Fox Hall - *Part 10*, Jack Arch Segment "8L"

By Dick Gresham, Jim Melchor, and Tom Newbern

A secondary product of the masonry restoration portion of the overall Fox Hall project is numerous piles of brick and mortar debris surrounding the house (Fig. 1, Brick debris piles).

Figure 1

During the restoration of the windows, chimneys, and fireplaces, many bricks, from various eras, had to be removed, especially in the fireplaces, to return them to their original dimensions. Some of the bricks were common bricks from mid- 20th century construction, others were unique iron-flecked glazed face bricks matching those of Norfolk's Wells

Theatre (ca. 1913) and Monticello Hotel (1898, burned and rebuilt ca. 1912). Additional bricks were remnants from the original Fox Hall construction.

The first duty of the team architect was to design and construct the cellar entrance or "doghouse" (See Fox Hall - *Part 5*, Cellar Entrance). This led to an ongoing duty of culling through these piles of debris to find, collect, sort, clean, and stack bricks according to age, type, and degree of usefulness – initially for the doghouse's foundation and later for other restoration uses (Fig. 2, Culled and sorted bricks).

Figure 2

On 1 August 2020, the team architect visited Fox Hall to salvage full bricks and useful bats to supplement the diminishing supply of restoration bricks. During the culling, what appeared to be a refractory

brick emerged from the debris. However, on second look, it became clear that it was an unexpected and interesting find, an original jack arch segment. Inscribed into the side of the brick is “8 L” denoting the segment is from mold set eight and was for position "L" of a jack arch. (Fig. 3, Face) (Fig. 4, Marked proper right side) (Fig. 5, Back) (Fig. 6, Proper left side) (Fig.7, Top) (Fig. 8, Bottom) (Fig. 9, Measured drawings of jack arch segment).

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

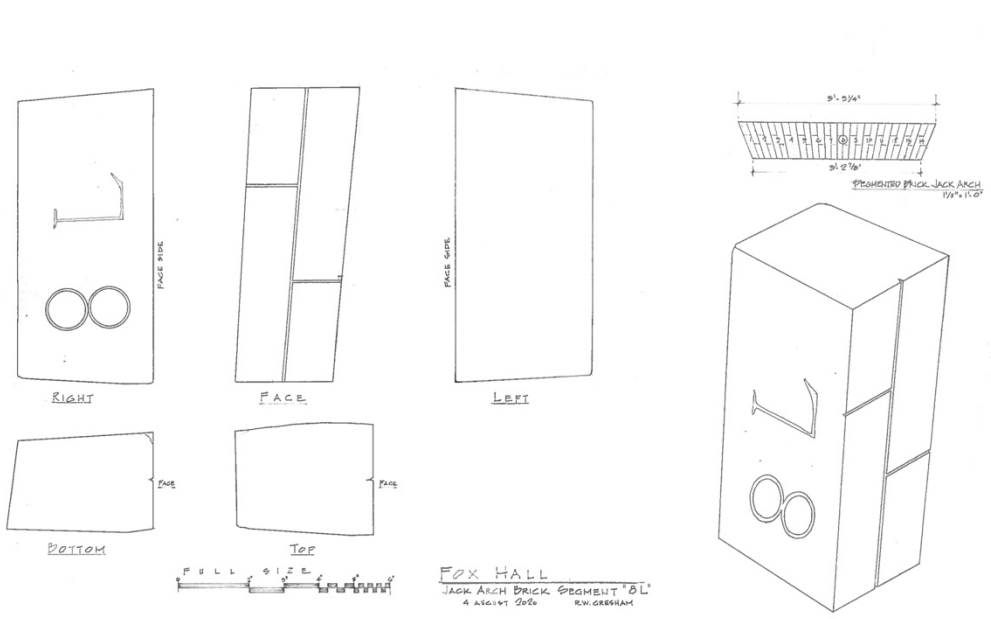

Figure 9 (Zoom in to enlarge for better view.)

A similarly inscribed segment from the front-door jack arch was photographed prior to the restoration team coming on site (Fig. 10, Front-door jack arch segment) (See **Update** at the end of this article for a discussion of this segment and others from the front-door jack arch at Fox Hall).

