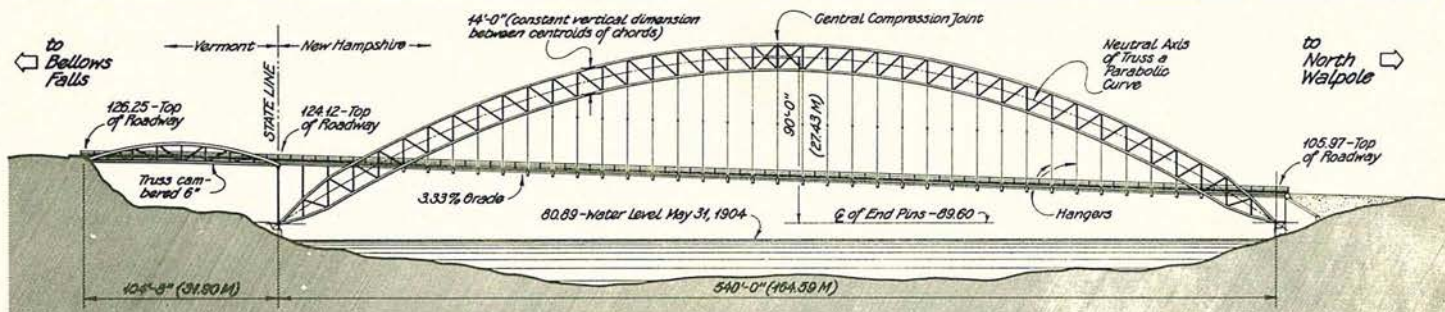


# SOCIETY FOR INDUSTRIAL ARCHEOLOGY NEWSLETTER

Volume 12, Number 1

Winter 1983



East Elevation (1905)

Note: Elevation figures given for roadway, and pins, and water level are taken from J.R. Worcester's drawings and do not have the same datum line as U.S. Geological Survey topographic maps.

Historic American Engineering Record drawing, 1982, delineated by Richard K. Anderson Jr.

## THE FAILURE TO PRESERVE THE BELLOWS FALLS ARCH BRIDGE

By Christopher W. Closs

*Editor's Note: The Bellows Falls Arch Bridge was supposed to drop into the Connecticut River between Walpole, N.H., and Bellows Falls, Vt., after explosive charges were set off last Dec. 3. Instead, the bridge won cheers from thousands of onlookers who saw it withstand four attempts to blow it up. The spectacle drew the attention of the national news media for several days. The Arch Bridge, declared unsafe 11 years ago, finally succumbed to cutting torches on Dec. 6, ending a bitter preservation battle that had begun more than five years earlier. Ironically, three days of futile efforts to demolish the bridge with explosives only confirmed the findings of a 1978 engineering study undertaken at the SIA's request: the bridge was still sound.*

*The story of the failure to preserve the Bellows Falls Arch Bridge holds some important lessons. The complex series of events that led, ultimately, to its demolition raise some broad planning, engineering, and preservation issues that deserve close examination if we are to learn from this loss.*

The campaign to rehabilitate the Bellows Falls Arch Bridge for medium-load traffic was initiated in 1978 by the National Trust for Historic Preservation and sponsored by the SIA. It was conceived shortly after passage of the Surface Transportation Assistance Act of 1978, which for the first time authorized federal highway monies to be used for bridge rehabilitation as well as replacement, for structures both on and off of the federal-aid system. Although innovative, the new legislation did not provide for any ongoing maintenance assistance, a responsibility still to be borne by the states.

Built in 1904-05, the Arch Bridge had a suspended deck carried by a three-hinged, steel arch. The span, originally 540 ft. in length, was shortened to 486 ft. in 1937 by removal of the end panels, which had been damaged by ice floes. The bridge was rated at 12 tons and had a 32-ft.-wide timber deck. Over the years the N.H. Dept. of Public Works & Highways (NHDPWH) had replaced the wooden deck with a concrete and, later, an asphalt surface, greatly increasing the dead load and contributing to the bridge's low rating. The last repair work on the structure was done in 1961. Following a study by the NHDPWH's engineering consultants, the bridge was closed to all but pedestrian traffic in 1971. By this time, the deck was badly

deteriorated from inadequate drainage, its floor beams heavily corroded by salt, and the arch trusses rusting from lack of paint. Without considering the possibility of rehabilitation, NHDPWH hired the same consulting firm to design a replacement.

The Arch Bridge was declared eligible for listing in the National Register of Historic Places in 1976. But, during the long period of its closure, public opinion already had begun to solidify, reinforced by NHDPWH's repeated assertions that replacement was the only option.

Ownership of the bridge was shared by the states of N.H. (83 percent) and Vt. (17 percent). (The state boundary line is on the west bank of the river.) NHDPWH, in cooperation with the Federal Highway Administration, proposed to pay for demolition of the bridge and construction of a new span at either the existing or an alternate location, but the agency consistently asserted that federal funds could not be used for rehabilitation. NHDPWH also maintained that its policies prohibited the use of state funds for either rehabilitation or maintenance of any bridge that could not meet AASHTO standards or that was not a part of the state-aid maintenance system. NHDPWH would agree to rehabilitation of the Arch Bridge only if the two municipalities would take full responsibility both for its rehabilitation and future maintenance, an untenable alternative considering the decades of deferred maintenance and already-stretched local resources.

If the intransigence of state and federal highway officials was the primary obstacle, conveying to the press and public the real dimensions of the issue and the alternatives available was certainly the second. Rehabilitation of the Arch Bridge emerged as not simply a landmark preservation battle but as a case involving the larger issues of regional transportation planning and commercial and neighborhood revitalization.

When the bridge preservation effort was launched in late 1978, the National Trust recognized that the continued viability of the commercial and neighborhood centers bisected by Vt. Rte. 5 and N.H. Rte. 12 was heavily dependent upon rehabilitation of the Arch Bridge for medium and light-duty traffic. Eliminating heavy truck traffic from the square in Bellows Falls already was an established objective of local planners. In essence, then, what was needed was a solution to an



## STUBBORN BRIDGE



Stubborn bridge: The Bellows Falls Arch Bridge, spanning the Connecticut River between Walpole, N.H., and Bellows Falls, Vt., withstood four blasts from explosives before finally being downed with the aid of welders' torches last Dec. *Wide World Photos.*

immediate structural problem (rehabilitation of the bridge) combined with a long-range transportation plan (construction of a new bridge and rerouting of truck traffic). Several elements of the solution actually were already in the planning stages but failed to coalesce in time to make a difference.

Supported by grants from the National Trust and the Eva Gebhard Gougard Foundation, the Trust's project director arranged for a three-pronged feasibility study, which included: (1) analysis of potential capacity of a rehabilitated Arch Bridge; (2) analysis of local and regional traffic patterns and rerouting alternatives; and (3) evaluation of the bridge's historical and engineering significance. Earlier studies had not taken a comprehensive approach to the problem. The National Trust hoped to demonstrate that rehabilitation was feasible when viewed within the larger context of local and regional traffic patterns.

Late in 1978, A. G. Lichtenstein & Assoc., consulting engineers then of Teaneck, N.J., inspected the bridge and reported, "... the Bridge can be economically rehabilitated with a life-expectancy of 25-50 years." While the deck would have to be replaced with an open steel grid floor to reduce the dead load, the arches were still sound. According to the consultant, the bridge could be rehabilitated to carry H-20 loads as a one-way bridge, or lighter H-12 loading for two-way traffic.

Traffic consultant Thomas Adler studied traffic patterns and rerouting alternatives. According to Adler, the bridge was one of two primary crossings within a quarter mile of each other (the other being the Vilas Bridge) that connect historic North Walpole village with the regional commercial center of Bellows Falls. Both bridges had low ratings and were part of a regional network of Connecticut River crossings connecting the two major north-south highways that serve a 50-mi. stretch of river valley. Of these, five were in critical condition while only one was rated excellent. Clearly, there existed a regional access problem. Compounding this, there were three major motor freight terminals in Bellows Falls. Traffic studies confirmed that the truck traffic was exerting severe wear on the Vilas Bridge and that much of it was forced through downtown Bellows Falls (now listed as a district in the National Register). The noise, congestion, and carbon-monoxide levels were hampering commercial revitalization efforts and adversely affecting the historic village.

Adler suggested that rerouting alternatives could relieve traffic congestion in the historic commercial and residential areas of the two villages. Rerouting, combined with a new, H-20 all-service rated bridge upstream and replacement of the Westminster Bridge 4 mi. downstream (previously planned) were the keys to a viable solution to the region's traffic problems. Rehabilitation of the Arch Bridge for one or two-way traffic, in conjunction with the Vilas Bridge, would solve local traffic circulation problems.

Adler's plan offered a solution that was cost-effective (\$1.1 million for rehabilitation of the Arch Bridge vs. \$4.5 million to replace it), timely (2½ years vs. 4 years, respectively), and that eliminated two-way truck traffic through downtown Bellows Falls. Accurately forecasting replacement of the Westminster Bridge proved difficult, however, and resulted only in further increasing public impatience.

Investigation of the bridge's historical significance, conducted by Roger Brevoort [SIA], revealed several important facts. First, when completed in 1905, the Bellows Falls Arch Bridge was the longest single-span highway bridge in the U.S. and the first with a suspended deck. The bridge was erected by Louis A. Shoemaker & Co. of Philadelphia. Designer J. R. Wooster introduced a unique modification. Instead of having the chords converge at the top of the arch as they would in a conventional three-hinged design, he replaced the

The *SIA Newsletter* is published four times a year (Winter, Spring, Summer, and Fall) by the Society for Industrial Archeology. It is sent to SIA members, who also receive the Society's journal, *IA*, published annually. SIA promotes the identification, interpretation, preservation, and re-use of historic industrial and engineering sites, structures, and equipment. Annual membership: individual \$20; couple, \$25; institutions, \$25; contributing, \$50; sustaining, \$100; student, \$15. Send check payable to SIA to Treasurer, Room 5020, National Museum of American History, Smithsonian Institution, Washington, D.C. 20560; all business correspondence should be sent to that office. Editorial correspondence should be sent to CAROL POH MILLER, Editor, *SIA Newsletter*, Program for the History of Science & Technology, Mather House, Case Western Reserve University, Cleveland, Ohio 44106.



center hinge with a compression joint by inserting a horizontal strut between the chords. The strut was connected to the chords by diagonal members. By this means the compressive stresses, normally concentrated at the hinge, were transferred to the main trusses.

The National Trust's feasibility study was submitted to the Advisory Council on Historic Preservation in Dec. 1978 in accordance with Section 106 of the National Historic Preservation Act of 1966, which requires Council comment on all federally funded or licensed projects that affect properties listed in or eligible for the National Register. The Council found that NHDPWH had not sufficiently investigated all possible alternatives to demolition and tied its ultimate concurrence in removal of the bridge to satisfactory completion of the Section 4(f) process. (Section 4(f) requires the FHWA to investigate all reasonable alternatives to demolition.) Meanwhile, the Trust initiated a dialogue with local officials in the two communities to try to redirect the now ominous weight of public opinion which favored demolition and replacement.

The failure to preserve the Arch Bridge was due largely to previously solidified public opinion at the local, state, and national levels. After being closed for seven years, local citizens were impatient for any solution that would expedite re-establishment of the link between their communities. The rehabilitation provision of the Surface Transportation Assistance Act, new and untied, simply was not sufficient to redirect public opinion or change the minds of state highway officials. Although replacement of the Westminster Bridge would have offered a convenient link to nearby Interstate 91, residents on both sides of the river failed to make this project a priority.

