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Cover Page Footnote

I would like to thank Joseph Sopko and Joe McEvoy who did the initial work on this report which made it easier for me to finish it. Thanks also to Linda Demers who did the drawings, to Jim Briggs who produced the final PMTs, and to Mary Valek who struggled with some of the tables. I would also like to thank the reviewers of this paper as submitted to the journal for their useful suggestions. Most of all, thank you to Dr. Paul Huey who edited an earlier version and assisted with final production.

18th- and Early 19th-Century Brickmaking at the John Jay Homestead: The Process, Products, and Craftsmen

Lois M. Feister and Joseph S. Sopko

On-site brick kilns were established routinely for construction projects at non-urban sites in the 18th and early 19th centuries. Archaeological excavations at the brick lot at the John Jay Homestead State Historic Site revealed features relating to the manufacture of brick. Documentary and scientific research revealed information about the brickmakers and established a baseline for the identification of brick sources from three different areas of New York State. Comparisons between brickmakers at the Jay and Schuyler houses and between brickmakers and other craftsmen are discussed here.

Des fours à briques étaient normalement établis à proximité des sites de construction en milieu non urbain au XVIIIe et au début du XIXe siècle. Les excavations archéologiques pratiquées au terrain à brisques du John Jay Homestead State Historic Site ont révélé des vestiges associés à la fabrication de ce matériau. Des recherches documentaires et scientifiques ont fourni des renseignements sur les briquetiers et ont établi une base pour l'identification de sources de briques provenant de trois différents endroits de l'État de New York. Il est question, dans cet article, de comparaisons entre les briquetiers des maisons Jay et Schuyler et entre les briquetiers et d'autres artisans.

Introduction

This article describes and interprets the archaeology conducted in the brickyard area at John Jay Homestead State Historic Site (FIGS. 1, 2). Here, pits were found from which clay had been dug for the brick. These pits later were filled with waster brick from the kiln operations. The results of documentary research on the history of brickmaking at John Jay Homestead is presented. This research produced considerable information on the individuals and procedures involved in brickmaking at this site, thus helping to "personalize" a technical process. Further scientific research on the makeup of the bricks is described. Finally, comparisons are made between the brickmaking at Schuyler Mansion State Historic Site, an 18th-century house built near an urban area, and John Jay Homestead, a rural 18th-century site. The result is a portrayal of an early industry as it was practiced in the last half of the 18th century in two areas of the Hudson Valley and the fleshing out of the bare bones of what was a common industrial process.

The brickyard at John Jay Homestead was one of many established in rural areas in the 18th and early 19th centuries. Rural brickmaking was possible where there was a ready

source of good clay. To exploit the clay and to save the cost of transporting heavy finished brick from urban brickyards, itinerant craftsmen set up kilns. During that time period, brickmakers preferred sandy clay over plastic clay because the sandy type required less work to prepare. Sandy clays did not have to be weathered to break down the clay structures and less temper had to be added to remove plasticity and control shrinkage (Dobson 1850: 12–13). After the clay was dug, it was molded into brick form. A team of oxen walking around a ring pit often was used to mix the mortar for the molding of the brick (Dobson 1850: 24; McKee 1976: 82; see FIG. 3 which shows a horse-powered mill, probably a later technology than that used at John Jay).

The bricks found at John Jay Homestead, both in the brick lot and in the house itself, do not have the sand coating that is characteristic of the sand-struck process. Instead, they probably were water-struck: a process, known as slop-molding, in which the mold is dipped in water to prevent the clay from adhering to the mud (Garvin 1994: 21; Gurcke 1987: 15–16). A brickmaker using the slop-molding process could produce 10,000 bricks a week (Dobson 1850: 27–30; McKee 1976: 82; see FIG. 3). Molded bricks were tipped onto the ground to harden for 1–6 days. They then were piled in



Figure 1. Location of John Jay Homestead State Historic Site.



Figure 2. John Jay Homestead as seen from the south.

