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3.1 Undated view of Iron Works House before restoration. (Photograph by W. H. Halliday, ca. 1915. Courtesy of Historic New England.)

The Story of the Saugus Excavations

Donald W. Linebaugh

By the time of Roland W. Robbins' initial involvement in the Saugus Iron Works project in 1948, the ironworks property had a long history within the historic preservation movement. His employer, the First Iron Works Association, incorporated in 1943, was actually the result of preservation efforts begun around the turn of the twentieth century.[1] While the seventeenth-century structure known as the Iron Works House had survived, the remainder of the original industrial complex was deeply buried and largely forgotten. Recorded and published as early as 1879 in Edwin Whitfield's ***Homes of Our Forefathers: Being a Collection of the Oldest and Most Interesting Buildings in Massachusetts***, the house itself was an important shrine that interested many early preservation organizations and was linked to a veritable who's who of preservation figures.[2] When the house was placed on the market in 1911, it quickly drew the attention of William Sumner Appleton, founder of the Society for the Preservation of New England Antiquities (SPNEA).[3] Acting as a historic property broker, Appleton sought to find a buyer who would preserve and restore the house.

The romance of preindustrial craftsmanship again motivated the minister [Wallace Nutting]. Writing of the original Saugus ironworks, he longed for a time when the "age of chivalry had passed away and the modern-time machinery had not come in. Simplicity and strength mark the productions of our forefathers at the forge."

Thomas A. Denenberg, *Wallace Nutting and the Invention of Old America,* p. 97.

After negotiating with the likes of Henry Clay Frick, Andrew Carnegie, and local Daughters of the American Revolution (DAR) and Sons of the American Revolution (SAR) chapters, Appleton finally interested noted antiquarian Wallace Nutting in purchasing the structure in 1915. Thus, Broadhead, as it became known, emerged as the first link in Nutting's famous "Chain of Colonial Picture Houses."[4] Nutting promptly hired Boston architect Henry Charles Dean to "restore" the structure. Dean reworked the interior and exterior to what he felt was their seventeenth-century configuration and finishes, adding dormers and a projecting front porch along with an expanded later-period ell. Broadhead became, according to historian Thomas Denenburg, "the center of Nutting's historical and commercial activities, serving as the 'authentic' façade for a second photography studio, a furniture factory, and a forge."[5] Nutting used the ironworks building as a showroom to display part of his collection of antiques, photography, and reproduction furniture.[6] In 1917, he added a blacksmith shop to the property and hired blacksmith Edward Guy to reproduce early ironwork for sale.[7]

In 1920, failing economically, Nutting sold the property to antiques dealer Charles L. Cooney and in 1925 Cooney's estate sold it to Boston antiques dealer Philip A. Rosenberg. At the time of the purchase, Rosenberg promised M. Louise Hawkes, an officer of the local DAR, that "he would sell the house only to the Daughters of the American Revolution or to the Town of Saugus."[8] In 1930, the town began

negotiations to purchase the house and property for a park, but its interest waned due to Rosenberg's "ridiculously high" asking price.[9] After foreclosure proceedings on the adjacent ironworks parcel were begun, Hawkes offered to purchase the property from the bank and in 1938 the Parson Roby Chapter of the DAR obtained title to the land.[10] It was this parcel that contained the slag pile and buried remains of the early ironworks complex, although no one at the time imagined the remarkable archeological discoveries that awaited excavation.

In keeping with his 1929 promise to Hawkes, Rosenberg again offered the Iron Works House property to the town of Saugus and the DAR in 1941, but neither had the money. He therefore sold it to the Alumni Association of the Henry Ford Trade School, which intended to move the "restored" structure to Henry Ford's developing Greenfield Village in Dearborn, Michigan.[11] The initial reaction of the townspeople and preservation community was outrage and after extended discussions Ford agreed to abandon the purchase if the School was reimbursed for all of its expenditures, which amounted to just over $12,000.[12] Fundraising to buy the house back proved disappointing. With little success in the local community, Appleton devised a plan to split the cost evenly among the state, town, and the public. When it became clear that this approach would also fail due to lack of support, Appleton worked to create a nonprofit corporation to acquire the land and run the property. In 1943, a major fund drive, pitched "To Lovers of Old New England," raised $7,000. This, along with $3,000 from the state and town governments, permitted the purchase of the house and property. The First Iron Works Association (FIWA) officially assumed operation of the site that now included both the house and ironworks parcel.[13]

In 1935 Miss Hawkes spoke with the treasurer of the Rochester Trust Co., which had acquired the property by virtue of a mortgage foreclosure. "I offered him fifty dollars for the land if he would sell it to the Daughters [DAR]," she recalled. "He laughed. But before he left he said, if I were you I would not worry too much about it." Three years later she received a letter from the bank stating that "if I would send the money [the] Parson Roby Chapter could have the land."

Stephen P. Carlson, "The Saugus Iron Works Restoration: A Tentative History," p. 3.

In 1948, J. Sanger Attwill, then president of the Lynn Historical Society and an early supporter of the ironworks project, became the FIWA's second president. His local business of reproducing and restoring period furniture provided an excellent network for fundraising and support. Among the FIWA's board of directors was the well-heeled and influential preservationist Louise Dupont Crowninshield. Crowninshield, a founder of the National Trust for Historic Preservation, was both a financial contributor and fundraiser for the project and it was she who approached Quincy Bent, a vice-president of Bethlehem Steel Corporation, for money in 1944.[14] When Bent first visited the site he was generally unimpressed with the Iron Works House, but tremendously excited by the nearby slag pile and the potential of the site to contain buried ironworks remains.[15]

In 1947, the FIWA formed a Reconstruction Committee consisting of iron industry professionals and iron experts, including Quincy Bent, Edward L. Bartholomew, Charles Rufus Harte, John Woodman Higgins, and Walter Renton Ingalls.[16] Higgins, Harte, and other members of the Committee visited the site and, like Bent, saw great potential for exploration. With the forceful and well-connected Bent taking the lead, the Reconstruction Committee approached the officers of the American Iron and Steel Institute in New York for funding support. The Institute, however, felt that it could not underwrite the project

3.2 General view of the ironworks property prior to excavation. (Photograph 782 by Richard Merrill, unknown date.)

without some tangible evidence that the remains of the ironworks actually existed on the site. Therefore, in the summer of 1948, J. Sanger Attwill approached Roland W. Robbins, whom he had seen lecture on his exciting excavations at Thoreau's house at Walden Pond, about a brief exploratory dig at Saugus.[17] Robbins, between seasons in his window-washing and painting business, readily agreed to dig at Saugus in the fall of 1948.

Neither industrial archeology nor much historical interest in industrial sites existed in North America as the FIWA began to investigate the ironworks complex. Formally established in this country in the 1950s, industrial archeology had a long tradition as an avocational pursuit in England.[18] Although several studies on industrial sites would be published in the United States by the late 1960s, not until the late 1970s did it make "itself known in the university curriculum."[19] Like historic sites archeology several decades earlier, the new subdiscipline of industrial archeology became somewhat controversial in the United States, generating a "great debate over its value, direction, and service."[20] In 1969, archeologist Vincent Foley wrote that it was "only reasonable that a person interested in the history of a particular technology or trade, who desires to call himself an archaeologist . . . justify it [his or her research goals] with the addition of his background and degrees in archaeology."[21]

My reason for writing to you at this time is to see if you would like to go on an Antique Treasure Hunt. It seems that now we have acquired the Iron Works House, . . . the . . . Institute have [sic] *agreed to rebuild the Blast Furnace and Mill . . . if we will find the location and foundations. Does this arouse any interest on your part? If you are interested and have the time to tackle this let me know. It needs someone that has interest and will attack the situation with sympathy.*

J. Sanger Attwill to Roland W. Robbins, August 24, 1948.

Robbins had neither a background nor a degree in industrial archeology when he arrived at Saugus in 1948, nor any prospect of getting a degree given the lack of interest in industrial archeology by academic archeologists. What Robbins did possess was a visual acuity for unraveling industrial sites that was linked to his interest in how such sites worked and how people used them. His interest in industrial sites can best be understood within the longstanding tradition of Yankee tinkerers. His preoccupation stemmed from his roots as a laborer and from his innate Yankee curiosity in how things worked, particularly mechanical devices and processes. Robbins' work at industrial sites was also informed by his excellent visual skills; one acquaintance noted that "he was very astute visually . . . . [He] saw so much, not just in detail, but in terms of landscape and relationships of landscape."[22] Archeologist Paul Heberling recalled a visit that he and Robbins made to the Greenwood Furnace site in the 1970s: "He just walked around and looked at the terrain. He would see something and get out his probe rod to confirm his suspicions. In this way, he figured out the entire setup . . . . He had such an astute alert awareness of iron complexes that he immediately recognized what he had."[23]

Reflecting on his years of collaboration with Robbins, author Evan Jones commented that Robbins was not particularly interested in the lives of the people at the sites that he excavated. "He was interested in the problem," Jones recalled. "He may have considered how a miller did something or made something, but only in the context of trying to figure out the mechanical setup, and the archaeological problem at hand."[24] Jones' recollection reflects very accurately how Robbins came to approach the Saugus site.

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3.3 Workers beginning excavation of blast furnace site on September 18, 1948. (Photograph 2 from the Roland W. Robbins slide collection, 1948, Saugus Iron Works. Courtesy The Thoreau Society® Collections at the Thoreau Institute at Walden Woods.)