The key monetary issue was the lack of funding for *maintenance* of the bridge, since NHDPWH refused to retain it on the state-aid system even if it were rehabilitated as part of a one-way pair with the Vilas Bridge. (It was later suggested that the \$200,000 spent to demolish the Arch Bridge might have been invested to create a maintenance endowment.)

NHDPWH's entrenched resistance to applying for the new rehabilitation funds was in part founded on the steadfast refusal of the FHWA division administrator to consider application of a little known but critically important waiver provision (CFR 625.5 [b] [iii]) permitting relaxation of AASHTO standards "if unusual conditions warrant that exception be made." The waiver had been successfully applied in Vt. in 1977, resulting in the reconstruction of Woodstock's celebrated Elm St. Bridge [NR, HAER], an 1869 Parker pre-patent truss. By focusing only on the re-establishment of two-way, H-20 traffic at the Arch Bridge location, the larger traffic planning needs of the communities and the revitalization of Bellows Falls square were overlooked.

In retrospect, both funding and staffing of the bridge preservation effort were insufficient to overcome entrenched public attitudes and the huge amount of public money already invested in replacement plans. In failing to re-orient the media's attention to the critical planning issues, the weight of the public record established by NHDPWH hearings held previous to passage of the Surface Transportation Assistance Act proved insurmountable. Future advocacy projects of this sort would do well to establish a staffed office in the community that is backed by local sponsors.

The Bellows Falls Arch Bridge will be replaced by a concrete deck girder span at a cost of approximately \$5.2 million. It is to be completed in 1984. The new bridge may well ensure the continuation of heavy truck traffic through the Bellows Falls square and North Walpole's residential neighborhood for the next 50 years.

Ironically, the 4000 spectators who cheered the bridge's resistance to the demolition charges were the very constituency that might have altered the final course of events. Without vigilance, the planning and management of the nation's infrastructure will continue to be forfeited to insulated government agencies and lobby interests. The end result will be diminished accountability and spiralling public works expenditures.

*Christopher W. Clöss is the principal of Community & Preservation Planning Consultants of Concord, N.H. He served as project director for the Arch Bridge preservation effort while employed by the Northeast Regional Office of the National Trust for Historic Preservation.*

## BRIDGE PRESERVATION FORUM

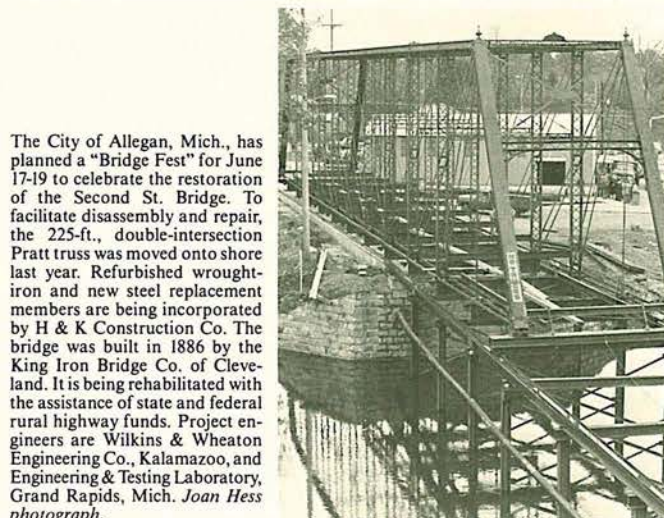
On Jan. 17 more than forty people, representing state and federal transportation departments and private engineering firms, assembled for a session of the Transportation Research Board's annual meeting titled "Mitigation Alternatives for Historic and Archeological Resources/Part I: Structures." The Transportation Research Board (TRB), an activity of the National Academy of Science, is charged "to advance knowledge, stimulate research, and disseminate information concerning the nature and performance of transportation systems." This was the Board's 62nd annual conference, and the week-long meeting was attended by well over 3000 engineers, planners, environmentalists, and scientists.

The structures discussed in the "Mitigation Alternatives" session were, exclusively, historic bridges: how to preserve them, how to fund them, and how modern design standards affect them. The purpose of the session was to show that there *are* alternatives to new construction. Six people representing the Federal Highway Administration (FHWA), state transportation departments, a state historic preservation office, and practicing engineers gave presentations. The session summarized both the many crises confronting historic bridges and the limited, though significant, preservation efforts that have saved some of them.

Last year was a tumultuous but significant one for continuing efforts to foster the recognition and preservation of the nation's historic bridges:

- In late 1981, Virginia Devine of Pasco, Wash., posted a \$75,000 bond — her life savings — to postpone demolition of the 60-year-old Pasco-Kennewick Bridge [SIAN Spring 82:8]; federal, state, and local officials are still awaiting a decision on the case from the U.S. 9th Circuit Court of Appeals.
- On Sept. 16, FHWA requested comments on a proposed rule that would authorize a "Nationwide 4(f) Evaluation and Determination" that there are *no* feasible and prudent alternatives to the demolition of certain historic bridges. This proposal ultimately was rejected by Congress.
- In its Dec. newsletter, the American Society of Civil Engineers highlighted a project to rehabilitate the Second St. Bridge in Allegan, Mich., a 230-ft., double-intersection Pratt truss fabricated by the Wrought Iron Bridge Co. in 1886 [SIAN Fall 81:4].
- In a Dec. 12th *Washington Post* article, Gov. Richard Snelling of Vt. claimed that the "quick nickel gas tax continues the tradition of encouraging massive reconstruction rather than simple preventive maintenance of the nation's road system."
- On Dec. 5th, four blasts of explosive charges failed to collapse the "structurally unsound" Bellows Falls Arch Bridge (1905) into the Connecticut River (see story on page 1).

With these events setting the tone for the session, the first speaker, William Chamberlin [SIA], of the N.Y. State Dept. of Transportation, outlined his forthcoming study on bridge crises and their impact on historic bridges. This important report will summarize in detail the actions that states, localities, and the FHWA have taken during



The City of Allegan, Mich., has planned a "Bridge Fest" for June 17-19 to celebrate the restoration of the Second St. Bridge. To facilitate disassembly and repair, the 225-ft., double-intersection Pratt truss was moved onto shore last year. Refurbished wrought-iron and new steel replacement members are being incorporated by H & K Construction Co. The bridge was built in 1886 by the King Iron Bridge Co. of Cleveland. It is being rehabilitated with the assistance of state and federal rural highway funds. Project engineers are Wilkins & Wheaton Engineering Co., Kalamazoo, and Engineering & Testing Laboratory, Grand Rapids, Mich. Joan Hess photograph.



the past few years and their results. Howard Newlon [SIA] of the Va. Highway Transportation Research Council, who pioneered the first comprehensive statewide historic bridge inventory, presented specific case studies illustrating his state's evolving experience with the conservation of historic bridges.

Bruce Eberle, chief archeologist with FHWA's Environmental Analysis Divn., updated the status of the statewide historic bridge inventories and outlined mitigation alternatives that are compatible with FHWA policy. For the record, it should be noted that Ga., Ky., Mont., N.C., S.C., Va., and Wy. have completed and published historic bridge inventories; Maine, Ohio, and Wash. State have completed inventories but not yet published them; inventories in twenty-two states are in progress; in nine others the inventories are in the development stage; and Conn., the District of Columbia, Md., Mo., Nebr., Okla., S.D., Texas, and Vt. have elected to address historic bridges at the time of replacement or rehabilitation. Calif. and Pa. have inventoried only federal-aid roads and not off-system roads on which most historic bridges are likely to be found.

John Ahlskog, Chief of the Design & Inspection Branch of FHWA's Bridge Divn., revealed the potential effects of the recently passed Highway Improvement Act of 1982, which will provide an estimated \$7 billion for bridge and road improvements over the next four years, and the problems of modern AASHTO design standards and historic bridge requirements. Mark Edwards [SIA], Deputy State Historic Preservation Officer for Md., outlined funding alternatives for preserving historic bridges. Finally, Gordon Jones, an engineer with Wilkins & Wheaton Engineering Co. of Kalamazoo, Mich., gave a progress report on his firm's project to rehabilitate the Second St. Bridge in Allegan.

Several conclusions emerged from the morning's session. The fact that 32 of the 52 states and possessions — or nearly 62 percent — have completed or made substantial progress on historic bridge inventories is a remarkable accomplishment. In fact, the day is fast approaching when we can claim to have completed a nationwide inventory.

States still working on their inventories were urged to publish the results. Publications might be similar in format to *Historic Bridges in Montana* by Fred Quivik [SIA], a concise, 85-page booklet that summarizes bridge building in Mont. and concludes with an annotated and illustrated listing of 80 of the most notable spans.\* Publishing makes the data available to a larger audience, adds to the historiography of bridge building in the U.S., encourages preserva-

\*Single copies are available free of charge from Steve Kologi, Chief, Preconstruction Bureau, Montana Dept. of Highways, 2701 Prospect, Helena, Mont. 59620.

tion planning, and, if neighboring states have completed and published inventories, permits the assessment of bridges on a regional basis. Once a national inventory is completed, it will be possible to identify America's most significant historic bridges.

With the inventory phase essentially behind us, our attention can now be focused on evaluating specific examples of rehabilitated, relocated, and adaptively reused bridges. Developing case studies on these structures will provide alternatives to mitigative documentation to HAER standards followed by demolition, which currently is the most popular solution to dealing with National Register-eligible spans rated as deficient. We need to assess the factors that have resulted in the successes and failures of bridge preservation. We must identify funding strategies that have been used to rehabilitate historic bridges. Groups that have championed the preservation of covered bridges may be helpful because of their high success rate. Once the cost advantages and construction efficiencies of rehabilitation are proven, mitigatory documentation followed by replacement no longer will be the only alternative.

Planning for the rehabilitation, relocation, and adaptive reuse of historic bridges will require the successful resolution of certain "Catch-22" issues: bridge ownership, safety, and maintenance liabilities; federal standards that have been designed to promote an interstate level of construction; federal funds that are available only if a bridge is rehabilitated to these standards; legislation that continues the tradition of massive new construction rather than periodic maintenance; conflicts between FHWA Washington and FHWA regional and field offices on the interpretation of bridge regulations; and the bias of transportation officials against rehabilitation.

As Howard Newlon pointed out, the preservation of historic bridges rests with technicians and engineers sympathetic to the cause of bridge rehabilitation. Any engineering student can plug into a computer the factors necessary to design a concrete girder, but real engineering ability is required to rehabilitate a structure like the Allegan, Mich., bridge. This exemplary project proves that the rehabilitation of large truss bridges is not only possible but that it can be done according to modern design standards and more economically than new construction.

