Archaeology of College Hill: John Brown House

Results and Interpretations from the Fall 2011 Excavations

Jessica Nowlin and Müge Durusu-Tanriover, Editors, with contributions from the students of ARCH 1900, *The Archaeology of College Hill*, Joukowsky Institute for Archaeology and the Ancient World, Brown University

ARCHAEOLOGICAL REPORT SUBMITTED TO

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Chapter 1 Introduction: Excavations at the John Brown House, 2012

Jessica Nowlin

In the fall of 2011, excavations were conducted at the John Brown House for the fourth year in a row as a part of the *Archaeology of College Hill* (ARCH1900) , an advanced undergraduate course offered by the Joukowsky Institute for Archaeology and the Ancient World at Brown University. The course met for three hours once a week between September and December 2011, providing eleven days of excavation work and two days of post-excavation analysis. The students excavated three units over the yard of the John Brown House: one 2x2m, one 3x3m, and one 1x3m unit. Information concerning the site layout, history and excavation methodology is detailed in several of the following chapters as well as in excavation reports from the previous three seasons (Archaeological Reports 2008-2010 available at http://proteus.brown.edu/collegehill2011/home).

Along with this more traditional paper publication of the excavation findings, the students maintained a wiki, an editable website, with their own formal and informal updates as to the weekly progress of the excavation (http://proteus.brown.edu/collegehill2011/Home). At the end of the semester, the students submitted independent reports concerning different aspects of the excavation, the variety of technologies employed, and the artifacts collected. This report is a compilation of these student research projects; editorial changes have been kept to a minimum to foreground the students' accomplishments.

For the past three years, the excavation has been led by Dr. Krysta Ryzewski, and in taking over excavations in 2011, I have chosen to make few changes in both excavation methodology and course design. This was done in effort to maintain consistency, but also due to an agreement with the excavation methodology from previous years. In one respect, however, I have chosen to make serious changes: that of the role of technology in archaeological documentation. The extent and

elevation of all units and contexts, as well as any special finds, were recorded using a total station and the data has been compiled in a site-wide GIS. Along with these more standard forms of archaeological documentation, we also recorded more complicated features through photogrammetry, a technique that allows the creation of three-dimensional models through a series of photographs. This update in technological applications was done to keep the excavations at the John Brown House in line with best practices in modern archaeological recording techniques. It is my hope, as well, that these students will disperse the application of these technologies more widely throughout the archaeological community as they continue their own fieldwork.

Chapter 2: Compilation of Digital Data at the John Brown House 2011

Ian Browstein and Nicholas Sinnott-Armstrong

Abstract

Archaeology has the primary goal of understanding the context and meaning of material remains. One essential part of this is getting an accurate representation of the distribution of artifacts across a site. Using modern survey and geography techniques, the representation of a site can be generated which precisely locates all units, contexts, and finds with relative ease.

After the 2011 excavation season Geographic Information System (GIS) software was used to compile the GPR, total station, and photomodels of the site. The resultant GIS is compatible with the 2010 seasons GIS so that the results of the two season could be used in tandem. The total station points were used to create context boundaries in three-dimensional space and to create three-dimensional volumes of these contexts. While the concept of 3-D volumes has been used by archeologists for years, most reported analysis comes from the 2-D representations of the excavation (Losier et al. 2007). An analysis of artifact densities inside of each of these volumes was conducted using ArcGIS symbology functions.

Introduction

The GIS was compiled using three programs from the ESRI ArcGIS suite: ArcCatalog, ArcMap, and ArcScene. ArcCatalog is software which was used to house all of the site information. ArcMap was used to compile all 2-D spatial data and ArcScene was used to take advantage of the third dimension, elevation, which goes unused in ArcMap, allowing the creation of a 3-D model of the site.

There are three basic units used to create the 20011 JBH GIS model, the most basic of which is a point. Points are a location in two or three dimensional space which have associated x, y, and z coordinates. This information defines the location of the point with respect to the origin. In the JBH model, the origin was defined at the total station which was given the coordinate (1000m, 1000m, 100m). Points can be used to define features which can be polylines or polygons. Polylines, or outlines, connect points to allow the user to visualize boundaries or divisions. Polygons allow the user to define either a surface or a volume. Surfaces are made by filling in the space between a series of points on a single plane. Volumes, or 3-D objects, are made by enclosing a space with series of polygons. Volumes are formed using the third basic unit of the JBH 2011 GIS, the triangular irregular network, or TIN. TINs define three dimensional surfaces by connecting triangles between the points.

During the beginning of the 2011 excavation season, a GPR survey was conducted on the northern portion of the lawn. This survey was conducted to determine the location of what

would become Unit 14. This survey data was georeferenced into the 2010 season GIS before this project began. Georeferencing takes a two dimensional image and places it over the space that it represents by using at least three datum, unless the image is orthogonally rectified. In this case only two datum are necessary. This operation can be conducted in ArcMap.

Throughout the 2011 season a Topcon GPT-3100N Total station was used to collect points which define the unit and context corners, topography of each context, location of special finds, and points used for the classes' final drawings of the site.

Photomodeling is a technique which uses information encoded in multiple images to reconstruct a 3D model of a scene. This technique, one common form of photogrammetry, has been successfully applied to artifactual analysis in the past. Andreetto et al and Nassar et al provide more details on how the algorithms work and their implications; essentially local features are extracted and use to align cameras, and then these local features can be projected into a three dimensional space. In order for the location of a point to be known, at least three cameras much have a picture of it, so it is important to make sure there is sufficient coverage of all locations in the target. Pierrot-Deseilligny et al provide many archaeological examples of photogrammetry and provide a comparison with the technique employed below.

Methods

Surveying

The first step in doing any sort of geographical analysis is to collect data points relevant to the research question. Geographical points were collected using a Topcon GPT-3100N Total station. A Total station is a surveying instrument which records the relative location of a reflector target in spherical coordinates. A single origin point and backsight point were used on all days to ensure registered data and a consistent height 1.6m reflector was used for all measurements. The process used to set up the station is as follows:
1) The surveying tripod is set to chin height and approximately centered over the origin point in the eastern uphill portion of the property.
2) The Total station is securely attached to the tripod.
3) Using the circular spirit level built in to the Total station, the tripod is leveled over the origin point by adjusting the height of the legs, one at a time.
4) The Total station is turned on and set to enable the laser plumb level.
5) The Total station is loosened on the tripod and adjusted so that the plumb level is directly above the origin point.
6) The fine adjustment knobs on the Total station are used with the horizontal spirit level to ensure a precise leveling at all orientations.
7) The height of the Total station is recorded using a folding rigid ruler and a horizontal spirit level.
8) The handheld computer used in the field is turned on and synchronized with the GPT-

3100N using Bluetooth. A new job for the day is set up.
9) The reflector is set to a constant height (1.60m) and placed on the backsight point, facing towards the Total station and with the corner mirror in full view.
10) The Total station is adjusted using the coarse and fine movement controls until the target is centered on the crosshairs.
11) Using the Setup -> Backsight options, the backsight accuracy is calculated and the result is checked, with adjustments made until the horizontal and vertical error are both less than 0.01m.

Once this is set up, the Topo -> Survey options allow for collection of attributed points that can later be manipulated on the GIS.

Points were collected each day of field work, with the exception of September 12, when we were still deciding on the locations of our units. The unit corner nails

Ground Penetrating Radar (GPR)

GPR is a survey method that utilizes contrasting dielectric permittivity and conductivity of the subsurface to map two-dimensional vertical profiles of the Earth. These profiles can be compiled to form a three dimensional image of the subsurface. GPR does this by sending electromagnetic waves into the subsurface through an antenna. A wave travels downward until it comes in contact with a material of different electrical properties than that of the medium through which it is flowing. Part of the energy is then reflected off of such an interface and returns to an antenna, where the time it took to return is recorded as well as the strength of the returning wave (Conyers et al. 1997: 23). This data can be converted into horizontal 'time slices' which represent the geophysical data at various depths. These slices were georeferenced into ArcMap using the georeferencing tools and the georeference points taken with the total station which represent the corners of the GPR survey.

Compiling

The data was first imported from the total stations handheld computer to ArcCatalog. Data came into the database sorted by the date it was taken and what it was supposed to represent. These points were reorganized into the following feature classes using ArcMap: unit corner, context corner, finds, topography, georeferencing points, and drawing points. Depending on the feature class different attributes were also assigned the points such as unit, context, and artifact densities. Volumetric analysis was performed for artifact count per cubic meter densities on various artifact types. Densities of glass, nails, metals, and total ceramics were inputted using this method. These densities could then be compared using ArcGIS symbology tools, which assign colors features based on attribute qualities or quantities. Due to inconsistencies between various data sets given for analysis, more specific densities, such as the densities for specific ceramic types, were not analyzed in this report.

Georeferencing

An orthonormal photo and a 3-D photomodel of Unit 13 were inputted into the GIS. The orthonormal photo was georeferenced using ArcMap georeferencing tools, anchoring the nail heads defining three unit's corners in the photo with the unit corner points taken with the total station. To properly orient and place the 3-D photomodel within the GIS model ArcScene was used to manually scale, drag along the x-y plane, rotate, and lower in the z direction. In future studies, it would be advisable to take easily topographical points that can be used to georeference the photomodel in the absence of textures. Unit corners, topographic points, and context volumes were used in tandem to confirm the validity of the final placement of the photomodel.

Creation of the 3-D Model

After the data points were compiled they were used to make context surfaces and context volumes in ArcScene. First, points which defined the outline of a context were selected to form context surface polygons. These points were used again, in conjunction with the context topographic points to create TINs for each context surface. Using top and bottom TINs for each context, a volume was extruded which approximates the volume which was removed from the site as the contexts were dug.

Photomodeling

A Canon Digital Rebel XT Digital SLR camera was used to record the images for photomodeling. Images were taken from a low azimuth (about thirty degrees) from thirty to forty different locations around the site, as well as five to ten images from the top to get good quality textures. The final layers of units 11 and 13 were modeled, and the models were assembled from 109 and 44 images respectively.

Once the images were recorded and downloaded to the computer, two software packages were used: PhotoModeler Scanner and Autodesk 123D Catch. PhotoModeler Scanner is a sophisticated software system that is dedicated to high precision models of objects at a wide variety of scales. It is very powerful and the process used to generate the models is very configurable. It also integrates directly with GIS systems and its models and orthorectified photographs can be georeferenced with ease. The first step of generating a model with PhotoModeler is to import the images. From there, either guided point mode or Smart Point selection should be used. With guided point mode, a set of points that correspond to the individual surface locations of known static objects should be chosen -- for this project and other archaeological digs, we recommend the unit border nails. PhotoModeler integrates well into the existing workflow and is fully capable of georeferencing and export to GIS. It provides a wealth of settings for controlling how points are mapped, filtered, and extracted to give a good quality mesh and gives users the ability to individually select and remove errors at nearly every step of the model generation.

Autodesk 123D Catch, a software package designed for artists and hobbyists looking to make detailed copy of physical constructions, is a relatively new offering in the area of

photo-based modeling. Formerly known as Photofly (Lee, NYT), it is easy to use and well situated in the multitude of applications available. It gives users an easy to use, fast, streamlined interface and can give fast, high quality results. The details of the image are in general well preserved and it is likely that this program will become a standard in the field.

Results

There are two distinct types of results which can be draw from the above process. First, all of the inputted data could be viewed and analyzed to look for similarities between data types from both the 2010 and 2011 seasons. Second, the volumetric analysis can be used to draw possible conclusions about the use of various contexts which can explain the artifact distribution across the site and within units.

Comparison

Since no geophysical or georeferenced data was done for the area near Unit 11 in the 2010 or 2011 GISs no comparison were able to be made to help explain this unit. The northern units are much more fortunate in that there was GPR data, Sandborn maps, and context boundaries from the 2010 season in addition to the contexts added from the 2011 season. All of these data types were used to make Figure 1, shown below. Three results can be taken from this view.

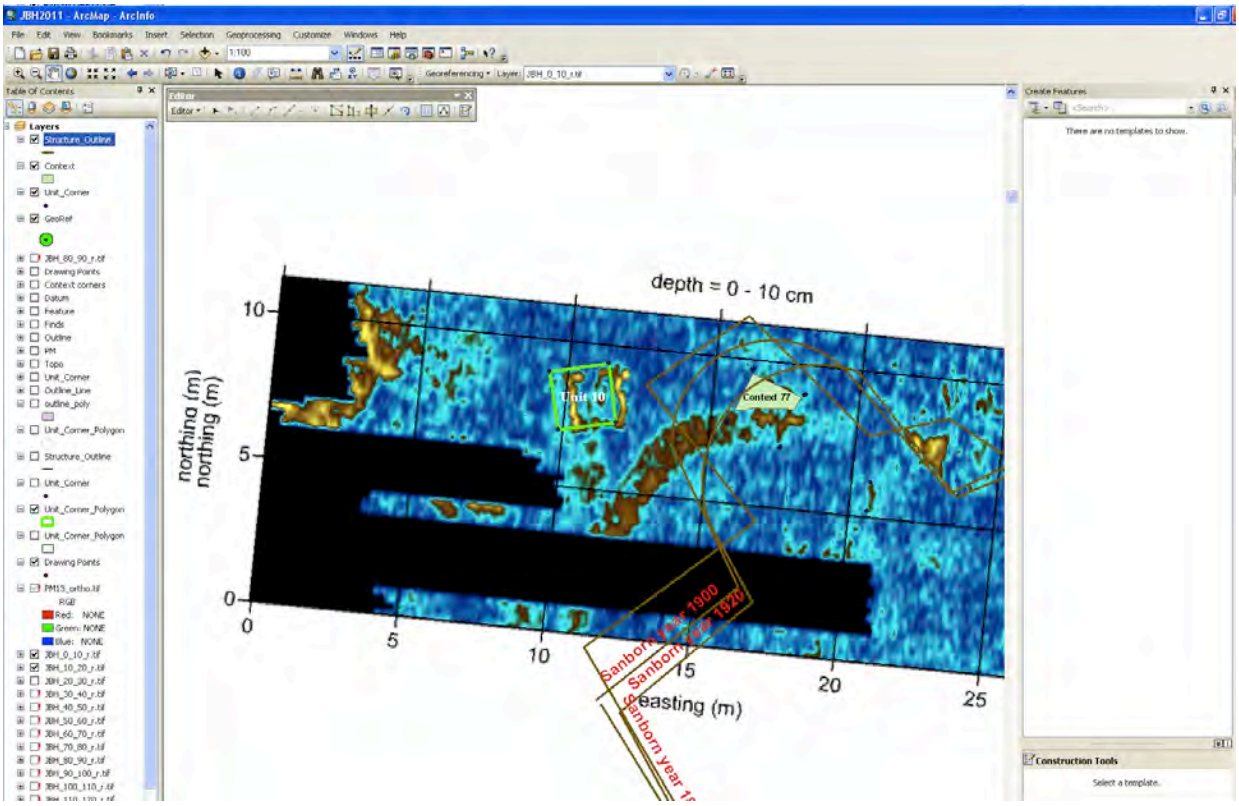


Figure 1: Context Boundaries, GPR 90-100cm time slice, and Sandborn Map Structure Outlines from 1860, 1900, and 1920

First, Unit 10, dug during the 2010 season, was directly over a rectangular GPR anomaly of similar size to the Unit 10. This unit was originally placed by an anomaly from the 2008 magnetometry survey of the lawn. Since Unit 10 was not dug down to the 90-100cm depth where the GPR anomaly overlaps lies, this anomaly may be the same one seen in the magnetometry survey and not a result of their excavation. This is significant because Unit 10 concluded that they were not digging over any significant material culture at the end of their excavation season but this suggest there may still be features of interest at approximately a depth of 1m.

Second, the large arcing anomaly seen in the middle of this shown GPR time slice matches up almost perfectly with context division for Unit 13. Context 77, also shown above, lies perfectly above the arcing anomaly. This is interesting because it would seem to justify the groups' context division but the time slice is from a meter depth and the unit was only dug down a few centimeters. This may indicate that the linear anomaly is some sort of wall or reaching down to a depth of 1m.

Third, the arcing GPR anomaly appears to have similar curvature to that of the outlines from the 1900 and 1920 sandborn maps. This brings into question the validity of the sandborn maps. The maps from 1900 and 1920 are already offset suggesting inaccuracies on the behalf of the mapmakers. Once inaccuracies on the behalf of the mapmakers are considered it becomes possible that the curved anomaly may actually be the outline of the Hale Ives house.