Robbins, still very much an avocational archeologist at this point, met with FIWA president Attwill at the site on September 10, 1948, and was briefed on the primary objective of the initial work: locating and excavating the blast furnace foundations. Robbins' initial "testing [of] the soil by sinking holes" revealed that the land along the Saugus River was covered with as much as four feet of slag fill.[25] After four days of digging "numerous test holes," Robbins identified the stone blast furnace foundation "buried three feet deep and some fifty feet north of the slag heap which runs north and south."[26] He recorded that

> . . . at one foot and one foot three inch depths, I located small pieces of old chinaware. At two feet six inches a bed of clay with pieces of red (baked) clay and bits of charcoal, as well as good-sized pieces of sandstone mixed with it, was located. This vein was six to nine inches in thickness. Beneath this vein was found a base of medium-sized stones.[27]

After the business meeting Mr. Harte, Mr. Bartholomew, and J. Sanger Attwill again examined the area now excavated. Mr. Harte couldn't determine the reason for the fine sand base found on north side of stone base, nor for the large bed of charcoal found on the south side of stone base. In fact he admitted the stone base may be site of blast furnace.

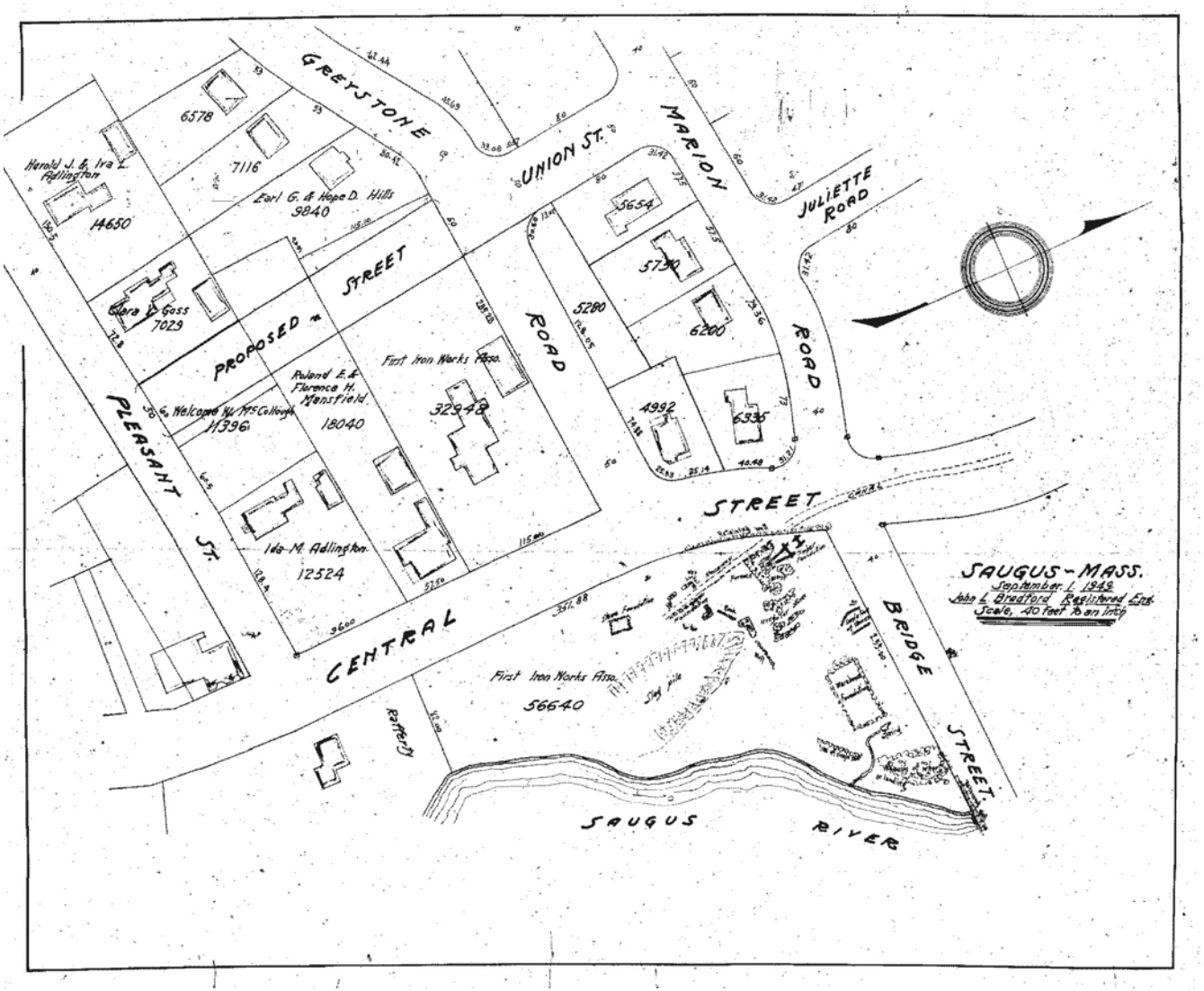
Roland Robbins, "Saugus Ironworks Daily Log - 1948," September 21, 1948.

Attwill and the Reconstruction Committee were so impressed by the success of Robbins' initial excavations that they agreed to finance his work for an additional six weeks, at a cost of $1,500.00.[28] The first evidence of the furnace foundation uncovered by Robbins became the center of his continuing excavations. By mid-October 1948, he had identified the entire "outline of the furnace foundation, the heavy timbered base for the bellows, and the crucible cavity."[29] He also identified several wooden beams at the northwest corner of the foundation, buried eight feet below the ground surface; these he speculated were part of "the waterwheel [and sluiceway]. . . ."[30] The sluiceway, he thought, probably ran along the western side of the furnace, and the furnace waterwheel, he reasoned, would be found north of the furnace under the Central Street roadway.

In December, curious about the sluiceway's construction, Robbins returned to Saugus to check on several details. He noted that he was "impressed with soil at [the] level of [the] base of [the] beams which form [the] sluiceway, it was blue-gray in color. Its bed was about 4 inches deep. Beneath it was a deep bed of fine sand."[31] He also dug a test unit outside the sluiceway and found only a coarse gravelly sand that "seemed to be much more natural . . . ." Robbins collected soil samples from each stratum in glass jars for later examination.[32]

In his report summarizing the 1948 excavations, Robbins described his findings related to work around the blast furnace during the fall, and concluded that:

> Undoubtedly, the pattern formed by the uncovered areas will shed enlightenment on America's first blast furnace, as will the relics and castings advance new knowledge on the methods and theories of that day.



3.4 Plan of excavations in September 1949, showing the original street layout in the vicinity of the site and with notations on general excavation area location. (Drawing by John L. Bradford, 1949.)

> Future research and excavations should prove very fruitful, as should a concerted effort to concentrate on the records of "The Company of Undertakers for the Iron Works" for a thorough study and analysis.
>
> In my opinion, many facts concerning the over-all setup of the first iron works undertaking, its branch at Braintree, Massachusetts, canals, bog iron sites, whether or not a pier existed on the Saugus River for barge service to the iron works, customs, theories, and business philosophy of the era are but a few of the unknown elements of America's first iron works that quite possibly could be answered if the time was exerted to such an undertaking.[33]

Iron expert Charles Rufus Harte also completed a report based on his observations of the 1948 excavations and supported Robbins' call for additional research and excavation: "In my judgment Mr. Robbins has done excellent work, which has disclosed much important information regarding the location and construction of the blast furnace, but there still are lacking important details which only can be secured by additional further excavation of the site."[34]

The Reconstruction Committee, fortified by Robbins' success at finding intact ironworks features, once again approached the American Iron and Steel Institute for funding.[35] The Institute, excited by Robbins' report and findings, agreed to finance additional archeological work as part of a larger reconstruction project. In the spring of 1949, the FIWA hired Robbins as the project's archeologist on a full-time basis. Plans to restore the furnace had begun to materialize even before excavations resumed. The FIWA and the American Iron and Steel Institute formed a new, expanded Reconstruction Committee to manage the project in 1949. The new Committee elected Quincy Bent as chairman and hired historian E. Neal Hartley of the Massachusetts Institute of Technology to begin a long-term historical research project on the ironworks.

Sanger Attwill phoned me Mon. evening, March 28, 1949 and said that he talked on the telephone with Mr. Bent, Sunday night. Mr. Bent wants me to start work at Saugus immediately. Sanger said Mr. Bent believes my work should keep me busy until October this year. Sanger said Mr. Bent said it was all right to start a supervised crew with me directing its work by checking on it several times a week. In other words any way that could be worked out by me so that I could get work started at once.

Roland Robbins, "Saugus Ironworks Daily Log - 1949,"March 28, 1949.

