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COVER: The lumber and coal yard of Mr. J. F. Brown. See "The Industrial Archeology of Retail Coal Yards in Upstate New York," pp. 5–18.

The Industrial Archeology of Retail Coal Yards in Upstate New York

Daniel D. Mayer

One of the hallmarks of industrialization in America during the 19th century was the introduction of coal to replace wood as the basic source of industrial and domestic fuel. The use of anthracite coal in upstate New York came after the Civil War as an increasing scarcity of wood and the expansion of the railroads stimulated an anthracite market. To supply this home market, an intermediary was needed between the coal producer and the homeowner: This was the retail coal operator and the retail coal yard. The transition from moving coal by canal to railroads and then by truck resulted in changes in the location, architecture, and construction techniques used in retail coal-yard storage structures. The move from railroads to trucks for transport also required new methods and machinery for handling coal at the retail coal pockets. A nine-county survey in central New York identified past and existing coal yard structures, developed a nomenclature for coal yard classification, and traced the evolution of coal yard development (see figure 1).[1]

Introduction

As the availability of wood declined along the eastern seaboard during the early-19th century, coal became the basic source of industrial and domestic fuel. In the East, anthracite became the preferred domestic fuel because of its clean, long burning qualities. At the same time that the market for coal was expanding, there was a growing national interest in improving America's transportation network. The resulting canal boom provided a more efficient, less costly method of transporting bulk loads like coal (see figure 2).[2]

Beginning in the 1820s, canal and river transport supplied Pennsylvania coal to cities along the East Coast and canals entered upstate New York. In 1828, canal boats carried 77,516 tons of anthracite. By 1841, tonnage reached a million tons, and at the beginning of the railroad boom in the 1860s, canal boats carried nearly 10 million tons of coal annually.[3] But canal transportation had inherent limitations. Winter freeze-ups closed the canals, limiting the supply of coal or making it expensive. Because canals were tied to waterways, coal suppliers could not access villages and towns located away from water. The limitations of canal transportation delayed the widespread use of coal in upstate New York until after the Civil War.

It soon became evident that railroads had an advantage over canals in reaching markets and handling coal. From 1865 to

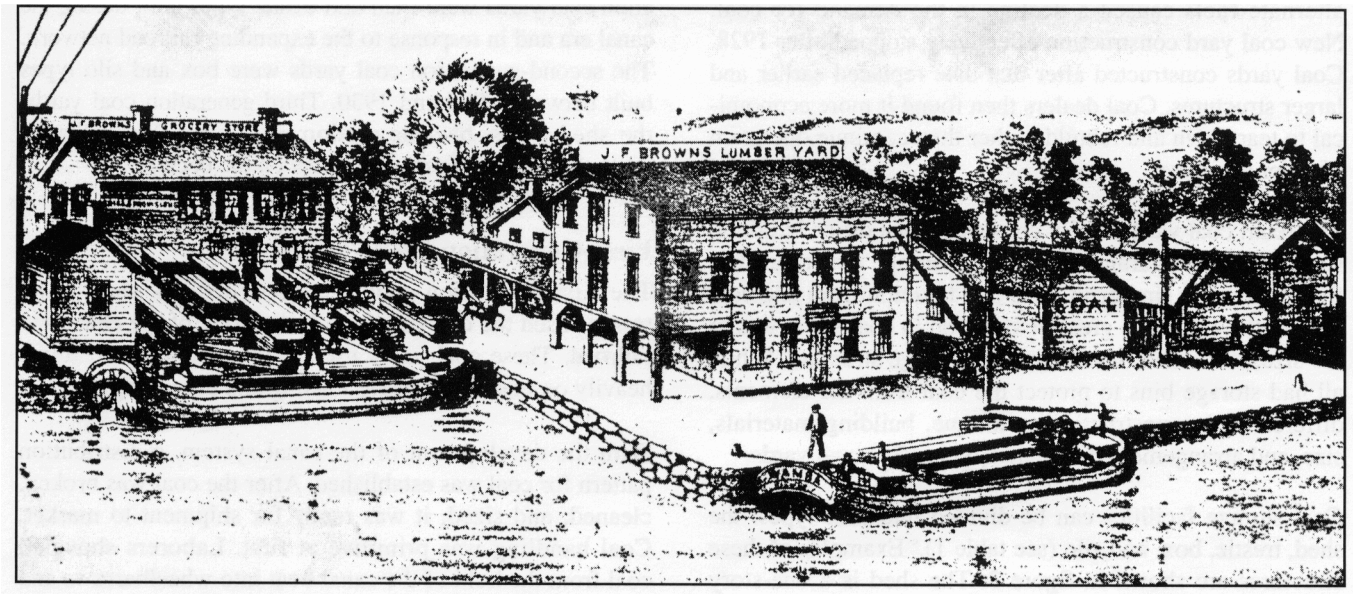

Figure 2. *Lumber and coal yard of Mr. J. F. Brown.* From F. W. Beers, *History of Montgomery und Fulton Counties* (New York: F. W. Beers,1878), 112.