Figure 10

On this particular segment, the first mark is a "5" indicating mold set number five. The "L" denotes it fit only in that particular slot in the jack arch over the front door of Fox Hall. Important to notice is that the "L" appears to be by the same hand as the "L" in the newly discovered jack arch segment (See Fig. 4). These marks were incised and/or impressed into the bricks before they were fired.

There are complete jack arches over the five large first-floor windows and the front door at Fox Hall. As noted in Fox Hall - *Part 8*, Windows, the jack arch of the northwest front window has its segments numbered across their bottoms in Arabic numerals, 1 through 14 (Fig. 11, Jack arch segment numbers of northwest front window). These numbers were incised into the bricks prior to firing.

Figure 11 (Zoom in to enlarge for better view.)

In Fig. 12, these numbers are transferred to the faces of the jack arch segments (Zoom in to enlarge for better view.).

Figure 12

The “8 L” segment initially perplexed the team manager, as all the known Fox Hall jack arches had their "L" segment intact. Based on the section numbers in the jack arch in Fig. 12, the "L" position is the corresponding "12" slot. The manager compared this newly found segment to the "L" or "12" segment in the arches above the five large window openings. It matched them precisely. The jack arch above the front door is considerably wider with more segments, and there was no match. This confirmed that segment "8L" was from a jack arch at Fox Hall, the same size and containing fourteen segments, as those above the large windows. So, where was it located originally?

This jack arch segment was found in a brick debris pile in the yard near the small restored window in the southwest corner of the west endwall and the associated structural re-building of some of that corner’s brickwork. The large annex, constructed circa 1900-1915, attaches to this corner of the house. The debris pile in the yard resulted from the masonry work required in the removal of an improper window and the restoration of the small original window.

It was during the annex’s construction that the masonry corner of Fox Hall was poorly rebuilt using mostly common brick, salvaged old brick, and Portland cement mortar. It is likely that the "8L" segment was incorporated in this corner rebuild and was recently removed unnoticed and discarded by our team masons during the restoration of the small window (Fig. 13, Southwest house corner, annex, and debris pile).

Figure 13

With little information, the restoration manager and team architect began developing scenarios for where the "8L" jack arch segment might have been located originally. Three candidate locations where proposed: the small original endwall window, the south exterior door of the passage, and the kitchen chamber opening.

The small original endwall window was quickly eliminated for several clear reasons. The original rough opening of this window was too small to have a jack arch with fourteen segments. An opening for a jack arch containing the "8L" segment would be approximately thirty-seven inches, the same as the five large windows. Also, no evidence of jack arches is present in the masonry above this small window or the other two small endwall windows.

That left the other two options open for forensic investigation. Our approach was to analyze the following indicators found in the key elements: the masonry opening’s head, the masonry opening’s jambs, and the opening’s sill.

Late in the nineteenth century, an addition was added to the back of Fox Hall to accommodate a bathroom off the stair landing. This compromised a dormer and required a penetration in the back, brick

wall. As previously noted, shortly later, a much larger annex was added to the back of the house to provide more space for modern living. This addition compromised another dormer, required another wall penetration, and necessitated extending the stair landing west for access to this addition.

The south exterior door of the passage retains its original frame; however, the bathroom annex's ceiling structure abutting the exterior side of this frame obscures the brick above the frame's head (Fig. 14, Exterior of passage back door).

Figure 14

Further, the width of the rough opening for this door is forty-five inches, substantially wider than the other masonry openings in Fox Hall accommodating fourteen-segment jack arches.

The minimal view of the masonry above the door frame head obscured by the bathroom annex framing provides what appears to be the bottoms of several possible jack arch segments (Fig. 15, Possible jack arch segments over passage south door).

Figure 15

In an attempt to verify possible jack arch segments above the passage door frame, flooring was removed at the stair landing/bathroom doorway above the passage door. However, this was not successful. As best as could be discerned, any jack arch would have been a course or two below the masonry seen in this opening. It is also possible that all the brickwork above the door frame was disturbed and rebuilt with the wall penetration during construction of the bathroom annex. In any case, the width of the south exterior door of the passage would preclude a jack arch containing the "8L" segment. That conclusion left the kitchen chamber opening as the possible original location of the "8L" segment.

