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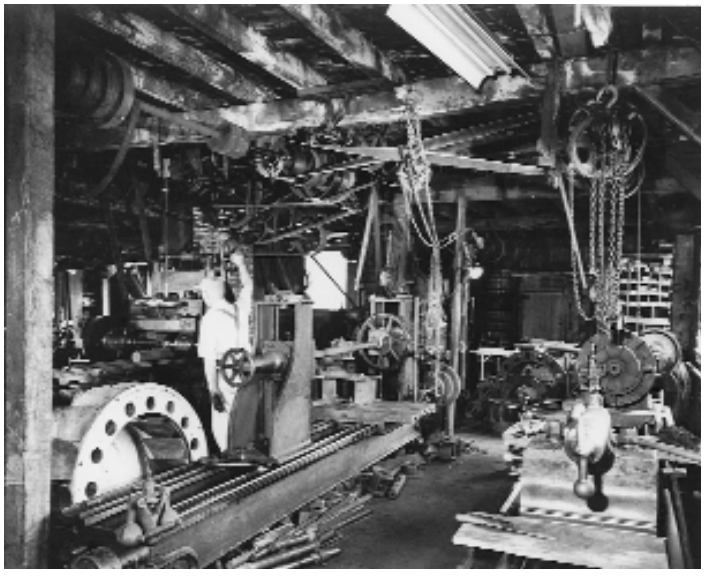
The Prehistory of HAER, 1965-1968

The genesis of the Historic American Engineering Record was a rather long and at times inchoate one with roots that reached deeply into its cousin-like organization, the Smithsonian Institution. From some indefinite time in the 1960s there had developed an unofficial symbiotic relationship between the Historic American Buildings Survey—principally on the part of chief James C. Massey and photographer Jack Boucher—and those curators at the Smithsonian's Museum of History and Technology (now the National Museum of American History) who dealt with matters of engineering history. This relationship, which was based quite naturally on the numerous interests common to both organizations, led to periodic casual discussions on the possibility and desirability of undertaking HABS-type recording surveys, not of the sort of structures that HABS had typically been recording since its inception in the early WPA period—houses and other buildings on an essentially domestic scale—but of purely industrial buildings. Here the focus would be less on the space-enclosing fabric itself than on the manufacturing equipment within, and where possible, on the process itself, including the building proper where it was of a distinctly "industrial" character. The concept was not an entirely new one, for over the years both the HABS and the Smithsonian's Division of Mechanical & Civil Engineering (M&CE) had conducted a number of such surveys. The HABS archival holdings contained drawings, photographs, and other records of a number of small flour mills and timber bridges, for example, while the M&CE in the early 1960s had made measured field drawings of several 19th-century timber and iron bridges. Even earlier, several historians of technology had recorded sites and structures of historic engineering interest, in some cases publishing the results. Of these, perhaps the best known is Greville Bathe of Philadelphia, who in the 1930s and 1940s had published several books of his drawings, photographs, and observations of a number of historic iron works, and other industrial sites and structures.



Machine shop of the C.P. Bradway Machine Works, a small manufacturer of water turbines in West Stafford, Connecticut, in July 1965. Photo by the author, 1965.

The tradition within the engineering fold can be said to reach back even further, for seniors at Rensselaer Polytechnic Institute, one of the nation's earliest engineering schools, from at least the mid-19th century were required to produce an illustrated thesis examining some existing engineering structure, frequently one of historic interest. In many if not all cases this work included measured drawings. The thesis of one student, for example, thoroughly described Roebling's 1855 Niagara Railway Suspension Bridge, while another's fully analyzed the Great Burden Wheel in Troy, New York, the most powerful water wheel ever built, anywhere. This immense prime mover was by then abandoned but still intact, and the thesis provides the only complete record of it.

By 1965, the HABS and M&CE principals determined that the time had come to mount an experimental survey of a fairly elaborate factory as a means of determining whether work of this sort could be practically conducted on a regular basis. This author, who was the M&CE curator, had been aware for some time of a small manufacturer of water turbines in West Stafford, Connecticut—the C.P. Bradway Machine Works. Although theoretically still in operation under the direction of the son of the firm's founder, a

man in his eighties, the place was in fact moribund; production had long ago ceased but happily all machinery and equipment remained in place. As is typical with any manufacturing facility, there had been additions to both building and equipment over the years, but the last major structural change had been the construction of a high erecting bay in 1920. Little had been added or removed thereafter, leaving an outstanding example of a typical small New England machine works of, practically, the 19th century.

Bradway was fully measured, photographed, and documented through oral history during a week in the summer of 1965 by a contract photographer and a crew of three: a HABS architect, the M&CE curator, and an engineer-surveyor. The funding for transportation, per diem, photography, and the engineer's salary was provided by the Museum of History & Technology, while the National Park Service contributed the time of the architect, who also prepared nine sheets of finished drawings. All field notes, negatives, tracings, and other records were placed with the HABS collections at the Library of Congress, and the project was given a regular HABS survey number (HABS No. CT-280). Thus, the Bradway project may be considered the first of the pre-HAER surveys.

All concerned saw the effort as a clear success. While it generally followed traditional HABS guidelines in that the (frame) building was recorded, far less detail was covered and far fewer photographs were taken than would have been the case had the building itself been the focus of the exercise. Instead, the bulk of attention was devoted to the machine tools, other production equipment, and the extensive system of power-transmission machinery, for every machine, on both floors, was belt driven; there was not a single electric motor in the place. (The prime mover was a 1928 Chevrolet engine.) A historical report covered the evolution of the firm from its beginnings in 1875, and the complete process by which the turbines were designed, built, marketed and installed.