Safety and Showmanship: Corporate Requirements for the Hardy Hydroelectric Plant

Cynthia de Miranda

Consumers Power Company began building dams and hydroelectric plants in Michigan before 1900. The late 1920s found the company planning a peak-load plant requiring a large reservoir. The proposed 100-foot-high dam exceeded by 30 feet any other Consumers Power embankment, a significant increase for a system of low-head dams.

***All** agreed that the project could be a showpiece, but engineers and executives argued over specifics. They weighed designs for an outsized version of small regional dams against plans for larger embankments built in the West. Resolution of the debate reflects the role that technological conservatism and corporate identity play in solving engineering dilemmas.*

Systems of Power Supply

In 1899, less than 20 years after the first hydroelectric plant in the United States began operating, a pair of brothers built a power plant on Michigan's Kalamazoo River and sent high-voltage current over 24 miles of wire. Their Kalamazoo plant became the first in the Midwest to generate power at a remote location and transmit the current to distant customers.[1]

For William Augustine and James Berry Foote, the Kalamazoo plant did not represent an isolated achievement. In the early years of the 20th century, the brothers built chains of run-of-the-river hydroelectric plants on several rivers in the sparsely populated northern reaches of Michigan's Lower Peninsula. The plants utilized a river's typical water flow and stored little water. The Foote brothers sent the power generated on these systems over high-voltage, long-distance transmission lines to their consumer base in Michigan's southern cities. They established separate power companies to develop each river, but joined the river systems together to create a power-supply network that reached throughout the Lower Peninsula (see figure 1).

In 1910, the Foote brothers consolidated their various Operating companies with those of another Michigan group known as Hodenpyl, Walbridge & Company. Consumers Power Company (CPCo), a newly formed Maine corporation, served as a holding company to the collection of Operating companies in Michigan. CPCo also maintained financial offices in New York's Wall Street district. In 1915, CPCo became an operating company and dissolved most of its subsidiaries. A Jackson, Michigan, subsidiary known as Commonwealth Power Corporation remained, however, and continued to handle engineering work for CPCo. By 1922, the Consumers Power system that the Foote brothers had begun comprised 31 hydro and steam plants. Together, the plants formed an extensive and reliable regional power network. Regional system-building began to spread nationally after World War I.[2]

As the company's system grew, the requirements of the hydro plants changed. Initially, the hydro plants—using the free water flow—provided the bulk of the system's power while coal-fed steam plants provided peak and emergency power. By the 1920s, the company inverted this formula, making steam plants responsible for base power and saving the hydro plants for peak and emergency loads. Peak-load hydro plants, however, required large storage reservoirs. The company's work on other Michigan rivers, furthermore, had demonstrated the greater economy of plants with higher heads and larger storage capacity. During its early years, the company had built dams between 27 and 42 feet in height. After its first two decades of constructing dams, however, the company built increasingly larger structures: in 1918, CPCo erected a 57-foot dam for the Junction Plant (now known as Tippy) on the Manistee River, followed by Hodenpyl's 75-foot dam, built in 1925 on the Manistee.[3]

In the mid-1920s, CPCo wanted another plant to supply additional generating capacity for the system. The company's hydraulic engineers turned to a long stretch of the Muskegon River in west-central Michigan that had been left undeveloped when the Foote brothers built smaller plants there in the early-20th century. The Oxbow site, situated at the bottom of an unutilized 100-foot drop in the river, seemed ideal. Unfortunately, it had a clay riverbed covered in glacial drift, a somewhat soft foundation characteristic of

The World Heritage Convention As a Medium for Promoting the Industrial Heritage

Henry Cleere

The evolution and application of the 1972 UNESCO World Heritage Convention are explained in general terms. Attention then shifts to the inadequate representation of the industrial heritage on the World Heritage List up to the present and to the steps being taken to accord it proper recognition on the global scale. The paper ends with a discussion of the implications of World Heritage listing in the creation of a greater awareness of the industrial heritage and in the education of both the general public and professional practitioners.