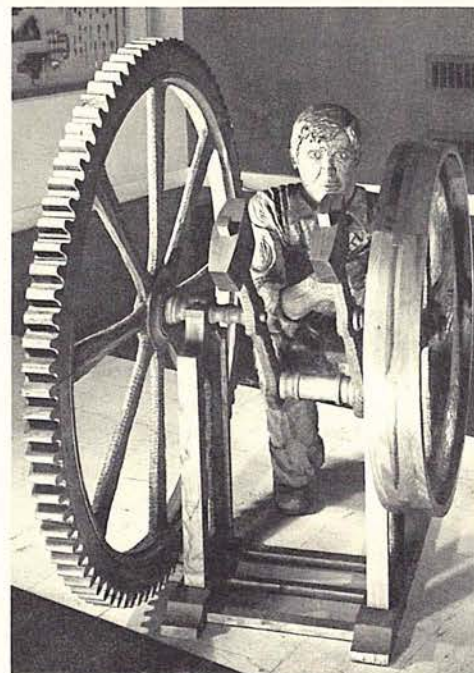
*Howard Newlon, chairman of the TRB Subcommittee on Historic and Archeologic Considerations in Transportation, organized the speakers for this session. Eric DeLony, Principal Architect, Historic American Engineering Record, was presiding officer and prepared this report.*

## IA IN ART: THE MACHINIST

Harry Hitchner, of Hollandale, Wis., doesn't aim to create awe-inspiring carvings. Instead he concentrates on creating an aura of plausibility through subtle detail — position of the hands, condition of the clothing, texture of the hair. This life-size carving of *The Machinist*, like others in Hitchner's repertoire of representative figures from American history, depicts an ordinary man reacting to the events of an ordinary day. Rarely does Hitchner portray the rich or famous. Easy recognition, he feels, discourages careful examination and the viewer's active interpretation.

The carving was gouged out of laminated 4-in. planks of cherry. The gears and flywheel were built up from turned hubs centered within a spoke-supported rim of laminated boards. The rims were cut to true round by rotating them into a band saw, while the hubs were held by a stationary jig. Some of the gear surfaces were worked smooth, while others were left with the texture of the gouge, to depict the contrast between rough-cast and machined iron.

Hitchner, who has been a professional woodcarver for the past ten years, completed *The Machinist* in six weeks. It captured best of show honors and the Marples purchase award at the 1978 International Woodcarvers Congress held in Davenport, Iowa, and is now on permanent display in the lobby of the Marples tool factory at Sheffield, England.



Geoffrey B. Platts  
photograph courtesy  
Bahco Record Tools,  
Sheffield.



## NEWS IN BRIEF

In Oct., **Old Sturbridge Village** began operation of a low-head hydroelectric generating facility that will produce 275,000 kw hrs. of electricity a year from the Quinebaug River, which courses through the living history center's woods and meadows. The \$250,000 facility, made possible by gifts and grants, is expected to save the museum at least \$20,000 a year, or ten percent of its energy costs. The facility is located near a 19th-c. covered bridge and mill pond serving water-powered wool carding and grist mills that are part of the Village's recreated community of 1830s rural New England. Comparison of the contemporary hydroelectric plant and the early 19th-c. mills will form the basis for special programs for visiting school groups.

After a \$20-million renovation, the **Lorain-Carnegie Bridge** [NR, HAER] in Cleveland is scheduled to reopen in Oct. For the first time in its history, the bridge's imposing, Modernistic-style pylons, which depict the history of transportation, will be illuminated. An advance look at the illuminated pylons, shown here, was part of a demonstration of lighting planned for the bridge. The cantilever steel-arch highway bridge was completed in 1932 [SIAN Jan. & Mar. 78:2].

With a \$5.2-million loan from the Mass. Housing Finance Agency, the 116-year-old **Tecumseh Cotton Mill** in Fall River will be rehabilitated to provide 125 apartments, primarily for the elderly. Located three blocks from downtown, the three-building, five-story granite complex housed over 10,000 spindles at the peak of its production in the early 1920s. The housing is being developed by Boen Development Corp. of Brookline. Architect for the project is R. D. Fanning Architects, Inc., of Boston.



Chris Hartman photograph courtesy The Plain Dealer.

The sad news of plant closings — closings that oftentimes cast doubt on the future preservation of industrial buildings — continues unabated. The **Singer Co.** has shut down its manufacturing operation in Elizabeth, N.J., where sewing machines have been produced since before the Civil War. Singer will seek to sell off its 11 buildings and 1.4 million sq. ft. of space . . . After 110 years in New York City, **Sohmer & Co.**, a piano manufacturer, is leaving its Astoria, Queens, facility for Ivoryton, Conn. Sohmer recently was acquired by Pratt-Read Corp., a manufacturer of piano parts, which wanted to move the company into one of its empty buildings. Sohmer, which produces about 3,000 pianos a year, is housed in a handsome red brick factory directly across the East River from Gracie Mansion. The plant was built by Hugo Sohmer in 1885. Previously, the company was located in Manhattan at Third Ave. and 13th St., once the heart of German New York. "There were, in 1872, 171 piano manufacturers in New York City," Harry J. Sohmer Jr., grandson of the founder, said recently. Now there will be only one, Steinway . . . In Akron, Ohio, once known as the rubber capital of the world, Aug. 20th marked the last day of bias-ply truck tire production at **General Tire & Rubber Co.** and in the city. Company officials announced last Mar. that they were closing the red brick plant, built in 1915. The company, which has its headquarters here, was increasingly hurt by imports of longer-lasting radial tires and decreasing mileage driven. About 9,000 rubber-industry jobs have been lost in the Akron area in recent years. Production of tires for passenger cars stopped here in 1972 as the troubles of American car makers sharply reduced

demand. Firestone has only a few hundred hourly workers left, against its high of 16,000 during World War II. The only tires still made in Akron are racing tires produced by Goodyear, aircraft tires made at B. F. Goodrich, and experimental tires made at General Tire's research building.

One of the Calif.'s oldest aviation treasures, **Hangar Number One** at **Los Angeles International Airport**, faces possible extinction. The Spanish-style structure, built in 1929, was the first permanent hangar constructed at Mines Field, then a 600-acre facility with one 2,000-ft. oiled dirt runway. It was built by the Curtiss-Wright Co. to house a



Hangar Number One, Mines Field (later the Los Angeles Municipal Airport), 1929. Los Angeles Dept. of Airports photograph.

flying school run by the Curtiss Flying Service. Mines Field was dedicated as Los Angeles Airport in 1930. Today, Los Angeles Airport comprises 3,500 acres with Hangar One being a micro-postage stamp among the giant structures around it. Airport management plans to demolish the hangar or move it, depending upon the availability of funds, to make way for a 747 cargo pad. It can be moved 1,000 ft. south of its present site for \$1 million.

At the **Slater Mill Historic Site** in Pawtucket, R.I., the Blackstone River is once again linked with the Wilkinson Mill. Completion of four gate structures, a trash rack, and a spillway dam made the system operable. The water wheel was run with power from the Blackstone for the first time on Oct. 2nd. Mayor Henry Kinch officiated at the gate-raising ceremony. Several SIA members contributed to the success of its initiation. Walter Pulawski's firm, Joseph Pulawski & Son, built the wood structures and gate machinery of the raceway system. Architect Charles Parrott designed an inclined trash rack after examining a precisely notched base board found during archeological investigation; white oak slats will catch floating debris before it can enter the gates to the wheel pit. John Bowditch, of the Henry Ford Museum, built a custom-made flyball governor for the sluice gate that automatically will control water to the wheel. The mechanical transmission system linking the wheel to the machine shop will be in place this spring. In the meantime, the wheel runs at full speed — 7 r.p.m. — with a fixed gate setting.



John Bowditch presents a custom-made flyball governor to Slater Mill director Pat Malone. Photograph courtesy Slater Mill Historic Site.

Twenty-five years have elapsed since an Ill. tollway bridge near Chicago became a model for tens of thousands of highway bridges since built of precast/prestressed concrete. At the time, the technology of using prestressed concrete in place of steel structural shapes

*Continued on page 12*



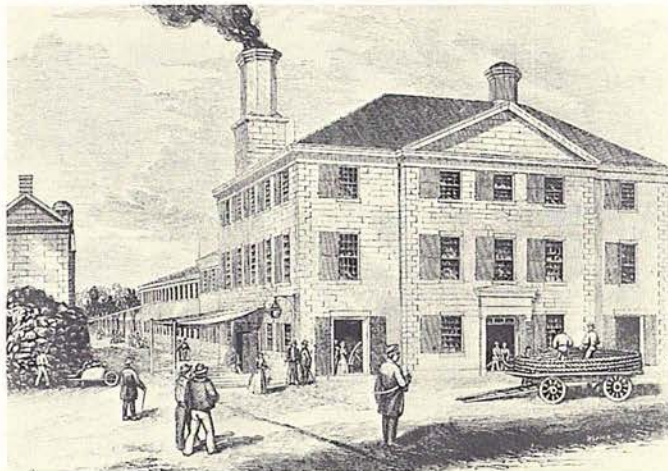
# ADAPTIVE REUSE: LIFELINE OF THE CHARLESTOWN NAVY YARD

*Third in a Series*

When the U.S. Navy decided to deactivate the Charlestown Navy Yard near Boston in 1974, the impact was devastating. Not only did the city lose a historic industry, but 5,000 people lost their jobs. According to Robert Walsh, former director of the Boston Redevelopment Authority (BRA), "The City's first response to the closing was an effort aimed at replacing the severe job loss. The city, with the help of state officials, began trying to induce shipbuilders to locate in the navy yard. But the Navy's decision was not without foundation. The facility was obsolete and simply could not accommodate itself to the requirements of modern ship manufacture." One option emerged from studies conducted by BRA: reuse of the shipyard's old industrial buildings for residential and commercial development. That option has proven to be the shipyard's lifeline.

Between 1800 and 1974, the Charlestown Navy Yard built, repaired, and converted thousands of Navy ships. During this period, the facility grew to encompass 130 acres, 86 buildings, 4.6 miles of railroad, and numerous piers and dry docks. At the height of its activity during World War II, the yard employed over 50,000 people and launched a ship each month. Several buildings, such as the Ropewalk and the Chain & Forge Shop, housed unique industrial processes and are among the few of their type in the country.

The Ropewalk, designed by Alexander Parris and constructed between 1834 and 1837, produced naval rope and cordage for 134 years. It takes its name from that phase of the manufacturing process in which a man walked the length of the building with a strand of hemp tied around his waist. The "walks," which form the northern boundary of the shipyard along Chelsea St., were 1,360 ft. long. They

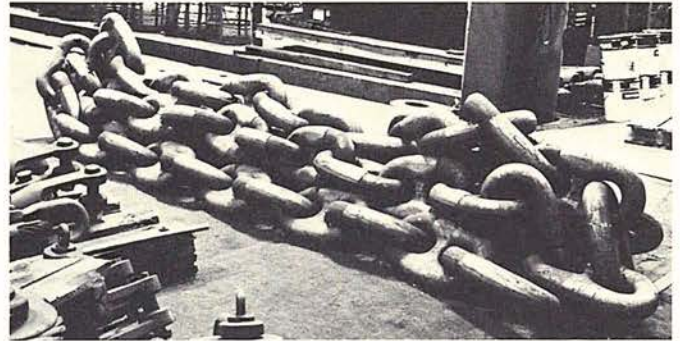


The Ropewalk, Charlestown Navy Yard, as it appeared shortly after completion in 1837. Official U.S. Navy photograph.

were of such great length because the building had to be longer than the longest piece of rope manufactured. Its head house, 60 x 70 ft., contained machinery for preparing the hemp and for twisting and stretching the rope.

The Forge & Chain Shop (1903) produced another product unique to the Navy: "dielock" chain, invented in 1926 by civilian employees A. M. Leahy and C. G. Lutts and produced exclusively at the Charlestown Navy Yard. Since 1928, "dielock" chain has been an official U.S. Navy standard and is recognized as the strongest chain in the world. Used primarily for anchor chains, it consists of male and female half-links joined by specially designed forging hammers. Much of the rope and "dielock" chain equipment remains intact.