The kitchen chamber opening is rife with problems. The head, one jamb, and the sill had been rebuilt, most likely in the circa 1900-1915 era. While the present opening is approximately the correct width, thirty-seven inches, a classic triangular stress zone in the masonry above the opening is visible and shows a number of attempts at tuck pointing and parging. This distress was caused by the head being poorly rebuilt without a proper bridging arch or lintel (Fig. 16, Damaged brickwork above kitchen chamber doorway, viewed from kitchen) (Fig. 17, Doorway to now-removed kitchen chamber, viewed from annex). Because of this rebuild no original brickwork or hints of an original arch were perceived.

Figure 16

Figure 17

The proper right jamb is of entirely non-original brickwork, most likely from the circa 1900-1915 period. The proper left, however, is original,

with original or early plaster and good square and plum corners. The plaster on the left jamb extends about nine inches of the thirteen and three-quarter-inch wall depth, just enough for a four and seven-eighth-inch deep door frame. This matches nicely with the original window frames and other two exterior doors frames at four and seven-eighth inches deep. The plaster stops just before six feet, eight inches. Also, slightly below and right of the proper left jamb, there is a joist pocket believed to be associated with the now-removed kitchen chamber (See Fig. 17).

The sill block (15”x 39” x 3”), while old, does not demonstrate the surface wear and tear one would expect after nearly three centuries (See Fig. 17). It probably is a second-generation sill block added with the circa 1900-1915 annex.

In the cellar, below the southwest corner of the kitchen, there is a forest of wires, ductwork, and structural repair beams, posts, and masonry work obscuring much of the view under the kitchen chamber opening. While investigating this area, a fascinating discovery was made. A hewn support strut, approximately four-inches square, is inserted mid-span between two joists partially under the left jamb of the doorway to the kitchen chamber (Fig. 18, Strut under left jamb). It was intended to add additional support below the left jamb and likely extended under the kitchen chamber.

Figure 18

Flooring and structural repairs plus utilities obstruct this area under the kitchen; consequently, it was not possible to examine the area for evidence of a second strut in the vicinity of the right jamb.

The conclusion of the investigation leads the team to believe that jack arch segment "8 L" once was a part of a jack arch above the kitchen chamber opening. Before or during the construction of the annex, structural failure of the masonry occurred – most likely from the additional loading placed on the masonry by the annex. The rebuilt section was poorly constructed and was not stitched into the west

endwall at the corner, leaving a fifteen-inch-wide column floating between the house's corner and the former kitchen chamber's masonry opening (See Fig. 17). Existing bricks were re-used as filler in the new wall construction. The existing plaster and the delineation of original and repaired masonry convincingly indicate that a passageway approximately thirty-seven inches wide and six feet, eight inches tall existed with a jack arch bridging the opening.

Another question concerning this doorway must be addressed. Since the width of the rough opening of the doorway is the same as for the large first-floor windows, the frame depth is the same, and the jack arch containing segment "8L" would be the same as those of the windows, was this opening originally a similar window that was later converted into a doorway? This is a reasonable question, but the answer is no. In looking at the fill brick in the triangular failure area above the doorway, notice there is a small arrow on blue tape, centered over the doorway four courses of brick down from the top. If this had originally been a window, there would have been a timber lintel spanning the rough opening here, the bottom of which being at arrowhead level. Three courses of obvious original brick extend from the left at least as far as the arrow, precluding a lintel. Consequently, a window did not occupy this location. The opening was purpose built as a doorway (Fig. 19, Study area above kitchen chamber doorway).

Figure 19 (Zoom in to enlarge for better view.)

The above argument is compelling that this kitchen doorway had a jack arch containing segment "8L". However, there is a major complication that questions if this argument is, indeed, correct. Our friend and colleague, Wallace Gusler, advised years ago "to listen to what an object is trying to tell you". In our restoration work at Fox Hall, we try to live by his advice and adjust what we do based on what we are being told by the building. Unfortunately, sometimes we hear, but we cannot fully comprehend that which we are being told. Such is the case here.

Looking to the left of the doorway, there is a vertical joint between the house endwall and the infilled brick repair (Fig. 20, Joint in brickwork).

Figure 20

Upon careful examination, it becomes obvious that most of the brickwork to the left of this joint is the south end of the west endwall.

These original bricks, extending from the door sill to about one foot shy of the top of the door, are clean, relatively intact, and have struck mortar joints (See Fig. 20) (Fig. 21, Original bricks with struck mortar joints).

