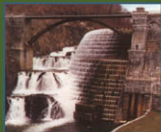


# America Transformed



## ENGINEERING AND TECHNOLOGY IN THE NINETEENTH CENTURY

SELECTIONS FROM THE  
HISTORIC AMERICAN ENGINEERING RECORD,  
NATIONAL PARK SERVICE

**Dean Herrin**

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# *America Transformed*

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IN THE NINETEENTH CENTURY

Selections from the  
Historic American Engineering Record,  
National Park Service

DEAN HERRIN



AMERICAN SOCIETY OF CIVIL ENGINEERS  
1801 Alexander Bell Drive / Reston, Virginia 20191-4400

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**ABSTRACT:** America was transformed in a variety of ways in the nineteenth century by engineering and technology. From a fledgling, agrarian, and largely unexplored nation clinging to the Atlantic seaboard in 1800, the United States by 1900 was the world's leading industrial nation, manufacturing a third of the entire world's industrial output, and on its way to becoming a more urbanized and mechanized country. Since 1969, the Historic American Engineering Record of the National Park Service has documented, through photographs, drawings, and histories, thousands of significant American engineering and industrial structures and sites. This book presents a sampling of that documentation to show the scope and variety of sites, structures, mechanisms, and complexes that were components of America's industrial transformation in the nineteenth century.

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Herrin, Dean A., 1958–

America transformed : engineering and technology in the nineteenth century / Dean Herrin.

p. cm.

"Selections from the Historic American Engineering Record, National Park service."

Includes bibliographical references and index.

ISBN 0-7844-0529-8

1. Engineering—United States—History—19th century. 2. Technology—United States—History—19th century. I. United States. National Park Service. National Architectural and Engineering Records Division. II. Title.

TA23 .H47 2002

609.73'09'034—dc21

2002027963

[FRONT COVER] *Background photograph:* Carding machine, c. 1865, Watkins Woolen Mill, Lawson, Missouri (photograph by Jet Lowe). *Inset images, left to right:* New Croton Dam and Reservoir, New York (photograph by Jack Boucher); Harmony Manufacturing Company, Cohoes, New York (photocopy by Jack Boucher; original from Evan Leigh, *Modern Cotton Spinning*); Steam engine, St. John, Virgin Islands (photograph by Jet Lowe); and Brooklyn Bridge, New York City (photograph by Jet Lowe).

[BACK COVER] *Inset images, left to right:* Smithfield Street Bridge, Pittsburgh, Pennsylvania (photograph by Jack Boucher); Block Island Southeast Light, Rhode Island (drawing by Lee Ann Jackson and Isabel C. Yang); Turbine governor, Folsom Powerhouse, California (photograph by Brian Grogan); and work crew, 1895, Ashtabula, Ohio (photograph courtesy of Mrs. L. J. Fargo, Lexington, OH).

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*This book is dedicated to the memory of  
Neal FitzSimons,  
long a bridge between the American Society of Civil Engineers  
and the Historic American Buildings Survey /  
Historic American Engineering Record.*

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# Foreword

This book is intended to reveal the extremely rich and varied treasures found in the Historic American Engineering Record (HAER). Though little known by the American public, it is one of the most comprehensive graphic and textual collections elucidating America's engineering, industrial, and technological achievements. This book will help alleviate this lack of familiarity. The book is authored by Dean Herrin, who served as HAER staff historian for ten years. *America Transformed* focuses on HAER's documentation of historic sites and structures related to nineteenth-century American engineering and technology. The book's publication coincides with the sesquicentennial celebration of one of America's oldest professional organizations. Established 150 years ago, the American Society of Civil Engineers was created to remind people that while this nation was founded on principles of life, liberty, and the pursuit of happiness, that vision could not be fulfilled without the contribution of engineers.

It has been said that the past is prologue. HAER was established thirty-three years ago to preserve the evidence of the engineer's prowess along with the nation's other technological achievements. Though HAER is not as old as ASCE, its establishment at the highest level of government and its partnership with other esteemed organizations gives legitimacy and authority to the function of compiling an archive. We only can aspire to continue these achievements by knowing what was accomplished in the past. The program is vested within the National Park Service, along with the other conservation and preservation programs of the United States, with support from the American Society of Civil Engineers, its major constituent group, and many of the other engineering organizations. The collection is curated and made available to the American public by the Library of Congress. That archive is represented by nearly 3,500 sheets of measured and interpretive drawings, 72,000 large-format photographs, 61,000 data pages, and 1,000 color transparencies, comprising information on nearly 7,000 sites, structures, and objects. This rich archival treasure serves as the cornerstone of this book.