With the enlarged Reconstruction Committee in place and the project historian on staff, Robbins and a team of local laborers began full-time excavations at Saugus in May 1949.[36] The workers initially cleaned the previous year's furnace excavations, identified the furnace tailrace, and then traced it along the southwest side of the furnace. Within a week, Robbins noted in his daily log that "we are now digging to a depth of nearly seven feet to reach the upper most evidence of the tailrace."[37]

Robbins' field team was quickly expanded to include two new members, surveyor John Bradford and professional photographer Richard Merrill. Robbins noted that he immediately met with Bradford, who worked on an as-needed basis, about making a master plan for cumulatively plotting excavation information.[38] Upon arrival, Bradford began to make detailed, scaled field maps complete with elevations

3.5 Organizational chart of the Reconstruction Committee.

First Iron Works Association

American Iron and Steel Institute

Reconstruction Committee

J. Sanger Attwill
Walter Renton Ingalls
Edward L. Bartholomew, Jr.
Charles Rufus Harte
John Higgins

E. G. Grace
Irving S. Olds
Edward L. Ryerson
Walter S. Tower
Quincy Bent, Chairman

Exploration

Archeologist:
Roland Wells Robbins

Location of:
1. Water Wheel
2. Tail Race
3. Canal, Flume and Dam
4. Cast House
5. Bloomary
6. Finery
7. Slitting Mills
8. Establish all Elevations
9. Bog Ores
10. Wharves
11. Trestle from Hillside to Furnace Top
12. Specimens
13. Lake

Historical Research

Historian:
Neal Hartley

1. History of Undertakers
2. Furnace Construction
3. Materials Used in Construction and Operation
4. Actual Operations
5. Tools and Implements
6. Clothes and Customs
7. Contemporary Operations
8. English and European Operations
9. Uses of iron in 17th and 18th Cent.
10. Methods of Iron Manufacture
11. Contemporary literature
12. Financial and Court Records
13. Personalities

Administration

Secretary and Treasurer:
J. Sanger Attwill
Assistant:
Miss M. Louise Hawkes
Clerk

1. Finance
2. Correspondence
3. Museum
4. Files
5. Contracts
6. Property
7. Publicity
8. Library
9. Town Relations
10. Caretaker

Architects

Perry, Shaw & Hepburn
Kehoe & Dean

1. Design
2. Engineering
3. Reconstruction

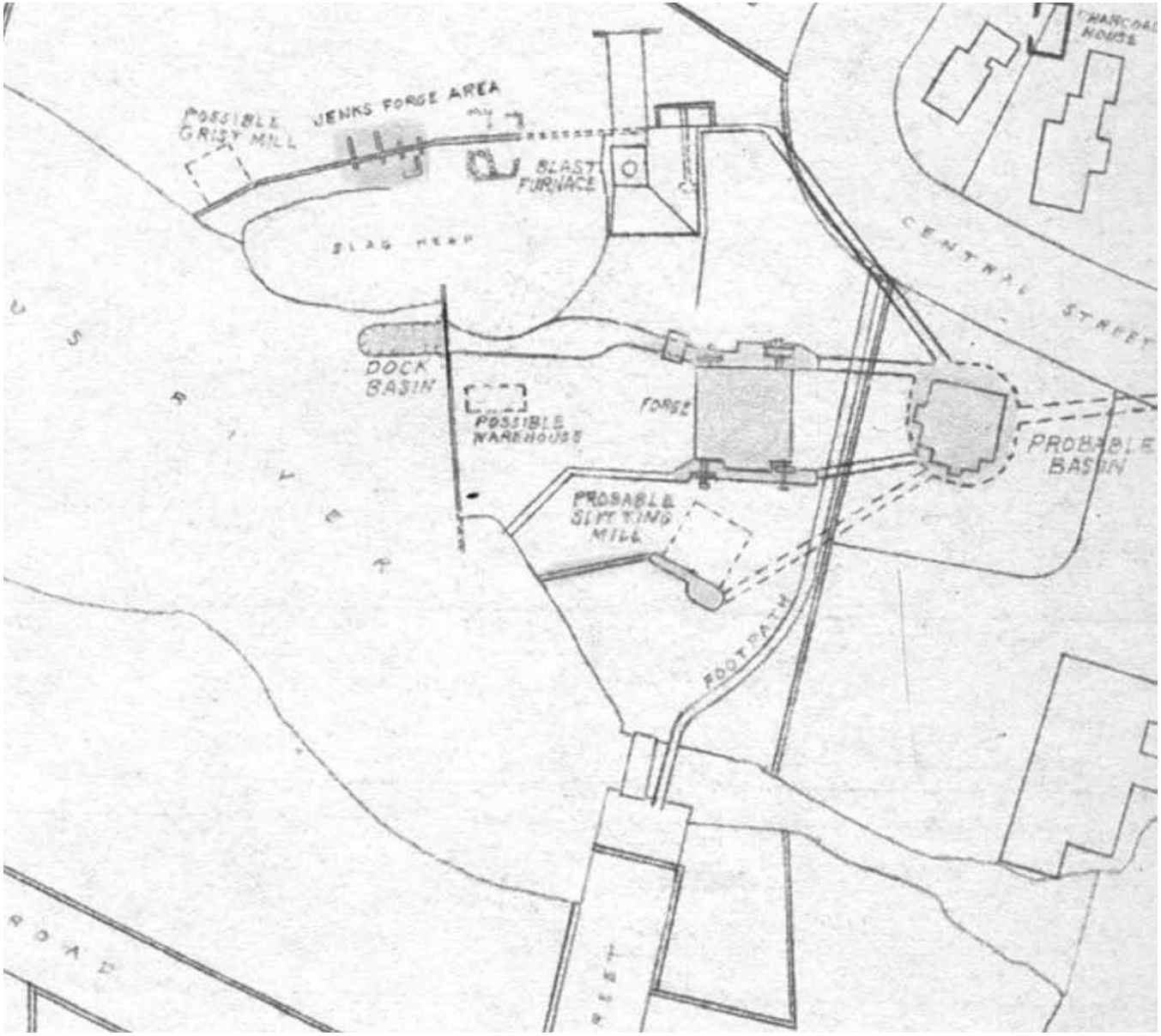
relative to a site datum. Merrill, hired on an intermittent basis like Bradford, began to photograph the excavations and features.[39] The several thousand excellent black and white photographs by Merrill provide a detailed record of the excavation work and later reconstruction. Drawing on his association with specialists like Bradford and Merrill, Robbins greatly expanded his own skills in surveying and photography during the Saugus project. Similarly, when Robbins recovered numerous animal bone and wood specimens, he sought help from Barbara Lawrence, curator of the Museum of Comparative Zoology at Harvard for bone identification, and Fred Orchard at the Peabody Museum for "properly treat[ing] and preserv[ing] the timbers of the tailrace and bellows base."[40] Although Lawrence took on the project of identifying the faunal remains from the project, Orchard explained to Robbins that his museum was not equipped to conserve large wooden artifacts.[41]

I checked the Geological Survey map of the Boston North, Mass., 1946 edition, and found . . . the distance between the site of the furnace waterwheel and the nearest section of the "cranberry bog" at the end of Marion Road to be about 500 feet."

Roland Robbins, "Saugus Ironworks Daily Log - 1950," January 9, 1950.

By mid-summer 1949, Robbins had located five separate foundations and began identifying them by number, "beginning with [the] furnace foundation as #1, the possible hammer foundation as #3, junction of 2 walls as #2, the possible forge foundation east of #2 and #3 as #4, and the stone evidence running ESE of the 3rd large elm tree site as #5."[42] Robbins also began a search along Central Street for the canal or waterway that had supplied the furnace with waterpower. His first two trenches averaged between 13 and 16 feet wide and 30 to 55 feet long and were oriented perpendicular to Central Street. These hand-excavated trenches each contained portions of a linear feature that measured between four and five feet deep and between ten and twelve feet wide, both with tapering ditchlike sides. Robbins was intrigued by these features but noted that he was "not entirely convinced" that he had found the canal course.[43]

From the very start of his full-time employment at Saugus, Robbins' approach to the excavations began to assume a haphazard appearance, apparently lacking any organized plan. Although archeologist Marley Brown commented in his 1977 review of Robbins' excavations that "in most cases, Robbins' testing proceeded on a rather random and limited basis, reflecting the location of utility trenches and other construction activity, rather than the application of any systematic sampling scheme," a closer look at Robbins' field notes and logs suggests that his work was far from random.[44] Robbins attempted to follow the feature and artifactual evidence in a logical sequence: for instance, he began with the furnace complex and then defined its watercourse and the source for this water. His strategy consisted of tracing identified features and evaluating the landscape, both through testing and topographic clues.[45] Testing north of the ironworks property resulted in the discovery of a series of other watercourses likely flowing out of a central holding basin. The various watercourses were then carefully followed to identify associated features, like wheel pits and raceways, from which he then expanded out to identify building-related features. Finally, he traced the tailrace features of these buildings to the river, where he then investigated the dock or wharf area. While several areas were often under investigation at the same time, Robbins did his best to work through specific areas and features, attempting to complete work in each activity area be-



3.6 Detail of plan of site showing basin, watercourses, and principal features, January 1953. (Drawing by Steve Whittlesey.)

fore moving on to a new area. However, numerous management issues and delays challenged Robbins' efforts and in the end he was forced to move around the site to satisfy the demands of the architects, attorneys, and reconstruction crew.

Private property issues, construction demands, and weather all hindered Robbins' attempts to carry out his work in a more systematic and organized fashion. For instance, his testing work around the houses that lined Marion Road, Central Street, and Bridge Street was continuously hampered by difficulties in getting permission to excavate and by landowner complaints.[46] Robbins was frequently promised access to properties by the FIWA's attorney, Laurence Davis, but after preparing for the work he would find that the situation was not properly resolved. In fact, the attorney's reputation with the neighbors was such that Robbins was frequently called upon to act as a negotiator and mediator between Davis and the property owners, particularly when the ironworks wished to buy the land.[47] Lengthy delays in rerouting Central Street, which covered the furnace waterwheel, severely disrupted Robbins' plans for completing work on the furnace complex before moving to other areas.[48] In another instance, his excavations along Bridge Street on several of the watercourses and the refinery forge complex were disrupted when attorneys discovered that they had not obtained permission from the city to work in the Bridge Street right-of-way. They ordered Robbins to backfill his units immediately and abandon the area until they had attended to the problem.[49] This caused a lengthy delay in the recording of features related to the refinery forge building and forced Robbins to refocus the ongoing excavation work on other areas.

Mr. Murray would not permit any more work *at the site of the hammer beam anchorage, anvil base, sites of uprights, or at any point within the 40 ft. right of way. Another day at the site . . . and we would have plotted their details, etc*. This cannot be done, *I was informed by Mr. Murray. Considering the importance of this work surely another day could have been spared to complete it.*

Roland Robbins, "Saugus Ironworks Daily Log - 1950," December 13, 1950.