Volumetric Analysis

The context volumes for Units 11, 13, and 14 are shown in the four figures below. They are colored by artifact type density with green being the least and red being the most dense. It is extremely important to note that some volumes had non-sensible volumes according the to ArcScene. Unit 84, for example, outputted a volume of 0 square meters. For contexts such as this volumes were calculated manually and these values were inputted into volume attributes in the GIS.

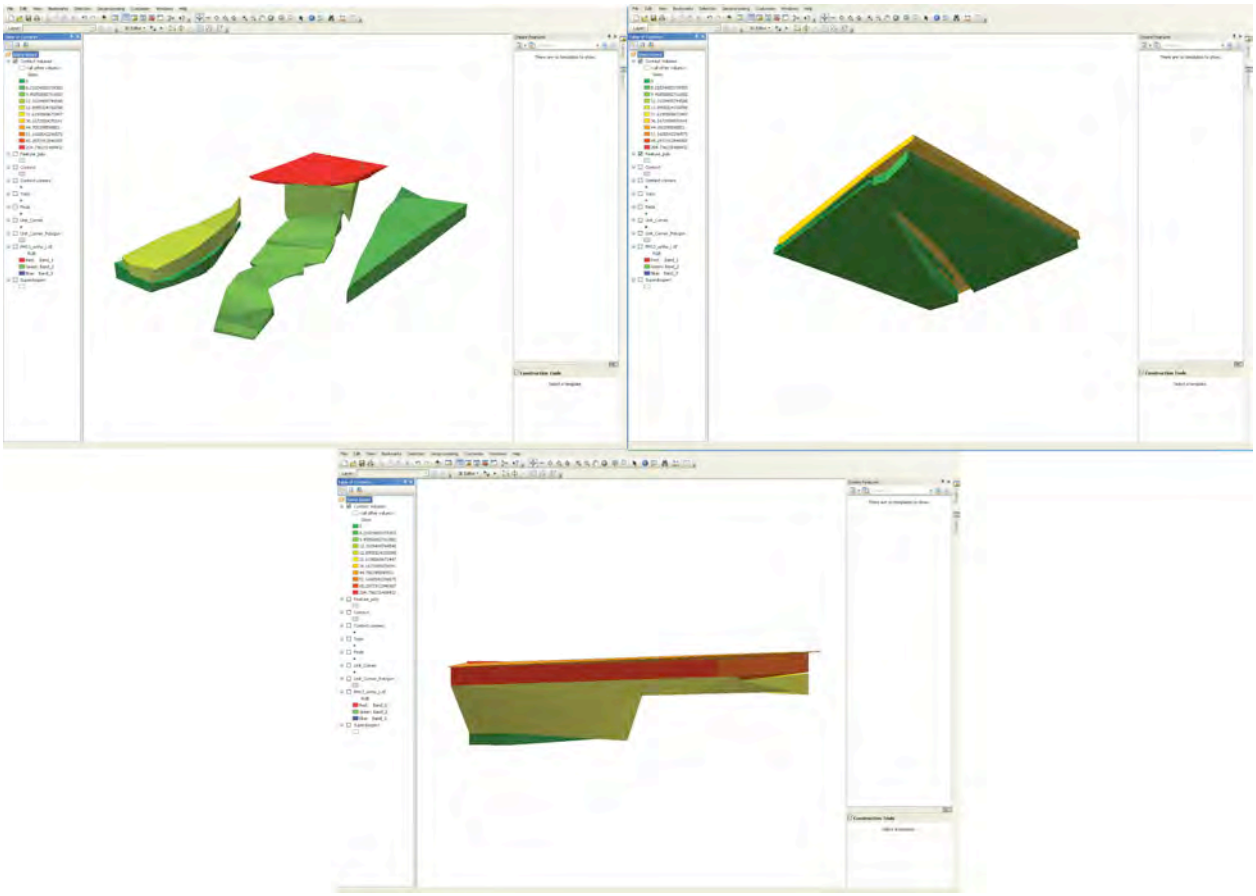


Figure 2: Volumetric Analysis-Glass

The volumetric analysis of glass densities reveals that there are higher densities of glass at higher elevations. On the scale used for these densities largest category has densities of 204.74 pieces of glass per cubic meter and the next size down in 65.29 pieces of glass per cubic meter. Higher contexts with each unit show significantly more glass pieces per unit volume than lower ones. This may be because of the proximity of the John Brown House to the Brown University dormitory, Keeney Quadrangle and the rest of the Brown University campus. During excavations, alcoholic beverage bottles, most likely deposited by the neighboring college community, littered the John Brown House lawn. It is possible that over time the college campus has increased this number as students walk by the lawn and sometimes dropping bottle which break, depositing glass on the surface. Since the school as grown in population and influence on college hill with time, more glass would be deposited on the lawn.

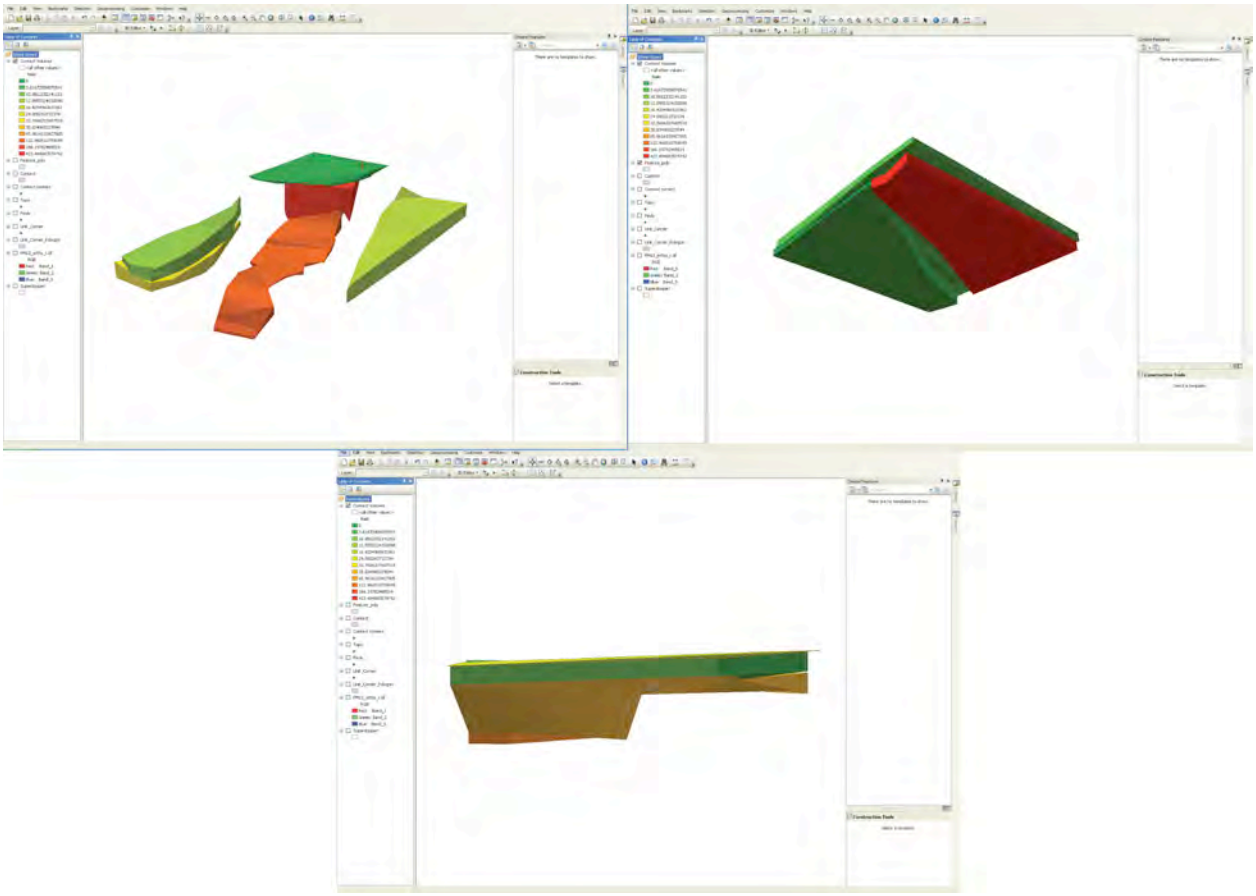


Figure 3: Volumetric Analysis-Nails

Nail concentrations are highest in context 78 and between the walls of Unit 11. For Unit 11, this may indicate that there was some sort of wooden structure within the walls. In addition to having the largest nail density, context 78 lies over the arcing GPR anomaly. More information about the anomaly may help put this observation in context. Also of note, nail densities increase with depth for Unit 14.

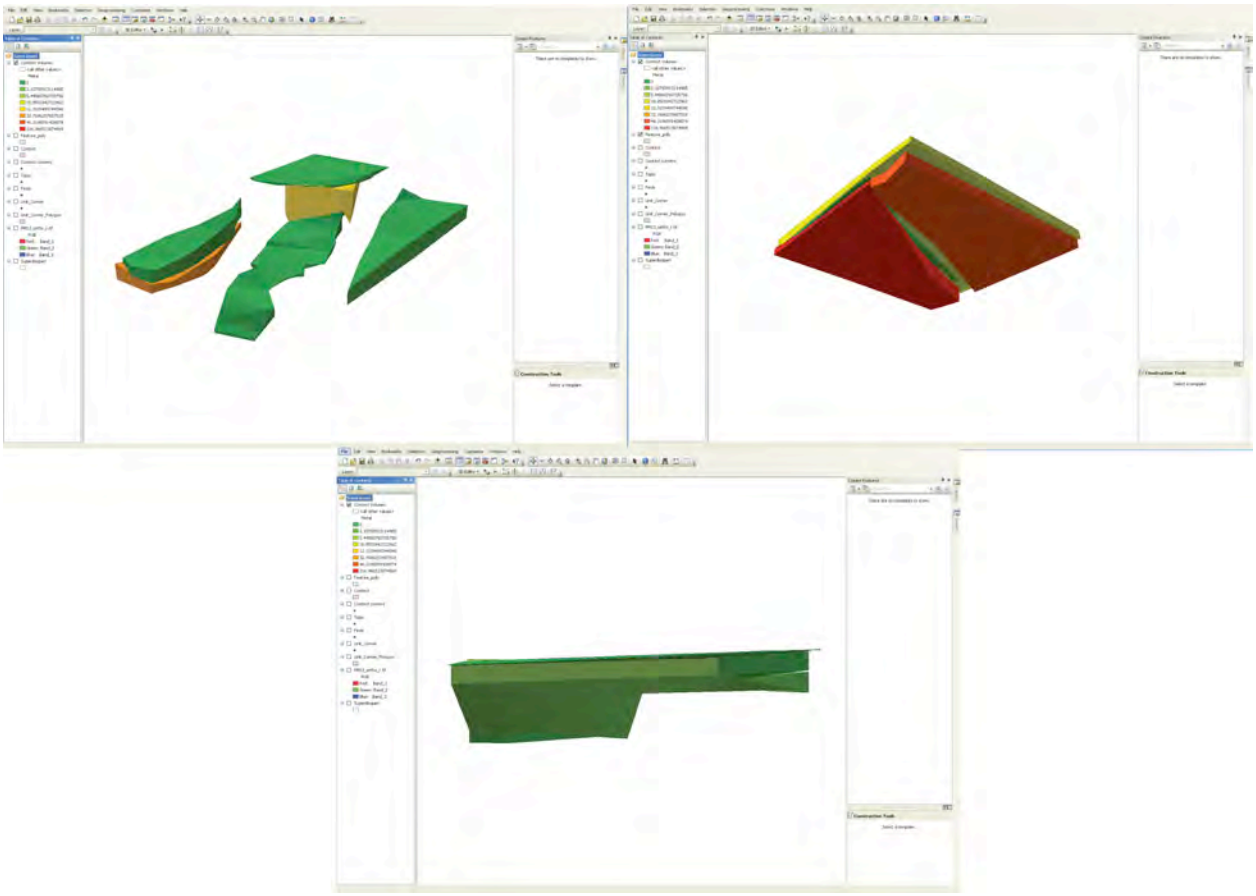


Figure 4: Volumetric Analysis-Metals

Unit 13 has by far the highest, non-nail, metal concentrations. Densities in the range of 317 pieces of metal per cubic meter are reported for this unit while the highest density in any other unit is only 32 pieces of metal per cubic meter. Based on this extremely high density it is possible that this was a repository of metal scarps or debris of some sort, possibly from the destruction of the Hale Ives House.

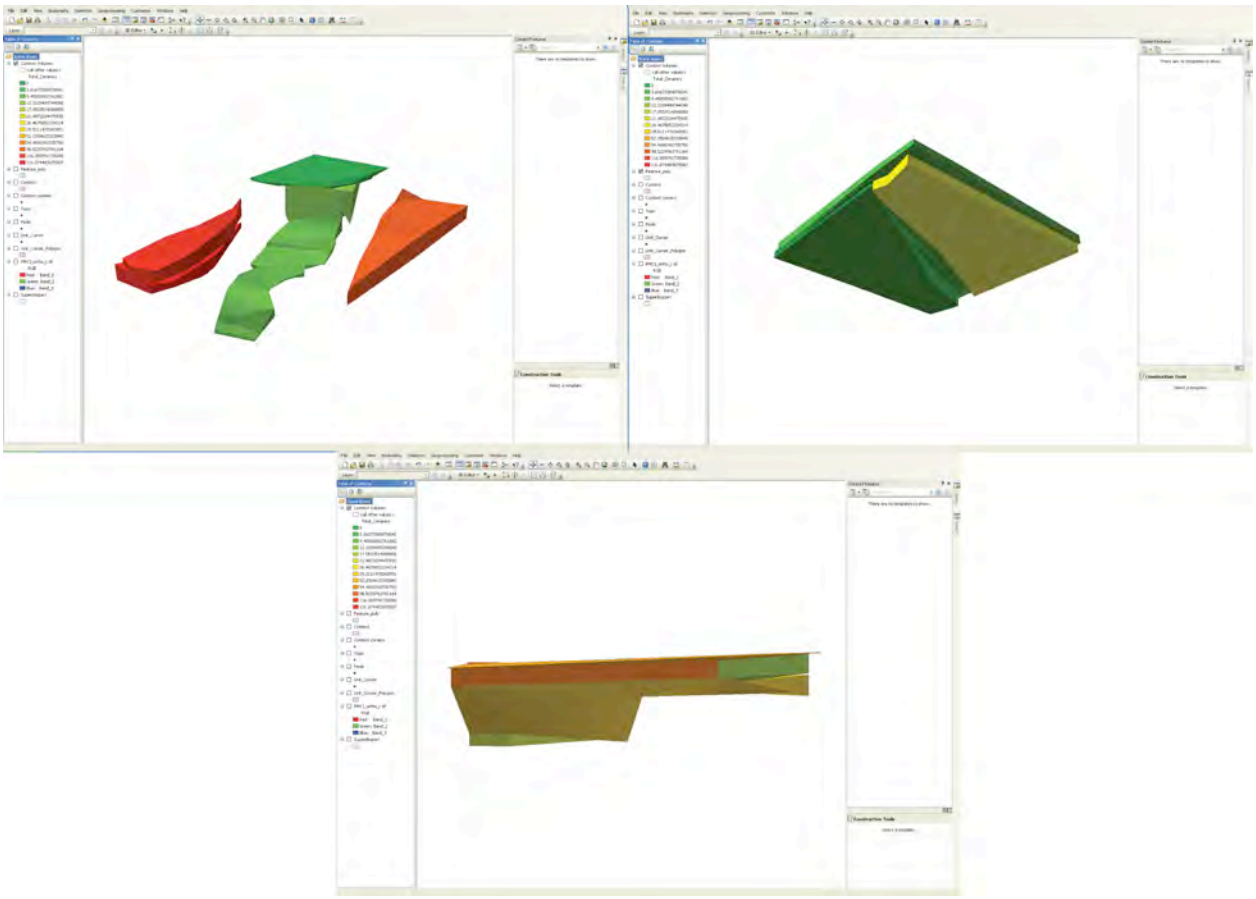


Figure 5: Volumetric Analysis-Total Ceramics

Unit 11 has extremely high ceramic densities, around 120 pieces per cubic meter, on the outer sides of both walls, and extremely small, less than 10 pieces per cubic meter, between them. It is possible that when the walls were exposed there were ceramic pieces along there perimeter for some sort of decoration. These pieces may have broken and been left being as the walls fell out of use. It is also of note that Unit 13 has extremely low ceramic densities and Unit 14 has higher ceramic densities closer to the modern surface.

