailrace discharged into the stream about 40' below the mill. The mid-breast wheel is about 18' diameter and 6' across the face. The buckets and much of the felloes have rotted away but extant fragments of the felloes have mortises where the buckets were fitted, and from which the size, shape, and location of the buckets can be determined. The axle is iron, as is the hub, which held the heavy wooden spokes. Iron rods tie the two sides of the wheel together at the spoke ends. On one side of the wheel the felloe is extended toward the wheel's center, and this extension carries a cast iron internal ring gear which provided power take-off through a pinion gear. The round shaft carrying this pinion holds a bevel gear at its other end, which meshes with another bevel gear to drive the polygonal vertical shaft that drove the spindles for the stones. All these parts are iron, except for the wooden teeth in the bevel gear on the vertical shaft. Little survives on the first floor of the mill. On the second floor are found a bolter and a smutter, along with the overhead, square-section shafting which drove them. Because this mill represents 19th-century technology which rarely survives, even in this deteriorated condition, it was recorded in 1977 by a survey team from the Southern New England Chapter, Society for Industrial Archeology. The survey findings have had significant impact on the waterwheel reconstruction project at Slater Mill Historic Site, Pawtucket, RI.
(Litchfield Atlas; Sarah L. Jones, <u>History of Litchfield County</u>, 1881; Census 1850, 1860, 1870, 1880; NR.)

SPRAIN BROOK SAWMILL (1853)
Nettleton Hollow Rd.
Washington

Roxbury
18.644190.4607940

Portions of this mill may have originated in the mid-18th century, but most of the visible surviving fabric dates from the 1853 recon-struction by Amos Galpin. Galpin retained the vertical reciprocating saw while rebuilding the L-shaped frame mill and 10'-high rubble dam. A vertical turbine replaced the original prime mover, an overshot waterwheel, in 1853 or thereafter. The round, iron shaft and cast-iron bevel gear that transmitted turbine-generated power are extant, as is the 6'-high saw and its frame. The saw carriage, however, has been cut off on both sides to within 3' of the saw. Edward Fenn bought the mill in 1876 and ran it for 50 years, producing shingle, lath, heavy lumber and rough stock for tool handles and barrel staves. Like many small-scale industrialists in rural New England, Fenn pursued several trades, operating a cabinet shop and forge here in addition to the saw mill. The mill has served a recreational function since its last industrial use in 1926. (Litchfield Atlas; Census 1850, 1860, 1870, 1880; Kenneth Howell and Einar Carlson, Empire Over the Dam, 1974; Interview with Mrs. S. Hessel, present owner, Oct. 1979.)

BEEMAN'S MILL; (c.1875) — New Preston
WOODRUFF'S MILL — 18.636900.4615320
Rte. 45
New Preston

Local builder Oscar Beeman erected this 2 1/2-story, gable-roofed, frame sawmill, 85' x 30', in the mid-1870s. The basement sawmill cut the lumber for the barns he built; the floors above held carpentry shops. Beeman's son made violins here before selling the mill to Robert Woodruff in 1941. Woodruff continued the lumber business and ran a machine shop on the first floor; he lived on the second floor. Much of the equipment survives and the power system is operable. Beeman's 15'-high masonry dam, across the East Aspetuck River, is in good condition. Concrete bulkhead and steel penstock were installed by Woodruff, but the turbine (Chase Turbine Co. of Orange, MA; last patent date, 1873) probably dates to original construction of the mill. Circular sawmill equipment (Muncie Products, 1872) was probably installed by Beeman as well. Woodruff's machine shop equipment, in use into the 1970s, has been removed but the line shafting and pulleys remain from the power system. This is the last mill in fairly intact condition in New Preston. By the mid-19th century marble sawmills, grist mills, a twine mill and others were located along this sharply inclined stretch of the East Aspetuck River. The first floor of a grist mill that once rose four stories can be seen beside Rte. 45; its masonry dam still stands. A small 1-story barn, about 40' x 25', that was once associated with a tannery or the twine works stands on the west bank of the stream near New Preston Hill Road. Another grist mill building, now a residence, is behind the New Preston Boys' Club. Little other fabric remains from the industrial past of this small, riverbank community. (Martha and Murray Zimilies, Early American Mills, 1973; Census 1880; Kenneth Howell and Einar Carlson, Empire Over the Dam, 1974; Interview with Mrs. Robert Woodruff, present owner, Oct. 1979.)

WINSTED HOSIERY MILLS (1900)
Whiting St.
Winsted

Winsted
18.660940.4642870

Winsted Hosiery Co. was founded in 1882 to manufacture underwear, hose and other knit goods, primarily from wool. Local industrialists, notably William Gilbert of Gilbert Clock Co. (separate entry), provided capital for the venture. Initially the firm employed 55 people in a frame mill, which burned around 1900. Winsted Hosiery erected two flat-roofed, brick-pier, 4-story mills in 1900-1901; they stand parallel to each other on both sides of Whiting St. The west mill, about 300' x 60', has segmental-arched lintels, stone sills, and corbeled drops and arches at the cornice. The east mill, about 275' x 60', has similar features. Attached to the east mill is a 3-story, 50' x 39' office block, built in 1905 of granite blocks in random ashlar. Winsted Hosiery closed after World War II and the mills are now tenanted.
(The Winsted Tercentenarian, 1935; W.S. Webb and Co., Historic, Statistical and Industrial Review of the State of Connecticut, 1884; Connecticut Bureau of Labor Statistics, Annual Report, 1900, 1901.)

GREENWOODS COTTON MILLS (c.1870)
Greenwoods Ave.
New Hartford

New Hartford
18.667580.4638720

In 1847 the Greenwoods Co. began producing duck and sheeting from raw cotton. The extant mill buildings are all of brick and have near-flat roofs. Except for the stair tower the mills bear no ornamentation, with unadorned cornices, stone sills and flat lintels of brick. It is likely that the earliest extant mill, 4-story and 170' x 50', was built in the early 1870s, and it is certain that the other large mill, 4-story and 161' x 60', was erected in 1872. These two buildings form an ell, and the 5-story mansard-roofed tower rises at their junction. On the top floor of the tower protruding brick borders frame arched openings. The floors of both mills are tied into exterior walls. The steam plant, 1-story and 85' x 46', was built in 1874 and the picker house, 1-story and 104' x 30', was added in 1878. In 1880 Greenwoods Co. employed 525 workers to run 12,000 spindles and 226 looms. Many of the more than 70 company-built dwellings are gone, but a row of 10 houses is mostly intact. In 1920 Landers, Frary and Clark (separate entry) bought the mills to house its Vacuum Cleaner and Paper Box Divisions. In recent years, after a period of idleness, the mills have been refurbished and now contain several industrial tenants.
(Litchfield Atlas; Census 1850, 1860, 1870, 1880; Associated Mutual Insurance Co., survey #18344-5, 1924, courtesy Hurley Mfg. Co., present owner.)

PLUME AND ATWOOD BRASS MILL (1875)
235 East Main St.
Thomaston

Thomaston
18.660830.4615220

Seth Thomas's adoption in the late 1830s of clock movements made from sheet brass involved him closely with the primary brass producers in Waterbury. When the brass producers began making clocks on their own, Thomas responded by planning his own brass mill. It was built in 1853-54. Thomas' sons sold the brass mill in 1869 to Holmes, Booth and Atwood, a Waterbury firm founded in that year; the name was changed to Plume and Atwood in 1871 to avoid confusion with Holmes, Booth and Haydens, another Waterbury firm. As a condition of the sale Plume and Atwood was required to supply Seth Thomas Clock Co. with all the brass for its clocks. The relationship between the two firms was solidified by David Plume, a partner in the new firm who had superintended the brass mill under the Thomas company. In 1870 Plume and Atwood employed 140 men at the mill. The firm rolled sheet and drew wire at this mill, and fabricated finished brass products at its Waterbury factory. Plume and Atwood started to rebuild the Thomaston plant in the 1870s. The rolling mill, a brick-pier structure 711' x 80' with one high story and monitor roof, was built in several stages between 1875 and 1915. A 1-story, 260' x 90' brick wing may incorporate sections of the 1854 mill. The casting shop, 1-story and 352' x 75' with brick walls and a gable roof, may also retain fabric erected by the clock company in the 1850s. There are numerous sheds and storehouses built by Plume and Atwood, and several modern additions. The mill still serves its original function (with updated equipment) as the Plume and Atwood Division of Diversified Industries, Inc.
(Cecelia Bucki, "Waterbury Industrial History," typescript, 1980, at Mattatuck Museum, Waterbury; Rosa Gangloff, Thomaston: Its Origin and Development, 1975; Pape; Litchfield Atlas.)

Manufacturing

HOLLEY POCKET CUTLERY FACTORY (1866)
Pocket Knife Square
Lakeville/Salisbury

Sharon
18.629150.4646700

This millseat at the outlet of Wononscopomuc Lake was the site of Connecticut's first blast furnace, built in 1762. The furnace was demolished in the 1830s and Alexander H. Holley built a pocket knife factory (not extant) on the site in 1844. Holley expanded in 1866 with construction of the surviving 4-story brick mill, about 100' x 35' with clerestory monitor roof. Foundations are stone, and iron tie-rods and wall anchors bind the floors into end and side walls. Manufacturing here consisted of forging and grinding the steel blades, moldings and other components; cutting and finishing the handles from bone, wood or ivory; and assembling the knives. Holley Manufacturing Co. built a 2-story brick annex, about 65' x 25' with gable roof, in 1887, by which time the firm employed 40 workers who produced more than 100,000 pocket knives annually. The company installed a turbine-based power system c.1905, using the 15' head at the masonry dam to run an S. Morgan Smith horizontal turbine which drove a Western Electric direct-current generator; all this equipment survives in the wheelpit. Holley Manufacturing Co. went out of business in the 1930s and a newspaper now occupies the buildings.
(Litchfield Atlas; Census 1850, 1860, 1870, 1880; Alexander L. Holley, "An Essay on Pen and Pocket Cutlery," American Railroad Journal 23, Whole Numbers 736-749(1850); Richard A. Kimball, ed., Salisbury Bicentennial Celebration, 1976,)

HITCHCOCK CHAIR FACTORY (1825)
Rte. 20
Riverton/Barkhamsted

Winsted
18.664220.4647380

The career of Lambert Hitchcock represents a major transition in antebellum, non-textile manufacture in Connecticut. Trained as an apprentice (before 1814) and journeyman (1814-1818) in small furniture shops, Hitchcock brought entrepreneurship and large-scale production to furniture manufacture. In 1818 he rented a shed and water power at a sawmill and began making unfinished, ready-to-assemble batches of chair parts. He first sold to local stores and peddlers heading west and south. Within several years Hitchcock had hired a dozen workers, expanded to another building at the sawmill, and was shipping substantial lots of chair parts to Charleston, SC and other southern towns. In 1825 he built, upstream from the sawmill, a 3-story, gable-roofed brick factory, 60' x 32' with bracketed eaves and a square cupola; hand-wrought, S-shaped wall anchors tie the floor beams into the walls. A 2-story, 36' x 30' extension to the east repeats the features of the main factory

Hitchcock Chair Factory
(M. Roth)

(except the cupola), as does the 2-story, 45' x 18' ell at the southwest corner. Hitchcock employed nearly 100 woodworkers, finishers and rush-seat weavers in the 1820s, at the time one of the largest workforces in commercial manufacture in the state, and the largest in furniture production. In the 1830s and 1840s Hitchcock and his partners expanded into cabinet furniture production and operated retail stores near the factory and in Hartford. In 1864 Delos Stephens bought the factory; Stephens and Co., which made joiner's tools and ivory rules, lasted 40 years. The mill was then idle until 1946, when John T. Kenney bought and renovated it to house shops making reproduction Hitchcock chairs. The buildings, with extensive interior alterations, now house showrooms. Kenney scrapped the turbine that Stephens had installed and demolished the wheelhouse. The only remnant of mechanical power is a shaft with pulley, which protrudes from the attic level of the mill.
(Litchfield Atlas; Census 1860, 1870, 1880; John T. Kenney, The Hitchcock Chair, 1971; M.R. Moore, Hitchcock Chairs, 1933.)

STRONG HARDWARE FACTORY (1873) Winsted
Main St. 18.660730.4642590
Winsted

Strong Manufacturing Co. started in East Hampton, CT in the 1850s as Markham & Strong, plating sub-contractors for the town's bell manufacturers. One bell producer, Bevin Brothers (separate entry) provided capital. Markham & Strong gradually added lines of coffin tacks, screws, handles and other trimmings which were cast or forged from "white metal," a variable amalgam including differing amounts of zinc, tin, nickel, lead, brass, or iron. In 1866 David Strong bought his partners' shares and moved the business to Winsted to concentrate on coffin trimmings. Strong built a new mill in 1873. The 4-1/2 story brick-pier factory, 148' x 36' with brownstone sills, segmental-arch lintels, gable roof with dormers, and a central stair tower on each long side, is intact except that the pyramidal roof of the north-side tower has been removed. An 1886 flat-roofed addition, also 4-story and of brick-pier construction, has granite belt courses, corbeled cornice, and round-arched windows on the fourth floor. An electrical equipment manufacturer now occupies the buildings.
(Litchfield Atlas; Barlow's Insurance Survey, #4220, 1875, with supplements 1878, 1880, 1883; MVTM; Edward Eaton, "The Financial and Industrial History of Winsted," Connecticut Magazine 8, 3(1903); John Boyd, Annals and Family Records of Winchester, Conn., 1873.)

WINSTED METALLIFORM FACTORY (1896)
Lake St.
Winsted

Winsted
18.659070.4643000

Winsted Metalliform Co., producer of stamped metal goods, built the first section of this factory in 1896. The 2-story, 140' x 50' brick-pier structure has a flat roof, corner stair tower and segmentally arched windows with stone sills. Kellogg and Wakefield Co., another hardware producer, occupied the mill from 1903 to 1910, when the newly-formed Winsted Hardware Manufacturing Co. bought it. This firm made drapery and upholstery hardware and several specialty lines, including brass bathroom fixtures. Winsted Hardware built a 2-story brick addition in 1924; it has a flat roof and concrete sills and lintels. An appliance manufacturer now uses the buildings for storage.
(R.H. Pidgeon, Map of the Borough of Winsted, 1896; Pape; The Winsted Tercentenarian, 1935.)

NEW ENGLAND PIN CO.; (c.1875)
NEW ENGLAND KNITTING MILLS
Main and Bridge Sts.
Winsted

Winsted
18.659100.4642530

New England Pin Co., founded in 1854, occupied a water privilege on the Mad River. The earliest extant structure is a c.1875 3 1/2-story brick mill, about 100' x 30' with gable roof, segmental-arch lintels and stone sills. A c.1895 brick mill, 4-story and about 70' x 30', stands at the north end of the complex. In 1903-1905 the firm attached a 5-story, 55' x 43' flat-roofed wing to the c.1895 factory, and built another 5-story, flat-roofed factory, 125' x 35', along Bridge St. With completion of these facilities employment exceeded 200 workers and production reached 12 million pins per day. New England Pin also built mills to lease to New England Knitting Co., a woolen underwear producer founded in 1887 by managers of Winsted Hosiery Co. (separate entry) The 4-story brick mill, about 85' x 35', that stands southwest of the pin factories was built c.1890 for the knitting firm. After New England Pin moved out of Winsted in the 1920s the knitwear producer occupied the entire complex. Tenants now use the buildings, which contain no historic pinmaking or knitting equipment.
(Litchfield Atlas; Connecticut Bureau of Labor Statistics, Annual Report, 1900, 1905; Edward Eaton, "The Financial and Industrial History of Winsted," Connecticut Magazine 8, 3(1903); The Winsted Tercentenarian, 1935.)

GILBERT CLOCK FACTORY (1870) | Winsted
Wallens St. | 18.660940.4643660
Winsted

In the 1840s William Gilbert and Lucius Clarke started a clock shop on this site, which had been used for clockmaking as early as 1807. Gilbert gained full control in 1866 and incorporated the business as William L. Gilbert Clock Co. in 1871. His line consisted of wall and shelf clocks in 8-day or 30-hour models with a broad array of cabinet designs. The shop burned in 1870, whereupon Gilbert erected a new plant, including the 4-story brick-pier factory that continues to stand alongside the Still River north of Wallens St. This 151' x 38' mill, with hipped roof, segmental-arch lintels, stone sills, and corner stair tower with mansard roof, housed the woodworking operations for case production. A 3-story, 36' x 20' wing held offices. To the east stands the brick, 1-story, irregular-shaped boiler house and coal dump, with two Bigelow Co. boilers of unknown vintage. South of the case mill was the 1872 movement factory which burned in 1975. The 1904, 4-story, 133' x 60' finishing mill stands east of the boiler house. Also of brick-pier construction, it features a flat roof, corner stair tower with hipped roof, and two-ply, "slow-burn" flooring. When this last mill was built the firm employed some 500 workers who produced an average of 2,000 clocks per day. The company closed in the early 1960s. The only building presently occupied, the finishing mill, houses the casting operations of an appliance manufacturer.
(Litchfield Atlas; Stanley A. Ranson, "History of William L. Gilbert Clock Co.." LLH 29, 3(1969); John Boyd, Annals and Family Records of Winchester, Conn., 1873; Eastern Underwriters Inspection Bureau, insurance survey, 1928, courtesy Mr. D. Fitzgerald, Son Chief Electronics, Inc., present owner.)

THOMAS CLOCK FACTORY (1850) | Thomaston
135 South Main St. | 18.660080.4614600
Thomaston

Seth Thomas was a carpenter when he joined Eli Terry, Sr. and Silas Hoadley in a partnership to make tall clocks. Terry left in 1810 to perfect his shelf clock. The two remaining partners continued until 1813, when Thomas began his own clock shop. He bought a small clock factory in Plymouth and started producing tall clocks. More entrepreneur than technological innovator, Thomas adopted many developments of others, such as Terry's perfected shelf clock and Chauncey Jerome's brass clock movement. The firm grew from 20 workers in 1813 to over 200 in the 1840s. In 1875, when the western portion of Plymouth became a separate town, the clock company's dominance in the local community was reflected in the town's name: Thomaston.

The industrial plant standing today on the site of Thomas's original shop includes buildings from 1850 and from 1915 and later. The 20th-century buildings replaced frame factories from the second half of the 19th century. The 1850 frame structures are: a 4-story, 102' x 86' factory; a 1-story, 200' x 32' factory; and a 1-story, 70' x 35' storehouse. The 1915 factory is a 4-story, 380' x 62' reinforced concrete structure with brick curtain walls. Offices, stairs and elevator were located in a semi-detached 51' x 51' block which is surmounted by a clock tower with pyramidal roof. Brick factories were added in 1934 and 1938. General Time Corp., which purchased Seth Thomas Clock Co. in 1931, continues to produce clocks here.

On Elm St., about one-half mile north of this plant, Thomas built a cotton mill in 1834. It became a clock movement factory in the 1860s and many buildings were added. The cotton mill has been demolished, but a c.1870 brick mill continues to stand, as do several other brick buildings in the small complex. A tool company now operates here.
(Litchfield Atlas; Rosa Gangloff, Thomaston: Its Origin and Development, 1975; Chauncey Jerome, History of the American Clock Business..., 1860; Henry Terry, American Clock Making..., 1870; Thomaston Assessor's Records.)

HENDEY MACHINE WORKS
105-123 Summer St.
Torrington

West Torrington
18.655580.4629030

Henry J. Hendey, an English-born toolmaker, began machine tool production in Torrington in 1870. For 15 years Hendey made machinery for the brassware industry, such as swages, punch presses, roll mills for slitting and grooving, and machines for producing shoe nails, lamp burners, clock parts and pins. In 1887 Hendey introduced a line of screw-cutting engine lathes, and in 1888 he purchased rights to make Eli J. Manville's friction-drive shapers and planers; these marked the beginning of Hendey's significance as a manufacturer of general-purpose machine tools. A contract was made in 1892 to produce W. P. Norton's Quick Change-Gear Screw-Cutting Engine Lathe, which gained quick acceptance as an adaptable, dependable machine for toolroom use. Norton's lathe was redesigned by Hendey to become the Hendey Geared Head Lathe, which formed the greatest portion of the firm's output by the early 20th century and gave Hendey Machine Co. a worldwide market.

The surviving plant was built between 1906 and 1920. The 1906 brick-pier factory, about 260' x 120', has a flat roof and segmentally arched windows with stone sills; it is divided into three long bays, with the 3-story center flanked by 2-story wings. A similar mill was

built c.1910; L-shaped and 2-story, its longest sides are about 250' and 200'. A brick, 1 1/2-story monitor-roofed foundry and a similar, though smaller, forge shop stand in the factory yard. A brick factory with sawtoothed roof and about 500' x 100' is the last major structure. Barber-Colman Co. of Illinois bought Hendey Machine Co. in 1955; the lathe and shaper lines are still active, although Barber-Colman sold them to a machine-tool rebuilding firm in 1978. A container manufacturer now occupies the Hendey plant.
(L.M. Bingham, "Machine Tolls," Connecticut Industry 13, May 1935; Joseph W. Roe, English and American Tool Builders, 1916; Interview with Mell Greene, National Machine Tool Builder's Association, Washington D.C., September 1980.)

BULLS BRIDGE HYDROELECTRIC PLANT (1903) — Kent
Kent Rd. — 18.625540.4612800
New Milford

Bulls Bridge hydroelectric generating station, built in 1903, was the first Housatonic River plant erected by Connecticut Light and Power Co., the firm that later built Falls Village and Rocky River generating plants (separate entries). Bulls Bridge dam, a curved gravity, masonry structure about 25' high, 22' wide at the base and 195' long, stands about two miles upstream from the power house. The company built a second dam (Spooner dam) in the bypass channel, cut by the river, which carries spring flood water around a rocky knoll; Spooner dam is 19' high, 14' wide at the base and 125' long. The canal runs through rock, earth and along hillsides. In rock it is a simple cut; in earth the sloping walls are faced with riprap; rolled-earth embankments with riprap facing support the canal on hills. The canal feeds into a steel penstock which carries the water the last 420' to the power house. Two steel surge tanks (8' diameter, 96' high; 5'diameter, 98' high) tower over the steel-framed, concrete power house (112' x 45' with a 45' x 45' ell), where six turbine-generator units operate under 105' head. The turbines, all S. Morgan Smith Co. model F-1's with double 35" horizontal runners, are original to the installation, Five of the General Electric generators are original and one is a replacement.
(Connecticut Light and Power Co., "Application for License: Housatonic River Project, No. 2576," vol. 1, 1979.)

ROCKY RIVER HYDROELECTRIC PLANT (1929) — New Milford
Kent Rd. — 18.630440.4604400
New Milford

Rocky River Hydroelectric Plant was one of the first pumped-storage hydroelectric plants in the United States, and the largest such facility in the country when it was completed in 1929. Water is pumped from the Housatonic River into the reservoir and the same water flows back down from the reservoir through the turbine to generate power. It takes 1.63 times as much energy to raise water into the reservoir as is generated from the same water on its return to the river. This apparently irrational system made economic sense only when inter-connection of electric generation and transmission systems over large areas made it possible to use power from other plants, during off-peak hours, for pumping. Steam plants were run throughout the night even though demand was quite low, so energy for pumping was obtained there. Power for night-time pumping was obtained from hydroelectric plants during the spring, when runoff water exceeded normal demands for electricity at night. Thus, pumping was done with low-cost, off-peak energy and energy

from the stored water was released at peak-load periods when it was at a premium. Connecticut Light and Power Co. hired U.G.I. Contracting Co. of Philadelphia to design and build the facility. The plant sits on the bank of the Housatonic River at its confluence with the Rocky River, which was dammed to create the storage basin. An earth-fill dam (100' high, 925' long, 525' wide at the base) was built and smaller dikes were raised at low points in the surrounding hills to create Lake Candlewood, at 81.3 square miles the largest lake in Connecticut. A half-mile long canal leads to a wood-stave penstock (943' long, 15' inside diameter). The wooden penstock carries water to a steel surge tank (76' high, 9' inside diameter) and steel penstock (672' long, inside diameter reduces from 15' to 11') which runs downhill to the power house, where an S. Morgan Smith single-runner horizontal turbine, under 226' head, drives the single General Electric generator. The 105' x 40' brick powerhouse also contains two motor-driven Worthington centrifugal pumps, which are used to fill Lake Candlewood. Water pumped up travels through the same structures (except the turbine) through which it will flow back down when used for generation. The plant still produces electricity with mostly original equipment.
(Connecticut Light and Power Co., "Application for License: Housatonic River Project, No. 2576," vol. 1, 1979; Paul L. Heslop, "A Hydroelectric Plant That Pumps Its Own Water Supply," CSCE, 1928.)

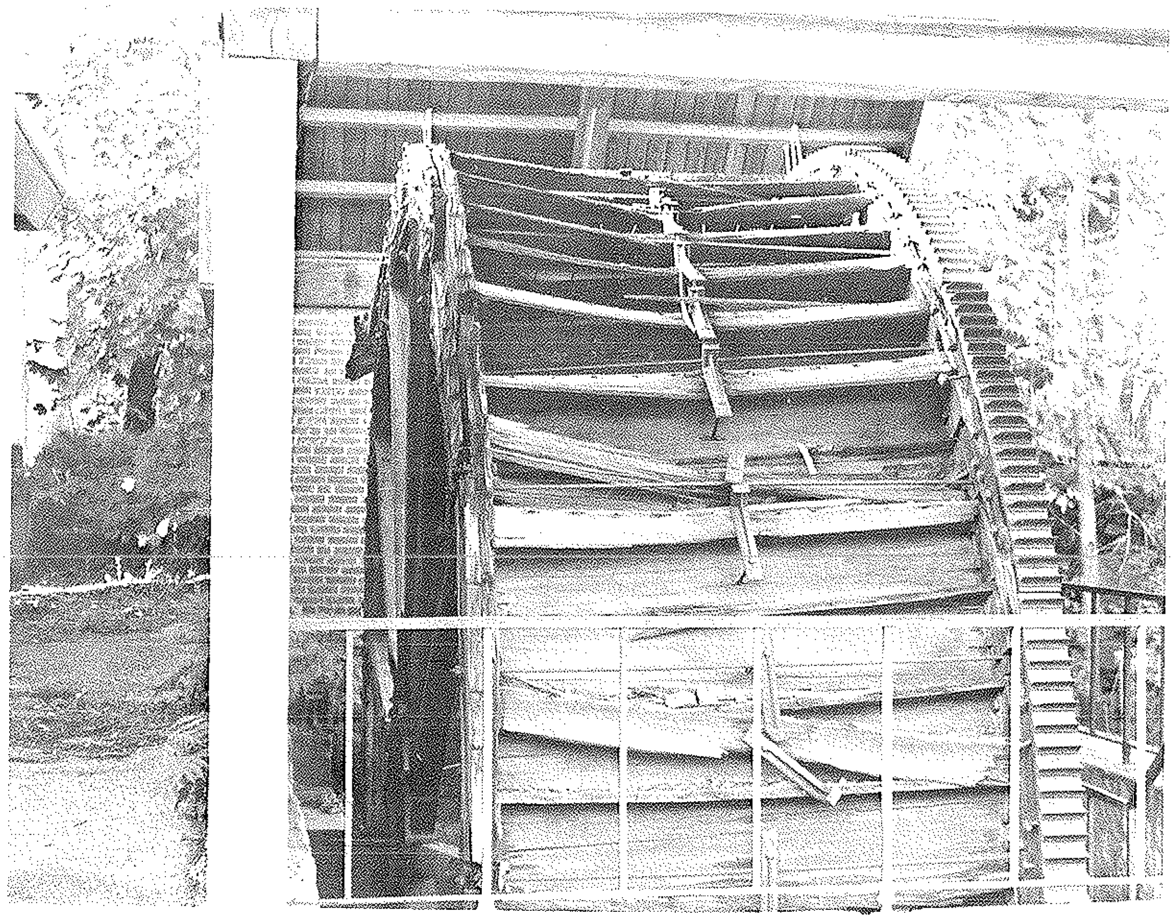
COMPENSATING RESERVOIR; (1920) — New Hartford
LAKE MC DONOUGH — 18.669420.4638300
Rte. 219
New Hartford

The Hartford Board of Water Commissioners built Compensating Reservoir, on the East Branch of the Farmington River, to maintain water supplies to mill owners when the Board diverted Farmington River tributaries to create Nepaug Reservoir (separate entry). The original Nepaug Reservoir plan of 1909 was defeated in the State Legislature by opposition from manufacturers, who would have lost between five and nine percent of available flowage. City officials, representatives of the Board, and mill owners drafted a compromise whereby Compensating Reservoir would be built, upstream from Nepaug Reservoir, to store flood waters during high-water periods and return them to the stream during low-water periods. This plan passed in 1911. Richards Corner Dam impounds Compensating Reservoir; the earth embankment with concrete core wall and riprap facing stands 75' high, 950' long, 400' wide at the base and 15' wide at the top. Caleb M. Saville, chief engineer for the Board, supervised design and construction. C.W. Blakeslee and Sons of New Haven built the dam in 1915-1920.
(Board of Water Commissioners, Annual Report, vols. 4-5, 1910-1921; "Statistical Returns to Extra-Mural Agencies...," 1964, and Photograph Collections, Metropolitan District Commission Engineering Division Files, Hartford.)

TERRY WATERWHEEL (c.1845)
Main St.
Terryville/Plymouth

Thomaston
18.665160.4615930

The sons of Eli Terry, Samuel and Eli, Jr., established their own clock factory in 1824 in which they utilized the techniques developed by their father, notably the use of water-powered machinery. This waterwheel is mounted in the wheelpit on the site of their now-demolished factory. It was probably built by one of the later occupants of the site: Welton Brothers, a lockmaking firm that operated here from 1839 to 1845, or Terry and McKee, another lock shop that was here after 1845. About 20' in diameter and 7' wide, the mid-breast wheel has 56 buckets and generated about 8 horsepower from the Pequabuck River. The shaft and hub are iron, as are the spacers between the buckets, the tie-rods that cross-brace between the sides of the wheel, the external ring gear for power take-off, and the pinion that engages the ring gear. Spokes, felloes, soling and the flat buckets are of wood. The wooden elements are rotting and the iron parts rusting despite a protective canopy erected in 1956. The extensive use of iron and the cylindrical shape of the shaft suggest the c.1845 date for construction of the wheel. A "bellied" shaft, increasing in cross-section toward the center, would be more characteristic of the period when the Terry brothers first applied water power at this site. As one of only several waterwheels known to survive in the state, and because of the possible association with one of the most innovative families of Connecticut technologists, this wheel merits further study, which will be impossible if steps to preserve the wheel are not begun immediately. (C.R. Harte, "The Terry Waterwheel," Connecticut League of Historical Societies <u>Bulletin</u> 8 (Fall 1956); Osborn; Interview with Dr. Patrick M. Malone, Slater Mill Historic Site, October, 1980.)



Terry Water Wheel (M. Roth)

HART'S BRIDGE: (1841)
WEST CORNWALL BRIDGE
Rte. 128
Cornwall

Cornwall
18.635720.4636590

Built in 1841 as a 242' single span, Hart's Bridge is one of three surviving covered bridges in the state. (See entries for Bulls Bridge and Comstock Bridge.) Primary structural members of the original bridge consisted of Town lattice trusses held together with treenails. Queen-post trusses, pegged to both sides of each lattice, provided secondary support. Although these members are still in place, a steel deck concealed beneath the plank floor now carries the load. In order to install the deck the bridge was raised two feet and the abutments were capped with concrete. At the same time (1972), the bridge gained a new roof of white cedar shingles. Small windows break the board-and-batten side walls at irregular intervals. (Richard S. Allen, "Covered Bridges in Connecticut," The Antiquarian 2 (Nov. 1950); Richard S. Allen, Covered Bridges of the Northeast, 1957; NR.)

BULLS BRIDGE (1842)
Bulls Bridge Rd.
Kent

Dover Plains
18.624180.4614630

Accounts of this covered bridge offer contradictory data as to its construction date, mentioning both 1842 and 1858. Because the auxiliary support system of queen post trusses, pinned to each side of the Town lattice trusses that provide primary support, is virtually identical to that found several miles up the Housatonic in the 1841 Hart's Bridge, the earlier date is credible. The 110'-long span has been altered considerably. Connecticut Light and Power Co. raised it 20' during construction of the nearby dam for Bulls Bridge hydroelectric plant (separate entry). In 1969 the State Highway Department capped the abutments with concrete, installed steel girders below the deck, and extended the board-and-batten walls downward to hide the girders. (Richard S. Allen, "Covered Bridges in Connecticut," The Antiquarian 2 (Nov. 1950); Richard S. Allen, Covered Bridges of the Northeast, 1957; NR.)

HOUSATONIC RAILROAD (c.1840) | Ellsworth
STONE ARCH BRIDGE | 18.631360.4625960
Rte. 7
Kent

Railway development in northwestern Connecticut began with the Housatonic Railroad, chartered in 1836. The line from Bridgeport to New Milford opened in 1841 and the final link with the Berkshire Railroad at the Massachusetts border opened soon after. In its northern section, where the route runs along the bank of the Housatonic River, the railway crosses dozens of small creeks and drainages that flow into the Housatonic. This bridge over Kent Falls Brook is generally typical of these crossings, although the masonry bridges exhibit some variety in size, configuration and material. Kent Falls Brook bridge is a round-arched structure, with the opening for the stream about 15' high, 13' wide and 40' long. Walls consist of local granite in random ashlar. This is one of the least endangered bridges on the abandoned rail corridor, as it was used as the footing for one side of the bridge carrying Rte. 7 over the brook. Other c.1840 masonry-arch bridges of the Housatonic Railroad can be seen over Maumee Brook in the town of Kent, Flanders Brook in Kent, Cobble Brook in Kent and Gunn Brook in Cornwall. The New York, New Haven and Hartford Railroad replaced some of the small stream-crossings in the early 20th century with plate girder bridges. An example can be seen over Potter Brook in Cornwall.
(Alvin F. Harlow, Steelways of New England, 1946; Research files of the American Indian Archaeological Institute, Washington, CT, courtesy Russell Handsman.)

NEW MILFORD RAILROAD BRIDGE (1913) | New Milford
.4 mile NE of New Milford High School | 18.632750.4602360
New Milford

The New York, New Haven and Hartford Railroad built this single-track bridge in 1913. It consists of three double intersection Warren (with sub-struts) truss spans, each 109' long. Piers and abutments of brownstone blocks in coursed ashlar support the rivet-connected steel through trusses. The bridge is on the line of the Housatonic Railroad, which the New Haven acquired in the 1890s. The New Haven constructed many bridges similar to this one in the first twenty years of this century, on the lines it had recently acquired.
(PC)

BOARDMAN'S LENTICULAR BRIDGE (1888)
Boardman Rd.
New Milford

New Milford
18.629150.4605560

Boardman's Bridge is a wrought-iron lenticular through truss. Berlin Iron Bridge Co. built it in 1888. At 188', it is the longest lenticular in Connecticut. With two exceptions, all members of the pin-connected span duplicate those of the 1895 Lover's Leap Bridge, the only lenticular in the state of comparable length. Here the floor beams are tapered, declining in depth from the midpoint out to the sides, rather than the parallel-sided rolled beams of the later bridge. The hangers that support these floor beams are eyebars, while at Lover's Leap the hangers are composite eyebar and lattice-girder members. Decorative elements include curved lattice-girder portal struts forming oval portals which are crested with interlocking floral designs in iron. Endposts have some punched plate ornamentation near the top and are topped by orb-shaped castings. See entry for Berlin Iron Bridge Co. Plant.
(NR)

LOVER'S LEAP LENTICULAR BRIDGE (1895)
Pumpkin Hill Rd.
New Milford

New Milford
18.632860.4600170

Lover's Leap Bridge, built in 1895 by the Berlin Iron Bridge Co., is a wrought-iron lenticular through truss. The roadway is 19' wide and the span is 173' long. Endposts and top chord are box-section girders with one laced side. The bottom chord consists of pairs of eyebars. Parallel-sided lattice girders serve as truss verticals. All connections are pinned. Transverse floor beams hang from the bottom chord on composite members of eyebars and lattice girders. These floor beams carry I-beam stringers supporting corrugated iron sheets upon which the roadway rests. The bridge is highly ornamented, particularly at the portals, with urn finials atop the endposts, curving lattice-girder portal struts, and cresting of fleur-de-lis ironwork. This is the newest Berlin lenticular standing in Connecticut and is among the last few built. A recent bridge now crosses the Housatonic several yards away. See entry for Berlin Iron Bridge Co. Plant.
(NR)

ROMFORD LENTICULAR BRIDGE (1887)
Romford Rd.
Romford/Washington

New Preston
18.642130.4615040

Built in 1887 by Berlin Iron Bridge Co., this 62'-long pony truss carries Romford Rd. over the Bantam River. The wrought iron superstructure features the distinctive Berlin endpost connections for small pony trusses, with bottom-chord bars nut-connected through castings. Other joints are pinned. Web verticals, consisting of four angles with lacing bars, taper in at the top. The trusses no longer carry load because steel I-beams now span between the abutments and the bridge rests on these. See entry for Berlin Iron Bridge Co. Plant.

WOODBURY LENTICULAR BRIDGE (c.1885)
Mill Rd.
Woodbury

Woodbury
18.650080.4601730

Berlin Iron Bridge Co. built this lenticular pony truss in the mid-1880s. Carrying unpaved Mill Rd. over the Nonewaug River, the one-lane, 63'-long span retains all of its original features: riveted box-section top chord, rectilinear bars for the bottom chord, parallel-sided posts fitting outside the chords, tapered floor beams, and pinned connections except at the endposts, where the bottom-chord bars are nut-connected through castings atop the posts. See entry for Berlin Iron Bridge Co Plant.

SHARON VALLEY LENTICULAR BRIDGE (c.1885)
Sharon Station Rd.
Sharon

Sharon
18.624960.4637840

Berlin Iron Bridge Co. built this lenticular pony truss bridge in the mid-1880s. Just three panels long (35' total length), the wrought iron span is one of the smallest built by the firm. Bottom-chord rods are nut-connected through castings at the endposts; all other joints are pinned connections. Truss verticals are paralled-sided and fit outside the chords. The bridge was damaged when the Webatuck River flooded in 1955. In subsequent repairs the east abutment was capped with concrete and I-beam stringers were installed under the deck. Since these stringers now carry the load, the trusses function only as quardrails, which does not compromise their visual impact or historical significance. See entry for Berlin Iron Bridge Co. Plant.

Additional Bridges:

KONKAPOT BROOK BRIDGE (1915)
Rte. 833
North Canaan

Ashley Falls
18.639720.4656100

AMESVILLE BRIDGE (1903)
Amesville Rd. over Housatonic River
Amesville/Salisbury

South Canaan
18.634990.4646200

KENT BRIDGE (1923) Rte. 341 over Housatonic River Kent [illegible] replaced Apr [illegible]	Kent 18.626310.4620320
GAYLORDSVILLE BRIDGE (1926) Rte. 7 over Housatonic River Gaylordsville/New Milford	Kent 18.626220.4611540
WASHINGTON BRIDGE (1929) Rte. 47 over Shepaug River Washington	New Preston 18.640160.4611300
ROXBURY BRIDGE (c.1910) Spargo Rd. over Shepaug River Roxbury	Roxbury 18.638360.4605330
WEEKEEPEEMEEE RIVER BRIDGE (1928) Rte. 47 Woodbury	Woodbury 18.647840.4603280
RICHARDS CORNER BRIDGE (1929) Rte. 219 over Farmington River, East Branch New Hartford	New Hartford 18.669340.4638000
BARKHAMSTED BRIDGE (1939) Rte. 181 over Farmington River, West Branch Barkhamsted	New Hartford 18.466860.4641800

Specialized Structures

SHEPAUG VALLEY RAILROAD TUNNEL (1871)
Tunnel Rd.
Washington

Roxbury
18.638580.4606800

Major Edwin McNeil of Litchfield, seeking to spur industrial growth for his region, obtained a charter for the Shepaug Valley Railroad in 1866. The line ran from Hawleyville to Litchfield, through rocky hilly terrain in the Shepaug River basin. To avoid steep grades the line followed a serpentine route, its 32 miles covering a crow-flight distance of 17 miles. The largest engineering works were the 428'-long bridge (not extant) over the Housatonic River and the Shepaug Tunnel. The curving tunnel (234' long, 22' wide, 30' high) pierces a ridge just east of the Shepaug River. The unshored walls were cut from solid bedrock. After opening in 1872 the railroad never achieved solvency. The New York, New Haven and Hartford Railroad bought controlling interest in the early 1890s and assumed full ownership in 1898, operating the line as its Shepaug Division. Passenger service ceased in 1930 and the last freight train rolled in 1948.
(Litchfield Atlas; "Slow, Late and Noisy," LLH 11, 3(1951); Kenneth Howell and Einar Carlson, Empire Over the Dam, 1974.)

FALLS VILLAGE CANAL; (1851)
FALLS VILLAGE HYDROELECTRIC PLANT
Water St.
Falls Village/Canaan

South Canaan
18.635120.4646100

Canfield and Robbins, iron manufacturers, organized the Falls Village Water Power Co. in 1845 to develop the vast potential at the Great Falls of the Housatonic, where the river drops over 100' in less than a mile. Construction of the dam and canal took two years, 1849-1851. A stone-and-earth retaining wall supported the canal high on the ridge running along the river's east bank; the water would be used three times on its return to the river, affording about 30' head at each application. The canal itself was made of granite blocks. An impressive structure, sufficiently sound to have survived 130 years, the canal was a resounding failure because, for unknown reasons, the builders did not seal the walls in any way to prevent leakage. The canal did not hold water. In 1859 the owners appealed to local residents to contribute labor to repair the canal, but nothing was accomplished. William Barnum, a competitor in the iron trade, bought Canfield's share in 1859 and paid for extensive repairs in 1865, but water never flowed and industry never came. For the rest of the 19th century business and personal antipathy between Robbins and Barnum paralyzed the project, as each vetoed the other's initiatives. Incompetent engineers and contentious owners prevented realization of one of the more ambitious schemes for industrial development in 19th-century Connecticut.

Connecticut Power Co. bought the dam, canal and surrounding land in 1912, and engaged Stone and Webster Engineering Corp. of Boston to design and construct a hydroelectric generating plant. The earth-buttress dam was rebuilt to its present dimensions of 25' wide at the base, 10' wide at the top, 16' high, and masonry facing and cap were added. The canal was widened to 18' and lined with concrete to about 1,900' below the dam, at which point steel penstocks were laid to run 90' down the hill to the brick powerhouse. Generation began in 1914. The original generating equipment has been replaced, but electricity is still produced here. The 1851 canal survives substantially unaltered below the penstocks.
(Litchfield Atlas; E.A. Ekern, "The Falls Village Hydroelectric Development," CSCE, 1914; Winton B. Rogers, "A Short History of the Water Power Development at Falls Village," LLH 8, 4(1951); Hartford Electric Light Co., "Application for License: Falls Village Project, No. 2597," 1978; Stone and Webster Engineering Corp., "General Plan of Works," 1913, with views of dam, spillway, headworks, canal, gates, State Library, Hartford.)

Extractive Industries

PORTLAND BROWNSTONE QUARRIES (c.1870) | Middletown
west of Main St. | 18.696500.4605100
Portland

In the early 1650s the first settlers of Middletown (across the Connecticut River from the area that became Portland) began exploiting these deposits of reddish-brown Triassic sandstone for building material. Middletown residents tried to keep the brownstone to themselves by fining outside users and appointing caretakers to oversee the deposits. After the Revolution the town sold the prime quarry lands to commercial interests. Middletown probably did not have the right to make these sales, but did so to retire its considerable debt from the Revolutionary War. After 50 years of buying and selling of claims three companies--Shaler and Hall, Middlesex Quarry Co. and Brainerd Brothers--came to control the quarry lands in the 1840s. These firms presided during the period of greatest output, 1865-1885, when accelerating urban growth provided a large market for the excellent building stone of Portland.

The stone deposits lay in roughly rectilinear blocks. These were freed by wedging or blasting and then hoisted out with animal- or steam-powered derricks. By the 1870s all three quarry companies were using steam power for hoisting and drainage. At least one firm, Shaler and Hall, had narrow gauge tracks on the quarry floor to haul flatcar loads to the hoisting area. Oxen slings were more commonly used for surface carriage of the stone; a restored oxen sling now stands in front of Portland Junior High School on Main St. All three quarries had wharfs (none extant) on the river, and 25 vessels were employed in shipping brownstone at the peak of output in 1880. In that year Portland had 4,100 inhabitants; a majority of the adult male population, 1,500 men, worked in the quarries. Most of the quarry workers were Irish or Swedes, the latter having arrived after the Civil War. The companies built dwellings for the quarrymen and their families; two c.1870 12-family tenements stand today at the northern edge of Middlesex Quarry. Around the turn of the century the markets for brownstone contracted, largely because of increased use of structural concrete, and it became difficult for three firms to prodit from brownstone production. Through mergers in 1896 and 1906 the three quarry firms combined into one. Intermittent working took place until the flood of 1936 filled the quarries with water. Data on output are incomplete, but it is clear that over 10 million cubic yards of stone were removed. The three quarries cover over 10 acres and the deepest working reached 260' (the deposits are near 300' deep). Unused dirt and rubble that were dumped in the river extended the bank by hundreds of feet and claimed over 30 acres from the water. Portland brownstone

was used in construction of many notable buildings, including the homes of George Corliss in Providence, James Flood in San Francisco, Cornelius Vanderbilt in New York, as well as many blocks of houses in Manhattan, Brooklyn and the Bronx.
(Middlesex Atlas; Census 1880; J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; Scenes in Middlesex County, 1892; Portland Historical Society, The History of Portland, Connecticut, 1976; Photograph Collection, Buck Library, Portland.)