Robbins' work plans were also disrupted by the demands of the architects and builders who literally followed him across the site during the reconstruction process. They frequently asked him to stop work in one area and move to another to answer a question or respond to a problem that had developed. He was also restricted by the guidelines set by the Reconstruction Committee that directed him to "concentrate his activities on locating and exposing only the major features of the industrial complex of the Iron Works proper."[50] For example, his work on the charcoal house foundation, located on private property north of the ironworks during testing for the watercourses, and his later work on the Jenks Forge area, were terminated by the Committee, which saw these elements as ancillary to the main buildings of the ironworks.

Although his ability to focus on specific archeological areas and features would become increasingly hindered by the overwhelming demands of the managers and the complexity of the site, Robbins initially succeeded in organizing his work around the furnace. He had identified five additional foundations to the southeast of the furnace by August 1949 and was continuing his series of "canal test trenches" along Central Street to locate evidence of the watercourse to the furnace. During the late summer and fall of 1949, he concentrated his excavation efforts on features associated with the furnace foundation, the casting beds, the crucible pit, and the bellows base, along with the area immediately east of the furnace foundation itself.

3.7 Robbins working in forehearth of blast furnace; note intact sow in front and to his right. (Photograph 116 by Richard Merrill, 1949.)

Commenting on the work completed in 1949, Robbins wrote in his report to the Reconstruction Committee that ". . . my major problems were not the locating and excavating of buried foundations, but rather the association of these foundations one to the other and their functions. This was necessary to determine the original pattern of the plant and its layout."[51]

Robbins went on to set forth some of the questions in his mind regarding the original site plan: "Why was this site decided upon? What was [sic] its geographical advantages? Its source of bog iron ore, and its water power? Where was the site of the stone wharf on the Saugus River?"[52]

Robbins then noted that

> probably the most revealing observation made during the 1949 excavations here at Saugus was the determining of the ravine which existed before the Ironworks were erected. And how the incline of this ravine climbed to a height of some thirty-four feet above the high tide of the Saugus River. Fullest advantage of the elevations provided by the ravine were made use of when the furnace, its bridge and the race were constructed.[53]

The increasingly successful excavations produced large numbers of ironworks-related artifacts, causing Robbins to observe that "our museum is bulging with tons of various artifacts uncovered during past excavations. These visible legacies of the past are being classified and must be preserved for future generations to revere and ponder."[54] While proud of his early accomplishments, Robbins concluded that identification of the ruins and artifacts was not enough: "the fact that many foundations and sites have been located does not indicate that my work with them is done. To locate foundations is one thing—to fit them and their intricacies into the over-all picture is another matter."[55]

From late 1949 to July 1950, Robbins and his crew performed only limited testing, including test units in the furnace crucible pit and the area east of the Central Street retaining wall. Severe winter weather limited work in the field and the Reconstruction Committee decided that he should "terminate present excavations until the middle or last of March." The committee suggested that he spend his time cataloging the artifacts and writing his report for the 1949 excavations. Meanwhile, the group discussed rerouting Central Street for excavations of the furnace waterwheel.[56]

The restricted work around the crucible pit focused on several fill areas containing slag and metal artifacts. Robbins initially speculated that these depressions may have been used for cooling hot slag waste, but felt that the quantity of slag and metal artifacts suggested some other interpretation.[57] Along the Central Street retaining wall above the furnace, Robbins trenched the slope to determine the stratigraphy

The collection includes a wide range of ironworking tools in both complete and broken-in-use forms as well as a range of iron products including cast iron fragments, ceramic casting mold fragments, stock, wasters, and finished products. Other seventeenth-century items with research potential include pipe fragments, Native American trade goods, leather shoe fragments, brass pins, case bottles, flatware, and domestic ceramics.

Eric S. Johnson, *Archeological Overview and Assessment of the Saugus Iron Works, National Historic Site, Saugus, Massachusetts*, p. 64.

3.8 Robbins examining artifacts in the Museum Building on January 7, 1950. (Photograph 139 by Richard Merrill, 1950.)

and in hopes of locating the supports for the furnace charging bridge.[58] He identified a concentration of stones, fire-scorched soil, charcoal, and a large iron sow in the same area; this suggested a possible foundation related to some type of production activity, potentially a bloomery or Catalan forge.[59] Robbins also continued to seek the source of the furnace watercourse, particularly the so-called "cranberry bog" area above the ironworks, during the first half of 1950.[60]

In addition to cataloging "relics" during the extremely cold and snowy winter, Robbins continued his research into appropriate conservation methods.[61] He wrote to Plimoth Plantation archeologist Henry Hornblower about iron artifact conservation. Hornblower suggested that Robbins contact James Bateman of Williamsburg.[62] In late January, Robbins sent Bateman "eight metal specimens" for restoration, but he felt that the results were disappointing and not worth the cost.[63] During this period, Robbins also continued what had already become standard procedure at Saugus: sending samples of iron artifacts and waste, slag, and iron ore to laboratories at several steel companies for analysis.[64] The members of the Reconstruction Committee and their consulting geologist hoped that these tests would provide new information on the specific iron-making process, result in the identification of iron ore sources, and succeed in distinguishing products made at the Saugus operation.

One thing worthy of note about evidence uncovered here (W. Quincy) is that this furnace was lined with sandstone. I found sandstone (burned) pieces that appear to be the same as used in the Saugus furnace lining. Also was found a type of stone similar to what was found at Saugus, but yet unidentified. It was found (both at Saugus and W. Quincy) mixed with the burned sandstone lining. It may be a type of sandstone. It is cataloged under #1-1-16 in 1948 relics.

Roland Robbins. "Saugus Ironworks Daily Log - 1950," April 7, 1950.

In April 1950, Robbins and historian Hartley traveled to West Quincy, Massachusetts, to investigate an early iron furnace known to be part of the larger "Company of Undertakers for the Iron Works" holdings.[65] Hoping to use this furnace for comparison with the Saugus complex, Robbins dug several small tests in an attempt to verify the furnace location. He succeeded in locating a foundation and evidence of the burned sandstone furnace lining in an area measuring 24 by 21 feet and evidence of a slag deposit; Robbins collected samples of both the sandstone and slag for later testing and comparison with the Saugus materials.[66]

Robbins received an introduction to local community politics during the campaign to relocate Central Street in order to search for the furnace waterwheel.[67] Negotiations between the FIWA members and town officials dragged out over several months due to disagreements over the cost of the project, public safety, and convenience. Town meetings generated heated debate and opposition from homeowners in the ironworks neighborhood and interested town representatives and neighbors visited the site throughout the summer of 1950. Robbins gave them full tours of the excavations, the museum and laboratory, and the artifact collections, while vigorously lobbying for the project.[68] With the help of lobbying efforts by Robbins and Reconstruction Committee members, the road rerouting was approved at a special town meeting on July 27, 1950. Anxious to leave politics behind, Robbins resumed excavation work the following day.[69]

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3.9 Iron artifacts prior to conservation treatment. Note the provenience information on the gear in the upper center of the photo. (Photograph 402 from the Roland W. Robbins slide collection, 1951, Saugus Iron Works. Courtesy The Thoreau Society® Collections at the Thoreau Institute at Walden Woods.)

Moving out from the furnace in hopes of identifying other ironworks structures, Robbins turned his attention to excavating the Bridge Street area and began a series of test trenches along the north side of the street.[70] He had previously determined that this area was a likely candidate for another ironworks structure as it appeared to contain several other watercourses running from the basin to the river's edge. Almost immediately, the digging identified two foundations at depths of approximately three and a half and five feet. Robbins also identified a "large circular affair" along the north side of Bridge Street that appeared to be a hammer base.[71] At a depth of 34 inches, he found a "stump or block of a tree that measured 41 inches in diameter."[72] "The theory at the moment," he recorded, "is that the circular wood base is the base on which the hammer fell and the metal waste about it was the accumulation of the impurities extracted from the iron by the hammer action."[73] Later discoveries would confirm that he had identified a forge hammer base.

During August, Robbins met with architects Conover Fitch and Harrison Schock of Perry, Shaw, and Hepburn, Kehoe and Dean to discuss details of the furnace layout.[74] At this session, and others like it over the next two years, Robbins provided commentaries on the features, plan and profile drawings of the excavations, and relevant photographs, all to aid the reconstruction design process. The work of surveyor Bradford and photographer Merrill also contributed to the discussion.

After identifying the hammer base along Bridge Street, Robbins dug several test trenches "to determine the natural soil line" and guide future excavations.[75] "At this spot," he recorded, "only several inches of surface soil covered a deep deposit of natural clay."[76] His notes for the excavation of these trenches contain clear, detailed descriptions of the soil profiles that note soil color, soil type, disturbances, and the stratigraphic relationships between the various layers and deposits.[77] During late August, Robbins used heavy construction equipment to begin restoring "the slope from Central Street to the area south of the furnace" to the natural contours that existed prior to the construction of the Central Street roadway.[78]

Also in August, Robbins and his men found another wooden feature about 11 feet east of the hammer base that was later identified as the hammer beam base or upright. This feature also appeared to be a section of tree, although in this case squared off and smaller than the first, measuring 21 by 23 inches.[79] Robbins and Hartley were excited about this discovery, believing that it and the hammer base were likely part of the ironworks' refinery forge building.[80] This interpretation was strengthened when, on August 31, Robbins found the head of a trip hammer of the type and size likely used in a refinery forge operation in the immediate vicinity of the bases along Bridge Street. He noted that the 500-pound iron hammerhead was covered with approximately 8 to 10 inches of soil and "appeared to be resting on natural clay."[81]

I excavated the newly located metal waste square sleeve found . . . [east or northeast] of the circular metal waste affair found on the [north]side of Bridge St. It is the same idea as the circular metal affair, only smaller and somewhat square . . . Found in it was an upright section of a tree. It had been squared somewhat, rather than left in its natural . . . shape. Hartley seemed quite pleased about this discovery. Said it enhances the chances of this being the site of a hammer and refinery.