In 1974, the Navy gave 25 acres, 20 buildings, and a dry dock to the National Park Service for development as part of Boston National Historic Park. The primary artifact in this portion of the yard was the square-rigged wooden frigate U.S.S. *Constitution*, the oldest commissioned ship in the Navy. Another 105 acres and 65 buildings



The "dielock" anchor chain was developed at the Charlestown Navy Yard and adopted as a U.S. Navy standard in 1928. Eric DeLony photograph.

and structures remained to be disposed of as surplus federal property. Because of the shipyard's designation as a National Historic Landmark, the Dept. of the Interior and the Advisory Council on Historic Preservation were called upon to approve plans for redevelopment consistent with the protection of buildings and areas of historic value.

The Historic American Engineering Record (HAER) played a small but important role by defining the significance of the historic resources in that portion of the yard to be disposed of as surplus. The Park Service study that determined what elements should be included in the park recognized the significance of the Ropewalk and the Chain & Forge Shop, but did not recommend that these buildings be included because they were discontinuous from the 25-acre park site and presented major maintenance problems. The study did not consider the Band Saw Mill in Building 114, reportedly the largest band saw in New England and one of the last vestiges of a wooden ship-building Navy, or the extensive archives of architectural drawings, photographs, log books, and other materials that had been abandoned in the vaults of Building 36. Hundreds of drawings (except those of Alexander Parris, which had been removed to the National Archives) provided a graphic history of the evolution of the yard from the 1830s until its deactivation in 1974. During the summer of 1974, a HAER team cataloged the collection and arranged for its transmittal to the National Archives Regional Repository in Waltham. HAER's work drew attention to the shipyard's industrial and technological importance and insured that all structures representative of these values were protected.

Based on various studies of the yard, including HAER's, the 105-acre property was divided into three parcels: historic monument (30 acres); park and recreation (16 acres); and new development (59 acres). The first area, consisting of 30 buildings of outstanding significance, was conveyed to the city at no cost, but BRA had to



Many public area improvements have been completed. Streets have been resurfaced with Belgian pavers, new sidewalks have been built, and streetlights and trees added. This is how Second Ave. looks today. Muster House (1853) is at left. Eric DeLony photograph.



agree to preserve the area in perpetuity according to "a program of preservation and utilization" approved by the Secretary of the Interior. This parcel includes the Ropewalk, the Chain & Forge Shop, and the Muster House, which BRA has agreed to restore. It is hoped that these buildings and their equipment eventually can be added to the Park Service's interpretive program since they best convey the industrial character of the yard. The remaining buildings will be rehabilitated for new uses. Individual buildings or groups of buildings are being leased to developers, who are free to substantially rehabilitate the interiors but must preserve the visual integrity of the exteriors. The Secretary of the Interior's "Standards for Rehabilitation" are being used by BRA to guide developers in their planning. Adaptive reuses planned for these buildings include commercial and retail space, residential development, offices, and light manufacturing. To stimulate private investment, BRA assumed responsibility for public improvements. The Economic Development Administration (EDA) made a grant of \$5.4 million to improve and landscape the streets.

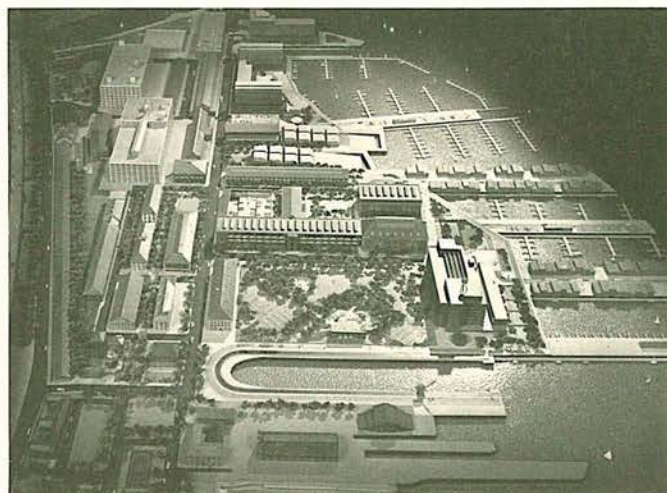
The second parcel, designated for park and recreation purposes, also was conveyed to the city at no cost. Its main features are Dry Dock No. 2 and the circular Pump House once used for pumping water out of Dry Docks 1 and 2. Here, the construction of Shipyard Park, designed by landscape architects Childs, Bertram, Tseckares & Casendino, has returned a portion of the scenic waterfront to the public. The park will serve as a buffer zone between the National Historic Park and the adjacent new development and historic monument areas and was included as an incentive to private investors to undertake development in the adjacent new development and historic monument areas. Financing for the park came from a \$1.7 million EDA grant supplemented by \$1.4 million from the Land and Water Conservation Fund.

The remaining 59 acres, designated for new development, had to be purchased. The General Services Admin. (GSA) appraised it at \$1.7 million. Waiting in the wings was one of the largest real estate and development companies in the world. The Canadian subsidiary of the Societe Immobiliare General, developers of the Watergate in Washington, D.C., and Place Victoria in Montreal, was ready to provide \$1.7 million to BRA to construct a 1,100-unit residential complex. BRA would then reimburse Immobiliare with disposition proceeds as the residential and commercial complex is completed and occupied. Plans call for a neighborhood (slated for completion around 1990) to include condominiums, a 550-boat marina, recreational and shopping facilities, a shopping mall, and a 500-unit hotel. To control development, BRA compiled "developer's kits" for each building, which include a description of the site, conditions of sale or lease, the stages of the disposition process, and acceptable treatments for historic buildings. The Economic Recovery Tax Act of 1981 has helped immeasurably to make rehabilitation and adaptive reuse of historic buildings financially attractive.

The first phase of the adaptive reuse development is complete. Building 42, the former machine shop constructed in 1856 and extensively altered over its lifetime, has been converted into "Consti-



A veritable family of cranes once gave the wharf and dry dock area of the yard a distinctly industrial character. For safety, all of them have been removed. Such "sanitization" is a problem common to most industrial rehabilitation projects. *Eric DeLony photograph.*



A scale model of a rehabilitated shipyard. Building 42 (at center, with clerestory windows), formerly a machine shop, has been renovated for use as apartments. *Steve Rosenthal photograph for Anderson Notter Finegold, Inc.*

tution Quarters," a 367-unit apartment building adjacent to the recently completed "Shipyard Park." Architects Anderson Notter Finegold, Inc., a firm with a reputation for imaginative adaptive reuse schemes, designed the project and, under contract with BRA, developed a master plan for the new development area.

While the industrial ambiance and the 5,000 jobs lost when the Charlestown Navy yard closed will never return, the new development, according to former BRA director Walsh, will contribute \$3 million annually to the city in real estate taxes. He estimates that the project will provide an average of 350 construction jobs each year over ten years and result in 1,700 permanent jobs. A prime piece of Boston waterfront has been returned to the people of Charlestown, many of the old industrial buildings will be saved by a new generation of uses, and, when the Park Service completes its interpretive program for its portion of the yard, the visiting public will have some idea of what it was like as a major shipbuilding facility. *E.N.D.*

## ONE MAN'S "IA CONVERSION"

Last Sept., a printing press bought and used by Buffalo Bill Cody was returned to the town carrying his name. Buffalo Bill Museum curator Paul Fees drove from Calif. back to Cody, Wyo., with his unusual cargo, a 4,000-lb. press used to print the *Cody Enterprise*, published by Buffalo Bill beginning in 1899. In the 1930s, the press was sold to a Calif. publisher with the stipulation that it be offered to the Buffalo Bill Museum before being given away or sold. As late as 1968, the press was still in use, printing the high school newspaper in Lodi, Calif.

Manufactured ca. 1895, the Babcock drum cylinder press produces 600 impressions an hour on 20 x 25-in. sheets. It was originally steam-driven. Fees believes the hand-fed press was used by the *Enterprise* until 1905 or 1910, when it was replaced by a more productive machine. According to Fees, "the press is a good symbol of Buffalo Bill's confidence in this region. That he was devoted to the West's development is evidenced by his founding a newspaper and the purchase of his first press." More telling are Fees's comments about the press's aesthetic appeal in a recent letter to SIA president Patrick M. Malone. "This is an exquisite piece of machinery" he wrote. "It is fully functional, and we also have the 1916 Western Electric motor that has been powering it for the last 60 years or so. I don't think I ever understood how you all could get so excited about a machine until I had a chance to bring this one back." Welcome to the fold, Paul!

### CONTRIBUTORS TO THIS ISSUE

Eric N. DeLony, Historic American Engineering Record; Robert M. Frame, James J. Hill Library, Minnesota Historical Society; H. K. Garges, Simi Valley, Calif.; and Edward S. Rutsch, Historic Conservation & Interpretation Inc.



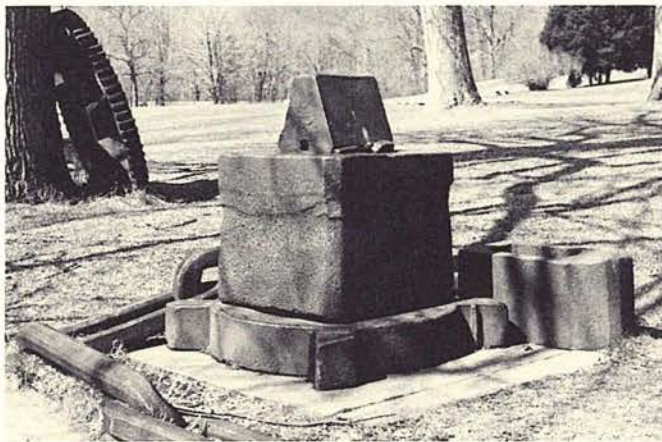
## ARCHEOLOGICAL SURVEY AT THE LONG POND IRONWORKS

Historic Conservation and Interpretation, Inc. (HCI), of Newton, N.J., has completed a contract to conduct an industrial-archeological survey of the Long Pond Ironworks site awarded by the Township of West Milford, Passaic Co., N.J. Work was funded by a N.J. Historic Preservation Survey and Planning Grant and by the Township of West Milford. Gary Webb, West Milford Parks and Recreation Director, was the project's administrator.

Long Pond is the outstanding historical water power site of the region. It was to enhance this site that Long Pond (Greenwood Lake) was enlarged by damming in the 18th c. The site remains comprise what has been described as a landmark setting of the American iron industry. They include a forge site with four fires, three blast furnaces, and an extensive workers' village.

The first ironmaking establishments to tap the magnetic ores in the North Jersey Highlands region were forges built in the 1730s by the Ogden family. The Ogdens' Ringwood Co. controlled the Long Pond site and sold it to the American Co. in the 1760s. American, a company of London investors, in 1764 engaged the German ironmaster Peter Hasenclever to set up the works. He imported experienced German ironworkers and their families, over 500 people, and in a short time had set up blast furnaces and/or forges at Ringwood, Long Pond, and Charlottenberg.

Hasenclever was succeeded by two famous ironmasters, Johan Jacob Faesch and Robert Erskine. Faesch was a Swiss who later successfully operated the Mount Hope furnace and the Boonton forge and slitting mill in neighboring Morris Co. He was succeeded by Erskine, a trained Scottish technician who already had patented a pump and had been accepted into the Royal Academy of Science, having been nominated by Benjamin Franklin. Erskine experimented with a magnetic ore separator and sought to put the American Co. on a sound financial footing. When the Revolutionary War began, the works was an important source of war materiel for the



Cast-iron forging equipment from the Long Pond Ironworks is now on display at the Hewitt Mansion in Ringwood (N.J.) State Park. The huge chain represents the kind forged at the Highland works and used during the Revolutionary War to block British access to the upper Hudson River. *Edward S. Rutsch photograph.*

Continental Army, and Erskine became Surveyor-General to the American Army. His many maps of the N.J./N.Y. military theater survive today and are some of the first accurate, detailed maps of America.