Bulk Products

RUSSELL MILLS (c.1850)
East Main St.
Middletown

Middletown
18.696900.4601650

Samuel Russell capitalized the Russell Manufacturing Co. in 1834 with part of the fortune he made in the China trade. The firm began in a small brick mill (not extant) in the South Farms section of Middletown, making cotton webbing for suspenders and harness tack. The firm nearly failed in 1837, after which Henry Hubbard, nephew of one of Russell's partners, assumed control. His first project was an attempt to develop water-powered machinery for making elastic webbing; he was unsuccessful until he brought in a Scottish weaver to help. They succeeded after devising heated calendar rolls to contract the web, rather than the hand-held flatirons used previously; the flatirons had caused uneven tension in the webs, resulting in excessive breakage. Elastic webbing made on adapted looms formed the basis for an enormously profitable enterprise. By the end of the 19th century Russell Manufacturing Co. operated seven plants in and around Middletown. The largest complex grew around the original mill. The earliest extant structures here are the c.1870 factory and office at the upstream, or south, end of the complex. The 2 1/2-story brick factory is ell-shaped with gable roof. The wings are 50' and 75' long and both are 25' wide. The 2 1/2-story, 25' x 25' office resembles the mills. Two more brick mills, each 4-story and more than 150' long, were erected downstream c.1880; they survive with extensive alterations. Another brick mill above the office was replaced in 1916 with the 2-story reinforced concrete factory seen today. Brick garages, built by Russell to house the South Farms District Fire Company, were attached to the office building c.1910. The firm still produces narrow fabric here today as the Russell Division of Fenner America, Ltd.

Starting in the early 1850s Russell Manufacturing Co. transferred weaving operations to another complex several hundred yards upstream on the Sanseer River (now known as Sumner Brook). The c.1850 brick mill, 3 1/2-story and 100' x 40', has a gable roof. Two brick, mansard-roofed wings were added c.1870; both are 3-story plus mansard attic and about 60' x 35'. All floors of all sections held looms, except for the attics which housed beaming. The c.1870 masonry dam and headrace are in good condition, although the small manufacturers who currently rent space in the complex do not use water for power.
(Middlesex Atlas; CHC; Barlow's Insurance Survey, #7056, 1882, with supplement 1889, and #9828, 1889, MVTM; A. Brainerd, Middletown Illustrated, 1877; Robert Grieve and John Fernald, The Cotton Centennial, 1790-1890, 1891; Service: Bulletin of the Middletown Chamber of Commerce, No. 3, 1922.)

STARR MILL (1813)
Rte. 157
Middletown

Middletown
18.693700.4602100

Nathan Starr received his first U. S. Government contract for sabers in 1808. After winning a substantial War Department contract in 1813 he built a new factory on the West River (now known as the Coginchaug) in the Staddle Hill district of Middletown. His business, carried on by son Nathan, Jr., operated continuously under government contracts until 1845, manufacturing swords, cutlasses, pikes, pistols and muskets. After government work ceased in 1845 the factory was leased to industrial tenants until 1864, when it was purchased by Russell Manufacturing Co. All that remains of Starr's 1813 mill is the brownstone foundation, upon which Russell erected a new brick mill in 1865. The 3 1/2-story mill is 81' x 33' with a 40' x 40' ell. A 30'-wide arched headrace opening, now sealed shut, remains in the west wall of the foundation and there are three tailrace openings in the south wall. The masonry dam, about 13' high, was rebuilt by Russell, which also installed a Leffel turbine (date unknown) that remains in place just below the dam and outside of the 1813 foundation. Russell built the adjacent gable-roofed brick mill, 4 1/2-story and 85' x 40' with central stair tower, in the late 1860s. Both mills feature segmental-arch lintels and wood sills. Four frame tenements built by Russell stand on a small hill just north of the mill pond. Russell occupied the mills until the late 1940s. Industrial tenants use them today. About 60' downstream from the dam the one-lane entry road crosses the river on a steel, rivet-connected pony truss bridge built by Berlin Construction Co. in 1927.
(D. J. Griswold, "S. Paddock to N. Starr," 1819 property survey map, courtesy Middlesex County Historical Society; CHC; Middlesex Atlas; Barlow's Insurance Survey, #7055, 1882, with supplement 1889, MVTM; J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; James Hicks, Nathan Starr, U. S. Sword and Arms Maker, 1940.)

SANSEER MILL (c.1847)
East Main St.
Middletown

Middletown
18.696700.4602100

The Sanseer Manufacturing Co. built the first mill on this Sanseer River water privilege in 1823. The shop produced textile, woodworking and metalworking machinery, including an early version of the back-geared lathe. The wooden shop burned in 1845 and the property was sold to Lewis Prior and Co., machinery and screw producer, which built the extant 3 1/2-story, gable-roofed brick mill, 52' x 30'. Russell Manufacturing Co. bought the site in 1884 and built the adjacent brick mill. Also 3 1/2-story with gable roof, it is 75' x 32' and has a central stair tower. The tower has been widened to accommodate an elevator but half of its original gable roof can still be seen.

Russell used these buildings for a specialized portion of its narrow-fabric manufacture: webbings for harnesses and other livery equipment. A warehousing firm now occupies the buildings.
(CHC; Barlow's Insurance Survey, #9829, 1889, MVTM; Middletown Tribune Souvenir Edition, 1896.)

L. D. BROWN AND SONS SILK MILL (1872) Middletown
Main St. Extension 18.696920.4602130
Middletown

In 1872 L. D. Brown and Sons moved its silk manufacture from Mansfield, CT to a new brick mill in Middletown. The 3 1/2-story, 100' x 45' mill has a gable roof and wide wooden cornice. The firm made machine twist for sewing from raw, imported silk by reeling, spinning, doubling, twisting, and dyeing. The 60' x 30' dye house and 30' x 20' boiler house were also built in 1872. Two wings, one for offices and one for production, were added in the 1880s. L. D. Brown and Sons was out of business by 1900 and a succession of industries have occupied the buildings since. Two early tenants were manufacturers of draperies and lace; one of these probably built the brick, sawtooth-roofed building which resembles a weave shed.
(CHC; A. Brainerd, Middletown Illustrated, 1877.)

SUMMIT THREAD MILLS (1880) Middle Haddam
Summit and Watrous Sts. 18.708350.4605540
East Hampton

Merrick and Conant Manufacturing Co., makers of silk thread, built the major portion of this plant but occupied it only two years. Summit Thread Co. bought the property in 1882. Summit made cotton and silk thread that was sold on ready-wound bobbins for Singer-type sewing machines. By 1900 the firm was also making sewing machine attachments, such as tension regulators and bobbin sheaths, for use with its ready-wound bobbins. The 1880 plant features two brick mills on opposite sides of Summit St. The 3-story west mill, 174' x 47', has a near-flat roof and central stair tower. The 2-story east mill, 175' x 38' with near-flat roof, is now enclosed on three sides by modern additions. A 2-story frame building, 60' x 33', on the west side housed the machine shop. The 1880 masonry dam remains substantially unaltered. A 1-story brick boiler house was added in 1900. Between the boiler house and the west mill a third brick mill was built in 1914; this 3-story, 127' x 32' mill has the dam as its north foundation. The Belding Heminway Co. bought Summit Thread in the late 1930s and moved it to Putnam, CT. Since then many tenants have used the buildings. Those west of Summit St. are now vacant and a plastics manufacturer occupies the east mill.
(East Hampton: Bell Town, 1921; Service: Bulletin of the Middletown Chamber of Commerce, No. 3, 1922; Carl F. Price, Yankee Township, 1941; East Hampton Assessor's Records.)

BROWNELL TWINE MILL: (1844) Moodus
SMITH MILL 18.7126020.4597540
Machimoodus Hill Rd.
Moodus/East Haddam

Edward Brownell moved from Seekonk, MA to Moodus in 1825 and began using the power of Moodus River for a variety of industrial purposes, including fulling, hose knitting and grist milling. In 1844 he built the extant frame mill for cotton-twine production. The 80' x 35' mill, 2 1/2-story with basement, has a gable roof and central stair tower. The basement held carding and drawing machines and a run of stone to grind grains for the Brownells and their millhands. The power system featured a dam of granite blocks, which survives in altered form, and an overshot wheel. In the 1870s Edward Brownell's son Charles installed the turbine which remains in the wheelpit. Charles Brownell also built the attached 2-story brick picker house (about 40' x 30'), at the request of his insurance company. The success of Charles' son Crary Brownell in converting to production of synthetic twine (used mostly for fishnets) in the 1930s allowed the mill to stay open, while the rest of the dozen twine mills on the Moodus River closed. All have burned except Brownell Mill and the c.1860 Smith Mill. The latter, 100 yards downstream, was bought by the Brownells in the 1880s. The 2 1/2-story frame mill, 70' x 40', has a gable roof and a shed addition on its north side. There is also an attached brick picker house built c.1875. Both mills, along with several modern structures, were sold to an English firm in the 1960s.
(J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; Barlow's Insurance Survey, #5701, 1889, with supplements 1884, 1889, MVTM; Interviews with Crary Brownell, November and December 1978.)

Manufacturing

MESSERSCHMIDT HARDWARE MILL (c.1880)
West Pond Meadow Rd.
Westbrook

Essex
18.710560.4579140

The Messerschmidts, a German farm family, emigrated to New York City in 1902. After ten years there they bought a farm with saw and cider mill in Westbrook. The 2 1/2-story frame mill, 40' x 22' with gable roof, was built in the early 1880s. In it the Messerschmidts processed apples and lumber from local farmers. By the early 1920s business at the mill was suffering because of the decline in farming in the area, so the Messerschmidts bought a hardware business in nearby Deep River and moved it to the Westbrook mill. The hardware firm had been organized in the 1880s as Potter and Snell, making knitting needles, crochet hooks and sewing accessories from metal. On the advice of a hardware jobber the Messerschmidts began manufacturing nutcrackers and nut picks. Chearles Messerschmidt, in his early 20s at the time and with no formal education or training in mechanics, converted the existing operating equipment for this new manufacture. He made cutting tools, workholding fixtures and various hopper-feed attachments for screw machines and swages. He redesigned the power trains to allow multiple operations on several of the machines; this entailed making new shafts, cranks, pulleys and other parts. He even created his own machine for knurling the handles of the nutcrackers and picks. Messerschmidt bought only two machines, both Gridley 4-spindle automatic screw machines which he purchased in the 1930s. Power transmission was by a hybrid of mechanical and electrical means: an S. Morgan Smith 30 horsepower turbine drove a General Electric motor-generator set (direct current) belted to the main line shaft. The 22'-high masonry dam (substantially rebuilt with concrete), the wheelpit and tailrace all survive, along with the power generation and transmission equipment. The entire shop, which ran until 1974, is remarkably intact. The toolroom features several c.1900 machine tools, notably a Pratt and Whitney hand-feed milling machine and a Blaisdell drill press, and numerous hand tools and cutting tools, the latter made here. The production machinery includes a Waterbury-Farrel power press, three Torrington Co. swages and several small screw machines and presses (makers unknown), all altered so extensively and idiosyncratically as to be unique. The Gridleys and Messerschmidt's knurling apparatus also survive. This shop is a striking remnant of an all but extinct class of Connecticut industry: the small hardware firm serving national markets with production processes based on localized, even personalized, innovations.
(Census 1880; Interviews with Charlie Messerschmidt, January and February 1979.)

Messerschmidt Hardware Mill
(M. Roth)

PRATT, READ AND COMPANY KEYBOARD FACTORY (1881) Deep River
Main St. 18.714140.4585150
Deep River

In the first half of the 19th century many small shops in Deep River made ivory products, such as combs, sewing implements and cabinet hardware. Numerous partnerships formed and dissolved until stability was achieved in 1863 when Julius Pratt and Co., George Read and Co. and Pratt Brothers Co. merged to become Pratt, Read and Co. This firm, larger than all its predecessors, competed with the comparably sized Comstock, Cheney and Co. for dominance in the ivory products market until 1936, when they merged. This new company used the Pratt, Read name and the Comstock, Cheney factory (separate entry).

In 1866 Pratt, Read built a new factory, mostly for production of keyboards for pianos and organs. That factory burned in 1881 and, after the town abated the company's taxes, the extant factory was built. The brick structure, originally 4-story and 154' x 50' with a 100' x 38' ell, has segmental-arch lintels and stone sills. Outbuildings included forge and box shops, storehouses, ivory bleaching houses and drying houses; most of these were eventually attached to the main building in 1909 to house piano-action manufacture. Since 1936 many firms have occupied the plant.
(Pratt, Read and Co., "Brick Plant," 1903, scaled drawing, courtesy U.A.R. Co., Deep River; Daniel J. Connors, Deep River, 1966; Margaret Latham, ed., A History of Pratt, Read and Co., 1973; Curtis S. Johnson, "From Ivory Combs to Carnegie Hall," typescript, 1973, Pratt Read Corp. Historical Collections, Ivoryton, CT.)

PRATT, READ PLAYER ACTION PLANT (1914) Deep River
Bridge St. 18.714100.4584920
Deep River

When Pratt, Read and Co. sought to expand in 1909 it looked to a product associated with the firm's principal manufacture of ivory keyboards: piano actions, the wooden mechanisms which connect the keys to the striking hammers. Interest was further piqued by the popularity of player pianos, and Pratt, Read purchased Wasle and Co., a player-piano action maker from New York City. A story was added to the keyboard factory and the Wasle equipment installed there. In 1913 the Pratt Read Player Action Co. was chartered and the parent firm built a factory to house it. The Hartford firm of Ford, Buck and Sheldon designed the new plant, which stands just around the corner from the keyboard factory. The reinforced concrete Player Action plant, 4-story and 160' x 60', has a flat roof and central stair tower. Single-story wings served as the boiler house (60' x 50') and kiln house (50' x 43') for curing wood. Player Action Co.'s sales plummeted in the 1920s with the waning popularity of player pianos. The firm filed for

The company began a second complex of buildings about one-quarter mile upstream in the 1870s, with construction of a frame factory (demolished). It was powered from the same dam as the lower mills, but by the turn of the century increasing mechanization engendered horsepower requirements in excess of available power from the Falls River, and a brick boiler and engine house was built. Further architectural evidence of growing mechanization is the 1890 brick machine shop, where the firm's custom-made ivory-working and woodworking machines were built. Brick factories were added in 1901 (5-story, 82' x 53') and 1905 (3-story, 132' x 40'). Pratt Read Corp. (the name adopted when Comstock, Cheney merged with Pratt, Read and Co.) still manufactures keyboards here, although most of the production is housed in a modern reinforced concrete factory, and ivory has not been used since 1954. The company's historical collections are in the 1901 factory. These include restored ivory-working machinery, hundreds of sketches and photographs of the buildings, interior and exterior, as well as day books, account books, correspondence files, hand tools, and representative products from the company's past.
(Middlesex Atlas; W. S. Webb and Co., Historical, Statistical and Industrial Review of the State of Connecticut, 1884; Margaret Chatham, ed., A History of Pratt, Read and Co., 1973; Pratt Read Corp., Annual Report, 1978; E. P. Augur, Engineer and Surveyor, "Boarding House Property, Ivory Factory Property, and Contiguous Building Lots," Plat No. 5 and "Keyboard Factory Property," Plat No. 1, December 1905, Pratt Read Corp. Historical Collections; Interviews with Peter H. Comstock, Chairman, Pratt Read Corp., November 1978.)

CENTERBROOK AUGER FACTORY (1894) — Essex
Main St. — 18.716000.4580780
Centerbrook/Essex

In 1867 the newly organized Centerbrook Manufacturing Co. bought this water privilege on the Falls River and began making augers and auger bits. In 1873 the Connecticut Valley Manufacturing Co., a partnership owned entirely by the Wright family, bought the property and pursued the same business; the extant structures were built by this firm. The 1880 masonry dam survives in altered form. The 1894 brick factory, 3-story and 71' x 36' with hip roof, gained a 2-story brick ell in 1909, 106' x 31' with gable roof. The surviving water power system also dates from 1909. It features a No. 26 Leffel turbine mounted in a concrete case and fed by an underground, masonry-walled headrace. Connecticut Valley Manufacturing Co. made forged-twist augers, expansion auger bits, plug cutters, countersinks and Forstner bits. As with many family businesses, the Wrights were content with steady, if unspectacular, profits and they invested little in new equipment or development of new products. Faced with aged equipment, decreasing profit margins and keen competition, the Wrights sold the

firm in 1969 to High Production Machine Co. of New Britain, where the auger-factory machinery continues to operate. The buildings now contain offices, studios and shops.
(J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; Census 1870, 1880; "Connecticut Valley Manufacturing Co.," site plan, 1969, courtesy Moore Grover Harper, Centerbrook; Interviews with Walter Wright, former owner, and William Grover, present owner, December 1978.

BROOKS HARDWARE FACTORY (1848)
33 Liberty St.
Chester

Deep River
18.712500.4586880

In 1848 Simeon Brooks began making wood screws and wood-screw eyes in a 2 1/2-story, 23' x 19' frame mill with gable roof, on the North Branch of Pattaconk Brook. His son Merritt soon joined him and they built another 2 1/2-story frame mill with gable roof, 40' x 24', onto the earlier one. They designed and built unique machines which combined metal-forming and metal-cutting operations to make screw eyes, S-hooks, J-hooks and other such hardware. In 1886, on the other (north) side of the stream, they built a 2 1/2-story frame mill, 120' x 40' with gable roof and hip-roofed stair tower. Power was generated by a horizontal turbine fed by a penstock mounted on ten piers of mortared fieldstone. The 1886 building gained a 3-story ell, 75' x 30' with near-flat roof, in 1902. Outbuildings include scale house and garage. All structures and equipment survive and, except for the water power component, are used for their original purposes. The mills are now sheathed in siding. Without the fluorescent lights and some guards on the machines, the interiors would look like they did in 1890. The machinery (including a dozen c.1870 machines made by Merritt Brooks), shafting, belts, pulleys, myriad tools and set-up pieces offer concrete evidence of the scale and texture of 19th-century water-powered hardware manufacture.
(Middlesex Atlas; Census 1850, 1860, 1870, 1880; Chester Historical Society, The Houses and History of Chester, 1976; Interviews with Howard Crook, former employee, and Robert McCandlish, present owner, November and December 1978; Chester Assessor's Records.)

BATES HARDWARE FACTORY (c.1875)
North Main St.
Chester

Deep River
18.712890.4586740

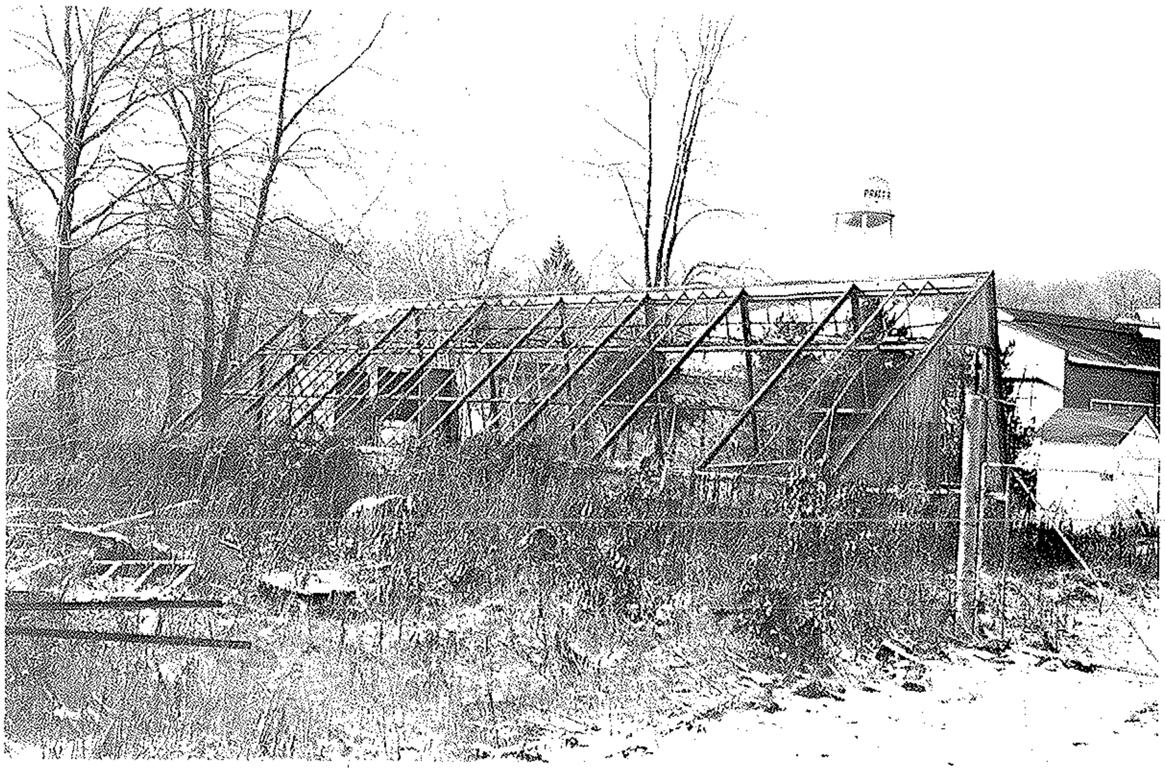
The firm that became C. J. Bates and Son originated in 1860 as a producer of "Yankee notions"--crochet hooks, collar studs, cufflinks, cribbage pegs, tiddlywinks--made from scraps of ivory obtained at the nearby piano-key factories. The surviving plant was built in the early 20th century, by which time the firm had turned to fabrication of sewing and manicure implements from steel. In 1905 the company bought this water privilege on the North Branch of Pattaconk Brook; it had been occupied previously by a small shop that made inkwells. The 2-story brick factory, about bankruptcy in 1930. Pratt, Read and Co. used the building until 1936, since which time it has served a variety of manufacturing purposes. (Ford, Buck and Sheldon, "Reinforced Concrete Factory Building," 1914, construction drawings, courtesy U.A.R. Co., Deep River; Margaret Latham, ed., A History of Pratt, Read and Co., 1973; Curtis S. Johnson, "From Ivory Combs to Carnegie Hall," typescript, 1973, Pratt Read Corp. Historical Collections, Ivoryton, CT.)

COMSTOCK, CHENEY AND COMPANY FACTORIES (1847) Essex
Main St. 18.713400.4580100
Ivoryton/Essex

Samuel Comstock first made ivory products in 1834, primarily combs and other "Yankee notions," although he made some keyboards too. He took George Cheney, a veteran of the East African ivory trade, as partner in 1860, and production thereafter was increasingly in keyboard manufacture. Comstock, Cheney and Co. built almost every building in Ivoryton, the village that grew around the keyboard works. The Ivoryton Playhouse of today occupies the workers' recreation hall. The company bought the Winthrop School for Girls and moved the building to Ivoryton to serve as a boardinghouse. Comstock, Cheney built over 100 houses of various sizes (one-family to six-family) and dates (c.1870 to c.1920). Most of the houses survive and the boarding house is now the Ivoryton Inn.

The earliest standing industrial structure is Comstock's 1847 mill. The 1 1/2-story frame building, 50' x 35' with monitor roof, is now obscured by additions except for the east wall. The firm built two factories in the 1870s for expanded keyboard production; both are frame with gable roofs, 3-story and 77' x 33', 3-story and 73' x 50'. Outbuildings included wagon shed, storehouse and ivory bleaching houses. Except for the majority of the bleach houses, all survive, as do the masonry and earth dam, headgates and penstock for the now-unused water power system.

Between rough-cutting and finishing, ivory piano keys were bleached to render the brownish-yellow tusk color into the milky white of keyboards. The rough-cut keys were washed, then doused with hydrogen peroxide and placed in a bleach house, which was a long, narrow frame structure, triangular in section. The roof slanted down to the ground and was covered with glass, as were the walls. Bleaching time varied to an upper limit of four or five months, depending on seasonal variations in duration and intensity of sunlight, which was the primary bleaching agent. The lone surviving bleach house from the Middlesex County ivory industry stands here in Ivoryton. It is 40' long, 10' high and 8' wide. It has the characteristic cross-section but bleach houses were generally longer, ranging to over 400'. In 1905 Comstock, Cheney had several thousand feet of bleach houses.



Ivory Bleach House, Pratt Read Corp.
(M.Roth)

IVORY BLEACHING SHED (1880s)
(TO BLEACH PIANO KEYS)
HAS BEEN DISMANTLED +
RESTORED

BEHIND THE DEEP RIVER
HISTORICAL SOCIETY

PER PAT MARTIN @ 12/20/01
SIA - MICHIGAN PHONE
(906) 487-2070 NEH

100' x 40', was erected in 1914, and was followed by a 2-story, 80' x 41' reinforced concrete factory in 1916. Reinforced concrete storehouses were built in 1921 and 1928. The earliest structure here is the c.1875 rubble-masonry dam, about 15' high and 90' long, that was built by the inkwell producer. The dam was partially rebuilt in the 1930s, when its eastern half was capped with concrete. Headgate, trash rack and penstock were also replaced at that time, although the Model 750 Fairbanks turbine was installed in the wheelpit c.1915. In 1971 C. J. Bates and Son moved to a modern factory in Chester. The firm uses the older plant for storage.
(C. J. Bates and Son, C. J. Bates and Son, 1873-1973, 1973; J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; Manufacturer's Mutual Fire Insurance Co., "Plan and Map of C. J. Bates and Son," 1947, courtesy Hamilton Bates, Jr.; Interviews with Hamilton Bates, Jr., Wells Bates, Richard Bates, October 1978.)

GRISWOLD HARDWARE SHOP (1850) — Deep River
9 West Main St. — 18.712960.4586320
Chester

This Pattaconk Brook (South Branch) water privilege was first developed for manufacturing in 1825 by Abel Snow, who ran an anchor forge and sold primarily to shipbuilders in Chester Cove. Noah Shipman, a carriage-spring manufacturer, bought the property in 1838 and sold it to Jeremiah Wilcox, another carriage-spring maker, in the early 1840s. In 1850 C. L. Griswold bought the site and erected the building standing now: a 2 1/2-story frame mill, 60' x 26' with gable roof and stone foundation/wheelpit. Griswold's rubble-masonry wing dam also survives. The shop produced auger bits, wood screws, corkscrews, reamers and other light hardware before closing in 1919. Solar Masonic Lodge No. 131 bought the mill in 1924 and still uses it.
(Middlesex Atlas; Chester Historical Society, The Houses and History of Chester, 1976; Chester Assessor's Records.)

RUSSELL JENNINGS OFFICE (c.1870) — Deep River
West Main and Spring Sts. — 18.712870.4586220
Chester

In 1865 Russell Jennings, who had been a contractor at Pratt, Read and Co. (separate entry), bought this water privilege and built a 2-story frame mill for manufacture of his famous extension-lip auger bit. Russell Jennings Manufacturing Co. continued to produce bits and augers here until 1944, when it was purchased by the Stanley Works of New Britain (separate entry). The factory burned in 1976, leaving the c.1870 Victorian brick office building as the only standing remnant of one of Connecticut's most noted small hardware producers. The 2-story, 50' x 30' office has a hip roof, dentiled cornice, arched double doorway, and granite sills and lintels. It is presently vacant.
(Chester Historical Society, The Houses and History of Chester, 1976; Middlesex Atlas; Chester Assessor's Records.)

ROGERS BRUSH FACTORY; (1859)
GLADDING BRUSH FACTORY
129 West Main St.
Chester

Deep River
18.712180.4585970

A succession of users occupied this water privilege before C. B. Rogers built this mill for making brushes in 1859. The 1 1/2-story, 60' x 25' frame mill has a gable roof with cupola. Rogers lasted but two years, then George and Calvin Gladding bought the business. The Gladding family made brushes here until the 1960s. The Gladdings installed a turbine (maker unknown) and c.1920 direct current generator (L. J. Land Co.), which remain in place; the dam and penstock also survive. The mill has been a restaurant since 1973; three wings have been added and the exterior has been painted orange. In the main dining room, however, which occupies the mill building, the line shafting, jack shafts, hanger bearings, belts and pulleys that ran the brush-making machinery remain in place. The basement bar is a former bench for a brush-winding lathe, with peg holes for mounting chucks and tying-off pins. The owner of the restaurant has installed a small steam engine in the lounge. The single-cylinder, vertical engine, built c.1900 by the Middletown (Ohio) Machine Co., is operable but is not run. (Chester Historical Society, The Houses and History of Chester, 1976; Census 1860, 1870, 1880; Chester Assessor's Records.)

SCOVIL HOE FACTORIES (1859)
Candlewood Hill Rd.
Higganum/Haddam

Haddam
18.70850.4596100

Daniel Scovil did not pursue a manufacturing career until after extensive travel in the southern states. Returning to his native Higganum in 1844, Scovil convinced his brother Hezekiah to join him in producing hoes for southern plantations. The brothers had learned metalworking from their blacksmith father, whose business after 1814 was devoted exclusively to forge-welding gun barrels for Whitney and other arms makers. The Scovils made their first "Planters' Hoes" in their father's shop on Candlewood Brook. They built their own small shop next door in 1849; little remains on this site except overgrown foundations and a fence composed of gun-barrel iron. They built their second shop in 1859 about 300' downstream from the 1849 building. The new plant consisted of two 1 1/2-story, gable-roofed brick mills standing end-to-end. The 12' space between them was spanned by a platform which held a bell tower. This plant survives except for portions of the east building which have been demolished. An order of nuns now uses the site for a retreat.

In 1867 the Scovils began construction of their third plant about one and one-half miles downstream from the second. A rubble-stone dam diverted the stream into an open headrace to provide power for the shop at 12' head. The plant had two main structures: a 1-story brick forge shop, 89' x 30' with gable roof, and a frame shop (demolished) for grinding, buffing and packing. The company office, a brick Victorian building with slate-covered mansard roof, stands adjacent to this plant, which is still occupied by Scovil Hoe. In c.1900 the power system was revamped and a new prime mover installed: a Holyoke Machine Co. Model A horizontal turbine with 15" runner. The Hercules turbine still runs the forge shop from June to September; many parts of it, including the runner, have been replaced.

When the Scovils built this plant they made hoes in two pieces. The eyehole for the handle was forged to shape from bar stock, the blade forged and ground from flat stock, and the two were welded together. Throughout the last third of the 19th century this process was evolving as the forging operations were changed from hammer and anvil techniques (hand and powered) to drop-forging with dies in power hammers. Finally mechanization dictated design changes and by 1900 hoes were being made from a single piece of flat stock. Drop hammers raised the eyehole with a series of dies, the end of the resulting cup was cut out, then the blade was forged and ground to finished dimensions. Coincident with these developments, the new buildings erected by the firm came to resemble the prototypical forge or foundry building of the late 19th century: narrow in proportion to length, a single high story tall, with a moderately pitched gable roof topped by a low, narrow monitor. Both brick buildings in the fourth Scovil complex, about 300 yards downstream from the third, followed that form; the 1880 forge shop is 220' x 40', and the 1887 shop is 225' x 40'. The firm also built a new shop c.1900 (90' x 68') at the third complex that followed this pattern. The State Highway Department now uses the fourth complex for garages and repair shops. (Osborn; Middlesex Atlas; J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; O. H. Bailey and Co., View of Higganum, 1881; Middletown Tribune Souvenir Edition, 1896; Holyoke Machine Co., "Hercules 'A' Wheel," drawing #TR6105, 1907, courtesy Scovil Hoe Division; Connecticut Highway Department, "New Maintenance Office and Garage--Plans," 1941, files of Property Control Division, DOT; Collection of historic Scovil hoes, courtesy Scovil Hoe Division; Interview with Jack Fisher, Factory Manager, Scovil Hoe Division, November 1978.)

BEVIN BROTHERS BELL SHOPS (1832) — Middle Haddam
Bevin Court — 18.708370.4605680
East Hampton

Bells have been made in East Hampton since 1808, when William Barton moved there and began making sleigh and hand bells. The oldest surviving bell factory in town in Bevin Brothers' frame shop, in which Abner and Chauncey Bevin started their business in 1832. The 2 1/2-story, 32' x 20' building, with gable roof and vertical-board siding, was originally located at the former outlet of Bevins' pond, several hundred yards northwest from its present site. When the pond was expanded in the mid-1860s with the building of a new dam downstream on Pocotopaug Creek, the frame shop was relocated adjacent to the factory at the new outlet. The mill's first-floor windows have been replaced and the roof reshingled; many framing members have been replaced or soon will be.

New construction in 1880 and 1904-1910 replaced the 1860s buildings. Brick structures erected in 1880 include a 2 1/2-story factory, 188' x 48' with gable roof, a 1 1/2-story foundry, 161' x 31' with (present) near-flat roof, and two smaller buildings for tumbling, finishing, packing and storage. The firm added two 2-story brick factories (83' x 72' and 98' x 37') in 1904, and in 1905 the 1880 brick factory gained a 1-story, 172' x 26' wing made of poured concrete. The japanning shop (1910), shipping room (1925) and office wing (1932) completed the plant, which represents the best-preserved East Hampton bell works and the only one still used for its original purpose. The Veazey and White, Gong Bell Toy and Barton Bell plants have been demolished or extensively altered. The N. N. Hill factory (separate entry) survives under different usage.

The Bevin family still owns and operates Bevin Brothers Manufacturing Co. Until 1979 the firm made its cast bells (a small portion of output as now most are stamped from sheet stock) with brass melted in pit furnaces from the late 19th century. Before replacing these with modern equipment Bevin Brothers permitted the Brass Workers' History Project to videotape the casting process. The firm donated a pit-furnace crucible and associated hand tools to Mattatuck Museum in Waterbury.
(Middlesex Atlas; Hartford Courant, 28 February 1902; Carl F. Price, Yankee Township, 1941; East Hampton Assessor's Records; Photograph collection of Stanley Bevin; Interviews with Stanley Bevin, November 1978 and December 1979.)

N.N. HILL BELL FACTORY (1890) — Middle Haddam
25 Skinner St. — 18.708160.4605000
East Hampton

N. N. Hill Worked in East Hampton's bell shops before starting his own company in 1889. He apparently derived impetus for his venture from the growing popularity of bicycles, bells for which were Hill's major product. In 1901 Hill introduced the Sterling Continuous Ringing Chimes, similar to the handlebar-mounted thumb bell widely used on bicycles today. He also refined the techniques of stamped bell production, which largely supplanted casting in the 20th century. Hill's first shop burned in 1890 and he began construction of the extant brick-pier factory, 3-story and 100' x 35' with stair tower and near-flat roof. The 1-story brick foundry, 128' x 30' with monitor roof, and 2-story brick office with hip roof also date from 1890. Hill added a 3-story brick-pier wing, 100' x 41', to the factory c.1910. A container manufacturer now occupies these buildings.
(Hartford Courant, 28 February 1902; Carl F. Price, Yankee Township, 1941; East Hampton Assessor's Records.)

SMITH'S PISTOL SHOP (1881)
Pistol Shop Rd.
Middlefield

Middletown
18.692450.4599840

Henry Aston, John North and others made pistols at this Coginchaug River water privilege before 1881, when Otis Smith bought the site and erected the present brick factory. The 3 1/2-story, 100' x 30' factory has a 35' x 30' ell; both sections feature gable roofs. Only the 1881 masonry dam and 1904 concrete bulkhead remain from the water power system. Smith made the Savage and Smith pistol and other patent hardware products. Small metalworking businesses occupy the plant today. (Middlesex Atlas; Felicia Deyrup, Arms Makers of the Connecticut Valley: A Regional Study of the Economic Development of the Small Arms Industry, 1948; Eli Bascom, "Short Industrial History of Middlefield," Tadzeuk Society of Middlefield Publication, n.d.)

LYMAN GUNSIGHT FACTORY (1880)
West St.
Middlefield

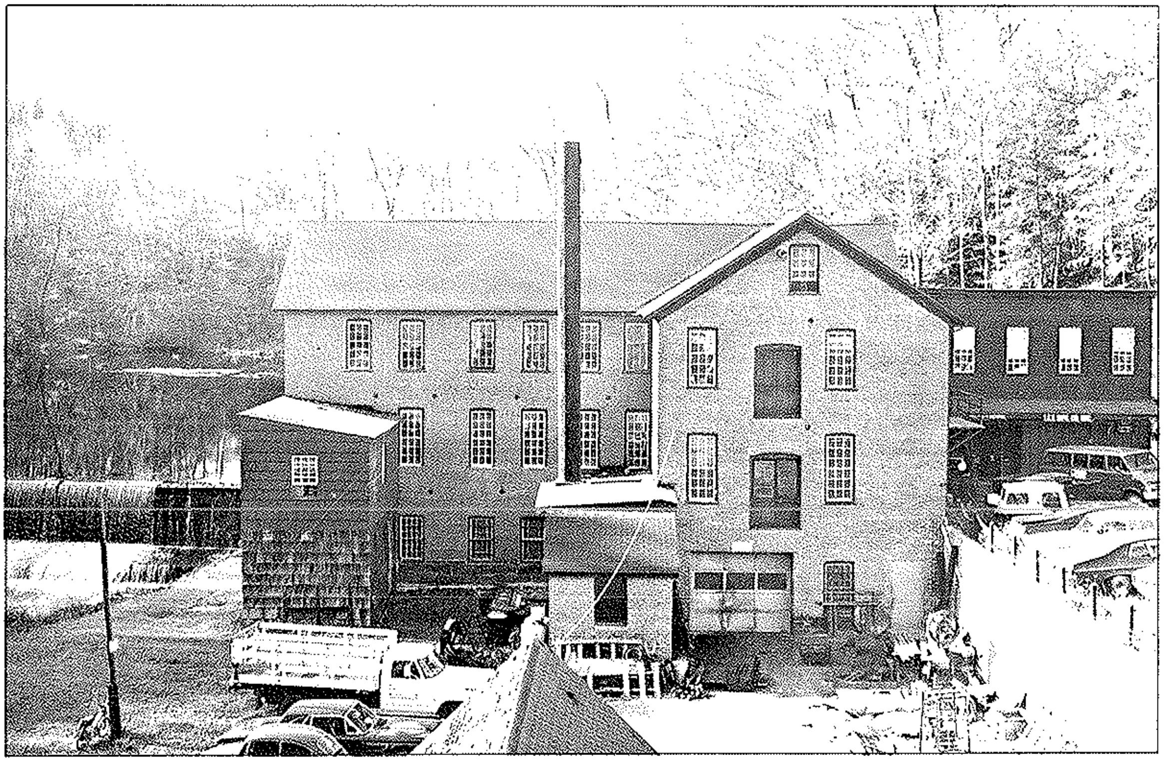
Middletown
18.690100.4597600

William Lyman learned the mechanical arts in his father's factory, the Metropolitan Washing Machine Co. of Middlefield. He developed there a tang-mounted rifle sight, patented in 1879. The next year Lyman built a small frame shop to produce his sights. The 2 1/2-story, 24' x 18' shop has a gable roof and clapboard walls. In 1903-1907 the Lyman Gun Sight Co. built the attached brick factory, 3-story and 103' x 42' with near-flat roof. These buildings, now partially obscured by later additions, still house the gun-accessories manufacture of Lyman Products Corp.
(A History of Middlefield Written for the Centennial Celebration, 1866-1966; 1966; C. Kenneth Ramage, ed., Lyman Centennial Journal, 1978; Associated Factory Mutual Fire Insurance Companies, survey #31-58R, 1956, courtesy Lyman Products Corp.; Interview with Victor G. Muzzulin, Maintenance Manager, Lyman Products Corp., November 1978.)

STEVENS TOY FACTORY (1843)
Nooks Hill Rd.
Cromwell

Middletown
18.696300.4609150

By the mid-1870s J. and E. Stevens Co., maker of cast-iron toys and hardware, claimed to be one of the largest concerns of its type in the country. Stevens employed 100 men and women and poured 1 1/2 to 3 tons of iron per day. This firm produced the first mechanical banks and the first cap pistols. Profits from these and from miniature replicas of tools, wagons, and rail cars financed expansion of Stevens' plant in the late 19th century. After World War I Stevens merged with two other toy companies to form National Novelty Co., which went bankrupt in 1920. The Stevens plant operated infrequently until 1940, when it reopened



Smith's Pistol Shop
(M. Roth)

only to close again in 1941.

Remains of the complex occupy both sides of Nooks Hill Rd. in an otherwise non-industrial area. North of the road are three brick buildings, including the first Stevens shop, built in 1843. This 1 1/2-story, 75' x 50' building has a gable roof with cupola. Adjacent are two more brick factories, both 2 1/2-story with gable roofs, 83' x 26' and 55' x 35'. These buildings housed deburring (tumbling), grinding, polishing, painting and packing departments, as well as a small foundry where brass patterns were cast from wood prototypes. These patterns were then used to make molds in which the iron toys were cast. The extant iron foundry, 1 1/2-story and 140' x 50' with monitor roof, located across the street, was erected c.1900. Several retail and manufacturing concerns now occupy the buildings. (Middlesex Atlas; J. B. Beers and Co., History of Middlesex County, Connecticut, 1884; Shirley DeVoe, "19th Century Connecticut Toymaking," The Connecticut Historical Society Bulletin 36, July 1971.)

Bridges

COMSTOCK'S BRIDGE (c.1860)
Rte. 16 at Salmon River
East Hampton

Moodus
18.712750.4603080

Comstock's Bridge consists of two sections, the 80'-long covered main span and a shorter, uncovered approach span. The main span has plank sides, a moderately pitched roof covered with cedar shingles, and oval portals. It is borne by a Howe truss, with its characteristic diagonal, timber compression members and vertical, iron tie-rod tension members. The stringers are built up of thick, lapped planks and the floor, laid parallel to the bridge over a diagonally planked subfloor, is borne by joists with diagonal bracing. Piers and abutments are granite ashlar and mixed-stone rubble. The 30'-long approach span is east of the covered span. Many alterations have been made. In the 1930s the Civilian Conservation Corps installed the portal gates, cut rectangular windows in the walls and replaced the roof and floor supports and sections of stringers and siding. Recently the state replaced the roof, added spacers between the trusses and the sides of the bridge, and braced the trusses with steel plates bolted across the joints. Once a part of the main road to Middletown from the east, Comstock's Bridge is now the focal point of a roadside picnic area.
(New London Atlas; Richard Allen, Covered Bridges of the Northeast, 1957; NR.)

RAPALLO VIADUCT (1873)
between Flat Brook and Daly Rds.
East Hampton

Moodus
18.711050.4605080

Rapallo Viaduct carried the Boston and New York Air Line Railroad for about 800' between two ridgetops at a maximum of 60' above Flat Brook. It was built at the same time as Lyman Viaduct (separate entry), which stands about one and one-half miles east of Rapallo on the Air Line right-of-way. The configuration and arrangement of Rapallo's wrought iron structural members are identical to those of Lyman. Also like Lyman, Rapallo was filled in during 1912-13 to accommodate faster and heavier trains, and recent sewer construction exposed parts of the viaduct for the first time since that filling.
(E. A. V. Gustafson, "The Air Line," Transportation 2, October 1948; Stanley M. Cooper, "The Air Line," typescript, 1970, Russell Library, Middletown; Scaled drawings accompanying excavation report, 1979, courtesy Cahn Engineers, Wallingford.)

AIR LINE RAILROAD STONE ARCH BRIDGES (1872)
Middle Haddam Rd.
Portland

Middle Haddam
18.701820.4604250
18.703500.4604280

These structures were built during initial construction of the Boston and New York Air Line Railroad in the early 1870s. The western bridge carried a single track over Middle Haddam Road. The arch, spanning about 28' and rising about 22', consists of closely fitted granite blocks. Wing walls are all at different angles to the bridge axis due to the large skew between track and road. The north wing walls and the top courses on the north side of the bridge were rebuilt in brownstone. About one-half mile to the east, a similar though slightly smaller bridge carried a single track over Great Hill Pond Brook. The east bridge has no wing walls and bears no sign of rework. This rail line is now abandoned.
(Stanley M. Cooper, "The Air Line," typescript, 1970, Russell Library, Middletown; Interviews with Harold Isham and Philip Moberg, Office of Mass Transit Planning, DOT, December 1978.)