Roland Robbins, "Saugus Ironworks Daily Log - 1950," August 25, 1950.

3.10 Architects from Perry, Shaw, and Hepburn, Kehoe and Dean reviewing drawings. (Photograph 1071 by Richard Merrill, 1953.)

In September 1950, the Central Street detour went into effect and Robbins made arrangements with a backhoe operator to begin removing the street surface as soon as possible.[82] The backhoe work, Robbins reported, entailed "restoring the natural contour here," and began with the removal of the Central Street retaining wall between Bridge Street and Marion Road.[83] After the bulk of the fill was removed from the Central Street slope above the furnace site, Robbins and his crew continued the search for the furnace waterwheel, "removing the fill from the area at the northwest corner of furnace and the easterly slope of the ravine" by hand.[84] He also continued test trenching to establish the natural grade at the intersection of Central and Bridge streets and Marion Road, when utility trenching produced evidence of a possible watercourse and a new foundation.[85] The bottom layer of silt in this trench, Robbins recorded, contained "Indian chips . . . that suggest the possibility of a natural brook having crossed here . . . ."[86] A similar watercourse was found in a trench behind a house at the corner of Marion Road and Central Street. Robbins believed that this watercourse was a direct approach to the furnace waterwheel.[87]

[T]he site of the charcoal house, pit or shed was located! About 3' of fill soil covered this charcoal bed. A test hole through the charcoal found it to be 45" deep. A piece of a brick was found at the bottom of the charcoal. Hartley believes a pit may have stored the charcoal.

Roland Robbins, "Saugus Ironworks Daily Log - 1950," October 19, 1950.

Beginning in mid-October, Robbins initiated a series of test trenches between Marion and Greystone roads west of Central Street.[88] Four of the twelve trenches revealed soil profiles that strongly suggested to him that he had identified a waterway cutting southeast from the "cranberry bog" to the ironworks.[89] He wrote that "information and artifacts revealed by trenches #4, 5, 6, and 7, as well as similar evidence noted in two trenches crossing Union St. near junction of Marion Rd. speak convincingly of a brook or water course leading from the cranberry pit in a somewhat southeasterly direction."[90]

Robbins also identified and partially excavated the site of the probable charcoal house in the rear yard of a house on Marion Road, west of Central Street. He reported that three feet of fill soil covered a stone foundation and charcoal bed that measured 45 inches deep.[91] Ongoing digging at the charcoal house site was unfortunately cut short due to complaints from the tenant living in the house and pressure from Attwill to return to more important features. Robbins was forced to record and photograph the exposed foundation features quickly before backfilling the excavation.[92]

During November 1950, Robbins continued working on restoring the original contours along Bridge Street and testing along Central Street to determine the extent of the ravine.[93] He and his crew then returned to work on the site of the anvil base foundation in the refinery forge area, south of the Bridge Street retaining wall.[94] As Robbins and the crew shoveled down this area, he identified several new features including uprights that supported the hammer beam, a stone foundation north of the retaining wall (the remains of a later tannery), and possible evidence of the waterwheel pit and watercourse for the refinery forge.[95] Shortly after finding these new features, Robbins was informed by the Institute's lawyer that the area would have to be backfilled immediately because it was within the 40-foot Bridge Street right-of-way owned by the city and the FIWA had not yet negotiated access to this area. Before the area was backfilled and fenced, Robbins sketched the evidence and had Richard Merrill take photographs.[96]

3.11 Profile of furnace watercourse at head of Central Street, January 13, 1951. (Photograph 642 from the Roland W. Robbins slide collection, 1951 Saugus Iron Works. Courtesy The Thoreau Society® Collections at the Thoreau Institute at Walden Woods.)

During the 1951 season, Robbins returned his attention to excavation along the recently closed Central Street corridor. Digging in January along the Central Street slope near the furnace and at the intersection of Central Street, Marion Road, and Bridge Street, he identified a stone foundation west of the furnace and a disturbance at the head of the Central Street ravine slope, respectively. Robbins believed that the stone foundation was likely the base of the furnace bridge or at least a retaining wall associated with the bridge support structure. He identified the disturbance as the watercourse leading to the furnace raceway.[97] Using the watercourse as a lead, Robbins concentrated his energies on finding the furnace waterwheel pit, calculated to be some 20 feet below the surface of Central Street. In February 1951, he identified a waterwheel bucket and proceeded to methodically uncover the entire furnace wheel pit and adjacent raceway, carefully documenting the work with his own sketches and photographs and with help from Bradford and Merrill.[98] Robbins excitedly recorded in his log that "today's work hit the jackpot! While I had expected to find about 25% of the waterwheel cradled in the race at least 40% of the wheel was found there . . . . "[99] He calculated the wheel's diameter as 16 feet and determined that it was definitely an overshot wheel.[100] The wood preservation was remarkable and Robbins found the wheel, wheel pit, and a section of the raceway virtually intact. The waterwheel's buckets even retained the original animal hair caulking used to make them watertight.

I estimate the outside measurement of the wheel to have been about 16' when in operation. Inasmuch as the lower area of the race is still full of stones, dirt and various rubble the exact diameter can not be determined until it is cleaned out. It definitely was an overshot wheel! The race at the wheel's center was 29" in width. Schock and Harley down in P.M.; were delighted and surprised at the discovery. I shall try to obtain more knowledge concerning the wheel's diameter and various measurements tomorrow.

Roland Robbins, "Saugus Ironworks Daily Log - 1951," February 23, 1951.

The almost unbelievable condition of the waterwheel complex brought the issue of wood preservation to a head, prompting Robbins to immediately search for appropriate conservation treatment prior to dismantling the feature. He first consulted Fred Johnson, a curator at the Robert Peabody Museum in Andover. Johnson had few ideas, telling Robbins that "it was so large that it may be impractical to do much with it," but recommended that he talk with Dr. Elso Barghoorn at Harvard's Biological Laboratories or Hugh Hencken at Harvard's Peabody Museum.[101] Robbins met with Barghoorn several days later and Barghoorn became interested in the problem and offered quickly to begin some limited experiments.[102] Robbins reported his finding to the Reconstruction Committee which authorized him to "attend to all arrangements for the dismantling, treating, and preserving of the water wheel."[103] As discussed further in Chapter 11, Barghoorn experimented with several possible treatments before arriving at the process of immersing the wood in hot paraffin wax to drive off the water and provide structure to the wood.[104]

While seeking appropriate treatment for the waterwheel and wheel pit complex, Robbins continued test trenching on the east side of Central Street and along the north side of Bridge Street, searching for the exact paths of the furnace and refinery forge watercourses.[105] This trenching uncovered evidence of watercourses to both the furnace and refinery forge and suggested that the furnace watercourse split off the refinery canal.[106] This evidence convinced Robbins that the furnace waterwheel was supplied from the same source as the refinery and also suggested to him that the furnace and refinery probably were built at the same time.[107]

3.12 Intact section of excavated furnace waterwheel, June 13, 1951. (Photograph 362 by Richard Merrill, 1951.)

During the summer of 1951, Robbins and his crew excavated to the south, east, and west of the furnace foundation itself, locating yet another foundation along the furnace tailrace.[108] By June, Robbins was satisfied with Barghoorn's experimental wood treatment process and completely dismantled the furnace waterwheel and wheel pit complex and shipped it to Barghoorn's lab.[109] In July, Robbins resumed testing along Bridge Street near the refinery forge and located a second watercourse along the east side of the structure.[110] About this time, he directed heavy earthmoving equipment into the wharf area, focusing on Foundation #6, the possible warehouse structure.[111] While testing in the area south of Foundation #6 and east of the slag pile, Robbins discovered several round beams over 50 feet long. He interpreted these beams as base sills of cribbing for the wharf or dock.[112] The same day, excavation of a trench along the south side of Bridge Street revealed evidence of a third potential watercourse crossing Bridge Street to the east of the refinery forge site.[113]

During the fall of 1951, Robbins excavated the wharf area and the two refinery waterways identified earlier in the year. In October, he located more evidence of a dock in the wharf area on the east side of the slag pile. He also performed limited excavations among the foundations on the furnace tailrace reportedly associated with a forge belonging to ironworker Joseph Jenks.[114] In late November, Robbins had his crew uncover the hammer anvil base feature within the refinery forge and begin excavating the related hammer watercourse and wheel pit.[115] This work continued into December, when he and the crew also began to investigate the second refinery waterway, located east of the hammer waterway.[116] In particular, he sought evidence of the refinery forge between these two watercourses.[117]

Robbins continued to excavate in the Bridge Street refinery forge area in the new year, working on the second wheel pit on the first, or hammer, refinery waterway.[118] Digging in this area was discontinued when Robbins decided to wait for "more consistent good weather."[119] The weather warmed in a few days and Robbins began excavating "evidence of [an] old retaining wall" at the foot of Central Street. After several weeks in this area, he moved the crew back to the Joseph Jenks forge area "just westerly of [the] south end of [the] slag dump."[120] In mid-February, Robbins' crew identified several base sills and other timbers that suggested the presence of a race or wheel pit feature.[121] Several days later, Robbins found the hub and shaft of a waterwheel buried in the fill and within the next two weeks identified two more waterwheels in their wheel pits.[122] The excavations in the Jenks area also yielded "many interesting artifacts," including shoe leather, slag, iron waste materials, and red clay tobacco pipes.[123] Robbins later found a fourth waterwheel and identified the likely remains of Jenks' forge hearth.[124]

During late March and April 1952, Robbins continued work in the Jenks area and opened up the second refinery waterway crossing Bridge Street.[125] In April and May, he "restored the contours" in the furnace casting beds and the area between the furnace and first refinery waterways.[126] While working in the area

Through the interest and collaboration of Roland W. Robbins . . . precise data concerning present tidal relations have been obtained, as well as useful and important historical information. Critical examination of the field relations exposed in the Saugus excavation indicates that the entire area of the early Iron Works development has been affected since 1650 by an increase in the height of tide in the Saugus estuary of approximately 2½ to 3 feet.