The World Heritage Convention

The *Convention concerning the protection of the world cultural and natural heritage,* better known as the World Heritage Convention, was adopted by the 17th session of the UNESCO General Conference in Paris on November 16, 1972. This event was the culmination of many years of discussions at the international level, begun in the 1920s in the League of Nations. The breakthrough came with the active involvement of the USA, which had become conscious of the threats to the natural and cultural heritage during the course of the 1960s.

The first inscriptions to the World Heritage List were made in 1978 at the meeting of the World Heritage Committee; since that time, the number of World Heritage cultural sites and monuments has risen to 553 in more than 100 of the 160 States Parties to the Convention.

Characteristic of the spirit that reigned in the 1960s, the World Heritage Convention (hereafter known as WHC) recognizes in its preamble that "parts of the … heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole" and calls upon "the international community as a whole to participate in the protection of the … heritage of outstanding value." Article 1 defines the term "cultural heritage" under three categories:

> *Monuments:* architectural works, works of monumental sculpture and painting, elements and structures of an archeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;
>
> *Groups of Buildings:* groups of separate or connected buildings which, because of their architecture, their homogeneity, or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;
>
> *Sites:* works of man or the combined works of nature and of man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological, or anthropological points of view.

These definitions were very carefully drafted by those responsible for the WHC, since they are broadly worded and eschew the use of specific terms such as "town," "village," "temple," or "church." **As** a result, the definitions can potentially apply to any form of nonmovable human achievement. It will be noted that no reference is made in these definitions to industry or technology, which most probably did not enter into the minds of those responsible for the drafting of the WHC. Nonetheless, the terminology used has made it possible for the industrial heritage, along with other aspects of cultural heritage not recognized by the founders, to be accommodated over the past quarter century.

The fundamental touchstone of "outstanding universal value" is not defined in the text of the WHC, and so it was the task of the World Heritage Committee, which is composed of 21 of the States Parties, to elaborate more detailed criteria in order to make the choice of selection practicable. In their present form, as set out in the *Operational Guidelines for the Implementation of the World Heritage Convention* (UNESCO Document WHC-97/2, February 1997), a cultural property (to use the UNESCO term) should

i represent a masterpiece of human creative genius; or

11 exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture, monumental arts, or town-planning and landscape design; or

Speaking in Tongues: The Multiple Voices of Fieldwork in Industrial Archeology

Donald L. Hardesty

The material remains of our industrial past define the source of information used in industrial archeology and the symbols for speaking to us about that past. Fieldwork distinguishes industrial archeology from other approaches to our industrial past. We spend countless hours in the field searching for and recording the material remains of our industrial heritage. The conduct of fieldwork in industrial archeology, however, varies enormously. Some fieldwork involves searching for and recording the surface evidence of industrial activity; other fieldwork involves digging for buried evidence. Some fieldwork takes place within the large-scale arena of regional landscapes transformed by industrial activity; other fieldwork is limited to the small space of a single building or structure. Some fieldwork explores the material expression of industrial technology; other fieldwork searches for and records the material evidence of the everyday lives of industrial workers. Some fieldwork takes place to comply with government laws and regulations; other fieldwork is driven by theoretical or academic goals or done for purely personal reasons. Some fieldwork involves free enterprise, private companies working for profit: other fieldwork involves volunteers or classes at universities or colleges. Each of the ways that we conduct fieldwork speaks to us about our industrial past in its own distinctive voice. The many approaches to fieldwork form a cacophony of voices, some loud, some whispering, some barely audible at all. The voices originate partly in the characteristics of the material remains of our industrial past, partly in the social and cultural context within which fieldwork is conducted, and partly in the people who do fieldwork.