MIDDLETOWN SWING BRIDGE (c.1907)
Rte. 9
Middletown

Middletown
18.696090.4604110

The first railroad bridge to cross the Connecticut River at this location was built in the early 1870s to carry the Air Line. Portions of the Air Line had been under construction for 20 years by the early 1870s, and completion of this crossing presented the major obstacle to a through route between New York and Boston. Commercial interests in Hartford had been able, through their state legislators, to prevent the state from granting permission for this crossing. Middletown, about 15 miles down-river from Hartford, had some advantage in waterborne transport because the river was navigable to the town through the dry months, while the river at Hartford was too shallow in the summer. The Hartford mercantile sector feared that if the route between New York and Boston, which bypassed Hartford, were completed it would combine with Middletown's superior river position to strangle Hartford trade. The long delay in granting rights to build the bridge prevented that, for by the time the Air Line was complete other east-west lines had been established for several decades and the Air Line had little chance to develop a market. Furthermore, the Air Line had to connect with the New York, New Haven and Hartford's New York Division at New Haven in order to reach New York. The New York, New Haven and Hartford set connection and track-use fees high enough to prevent the Air Line from realizing any profit from operations. Within ten years after opening the Air Line came under operating control of the New York, New Haven and Hartford, and this control was later formalized as the ill-fated route became the Air Line Division. The present bridge was built c.1907 during the New Haven Railroad's program to upgrade the

Air Line route. It consists of five rivet-connected steel double-intersection Warren trusses with sub-struts. The center truss, which has an inclined top chord, is the swing span. The 1,142'-long, single-track bridge carries trains occasionally, but most of the time the swing span is open.
(Board of Directors of the Boston and New York Air Line Railroad Co., Annual Report, 1878, 1880; Stanley M. Cooper, "The Air Line," typescript, 1970, Russell Library, Middletown; PC.)

COGINCHAUG RIVER BRIDGES (c.1907)
off Rte. 157
Middletown and Middlefield

Middletown
18.693220.4601420
18.692460.4599820

The New York, New Haven and Hartford Railroad built these bridges during its program to improve the route of the recently acquired Air Line Railroad. The spans are nearly identical, both consisting of double intersection Warren deck trusses, with sub struts, carried on brownstone abutments. Members in both are steel and joints are rivet-connected. The Middlefield bridge is about 110' long and the Middletown bridge (less than one mile downstream) is about 90' long. Both carried one track.
(Stanley M. Cooper, "The Air Line," typescript, 1970, Russell Library, Middletown.)

HIGGANUM LENTICULAR BRIDGE (c.1885)
Nosal Rd. over Higganum Creek
Higganum/Haddam

Haddam
18.703780.4596600

Berlin Iron Bridge Co. built this 48'-long, wrought iron pony truss in the mid-1880s. It retains all the features characteristic of the firm's standard practice on small lenticulars: nut connections at the end posts and pins at all other joints; riveted, tapering floor beams; and tapering web posts of paired channels with lacing bars. See entry for Berlin Iron Bridge Co. Plant.

EAST HADDAM SWING BRIDGE (1913)
Rte. 82
East Haddam

Deep River
18.711740.4591800

In 1909 a Governor's Commission on transportation recommended constructing a swing bridge across the Connecticut River at East Haddam rather than giving state aid for ferry service. Local residents had lobbied vigorously for the bridge and were gratified with their success. The state hired Edward W. Bush, one of Connecticut's most prominent civil engineers, as chief engineer for construction. Holbrook, Cabot and Rollins

of Boston won the contract for the superstructure and American Bridge Co. bid successfully for substructure work. Construction lasted from April 1912 to June 1913. The bridge has three spans, all composed of rivet-connected steel members. From west to east they are: a 101'-long Warren deck truss; a 327'-long Pennsylvania through truss; and the 461'-long swing span. The swing span is a Pratt through truss with inclined top chord. The stone-block piers and abutments rest on timber pilings. The bridge opened on Flag Day, 1913 and was hailhd as an ornament to this "age of progressiveness."
(Official Program of the Opening of the East Haddam Swing Bridge, 1913; State of Connecticut, "Contract Drawings," plans and elevations of proposed bridge, 1911, State Library, Hartford; Edward W. Bush, "Final Report on Construction of East Haddam Bridge," typescript, n.d., State Library.)

OLD SAYBROOK BRIDGE (1907)
Shoreline Route
Old Saybrook

Old Lyme
18.721870.4576440

The New York, New Haven and Hartford Railroad built Old Saybrook Bridge in 1907 to replace an earlier span that had crossed the Connecticut River at this location. It is a through truss Scherzer rolling lift bascule bridge, with riveted steel superstructure and masonry abutments and piers. There are ten spans in all, each carrying two tracks. From west to east they are: five Baltimore through trusses, each 182' long; the bascule span, a 158'-long Warren with verticals; two deck-girder rocker spans, 38' and 65' long; and two more 182'-long Baltimore through trusses. The bridge bears daily traffic.
(PC; NR; J. H. Soehrens, "The New Connecticut River Bridge," CSCE, 1907.)

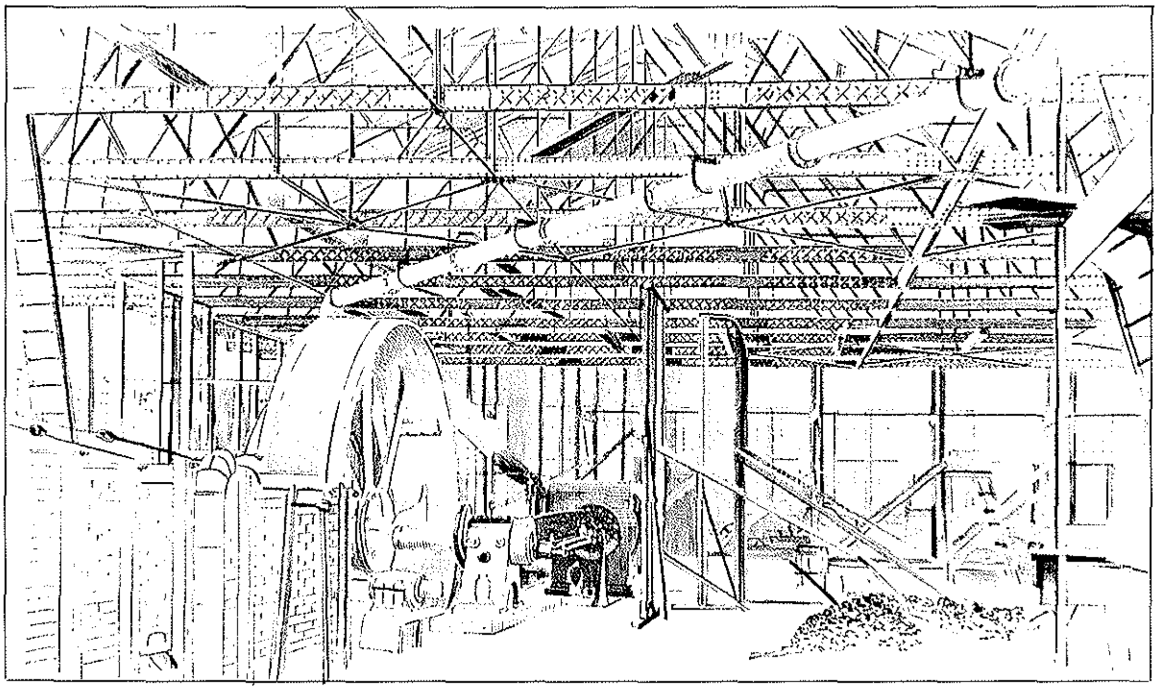
Bulk Products

SCOVILL BRASS WORKS (1872)
East Main St.
Waterbury

Waterbury
18.663950.4601840.

In 1920 the Waterbury plant of Scovill Manufacturing Co. was the largest brass and brassware factory in the nation. It covered land between East Main, Bridge and Mill Sts. and the Mad River. Scovill erected most of the extant buildings between 1900 and 1920, when employment rose from 2,000 to a peak of 13,500, but Scovill's origin extends a century further back, to Abel Porter's 1802 button shop. Several different groups owned this shop until 1827, when J.M.L. and W.H. Scovill formed a partnership to control it. The business relied on government orders for military buttons until the importation of skilled British workers in the late 1820s enabled the Scovills to begin primary production of brass (an alloy of copper and zinc), making and selling it in the basic forms of sheet, bar and wire. Markets for primary brass products continually expanded. Chauncey Jerome's 1837 introduction of clock movements made from sheet brass provided a significant early opportunity. Scovill also broadened its own brassware production, increasing the firm's use of primary brass products. Scovill adopted new lines, such as daguerreotype plates in 1842. The firm greatly increased manufacture of lamps and lanterns in the 1860s as exploitation of petroleum created a demand for lighting devices. Buttons remained a major line, with other light hardware manufactures added, such as hinges and curtain trimmings. The market for sheet brass used in metallic cartridges varied with the level of belligerency, both here and abroad. Cartridge brass and other military material accounted for much of the firm's growth in 1914-1918. New construction at that time, and subsequent highway construction, eliminated most of the earlier factories.

Today the oldest buildings are at the west end of the plant. Some 15 multi-story brick and brick-pier factories stand, most built in 1900-1910. One 1872 factory survives, 3 1/2-story and about 200' x 40' with gable roof and central stair tower. The south end of one c.1885 rolling mill can be seen; it is a brick-pier structure, 95' wide with one high story and a low monitor atop the gable roof. The massive structures of the World War I era depict vastly increased capacity. The 1915-16 rolling mill,850' x 310', has brick walls and a sawtooth roof carried on steel trusses. The 5-story, 600' x 78' reinforced concrete factory along East Main St. was also erected in 1915-16. In all, 24 buildings were started in those two years and nearly 70 buildings went up between 1900 and 1920. After World War I employment dropped to 8,000 and continued to dwindle in ensuing decades, with a temporary upward trend during World War II.



Holmes, Booth and Haydens, rolling mill interior
Berlin Iron Bridge Co., Catalog, c.1894.

In 1976 Scovill sold primary brass production to a new firm, Century Brass Co. Scovill now limits production in Waterbury to electrical appliances.
(Osborn; Pape; Cecelia F. Bucki, "Waterbury Industrial History, 1820-1920," typescript at Mattatuck Museum; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895.)

BENEDICT AND BURNHAM BRASS WORKS; (c.1860) Waterbury
WATERBURY BUTTON COMPANY 18.663580.4601000
698 South Main St.
Waterbury

Benedict and Burnham Manufacturing Co. grew from Aaron Benedict's button shop, opened in 1812. After skilled British roller-hands were brought to Waterbury in the late 1820s, Benedict began producing primary brass products (sheet, bar, wire) for use as raw materials by other manufacturers. He also continued making finished consumer goods from brass. Benedict and Burnham Manufacturing Co. incorporated in 1843. Unlike the other large Waterbury brass firms that continued both primary production and fabrication of finished goods, Benedict and Burnham set up nominally separate corporate entities for major lines of fabricated goods. American Pin Co. began as an expanded division of Benedict and Burnham in 1846, followed by Waterbury Button Co. in 1849, Waterbury Clock Co. (separate entries) in 1857 and Waterbury Watch Co. in 1880. The parent firm retained primary production and manufacture of light hardware such as handles, knobs, drawer-pulls, burners, lamps, beading, rivets and hinges. Substantial demolition and alteration have occurred at the plant. One c.1860 brick, gable-roofed, 2 1/2-story factory survives. Next to it stands an 1892 casting or rolling shop, brick, about 80' wide, high 1-story, with stepped-gable facade and monitor roof. Most of the extant fabric dates from 1900 to 1916, when 31 new buildings were erected. Across South Main St. stands the Waterbury Button Co. plant, consisting of 3-story and 4-story brick and brick-pier factories ranging upward in size from 112' x 40' and built from c.1880 to 1910. Benedict and Burnham joined American Brass Co. in 1900, one year after three brass producers in the Naugatuck Valley merged to create that holding company. Anaconda Copper Co. bought American Brass in 1922 and still houses some production at this plant.
(Osborn; Pape; Cecelia F. Bucki, "Waterbury Industrial History, 1820-1920," 1980, typescript at Mattatuck Museum; Waterbury and Her Industries, c.1905; G.M. Hopkins, Atlas of the City of Waterbury, 1879; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895.)

HOLMES, BOOTH AND HAYDENS BRASS WORKS (c.1870) Waterbury
Bank and Washington Sts. 18.663320.4600940
Waterbury

Holmes, Booth and Haydens Co. began operation in 1853, with initial products of rolled brass sheet, drawn brass wire, builder's hardware and daguerreotype plates. The firm added lamp and button manufacture in the 1860s, as well as production of tableware from German silver. This alloy of copper, zinc and nickel was widely used for flat and hollow ware. All the Waterbury primary brass producers made German silver for the tableware firms, centered in Meriden and Wallingford. Some of the Waterbury firms had divisions or subsidiaries in tableware production, and most of the brass entrepreneurs at least invested in this branch of industry. Holmes, Booth and Haydens joined American Brass Co. in 1901; that holding company apparently concentrated new construction in Waterbury at other plants, such as Benedict and Burnham (separate entry). The Holmes, Booth and Haydens plant has been altered, but overall it reveals more accurately than the other extant complexes the scale of a 19th-century integrated brass firm in Waterbury. Portions of the c.1870 rolling mill remain. Originally 140' wide and about 225' long, one end was demolished c.1910 when a sawtooth-roofed extension was built; the original mill and the extension both have brick walls. The lamp-burner shop, built c.1875, is attached to the rolling mill. The 3 1/2-story brick factory, about 180' x 40', has a dormered gable roof and a central stair tower topped by a pyramidal roof. The wire mill, foundry and spoon shop have been demolished. Anaconda Copper Co., which bought American Brass Co. in 1922, still owns this plant, but activity here appears to be limited. (Osborn; Pape; Cecelia F. Bucki, "Waterbury Industrial History, 1820-1920," 1980, typescript at Mattatuck Museum; G.M. Hopkins, Atlas of the City of Waterbury, 1879; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895.)

AMERICAN SUSPENDER MILLS (1843)
313 Mill St.
Waterbury

Waterbury
18.663800.4601300

American Suspender Co. was founded in 1843. The firm wove elastic narrow fabric for suspenders and garters and non-elastic narrow fabric for lamp wicks, saddlery and other uses. The 1843 brick mill survives: 5 1/2-story and 115' x 50' with clerestory monitor roof, corbeled cornices returning partially at both levels of the roof-slope, and segmental-arch windows with stone sills. Except for the missing roof on the central stair tower, the mill remains intact. Attached to its southeast corner is another mill erected during the firm's first decade. The 3 1/2-story, 85' x 42' brick mill has a gable roof and corner stair tower. Its cornice and windows resemble those of the first mill. The masonry dam across the Mad River and parts of the masonry-walled headrace survive, though substantially altered. In 1870 the river provided 100 horsepower; there were 200 looms and a workforce of 50 men and 400 women. American Suspender failed in 1879. American Mills Co. bought the plant in 1881 and resumed production. This firm built a 2-story brick-pier mill, about 300' x 45', in 1910. A textile finishing firm now occupies the buildings.
(Pape; Census 1870; Waterbury and Her Industries, c.1905; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895.)

HOME WOOLEN MILLS (c.1865) Naugatuck
Rte. 8 18.661880.4589500
Beacon Falls

Home Woolen Co. began manufacture of fancy cassimeres here in the mid-1860s, in a 3 1/2-story brick mill, about 225' x 45' with gable roof and segmentally arched windows with stone sills. The adjacent 2-story brick mill, about 90' x 60', served in part as the picker house. In 1870 the water-powered mill employed 155 men, 67 women and 44 children; there were 17 sets of cards, some 3,700 spindles and 70 broadlooms. Traces of the masonry dam across the Naugatuck River and an open, masonry-walled headrace remain. An 1890s addition has a near-flat roof and windows resembling those of the earlier structures. The brick counting house, 2-story with gable roof, stands just west of the addition. Later structures include a 4-story brick-pier mill and a 2-story brick mill with sawtoothed roof. North of the mills stand six mill houses: two duplexes and four single-family dwellings. Uniroyal now owns the complex.
(New Haven Atlas; Census 1870; Water Power Report.)

MERIDEN WOOLEN MILL (1865) Meriden
Pratt and Center Sts. 18.684250.4601020
Meriden

Jedediah Wilcox ran a carpet-bag manufactory on this site in 1850. He added production of hoop skirts in 1853 and of Balmoral skirts in the 1860s. The oldest standing structure is the 1865 brick mill, 250' x 56' with segmental-arch lintels, stone sills and a central stair and freight tower; a later occupant removed the mansard roof. In 1870 Wilcox produced woolen cloth primarily; the mill held 13 sets of carding machines and employed 150 women, 100 men and 20 children. Several changes of ownership occurred before 1886, when Rawitzer Brothers Woolen Co. bought the mill. This firm stayed until 1920, when New Departure Co. (separate entry) bought the works for ball-bearing production. New Departure removed the roof, applied a stucco finish to the walls and built the attached 4-story reinforced concrete factory, about 300' x 250' with brick curtain walls and a flat roof. The present occupant, a formed-metal goods manufacturer, replaced New Departure after World War II.
(New Haven Atlas; Census 1870; Barlow's Insurance Survey, #3614, 1875 with supplements 1884, 1885, 1886, MVTM; Frances A. Breckenridge, Recollections of a New England Town, 1899; Town Book Committee, 150 Years of Meriden, 1956.)

MILLER BRASS WORKS (1866)
Center St.
Meriden

Meriden
18.684040.4600500

Edward Miller started making small hardware items, such as candlestick springs and kettle ears, in 1844. In subsequent decades his works became a smaller-scale version of the integrated brass firms of Waterbury. The shop began manufacture of kerosene lamps in 1858, and fabricated brassware products came to include tableware, hinges and beading. The firm began rolling brass and German silver for its own products in 1868. Some 250 people worked here in 1870. A direct descendent of E. Miller and Co. still occupies these buildings and pursues similar, though evolved, lines of work to those of its predecessor. Several mid-1860s structures survive, including a 3 1/2-story brick factory with cut-stone lintels and sills and shed-roofed dormers along the gable roof. A c.1870 addition, also brick and gable-roofed, features a central stair tower, segmental-arch lintels, stone sills and the same dormers. Three brick, monitor-roofed foundry or rolling-mill buildings date to later in the 19th century, as does a 4-story brick factory with near-flat roof. Modern structures now house the rolling operations.
(New Haven Atlas; Census 1870; S.C. Pierson, Map of Meriden, 1891; Town Book Committee, 150 Years of Meriden, 1956.)

MALLEABLE IRON FITTINGS COMPANY (c.1880)
Maple Street
Branford

Branford
18.682950.4571200

Joseph Nason of Boston founded Malleable Iron Fittings Co. (MIF) in 1864. Nason was developing and planning to market steam-heating systems; MIF was to cast and machine the pipe fittings for these systems. Nason and his partners bought the Totoket Co., a Branford foundry that made agricultural machinery parts, and converted it to cast and machine malleable iron fittings. The structures on the site today date from 1880 to 1920. The earliest building is a 3-story, brick-pier factory, 200' x 50' with flat roof, timber framing, corbeled cornice, segmental-arch lintels and bluestone sills. It stands adjacent to a 1914 brick-pier factory (4-story, 220' x 90') which has a flat roof, central stair and water tower on its north side, and flat lintels of brick reinforced with steel shelf angles. Along with a c.1910 3-story, brick-pier factory (150' x 80'), these buildings housed most of the machining departments. The foundries comprised most of the 10 acres of floor space in the plant. By 1910 the production of miscellaneous castings exceeded the output of pipe fittings and MIF was equipped to cast steel and brass as well as iron. There is no equipment in the decommissioned plant to indicate which foundries were used for each material, but the massive size of the foundries illustrates the space requirements for a casting operation employing 1,400 people and with 23,500 tons annual capacity (c.1915). There are two groups of foundries. The west group has two long foundries side-by-side, 500' x 70' and 350' x 60'. Both rise one high story and have brick-pier walls

and steel lattice-girder framing, and both conform to the standard configuration of turn-of-the-century foundries: three long bays with the central bay under a narrow monitor. A later, and much wider, brick-pier foundry, 210' x 135' with two stories in the side bays, spans across the ends of the two parallel foundries. The east group of foundries has nine monitor-roofed, steel-framed sections side-by-side. They range in length from 130' to 250' and total width is 550'. Three powerhouses, several smaller manufacturing buildings, a stone office building and an 800'-long wharf along the Branford River complete the complex. Some of the buildings now house tenants.
(Osborn; John A. Brett, Connecticut Yesterday and Today, 1935; Malleable Iron Fittings Co., Malleable Iron Fittings, 1854-1946, 1946; Associated Mutual Insurance Co., "Malleable Iron Fittings Co.," survey #19620, 1917.)

SPENCER FOUNDRY (1852?)
20 Fair St.
Guilford

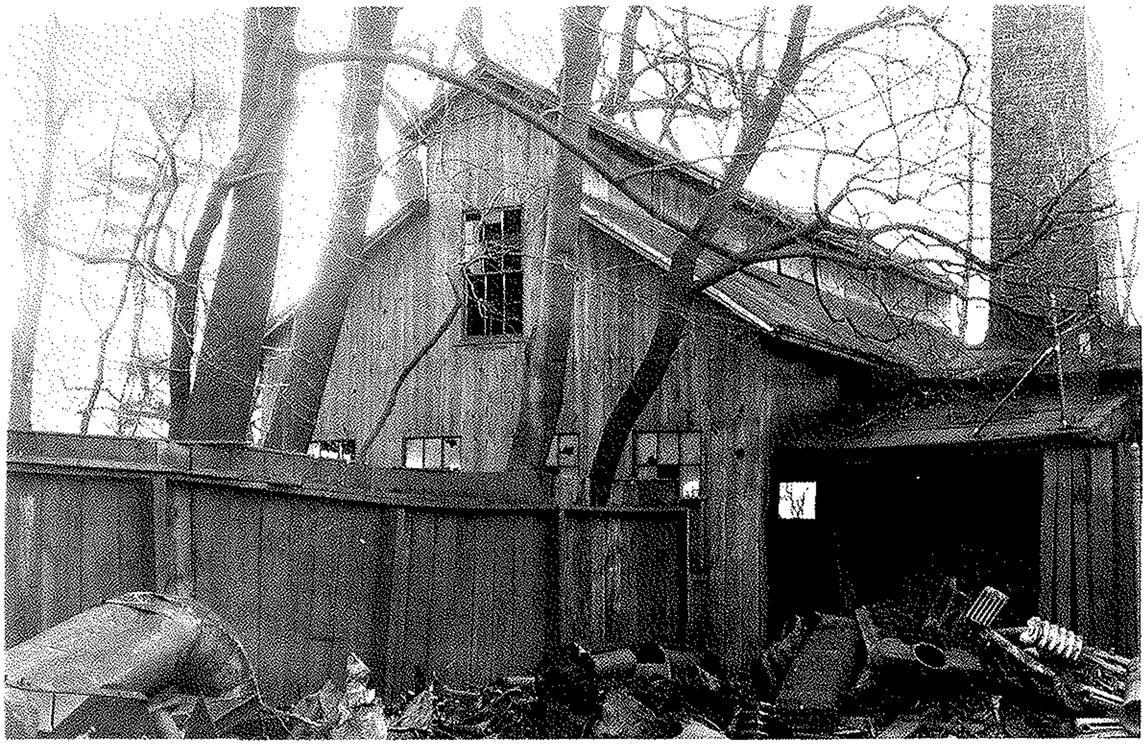
Guilford
18.693800.4572750

I. S. Spencer bought a bankrupt foundry in the early 1850s and ran it until his death in 1867. The business was small in 1860, with just five workers and about one ton weekly output. Three-quarters of the work went to agricultural implements, indicating the limited production and markets of commercial foundries in antebellum Connecticut. A timber-framed building with vertical-board siding stands in the yard of the present plant. Its small scale, about 55' x 25', is consistent with the firm's size in the 1850s. Its high one story and gable roof with narrow monitor are found in many foundries and rolling mills built later in the 19th century, and would represent an early application of these features of foundry design if Spencer used them in the 1850s. His sons certainly applied them in 1869 when they built a brick-walled foundry, 100' x 60'. This building housed a growing operation which in 1870 employed 36 men and poured about 6 tons per week. The firm continued to grow in the 1870s, building two new 2-story factories for pattern-making and machining. Both are brick and the street-facing addition features a corner stair tower with pyramidal roof. By 1880 the Spencers employed 60 men producing castings used as component parts in other products, such as pedastals for lamps and legs for school desks. Still used as a foundry, the plant is the only industrial site on a residential street.
(Bernard C. Steiner, History of the...Original Town of Guilford, 1897; Census 1860, 1870, 1880.)

WOODBRIDGE LIMEKILN (c.1900)
Route 69 and Dillon Rd.
Woodbridge

Mount Carmel
18.669070.4582300

This 55' x 25' kiln far exceeds in size the earlier extant kilns in the state (see entry for Sharon Valley Limekiln). The roughly coursed rubble walls incorporate many large boulders. Iron tie-rods terminating in



Spencer Foundry (M. Roth)

cast-iron plates formerly bound the walls, but the timbers against which they bore have rotted away. The two hearths, each with an arched opening consisting of our courses of brick, rise 9 1/2' at center and span 15'. Masses of fused lime plug the vent openings to the chimney in the south hearth; fallen stone has filled the vents in the north hearth. Atop the kiln can be seen two round chimney openings filled with rock, earth and weeds.
(CHC; Federal Writer's Project, Connecticut: A Guide to Its Roads, Lore and People, 1938.)

QUINNIPIAC BREWERY (1896)
19 River St.
New Haven

New Haven
18.676320.4574500

Quinnipiac Brewing Co. began making beer and ale in the 1870s, but little of the early plant appears to survive. The present brewing building represents an 1896 remodeling of an early 1880s structure. Brick, 5-story and 78' x 62', it stands at the south end of the complex; a large loading bay breaks the south wall. A 4-story brick wing and three brick ingredient storehouses stand behind the brewing building. At the north end of the complex is the 1-story brick boiler and engine house, and to the west a 3-story brick building that probably served in part as offices. Operations ceased after the Volstead Act and the buildings have served as warehouses ever since.
(Chamber of Commerce, The Industrial Advantages of New Haven, 1889; New Haven Assessor's Records.)

Manufacturing

Naugatuck Rubber Plants (1861)
Water St.
Naugatuck

Naugatuck
18.662360.4594700

Charles Goodyear came to Naugatuck in 1843 searching for investors to manufacture rubber goods under his patent. He convinced William DeForest, owner of a satinet mill and a relative by marriage, and Milo and Samuel Lewis, proprietors of a cotton warp mill, that rubber footwear was a viable product. They capitalized The Goodyear Metallic Rubber Shoe Co., the first step in the creation of the United States' first "rubber town." The Lewises also began The Goodyear's India Rubber Glove Manufacturing Co. in Litchfield, moving it to Naugatuck in 1847. The rubber producers, while successful, grew slowly. Metallic Shoe found a steady market for its "arctics" or rubber overshoes, and India Rubber Glove expanded its production to include ponchos, blankets, rubber clothing and dress shields, but in 1880 the two firms employed only 680 workers out of 4,300 people in the town.

In the early 1850s Metallic Shoe joined the Goodyear Shoe Association. Founded by five Goodyear licensees to combat a suit aimed at invalidating the Goodyear patent, the Association stayed intact after winning the suit in 1852. For 40 years the members used the Association to regulate prices and standardize products, until in 1892 this cooperation was formalized as the members merged to form The U. S. Rubber Co. India Rubber Glove joined U. S. Rubber in 1894. This combination followed a decade of accelerating growth for the rubber producers, during which their employment, sales and physical plants all multiplied several times over. Naugatuck's largest concentration of 19th-century industrial structures portrays this era of expansion.

The plants are on the site of the antebellum rubber factories, along Water St. between the town's commercial district and the west bank of the Naugatuck River. The two firms faced each other across Maple St., Metallic Shoe to the north and India Rubber Glove to the south. The oldest extant building is Metallic Shoe's 1861 3 1/2-story, brick mill, 152' x 40' with gable roof. Attached to it is an 1875 4 1/2-story mill, 92' x 40', also brick with gable roof; both are timber framed. Immediately north of these buildings stand four brick factories built in 1888. Three of these have three stories (128' x 52', 107' x 60' and 170' x 42') and one has four stories (110' x 42'); all had gable roofs originally but one has been changed to a flat roof. Metallic Shoe probably used these buildings, especially the upper floors, for the piecing and sewing operations to make footwear. The other major processes--laminating rubber to cloth and vulcanizing--required sturdier floors for calendar rolls and ovens. A brick boiler house (65' x 37'), rising one high story, also dates from 1888. The 1892 merger stimulated further expansion and a series of brick buildings went up soon after: an engine and pump house (high 1-story, 60' x 57') in 1892; a 3-story, gable-roofed factory (146' x 41') in 1893; a 4-story factory (170' x 50") with near-flat roof, and a 2 1/2-story, gable-roofed office building (67' x 36') in 1895. In 1904 new buildings were erected for the bulk processes. The brick vulcanizing building, 78' x 36' with one high story, utilizes a monitor roof carried by steel trusses. Timber beams and steel posts support the 2-story brick laminating building, 164' x 42'.

South of Maple St., India Rubber Glove also expanded significantly in the late 1880s, with six brick, timber-framed factories built in 1887-88, including the 1-story vulcanizing building (130' x 80') with a monitor roof, the "cutting & fitting" building (4-story, 209' x 60') and four more factories: 2-story, 290' x 108'; 2-story, 93' x 93'; 5-story, 117' x 53'; 5-story, 210' x 50'.

These two plants were not run as integrated parts of a larger firm until 1914, when U. S. Rubber built machine shops at the south plant to serve both sets of factories: a 3-story, frame structure with clapboard siding (90' x 41') and a 1-story, brick shop (129' x 33'). In 1917 the two plants were combined to form the Naugatuck Footwear Division. Several of the glove and clothing factories converted to produce boots and shoes, and a laminating plant built in the north section served the entire united complex. Four stories high and 177' x 68', it has steel posts, timber beams, slow-burn flooring and a sawtoothed roof.

Expansion of the rubber industry made Naugatuck more dependent on rubber. By the 1890s rubber-factory employees comprised about a third of the town's 6,200 people. The rubber entrepreneurs started subsidiary industries in the 1890s as well: first a reclaiming plant to make raw material for manufacturing from used rubber products, then a factory to make the huge quantities of sulfuric acid used in the reclaiming process. A paper box factory made packaging for the rubber products. U. S. Rubber absorbed all these plants by the early 20th century. The town was extremely vulnerable to displacement in the rubber industry, and vulnerability increased as the Naugatuck Footwear Division lost money throughour the 1920s. The entire town held its breath in 1928 when E.I. DuPont de Nemours and Co., after gaining virtual operating control of U. S. Rubber, decided to consolidate the seven U. S. Rubber footwear plants into one operation. Fortunately for Naugatuck, DuPont chose it as the site. In an extraordinary reversal of the nationwide trend, employment at the Naugatuck Footwear Division rose from 2,000 in 1928 to 6,500 in 1932, making it the only town in the industrialized Naugatuck Valley to gain jobs through the Great Depression.

New buildings have been erected at Water St., some of the old ones altered and others demolished, but these that remain are central in the history of Naugatuck and the industry so closely intertwined with the town.

(Constance Green, History of Naugatuck, Connecticut, 1948; Glenn Babcock, History of the United States Rubber Company, 1966; Census 1850, 1860, 1870, 1880; Naugatuck Assessor's Records.)

FARREL FOUNDRY AND MACHINE WORKS (c.1890)
East and West Main Sts.
Ansonia

Ansonia
18.660660.4578100

Millwright Almon Farrel worked for Anson Phelps, the brass entrepreneur whose move here in 1845 was the first major industrial development in the area that became Ansonia. In 1846 Farrel completed the dam and races for Phelps' mill. The next year he bought land and water rights from Phelps and built a small foundry and machine shop. Farrel had ready markets in the developing brass and rubber industries, and subsequently took up related lines of rolls (for paper, sugar and grain milling), gearing and shafting. Farrel Foundry and Machine Co. (so named in 1857) worked mainly in special-order jobbing, so employment fluctuated. Between 1850 and 1880 the firm employed 100 to 200 men according to the amount of work on hand. Annual production rose from 500 tons of cast and machined rolls and millwork in 1850 to 4,000 tons in 1860 and some 9,000 tons in the 1870s.

Today there are three Farrel plants in Ansonia, all with many structures and most built since the early 1890s. The plants reflect the firm's tenure at the top of its trade in heavy equipment manufacture. The East Main St. Plant includes the pattern shop and an entire city block of factory buildings. The pattern shop, built c.1911, is a 3-story concrete-block structure, about 200' x 60'. The factory block has a 4-story brick mill with flat roof, segmental-arch lintels and stone sills, and a 4-story reinforced concrete factory. The Bridge St. Plant stands between the east bank of the Naugatuck River and West Main St. Its major buildings are three parallel factories, each several hundred feet long, all of brick with varying roof configurations: a monitor roof; a gable roof with trapdoor monitors; and a sawtoothed roof. At the northern end of this complex, on Bridge St., stands an ornate office building of white brick with marble trim. The Farrel Ansonia Plant, just north of Bridge St., includes dozens of factory and foundry buildings, most of brick. This plant includes a monitor-roofed foundry, built by Berlin Iron Bridge Co. for Farrel in the early 1890s, that represents the archetypal foundry building of its day. It is 302' long and 148' wide. Interior space is divided into a central bay 55' wide and wings of 50' and 43' width. A traveling crane traversed the entire center section carried on crane girders supported by iron columns of 3' diameter; jib cranes served the wings. The Farrel Company Division of USM Corporation now occupies these plants. Throughout the Naugatuck Valley today one sees many of the industries that depended on Farrel equipment, as well as the towns that were populated by people who worked every day with roll mills made by Farrel, or in factories powered by Farrel millwork.

(Census 1850, 1860, 1870, 1880; Farrel-Birmingham Co., Farrel Centennial, 1948; Farrel-Birmingham Co., Plants and Products, 1949; Berlin Iron Bridge Co., Catalog, c.1892; Ansonia Bicentennial Book Committee, A History of Ansonia, 1976.)

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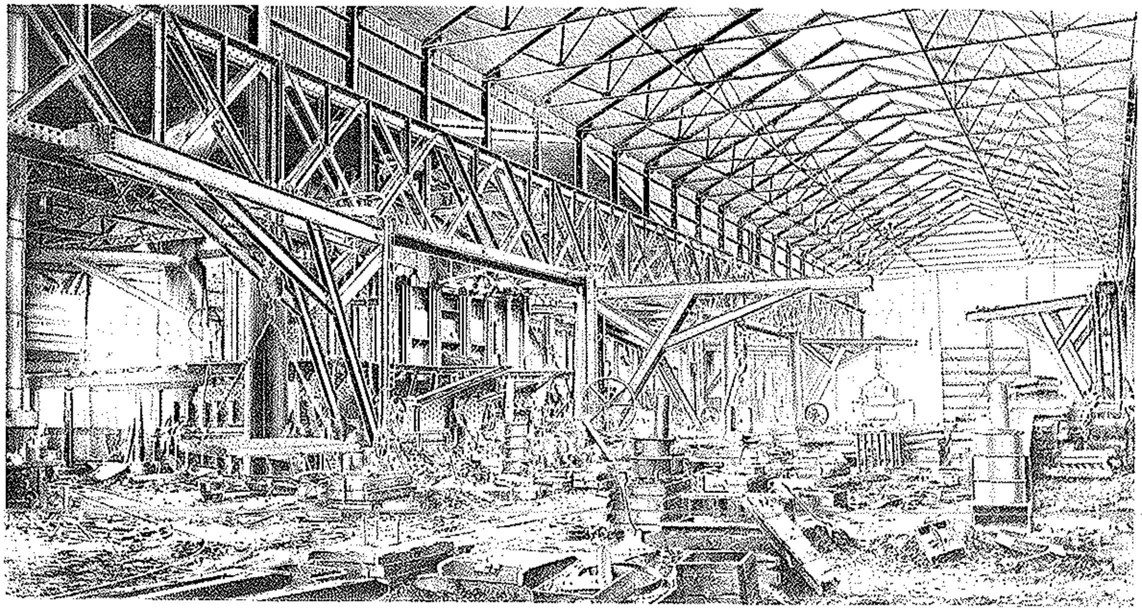


Farrel Foundry and Machine Co., foundry interior
Berlin Iron Bridge Co., Catalog, c.1894.

WATERBURY CLOCK COMPANY MOVEMENT PLANT (1860)
232 North Elm St.
Waterbury

Waterbury
18.663850.4602460

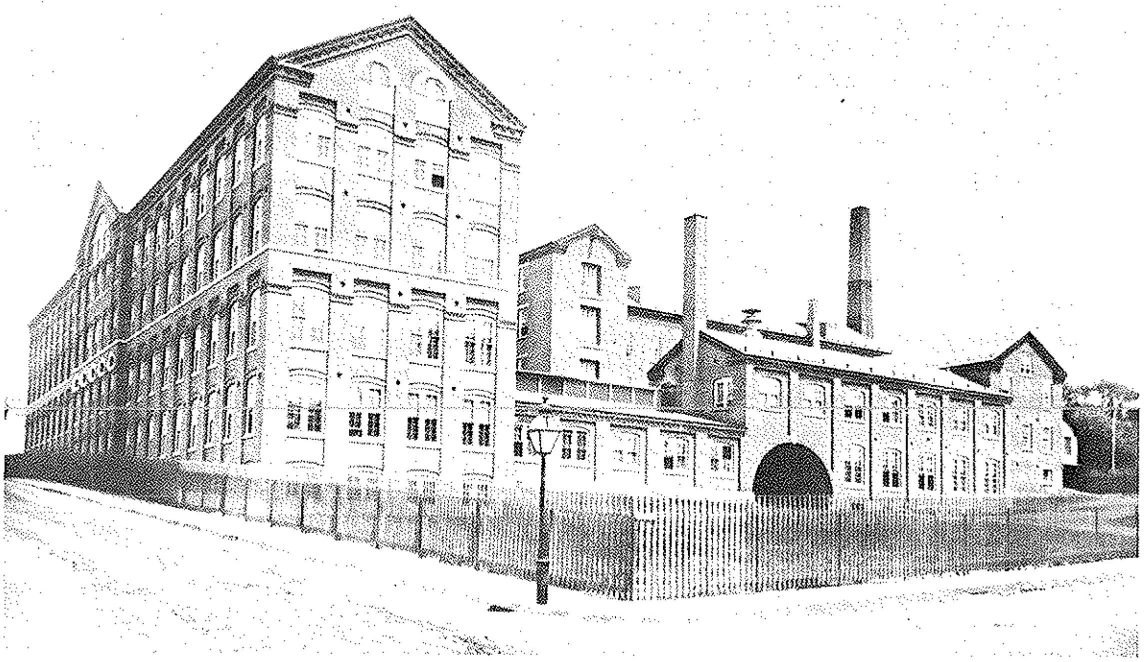
Waterbury Clock Co. began in 1857 as an offshoot of Benedict and Burnham Manufacturing Co. In 1860, housed in the Benedict and Burnham plant on South Main St. (separate entry), Waterbury Clock employed 70 people and produced 60,000 assembled clocks plus 10,000 clock movements. Ten years later 142 workers made 82,000 clocks and 96,000 movements. In 1873 Waterbury Clock moved to a factory on North Elm St. that had been built in 1860 by Waterbury Knitting Co. The 4-story brick mill, about 190' x 45', has a low-pitched gable roof and segmentally arched windows with stone sills. Two 4-story brick-pier ells, each about 80' x 40', date from c.1880. In 1890-92 three more brick factories and an ornate hip-roofed office building with rusticated stone walls were erected. The period of largest and fastest growth began in 1893, as the firm expanded its plant to serve the markets developed by Robert Ingersoll. Ingersoll's firm, R. H. Ingersoll and Brothers, acted primarily as a selling agent. Ingersoll ordered 188,000 "Jumbo" watches in 1893, 300,000 in 1894, and the order increased every year. Ingersoll also worked with Waterbury Clock in reducing the watch's size and in formulating mass production techniques for its manufacture. The redesigned, mass-produced timepiece became known as the "Dollar Watch."

After Ingersoll's first order Waterbury Clock built a 4-story brick-pier factory, about 165' x 40', for the expanded production. More factories were built in 1898 and 1901, and several others were lengthened or gained stories. In 1905-1906 Waterbury Clock added three 5-story brick-pier factories with dimensions of 116' x 43', 104' x 43' and 176' x 40'. The plant employed over 2,000 people in 1910 and produced some 3.5 million watches. Further expansion took place to the west across North Elm St. and to the south across Cherry Ave. The west factory has been demolished but the 1918 south factory continues to stand. The 5-story reinforced-concrete factory, 176' x 40', has a flat roof. Benrus Watch Co. moved to Waterbury in the 1920s, renting space here from Waterbury Clock until buying the entire plant in 1944. Since Benrus moved out in 1968 many of the buildings have remained vacant.
(Osborn; Pape: Census 1860, 1870; Cecelia F. Bucki, "Waterbury Industrial History, 1820-1920," 1980, typescript at Mattatuck Museum; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895.)

WATERBURY CLOCK COMPANY CASE SHOP (c.1905)
250 Mill St.
Waterbury

Waterbury
18.663750.4601480

Waterbury Clock Co.'s Case Shop initially occupied space in the Benedict and Burnham Plant, just as the Movement Shop did. In 1864 the Case Shop moved into frame buildings purchased from Cotton Gin Manufacturing Co.



Waterbury Clock Co. Movement Plant
H. F. Bassett, Waterbury and Her Industries, 1889.

These structures were demolished c.1905 and replaced with this 5-story brick factory, 370' x 40', with two wings, 168' x 50' and 88' x 56'. All sections have near-flat roofs, segmentally arched windows with stone sills, and granite foundations. Belt coursing runs between the second story and third story levels, and cornices feature corbeled brickwork in dentil patterns. A knitwear manufacturer now occupies the buildings.
(Osborn; Sanborn Map Co., Insurance Maps of Waterbury, Conn., vol. 1, 1922.)

MATTHEWS AND WILLARD HARDWARE FACTORY (1874)
16 Cherry Avenue
Waterbury

Waterbury
18.663800.4602300

In 1848 Henry Matthews began producing saddlery trimmings in precious metals and brass. He took William Stanley as partner in 1870 and expanded production to include cast and wrought brass stove trimmings. Matthews and Stanley moved to this site in 1874. The first factory was a 4-story brick building, about 95' x 30' with dormered mansard roof. Stanley died in 1877 and Samuel Willard became Matthews' partner in 1882. In the next four years products came to include lamps, cast urns and statuettes, and the plant was expanded to its present extent. A 2-story brick factory, about 120' x 40', was erected parallel to and west of the original mill. These two buildings held plating, soldering, polishing, harness finishing and shipping departments. Across their south ends were built two more brick mills, both with gable roofs. One is 2-story and about 75' x 50'; the other is 4-story and about 85' x 40'. The first floors of each held stamping machines. (These were frequently installed on ground floors because considerable vibration accompanied their operation.) The upper floors held finishing departments for urns and lamps. A 3 1/2-story, gable-roofed brick factory, about 80' x 40' with hip-roofed corner stair tower, extends south from the 2-story building; a polishing department was on the first floor, machine shop on the second, metal-spinning on the third and storage in the attic. Buildings adjacent to this factory's east end contained the annealing room, boiler house and molding department. Further east was the foundry. Except for frame sheds and parts of the foundry, the entire plant continues to stand. As Matthews and Willard expanded in the 1880s the workforce grew from under 100 people to near 500. The increased payroll and large capital ourlays for construction weakened the firm's financial position. Then in 1888 the primary brass producers, acting in concert through pooling agreements, raised the price of brass by six cents per pound. Many of the "cutting-up shops," as fabricating firms like Matthews and Willard were called, could not survive this increase in their raw material cost. Matthews and Willard was bankrupt by 1890. Tenants occupied the plant until 1903 when Scovill Manufacturing Co. (separate entry) bought it. Many concerns have used the buildings since Scovill sold them in 1945.
(Mattatuck Museum Historical Survey Project, 1979, typescript at Mattatuck Museum; Waterbury and Her Industries, c.1905; Sanborn-Perris Map Co., Sanborn Map of Waterbury, 1895; Pape.)

