THE REUSE OF MONASTIC MATERIALS IN POST-DISSOLUTION CONTEXTS AT
THORNTON ABBEY

by

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During the Reformation Period in England, many monasteries were dissolved as a way to remove the Catholic influence from the country. Building materials were removed from the empty monasteries and reused to build new structures on the site and in the area. The University of Sheffield conducted excavations in 2011 and 2012 at Thornton Abbey and found this period well-represented in the archaeological record. While working on the excavation with Sheffield, I conducted independent research; looking at Thornton Abbey as an example of reuse of building materials in the archaeological record. I investigated reuse by looking for monastic church stone and bricks in post-medieval, secular contexts unearthed during excavation. I also attempted to date the bricks by size and look for occurrences of mixed dates as evidence of using materials from previous dates in later contexts. The evidence collected from the excavations were compared against bricks and masonry still standing on the site and in the surrounding areas. Evidence of this practice was found in a few of the trenches examined. This practice during the reformation reflects the rapid change that the monasteries went through; from a sacred and exclusive place in the Medieval period to a quarry for masonry and bricks during and after the Reformation.

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INTRODUCTION

Many of the buildings we have today are not used for their original purpose, or even look like their original form. An old house is modernized, torn apart, and built onto, until it finally falls apart; but even then it has some kind of use. The best parts can be sold off or a new building can use the foundation; and for as long as buildings have been abandoned, they have had new potential. As a person who takes advantage of the bricks, stone, lead and glass, this practice of recycling may be a blessing; as an archaeologist it leads to confusion. The questions of where and when different parts of a building originate becomes a prime focus, further distorting the context that is excavated.

Thornton Abbey, in Lincolnshire, England, is an example of reused property, abandoned as a result of the dissolution of the church by King Henry VIII. The abandoned monasteries provided a source of cheap building materials, from which new structures were built (Colvin 1999). Archaeologically, these result in walls and floors made of masonry and bricks from multiple sources and periods.

Over the past two summers, 2011 and 2012, the University of Sheffield conducted excavations at Thornton Abbey, and revealed both medieval and post-medieval structural remains. Several bricks and large pieces of masonry which appear to have been part of the original abbey were unearthed, creating a need to determine whether or not any of the post-medieval remains, built after the dissolution, used parts of the former monastery in its construction.

Bricks from the excavation were chosen as a focal point because of the variable nature of their measurements, changing from period to period (Wight 1972). For this study, measurements of bricks from known dated contexts at the site were obtained (i.e. the brick Gatehouse), and checked for standardization of size during that period. Those measurements were compared against the excavated bricks taken from a known, post-medieval structure. If the measurements from the excavation samples show a mixture of measurements similar to the control set, and dissimilar, it would suggest that the building was composed of two different sources of brick, possible two different periods as well.

The ability to use bricks as a determined means to see the dissolution would be one more tool for archaeologists with which to study and understand this occasionally confusing period. It would also open up the idea of using brick measurements as a means to examine other periods where reuse was evident, such as the post-Roman period of Britain (Smith 1985:2).

Ultimately, the circumstances surrounding the period from which the bricks were examined was tumultuous. The archaeology around the bricks themselves is largely a byproduct of the historical circumstances; without which, this study would be unnecessary.

THE ENGLISH REFORMATION

The English Reformation shifted the focus of religious devotion by removing an entire country from the authority of the Pope. However, the Reformation was not a singular event in 1534, when King Henry VIII declared himself the head of the new Church of England (Koeller 2005). It certainly did not end there either, for there were still those who represented the Catholic

Church in England; in particular, those who lived and worked in one of the hundreds monastic communities throughout the country.

King Henry VIII was not the first to call for reform of the Church in England. John Wycliffe, who was subsequently tried for heresy, called for a Bible in English, the reduction of Papal power, and the dissolution of the monasteries in the mid-fourteenth century (Newcombe 1995). Although all of those complaints would be solved, directly or indirectly, by the English Reformation, the intentions behind King Henry's reformation were not wholly spiritual.

King Henry VIII's first step towards changing the religion of his country came about with a singular issue, the termination of his marriage to Queen Katherine of Aragon (McIlwain 1993 [2009]). Termination of marriage is a process that the modern western populace takes for granted, but it was far from straightforward, even for the King of England. Divorce was not an option under the rulings of the Catholic Church, however annulment (denial of a marriage's legitimacy) was.

King Henry wanted to annul his marriage for largely dynastic reasons; his current wife had not provided him with a male heir. His family had gained the throne during a dynastic civil war, which had come about because of two separate claims to the throne. Although it is widely acknowledged that King Henry VIII had fallen in love with Anne Boleyn, his future second wife, he had multiple mistresses throughout his marriage, and had no reason to annul or divorce his wife out of purely romantic intention. Anne Boleyn and her family merely played up the dynastic concern already on his mind (Newcombe 1995:26-28).

King Henry VIII had legitimate reason to believe that the Pope would annul his marriage to Queen Katherine. Emperor Maximillian I of Portugal had recently obtained an annulment, and closer to home, the Duke of Suffolk had his first marriage annulled (Newcombe 1995:28).

However, his annulment was denied; likely because Katherine's nephew was the Holy Roman Emperor in Spain and that the Pope in Rome was unwilling to provoke their closest ally (Rex 1993).

Rather than submit to papal authority, King Henry made the decision to declare himself the Christian authority in England, and obtain a divorce instead (Ellis 1825). However, the benefits to the king were beyond that of a seemingly secure dynasty off of Anne Boleyn; he had no obligation to the up keep of Catholic institutions (i.e. monasteries), and had come to see them as a source of income.

The Dissolution of the Monasteries

Henry's reformation resulted in the active destruction of the monasteries, but the monasteries were already on a path to decay. "The ease with which many of the English monks and nuns slipped into the secular life at the time of the Dissolution does not suggest that they had any very fervent attachment to the cloister. The general pattern in medieval monastic life was one of decline." (McIlwain 1993 [2009]:9).

A few monasteries were closed before the Reformation and were dissolved for the purpose of cleaning out some of the smaller houses and recombining them. "The first person who struck the first blow at the inviolability of the English monasteries was none other than the Papal Legate himself, Cardinal Wolsey, who, in 1519, had been empowered by a bull to reform them." (Braun 1971). Cardinal Wolsey had seized 29 religious houses and used their income to finance the construction of a grammar school in Ipswich and a new college (i.e. Christ Church) in Oxford (McIlwain 1993[2009]). His intention, though, was clearly not to end or dissolve monasticism as a whole.

Thomas Cromwell, an advisor to King Henry VIII, was one of the main proponents in the dissolution of the monasteries following the Reformation. "It was clearly Cromwell's plan to put the Crown on a firm financial footing by transferring the wealth of the Church to the government." (Newcombe 1995:58). Cromwell surveyed church property for its value, which would have not only allowed a basis for taxation, but the potential value that the property would have held if it was seized. He then sent out commissioners to look into the practices of the Church, particularly the religious houses. "None of them was anxious to give the institutions inspected the benefit of doubt or charity, and they knew that Cromwell wanted adverse reports." (Elton 1977:234).

In 1535, Cromwell had enough evidence against the monasteries to dissolve the first wave of them. All houses worth less than two-hundred pounds annual income were dissolved, along with all of their property and land (Elton 1977:235).

Soon after the first wave of dissolutions, there was protest in the rural sectors of the country. The initial uprisings came out of Lincolnshire, in 1536, from October first to October eighteenth. The larger, Yorkshire protest, called "The Pilgrimage of Grace", lasted for two months. The complaints of the protestors came about from dissolution, the change in religion, and new taxes invoked by Cromwell; they called for his dismissal, as well as the dismissal of other religious reformers. The protests were ruthlessly put down, and thus the way was open for more monasteries to be put down (Newcombe 1995:60-61).

"… in 1538-40, all the surviving monastic institutions were dissolved individually … and their properties transferred to the Court of Augmentations whose officers surveyed, administered, and if necessary disposed of them."(Elton 1977:235). As of 1540, there were no religious houses left in England or Wales.

Demolition and Reuse of the Monasteries

It is made quite clear that King Henry never intended to let the monasteries stand untouched, they had too much potential; there was valuable lead in the roofs, rare religious relics, and dressed stone. "The church was the first to go. Throughout the centuries, a great deal of valuable building material had gone into the construction of the monastic houses." (Braun 1971:234). After Cromwell's commissioners were done with the ruins, the local people rushed in for the opportunity of cheap building resources (Braun 1971:232). This resulted in the eventual demolition of the monastic houses.