Voices from the Ground

The voices of fieldwork clearly reflect differences in the preservation of the material expression of industry, past and present. Some industrial sites are buried; others are not. Some industrial sites have abundant and diverse still-standing buildings and structures; others are limited to nearly invisible traces on the surface. Some industrial sites appear to be nearly frozen in time, almost as if abandoned only yesterday; others are so badly disturbed that it is nearly impossible to interpret the industrial technologies and lifeways represented in the remains. The archeological record of mining is a good example. Mining sites, which typically reflect the material remains of repeated cycles of exploration, production, and abandonment, self-destruct to a greater or lesser degree. The archeological record of earlier episodes of mining tends to be destroyed by later episodes occurring in the same place. Furthermore, miners often moved buildings, structures, and machinery from one mine to another. The common practice of scavenging abandoned buildings and structures for their materials in the American West severely disturbed the material expression of mining, combined with the scrap metal drives in World War Two and recreational bottle hunting in more recent times. In contrast, the remoteness of some mines preserved them in a near-perfect condition.

In addition to preservation, the hazardous condition of some industrial sites also affects the conduct of fieldwork. For example, much of the material expression of a mining site, like an iceberg, is underground. Exploration of underground workings is an exceedingly dangerous, not to mention a sometimes claustrophobia inducing activity, which is regulated by governmental agencies and requires special training and technology. Mining sites can contain toxic wastes such as mercury or lead that require special protective clothing or other treatment.

The physical context of the material remains of industry, then, clearly channels and constrains both the conduct of fieldwork and the images of our industrial past coming from fieldwork regardless of what social and cultural context it is conducted in and by whom. Both natural and cultural processes play significant roles in the formation of the archeological record of industrial sites. Documenting those processes and the history of site formation is essential to understanding voices from the ground, which all too often speak in no more than a whisper.

The Social and Cultural Context of Fieldwork

Fieldwork in industrial archeology also speaks about our industrial past through the social and cultural context within which it is conducted. The context contains the rea-

Archeology or Heritage Management: The Conflict of Objectives in the Training of Industrial Archeologists

Marilyn Palmer

This paper will argue that while the statutory conservation and recording bodies in Great Britain, together with most county and contract archeologists, recognize the importance of industrial archeology, the academic community lags far behind and is, therefore, failing to provide adequate training for those working in the field. The paper suggests that one of the reasons for this failure is the continuing debate over the scope and definition of industrial archeology, and that its practitioners need to recognize the contradictions within their discipline and work towards a solution that will satisfy both those who teach and those who employ the archeologists of the future.

It is generally accepted that industrial archeology as a separate discipline first achieved recognition in Great Britain in the late 1950s. The use of the term "archaeology" in the title of a book by Michael Rix led to early adoption of the term by the Council for British Archaeology.' Thus, in Britain the study of industrial archeology has always been loosely linked to that of so-called mainstream archeology rather than engineering or architecture as it is, for example, in projects run by the Historic American Engineering Record in the USA. Undoubtedly many engineers are interested in historic structures, notably in the UK members of the Panel for Historic Engineering Works attached to the Institution of Civil Engineers, but their interest is a voluntary exercise: there is little or no formal training in archeology for engineers as part of their undergraduate education. Effort in the UK has been directed towards achieving full recognition of industrial archeology within mainstream archeology, not an easy task in a country full of prehistoric and Roman remains where historical archeology has as yet made little impact on archeology courses. This paper will, therefore, be mainly concerned with the education of peo-

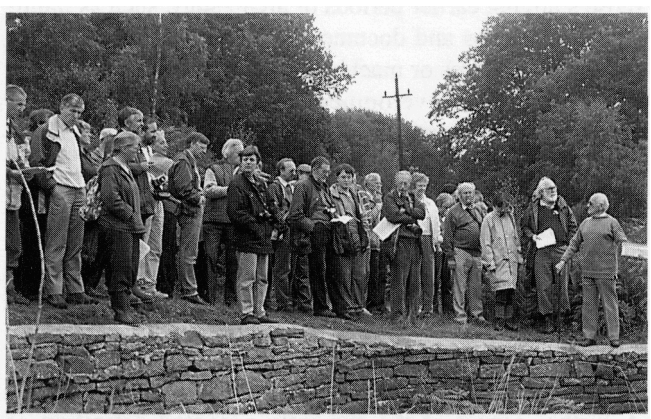

Figure 1. *The Association for Industrial Archaeology, like SIA, values the visits made to sites of interest during their annual conference. Here Stun Coates from the Historical Metallurgy Society is describing the site of Darkhill Furnace in the Forest of Dean.* Photo by author.