BLAKE AND JOHNSON HARDWARE FACTORY (1909)
1495 Thomaston Ave.
Waterbury

Waterbury
18.662220.4601500

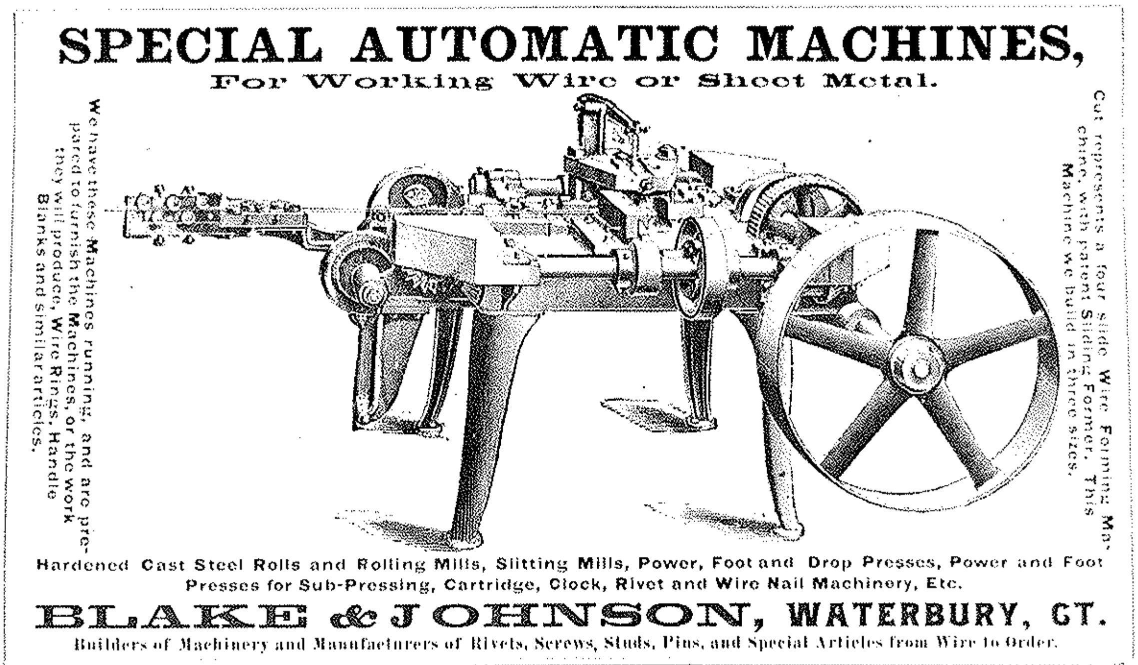
Blake and Johnson Co. represents the machine-building sector of Waterbury's brass industry. Although not used primarily for machine building, these are among the few, if not the only, standing structures that were associated with that crucial part of the city's industrial base. Machinists J. P. Blake and C. W. Johnson organized their firm in 1852. They developed heading machines to make rivets and screws, and small re-rolling mills for jewelry and flatware producers. In the 1860s Blake and Johnson supplied cartridge-making machinery to U. S. arsenals and developed a machine to form hairpins. Their line came to include slitters, presses, grinders, machines for rolling threads and others for forming wire. In 1870 the shop employed 30 people and produced 20 re-rolling mills, 32 presses, 8 rivet-headers and several special-order machines. Blake and Johnson also manufactured hardware, such as bolts, screws, rivets, pins and piano trimmings, that was made on the firm's own machines. The Blake and Johnson East Main St. machine shop and the original hardware production shop on North Elm St. have been demolished. In 1909 Blake and Johnson erected this factory for hardware manufacture. One-story and 260' x 200', it has a sawtooth roof, brick walls and concrete foundation. Adjacent is the 1-story, 80' x 50' brick power house. Blake and Johnson operated here until 1980.

Cross and Speirs, E. J. Manville Co., Kirk and Welton and other Waterbury shops also made specialized machinery to fabricate many different metal products. They also made attachments for, and their own versions of, more standard equipment such as power presses used for buttons, lamps and other goods. The Waterbury-Farrel Foundry and Machine Co. (not extant) was the pre-eminent machinery producer in Waterbury. It started in 1851 as a branch of Farrel Foundry and Machine Co. (separate entry), which was based in Ansonia. In 1880 the Waterbury branch became independent. The Ansonia plant continued making rolling mills and other heavy millwork, while Waterbury-Farrel made a broad range of machine tools and fabricating equipment. Waterbury-Farrel's plant and workforce grew to a size comparable to that of the major brass producers, but the other machine shops had more limited product lines and tended to remain smaller. (Cecelia F. Bucki, "Waterbury Industrial History, 1820-1920," 1980, typescript at Mattatuck Museum; Waterbury and Her Industries, c.1905; Pape.)

DAY CABLE WORKS; (c.1865)
KERITE CABLE WORKS
49 Day St.
Seymour

Naugatuck
18.661620.4584370

Founded in 1854, A. G. Day Co. made small household and office items from molded hard rubber, such as pen and pencil holders. In the 1860s the firm began making insulated telegraph wire, which combined products from two of the Naugatuck Valley's prominent manufactures: copper wire and rubber. In 1870 A. G. Day produced 100 miles of wire while another firm, Julius Day Co., had taken over manufacture of small rubber goods. The



Four-slide wire forming machine
Price and Lee Co., Waterbury and Naugatuck Directory of 1889.

two concerns shared the same building and power system. The c.1865, 3 1/2-story brick mill, about 175' x 40', has a gable roof, central stair tower and segmental-arch windows with stone sills. Remains of the water power system date from c.1882; a 32'-high masonry dam spans Bladens Brook and channels water into an open headrace. W. R. Brixey bought the works in 1892 and concentrated on making electrical cable for such customers as Western Union, Postal Telegraph Co., New York Telephone Co. and New York Central Railroad. Brixey renamed the firm Kerite Co., after the rubber compound used for insulation. Buildings from c.1900 include a 3-story brick-pier factory just downstream from the earlier mill and a 2-story brick-pier factory about one-quarter mile to the west. Kerite still produces cable in this plant. (Hollis C. Campbell et al., Seymour Past and Present, 1902; Census 1860, 1870, 1880.)

WATERMAN PEN FACTORY (c.1880) — Naugatuck
Main and DeForest Sts. — 18.661000.4584050
Seymour

After W. R. Brixey bought the Day cable and rubber works (separate entry), that firm's output of small rubber goods formed the basis of a new enterprise--Waterman Pen Co., which pioneered in the manufacture of hard-rubber fountain pens. Most of the surviving Waterman plant dates from c.1910 and consists of reinforced concrete factories, 2-story, 3-story, 5-story and 6-story. One of the prior occupants of this water privilege on the Naugatuck River built the masonry dam, about 175' long and 18' high, which is founded on a bedrock outcropping. In the mill-yard stands a high 1-story, monitor-roofed thermal-process building with walls of granite in random ashlar. This structure as well probably represents one of the firms that operated here in the late 19th century: United States Pin Co.; Humphreysville Manufacturing Co., augers and bits; or New Haven Copper Co. (Water Power Report; Pape.)

CHESHIRE MANUFACTURING COMPANY; (1850) — Southington
BALL AND SOCKET MANUFACTURING COMPANY — 18.674100.4596940
493 West Main St.
Cheshire

Twenty-four local investors formed Cheshire Manufacturing Co. in 1850. The firm manufactured stamped-metal goods, mostly brass buttons, though it also made combs and some plateware. The 1850 frame factory, 2-story and 145' x 30' with gable roof, originally extended some 30' longer. Cheshire Manufacturing Co. bought sheet brass in narrow-width rolls and performed all the fabrication operations. The 1870 workforce included 15 men, 25 women and 20 children. Men were concentrated in supervisory and toolmaking jobs; women and children did most of the production work. Six power presses and five stamps made the blanks for buttons and

impressed designs on the button fronts. The 120 foot presses were mostly for assembly of buttons, which generally had three component parts: back, front and wire-eye for attachment to the garment. The toolroom had six machine tools. A 35-horse-power steam engine powered the entire operation. In 1899 the company built a brick production building, 1-story and 156' x 38'. In 1901 Cheshire Manufacturing Co. merged with Ball and Socket Fastener Co. of New Hampshire, forming the Ball and Socket Manufacturing Co. The new title referred to two-piece, resilient metal closures, known today as snaps. New brick buildings were constructed from 1907 to 1917, including 2-story lacquer and paint buildings, each 65' x 40', 2-story tumbling and plating building, 115' x 38', and others for offices, storage and packing. An extension, 112' x 38', was added to the 1899 factory for the eyelet presses that made snap fasteners. These progressive-die presses blanked and completely formed the pieces in a series of six or more operations. Ball and Socket Manufacturing Co. still operates here, with many machines that were probably acquired in the expansion of 1907-1917: 8 presses made by E. J. Manville Co. of Waterbury, 6 presses made by Waterbury's Draher Machine Co., several Waterbury-Farrel eyelet machines and 12 Baird presses. All are now fitted with individual electric motors, as all mechanical power transmission has been removed. The company also uses a substantial number of more recent machines.
(New Haven Atlas; Valerie Kent, "Cheshire Manufacturing Company," 1979, typescript at Mattatuck Museum; Census 1870; Interview with William Anthony, Jr., President, Ball and Socket Mfg. Co., August 1980.)

PARKER SPOON FACTORY (1845) Wallingford
Church St. 18.682000.4595420
Yalesville/Wallingford

Charles Parker built this factory on the Quinnipiac River in 1858, but tableware manufacture began here with Charles and Hiram Yale in 1815. The Yales made pots and spoons of brittania. This alloy of tin, copper and antimony competed directly with pewter (an alloy of tin and lead primarily) as a material for flat and hollow ware; brittania was harder and took a higher polish. The Yales made tableware until 1835, after which several different manufacturers used the shop until Parker bought it in 1848. Parker, from nearby Meriden, had produced various hardware items, such as coffee mills, spectacles, tobacco boxes and tableware, since 1832. At first he used the Yalesville mill for spoon production. In 1860 his 60 employees made nearly 3.8 million tablespoons and teaspoons from brittania and over 260,000 teaspoons from German silver. By 1870 this shop was mostly used for making the wood bodies of coffee mills and wood packing crates, though some spoon production continued. The extant factory was built in 1858 after the Yales' mill had burned. Parker's factory originally had two stories but another two were later added. The brick factory, 132' x 32', has a near-flat roof and corbeled cornice. Window openings are segmentally arched and have stone sills. Attached is a 90' x 30' addition with 41' x 30' ell. The 1845 dam is the earliest structure here. It is a 9'-high curved gravity dam made of brownstone blocks. The short headrace has been paved over. The mill now houses offices and stores. (New Haven Atlas; Census 1860, 1870; J. L. Rockey, ed., History of New Haven County, Connecticut, vol. 1, 1892; Henry S. D. Davis, History of Wallingford, 1870; Wallingford Assessor's Records.)

WALLACE TABLEWARE FACTORY (1865)
Quinnipiac Street
Wallingford

Wallingford
18.680750.4591000

Robert Wallace introduced German silver to Connecticut flat and hollow ware manufacture in the mid-1830s. This alloy (also known as nickel silver) of copper, zinc and nickel took a handsome polish and was more durable than pewter or brittania. The ductility of German silver made the metal suitable for rolling, one of the important mass-production techniques adopted by tableware manufacturers in their quest to develop ever-larger markets. Rolling was first used to prepare sheet stock preliminary to fabrication, but by the 1860s forming and decorating were increasingly being performed by rolling processes.

Wallace was under contract to Almer Hall from 1838 to 1855, supervising production of German silver goods. In 1855, with Samuel Simpson and other stockholders of Meriden Brittania Co., Wallace formed R. Wallace and Co. This firm was, in effect, a manufacturing subsidiary of Meriden Brittania, which bought all the output. In rented quarters in 1860 the shop employed 37 people and turned out some 700,000 German silver forks and spoons. In 1865 the manufacturing firm was incorporated as Wallace, Simpson and Co.; this firm began building a new plant and marketing its products independently. In 1871 the name was changed to R. Wallace and Sons Manufacturing Co., which still produces tableware today.

The original 1865 factory, a 3-story, 156' x 38' brick structure, stands just west of the 2,500'-long masonry headrace. Apart from a 1-story brick wing added to the first mill in 1866, and several later wings, the plant lies east of the race. Few of the 19th-century buildings survive; the rest were demolished and replaced with later structures. A c.1871 3 1/2-story, gable roofed brick mill, 110' x 32', stands immediately east of the race. Adjacent is an 1880 brick mill, 72' x 35'; originally 3-story, it gained a floor c.1900. At that time pilasters were also added; they are cast-iron rectilinear columns extending the full four stories and set into the brick walls between windows. Mills for finishing operations (plating, burnishing, polishing, buffing) were built in 1903 and 1908. The three 4-story mills form a continuous building 245' long; roofs are flat with monitors. Five factories were built during World War I, when Wallace and Sons supplied 16 million tin-plated, cast-steel knives, forks and spoons to the U. S. Army. There are some

30 other buildings, mostly of brick; dates of construction range from 1880 to 1967. The Wallace firm moved to new quarters in 1978. Many concerns now rent space in this plant.
(Osborn; New Haven Atlas; Census 1860; J. L. Rockey, ed., History of New Haven County, Connecticut, vol. 1, 1892; Sanborn-Perris Map Co., Sanborn Map of Wallingford, 1897; Records of Cooke Properties, present owner, courtesy George Cooke.)

WILSON SEWING MACHINE FACTORY; (1883) Wallingford
NEW YORK INSULATED WIRE WORKS 8.681840.4592300
Parker St. Wallingford

Wilson Sewing Machine Co. of Chicago built the first section of this factory in 1883. It stands alongside the (former) Hartford Division of the New York, New Haven and Hartford Railroad. The 4-story brick factory, 290' x 40', has a flat roof and segmentally arched windows with stone sills. At the center of its east wall a 50' long, 12' wide pavilion holds the stairs. A 1-story, 160' x 50' wing to the east held heat-treating departments, boilers, and a 250-horsepower Harris-Corliss steam engine. Wilson Sewing Machine failed after two years. In 1887 Metropolitan Rubber Co. and New York Insulated Wire Co. moved in. By 1897 New York Insulated Wire occupied the entire plant. In c.1900 this firm built another factory onto the north end of the original building. The 4-story, 210' x 60' addition has similar roof, walls and windows to the earlier factory. Tenants presently occupy parts of the buildings.
(J. L. Rockey, ed., History of New Haven County, Connecticut, vol. 1, 1892; Sanborn-Perris Map Co., Sanborn Map of Wallingford, Conn., 1897; Wallingford Assessor's Records.)

PRATT IVORY FACTORY (1846) Meriden
Pratt St. 18.684580.4601240
Meriden

Julius Pratt established an ivory-comb works here in the 1830s. He belonged to the Pratt family of Deep River which controlled a large portion of that town's extensive ivory industry (see entry for Pratt, Read and Co.). The Meriden shop joined Pratt, Read and Co. in 1863 during the merger which created that firm. Fire destroyed Pratt's original plant in 1846, and the only extant structure that may date to the subsequent rebuilding is a 3 1/2-story gable-roofed brick mill, about 80' x 35' with stone sills and lintels. A slightly later and slightly larger 3 1/2-story gable-roofed brick mill features segmental-arch lintels and stone sills. Pratt, Read and Co. employed 50 men and 15 women here in 1870, several years before Miller Brothers, a cutlery producer, bought the works. Miller Brothers built the rest of the structures: two forge shops, both high 1-story with monitor roofs; a boiler house; and two c.1910 factories, 1-story and 3-story with flat roofs and concrete cornices and sills. Tenants now occupy the complex. (New Haven Atlas; Census 1850, 1860, 1870, 1880; S. C. Pierson, Map of Meriden, 1891; Frances A. Breckenridge, Recollections of a New England Town, 1899.)

WHITNEY ARMORY SITE (c.1805)
Whitney Ave.
Hamden

New Haven
18.674800.4577930

Eli Whitney began building his firearms manufactory here in 1798. Recent scholarship in the history of technology has indicated that Whitney's application of interchangeable-parts manufacture was at best rudimentary, and perhaps was non-existent. Nonetheless, Whitney's armory is notable as an early supplier of U. S. military arms and as an important institution in the local economy and technical community. Also, Whitney's exaggerated claims contributed to the aggrandizement of interchangeable-parts manufacture, if not to its realization.

Relatively little fabric remains to provide detailed data on the manufacturing conducted here. Portions of a coal storage shed date to c.1805. A brick manufacturing building from the mid-19th century still stands; 1-story and about 110' x 45', it has a monitor roof and segmentally arched windows with stone sills. A barn and a single men's boarding house also survive. The present dam, a masonry gravity dam about 30' high, was built in 1860-61. The dam provided power to Whitney Arms Co. and drinking water which the New Haven Water Co. supplied to the city. A New Haven Water Co. 1-story brick pump house stands west of the factory site. Plans exist for a museum to occupy the factory area, and a Town lattice truss bridge has been reconstructed here. (Historic American Engineering Record, "Eli Whitney Armory Survey," HAER Recording Project No. CT-2, 1974; E. A. Battison, "Eli Whitney and the Milling Machine," The Smithsonian Journal of History, 1(Summer 1966); M. R. Smith, Harper's Ferry Armory and the New Technology, 1976; David Hounshell, "From Interchangeable Parts to Mass Production," Ph.D. diss., University of Delaware, 1978.)

WINCHESTER REPEATING ARMS FACTORY (1883)
275 Winchester Avenue
New Haven

New Haven
18.673220.4576540

The history of Winchester Repeating Arms Co.--its origin as the Volcanic Arms Co., its role in the development of the repeating rifle, its innovative mechanics and managers--is well documented and need not be recounted here. The firm started in New Haven, moved to Bridgeport in 1866 and returned to New Haven in 1870, when the first buildings were erected in the present location. The earliest factories do not survive, but the enormous plant, covering more than six city blocks, contains many 19th-century and World War I-era structures. The oldest building is the 1883

brick-pier factory (1-story, 130' x 101') on Newhall St., which is now a company-owned right of way. Its timber framing represents one of Winchester's last uses of that structural material. The adjacent 1886 brick-pier factory (1-story, 102' x 80') has lattice-girder columns and riveted plate-girder roof beams; these iron components were fabricated and erected by Berlin Iron Bridge Co. (Separate entry.) A 5-story 1895 brick-pier factory (119' x 44') depicts the type of structure that housed machining operations for the manufacture of rifle parts. Winchester also made metallic cartridges for its firearms and began in 1883 to roll its own brass for this product. The original brass mill is gone, but the 1916 brass mill (high 1-story, 423' x 170') continues to stand; it has brick walls, steel framing and a 20'-high monitor along the length of its flat roof. This mill was part of the plant expansion during 1914-16, when the complex doubled in size to 3.25 million square feet. The construction program cost over $8 million, most of it financed through a loan from J. P. Morgan & Co. Aberthaw Construction Co. of Boston built the new structures, most of which were of reinforced concrete construction. The first of these was the 5-story factory (200' x 50') along Munson St., which was completed in the astonishing time of five weeks. At least 10 similar factories were built by 1916, as well as two powerhouses, various storehouses, kilns for drying wood for stocks, and the brass mill noted above. The buildings detailed here portray the historic manufacturing environment of one of the nation's major military and civilian arms producers, despite the considerable demolition, alteration and reconstruction that have occurred since 1916. Winchester, now a division of Olin Corp., still occupies the plant, though it has curtailed production greatly in recent years.
(Osborn; Harold F. Williamson, Winchester: The Gun That Won the West, 1952; Associated Mutual Insurance Companies, "Winchester Repeating Arms Co.," survey #19530, 1914; Berlin Iron Bridge Co., Catalog, c.1892; New Haven Assessor's Records.)

MARLIN FIREARMS FACTORY (c.1875) | New Haven
Willow Street | 18.674670.4576450
New Haven

John Marlin began producing pistols, revolvers and rifles in 1870. He did not attempt to obtain government contracts, instead concentrating on civilian arms such as the Ballard target and sporting rifles. Several structures remain from Marlin's first decade of operation, including the 2 1/2-story, 228' x 40' factory along Willow St. It has timber framing and brick walls; the attic under the gable roof is lit by rows of gabled dormers. The c.1875 office building (78' x 34') duplicates the features of the factory, except for the dormers. Three more brick-walled, timber-framed factories were added in the 19th century: 1-story, 179' x 36'; 3-story, 110' x 42'; 3-story, 72' x 34'. A 1-story, brick boiler house (73' x 36') was built in 1911. In 1915

Marlin's sons sold the firm to a group of investors who ran it until 1923, when Frank Kenna bought the business. Kenna added several more factory buildings in the 1940s and 1950s. Marlin Firearms moved to a new plant in 1970 and the Willow St. complex is now tenanted. (Osborn; Frank Kenna, Jr., The Marlin Story, 1975; New Haven Assessor's Records.)

C. COWLES AND COMPANY (1890) New Haven
83 Water Street 18.674450.4574080
New Haven

C. Cowles & Co. began in 1838 as a supplier to the New Haven carriage makers. Throughout the 19th century the firm served that extensive trade, expanding its line of goods and even importing European carriage hardware for sale to New Haven producers. Using primarily metal-forming processes, Cowles manufactured carriage bolts, lamps, decorative stampings, axle clips, knobs, curtain fasteners and virtually any other metal carriage part except tires. Employment averaged between 125 and 175 workers in the 1890s, the decade before increasing use of automobiles caused the carriage industry's sudden decline. Unlike the carriage producers themselves, who were in direct competition with the automobile, Cowles was able to survive by selling parts to car makers. Lamps were one of the first Cowles products transferred to the new market, and the firm gradually retooled to make door locks, ashtrays and decorative moldings for automobiles. Only one structure in the surviving Cowles complex was built in the carriage era: a 2-story, 120' x 45' brick factory with near-flat roof. Two 1914 buildings survive, one of brick construction and one of reinforced concrete post-and-beam construction. C. Cowles & Co. continues to produce formed-metal automobile parts here. There are many small additions to the plant and one large factory built in the 1960s. (Chamber of Commerce, The Industrial Advantages of New Haven, 1889; Mercantile Illustrating Co., New Haven and Its Points of Interest, 1895; New Haven Assessor's Records.)

FITCH HARDWARE FACTORY (c.1870) New Haven
127-151 East Street 18.674940.4574780
New Haven

W. and E. T. Fitch moved their hardware manufactory from New Haven's Westville district to the south end carriage manufacturing district in 1853. Carriage springs and cabinet locks comprised the bulk of output, though by the 1880s the firm made a full range of carriage and builder's hardware, and the foundries took contract work as well as casting parts for Fitch's stock products. The oldest of the extant brick structures, built in the 1870s, replaced earlier frame buildings. The 4-story mill, 125' x 34', housed machining operations; it has a corner stair tower, segmental-arch lintels and stone sills. An adjacent building, 2-story

and 72' x 27' with an ell 35' x 16', housed offices and rooms for packing and shipping. Most of the casting was done at the Fitch's foundry complex just south on East St., but one small foundry was built to the north of the 4-story mill. This high, 1-story foundry, 45' x 28', has a near-flat roof crowned with a low, narrow monitor and abuts a 2-story building, 52' x 38', that probably housed pattern-making. The largest foundry to the south, 193' x 40', also rises a single high story and has a low, narrow monitor along its ridge. From about 1890 to 1920 three more foundries and a heat-treating room were erected adjacent to the south foundry. The Fitch buildings, now tenanted, remain as the most intact plant from New Haven's extensive 19th-century carriage and carriage parts industry.
(Chamber of Commerce, The Industrial Advantages of New Haven, 1889; G. M. Hopkins, Atlas of the City of New Haven, Connecticut, 1888; New Haven Assessor's Records.)

NEW HAVEN CLOCK COMPANY (c.1870) New Haven
133-141 Hamilton Avenue 18.674880.4575100
New Haven

Chauncey Jerome moved case production for his one-day brass clocks from Bristol to New Haven in 1844. After a fire destroyed his Bristol movement shop in 1845, he moved that production to New Haven as well. By 1850 Jerome's New Haven plant was the largest industrial employer in the city, with 225 workers producing 250,000 clocks annually. Jerome Manufacturing Co. failed in 1855, mostly as a result of overvaluation of the stock of a smaller clock producer purchased by the firm. New investors formed New Haven Clock Co., which occupied Jerome's factories, hired its former employees, and used Chauncey Jerome's patterns, tools and methods.

The surviving plant covers the block east of Hamilton Ave. and north of St. John St. Some building fabric may remain from the years of Jerome Manufacturing Co., but the visible structures appear to have been built in the 1870s and 1880s. All are of brick with segmentally arched window openings and stone sills. The mills are ranged around the perimeter of the block. Three mills comprise the south facade (3-story, 177' x 40'; 3-story, 72' x 40'; 3-story, 32' x 40'). Two mills face west (4-story, 100' x 40'; 4-story, 48' x 40'); two face east (4-story, 100' x 40'; 4-story 53' x 40') and two face north (4-story, 100' x 40'; 4-story, 72' x 34'). By the early 20th century infill buildings at the northwest corner had completed enclosure of the yard. Inside the yard are the boiler house and a narrow 2-story building (55' x 13') that held a drying kiln. Tenants now occupy the mills.
(Osborn; Chauncey Jerome, History of the American Clock Business, 1860; Henry Terry, American Clock Making, 1870; G. M. Hopkins, Atlas of the City of New Haven, 1888; New Haven Assessor's Records.)

STROUSE CORSET FACTORY (1860)
78-84 Olive St.
New Haven

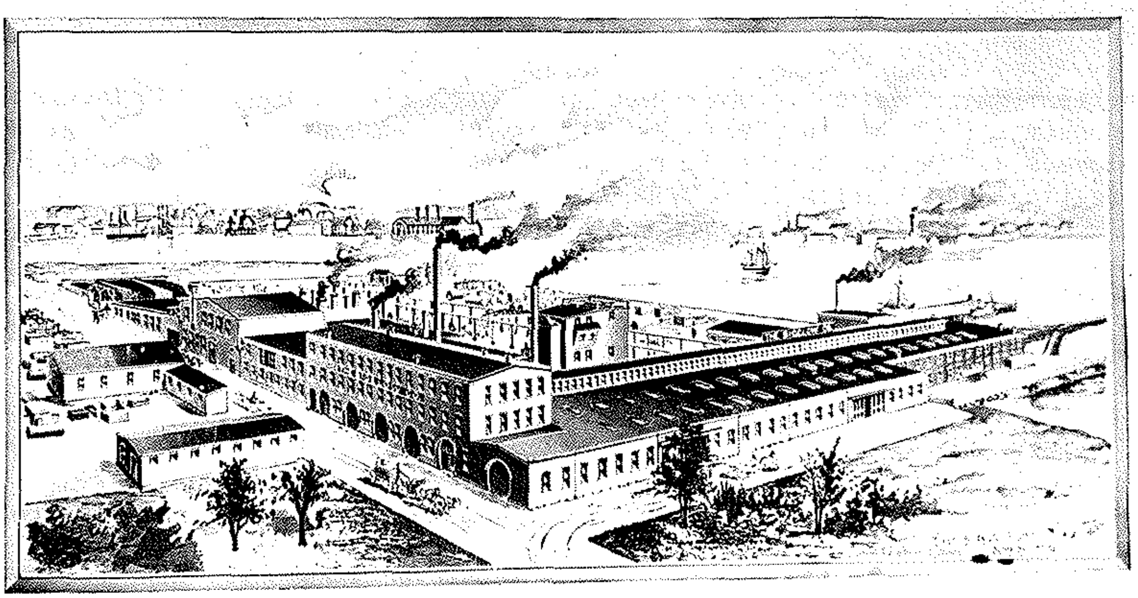
New Haven
18.674040.4574700

Industrial corset production in New Haven began in the 1850s with J. H. Smith and Co. In 1860 Smith built a 4-story brick mill, 190' x 40' with a 4-story ell, 60' x 30'. The mill has a near-flat roof and window openings framed by stone lintels and sills. Isaac Strouse bought the firm in 1861. He added two more 4-story brick mills in the late 1860s (115' x 40' and 76' x 43'). In 1870 I. Strouse and Co. employed 174 children, 105 men and 16 women, who manufactured 173,000 corsets. Twenty years later employment had quadrupled to 1,200 workers. Two 4-story, brick-pier mills (115' x 68' and 145' x 40') were added in 1905-07, soon after the firm had become Strouse, Adler and Co. During the peak years of corset production in the U. S., 1910-20, Strouse, Adler and Co.'s average employment exceeded 2,000 workers and production reached 12,000 corsets per day, or between two and three million per year. Strouse, Adler and Co. still manufactures foundation garments here, although the product designs have changed substantially.
(Osborn; G. M. Hopkins, Atlas of the City of New Haven, 1888; Chamber of Commerce, The Industrial Advantages of New Haven, 1889; J. H. Burgess and R. J. Lawton, New Haven, 1912, 1912; New Haven Assessor's Records.)

THE BIGELOW COMPANY (1873)
River and Lloyd Streets
New Haven

New Haven
18.675650.4574780

H. B. Bigelow began making boilers and steam engines in 1860. By the mid-1870s his firm produced dozens of models of boilers as well as portable and stationary engines. Engine production ceased in the next decade, though Bigelow added production of feed-water heaters, foundry cupolas and slaughterhouse equipment. Most of the plant was in place by the 1890s, when employment averaged 150 workers. An 1873 3-story brick factory (100' x 40') originally housed machine shops on the upper floors and assembly below; the street-side ground-floor wall has five round-arched openings (now bricked in) for passage of assembled boilers and other large equipment. Two smaller brick shops (both 2-story, 42' x 40' and 40' x 40') were also built in 1873. The 1-story brick layout building (209' x 43') was erected in 1886. Around the turn of the century the firm built two erection shops. One has brick walls (1-story, 122' x 78') and a roof monitor for lighting. The other (342' x 53') has one 42'-high story and a near-flat roof; its steel frame is sheathed in corrugated metal siding to a height of 20', above which the walls consist totally of steel-framed windows. Other structures include the 1889



Bigelow Boiler Works
New Haven of Today, 1892.

1-story, brick machine shop (100' x 56') and a 1902 office building. The Bigelow Co. still manufactures steam equipment in this plant. (H. B. Bigelow & Co., Descriptive Pamphlet of the Bigelow Portable and Stationary Steam Engines and Boilers, 1878; The Bigelow Co., Catalogue, 1891; Mercantile Illustrating Co., New Haven and Its Points of Interest, 1895; New Haven Assessor's Records.)

GEOMETRIC TOOL COMPANY (1905)
Blake and Valley Streets
New Haven

New Haven
18.671120.4577080

William Smith was an inventor without a market when Howard Adt joined Geometric Tool Co. in 1896. The 3-year-old firm had but several employees making Smith's Geometric Drill, an ingenious device with no practical application in manufacturing. Adt's training in his father's New Haven toolmaking shop enabled him to recognize the futility of marketing Geometric Drills and the possibilities in another of Smith's patented devices, the Automatic Self-opening Die Head. Adt redirected production devices, the Automatic Self-Opening Die Head. Adt redirected production to this device, which proved to be of great utility in mass production of threaded metal parts. The Die Head cut threads with two chasers, which were actuated by a plunger to withdraw from the surface of the workpiece after a predetermined length of thread was cut. This made it unnecessary to reverse the rotation of the work while retracting the Die Head. Used mostly on screw machines and turret lathes, the tool almost halved the time for many threading operations and greatly simplified the setting-up of the machines. It expanded the high-production capabilities of these crucially important machine tools and was applicable to manufacture of an unlimited range of products. The firm that Adt built around the Die Head was successful but not large, with the number of employees never exceeding 200. In 1905 Geometric Tool Co. bought the property it had rented and began to build a new plant. A 2-story brick office building (60' x 30') and 2-story brick-pier machine shop (80' x 60') remain from that rebuilding. Two 1912 1-story machine shops also stand (138' x 50' and 50' x 43'); both are of brick-pier construction and have sawtoothed roofs. A heat-treating plant (1-story, 75' x 50') was added in 1916; it has a low-pitched roof with a monitor along its ridge, the typical roof configuration for thermal-process buildings of the time. The present complex of structures, still occupied by Geometric Tool Co., has several additions from the 1940s and 1950s.
(Jason W. Hook, The Geometric Tool Co., 1943; New Haven Assessor's Records.)

FARMINGTON CANAL (1829)
from New Haven to Suffield

New Haven
18.674190.4574950
Tariffville
18.684540.4650400

The Farmington Canal, Connecticut's largest pre-railroad engineering project, grew from the rivalry between merchants in Hartford and New Haven. At issue was control of trade with the upper Connecticut River valley in Massachusetts, Vermont and New Hampshire. Hartford, on the bank of the river, was advantageously situated for this trade. By the early 1820s canals had been built to bypass all the rapids on the Connecticut River except for Enfield Falls, just north of Hartford. (See entry for Enfield Canal.) New Haven interests hoped to take advantage of Hartford's position below the falls by building a canal over an inland route between New Haven and a point on the river in Northampton, MA. In 1822 the 17 Connecticut towns on the route hired Benjamin Wright, engineer for the Erie Canal, to survey the proposed line. On the basis of that survey Connecticut's General Assembly chartered the Farmington Canal Co. to construct and operate the canal. Hartford representatives in the General Assembly, unable to block passage of the charter, were able, however, to prevent state subsidy of the project. Except for some assistance from New Haven, the company had to rely on private subscriptions and occasional bond sales for capitalization. In 1823 the Massachusetts legislature chartered the Hampshire and Hampden Canal Co. to build the Massachusetts section. Construction began in 1825.

The canal ran approximately 80 miles, with 58 miles in Connecticut. Over most of its length it was 4' deep, 20' wide at bottom and 36' wide at top. Towpath and embankments totalled some 30' in additional width. For most of the route the walls were simply banks of locally available soils with no shoring or capping. The 213' rise between New Haven and the Massachusetts line was taken in 28 locks. There were 3 aqueducts and some 15 culverts crossing rivers and creeks. The Connecticut section opened in 1829, the Massachusetts section in 1835; the two were merged into the New Haven and Northampton Canal Co. in 1836.

Operations were troubled from the start due to technical inadequacies and insufficient capital. The porous local soils used were not watertight; banks were frequently undercut, or simply collapsed from excess weight due to the amount of moisture absorbed. There were not enought spillways or wastegates to drain excess flow, so relatively minor rises in water level resulted in bank-destroying floods. Some locks were initially built of dry-laid sandstone blocks with timber facing; these had to be replaced with masonry laid in hydraulic cement. Many of the bank cave-ins were attributed to vandalism by farmers who owned land along the canal and who were unsatisfied with reparations paid for damages to their fields caused by construction.

Traffic was substantial when the canal was navigable, even though Farmington Canal never became the predominant trade route for the upper Connecticut River valley. It was the first means of transport, besides roads, to reach much of west-central Connecticut, and canal-shipping was important to developing industries in the region. Furthermore, the traffic in freight and passengers created opportunities for private carrier services, wharf and warehouse facilities, hotels and taverns. Towns such as Plainville grew in response to canal traffic opportunities. New Haven prospered most from the canal, which began at Long Wharf and enhanced the city's position as a distribution point for New England goods bound for East Coast markets.

The plague of collapsing canal banks continued to generate repair costs exceeding revenues. The canal company had little opportunity to increase revenue in operations, since it was not empowered to operate boats, to build and lease storage facilities, or to participate in any of the ancillary functions that proved profitable to others. In 1845 the company surveyed the route for the purpose of building a railroad. Following necessary charter revisions, the New Haven and Northampton Railroad was completed north from New Haven to Plainville in 1848, and to Simsbury in 1850. For most of their course the tracks ran on the former towpath, although in New Haven the canal bed itself became the track bed. (The origin of this right-of-way in New Haven as a canal engendered many subsequent problems for the rail operators. This section was subject to frequent flooding, and the pre-existing bed limited flexibility in the design of later crossings. See entry for Olive St. Bridge.)

Portions of the canal survive today in various states of repair. The masonry in many culverts and other structures has been taken and reused; the banks themselves became sand quarries in many of the towns. Lengths of several thousand feet or less are found in Suffield, Simsbury, Avon, Farmington, Plainville, Cheshire and Hamden. In Plainville's Norton Park the town has restored 700' of canal and towpath (Bristol Quad, 18.676410.4613740). Where the canal crossed Ten Mile River in northern Cheshire (Southington Quad, 18.674940.5602170) an 18'-wide masonry-arch culvert survives in good condition. Lock 12 in Cheshire (Mount Carmel Quad, 18.673320.4593320) is the best-preserved structure; about 12' wide and 100' long, it has mortared walls of random-coursed sandstone blocks. The present mortar and timber gates were added during recent reconstruction. Immediately south of the lock stands a masonry-arch bridge that carried the railroad over the canal. Also fairly intact is Lock 13 in Hamden (Mount Carmel Quad, 18.673860.4591560), one of the original timber-lined locks. About 110' long, it is 12' wide except at the south end, where the masonry walls flare to 16' width. The canal crossed the Farmington River on a 7-span, 280'-long aqueduct, the largest structure on the route. The aqueduct and piers are gone, but traces of the abutments remain (Avon Quad, 18.681070.4624740).

The problems of the Farmington Canal seem traceable to its legal origin in the General Assembly, when the Hartford interests blocked approval of state funds for construction. Capable engineering talent was available, as shown by the hiring of Benjamin Wright for the initial canal survey. But no matter how fit the designs were the company could not pay for the proper construction, so waste-water facilities were minimal and embankments were built from whatever material was immediately at hand. As the effects of these shortcuts in construction pushed maintenance costs higher, the company's resources were drained. These costs could not be recouped in operation, again because of the charter, which strictly limited the means by which the company could generate revenue. Thus the metropolitan rivalry which spawned the canal also established the pattern for its eventual failure, if conversion to a railroad can be so described, but not before the canal opened opportunities for manufacturing in inland Connecticut, and not before the canal solidified New Haven's position in the transportation networks of New England. (Act of Incorporation of the Farmington Canal Company, 1825; C. R. Harte, "Some Engineering Features of the Old Northampton Canal," CSCE, 1933; C. R. Harte, "Connecticut's Canals," CSCE, 1938; Work Projects Administration Writers' Project, Boats Across New England Hills: The Story of the Farmington Canal, 1941; H. Segal, "Canals and Economic Development," in Carter Goodrich, ed., Canals and American Economic Development, 1961; Connecticut Department of Environmental Protection, The Farmington Canal: A Proposal for Selective Restoration, 1976.)

CEDAR HILL RAILYARDS
State St.
New Haven

New Haven
18.676250.4576900

The New York, New Haven and Hartford Railroad held a virtual monopoly in New England rail transport by the beginning of the 20th century. In the first decade service was hampered because of increasing demand, as New England's population and industrial production were still on the rise. Furthermore, the takeover of many smaller railroads had multiplied the problems of traffic coordination, particularly in switching freight cars from one line to another. Starting around 1910 the railroad improved yard facilities at New Haven, Waterbury, Hartford, Springfield and Providence. By far the most extensive construction was in New Haven, where four routes intersected: the New York Division along Long Island Sound; the Air Line Division running northeast to Boston; the Hartford Division running north; and the Canal Division, running north along the route of the Farmington Canal, west of the Hartford Division. Cedar Hill Terminal and railyards were begun in 1909 to handle freight traffic and repairs. The yards cover 880 marshy acres along the Quinnipiac River, north of the center of New Haven. Buildings were finished by 1913 but the extensive switching and car-handling facilities took another five years to complete. Extant buildings are no longer used, and the only functions visibly served by the yard now are on-track storage of railroad maintenance cars and apparently some switching. The brick-walled, 360'-diameter, 44-stall engine house survives, but the 30-stall engine house has been demolished. A 250' x 77' brick-pier building, sectioned by interior brick walls, held machine shops, boiler and engine room to power the shops, plus lockers and lavatories. A c.1912 steel water tank and a sand drier still

stand. There are also catenary bridges that carried electrical lines to power locomotives in the yard. Cedar Hill was the easternmost facility put "under the wire" when the New York, New Haven and Hartford electrified the New York Division between Stamford and New Haven in 1911-14. The yard handled the change between electric and steam or diesel locomotives on freight trains.
(E. C. Kirkland, Men, Cities and Transportation, 1948; John M. Sullivan, "Cedar Hill Engine House Facilities," CSCE, 1912; E. A. Pierson, "Cedar Hill Terminal," CSCE, 1918.)

WATERBURY UNION STATION (1909)
389 Meadow St.
Waterbury

Waterbury
18.662840.4602000

At the height of rail traffic in Waterbury, 66 regularly scheduled trains per day served the city. Waterbury Union Station was built in 1909 to better accommodate rail travel and to integrate the railroad more fully with the city, both physically and symbolically. Designed by McKim, Mead and White, the station (350' x 50') gives an appearance of monumentality and controlled grandeur. The central portion contained a waiting room and railroad offices. Smaller, lower wings to the north and south provided additional waiting space and ticket counters. Foundations are granite; walls are sand-struck brick; and almost all of the decorative features are terra cotta. Three tall, round-arched openings dominate the streetside facade of the central part. Terra cotta decorations of stylized vines and flowers, bordered by pearl, egg-and-dart and anthemion moldings, outline the arches. Corbeling and terra cotta designs mark the cornice and the floor level between waiting room and upper story. A plain brick parapet conceals the low, hip roof.

From the southeast corner of the central section rises a 245'-high brick tower, the most distinctive feature of Waterbury's skyline. It is plain for most of its height. Three-quarters to the top, on all four sides, are clock faces (cast-aluminum replicas of the originals), above which projects a balcony), supported on long, tapered corbels. The gargoyles at the balcony and the belfry, the heraldic shields on the balcony rail, the arched openings at the belfry stage, and the tiled hip roof were all copied from the tower on the town hall of Siena, Italy, a Gothic building. The architects grafted this tower onto their design at the request of the president of one of the railroads. One authority (Carroll L. V. Meeks) believes the architects intended the tower as a deliberate rebuke to meddling amateurs. Despite its incongruity, the tower contributed to the grand scale of the station, which attested to the importance of the railroads in the city's prosperity.

During and immediately after construction the city, in partnership with the railroads, used Union Station as the central factor in an urban renewal program. Pedestrian tunnels eliminated grade crossings between the station and remote tracks; these survive but are not used. Streets leading to the station were straightened, deteriorated buildings were demolished, and a park was created nearby. When American Brass Co. built its headquarters across the street a few years later, it was designed to harmonize in style and materials with Union Station. The station was thus the primary focus of development in the surrounding neighborhood.

A newspaper has remodeled the interior of the station for use as offices. An added floor now divides the main waiting room into two stories, but its vaulted ceilings remain exposed on the upper level. The south wing now serves as the waiting room for passengers. Many original interior details are preserved here: brass ticket windows, one Mission-style bench, an iron radiator grille and marble baseboards and window sills.
(Carroll L. V. Meeks, The Railroad Station: An Architectural History, 1956; Waterbury Sunday Republican, 11 July 1909; NR.)

GUILFORD ENGINE HOUSE AND WATER TANK (c.1875) Guilford
foot of Whitfield St. 18.694840.4571770
Guilford

The New York, New Haven and Hartford Railroad built this small repair facility c.1875, just east of Guilford Station. The engine and repair house is a 1 1/2-story brick-pier building, 70' x 45' with gable roof. Ground-floor window openings have segmental-arch lintels and stone sills; there are two round windows in each attic end wall. Locomotives entered through arched openings in the east wall. About 20 yards west of the engine house stands an octagonal brick water tower, about 22' high with pilasters at each corner, a peaked roof, and a painted, wooden water gauge attached to the outside. The upper half of the tower, now missing its redwood lining, held the water. A steel or iron plate, also missing, served as the floor of the tank; the timber frame that undergirded the tank remains intact. According to a former railroad employee, the floor plate was heated with fires from below, thus preventing water in the tank from freezing in winter and providing preheated water for the locomotive boilers. Recent bulldozing has uncovered turntable foundations about 25 yards east of the engine house. Granite blocks cut to form segments of a circle's circumference were found just below surface. The circle they made was approximately 40' in diameter.
(CHC; Interviews with Aurelio Licata, present occupant, and Butch Page, former railroad employee, December 1979.)

WASHINGTON AVENUE LENTICULAR BRIDGE (c.1880) Waterbury
Washington Avenue 18.663610.4600800
Waterbury

Waterbury's Washington Ave. Bridge is the oldest surviving lenticular truss in Connecticut and one of only four known survivors in the nation that were built by the Corrugated Metal Co., predecessor firm of Berlin Iron Bridge Co. Washington Ave. is in an area that has been heavily industrialized since the mid-19th century, and the bridge was obviously designed for heavy traffic, with four eyebars for the bottom chord. Even the largest of other extant lenticulars has but two eyebars for the bottom chord. The endpost joints are duplicated in only one other standing bridge (in Hume, N.Y.), and they illustrate how these difficult connections were made before the firm introduced the unusual nut connections seen in many later Berlin bridges. (See, for example, entry for Higganum Lenticular Bridge.) The top chord is narrower than the endpost and it fits between the sidewalls of the endpost, not bearing on anything except the pin through the joint. Thus, all loads are transferred through the pin. To strengthen this arrangement a short piece of channel was riveted to the top chord, bearing against the pin to stiffen it. The truss remains as built. The 5-panel (68' long), two-lane pony truss has original wrought-iron chords, endposts and laced-channel web posts (parallel-sided and connected outside the chords). Because it represents an early period in the development of Connecticut's most important bridge builders, a period largely undocumented in standing structures, Washington Ave. Bridge ranks as one of the state's premier civil engineering landmarks. See entry for Berlin Iron Bridge Co. Plant.