Occasionally, however, the commissioners were directly ordered to destroy the monasteries. "the King's commission commandeth me to pull down to the ground al of the walls of the churches, steeples, cloisters, fraters, dorters, chapter houses,[sic…:all parts of the main church complex] with all other houses, saving them that be necessary for a farmer." (Colvin 1999:157).

The needs of the period also dictated what was taken, and how they were used. For example, parts of the abbeys supplied paving stones in houses, which were in heavy demand (Braun 1971:236) (Figure 1). The following outlines the three main ways in which the materials of the abbey were put to use.

> Those excavating the sites of abbeys today are not involved in much carting away of fallen stonework…This is because the stones of abbeys were useful material. They could be used for three purposes.
>
> They could be burnt for lime, more in demand than ever now that the most common building material was brick, which uses more mortar than dressed stone.

Another use for the stone was for building houses for privation persons, farmers and the like, who had taken over portions of the abbey lands and need houses from which to work them.

The third use of abbey stone was for the metaling of roads." (Braun 1971:235).

Knowing what the pieces of the monastery were used for historically is useful in determining the practice of reuse in the archaeological record. The mixture of medieval and post-dissolution materials may confirm this practice, particularly if the post-dissolution building is found on the site of the former monastery.

Figure 1. An example of a piece of monastic stone as a flagstone in a post-dissolution building at Thornton Abbey.

Thornton Abbey

Thornton Abbey is an Augustinian Abbey that located in North Lincolnshire England and was founded in 1139 by William le Gros and was dissolved in 1539 by King Henry VIII (Figure 2). It was one of the wealthiest of Augustinian Abbeys and the only indication of that fact which physically remains is the large, brick Gatehouse. The abbey Gatehouse (Figure 3) is one of the largest, and best preserved in England (University of Sheffield 2012).
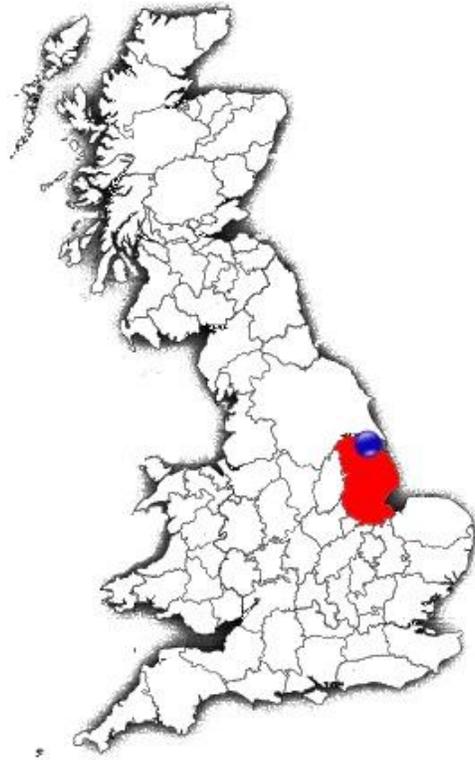

Figure 2. Location of Thornton Abbey, as marked. (adapted from Molebegone 2008).

Figure 3. Thornton Abbey Gatehouse from the front, dated to mid-fourteenth century. The Barbican extends outward from the entrance of the Gatehouse, a later addition.

After the Abbey was dissolved, it served as a college for priests, until 1547, when it was shut down by King Edward VI. In 1603, the Abbey and its lands were bought by Sir Vincent Skinner, who used some of the monastic buildings in the construction of his estate. "Skinner, that pull'd the college down, built a most staitly [sic stately] hall out of the same, on the west side of the abby plot within the moat, which hall, when it was finished, fell quite down to the bare ground without any visible cause." (Pryme 1870:145). Abraham de la Pryme, a Yorkshire antiquary and diarist, wrote about the common-held story that Skinner's house fell down after being built with pieces of the Abbey, which has yet to be archaeologically confirmed. While the abbey was subjected to demolition and scavenging of materials several other part of the abbey still exist today such as parts of the church (Figure 4), and the mill, as well as a smaller, decayed Gatehouse towards the South.

Figure 4. Above are the ruins of the church in the foreground, with the back of the Gatehouse in the background.

An important aspect of the church ruins is the rebuilt brick work. Fifteenth century brick work was laid over parts of the church, blocking over some monastic features. In some cases, the later brickwork had to be removed from the doorways of the monastic structure later on (Clapham and Reynolds 2011:8-12).

Excavations of Thornton Abbey

During the summers of 2011 and 2012, the University of Sheffield conducted excavations at Thornton Abbey under the direction of Dr. Hugh Willmott. During both summers, the area was substantially surveyed, identifying underground earthworks, and key areas of the site were excavated. During 2012, several trenches were opened, and the trenches that yielded the majority of bricks are as follows; a trench was opened over a post- dissolution building (Trench E; see Figure 5) and another trench opened over the foundation cuts for a house that had never been built (Trench C; see Figure 6)

Figure 5. Trench E, pictured wall of post-dissolution building

Figure 6. Trench C, pictured is the interior wall of an unfinished building.

Based on the amount of apparent reuse of materials from the Abbey in later constructions observed during excavation of the Thornton Abbey, I made the decision to examine the practice of reuse during the post-dissolution period. The material that was chosen was bricks, because of the changing nature of their measures over time and the apparent temporally diagnostic nature of these changes.

Bricks

Bricks were introduced in England as a building material by the Romans, and, other than post-invasion reuse, the material was not widely used again until the fifteenth century A.D. (Smith 1985). However, occasional use of native brick is recorded and seen, particularly in ecclesiastical buildings; Thornton Abbey's Gatehouse is an example of this kind of building use. It is also worth noting that, until the fifteenth century, bricks were frequently referred to as tiles (Latin *tegula*) (Wight 1972).

Bricks varied greatly in size from place to place, depending on the maker and the local molds (Wight 1972:28). Given this variation, and a lack of maker's marks on bricks during this time, it is very difficult to assign a date to a single, out-of-context brick. However, that fact does not necessarily negate the brick as a means to see change over time. A building that has a uniformity in brick size suggests a common maker and mold and possibly single period of construction; consequently, a building that has two, distinct groupings of brick sizes, uniform within themselves, would suggest bricks from two different makers, and potentially different periods of building. This pattern can therefore indicate, in the proper context, the presence of monastic reuse in a post dissolution building.

METHODOLOGY

Bricks, as previously mentioned, are dimensionally variable over time. The length, width, and thickness are determined by the molds used, in this case, at a local level. Thus, the measurements themselves are not enough to determine potential changes through time. It is necessary to provide a basis for comparison; in this case, bricks that come from a known location and can be dated, collectively, to the same period. At Thornton Abbey, this theoretical framework was put to use.

During the 2012 excavations, bricks recovered from the excavation were measured and recorded according to trench and context, given a unique identification number, and photographed (Figure 7). Only bricks that could adequately provide a complete, unaltered, length, width, and thickness were used; many fragments of bricks were discarded during this process. Two trenches provided bricks for this study, Trench E and Trench C; the majority came from the former.

In order to obtain a sample from a known date, the bricks of the Gatehouse and front Barbican were measured and recorded as the date of construction of these structures is fairly secure. While all the bricks of these structures were not measured, a random selection of those bricks able to provide complete measures was chosen and the individual bricks measured. Bricks on both the inside and outside of the Gatehouse were taken as a sample (Figure 8). In addition, bricks from the church, south Gatehouse, nearby mill, and a local mansion (Thornton

Hall; suspected to have been built of monastic materials) were all measured, identified, and

photographed.

Figure 7. An example of a brick measured, identified, and photographed.

Figure 8. An example of a brick measured from the inside of the Abbey Gatehouse.

After all of the measurements were collected, they were entered into a Microsoft Excel

workbook with individual spreadsheets dividing the bricks by their location of origin; for

example, all the bricks from the Gatehouse were together on one worksheet.

The measurements from each context were then examined through the use of a histogram

to check for normality in their distributions; normality would indicate a standardization of sizes,

and thus indicate that the bricks were all potentially made and supplied by one source during the

same period. Overall irregularity would suggest that there was no standardization, and bi- or

multimodality would indicate bricks coming from two to many different sources and/or from

multiple time periods.

If multimodality was identified in the control data, then a K-means Nonhierarchical

Cluster Analysis was conducted using the length and width measurements as a proxy for spatial

distances using Kintigh's Tools for Quantitative Archaeology (Kintigh 2013). This analysis was

used to identify the presence of clustering within the control data based on a combination of both

length and width measurements for each brick, rather than just on a single dimension. The K-

means analysis, as implemented by Kintigh, compares the actual data to a number of random

data runs and provides a graphical result of the comparison where if the plot of the summed

standard errors (SSE) at various clustering levels falls below the plots for the random runs, then

the data under analysis can be shown fall into discrete clusters. If on the other hand it falls

within the plots of the random runs, it is randomly distributed and not clustered, or if above the

random runs, it is systematically distributed and not clustered (Kintigh 2013).