Photomodel

The PhotoModeler Scanner results were lackluster. Unit 11 was first run using the Smart Points system, and while this worked to produce a set of points, the triangulated surface was unsuccessfully constructed and had a spiky profile. Manual points were added, and while this helped get a more accurate point cloud, it did not solve the spikiness issues.

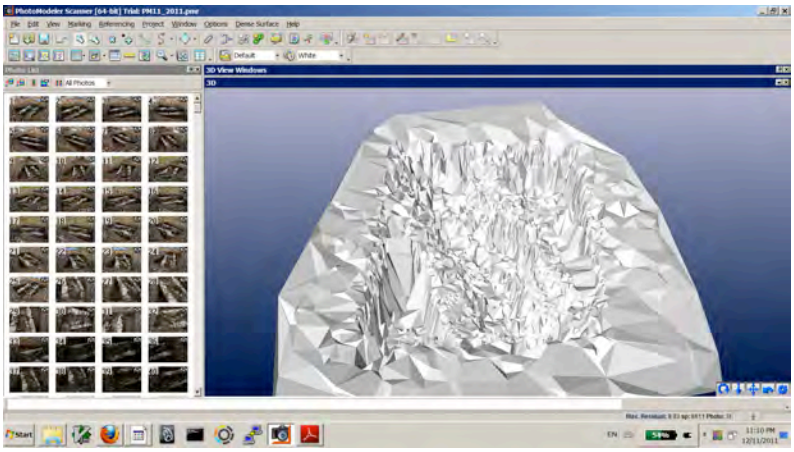


Figure 6: Spiky Photomodel of Unit 11 in PhotoModeler

In order to alleviate this, the surface was replaced with a dense surface mesh, with aggressive smoothing and point filtering, that is better able to capture the overhangs present in the wall. While this worked to produce a highly smoothed model of the surface geometry, the tessellation parameters and uneven lighting/exposure of the scene made the details uninterruptable. In the future, using manual exposure on the camera while taking images might fix this to some degree.

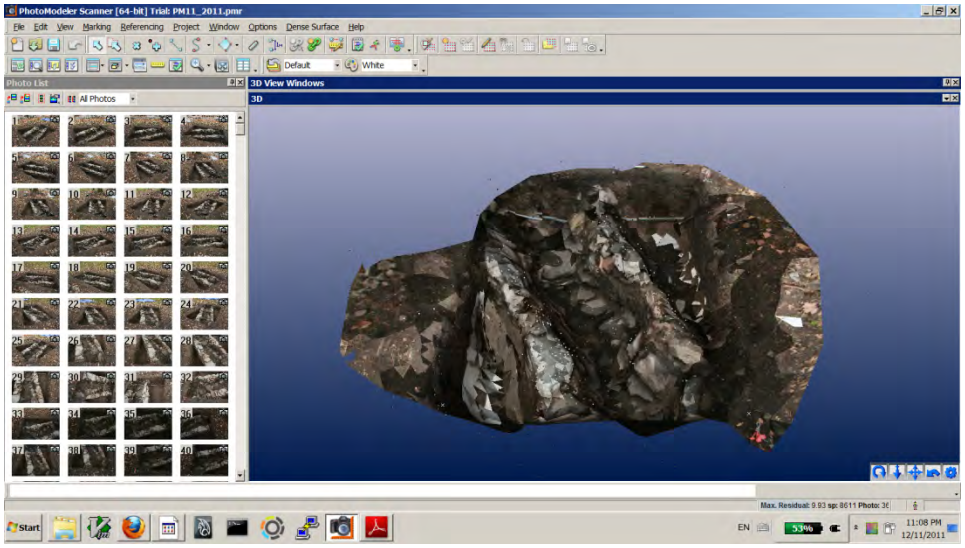


Figure 7: Texture Failure of Photomodel of Unit 11 in PhotoModeler

Unit 13, on the other hand, did not work with the Smart Points automatic construction method, so the four nails were manually located to begin with in each of the images and the processing was rerun to give the software a reference to how the cameras were oriented. PhotoModeler still had trouble putting Smart Points in the images, perhaps because of the quantity of roots present, and so instead manual points were added along the central feature to provide some surface complexity in the image. When the pictures were projected on this simple surface, the result was acceptable but did not capture the detailed vertical

locations of any features in the unit and lacked accuracy on the edges of the frame. An orthonormalized photo was georeferenced and exported to GIS as a baseline comparison.

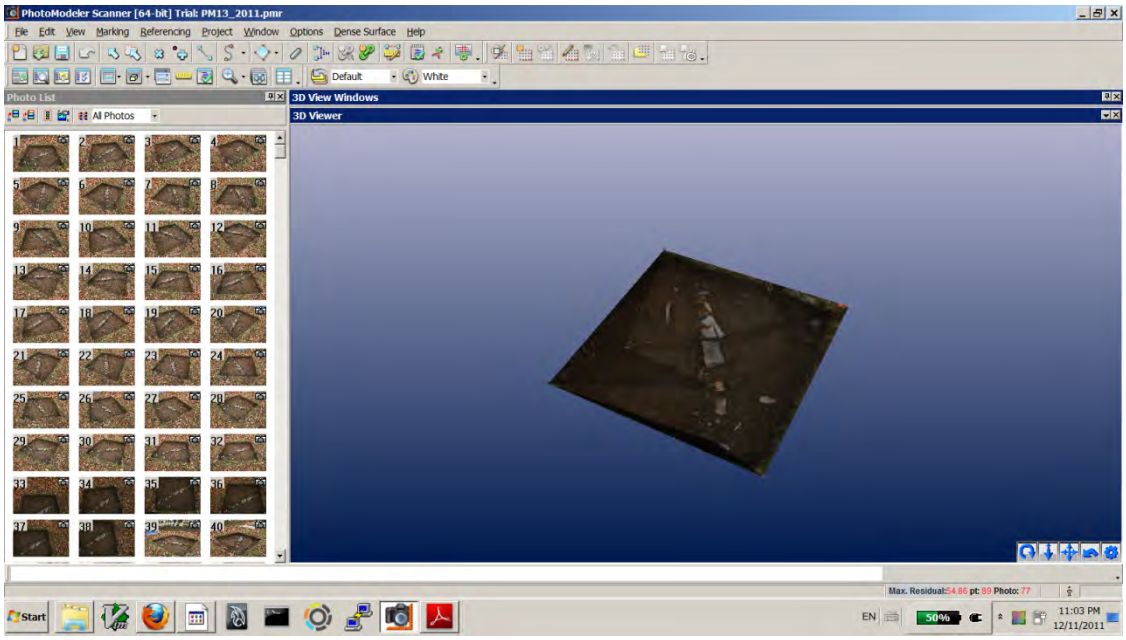


Figure 8: Creation of Orthonormal Photo of Unit 13 in PhotoModeler

Figure 9: Completed Orthonormal Photo of Unit 13 Exported by PhotoModeler

Because of the problems with getting acceptable models from PhotoModeler, other options were explored. Photosynth was considered but lacked the correct output formats to make texturing feasible. 123D Catch, was then considered. The results of the fully automated, cloud-based solution were fantastic. The rendered detail and accuracy of the model were phenomenal and the textures were not only correctly placed on faces but also evenly illuminated and easy to interpret. The models themselves were sufficiently detailed to render individual root perturbations to the soil and had no trouble at all with overhangs or unit edges.

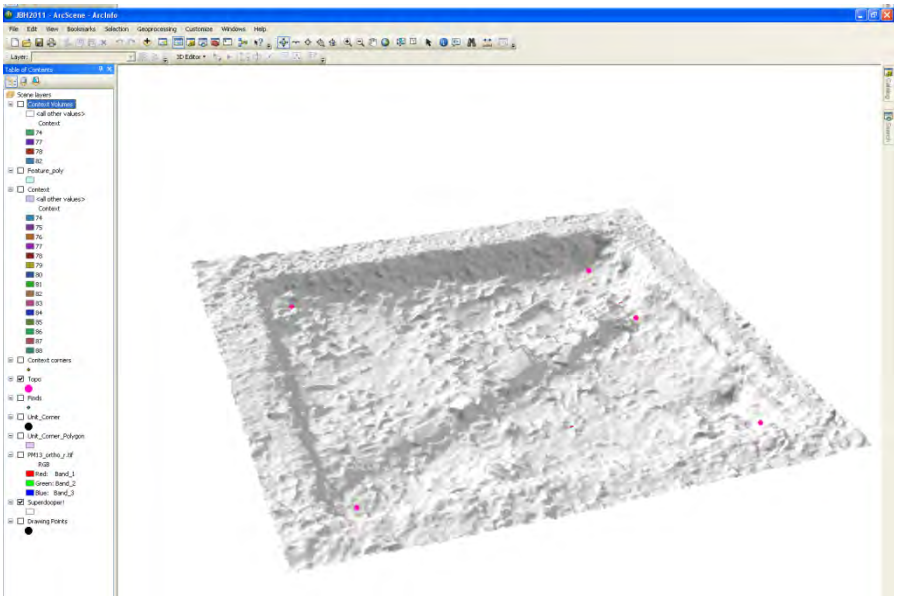


Figure 10: 123D Catch 3-D Model of Unit 13 and Unit 13 Bottom Topographic Points in ArcScene

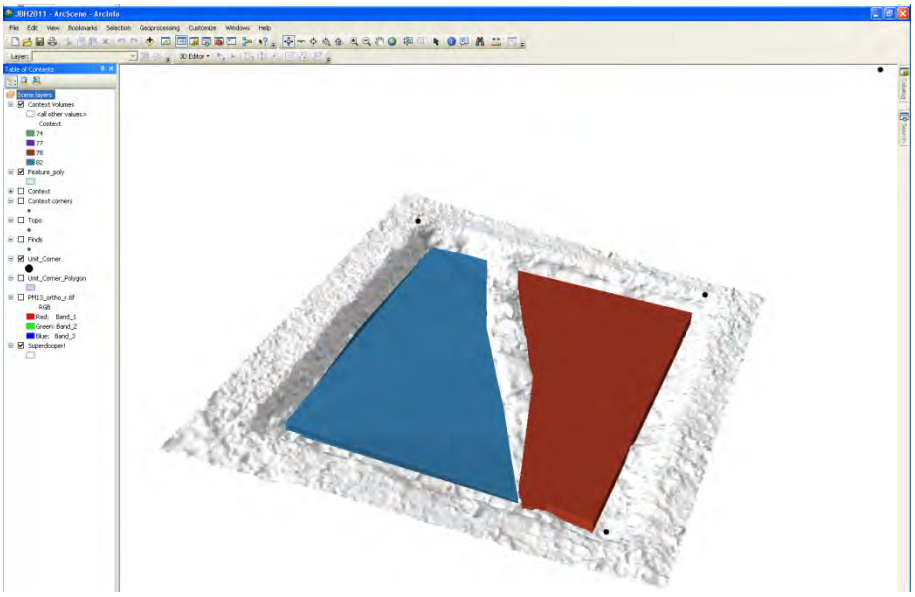


Figure 11: 123D Catch 3-D Model of Unit 13 and Context Volumes of Contexts 78 and 82 in ArcScene

Conclusion and Discussion

After going through the process of compiling and analyzing the 2011 JBH GIS it has become apparent that ArcGIS is not the ideal tool for 3-D modeling or analysis. While the 2-D modeling in ArcMap is sometimes difficult to use, it is mostly functional and accessible after the user builds up a familiarity with the software for georeferencing, creating points and features, and for viewing the layering of data. The same cannot always be said for ArcScene.

The ArcScene software package is about as non-user friendly as a 3-D modeling software can be, at least for the applications it was used for in this report. The user cannot interface effectively with the model without the combined use of multiple tool and definition querying to specific features. ArcScene must take a lesson from other 3-D modeling softwares, such as AutoDesk and Solidworks, where the user can move freely around the model by moving and holding buttons on the mouse. Also, the creation of volumes is a imprecise process with involves the creation of a top and bottom TIN and extruding between them. The extrusion tool is extremely sensitive and varies on which input should be the top or bottom. The only consistent observation made was that flatter TINs make better volumes. This is not helped by the fact that TINs cannot be manipulated in ArcScene, so TINs are do not always form the desired network of triangles. Even once a volume is extruded, its volume may be misrepresented if the extrude has concave edges or the volume 'collapses' to a skin which has no calculated volume. This occurred when creating context 84 and despite multiple approaches to the extrusion the volume would always be zero cure to a complete failure to properly extrude.

Recommendations for the Future

There are multiple ways that this process could be improved upon for future work. First, if total station points were organized by context top and bottom, in addition to the organization by only context, it will make compiling a much smother process. Topographic points representing both tops and bottoms can cause misrepresenting TINs and are sometimes hard to catch. It also may be useful to look into other 3-D modeling softwares that ArcScene can import from and possibly export too. Currently, ArcScene cannot export CAD files and ArcMap can only export drawing files. If points could be exported an manipulated in a more user friendly software it would be possible to make more precise and functional volumes. It would also be wise to look into other programs such as Gocad. This software is similar to ArcScene, using data points to make surfaces and volumes which can be assigned attributes, but used a mesh system to create surfaces and voxel model to create volumes (Losier et al.). Based on the success of the photomodeling using 123D Catch, it would be possible to input photomodels of every context without too much hassle. This would be beneficial when looking back for Munsel values and help recreate the context which has been destroyed by excavation. It would also be interesting to assign these Munsel values to the context volumes.

References

L. Conyers, and Dean Goodman. *Title Ground-penetrating radar: An Introduction for Archaeologists*. Walnut Creek, CA: AltaMira Press, 1997.

L.-M. Losier, J. Pouliot, and M. Fortin. 3D geometrical modeling of excavation units at the archaeological site of Tell 'Acharneh (Syria), Journal of Archaeological Science, Volume 34, Issue 2, February 2007, Pages 272-288

M. Pierrot-Deseilligny, L. De Luca, and F. Remondino. Automated Image-Based Procedures for Accurate Artifacts 3D Modeling and Orthoimage Generation, 2011. Available from http://www.micmac.ign.fr/svn/micmac/trunk/Documentation/DocMicMac/Cipa-2011.pdf.

K. Nassar, E. Aly, and J Younghan. Structure-from-motion for Earthwork Planning. Proceedings of the 28th ISARC, Seoul, Korea. 2011. 310-316. Available from http://www.iaarc.org/publications/fulltext/S09-2.pdf.

J. Lee. Photofly Brings 3-D Models to the Masses. The New York Times, July 14 2011. Available from http://bits.blogs.nytimes.com/2011/07/14/photofly-brings-3-d-models-to-the-masses/.

M. Andreetto, N. Brusco, and G. Cortelazzo. Automatic 3-D Modeling of Textured Cultural Heritage Objects. IEEE Transactions on Image Processing, 13:3, March 2004. Available from: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1278359

Chapter 3 - Unit 11 Excavation Summary

Allison Barker

Unit 11 was opened on September 12, 2011 as an extension of fieldwork undertaken in the 2008, 2009, and 2010 field seasons. In 2011, the excavators Allison Barker, Susana Ortega, and Hannah Sisk under the supervision of instructor, Jessica Nowlin, and teaching assistant, Muge Durusu-Tanriover, opened a 3 by 2 meters unit running parallel to Benefit Street on the property of the John Brown House. In 2008, in the same location was a shovel test pit that was 50 by 50 cm. In 2009, Unit 7 was opened as a 2 by 1 meters unit. In 2010, Unit 11 was opened as a 2 by 2 meters unit. The reasons for returning to this heavily excavated area was to better understand that purpose of the parallel walls. A single stonewall was found in the 2009 field season (Feature 2 in Unit 7), which then motivated the 2010 field season excavators to re-open the unit due to the inconclusive conclusion of the purpose (Ben Colburn, 2009 John Brown House Report, 71). In 2010, the excavators found a similar and parallel wall, however there were more inconclusive conclusions (Hernandez, 2010 John Brown House Report, 50), and it was proposed that this unit be opened again. The walls are very perplexing due to the fact that these features were not found on any historical or geophysical maps. Which is why as excavators, our goal was to find the *terminus post quem* of the two parallel rock walls. If a date could be found, then there could be a more conclusive way to date and understand these two features. However, we were not able to reach this goal due to time limits and the excavators were only able to unearth to the base of the walls and not below, therefore not finding the *terminus post quem* (TPQ).

Excavation Methods:

Before the beginning of excavation for the 2011 field season, the excavators, Barker, Ortega, and Sisk, needed to extract the backfill from last year. However, when the excavators uncovered the tarps laid down from the previous year, they were not able to distinguish were the end of the previous excavation was, and therefore started to un-backfill an area that was not excavated previously. Therefore, due to ethics, this unit was no longer 2 by 2 meters, and therefore the unit was then lengthened to create a 3 by 2 meters unit. Once this was decided, the unit was measured and marked using stakes at the corners of the unit and white string as the boundary limit. Once this was completed, the excavators along with Jessica Nowlin shot in datum points to the total station for the location of the unit, along with the elevations of the unit.