Erskine's untimely death while on military duty at the end of the war resulted in operation of the works by several independent American ironmasters. In 1807 Martin Ryerson, owner of the Pompton Works located downstream, took control, and his family continued in its role as N.J. ironmasters for some time. (Active in the trade yet today, a part of the family eventually moved west and manufactured steel.)

In 1853 Peter Cooper purchased the tract for his son Edward and son-in-law Abram Hewitt, whose Trenton Iron Co. is famous as the first American producers of railroad rails and structural iron beams. They found the region's ores, when smelted by charcoal, to be

especially suitable for manufacturing gunmetal iron, used to make wire rope and cable as well as musket barrels. For this purpose, Cooper & Hewitt erected two hot-blast charcoal furnaces at Long Pond during the 1860s, one of which was reworked to accommodate anthracite fuel in the 1870s when a railroad was built to the site.



Two water wheels are among the remains of the Cooper & Hewitt hot-blast charcoal furnaces (ca. 1860s) at Long Pond. Plans are under way for an interpretive program at the site. *Michael Spozarsky photograph.*



This two-family stone workers' house, built during the early 19th-c., is one of several dwellings still standing that were once part of an extensive workers' village at Long Pond. *Michael Spozarsky photograph.*

Today, site remains include the colonial furnace, excavated by Roland Robbins in 1968, the forge site, and the two 19th-c. furnaces of Cooper & Hewitt. The substantial remains of the latter furnaces include water wheels and blowing-engine settings. Also present are the remains of two ore roasters, which rid the iron ore of sulphur, and elements of three successively larger water power systems.

Archeological work to date has included two seasons' work on the ironworkers' village, which contains occupied and standing dwellings as well as ruins. Research on the village is being conducted by James Boylan and his Montclair (N.J.) State College classes. An investigation of the forge site, the raceway of which was located by members of the North Jersey Highlands Historical Society, also has been initiated by Society members and HCI staff. Documentary research undertaken by HCI industrial archeologists Jo Ann Cotz and Brian Morrell [SIA] has to date located thousands of primary documents concerning the enterprise but few original illustrations of the site and its equipment.

Plans are being formulated for preliminary site stabilization and a Historic American Engineering Record recording project by HCI architect Herbert Githens [SIA] to continue this year's survey work. Plans for an interpretive program will be undertaken shortly; the site is now closed except by special arrangement. Research inquiries should be addressed to Ed Rutsch, HCI, Box 111, RD 3, Newton, N.J. 07860. *E.S.R.*



# RAIL BRAND FAN

*Editor's Note: Ken Garges, of Simi Valley, Calif., is a retired aircraft engineer with an unusual hobby: he collects railroad rail brands. Garges, who has pursued his hobby for twelve years, believes that there is a lot of history associated with the brands just waiting to be discovered. He writes, "Railfans and historians have long overlooked the most basic part of railroad development, the rails. Trains would not have been able to get larger, heavier, longer, or run faster without a corresponding improvement in the steel, the rolling process, and the design of the basic rail." Here, Garges describes his collecting interest and some of his unusual finds. "I would surely like to interest some others in this type of rail archeology," he writes, "if for no other reason than to find someone to trade with."*

For several years I have collected the brands of railroad rails and now have brands representing more than sixty rolling mills, including four located overseas and one in Canada. The most astonishing aspect of this endeavor is that I have yet to leave Southern California!

The first figure is a good example of a brand. During the last pass of the hot rail through the rolling mill, the brand of raised letters and numbers is formed on the web, telling who rolled the rail and when. This one shows that the 60-lbs.-per-yard rail was rolled by Cambria Rolling Mills of Johnstown, Pa., in Aug. — the eighth month — of 1874. This was during the period of transition from iron to steel rails; this Cambria County mill wanted to be sure its product was recognized as being made from the higher grade metal.

Fig. 1



Fig. 2



Fig. 3

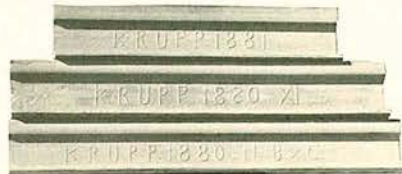
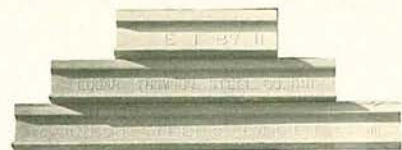


Fig. 4



The second photograph shows a change in branding by the same mill, from initials only in 1876 to complete spelling of the name (Vulcan Steel, St. Louis) in 1881.

The third group shows a progression of rail brands from Krupp of Germany. In early 1880, Krupp included the letters "N.B. & Co.," which I initially interpreted to stand for a subsidiary. However, Bill Burk, V.P.-Public Relations for the Santa Fe in Chicago, tells me that this really reads "N.B. & Go.," signifying a guarantee provision. The German wording is "Nicht Beschränkten Haftung," which means "Action Organization with Unlimited Guaranty." By late 1880, Krupp had dropped its guaranty from the brand and added "XI," meaning the eleventh month, or Nov. By 1881, Krupp had dropped even that. The top rail shows the brand that remained standard for several years.

The last photograph suggests that E.T. visited me and left his calling card, but in fact it was "Edgar Thomson." The photo depicts a progression from a 50-lb. rail with the name spelled out through a 60-lb. rail bearing only initials and date, to a 60-lb. Carnegie rail from the same Edgar Thomson mill after the merger. (Carnegie certainly didn't waste much metal to make the brand readable.)

The standard rail length in the 1880s was 30 feet. Depending on the roll diameter, the brand would be repeated from 2 to 5 times per rail.

To obtain the brands for my collection, I purchase the whole rail, cut out the brand using a cutting torch or gasoline-powered rail saw, and scrap the rest. I am able to sell the scrap to a foundry, which helps keep my hobby affordable.

Although there is a good deal of physical labor involved in collecting brands, the most difficult part is getting the owner to sell me the rail (or rails) in the first place. The bigger the railroad, the harder it is to find the proper person to deal with. Fortunately, I have found a small switching road that is replacing its old 60-lb. rail for 90-lb. They sell me a "jackstraw" pile of 8 to 10 tons, and I work my way through it. This is where "industrial archeology" comes into play, for I never know what I am going to find when I dig out that next rail. The most amazing part of the whole operation is finding a 100-year-old rail that is just now being taken out of service!

I hope eventually to put as complete a display as possible in the Smithsonian's National Museum of American History and another in the California State Railroad Museum at Sacramento. Meanwhile, I welcome correspondence from members wishing to trade brands or who have information about the various rolling mills that have turned out railroad rail. H. K. Garges, 730 Wishard Ave., Simi Valley, Calif. 93065.

## ASME LANDMARKS

The following sites recently were designated National Historic Mechanical Engineering Landmarks by the American Society of Mechanical Engineers:

**LOMBARD STEAM LOG HAULER**, ca. 1910. This vehicle, invented by Alvin O. Lombard (1856-1937) and patented in 1901, featured the first successful application of lag or crawler tread, which led to the development of the world's military tanks, tractors, bulldozers, power shovels, and the crawler transporters that carried the space shuttle *Columbia* to its launch pad. The first steam log hauler, at the Lumberman's Museum in Patten, Maine, will share landmark status with the crawler transporters at Kennedy Space Center. The steam crawler-tractor invented by Lombard emancipated horses from the killing work of hauling trains of log sleds over icy roads in the winter woods of the U.S. and Canada. See SIAN Fall 82:2-3.

**ALTERNATING CURRENT ELECTRIFICATION OF THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 1907.** (Designated jointly with the Institute of Electrical and Electronics Engineers.) This pioneer venture in mainline railroad electrification established single-phase alternating current as a technical and economical alternative to direct-current. This concept exerted considerable influence over subsequent systems both in the U.S. and abroad. The major components of the system were developed by the engineering staffs of the New Haven RR and the Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa.

## CABLE CARS AT A STANDSTILL

Will San Francisco dissolve into the fog without cable cars? That was the question asked in a recent issue of the *Wall Street Journal*. Beginning Sept. 22, the system was shut down for a two-year period while the tracks and machinery of the cable cars [NHL, HAER] that have been scaling San Francisco's hills for 109 years are overhauled. Cost of reconstructing the system is put at \$60 million. The project makes sound economic sense, though, to a city that last year enjoyed a \$1.2-billion tourist industry.

Only 44 cars and 4.7 mi. of cable railway remain from a system that in its heyday comprised more than 200 cars on 52.8 mi. of track. Until its shutdown in Sept., the system worked much as it did in the late 19th c.: Cars were pulled by an underground cable that moved at 9.5 m.p.h., powered by a single 750-h.p. electric motor. The machinery visitors saw at the downtown powerhouse (turned into a museum for curious tourists) soon will be gone as the whole system is rebuilt. Eight small motors will power the system so that problems in one part of the line won't affect the entire system. Magnetic wire rope-testers will watch for trouble, not the human eye. Tourists still will be able to view the machinery, but it won't have the Victorian appearance it once had. The cable cars will remain, however, and wrecking crews will gut the powerhouse without touching its facade.



## MISC. NOTES

**"BRIDGE TO THE FUTURE,"** a symposium commemorating the centennial of the Brooklyn Bridge, will be held at the Barbizon-Plaza Hotel in New York City May 18-20. The symposium will address the subject of human creativity and the ways that individuals and groups influence, and are influenced by, technological development. There will be a sunset walk across the Brooklyn Bridge, a visit to the Brooklyn Museum to view an exhibition about the bridge, and a reception at the world-famous Brooklyn Botanic Garden. The symposium is sponsored by The New York Academy of Sciences and Brooklyn Rediscovery, a program of the Brooklyn Educational & Cultural Alliance. Information: Conference Dept., NYAS, 2 E. 63rd St., N.Y.C. 10021; (212) 838-0230.

**"THE MILL WORKS,"** a conference on industrial reuse, will be held in Boston May 26-27. Sponsored by the Northeast Regional Office of the National Trust for Historic Preservation, the conference will consider rehabilitation of the region's historic industrial buildings for industrial use. The conference is directed at industrial development specialists, real estate interests, potential users, and design professionals who deal with industrial environments. James Howell, of the Economics Dept. of the First National Bank of Boston, will be the speaker at Fri.'s luncheon. Information: NTHP, Northeast Regional Office, 45 School St., Boston, Mass. 02108; (617) 223-7754.

**HOOSIER LANDMARKS.** Indiana's more than 330 historic sites and structures and 30 historic districts are included in a new publication, "The National Register of Historic Places in Indiana," available free of charge from Historic Landmarks Foundation of Indiana, 3402 Boulevard Pl., Indianapolis 46208.

**"POWER TO MOVE THE WORLD,"** an exhibit of 60 original drawings of steam engines attributed to Fitch, Fulton, Latrobe, and other of America's earliest makers, is on display at the New Jersey Historical Society headquarters at 230 Broadway, Newark, through June 3. Hours are noon-4:15 P.M., Mon.-Sat. The color-wash drawings are from the Society's Alofsen and Stoudinger collections. The exhibit, prepared by curator Alan Frazer, marks the 175th anniversary of Robert Fulton's successful steamboat voyage, when the *Clermont* made its way up the Hudson.