The overall site data was then compared to the control data to see if there are any site-

wide patterns that could better define the status of reuse in the archaeological record.

DATA AND ANALYSIS

The total dataset contains three hundred and forty-seven bricks; which are tabulated by specific areas in Table 1. In spite of all of the data that was collected from the excavation, there were very few that were collected out of Trenches C, G, and F. For that reason, the data analysis focuses primarily upon the data from Trench E.

Table 1. The number of bricks sampled from each area.

Area	Number of Bricks
Gatehouse	88
Barbican	87
Trench E	87
Trench C	6
Trench G	5
Trench F	1
Church Ruins	48
Mill	13
Thornton Hall	11

Note: Shading indicates control samples.

The bricks coming from the Gatehouse and Barbican come from a known date, and thus operated as a control against which to compare other data. Before any data from Trench E was analyzed, it was essential to see if the Gatehouse and Barbican measurements exhibited a relatively normal distribution in length, width, and thickness.

A normal distribution in the Barbican and Gatehouse would indicate that there was regularity in the manufacture of the bricks, a common mold from which most of the bricks were constructed. If the distribution is not normal, it would be without consequence to investigate

measurements of excavated bricks against one another, since there is no regularity or standardization during the period.

The measurements from the largest excavated sample size, Trench E, were plotted together with the Barbican and Gatehouse(Figures 9-11) to display any differences in normality. It is important to note that initially, the bricks of Trench E were divided by context; however, after the excavation, it was determined that the contexts could be lumped together, because the contexts from which the bricks came were contemporary with one another (personal communication Dr. H. Willmott, March 2013).
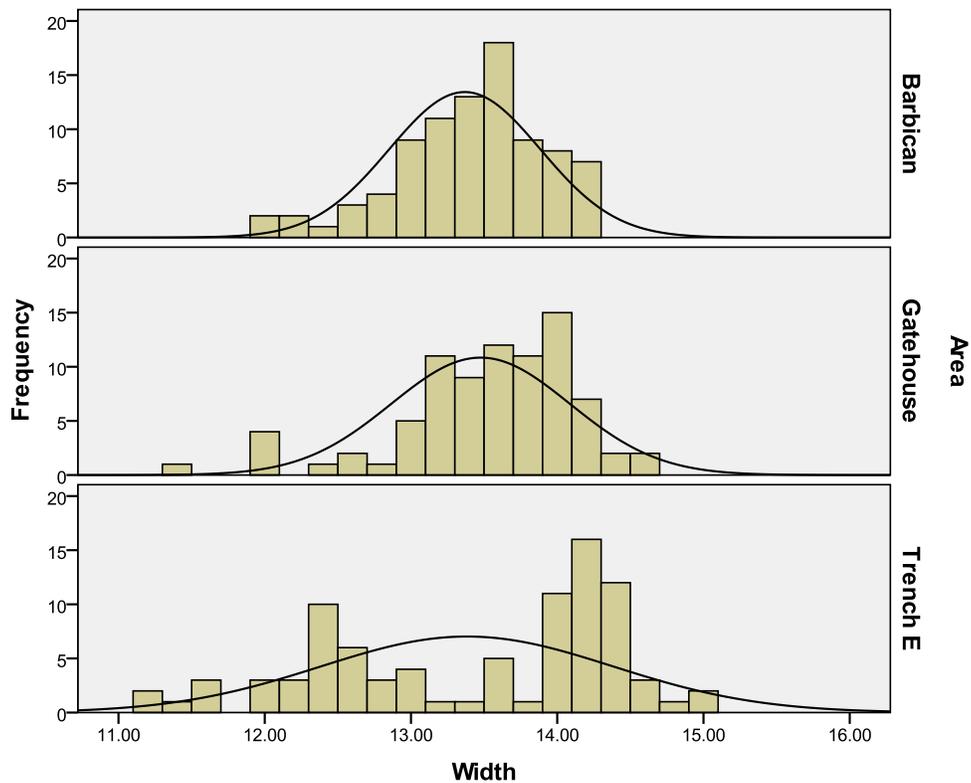

Figure 9. Distribution of brick width from the Barbican, Gatehouse, and Trench E excavations.
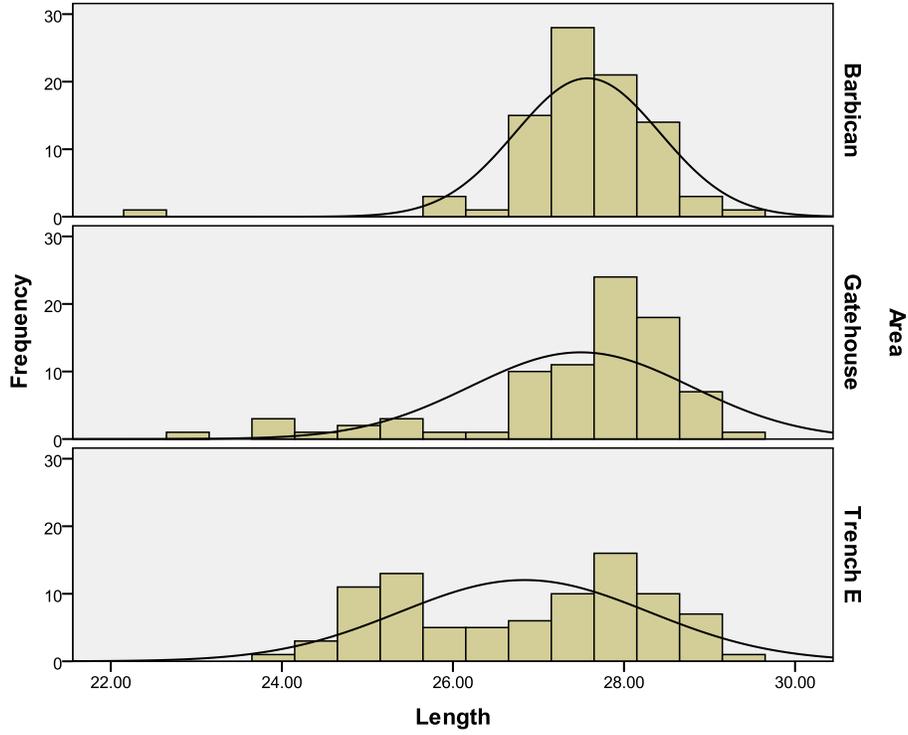
Figure 10. Distribution of brick length from the Barbican, Gatehouse, and Trench E excavations.
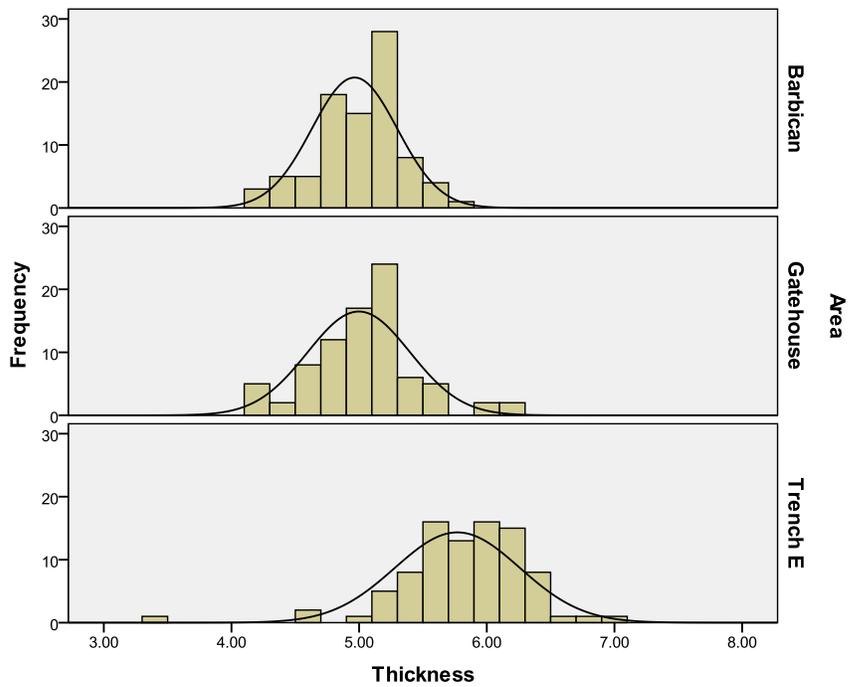

Figure 11. Distribution of brick thickness from the Barbican, Gatehouse, and Trench E excavations.