Elso S. Barghoorn, "Recent Changes in Sea Level Along the New England Coast: New Archaeological Evidence," *Science*, Vol. 117, No. 3048 (May 29, 1953), p. 597.

3.13 Robbins (bottom center in white baseball cap) and workmen excavating along waterfront "dock area," December 7, 1951. (Photograph 533 by Richard Merrill, 1951.)

of the second refinery waterway, Robbins also further explored the possible third waterway crossing Bridge Street.[127]

From June through August, Robbins focused his attention on the layout of the refinery forge and two associated waterways.[128] He worked around the anvil base, "cleaned down to [the] working surface of [the] refinery area," and excavated along the second refinery waterway.[129] He identified a second anvil base feature, 42 inches in diameter, similar in width to the other finery anvil base. This led Robbins to argue for a "two hammer setup at the forge."[130] His discovery led to a series of Reconstruction Committee meetings that pitted Robbins against some of the committee members who ultimately decided that the layout had only one hammer that had been replaced.[131] Further work around the second anvil base revealed metal waste evidence indicating that the second hammer, like the first, had been used extensively.[132] Even with this convincing new evidence, the Committee members refused to change their minds. In fact, chairman Quincy Bent commented to Robbins, "What are we going to do? We've got to do some building."[133]

In reading through Roland Robbins' notebooks it can be seen that there was little effective cooperation between the archaeologist, the historian, and the architects. It is obvious that, at least in the case of the refinery forge, archaeological evidence was either entirely ignored or modified in the final design. Assessing the accuracy of the reconstruction then, should utilize not only an architectural historian but also an industrial archaeologist whose task it would be to examine the validity of Robbins' interpretation of the evidence . . . and the specific use of this evidence . . . by the restoration architects.

Marley R. Brown III, "Saugus Iron Works National Historic Site: An Evaluation of Roland Wells Robbins Archaeology," pp. 15-16.

During the fall of 1952, excavation continued at the refinery forge complex, with Robbins "seeking possible evidence of early uprights" that might indicate the structural layout of the actual building.[134] In late October, he resumed his search for the "southerly course of [the] third waterway."[135] At the same time, he dug new trenches in the wharf complex, where he reported that "we are finding a great deal of rich, black . . . soils in the area abutting . . . the stone wall built above the wharf sill. In it are many artifacts, including some very interesting shoe leather."[136] Excavations in the wharf area also located what Robbins believed to be a boat basin for floating boats at low tide.[137] New trenching north of Bridge Street identified "definite evidence of the [impounding] basin" that supplied the ironworks waterwheels.[138] For the remainder of the year Robbins focused primarily on the excavation of the third waterway, thought to be the slitting mill site, and the wharf area.[139]

Little digging occurred during January and February 1953 because of bad weather. When work resumed in March, Robbins turned his attention to the rolling and slitting mill site, "removing all fill soils to the natural sub-surface which can be carefully studied for evidence of gear pits or other slitting mill activity."[140]

The excavation crew also returned to the wharf area after Robbins and assistant Steve Whittlesey had recorded the details of the "yard and dock sills." Following this mapping, Robbins and Whittlesey laid out "a system for numbering the sills intended to be removed."[141] In April and early May, Robbins concentrated his efforts on the slitting mill site, working "about the charcoal bed and stone work located there."[142] He also excavated the "surface directly below the iron works surface with the hope that we might find some evidence of stone work, or locate sites of wooden uprights" that supported equip-

3.14 Excavation of slitting mill area looking east toward Saugus River, December 27, 1952. (Photograph 778 by Richard Merrill, 1952.)

ment or the building itself.[143] In the end, little evidence of the slitting mill structure survived, but Robbins identified the waterwheel that powered the mill, charcoal and stone evidence that he and several Committee members finally interpreted as a heating forge for the mill, and numerous artifacts that were clearly products or scrap from the mill.[144]

During late May and June, Robbins and his crew worked on restoring the "west arm of [the] ravine, to the south of [the] stairway to [the] furnace" along Central Street. Beneath the retaining wall, he again located a stone foundation that after additional excavation was found to contain a possible hearth, cast-iron hearth plate, slag material, and another anvil base. Although historian E. Neal Hartley previously had identified the foundation as a roasting oven, Robbins thought that the evidence suggested smelting activity.[145]

Just prior to Memorial Day, Robbins and his crew also opened seven test trenches around the Iron Works House before having the area regraded. Although the tests "revealed no evidence of stone foundations," Robbins located several "post sites" or postholes. He recorded in his daily log that "possibly these posts originally were pilings for some sort of building structure. To properly evaluate the pattern of the postholes, and to determine how many more exist in this area, it will be necessary to take the entire area down to the sub-soils."[146]

Beginning in late June 1953, Robbins began the removal of additional soil and sections from Central Street, running test trenches to "determine the extent of fill . . ." and "pick up contours that existed there 3 centuries ago."[147] This work continued until late July, when Quincy Bent abruptly ordered him to stop. After discussing Bent's "gruff remark" with architect Conover Fitch and the state of his health with his doctor, Robbins met with Bent several days later and resigned as archeologist and member of the Reconstruction Committee.[148]

With Robbins gone, assistant Steve Whittlesey continued the excavations. Robbins reported that Whittlesey, who had joined the project in April 1952 as Robbins' "civil engineer," was his "logical successor." "He is," Robbins noted, "acquainted with this work, and should be able to work out details." Robbins commented as he left that there was "considerable detail work to be done in certain areas. But this work would not create drastic changes in the basic pattern of the entire layout."[149] Whittlesey remained on site, completing various small excavation projects and final documentation; he resigned his position immediately after the formal dedication of the restoration in September 1954.[150] At this point, with Robbins and Whittlesey gone, the processing and cataloging of the artifacts from the excavation was carried on by others, with little continuity to and no participation from the original excavators.

At Saugus, Robbins attempted to "restore the contours," or literally to return the site to the original ground surface and configuration based on his reading of the early soil strata and evidence for building floors and surfaces. A close reading of Robbins' records suggests that his decisions regarding the historic topographic configuration at Saugus were generally well reasoned and accurate, based as they were on soils data, a host of building-floor levels, watercourses . . . , work area surfaces such as the casting beds, and water levels in the Saugus River. . . . [However], the movement of soils around the site resulted in problematic mixing of soils and artifacts from various areas, along with the general destruction of potentially intact soil layers and artifacts from some portions of the site.

Donald W. Linebaugh, *The Man Who Found Thoreau: Roland W. Robbins and the Rise of Historical Archaeology in America,* pp. 78-79.

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3.15 Lawrence Davis, Harrison Shock, and Quincy Bent view work on April 20, 1951. (Photograph 696 from the Roland W. Robbins slide collection, 1951, Saugus Iron Works. Courtesy The Thoreau Society® Collections at the Thoreau Institute at Walden Woods.)

In a 1975 review of Robbins' work, archeologist Marley Brown writes that "it would appear that Robbins's resignation was triggered in part by an argument with Quincy Bent." Historian Stephen Carlson likewise reports that "increasingly, Robbins came into conflict with Quincy Bent over the extent of the remaining archaeological effort."[151] While Brown and Carlson are correct that conflict with Bent triggered Robbins' resignation, his resentment had been brewing for some time and actually grew out of a variety of obstacles. Among the factors influencing him to quit were his continuing frustration with the decisions of FIWA and Reconstruction Committee members and the architects, an extremely complex and demanding archeological site, overwork caused by responsibility for many non-archeological issues, and the cumulative effects of these problems on his physical and mental health.[152]

Robbins became disenchanted with FIWA president J. Sanger Attwill early in the project because Attwill failed to run a tight ship. Although unhappy with many daily operational problems, Robbins was particularly disgusted with Attwill's repeated failure to pay his crew members' meager salaries on time.[153] Attwill's lax attitude toward the payroll, Robbins recorded, also carried over to his management of the FIWA accounts payable. Robbins reported that he was called repeatedly by suppliers and contractors who had not been paid. Another disagreement, typical of those between Robbins and Attwill, revolved around the installation of a fire alarm system in the museum buildings. Robbins strongly argued for the "utmost precautionary measures where we are exhibiting our original waterwheel, anvil block, and other wooden artifacts, and hundreds of invaluable relics."[154] However, Attwill overruled Robbins' suggestion for the alarm system because the museum buildings were still "temporary."

To my mind, if fire should break out in the old museum building, within five minutes the interior could well be beyond control. In any event, I have made my point, this being the need of utmost precautionary measures where we are exhibiting our original waterwheel, anvil block, other wooden artifacts, and hundreds of invaluable relics.

Roland W. Robbins. "Saugus Ironworks Daily Log - 1953," April 24, 1953.