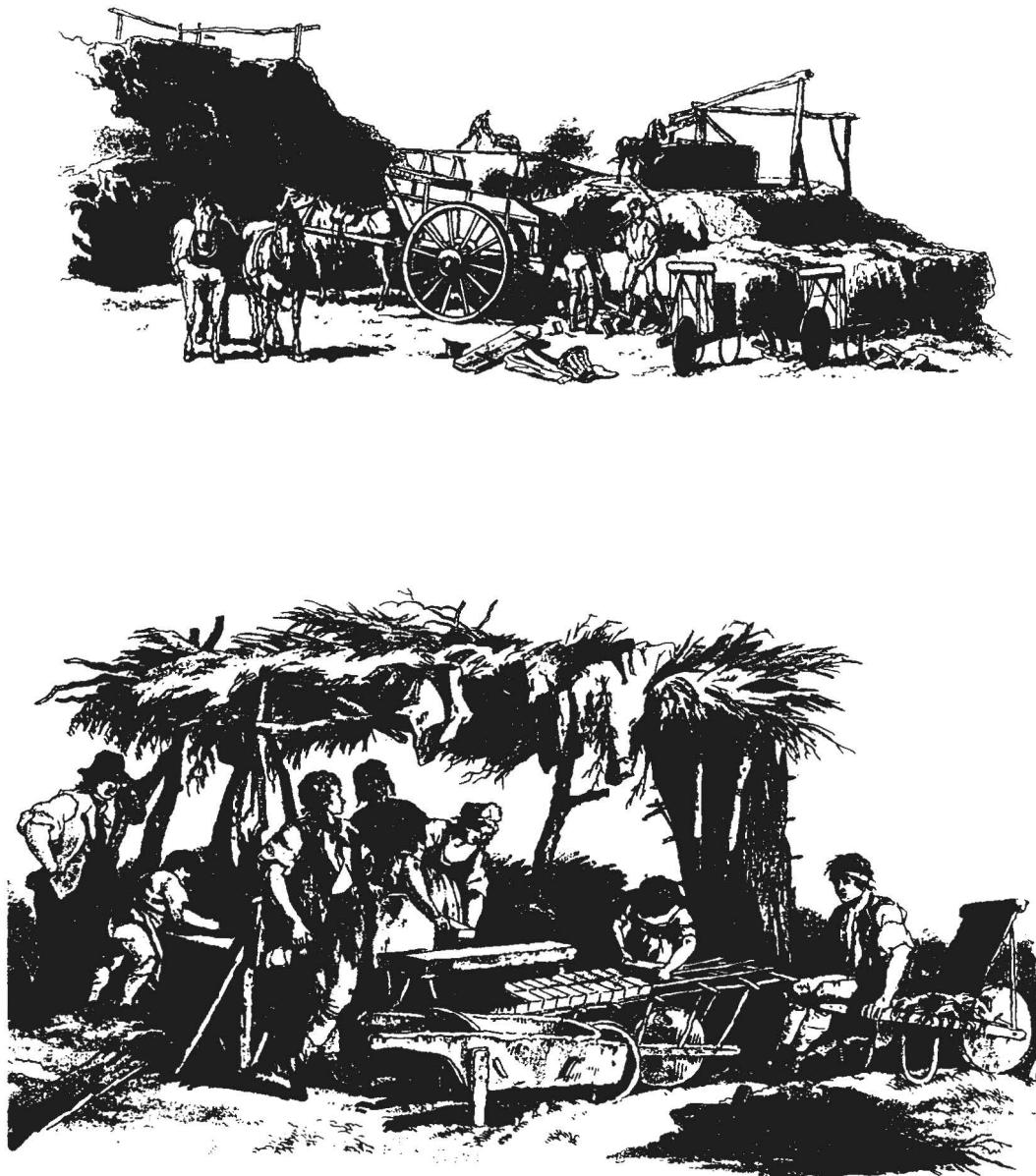


Figure 3. Top: early 19th-century drawing of brickmaking operations. Note the horse-powered pug mill on the upper right (Pyne 1977: plate 106). Bottom: early 19th-century drawing of the molding and drying of brick. Note the heaps of clay, freshly molded bricks, and the temporary nature of the entire operation (Pyne 1977: plate 105).

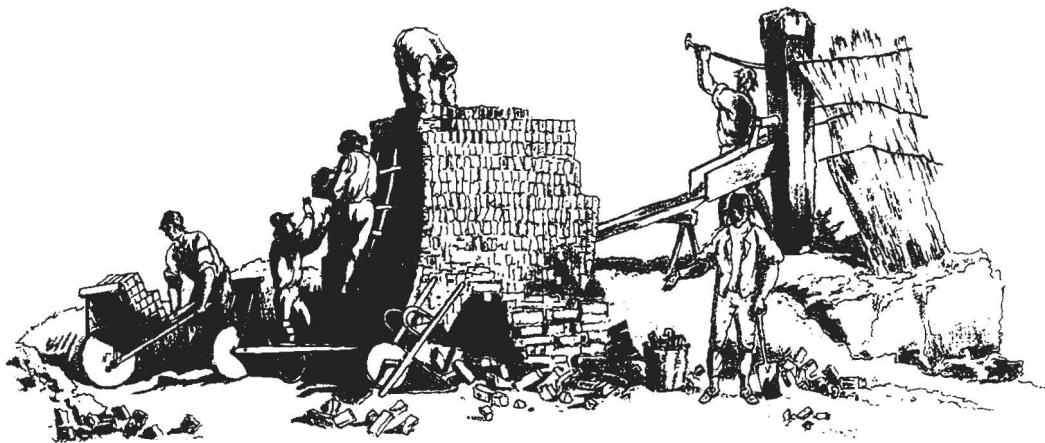


Figure 4. Early 19th-century drawing of workmen dismantling a rural brick kiln (Pyne 1977: plate 106).

rows to dry under cover for one week to several weeks or more, depending on the weather (Dobson 1850: 35–36; 82; McKee 1976: 82; Gurcke 1987: 24–26; Garvin 1994: 21, 23).

The next step was to burn the brick. Kilns were built of the hardened, molded bricks. Once the firing was completed, therefore, the kiln “disappeared” as the bricks that formed it were removed (FIG. 4) leaving large areas blackened by charcoal or ashes or reddened clay on the ground. A kiln for the manufacture of a moderate number of bricks would be about 20 x 15 ft (6.1 x 4.6 m) and 10–12 ft (3–3.7 m) high. Kilns of this size usually contain two arches where the fires are built (Dobson 1850: 41, 79). The dried green-brick kiln is topped off with a course of burned brick, and “a wall of burned brick is put around the kiln and daubed over with mud to prevent unwanted drafts” (Gurcke 1987: 29; see also Garvin 1994: 23). Kiln fires must be built up slowly in order to evaporate any moisture left in the bricks. Once this is accomplished, the heat is increased and the kiln is sometimes covered with a wooden roof to shelter it from prevailing winds (Garvin 1994: 25). Kilns burn from one to three weeks depending on their size and on the weather. Bricks in the center of the kiln are often overfired while those on the exterior are underfired. Each firing therefore produces some unusable brick (*wasters*) or

brick useful only for infilling walls (Garvin 1994: 23, 25, 26; Dobson 1850: 39–51, 86).

History of John Jay Homestead State Historic Site

During his 27 years of service to the nation as President of the Continental Congress, Minister to Spain, Secretary of Foreign Affairs, author and negotiator of the Treaty of Paris (which ended the American Revolution), co-author of the Federalist Papers, first Chief Justice of the Supreme Court, and chief negotiator of the controversial Jay Treaty signed with Great Britain in 1794, John Jay looked forward to the day when he would retire with his wife and family to his farm in Westchester County, New York. During his second term as governor of New York, Jay renovated the farmhouse there in preparation for his retirement in May 1801. He lived at the Homestead until his death in 1829, enjoying life as a country farmer. Successive generations of Jays and their descendants occupied the site until the 1950s when it became the property of the State of New York and was opened to the public as an official New York State Historic Site. Interpretation of the Jay site to the public includes both archaeological research and rescue work performed in advance of site development.