**"SUCCESSFUL REHABILITATION" WORKSHOPS,** for those interested in qualifying for the federal investment tax credits for historic rehabilitation, will be held in Baltimore (May 12-15), Pittsburgh (June 9-12), and St. Louis (June 23-26). The workshops are cosponsored by the Assn. for Preservation Technology, the National Park Service, and the National Trust for Historic Preservation. Information: Education Services, NTHP, 1785 Massachusetts Ave., N.W., Washington, D.C. 20036; (212) 673-4092.

**THE COAL HERITAGE CENTER,** located at the Johnstown (Pa.) Flood Museum, opened last July. Visitors enter a simulated mine tunnel framed by panels depicting miners' daily underground tasks. Inside, handmade tools are mounted with historic photographs demonstrating their use. A silent movie, edited from a 1926 production, captures miners at work. Rare photographs show how coal was pulled into the breaker, weighed, cleaned, sized, and loaded into railroad cars for shipment as far away as New England and Canada. Other displays treat the uses of coal, the history of underground lighting, mine safety, and the social history of mining towns. The museum is located at 304 Washington St. Hours are Tues.-Sat., 10:30-4:30, Sun. 12:30 to 4:30.

**DE ARCHAEOLOGISCHE PERS NEDERLAND,** a new publishing venture, has been launched by Alex den Ouden. He aims to publish, quickly and at low cost, works on the subject of industrial archeology and historical metallurgy in order "to promote the gathering and propagation of historical knowledge and the comprehension and understanding of our industrial past." Among his books are *Glengarnock*, edited by Derek Charman, and *John Gijers: Ironmaster*,

by John K. Harrison. The book on Glengarnock was written at the time the Historical Metallurgy Society was attempting to organize the preservation of this last open-hearth steelworks in Britain. It contains a history of the works, an account of excavations conducted at the blast furnace plant site, and the results of an oral history project. Harrison's book is a technical history of a blast furnace plant in the Cleveland (England) District that puts this works and its proprietor into the perspective of the late 19th-c. iron industry. To date, the works published have been from Scandinavia, Great Britain, and the European continent, but den Ouden would like to have American material. Information: De Archaeologische Pers, Lelleanlaan 3, 5582 GH Aelst-Waalre, Holland.

**AASLH GRANTS-IN-AID.** The American Association for State & Local History offers a competitive program of small grants-in-aid for research in state, regional, local, and community history. At least fifty grants of up to \$3,000 each will be available in 1983 and again in 1984. Individuals and institutions may apply. (Students whose research is part of the requirements for a degree are ineligible.) Projects may draw upon any humanities discipline. Research must be original and intended for publication in some form. Deadline for proposals for the 1983 award is July 15. Application and information: Dr. James B. Gardner, Staff Historian, AASLH, 708 Berry Rd., Nashville, Tenn. 37204.

**ASME FILMS.** Available for loan, free of charge, are four educational films exploring the world of mechanical engineering. All are 16mm color. One, "On the Shoulders of Giants," highlights the role of mechanical engineering in American history, tracing landmark applications of technology from the first commercial ironworks (1647) to the first use of air conditioning in a mine shaft (1937). Brochure: Public Information, American Society of Mechanical Engineers, 345 E. 47th St., N.Y.C. 10017.

**EDUCATION UPDATE.** The SIA Guide to undergraduate, graduate, and continuing education courses in IA, the history of technology, and allied subjects is being updated after a lapse of many years. If you are aware of any such in North America or elsewhere, please send a description to Roger L. Robertson, 3706 Emily St., Kensington, Md. 20795.

The 7th **INDUSTRIAL ARCHEOLOGY INSTITUTE** will be held at the University of Vermont, June 27-July 1. The 2-credit course will be conducted by Eric DeLony, HAER Principal Architect; Robert M. Vogel, Curator of Mechanical & Civil Engineering, Smithsonian Institution; and Helena Wright, Curator, Graphic Arts, Smithsonian Institution [all SIA]. The IA Institute instructs preservationists, historians, architects, and part-time enthusiasts to recognize, evaluate, and document historic industrial sites and engineering structures. The focus of the course is a hands-on experience recording an industrial site, this year the Vergennes Water Works (20 mi. south of Burlington), which features a unique turbine-powered reciprocating pump. There will also be lectures, discussions, and films on recording techniques, documentation, adaptive reuse, and preservation. The course is limited to 25 students and costs \$140 for Vt. residents, \$220 for non-residents. University housing is \$45/week double, \$60/week single. Information and application: IA Institute, Continuing Education, Grasse Mount, University of Vermont, Burlington 05405.

### RESEARCH QUERIES

For an archeological investigation, information is sought on animal-powered mills prior to ca. 1840. Information on inclined wheel mills, including verbal descriptions, sketches, or other illustrations, would be helpful. Edward M. Morin, Staff Archaeologist, American Resources Group, Ltd., 127 N. Washington, Carbondale, Ill. 62901.

For a survey of traditional craft products and materials, information is sought on sources of replica artifacts and the special raw materials — for example, wrought iron, cattle horns, and ash splints — from which authentic replicas of tools, utensils, and furnishings can be fabricated. Craftsmen, manufacturers, or distributors of such materials are invited to contact the Living History Source Survey, c/o



Ron Kley, Assn. for Living Historical Farms & Agricultural Museums, Alonzo Wood Homestead, P. O. Box 111, East Winthrop, Maine 04343.

For a proposed permanent display of a small (non-generating) hydroelectric installation of the period ca. 1890-1905, the following are sought for donation or purchase: DC dynamos (100-250 kw); and meters, switches, rheostats, and hardware such as insulators, lamp sockets and fixtures, wire, etc., for the construction of a switchboard. M. P. Figliomeni, Pres., Orange County Historical Society, Clove Furnace Historic Site, Arden, N.Y. 10910.

The National Museum of American History, Smithsonian Institution, is planning an exhibit on the American Industrial Revolution that will, among other things, emphasize the importance of the mechanic and the machinist. We are looking for a machinist's tool chest, with tools, that dates from about 1860, to be a prominent part of the exhibit. We'd like it, best of all, as a gift; if not that, as a long-term loan or purchase. Steven Lubar, NMAH, Rm. 5707, Smithsonian Institution, Washington, D.C. 20560; (202) 357-2379.

For a Master's thesis, information is sought on the adaptive use of electric power stations. By examining such characteristics as size, design, plan, siting, and equipment, I hope to discover similarities among plants and evaluate them for adaptive use. Information about existing plants that are abandoned (or about to be) would be especially welcome, as well as information about proposed or completed examples of adaptive reuse. Such facilities as pumping stations, gas works, and steam plants are of peripheral interest. Robert S. McGonigal, 2204 E. Locust St., Milwaukee, Wis. 53211.

#### NEWS OF MEMBERS

**MATTHEW ROTH** has opened a new office for his firm, Historic Resource Consultants, in the Colt Armory, 55 Van Dyke Ave., Hartford, Conn. Roth works with partner Bruce Clouette.

**NEIL COSSONS** has been appointed Director of Great Britain's National Maritime Museum. Dr. Cossons, director of the Ironbridge Gorge Museum Trust since 1971, will assume his new position in July.

## SIA AFFAIRS

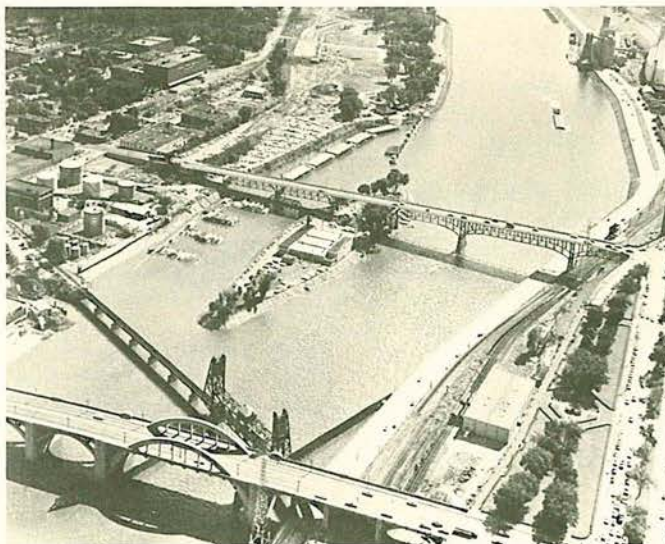
### ANNUAL CONFERENCE PREVIEW: THE TWIN CITIES

SIA members, guests, and friends are cordially invited to Minnesota's Twin Cities, May 12-15, for the 12th Annual SIA Conference. Headquarters will be the Radisson St. Paul Hotel, on the Mississippi River overlooking the Chicago Great Western RR Lift Bridge (1925) and the reinforced concrete rainbow arch Robert St. Bridge (1926-27), largest of its kind in Minn. Republic Airlines is serving as the official conference airline, offering a 30 percent discount to conferees. Here is a preview of events:

**Thurs., May 12.** Early arrivals can attend one of two pre-conference afternoon workshops: a two-part teachers' program, first for college faculty followed by a session for elementary and secondary teachers and administration, on IA curriculum; or a program on Archival Sources for IA. An evening reception hosted by the Minnesota His-



"Heat, Light, & Power": Door frieze, Northern States Power Co. Building (1930), St. Paul.



The Radisson St. Paul Hotel, headquarters for the SIA's 12th Annual Conference, overlooks a number of sites of IA interest. Art Advertising Associates photograph.

torical Society at the James J. Hill House (1891) in St. Paul, home of the founder of the Great Northern Ry., will mark the official conference opening. Along with refreshments, there will be a tour of the house, including its mechanical systems, and an introductory slide overview of IA in the Twin Cities.

**Fri., May 13.** Process tours will include the Ford Motor Co. Twin City Assembly Plant (1924-25); the Mississippi River hydroelectric plant that still powers the Ford works; Twin City Shipyard, the manufacturing facility of Twin City Barge, Inc.; Greif Bros. Corp., a tight-barrel cooperage still using ca. 1900 belt-driven machinery; and other sites. A Mississippi sternwheeler cruise and banquet concludes the day.

**Sat., May 14.** Morning paper sessions will include midwestern mining, flour milling and grain trade, bridges, midwestern beet sugar, potash, and paper industries, steam engine restoration, IA theory and method, IA in urban and rural settings, and regional and local IA sites. The Annual Business Meeting, to be held at noon, will be followed by a tour of the Minneapolis milling district at St. Anthony Falls, site of the world's largest flour mills.

**Sun., May 15.** Paper sessions continue all day.

All SIA members will receive registration materials by mail. Others wishing conference information should contact John M. Wickre, Minnesota Historical Society, 1500 Mississippi St., St. Paul, Minn. 55101; (612) 296-6980. R.M.F.

**ROYALTY CHECK.** The Society is pleased to announce receipt of a fifth royalty check, for \$64.46, from sales of *Historical Archaeology: A Guide to Substantive and Theoretical Contributions*, edited by Robert L. Schuyler [SIA]. The book is available from Baywood Publishing Co., Inc., Farmingdale, N.Y. 11735, for \$16.50 ppd.