SHEFFIELD AVENUE LENTICULAR BRIDGE (c.1890) Waterbury
.3 mile north of Huntington Avenue 18.662720.4606680
Waterbury

Berlin Iron Bridge Co. built this wrought-iron, lenticular pony truss bridge in the early 1890s. It is two lanes wide and 53' long. All members are typical of the firm's bridges, but the endpost connections differ from those of other short Berlin pony trusses. The bottom-chord eyebars, commonly threaded and nut-connected on smaller bridges, are pin-connected here. The atypically wide roadway (21' in the clear), and consequently large area borne by the trusses, required larger-section eyebars than usual for this length of span. The larger bars were more difficult to upset, round and thread, so the endpost connection employed on larger spans (see Pulaski St. Lenticular Bridge, for example) was used. See entry for Berlin Iron Bridge Co. Plant.

BERLIN IRON BRIDGE COMPANY PLATE GIRDER BRIDGE (1897) Waterbury
Boyden Street 18.662480.4605740
Waterbury

Berlin Iron Bridge Co. built this steel, plate girder bridge in 1897. The girders on each side are riveted together from eight sections; the top flange has a gentle curve and the bottom flange is straight. The two transverse floor beams of the 50'-long bridge are also comprised of multiple plates riveted together. There are two lanes for traffic and a walkway on each side. Decorative cast-iron endposts rise from the girder ends at the walkways. See entry for Berlin Iron Bridge Co. Plant.

MERIDEN LENTICULAR BRIDGE (c.1890) Meriden
west of Oregon Street 18.680280.4598160
Meriden

Berlin Iron Bridge Co. built this pony truss bridge in the early 1890s. Five panels long (78'), the span is the shortest length for which the firm used pinned endpost connections. Below this length, nut connections were generally used; above it, one always finds pinned joints. The tapered floor beams, tapered web posts, and other members are characteristic of Berlin lenticulars. Castings atop the endposts apparently served as bases for ornaments that have been removed. The bridge carried Oregon Ave. over the Quinnipiac River until the 1960s, when a concrete bridge was built some twelve yards to the east. The wrought-iron span is now a footbridge in a park. See entry for Berlin Iron Bridge Co. Plant.

TOELLES ROAD BRIDGE (1898) Wallingford
over Quinnipiac River 18.679530.4588800
Wallingford

Berlin Iron Bridge Co. built this 110'-long, one-lane bridge in 1898. The double intersection Warren truss is comprised of steel members with pinned connections. The bridge illustrates the course of the bridge firm's business after the mid-1890s: when it could no longer sell its wrought-iron lenticular trusses, Berlin Iron Bridge Co. began erecting steel structures employing more standard configurations like this Warren. This is one of Berlin Iron Bridge Co.'s last projects before it was absorbed by American Bridge Co. See entry for Berlin Iron Bridge Co. Plant.

DERBY RAILROAD BRIDGE (1904)
over Naugatuck River
Derby

Ansonia
18.659900.4575520

This 1904 steel rivet-connected bridge carried the Waterbury Branch of the New York, New Haven and Hartford Railroad over the Naugatuck River. There are three spans, each a 107'-long double intersection Warren through truss with sub-struts. Piers and abutments are made of brownstone blocks.
(PC.)

DEVON BASCULE BRIDGE (1905)
Shoreline Route
Devon/Milford

Milford
18.658470.4563060

In 1905 American Bridge Co. built this through truss Scherzer rolling-lift bascule bridge. The movable span is a Warren through truss with verticals; it has two leaves, each carrying two tracks over the Housatonic River. From east to west, the bridge consists of three 218'-long Baltimore through trusses, the 110'-long bascule span, a 109'-long deck girder span, and a 145'-long Baltimore through truss. All trusses are riveted steel; piers and abutments are brownstone masonry. Drive machinery sits on platforms between the top chords of the trusses over the rear floor break of the bascule span.
(NR; PC.)

CHAPEL STREET SWING BRIDGE (1899)
over Mill River
New Haven

New Haven
18.674300.4574350

Chapel St. crosses Mill River on a swing bridge built in 1898-99. The approach spans are masonry piers extended into the river. The swing span is a Pratt pin-connected steel through truss with inclined top chord. The swing span is 113' long with 33'-wide roadway.
(New Haven City Engineer, Bridge Data Files.)

FERRY STREET BRIDGE (1912)
Ferry Street
New Haven

New Haven
18.675910.4576080

Built in 1912 by Boston Bridge Works, this 4-lane bridge carries Ferry St. over the (former) New York, New Haven and Hartford Railroad just south of Cedar Hill Terminal and Railyards. The single span is a double-intersection Warren through truss with sub-struts. Rivet-connected steel members form the 114'-long truss.
(PC.)

BLATCHELY AVENUE BRIDGE (1888)
Blatchely Avenue
New Haven

New Haven
18.675640.4575820

Berlin Iron Bridge Co. erected this bridge carrying Blatchely Ave. over the New York, New Haven and Hartford Railroad in 1888. Two pin-connected Pratt through trusses, each 103' long, support the roadway. Diagonal tie bars, verticals of paired channels connected with riveted lacing, and box-section top chords are all wrought iron. See entry for Berlin Iron Bridge Co. Plant.
(PC.)

WATER STREET BRIDGE (1894)
Water Street
New Haven

New Haven
18.673800.4574080

Water St. crosses the (former) New York, New Haven and Hartford Railroad just north of the New Haven station, where eleven sets of tracks must be spanned. The 167'-long bridge is supported by a subdivided steel Pratt through truss with tension ties, also known as a Baltimore truss with tension ties. In this configuration, alternate vertical members extend only halfway up the webs, from which points the diagonal tension ties extend to panel points along the top chords. All joints are pinned.
(PC.)

WEST RIVER BRIDGE (1884)
Chapel Street
New Haven

New Haven
18.671050.4575410

Chapel St. crosses the West River on a Pratt pony truss bridge. Built c.1884 by Berlin Iron Bridge Co., the superstructure features wrought-iron members and pinned connections. It is 100' long and two lanes wide, with a walkway on either side. During the mid-1880s the firm was aggressively marketing its patented lenticular truss, indicating that the city engineer's office probably designed the bridge or contracted separately for design and erection. See entry for Berlin Iron Bridge Co. Plant.
(Berlin Bridges and Buildings 1, February 1899; Berlin Bridges and Buildings 1, June 1898.)

GRAND AVENUE SWING BRIDGE (1896)
over Quinnipiac River
New Haven

New Haven
18.675260.4574900

Berlin Iron Bridge Co. built this bridge in 1896. H. C. Keith and C. W. Kelly designed it. The superstructure is mostly steel, and piers and abutments are ashlar masonry. There is one 55'-long deck-girder span

on each side of the 205'-long swing span. The swing span is borne by a Pratt-like, pin-connected through truss with inclined top chord. The operator's house is suspended above the roadway in the center of the bridge. Grand Ave. Bridge survives mostly unaltered, except that the original two electric motors for operating the swing span have been replaced by one 15-horsepower motor of recent vintage. Two lines of electric-railway tracks, installed during original construction, have also been removed.
(Berlin Bridges and Buildings 1, September 1898.)

OLIVE STREET BRIDGE (1907)
Olive Street
New Haven

New Haven
18.674190.4574950

The Olive St. crossing presented unusual problems for the New Haven Railroad design team (E. H. McHenry, Vice President for Engineering; Edward Gagel, Chief Engineer; W. H. Moore, Engineer of Bridges; C. L. Slocum, Assistant Engineer). The Olive St. neighborhood was densely settled in 1907, so the new bridge had to fit on existing railroad property, which here followed the route of the Farmington Canal (separate entry). The abutments were to be so close to the tracks that their faces had to follow the curve of the tracks. But the railroad narrowed here from 17' center-to-center distance between tracks to 13' centers, thus the inside and outside sets of rails were not parallel, so the abutments could not be made parallel either. Further complicating matters was the very sharp skew (31 degrees) between Olive St. and the railroad. The bridge's superstructure, a rivet-connected steel double-intersection Warren through truss, is asymmetrical in every detail due to the large and different end skews. At the south end of the bridge the west truss extends 61' beyond the east truss; at the north end the east truss extends 50' beyond the west. The two sides are of different length (west, 148'; east, 137') and the panels within each side differ in length as well. Olive St. Bridge clearly illustrates the adaptability of metal-truss structures to virtually any local conditions.
(C. L. Slocum, "The Highway Bridges of the New Haven Improvements," CSCE, 1907; PC.)

YALE BOWL (1914)
Derby Ave.
New Haven

New Haven
18.670690.4575330

Yale Bowl was the largest stadium in New England when it was built, a distinction lost only recently to Schaefer Stadium in Foxboro, MA. The university rejected various schemes for a stadium using wood or steel and reinforced concrete because they were too expensive, not safe enough, or offered insufficient access. Charles A. Ferry submitted a design in 1911 that was not only safe and accessible but was also cheaper by half than the next most inexpensive design. He simply adapted a practice used in reservoir construction. Ferry's plan was to dig a hole in the ground, use the excavated material to build up an embankment around the hole, then to face the interior slipe with concrete in the form of steps, on which benches could be placed. Excavation began in July 1913 and the Bowl's first football game was in November 1914, before a capacity crowd of 60,617 people. The structure's overall length is 930' and width is 750'. The playing area is 500' x 300' and is 27' below grade. The top of the embankment is 26' above grade. There are 32 concrete-lined tunnels through the embankment for access to the interior. Sperry Engineering Co. of New Haven built the Bowl.
(Charles A. Ferry, "The Yale Bowl," CSCE, 1915.)

NEW LONDON COUNTY

Bulk Products

PONEMAH MILLS (1866)
Rte. 97
Taftville/Norwich

Norwich
18.746150.4506000

In 1865 Edward Taft of Providence began the cotton-textile manufacturing village that would bear his name. He bought 600 acres of land and a previously undeveloped water privilege (30' head) on the Shetucket River above Norwich. Construction of the mills, power system and village took five years. F. P. Sheldon and Son designed the brick-pier main mill, 5-story and 750' x 74' with a 5-story, 228' x 61' wing. It is highly elaborate, even grandiose, depicting the textile economy at the height of its power in eastern Connecticut, but fumbling for an architectural style. The mansard roof with monitor and gabled dormers at alternate bays, corbeled drops and arches at the cornice and corbeled belt courses contribute to the mill's handsome appearance, but most striking are the two main stair towers, 150' in from each end on the village-facing (west) side. They have four-sided domed roofs topped with octagonal cupolas and feature a variety of window treatments, decorative papapets and finials. Inside the mill, timber posts and beams carry the hardwood floors, which are laid over two plank subfloors. The fourth floor, which housed the large spinning mules, has no posts; its ceiling hangs from the roof trusses on iron rods. Traces of the rubble-stone dam remain, but most of it was rebuilt in concrete in the 1930s. The original coursed-granite bulkhead and rubble-walled headrace still feed water into the wheelpit under the wing, where modern turbines generate electricity. Behind the mill stand a boiler house, machine shop and gas-holder house, all of brick. The village consists of 11 blocks, each with 10 houses around its perimeter and open space in its center. The dwellings are 1 1/2-story and 2 1/2-story frame duplexes. Ponemah first produced fine cottons such as percales, lawns and cambrics. English tradesmen and experienced Rhode Islanders filled many of the skilled and supervisory positions, while Irish comprised a majority of the initial 1,000-member workforce. After a strike in 1875, caused in part by the workers' demand for an adjustment in piece rates to correspond with the coarser goods being introduced, many people left the village for good. The turnover from Irish to French-Canadian millhands began at this time.

In 1884 the company built Mill #2 for its weaving operations. The 2-story and about 700' x 90' brick mill has a low, hip roof and a more prominent monitor than the first mill. It has no piers and much simpler corbeling. Stylistic intent was concentrated on the elaborate, chateauesque west stair towers; these feature different window treatments for each floor, and roofs that have two hipped sections, copper cresting and finials. In 1902 the weaving was again moved to a new building. The 2-story brick mill, about 250' x 150' with a near-flat roof, is the first in Taftville to have iron posts. Last in the line of mill structures is the 3-story brick storage building, about 300' x 100'. It was started in 1900 and enlarged several times to its present size. The residential component of the village was enlarged around 1895 with 32 brick dwellings built south of the mills. Unlike the earlier houses in their spacious block setting, these are tightly spaced in two long rows. These houses do not reflect growth in the number of people working in the mills, for even though the number of spindles increased from 108,000 in 1882 to 120,000 in 1890 and 265,000 in 1924, employment remained at about 1,500 from the 1880s. The new dwellings became necessary only after state laws prohibited child labor in the mills, thus requiring more families to provide the same number of millhands. The increase in number of spindles was achieved almost entirely through the adoption of new machinery and by increasing the number of machines each worker tended.

After financial reverses in the 1930s the houses were sold. The mills were sold one at a time until 1970, when the last looms ran. The mills now house several warehousing and manufacturing concerns. Despite some alterations the houses and mills retain their structural integrity and relation to the village plan. Also extant are three barns, supervisors' houses, the boarding house, the commercial/community building and several 12-family dwellings. The only major loss is the 1910 Great Weave Shed, a brick structure with sawtooth roof that burned several years ago. Ponemah Mills and Taftville embody the textile economy that dominated eastern Connecticut in the 19th and early 20th centuries. (Connecticut Bureau of Labor Statistics, Annual Report, 1875; Barlow's Insurance Survey, #6837, 1881, MVTM; The Leading Businessmen of Norwich and Vicinity, 1890; John D. Nolan, History of Taftville, Connecticut, 1940; Forest Morgan, History of Connecticut: Industrial and Institutional Records, 1962; NR.)

FALLS COMPANY MILLS (c.1840)
Yantic St.
Yantic/Norwich

Norwich
18.743000.4601900

In 1840 Samuel Greene of Boston bought the furthest downstream water privilege on the Yantic River and established the Falls Co. to make cotton cloth. The only standing structure that may date from that time is the 2-story, 152' x 38' mill with gable roof and random-coursed granite walls. In the 1880s, when larger mills had been built, this was used as the picker house. Around 1855 Falls Co. built a brick-pier spinning mill, 275' x 60' with segmental-arch lintels and stone sills. It was 2 1/2-story with gable roof until the 1890s, when the attic was raised to a full story and the roof flattened to a near-flat double-pitch. A smaller spinning mill, a dye house and a carding mill were also built in the mid-1850s, and in 1860 Falls Co. employed 375 women and 125 men producing cheviots, ticking and sheetings. Around 1880 a 3-story, 180' x 80' brick extension, with pyramidal-roof corner stair tower, was added to the large spinning mill; the top floor of this extension has been removed. Also built c.1880 was the brick-pier dyehouse,

with three sections meeting at oblique angles; the sections are 60' wide with clear lengths of 100', 80' and 65'. The dyehouse has a near-flat roof with monitors, as does the attached 1-story, 60' x 40' bleach house. The water power system included two stone dams and elaborate system of above- and below-ground races that fed water to five turbines located in three buildings. Both dams survive but recent construction has destroyed the races. At the north abutment of the upper dam stands an early 20th-century powerhouse that was used to generate electricity; refitting is presently underway to generate here again for the city of Norwich. In the engine house at the mills is a c.1895 cross-compound steam engine built by C. H. Brown and Co. of Fitchburg, MA. Its surface appearance is being restored and the engine will be retained as an exhibit when the mills assume their imminent usage as a housing complex. Along Yantic St. north of the mills stand seven c.1855 brick millworker dwellings, each 2 1/2-story with double-entry.
(New London Atlas; F. M. Caulkins, History of Norwich, 1874; Barlow's Insurance Survey, #7777, 1883, MVTM; Norwich Board of Trade, Norwich, Connecticut, 1888.)

WILLIAMS FLANNEL MILL (1865) — Fitchville
Willimantic Rd. — 18.739730.4604800
Norwich

Textile manufacture began here in 1818 with John and George Tisdale, who built frame mills to make cottons. Erastus Williams bought the mills in 1837 and installed machinery to produce woolens. After a fire in 1865 Williams built the present complex. His son E. Winslow Williams ran the operation for the rest of the century, making flannels and ladies dress goods. The buildings all have coursed granite walls and cut-stone sills and lintels. The main mill, 4 1/2-story and about 135' x 40', has a gable roof and a central stair tower with mansard roof. A 2-story wing, about 100' x 40' with near-flat roof, extends to the north. Three smaller contiguous wings, each about 40' x 40', also extend to the north: 3-story, which housed part of the spinning operations; 2-story, which housed carding; and 1-story, which housed picking. Beyond the wings stands a detached 3 1/2-story gable-roofed mill. A c.1910 brick boiler house is the only 20th-century structure in the complex. Several frame workers' dwellings lie south of the mills, but recent highway construction caused demolition of most of the small village. At peak operation, in the late 1880s, Williams employed 150 people and ran 10 sets of cards. A synthetic textile producer now occupies the mills.
(New London Atlas; F. M. Caulkins, History of Norwich, 1874; Norwich Board of Trade, Norwich, Connecticut, 1888.)

OCCUM WOOLEN MILL (1866)
Main St.
Occum/Norwich

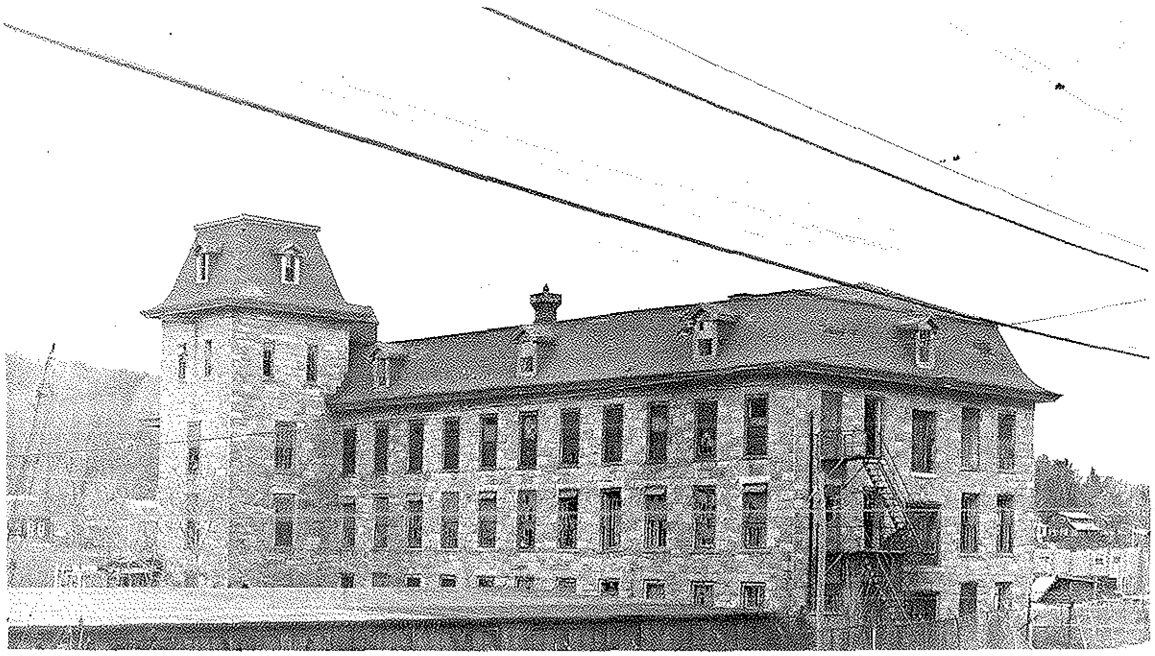
Norwich
18.745860.4608800

Moses Pierce and L. W. Carroll of Norwich formed the Occum Co. in 1864. This firm bought 800 acres of land and water privileges with 44' head on the Shetucket River. Occum Co. sold the lower privilege of 30' to Edward Taft for his Ponemah Mill (separate entry) and built a dam and canal at the upper privilege, which became known as the village of Occum. The 14'-high, 800'-long dam was solid masonry when constructed in the late 1860s, but its eastern half was rebuilt in concrete in 1938. The canal ran some 2,000' down the west bank, where land and flowage were leased to two firms for woolen mills. Joseph H. Converse and Son built the upper mill. The 4-story, about 145' x 35' mill has walls of random-coursed granite; it was designed for four sets of cards. Window openings have cut-stone sills and lintels. A stair tower rises four stories on the east wall; its original roof, like that of the mill itself, has been removed and the roof is now flat. A wing at the north end of the mill has brick walls for its upper three stories and its ground floor has the same stone walls as the main mill. A c.1910 weave shed, with brick-pier walls and sawtooth roof, stands at the north end of the millyard. The canal now runs beneath an embankment which dates to the 1930s. A tailrace exiting from under the center of the mill returned water to the river. Below the Converse Mill the canal is no longer visible. The lower mill, built by R. G. Hooper, no longer stands. Many frame dwellings associated with both mills are extant. Across Main St. from the Converse Mill is a 2-story, 6-entry house with gambrel roof. There are four 1 1/2-story, double-entry houses south of it and two to the north. Seven similar houses stand west of this main cluster and 16 more to the north. Across Main St. from the site where Hooper's mill once stood are 35 dwellings in two long rows. The Converse mill is now a fabric outlet.
(New London Atlas; F. M. Caulkins, History of Norwich, 1874.)

KING WOOLEN MILL (c.1865)
Versailles Rd.
Versailles/Sprague

Norwich
18.746300.4609400

Versailles would be an unnamed bend in the Little River had Amos King not built a woolen mill here in the mid-1860s. Several modern houses and some deterioration of the older buildings have not materially affected the scale or plan of King Woolen Co.'s village, but as fieldwork was being conducted for this inventory the central structure of the village was being demolished. It was a plain yet handsome mill, with random-coursed stone walls and a mansard roof with dormers. The stair tower also had a mansard roof. Cut-stone sills and lintels framed the windows of the 4-story, 146' x 50' mill. Picker and boiler houses have also been demolished. The stone dam survives, though it has been reworked with some new stone and concrete capping. The wooden



King Woolen Mill (M. Roth)

sluice gates are rotted, but the stone-lined headrace is in good condition for the present. Four double-entry, frame dwellings stand just south of the mill, and three ell-shaped mill houses below them. In 1870 King Woolen Co. employed 101 men, 48 women and 14 children to run 3,364 spindles and 24 broadlooms in production of cassimeres.
(New London Atlas; Census 1870; Barlow's Insurance Survey, #3633, 1875, MVTM.)

BALTIC MILL (1876)
Main St.
Baltic/Sprague

Norwich
18.743000.4611300

Frederick Sayles of Pawtucket, RI built the present mill on the Shetucket River in 1901. It stands on the site of an 1857 mill, then the largest in Connecticut, erected by prominent Rhode Island textile entrepreneurs Amasa and William Sprague. The Spragues lost Baltic When their empire collapsed in 1873, and the original mill itself burned in 1887. Most of the extant industrial structures date from Sayles' subsequent rebuilding, though the village and parts of the water power system were in place in the 19th century.

The original dam washed away in 1876. The new dam lasted until 1955 before suffering a similar fate. The stone bulkhead with six sluice-gates was built in 1876. Races seen today have mostly the same configuration as the original layout, which mirrored the symmetrical arrangement of mill and wings. The headrace parallels the north side of the mill; water entered wheelpits beneath each wing and exited into the tailrace, which runs parallel to the south side of the buildings. Supervisors lived in the row of 10 dwellings northeast of the mill. The gable-roofed, double-entry, frame houses have cross-gable center bays. Across the river southwest of the mill the workers lived in 96 houses of similar design, arranged in a gridiron pattern with eight houses per block. Supervisory housing was later augmented with a second row of seven dwellings, while some 35 more were built in the workers' village.

Sayles' 5-story mill, about 500' x 70', has a flat roof and a central stair tower on each side. Walls consist of random-coursed granite blocks. Two 4-story wings, with similar stone walls, stand to the east and west of the mill, just like the original complex except that there is no wheelpit below the east wing. Sayles built the sawtooth-roofed weave shed, about 450' long with width ranging from 100' to 150'. Other extant structures include the gasholder house, boiler house and storehouse. The firm organized by Sayles, Baltic Mills Co., operated until 1966. The buildings are now vacant.
(New London Atlas; Census 1860, 1870; Barlow's Insurance Survey, #3329, 1874, MVTM; Tom Robustelli, "Baltic Mill a Born Survivor," The Courier, Norwich Bulletin Sunday Supplement, 26 March 1978.)

JEWETT CITY COTTON COMPANY MILL (1846)
Slater Ave.
Jewett City/Griswold

Jewett City
19.251300.4609700

Samuel Slater, one of the best-known figures in the establishment of the American cotton industry, bought the Jewett City Cotton Co. in 1823 with his brother John. Although he did not always reside here, John supervised the mill until his death in 1843, when his son John F. Slater assumed control. The oldest extant structure dates from 1846; the gable-roofed brick mill, 2 1/2-story and about 150' x 40', has flat-arched window heads formed by a single soldier course, stone sills and a 4-story stair tower (missing its original roof). In 1859 the mill gained a 3-story brick extension, about 130' x 45', at its west end. Employment reached 175 males and 125 females in 1860 (up from 70 males and 90 females in 1850) and equipment included 9,000 spindles and 210 looms. While the addition was under construction John F. Slater also built 13 frame dwellings just southeast of the mill and named Lincoln Square. Brick wings were added to the mill in the 1870s and 1880s, and when John F. Slater died in 1884 his Jewett City Cotton Co. employed over 400 people. In 1900 William A. Slater, John F.'s son, eliminated weaving, and with it half the jobs. Before then every process to make finished cloth from raw cotton had been utilized here. The mill housed textile production as recently as the early 1960s but today serves as a warehouse. Also extant are the c.1860 boiler house and the 1862 masonry dam across the Pachaug River.
(New London Atlas; Census 1850, 1860, 1870; Norwich Board of Trade, Norwich, Connecticut, 1888; Daniel L. Phillips, Griswold--A History, 1929.)

ASHLAND COTTON MILL (1864)
Ashland St.
Jewett City

Destroyed by fire, [illegible]

Jewett City
19.251700.4610100

This water privilege, next upstream from Jewett City Cotton Co. (separate entry), first powered cotton textile production in 1818. The property changed hands many times until 1863, when it came under control of Ashland Cotton Co., a partnership of local men. In 1864 Ashland built the 4 1/2-story, gable-roofed brick-pier mill, 217' x 70', with a stair tower on each side. The north tower is strictly functional, rising just to the level of the attic and featuring a simple gable roof and plain brickwork. The 6-story south tower, facing the town, has cut-stone belt-coursing and cornice, and sets of three round-arched windows on each side at the belfry stage. The earth-buttress dam with masonry spillway dates from 1865, and the 2-story flat-roofed picker house from the late 1860s. In 1870 Ashland employed 110 females and 80 males to run 19,832 spindles making cotton sheetings. Three brick-pier, flat-roofed mills were built in 1900-20, when Ashland still produced cottons. Ashland Rayon Co. uses the buildings today.
(New London Atlas; Census 1870; Daniel L. Phillips, Griswold--A History, 1929.)

LEDYARD SAWMILL (c.1869)
Iron Street
Ledyard

Old Mystic
19.250370.4592460

This mill occupies a water privilege that was used for sawing lumber from the 1790s to 1938. The building, erected in the late 1860s, is the third mill on the site. Equipment dates from several periods. The vertical saw was probably here some decades before the present mill was built. The prime mover, a turbine, was installed during construction of the present mill. The mill is a frame structure, about 42' x 22', with gable roof, board-and-batten walls and a lean-to addition on the south side. Its north wall opens so that logs could be rolled directly onto the saw carriage inside. Foundations are a dry-laid rubble of large field stones. The earthen dam with stepped, stone spillway was rebuilt in the early 1970s during restoration of the mill. All milling equipment was retained and is now in operating order. Demonstrations of sawmilling are offered on summer weekends and the mill's output is found in many restoration projects requiring vertically sawn boards.
(H. G. Sokolski, "Ledyard Saw Mill," scaled drawing, CHC; NR.)

CLARKS FALLS MILL (1861)
Clarks Falls Rd.
Clarks Falls/North Stonington

Ashaway
19.264580.4593040

Clarks Falls is a small village on the Wyassup River. In the 18th century the stream powered a sawmill, which Thomas Clark of Newport, RI bought in 1796. The Clark family controlled the water privileges throughout the 19th century, using them to power several enterprises. In the early 19th century Peleg Clark built a grist mill and later Alfred Clark founded Clarks Falls Manufacturing Co. to produce flannels. Peleg Tift joined Alfred Clark in the sawmill and gristmill businesses in 1861, when they rebuilt the dam and watercourses. It is likely that the one extant mill was also rebuilt at this time. The 1 1/2-story, 36' x 22' frame mill, with gable roof and vertical-board siding, stands on a foundation/wheelpit of rubble masonry. Although the building has been a gristmill for at least 50 years, it may originally have been the Clark and Tift sawmill. The east wall, now boarded closed, once opened to permit the entry of logs, as depicted in a c.1895 photograph of the site. The mill's heavy center girts are closely spaced, an arrangement consistent with the structural requirements of supporting a saw frame. Present equipment includes one run of stone and a John Deere two-hole corn-sheller. The turbine has been removed for reconditioning and a new steel vertical shaft, between wheelpit and stone, has been installed. Otherwise the power system retains the components of the early 20th century, primarily steel shafting with cast iron gears. The masonry dam survives but the stone-walled headrace collapsed recently. Grain milling will resume when repairs are completed on the headrace and turbine. Tailwater from this mill ran through a stone culvert under the road and continued eastward to the wheelpit of the flannel mill some 75 yards away. Except for stone foundations there are no above-ground remains of the flannel mill. A 2 1/2-story, gable-roofed frame boardinghouse stands on the bank south of the flannel mill's headrace. (New London Atlas; Census 1850, 1860, 1870, 1880; Barlow's Insurance Survey, #6856, 1882, MVTM; William Haynes, Stonington Chronology, 1976; Photographs in the collection of Jack Bucklyn, Old Mystic, CT; Interview with John Palmer, present miller, May 1980.)

CLYDE'S CIDER MILL (1898)
Old North Stonington Rd.
Old Mystic/Stonington

Old Mystic
19.254520.4588930

Farmer B. F. Clyde installed an apple press in his barn in 1881, using it to make cider and vinegar from local apples. In 1898 he built a separate cider mill and purchased new equipment for it. With some changes this industry continues to operate, with Clyde's grandson the present proprietor. The 2 1/2-story, gable-roofed frame mill has granite foundations and vertical-board siding. Pressing is still done with the 1898 cider press made by Boomer and Boschert Press Co. of Syracuse, NY. Clyde's original steam engine is gone, but the replacement is a c.1890, 8" x 8" horizontal engine made by Ames Iron Works. Line shafting, pulleys (several of wood) and flat belts transmit power. Many techniques of 19th-century cider pressing have been retained, such as the use of wooden barrels for aging vinegar and of a "gauge and wantage rod" to determine the volume of a partially filled barrel's contents. Changes in the operation have been made to meet modern standards of health and safety. The lavatories, the 1942 fire-tube steam boiler (C. H. Dutton Co.) and the fiberglass finish on parts of the press do not alter the essentially 19th-century character of the mill.
(Interviews with Jack Bucklyn, present owner, May 1980.)

STILLMANVILLE WOOLEN MILL (1848)
75 Stillman Ave.
Pawcatuck

Ashaway
19.263050.4585160

A sawmill, an oil mill and a woolen mill occupied this water privilege before Oremus Stillman bought it in 1831. His woolen firm built mills on both the Rhode Island and Connecticut sides of the Pawcatuck River. The 1848 Connecticut mill is a 3 1/2-story, brick-pier structure, about 110' x 42' with gable roof. Its many graceful details lend an attractive appearance to the mill. Teardrop windows in the gable-ends and dormers along the roof-slopes light the attic. Corbeled drops and arches accent the cornice, and dentil courses delineate the floor levels. The central stair tower has freight openings at each stage. Rectangular window openings have granite sills and lintels. Connecticut Investment Casting Corp. now operates in the mill.
(New London Atlas; William Haynes, Stonington Chronology, 1976; Gary Kulik, Rhode Island: Historic Engineering and Industrial Sites, 1978.)

CLARK THREAD MILL (1891)
River Road
Pawcatuck

Watch Hill
19.262400.4582700

Clark Thread Mill Co. built the first of these buildings in 1891. The main mill is a 4-story, flat-roof, brick structure, about 200' x 55'. It has segmental-arch lintels, stone sills and a corner stair tower. Outbuildings include a 1 1/2-story, brick picker house and a 1 1/2-story, brick power house, both with gable roofs. The main mill was extended in 1899 with a 4-story, brick-pier addition, about the same length as the first mill but one bay wider and slightly taller. Its window openings are segmentally arched and sills are of cut stone. A 5-story stair tower rises at the southwest corner. Cornices of both tower and mill are corbeled. A 1-story, brick office building with hipped roof stands just west of the mill. Industrial tenants now utilize the buildings.
(William Haynes, Stonington Chronology, 1976; Richard A. Wheeler, History of the Town of Stonington, 1900.)

HOPKINS AND ALLEN FIREARMS FACTORY (1862)
132 Franklin St.
Norwich

Norwich
18.744100.4601200

Union Machine Co., which made special-order production equipment for various manufactures, built this plant in 1860-62. The main building, a 4-story brick-pier mill about 220' x 60', has a raised basement and near-flat roof. A 4-story brick ell, about 100' x 35', extends north from the west end of the main mill. Between 1862 and the end of the Civil War the plant served as the Norwich Armory; the newly formed Hopkins and Allen Firearms Co. occupied it by 1868. This firm produced pistols for the civilian market, bearing the trade names of Captain Jack, Bluejacket, Young American and others. Hopkins and Allen grew from 50 employees in 1870 to 175 in 1888; annual pistol production in the same period rose from 9,200 to nearly 100,000. The gun firm added brick factories along the east side of the complex and in the enclosed yard before going out of business in 1915. Industrial and commercial concerns now use the plant.
(Census 1870, 1880; F. M. Caulkins, History of Norwich, 1874; Norwich Board of Trade, Norwich, Connecticut, 1888; Sanborn Map Co., Insurance Maps of Norwich, Connecticut, 1914.)

TRUMBULL IRON WORKS; (1849)
ATWOOD MACHINE COMPANY
Water St.
Stonington

Mystic
19.256700.4579300

J. F. Trumbull built the first structures in this complex in 1849-51. The main buildings, a 3 1/2-story machine shop and high 1-story foundry, both have walls of random-coursed stone. The 108' x 74' machine shop has a gable roof; the foundry was originally 62' long and about 30' wide, but was altered by a later occupant (see below). Trumbull Iron Works employed 10 men in 1860 and produced 150 cotton gins and 6 steam engines. Trumbull was gone by the late 1860s and a braiding firm occupied the plant. In 1876 Atwood Machine Co. bought the buildings. This company originated in Mansfield, CT and grew from the silk manufacturing sector in that town. John E. Atwood founded the firm in 1852 to produce silk-making equipment. In the 1860s his son Eugene's patented inventions in mechanized reeling and spinning of silk propelled the firm's sales beyond local markets. Atwood Machine moved to Willimantic in 1870 and to this plant six years later. Atwood Machine widened the foundry to 41' and rebuilt the roof to include a low, narrow monitor, thus giving the structure the typical foundry form of the late 19th century. The company's growth accelerated in the 1880s, again because of product improvements by Eugene Atwood, notably his self-centering spindle which allowed substantially faster thread-making. In 1896 a 2-story brick-pier mill, 67' x 65' with near-flat roof, was erected along Water St.

Foundry at Atwood Machine Co. (M. Roth)
Note the addition of the monitor.

The rest of the plant went up during World War I; brick-pier extensions covered the entire Water St. side of the property and a new foundry, 128' x 87', was added. Several manufacturers have occupied the plant since Atwood Machine went out of business after World War II. (New London Atlas; Census 1860; Barlow's Insurance Survey, #6187, 1880, MVTM; William Haynes, Stonington Chronology, 1976; M&M Protection Consultants, Survey #L-2045, 1977, courtesy Monsanto Corp., present owner; Henry R. Palmer, Jr., "The Atwood Machine Co.," Bulletin of the Stonington Historical Society 17, Winter 1980.)

COTTRELL MACHINE WORKS (c.1870)
River Rd.
Pawcatuck

Watch Hill
19.262960.4583600

Cottrell and Babcock started their machine-building business in 1855. They made textile and woodworking machinery as well as printing presses. In 1860 the firm employed 50 men and produced 20 machines of various kinds. Ten years later Cottrell and Babcock were making only printing presses and their 100 employees produced 50 of the machines. Employment and output nearly tripled in the next decade. In 1880 Cottrell purchased his partner's share and continued the firm as C. B. Cottrell and Sons. Pre-1880 structures include a 3 1/2-story frame mill with gambrel roof and clapboard walls, and a 2-story brick mill with pink granite lintels and sills. The small brick office building with dormered mansard roof dates from the mid-1870s. Despite its location on the Pawcatuck River the plant was always powered by steam. The 1890 2-story brick building with round-arched windows was used, in part, to house boilers and engines. There are two c.1900 brick-pier mills (1-story and 3-story) with near-flat roofs, segmental-arch lintels and stone sills. These last structures and the adjacent 1-story brick mill with sawtooth roof may have been built by one of several woolen firms that operated here. Two brick mills from the 1920s complete the plant. A printing-press producer (not Cottrell) and an electrical-component manufacturer now occupy the buildings. (New London Atlas; Census 1860, 1870, 1880; William Haynes, Stonington Chronology, 1976.)

NORWICH AND WORCESTER RAILROAD SHOPS (1868)
67 North Main St.
Norwich

Norwich
18.744600.4601080

The Norwich and Worcester Railroad built these shops in 1868-69 for the manufacture and repair of locomotives and rolling stock. There are two brick-pier buildings, each about 160' x 50'. The 2 1/2-story structures have gable roofs, segmental-arch lintels, stone sills in the windows of the top floors and brick and wood sills in the first floor. Facilities here included machine shops, engine repair shop, blacksmith and boiler shop, and carpenter shop. A brick roundhouse stands just south of these buildings. These shops produced 12 locomotives between 1869 and 1890, as well as numerous tenders, passenger and freight cars. In 1890 the New York and New England Railroad, which had leased the Norwich and Worcester, moved the shops to East Hartford. Since then the buildings have had a succession of occupants. Now they serve various commercial, storage and manufacturing functions.
(Elmer F. Farnham, The Quickest Route: The History of the Norwich and Worcester Railroad, 1973.)

STONINGTON HARBOR LIGHTHOUSE (1840)
7 Water Street
Stonington

Mystic
19.256850.4579070

The first Stonington lighthouse, built in 1823, was located further out the point from the present one. Fifteen years after construction a government inspector found that 22' of the original property had been eroded. Rather than build a sea wall the government demolished the earlier structure and, in 1840, used the same stone to build the extant lighthouse. It consists of an octagonal tower and an attached keeper's house. The tower is 10' in diameter at bottom and top and is 35' tall. It is surmounted by a cylindrical plate-glass lantern, about 6' diameter. The 1 1/2-story house, like the tower, is built of irregular granite blocks. On each side two brick chimneys rise from the gable roof. The lack of professional oversight that resulted in the poor choice of original location led to further difficulties with the lighting system. The 1840 fixed light, created by 8 lamps fitted with 16-inch parabolic reflectors, was plagued by the same kind of deterioration that had affected the first light: the government-approved polishing powder wore the silver coating off the reflectors very quickly. Moreover, such lights had been obsolete since the invention in 1822 of the Fresnel lens, a prismatic device for concentrating light. This development was ignored until Congress intervened in 1851. Finally, in 1856, the Stonington Lighthouse received a sixth-order Fresnel harbor light, which operated effectively until the lighthouse was decommissioned in 1889.

Both signaling systems used here were fueled by whale oil. The Fresnel lens is now in the museum in the keeper's house.
(John W. Barber, Connecticut Historical Collections, 2nd. edition, 1936; United States Lighthouse Board, Annual Report, 1852, 1956, 1889; Arnold B. Johnson, The Modern Lighthouse Service, 1890; William Haynes, Stonington Chronology, 1976; NR.)

THAMES TOW BOAT COMPANY SHIPYARD (1903) | Uncasville
Farnsworth Street | 18.742710.4584630
New London

Thames Tow Boat Co. shipyard was built in 1901-03 by Frank H. Chappell. He used it to build and repair barges and ships for his coal-wholesaling business. The facility survives in a more intact condition than any other turn-of-the-century shipyard. Machine and pattern shops, boiler shop, engine house and other buildings remain, but the most important installations are the two steam-powered marine railways that were used to haul vessels from the water. Crandall Dry Dock Engineers of Dedham, MA designed the equipment. Robert Poole and Son Co. of Baltimore built the winches and Houston, Stamwood and Gamble of Cincinnati built the horizontal single-cylinder steam engines. Historic American Engineering Record recorded the shipyard in the utmost detail during recording project HAER CT-4 in 1975. Photographs, measured drawings, interview transcripts and the historian's report documenting the yard can be found at the Library of Congress.
(Alex Gratiot, "Thames Tow Boat Co.," HAER CT-4, 1975.)

NEW LONDON UNION STATION (1887) | New London
State St. | 18.743150.4581950
New London

Union Railroad Station is a strikingly handsome hip-roofed brick structure built in 1886-87. H. H. Richardson is credited with the design, although some controversy exists on the attribution because Richardson was ill in 1885 when his firm received the commission and he died before the station was completed. Nonetheless, Richardson's biographer doubted that Richardson's colleagues could have executed this "excellent" design and detected Richardson's hand in the patterned brickwork and monolithic, but not ponderous, massing. When the station was built the tracks ran along its northwest side (they run to the southeast today), which is dominated by a projecting, cross-gable center bay with arched entry. The station faced demolition in the early 1970s but was saved largely through the efforts of local citizens. Now restored and still used for rail traffic, Union Railroad Station has become the centerpiece for preservation-oriented redevelopment in New London's waterfront district.
(CHC; NR; Henry-Russell Hitchcock, The Architecture of H. H. Richardson and His Times, 1936.)

LYMAN VIADUCT (1873)
.2 mile west of Bull Hill Rd.
Colchester

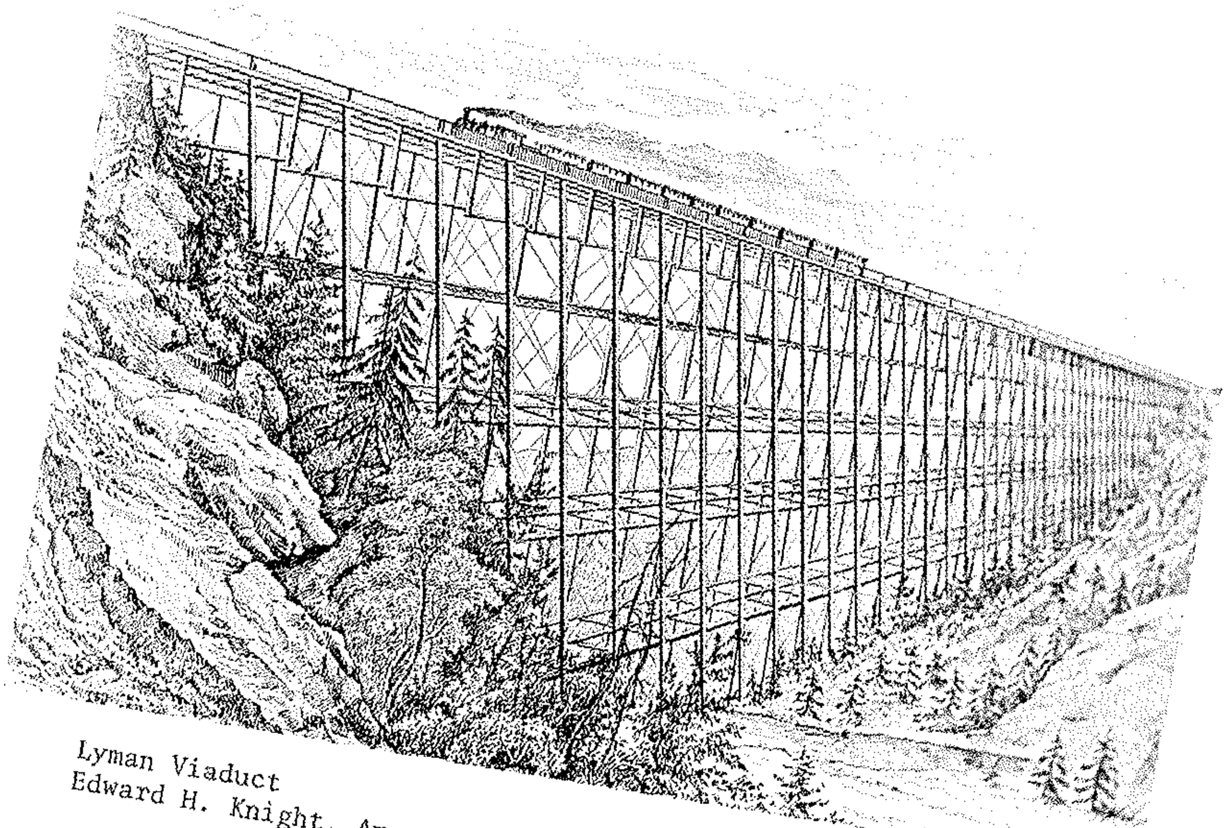
Moodus
18.712590.4604300

Lyman Viaduct was a principal crossing on the Boston and New York Air Line Railroad, exceeded in length only by the swing bridge over the Connecticut River (separate entry). East-west railway building in Connecticut was hampered by the steep, parallel ridges that generally run north-south. Lyman Viaduct, completed in 1873, was one spectacular solution to this problem. Spanning 1,100' at a maximum of 137' over Dickinson Creek, it connects the tops of two ridges. Most structural members are wrought iron, including bents consisting of 8"-diameter Phenix columns. Mortared stone abutments support the I-beam stringers at both ends of the structure. The New York, New Haven and Hartford, which had, in effect, acquired the Air Line in 1882, found the viaduct inadequate for 20th-century rolling stock. Rather than build another structure the railroad simply filled this one in. First a culvert was built through the bottom of the viaduct for Dickinson Creek. Then trains of hopper cars filled with fine sand were hauled to the viaduct, where they dumped their loads. The filling took two years, 1912-13. A foot-thick layer of compacted cinders formed the skin of the sloping fill. The town of Colchester plans to run sewer lines through Lyman Viaduct, and excavation for this project exposed parts of the structure for the first time in over 60 years.
(Board of Directors of the New York, New Haven and Hartford Railroad, Annual Report, 1883; E. A. V. Gustafson, "The Air Line," Transportation 2, October 1948; Stanley M. Cooper, "The Air Line," unpub. typescript, 1970, Russell Library, Middletown; Drawings accompanying excavation report, 1979, courtesy Cahn Engineers, Inc.)