The first method of excavation began with shovel shaving the top layer to remove the topsoil from the expanded unit, this method was also used later on in the excavation when an area became very gravelly and difficult to excavate. Another method of digging was troweling; this method was used to more carefully excavate the unit and separate contexts. Once earth was removed, the excavators then sieved the soil through ¼ mesh.

Artifacts, once found through sieving or through excavation, were then bagged by context, and later were processed at the Brown University Archaeology Laboratory, the Carriage House, located at 137 Waterman Street. Processing the artifacts included cleaning identifying, dating, and storing the objects.

There were two methods of data recording. The first was by hand and the second was through digital recording. By hand, the excavators recorded each context through excavation forms. These forms required information on the context number, the unit, the context definition, the Harris Matrix, the Munsell value and description, the methods of excavation, the weather conditions, notes, and a plan view drawing. Due to the size of unit 11, the drawings were recorded on separate graph papers. By digital, the excavators recorded each new context through photographs, video recording, and datum points. These datum points, taken with the total station, were later transferred into photo modeling and a geographic information system. Each excavator was responsible for keeping an online field blog that discussed the day's excavation progress and any significant finds. These methods of excavation are similar to previous years, however this year's excavation is using total station, allowing for a more balanced excavation recording, which allows for human and computer error to occur.

Excavation Summary:

Prior to excavation, depths were taken along the outline of the unit through the total station. Six contexts were assigned during the 2011 field season due to color change and leveling. The contexts are JBH 75, 79, 84, 85, 86, and 87.

<u>JBH 75:</u>

This context was opened as the first context of Unit 11's 2011 field season on October 3, 2011. This context is located in the northwest corner of the unit, where the accidental backfilling accident occurred. This topsoil was not very grassy and included some moss underneath the surface. The soil color underneath the surface determined by the Munsell value guide was 7.5 YR/2.5/1, which was noted to be slightly grayish/brown, which could be to the rain that occurred the previous day. Within five cm of excavation the soil changed to a different color and became rocky, prompting the excavators to start a new context. There were no artifacts found in this context, however the context beneath JBH 79 TPQ is dated to the late 1980's. Therefore, this must be after the late 1980's.

JBH 79:

This context is covered by JBH 75 and was opened on October 17, 2011 and continued excavation on October 24, 2011. The change in contexts was due to color and texture change. The new soil color determined by Munsell was 2.5Y/2.5/1. The context texture was noted to be very rocky and gravelly. Due to this texture, the excavators had difficulties discerning what was important to take as an artifact. There were quite a few

bricks that were taken as artifacts, but there were even more that were removed from the context and not taken as artifacts. This was decided to the time, resources, and difference between the bricks; the main goal of the excavators was also not to count the number of bricks. As the excavators dug further, the west wall appears to have fallen inward. There was also a plastic pipe that was shot through the northern section of this site, which could potentially be the cause of the fallen wall, however it is not conclusive.

JHB 79 yielded several artifacts that were a mix of modern and older artifacts. The TPQ for this context is the late 1980's due to a potential Tropicana bottle. This plastic piece is very similar to the Tropicana plastic piece found by Alicia Hernandez last year, who dated the plastic from 1951 to the late 1980's (Hernandez 178). However, it should be noted that a piece of soda-lime glass was also found in this context and can be dated to present day. However, the dates for the Tropicana plastic piece are much more conclusive and not as extensive as the dates for the soda-lime glass piece.

Artifacts	Date Range
Soda-lime Glass	1860 - Present
Porcelain	1830 - 1900
Plastic	1951- 1980s
Pull Tab	1962
Cream ware	1760 – 1820

JBH 84:

Allison Barker opened this context on October 31, 2011 continued excavation on November 7, 2011. This context was covered by JBH 70 from 2010, and is located to the east of the two rock walls. It was opened due to the leveling of JBH 79 with the previous year's excavation. JBH 84, 85, and 86 were all opened at the same time due to this; the two parallel walls break up each context. The new soil color determined by Munsell was 2.5Y/2.5/1, the same color of JBH 79. The texture of the soil was smooth due to the compact nature of the soil, however the roots prohibited easy excavation, and therefore both a shovel and a trowel were used. Barker noted that due to the smaller nature of the context it was much more difficult to excavate making leveling the context difficult.

JBH 84 TPQ date is 1879. This date is due to the white ware that found in this context. The decoration on this small piece roughly correlated to a similar white ware artifact with this dating. (Steele)

Artifacts	Date Range
Pearl ware	1784 - 1840
White ware	1870 - 1879
Cream ware	1770 - 1815

JBH 85:

Susana Ortega opened this context on October 31, 2011 continued excavation on November 7, 2011 and November 14, 2011. This context is partly covered by JBH 79 and 2010's previous excavation contexts, and is located between the two rock walls. The new soil color determined by Munsell was 5R/2.5/1, which was noted to be dark brown. The texture of the context was gravelly and damp. The context in general was noted to be difficult to excavate due to the gravel and roots, however Ortega did not use a shovel to excavate this area, and only used a trowel.

This is the only context that was opened in between the rock walls, which yielded quite a lot of artifact finds. The TPQ date is 1820 due to the general range of cream ware production. This artifact is really too small to draw any more conclusive date and does not have any decoration on the pottery sherd. (Steele)

Artifact	Date Range
Glass	18th century
Cream ware	1760 -1820

JBH 86:

Hannah Sisk opened this context on October 31, 2011 continued excavation on November 7, 2011 and November 14, 2011. This context was covered by 2009 field season excavation contexts, and is located to the east of the two rock walls. The new soil color determined by Munsell was 2.5YR/2.5/2. The texture of the context was gravelly. The context was also noted to be difficult to excavate due to the gravel and roots, however unlike Ortega, Sisk did was a shovel to excavate this area and then later a trowel.

This is the only context that was opened to the east of the walls. The TPQ date is definitely dated to 1870 due to a piece of glass with a valve mark, however the white ware dates of production continue till 2005 in America. The piece is really too small to analyze for a more finite date and there is no decoration on the piece. Therefore, 1870 is the definite date. (Steele)

Artifact	Date Range
White ware	1828 - 2005
Cream ware	1760 - 1820
Glass	- 1870
Pearl ware	1780 - 1840
Porcelain	1790 - 1835

JBH 87:

Allison Barker opened this context on November 7, 2011 and continued excavation on November 14, 2011. JBH 84 covered this context. It was opened due to soil color change from JBH 84, which was 2.5Y/2.5/1. The new soil color determined by Munsell was 10YR/3/2. Originally, there was no difference in the texture of this context, meaning it was compact soil with roots. However, towards the end of the context the texture became gravely, which could mean that Barker started to excavate into a new context. This could be especially true due to this being potentially the level of the base. This unit was both shoveled and troweled.

The TPQ date is 1820, due to the general dates of production of cream ware. However, the white ware dates of production continue till 2005 in America. The white ware is too small to analyze for a more finite date and there is no decoration on the piece. Therefore, 1820 is the definite date. (Steele)

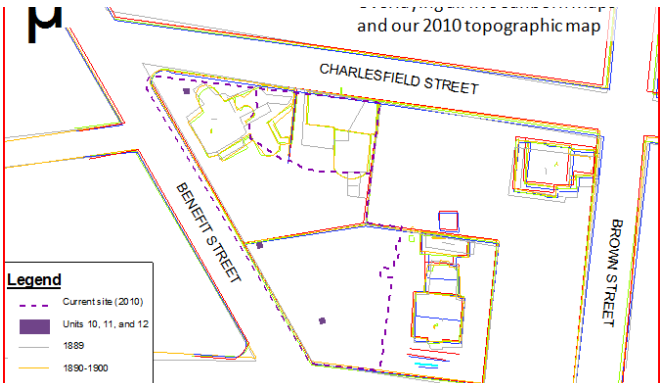
Artifact	Date Range
White ware	1828 - 2005
Cream ware	1760 - 1820

Analysis:

The purpose of excavating this unit for a fourth season was to better understand the anomalies of the two parallel walls. Both 2009 and 2010 unit summaries looked into possible explanations for these two walls. In 2009, Ben Colburn proposes two possibilities: structural foundation and walking path (71). However, in 2010, after finding a parallel wall that is around 50 to 70 cm apart from one another, the possibility of this being a structural foundation seems highly implausible. Hernandez states that the distance is too great to be a structure of a single wall (48). The walls are also not fit to bear a heavy load, like a roof. Hernandez then proposes two possibilities: a drain or a walkway. (48). Hernandez though thought that if the "walls were used for drainage purposes then their orientation should be perpendicular o the house itself as the flow of drainage runs from east to west down college hill, not north to south as the features do" (49). Hernandez also seemed cautious of calling this a walkway due to the height of the walls, and having a walkway of such enclosed space.

It was with these past analyses in mind that I looked at the possibility of three things: water drains, border wall, and footpath. Both Hernandez and Colburn mentioned the footpath and a drainage system, but I also thought that a border wall could have occurred. First, it would seem that this is not a footpath. I

agree with Hernandez when she stated that the walls were too high. The stones are also not smooth to create an even pathway. When looking at the 1949 aerial image of the John Brown House, one can see that there is a footpath, however it does not seem to be a very high footpath and it is clearly delineated from the grass and trees as to being of a brighter color than the grass. When looking at the walls that were excavated there is not as clear differentiation between the grass and the stone to create such an effect, an effect that could be created by shells or white small pebbles. Yet, when looking at the image from 1949 it does seem plausible that pathway runs along this area. The John Brown House Unit Locations and Quadrature Map, which shows a linear blue anomaly, could support this idea. However, this is sill not a very convincing argument.



Another idea would be that it was a border marker wall, like the rock walls created by farmers in New England through removing stones from their fields. However, when examining Eva Schwartz's Geographic Information Systems and Historic Sanborn Maps (1889-1956) (John Brown House Report 2010) the border of the property did not change dramatically along Benefit Street and Unit 11 is not near any of these boundaries, except for the one running perpendicular to the house, which could not be the parallel walls. Therefore, this argument does not seem very conclusive either.

Finally, the drainage idea does seem plausible at this time. At first, when thinking of modern water drainage systems, one could think of brick arched drains or pipes that

could be covered by earth or by rocks. Yet, when the Unit was first fully excavated in 2010. There were no large stones to create a

covered drain. There also could have potentially been a pipe in between these walls that was taken out before it was filled. Yet, it does not seem as logical to dedicate time to building two substantial rock walls, if a pipe was going to be placed in between the two.

Which lead me to my last idea, natural uncovered storm drains or erosion control. Today, there are many individuals who think that stonewalls are aesthetically pleasing, which is why certain companies today specialize in building stonework. One company, Ambrose Ltd. Landscapes explains the different variations of stone drains, which direct the water. One possibility is a stone runoff drain, which is used for channeling storm water. Another possibility is building stones walls into a downward hill to stop soil erosion. The storm drain idea seems to be more conceivable, however the owner of this property at the time could

have also had erosion problems. Above Hernandez mentions that she did not think that it was a drainage system due to it parallel nature to the John Brown House and therefore Benefit Street. However, the two walls are not parallel to either. In fact, the walls are at angle - not perfectly perpendicular though - which if they were to continue would connect with Benefit Street. Therefore, the walls could very well be an early visible storm drain.

What is even more significant is the TPQ of the artifacts from inside the walls, JBH 85, is 1820. A letter written by John Brown to Edward Dexter in 1796 makes references to the drainage problem that has occurred and that he has built a system to control this water situation (Brown, 1796). The TPQ occurs only 24 years after this letter was written. This could be quite a large assumption to assume that these are the storm drains that John Brown discussed in his letter, especially since the TPQ is based on production ranges of pottery. However, this unit could have very well found the storm drains that John Brown had built.

In the end, it is very hard to find a conclusive answer as to the purpose of these features due to that lack of a *terminus post quem* date for the walls. It is clear however that further excavation needs to be commenced to determine the exact date and purpose of these walls and their potential connection to John Brown. I would implore the Rhode Island Historical Society to allow the students of the "Archaeology of College Hill" to

excavate for at least another season to find if these are truly the famous drainage walls of John Brown.

Images of Unit 11:

Image 1: At the end of field season 2010

Image 2: Context 75 and 79

Image 3: Context 75

Image 4: Context 79

Image 5: Sample of artifacts from Context 79

Image 6: Context 84

Image 7: Context 84

Image 8: Sample of artifacts from Context 84

Image 9: Context 85

Image 10: Conetxt 85

Image 11: Sample of artifacts found in Context 85

Image 12: Context 86

Image 13: Context 86

Image 14: Sample of artifacts found in Context 86

Image 15: Context 87

Image 16: Context 87

Image 17: Sample of artifacts found in Context 87


Image 18: Unit 11 at the end of Season 2011

Works Cited:

- John Brown House Report 2008, 2009, 2010
- John Brown House 2011 Field Photographs and mapping
- John Brown House 2011 Object Photographs
- John Brown House 2010 - Eva Schwartz -Landscape History based on the application of Geographic Information Systems to Historic Sanborn Maps (1889-1956)
- *Decorative Landscapes, Landscape Contractor for Twin Cities - St Paul MN*. Web. 04 Dec. 2011. <http://www.arborlandscape.com/drainage.php>.
- "Customer Testimonials." *Home*. Web. 04 Dec. 2011. <http://gyaltsenstonework.homestead.com/testimonials.html>.
- "Stone Water Channels, Rain Gardens, Waterfalls | Ambrose Landscapes | Outdoor Stonework in Asheville, N.C." *Home | Ambrose Landscapes | Asheville Landscaping Contractor for Asheville-area Garden Design, Installation, Maintenance*. Web. 04 Dec. 2011. http://www.ambroselandscapes.com/projects/stonework_samples/stone-water-channels-by-ambrose-landscapes.php
- "September 2010." *Subterranean Greenwich and Kent*. Web. 04 Dec. 2011. <http://subterraneangreeenwich.blogspot.com/2010_09_01_archive.html>.
- "Gray Rock Garden Paths : Katyelliott.com." *Katy Elliott*. Web. 04 Dec. 2011. <http://www.katyelliott.com/blog/2010/05/gray-rock-garden-paths.html>.
- Brown, John. Letter to Edward Dexter. Providence, RI. 16 March 1796.

Summary of Excavation: Unit 13, Fall 2011

By Valerie Bondura

Work on Unit 13 began September 12, 2011, with three members of the John Brown House excavation team choosing an area for excavation in the northwest corner of the yard, near the intersection of Charlesfield Street and Benefit Street. The unit is a 2m x 2m square angled in a northeasterly direction. The excavators of Unit 13, Valerie Bondura, Kaitlin East, and Nicholas Sinnott-Armstrong, consulted historical maps of the John Brown House property as well as excavation reports and geophysical maps from previous seasons to identify an area of the yard that could prove worthwhile to excavate. Unit 13 was set up almost exactly halfway between previous units 2 and 10, although no excavation or test pits had ever been conducted in the exact location of Unit 13.

The 2011 team used the same research questions as these past teams to define their motivation for digging in this area.[1] Historic insurance maps, corroborated by modern geophysical survey, show that the Hale-Ives house occupied this area of what is now the unified yard of the John Brown House. Ground Penetrating Radar (GPR) survey conducted in this area of the yard during the 2011 season further supported the hypothesis that the Hale-Ives House stood in this northwest quadrant. Unit 13 was placed with the hope that excavation would uncover cultural material or architectural features that would contribute to understanding of the Hale-Ives House and, by extension, the history of the John Brown House property. Actual excavation began on Unit 13 on September 19th,

[1] For a summary of the research questions developed by past units, see p. 19 of the 2010 John Brown House Excavation Report (Unit 10) and p. 88 of the 2008 John Brown House Excavation Report (Unit 2).

2011, and the field season officially ended with the backfilling of Unit 13 on November 21st, 2011.