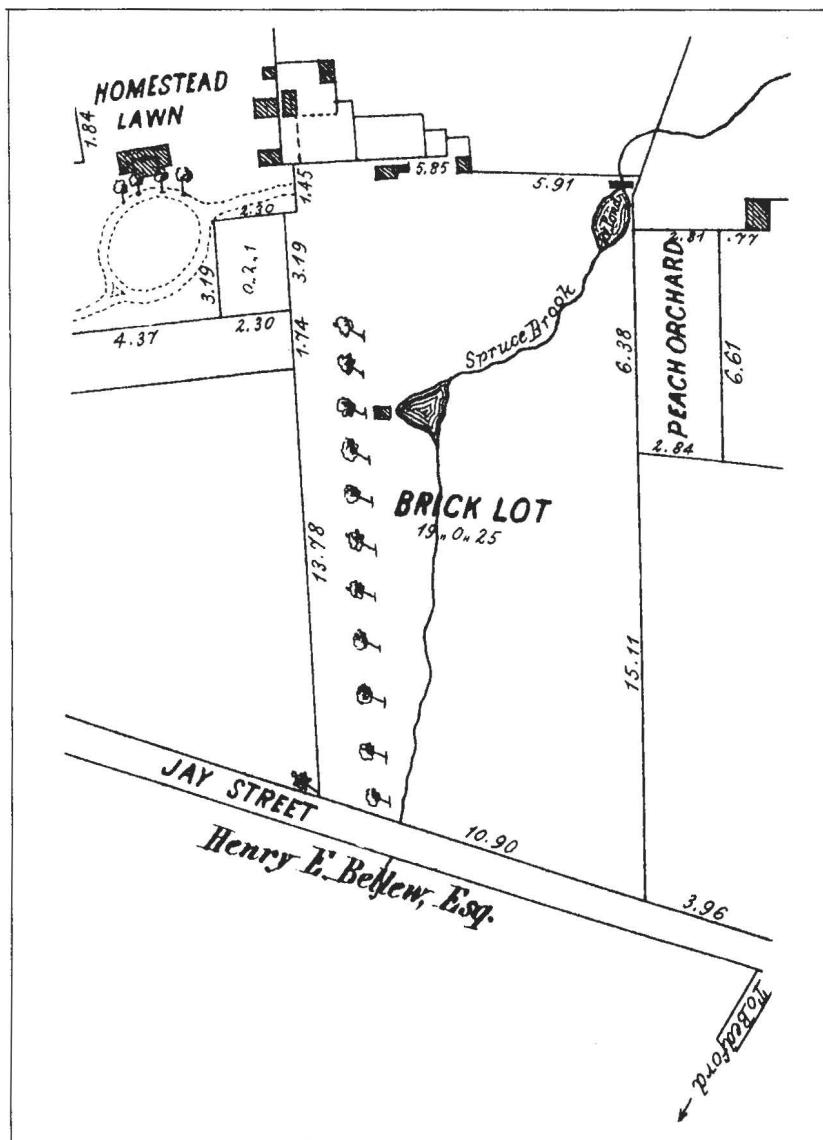


Figure 5. The Alexander Reynolds 1859 Survey Map of the Jay property. The "Brick Lot" is shown just north of Jay St. (Collection of John Jay Homestead State Historic Site, Peebles Island, Waterford, NY). North is to the top.

Archaeology at the Brick Lot

The area southeast of the John Jay house has traditionally been known as the brick lot, and is shown as such on the Alexander Reynolds 1859 survey map (FIG. 5). The area was called the "brick lot" earlier than 1859, however. In 1792, Jay's son Peter Augustus Jay wrote to John Jay that Major Samuel Lyons,

the farm manager, "has brought water into his brickyard from the Brook over the highest part of the Ridge behind his barn" (Doell and Doell 1989: II-A5). In 1852, William Jay referred to "the lane wall in the brick lot" (Doell and Doell 1989: I-69, II-A35). Therefore, when the archaeologists began investigating the proposed route for a new underground electrical line through the area of the brick lot, they

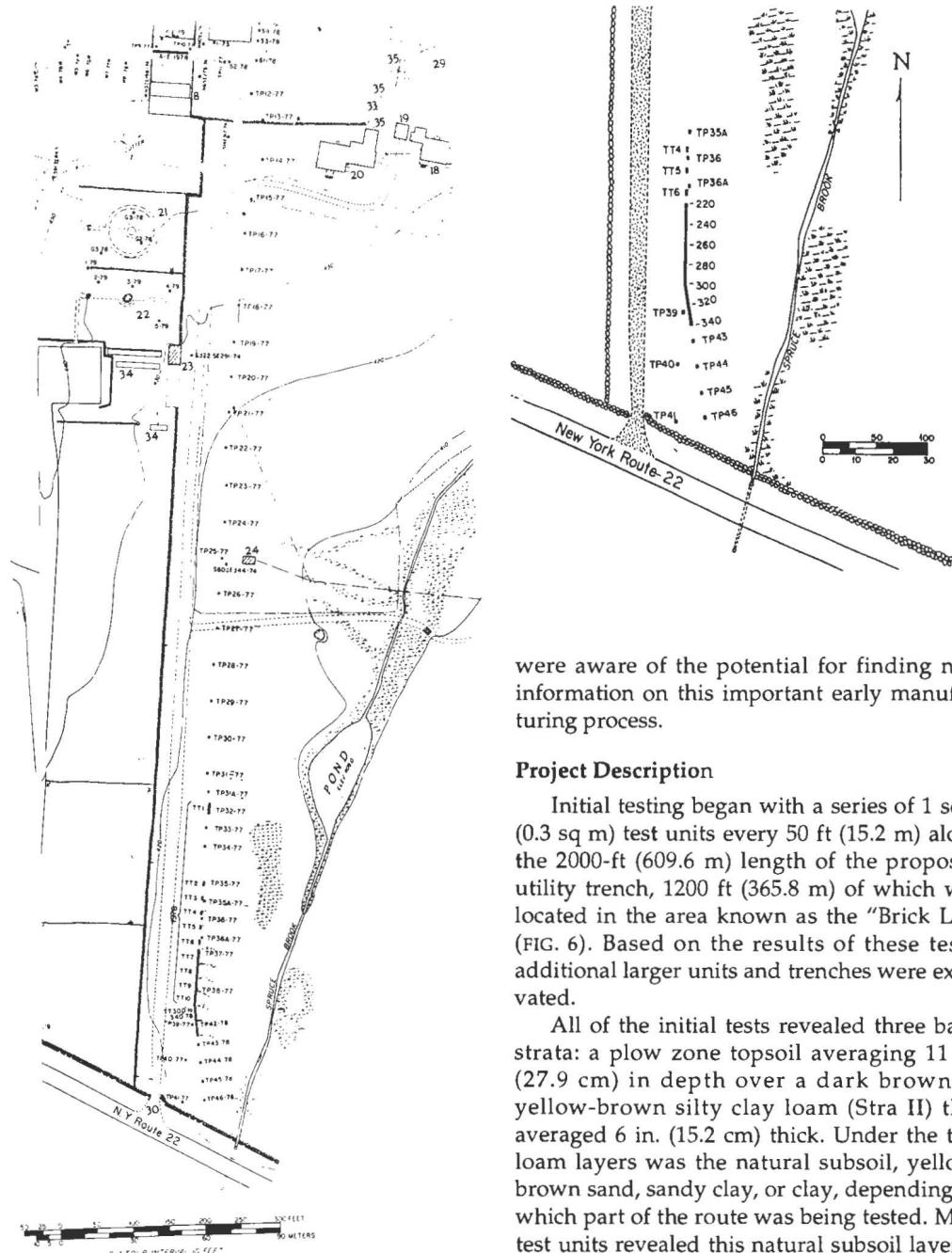


Figure 6. Left: Overall site map showing the archaeological test locations. Right: Close-up of the archaeology units in the brick lot.

were aware of the potential for finding new information on this important early manufacturing process.