The measurements from the Gatehouse exhibit skewing, while the measurements from the Barbican are normal with a few outliers (Figures 9-11). The widths from the Gatehouse are only slightly skewed, while the widths from the Barbican are normal with one outlier. The Gatehouse lengths are very skewed towards the smaller length. In the case of the thicknesses, the measurements were normal in all three cases. Overall, the Barbican exhibits a more normal curve, the most skewing seen on the distribution of widths (Figure 9). The Gatehouse, however, exhibits skewed data throughout the distributions, most prominently in the distribution of widths.

Trench E exhibits a bimodal curve in both the lengths and widths of measurements, while maintaining a normal curve in thickness. The bimodality indicates a possible clustering of measurements, and perhaps two sources of bricks within the same context.

The skewing of the measurements on the Gatehouse could be a result of differential use of the bricks in and outside the building. While the bricks on the Barbican were all placed, and used in a more uniform fashion (see Figure 3), the bricks from the Gatehouse were taken from the interior and exterior, randomly selected throughout the building. The bricks were used in various locations and were likely cut to fit in the bonds. Throughout the building there were obvious examples of cut bricks usually near corners, over doorways, and the end of walls, and it is inevitable that some of the sample may have contained bricks that were less obviously cut.

Figure 12. Above the brick marked with a coin, bricks cut to fit into a window overlook are pictured.

Any later work done on the Abbey, either in terms of additions or repairs may also account for the difference and skewing. If this is the case, it would be expected that the data from the Gatehouse would show evidence of two separate clusters of sizes, indicating two sources of brick within the structure, which will tested along with the larger, whole-set of data. In spite of the few odd bricks, however, the Gatehouse appears to be normal.

Data Clusters in Thornton Abbey

The data from the Barbican and Gatehouse were plotted on a k-means analysis to check for clusters in the data. Since the Gatehouse showed some slight variation, it was important to see if the variation was a separate cluster entirely. A K-means analysis determines whether data is random, normal, or clustered. The lighter lines on top represent random data against which the data from the Gatehouse and Barbican were compared (Figure 13).
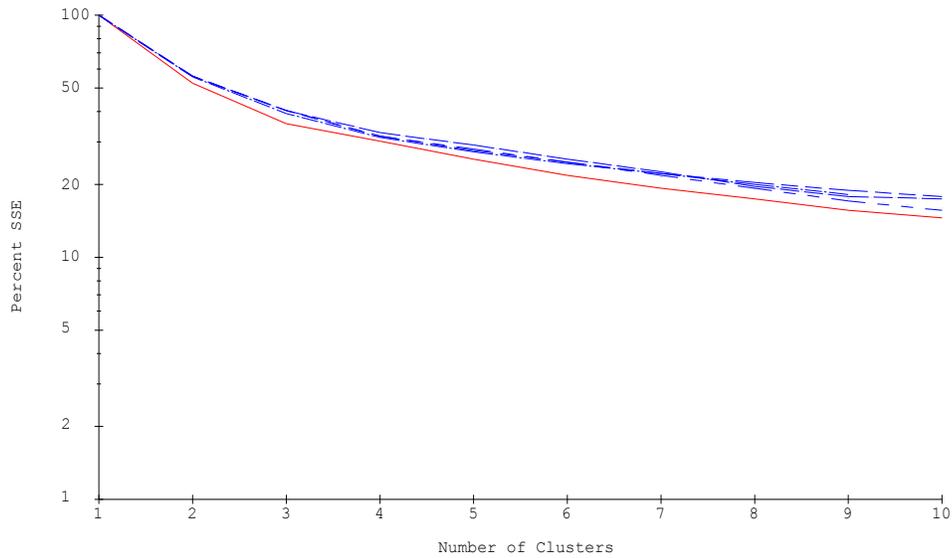
Figure 13. Percent sum standard error graph of the clustering solutions for the control data and ten random runs.

The darker line beneath the random data shows a bend where the data clusters. According to this graph, therefore, the data clusters in two, or possibly three clusters. The data was then plotted in Autocad as a scatterplot to determine where the two clusters lie. Each of the bricks was given a number depending on which cluster they belong in (Figure 14). The clusters are outlined according to the range of bricks inside.
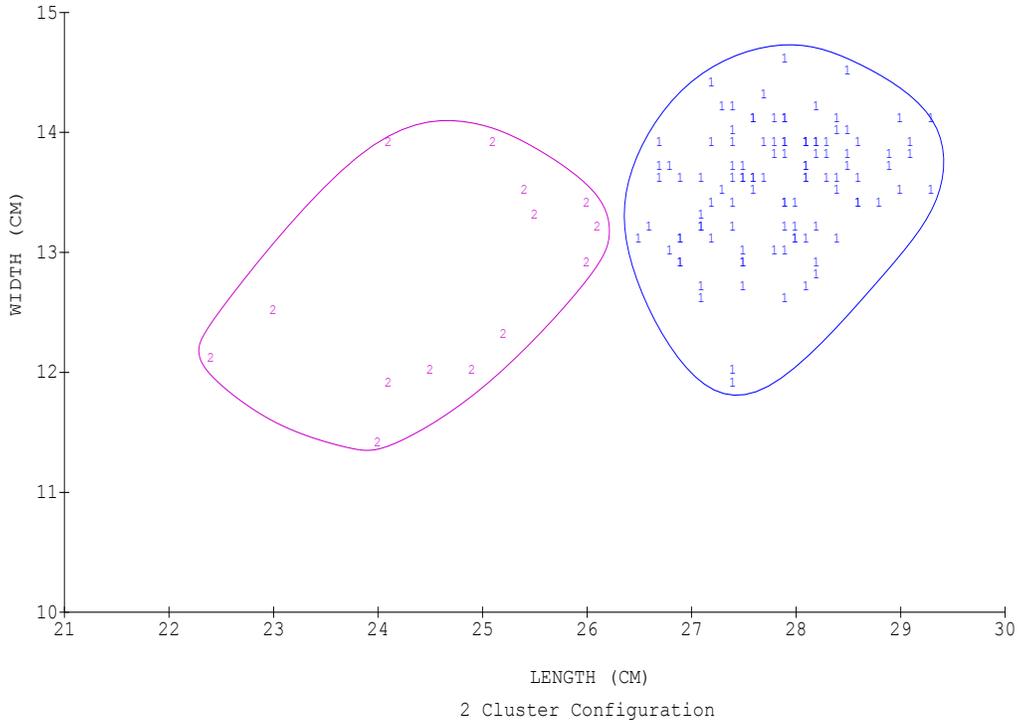
Figure 14. The two cluster configuration of the control data from the Barbican and Gatehouse.

Although it appears that the majority of the control data falls into the first cluster, the second cluster has a few data points as well. Eleven out of the fifteen bricks in cluster two are from the Gatehouse, while only four are from the Barbican. This second cluster of bricks coming largely from the Gatehouse accounts for the skewing in the histograms (Figures 9 and 10).

All of the available brick data was then analyzed using the K-means analysis, to see if there was any larger pattern of clustering across all of the bricks measured. As with the Barbican and Gatehouse, the lighter lines at the top are random numbers to compare against the plotted data and bends in the data indicate where a cluster lies (Figure 15).
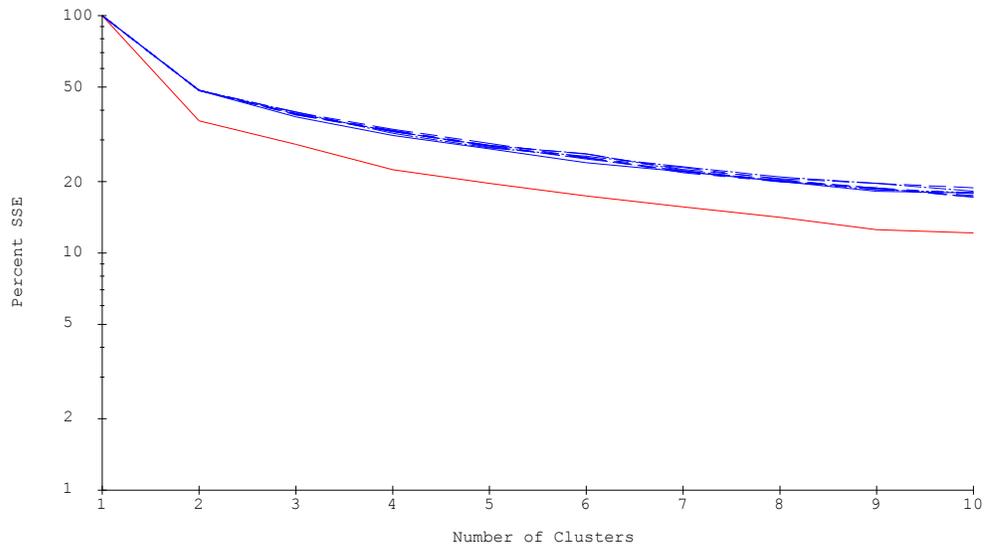
Figure 15. The K-means analysis for all of the brick data.