Figure 21

Interestingly, there is no stitched corner in this area turning this endwall into the south wall of the house. Just finished bricks. This is the proper right jamb of the doorway to the kitchen chamber as initially constructed. It matches the brickwork of the proper left jamb, and the courses of brick and mortar joints are perfectly level across this rough opening. There is infilled repair brickwork above this line of original bricks as well as the framing of the annex; therefore, we could not determine if there was corner stitching of the bricks. Fortunately, the corresponding area in the kitchen is open. The bricks of the south wall above the doorway definitely are stitched into the endwall, forming a proper corner (Fig. 22, Corner stitching of bricks).

Figure 22

There is some remaining evidence in the brickwork on the kitchen side that there was a five-inch high timber lintel spanning this rough opening about where there are now rowlock bricks in the repaired masonry (See Fig. 16 & blue tape on the right side of Fig. 19).

In its initial assessment of Fox Hall, the restoration team recognized this wide opening, attributed it as a doorway to a now-missing kitchen chamber, and noted it had been later reduced in width. This assessment, which is still valid, was included in Fox Hall - Norfolk's Oldest House, *Part 1* of this series. The wrinkle came with the discovery of jack arch segment "8L". Where was its original location?

The subsequent above investigation led the restoration team to the conclusion that the most likely original location was over the kitchen chamber doorway. The question now evolves into when and under what circumstances was the doorway reduced in width. With all the repair work around this doorway, a definitive answer is not possible. We can only speculate at this time.

Without question, this wide doorway was originally incorporated into the brickwork at Fox Hall. The rough opening of this doorway, as constructed, is fifty-two inches wide, the exact width of the rough opening of the front door. Possibly, once completed, the decision was made that this opening was too large and out of proportion for the kitchen, and the masons were directed to reduce it to match the front

windows, including a jack arch. Instead of the proper structural solution of stitching in a corner and stub wall, the masons took the expedient approach, either directed by the builder or on their own initiative, of building a butt-jointed, free-standing column of brick. The timing of this modification had to have taken place when the masons and brickmakers were still on site, as segment "8L" is a match for the others in the large windows and the markings are in the same format as over the front door. Over time, this early modification has led to several failures in this corner with several campaigns of repair work. The corner still is not stable, and additional repair work will be needed soon.

Can we say with certainty that the above analysis is correct and that segment "8L" was originally located in a jack arch over the modified kitchen chamber door? Absolutely not, but it is our best educated guess based on the evidence we currently have. We will continue to listen to what the house is telling us and will adjust our thinking accordingly. There are no plans for restoration work in or around this kitchen chamber doorway.

To the delight and amusement of the restoration team, Fox Hall continues to share its secrets. In this case, they are the "8L" segment and the strut. Fox Hall also continually challenges us at every turn to listen and think.

Update - As noted in Fox Hall - *Part 8*, Windows: "Earlier in the restoration project *(before the restoration team arrived onsite)* during repair to the jack arch over the front door, several marked bricks in the jack arch were encountered. These bricks ... were marked prior to firing. These marks are symbols rather than numbers". At the time of writing *Part 8*, only the photo of the segment in Fig. 39 in *Part 8* (Fig. 10 above) had been supplied to the restoration team. The additional information about the front-door jack arch was provided verbally by the owner. The team did not realize until recently, when the owner found and provided additional photos of the jack arch, that the first mark was not a symbol, but the numeral "5" and that the segments are lettered (Figs. below, Numbered and lettered segments from front-door jack arch). Finally, the markings on the segments make sense. Apparently, the brickmakers standing toolkit included a number of sets of molds for making an assortment of jack arches of different sizes. Thus, the number refers to the set of molds for a specific jack arch, and the letter is the location of that segment within the jack arch. These mold sets would not have been made for a job and then discarded. They would have remained in the brickmakers inventory to be utilized on subsequent jobs requiring a certain size jack arch. In the case of the brickmakers at Fox Hall, they had at least eight sets of molds and used set "5" for the front-door jack arch and set "8" for the jack arches over the five large windows and kitchen chamber doorway.

Partial Jack Arch Fox Hall Front Door

5B

5D

5E

5F

5G

5H

5I or J

5K

5L