Project Description

Initial testing began with a series of 1 sq ft (0.3 sq m) test units every 50 ft (15.2 m) along the 2000-ft (609.6 m) length of the proposed utility trench, 1200 ft (365.8 m) of which was located in the area known as the "Brick Lot" (FIG. 6). Based on the results of these tests, additional larger units and trenches were excavated.

All of the initial tests revealed three basic strata: a plow zone topsoil averaging 11 in. (27.9 cm) in depth over a dark brown or yellow-brown silty clay loam (Stra II) that averaged 6 in. (15.2 cm) thick. Under the two loam layers was the natural subsoil, yellow-brown sand, sandy clay, or clay, depending on which part of the route was being tested. Most test units revealed this natural subsoil layer at a depth of less than 24 in. (60.9 cm) from the ground surface. In a few tests, the excavations were taken down into the subsoil to determine deeper natural deposits.

JOHN JAY HOMESTEAD
1978 Utility Trench

S220-S260

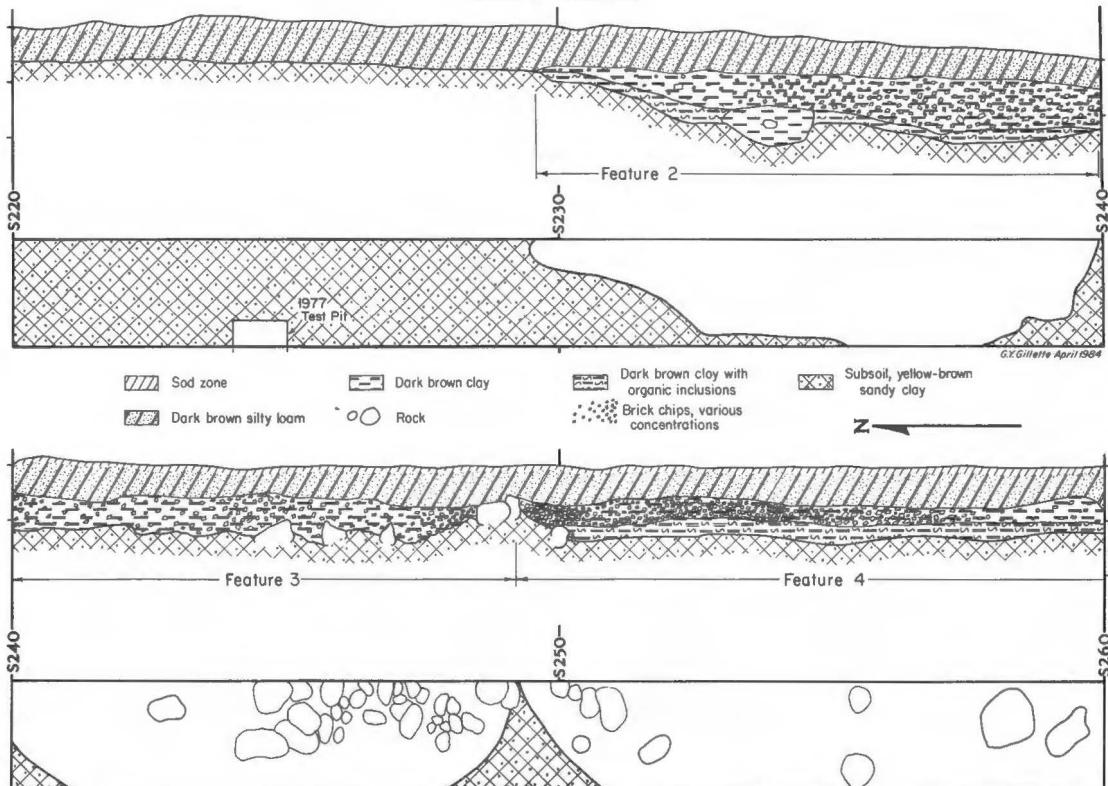
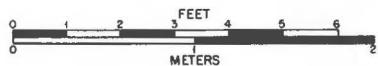


Figure 7. Profiles and plan views of a section of the trench excavated in the lower brick lot. Features 2, 3, and 4 are borrow pits.

In those cases, a layer of gray-brown silty clay was located overlying coarse gray sand. This type of deposit, a vertical transition upward from a coarse sand to clay to silt, is typical of deposits found on ancient stream flood plains and represents the depositional history of nearby Spruce Brook from the end of the Pleistocene glaciation to the present day.

No major features were found along most of the route for the new utility line. In the area closest to the state highway (Route 22), however, units south of #35 revealed brick fragments, charcoal, and wood ash deposits, all in Stratum II under the plow zone topsoil. All

brick fragments in these latter test units were either overfired or underfired. The presence of charcoal together with bricks in different states of firing suggested the proximity of a brick kiln. To explore this possibility, larger test units, including a 120-ft-long (36.6 m) trench were excavated south of the location of test pit #35. Eight separate features were found during these additional testing activities. Two of these were drainage features; the rest were large pit-like depressions, which were identified as clay borrow pits where raw materials had been excavated for the manufacture of brick (FIG. 7).

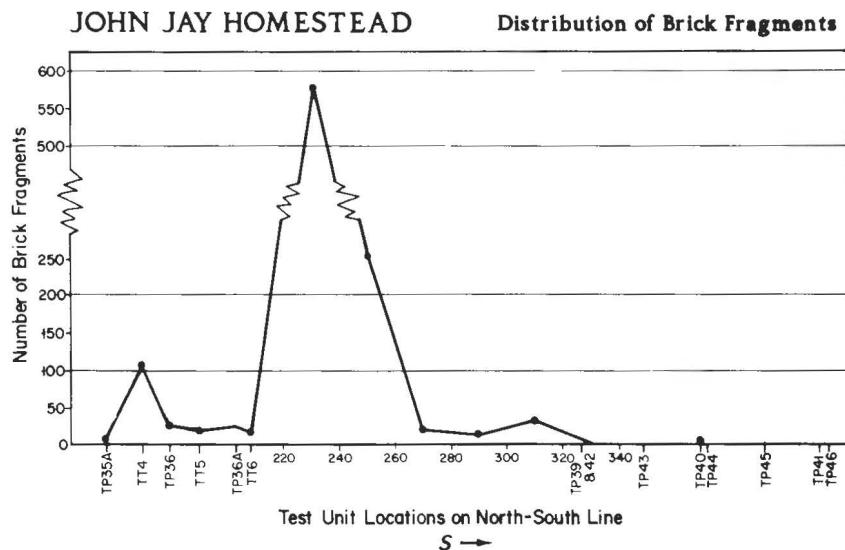


Figure 8. Locations and distributions of brick concentrations in the trench excavations. See Figure 6 for locations.

