



## Society for Industrial Archeology · New England Chapters

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### CONTRIBUTORS TO THIS ISSUE

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### EDITORIAL

Here is the Fall Newsletter, just in time to announce the fall meetings for both the Southern and Northern New England Chapters. Please note on your calendars that the Northern Chapter will meet in Claremont, NH on November 15 and the Southern Chapter in Dedham, MA on November 22. (For more details, see "Meetings and Announcements.")

In addition to the usual smaller news items, this issue features two articles, one on architectural decoration in Newburyport, MA, and the other on the Sawyers Mills in Dover, NH. There also are lengthy discussions of the research currently being conducted at the Boott Mills in Lowell, MA.

Please send in copy for the Spring 1987 issue by March 15.

David Starbuck  
Rensselaer Polytechnic Institute



Members of the NNEC and SNEC view bridges crossing the Piscataqua River from the deck of the M.V. Heritage during the Portsmouth Harbor tour following the joint spring meeting. Photo by Dennis Howe.

## PRESIDENTS' REPORTS

### SNEC PRESIDENT'S REPORT

Applause and heartfelt thanks are due to Mary Donahue and David Poirier for creating and organizing a wonderful 1986 SIA Fall Tour. Recognition and thanks are due also to the tour leaders and organizers who informed, entertained, and marshalled SIA enthusiasts throughout their respective tours in Connecticut and Rhode Island. Their ranks included Matt Roth, Howard Miller, Pat Malone, Rick Greenwood, Sandy Norman and Sarah Gleason. The Fall Tour drew some seventy registrants. For us it provided a welcome and long-sought opportunity to explore Mystic Seaport, and much, much more!

Hooray! SNEC has a membership brochure. Many of you may have seen it during Fall Tour registration. We are very grateful to Peter Stott, Chuck Parrot and Jeff Howry for seeing this project through to completion; and to Dennis Howe for printing the brochure for us absolutely free of charge! Dennis's contribution was an enormous help.

While we are on the subject of membership, we are also very glad to report that the membership list is at this very moment being committed to Jane Carolan and Larry Gross's word processor. We thank Jane and Larry for volunteering their machine and Jane her time.

SNEC's Fall Meeting will be at the former Barrows-Cochrane Textile Mill on Mother Brook in Dedham, MA on Saturday, November 22, 1986. Some of you may have toured the mill during the 1984 SIA Annual Meeting. The Barrows Mill is to be rehabed into condominiums by Bergmeyer Associates, Inc., Architects. However, the Charles River Museum of Industry is negotiating a unique agreement with the developers whereby the Museum will take condominium title to the mill's power plant. This will enable the Museum to preserve and interpret the Barrows Mill power plant in situ. As

far as we know, this is a first for Massachusetts. Mike Folsom, Director of the Charles River Museum of Industry, will tell us more about this agreement and how it came about. We will also tour the power plant under Mike's expert guidance. We hope to see you there.

Anne Booth  
Charlestown, MA

### NNEC PRESIDENT'S REPORT

There is nothing like being there! This year I had the opportunity to participate in two nationally sponsored tours. First, in June, it was the SIA Annual Conference and Tour in Cleveland, Ohio. Later, in October, it was the SIA Fall Tour of maritime and textile industries in northeastern Connecticut and southwestern Rhode Island. Both tours were exciting IA experiences where I saw two different and contrasting industrial areas. I would like to report to chapter members the flavor and feel of them, rather than cold facts and figures which can be read about elsewhere.

In Cleveland, other tour participants and I were awed by the massive machinery and structures of American steel and manufacturing industries. There were the giant Hulett ore unloaders which could dip their great jaws into a ship's belly and efficiently remove tons of iron ore with each bite, yet, are now sadly becoming obsolete as newer ore ships are constructed with their own on-board off-loading systems. There was an impressive hot strip rolling mill at LTV Steel that, with showers of sparks and clouds of steam, pressed tons of glowing steel block into long, coiled sheets in minutes under almost total automation as we watched. There was the complex and intricate process of making specialty light bulbs at General Electric's Euclid Lamp Plant. And there was the labor-intensive manufacture of Geoffrey Beene/Cricketeer garments by hundreds of people busy at humming sewing

machines at the Joseph Feiss and Company.

The New England Fall Tour was a subdued contrast to Cleveland. We sipped fresh cider from an old steam engine-driven press. We climbed down into and snaked our way through the labyrinth passageways of the submarine Nautilus, surrounded by a puzzling array of pipes, valves and cables; and later stood below equally puzzling rope rigging on the polished wooden decks of the Coast Guard Academy training ship Eagle. We viewed and photographed a dozen fine 19th century textile mills and water-power systems. An architect showed us why a turn-of-the century stone mansion that was "built to last forever" was crumbling. And we spent fascinating hours learning the history of and seeing an incredible number of different types of boats, from flat-bottomed dories to sleek racing yachts, during a specially arranged lecture-tour of Mystic Seaport Museum's collection of hundreds of small boats.

SIA tours provide an important function for those with a serious interest in industrial archeology. One does not truly come to know an industry by analyzing its records and measuring its artifacts. You've got to be in the action of it and sweat from the radiated heat of glowing steel, bend your back to look up at a great structure, see the tedious concentration of a worker attaching a tiny filament to a hair-like support wire, hear the wham of a drop forge and the little crunch of a bit cutting metal, smell the stuff that is being worked and formed, and touch the grit that has settled on a mill's windowsill. There is nothing like being there.

And SIA tour organizers understand that. The Cleveland and New England tours were flawlessly executed. I know that countless hours were spent planning, rehearsing and timing to make our experience rewarding and safe. Attention was paid to every detail. The narrators, guides, and lecturers were pleasant, efficient and informative. Real pros, all.

I urge our members to attend the upcoming National Conference and Tour in Troy, New York. It will be an IA experience long remembered.

Dennis E. Howe  
Concord, NH



## MEETINGS AND ANNOUNCEMENTS

### NNEC FALL MEETING NOVEMBER 15

9:00 am to 9:45 am

Registration, coffee and donuts at the New Hampshire Vocational-Technical College located on Route 120 north of the City of Claremont.

9:45 am to 10:30 am

Annual meeting of the Northern New England Chapter and election of officers.

11:00 am to 12:15 pm

Walking tour of the old Joy Manufacturing Company and Sullivan Machine Company buildings led by Susan Elder. Some of these structures have been adapted to new use, and some remain as they were when last used for manufacturing.

12:15 pm to 1:30 pm

Lunch on your own.

1:30 to 3:00 pm

Harvey Hall, company president, will lead a tour of the CPM, Inc. (a paper mill) hydroelectric facilities.