The data for all of the bricks very clearly bends at a two cluster solution. The measurements

were then plotted in Autocad to examine at the overall clustering. All of the non-control data is

represented as triangles, while the two clusters from the control data (Figure 14) are present as

the outlines, delineating the cluster boundaries of the Barbican and Gatehouse data.
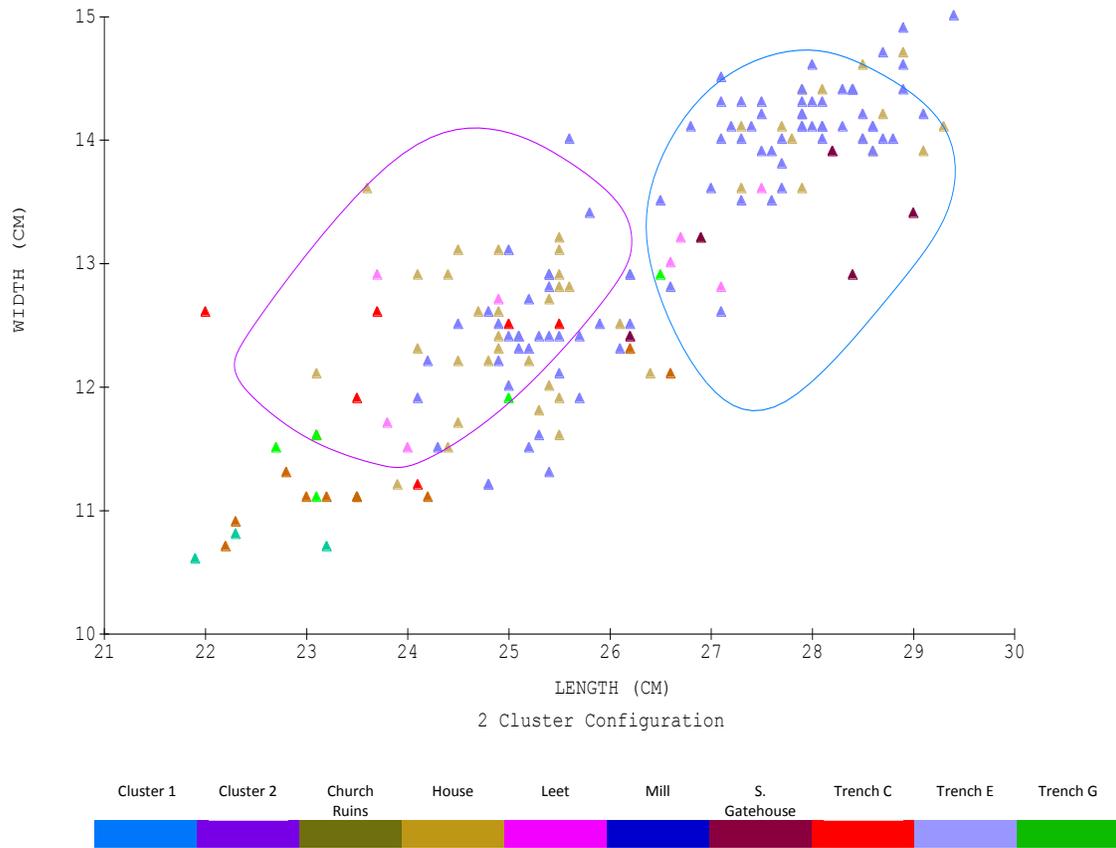
Figure 16. The brick measurements from the collective excavations, church ruins and outlying areas in relation to the control data clusters, with key.

Most of the data falls within or close to the two clusters identified in the control data, which supports the two main sources or periods of brick manufacture. The data roughly is divisible between the two clusters, with bricks coming from either cluster one or cluster two. In terms of dating, cluster one is the data contemporaneous with the building of the Gatehouse and Barbican, and cluster two is data dating to the post-dissolution era.

A few of the data sets span both of the clusters, including Trench E (Figure 17), the Church ruins (Figure 18), and the Leat from the Mill (Figure 19). Historically, the church is known to have been rebuilt in particular areas with brick, and so the archaeology appears to

reflect this event. The leat from the mill is a long, former creek with outwash including faunal

bones and pottery, and so it is not hard to imagine that this area was used to dispose of stray

materials throughout the period.
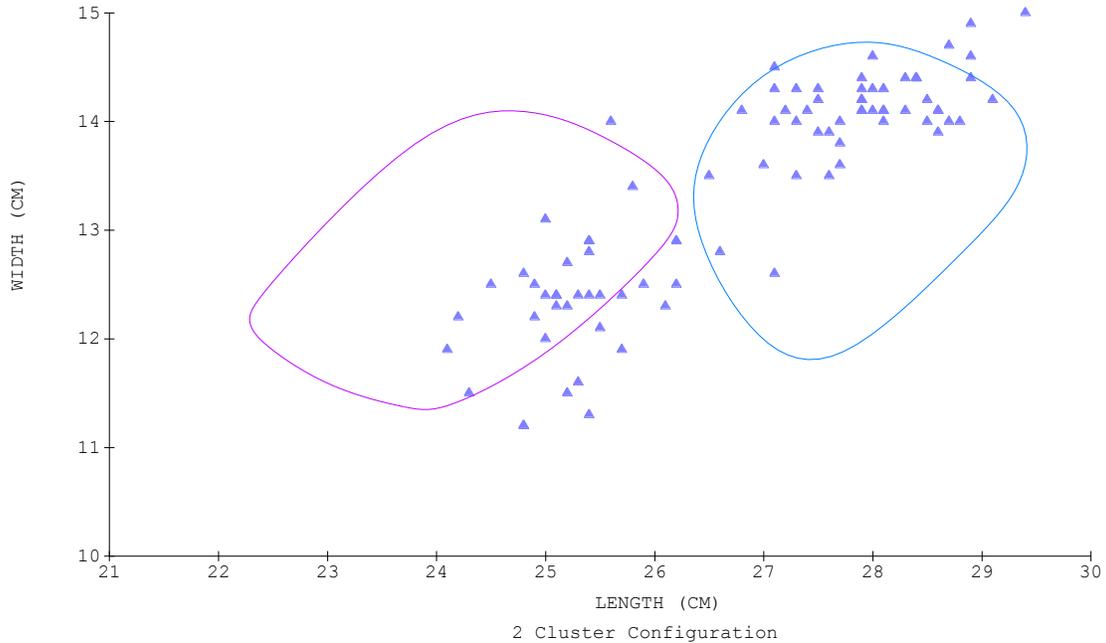
Figure 17. Trench E brick measurements in relation to the control data clusters.

The bimodality of Trench E, as seen in figures 9 and 10, is explained with the above

cluster configuration. Trench E fits in or near the control data clusters, which suggests two

different sources of bricks, and thus, bricks from two different manufacturing periods.   As the

largest and most intensive excavated sample, Trench E serves as a model for what should be

expected in the excavation of buildings built from reuse during the post dissolution period.

The largest cluster of bricks that fall outside of the two main clusters are the bricks from

Thornton Hall, which is not unexpected (Figure 20). Thornton Hall is a few miles away from the

site and is suspected to have used monastic stone in the foundations, but the majority of the

bricks do not appear in either cluster. There are two that measurements thatfall between the