Table 1. Summary of archaeological features in trenches excavated in the brick lot at John Jay Homestead State Historic Site.

Location	Features	Description	Dimensions
S230 to S240	2	borrow pit	11 ft (3.5 m) diameter
S241 to S249	3	borrow pit	8 ft (2.42 m) diameter
S250 to S60	4	borrow pit	11 ft (3.5 m) diameter
S267 to S271	5	stone drain	2 ft (0.61 m) to 3 ft (0.91m) wide
S285 to S295	6	borrow pit	10 ft (3.0 m) diameter
S296 to S306	7	borrow pit	9 ft (2.74 m) diameter
S312 to S327	8	borrow pit	13 ft (3.96 m) diameter
S318 to 320	9	stone drain	1 in. wide, 18 in. deep
S327 to 335	10	borrow pit	8 ft (2.42 m) diameter

Figure 8 is a graph summarizing the locations and distribution of brick concentrations in the trench excavations. As is clear on the graph, between the location of test trench #6 and excavations at South 340 was a very large concentration of brick fragments. Table 1 summarizes the brick concentrations and features that were found.

Concentrations of brick chips and charcoal were found under the plow zone topsoil layer. These brick and charcoal concentrations were embedded in a brown loam. Between trench 6 and South 340 ft, there were large pits that had been dug into subsoil for the purpose of collecting clay. These pits were then refilled with

a clay soil mixed with brick wasters. Designated as Features 2, 3, 4, 6, 7, 8, and 10, the pits ranged in size from 8 to 13 ft (2.4 to 3.9 m) in diameter (see TAB. 1). Because the plow had truncated these features, determining their original depths was not possible. The remaining pit fills ranged in depth from 6 in. (15.2 cm) to one ft (0.3 m). What is especially interesting about the borrow pits is that they did not occur singularly, rather they were found in groups of two or three. This could signify a particular manufacturing method or more than one episode of brick manufacturing.

The first group of pits, Features 2, 3, and 4, were located between South 230 and South 260

Table 2. Number of brick fragments in the plow zone as compared to the number of brick fragments in features found in the trench. The area between S220 and S260 contained 71% of the total brick sample.

Trench location	No. of bricks in plow zone	No. of bricks in features
S220 to S260	176	653
S260 to S300	9	8
S300 to S340	13	59

ft. In Features 2 and 4, brick debris was found under the plow zone but above a concentration of weathered organic material. This layer could have been formed by leaving the clay pits open for a while during which time the organic material accumulated. The presence of weathered deposits in Features 2 and 4 thus could indicate that they were dug at the same date. Feature 3, located between them, did not contain such a deposit and may have been dug and filled in more quickly, thus possibly representing a different brickmaking episode. Unfortunately, the few artifacts found in the borrow pits were not useful for dating purposes (see discussions below).

The second group of pits was found between South 286 and South 305 ft. Features 6 and 7 each contained two levels of fill: soil and brick concentrations overlying a layer of soil with much less brick. The organic concentrations were not present here.

The third group of pits, Features 8 and 10, was found between South 312 and South 335 ft. Feature 10 was very much like those found elsewhere; Feature 8, however, contained a lower level of rocks not found in the other pits. Feature 8 may have been excavated earliest, and rocks found while excavating the other pits then deposited in this one.

After the brick manufacturers were finished, the features were backfilled with a mixture of soil and brick discarded from the kiln. Although subsequent plowing disturbed some of the brick concentrations, most of the brick that was found came from the pit features (see TAB. 2). In addition, the table shows that the greatest number of bricks in the plow zone occurred above the features. Although the soils were plowed repeatedly, the artifacts remained close to their original location. Therefore, the brick fragments in the plow

zone were analyzed with the bricks found in the features.

Figure 8 shows the distribution of brick fragments with the greatest concentration being between South 220 and South 260 ft. The highest concentration of charcoal was discovered in this same location. Since both the brick fragments and charcoal were waste products from the firing process, the concentration of brick and charcoal here could indicate the proximity of a kiln to this area. If the brick and charcoal were used as fill to level the brickyard area, then a more uniform distribution would be expected. Instead, the brick and charcoal are concentrated in one location, suggesting that South 220 to South 260 ft could be near the source of the waste products, that is, the kiln area.

Also found were two stone drains, Feature 5 and Feature 9 (see TAB. 1). Feature 5 was a 2 to 3 ft deep (0.6–0.9 m) trench filled loosely with cobbles. The drain apparently was designed to carry water away from the ridge area to Spruce Brook. Brick manufacturing requires a well-drained area and this feature may have helped to accomplish this.

Feature 9 was located from South 318 to South 320. It was a pipe trench 1 ft wide by 2 ft (0.3 by 0.6 m) deep that contained red earthenware drain pipes. Feature 9 intruded into Feature 8 and therefore postdates the waster pit. Feature 9, a drain for the farm road west of the clay pit area, removes water from the area and carries it to Spruce Brook.

Analysis of the Brick Fragments

The brick fragments consist of both over- and underfired brick. A total of 1172 fragments was excavated, of which only one was a whole brick and 29 were half bricks. The

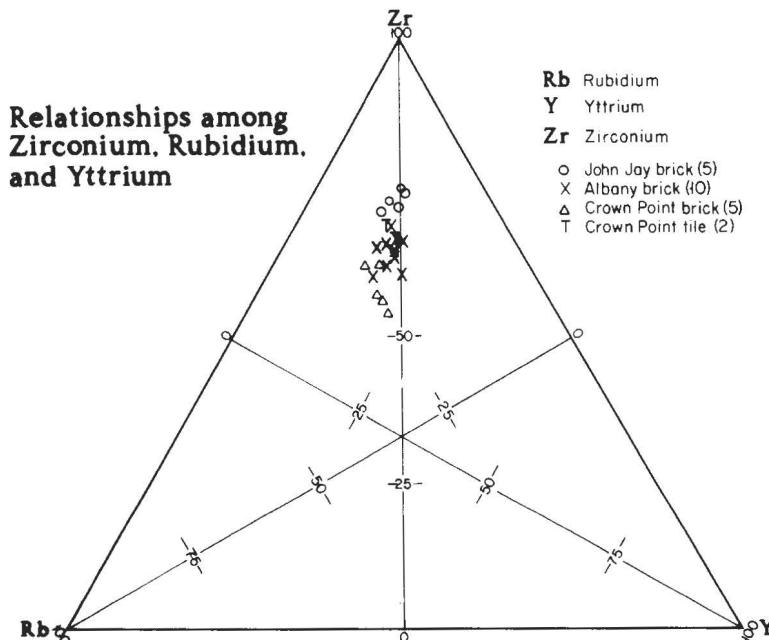


Figure 9. Results of the brick analysis. Note the clustering of Jay and Albany brick as compared to samples from Crown Point.

whole brick measures 8 3/4 x 4 x 2 in. (22.2 x 10.2 x 5 cm). The average measurement for the widths and thicknesses of the partial brick is also 4 in. (10 cm) wide by 2 in. (5 cm) thick. This consistency indicates most of the brick manufactured in this part of the John Jay brick lot were probably similar in size to the one whole brick in the sample. Fifty-five percent of the 1172 brick fragments are severely under-fired, 19% are vitrified, and 3% have characteristics of both under- and overfiring. Only 23 % of the collection appear normally fired. Most of the brick fragments found were wasters.