### SNEC FALL MEETING NOVEMBER 22

The Southern New England Chapter will hold its Fall Meeting at the Barrows-Cochrane Textile Mill on Mother Brook in Dedham, MA. Mike Folsom, Director of the Charles River Museum of Industry, will lead a tour of the Barrows Mill power plant.

For information contact Richard Greenwood, Program Coordinator, or Anne Booth, Chapter President.

### JOINT SPRING MEETING AND TOUR HELD IN PORTSMOUTH, NH

Members of the Northern and Southern NE Chapters held their spring meetings jointly on May 17 at Strawberry Banke in Portsmouth, New Hampshire. Fifty members representing both chapters enjoyed an afternoon boat tour of the harbor aboard the M.V. Heritage.

For the tour, well-known historical authors Richard Candee and Raymond Brighton, along with Navy Yard

Historian James Dolph and Harbor Historian Walter Dunfey, provided a continuous narration of historical background and anecdotes of the harbor and its many fascinating sites. Among the sites on both the New Hampshire and Maine banks were the State Pier, Sprague Energy Company's oil tank farm, Public Service Co. of New Hampshire's electric power plant, Simplex Wire and Cable Company (underwater cable manufacturer), the Portsmouth Naval Shipyard (actually in Kittery, ME), and numerous ruins of the ways where famous 19th-century clipper ships were built. Participants left the boat well informed, refreshed by salt air and a little more tanned.

Later in the day, Woody Openo led a group to the rehabilitated Cocheco Mills and Sawyers Mills in Dover (see Sawyers Mills article in this issue), while Dick Candee led another group on a tour of Atlantic Heights, a 20th-century shipbuilding company complex in Portsmouth.

The meeting and tour arrangements were made by NNEC members Faith Harrington and Woodard Openo.

### COOPER RECEIVES NEVINS PRIZE

Carolyn Cooper, a Research Affiliate in the History of Science Department who received her doctorate in the history of technology from Yale in 1985, has been awarded the Allan Nevins Prize by the Economic History Association. The award includes a \$1,000 cash prize and submission of her dissertation, "The Roles of Thomas Blanchard's Woodworking Inventions in 19th-Century American Manufacturing Technology," to Columbia Press for publication.

Her faculty advisors were Asger Aaboe, Professor of History of Science, Mathematics and Near Eastern Languages and Literatures; Eda Kranakis, Assistant Professor of History; and William N.M. Parker, the Philip G. Bartlett Professor of Economic History. Last year Ms. Cooper was a postdoctoral fellow at the National Museum of American History at the Smithsonian Institution.

(From Yale University's Weekly Bulletin and Calendar, Oct. 13-20, 1986)



The Portsmouth Naval Shipyard was one of many industrial sites viewed by NNEC and SNEC members on their spring tour. Photo by Dennis Howe.

## KINGSBURY MACHINE TOOL CORP. TOYS FEATURED IN NEW EXHIBIT

With a holiday salute to both the children who played with them and the company that created them, the New Hampshire Historical Society, 30 Park St., Concord, NH, is presenting a loan exhibition of early toys of the Kingsbury company of Keene, NH.

The exhibit, "Built To Last: The Toys of Kingsbury," opens Saturday, November 23, with a reception from 3:00 to 5:00 pm. The public is welcome. There is no admission charge.

Over 50 antique toys from the collection of the present-day Kingsbury Machine Tool Corporation will be on view at the Society through Jan. 3, 1987. Now recognized as valuable collector's items, some of these toys, nearly a century old, represent just one avenue of commerce chosen by the Kingsbury company in the 1800's.

In 1894 a Keene bicycle shop proprietor named Harry Thayer Kingsbury bought Wilkins Toy Company and turned it into one of the most reputable and popular toy manufacturers in America. Introduced to the toy-buying market in 1895, Kingsbury's new catalogue listed some 85 different Wilkins Model iron toys. While his products soon mirrored the times, they also warmed the hearts of children across the country with unique vehicles such as Kingsbury's horse-drawn road sprinkler, a steamboat, streetcars, hansom cabs, and a rowing shell with oarsmen.

Kingsbury made the first toy automobile in 1900, and by 1901 his company was the largest manufacturer of toy cars in America. In subsequent years, the toys would come from pressed steel, powered by wind-up motors, illuminated with battery-operated lights, and further equipped with rubber tires and music-box radios.

Then came trailer trucks, submarines, airplanes, blimps and Desoto sedans. The firm, which had changed its name from Wilkins Toy Company to Kingsbury Manufacturing in 1918, also began making a different toy Chrysler "Airflow" every year to match the changes in its true-life counterparts.

In 1942 the sheet steel which Kingsbury devoted to the manufacture of its toys was reallocated to wartime production of machines for fuses, aircraft engine parts, rifle bolts and gun parts. Today Kingsbury custom designs and builds precision machines for the mass production of parts. Its toy line has been discontinued.

But a large collection of these early and innovative toys are on display in the lobby of the main Kingsbury plant in Keene, and from Nov. 23 - Jan. 3, many may be seen at the Historical Society as well. The New Hampshire Historical Society is a private, nonprofit membership organization founded in 1823, dedicated to collecting, preserving and promoting the objects of New Hampshire history.

The Society's galleries are open to the public free of charge, Monday through Saturday, 9 am to 4:30 pm, and Wednesday, 9 am to 8 pm. The Society library is closed on Saturdays. For more information please call (603) 225-3381.

## 7th ANNUAL LOWELL CONFERENCE ON INDUSTRIAL HISTORY HELD

Senator Edward M. Kennedy and William Winpisinger, President of the International Association of Machinists, were among the featured speakers at the 7th Annual Lowell Conference on Industrial History, held October 30 through November 1 at the Lowell Hilton. "Politics and Industrialization" was the theme of this year's conference, which was sponsored by the Lowell Historic Preservation Commission, the Museum of American Textile History, the University of Lowell, Boston University, and Lowell National Historical Park.

The conference focused on such topics as immigration policy and the American labor force; industrial policy in the United States, as compared with Germany and Japan; arguments for and against the substitution of a service economy for an industrial economy; federal labor policies; and more.

The three day program included presentations by over forty professionals from universities, museums, and historic sites across the country.

## PUBLICATIONS

### ARTICLES IN PRINT OR FORTHCOMING BY BETSY H. WOODMAN:

All of these imprints, available to SIA members at the author's cost, are hand-pulled, limited editions with specially designed covers, and all were printed by the Stinehour Press of Lunenburg, VT.

1) "Rufus Sargent (1812-1886): A Newburyport Architect Rediscovered," Essex Institute Historical Collections, October 1986. This article documents the known Newburyport building designs of Rufus Sargent, the major 19th-century architect of Newburyport, Massachusetts.