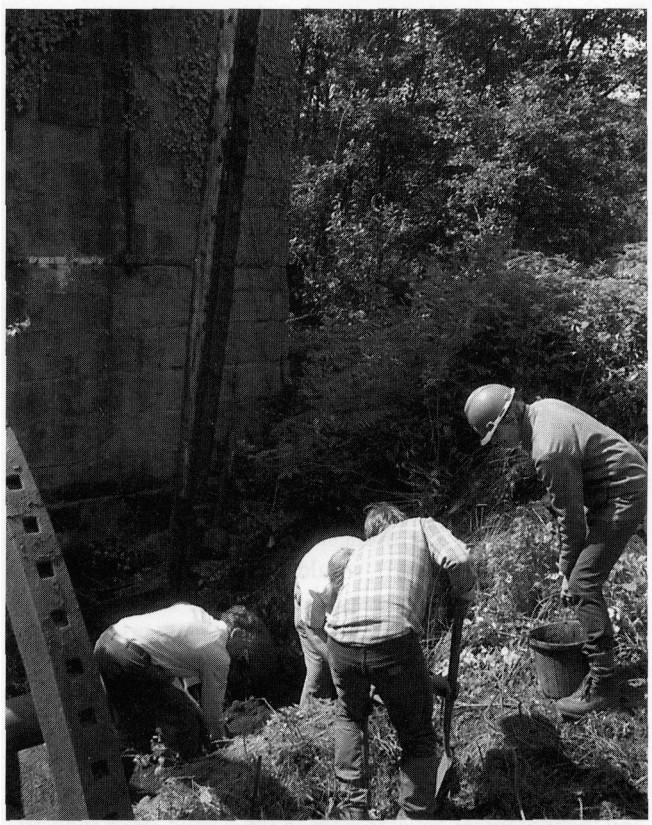

Figure 2. *A volunteer group hard ut work clearing the site of the Glyn Pits engine houses in South Wales, a scheduled Ancient Monument that had been sadly neglected. This is now again undergoing restoration work by another volunteer group, the Welsh Mines Preservation Trust.*

Landscapes as Industrial Artifacts: Lessons from Environmental History

Fredric L. Quivik

As industrial archeologists, we contend that material evidence is an important adjunct to the documentary record of the past. In this article, I will suggest ways we can enhance our analysis of a particular kind of artifact, the industrial landscape, to strengthen our claim that we have important contributions to make to the broader scholarly community. We can enhance our analysis of industrial landscapes, and indeed of all artifacts, by drawing on the insights and methods of environmental history.

Environmental history is an increasingly important subfield of history, gaining in importance as young scholars, who have grown up within the context of the environmental movement, mature and seek to engage in scholarship that "matters," and as environmental historians produce books and articles that are recognized by the broader scholarly community as significant contributions to our ways of understanding of the past. The methods and insights of environmental historians also hold promise for our practice as industrial archeologists. Indeed, there are ways in which our own practice could contribute to the work of environmental historians as well, but this article will focus on what we as industrial archeologists can learn from them.

A first task is to define environmental history. A number of scholars in that field have written essays describing it, or what they think the definition ought to be.' Their descriptions share a common characteristic: environmental history looks at the dynamic and reciprocal interactions among three sets of realities, or three poles, but the historians differ in how they define those three poles. I'll use a definition of the field provided by Arthur McEvoy in an essay he published in *Technology and Culture.* Writing for historians of technology and industrialization, he states:

> As a method ... environmental history looks to the ways in which ecology, political economy, and human consciousness interact with each other over time, each continually adapting to a dynamic environment made up of the other two.[2]

Like other environmental historians, McEvoy stresses that what is often uncritically called the "natural environment" is more than a static and passive stage on which human history takes place. According to McEvoy

> Environmental history portrays nonhuman nature as an active player in human history. Its fundamental insight is that nothing that people do is without causes and consequences in nonhuman nature. The interaction between the two works ecologically, through the medium of biology and adaptation, whether the human protagonists are aware of it or not. Technology is what distinguishes human activity in nature from that of other animals; because technology is a means of interacting with nature, however, it should be amenable to ecological analysis.