In addition to this analysis, samples of the brick were included in a larger study of brick excavated from New York State sites (Sopko and McEvoy 1991). For this analysis, brick samples from John Jay Homestead, Crown Point, and several sites in Albany were chosen, to form a sample representing the southern, central, and northern parts of the state (FIG. 9). The brick samples were subjected to X-ray fluorescence analysis, a process that identifies the trace elements present in the clays used to make the brick. Dr. William Lanford of the State University of New York at Albany's physics department assisted the Bureau of

Historic Sites in conducting the experiments. A description of the scientific process and the statistical analysis that followed is not necessary here. Diagnostic trace elements were identified in the bricks: iron, rubidium, strontium, yttrium, and zirconium. By comparing the amounts in each, the authors were able to demonstrate the similarities and differences among the clays from different parts of the state. In these tests, the John Jay Homestead clay clustered more closely with the samples from Albany than with the trace elements in clays from the Champlain Valley. The Albany and John Jay Homestead clays were distinguishable from each other by the amount of zirconium present in each type.

As a result of this type of study, it should be possible to determine the source of the clay used to make a brick, regardless of where the brick was found.

Other Artifacts Recovered in the Brick Lot Excavations

The brick fragments discussed above constitute the majority of the artifacts found in the brick lot. There was a scatter of artifacts, how-

ever, both in the features and in the plow zone stratum. Except for 13 brown bottle glass fragments and one clear glass bottle fragment, the artifacts date to the late 18th and early 19th centuries. The artifacts include fragments of gray stoneware, glazed redware, and a piece of pearlware, nail fragments, and personal items such as a pewter button, a pipe stem, and a honey-colored gunflint, which may have been a strike-a-light. The ceramics may represent vessels used to hold water for the brick-making process or may represent containers used for the consumption of meals on site. The personal items may have been dropped by the workers or supervisors during the brick manufacturing process. The artifacts are not helpful for dating the filling of the various borrow pits, but they do provide clues as to when the brickmaking activities occurred in this area, reinforcing the documentary evidence for the late 18th and early 19th centuries.

Documentary Evidence

The development of John Jay Homestead from 1787 to 1802 encompassed three construction episodes: initial work on the wood-framed 1787 house; the addition of one wood-framed wing by 1801 along with a brick cottage for the farm foreman; and a second wood-framed wing by 1802. For each of these construction episodes, John Jay supplied the lumber from trees cut on his land and brick from the clay on his farm. Since Jay was occupied as Secretary of Foreign Affairs, Chief Justice of the Supreme Court, and as Governor of New York between 1787 and 1801, he relied on his son Peter Augustus Jay and on farm superintendent Major Samuel Lyons to carry out his instructions. Included in Jay's correspondence for that time period are many references to brick manufacturing. These descriptions document the making of brick, the use of brick in construction, and the wage scales for the different artisans involved. Each of these topics is discussed below.

1787 Brick Contract

The first contract for the manufacture of bricks was signed on February 1, 1787. John Avery and William Van Tine, both of West-

chester County, were hired to burn 200,000 merchantable bricks on the land at John Jay Homestead, the contract to be fulfilled by August 20 of that year. Jay was to provide two yoke of oxen and an ox cart to carry the wood for the burning of the brick. The wood itself was to be cut and carted by Avery and Van Tine. Jay was to provide the board and straw needed (Waite, Huey, and Truax 1972: 14; Contracts 1787–1802: 2/1/1787). The straw probably was used to cover the ground on which the newly molded bricks were laid; the boards probably covered the bricks while drying or formed sheltering roofs over the kilns. Payment for the brickmakers included use of 30 acres of land from April 1, 1787 to April 1, 1788, a dwelling house, and 100,000 of the bricks produced. Failure to deliver would cost them £100.

Avery and Van Tine apparently fulfilled their contract since John Jay complained to Major Lyons by July 1787 that a friend, John Strang, who had permission to use some of the brick, had taken too many and not left enough for Jay's house (Jay 1787–1802: 7/8/1787). Examination of the mason's contract for 1787 revealed that much of the brick was to be used to fill in three walls of the house. In addition the cross cellar arch, the hearths, and the chimneys were to be made of brick.

Brick Manufacturing from 1798–1800

The second episode of brick manufacturing began in 1798 under the direction of John Lyons, son of Major Samuel Lyons. These bricks were to be used for a brick house for Major Samuel Lyons and for an office wing addition on the west side of Jay's house.

Although the contract between Jay and John Lyons has not been located, correspondence between Jay and his son Peter Augustus provides information on the brick manufacturing process, the payment John Lyons received, and where the bricks were to be used. The work proceeded slowly and was not completed until sometime in the fall of 1800. Bricks produced under this contract were used to fill in partitions, for hearths and chimneys, and to build an oven for the brick house.

John Lyons was to receive half the bricks he produced and be reimbursed for his



Figure 10. The Brick Cottage built on the John Jay property in the late 1790s from brick manufactured in the Brick Lot.

expenses as evidenced in a letter written by Peter Augustus to John Jay in December 1798: "John Lyons has set off a number [of bricks] equal to your half of it [the first kiln], in addition to your preposition [proportion?] of the new kiln" (Jay 1787–1802: 12/5/1798).

Brick Manufacturing in 1801

In January 1801, John Ostrander of Albany signed a contract with John Jay to make the bricks for the new east wing to his house. Ostrander and his partner Patrick Bradley (replaced later by Teunis Hemstreet) were to complete the firing of 100,000 brick, each 9 x 3 x 2 in. (22.9 x 7.6 x 5 cm), by July 1. A higher price was to be paid if three-quarters of the product were hard merchantable bricks, and Jay was to pay travel expenses (Contracts 1787–1802: 1/29/1801). The bricks were to be used to fill in the side walls of the kitchen wing and in the chimney, hearths, oven, and possibly the basement floor. Ostrander received his last payment in April 1802, indicating work progressed on schedule.