2) "Architect Rufus Sargent (1812-1886): Beyond Newburyport," Essex Institute Historical Collections, January 1987. Sargent was parapetitic architect who did many buildings outside of Newburyport, and the second half of this study documents Sargent's buildings in a number of towns and cities in Essex County, MA and in Rockingham County, NH.

3) Newburyport's Rufus Sargent: An Architect Rediscovered. Imprint of the two articles listed above, 1987. This edition will bring together both articles as a monograph of Rufus Sargent and his known building projects. It is available for about \$10.00.

4) Also available from the author is the imprinted, limited (300 copies) edition of The Salisbury Beach Dodgem: A Smashing Ride (1920-1980), originally published in the Essex Institute Historical Collections, October 1984. \$9.00 includes shipping.

5) And from the Custom House Maritime Museum in Newburyport, MA, the limited edition (500 copies) imprint of A Custom House for Newburyport (1834-1835): by Architect Robert Mills (1781-1855), and originally published in the Essex Institute Historical Collections, July 1985, is available for \$6.00 including shipping.

Please note that these very collectible imprints are available to SIA members at my cost, or by the Maritime Museum at a nominal fee. And the arti-



cles on the Dodgems and the Mills' Custom House were among the last Essex Institute publications and imprints to be printed in hot metal type. The Sargent article is photo-offset. The latter method allows more photographs, but the wonderful imprinted surface quality of the page is lost...alas! As we all know too well, technology does move on...toward the bottom line, cost in this case.

To obtain copies, write to: Betsy H. Woodman, 20 Inn Street, Newburyport, MA 01950. (617) 462-9522. Please enclose check.

## CONNECTICUT HISTORICAL COMMISSION PUBLICATIONS

The Connecticut Historical Commission is offering a discounted price on the purchase of the following four publications:

Adam Rome, Connecticut's Cannon: The Salisbury Iron Furnace in the American Revolution, (Vol. 24: Connecticut Revolutionary Series).

Louis I. Kuslan, Connecticut Science, Technology, and Medicine in the Era of the American Revolution, (Vol. 27: Connecticut Revolutionary Series).

James P. Walsh, Connecticut Industry and the Revolution, (Vol. 29: Connecticut Revolutionary Series).

Matthew Roth, Connecticut An Inventory of Historic Engineering and Industrial Sites, (Society for Industrial Archeology 1981).

If purchased together, these four volumes sell for the reduced price of \$10.00. The volumes in the Connecticut Revolutionary Series are \$2.50 separately; Connecticut's HAER volume is \$5.00. Checks should be made payable to Treasurer, State of Connecticut.

Also available is Connecticut History and Culture: An Historical Overview and Resource Guide for Teachers. The price is \$5.00 per copy plus \$1.00 per copy for postage and handling for the first copy, 25 cents for each additional copy.

Send all orders to: Connecticut Historical Commission, 59 South Prospect Street, Hartford, CT 06106.

For further information, please contact David A. Poirier (203) 566-3005.

## CURRENT RESEARCH

### Massachusetts

#### KIRK STREET AGENTS' HOUSE, LOWELL, MA

Excavations at an urban backlot were undertaken during July, 1986 by Boston University Center for Archaeological Studies and funded by the City of Lowell School System. This project was part of a cooperative agreement between Boston University and the National Park Service. Mary C. Beaudry, Assistant Professor of Archaeology and Anthropology at Boston University, was Principal Investigator, and Edward L. Bell, a graduate student in the Department of Archaeology's B.A./M.A. program, served as Assistant Archaeologist.

The area that was tested included what was the backyard of a house occupied by mill agents from the Massachusetts and Boott Mills, from 1845 to 1901. After this date, the property was occupied by tenants until 1929 when the building was used, at different times, as an annex to the nearby high school, as a health clinic, and as a drug rehabilitation center. The only historical research that focused on this structure was contained in an architectural report prepared by John Robbins in 1979. Further documentary research on the occupants of the Kirk Street Agent's House is being carried out by Edward Bell.

Renovation of the Lowell Magnet School immediately east of the site would have directly impacted the backyard area. For a number of reasons this area was considered to have a high potential for significant archeological resources. Excavations at the nearby Boott Mills boarding house area and related documentary research by Boston University in 1985 (see SHA Newsletter 19(1):17-18) yielded important data on the lifestyles of the millworkers. Archeological information from the Kirk Street Agents' House would provide comparable data on the lifestyles of the managerial class. At the boarding house area, directly under the blacktop surface of a parking lot, a number of well preserved features were encountered. The backyard area at the Kirk Street

Agents' House was also covered by a blacktop surface, and it was hoped that features similar to those found at the boarding house area would be preserved underneath the asphalt.

At the Kirk Street Agents' House, the archeologists had access to heavy machinery being used in the renovation work at the Magnet School; this greatly expedited the work. The asphalt surface and underlying parking lot bedding were removed with a bobcat. Shovel-schmitting and limited testing resulted in the identification of a number of 20th-century trenches associated with construction work.

The areas of the site not disturbed by 20th-century construction work were far more interesting. It appears that this backyard area was used as a garden by the 19th- and early 20th-century residents of the Kirk Street Agents' House. Deep strata of rich loam proved equally rich in artifactual content. Materials recovered from these strata included many large ceramic sherds (including redware and stoneware flowerpots) and a great many faunal remains. (This situation has an analog in the 18th-century planting beds at the Peyton Randolph House in Williamsburg, Virginia.) Also recovered were a number of personal goods (clothing fasteners, a possible make-up compact, marbles, tobacco pipes), and household items. The range of artifacts suggest that trash was utilized for compost and drainage of the garden area. Only a few features that are tentatively identified as planting or root holes were observed. Soil samples were taken from almost all areas of the site and will be analyzed for floral remains. Pollen samples are currently being analyzed by Dr. Gerald Kelso (NPS). Preliminary artifact cataloging has been completed by Lorinda B. Rodenhiser, and undergraduate student at Boston University, and Edward L. Bell. Further artifact analyses are underway, including efforts to cross-mend and make a vessel count of the entire ceramic collection.

The fact that the mill agents and their families had access to a garden is significant. This landscape feature suggests yet another material expression of class differences, in addition to those suggested through documentary and archeological research in Lowell. Gardens were not present in the boarding house yards used by the millworkers. If the Kirk Street Agents' House garden proves to have been used to grow foodstuffs, the

economic advantages of home grown vegetables can be compared with the millworkers' practice of paying board. A final report on the research, excavation, and analysis will be available by late spring of 1987.

## THE BOOTT COTTON MILLS/ BOOTT MILLS

Laurence Gross and Russell Wright recently completed a Historic Structures Report on the Boott Mills for the Denver Office of the National Park Service. Wright addressed the history of the structures involved while Gross treated the occupation and use of the spaces they delineated. Targeted areas included the Counting House, Mill #6, the Court Yard, and the facades of Mills #1 and #2.