Initially, environmental historians usually looked at environments that did not include significant "built" components. Rather, they looked at ways that humans shaped what would otherwise be considered the natural environment. They investigated the history of how humans have made seemingly natural landscapes into artifacts. One of the first topics by which environmental historians' concerns bridged to industrial archeologists' interests involved the control of water resources. Noteworthy examples include Ted Steinberg's *Nature Incorporated,* which looks at the ecological consequences of having incorporated the Merrimac River into the industrial system controlled by the textile industry of Lowell and other New England towns; Don Worster's *Rivers of Empire,* which describes how the nation's dam-building transformed the American West into a hydraulic society; and Richard White's *The Organic Machine,* which explores the changing ways humans have manipulated the Columbia River to yield energy in forms such as food and electricity.[3] More recently, environmental historians have turned their ecological methods to analyses of special interest to industrial archeologists and historians of technology. Two excellent examples are Andrew Hurley's *Environmental Inequalities,* which examines how class and race correlate with the relative proximity to industrial pollution in the residential neighborhoods near the steel mills of Gary, Indiana; and Christopher Sellers' *Hazards of the Job,* which examines the contributions of Alice Hamilton and other early industrial hygienists to the emerging science of environmental health.[4]

That environmental historians are taking increasing interest in industrial topics is evident in the contents of *Environmental History,* the quarterly of the American Society for Environmental History. The journal is publishing ever more articles on the interplay of industry and the environment? Environmental historians are also taking their approach to

Coming to Terms with the 20th Century: Changing Perceptions of the British Industrial Past

Barrie Trinder

Industrial monuments in Britain only became the subject of serious academic attention after World War II. This paper considers the ways in which the industrial past has been perceived over the past half-century at both academic and popular levels. It focuses on the interpretation of three historical periods: the Industrial Revolution of the late-18th century and the first half of the 19th century, which tends to dominate most discussions of British industrial archeology; the last third of the 19th century, which saw the widespread growth of factories producing consumer goods; and the 20th century, during which the influence on industry of two world wars has been profound. Perceptions of the industrial past are related to developments in historical thinking over the last 50 years: the growing acknowledgement that the histories of Scotland and Wales should be seen as distinct from that of England: the awareness of environmental, gender, and ethnic issues: and the sense that the British Empire was a relatively short-lived phenomenon, which for much of the 20th century, imported rather than exported new technology and entrepreneurial skills. The paper looks at the relationships between industrial archeology and parallel academic disciplines and takes a critical view of the ways in which the industrial past is interpreted to the public at large, concluding with an examination of the potential for industrial archeological scholarship and for the conservation of monuments.

Introduction

The Industrial Revolution and the emergence of industrial archeology have much in common. Both are perceived as British phenomena, but participation in international gatherings of this kind raises doubts. After hearing the contributions of our colleagues from the Urals on salt making and iron smelting in the 16th and 17th centuries at the Ottawa and Toronto conferences of 1994, one hesitates to speak too boldly of an industrial revolution in Britain. There are other forms of industry than those developed in Britain in the 18th century. One of the most impressive industrial landscapes in Europe in the mid-19th century were the 400 windmills that lined the River Y at Zaandam, most of them processing imported materials. The scale and longevity of state-financed industry in France during the *ancien régime* is demonstrated by the Dijonval woolen factory at Sedan, founded in 1646, whose present imposing buildings date from 1755 and 1788. Here in Lowell in 1984, many of us learned that use of the term "industrial archaeology" by Michael Rix in Britain in 1955 was not an innovation. The French equivalent was used (René Evrard in Belgium) in 1950 and the Portuguese (Francisco de Sousa Viterbo) in 1896.

And, yet, after all the provisos, a sense persists that changes of international significance did happen in the British economy in the mid-18th century and that new attitudes to the industrial past developed in Britain in the mid-1950s, which have exercised some influence in other countries. This paper attempts to interweave the two concepts, to examine the ways in which appreciation for the industrial heritage developed in Britain in the third quarter of the 20th century, and to see how this appreciation has affected our understanding of the history of the last two-and-a-half centuries, at both academic and popular levels.

Whence IA?

At one level, industrial archeology is acknowledged to be an academic discipline, the scientific study within appropriate contexts of the artifacts, images, structures, sites, and landscapes of recent centuries. It is necessary to define boundaries more closely for particular purposes, when writing a book or designing an academic course, but this serves little purpose in abstract discussions. Archeological studies obviously interact with documentary and sometimes with oral evidence. It may, nevertheless, sometimes be illuminating to ask (as a means of enhancing our understanding of a particular topic) what we might learn from the archeological evidence alone. As in any other branch of archeology, understanding comes from dialogue, from argument, from dialectic, from speculating with models. Much of this paper will be devoted to a consideration of what can be learned from this kind of intellectual jousting.

However, industrial archeology has another meaning. It is often seen in Britain as an active or passive social activity: running or travelling on a preserved railway, arguing for the