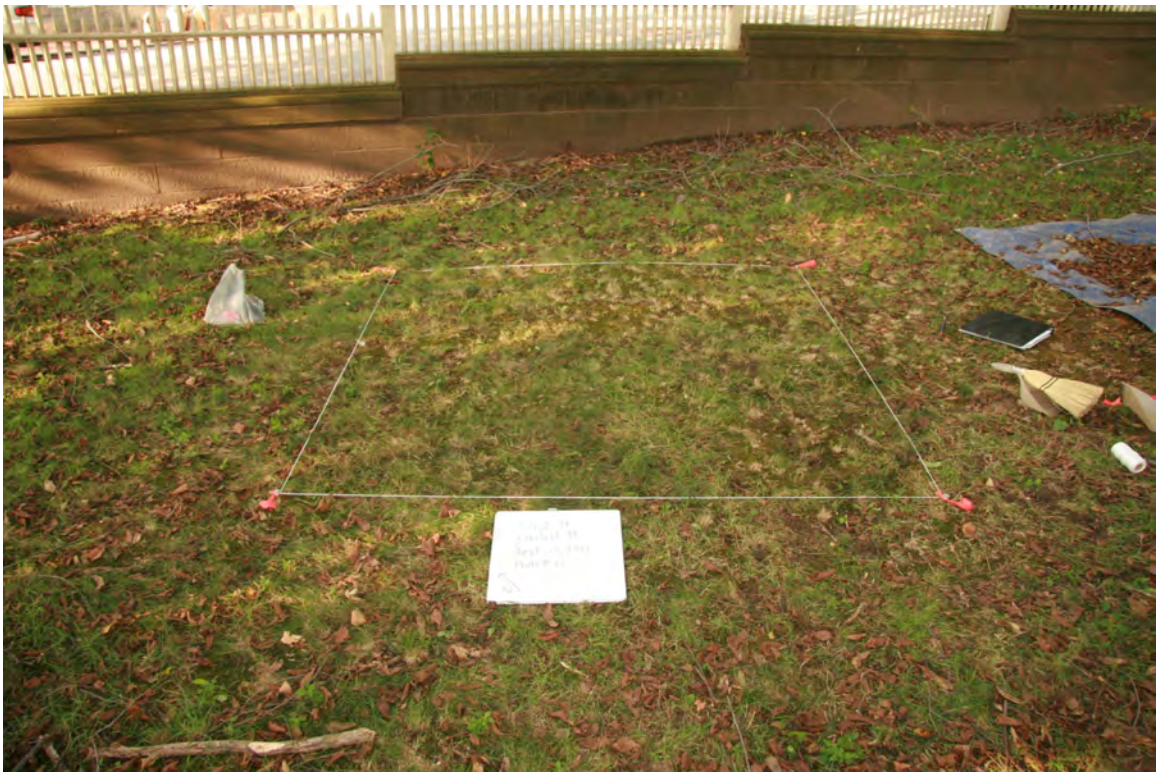


Figure 1: Unit 13 on the first day of excavation (Context JBH074)

Excavation Methods

A combination of methods was used in the excavation of Unit 13, dependent upon the composition of the soil in any given context and the presence of finds and features of interest. The team first defined the boundaries of the unit, measuring out 2-meter sides and marking them with twine strung around nails hammered into each corner of the unit square. The location of the unit was recorded using the total station, which was located at a datum point with an assigned elevation level of 100 meters for the duration of the field season. The use of the total station in recording contexts and finds continued throughout the excavation. Shovel shaving was the initial method employed to remove the topmost layers of the unit and

clearly define the edges of it. Trowelling and brushing were used in later contexts as excavation began to yield larger amounts of finds. All soil, whether shovel shaved or trowelled, was sifted through ¼ mesh sieves. Artifacts recovered through trowelling and sifting were kept in labeled bags according to type of material and the context in which they were found. For practical reasons, Unit 13 separated metals and bricks from other artifacts in the bagging process because other finds were often fragile or small and liable to be damaged by heavier stone and metal finds. After the end of fieldwork in late November, these artifacts were transported to the Brown University Archaeology Laboratory for cleaning, analysis, and storage. In the lab, artifacts were cleaned using brushes and were analyzed in terms of their relationships with other artifacts found in the same context and the unit as a whole. Attempts were made to date all of the artifacts from Unit 13 in order to establish a chronology of deposition at the site. This dating relied on analogy to compare artifacts with those that have been firmly dated at other sites.

Recording of the excavation of Unit 13 took a myriad of forms. Throughout excavation, new contexts were identified, each being defined by a distinct change in soil color and composition. The team filled out a context sheet every day of excavation. These sheets include information about the location of the context currently being excavated, its soil composition and Munsell value, a Harris matrix showing the relationship of the current context with previously excavated ones, and excavators' descriptions of the digging process and finds uncovered on the given day. Photographs were taken of every new context the team decided to open, as well as of individual finds of note and the excavation process in general. Videos were occasionally filmed, especially in the early weeks of investigation, and contain

interviews with the excavators of Unit 13 in which they discuss the thought process behind the excavation of the unit. GPR was conducted on September 26th, 2011 and from this survey, maps were generated that showed anomalies beneath the surface. These maps influenced decisions about how deep Unit 13 should be dug, as anomalies were shown at varying depths, including an uneven anomaly appearing just a few centimeters below the surface. Excavators were also required to keep weekly field blogs and cross-site unit summaries, which can all be found on the Joukowsky Institute for Archaeology and the Ancient World Classroom page (http://proteus.brown.edu/collegehill2011/Home). All methods of recording were consulted in the compilation of this excavation report.

Excavation Summary and Context Analysis

As mentioned previously in the report, Unit 13 was subdivided into contexts during the excavation process. In terms of labeling contexts, this season's excavators continued numerically where last year left off. Context numbers are also assigned in relation to the rest of the site, so that whenever a new context is identified anywhere on the site, it is assigned the next number. Thus, Unit 13 is composed of contexts 74, 77, 78, and 82. The first context, which included sod and topsoil, is JBH074. The next two contexts, JBH077 and JBH078, were opened simultaneously in separate parts of the unit. Context JBH082 is the final context reached during the 2011 season and lies beneath JBH077.

Context JBH074

Context JBH074 was opened on September 19th, 2011 and was the first context identified in Unit 13. The context was defined by significant moss and grass cover, which made initial digging difficult. Soil was partly visible in the unit from the beginning, and once the team had cleared out the majority of the grass, moss, and leaves, the soil could be examined further. The team assigned the soil in this context a Munsell value of 10YR 3/2 but did note that the soil appeared to be damp in some areas. This would prove to be a problem throughout the excavation season, but excavators tried to give accurate Munsell values for soil colors despite factors such as rainfall that affected the color and texture of the soil. The difference between the opening elevations of subsequent contexts JBH077 and JBH078 and the opening elevations of JBH074 represents the thickness of context JBH074 in the northwest corner of Unit 13. The NW corner of the unit was excavated 7.9646cm, the NE corner 4.9234cm, the SE corner 10.82cm, and the SW corner 4.4474cm.

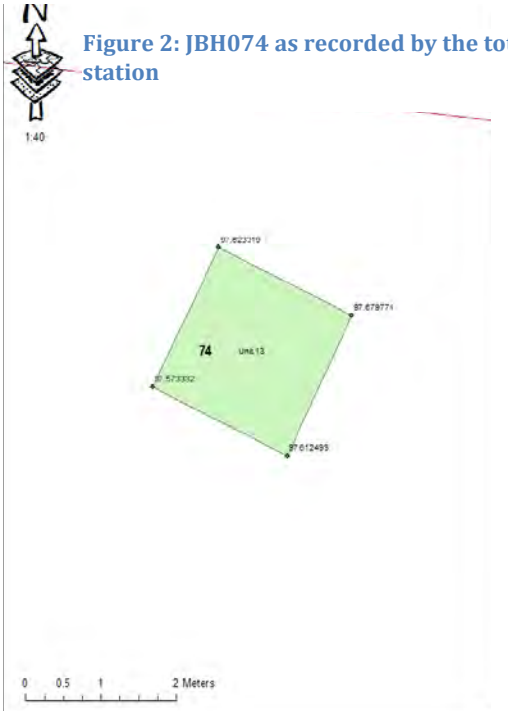


Figure 2: JBH074 as recorded by the total station

JBH074 yielded many finds, but only half could be dated with any certainty and even of those, only one artifact was solidly dateable. The nail and three pieces of unidentified metal were all too corroded to analyze in any meaningful way, but the few pieces found in this context proved to be prophetic; excavations in Unit 13

turned up a total of 148 pieces of iron, including nails, screws, pipes, and unidentified structural pieces throughout the season.

With the given tools and time in the lab, it was impossible to date the plaster or the organic materials. The glass shards were more useful in analyzing JBH074. Specifically, the presence of two bright green shards indicates a fairly modern deposition of material, since this color of glass, known as "7-Up glass", was not produced until around 1940.[2] The other glass shards, tentatively classified as soda-lime (5 pieces) and flint/lead glass (3 pieces) were not as diagnostic as the 7-Up glass and thus the date ranges for the production of these other two types of glass were considered but ultimately did not affect the final dating of the context much. There was also a piece of redware ceramic in the assemblage of finds from JBH074, but the large date range associated with the production of redware made using it to date the context impractical. In spite of these undiagnostic finds, JBH074 contained an artifact whose production date is indisputable. A penny minted in 1944 was uncovered early on in excavation and was the artifact that provided the *terminus post quem* (TPQ) date for JBH074. This date aligns with the post-1940 dating of the 7-Up glass also found in this context. Thus, JBH074 is a layer of fairly recent human activity, with the material found in it deposited some time after 1944.

[2] Society for Historical Archaeology website: http://www.sha.org/bottle/colors.htm#Greens & Blue-greens

Context JBH077

In the process of excavating JBH074, the Unit 13 team began to notice changes in soil composition, as well as what appeared to be a linear rock feature running diagonally from the southwest to the northeast corner of the unit. The first new context to be declared was JBH077, in the northwest corner of the unit and to the above-left of the linear formation of rocks. The context was defined by an increasing presence of gravel but otherwise shared most characteristics with JBH074. The Munsell value for JBH077 is the same as JBH074: 10YR 3/2. Grass and tree roots, which had been a foreseen difficulty in digging JBH074, continued on into JBH077 (much to the excavators' dismay). Roots would prove a challenge throughout the season, making shovel shaving problematic and requiring the use of root cutters and saws. The high concentration of both roots and gravel in JBH077 slowed excavation and trowelling was the main excavation method.

Figure 4: JBH077 at the opening of the context

Figure 3: Context JBH077 as recorded by the total station

The opening elevations of JBH077 were recorded using the total station. Previous points had not been taken inside the unit and were only recorded at the four corners. The elevation points in JBH077 were taken directly along the linear

rock formation that split Unit 13 in two. The average of these points shows that the center of Unit 13 at the opening of JBH077 was about 245.6625cm (2.456625m) below the datum. After doing these measurements, excavation began in earnest, but JBH077 failed to yield many finds. Only two artifacts were recovered, both undiagnostic and unidentified pieces of metal. It is difficult to say why so few artifacts were found in JBH077, especially considering the high density of artifacts found in JBH082, the context directly beneath JBH077. One possibility is that JBH077 may not actually be a context distinct from either the context covering it, JBH074, or the context below it, JBH082. Regardless, the lack of diagnostic materials made dating JBH077 with any certainty impossible. Because the TPQ of JBH074 is 1944, it can be assumed that JBH077 would have a TPQ of an earlier date if dating the context were possible. Unfortunately, the dating of JBH077 at this point is pure conjecture.

Figure 5: Unidentified metal, JBH077

Figure 6: JBH078 at the opening of the context

Context JBH078

Context JBH078 was opened at the same time as JBH077 and sits to the southeast of the linear rock formation in Unit 13. As was the case with JBH077,

JBH078 was opened because the excavators began to notice an increasing amount of gravel in this area of the unit. This gravel was spread throughout the entire southeast corner and included both large and small rocks. The soil coloration of JBH078 appears to have been slightly darker than that of JBH077, although no Munsell value was recorded. This, combined with the natural division created by the linear feature that separates the area of JBH078 from JBH077, led the excavators to identify the new context. JBH078 was excavated using a combination of shovel shaving and trowelling, though the high concentration of gravel made the use of both methods difficult. The total station was used to measure the elevation of JBH078, as had been done in other contexts. It was also used to record the location of certain large finds, such as large metal objects and bricks. he linear feature was again mapped, and the SE and SW corners of the unit were again measured. This measurements show that the elevations of the two corners of JBH078 are 2.495714m (SE corner) and

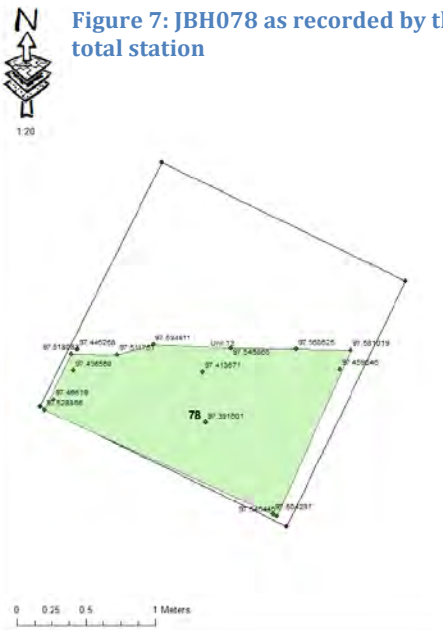


Figure 7: JBH078 as recorded by the total station

2.471144m (SW corner) below the datum point. JBH078 yielded large amounts of what seem to be structural materials. In total, 7 large pieces of metal, 64 nails, 3 screws, and 8 bricks were found, as well as a few shards of clear, flat glass. These artifacts all seem to relate to some sort of architectural structure, indicating that the deposition of JBH078 could be the result of construction or demolition. Both of these possibilities fit well with the hypothesis that the Hale-Ives House previously stood in this area of the yard.

Figure 8: Table of finds, JBH078

Find	Description	Approximate Date
4 ceramic sherds	All of same material (creamware?), two with traces of rosy-white glaze, two with identical grooves 1.5 cm wide	Refined earthenware of the creamware type produced from 1762-1820
64 nails, both whole nails and pieces	Iron, heavily corroded, most with rounded heads, average size of whole nails is about 7.04 cm, largest is 12 cm, all are machine cut	Machine cut nails were used most heavily from 1800-1900. The largest nail has a square head and squared off sides, indicating a date between 1810-1900
1 screw	Apparently broken, 3.7 cm long, threading is spaced at 2 mm	--------
8 pieces of brick	5 possibly of "Dutch gray" style, 3 traditional red, 2 with imprinted text	Text indicates that they are Sayre & Fisher Co. bricks, produced no earlier than 1876

Of particular note were two bricks of the Dutch variety that have legible text on imprinted on them. Dutch bricks are identifiable by their yellowish or buff color, in contrast to a typical red brick.[3] These bricks are sometimes smaller than their red counterparts and the decision to use Dutch bricks appears to be an aesthetic one rather than a choice made for any practical reason. One of these bricks found in JBH078 with legible text clearly reads "Sayre & [...]" on the top register, with the bottom register reading "Sayrev[...]". With this information, the company that produced the bricks is able to be determined and thus, the production date for the bricks can also be found. Bricks with the same text imprinted upon them were found during the 2008 season of excavations at the John Brown House. These

[3] See p. 83 of *A Guide to Artifacts of Colonial America* by Noël Hume for information on Dutch bricks.

bricks were analyzed, and it was determined that they were produced by the Sayre & Fisher Brick Company of Sayreville, New Jersey. This company began imprinting Dutch bricks with maker's marks, such as the one found on our brick, around 1876.[4] This brick proved to be the most diagnostic of the artifacts discovered in JBH078 and thus, the TPQ of JBH078 is 1876. This date does not run contrary to the dating of the majority of the material from JBH078, save for 4 ceramic sherds that were identified as creamware with a production range from 1762-1820. Two of these sherds had remnants of a rosy white glaze, but the glaze is essentially monochromatic and without decoration and as such, does not provide any clear indication of production date or function of the ceramic this glaze was used upon. The remaining two sherds also appear to be creamware and are unglazed, but both have an incised groove that appears to be more functional than decorative. All four ceramic sherds are so small that classifying them is difficult and as such, the sherds have limited dating utility.

Figure 9: Sayre & Fisher brick, JBH078

[4] See p. 169-170 of 2008 John Brown House Excavation Report

JBH082

Figure 11: JBH082 at opening of context

JBH082 was opened directly beneath JBH077 in the northwest corner of Unit 13. The excavators identified JBH082 by a distinct shift in soil color and composition from the soil of JBH077. Gravel began to give way to large rocks, especially a notable inclusion in the uppermost area of the northwest corner that contained rocks between 7.62cm and 12.7cm in diameter. The soil of JBH082 was mottled and as such, two Munsell values were assigned. The first, 10YR 2/2, is darker than the second value, 7.5YR 5/8. In terms of excavations methods, JBH082 was almost exclusively trowelled, with minimal shovel shaving and brushing.