The Boott Mills was among the last of the major Lowell cotton mills to be founded, in 1835, and also one of the last to go out of business when it closed in 1954. The corporation's history thus covers all the major periods of the city's and industry's history, from establishment with Yankee female labor, through the immigrant periods to the move south of other mills, and finally the cotton industry's demise in Lowell. Similarly, the buildings chosen by the Park Service for reasons related to their planned use, encompass this history. The Counting House and Mill #1 and Mill #2 date from the company's origin, and the latter two's modifications over time reflect changes in scale and philosophy on the part of the management and seriously impacted the experience of the workers. Mill #6 was built in 1872 and reveals the thinking of the builders at that time. Furthermore, it housed a variety of functions over time, so its history includes all cotton processing operations as well as Machine, Carpenter, Paint, Blacksmith, and Belt Shops.

The Park Service has purchased the Counting House and Mill #6, which will house their Lowell offices and exhibits. Visitors will enter through the millyard and view the facades of the earlier mills. The Historic Structures Report provides information for the use of the Denver Office in its role as architect and planner for the system. At the same time, it offers the Lowell National Historical Park a wealth of data for use in its interpretation of the industry in general and the Boott Mills in particular.

Wright's sections discuss the Boott in a context of mill developments in England, Rhode Island, and Waltham. He relates the development in Lowell to thinking regarding utilization of waterpower, town planning, and mill architecture. His discussions detail the mills' growth. With careful precision, he describes the buildings' construction from foundations to fenestration, stair wells to roofs. Mechanical systems installed, fire protection techniques, and sanitary systems are not only described, but changes in all aspects of the buildings' physical properties over time appear.

Wright's research and the detail of his account not only expand our knowledge of issues connected to the design and construction of the Lowell mills, but also remind us of how much is still to be discovered about them. At times he notes the contributions of a particular employee of the Lowell Machine Shop, for example, but he cannot solve many questions regarding the responsibility for the buildings' particular designs and alterations.

Gross' sections also offer a context for the Boott's development, but concentrate on the contents of the buildings, the people and technology which occupied the structures, and the interaction of all three. A "bale to bolt" section outlines the cotton textile processes for the unfamiliar. Then three chronological sections describe activities at the Boott in the periods 1871-1904, when the Boott Cotton Mills failed and was reorganized as the Boott Mills; 1905-1930, a period of strife between the mill's management and its selling house and the advent of "scientific management;" 1931-1954, a time of depression, prosperity, labor-management struggle, and closing.

The account is unusual for two reasons: little attention has been given to the Lowell of the post-Civil War years, and historians have not focused on a single company. Following the Boott's history up to 1954 allows attention to the periods in which most of the people who worked in the Lowell mills played their roles. Concentrating on a single company allows the historian to analyze those roles and to portray the contributions of the conflicts between treasurer, agent, overseer, and laborer. The giant corporations of Lowell meant many things to a great many people, and this report attempts to determine some of them in a more direct way than is

possible by surveys or overviews. A narrow focus brings the activities and relationships of individuals to the fore and presents their interactions at a level of involvement which offers a new view of Lowell. The contributions and tasks associated with all the jobs in the mill, from treasurer to doffer, can be determined. Adoption of new technologies, conflicts between investors and managers, managers and selling agents, workers and managers offer a new way of looking at Lowell cotton mills and illuminate broader questions such as the famous "move south" of the cotton industry and, ultimately, the runaway shops of today.

The process of creating this report was a long and difficult one for all concerned. In light of John Bodnar's recent article on Structures Reports, "Symbols and Servants: Immigrant America and the Limits of Public History," in *The Journal of American History*, the importance and potential of such efforts indicate they deserve the effort.

The report, some 600 pages with illustrations at present, will become available from and in a form to be determined by the Park Service in Denver. Gross is continuing research and writing on a book-length manuscript of the corporation.

Laurence F. Gross  
Museum of  
American Textile History

## EMERSON BIXBY SITE

Old Sturbridge has completed its third year investigating the domestic, work, and community life of an early 19th century Barre, Massachusetts blacksmith and farmer, Emerson Bixby. This multidisciplinary research project is part of a larger NEH-funded study of the social and economic transformations affecting the country towns of central New England during the early 19th century.

David Simmons and John Worrell directed the 1986 archeological fieldwork, including the 8th O.S.V. Field School in Historical Archaeology, and a seven-week staff and volunteer fall season.

Through test probing at suspected outbuilding sites on the Bixby



homelot, we were able to identify tentatively the location of an early blacksmith shop; the location and probable orientation of an early English barn; and the location of an early fence row, once enclosing the barnyard. We plan to continue our work on these and other outlying features next year, when we will also complete the detailed mapping and survey of the historic neighborhood landscape surrounding the Bixby site.

Our major excavations this summer and fall were once again concentrated near, and even under, portions of the Bixby house; we also completed our second season of work at the Bixby blacksmith shop. The front yard of the house continued to be our major focus. In expanding our excavations in the area of the original front door of the house, we found, to our surprise, evidence to support there having been a wooden, rather than stone, doorstep—an interesting material manifestation of the relative importance attached to public presentation of entry into this, the front facade, verses entry into the rear parlor door, where there was formerly a large stone doorstep. Interestingly, we found considerably more sheet refuse in the area of the rear and side yards than near either of the front doorways. Excavations in the front yard also revealed two more dry-laid cobble post supports, in line with four previously exposed; together with the ghost of stone foundations and sill remains, also a continuation of those excavated during the first two seasons. We also found yet another early—apparently pre-house—stone foundation which, together with curbing along the road, runs parallel to the other features and to the house. Neither the precise relationship of these features to each other nor their function is entirely clear. More of a stone-lined cellar drainage trench was exposed this season, as was at least one, and possibly two, areas in which natural ledge outcrops were quarried, possible for use during house construction.

Excavations were begun this year in the vicinity of the back-door of the ell. There, we found several early artifact scatters, and evidence of changing trafficways, these likely related to the closing up of a rear entry into the woodshed, to the addition of the rear bedroom, and to the demise of the barn, to which, we presume, much of the traffic passed.

After the house was moved to the museum in early September, we had the opportunity to dig the early yard spaces preserved under the floor of the ell, rear bedroom, and under the woodchip floor of the woodshed, allowing us to stratigraphically connect the front, rear, and side yards. It appears that the woodshed was originally floored with boards laid upon a thin dirt surface, suggesting, perhaps, an early construction date for this addition. Working under the ell and bedroom, we found, under a 150-year accumulation of dusty, wind-borne soil, the buried remains of early surfaces, including several pathways, leading in the direction of the former barn. The early yard space under the bedroom was apparently a very little-used area of the yard, whereas that under the ell was a receptacle for much refuse—much of it ending up against a terrace retaining wall—and for ashes, some of which formed the base for the compacted trafficways.