Robbins was also particularly discouraged by what he felt was the architects' lack of interest in and ignorance of the archeological evidence. On several occasions, Robbins and members of the Reconstruction Committee, including chairman Quincy Bent, questioned the quality of architectural work by staff at Perry, Shaw, and Hepburn, Kehoe and Dean. For instance, in August 1951 Robbins recorded that

> . . . for the past 2 years the architects have had the opportunity to study the detail and features of the furnace . . . etc; and yet are confused and ignorant of desirable furnace foundation data . . . . Making the architects [sic] confusion seem more unusual is the fact that all of Hartley's, Bradford's and my information has been made available to them, as well as Merrill's pictures.[155]

In November 1951, surveyor John Bradford was asked by architect Harrison Schock to provide his drawings of excavations in the wharf site, but Robbins told Bradford to do "no such thing."[156] Robbins commented that "my experience with Schock proves he has not the ability to understand the details of my business . . . . As such I do not intend to have Schock "decipher" and interpret something which is

3.16 Reconstruction Committee meeting in the east room of the Iron Works House, September 11, 1951. (Photograph 437 by Richard Merrill, 1951.)

still in its preliminary state and very complex. Schock will receive a copy of my report on this area when it is prepared, and with other associates."[157]

Writing to committee member and ironworks expert Charles R. Harte about the reconstruction plans for the blast furnace in 1952, Robbins complained that "[they] have had the use of all Hartley's, Bradford's, and my notes, as well as a complete set of our photographer's photographs, as well as material you sent them—yet are at a loss as to certain detail and elevation. What pray tell will they have to offer for the upper section of the furnace for which no evidence was uncovered?"[158]

Robbins was not the only staff member to be irritated by Schock. In a 1951 letter to committee member Charles R. Harte, chairman Quincy Bent wrote that "Mr. Schock's personality leaves much to be desired. He has a rare talent for rubbing people the wrong way, and has clashed on several points with Robbins and Hartley."[159] In early 1952, Robbins noted that Schock was going to complain to Bent that Robbins was not providing the needed data to the architects. Robbins recorded that Schock had not written or phoned to request information since September 1951, adding

> how can I be refusing him data if he doesn't ask for it. All my work has been with [Conover] Fitch . . . . I have shown the utmost patience with the architects in many respects . . . . Apparently Schock again has his rear in a sling and is going to try and use Robbins as a means of getting out of it.[160]

Mr. Bent was down yesterday. You will be happy to learn that he raised Hell with the architects. Mr. Schock has been called on the carpet by Mr. Hepburn. In other words, we should see constructive progress on the project really taking hold.

Roland W. Robbins to Charles Rufus Harte, August 8, 1951.

Following a meeting of the Reconstruction Committee in 1952, Robbins reported that both he and Hartley had remained silent about problems with the reconstruction, noting that "this silence was our tribute to Fitch, who is a hellava nice fellow—and not personally responsible for the architects' errors."[161] In mid-1953, Charles Harte resigned because of his own frustrations with the reconstruction designs, particularly the forge layout and furnace details.[162]

Problems also existed within the Reconstruction Committee, particularly concerning the free hand given to chairman Quincy Bent by the American Iron and Steel Institute.[163] Robbins came into conflict with Bent, himself a powerful personality, early in the project, and their disagreements escalated rapidly. Bent made it clear to Robbins that he was in control in every regard; Robbins was, to use J. C. Harrington's phrase, their "digging technician." Harrington wrote that "the problems of construction and restoration are so specialized that the archaeologist is not much more than a digging technician, and in most cases the conclusions and interpretation must be left to . . . specialists and architects."[164] In one instance, Robbins was invited to present a lecture on the Saugus excavations to the Eastern States Archaeological Federation and wrote to ask Bent if he should accept.[165] The tone of the salutation in Bent's reply, "My dear Robbins," suggests Bent's dismissive attitude toward him. Bent went on to explain that Robbins re-

QUINCY BENT
BETHLEHEM, PA.

WEYHILL FARMS

October 8, 1952

My dear Mr. Harte:

I have your note of October 5, tendering your resignation from the Reconstruction Committee.

This Committee was not founded with the idea that we should do the actual work in details, but to be used as a reference group, that they would follow the general purposes of the plans for reconstruction.

If we were to wait until every detail of re-building was approved, we would have plunged ourselves into a mass of history and procedures, which would have made progress impossible.

As new light comes to us, we must change those details, but not until then and then there will be a difference of opinion which must be reconciled.

It would seem to me that you are at odds with us on the details of construction and I ask of you a reconsideration of your decision of resignation until we can arrive at some conclusion of those details and new evidence is before us as to the necessity of a change in what has been done.

Your advice, help and knowledge is too valuable to miss just now and you must expect that some of us are not in accord with all that is being worked out today.

To reproduce what was in the minds of men three hundred years ago always needs careful consideration at the right time.

With warm regards,

Sincerely,

Quincy Bent

Mr. Charles R. Harte
28 West Elm Street
New Haven 15, Connecticut

3.17 Quincy Bent's reply to Charles Rufus Harte's resignation.

ally should be spending his time digging and indicated that he would need to get the "concurrance [sic] of Hartley and the Institute" to proceed with the lecture.[166]

Another early example of Robbins' conflict with Bent was an argument over staffing. In 1950, Bent had visited the ironworks over a weekend and found that no one was available to show visitors through the excavations and house. The next Monday, Attwill informed Robbins that Bent wanted him at the ironworks over the weekends for this purpose. Robbins was incensed that Bent expected him to do this in addition to his many other responsibilities. Like the lecture dispute it reinforced Robbins' "staff" position as opposed to the status conferred on other consultants like Hartley.[167] After talking with his wife, Robbins decided to resign "because of the consistent lack of cooperation my department gets from Bent and Attwill"; clearly he was also feeling used and under appreciated.[168] Before actually resigning, Robbins discussed the situation with Charles Parker and Walter S. Tower of the American Iron and Steel Institute in New York and both "wouldn't hear of it [the resignation] . . . . Mr. Tower then told me to sit tight—everything would be taken care of."[169]

Robbins and Bent clashed again a few months later over the issue of Robbins' salary and car expenses. Tower had told Robbins that he would get a salary increase and should also request car expense reimbursement.[170] Robbins followed this discussion up with a letter to Tower, but when Bent heard about it he believed that Robbins had deliberately gone over his head. "Obviously Mr. Bent was irritated by the incident . . ., " Robbins recorded.[171] Bent also told Robbins that he was not to lecture to groups during the work day. This exasperated Robbins because most of these engagements were pro bono lectures for local groups and clubs to "create interest and spread goodwill!" He noted that "after Mr. Bent's acid remark I have no designs on continuing this goodwill work in the future."[172]

Interestingly, Robbins saw the tensions between himself and Bent, and among Committee members in general, as healthy for a project of this magnitude and complexity. Writing to Bent after his resignation, he explained that "[t]he Saugus Restoration is a monumental work. The personalities responsible for its success have every right to do a bit of hair pulling among themselves. It is healthy, and brings problems and misunderstandings out into the opening *[sic]*. But it should be done behind closed doors, not made an undignified public spectacle."[173] Robbins realized that conflict and disagreement were inevitable and even acceptable for this type of interdisciplinary project. However, he was clear that there were specific rules of engagement and these had, he felt, been breached.

While dealing with Bent was problematic, Robbins generally enjoyed a good relationship with the staff of the American Iron and Steel Institute. Unlike Bent, these individuals treated Robbins as a professional consultant and accorded him the respect he thought he deserved. For example, Institute president Walter S. Tower counseled patience, urging Robbins to work at maintaining a good relationship with Bent. He added in the letter that he hoped that "life's little irritations will not in any way detract from interest

I enclose a letter with an invitation to present the Saugus Restoration project to members and guests of the Eastern States Archaeological Federation at the University of North Carolina, October 26-27, 1951. Dr. William Ritchie, who suggested this paper, is with Yale University's Archaeological School. While this talk would be of an academic nature, it may also be favorable for public relations. Would you kindly let me know your views on this matter, whether or not you would like to have me accept this invitation.

Roland W. Robbins to Quincy Bent, August 19, 1951.

3.18 Edward Ryerson, Walter S. Tower, J. Sanger Attwill, and Quincy Bent at a June 30, 1951 meeting. (Photograph 379 by Richard Merrill, 1951.)

in the job which you have managed so well . . . ."[174] Tower was always very supportive of Robbins's archeological work and frequently commended him for his extra efforts and achievements.[175]

As a consequence of the enormous archeological task and the problems associated with working for multiple project managers, Robbins had been "driving himself beyond all reasonable limits."[176] The often complex, varying objectives and the inexperience of restoration-minded organizations and their sponsors made planning and implementing excavations like Saugus difficult and required Robbins to do far more than excavate. At Saugus, for instance, he served simultaneously as a consultant to the restoration planning committee, primary archeologist, exhibit planner, site interpreter, museum curator, landscaper and landscape restorer, maintenance chief, and often day-to-day manager of the site. These multiple responsibilities and the intense pressure to move the reconstruction work to completion, clearly created daily stress for Robbins. His wife Geraldine reported to Quincy Bent that "in a desperate effort to keep going he went from doctor to doctor and specialist to specialist. The diagnosis in every case was the same—overwork."[177] Robbins came to realize the problem himself, writing to Quincy Bent that

> as complex as my archaeological work was it presented no problem which would wear me out, both physically and mentally. But to mix this work with sundry duties ranging from overseer of all problems to caretaker of washrooms, interspersed with two museums to study and carefully prepare appropriate exhibits for, as well as public relations and goodwill, research which developed mediums for restoring our priceless artifacts, both metals and wood, annual meetings which necessitated careful planning and many late evenings, as well as numerous other time absorbing details, was more than my strength could contend with after dieting on it for five years.[178]

Robbins felt demoralized that so much of this extra effort was "just taken for granted."[179]

All of these factors had an effect on Robbins' physical and mental health. By fall of 1952, he was complaining of "touchy nerves and irritableness." After a complete physical, his doctor recommended that he take a vacation and forget about Saugus. He wrote to an associate in Philadelphia that "two days after returning from my vacation, I found myself bordering on the rim of a possible nervous breakdown. I am under doctors *[sic]* orders to take things much more quietly, as well as a full dose of pills and medicine three times daily."[180]

Several months later he complained about his "damn nerves . . . kicking up again" and the doctor increased his dose of medication.[181] In late December, Robbins visited another doctor for continuing nerve problems, who also advised a vacation.[182] A visit to yet another doctor in early January 1953 con-

I have a definite interest in the Saugus Project, but I make no apologies for the fact that my primary interest is in the health and welfare of one Roland W. Robbins. There has been more than one occasion when he finished a job at a loss physically and financially. He is as fanatic in this as he is in details, as boring and unnecessary as they may seem to be to others. It is ironic that the assets which made him successful in his profession are the very factors which broke his health.