There was further agreement that the undertaking should be repeated, as indeed it was, the following summer. The 1965 format was repeated, with the same crew except for a different HABS architect. The target this year was Dudley Shuttles (later D. T. Dudley & Son Co.) of Wilkinsonville, Massachusetts, one of the last American firms producing wooden shuttles for power looms. As with Bradway, Dudley had been formed in the 19th century, and used older machinery in its production processes. The firm was selected for surveying as the advent of the shuttleless loom within the textile industry and the rapid spread of these efficient machines meant the eventual radical reduction in the use of the shuttle. In fact, Dudley folded within several years of the survey. Some of its buildings survive, but without a trace of the industry that occupied them for nearly a century (as also is the case with Bradway).

The Dudley Survey format was essentially that used in the Bradway project, the recording of the building subordinated to that of the highly specialized manufacturing machinery and production sequence, and their interrelationship. One innovation was contracting with a local graphic artist to prepare detailed isometric drawings of several of the more unusual of these machines.

With these two small surveys of industrial firms complete and apparently useful, the time was at hand to consider something more ambitious. It was no secret within the small circle of historians of technology and industrial archeology that far too little attention had been paid historically to the systematic recording of industrial structures, with the exception of picturesque flour mills and covered timber bridges. Discussion between the Smithsonian and the Park Service soon suggested that the textile industry, the first in America organized on the factory system—that is, conducted within purpose-built structures—would be a logical place to start, with New England, the initial and until the 1930s principal locus of the industry, the logical starting venue. Thus was initiated the real pre-HAER program: the New England Textile Mill Survey (NETMS).

NETMS was organized very much like a traditional HABS summer-long survey, with seniors drafted from several architectural schools to do the recording and produce the finished drawings. The Smithsonian's curator of engineering acted as the team historian, and a team photographer rather than a contractor did the photography. As a number of its major buildings were soon to be demolished, the survey concentrated on the vast complex of the [former] Amoskeag Manufacturing Co., of Manchester, New Hampshire, that at its height was the largest textile producing firm in the world on a single

Dudley Shuttles, of Wilkinsonville, Massachusetts, was one of the last American firms producing wooden shuttles for power looms. Shown in this photograph from 1966 are part of the team that documented the site, Robert Vogel on the left, Tom Rick, and Russell Keune on the far right. Second from the right is Howard Pellatt, owner of Dudley Shuttles at the time, and seated is Mrs. Chase, the wife of the former owner.

site. The greater part of the summer was spent recording the buildings that, so far as could be determined, were to come down in the near future, and producing ground plans of the remarkably extensive Amoskeag site.

Following the coverage of Amoskeag, several weeks were spent measuring two other important structures in Lawrence, Massachusetts—the Lawrence Machine Shop, the city's sole stone mill building and the only one dating from the site's organization in 1845 that had been essentially unaltered, and the Pemberton Mill, the 1861 replacement of the original that had spectacularly collapsed and burned the year before. In the summer's final week or so, two of New England's most interesting early mills were recorded—the 1825-50 Crown & Eagle in North Uxbridge, Massachusetts, and what has been reckoned the oldest mill in continuous textile production in the U.S.—the timber-frame Lippit Mill of 1811 in West Warwick, Rhode Island.

The product of the summer's work was some 50 sheets of finished drawings of the Manchester and Lawrence mills. Time ran out before the finished drawings of the Crown & Eagle and Lippit mills could be undertaken, but completion of the field notes and photographs ensured that a lasting record was made of these two significant industrial structures of indeterminate future.

Thus was completed the first summer-long project to record solely industrial buildings. As with the two smaller surveys, all involved felt that the exercise was a successful and extremely useful one that bore repeating, if only to be assured that such ventures were feasible on a regular and long-term basis. This led to a continuation of what became known as NETMS I, the organization of NETMS II in the summer of 1968. The format was identical to the 1967 project, only the venues differing.

Of the major New England textile complexes, it was determined that after Amoskeag, the next most endangered was the great collection of 19th- and early-20th-century mills in Fall River, Massachusetts. The city center and the earliest mills already had succumbed to the ramming of I-195 right through the city's heart. As the mills—nearly all of granite—had been widely dispersed throughout the city, however, many had been spared, including some of the most interesting, both architecturally and structurally. The earliest surveyed, the Metacomet Mill of 1847, dated from nearly the beginning of the textile industry in Fall River, and was the sole survivor of the water-power period. All the later mills, being distant from the Quequechan River, were steam powered.

As with NETMS I, the summer's work concluded afield. Several early Rhode Island mills were recorded—in Woonsocket and Allendale—and as well the mills of Harrisville, New Hampshire, widely regarded as the best preserved textile-mill town in New England.

While many more summers could justifiably have been spent recording the many remaining New England mills of one degree or another of importance, clearly the two NETMS projects (not to say the two smaller ones that preceded and inspired them) produced a collected record of enormous value. From this it was evident that such work should continue on a formal, fully organized basis, again following the HABS model. And so, with the tri-partite agreement entered into by the Park Service, the American Society of Civil Engineers (joined later by the Mechanical Engineers), and the Library of Congress, the Historic American Engineering Record was born. The Mohawk-Hudson Area Survey—its first official summer-long recording survey—was mounted the very next (1969) summer.

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