Figure 10: JBH082 as recorded by the total station

Elevation points were taken for JBH082 using the total station in much the same way they were done for JBH078. The linear rock formation was recorded, as were the two right-angle corners of the context. Major finds were also recorded, including large pieces of iron found throughout the context. These measurements show that the northeast corner of JBH082 is 2.49m (249.7868cm) below the datum, while the northwest corner is 2.39m (239.8504cm) below the datum. An average of the points taken along the linear rock formation show that the center of the unit at the opening of JBH082 was about 2.90675m (290.675cm) below the datum.

JBH082 yielded the largest amount of finds of any context in Unit 13. Structural materials, ceramics, glass, and bone were all found and analyzed, as well as a few unique artifacts. A small metal crucifix proved an exciting find out in the field as

Figure 12: Table of finds, JBH082

Porcelain, 1 piece	Whitish gray, 1.2 cm long, 4 mm wide,	Canton porcelain, produced between 1790-1835
Undecorated glazed ceramic, 3 pieces	White with bluish tint, fine crazing, probably ironstone	Ironstone produced between 1840-1930
Decorated glazed ceramic, 2 pieces	1 with blue rim decoration is pearlware edged, other is cream glazed with faint rose mottling	Pearlware production between 1785-1840
Undecorated glazed ceramic, 3 piece	Small, undecorated, white to yellowish glaze: creamware	Produced between 1762 and 1820
Cobalt glass, 2 pieces	Dark blue glass, flat edges indicating octagonal shape, color + shape indicate that this was a medicine bottle	Cobalt bottles used by chemists/pharmicists/doctors from 1870-1930
Green glass, 3 pieces	Dull olive green glass, smooth, slightly rounded	This color of glass mostly used from 1860-1900
Clear glass, 12 pieces	Varying sizes, clear to very light greenish clear, all slightly curved, all approx. 2mm thick	1870-present
Unglazed ceramic, 2 pieces	Porous, gray to cream in color	----------

Figure 13: Table of finds, JBH082

Pipe stem, 1 piece	White clay, 8 mm diameter, 2.8 mm center bore hole	Bore hole diameter coincides with dates between 1650-1680
Metal crucifix, 1 piece	4 cm tall (including loop for stringing), 2 cm wide, small holes at each end and in center, probably for the mounting of a Christ figure	No dating possible with current information, but the crucifix almost certainly came from a rosary and indicates Roman Catholic presence
Nails, 15 pieces	Iron, heavily corroded, all with squared off sides and square heads indicating machine cut production	1810-1900
Hook, 1 piece	Metal, slightly curved, pointed end, looped head so that hook could be threaded	----------
Red brick, 30 pieces	Varying sizes, some are composite (brick with other stones embedded), clear deep red color	----------
Gray ("Dutch") brick, 10 pieces	2 pieces have stamped text but mostly illegible, all are buff to yellowish red and mottled in the Dutch brick style	17th century-present

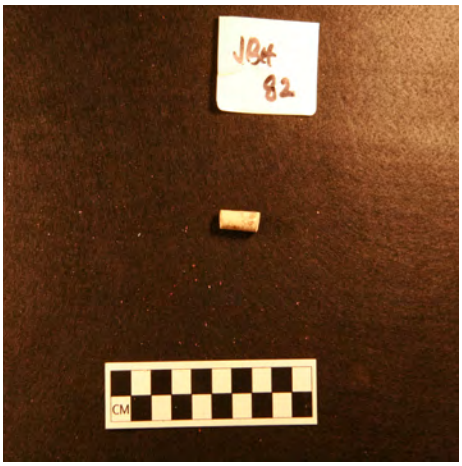
other contexts had not yielded such a recognizable, decorative artifact. However, once in the lab, the crucifix proved difficult to analyze and date. Glass from JBH082 proved to be of a much more diagnostic nature than earlier glass finds. Specifically, two shards of medium cobalt blue glass with flat sides and curved edges are clearly analogous with a type of glass and shape of vessel used from 1970-1930 by pharmicists and other medical professionals.[5]

Figure 14: Table of finds, JBH082

Find	Description	Approximate Date
Unidentified metals, 54 pieces	Iron, heavily corroded, varying shapes and sizes	----------
Screws, 3 heads	Pieces are all between 1.8 cm and 2 cm long, 2 of identical diameter, 1 larger, threading spaced between 1 and 2 cm	---------
Plaster, 5 pieces	All white, all less than 1 cm in size	---------
Limestone, 2 pieces	White and chalky, identical to stone from JBH078	---------
Unidentified object	4cm tall, 2 cm wide, weighs 12g. Grayish brown, porous, rough surface, possibly bone	---------
Bone, 1 piece	Appears burnt, gray, porous, 1.5 cm long	---------
Wood or charcoal, 2 pieces	Identical pieces of burnt material, both have a linear grain	---------
Coal, 2 pieces	Small, black, shiny, likely anthracite	---------
Slag, 2 pieces	Reddish brown composite materials	--------

Another object of interest was a small section of a white clay pipe stem. White clay pipe stem pieces are ubiquitious at colonial-era sites in North America and extensive typologies have been developed to assist in dating any particular piece.[6] This particular piece from JBH082 has a total diameter of 8mm with a 2.mm bore hole. This measurements indicate a production date some time in the late 17th century, much earlier than any other material uncovered in JBH082. To account for this early dating of the object, human error in calculations and categorization

Figure 15: White clay pipe stem, JBH082



[5] Society for Historical Archaeology website: http://www.sha.org/bottle/colors.htm#True Blues
[6] p. 297-298 of *A Guide to Artifacts of Colonial America*

must be acknowledged as a possibility, although if the pipe stem is dated correctly, its presence at this site in this context may be indicative of a long use life. It is possible that the pipe stem was produced in the late 17th century and was still being used in the 19th century. Because of the wide range of objects recovered from JBH082, dating the context was more complex than it had been for other contexts. Of the dateable finds recovered, all but one have production ranges that overlap during the period 1830-1880. The single artifact outside this date range, the white clay pipe stem, has been mentioned as a possible antique or heirloom piece that was produced in the late 17th century but was still being used concurrently with the later 19th century finds that make up the JBH082 artifact assemblage. A concrete TPQ cannot be established for JBH082. It can be assumed that the context was deposited after the pipe stem was produced in 1650, but this does not provide any more specific indication of the dating of the context. Machine-cut nails, like those firmly identified in JBH082, were not produced until 1810[7], so it seems likely that JBH082 was deposited after this year. This, coupled with the production ranges for all other artifacts from the JBH082 assemblage, make a TPQ of 1830 a reasonable one.

[7] See *Nails: Clues to a Building's History,* Thomas D. Visser. http://www.uvm.edu/histpres/203/nails.html

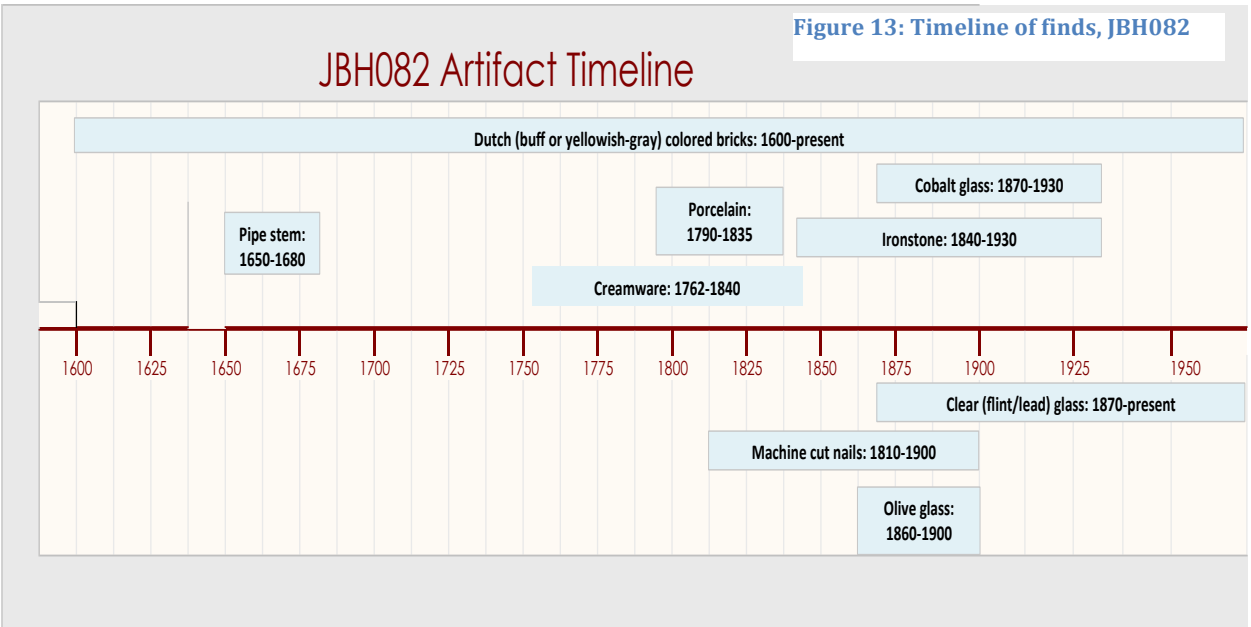


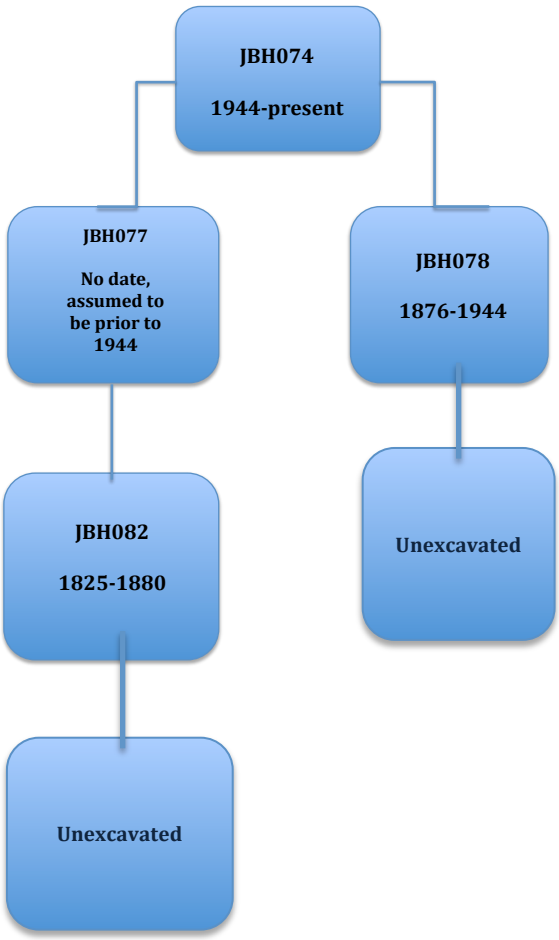
Figure 13: Timeline of finds, JBH082

Analysis of Excavation

Unit 13 did not encounter any of the architectural features the team had hoped to find at the beginning of the season. However, the type and amount of material from Unit 13 does indicate historic usage over an extended period of time. Although the location of the Hale-Ives House was not identified through excavation, the materials, such as iron pieces, nails, glass, and ceramic, uncovered during the 2011 season in this northern area of the yard clearly indicate that there was some period of human occupation of the area. Units 10 (2010) and 14 (2011), just to the east of Unit 13, and Unit 2 (2008), to the west of Unit 13, all yielded similar materials of similar time periods. It seems likely that much of this material comes from a residential structure that would have stood somewhere in this general area of the property. This hypothesis is supported by what is known of the Hale-Ives House and its location.

Unit 13 can conclusively be identified as an area of 19th and 20th century activity. A Harris matrix that organizes all contexts according to their relation with one another clarifies the range of dates:

Figure 14: Harris matrix, Unit 13



The dates assigned to each context make logical sense in relation to one another; the uppermost layer, JBH074, represents a deposition between 1944 and the present, the next dateable layer, JBH078, is a deposition between 1876-1944, and the final dateable layer, JBH082, is a deposition between 1825-1880. The stratigraphy and the determined sequence of artifacts fit together.

Analysis of Unit 13 suggests that the unit was placed in the area of either a construction pit or a demolition/trash pit. The high concentration of nails and bricks, materials used in structures, corroborates this theory. It seems likely that the majority of the unidentified metal pieces uncovered in Unit 13 are also structural in function. In total, 64 unidentified pieces of metal were found. These pieces range in size and shape, but all are incomplete. Many are curved and resemble fragments of pipes, a hypothesis further supported by the clear presence of threading on some ends of these metal pieces that shows the piece would have been screwed together with another.

Figure 15: Crucifix, JBH082

In my opinion, it seems most likely that Unit 13 excavated a demolition or trash pit. The ceramic sherds found are not consistent with an area that was affected only by the construction of a building, but also by its use and eventual demolition. The presence of certain decorative or nonessential materials also supports this idea that Unit 13 represents the end of the lifespan of the Hale-Ives House. The pipe stem came from an object used for leisure: smoking tobacco. Leisure activity would be associated more with the occupation of the house, rather than the building of it. The cobalt glass shards from a medicine bottle can be thought of in the same way. The metal crucifix, although itself unable to be dated, comes from a rosary and thus shows some sort of Roman Catholic activity occurring at the site. Further analysis should be carried out on the artifact assemblage from Unit 13, and I would advise that future excavation be

undertaken in the same area of the yard in order to finally locate the foundation or walls of the Hale-Ives House.

Figure 16: Unit 13 at the end of the 2011 season

References

Archaeology of College Hill Field Notes. Fall 2011.

Hume, Ivor Noël. *A Guide to Artifacts of Colonial America*. Philadelphia: University of Pennsylvania, 1969

Lindsey, Bill. "Bottle/Glass Colors." *Historic Glass Bottle Identification and Information Website*. Society for Historical Archaeology. <http://www.sha.org/bottle/colors.htm>.

Ryzewski, Krysta, Bradley Sekedat, and students of ARCH1900. Archaeology of College Hill: John Brown House, Providence, Rhode Island: Archaeological Report, Fall 2008. 2008. http://proteus.brown.edu/collegehill2011/home

Ryzewski, Krysta, Jessica Nowlin, and students of ARCH1900. Archaeology of College Hill: John Brown House. Results and Interpretations from the Fall 2010 Excavations. 2010. http://proteus.brown.edu/collegehill2011/home

Visser, Thomas D. "Nails: Clues to a Building's History." *Historic Preservation Research*. The University of Vermont. <http://www.uvm.edu/histpres/203/nails.html>.

Chapter 5: Unit 14 Excavation Summary

Sandra Mastrangelo

Drawing from historical record in addition to geophysical surveys obtained using ground-penetrating radar (GPR); Unit 14 was opened on October 3, 2011 in the northwestern region of the John Brown House (JBH) property in Providence, Rhode Island. Located just south of the Charlesfield Street-side fence, the rectangular unit measures 1m x 3m and was opened as a "fresh" plot this fall. Unit 14 was closed for this digging season on November 21, 2011.

Figure 1: Position of Unit 14 in the northwestern region of the John Brown House

The detailed geophysical survey, compiled by Thomas Urban (Brown University Geophysics Group) on September 26, 2011, revealed a linear anomaly that was most pronounced at a depth of approximately 1m in the western portion of the unit. In 2010, JBH Unit 10 attempted to locate the entrance to the Robert Hale Ives Homestead (circa. 1857-1925). However, the excavation did not reveal any significant findings. Our anomaly was was located adjacent to this unit.

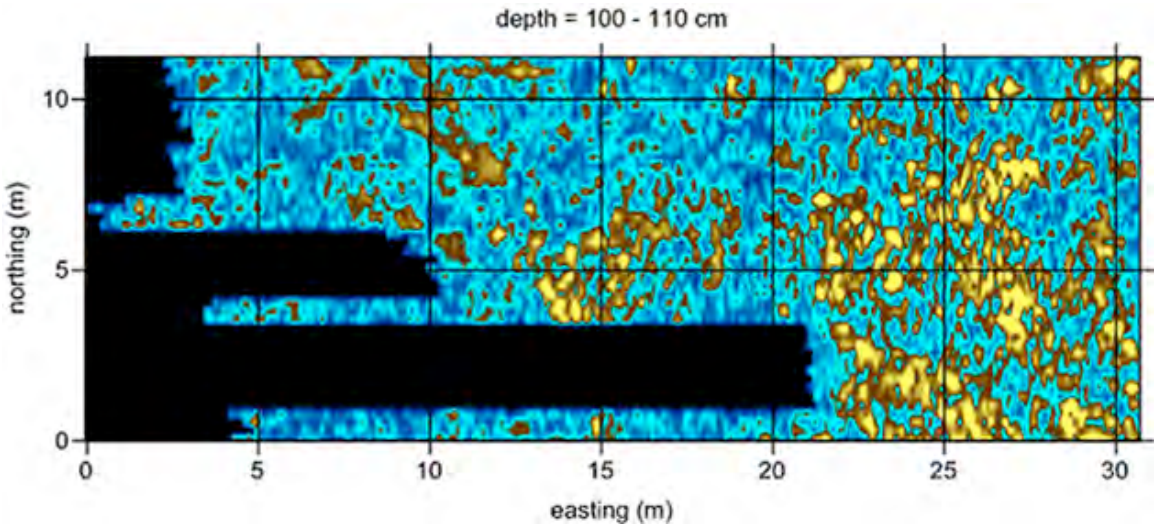


Figure 2: Results obtained from the geophysical survey. Dark blue and orange areas on the map represent geophysical anomalies.