The Brickmaking Process

The brickyard at John Jay Homestead produced approximately one-half million to three-

quarter million bricks during its operation. The construction of the 1787 house, the 1798 Brick Cottage (FIG. 10), and the 1801 and 1802 wing additions to the house was accompanied by brickmaking operations carried out at the site. The borrow pits were found as archaeological features in the brick lot, and it was discovered that the waste brick was deposited back into the pits.

A letter from Peter Augustus Jay to his father on June 7, 1798, offers clues as to how the drying process was carried out at John Jay Homestead. Peter wrote that Lyons

is now making brick of which he had lately burnt a Kiln of 30,000. The Rain has since destroyed a Number of those which had been moulded for another Kiln. He has brought water into his brickyard from the Brook over the highest part of the Ridge behind his barn in such a manner as to show that almost every Spot in the field can be watered the same way.

Apparently, then, the bricks were drying in the open after being tipped from their molds. The straw Jay provided probably lay on the ground under the newly formed bricks. The water brought into the brick lot probably was for the slop-molding process. The presence of a barn suggests that space may have been used

Table 3. Brick production at the John Jay brick lot.

<i>Date</i>	<i>Number of bricks</i>	<i>Working period</i>
1797 (Avery)	200,000	171 days
1798–1801 (Lyons)	200,000–300,000	2 years
1801 (Ostrander)	100,000	69 days, 8 nights

for molding with the drying process taking place in the open. The next step was the burning of the brick. After the kilns were built and the firing begun, each kiln may have been covered with turf to retain heat and apparently each was sheltered from the wind by a wooden roof. Both the turf and boards were to be provided by Jay.

The brickyard at John Jay Homestead operated between 1787 and 1802. The features found during the archaeological exploration could date from any one of the three brick-making episodes. The whole and partial bricks found there with measurements of 8 3/4 x 4 x 2 in. (22.2 x 10.2 x 5 cm) match the size of the bricks in the cross cellar arch and nogging in the walls of the 1787 house and also those used in the Brick Cottage. The bricks made later for the east wing of the main house measure 9 x 3 x 2 in. (22.8 x 7.62 x 5 cm) and thus probably were made in another section of the brick lot. Table 3 summarizes the brick production at the John Jay Homestead brick lot as best as can be gleaned from the records.

Paying the Brickmakers

In an effort to understand the place of the brickmaker in the economic milieu of the late 18th and early 19th centuries, additional research included a look at the process of building Schuyler Mansion in Albany.

The brickmakers at John Jay Homestead were paid in the following manner:

1. Avery and Van Tine received 100,000 bricks and the use of a 30-acre farm for the agricultural year April 1787 to April 1788.
2. John Lyons received one-half of the bricks produced and reimbursement for his expenses.
3. John Ostrander received 10 shillings per day and 8 shillings per night (Receipts 1787–1802: 4/1802).

In the first contract, no money exchanged hands. Thus, in order to understand what value the brickmakers received, an understanding of what a late 18th-century farm would produce in a year is needed.

In 1767, a writer in a Connecticut newspaper estimated that a 40-acre farm would earn £54 after labor costs had been subtracted; another later writer estimated in 1787 that such a farm would net £28 (Main 1965: 105, 78). Using an interim figure between these high and low estimates, a farm in the last half of the 18th century may have yielded an income of £1 per acre. A 30-acre farm with a high crop yield may have netted the brickmakers £30. Brick prices from the early years of the 19th century were found expressed in dollars rather than in pounds sterling. The prices ranged from \$5–\$10 per thousand (McKee 1976: 85; DeAngelo 1977: 4; no prices were found in the literature from the last two decades of the 18th century). In order to change dollars to pounds, a record found in the John Jay receipts was used. In a receipt dated June 30, 1801, John Ostrander received a payment of \$20 from Jay. Included in the receipt is a statement that the \$20 was equal to £8; £1 thus would equal \$2.50; \$1 would equal £0.40. These figures were used in the following analysis.

Using the low price of \$5 per 1000 bricks and changing that amount to pounds would give a profit of £200 for Avery and Van Tine or a total, including the farm produce, of about £230. Thus, the two men for a working period of 171 days could have made approximately £1.35 per day or about 27 shillings. (A pound was equal to 20 shillings.)

John Lyons also received payment in bricks. Most of his share of the bricks produced, estimated to be between 200 and 300 thousand, were sold back to John Jay at prices set by kilns in New Jersey (Jay 1787–1802: 12/29/1798). Brick was being sold in New

Table 4. Information about artisans working at John Jay Homestead and Schuyler Mansion State Historic sites

	<i>John Jay Homestead</i>		<i>Schuyler Mansion</i>	
	1787–1790	1798–1801	1801–1802	1761–1762
<i>Brickmakers</i>				
Name	Avery and Van Tine*	John Lyons †	Ostrander and Hemstreet‡	Lucus Hooghkerk §
Payment	30 acre farm; 100,000 bricks; approximately £230	Half the bricks plus expenses	£30 and £11	£206 18s 6d
Length	171 days	1798–1800; unknown	69 days, 5 nights	Unknown
Rate/day	Approx. 27s; 13s each	Unknown	10s; 3s Unknown	
<i>Carpenters</i>				
Name	John Cooley**	Hezekiah Tracy assisted by Luther Bradley ††	Hezekiah Tracy ‡‡	John Gaborial §§
Payment	£110	£110	£570	£233 4s (himself)
Length	2/17–?	5/1–9/14 ?	12/13–12/1; 300 days	5/17/61–12/18/62; 500 days
Rate/day	Unknown	11s; specified in contract	38s; based on above	9s; based on above
<i>Masons</i>				
Name	Moses Winian***	David Russell and Stephen Burton, Apprentice †††	David Russell ?	William Waldron †††
Payment	£70	£72	Unknown	£412 13s
Length	3/15–?	5/1–9/14, 120 days	Unknown	Unknown
Rate/day	Unknown	11s; specified in contract	Unknown (11s?)	Unknown

* Contracts 1789–1802: 2/1/1787; Waite, Huey, and Truax 1972: 14–15;

† Jay 1787–1802 6/7/1798, 12/15/1798, 12/29/1798, 1/3/1799; Waite, Huey, and Truax 1972: 19–23;

‡ Contracts 1787–1802: 1/29/1801; Receipts 1787–1802: 3/30/1801, n.d., 6/30/1801, 4/30/02; Waite, Huey, and Truax 1972: 23–25;

§ Gibbons and Stott 1977: 18;

** Waite, Huey, and Truax 1972: 14

†† Contracts 1787–1802: 1/29/1800; Receipts 1787–1802: 6/21, 9/14/1800;

‡‡ Waite, Huey, and Truax, 1972: 42;

§§ Gaborial 1762; Gibbons and Stott 1977: 18–19;

*** Contracts 1787–1802 3/15/1788; Waite, Huey, and Truax 1972: 14–15;

††† Contracts 1787–1802: 5/1/1800; Receipts 1787–1802: 6/21, 9/14/1800;

†††† Gibbons and Stott 1977: 18.