clusters, however with a sample size of only eleven, nothing conclusive may be said of the two.
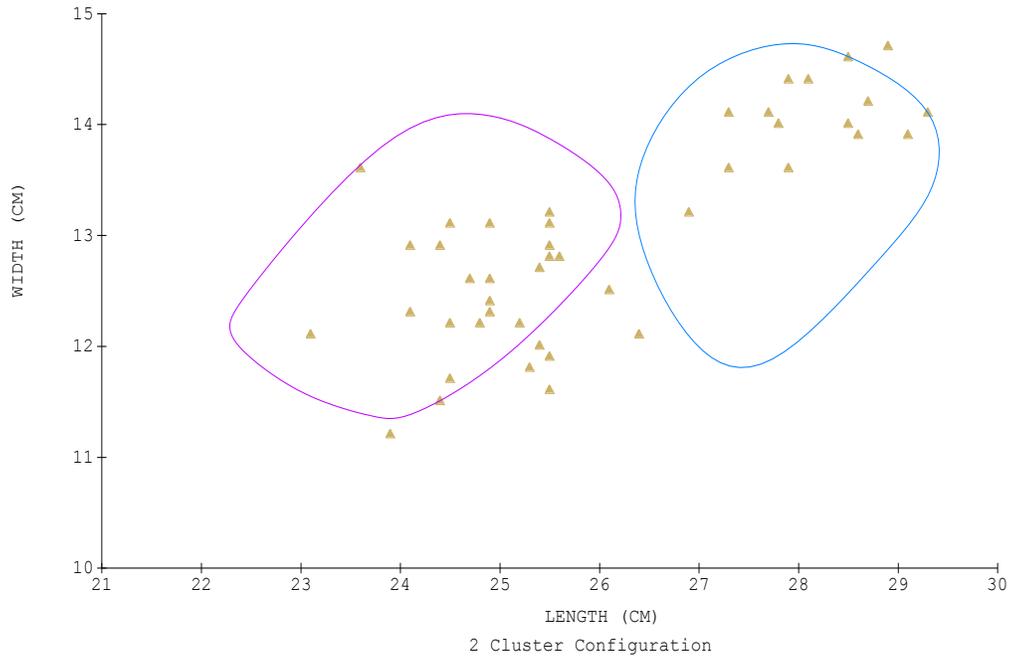
Figure 18. The brick measurements from the Church Ruins in relation to the control data
clusters.
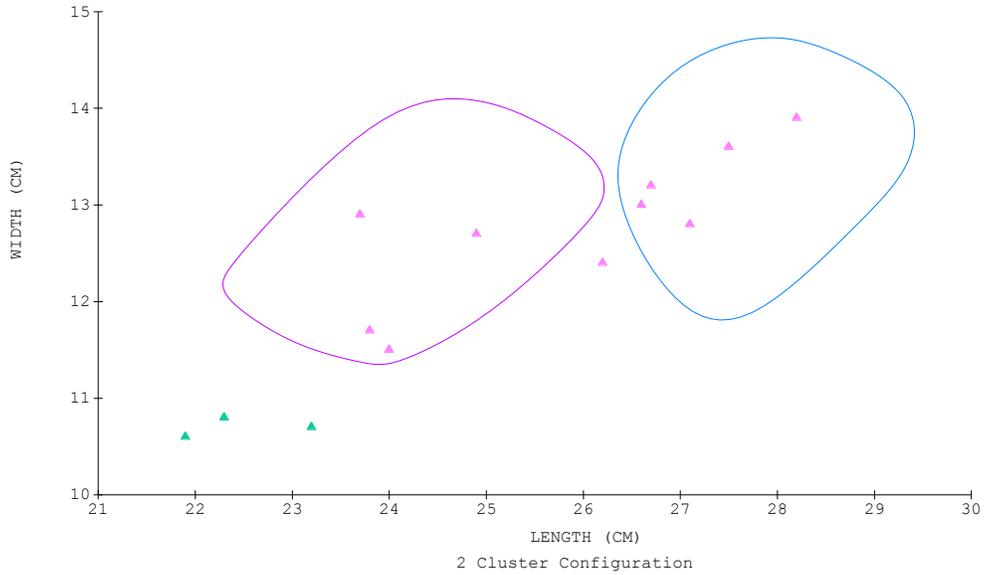
Figure 19. The bricks from the leat (green), and the mill (pink) in relation to the control data clusters.
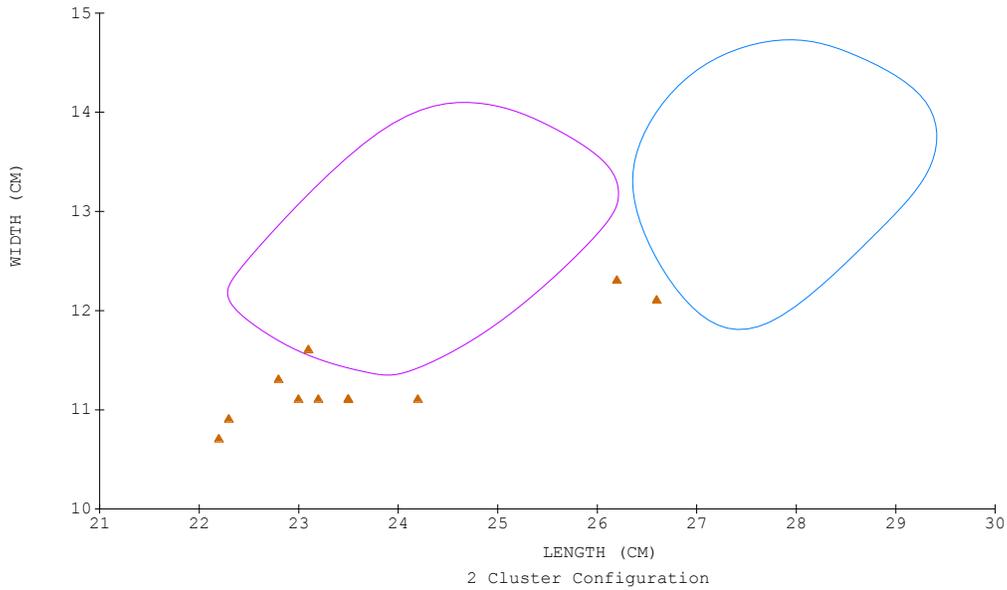
Figure 20. The bricks from Thornton Hall in relation to the control data clusters.

Overall the data analysis indicates that there are at least two main periods of building reflected in the brick measurements and confirmed by the archaeology. Although the reuse is

best exemplified by the bricks measured from Trench E, it can be seen throughout the site. Even the Gatehouse shows evidence of later building, although not extensive. Statistically, this study can be used in later excavations to determine where newly excavated bricks fall, and if reuse is present.

DISCUSSION

The original purpose of this investigation was to determine if the reuse of monastic materials could be seen archaeologically, and it has been confirmed that it is possible; particularly if a large sample, like Trench E, is used. However, architectural histories can be investigated through the use of bricks as well. Bricks are an underutilized resource that have opened up new questions at Thornton Abbey.

Each of the following areas were closely investigated, and studied through the use of bricks. In each case, the use of brick revealed either reuse or another explanation that is supported by the archaeological record.

Barbican and Gatehouse

The Barbican and Gatehouse were a very important part of the investigation. First, the results from the Barbican and the Gatehouse demonstrate that, during this period, brick production was standardized, at least on a local level. Furthermore, it can be stated that buildings were generally built using one standard mold and measurement. It was important for these statements to be established, because without standardization among brick measurements, attributing

measurements to a single source would be impossible, and no comparisons could be made on any of the data.

In addition to providing a set of control data, the bricks from the Barbican and Gatehouse solidify the relationship between the two structures. The exact dates of the Barbican and the Gatehouse are not established beyond both coming from the late 14th century. It is thought that the Barbican was built later, during a peasant's uprising in Lincolnshire, as added fortification (Clapham and Reynolds 2011). The results from the Barbican and Gatehouse determine that the buildings were, at the very least, built by the same manufacturer, and, likely, very closely in time.

The Gatehouse, although mostly composed of standard bricks, yielded a few measurements that went into the lower cluster of brick measurements. This was unexpected, as it has already been established that the entire Gatehouse built at the same time, and has a relatively standard set of bricks. It is possible that the few smaller bricks fall into the same period as the smaller bricks of Trench E, so it can be inferred that the repairs were contemporaneous with the construction of the structure in Trench E.

Trench E

The bricks from Trench E, as seen in Figure 17, come from two different populations. Given that bricks from this period were standardized, it is highly unlikely that a manufacturer of bricks would make two different sets of bricks in one building, or that a builder would use two different manufacturers to build a structure. Given that the sample size was rather large, and that the bricks from the sample settled fairly comfortably within one cluster or the other, there is no

doubt two different types of bricks were represented. It can be concluded, therefore, that Trench E possesses bricks from two different sources, and likely two different periods.

The representation of two different periods within one context strengthens the case of Thornton Abbey as an example of reuse. There are multiple ways in which the bricks could have been reused; either by building onto an existing structure, using the old brick as rubble fill in the walls, or using the old brick to make new walls.

Beyond the Gatehouse, there were other sources of brick that either had or could have been reused in the building of later structures, in spite of a lack of standing brick structures on the immediate site. The mill and the mill leat both had fragments and full bricks, largely discarded among an abundance of faunal bone observed along the leat path. In addition, the highly decayed south Gatehouse is found far from the excavations, and could have likely been utilized for building source (Figure 23).

Figure 21. The South Gatehouse.

The Church Ruins

The church was divided in and around the two main clusters of data (Figure 18), which in this case, confirms the historical record. The church is known to have been rebuilt in the fifteenth century with brick, in addition to being built up over time piece by piece (Clapham and Reynolds 2011:8-12).