Even before the house was moved, we participated in the recording of its dismantling. Our archeological recording system was adapted to describe the phases of change in the architectural fabric in order to allow us to combine that with evidence from the soils. Construction phasing and decorative details of the Bixby house are being compared with those of a number of late-eighteenth- and early-19th-century houses in the Barre Four Corners region surveyed by Myron Stachiw and by Nora Pat Small.

At the Bixby blacksmith shop site, we continued to excavate within the remains of the shop itself, and in the area immediately in front. Considerable residue from shoeing—Bixby's major smithing activity—continued to be found atop a prepared cobbled pad in front of the shop. Within the shop, later overburden was removed to expose the primary working surfaces. From these early and overlying strata both within and outside the shop, we continued to take soil samples on a 50 cm grid to be analyzed by Parks Canada for relative iron content. Through this, together with careful excavation, we are refining our hypotheses about the way Bixby organized his work spaces.

Information about the excavated material culture from the entire Bixby site continues to be entered into several computer files—a general, abbreviated database for all material culture, and two detailed files—one

for soils, the other for ceramics. Spatially segregated by one-meter subsquares and vertically by soil strata, data entered into and manipulated within these files will greatly assist our interpretation of changes through time and across space at the Bixby site.

Work on the Bixby project will continue during the winter with another archeological field school in the summer of 1987.

David Simmons  
Old Sturbridge Village

## Vermont

### BERLIN BRIDGE AT HIGHGATE FALLS, VT TO BE RECORDED TO HAER SPECS

A lenticular-truss bridge, manufactured by the Berlin Iron Bridge Company (E. Berlin, CT), crossing the Missisquoi River at Highgate Falls, Vermont, is being recorded to Historic American Engineering Record (HAER) specifications by Kleinschmidt Associates, consulting engineers. The engineering firm has offices in Pittsfield, ME. The bridge is considered to be one of Vermont's most prominent iron civil engineering landmarks.

In August the Northern New England Chapter was asked to assist with a field crew to measure the structure, but it was soon determined that extensive field work would not be necessary when fairly complete measured sketches for stress analysis made by the Vermont State Agency of Transportation were located. The Chapter may be called upon for limited field work for specific details and research as the project continues.

Also known as the Douglas and Jarvis patent iron bridge, the structure at Highgate Falls is one of the longest known single spans of this type left in the country. The bridge consists of a 215-foot main through-truss span with an 80-foot secondary pony-truss span at its south end. A stone block pier supports the bridge where the through-truss span and the pony-truss span meet. The lenticular truss has a unique profile. It consists of a curved top cord and a bottom cord which is a mirror image of

the top, providing the structure with a graceful symmetry and suggesting its nickname, the "pumpkin seed" bridge. Vertical iron lattice compression posts are pin-connected to the corresponding segment joints of the top and bottom cords. Each end of the iron I-beams which support the deck are suspended by iron rods from the eye-bar connecting pins of the bottom cords. Iron lattice bracing connects opposing segment joints between the top cords. The structure, when loaded, acts as a self-contained arch.

The bridge was erected in 1887, and the only major alteration to the structure was the replacement of the original wood plank deck with steel and concrete.

The lenticular truss was a virtual trademark for the Berlin Iron Bridge Company which manufactured and erected over 600 of them throughout the Northeast, Midwest, and Texas from 1878 until the late 1890s when wrought iron construction was replaced by steel. The lenticular form had the advantage of requiring ten percent less iron than comparable sized Pratt and Warren structures. The design was based on patents granted to William O. Douglas of Binghamton, New York in 1878 and 1885. It is estimated that less than 10 percent of the Berlin lenticular bridges still stand today.

The Highgate Falls bridge received a National Register of Historic Places nomination in 1974. It is in the mitigation process as a result of a planned hydro project in the area. Anyone interested may contact Dennis Howe (NNEC) or the Vermont State Historic Preservation Office.

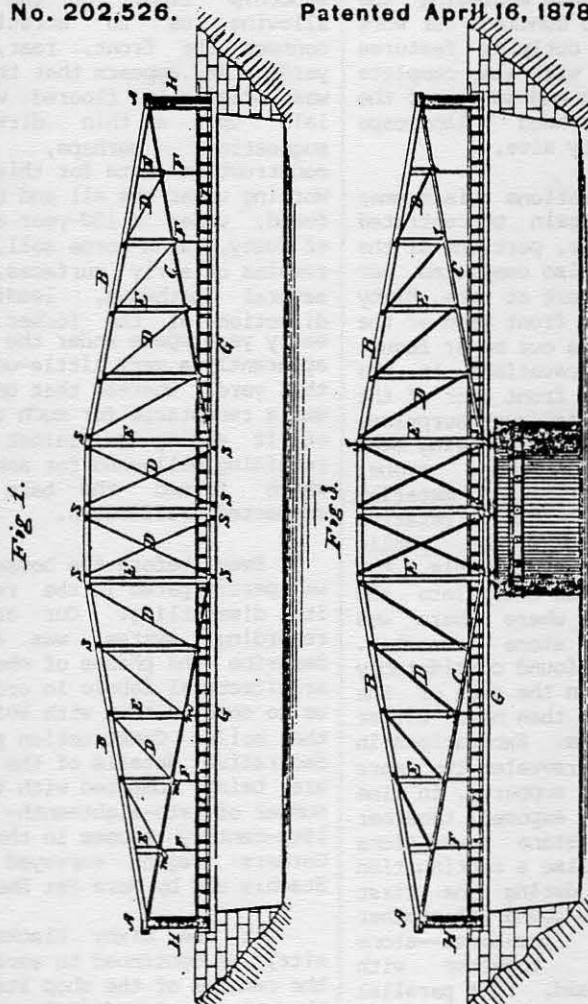
Dennis Howe  
Concord, NH

W. O. DOUGLAS.  
Truss-Bridge.

3 Sheets—Sheet 1

No. 202,526.

Patented April 16, 1878.



WITNESSES

*Harry King*  
*W. H. Shepley*

INVENTOR

*Wm. O. Douglas*  
*By H. H. Bellmont*  
Attorney

Drawing of the lenticular- or parabolic-truss bridge from 1878 patent granted to William O. Douglas. In 1885 Douglas was granted a second patent which added a diagonal brace between the junction of the first horizontal strut and the bottom cord (point M in drawing) and the end post (H in drawing) "to resist the effect of wind and other forces acting laterally."