#### CHAPTER NEWS

**ROEBLING HOSTS SECOND IA SYMPOSIUM.** One hundred and fifty people attended the second annual IA Symposium sponsored by the Roebling Chapter on Sat., Oct. 16. Using the facilities of the new science hall at Drew University in Madison, N.J., ten speakers presented slide lectures on a diverse range of IA subjects from the N.Y.-N.J. area. Railroads, canals, the South Jersey glass industry, mill and furnace sites, and the IA of the New York Westway project were among the topics. A history of wire rope manufacture had special significance in light of the upcoming Brooklyn Bridge centennial celebration. A special guest, Ian Dean, of the Chalk Pit IA Museum in West Sussex, England, made a slide presentation on the work of his museum. Plans already are under way for the third symposium, to be held in the fall.



## REVIEWS

*Windmills, Bridges, & Old Machines: Discovering Our Industrial Past*, by David Weitzman. Charles Scribner's Sons (597 Fifth Ave., N.Y.C. 10017), 1982. 114 pp. illus. \$13.95.

Members of the SIA have been very egalitarian in the past, welcoming into the fold almost anyone who manifested an interest in industrial history and its material record. Perhaps it is time to draw the line, however, to plead for more professionalism to assure that "industrial archeology" does not become synonymous with nostalgic antiquarianism and slipshod scholarship.

What prompts this sentiment is David Weitzman's latest book. The author's biographical note says that "he discovered that it's all right for adult historians to study and write about steam engines, locomotives and other joys of their youth and that those who do are now called industrial archaeologists." Scribner's, a publisher that can give this book wide distribution, calls it a "guide to industrial archaeology." God save us if it is.

The book is a collection of illustrations of windmills, canals, aqueducts, blast furnaces, locomotives, steam engines, bridges, and the like, surrounded by a juvenile, error-filled text. Weitzman is a proselytizer. His text oozes with colorful metaphors and flash. He wants to create interest and excitement when it comes to things old. He wants people to be charmed by old iron, romanticize about the good old days and, in so doing, magically transform themselves into "historians" or "archeologists." The author appears hellbent on degrading these two professions by treating them as hobbies. His book scorns expertise, methodology, accuracy, and scholarship. Weitzman would never claim that by examining an old bridge one becomes a civil engineer, yet he implies that such an experience can turn any fool into a historian.

Space does not allow a full recounting of this book's sins against scholarship. They run the gamut from factual errors to gross misinterpretations. Weitzman writes with a broad pen, and his generalizations, imprecise language, and skimpy research get him into trouble time after time. He is flat wrong when he says that early U.S. canals "would be done without engineers"; that early circular saws conserved wood by cutting a narrow kerf; that the history of steam power in the U.S. began in 1809. He draws no distinction between the properties and uses of wrought iron and cast iron, he says that bridge trusses are built up of "girders," and he calls the "Tom Thumb" locomotive one of the most important inventions in American history (this is both a gross overstatement and a misuse of the word "invention").

In pointing up errors, one could go on and on. Particularly grating is the overall tone of the book, its lack of critical awareness, and its childish fascinations. For Weitzman, canal locks were a "kind of magic" and steam locomotives were "gentle giants." This book is not a guide to industrial archeology, but an embarrassment to it. *Larry D. Lankton, Michigan Technological University*

*Old Reliable, an Illustrated History of the Quincy Mining Company*, by Larry D. Lankton and Charles K. Hyde. Four Corners Press (Franklin, Michigan 48026), 1982. 159 pp. illus. \$27.50. Available only through the Quincy Mine Hoist Assn., Box 265, Hancock, Mich. 49930.

This book originated with the reports of a team from the Historic American Engineering Record, headed by the book's authors. The HAER team spent a year recording the mines, mills, and smelters of Michigan's Keweenaw Peninsula copper district. This was the nation's first large-scale deep mining area, and one of its most durable mining districts. From the 1840s until well after World War II, the district produced millions of tons of copper ore from some of the largest mines in the world. One of these was the Quincy, nicknamed "Old Reliable" because of its steady output of dividends during a century of operations. Most of the Quincy's records have survived — a rarity in the history of mining — and Lankton and Hyde have used them to write the story of the mine from the 1840s until 1980.

The book is a compromise between a scholarly study and a pictorial essay. Of greatest interest to me were the dozens of large and nicely

reproduced photographs and drawings of the Quincy, its miners, and its managers. Many of the HAER team's excellent drawings of the Quincy's hoists, rockhouses, and site plans have been included. Lankton's captions for the period photographs are first-rate.

Unfortunately, I found the actual history rather disappointing. The book's organization, with each of its five chapters devoted to a chronological span of the Quincy's life, makes a rather disjointed, repetitive impression on the reader. The authors recount for each period the company's officers, the makeup of the work force, the mine's output, the construction of surface facilities, and the technology of mining. A topical rather than chronological organization might have been less ponderous.

Hyde's social history of the work force and Lankton's description of the mining technology are well done. However, I missed the absence of any attempt to compare the mining technology at the Quincy with that practiced at other mines in the Keweenaw as well as in the Western mining states. I was also disappointed in the sparse descriptions of the Quincy mill and smelter. The successful reduction of the Keweenaw's extremely rich amygdaloid ores using methods unique to the Keweenaw was one of the triumphs of 19th-century American metallurgy. My disappointment in the near absence of a description of milling and smelting technology was intensified by the excellent description of the Quincy's ore and rock handling procedures. Finally, the book lacks a bibliography, which would have been useful considering the obscurity of books and articles describing the Keweenaw.

Despite its shortcoming and its steep price, I recommend the book. Its illustrations alone, with their excellent captions, are worth the purchase price. The labor history and what there is of the technological history are well done, and the lack of any other recent histories of this important mining district justifies the purchase of *Old Reliable*. *Peter M. Molloy, Western Museum of Mining and Industry*

### TRUSS BRIDGE LEAFLET REPRINTED

First published by the American Assn. for State & Local History in 1977, "Bridge Truss Types: A Guide to Dating and Identifying" has been reprinted. Written by Donald C. Jackson and T. Allan Comp [both SIA], the 12-page leaflet is aimed at audiences with limited background in the history of bridges. Copies may be obtained for \$1.00 each from AASLH, 708 Berry Rd., Nashville, Tenn. 37204. Bulk rates are available upon request.

## NEWS IN BRIEF

*Continued from page 5*

was new. The **Beverly Rd. Bridge** was tested with cylindrical piles, deck forms, and deck beams to observe the bridge's performance under load. At ceremonies recognizing the bridge as a forerunner in concrete technology as well as marking the 25th anniversary of the Illinois State Tollway, a bronze plaque presented by the Prestressed Concrete Institute was affixed to the bridge. The plaque recognizes the first of 459 bridges built along the Tollway using beams and girders of precast/prestressed concrete.

On the periphery of IA, but worth noting anyway, is a two-year program to restore Chicago's **Railway Exchange Building**, home of the Santa Fe. Santa Fe Industries will restore the 17-story structure, designed by Daniel H. Burnham and built in 1903. The building, located on Michigan Ave., has a handsome white terra-cotta facade and is distinguished by ranks of bay windows and great oculus windows in the cornice. John Schmidt, president of Santa Fe Industries, cites the federal Rehabilitation Tax Credit as an important incentive for Santa Fe to remain in the building. "Without it, we would not have been able to bear the expense of restoring [it] to its original elegance."

The *SIA Newsletter* is published with the support of the Program for the History of Science & Technology, Case Western Reserve University, Cleveland, Ohio.





# SOCIETY FOR INDUSTRIAL ARCHEOLOGY NEWSLETTER

## PUBLICATIONS OF INTEREST

A SUPPLEMENT TO VOL. 12 NO. 1

WINTER 1983

Compiled by Robert M. Frame III, James J. Hill Papers, Hill Library, St. Paul, & Robert M. Vogel, National Museum of American History

### BOOKS & ARTICLES

Gary G. Backler & Trevor D. Heaver, THE TIMING OF A MAJOR INVESTMENT IN RY CAPACITY: CPR'S 1913 CONNAUGHT TUNNEL DECISION. In *Business Hist.* (London), Nov. 1982, pp. 300-13. Five mile tunnel beneath Rogers Pass, B.C.

Don Barbeau, THE ECCENTRIC CRANK: STEAM LOCOMOTIVES IN REVIEW. (Avail.: Mohawk & Hudson Chapter, Nat'l Rwy. Hist. Soc., Box 523, Schenectady NY 12301.) 90 pp., illus., \$7. PpD. "Sketches of over 40 existing or noteworthy steam locomotives: measurements, ratings, features, & histories."

Jean-Pierre Bardou, THE AUTOMOBILE REVOLUTION: THE IMPACT OF AN INDUSTRY. Trans. by James M. Laux. Univ. of North Carolina Pr. (Chapel Hill), 1982. 335 pp., \$20. Rev.: *American Hist. Rev.*, Feb. 1983.

Suzanne Beedell, WINDMILLS. David & Charles (Box 294, N. Pomfret, VT 05053) Reissue, 1983 (hardback) \$21.50. 222 pp., illus.; paper \$8.95.

Robert B. Belfield, THE NIAGARA FRONTIER: THE EVOLUTION OF ELECTRIC POWER SYSTEMS IN NEW YORK & ONTARIO. Ph.D. dissertation, University of Pennsylvania, 1981. 522 pp., biblio.

Charles Bohi & H. Roger Grant, STANDARDIZED RR STATIONS IN KANSAS: THE CASE OF THE ATCHISON, TOPEKA & SANTA FE. In *Kansas History*, Spring 1981, pp. 39-52.

Martha Bowers & Hans Muessig (SIA), SPANNING THE MISSOURI. In *Palimpsest*, No. 1, 1981, pp. 14-26. Sioux City's Pacific Short Line Bridge.

C.M. Brown, 20th CEN. GROWTH & REGIONAL CHANGE IN THE BRITISH GLASS INDUSTRY. In *Geography*, July 1979, pp. 196-204.

Shannon R. Brown, CAKES & OIL: TECHNOLOGY TRANSFER & CHINESE SOYBEAN PROCESSING, 1860-95. In *Comp. Stud. Soc. Hist.*, July 1981, pp. 449-63.

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Richard M. Candee (SIA), NEW TOWNS OF THE EARLY NEW ENGLAND TEXTILE INDUSTRY. In *Perspectives in Vernacular Architecture*, Camille Wells, ed. Vernacular Architecture Forum (Annapolis, MD), 1982. pp. 31-50.

David L. Carlton, MILL & TOWN IN SOUTH CAROLINA, 1880-1920. Louisiana St. Univ. Pr. (Baton Rouge), 1982. 313 pp., map, biblio., \$32.50/\$15 paper

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R. Bruce Council, M. Elizabeth Will & Nicholas Honerkamp. BLUFF FURNACE: ARCHAEOLOGY OF A 19th C. BLAST FURNACE. (From Jeffrey L. Brown Institute of Archaeology, Univ. of Tennessee, Chattanooga, TN 37402.) 156 pp. illus. \$5.50. Results of archeological and documentary research at Bluff Furnace site; findings compared with contemp. furnaces.

John Taylor Cumbler (ed.), A MORAL RESPONSE TO INDUSTRIALISM: THE LECTURES OF REVEREND COOK IN LYNN, MASS. State Univ. of New York Pr. (Albany), 1982. 160 pp., appendix, notes, biblio., index, \$30.50/\$10 paper.

George H. Douglas, RAIL CITY: CHICAGO U.S.A. Howell-North Bks (Box 3051, La Jolla CA 92038), 1981. 338 pp., photos, maps, charts, \$27.50. Includes info on all Chicago passenger terminals, freight yards, & city tunnel system. Rev.: *RR Hist. Bulletin* 147, Aut. 1982.