York in 1800 for \$10 per 1000 (DeAngelo 1977: 4); John Lyons may have received something close to this price and thus earned between £150 to £300 for his labor. Lyons spent almost two years working on the building projects for Jay, however, and without the original contract, it is impossible to judge how many days were spent making brick. In addition, Lyons was in debt to Jay "on account of the mill" (Jay 1787–1802: 12/29/1798) so that the brick he sold to Jay probably helped meet his debts, and no money exchanged hands. It is not possible to compare Lyons' earnings per day with the other craftsmen.

The work done by the Albany brickmakers was strictly for cash. John Ostrander received 10 shillings per day, and he paid his helper, Teunis Hemstreet, \$12 a month plus board (Contracts 1787–1802: 1/29/1801). According to a receipt in the collections of the New-York Historical Society, Jay paid Ostrander a total of £36 10s, minus his board.

The difference between the arrangements with the Albany brickmakers and the others may have to do with the development of brickmaking as a full-time craft. Avery, Van Tine, and Lyons were not making brick full time but used their skills to augment their income. Avery and Van Tine were farmers; Lyons did other projects for Jay including dam construction and repair of Jay's mills. The brickmakers from Albany, however, probably worked full time at one of the several permanent brick yards that had been operating in Albany since the 1650s.

During the construction of the 1787 house, Jay also employed carpenters and masons. These craftsmen were paid in cash, probably because they did not produce a product they themselves could market.

Table 4 summarizes information about the brickmakers, carpenters, and masons who were employed at John Jay Homestead during the three construction periods under study. In addition, information about the employment of the same three categories of craftsmen at Schuyler Mansion is included. In some cases, there is not enough information for comparison. In most cases it is unclear as to how many other workers had to be paid from the money. In addition, the actual number of days worked is not always specified. The dates refer

to the date the contract was signed and either the completion date agreed upon in the contract or one found on a receipt. One day each week was then subtracted as a non-working day in order to arrive at an estimate of how many days were involved. So many variables, of course, make the analysis difficult. Some points can be made about the artisans involved, however.

Clearly, at least during two time periods, the late 1780s and the early 1800s, the brickmakers, masons, and carpenters were paid similar wages. In 1801, when Tracy was paid more than £500, the money had to cover the wages of a large crew (Waite, Huey, and Truax 1972: 42). How much Tracy himself received is unknown but can be judged by the amount of the contract agreed upon the previous year, 11 shillings per day. Gaborial's wages at Schuyler Mansion are very clear. The final account there specified what he received and the amounts paid each of his crew. Gaborial himself received 9 shillings per day; the crew members were paid wages of 7 shillings, 8 shillings, and 6 shillings depending on their duties for an average of 7 shillings each (Gaborial 1762). In 1798, carpenters and masons received the same wages per day. In fact, Tracy and David Russell signed identical contracts on the same day (Contracts 1787–1802: 5/1/1800).

It is also interesting that the wages of the artisans did not change significantly from before the American Revolution to the first years of the 19th century. At Schuyler Mansion in the early 1760s, Gaborial received a total payment of £453 from which he paid his workers £199. This is very similar to the payment that carpenter Tracy received at John Jay Homestead (£570) from which he paid an unknown number of crew, suggesting the wages per day had not changed greatly in the 40-year span. As noted above, however, the method of payment changed for the brickmakers from goods for services to cash for services.

What is truly interesting about the above story is that, according to some authorities (Main 1965: 77), the average wage for a "common carpenter" in the last quarter of the 18th century was about 3 shillings per day. Housewrights received 3 to 4 shillings per day. The average unskilled laborer received much

less. If Main is correct, the artisans at John Jay Homestead and Schuyler Mansion were being paid well above average wages. This may reflect the willingness of wealthy men like Jay and Schuyler to pay well for the most talented workers they could find. Artisans involved in the construction work at John Jay Homestead often were brought in from elsewhere: Tracy from New London, Connecticut; Russell, Burton, Ostrander, and Hemstreet from Albany; Avery, Van Tine, Lyons, Cooley, and Winian from elsewhere in Westchester County. Some of the artisans received travel expenses from Jay. For example, in the case of Russell and Burton, Jay promised to pay £5 15s for travel and wages "in going there and the like sum for returning in case they should not be there employed, but if they should be employed, then only three pounds each for returning" (Contract 5/1/1800). Obviously, Jay was anxious for their services. Exactly the same arrangements were made with Tracy the same day. These traveling artisans usually paid board where they worked; Major Lyons seems to have boarded some of them. In some cases, Jay paid their board as part of the agreement; the earliest brickmakers received a house and farm. In all of the cases for which information could be found, Jay paid the artisans in installments. He usually gave them money up-front (for example, Russell and Tracy each received \$30, or £12, the day they signed the contract), probably in order to make certain they honored the contract.

Conclusions

The archaeological testing of the brick lot at John Jay Homestead resulted in the discovery of clay pits and brick wasters related to the manufacture of brick at the site during the late 18th and early 19th centuries. By combining the archaeological evidence with documentary records, a fuller picture emerged of three construction periods at the site.

On-site manufacturing of brick was carried out in non-urban areas where the bricks were produced for a specific building project. In urban areas, such as New York City and Albany, bricks were produced on a regular basis in commercial brickyards and sold to customers as needed.

In New York City, the brick industry began in the 17th century and grew rapidly in the 18th and 19th centuries. Fire codes passed in the 18th century specified the use of brick for buildings (DeAngelo 1977: 3) so that by 1855, 70% of the buildings on Manhattan were brick. The brick industry in Albany showed a similar pattern. There were at least two brick-yards in Albany by the 1650s and 18 in the Albany area by 1855 (Census, 1855, New York State). With the growth of the brick industry and the transportation systems needed to ship goods to new areas, local brick manufacturing efforts such as those at John Jay Homestead became obsolete.

The brick yard at John Jay Homestead is a valuable archaeological resource that represents one of the few well-documented examples of early brickmaking. Bricks manufactured on-site were used during most of the 18th and early 19th centuries in constructing rural brick houses outside New York City and Albany. Yet, the exact locations of sites where these bricks were made is seldom known, and seldom is it possible to determine the names and wages of the craftsmen who did the work. Thus, the brick lot research at John Jay Homestead has provided information that has not been available from many other sites.

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