## Article

### DRILL OR PUNCH WORK

The Saint Louis Art Museum has a Federal Period room that came from a Newburyport house. (It is now in pieces and awaiting re-installation under the guidance of Decorative Arts Curator, Christina H. Nelson.) The woodwork was purchased by the museum from a New York antiques dealer in 1931. Documenting the source of this work has led to an ongoing study of Federal Period ornamental architectural woodwork. From studying a number of examples of Federal Period woodwork, still "in situ" and located in Newburyport houses, the following types of decoration can be discerned:

1. Ornament that was 3-dimensional (sculptural) and applied. This type is consistent with the Adams-McIntire tradition, and it can be seen most notably in Essex County, MA in the work of Salem carver and architect, Samuel McIntire (1757-1811), who was noted for his carved fruit baskets, wheat sheaves, swags, and other ornamental motifs. Such motifs were carved in wood and were also moulded in plaster and composite materials. This would most likely have been in the shop, and then the decorative designs would have been applied to moulding surfaces or whole mantle pieces that were commissioned or planned to be installed in specific rooms.

2. Fairly thin (in section), cut-out (vs. carved or molded) designs were also applied in many Federal Period rooms. Most commonly used in Newburyport was the diamond or lozenge shape. And in the rare examples where hardwoods were displayed, paint was not applied to the design.

3. Frequently, the mouldings received carved or intaglio motifs. Common examples in Newburyport are the grooves (vs. 3-dimensional reeding) and alternating carved rosette patterns.

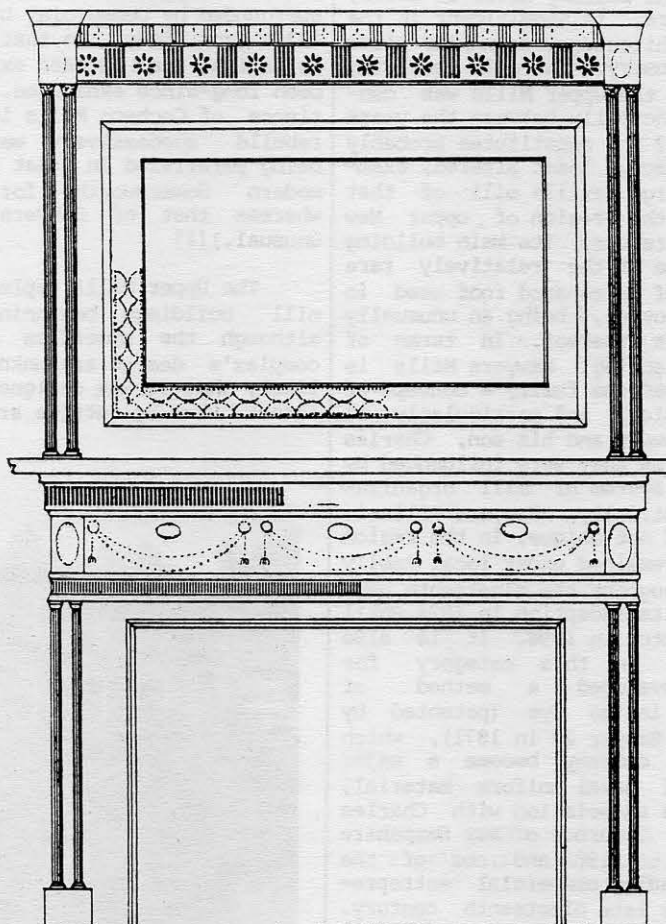
4. Another unique way to create a design was with a punch and/or drill. In this method, the design was carried out with tiny, closely spaced holes drilled or punched into the flat surface of the wood. With probable antecedents in pierced tinwork and early pierced woodwork, this method was successful when it was newly completed and did not have numerous coats of paint, which over time tended to fill

the holes and nearly obliterate the designs. In Newburyport, pierced or drilled woodwork designs include: circles, swags, crescents, lozenge shapes and even hearts in one fine example.

In the Newburyport Saint Louis room, drill work designs were used. And the most exciting find of the study has been a Newburyport room (still "in situ") where the same drill work design as that in the Saint Louis example occurs in the overmantle. From this discovery, it can be postulated that the same hand, or the same shop, was responsible for the woodwork in both of these fine examples. Was this type of drill work, that was

apparently done in the shop, a type of decoration common only to Newburyport? Or, was it commonly used in Federal Period buildings located in Portsmouth, NH, Salem and Boston Massachusetts and perhaps other locales as well? And with what tools and in what manner was this "drill work" carried out? The author is looking for Federal Period examples of drill work that occur in towns and cities outside of Newburyport. Any help locating examples, or suggestions as to woodworking tools and methods would be appreciated.

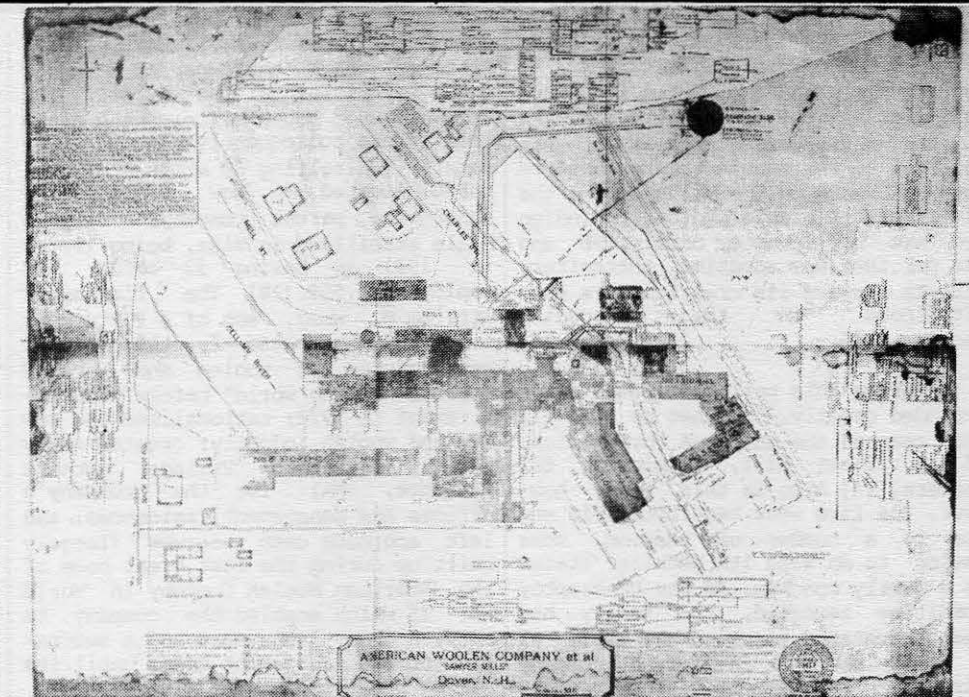
Betsy H. Woodman  
Newburyport, MA



Field drawing of mantle at Newburyport YWCA with drill work in overmantle frame and in mantle face (swags and ovals). Courtesy of Historic Resources, Newburyport, MA.

mansard roof followed domestic and commercial styles which were popular and well-established by 1870, but it was not cost-effective, approximating the expense of continuing brick walls up another story without the additional fire protection afforded by brick; thus, according to The Factory Mutuals, "These 'Mansard' roofs quickly went out of fashion, particularly after the great fire of Boston in October, 1872." [4] The new office and other additions to the mills in the 1880s and early 1890s were part of the great expansion of the business in this period, and coincided with the directorship and presidency of the Company by Charles H. Sawyer. Likewise, the adoption of a more contemporary industrial style (without the granite window trim), larger scale and richer embellishments (where appropriate, as in the 1882 office) signified the growth of the business to one of the largest independent regional textile firms, with a national reputation, but also heralded the period of corporate consolidation which was to follow, when Sawyers Mills would be absorbed by the American Woolen Company.