RIVER ROAD BRIDGE (1887)
River Rd.
Colchester

Moodus
18.714620.4606160

River Road Bridge carried the Air Line Railroad over this dirt lane. The brownstone arch spans about 22' and rises about 18'. Voussoir stones are chisel-marked with consecutive numbers, suggesting that the blocks were cut to size elsewhere and then shipped here for erection. The future of the state-owned bridge is uncertain. (Interview with Harold Isham, Office of Mass Transit Planning, Connecticut Department of Transportation, November 1978.)



Lyman Viaduct
Edward H. Knight, American Mechanical Dictionary, vol. 3, 1881

BLACKLEDGE RIVER BRIDGE (c.1907)
.2 mile south of River Road
Colchester

Moodus
18.714820.4606380

This bridge is typical of the river crossings built in the first decade of this century by the New York, New Haven and Hartford Railroad in its upgrading of the former Air Line route. It is a riveted steel, double-intersection Warren deck truss, with sub-struts, supported on brownstone abutments. The 108'-long span carried a single track. Unlike other similar bridge sites on the Air Line, remains of the original, c.1870 bridge can be seen here. These abutments are 19' x 6 1/2' in plan and their tops are 5' lower than the truss-supporting ledges of the c.1907 abutments.
(Drawings accompanying excavation report, 1979, courtesy Cahn Engineers, Inc.)

SALMON RIVER BRIDGE (c.1880)
.3 mile north of Day Pond Brook
Colchester

Moodus
18.713660.4604710

This bridge carries unimproved Day Pond Rd. over the Salmon River. It is a Pratt pony truss, about 80' long and 12' wide, supported on stone abutments. The truss is lightly proportioned, with built-up wrought iron top chords and endposts only 10" square. All connections are pinned except for those at the bottom-chord panel points, where simple bearing block connections are found. The pin connections at the upper portal joints are reinforced with cast iron cover plates which are embossed with 5-pointed stars centered on the pins. The bridge is in a remote, wooded area and the only traffic borne is the occasional fisherman, hiker or industrial archeologist.

ASHLAND LENTICULAR BRIDGE (c.1885)
in millyard
Jewett City/Griswold

Jewett City
19.251700.4610100

Built by Berlin Iron Bridge Co. in the mid-1880s, this one-lane lenticular pony truss crosses the Pachaug River just below the dam in the yard of Ashland Cotton Co. (See separate entry.) It is 64' long and, with its tapered web verticals and floorbeams, representative of the firm's standard techniques for small pony trusses. End-post connections feature threaded chord rods run through the posts and secured with nuts. All other joints are pinned. The wrought iron structure carries only pedestrian traffic today. See entry for Berlin Iron Bridge Co. Plant.

SLATER COTTON MILL BRIDGE (c.1890)
in millyard
Jewett City/Griswold

Jewett City
19.251300.4609700

Berlin Iron Bridge Co. built this 30'-long wrought iron lenticular pony truss in the early 1890s. A single lane wide, it crosses the tailrace in the yard of J. and W. Slater's Jewett City Cotton Co. (See separate entry.) It is in all ways typical of the small Berlin pony trusses: tapered verticals and floor beams, pinned connections except for at the endposts, where the chords are threaded and fastened with nuts. See entry for Berlin Iron Bridge Co. Plant.

NORWICH RAILROAD BRIDGE (1890)
south of Main St.
Norwich

Norwich
18.744050.4600780

The Norwich and Worcester Railroad built this steel and wrought iron bridge in 1890 to carry a single track over the Shetucket River. The 234'-long span is a Baltimore through truss with pinned connections. There are two levels of ties between the truss webs for lateral stability. Eyebar diagonals are fitted with turnbuckles to take up tension. The bridge is immediately north of Laurel Hill Tunnel, a 170'-long unshored cut through rock.
(PC; Elmer F. Farnham, The Quickest Route: The History of the Norwich and Worcester Railroad, 1973.)

MYSTIC RIVER SWING BRIDGE (1919)
Shoreline Route
Mystic

Mystic
19.251460.4581560

Built by the American Bridge Co. in 1919, this is the only center-bearing swing through truss on the former New York, New Haven and Hartford Railroad in Connecticut. There are four timber-trestle approach spans to the south (total length 46') and four similar approach spans to the north (46'). The swing span is a 181'-long rivet-connected Warren through truss with verticals. The original operator's house, suspended over the tracks between the trusses, is now used for equipment storage and the bridge is controlled from an operator's house on the shore. Operating equipment has not been altered since initial installation. There is one 25-horsepower motor for operating the swing span and one for the rail locks, wedge locks and bridge locks. Timbers have been replaced occasionally in the approach spans and the swing span had some members replaced in 1946. This two-track bridge carries trains every day.
(NR; CHC; PC.)

MYSTIC RIVER/ROUTE 1 BRIDGE (1922)
Route 1
Mystic

Mystic
19.251620.4582180

This 223'-long bridge consists of an 85'-long bascule span and rolled steel beam approach spans. The superstructure of steel girders on the bascule span carries scant traffic load, but rather it supports the overhead counterweights and stiffens the deck of the bascule span when the bridge is open. The bridge operates by means of a flywheel and crankshaft apparatus, and carries two lanes of traffic.
(DOT.)

SHAW'S COVE SWING BRIDGE (1918)
Shoreline Route
New London

New London
18.742840.4581360

Shaw's Cove Bridge consists of a 136'-long Pratt through truss, rim-bearing swing span with rivet-connected steel members, and fifteen 12'-long timer-trestle approach spans. It carries two tracks.
(NR; CHC; PC.)

GROTON BASCULE BRIDGE (1918)
Shoreline Route
Groton

New London
18.743640.4582930

Built in 1918 by American Bridge Co., this is a Strauss bascule bridge of the heel trunnion type, characterized by the pivots on which the bascule span rotates to lift and by the overhead counterweight. There are two Parker through truss approach spans to the west (186' long and 328' long) and two to the east (327' and 324'). The bascule span is a Warren through truss with verticals (188'). All trusses have steel members and riveted connections. The masonry piers and abutments were built wide enough to accommodate four tracks, but the bridge was never widened beyond the original double-track installation. This is the only Strauss heel trunnion bascule bridge on the Northeast Corridor rail line.
(NR; CHC; PC.)

STATE PIER ROAD BRIDGE (1899)
Rte. 437
New London

New London
18.743070.4582790

This one span is the last remnant of the swing bridge built in 1888-89 across the Thames River. It is a steel, pin-connected Parker through truss resting on piers of brownstone blocks. Designed by Alfred Boller and constructed by Union Bridge Co. of Buffalo, NY, the swing bridge eliminated ferry service for trains here and completed the Shoreline

Route between New York and Boston. This line rapidly became the most popular east-west route in Connecticut and parallel routes, notably the Air Line and the Hartford, Providence and Fishkill, suffered from the competition. They were eventually decommissioned while the Shoreline became part of the Northeast Corridor mainline. This bridge was superseded by the 1918 Groton Bascule Bridge. It was then converted to road service. All but this span was later demolished.
(William E. Grove, "Modern Bridge Erection," CSCE, 1927; DOT.)

NEW LONDON RAILROAD BRIDGE (1918) — New London
Shoreline Route — 18.743070.4582850
New London

This bridge was built in 1917-18 during the re-routing of the railroad line, which was undertaken as the Groton Bascule Bridge replaced the earlier Thames River crossing. (See entries for Groton Bascule Bridge and State Pier Rd. Bridge.) This bridge carries two tracks over the Central Vermont Railroad tracks. It is borne by a steel, rivet-connected Warren through truss, 154' long. A 49'-long plate girder span carries the tracks over Congdon St., immediately east of the Central Vermont tracks.
(PC.)

ROUTE 156 SWING BRIDGE (1921) — Niantic
over Niantic River — 18.736300.4578400
Niantic

Berlin Construction Co. built this bridge in 1919-21. There are two spans: a fixed Pratt through truss (103' long) and the swing span (180' long), a Warren through truss with verticals and inclined top chord. All members are steel and all connections are riveted. Piers and abutments are made of stone blocks, though the abutments have been faced with concrete. The bridge is scheduled for replacement.
(DOT.)

NIANTIC RIVER BASCULE BRIDGE (1907) — Niantic
Shoreline Route — 18.736280.4578230
Niantic

The 1907 Niantic River Bridge is a chain-driven Scherzer rolling lift bridge. This is the only example of the chain-drive feature on the movable bridges of the former New York, New Haven and Hartford rail line. There are two deck girder approach spans (77' and 70' long) east of the swing span and one deck girder approach span (50') to the west. The through girder swing span is 69' long. All superstructure members are steel and the piers and abutments are stone.
(PC; NR; CHC.)

KING POST BRIDGE (1933?)
Buttonball Road
Old Lyme

Old Lyme
18.725650.4574960

Buttonball Rd. crosses the double-track mainline of the Shoreline Route on this 31'-long king post truss bridge. Its bottom chord and inclined top chord members are timbers 12" square. They are connected with sawtooth splices at the lower joints. The top chord members simply butt at the center of the bridge. In each web the vertical tension member is a steel or iron rod that runs through the butt joint at the top and the chord at the bottom; it is secured with nuts at each end. Abutments are coursed ashlar masonry.

The bridge's origin is an enigma. Railroad company bridge data files indicate that the bridge was built in 1933, which seems extraordinarily late for a technologically advanced railroad to have used timber construction and a truss pattern several centuries old. Perhaps the light and intermittent usage of this rural crossing warranted no stronger design. Certainly financial conditions were strained in 1933, and this method of construction would have been relatively inexpensive. It is possible that the 1933 designation refers to the last major repair, such as, perhaps, the installation of the metal verticals. In any case, the bridge remains for the present as the only surviving timber king post railroad crossing in Connecticut. It is now closed and could face imminent replacement.
(PC.)

GREENEVILLE INDUSTRIAL DISTRICT (1842) Norwich
North Main St. 18.4602000.745800
Norwich

Norwich Water Power Co. was incorporated in 1828 and empowered to build a dam and canal that would bring the water of the Shetucket River to industrial use. A timber and stone dam was built to impound the Shetucket and feed water into the 4600'-long canal, which averaged 10' depth and 45' width. At its lower end, where the mills were built, masonry walls contain the canal. Above the mills only the east wall, or river side, is similarly reinforced. In 1881-82 a new dam was built some 1,200' downstream from the first dam; traces of the original structure may exist, but if so they are beneath the water impounded by the later dam. Designed by Hiram Cook, a civil engineer who also served as president of the Water Power Co., the 1882 dam is 15' wide at the base and 7 1/2' wide at top. It is built of rubble masonry with coping of dressed granite blocks. Six headgates are set in a bulkhead of random-coursed granite blocks, and a gable-roofed frame building atop the bulkhead contains the machinery for operating the gates.

Parcels on the island between canal and river were sold or leased for mills. The first firm to build was Quinebaug Co., cotton-cloth producers. Before construction was finished Thames Co. bought Quinebaug. Thames went bankrupt in 1837 and was sold to Shetucket Co., which continued to produce cottons here until the 1920s. The next large lessee of power was Chelsea Manufacturing Co., a paper producer established here in 1835. Chelsea ran until c.1890, when its works were purchased by Norwich Bleaching & Calendering Co. (NB&C), a textile-finishing firm which had built its own mills on the canal in 1840. Besides these large firms there were many smaller lessees: Durfy & Mowry's merchant grist mill, Johnson & Miller's cotton mill, and Samuel Mowry's spoke and axle shop, among others. The last large manufacturer to build along the canal was Hubbard Paper Co., which had operated since 1818 at the falls in the Yantic River, and came here in 1860 when that water privilege came under control of the Falls Co. (separate entry).

Virtually nothing remains of the furthest upstream plant, Hubbard Paper Co. Proceeding downstream, one next encounters the foundations of NB&C's early buildings. Beyond the demolished sections stands a c.1870, 3 1/2-story, 90' x 30' brick-pier mill with gable roof. Between its pilasters are paired windows under segmental-arch heads. The foundation doubles as a retaining wall for the canal's east bank. NB&C operated machine and repair shops here. Behind it, to the east, lies a 2-story, flat-roofed brick-pier mill built c.1910. Across the canal stands a 5-story brick, 115' x 72', c.1890 storehouse. Next downstream are the enormous paper works of the Chelsea Manufacturing Co. With its stone foundation also serving as the canal's east wall, the c.1860, 3-story, brick main mill runs 375' along the canal and is 78' wide. Its roof is near-flat and windows are set in openings with segmental-arch lintels and stone sills. In the 1880s a mill with almost precisely the same specifications was built parallel to the c.1860 mill, along the bank of the river. Below Chelsea stands the plant of the Shetucket Co., which includes the earliest surviving mill on the canal. Built c.1840, the 4 1/2-story mill, about 170' x 40', has a gable roof. Tie rods and flat-arched window openings with a single soldier course punctuate the walls. A cross-gabled pavilion extended the north wall by four bays. An adjacent c.1860, 2 1/2-story, gable-roofed brick mill extends partially out over the canal. Across the canal to the west stands a 1915, 2-story brick-pier mill, about 425' x 100', with near-flat roof. Adjacent to it is the c.1910, 1-story, brick boiler house, about 140' x 60'.

Besides the buildings noted here, there are dozens of smaller structures. The Norwich and Worcester Railroad ran just west of the canal, and several storehouses, including one railcar vault with rubble-stone walls, are found along the tracks. Numerous bridges cross the canal in the millyards, including plate girder, timber beam and reinforced concrete arch structures. There is a c.1920, rivet-connected steel Warren pony truss just north of the NB&C machine shop. The mills house manufacturing firms today, but none of the 19th-century companies operate here anymore.
(New London Atlas; Water Power Report; F. M. Caulkins, History of Norwich, 1874; Norwich Board of Trade, Norwich, Connecticut, 1888; Barlow's Insurance Survey, #6831, 1881, with 1888 supplement, MVTM; Associated Factory Mutual Insurance Co., Survey #17256, 1913; Sanborn Map Co., Insurance Maps of Norwich, Connecticut, 1914.)

NORWICH AND WORCESTER RAILROAD TUNNEL (1837) — Norwich
near Bundy Hill — 18.747180.4604330
Lisbon

This tunnel was among the first such structures built on a U. S. railroad, preceded only by the tunnels on the Allegheny Portage Railroad, the Philadelphia and Reading, and the Granite Railway Company of Massachusetts. It was built in 1837 during the first phase of construction on the Norwich and Worcester, which was the 8-mile stretch between Norwich and Jewett City. The curving tunnel is 292' long, 23' wide and 18' high. It was cut through solid schist and was unreinforced originally. Today there is one small section with brick walls and a vaulted cement ceiling. There is about 20' overburden.
(PC; Elmer F. Farnham, The Quickest Route: The History of the Norwich and Worcester Railroad, 1973.)

OXOBOXO RIVER INDUSTRIAL DISTRICT (1823)
along Route 163
Uncasville

Montville
18.734300.4596120
Uncasville
18.741600.4591040

Oxoboxo River falls 350' in the six miles between its source at Oxoboxo Lake and its mouth at the Thames River in Uncasville. Industrial exploitation of the water power began in 1653 with the building of a sawmill near the stream's outlet. Throughout the 17th and 18th centuries small grist, fulling, oil and sawmills began on the Oxoboxo, but it was the manufacture of cloth, and later paper, that led to the complete utilization of the stream's power. By the 1880s, the Oxoboxo drove machinery at 15 water privileges. Regulated by dams and gates, flow averaged 20-25 cubic feet per second and afforded between 750 and 1,000 horsepower in all. Oxoboxo Lake served as the reservoir. It was a natural impoundment first enlarged by damming in the late 17th century. The dam was raised and rebuilt several times. The present dam, a 22'-high earth and stone embankment, was built in the 1880s. All of the colonial-era mills have been destroyed or demolished. Except for the 1823 Richards mill (see below), all the mills from the first generation of factory production are gone, as are many of the later mills. None of the sites that retain vivible industrial fabric are intact. Burned-out or half-demolished shells of buildings are found at several places, and none of the standing structures survives unaltered. Nonetheless, the dams, watercourses, mills and houses that do survive reveal a concentrated picture of 19th-century industrial development in eastern Connecticut.

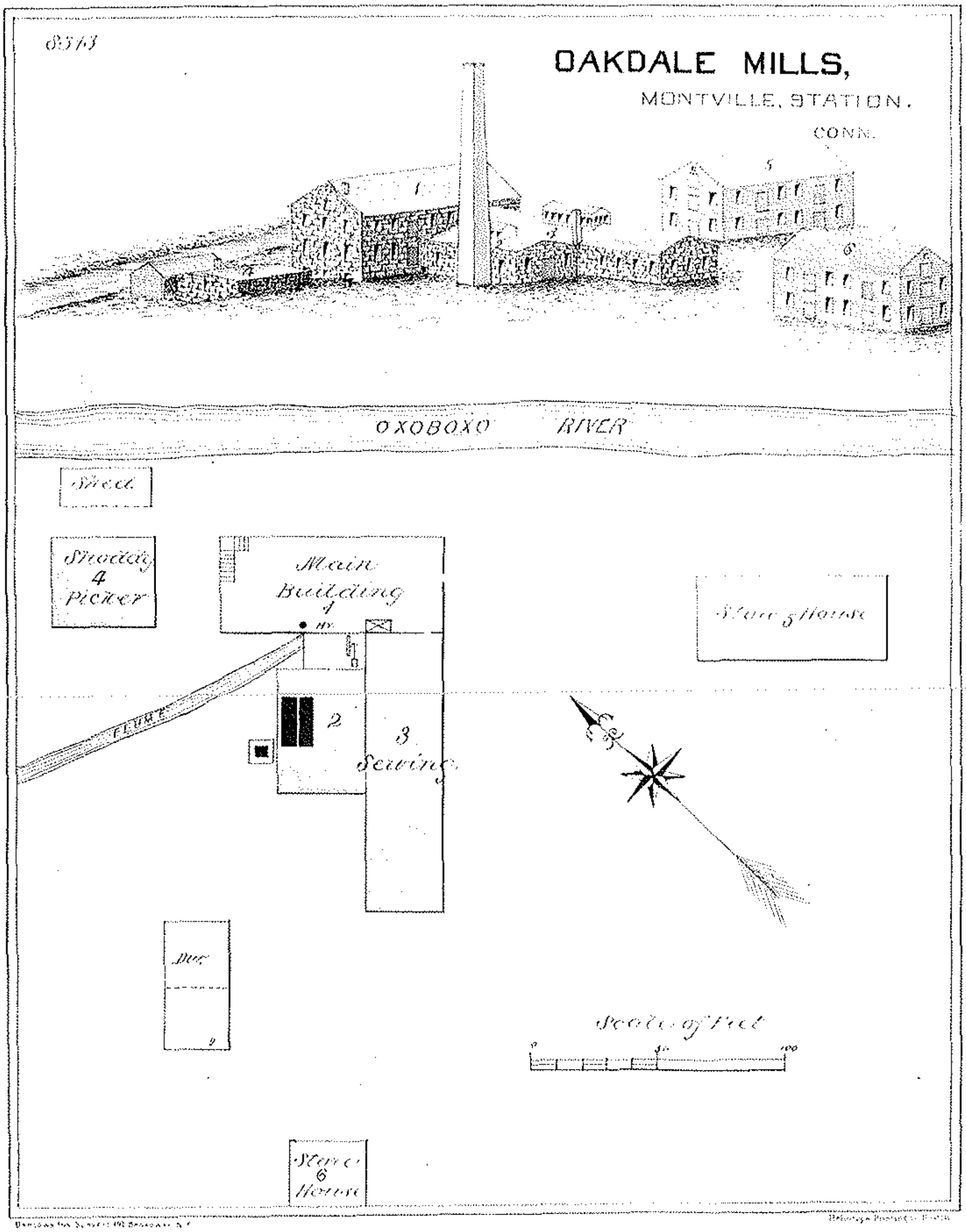
Beginning from the outlet in Uncasville, the first mill seat (site of the 1653 sawmill) is now occupied by modern structures. It was here in 1798 that John and Arthur Scholfield began a wool-carding and spinning mill which was among the first water-powered textile mills in the state. In the 19th century Johnson and Co. ran a wood-extract works here, producing dyestuffs. The next privilege was first used to power a gristmill in 1794. Peter and Henry Richards bought the property in 1823 and erected a cotton mill, which today is the earliest extant industrial structure on the Oxoboxo. It is 5-story, about 120' x 40', with random-coursed stone walls and a clerestory monitor roof. A stair tower was later added to the north end and the ends of the clerestory were rebuilt in brick. In 1845 new owners added a 3 1/2-story, gable-roofed brick mill with cut-stone sills and lintels. Two 1-story brick mills were built late in the 19th century. The present dam, a granite buttress about 12' high and 75' long, was built in the 1870s; it stands above the hollow where the mills are located, so a total of about 40' fall was applied here. North and east of the mills stand 26 frame workers' dwellings.

Next upstream, at the third privilege, are the ruins of the Pequot Mills, formerly the site of a sawmill in the 18th century and an oil mill from 1803 to 1860. Three investors from Norwich bought the oil mill in 1860, enlarged it, added more buildings and produced woolen cloth. The random-coursed stone walls of a 2-story mill, about 100' x 5-', stand on the east bank of the river. Next to it is a 1-story, brick mill, about 280' x 50' with near-flat roof, segmental-arch lintels and stone sills; this mill was probably built in 1877 when production changed from woolens to cottons. On the west bank are foundations and some walls of a stone, random-coursed, 2-story mill, about 70' x 30'; of a windowless, rubble-walled storehouse, about 60' x 50'; and of several smaller structures. The dam is about 35' high and consists of earth embankments with a stepped, masonry spillway. From the west abutment a penstock runs about 30' downstream to the wheelpit of what was the powerhouse, below which the penstock crosses the stream and goes underground to the mills on the east bank. This two-stage system, with 52' total fall, was built in 1877. West of the mills are five double-entry trame dwellings and three with single entry; all have two floors and gable roofs. Thames Woolen Mill occupied the next privilege, the fourth, but scant traces of it remain.

Above that, in the village of Montville, is the Palmer Brothers 1866 cotton mill. A 2 1/2-story structure, 230' x 40', it has coursed granite walls, central stair tower and a gambrel roof; dormers have been removed. This mill stands on the river's east bank, directly across the stream from three smaller stone-walled buildings, including the wheelhouse and picker house. West of these is a 3-story, brick-pier mill with segmental-arch lintels and stone sills. Just upstream on the east bank stands a barn-like, 3 1/2-story, frame building. There are at least six mill-related dwellings: one 2 1/2-story, gable-roofed frame duplex; four 1 1/2-story, single-family frame houses; and one large 2-story house with first-floor walls of coursed granite and clapboarded walls above.

The sixth water privilege was first developed in 1852 by Gideon Palmer. C. M. Robertson bought it in 1866 for a paper mill. Robertson Paper Box Co. still operates here, but most of the plant is of recent vintage, except for one stone mill and the brick boiler house. The 2-story stone mill, with coursed granite walls and a near-flat roof, probably dates from Robertson's initial years of operation; it has been incorporated into a later brick factory. The brick boiler house, one high story tall and with round-arched window openings, was built c.1890. The next two mill seats, the seventh and eighth, had a succession of industries, the lower one starting in 1866 with Hurlburt's cotton mill and the upper in 1850 with the Rockland Paper Mill. Neither retains any above-ground fabric.

Above Rockland's pond is the so-called Wheeler privilege, one of the oldest developed sites on the Oxoboxo and the site of the largest impoundment below the reservoir. A sawmill operated here from 1700 to 1813, a machine shop from 1813 to 1817, and cotton mills from 1837 to 1871, after which Rockland Paper Co. ran the mills for 15 years. C. M. Robertson bought the property in 1886 and erected a stone mill for his paper manufacture. It is an ell-shaped, 1-story mill with random-coursed granite walls and a gable roof topped by a low monitor. Another



Insurance survey of Oakdale Mills
Barlow's Insurance Survey, #8313, 1885
courtesy Merrimack Valley Textile Museum

stone mill and two brick additions also stand, as does the earth and masonry dam.

The tenth mill seat is in the village of Oakdale. James Bingham built a dam here in 1866 and started a paper mill. The masonry dam, between 20' and 25' tall, diverted water into a 500'-long headrace, the longest race built along this steeply inclined river. Stone walls of the mills stand but roofs have been removed and interiors gutted. Rubble walls remain of a 3 1/2-story mill, 83' x 38', and random-coursed walls of a 1- and 2-story mill about 200' x 40'. Remnants of the boiler house and of three smaller structures are also found. Palmer Brothers made bed quilts here from 1880 to the early 1890s, then leased the property to the Massasoit Co. of Fall River, MA. Above Oakdale there were five more developed privileges in the late 19th century, including two woolen mills owned by the Scholfield family. Only traces of the buildings are found above ground.

These remains along the Oxoboxo reflect the imperatives of 19th-century water-powered manufacture. The river itself was transformed from a swift and rocky stream into a series of regulated pools. With further study, these watercourses, mills and dwellings have the potential to reveal useful data on the patterns, resources and techniques of the industrialization that created the Oxoboxo region as it exists today.
(Osborn; New London Atlas; Water Power Report; Barlow's Insurance Survey, #7895, 1885 and #8313, 1885, MVTM; Henry A. Baker, comp., History of Montville, Connecticut, 1896.)

FORT TRUMBULL (1790)
Fort Neck
New London

New London
18.743180.4580750

In 1775-76 Connecticut's colonial government first fortified this point overlooking New London harbor. The only extant 18th-century structure is the 1790 1-story granite blockhouse with hip roof. The Federal Government acquired the fort in 1798, but nothing remains from its 1812 rebuilding program. The Army Engineers under Brigadier General George Cullum built the present Fort Trumbull in 1839-59. Cullum's design adhered to contemporary practice followed throughout the eastern coastal defense system, notably at Fort Adams, built in 1824 at Newport, RI. In plan, Fort Trumbull is an irregular pentagon with projecting ramparts at each corner except the northwest. Walls consist of granite blocks quarried at nearly Millstone Point. The massive main entry features Egyptian Revival details, such as the inward taper of the opening and the flared cornice. Buried beneath the fort are rows of stone arches, probably placed there to distribute the shock from incoming shells. The Army trained recruits here during the Civil War, and maintained small artillery units at the fort until 1910. Since then it has served a number of training and research purposes for the Coast Guard and the Navy.
(U. S. Navy Underwater Sound Laboratory, USL Publication No. 965, 1968; Gary Kulik, Rhode Island: An Inventory of Historic Engineering and Industrial Sites, 1978; Mark Anderson, "Inside Fort Trumbull," The Norwich Bulletin, 1 July 1979.)

TOLLAND COUNTY

Bulk Products

MINTERBURN MILL (1906)
215 East Main St.
Rockville

Rockville
18.713020.4638060

This 5-story, 296' x 58' reinforced concrete structure, the last and the largest of Rockville's textile mills, occupies the furthest upstream water privilege in town. (Rockville grew in the 19th century around the dozen millseats on the Hockanum River just downstream from Snipsic, also known as Shenipsit, Lake. The following 10 entries detail those structures that survive at the remaining privileges, in order from upstream to down.) Minterburn Mills Co. purchased several other mills in town before building this one in 1906, when it also merged with other Rockville producers to form Hockanum Mills Co. This mill has a flat roof and concrete pilasters which are scored to resemble large blocks of stone. It employed 225 people to run 4,080 spindles and 68 broadlooms. The mill is unique in Rockville because it is still occupied by a textile manufacturer, Roosevelt Mills, founded in 1941.
(Henry C. Smith, comp., A Century of Vernon, Connecticut, 1808-1908, 1908; CHC.)

ROCK MANUFACTURING COMPANY; (1834)
ROCKVILLE WARP MILLS
210 East Main St.
Rockville

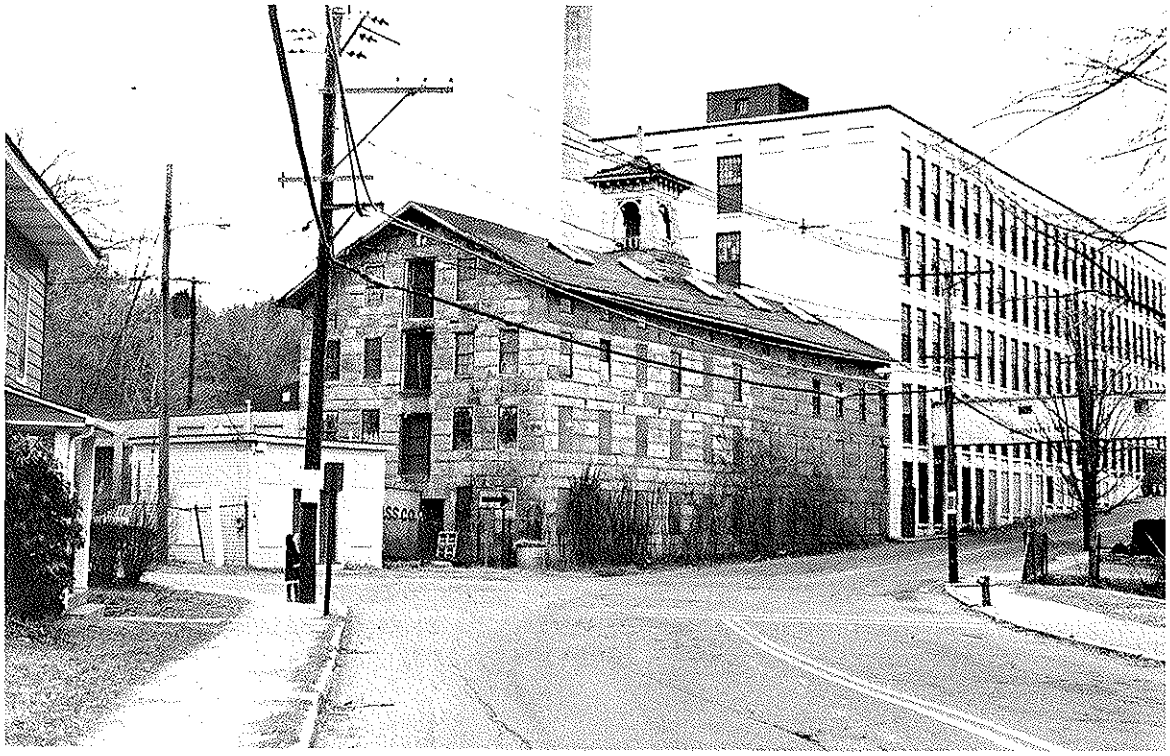
Rockville
18.712910.4638100

Rockville Warp Mills Co., incorporated in 1891 by Henry Adams, occupied several mills in town in the 1890s. Two survive: an 1834, 3 1/2-story stone mill, 107' x 36' and an 1888 2-story brick-pier mill, 123' x 44'. Rock Manufacturing Co., an earlier producer of cotton warps, built the 1834 mill; it has coursed ashlar walls and a gable roof with cupola. The 1888 mill, built by Adams, features a near-flat roof, central stair tower and segmental-arch windows with stone sills. Minterburn Mills Co. bought both buildings in the early 20th century. A chemical firm now uses them.
(Barlow's Insurance Survey, #3978, 1876, MVTM; The Rockville Journal, Illustrated Rockville, 1893; CHC.)

DART MILL (1868)
104 East Main St.
Rockville

Rockville
18.712200.4637990

This mill, erected by Albert Dart in 1868, has the most dramatic setting of any mill in Rockville--perched on the high rock shelf at the second



Foreground, Rock Manufacturing Co. Mill
Background, Minterburn Mill
(M. Roth)

millseat down from Snipsic Lake. A main section, 5 1/2-story and 74' x 32', joins two wings: 3 1/2-story, 79' x 39' and 2 1/2-story, 78' x 49'. All sections have gable roofs, stucco-covered stone walls and two-ply, slow-burn flooring. Tailwater exited the wheelpit through an arched opening in the rubble foundation of the 3 1/2-story wing. Dart first used the mill for spinning silk, then added shoddy production. Cyrus White bought the mill in 1870, continuing shoddy production and adding manufacture of cotton warps. In the late 1870s White ran six sets of cards for his woolen operation and 4,800 cotton spindles, as well as renting space to the textile firms of J.J. Regan and J.A. Smith and Son. Belding Brothers and Co. (separate entry) bought the mill in 1909. A rubber-goods firm uses it now.
(Barlow's insurance Survey, #5711, 1879, MVTM; Hartford and Tolland Atlas; CHC.)

CARLYSLE THREAD COMPANY; (1865) — Rockville
FITCH'S KNITTING MILL — 18.712170.4638050
98 East Main St.

Carlysle Thread Co. occupied this 3 1/2-story, gable-roofed brick mill, 165' x 45', for only nine years after building it. Then in 1874 Samuel Fitch and Son bought it and installed 14 knitting machines to produce stockinet. This firm added a 3 1/2-story, 70' x 48', gable-roofed ell in 1884, by which time 46 knitting machines were in operation. Belding Brothers bought the mill around 1900 and sold it in 1909 to Edmund Corcoran, who installed 90 Knowles looms and employed some 200 hands in production of worsted suitings. The mill presently stands vacant.
(Barlow's Insurance Survey, #3701, 1874, MVTM; H.C. Smith, comp., _A Century of Vernon, Connecticut, 1808-1908_, 1908; CHC.)

ROSE SILK MILL; (1867) — Rockville
BELDING BROTHERS SILK MILLS — 18.712150.4637900
104 East Main St.

Rose Silk Manufacturing Co. built the first of these mills in 1867. The 146' x 43' brick mill has projecting segmental-arch lintels and stone sills. The central stair tower features Italianate details, such as the paired wooden brackets at the corners of the eaves. The attached 62' x 46' brick building held the wheelhouse and dyehouse. Belding Brothers bought Rose Mill in 1870 and eventually acquired all the mills clustered at this water privilege, including Dart Mill and Fitch's Mill (separate entries). The firm augmented this complex c.1890 with construction of the 3-story, 74' x 40' brick-pier, flat-roofed mill with pyramidal-roofed stair tower. Belding Brothers employed 400 workers and ran 10,000 spindles here in 1908. A rubber-goods firm operates here now.
(Osborn; CHC; Hartford and Tolland Atlas; The Rockville Journal, _Illustrated Rockville_, 1893.)

J. J. REGAN COMPANY (1893)
114 Brooklyn St.
Rockville

Rockville
18.711500.4637670

James J. Regan entered woolen manufacture in the 1870s in rented space at the Dart Mill (separate entry). He rented in several other Rockville mills before building his own facilities. Regan specialized in knit goods for linings but made woven goods as well. In the first decade of the 20th century J.J. Regan Co. employed 350 workers, ran 50 looms and some 10,000 spindles. The only surviving structure in the two Regan-built complexes is this 1893, 4-story, brick-pier mill (102' x 73') in the center of Rockville, at the seventh water privilege on the Hockanum Rover in town. It has a flat roof, segmental-arch lintels and stone sills and now serves as a furniture warehouse.
(The Rockville Journal, Illustrated Rockville, 1893; Henry C. Smith, A Century of Vernon, Connecticut, 1808-1908, 1908; CHC.)

NEW ENGLAND MILLS (1860)
12-18 Vernon Ave.
Rockville

Rockville
18.711350.4637620

The New England Co., organized in 1837, was the first Rockville textile firm to produce high-quality and "fancy" woolens. This manufacture began in 1841-42 with the introduction of Crompton looms to make kerseymeres. The antebellum main mill has been demolished. The 1860 picker, sorting and storage building still stands. This 1 1/2-story mill, 125' x 31', has timber framing, walls of coursed ashlar masonry and a gable roof. The 5-story, 151' x 45', 1885 brick mill has a flat roof and a stair tower centered on an end wall; windows are segmentally arched with stone sills. A c.1880 frame office building also survives, as do remnants of the dam and races. In the 1880s the firm ran 103 looms here. New England Co. joined Hockanum Mills Co. when that holding company formed in 1906. These buildings presently house tenants.
(Barlow's Insurance Survey, #9800, 1889, MVTM; Hartford and Tolland Atlas; The Rockville Journal 100th Anniversary Edition, 15 August 1968; CHC.)

FLORENCE MILL; (1864)
U.S. ENVELOPE COMPANY
121 West Main St.
Rockville

Rockville
18.711230.4637650

Florence Mill, 4-story and 128' x 51', originally held woolen manufacture. The brick mill has a slate-covered mansard roof with gambrel-roofed dormers. Projecting lintels and sills of brownstone frame the windows; the 6-story, pyramidal-roofed stair tower is highly stylized, with round-arched openings in its sixth floor, ocular windows in the fifth, and decorative brickwork throughout. White, Corbin & Co., maker of paper

envelopes, bought the mill in 1881. In 1898 White, Corbin & Co. became a division of U. S. Envelope Co.; at the time it employed some 200 workers and produced 2 million envelopes daily. U. S. Envelope added a 4-story brick ell (106' x 50') in 1915; another brick wing (4-story, 132' x 49') in 1916 formed an open-ended courtyard between the three structures. U. S. Envelope occupied the mills until 1975. The buildings have recently been rehabilitated for apartments.
(Hartford and Tolland Atlas; NR; CHC; Henry C. Smith, comp., A Century of Vernon, Connecticut, 1808-1908, 1908.)

SPRINGVILLE MANUFACTURING COMPANY (1886)
155 West Main Street
Rockville

Rockville
18.711000.4637640

Springville Manufacturing Co. was founded in 1833 to make woolens. Major periods of expansion occurred in the mid-1860s and the mid-1880s. By the 1880s Springville had followed other Rockville producers by specializing in high-grade woolens and worsteds. (Like the Hockanum Co., Springville claimed the distinction of having produced worsted for a presidential inauguration suit, Hockanum for William McKinley and Springville for Theodore Roosevelt.) The 1886 brick-pier mill, 4-story and 297' x 46', used electric lighting, the first Rockville mill to do so. Its 5-story central stair tower has a slate-covered pyramidal roof. Segmental-arch lintels and stone sills of the mill are repeated on the 4-story, 119' x 58' ell; another duplicate ell has been demolished. A hip-roofed brick office building (1886) faces West Main St. at the north side of the millyard. Springville Manufacturing Co. joined Hockanum Mills Co. at that holding company's formation in 1906. Three years later an office building for Hockanum Mills Co. was attached to the earlier Springville office. Also brick with a hip roof, this 1909 office housed the centralized purchasing and marketing functions for which Hockanum Mills Co. was established. At the time of the merger Springville employed 350 workers and equipment included 8 sets of cards, 3,500 spindles and 135 broadlooms. A non-textile manufacturer now occupies the complex.
(The Rockville Journal, Illustrated Rockville, 1893; George S. Brookes, Cascades and Courage: History of the Town of Vernon and the City of Rockville, 1955; CHC.)

HOCKANUM MILL (1854)
200 West Main St.
Rockville

Rockville
18.710620.4637750

Hockanum Co., organized in 1838, originally made satinets. In 1858 Hockanum began manufacture of fine woolens and in 1870 started making worsteds. The earliest mill here, 3 1/2-story and 252' x 36' with gable roof and central stair tower, was built in 1854 along the lines of the 1849 mill that had burned. First-floor walls are of brick, and clapboards sheathe the frame structure of the upper floors. Small rectangular windows under the eaves light the attic. The firm erected the

adjacent brick mill, 3 1/2-story and 115' x 60', in 1881. Corbeled dentil moldings adorn the cornice; segmental arches and stone sills frame the windows. The brick mill held most of the 150 broadlooms run here in the late 1880s. In 1906 Hockanum Co. joined with three other Rockville firms to create Hockanum Mills Co. A plumbing materials warehouse now occupies the mills.
(Barlow's Insurance Survey, #3637, 1889, MVTM; Hartford and Tolland Atlas; CHC; Henry C. Smith, comp., A Century of Vernon, Connecticut, 1808-1908, 1908.)

SAXONY MILL (1836)
66 West St.
Rockville

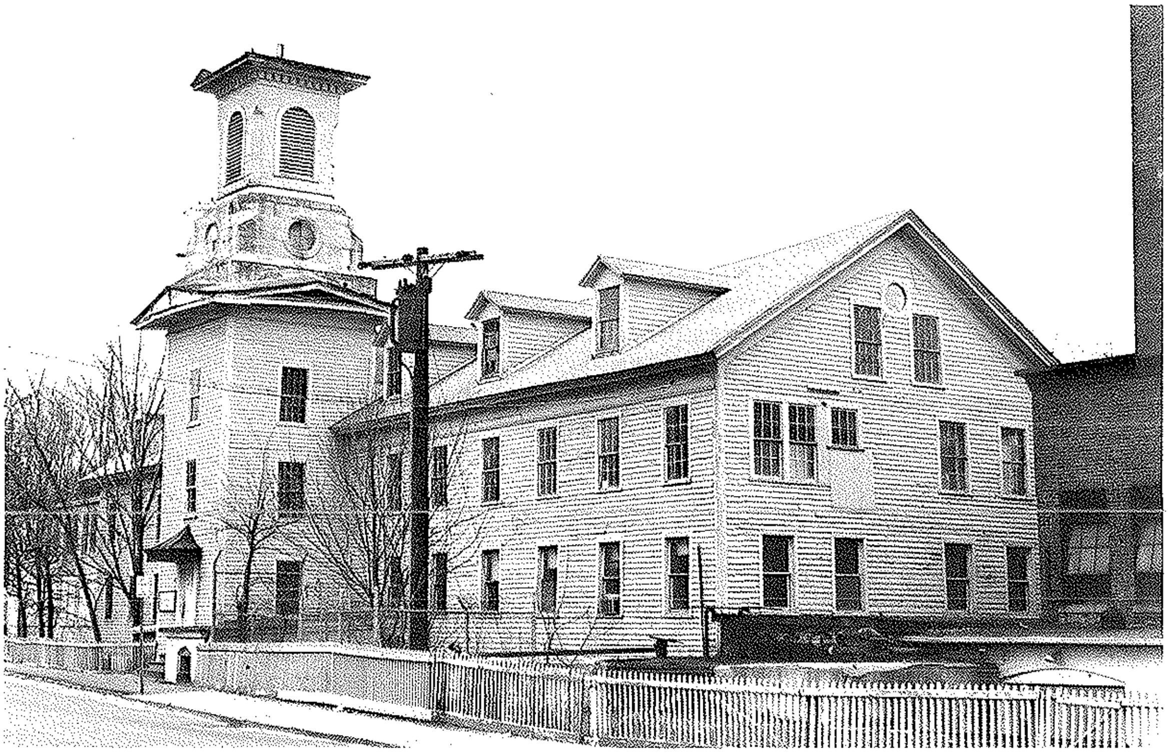
Rockville
18.710260.4637830

Saxony Co. built this frame and clapboard mill in 1836 to manufacture satinets. The only surviving, completely wooden mill in town, it provides the unique opportunity to view the kind of mill structure that housed the emerging woolen industry in antebellum Rockville. It was originally a simple rectangle, 2 1/2-story and 120' x 34' with gable roof. Hockanum Co. (separate entry) bought Saxony in 1874 and added the 5-story stair and bell tower. The beveled corners, arched openings and dentiled cornice of the tower contrast with the unadorned utilitarian design of the original structure. Brick boiler and dye houses were added in the 20th century. A plastics firm now uses the mill.
(Hartford and Tolland Atlas; CHC; William T. Cogswell, History of Rockville from 1823 to 1871.)