The author has selected not just the obvious icons of civil engineering such as the Brooklyn Bridge, the Lowell textile mills, and Erie Canal, but the not so obvious industrial and technological feats such as the textile, iron and steel, and wind mills; public works such as water treatment, irrigation, and hydro-

electric generation; and, the canal, railroad, and highway infrastructure that knit us together. We take much for granted when flipping a light switch or turning the faucet. This book begins to reveal what's behind those seemingly everyday conveniences.

A remarkable thing about the HAER collection is that it is based on the painstaking measurement, research, and documentation of actual works. This means that many of the sites, structures, and objects depicted are still standing. Thus the mission of HAER is not just preservation through documentation, but also to promote and encourage the commemoration and preservation of selected monuments and artifacts of the engineer's, industrialist's, and laborer's art. A goal of this book is to encourage the public to notice and better understand the meaning and value of these types of resources, and, when appropriate, to advocate the preservation of selected examples.

HAER also strives to introduce students to this great engineering and technological legacy. One of the largest student internship programs of the federal government has been implemented by HAER and the National Park Service. Over three decades, three thousand student engineers, architects, and historians of technology have served on HAER teams creating the histories, drawings, and photographs that comprise the HAER collection. Anyone having served on a HAER team for twelve weeks will never look at a bridge, dam, canal, factory, or power plant in similar light.

When Librarian of Congress, Dr. James Billington, commissioned the Kellogg Foundation to determine which of its vast collections should be first tapped for the National Digital Library, the HAER collection was singled out because of its national coverage, its quality, consistency, and easily reproduced format, and the fact that it could be used by primary and secondary school students K-12 for local history and science projects. It also deals with engineering and technology, one of the career choice areas that has declined among young people. By producing this and subsequent volumes with ASCE, we at HAER hope to reveal the remarkable legacy of our engineers, laborers, and technologists. While it is not possible to preserve all remaining engineering and industrial artifacts, there is at least comfort in knowing that a permanent record will be available to future generations through the internet and at the Library of Congress.

ERIC DELONY

*Chief, Historic American Engineering Record*

*National Park Service*

*Spring 2002*

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# Acknowledgments

Library research can have its slow moments, but sitting in the reading room of the Prints and Photographs Division of the Library of Congress, poring over more than 30 years of work by the Historic American Engineering Record (HAER), was a task I immensely enjoyed. Even after a decade as a historian for HAER, I was only dimly aware of the magnitude and richness of the collection. Sampling quickly gave way to a project-by-project examination, even as librarians looked a bit concerned as I wheeled cart after cart to my table. My thanks first go to those librarians in the Prints and Photographs Division, both for their assistance and forbearance during my research and, mostly, for their dedication in maintaining the Historic American Buildings Survey / Historic American Engineering Record (HABS/HAER) collection and in making it available to the public.

The collection exists, of course, because HAER has fielded team after team, year after year, to document America's engineering and industrial legacy. After reviewing their work, I appreciate more than ever the work of the hundreds of project team members who over the years have added their talents and unique contributions to this endeavor. I especially would like to thank Eric DeLony, Chief of HAER, for his continued enthusiasm and commitment in leading the organization. Eric was HAER's first permanent employee, hired in 1971, and he has been an unwavering advocate for the role HAER plays in both the documentation and preservation of historic technological sites and in the training of young professionals in the field. Robert Kapsch was the first to suggest a book on HAER's documentation of significant nineteenth century sites, and Blaine Cliver, Chief of HABS/HAER, has supported the project from the beginning. I thank both Eric and Blaine for the time away from normal duties to complete this book.

Even though I have worn their collective patience thin, current and former staff members of HABS/HAER have helped me tremendously. I would like to thank Tom Behrens, Brian Cary, Brian Cleven, Todd Croteau, Tim Davis, Gray Fitzsimons, Catherine Lavoie, Dana Lockett, Christopher Marston, Rich O'Connor, and Justin Spivey for reviewing drafts, answering questions, finding files, listening to a writer's complaints, and graciously forgiving me when I hogged the office copies of project files and forgot to leave a sign-out card. The HABS/HAER staff photographers, Jet Lowe and Jack Boucher, are wonderful



colleagues and gave me very helpful advice in the selection of photographs. James Rosenthal did a superb job of printing the photographs. I would especially like to thank Lisa Davidson and Martin Perschler for all of their assistance in preparing this book.

The American Society of Civil Engineers (ASCE) was one of the founders of HAER in 1969, and the organization's support has made this book possible. I owe a debt to Jack Bruggeman, Alyson Hackett, and Suzanne Coladonato for their guidance. I would also like to thank the National Park Foundation, for its early support in sponsoring the project. I also appreciate reviews and advice from Steve Lubar, Robert Vogel, Helena Wright, Neal FitzSimons, and Terry Reynolds.

Finally, I most want to thank Sarah Heald and Emma Herrin, loving advisors.

DEAN HERRIN  
*National Park Service Coordinator  
Catoclin Center for Regional Studies  
Frederick Community College  
Frederick, Maryland*

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