The church area in general has been built and rebuilt over time, with a long architectural history that was well recorded. It would be interesting what other archaeology or architectural history this area could yield in terms of material culture. With that in mind, the church was badly ruined during the dissolution, and so much of what is there is close to the ground and toppled.

There is not much more that can be done with bricks on the site of the church ruins, as it was already difficult to get a good sized sample. A probable reason for the lack of bricks could be due to the period the church was originally built. Before the late fourteenth century, brick was almost never locally produced. Therefore, most of the architecture from the church built prior to that time would not have been brick. Any other studies done on the area should be based on another, more abundant material; of which there is a variety.

Other Possible Reuse

During the course of the excavation, other types of reuse emerged. A gravestone was found reused as a flagstone (Figure 1) in Trench E, which had an almost identical, cruciform symbol as some of the gravestones in the church area. Once again, historical sources state that flagstones

were in demand during this period, and so the find certainly confirms it to be true (Braun 1971:236).

In the same vein, chunks of broken monastic stone were found in some parts of Trench E, in rubble piles. Exactly how this monastic stone was used is not clear, perhaps as a rubble fill in the walls or some such purpose, but in some capacity it was used, or rather reused.

What Reuse Means

The reuse of monastic building materials may seem surprising to people, particularly since the Catholic Church was such a prominent institution during this time. However, King Henry made these properties secular and even heretical by changing the church, which potential pushed aside any moral objections people had had at that time. This practice also shows the priorities of the people, higher and lower class, of this time; they put their economic needs before the needs of a formerly sacred institution. This could indicate a growing dissatisfaction of monasticism within English society of this time, or at least apathy towards the institution in general. However, in any situation, people put their survival and well-being ahead of most priorities, and the economic potential of the open ruins almost certainly fed into that. Today, we are just as guilty of tearing down buildings with sentimental value to increase economic productivity. We just are not the first to do it.

Only a few generations later did the people of England start to lament the actions of their ancestors, even while maintaining the protestant cause. "The wanton destructiveness of King Henry VIII's actions exposed him to protestant as well as Catholic reproaches. Indeed, the monasteries, for some, came to belong to a blurred and gilded vision of a vanished past." (Aston 1973:234).

APPENDIX

Brick Raw Data from Thornton Abbey

All measurements are in centimeters

AREA	WIDTH	LENGTH	THICKNESS
Barbican	12.1	22.4	5.2
Barbican	13.4	26	4.6
Barbican	13.2	26.1	5.3
Barbican	12.2	26.1	5.1
Barbican	13.2	26.6	4.4
Barbican	13.7	26.7	4.8
Barbican	13.4	26.8	5.1
Barbican	13	26.8	4.9
Barbican	13.1	26.8	4.8
Barbican	12.9	26.9	4.7
Barbican	12.9	26.9	5.1
Barbican	13.5	26.9	5.2
Barbican	11.9	26.9	4.7
Barbican	13.6	27	4.8
Barbican	13.6	27.1	5.1
Barbican	12.7	27.1	5.2
Barbican	12.6	27.1	5.2
Barbican	13.4	27.1	5.2
Barbican	13.2	27.1	4.8
Barbican	13	27.1	4.8
Barbican	13.4	27.2	5
Barbican	14.2	27.3	4.5
Barbican	13.5	27.3	5.1
Barbican	14	27.3	4.8
Barbican	13.4	27.3	4.8
Barbican	12.4	27.3	5.1
Barbican	13.6	27.3	4.9
Barbican	14.2	27.3	5
Barbican	14	27.4	5
Barbican	13.7	27.4	5.4
Barbican	11.9	27.4	5.2
Barbican	13.6	27.4	4.3
Barbican	13.6	27.4	5.4

AREA	WIDTH	LENGTH	THICKNESS
Barbican	13.8	27.4	4.3
Barbican	13.3	27.4	4.4
Barbican	13	27.5	5.3
Barbican	13.7	27.5	5.6
Barbican	12.7	27.5	4.7
Barbican	12.9	27.5	5.1
Barbican	13.6	27.5	4.9
Barbican	13.7	27.5	5.2
Barbican	13.2	27.5	5
Barbican	13.5	27.6	4.7
Barbican	13.6	27.6	5.1
Barbican	14.1	27.6	5.5
Barbican	13.6	27.6	5.2
Barbican	13.2	27.6	5.2
Barbican	13.9	27.6	4.1
Barbican	13.7	27.7	5.5
Barbican	13.2	27.7	5.3
Barbican	13.3	27.7	5
Barbican	13.4	27.8	5.1
Barbican	13.8	27.8	5.1
Barbican	12.9	27.8	4.8
Barbican	13	27.9	5.3
Barbican	14.1	27.9	4.3
Barbican	13.9	27.9	4.5
Barbican	13.2	27.9	5.3
Barbican	13.6	27.9	5.2
Barbican	13.3	27.9	5.1
Barbican	12.5	27.9	4.8
Barbican	12.6	27.9	5
Barbican	13.6	28	5
Barbican	14	28	4.2
Barbican	13.1	28.1	5.1
Barbican	13.7	28.1	4.9
Barbican	13.9	28.1	4.6
Barbican	13.5	28.1	5.1
Barbican	13.3	28.1	5
Barbican	13.9	28.2	4.8
Barbican	13.2	28.2	5.1
Barbican	12.8	28.2	4.8
Barbican	13.4	28.2	4.5
Barbican	13.6	28.3	4.2
Barbican	13.7	28.3	4.8
Barbican	13.4	28.3	4.9
Barbican	13.6	28.4	5.6
Barbican	13.6	28.4	5.2
Barbican	13.6	28.4	5.8
Barbican	13.2	28.4	5.1
Barbican	14	28.5	5.2

AREA	WIDTH	LENGTH	THICKNESS
Barbican	13.4	28.5	4.7
Barbican	12.9	28.5	4.9
Barbican	14.2	28.9	5.2
Barbican	12.7	28.9	4.8
Barbican	14.2	29.1	5.3
Barbican	14.1	29.3	5
Church Ruins	13.1	25.5	4.9
Church Ruins	12.9	24.1	5.6
Church Ruins	12.2	24.8	5.7
Church Ruins	13.6	27.9	3.8
Church Ruins	12.6	24.7	5.9
Church Ruins	13.9	28.6	5
Church Ruins	12.8	25.5	5.9
Church Ruins	12.7	25.4	6
Church Ruins	12.2	25.2	5.8
Church Ruins	12.9	24.4	5.2
Church Ruins	12.4	24.9	5.4
Church Ruins	12.2	24.5	4.9
Church Ruins	12.9	25.5	5.2
Church Ruins	12.6	24.9	6.1
Church Ruins	12.8	25.6	5.8
Church Ruins	12.3	24.9	6
Church Ruins	14	28.5	6
Church Ruins	12.1	23.1	5.1
Church Ruins	13.2	25.5	5.6
Church Ruins	12.3	24.1	5.9
Church Ruins	11.7	24.5	6.1
Church Ruins	12.5	26.1	5.9
Church Ruins	12	25.4	6.1
Church Ruins	13.1	24.5	3.2
Church Ruins	13.1	24.9	5.3
Church Ruins	14.6	28.5	4.6
Church Ruins	11.8	25.3	5.9
Church Ruins	13.9	29.1	5.7
Church Ruins	14.4	27.9	5.1
Church Ruins	14.1	29.3	4.5
Church Ruins	14	27.8	4.6
Church Ruins	12.1	26.4	5.8
Church Ruins	14.7	28.9	4.4
Church Ruins	11.9	25.5	5.1
Church Ruins	11.5	24.4	6.2
Church Ruins	13.6	27.3	5.2
Church Ruins	11.6	25.5	6.2
Church Ruins	14.4	28.1	4
Church Ruins	13.2	26.9	5.4
Church Ruins	14.6	21.4	5.2
Church Ruins	13.6	23.6	4.7
Church Ruins	14.1	27.3	4.9