KENYON WOOLEN MILL (1859)
Armstrong St.
Coventry

South Coventry
18.725220.4626950

C. H. Kenyon began manufacture of woolen doeskin jeans in the 1840s. His original mill is gone. In 1864 Kenyon bought this building from another woolen producer who had built it in 1859. The 2 1/2-story, gable-roofed, frame mill (150' x 40') has clapboard walls, two-ply, slow-burn floors and a foundation of granite blocks in random ashlar. Freight doors open to each floor in the north end wall. In 1870 Kenyon ran 4 sets of carding machines, 52 looms, 1,200 spindles and employed 40 men and 34 women. The earth buttress dam with masonry spillway is intact but water is no longer used for power. A trailer manufacturer occupies the mill today.
(Barlow's Insurance Survey, #3374, 1874, MVTM; Census 1850, 1860, 1870, 1880; J.R. Cole, History of Tolland County, 1888.)



Saxony Mill (M. Roth)

RIVERSIDE WOOLEN MILL (1881)
Old Monson Rd.
Stafford

Stafford Springs
18.724480.4651610

Riverside Woolen Co. built this mill when it was organized in 1881 with Cyril Johnson as president. The 4-story brick mill, 115' x 52' with near-flat roof, has a stair tower on the east end wall. The 3-story, 42' x 28' west wing held steam boilers on the first floor, drying on the second and pickers on the third. A brick dyehouse, frame storehouse and earth-buttress dam complete the original complex. The firm erected the 3 1/2-story, 100' x 40' mill with gable roof in the 1890s; it abuts the north wall of the 1881 mill. Riverside produced woolens here until 1959; an electronics manufacturer has occupied the buildings since 1964.
(Barlow's Insurance Survey, #7301, 1882; Town Book Committee, Stafford, Connecticut 250th Anniversary, 1969; William Young, comp., Stafford Illustrated, 1895.)

HYDEVILLE MILL (1860)
Hydeville Rd.
Stafford

Stafford Springs
18.725400.4652480

The Hydeville Co. built the main mill (3 1/2-story, 100' x 34') of this small complex in 1860. Its first-floor walls are a coursed ashlar of granite and the upper floors are sheathed in clapboard. The attic under the gable roof is lit through small windows under the eaves and skylights in the roof. Attached to the rear of the mill are the 1-story stone picker house (40' x 32') and the 1-story frame boiler and dye house (58' x 34'), both built in the 1860s. Set back from the mill is the 2-story wool storehouse (113' x 30') with brick and granite ashlar walls. Phoenix Woolen Co. bought the property in 1868. In 1870, under superintendent Cyril Johnson, Phoenix ran 4 sets of cards, 1,400 spindles, 28 narrow looms and employed some 50 people in making cassimeres. A 1-story brick-pier weave room was added to the main mill c.1900. The exterior of the main mill is covered with siding but the interior is substantially intact. The slow-burn flooring has three plies of planks rather than the more common double-ply. The wheelpit, built to accommodate a breast wheel, is clear of obstructions. Still visible are mortises cut in the sidewalls for securing bearings that held the waterwheel shaft. The original power take-off mechanism, a 12'-diameter, 4' wide cast-iron flywheel, also remains. Mounted on one end of the waterwheel shaft, it transmitted power to the floors above through leather belting. A Rodney Hunt double-runner horizontal turbine replaced the waterwheel around 1895. The turbine remains in place, as does the Rodney Hunt Rotary Fire Pump with its friction drive. Except for the leaking case of the turbine the entire water power system--from earth-buttress dam to underground tailrace--survives in good condition, though no longer used. A used-cloth dealer uses the mill today.
(Barlow's Insurance Survey, #3379, 1874; Hartford and Tolland Atlas; Census 1860, 1870, 1880; William Young, comp., Stafford Illustrated, 1895; Interview with Don Sosebee, present owner, January 1980.)

HYDE MILL; (1841)
CENTRAL WOOLEN MILL
22 Furnace Ave.
Stafford

Stafford Springs
18.723500.4648040

The Hyde Co. built the first mill, 4-story and 158' x 41', here in 1841. It has walls of granite blocks in coursed ashlar, a central stair tower, and a near-flat roof that was probably altered by a later occupant to its present form. Granite Mill Co. bought the mill in 1843; in 1860 this firm employed 90 people to run 5,000 spindles and 138 looms in manufacture of cotton sheetings. Riverside Woolen Co. (separate entry), under agent Cyril Johnson, bought the mill in 1887, changed its name to Central Woolen Co., and installed 6 sets of cards and 32 looms to make cassimeres; more looms were soon added. Central Woolen made several brick additions, only one of which survives: the 1900, 4-story, 55' x 46' office block at the southeast corner of the granite mill. Cyril Johnson, acting independently, bought the mill in 1907 and ran it for four years. Since then several firms have operated the plant and several buildings have been added; the 1919 3-story brick-pier mill, 216' x 89' with flat roof, and the 1924 1-story brick-pier dyehouse, 112' x 48' with flat roof, are the most prominent. Today the plant produces synthetic cloth on adapted woolen machinery.
(William Young, comp., Stafford Illustrated, 1895; Town Book Committee, Stafford, Connecticut 250th Anniversary, 1969; Factory Mutual Engineering Association, survey #17,762, 1976, courtesy Ray Jones; Interviews with Ray Jones, Plant Manager, and Ben Penney, Master Mechanic, Cyril Johnson Division, January 1980; Census 1850, 1860, 1870, 1880.)

CONVERSEVILLE MILL; (1853)
WARREN WOOLEN MILLS
99 Furnace Ave.
Stafford

Stafford Springs
18.723600.4648270

Converseville Co. produced woolens at this site from 1853 to 1879. Extant from those years are the 1853 picker house, 2-story and 40' x 40' with near-flat roof, and the 1862 mill, 4 1/2-story and 120' x 38' with gable roof; the walls of both consist of granite blocks in coursed ashlar. Somewhat atypically, there is no stair tower on the mill, but the west end has freight openings at each floor. In 1879 the newly formed Warren Woolen Co. bought the plant and revamped it to produce kersey and worsted coatings. William C. Avery, who had trained at Lowell's Middlesex Mills, served as the mill agent. In 1883 Warren built a worsted-yarn mill, 4-story and 110' x 70'. It features brick walls, near-flat roof, segmental-arch lintels and stone sills; the pyramidal roof of the stair tower has been removed. Around 1900 Warren built the brick, hip-roofed office building and in the mid-1920s erected the 3-story, flat-roofed reinforced concrete factory. Brick buildings have replaced the earlier frame structures used for dyeing, finishing, sorting and storage. Warren, under different ownership, still produces high-grade woolens here, as well as shags and tweeds of camel hair, alpaca and other natural fibers. Warren is the only firm in Connecticut that still manufactures woolen cloth using the entire process, from raw wool to finished cloth. The firm owns the 19th-century frame workers' dwellings above the mill on the east side of Furnace Ave. The 1880s water power system includes an earth and stone buttress dam and 1,050'-long headrace; these structures supply process water, though not power, to the woolen mills. (Barlow's Insurance Survey, #3381, 1874, and #8420, 1885, MVTM; Town Book Committee, Stafford, Connecticut 250th Anniversary, 1969; Interview with W.L. Sorenson, Vice President, Warren Corp., January 1980.)

SOMERSVILLE MILLS (1840)
Maple St.
Somers

Ellington
18.708000.4650680

Woolen manufacture at this site began in 1837 when Spencer and Chafee produced satinets in their saw and grist mill. Their 1840 frame mill, 3 1/2-story and 92' x 36', still stands; it has a gable roof with cupola and single-ply flooring with joists (therefore not slow-burn flooring). Frame outbuildings (picker, tenter, store and dye houses) from the 1840s are gone. Ownership of the mill changed frequently in the next 40 years but it operated most of the time. Employment peaked in 1860 with 55 workers. The 3 sets of carding machines, 1,040 spindles and 36 looms on hand in 1860 were still around in 1870, but employment had dropped to 30 workers. Rockwell Keeney, a veteran of Cheney Brothers silk mills in Manchester, CT (separate entry), bought the mill in 1879. Keeney and his sons expanded the plant to ten times its former size. By 1886 they employed some 200 people and had increased capacity to 10 sets of cards. The Keeneys first produced cassimeres, then in 1893 they brought in Arthur Goldthorpe, a Yorkshire woolen worker who introduced manufacture of kerseys and meltons.

The frame mill gained a 40' x 40' extension and a 110' x 30' shed addition in the early 1880s. In 1884-85 the Keeneys built a 3 1/2-story, gable-roofed, brick mill (100' x 40') across the Scantic River from the frame mill. A 2 1/2-story, gable-roofed brick pumphouse (80' x 70') and a 1-story, brick picker house (70' x 38') were built around the same time. In the mid-1890s a 3-story, brick-pier mill (about 160' x 60') with mansard-roofed stair tower was erected; another floor was later added. Around 1905 the last major structure was built: a 2-story, brick-pier mill (about 220' x 70') with near-flat roof. A brick boiler house and several smaller outbuildings also continue to stand. The power system, rebuilt around the turn of the century, still operates. The concrete and stone dam (90' long, 15' high) channels water through wooden headgates, underground brick and tile headrace and 6'-diameter steel penstock to a turbine-generator set. The Keeneys ran the mills until the mid-1960s. The tenanted buildings now serve a variety of industrial and commercial functions.
(Barlow's Insurance Survey, #8864, 1886; Hartford and Tolland Atlas; Census 1860, 1870; Fred C. Davis and R.W. Davis, Somers: The History of a Connecticut Town, 1973; CHC.)

HALL THREAD MILLS (1860) South Coventry
Rte. 32 18.724160.4637240
Willington

Gardiner Hall, Jr. founded this thread firm in 1860. Hall Co. bought yarn (silk before 1862, cotton after), then doubled and twisted it and ran it onto the firm's own birch spools. In 1870 the spool shop alone employed 9 men, who turned out 4.3 million spools; they used 4 roughing lathes, 3 finishing lathes and 1 drill to machine the spools. That same year 30 women and 11 men worked in the thread mill on 36 winders, 6 doublers and 3 spoolers. Two men worked in the print shop, making and applying Hall's labels to the spools. The 1860 thread mill (3-story, 78' x 58') and c.1865 spool storehouse (1-story, 40' x 25') remain from Hall's first decade of operation. Both are frame structures. The mill has a near-flat roof and rubble foundation; the storehouse has a gable roof, and it spans between the rubble walls that channel Conant Brook as it passes the mill. These walls were built in the 1860s but the earth buttress dam that impounds the brook above the mill was rebuilt in 1920. Three later brick-pier mills also survive: 2-story, 80' x 46' with gable roof, built in 1881; 3-story, 96' x 64' with near-flat roof, built in 1906; 3-story, 120' x 65' with flat roof, built in 1916. The last mill contains a Lecourtensy Co. rotary fire pump and 150-horsepower gas engine, both installed in 1916. The mills are now occupied by industrial tenants. From 1872 through 1878 Hall built tenements, a boarding house and a community building for his growing workforce. A cluster of eight, 2-story tenements still stands along Village St., just south of the mills. All are frame dwellings, two with gable roofs and six with hip roofs.
(Barlow's Insurance Survey, #4916, 1877, MVTM; Census 1870; J.R. Cole, History of Tolland County, 1888; Willington Historical Society, Chronology of Willington, 1977; Willington Assessor's Records.)

NATIONAL THREAD MILL (1882) Kirby mill? Spring Hill
114 Mansfield Hollow Rd. 18.734060.4626350
Mansfield

A group of local investors, headed by Marcus Johnson, built this mill in 1882 at a water privilege on the Natchaug River which previously had been occupied by another silk mill and several smaller shops. The mill took skein thread from mills in Massachusetts and Rhode Island and finished it by twisting, doubling, braiding, washing and bleaching. The 2 1/2-story mill, 155' x 52' with gable roof, has walls of gneiss in random ashlar. The central stair and freight tower, originally little higher than the main roof, was later raised to its present height of 75' and fitted with clock faces on all four sides. The adjacent smaller building with similar stone walls probably held washing and bleaching. Several mill houses from National Thread and prior firms stand across

the street. American Thread Co. (separate entry) bought the mill in 1899 and soon moved the machinery to its factories in Willimantic. A hardware firm used the mill until after World War II, when the University of Connecticut acquired the property. The race and wheel-pit have been bulldozed, the basement windows filled with cinder blocks, and ancillary wooden sheds removed.
(Census 1880; J.R. Cole, History of Tolland County, 1888; Mansfield Historical Society, Chronology of Mansfield, 1974.)

GURLEYVILLE GRIST MILL (c.1832)
Stone Mill Rd.
Mansfield

Spring Hill
18.731140.4632200

"For the first nine years of my childhood the family lived most of the time in the house where I was born by the river. There I opened my eyes on the old stone mill with its large wooden water wheel, on the up-and-down saw which made boards out of logs, and on the stages of converting corn on the cob into meal or buckwheat into flour. Men and boys of all ages brought in small loads of grain and waited for it to be ground amid talk and jokes and laughter...No man could give himself more completely than my father to the work that lay before him. There were times when he managed both the grist mill and sawmill single-handed, early mornings and long evenings being occupied in running the up-and-down saw through logs so that all the daylight there was could be given to grinding grain for customers coming in. This often meant a sixteen-hour day." (Cross autobiography)

The stone mill was built in the 1830s. Built of local granite in coursed ashlar and with clapboarded gable ends, the mill is founded on a rubble-masonry wheelpit on the bank of the Fenton River. Much of the operating equipment, notably the square-section wrought-iron shafting, was first installed in the 1830s. Samuel Cross bought the mill in 1848. In the 1870s he replaced the water wheel with a turbine mounted in the sawmill; the turbine was lost when the sawmill was demolished in the 1950s. All of the milling equipment remains as Cross placed it in the 1870s, including two runs of stone, bolter, sheller, cob grinder and transmission system. The Douda family ran the mill from 1912 to 1941. Since then it has been idle, though well-maintained in substantially the same configuration as when described by Samuel's son, Governor Wilbur Cross, in his autobiography Connecticut Yankee. This remarkable survival is one of the most intact 19th-century industrial sites in Connecticut. Because of the significant role played by such mills in the diffusion of power technology in the 19th century, and because the physical integrity of the mill enables us to learn precisely what knowledge was being diffused, Gurleyville Grist Mill ranks among the most important sites in Connecticut. Joshua's Tract Conservation and Historic Trust bought the property in 1979. Research and planning are currently underway to open the mill as a museum.
(Wilbur Cross, Connecticut Yankee, An Autobiography, 1943; Mansfield Historical Society, Chronology of Mansfield, 1974; Interview with Annarie Cazel, Mansfield Historical Society, August 1979.)

PORTER'S GRIST MILL (c.1790)
.1 mile south of Rte. 66
Hebron

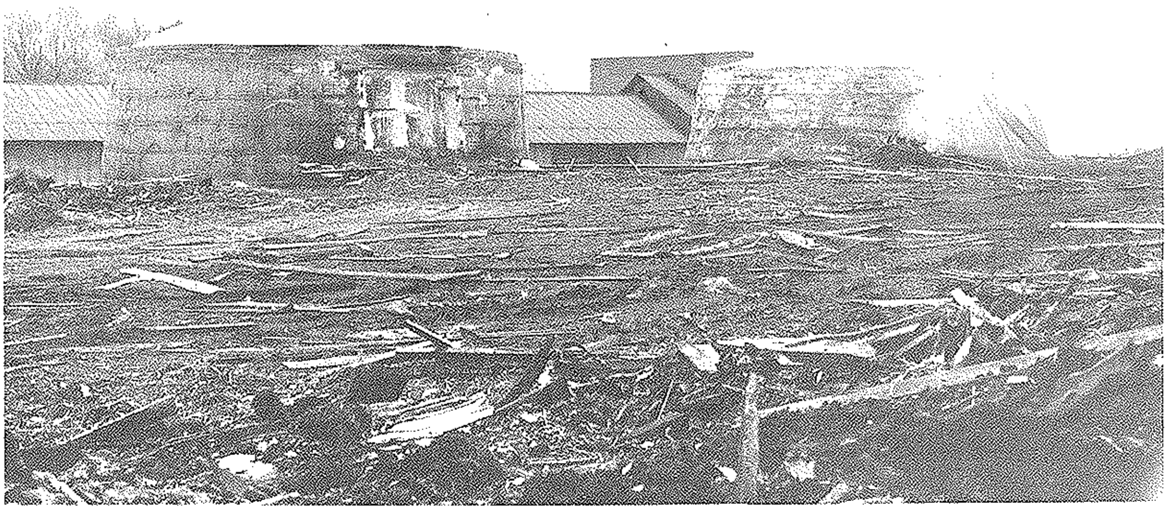
Columbia
18.718830.4614870

This water privilege on Jeremy Brook has been used for grain milling since the 1740s, when Ebenezer Fuller built a mill here. The main portion of the extant mill, a gable-roofed frame structure about 30' x 25', is purported to have been built by Fuller. Certainly the rubble foundation could be the same as was laid in the 1740s, but the roofing, clapboards and probably many of the framing members were replaced by the Porter family, who acquired the property in 1790. An addition (25' x 12') to the mill, extending the original roofline, was built by the Porters in the 1790s, as was the frame house just north of the mill. The power system--a masonry and earth buttress dam feeding an open, stone-walled headrace that leads to a wheelpit outside the mill--was installed by the Porters in the mid-19th century. All the original milling equipment, from breast wheel to grinding stones, has been removed to Old Sturbridge Village, where it can be seen in operating exhibition. From c.1820 to c.1860 the wheel powered button and furniture shops in the mill in addition to grinding grain. The present owners of the property have maintained the mill as closely as possible to its condition in 1932, when milling ceased. They have installed a small horizontal grain-milling machine, with cast-iron body and steel grinding plates; this "Quaker City Mill," model 10-A35, was manufactured in the 1870s by A. W. Straub & Co. of Philadelphia. It is powered by a 20'-diameter wooden breast wheel constructed to the dimensions of the original wheel. The mill is now used to host meetings of the Hebron Historical Society, and grain is ground occasionally for demonstrations to school groups.
(Hartford and Tolland Atlas; John Silbun, Our Town's Heritage: Hebron, Connecticut, 1708-1958; Interview with Mrs. E. Brink, present owner, January 1980.)

UNION CHARCOAL KILNS (1938)
Rte. 171
Union

Westford
18.736950.4653440

The Welles family built these charcoal kilns to take advantage of the enormous amount of lumber felled by the hurricane of 1938. There are seven kilns, each about 40' in diameter and 30' tall. Walls are common brick lined with fire brick. Each kiln requires about 20 tons of wood per heat, and each ton of wood produces about 700 pounds of charcoal. Each heat is fired for six days then cooled for six weeks. There is no mechanical apparatus connected with the operation of the kilns, but pollution-control devices will be installed shortly.
(Interviews with employees, who requested anonymity, May 1980.)



Union Charcoal Kilns (M. Roth)

MANSFIELD ORGAN PIPE WORKS (1896)
Mansfield Depot
Mansfield

South Coventry
18.723550.4630620

The McCollum brothers of Rockville worked for several organ manufacturers in the 1840s, '50s, and '60s, making and installing pipe organs all over the eastern U. S. The youngest brother, Fenelon, secured the contact for making wood organ pipes at Johnson & Son of Westfield, MA, in 1868. When that shop burned in 1871 he began producing pipes as an independent industry. Moving to Mansfield Depot in 1873, Fenelon McCollum rented space in a paper mill for his pipe works. In the 1890s McCollum invented the lead-tipped pipe toe, which greatly eased the tuning of pipe organs. A tuner lowered the pitch by reaming out the hole in the toe, and raised the pitch by light hammering to narrow the hole. This leaded toe, patented in 1898, helped McCollum's pipes reach a national market.

McCollum built the present mill in 1896 after fire destroyed the paper mill. The frame and clapboard building, 3-story and about 55' x 25', has a stair tower and near-flat roof. Most of the power system and production machinery survives. Much of it was bought or made by McCollum, but the present configuration reflects the stewardship of Fenelon McCollum, Jr., who took over after his father's death in 1920. The dam washed out in 1955 and the open headrace has been dry ever since. The turbine found today was installed c.1925; it was built at Bradway Machine Works (now defunct) of West Stafford, CT. Line shafting runs along the ground from turbine to mill. The transmission system inside the mill is virtually intact, with wood and iron pulleys, iron shafting, leather and cloth belts. After 1955 McCollum, Jr. powered the mill with a one-cylinder Fairbanks-Morse gasoline engine. Production machinery includes: table saw with a sliding framework to guide work, built by McCollum, Jr.; three c.1900 wood lathes (all by Goodspeed Machine Co., Winchendon, MA) that cut the pipes to shape; one c.1900 horizontal wood-boring mill (also Goodspeed); and one c.1880 metal planer (Lucius W. Pond Co., Worcester, MA) that the McCollums used to make the special tools and fixtures with which each of the production machines is fitted. There are also numerous hand tools and various sizes of cutting tools and fixtures. The finishing shop contains a small forge for melting lead, a pouring bench and polishing lathes. Many sizes of molding dies, made by McCollum, Jr. and used in casting the lead toes, are found at the bench. The mill is hardly used anymore, though Fenelon McCollum, Jr. still fills occasional orders for replacement pipes. Deterioration threatens this rare and valuable survival of historic Connecticut industry.
(Mansfield Organ Pipe Works advertising circular and descriptive brochure of organ-pipe manufacture, c.1900, courtesy H.W. Vahlteich; Interviews with Fenelon McCollum, Jr., March 1979.)

Mansfield Organ Pipe Works (M. Roth)

Transportation

VERNON TUNNEL AND CULVERT (1849)
Vernon

Rockville
18.710720.4633160
(tunnel)
18.709560.4632980
(culvert)

The Hartford, Providence and Fishkill Railroad completed the first inland east-west rail line in Connecticut. These structures are found on the section between Willimantic and Hartford, built 1846-49. The tunnel conducts Tunnel Rd. under the railroad embankment near the intersection with Valley Falls Rd. The 110'-long, one-lane tunnel consists of sandstone blocks in arches. The culvert, of similar construction, allows a tributary of the Tankerhoosen River to pass through the high embankment for the tracks; it is only about 6' wide.
(Sidney Withington, The First Twenty Years of Railroads in Connecticut, 1935.)

Bridges

DOBSONVILLE LENTICULAR BRIDGE (c.1891)
over Tankerhoosen River
Dobsonville/Vernon

Rockville
18.708630.4633090

Berlin Iron Bridge Co. built this wrought-iron span in the early 1890s. It is 61' long and 19' wide. Joints and members are identical to those found in other Berlin pony trusses of comparable length and width. (See entries for Sheffield Ave. and Old North Stamford Rd. Lenticular Bridges.) This bridge retains decorative orb-shaped castings at two of the endposts. See entry for Berlin Iron Bridge Co. Plant.

COVENTRY LENTICULAR BRIDGE (1888)
Rose Bridge Road
Coventry

Columbia
18.725550.4622590

Berlin Iron Bridge Co. built this wrought-iron pony truss bridge in 1888. It carried Rose Bridge Rd. (sometimes referred to as Pucker St.) over Pucker Brook until December 1977, when a truck crashed through the deck. The trusses (83' long), with tapered web posts and pinned connections throughout, were apparently not at fault in the mishap, though the entire bridge faces imminent replacement. See entry for Berlin Iron Bridge Co. Plant.

MOUNT HOPE BRIDGE (1901)
Mount Hope Rd.
Mansfield

Spring Hill
18.735010.4630820

Berlin Construction Co. built this bridge soon after the firm was founded by former executives of Berlin Iron Bridge Co. (See entry for Berlin Construction Co. Shops.) The steel, rivet-connected Warren pony truss spans about 75' across Mount Hope River. Rivets in the top chords and endposts are threaded and secured with nuts.

WILLINGTON RAILROAD BRIDGE (c.1920)
.2 mile south of Depot Rd.
Willington

South Coventry
18.723660.4636880

Central Vermont Railroad built this steel, rivet-connected Pratt through truss to carry a single track over the Willimantic River. Heavy I-beams and lattice girders form the 150'-long truss. Stone abutments, now encased in concrete, support the truss.
(Central Vermont Railroad, "List of Bridges in Connecticut," n.d., courtesy of Track Safety Inspector, DOT.)

TOLLAND RAILROAD BRIDGE (c.1920)
.5 mile south of Stafford town line
Tolland

Stafford Springs
18.723610.4644470

This rivet-connected Warren (with verticals) through truss carries a single track of the Central Vermont Railroad over the Willimantic River. The steel superstructure consists of box-section and lattice built-up girders. The 125'-long truss rests on concrete-capped stone abutments.
(Central Vermont Railroad, "List of Bridges in Connecticut," n.d., courtesy of Track Safety Inspector, DOT.)

Bulk Products

POMFRET COTTON MILLS; (1824)
SAXON WOOLEN MILLS
Rte. 44
Putnam

Putnam
19.258460.4644180

The Wilkinson family of Pawtucket, RI and the Rhodes family of Warwick, RI formed the Pomfret Manufacturing Co. in 1806. On July 4, 1807 the firm raised the timber frame for the first cotton mill in Connecticut on this site, immediately south of present-day Rte. 44 on the west bank of the Quinebaug River. Smith Wilkinson was agent in charge and in the mid-1820s he and James Rhodes became the sole owners. The earliest standing mill here was built in 1824. Three stories and about 90' x 30', it has coursed ashlar walls; the original clerestory roof and end stair tower have been removed. In the mid-1840s another stone mill was erected: 3-story, about 100' x 40' with rubble walls and central stair tower. The original gable roof has been flattened and the cupola removed. In 1850 these mills contained 4,260 spindles and 105 looms worked by 60 males and 45 females. A 3-story brick mill went up in 1856; about 85' x 40' with an ell 55' x 40', it features segmental-arch lintels, stone sills and rubble foundations. E. P. Mason bought the complex in the 1860s to house the cassimere production of his firm, Saxon Woolen Co. In 1869 Saxon added the hip-roofed office building and 3-story mansard-roofed brick mill (about 200' x 45'). Today a synthetic textile producer operates here. There are some 15 millworkers' dwellings north and east of the mills along High St. and Rte. 44.
(Bayles; Windham and Tolland Atlas; Census 1850, 1860; Barlow's Insurance Survey, #4239, 1876, MVTM; "Putnam Souvenir," Taylor's Home Journal 2, October and December 1894; Richard Candee, Industrial Architecture in the Quinebaug and Blackstone Valleys, 1972.)

MONOHANSETT MILL (1868)
Canal and Monohansett Streets
Putnam

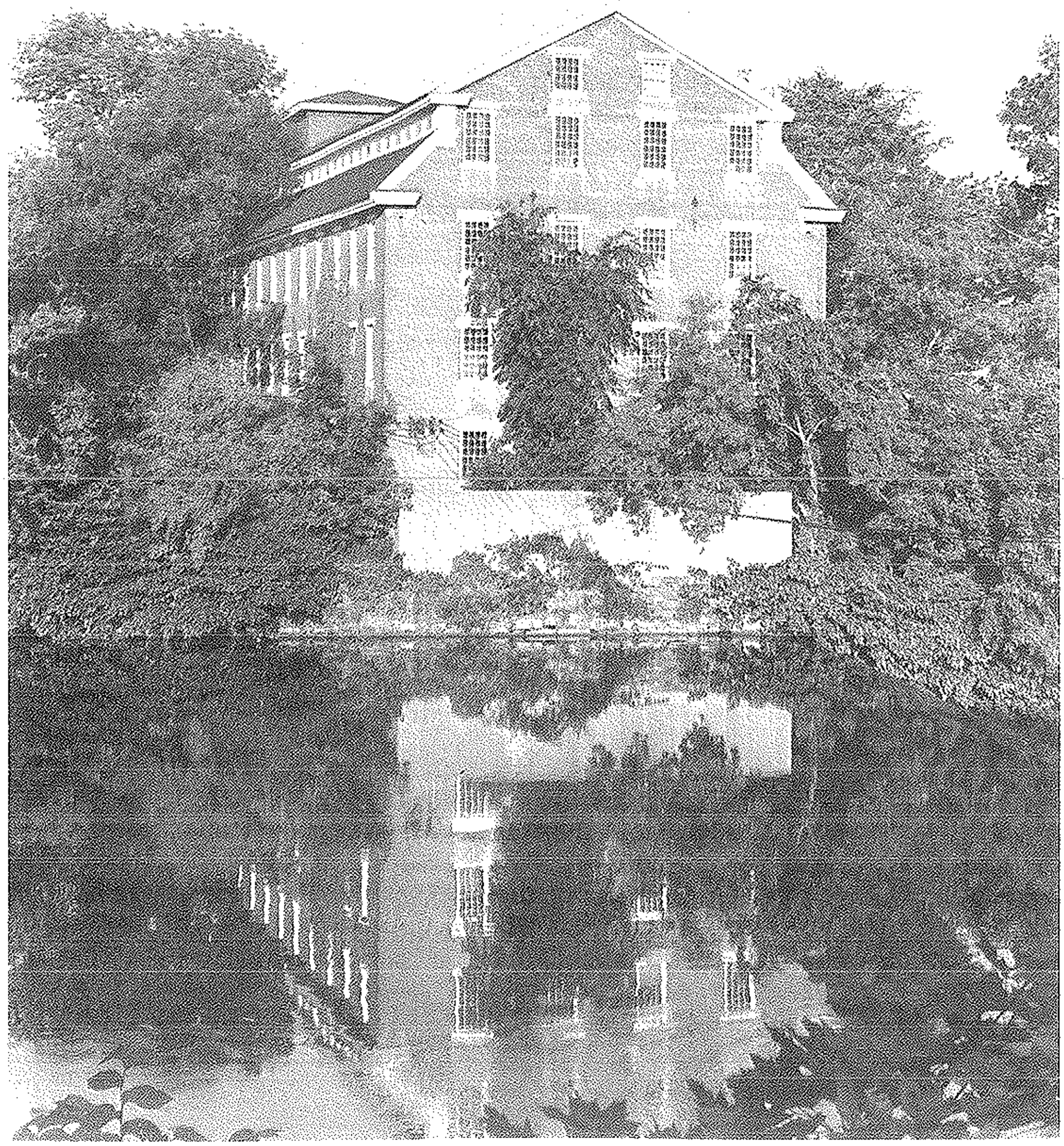
Putnam
19.258600.4643970

Thomas Harris of Providence owned rights to half the water privilege at Pomfret Falls on the Quinebaug River in Putnam. Pomfret Manufacturing Co. (separate entry) owned the other half, which was applied at the most desirable mill site, next to the falls on the west bank. In mid-century Harris built a woolen mill (since demolished) immediately downstream from the Pomfret mills and used part of his privilege there. In the 1860s he built a 1,000'-long canal along the east bank to utilize the rest of the water. The canal ran parallel to the bank before taking a wide bend to rejoin the river. At this bend, in 1868, Harris

built a 4-story, mansard-roofed brick mill, about 200' x 55' with central stair tower. Pairs of round-headed windows set in flat formers light the attic. On the three lower floors the windows have projecting segmental-arch lintels and brick sills. West of the mill stands a smaller, 2 1/2-story gable-roofed brick building. Harris never engaged in manufacturing here, intending rather to lease the mill and power, which he did in 1872 when the newly formed Monohansett Manufacturing Co. moved in. Monohansett ran 280 looms and employed 175 people in production of cotton sheetings. Superintendent George Holt was yet another of the Rhode Island men who supplied technical expertise as well as capital to Putnam's cotton manufacture; he had managed cotton mills in Forestdale, RI and in his native Slatersville, RI. Monohansett expanded into two more mills just south of the original plant. These 3-story brick-pier structures, built in 1885 and 1892, also housed Hammond and Knowlton, a silk-thread manufacturer. The 1885 mill was the first in Putnam to use electricity for power transmission and lighting; the electrical apparatus was installed by the Mather Electric Co. of Manchester, CT (separate entry). The 1872 mill is now vacant and the later mills are used by a mattress producer. The canal has been paved over.
(Windham and Tolland Atlas; Bayles; "Putnam Souvenir," Taylor's Home Journal 2, October and December 1894; Thomas Flynn, Map of the City of Putnam, Connecticut, 1897.)

RHODES MILL; (1841) Putnam
NIGHTINGALE MILLS 19.258830.4644960
328 Kennedy Drive
Putnam

James Rhodes had been a partner in Pomfret Manufacturing Co. (separate entry) before building the first mill here, on the middle water privilege in Putnam. Cotton entrepreneurs, anxious to expand, convinced the Bundy family to sell the privilege in 1826, when Rhodes bought part of the water rights and built a masonry dam. His mill, on the east bank, opened in 1830. It burned in 1841 and was replaced with the present structure, a 3 1/2-story brick mill, about 110' x 45' with clerestory monitor roof, stone sills and lintels, and stair tower centered on an end wall. After Rhodes' death in 1842 the mill's ownership and management passed among the interlocking partnerships that controlled cotton production in upper Putnam. G. C. Nightingale and C. Allen bought it in 1850 to augment the mill they had built immediately downstream in 1846. Their 3 1/2-story mill, about 170' x 45', has a gable roof, rubble walls, central stair tower, and sills, lintels and quoins of granite. A rubble-walled wing to the north, originally 2-story, later gained a third story in brick. By 1860 M. S. Morse, who had built a cotton mill directly across the stream in 1846 (separate entry), had pooled his holdings with Nightingale and Allen. In 1861 this group built the extant dam (157' long, 18' high, originally stone but substantially build in concrete) to serve the mills on both banks. After building the dam M. S. Morse's involvement with the east-bank mills ended. Nightingale served as chief executive of the firm controlling



Rhodes Mill (M. Roth)

the east mills while Allen supervised production as agent. A frame wing, since demolished, connected the mills. In 1870 Nightingale Mills employed 60 women, 59 men and 39 children producing sheetings and shirtings on 10,432 spindles and 205 looms. By 1889 control of the east and west mills was agin consolidated, with George M. Morse as president of the new firm and Nightingale as treasurer. This arrangement (but not all the people) lasted into the 20th century. A warehouse now occupies the 1841 Rhodes Mill, a plastics firm the 1846 Nightingale Mill. (Windham and Tolland Atlas; Bayles; Census 1850, 1860, 1870; Water Power Report; Thomas Flynn, Map of the City of Putnam, Connecticut, 1897; Windham County Observer, 15 June 1955.)

MORSE MILL (1846) — Putnam
241 Church St. — 19.258720.4645000
Putnam

M. S. Morse and Co. began construction of this mill on the west bank of the Quinebaug River in 1846. The 4 1/2-story, 165' x 50' mill has a gable roof and central stair tower. Granite was used for lintels, sills and quoins; large granite slabs frame the freight openings in the tower. A 2-story, 50' x 44' wing is attached to the north end; its brick third story was added later. Stonemason Lafayette Waters built this mill and the very similar Nightingale and Allen mill across the river, also begun in 1846. Morse and the Nightingale firm combined in 1861 to build the dam (see Rhodes/Nightingale entry), and shared equally the 360 horsepower the dam afforded. After the dam was built Morse withdrew from major involvement with the east-bank mills, but Nightingale retained shares in the Morse operation. In 1870 Morse employed 52 men, 44 women and 29 children to run 9,046 spindles and 200 looms in manufacture of cotton sheetings. By 1889 George M. Morse headed a new firm that controlled the mills on both sides of the river. Frame mill houses stand west of the Morse Mill along Church and Morse Sts. The mill has been converted to a cold storage warehouse. (Windham and Tolland Atlas; Bayles; Census 1850, 1860, 1870; Water Power Report; Thomas Flynn, Map of the City of Putnam, Connecticut, 1897.)

POWHATAN MILL (1872) — Putnam
107 Providence St. — 19.258920.4645070
Putnam

George M. Morse built Powhatan Mill in 1872. It stands at the upper water privilege on the Quinebaug River in Putnam, about 1,000' upstream from the Morse family's 1846 cotton mill (separate entry). Hosea Ballou first developed this upper privilege in 1847, erecting a mill (since destroyed) on the west bank, opposite Powhatan. The brick, 4-story, 175' x 62' Powhatan Mill has segmental-arch windows with brick sills

and mansard roof with round-headed dormers. Freight doors open to each level in the central stair tower, which is now missing its roof. Morse ran 20,000 spindles for cotton manufacture here in 1884. The 115'-long, 10'-high dam retains much masonry from its original construction, including an arched opening on the west side that was used to drain the pond. Its east abutment was altered in 1872; it takes a right-angle bend to become, in effect, one wall of the Powhatan flume. The dam provided Powhatan with 15 1/2' head and 200 horsepower, which was augmented by a steam plant in the 2-story ell-shaped brick power house behind the mill (original equipment gone). East of the mill along Powhatan and Mohegan Sts. stand 20 double-entry, frame workers' dwellings, also built in 1872. The current occupant, Belding-Corticelli Thread Co., bought Powhatan in 1918.
(Windham and Tolland Atlas; Bayles; Thomas Flynn, Map of the City of Putnam, Connecticut, 1897; Windham County Observer, 15 June 1955.)

MASONVILLE MILLS; (1826) Putnam
GROSVENORDALE MILLS 19.259930.4650570
Rte. 12
Grosvenordale/Thompson

Providence merchant John Mason came to the town of Thompson in 1811 and built a wooden mill to manufacture cotton yarn. This structure no longer stands, but mills built in 1826 and 1831 remain from the early days of the village of Masonville. The 80' x 40' 1826 mill has walls of coursed rubble. Window openings are framed with granite sills and lintels and have brickwork up the sides. Floors are tied into exterior walls; the ends of the tie rods are not threaded and secured with nuts to the tie plates, but rather are simply peened over the plates. There is not stair tower; freight doors open to each floor in the center of the east wall. The attic and clerestory monitor roof have been removed, leaving three stories and a near-flat roof. The mill held 2,500 spindles. The attached 1831 mill differs markedly from its predecessor. Its walls are brick, and while the stone mill parallels the street, the brick mill is sited gable-end to it. This facade has a central stair tower with freight openings. Now 3-story, the 1831 mill has also lost its clerestory monitor. Sills and lintels are granite, and peened tie rods connect floors to walls. It is 14' longer and about the same width as the 1826 mill; capacity was also 2,500 spindles. Due east of the mills are four 2 1/2-story, double-entry dwellings with the same walls and window treatment as the 1826 mill. They have central chimneys and gable roofs with trapdoor monitors. Just south of the mills are four similar houses except with brick walls, like the 1831 mill. It seems probable that the two groups of houses were built at the same times as the respective mills. There are also two boardinghouses from a later period; both have four entries, clapboard walls and gable roofs.

In 1848 William Grosvenor, a Providence physician, took over the mills. (In 1868 the village was accordingly renamed Grosvenordale.) With expansion of the original wooden mill the capacity of the complex reached 8,000 spindles by 1850, when there were also 189 looms; 80 males and 80 females worked in the three mills. The principal output was fine sheetings. In 1860 employment had fallen to 75 males and 75 females, but there was more machinery (13,500 spindles and 300 looms) and the quantity of output had doubled.

Then in 1861-62 Grosvenor built the 5-story brick mill (about 200' x 60') several hundred yards downstream from the earlier complex. It was one of the first mills designed by F. P. Sheldon and Son, the noted firm of industrial architects/engineers from Providence. The near-flat roof, the segmentally arched lintels, and the aggressive upthrust of the pyramidal-roofed central stair tower were features that became standard for southern New England textile mills in the last third of the 19th century. The mill has been altered with a steel and glass addition on its east facade. Nineteenth-century additions include a 4-story brick mill attached to the west side and a 1-story brick weave shed to the south. Associated housing includes a frame boardinghouse and nine frame, double-entry dwellings. Despite the alterations, these mills provide an excellent opportunity to observe the evolution of mill and mill-housing design in this dynamic period of New England textile manufacture. The opportunity is enhanced when the 1872 North Grosvenordale Mill is also considered (separate entry).
(Windham and Tolland Atlas; Bayles; Census 1850, 1860; CHC; Richard Candee, Industrial Architecture in the Quinebaug and Blackstone Valleys, 1972; David M. Margolick, "Patterns of Change in the New England Textile Towns," Honors Thesis, 1974, University of Michigan.)

NORTH GROSVENORDALE MILL (1872)
Rte. 12
North Grosvenordale/Thompson

Putnam
19.259950.4652200

In 1864, two years after completing the 5-story mill in lower Masonville (separate entry), William Grosvenor purchased the plant and water privilege of the Fisherville Co., about one mile up the French River from Masonville. In 1868, when Masonville was renamed Grosvenordale and the Grosvenor-Dale Co. was incorporated, Fisherville became North Grosvenordale. The company chose the north village for the site of its most ambitious project, building in 1872 the huge Mill No. 2 or North Grosvenordale Mill. It is comparable in scale to Connecticut's largest textile mills: Ponemah, Wauregan and Baltic (separate entries). Like these others, Mill No. 2 was owned by a firm based in Providence and it specialized in finer cottons such as cambrics and high-count sheetings. Four stories tall and 464' x 75', it resembles a brick-pier mill because the segmentally arched windows are recessed in the walls, but there are no pilasters. The cornice is corbeled. There are two stair towers on each long side, at the quarter points. The 5-story west towers are smaller and less ornate than those to the east, which are 6-story with corner pilasters, corbeling between the fourth, fifth and sixth levels, and domed roofs. A 4-story, 135' x 70' brick wing extends west from the center of the mill. The wheelpit beneath the wings held three turbines; the initial installation yielded 400 horsepower, but the masonry dam was raised c.1900 and new turbines installed that provided some 700 horsepower. A steam engine in the attached boiler house generated another 300 horsepower. A 2-story, 90' x 51' ell at the west end of the wing served as the picker house. Outbuildings include the smith shop and waste house in the millyard and two windowless storehouses along the (former) Norwich and Worcester Railroad southeast of the mill. The mill contained 60,000 spindles and by 1882 employed 850 workers. Employment increased to 1,122 in 1890 and 1,750 in 1900, two years after completion of the new weave shed. The high 1-story, brick weave shed originally had a sawtooth roof, which is now flat.

Of the more than 100 houses in this completely mill-spawned village, most are in three distinct groups and were built simultaneously with the mill. South of the mill is the group called Three Rows, consisting of 25 frame, 2 1/2-story double-entry dwellings. From initial occupation these housed French-Canadian families (four per house), who comprised 80 percent of the workforce when the mill opened. Three Rows, on the lowest land in the village, is surrounded by the railroad and river. On high land west of the mill is Swede Village, so named in 1882 when the company brought in Swedish operatives, first from Providence and then directly from Sweden. The houses are exactly like those in Three Rows but are spaced further apart. East of Three Rows and across the river stands Greek Village, four long, 2 1/2-story, frame houses with six entries per side. Originally each housed 12 French-Canadian families, but starting around 1910 they were occupied by unmarried men. These men were designated "Greeks," although most were natives of Turkey, Rumania or Albania. The firm built some 30 more frame dwellings in the 19th century, as well as six brick houses north of the mill for supervisory personnel. Among the many community buildings are St. Joseph's Church, built in 1872; the Swedish Lutheran Church, 1884; and the 1894 Salle Union built by the St. Jean de Baptiste Society for meetings and entertainment.

Through various strategems the Grosvenor-Dale Co. managed to last longer than most Connecticut cotton producers. Wages were reduced in the late 1920s and early 1930s. Production changed from sheetings, which were produced more cheaply in the South, to colored shirtings. The company borrowed money to upgrade the machinery, and in 1938 auctioned the houses. Cluett, Peabody and Co. bought the mills in 1942 and closed them 12 years later. Industrial tenants now occupy parts of North Grosvenordale Mill.

(Bayles; Water Power Report; Barlow's Insurance Survey, #5108, 1878, MVTM; David M. Margolick, "Patterns of Change in the New England Textile Towns," Honors Thesis, 1974, University of Michigan.)

WESTCOTT AND PRAY'S MILL (1846)
Slater Hill Rd.
East Killingly/Killingly

East Killingly
19.265970.4636420

Westcott and Pray's 1846 cotton mill stands at the outlet of the Whetstone (or Whitestone) Brook reservoir system, which was begun in 1828 by the numerous textile firms located on the stream. The 4-story, approximately 110' x 35' mill has rubble walls, near-flat roof and cut-stone lintels and sills. The outline of an arched headrace opening is visible in the upstream (east) wall. The 2-story picker house, with gable roof and rubble walls, also survives. The pond is retained by a long earth embankment broken by a rubble masonry spillway; portions of the dam date to 1846. The mill changed hands at least three times before John Ross bought it in 1874; he employed 60 workers to run 6,000 spindles and 104 looms making light sheetings. Several more purchases occurred before Acme Cotton Co., predecessor firm of the current owner, bought the mill in 1925. The brick additions were built by Acme. This mill stands immediately upstream from the site of the earliest mill on the Whetstone, the Chestnut Hill Manufacturing Co. of 1815, now demolished. Several frame dwellings, associated both with Chestnut Hill and with Westcott and Pray, are seen north of the mill.
(Windham and Tolland Atlas; Bayles; E. P. Gerrish et al., Map of Windham County, Connecticut, 1856; Margaret Weaver et al., Miles of Millstreams, 1976.)