Consequently, our group positioned Unit 14 on relatively flat ground as the probable location of the Robert Hale Ives House. The Homestead is well-documented in historical aerial photographs and property records. No shovel test pits were dug prior to opening the unit.

Excavation Methods

The excavation of Unit 14 was performed by three undergraduate students: Ian Brownstein ‘11, Brian Kelly ‘12, and Sandra Mastrangelo ‘12 under the direction of Jessica Nowlin (Doctoral Candidate, Brown University) and graduate teaching assistant Müge Durusu.

Before we began digging, we used a total station to impose an arbitrary, site-wide grid on the entire JBH property (X=1000m, Y=1000m, Z=100m). Geophysical coordinates were obtained and used to create a topographic map of the area. The linear anomaly of interest was located in the northwestern region of the JBH property. A datum positioned directly under the total station (100m) was used as a reference point for all

spatial measurements. The depth of each context of Unit 14 was calculated with regard to the location of the total station in the northeastern portion of the JBH property. Based on the measurements derived from the total station and GPR results, we sectioned off a 1m x 3m area. Prior to photographing our unit, excavators cleared away leaves and debris from the roped-off portion (pictured). To do this, we used small brooms and brushes and prepared to open our first context!

Careful shovel shaving was the primary method of digging while trowels and root clippers were frequently used to define the profile walls of the unit. Trowels and brushes were used to dig around delicate artifacts and reveal prominent embedded features. We also employed a root saw on various occasions to remove large roots that obscured unit features and to make shoveling more efficient.

All of the soil removed from the unit was sifted through a ¼'' wire mesh. Found artifacts were stored in labeled Ziploc plastic bags separated by context for subsequent laboratory analysis at the conclusion of the digging season. Notable soil samples were also preserved in plastic bags when appropriate. Measurements, context descriptions, methods and notes were recorded on standard Excavation Forms, which were filled out each time a new context was opened. Munsell soil values were assigned and recorded for each context using the 2009 revised Munsell soil color chart. Excavation forms for each

individual context are currently on file at the Joukowsky Institute (Brown University, Providence RI). Excavators also maintained weekly field-blogs further detailing the progress of the unit excavation.

Prior to opening a new context, a unit drawing was completed, elevations were documented, a picture was taken and a video was recorded in which excavators described the reasons for beginning a new context. New contexts were assigned based on natural changes in soil type and composition rather than arbitrary measurements.

Stratigraphy

During the 2011 digging season, we excavated five different contexts in Unit 14. Excavators determined context changes based on observable changes in soil color, texture and composition. The surface context was JBH 76, characterized primarily by sod and topsoil. This context transitioned into two separate contexts, JBH 80 in the western portion of the unit, and JBH 81 to the east. There was a noticeable distinction in soil color and composition between these two contexts compared to JBH 76. JBH 80 was characterized by a dark, homogeneous and moist soil, whereas JBH 81 contained a light brown, dry and patchy soil. Both contexts were densely covered in roots; JBH 80 contained a prominent root which was removed with a handsaw. Since JBH 80 was the larger of the two contexts measuring 1m x 2m, and JBH 81 measured 1m x 1m, the unit depth was uneven.

The two separate contexts converged into one, JBH 83, on October 24, 2011. This context was characterized by a dark yellow-brown soil whose color and quality was consistent throughout the unit. The soil in JBH 83 was also distinguishable from the two previous contexts as it contained more rocks and gravel. Towards the end of the digging

season, our unit collectively decided to dig exclusively in the western 1.5m x 1m portion of the unit as this was where we perceived the location of the linear anomaly. JBH 83 produced the majority of recovered artifacts from Unit 14 including printed pearl and whiteware, glazed stoneware, nails and glass fragments. There was an abundance of structural material present in this context including plaster and brick fragments. This is also the context in which our linear feature was first revealed.

Context 88 was the last context we excavated in Unit 14. It was located in the western portion of the unit and was opened due to a marked change in soil color and content from JBH 83. The soil in this context was very dark brown with grey tints and patched of sand. This was the deepest context of our excavation and measured 1.5 x 1m. JBH 83 revealed a significant amount of architectural material and is the context in which a small iron pipe was discovered.

The Harris matrix (below) depicts the temporal succession and position of the aforementioned stratigraphic contexts.

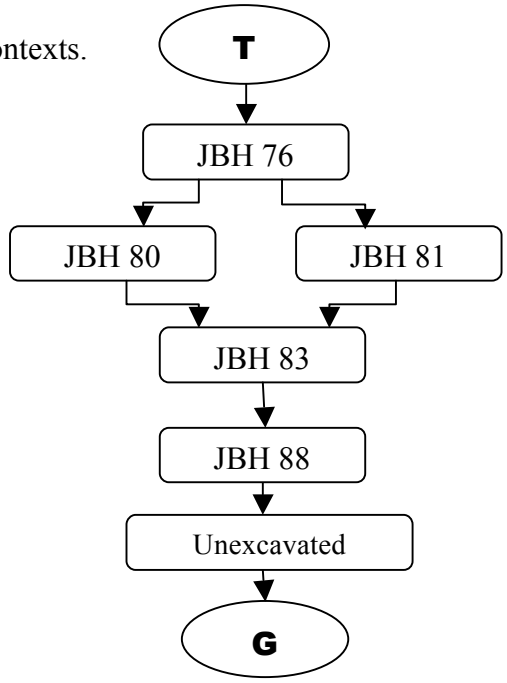


Figure 3: Harris matrix depicting the positions of stratigraphic contexts in Unit 14.

Context JBH 76

Context 76 was the surface context of Unit 14 characterized primarily by sod and topsoil. To excavate JBH 76, we used shovel shaving, which allowed us to effectively cut through the grass and moss to reach the soil. All of the soil removed from the unit was sifted using ¼" mesh. Since this was the surface layer of the unit, much of the soil had to be removed from the grass's roots before sifting. Although the soil was not particularly visible through the moss and grass cover, it was assigned a Munsell value of 7.5 YR 3/2 characterized by moist, dark, homogenous soil with grayish tints.

Figure 4: The beginning of JBH 76 after removal of topsoil

We quickly noticed that the unit was located on a slight incline; the eastern portion was slightly higher than the west. The elevations of significant points are as follows:

Measuring Location	Elevation Below Datum (m)
Northwestern Corner	2.20
Northeastern Corner	2.07
Southwestern Corner	2.26
Southeastern Corner	2.12

Although we did not encounter many notable artifacts in this first context, there were several diagnostic features present including iron-cut nails and small bottle fragments with seams just below the neck. It was difficult to accurately date the bottle fragments because they are so small and do not reveal much information about the container shape.

Figure 5: Sample of artifacts from JBH 76

A comprehensive inventory of artifacts excavated from JBH 76 including quantity and production range can be found below:

Table 1: Inventory of artifacts from JBH 76

ARTIFACT DESCRIPTION	QUANTITY (# OF PIECES)	PRODUCTION RANGE (YEARS)
Brick Fragments	5	
Iron Cut Nails*	4	1835-1890
Creamware (plain)	4	1762-1820
Clear Glass*	4	1770-present
Quartz	4	
Pearlware (plain)	3	1780-1840
Bottle Fragments w/ seam*	2	1870-1950
Stone	2	

Cream-Colored Tile	1	
Mortar	1	
Charcoal Fragment	1	
Plaster Fragment	1	

* = diagnostic features

The TPQ for this context is defined by the bottle fragments as 1950, as it is the most recently dated of the artifacts for which we have date ranges.

JBH 76 was determined to have ended once a change in soil content and composition was observed, thereby dividing the unit into JBH 80 and JBH 81.

Context JBH 80

We opened context JBH 80 in the western portion of Unit 14 (1m x 2m) on October 17, 2011. It was characterized by a dark, homogenous, moist soil and was assigned a Munsell value 10YR 2/2. This was the point at which we divided the unit into two separate contexts, JBH 80 and JBH 81. Context 80 contained a prominent root (pictured) which was removed at the end of the day with a handsaw.

Figure 5: A prominent root is evident in context JBH 80

We primarily used trowels in this context to initially work around the root and sifted all dirt with ¼" mesh. Once the root was removed, we used shovels. The elevations of significant points are as follows:

Measuring Location	Elevation Below Datum (m)
Northwestern Corner	2.23
Northeastern Corner	2.16
Southwestern Corner	2.26
Southeastern Corner	2.19
Center	2.25

Sifting through the soil in this context was a laborious task as we tried to be as careful as possible so as to make sure no artifacts remained entangled in the roots. Fragments of various types of glass were the most abundant artifacts in this context, followed by pieces of coal and whiteware. The printed porcelain and whiteware fragments were arguably the most interesting finds in JBH 80. One small piece depicted a pink Chinese flower motif, while the other was characterized by a powder blue, scalloped Chinese motif. While both of these artifacts were present in the same context, their production ranges are significantly different. Furthermore, the Phillip's head screw indicates that the context had to have been deposited after 1934.

Figure 6: Artifacts recovered from JBH 80

A comprehensive inventory of artifacts excavated from JBH 80 including quantity and production range can be found below:

Table 2: Inventory of Artifacts from JBH 80

Artifact Description	Quantity (# of pieces)	Production Range (years)
Glass Fragments*	12	Black/Opaque: to 1870 Soda Lime/Moderately Clear: 1860-present Flint/Lead: 1770-present
Coal Pieces	11	
Transfer-Printed Whiteware*	7	Powder blue, scalloped Chinese Motif: 1795-1845, median 1817
Transfer-Printed Whiteware (Chinese Porcelain Replicate)	1	Chinese Flower Motif: 1820-1900
Stone	4	
Brick Fragments	2	
Screws*	2	Pointed, circular Phillip's head, rings (20) are 1mm apart: post 1934
Unidentified Metal Chunk	1	
Seed	1	

*= Diagnostic features

The TPQ for this context is defined by the Phillip's head screw as 1934, as it is the most recently dated of the artifacts for which we have date ranges.

To the east of JBH 80 was JBH 81. The unit was split into two contexts based on an observable difference in soil color.

Context JBH 81

We opened JBH 81 in the eastern portion of Unit 14 on October 17, 2011. The context was smaller than JBH 80 measuring 1m x 1m. Characterized by a light, dry and patchy soil, it was assigned a Munsell value of 2.5Y 5/6. We primarily used trowels and shovels to excavate this context and sifted all dirt with ¼" mesh. At this point in the excavation, the unit was uneven; JBH 81 was deeper than JBH 80. Ian Brownstein was the primary excavator in this context while Sandra Mastrangelo and Brian Kelly worked concurrently in the larger context JBH 80.

The elevations of significant points of this context are as follows:

Measuring Location	Elevation Below Datum (cm)
Northwestern Corner	2.16
Northeastern Corner	2.07
Southwestern Corner	2.19
Southeastern Corner	2.11

Finds in context JBH 81 were scarce. The most abundant artifact in this context was glass and appears to be the only true diagnostic find since both the creamware and whiteware are unmarked. As a result, the exact production ranges of the creamware and whiteware were difficult to determine. Perhaps the small size of this context

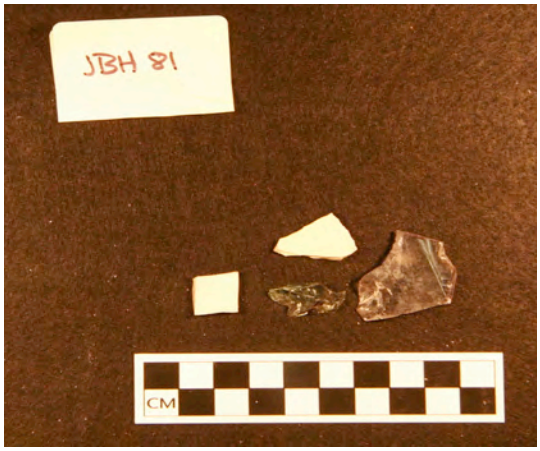


Figure 7: Sample of artifacts from JBH 81

contributed to the minimal number of artifacts present.

A comprehensive inventory of artifacts excavated from JBH 81 including quantity and production range is summarized below:

Table 3: Inventory of Artifacts from JBH 81

Artifact Description	Quantity (# of pieces)	Production Range (years)
Glass Fragments*	6	Soda lime, moderately clear: 1860-present Flint, lead/clear: 1770-present
Creamware (plain)	1	1762-1820
Whiteware (plain)	1	1830-present

*= Diagnostic features

The TPQ for context JBH 81 is 1860 as defined by the soda-lime glass fragments. This is the most recently dated of the artifacts for which we have date ranges.

Context JBH 83

We opened context JBH 83, combining contexts JBH 80 and JBH 81 on October 24, 2011. This context was characterized by a dark yellow-brown soil. It was not as dark or patchy as contexts 80 and 81, and the soil color and quality was consistent throughout the unit.

Figure 8: Combining contexts: JBH 83

We assigned this context a Munsell value of 10YR 3/6. When we combined contexts, JBH 81 was deeper than JBH 80.

Soil in context 83 contained more rocks and gravel than previous contexts and also revealed a number of small and large roots. Since our days in the field were coming to an end, our unit collectively decided to dig exclusively in the western 1.5m x 1m portion of the unit after October 31, 2011 as this is where we perceived the location of the anomaly to be.

We used shovels and trowels as our primary methods of excavating and sifted all dirt through ¼" mesh. The elevations of significant points are as follows:

Measuring Location	Elevation Below Datum (cm)
Northwestern Corner	2.36
Northeastern Corner	2.41
Southwestern Corner	2.40
Southeastern Corner	2.30
Center	2.33

Towards the end of class on November 7, 2011, the western portion of JBH 83 revealed a linear feature running south to north seemingly comprised of metal. There was also a significant amount of brick and a plaster material surrounding the anomaly. We

could not tell what it was until we dug deeper! Using the total station (pictured), we recorded the exact location of the top of the feature and continued to dig carefully around it using brushes and trowels.

We unearthed a diverse array of artifacts from JBH 83, likely due to the fact that we dug very deep in this context. There was also a significant amount of structural material present, especially plaster, brick fragments and cut-nails of different sizes.

Notable artifacts include printed pearlware, a smoking pipe fragment, glazed stoneware, printed whiteware, and a metal buckle. We spent the most amount of time excavating context JBH 83 and sifted through a significant amount of dirt to reach the beginnings of the linear anomaly.

Figure 9: Sample of artifacts from JBH 83

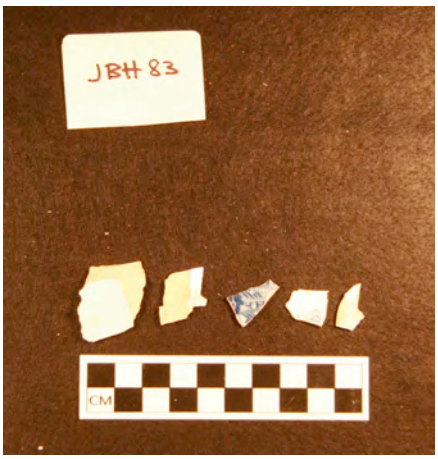


Figure 10: Transfer-printed whiteware

Two pieces of glazed stoneware were discovered in this context characterized by a granite-like texture. Both fragments are hard and very compact with a salt glaze applied to the pipes' interior and exterior surfaces. One piece had a 20cm diameter and the other measured 22cm in diameter. The 22cm diameter fragment was likely a sewer pipe as the

material is vitrified clay, the material of choice for many sewers through the 1800s. The salt-glaze is impervious to water, corrosion resistant and unaffected by temperature changes. This pipe fragment is likely from the rim of the bell and spigot joint.