The industrial history of Sawyers Mills illustrates the interconnections between the various early textile mills in New England, in terms of experience and example, and the typical growth in size and expertise of one of these mills over the course of the century. The concern was founded by Alfred I. Sawyer, who had gained experience as a dyer in Amesbury, Massachusetts, and had worked for the Great Falls Manufacturing Company (in present-day Somersworth, NH, adjacent to Dover). Alfred was one of twelve children born to Phineas and Hannah Sawyer of Marlborough, Massachusetts. [5] Alfred leased from the Great Falls Manufacturing Company in 1824, the water privilege at the upper dam and the grist mill on the Bellamy River in Dover, where he began the business of cloth dressing. [6] After successively enlarging the mills and going into the business of woolen flannel production, Alfred died in 1849, his brothers Zenas and Jonathan taking control of the company the following year. [7] Jonathan brought with him a knowledge of the Lowell system of manufacture, having been raised in Lowell (and working there) where his mother took her family after the death of his father. In 1839 he had gone to Watertown, New York, where he became superintendent of the Hamilton Woolen Company and later established his own business manu-



Plan of the Upper Mills; Sawyers Mills; Dover, NH, by the Associated Factory Mutual Insurance Companies (1939). Photo by Closs Planners Inc.

facturing satinets. [8] It is likely that Jonathan was responsible for the general layout of the mill complex as it evolved in the 1860s and 1870s, broadly following the Lowell scheme, with the agent's house above (his own; built c.1866 and no longer standing); workers' housing leading up to the mill buildings and clearly subordinate to them (ten double houses flanking Charles Street, of which eight remain); a ten-unit row block located between the Upper and Lower Mills; and the orderly situation of the mill buildings themselves, placed to gain maximum advantage from the water power of the Bellamy River. Moreover, Sawyers Mills received its own station on the Dover and Portsmouth Railroad (of which Charles H. Sawyer was one of the directors) and was able to unload goods from the railroad directly into its storehouses, again paralleling the Lowell-Boston railroad link which had proven so important to the earlier industrial city. [9]

Sawyers Mills manufactured flannel until 1862 and during the Civil War provided uniform cloth for the Union forces. [10] The war ushered in a period of great economic turmoil in the textile industry; woolen companies which were well-managed, as was Sawyers Mills, were able to lay the groundwork for future expansion. By contrast, cotton mills, cut off

from their source of supply, cut back or attempted to switch to woolen manufacture, and many failed. However established woolen companies made enormous profits which were unmatched until World War I. [11] Sawyers Mills took advantage of its improved economic conditions to introduce a remarkable innovation in its selling practices; in 1866 it began selling directly through its own agents, rather than through commission houses as had been the normal practice up to that time. Among the advantages thereby secured were that of increased management independence (commission houses normally made loans to mills and therefore presumably exercised a measure of control) and a greatly enhanced national reputation gained by businesses dealing directly with Sawyers' agents. Thus the brothers F.A. and J. Sawyer gave their names to the selling house as well as the firm itself, which became so well known under this name that it was retained as a trademark after the death of Francis A. Sawyer in 1881. Charles H. Sawyer (son of Jonathan and, later, Governor of New Hampshire) was made a partner upon the incorporation of the firm in 1873 and later became president, serving in that capacity when the firm went bankrupt in 1898. [12]

In 1871 Francis A. Sawyer 2d (son of Jonathan) patented a process for



revivifying spent indigo dye. This was an invention of great importance to Sawyers Mills and the woolen industry, as indigo was the most costly dye used in the manufacturing process and was critical to the manufacture of uniform material begun by the Mills during the Civil War. A viable synthetic indigo dye was not invented until 1890 and was put into use sometime thereafter; efforts toward its creation were multitudinous in the preceding decades.[13]

During this period, Sawyers Mills expanded greatly, so that by 1898 it had reached the enormous proportions of a 39-set mill, employing 600 workers.[14] Also in this year, however, the firm went bankrupt. This was due to a number of reasons, some having to do with its peculiar status as a family concern. As the bankruptcy committee reported, the family had been accustomed to using the Mills as a bank, so that family and company finances had become inextricably linked and Byzantine in their complications. More important was the position of the company in the New England textile industry as a whole. Caught up in the Depression of 1893-1897, along with the dropping of tariffs on imported wool which had been in effect since the Civil War, increasing southern and foreign competition, and a change in American taste away from heavy woolen fabrics to worsteds and other lighter, more finely finished textiles, the New England woolen industry went through a crisis in the late 1890s. The immediate cause of failure was the prospect of the liquidation of a number of Boston banks which had lent money to Sawyers Mills and the failure of Plymouth Woolen Mills in Massachusetts, which was owned by members of the Sawyer family although not connected in business with Sawyers Mills. The failure of Plymouth was regarded as necessarily affecting the credit of the Dover concern.[15] The experience of Sawyers Mills in 1898 is an example of what was happening to woolen mills across New England at the time. Arthur Cole quotes S.N.D. North who called the mid-1890s "...without any reservations or qualifications whatsoever...the most disastrous period in the history of American wool manufacture" in tariff hearings in 1896.[16]

A response was the formation of the American Woolen Company in March 1899 by William M. Wood, treasurer of the troubled Washington Mills of Lawrence, Massachusetts, along with

James Phillips, Jr., and Charles Fletcher, each the owner of a small group of mills. At the outset, the company owned seven mills, with nineteen others subsequently added, ultimately controlling 59 mills, all but three located in New England.[17] Under the parent company, Sawyers Mills stabilized in size, being listed in 1921 as having 32 cards and employing 550.[18] The flamboyant William M. Wood, son of a Portuguese immigrant, created "...the largest manufacturer of woolen and worsted fabrics in the world" before his retirement in 1924; rationalized the New England woolen industry; created a new town (Shawsheen Village outside Lawrence, MA) for the company's offices and management residences; and left enormous cash reserves (largely built up during the last great boom of the American Woolen Company in World War I) which enabled the company to survive many lean years and a succession of bad management teams until its ultimate demise in 1955.[19]