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Sharon L. Edaburn, THE RAILROAD GRADE--A STUDY IN ARCHEOLOGICAL PERSPECTIVE. Churchill Co. Museum & Archive (1050 S. Maine St., Fallon, NV 89406), 1981. 24 pp., photos, drawings, notes. Excerpted from author's thesis, "The Archeological Study & Interpretation of Western RRs." Calif. State Univ., Sacramento, Dec. 1981; also appearing in *Nevada Archaeologist*, Winter 1981.

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Mark Stewart Foster, DELIVERING THE MASSES: RECENT EXCURSIONS IN TRANSPORTATION HISTORY. In *Jnl. of Urban History*, May 1981, pp. 381-89.

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(SIA). WOODWORKING PATTERNS AT THE SUTHERLAND STEAM MILL, NOVA SCOTIA MUSEUM. In *Material History Bulletin/Bulletin d'histoire de la culture materielle*, Spring/Print. 1982, pp. 55-58.

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- Thomas F. Hahn (SIA), THE INDUSTRIAL ARCHEOLOGY OF THE SHEPHERDSTOWN, WEST VIRGINIA SITE AS A CASE STUDY OF THE NATURAL CEMENT INDUSTRY OF THE UPPER POTOMAC VALLEY. Ed. D. Thesis, West Virginia Univ, 1981. 197 pp.
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- James Hiller, THE ORIGINS OF THE PULP & PAPER INDUSTRY OF NEWFOUNDLAND. In *Acadiensis*, Spring/Print. 1982, pp. 42-68.
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- Douglas R. Hurt, AMERICAN FARM TOOLS: FROM HAND-POWER TO STEAM POWER. Sunflower Univ. Pr. (Manhattan, KS), 1982. 121 pp., \$20/\$10 paper. Rev.: *Agricultural Hist.*, Jan. 1983.
- Donald C. Jackson (SIA), GREAT AMERICAN BRIDGES. In *Historic Preservation*, vol. 33:6 (1981), pp. 46-51.
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- Larry Lowenthal, IRON MINE RAILROADS OF NORTHERN NEW JERSEY. Tri-State Ry. Historical Soc., Inc., (Box 255, Dover, NJ 07801.) 145 pp. illus, index, bibliography. Thorough coverage of railroads, mines, furnaces, and associated industries in northern NJ, with good maps and illustrations.
- Elizabeth A. Lyon, CULTURAL & ENVIRONMENTAL RESOURCE MANAGEMENT: THE ROLE OF HISTORY IN HISTORIC PRESERVATION. In *Public Historian*, Fall 1982, pp. 69-86.
- Eleanor A. Maass, PUBLIC WATCHDOG: THOMAS PYM COPE AND THE PHILADELPHIA WATERWORKS. In *Proceedings of the American Philosophical Soc.*, April 30, 1981.
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- Barbara R. Robertson (SIA), FROM "CASTINGS OF ALL KINDS" TO "INTERCHANGEABLE PARTS": SAWMILL EQUIPMENT MADE IN NOVA SCOTIA (Part One) in *The Occasional*, Vol. 7, No. 2 (Spring 1982) pp. 9-15. Nova Scotia Museum (1747 Summer St., Halifax, NS B3H 3A6)
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- Donald Sayenga, ELLET & ROEBLING, THE AMAZING TALE OF FRIENDSHIP & RIVALRY BETWEEN TWO OF AMERICA'S GREATEST ENGINEERS. Amer. Canal & Transp. Center (809 Rathton Rd., York, PA 17403), 1983. 60 pp., illus. Splendid account of the dual fathers of the American wire-cable suspension bridge.
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Paul K. Walker, *ENGINEERS OF INDEPENDENCE: A DOCUMENTARY HISTORY OF THE ARMY ENGINEERS IN THE AMERICAN REVOLUTION, 1775-1783*. Historical Div., Office of the Chief of Engineers (Wash. D.C.), 1981. 403 pp., maps, illus., chart, tables, notes, biblio, index, \$7.50 paper.

Anthony F.C. Wallace (SIA), *THE SOCIAL CONTEXT OF INNOVATION: BUREAUCRATS, FAMILIES, & HEROES IN THE EARLY INDUSTRIAL REVOLUTION, AS FORESEEN IN BACON'S NEW ATLANTIS*. Princeton Univ. Pr. (Princeton NJ), 1982. 175 pp., map, illus., chart, notes, biblio., index, \$15. Includes an essay on deep-shaft coal mining in Pa.

Martin J. Wiener, *ENGLISH CULTURE & THE DECLINE OF THE INDUSTRIAL SPIRIT*. Cambridge U. Pr. (NY), 1981. 217 pp., \$16. Rev.: *Tech. & Cult.*, Jan. 1983.

Carolyn V. West, *1700 MILTON AVENUE: THE SOLVAY STORY 1881-1981*. Allied Chemical (Solvay, N.Y. 13209), 1981. 44 pp., gratis. Fine, well-illus account of the bringing of the Solvay process (sodium carbonate) from Belgium to the US at Syracuse, where the limestone and brine needed were plentiful. Tells, too, of the firm's advanced social theories.

John H. White, *SAFETY WITH A BANG: THE RAILWAY TORPEDO*. In *Technology & Culture*, April 1982, pp. 195-201.

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Chuck Yungkurth, *HARD COAL, THE ANTHRACITE STORY*. In *Railroad Model Craftsman*, March, April, May, and June 1982. 4 pt. description of anthracite mining, processing, and distribution. Includes drawings of structures and facility layouts. Complete coverage from mine face to coal dealer.

*THE NEXT STATION WILL BE, AN ALBUM OF RAILROAD DEPOTS IN 1910, Vol VII*. (Erie RR: Delaware, Jefferson, Wyoming divns.) Railroadians of America (18 Okner Pkwy., Livingston, NJ 07039), 1982, 64 pp. \$?. Superb reproductions of "official" station photos of 1910, large format, 7th in a distinguished series.

*WANT TO BUY A BRIDGE?* In *New Hampshire Historical Society Newsletter*, March 1982, pp. 1-2. A description of the S. Lyndeborough Trestle over Stony Brook built in 1882-3. It is a planned preservation project.

*WORLDWIDE SMALL HYDROPOWER PUSH GAINS MOMENTUM*. In *Engineering News-Record*, Sept. 16, 1982, pp. 26-27. Int'l overview of small hydro development.

*TRUSS BRIDGES GET NEW LIFE*. In *Engineering News-Record*, 17 June 1982, p. 57. Addition of superimposed arch, hangers, and floor beams, to save 80-90% of a replacement bridge.

*TYOGA, A BIT OF PENNSYLVANIA IN MICHIGAN*. In *Timber Producer*, Feb. 1982, pp. 28-31. Brief account of a typical small sawmill & logging town in Michigan's Upper Peninsula c1900.

*FITCH ON HISTORIC PRESERVATION*. In *Buildings*, June 1982, pp. 88-89. An interview with James Marston Fitch for the construction industry audience of this trade jnl.

*IN SEATTLE STREETCARS ROLL AGAIN*. In *Pacific News* #239 (Chatham Publ. Co., Box 283, Burlingame, CA 94010), Mid-July 1982, pp. 11-13. 4 historic cars revived on official Metro route.

*NATIONAL CASTINGS: A CENTURY PLUS OF INNOVATION*. In *Railway*

*Age*, May 10, 1982, pp. 33. Brief overview of National Castings (predecessors were Cleveland Malleable Iron Co. & Nat'l Malleable & Steel Castings Co.) and its contributions to RR technology--couplers, draft gear, trucks.

*MODERN METHODS RENEW OLD BRIDGE: CONTRACTOR-DEVELOPED DEVICES SPEED INTRICATE CABLE REPAIR*. In *Engineering News-Record*, Dec. 9, 1982, pp. 20-31. 1008-ft. 1850 Wheeling W.Va. Suspension Bridge, oldest in world over 1000 ft.

*PEORIA WATER WORKS*. In *Public Works Hist. Soc. Newsletter*, Mar. 1982, p. 3. Inc. photos of Pumping Station #1 (1890).

*RIVER BRIDGES REMAIN SCENIC*. In *Railway Gazette* (Box 55, N. Freedom, WI 53951), Oct. 1982 pp. 14-18. Pt. 3 of series on bridges over the lower Wisc. R. on CMStP & PRR. Good historical information.

*SCHOONERS, EMITTING FOUL SMELLING FUMES FROM PRIMITIVE GAS ENGINES, BECAME KNOWN AS SKUNKS; WESTERN LOGGERS APPLIED THE TERM TO THEIR RRS*. In *Timber West*, Jan. 1982, pp. 8-9. Redwood logging operations in northern CA, featuring the Fort Bragg Lumber Co. & its railroad system, 1885 to present.

*SIX NEW CONDOMINIUMS REPLACE A PAPER MILL*. In *Architectural Record*, June 1982, pp. 82-85. The "Stone Mill" (1833) and "Fred's Old Office" in N. Bennington VT, now rehabbed.

*SMALL HYDRO--FORDS TO CADILLACS*. In *Engineering News-Record*, Nov. 11, 1982, pp. 52-3. 2 plants near Albany, NY.

## SPECIAL PUBLICATIONS

Johathan Garlock (Comp.), *GUIDE TO THE LOCAL ASSEMBLIES OF THE KNIGHTS OF LABOR*. Greenwood Pr. (Westport, CT), 1982. 682 pp., \$65. Basically for labor historians, but among other things has the members' occupations (e.g. millers, miners, etc.) for some 12,000 Local Assemblies.

Maya Hambly, *DRAWING INSTRUMENTS, THEIR HISTORY, PURPOSE & USE FOR ARCHITECTURAL DRAWINGS*. Catalog of 1982 exhibition at Heinz Gallery, RIBA Drawings Collection, (21 Portman Sq., London W1H 9WF, England), 1982. 60 pp. \$?. Nicely illustrated record of this interesting but little-attended subject. From earliest instruments to computer-aided drawings. Fine.

Moshe Ron (Comp.), *CATALOG OF THE SIDNEY M. EDELSTEIN COLLECTION OF THE HISTORY OF CHEMISTRY, DYEING, & TECHNOLOGY*. Jewish National & Univ. Library Pr. (Jerusalem), 1981. 182 pp., illus., indexes, \$30 paper. Rev. by Robert P. Multhauf in *Isis*, March 1983.

Christopher Wilk, *THE ART OF WOOD TURNING*, American Craft Museum (77 W. 45th St. NYC 10036), 1983. 48 pp. 29 illus. Catalog of wood-turning exhibit (through May 13), quasi-historical survey of the omnipresent art, flutes to finials, mortars to muffleers. Little on lathes...much on their produce, chiefly visual. A real turn-on.

National Research Council, *CONSERVATION OF HISTORIC STONE BUILDINGS AND MONUMENTS*. National Academy Press. (2101 Constitution Ave. NW, Washington, D.C. 20418) 1982. 365 pp. \$21.25. Paper. Specific structural problems discussed in individual papers.

*THE GREAT EAST RIVER BRIDGE: 1883-1983*. Brooklyn Museum, 1983. 180 pp. \$18.50/35. 258 illus.; 65 color; 2 gatefolds. (Paper version avail only at the Museum, Eastern Pkwy., Brooklyn, NY; cloth trade edn. distr. by Harry Abrams, NY.) Good account of the history of the bridge's construction and especially, its extensive iconography at the hands of artists in all media.

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