WHITESTONE MILL (1858)
Valley Rd.
East Killingly/Killingly

East Killingly
19.265000.4635800

Westcott and Pray built Whitestone Mill in 1858 on the site of Leavens and Leffingwell's 1828 frame mill. Whitestone, 3 1/2-story and about 160' x 45', features a pedimented gable roof and granite lintels, sills and cornice. The dam, about 400' upstream, was built completely of rubble; now coarse concrete caps the structure. In the 1880s Westcott and Pray used the 30' head of this water privilege to power 8,032 spindles and 150 looms making cotton sheetings and baggings. Employees lived in two stone 12-family houses; a building north of the mill may be part of one of these tenements. Several smaller mill houses and a former store nearby were associated with the next downstream mill (not extant), that of Asa Alexander and later John Himes. Various textile concerns used Whitestone from the 1890s on, including manufacturers of quilts, shoddy, bookbinding cloth and synthetic textiles. The mill is now a warehouse with recent additions in frame and brick.
(Windham and Tolland Atlas; Bayles; Margaret Weaver et al., Miles of Millstreams, 1976; Interview with Madeline Welles, local resident, June 1980.)

PEEP TOAD MILL

ELLIOTTVILLE LOWER MILL (c.1850)
Peep Toad Rd.
East Killingly/Killingly

East Killingly
19.264000.4635680

The partnership of Eddy and Elliott built this mill in the early 1850s, soon after buying a cotton mill (not extant) just upstream on the Whetstone Brook from this site. Lower Mill was used for spinning and preparing the warps for cotton sheetings, the firm's principal product. The 2 1/2-story, 75' x 40' mill has a gable roof with trapdoor monitor. Ground-floor walls are a rubble of flat stones with stucco finish. Second-floor and attic walls are of frame construction with clapboards and corner pilasters. The east end has loading doors at each level. The dam is made of cut stone and the headrace is of rubble. Peep Toad Rd. crosses the headrace on a bridge carried by two rubble-stone arches. The original prime mover was a waterwheel located beneath the mill. The wheelpit has been filled in with concrete, but outlines of two tailrace arches are visible in the mill's south wall. In 1870 the two mills employed 18 women, 18 children and 13 men. Spindles, located in both mills, numbered 3,368; the 86 looms were probably all in Upper Mill. Cotton manufacture here lasted into the 20th century under subsequent owners. A tannery occupied Lower Mill in the 1920s and 1930s. Known locally as Peep Toad Mill, it presently houses a residence, studio and gallery.
(Windham and Tolland Atlas; Bayles; NR; Census 1870; Interview with Richard Farrell, present owner, June 1980.)

SAYLES MILL (c.1875)
Valley Rd.
Elmville/Killingly

East Killingly
19.261620.4635180

1850

Sabin and Harris Sayles of Pascoag, RI began woolen manufacture on Whetstone Brook around 1950. After their mill burned in 1858 they moved most of their operations to Dayville on the Five Mill River (see entry for Dayville Mills), but some holdings were retained on the Whetstone Brook, including this mill. It was built, or altered to its present form, in the mid-1870s on a water privilege that had been developed late in the 18th century. The present structure is a 4-story mill, 45' x 25' with near-flat roof and segmentally arched windows with wooden sills. Immediately upstream are the ruins of rubble-masonry foundations, wheelpit and tailrace of an earlier mill, which apparently obtained power from the same dam as the standing mill. The dam, about 11' high, is made of squared stone blocks laid without mortar. The brick mill is now a residence.
(Windham and Tolland Atlas; Bayles; Interview with Robert Lucas, present owner, September 1980.)

ELMVILLE MILL (c.1875)
Rte. 12
Elmville/Killingly

Danielson
19.261100.463850

The village of Elmville abuts Whetsone Brook just above its outlet into the Five Mile River. Woolen manufacturer Alfred Potter built the present mill to replace a frame mill that had been here since at least the 1830s. The 3-story, 175' x 50' brick-pier mill has a low-pitched gable roof and a stair tower with loading doors. Windows are segmentally arched and have stone sills. There is a single round window in each gable end. A boiler house adjoins the mill but power was primarily by water. The 9'-high dam, made of squared stone blocks, was also rebuilt in the mid-1870s. C. D. and C. S. Chase bought the mill in 1886. Employing about 80 people, they ran four sets of cards and 25 broadlooms in production of fancy cassimeres. Glen Worsted Co. succeeded the Chases, then Killingly Worsted Co. took over in 1915. American Woolen Co. occupied the mill in the 1920s. (American Woolen designated it Whitestone Mill, not to be confused with Westcott and Pray's 1858 Whitestone Mill, about 2 1/2 miles upstream and noted in a separate entry.) It was idle between 1929 and 1933, when Connecticut Cordage Co. began operating here. A plastics firm now occupies the mill.
(Bayles; H. V. Arnold, Memories of Westfield, 1908; Margaret Weaver et al., Miles of Millstreams, 1976.)

DAYVILLE MILLS (1858)
Rte. 101
Dayville/Killingly

Danielson
19.260040.4636640

Most of the woolen production of Sabin and Harris Sayles moved to Dayville in 1858, after their Whetstone Brook facilities burned. In the next 20 years they built several mills of brick and stone in Dayville and upstream from the village on the Five Mile River. The only extant building from that time is the 2-story rubble-walled mill, about 75' x 35', which stands south of present-day Rte. 101 in Dayville. It has a near-flat roof and granite lintels. After Harris Sayles retired in 1879, Sabin continued on his own and in 1882 erected the 4 1/2-story brick mill seen today north of Rte. 101. The mill has a dormered gable roof and central stair tower. About 200' x 50', it also has segmental-arch lintels and stone sills. At the mill's southeast corner is a 3-story brick powerhouse. The masonry dam, extant though reconditioned, afforded 19' head for the 190-horsepower Risdon turbine. A 175-horsepower Wheelock steam engine provided back-up power; these prime movers do not survive. The mill contained 16 sets of cards and employed 250 people in production of woolen broadcloth. Additions include a c.1915 brick-pier, sawtooth-roofed weave shed and a 1922 2-story brick mill. A wire-products manufacturer now uses the mill, which has modern additions to the west and on its south facade. A substantial number of mill houses remain in the village.
(Windham and Tolland Atlas; Bayles; Water Power Report.)

ATTAWAUGAN MANUFACTURING COMPANY MILLS (1860)
Attawaugan-Ballouville Rd.
Killingly

Thompson
19.262750.4640300
Danielson
19.260830.4638600

H. B. Norton and L. Blackstone of Norwich formed the Attawaugan Manufacturing Co. in 1859. The firm ran cotton mills on three water privileges within three miles of each other along Five Mile River in northern Killingly. Each mill was the center of a small village; from downstream to upstream these were (and are) named Attawaugan, Ballouville and Pineville. Each privilege had seen industrial activity since at least the early 19th century. The Stone Chapel Manufacturing Co. built a stone mill at the Attawaugan privilege in 1810; George Ruggles owned and ran it until Attawaugan Manufacturing Co. bought the site in 1859. At Ballouville Asa Alexander milled corn early in the century. Leonard Ballou and Jabez Amesbury bought the property in 1825 for cotton textile production; Ballou remained until 1860 when Attawaugan bought him out. Amesbury had separated from Ballou and built a cotton mill at Pineville that burned in 1853. Attawaugan bought this privilege in 1860.

Attawaugan Manufacturing Co. built (or altered to present form) all the surviving mills, beginning in 1860 with the 3 1/2-story, 235' x 67' brick mill in the village that bears the firm's name. It has a dormered gable roof and a stair tower that is off-center on the west side. The segmentally arched windows have granite sills. There are brick additions built in 1890 and 1893, a c.1890 boiler house and a 1913 brick weave shed with sawtooth roof. Only ruins of the masonry dam remain, but the stone-lined headrace is preserved. Some 30 frame mill houses stand in rows north of the mills.

Upstream at Ballouville the company's 1860 mill is a 4-story stucco and rubble-walled structure, about 120' x 50' with near-flat roof and end stair tower. Quoins, sills and lintels are dressed granite. It has been extensively altered with modern additions. The 2-story, 30' x 26' storehouse east of the mill has similar walls and appears to have been built around the same time. The Ballouville store, adjacent to the mill, is a 2 1/2-story frame structure. Several dwellings, with masonry first stories and clapboarded walls above, may have been built in the mid-1820s by Ballou and Amesbury. The dry-laid traprock abutments of the dam's spillway, and the stepped spillway itself, are at least as early as Attawaugan Manufacturing Co.'s use of this site.

The 1865 mill in Pineville resembles the Ballouville mill, with stuccoed rubble walls, near-flat roof, granite sills and lintels. The 3-story mill is 124' x 50' with a central stair tower and 80' x 26' ell. A brick boiler house was added later. There are six mill houses west and south of the mill.

In 1870, when all three mills were operating, Attawaugan Manufacturing Co. employed 150 men, 130 women and 130 children. The combined power systems provided 315 horsepower to run 27,500 spindles and 525 looms in production of sheetings. By the mid-1880s there were about 500 workers. The power system had been upgraded to yield at least

500 horsepower from water; spindles numbered near 36,000 and looms over 800. Output came to include cambrics and fancy dress goods as well as sheetings and shirtings. In 1927 the curtain manufacturing firm of Powdrell and Alexander bought the mills; when this firm liquidated in 1952 it donated the water system to the residents of the villages. The Attawaugan and Ballouville mills are now used by a synthetic textile firm. Pineville mill is a chicken coop.
(Windham and Tolland Atlas; Bayles; CHC; Census 1870; Report on Water Power; H. V. Arnold, History of Danielson, Connecticut; Margaret Weaver et al., Miles of Millstreams, 1976; Killingly Assessor's Records.)

DANIELSON MILL (1868) — Danielson
Main St. — 19.260140.4631750
Danielson

In the first years of the 19th century James Danielson farmed the land between the Five Mile and Quinebaug Rivers. In 1809 he formed a partnership, including local men plus Israel Day of Providence and Ira and Stephen Draper of Attleboro, to build a frame cotton mill. A stone mill was added c.1817 and by 1819 the Danielson Manufacturing Co. was weaving with power looms. Danielson's sons ran the mills (now destroyed) after his death. Cotton shortages forced the mills to close in 1864, after which a group of Providence capitalists headed by Daniel G. Sherman bought the property. Sherman's firm, incorporated as Danielson Cotton Co., erected the extant brick-pier mill in 1868. Four stories with basement, the 219' x 78' mill has a near-flat roof and segmentally arched windows with stone sills. The central stair tower has round-arched freight openings. The 2-story brick picker house, 63' x 43', adjoins the mill's east wall. To the south are the 2-story brick office and 1-story brick engine house, which once held a Corliss steam engine. Power was primarily by water, with the 110'-long, 15'-high masonry dam (partially rebuilt in 1920) yielding 24' head for 360 horsepower. The firm was reorganized in 1880 with Rhode Island's B. B. Knight as president. He was succeeded by C. Prescott Knight, who supervised construction of the sawtooth-roofed weave shed (about 200' x 150') at the mills' north end. The shed held 451 looms in 1897, when spindles numbered 21,080 and employees 210. Nearly 160 years of continuous textile production on this site ended in 1964 when a dyeing firm expired. A fence manufacturer occupies the mills today.
(Windham and Tolland Atlas; Bayles; O. H. Bailey, Danielsonville, Connecticut, 1877 bird's-eye view; M. P. Dowe, "The Borough of Danielson," The Graphic 2, January-February 1897; Margaret Weaver et al., Miles of Millstreams, 1976.)

UPPER VILLAGE; (1854)
QUINEBAUG COMPANY WEAVE SHED;
QUEBEC VILLAGE
Front and Main Sts.
Brooklyn

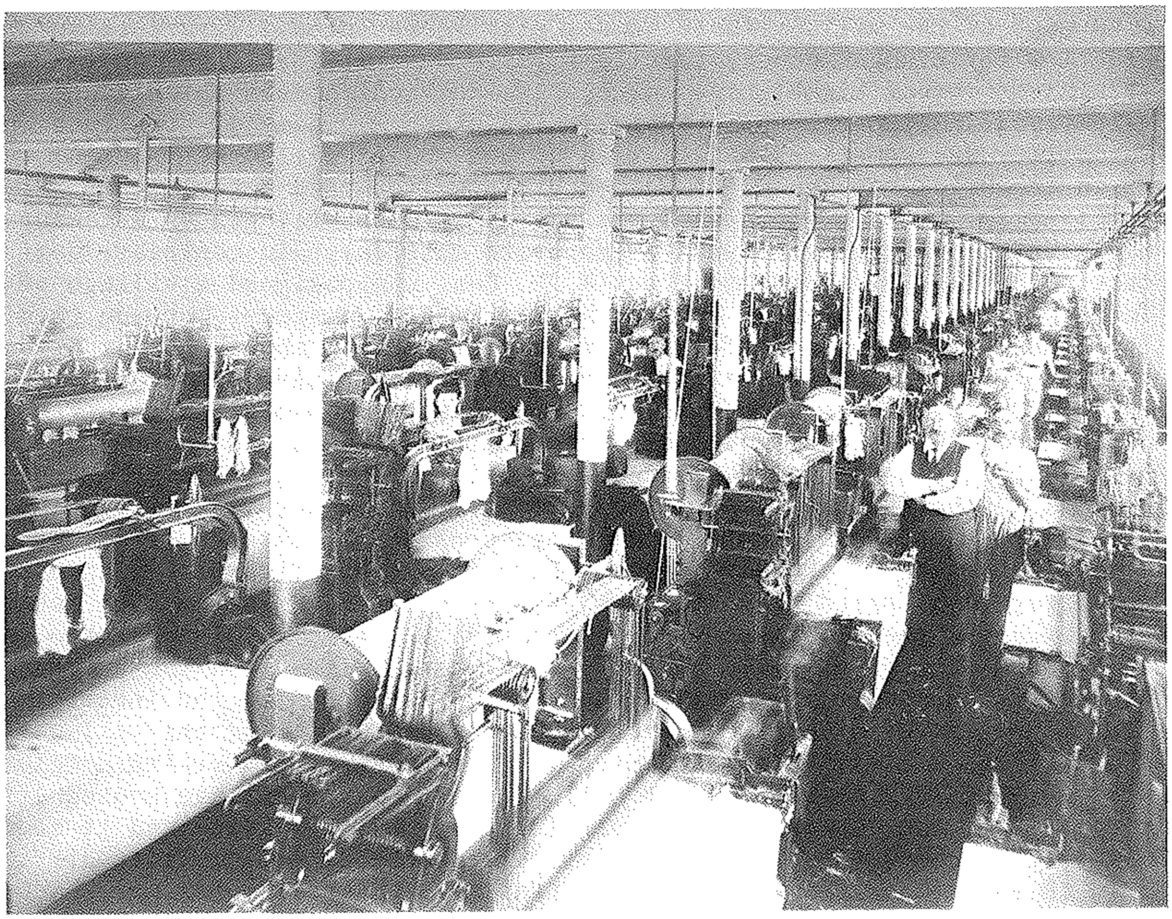
Danielson
19.260080.4631120

Cotton manufacture in Brooklyn began in 1820 when Comfort Tiffany built a mill on the west bank of the Quinebaug River, directly across from Danielson. A partnership of Rhode Island men, notably Moses and Amos D. Lockwood of Slatersville, bought the property in 1848. Incorporated as the Quinebaug Co., this firm built a stone mill for cotton production in 1850-54, which burned in 1961. Still standing, however, are the brick tenement houses built in the early 1850s west of the mill. Known as Upper Village, these 1 1/2-story and 2 1/2-story dwellings include ten 2-family houses and one each for four, six and ten families. Most have gable roofs with shed-roofed dormers. Sills and lintels are granite. Most of the 1860 workforce of 166 females and 144 males lived in these houses; on average, seven people occupied each family-unit of housing. In 1881-82 Quinebaug Co. built a new weave shed, which continues to stand. Two stories with near-flat roof, this rubble-walled 450' x 102' mill held 1,514 looms for weaving sheetings. Its large windows, about 8' x 5', have stone sills and segmental-arch brick lintels. Behind the weave shed is a brick gasholder house with peaked roof and stone-block foundations. New tenements built south of Upper Village housed the expanded workforce, which numbered some 800 people when the weave shed began operating. The name of the new housing complex--Quebec Village--indicated the heritage of most of the residents. The village consists of five 8-family rows arranged around a central square. They were modeled on the row houses of Upper Village, with some changes. Gabled dormers light the upper floors in Quebec Village, and windows are segmentally arched in brick instead of flat with granite lintels. On Main St. at the north end of Upper Village stands the Quinebaug Store, built in the 1880s to replace Tiffany's 1820s store. A pilot project in the reuse of historic mill housing restored Quebec Village in the 1970s. A plastics manufacturer now occupies the weave shed.
(Windham and Tolland Atlas; Bayles; Census 1860; CHC; O. H. Bailey, Danielsonville, Connecticut, 1877 bird's eye view; H. V. Arnold, History of Danielson, Connecticut, 1905.)

CONNECTICUT MILLS; (1909)
CONNECTICUT GABLES
Connecticut Mills Ave.
Danielson

Danielson
19.260400.4633440

Connecticut Mills Co., formed in 1909, differed in two important ways from its predecessors in Windham County cotton production. First, it wove duck specifically intended for use as laminating material in automobile tires, a product most characteristic of the 20th century. Second, it never used water power but relied on steam. The plant was located next to the (former) Norwich and Worcester Railroad, about one mile



Quinebaug Co. Weave Room, 1901
courtesy People at Work Collection,
Quinebaug Valley Community College

north of the center of Danielson. Production began in a building several feet from the tracks that the railroad had probably used for shops or storage. It has been demolished, but the Connecticut Mills 1909 boiler house continues to stand. It is brick, 65' x 54' with a monitor roof. In 1915 the firm built the two brick mills seen today. The 4-story, 308' x 51' mill and the 3-story, 204' x 51' mill were built end-to-end and parallel to the tracks. Both have central stair towers and segmental-arch windows.

The company built housing along Morin and Wheatley Sts., one-quarter mile east of the mills. These houses also represented a departure in practice for Windham County textile firms. Most mill villages in the area have rows of tightly spaced, nearly identical houses which generally reveal no imperative in their design except economy of construction. Durability was sometimes a factor in company-built millworker housing, as in the brick row houses of Quebec Village (separate entry). But stylization, or even adornment, are scarce in such villages as Attawaugan, North Grosvenordale or Almyville (separate entries). In contrast, Connecticut Mills Co. hired architect W. H. Cox, who designed a village of Tudor Revival and Colonial Revival houses with wide spaces between them. The houses all face in different directions, so even though houses within each type are essentially similar there is no repetitive appearance. Most of the dwellings are frame, Colonial Revival houses with an array of features that dispel any look of regularity. There are projecting bays at the corners, projecting gable ends, and dormers at different heights on the various slopes of the roofs. The centerpiece of the village, a stone Tudor Revival building, consists of three multi-apartment sections meeting at oblique angles. Each facade has irregularly spaced and irregularly sized cross-gable bays. Even the material in each gable end differs: there are walls of stucco and half-timber, plain stucco, and random-coursed masonry. A domed clock tower rises from the junction of two of the sections, and an arched passageway opens to the interior court. A plaque in the arch reveals the company's view of the village: "Connecticut Gables. A forward step in good housing for working people. Erected A.D. 1917 by Connecticut Mills Company." The village housed less than half of the 700 people who worked in the mills in 1920, and it seems likely that company-housed supervisors lived here as well. It is difficult to assess how the village inhabitants viewed their homes, or whether the company's experience with this "forward step" figured into the decision in 1926 to move half the machinery from Danielson to facilities in the South. By 1929 Connecticut Mills Co. had left the stage and the Powdrell and Alexander curtain works occupied the mills. A furniture company now uses the mills. The handsome dwellings in their park-like setting are fully occupied.

(Allen B. Lincoln, A Modern History of Windham County, Connecticut, vol. 2, 1920; Margaret Weaver et al., Miles of Millstreams, 1976; Killingly Assessor's Records.)

Connecticut Gables (M. Roth)

BRAYTON'S GRIST MILL (c.1890)
Rte. 44
Pomfret

Danielson
19.252300.4638350

Brayton's mill was built in the 1890s on a stretch of Mashomoquet Brook that had been used for industrial purposes since 1719. It was the last of three grist mills; the area had also seen a sawmill, an oil mill, a wood-turning shop and wagon works, and a blacksmith shop. Brayton's mill is the only standing structure, although masonry-walled races for several other mills are found several hundred yards downstream. The mill is two stories tall and about 30' x 25', with rubble foundations, vertical board siding and a gable roof. The dam has been demolished and the watercourses are obscured. Inside the mill the equipment remains mostly intact. On the first floor are the single run of stones with conveyor-fed bagging stand, the corn sheller (Sullivan Machinery Co. of Chicago, last patent date 1890) and a wood joiner. All are in the position in which they were used. On the second floor is a small lathe (5" swing), with wood body and cast-iron, stepped-pulley headstock. The tool rest and overall lightness of the machine suggest a wood lathe. A vertical turbine lies obscured in the wheelpit below the basement. A spur gear keyed onto the turbine shaft slides up to engage another spur gear that initiated power transmission to the runner stone. This engagement was accomplished by pivoting a horizontally suspended 20'-long timber that has a hand-forged dog on one end to catch and lift the sliding spur gear. At the timber's other end is attached a wooden handle that extends up through the floor. By pushing down on this handle the miller set his runner stone in motion. The joiner was driven by a flat belt from a pulley mounted on a line shaft above, which the turbine also drove. A bevel gear on the turbine shaft, above the spur gear for the stone, engaged another bevel gear to drive a horizontal shaft which carries a pulley. A flat belt on this pulley runs through a hole in the floor to drive the shaft above the joiner. The bevel gears were engaged by simply sliding the entire horizontal shaft in its bearings and wedging it into place against one of the posts in the basement. The milling, woodworking and transmission equipment, preserved in their working relationship to one another, provide one of just several opportunities to observe the mechanical vocabulary of rural, water-powered industry in Connecticut. The mill now stands in Mashomoquet Brook State Forest. The state has taken scant action to preserve the building or equipment and has no plans at present for public access.
(Windham and Tolland Atlas; Susan J. Griggs, Folklore and Firesides in Pomfret, Hampton and Vicinity, 1950.)

ALMYVILLE MILLS (1879)
Rte. 14
Almyville/Plainfield

Oneco
19.260960.4622300

Almyville was named for William Almy, who built a woolen mill at the lower privilege on the Moosup River in 1816. Almy interests produced woolens

here until fire destroyed the mill in 1875. David Aldrich and Edwin Milner, woolen manufacturers from Rhode Island, built a new mill in 1879. The 3-story rubble-stone mill, about 100' x 50', has a gambrel roof with trap-door monitor and a corner stair tower; it was originally some 60' longer and one story higher. Sills, lintels, and quoins are made of granite. Additions with similar walls and trim were built to the east and west in the early 1880s. After Aldrich died in 1889 Milner reorganized the firm as Milner and Co. In 1891 he built the Glen Falls Mill about one-half mile upstream. This 2-story mill, 260' x 75' with a 75' x 65' wing, has random-coursed stone walls and granite trim. The near-flat roof has five raised skylights. Milner used Glen Falls Mill for carding and weaving, with 17 sets of cards and 85 broadlooms operated by about 275 workers. American Woolen Co. bought the mills in 1899. Under American Woolen all carding and spinning were done at the lower mill and all weaving at Glen Falls. The mills ran until 1929 and were sold in 1932. The lower mill is now tenanted and Glen Falls is owned by Brunswick Worsted Mills, Inc. There are some 60 workers' dwellings in Almyville; most are double-entry frame houses with gable roofs. The dam at Glen Falls was built some 10 years before the mill; it is a curved gravity dam, made of stone blocks, 18' high with a stepped spillway. The lower dam is gone but the power canal that it fed remains. Now mostly dry, the rubble-walled canal is about 6' deep, 7' wide and 1700' long.
(Bayles; CHC; Barlow's Insurance Survey, #10,767, 1892, MVTM; Allen B. Lincoln, A Modern History of Windham County, Connecticut, vol. 2, 1920; Interview with Edward LaRose, former weaver for American Woolen Co., Almyville, CT, June 1980.)

CRANSKA THREAD MILL (1880)
Rte. 14
Moosup/Plainfield

Plainfield
19.260360.4621850

Floyd Cranska built this mill between 1880 and 1916 for thread manufacture. The water privilege was first developed in 1832 by Joseph Gladding, who made cotton cloth. Cranska bought the property in 1880 after serving for 10 years as head clerk and paymaster for the Grosvenor-Dale Co. (separate entry). The mill consists of two wings, one to each side of a 4-story brick stair tower. The south wing, 3-story and 176' x 86', has a near-flat roof and three brick-pier walls. Its east wall, built partly of random-coursed stone, may have been part of Gladding's original mill that was incorporated into the structure as rebuilt by Cranska. The north wing, 3-story and 158' x 36', also has a near-flat roof and three walls of brick-pier construction. Its north wall, brick without piers, could have been part of an earlier mill. Cranska ran some 4,000 spindles here in the late 1880s and employed 35 people on average. North of the main mill is a c.1916 2-story brick building, 101' x 60'. Thread was produced here until 1956, when the present occupant, a rubber-products firm, bought the mill.
(Bayles; CHC; Water Power Report; Allen B. Lincoln, A Modern History of Windham County, Connecticut, 1920.)

UNION MILLS (c.1880)
Union St.
Moosup/Plainfield

Plainfield
19.260000.4621400

This site was developed by Providence textile interests early in the 19th century, but the earliest standing parts of Union Mills were built around 1880 by Aldrich and Gray, cotton manufacturers. The main mill has random-coursed masonry walls with lintels, sills and quoins of dressed granite. The northside stair tower retains its original pyramidal roof; the south tower roof has been removed. In the 1890s the mill was extended by 100' to make it 380' x 50'; a fourth story with brick walls was added and the present, near-flat roof was installed. The c.1880 picker house, 3-story and about 50' x 40' with random-coursed walls and granite trim, remains essentially unchanged. In the first decade of the 20th century the mill gained a 4-story brick-pier wing, about 250' x 60'. A brick, sawtooth-roofed weave shed, at least 500' x 80', was built c.1910 northeast of the mill. The power canal, which runs between mill and weave shed, is extant. At peak operation, in 1910-15, Union Mills employed 650 workers to run 48,500 spindles and 1,475 looms making cotton print goods. There are some 80 mill houses in the village of Moosup. Most are frame duplexes, but on Union St. there are four 1 1/2-story rubble-masonry duplexes that were probably erected by one of the pre-1880 manufacturers. The mills closed in 1935 and were sold to General Cotton Supply Co. of Fall River, MA, which never ran them. Equipment was stipped and resold to textile manufacturers in the South and in Japen. A metals warehousing firm operated here from 1939 to 1958, when the present occupant, an aerospace equipment manufacturer, bought the mills. (Bayles; CHC; Barlow's Insurance Survey, #7770, 1883, MVTM; Allen B. Lincoln, A Modern History of Windham County, Connecticut, 1920.)

PLAINFIELD WOOLEN MILL (1901)
Main St.
Central Village/Plainfield

Plainfield
19.258300.4622520

Plainfield Woolen Co. built this 3-story brick mill (207' x 70') on a Moosup River water privilege that had been used for textile production for nearly a century. A wide monitor straddles the ridge of the near-flat roof. Windows are segmentally arched with wood sills. Attached are a 78' x 40' wing and a 35' x 15' boiler house. Plainfield Woolen, after lasting only four years here, was followed by a succession of woolen and worsted producers. The current occupant manufactures synthetic yarns.
(Commemorative Biographical Record of Tolland and Windham Counties, 1903; Allen B. Lincoln, A Modern History of Windham County, Connecticut, 1920; CHC.)

LAWTON MILLS (1905)
Railroad Ave.
Plainfield

Plainfield
19.256850.4617800

Harold Lawton, born in 1852 in Yorkshire, England, emigrated to Rhode Island in 1872. He worked as overseer in several Rhode Island and Connecticut cotton mills before serving as superintendent of Baltic Mill (separate entry) from 1901 to 1905. In 1905 he bought land along the (former) Norwich and Worcester Railroad in Plainfield for a new venture: a steam-powered mill to produce fine combed-cotton goods. Lockwood, Greene and Co. of Boston designed the buildings. The spinning mill, 3-story and 225' x 100', has a near-flat roof and segmentally arched windows with stone sills. Attached to its south end is a 1-story brick weave shed, 200' x 150' with sawtooth roof. Storehouses, picker house and boiler house stand to the east. A Cooper cross-compound, 1,200 horsepower engine powered the works. In 1911 Lawton again engaged Lockwood, Greene and Co. to design new buildings that more than doubled the size of the plant. The spinning mill was extended 180' to the north and piers were added at every fifth bay. The weave shed was extended 200' to the south. Then a second mill and weave shed, duplicating the dimensions of the expanded buildings, were added to the south with the weave sheds joined together. The entire structure was then over 1,600' in length. The mill contained 130,000 spindles and employed 1,200 workers. The company built 125 two-family houses for workers and 15 houses for supervisors; most of these dwellings survive. In 1936 the company proposed a cut in wages, prompting a strike. Despite the personal intervention of Governor Wilbur Cross, including a promise of financial assistance from the state, the shareholders liquidated the company for 28 cents on the dollar. The purchaser was General Cotton Supply Co. of Fall River, MA, which proceeded to sell all the equipment. The stricken town organized the Plainfield Corporation to rent space in the buildings. By 1940 they were occupied. Two firms now share the mills.
(Allen B. Lincoln, A Modern History of Windham County, Connecticut, 1920; CHC.)

WAUREGAN MILLS (1853)
South Walnut St.
Wauregan/Plainfield

Plainfield
19.257760.4625220

In 1850 a partnership headed by Amos D. Lockwood purchased land and water privileges along the Quinebaug River in Plainfield. Most of the partners were Rhode Island-based textile entrepreneurs, including Orray Taft, whose firm later built Ponemah Mills (separate entry). They began in 1853 to construct the first mill, 4 1/2-story and 250' x 50' with dormered gable roof, stuccoed fieldstone walls, granite quoins, and brick cornice in dentil pattern. The central stair tower has a peaked roof and two round-arched windows in each wall of the belfry. Inside, the unjoisted, double-ply floors are carried on turned chestnut posts and chestnut beams; the latter are anchored to the walls with wrought-iron tie rods bearing against cast-iron plates. The third story is free of posts because the top floor, just above, hangs from the queen-post roof trusses. In 1858 the mill doubled in length with an addition to the south which repeated all features of the first portion. In 1867-68 the firm built a second mill parallel to the first, on the opposite side of the power canal. This 500'-long structure also continued the features of the original mill. A 4-story, 250'-long wing spanned the canal and connected the two mills, so that from above the complex resembles a large "H." Wheelpits are below the connecting wing. This final form of the mill matched the original Lockwood plans, even though he had sold his interest in Wauregan in 1858 and James S. Atwood, another Rhode Islander, had assumed operating control. (Lockwood went on to form the influential mill engineering firm of Lockwood, Greene and Co.) Auxiliary structures include picker houses at the ends of the long mills, the 1866 boiler house, the stuccoed-stone waste house, several storehouses of brick or stone, and the 1853 office.

Remains of the second Wauregan dam, built in 1876 after the first dam washed away, are found 1,100' upstream from the mill. The second dam was 350' long, 36' wide at the base, 4' wide at the top, and rose 16' above the riverbed. It consisted of log crib-work filled with stone and sheathed with oak and chestnut planks. An apron of oak planks extended 23' down-stream to prevent undercutting. The east abutment, a massive masonry structure, continues to stand, as does a portion of the crib-work next to it. About 100' east of the dam is the granite bulkhead containing the sluice gates. The canal, now dry and partially filled in, was 50' wide and 8' deep. In the wheelpits are two turbines installed in the 1870s (inaccessible), and three double-runner horizontal turbines (maker unknown) from the early 20th century which were connected to electrical generators.

Up the slope east of the mills are some 80 frame houses in which the Wauregan millworkers lived. Most are duplexes. The village also includes two boarding houses for unmarried workers, the company store, and, further up the hill, eight duplexes where supervisory personnel lived.

After all the mills were built between 700 and 800 people worked here on more than 55,000 spindles and 1,400 looms. After James S. Atwood's death in 1885 his sons James A. and John W. managed the plant. By the early 20th century they had changed to production of finer cottons, such as shirtings, rather than the sheetings which had been the principal output before. Unlike most of Connecticut's textile firms in the 20th century, Wauregan promptly adapted their processes to synthetic materials. In the late 1930s Wauregan Mills collaborated with DuPont in developing technology to produce suitings from a blend of wool and rayon. The firm never recovered from a post-World War II decline in sales and closed in 1957. A cable manufacturer now owns the mills and occupies much of the space while renting the rest to other firms.

(NR; Water Power Report; Bayles; C. F. Burgess, ed., Plainfield Souvenir, 1895; J. H. Burgy, The New England Cotton Textile Industry: A Study in Industrial Geography, 1932; Martin M. Green, "125 Years of Continuous Textile Manufacture," Connecticut Circle Magazine, December 1944-January 1945.)

PHOENIXVILLE MILL (1823)
Rtes. 44 and 198
Phoenixville/Eastford

Eastford
18.741920.4639860

Rufus and Pardon Sprague of Johnston, RI initiated cotton textile production here in the early 19th century and constructed a wooden spinning mill in 1812-14. Sprague Manufacturing Co., a partnership including local men, was formed in 1815. The firm built a stone mill in 1823, soon after which the Spragues left. In 1830 the company failed and was reconstituted as Phoenix Manufacturing Co. At the time the stone mill contained 18 power looms and 816 spindles. In the early 1830s the mills were the center of a community of 200 people, including 50 females and 25 males who worked in textile production. Fixed assets included the two cotton mills, a grist mill, a saw mill, and 11 dwelling houses. The mills were run as a unit until 1852. Then there were several changes of ownership and a slow decline ensued. In the late 19th century the stone mill was used for twine production. It has been idle for most of the 20th century. The stone mill is the only standing industrial building. The 2 1/2-story mill, about 90' x 35', has rubble walls and a gable roof with trapdoor monitor. Inside, the floors are joisted and no operating equipment remains. Old Sturbridge Village bought the mill in the early 1970s and has undertaken an intensive research project on the history of Phoenixville, culminating in archeological investigation which began in 1980. Among the most significant artifacts revealed in the excavations is a timber dam from the 1820s. Made of horizontally laid logs, the dam takes a right-angle turn at one end to brace along the bank. Old Sturbridge Village plans to use the mill as the central exhibit in its proposed re-creation of a textile village.
(Old Sturbridge Village, Phoenixville research files, Courtesy Theodore Z. Penn, Researcher in Technology.)

WILLIMANTIC LINEN COMPANY (1857)
Main St.
Willimantic

Willimantic
18.732560.4621240

Four local investors founded Willimantic Linen Co. in 1854. The firm had barely begun its intended production--manufacture of linen--when the Crimean War disrupted the European flax supply. Willimantic Linen then hired Gardiner Hall, Sr. and Timothy Merrick, experienced thread-makers from South Willington, to convert the operation to that manufacture. An 1825 cotton mill (not extant) held the firm until it built Mill No. 1 in 1857. This 3 1/2-story mill, 200' x 68' with dormered gable roof and central stair tower, has coursed ashlar walls of granite blocks quarried from the banks of the adjacent Willimantic River. Willimantic Linen ran 10,000 spindles here making 3-cord sewing thread. Sewing machines created a vast market for thread, but for mechanized sewing the stronger 6-cord thread was more suitable, and the company built Mill No. 2 in 1864-65 for this production. The gable-roofed mill, 4 1/2-story and

400' x 70', has random-coursed granite walls, central stair tower and three round windows in each gable end. An ell extending back to the river held the wheelhouse, machine and carpenter shops. The 1-story stone office dates from 1865. In 1870 Willimantic Linen built the Dye House and Bleachery, 2 1/2-story with random-coursed stone walls and gable roof, west of Mill No. 2, and the 4-story Inspection Building, with similar walls and a near-flat roof, to the east. After completion of these facilities the firm employed 217 men and 192 women; equipment included 144 carding machines and some 50,000 apindles. Many machines were built in-house, such as the bobbin winders, while others were purchased, such as the 18 imported French combs. Mill No. 3 (not extant) was a frame cotton mill bought by the company in 1882.

Under A. C. Dunham, son of one of the founders, Willimantic Linen made significant advances in the use of electric lighting in manufacturing. In 1878 Dunham installed a 6-lamp arc-light system in a production area, one of the first such applications. Mill No. 4, built in 1884, was designed specifically to be lit electrically. The extremely wide brick mill (1-story and 820' x 174') gained some illumination from its sawtooth monitor roof, but overhead arc-lamps were the primary source of light. In order to obtain maximum unobstructed light from both the monitors and the lamps, all shafting ran in tunnels beneath the floor. A. C. Dunham went on to serve as President of Hartford Electric Light Co., which under his leadership became one of the nation's most innovative electricity suppliers, conducting early experiments with low-head hydroelectric generation and long-distance transmission, and buying the first Westinghouse-Parsons steam-turbine generator in 1900. See entry for Oil City Generating Station.)

Willimantic Linen began Mill No. 5 in 1895; the 4-story brick-pier mill has a flat roof, segmental-arch lintels and stone sills. Before its completion American Thread Co. bought Willimantic Linen. American Thread built the 5-story, flat-roofed brick-pier Mill No. 6 in 1907 and the similar (but 3-story) new dye house in 1910. The last structure in the complex, a 5-story reinforced concrete storehouse, was built c.1915. There are many related structures extant: the 2 1/2-story, random-coursed stone barn; the 3-story, frame company store; four masonry dams; the 1869 stone-arch bridge over the river; and some 70 workers' dwellings, most of which are 1 1/2-story, gable-roofed, frame houses with single or double entry. American Thread still operates here and was reported to employ 1,300 people in the mid-1970s.
(Windham and Tolland Atlas; Bayles; Census 1870; Willimantic Linen Co., History of Willimantic Linen Co., 1868; "A Brief History of the American Thread Co. Willimantic Mills," typescript, 1974 and scaled drawing of mill complex, n.d., both courtesy American Thread Co; Glenn Weaver, The Hartford Electric Light Company, 1969.)

SMITH AND WINCHESTER MACHINE WORKS (c.1875)
Machine Shop Hill
South Windham/Windham

Willimantic
18.735400.4617750

The first Fourdrinier paper-making machine in the United States was set up in a North Windham, CT paper mill in 1827. Machinist George Spafford and millwright James Phelps installed the imported English machine. In 1828-29 Spafford and Phelps built the first American-made Fourdrinier in their South Windham shop. After their small firm went bankrupt in 1837 their employee Charles Smith bought the works and, with investment from Henry Winchester, continued to produce paper-making machinery as Smith, Winchester and Co. Smith also made the Spafford-designed cylinder drier and his own pumps and beaters. The firm had a widespread and steady market, shipping machines to paper producers throughout North America. Smith, Winchester grew slowly from 35 employees in 1850 to 40 in 1860 and 51 in 1870. In 1860 the company produced 3 Fourdriniers, 14 calendar machines, 7 paper-cutter attachments, 4 rag cutters, and 10 miscellaneous machines. Smith, Winchester did all its own casting, forging, and machining, driving the mechanized processes with water power from Pond Brook. In the 1880s the company nearly doubled in size to some 90 employees and began to diversify with production of laundry equipment and machinery for making paper bags. Smith and Winchester Manufacturing Co. (so named in 1893) rebuilt its plant between 1908 and 1920 and demolished the old frame shops. The only extant 19th-century structure is the 1870s' office, a brick 2-story building, about 40' x 30' with dormered mansard roof and cut-stone trim. In 1908 a new machine shop was built; about 230' x 60' with one high story, the brick-pier shop is divided into three long bays with a monitor over the central bay. A 2-story, gable-roofed, brick-pier shop, about 70' x 30' with corner stair tower, was added in 1914 and a 3-story, flat-roof, brick-pier factory, about 110' x 40', in 1918. Smith and Winchester still produces paper-making machinery here today. This company provides yet another illustration of the key role played by the Connecticut production-goods sector, which has supplied capital equipment to a broad range of United States' industries since the first decades of industrialization.
(David C. Smith, History of Papermaking in the United States, 1691-1969, 1970; Smith and Winchester Manufacturing Co., A Century of Pioneering in the Paper Industry, 1928; Census 1850, 1860, 1870, 1880; Windham and Tolland Atlas.)

THOMPSON LENTICULAR BRIDGE (c.1885)
West Thompson Road
Thompson

Putnam
19.260500.4647760

Built in the mid-1880s by Berlin Iron Bridge Co., this 75'-long bridge consists of a pin-connected, wrought-iron, lenticular truss spanning between rubble-masonry abutments. It carries West Thompson Rd. over the French River. Bottom chords are pairs of eyebars; tapered lattice girders form the web verticals. Floor beams are tapered to greater depth at center. See entry for Berlin Iron Bridge Co. Plant.

BALLOUVILLE BRIDGE (c.1860)
Attawaugan-Ballouville Rd.
Ballouville/Killingly

East Killingly
19.262270.4639420

Attawaugan Manufacturing Co. (separate entry) probably built this stone arch bridge, which spans Five Mile River on the main road between two manufacturing villages built and controlled by the firm. Dressed stones in mortar form the arch. Spandrels and abutments consist of random-coursed stone, split but undressed; these parts were probably dry-laid originally but recently applied mortar now fills the joints. The spandrels have been capped with concrete and guardrails have been added. The arch, rising about 16' and spanning about 30', remains as built.
(CHC.)

ALMYVILLE LENTICULAR BRIDGE (c.1885)
Brunswick Avenue
Almyville/Plainfield

Oneco
19.261940.4622100

Berlin Iron Bridge Co. built this wrought-iron through truss in the mid-1880s. It carries Brunswick St. over the Moosup River, just downstream from the dam for Glen Falls Mill (see entry for Almyville Mills). The truss is 123' long and 18' wide. Bottom chords consist of paired eye bars; verticals are lattice girders of angles with lacing bars; and top chords are box-section girders with riveted lacing on their bottom sides. All joints are pin-connected. This is one of two surviving lenticulars in Connecticut on which William Douglas' second patent (1885) was used; Moosup is the other. This patent represented an attempt to stiffen the lenticular structure. An inclined strut was installed between each end-post and the first panel point at each end of the bottom chords. These inclined struts were then connected with tension rods beneath the roadway. See entry for Berlin Iron Bridge Co. Plant.

Almyville Lenticular Bridge (M. Roth)

MOOSUP LENTICULAR BRIDGE (c.1885)
behind Cranska Thread Mill
Moosup/Plainfield

Plainfield
19.260440.4621890

This wrought-iron lenticular through truss was built in the mid-1880s by Berlin Iron Bridge Co. It is 105' long and 18' wide. Except for its length, this bridge resembles in every detail the Almyville lenticular bridge (see separate entry), including the stiffening struts of William Douglas' second patent. Almyville is about one mile upstream on the Moosup River. See entry for Berlin Iron Bridge Co. Plant.

MOOSUP RAILROAD BRIDGE (c.1905)
.1 mile east of Rte. 14
Moosup/Plainfield

Plainfield
19.4621760

The New York, New Haven and Hartford Railroad built this bridge during a comprehensive improvement program on the lines it had recently acquired. The rivet-connected steel bridge spans between abutments of stone blocks. The through truss is a Warren with sub-struts, about 75' long and wide enough for one set of tracks.

PACKERVILLE BRIDGE (c.1850)
Packerville Road
Plainfield

Plainfield
19.254480.4616800

This mid-19th century stone arch bridge spans Mill Brook just upstream from the site of a demolished 19th-century textile mill. The voussoirs are rough dressed on their outside surfaces but fit closely enough not to have required mortar when originally constructed. Spandrel walls are made of random field stone, also apparently dry-laid originally. Cast concrete railings now surmount the spandrel walls. The one-lane bridge is about 30' long. The arch rises about 14' over the river and spans about 22'.

WILLIMANTIC FOOTBRIDGE (1906)
Railroad St.
Willimantic

Willimantic
18.731820.4621310

This pedestrian bridge crossing the river and railroad tracks in downtown Willimantic was built in 1906 by the Owego Bridge Co. under chief engineer C. W. Higley. There are five spans, all steel through trusses with bolted joints. From the north, the first span is a 72'-long Pratt truss made of steel angles. The second span, a 125'-long Warren with verticals, crosses the Providence and Worcester Railroad; it has box-section girders for inclined end posts and top chords. The third span, over the Central Vermont Railroad, is a 156'-long Pratt truss with box-section girders like the second truss. The fourth span, above the river-bank, is identical to the second span. The fifth span, over the Shetucket River, duplicates the third span. The north abutment is granite ashlar; the south is granite rubble. All piers are steel, lattice-girder trestles except for one of granite rubble.

A footbridge here was proposed as early as 1877 but almost 30 years passed before it was built. Its construction in 1906 represents one manifestation of the concern for the quality of city life that was growing in the first decades of this century. Part of this concern was the encouragement of pedestrian traffic by providing more and better sidewalks, creating scenic parks, and eliminating railroad grade crossings. Similar foot-bridges were mentioned in governmental reports of this period, but few of this scale have endured. (Connecticut Railroad Commissioners, Report, 1905; City of Willimantic, Annual Statement of the Mayor, 1905, 1906, 1907; Willimantic City Engineer, Footbridge File, including set of original plans; NR.)

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