Geraldine Robbins to Quincy Bent, October 29, 1953.

3.19 Robbins displaying a shovel recovered from the excavations. (Photograph 479 taken by Richard Merrill, 1951.)

firmed the earlier diagnoses and treatments and in February Robbins finally took a much needed one-month vacation.[183]

While the vacation helped renew his strength, he returned to the same set of circumstances that had precipitated his earlier problems. The confrontation between Bent and Robbins over the Central Street excavations in July 1953 was the final straw. Robbins felt he had dealt with the "human elements" and overwork for too long and was "completely worn out."[184] Even so, he remained characteristically resilient about his troubles at Saugus: "Of course there were certain human elements that saw to it that my life was unpleasant. But that happens wherever you go."[185]

I do not know how things are progressing at Saugus, having not been there since the day I talked with you [and resigned]. If conditions are such that I can be of any assistance to help insure the success of the Saugus Restoration, my sincerest desire is to cooperate in any manner I can . . . . If in assaying the progress of the Saugus Restoration you feel there is no longer need of my services, nor interest in my articles or lectures, I would like to be so informed so that I can feel free to pursue new interests. Though my health necessitated my dropping from the picture for a few weeks, my thoughts were always with the work.

Roland W. Robbins to Quincy Bent, November 16, 1953.

Robbins' excavations at the Saugus Iron Works clearly fit into the restoration tradition typical of much postwar historical archeology.[186] In his 1975 review of Robbins' excavations, archeologist Marley Brown reports that he effectively "located and excavated the major industrial components of the Iron Works."[187] Robbins' work went beyond the typical levels of restoration archeology in many ways. This is particularly true considering the lack of a comparative database from excavations of other iron works.[188] In addition, Robbins collaborated with an interdisciplinary team, drawing on the work of full-time historian E. Neal Hartley, metallurgical experts from the iron industry, a consulting geologist, and several members of the Harvard Biological Laboratories and Botany Museum. To the extent possible, he approached his work at Saugus in a very logical and organized manner.

Excavating roughly by natural strata, Robbins utilized general vertical and horizontal controls within test units and trenches. He excavated many small units across the site to determine the overall stratigraphy and identify ironworks features prior to more extensive mechanical excavation.[189] In seeking stone foundations and other solid features, Robbins utilized his trademark probe rod or "prodding rod."[190] His plan and profile drawings provide quite accurate information on the locations of both features and selected artifacts.[191]

Robbins' decisions to excavate at Saugus were based on documentary evidence and following features such as the furnace base, anvil bases and hammers, watercourses, and waterwheel pits to determine building locations or activity areas.[192] He used a wide range of documentary sources gathered by himself and historian Hartley to direct his fieldwork at Saugus, including early illustrations of ironworks by Diderot, plats and maps, and contemporary accounts.[193] Archeologist Mary C. Beaudry, who analyzed the use of documentary sources for the project as part of the 1975 review of Robbins' work, writes "Robbins was able to make fairly accurate statements about the remains he uncovered, based on the small-scale research which he personally conducted."[194]

3.20 Robbins looking over the shoulders of dendrochronologists examining the anvil base in the museum, April 1953. (Photograph 871 by Richard Merrill, 1953.)

Robbins supplemented his documentary research with visits to other iron-making sites in the area and throughout New England. These opportunities for comparative research were very important for Robbins in that little descriptive information was available through written sources. Robbins also conferred with other archeologists and historians working on historic sites around the country, particularly those excavating iron-making sites such as the National Park Service's project at Hopewell Village in Pennsylvania.[195]

The Saugus site produced thousands of artifacts and exhibited excellent preservation of metal, wood, and leather. The survival of these materials presented enormous conservation problems that concerned Robbins from the very beginning of the excavations. He contacted several iron conservation specialists and eventually began a series of experiments with Professor Herbert Uhlig, director of the Massachusetts Institute of Technology Corrosion Laboratory.[196] In 1952, Robbins hired a worker to begin a series of metal-cleaning experiments with brushes, grinding wheels, and electrolytic reduction.[197] Even more problematic than metals were wooden artifacts. Robbins voiced his concerns with wood preservation problems in early 1949 and quickly began searching for help with this conservation challenge.[198] Many sections of the furnace waterwheel pit and flume and the waterwheel itself were successfully preserved and remain on display at Saugus.

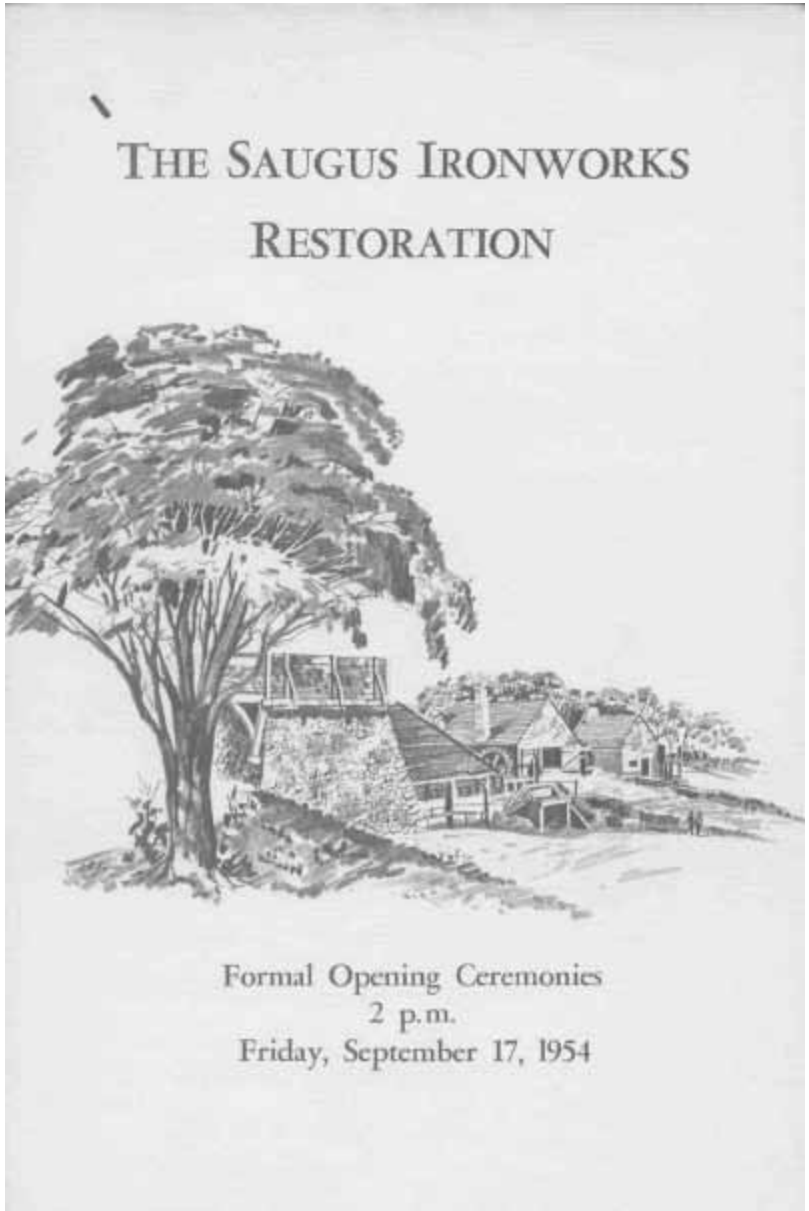
Robbins' use of a host of special studies, particularly in regard to faunal remains (animal bone), tree ring dating and geoarchaeology, metals and materials analysis, and artifact conservation was very advanced for this period in historical archaeology and also provides important comparative data for future study.

Donald W. Linebaugh, *The Man Who Found Thoreau*, pp. 79-80.

Although Robbins prepared a series of annual reports on his excavations at Saugus, he never wrote his final report on the work because of his abrupt resignation in 1953.[199] The record of his work is thoroughly documented, however, in his detailed daily logs, numerous letter reports on specific features and excavation areas produced for the Reconstruction Committee and the architects, and excellent mapping and photographic documentation by Robbins, Bradford, and Merrill; these records form the basis of the present volume.

The restoration goals of the Saugus project drove the overall research, particularly the archeology. This is reflected clearly in the Reconstruction Committee's organizational chart, which shows that Robbins was responsible for locating and excavating the major ironworks structures and restoring the landscape. The chart delineates Hartley's focus on the documentary records dealing with the construction and operation of ironworks and the tools and implements used and defines the architects' role as providing plans for the restoration and supervising the construction.[200] The FIWA's managers pushed Robbins' work and the physical reconstruction as fast as possible. Funding was not unlimited and both the FIWA and the American Iron and Steel Institute had their own agendas for the finished complex. In large part, these agendas arose out of the increasing use of the past, specifically historic sites, for political and commercial purposes, including the burgeoning tourism industry.[201]

Understood in its proper context, the story of Robbins' Saugus excavations points to the relative lack of any organized focus on either historical or industrial sites archeology in the United States in the late



3.21 Cover of the program given out at the formal dedication, September 17, 1954.

1940s and early 1950s. Robbins was largely untrained and unprepared for the monumental task of excavating a complex iron-making site. In spite of this, his work at Saugus is remarkable for its thoroughness, innovation, and contribution to the finished reconstruction.