Reported closed in May 1954, Sawyers Mills' demise was part of a belated effort by American Woolen to reorganize operations and prune uneconomic mills. The following year, the parent company was taken over in an unfriendly merger (along with Robbins Mills, a southern firm, which, however, favored a merger) by Textron, forming Textron American. Textron was

a conglomerate which hoped to further diversify by using the still considerable assets of American Woolen to finance acquisitions. This it did, liquidating all of its New England mills within two years of the 1955 merger. As Dunwell suggests, Royal Little (founder of Textron and architect of the merger) simply delivered the coup de grace to the New England textile industry.[20]

The history of American Woolen Company is the story of the decline of the woolen industry in New England, and Sawyers Mills clearly represents the fortunes of the company and the industry. Acquired in 1899 as one of the original mills, Sawyers never grew beyond its size at that time. Aside from improvements to the power plant with consequent alterations to the engine room and construction of a metal oil-storage building, the physical plant remained unchanged during the final half-century of Sawyers Mills. The Mills' final closing at a time when the merger battle with Textron was already underway, represents economic realities catching up with the New England textile industry. Bad management, outdated equipment, high labor costs and apathetic city governments combined to push the industry and the capital elsewhere.[21] Ironically, the rather bleak industrial history of Sawyers mills under the control of American



Aerial view of the Upper Mill complex; Sawyers Mills; Dover, NH. Photographer facing SE. Mill housing flanking Charles Street in foreground; "The Ten Commandments" rowhouse in background center. Photo by Closs Planners Inc.

Woolen had the effect of preserving intact the Mills as they had evolved by 1892 under the leadership of Jonathan Sawyer and his son, Charles H. Sawyer.

Thus, the unique circumstances of a mill complex built up laterally (rather than vertically) over a period of two decades by one family, economic collapse in 1898 in response to industry-wide conditions and the Depression of 1893-1897, and the subsequent "caretakership" by American Woolen during the long decline of the New England textile industry—all combined to preserve this extraordinary monument to the energy and ability of the Sawyer family and its particular vision of a woolen mill at the peak of the industry.

The Upper Mills complex has recently been converted to apartments, while the Lower Mills building continues as a manufacturing facility under separate ownership, as is the remarkable Italianate rowhouse known as "The Ten Commandments," between the two buildings. As above-mentioned, eight of the ten houses remain on the street leading up to the front of the Upper Mills. In addition, much later nineteenth century mill housing remains in the immediate area, notably on Monroe Street. The Jonathan Sawyer Mansion, which stood on the site now occupied by Burger King Restaurant, was demolished in the 1950s. Its extensive grounds extended up the hill and are now covered with twentieth century housing. Remaining in that area, however, is the circular brick reservoir and wool-storage building, converted to a house. Although the Sawyer Mill complex has been bisected by the Spaulding Turnpike, the visitor can gain a good idea of its plan by following the major landmarks and noting the location of the railroad, which remains. Continuing up the hill from the front of the Upper Mills, one will find the Dover Cemetery, where prominent monuments memorialize Jonathan Sawyer and other family members.

#### Notes:

1. Great Falls Industrial and Commercial Historic District National Register Nomination Form, prepared by Richard M. Candee; September 24, 1982.
2. Interview, June 12, 1984.
3. Building dates from Plan of "American Woolen Company et. al. 'Sawyer Mills'; Dover, NH," Associated Factory Mutual Fire Insurance Companies #29417, drawn 1939.

4. The Factory Mutuals, 1835-1935; Providence, RI: Manufacturers Mutual Fire Insurance Co., 1935, 224ff.

5. D. Hamilton Hurd, History of Rockingham and Strafford Counties, New Hampshire (Philadelphia: J.W. Lewis & Co., 1882), 861.

6. Mary P. Thompson, Landmarks in Ancient Dover, New Hampshire (Durham, NH: Durham Historical Association, 1965 (reprint of 1892 edition)), 23.

7. Hurd, pp. 820 and 8.

8. Ibid., 862.

9. R.G. Dun & Co. Collection; Baker Library Archives; NH. Vol. 17, p. 120 (#1458), June 18, 1867, for date of house. Foster's Daily Democrat; June 18, 1973, p. 109. Foster's Daily Democrat "Industrial Edition"; August 10, 1916; p. 9. A Sketch of the Mills of the American Woolen Company (Boston, MA: American Woolen Company, 1901), p. 56 (re. Sawyers Mills): "The company itself owns some fifty tenements which are rented to its employees." Atlas of Stafford County, New Hampshire (Phila.: Sanford & Everts, 1871); detail of map of Dover shows Sawyers Mills before major rebuilding. Cf. lithograph "Sawyer Woolen Mills" (R. Caughey, del.; The Strobridge Lithograph Co.; Cincinnati and NY, 1880) in Merrimack Valley Textile Museum; North Andover, MA.

10. Ibid., 820.

11. Arthur Harrison Cole, The American Wool Manufacture (2 vols.; Cambridge: Harvard University Press, 1926), I 379f.

12. Manuscript history of Sawyers Mills; Sawyer/Frost Collection; New Hampshire Historical Society; Concord, NH. History probably written by Charles H. Sawyer, according to his grandson of the same name (interview: June 12, 1884). R.G. Dun & Co. Collection; Baker Library Archives; Harvard University; Vol. 17, p. 317.

13. United States Patent No. 120,215, dated October 24, 1871, granted to Francis A. Sawyer, 2d. "Indigo," in The Encyclopedia Britannica 11th ed. (Cambridge, England: University Press, 1910), Vol. 14, pp. 485f.

14. The "Blue Book" for 1897-1898 (New York: Davison Publishing Co., 1897), 184.

15. Steve Dunwell, The Run of the Mill (Boston, MA: David R. Godine, Sawyer "To the Creditors and Others..."; October 17, 1898; in collections of the Museum of American Textile History and in the Sawyer/Frost Collection of the New Hampshire Historical Society.

16. Cole, op.cit., 229f. and 230n2.

17. Ibid., 231-234.

18. American Woolen Company Mills (Boston, MA: American Woolen Company, 1921), 94.

19. Ibid., preface. Dero A. Saunders, "Twilight of American Woolen," Fortune 49 (March 1954), 93ff.

20. Ibid. 93ff. Dunwell, op.cit., 161-164.

21. Ibid., 143-167. Saunders, op.cit. and "The Stormiest Merger Yet," Fortune 50 (April 1955), 136ff.

Woodard D. Openo  
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