AREA	WIDTH	LENGTH	THICKNESS
Church Ruins	14.1	27.7	5.9
Church Ruins	14.2	28.7	4
Church Ruins	11.2	23.9	4.3
Gatehouse	13.8	17.5	5
Gatehouse	12.9	19.6	4.9
Gatehouse	12.5	23	6
Gatehouse	11.4	24	5.2
Gatehouse	13.9	24.1	4.8
Gatehouse	11.9	24.1	5.9
Gatehouse	12	24.5	6.2
Gatehouse	12	24.9	5.6
Gatehouse	13.9	25.1	5
Gatehouse	12.3	25.2	6.1
Gatehouse	13.5	25.4	4.7
Gatehouse	13.3	25.5	5.2
Gatehouse	12.9	26	4.8
Gatehouse	13.1	26.5	4.9
Gatehouse	13.9	26.7	5
Gatehouse	13.6	26.7	4.9
Gatehouse	13.7	26.8	5.2
Gatehouse	13	26.8	5.3
Gatehouse	13.1	26.9	5.3
Gatehouse	13.6	26.9	5.1
Gatehouse	13.1	26.9	4.2
Gatehouse	13.2	27.1	5
Gatehouse	13.3	27.1	5.1
Gatehouse	13.2	27.1	4.5
Gatehouse	14.4	27.2	4.9
Gatehouse	13.9	27.2	4.6
Gatehouse	13.1	27.2	5.2
Gatehouse	13.4	27.4	4.6
Gatehouse	13.9	27.4	5.1
Gatehouse	12	27.4	5.6
Gatehouse	14.2	27.4	4.9
Gatehouse	13.2	27.4	4.7
Gatehouse	13.6	27.5	4.7
Gatehouse	12.9	27.5	4.7
Gatehouse	14.1	27.6	5.4
Gatehouse	14.3	27.7	5.3
Gatehouse	13.9	27.7	4.8
Gatehouse	13.6	27.7	4.6
Gatehouse	13	27.8	5.2
Gatehouse	13.9	27.8	5.1
Gatehouse	13.8	27.8	5.1
Gatehouse	14.1	27.8	4.7
Gatehouse	13.8	27.9	4.8
Gatehouse	13.9	27.9	5.5
Gatehouse	14.1	27.9	5.1

AREA	WIDTH	LENGTH	THICKNESS
Gatehouse	14.6	27.9	5.1
Gatehouse	13.4	27.9	5
Gatehouse	12.6	27.9	4.4
Gatehouse	13.4	27.9	4.6
Gatehouse	13.1	28	5.2
Gatehouse	13.2	28	5.2
Gatehouse	13.1	28	4.6
Gatehouse	13.4	28	4.2
Gatehouse	13.6	28.1	5.1
Gatehouse	13.9	28.1	5.3
Gatehouse	13.6	28.1	4.9
Gatehouse	13.9	28.1	5.1
Gatehouse	13.7	28.1	5.1
Gatehouse	12.7	28.1	5.1
Gatehouse	14.2	28.2	4.9
Gatehouse	13.9	28.2	4.8
Gatehouse	13.8	28.2	5
Gatehouse	12.9	28.2	5
Gatehouse	13.8	28.3	4.9
Gatehouse	13.9	28.3	5
Gatehouse	13.6	28.3	4.8
Gatehouse	13.1	28.4	5.1
Gatehouse	13.5	28.4	5.1
Gatehouse	14	28.4	5.1
Gatehouse	14.1	28.4	4.9
Gatehouse	13.8	28.5	5.6
Gatehouse	14.5	28.5	5.2
Gatehouse	13.7	28.5	5.1
Gatehouse	13.9	28.6	4.8
Gatehouse	13.4	28.6	4.2
Gatehouse	13.6	28.6	4.6
Gatehouse	13.4	28.6	4.2
Gatehouse	13.4	28.8	4.6
Gatehouse	13.7	28.9	4.4
Gatehouse	13.8	28.9	5
Gatehouse	13.5	29	5.5
Gatehouse	14.1	29	4.9
Gatehouse	13.9	29.1	5.1
Gatehouse	13.8	29.1	5.3
Gatehouse	13.5	29.3	4.2
Leat	11.7	23.8	5.8
Leat	12.7	24.9	5.8
Leat	13.9	28.2	4.7
Leat	12.4	26.2	5.7
Leat	13.6	27.5	5.1
Leat	12.9	23.7	5
Leat	11.5	24	5.7
Leat	12.8	27.1	5.7

AREA	WIDTH	LENGTH	THICKNESS
Leat	13	26.6	5.9
Leat	13.2	26.7	5.5
Mill Area	10.6	21.9	5.7
Mill Area	10.8	22.3	5.7
Mill Area	10.7	23.2	5.8
Thornton Hall	12.3	26.2	5.3
Thornton Hall	12.1	26.6	5.8
Thornton Hall	11.1	24.2	7.7
Thornton Hall	10.7	22.2	5.1
Thornton Hall	11.1	23.5	5.8
Thornton Hall	11.6	23.1	5.6
Thornton Hall	11.1	23.2	5.7
Thornton Hall	11.1	23.5	5.6
Thornton Hall	11.1	23	5.1
Thornton Hall	10.9	22.3	5.8
Thornton Hall	11.3	22.8	5.6
Trench C	11.2	24.1	5.4
Trench C	11.9	23.5	5.9
Trench C	12.5	25	6
Trench C	12.5	25.5	5.8
Trench C	12.6	23.7	5.4
Trench C	12.6	22	6.4
Trench E	11.2	24.8	5.6
Trench E	11.2	24.8	5.9
Trench E	11.3	25.4	5.5
Trench E	11.5	24.3	5.9
Trench E	11.5	25.2	5.5
Trench E	11.6	25.3	5.7
Trench E	11.9	25.7	6.3
Trench E	11.9	24.1	5.4
Trench E	12	25	6
Trench E	12.1	25.5	5.6
Trench E	12.2	24.2	6.1
Trench E	12.2	24.9	5.4
Trench E	12.3	25.2	5.9
Trench E	12.3	25.1	5.6
Trench E	12.3	26.1	6.2
Trench E	12.4	25.1	6.2
Trench E	12.4	25.4	5.6
Trench E	12.4	25.1	6.1
Trench E	12.4	25.7	5.6
Trench E	12.4	25.3	5.7
Trench E	12.4	25	6.4
Trench E	12.4	25.5	5.7
Trench E	12.5	25.9	6.9
Trench E	12.5	26.2	5.5
Trench E	12.5	24.5	5.9
Trench E	12.5	24.9	5.8

AREA	WIDTH	LENGTH	THICKNESS
Trench E	12.6	24.8	5.8
Trench E	12.6	27.1	5.8
Trench E	12.7	25.2	6.5
Trench E	12.8	25.4	5.8
Trench E	12.8	26.6	6.1
Trench E	12.9	25.4	6.2
Trench E	12.9	25.4	5.9
Trench E	12.9	26.2	6
Trench E	12.9	26.2	6.3
Trench E	13.1	25	6
Trench E	13.4	25.8	6.1
Trench E	13.5	27.6	5.3
Trench E	13.5	27.3	6.1
Trench E	13.5	26.5	5.7
Trench E	13.6	27	5.7
Trench E	13.6	27.7	5.2
Trench E	13.8	27.7	5
Trench E	13.9	27.6	5.2
Trench E	13.9	27.5	5.9
Trench E	13.9	28.6	5.6
Trench E	14	25.6	6.4
Trench E	14	28.7	5.4
Trench E	14	27.7	5.3
Trench E	14	27.1	6
Trench E	14	28.1	6.7
Trench E	14	28.8	5.8
Trench E	14	27.3	5.1
Trench E	14	28.5	5.8
Trench E	14.1	27.2	5.5
Trench E	14.1	27.9	6.3
Trench E	14.1	26.8	5.2
Trench E	14.1	28.6	6.1
Trench E	14.1	27.9	5.6
Trench E	14.1	28	5.4
Trench E	14.1	28.6	6.1
Trench E	14.1	28.1	5.8
Trench E	14.1	28.3	6.1
Trench E	14.1	28.1	6
Trench E	14.1	27.4	3.4
Trench E	14.2	29.1	6.3
Trench E	14.2	27.9	5.6
Trench E	14.2	27.5	5.9
Trench E	14.2	27.9	6.1
Trench E	14.2	28.5	4.6
Trench E	14.3	27.3	5.6
Trench E	14.3	27.5	5.5
Trench E	14.3	28	5.9
Trench E	14.3	27.9	6

AREA	WIDTH	LENGTH	THICKNESS
Trench E	14.3	28.1	6.1
Trench E	14.3	27.1	5.3
Trench E	14.4	28.3	6.1
Trench E	14.4	27.9	5.8
Trench E	14.4	28.4	5.3
Trench E	14.4	28.9	6
Trench E	14.4	28.4	6.2
Trench E	14.4	28.4	4.5
Trench E	14.5	27.1	5.1
Trench E	14.6	28.9	5.9
Trench E	14.6	28	5.6
Trench E	14.7	28.7	6.3
Trench E	14.9	28.9	6.3
Trench E	15	29.4	5.5
Trench G	11.1	23.1	7.5
Trench G	11.5	22.7	7.6
Trench G	11.6	23.1	7.2
Trench G	12.9	26.5	5.9
Trench G	11.9	25	5.4

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