We also discovered a metal buckle in context JBH 83. Although it is very rusty, the frame and prong of the buckle are structurally intact. The buckle is square-shaped with each side measuring approximately 4cm in length. As most colonial harness buckles were composed of brass, and given the amount of rust, this buckle is likely brass. These types of buckles did not exist in colonial North America prior to the 1750s.

Figure 11: Metal buckle from JBH 83

A comprehensive inventory of artifacts excavated from JBH 83 including quantity and production range is summarized below:

Table 4: Inventory of Artifacts from JBH 83

Artifact Description	Quantity (# of pieces)	Production Range (years)
Plaster Pieces	54	
Brick Fragments	45	
Coal Pieces	25	
Nails*	17	Large cut nail: 1810-1900
Glass Fragments	15	Flint, lead/clear: 1770-present
Creamware (plain)	6	1762-1820
Printed Whiteware*	4	Transfer printed: 1830-present

Printed Pearlware*	2	Light blue: 1826-1831, median 1829 Transfer-printed Chinese motif: 1784-1840
Stoneware*	2	Thick, 20cm diameter, grey stoneware paste: 1690-1775
Smoking Pipe Fragment	1	Inner Diameter = 2.2 cm
Metal Buckle	1	No earlier than 1750s
Animal Nail/Shell	1	

*= diagnostic features

The TPQ for context JBH 83 is defined by transfer printed whiteware as 1830. This is the most recently dated of the artifacts for which we have date ranges.

Context JBH 88

Context JBH 88 was opened in the western portion of Unit 14 on November 14, 2011 after observing changes in the soil color and content. It is characterized by a very dark/grayish brown soil with patches of sand. We assigned a Munsell value of 10YR 3/2. An iron object and brick are clearly visible in this context.

Figure 12: Context JBH 88 with iron and brick

We used shovels and trowels as primary methods of investigation to dig carefully around the anomaly. All dirt was sifted using ¼" mesh.

The elevations of significant points are as follows:

Measuring Location	Elevation Below Datum (cm)
Northwestern Corner	2.75
Northeastern Corner	2.73
Southwestern Corner	2.77
Southeastern Corner	2.85

Since the digging season was coming to an abrupt close, we decided to focus our efforts on this 1.5m x 1m section of the unit. We appeared to have reached the anomaly in context JBH 88 located approximately 1m deep in Unit 14. Context 88 revealed a small iron pipe running from south to north. There was also a considerable amount of plaster surrounding the iron pipe suggesting we encountered infrastructure associated with the Hale Ives Homestead.

Figure 13: JBH 88 revealed a linear feature

We dug carefully around the iron pipe in an attempt to determine the extent of the feature and get a better idea of its diameter. As depicted in the picture (right),

the pipe has a very small diameter and is considerably rusted. The plaster material surrounds the pipe, and in the southern portion of the unit, the pipe appears to run underneath the plaster.

We discovered several larger artifacts in context JBH 88 including a brick which was fully intact, large iron-cut nails and a glazed pipe fragment. The red-brown pipe is glazed on both sides and appears to taper sharply. It has a smooth texture and an outer diameter of 18cm.

Figure 14: Sample of artifacts from JBH 88

Figure 15: Glazed pipe fragment from JBH 88

A comprehensive inventory of artifacts excavated from JBH 88 including quantity and production range is summarized below:

Table 5: Inventory of Artifacts from JBH 88

Artifact Description	Quantity (# of pieces)	Production Range (years)
Brick Fragments	13	
Cut Nails*	3	1810-1900 (Type B cut nails)
Mortar	3	

Glazed Pipe Fragment*	1	Thick, glazed on both sides, tapers sharply, outer diameter 18cm
Full Brick (no distinguishing features)	1	
Plaster Chunk	1	

*= diagnostic features

The TPQ for context JBH 88 is defined by the iron-cut nails as 1810. This is the most recently dated of the artifacts for which we have date ranges.

Analysis and Interpretations

With the help of our fellow archaeologists, we backfilled Unit 14 shortly after discovering the linear feature we anticipated. Unit 14 was officially closed for the fall digging season on November 21, 2011

We discovered a diverse array of artifacts ranging from pottery sherds, structural material, glazed pipe fragments and a brass buckle. This seemingly arbitrary assortment provides evidence that Unit 14 was located on a gradual fill, rather than over a specific room of the Robert Hale Ives Homestead.

Figure 16: Backfilling Unit 14

The large number of pottery sherds, for example, can be attributed to the fact that we dug very deep into the unit, rather than conclusive evidence that our unit was located on a kitchen or formal dining area. Although finds were numerous, we did not find a high

density of any one artifact other that structural material such as brick and plaster, which were more abundant in the later contexts.

Further evidence supporting the notion that our unit was located on a fill is the temporal progression of the five excavated contexts of Unit 14. While the TPQ of the bottom three contexts, JBH 81, JBH 83 and JBH 88 are secure, and the date ranges of the artifacts are consistent, there is evidence of contamination in contexts JBH 76 and JBH 80. The date ranges of the artifacts discovered in these two contexts are far more variable. This can also be attributed to the fact that these units were closest to the topsoil and likely affected by current activity in the area.

Moreover, it is important to remember that there exists a degree of subjectivity in our assignment of different contexts, especially when using natural features to determine new contexts. While our unit collectively agreed on each contextual progression, the first two contexts that we assigned in Unit 14 were at the very beginning of the 2011 digging season. Perhaps we were overly cautious and changed contexts before it was appropriate.

While the linear anomaly we encountered is certainly part of infrastructural material, we cannot definitively conclude that it is part of the foundational structure of the Robert Hale Ives Homestead. In the southern region of the unit, the pipe appears to travel underneath the plaster; however, we did not have enough time to dig to the north to

Figure 17: Unit 14 prior to being backfilled

reveal the extent of the pipe. Our best guess is that Unit 14 was located very close to a foundational structure; we may have just missed it. Perhaps if we expanded the unit a meter south we would have encountered foundation. The entire pipe would have been cemented as part of the foundational structure, so the fact that we discovered a considerable portion of the pipe outside of the plaster implies we were not on the foundation.

If the 2012 excavation were carried out on the John Brown House property, I would definitely recommend further exploration in or in the vicinity of Unit 14. It would certainly be beneficial to reveal the extent of the linear feature to the north, as well as what lies beneath it. Furthermore, expanding the unit south would also help to determine the extent of the plaster, perhaps revealing a more foundation-like structure of the Robert Hale Ives House, which we had hoped to encounter.

References

Archaeology 1900: Archaeology of College Hill Field Notes. Fall 2011.

Historical Archaeology at the Florida Museum of Natural History. 1995. "All Types in Collection: Ceramics." Florida Museum of Natural History. Web. 5 Dec. 2011 <http://www.flmnh.ufl.edu/histarch/gallery_types/type_list.asp>

Hume, I.N. 1969. *A Guide to Artifacts of Colonial America.* 1st ed. New York: Alfred A. Knopf.

Jones, O., Sullivan, C., Miller, G.L., Smith, E.A., Harris, J. E., & Lunn, K. 1989. *The Parks Canada Glass Glossary.* 2nd ed. Quebec: The Canadian Government Publishing Center

Lindsey, B. "Bottle/Glass Colors." *Historic Glass Bottle Identification & Information Website.* United States Department of Interior Bureau of Land Management. Web. 7 Dec. 2011 < http://www.sha.org/bottle/colors.htm>

Lindsey, B. "Bottle Typing/Diagnostic Shapes." *Historic Glass Bottle Identification & Information Website.* United States Department of Interior Bureau of Land Management. Web. 7 Dec. 2011 < http://www.sha.org/bottle.htm>

Munsell Soil Chart 2009 Edition. *Munsell Soil Charts.* Web. 4 Dec. 2011. <http://www.dgcolour.co.uk/soil-chart.html>.

"National Clay Pipe Institute - NCPI | Vitrified Clay Pipe Gravity Sewer Systems | VCP Technical Resource for Design-Installation-Operations." *National Clay Pipe Institute - NCPI | Vitrified Clay Pipe Gravity Sewer Systems | VCP Technical Resource for Design-Installation-Operations*. Web. Dec. 2011. <http://www.ncpi.org/>.

Rybczynski, W. 2000. "One Good Turn." *A Natural History of the Screwdriver and the Screw*. Scribner, New York.

Ryzewski, K. ed. 2009. *Archaeology of College Hill: John Brown House: Results and Interpretations from the Fall 2009 Excavations.* Providence, RI: Joukowsky Institute for Archaeology and the Ancient World, Brown University. Accessed at: http://proteus.brown.edu/collegehill2011/Home

Ryzewski, K. ed. 2010. *Archaeology of College Hill: John Brown House: Results and Interpretations from the Fall 2010 Excavations.* Providence, RI: Joukowsky Institute for Archaeology and the Ancient World, Brown University. Accessed at: http://proteus.brown.edu/collegehill2011/Home

Visser, T.D. "Nails: Clues to a Building's History." *Historic Preservation Research*

Website. University of Vermont Historic Preservation Program. Web. 4 Dec. 2011 <http://www.uvm.edu/histpres/203/nails.html>

Chapter 6: Site-wide Stratigraphic Analysis

Kaitlin East

Stratigraphic analysis is an essential component of the interpretation of any archaeological site. While depicting and defining stratigraphic sequences is a process fraught with problems and complexities, it is an invaluable endeavor nonetheless. At the John Brown House, the relationship between strata within units, between units in the same field season, and across a number of field seasons can offer insights into the nature of the archaeological site under investigation and its changes over time. Therefore, in order to understand how different parts of the John Brown House site relate to each other in time and space, small and large-scale stratigraphic analysis is a useful analytical tool despite the many problems.

In order to analyze the side-wide stratigraphy, one must first define stratification and the methods used in its examination. Stratigraphy is "the description and interpretation of stratification or the layering of deposits" (Mills 2005:177). The different layers of stratigraphy are defined as a stratum or deposit, which are "distinctive three-dimensional unit[s]," and are formed through natural processes, human action, or a combination of the two. (Mills 2005: 177, 178). Different strata can be defined by a number of characteristics, including, the presence and type of artifacts, the age of the deposit, magnetic properties of the soil, degree of weathering, and floral and faunal material within the unit (Mills 2005:193). The interfaces, or dividing lines between layers are equally important in analyzing a unit's stratigraphy (Mills 2005: 196).

Certain principles are important in understanding the relationship between strata. The Law of Superposition first described by Nicholas Steno and later adapted by Edward Harris, states that the layers are deposited sequentially with those on top being the youngest (Mills 2005:

179, 197). Another product of Steno and then Harris is the Law of Horizontality, which states that layers are laid down horizontally (Mills 2005: 179, 197). These principles are especially important when depicting stratigraphic sequences in a Harris Matrix, which "consists of a chart of boxes that represent the different depositional units identified during an excavation" (Mills 2005:197). Relationships between units are illustrated as either no direct relationship, correlation, or superposition (Mills 2005:197)

Stratigraphy is the relationship between a number of smaller units. These smaller units are recognized and demarcated in the field and can be difficult to relate to each other in creating a site-wide stratigraphy. One problem is the difficulty of recognizing discrete contexts because of the activity of animal or plants, freezing and thawing, swelling and shrinking of clay, or gravity that can obscure boundaries (Mills 2005: 206). The recognition of units can also be affected by research questions that determine what is discarded and what is emphasized (Branch 2005: 26). Another issue is that the Harris Matrix's focus on the boundaries and relationships that are often difficult to recognize in the field (Mills 2005: 204). Additionally, the representation of a unit through discrete boxes depicts the site as discontinuous when it is actually a series of continuous layers (Mills 2005:208). Lastly, it is difficult to date and consequently relate units based on artifacts because the age of an artifact is different from age of the depositional event that placed it there (Mills 2005:208).

Despite these complexities and problems, stratigraphic analysis is still a necessary aspect of archaeological analysis. This is because a site's stratigraphy shows how units relate to each other and gives them spatial and temporal context, which is crucial to the archaeological process (Brach 2005: 24). Furthermore, the contexts uncovered by archaeologists are "physical manifestations of past individual actions or processes, and the relationship between them can

help ascertain the chronology of the stratigraphy" (Branch 2005: 25). By looking at the site's stratigraphy, archaeologists can relatively date contexts and artifacts and can better understand changes at a site over time (Branch 2005: 28). Stratigraphy then is an important part of any archaeological study as it defines temporal and spatial relationships between different layers and human actions at the site. Although there are problems in defining defining contexts and interfaces, if this can be done with some degree of certainty, then a clear and useful stratigraphy can be revealed that can be used to understand a site's chronology.

Unit Stratigraphy

In order to compare stratigraphy across a site, accurate and comparable stratigraphic sequences need to be created for each individual unit. By depicting the stratigraphy within Units 11, 13, and 14 from the John Brown House excavations in 2011, artifacts can be placed in their proper temporal and spatial context, and later on, these units can be fit into the site wide stratigraphy and understood in their broader context. When depicting relationships within a unit, each layer will be given a stratum number that are numbered sequentially within each unit. This streamlined numbering system will allow for the combination of contexts, especially when creating stratigraphy across different years within the same unit. The different contexts and layers are identified in the field based on changes in Munsell values, or soil color; soil texture; and inclusions. Much of this identification is a bit subjective and changes with soil moisture and available light, therefore, contexts can often be combined because of similar but not exact Munsell values.

The first unit dug this year was Unit 13. It is a 2 meter by 2 meter square located in the North of the site, along Charlesfield Street. It was placed here in an attempt to find a foundation wall of the Hale-Ives House based on historical maps and the results of magnetometery. There

were four contexts identified within Unit 13 at the time of excavation: 74, 77, 78, and 82, which will be labeled Unit 13-Stratum 1 through 3.

Unit 13			
Stratum	Context	Munsell Value	Soil Description
Stratum 1	74 + 77	10 yr 3/2	Sod, medium / dark soil
Stratum 2	78	10 yr 3/2	Very gravely
Stratum 3	82	10 yr 10/10, 7.5 yr 5/8	Some large rocks, architectural debris

Table 1. Unit 13 context descriptions.

Context 74 was the first layer of this unit and was described as sod, with a Munsell Value of 10 yr 3/2 or a very dark grayish brown (2011 Unit 13: 74). The second context was 77, which occupied the northwest corner of the site and was below context 74, its Munsell value was also 10 yr 3/2 and it was described as dark soil by the excavators (2011 Unit 13: 77). There is very little difference between these two contexts and so it is possible that they are actually both part of a single layer that was mistakenly separated in the field. As such, they will both be considered Unit 13-Stratum 1. Unit 13-Stratum 2 was made up of context 78, occupied the southeast half of the unit, and was described as having a Munsell value of 10 yr 3/2. It was distinguished from 77 which was uncovered at the same time, and 74 which was above it, by the large amount of gravel that it contained (2011 Unit 13: 78). The last stratum of this context was Unit 13- Stratum 3 and included context 82, which was below 77 on the southwest half of the unit and was distinguished from the upper layers by having a Munsell Value of 10yr 10/10 with inclusions of 7.5 yr 5/8 or mottled light and dark soil with some large rocks (2011 Unit 13: 82).

Based on this stratigraphy, context 82 is older than 77 which is older than 74 and context 78 is older than 74. However, because 74 and 77 may be the same stratum, context 78 would be older than both of them. Some artifacts found in both 78 and 82 were very similar and possibly

pieces of the same artifact, such as pieces rosy tile and metal pieces (East 2011: Object Biography). Therefore, contexts 78 and 82 may be temporally contemporaneous.

The earliest human event identified in unit 13 may have been the single fill event that created context 78 and 82. Context 78 could have then become distinguished by a gravel path placed over it and through bioturbation and erosion that mixed the gravel throughout the context. Later, another fill episode covered both contexts, obscuring the path, and leveling the area.

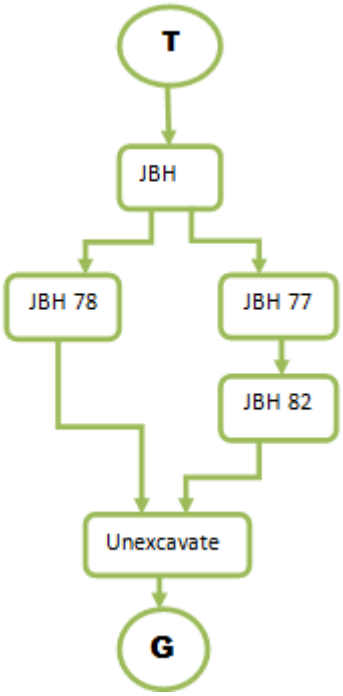


Figure 1. Unit 13 Harris Matrix.

The second unit opened in the 2011 field season was unit 11. It is located in the southern part of the site and is a continuation of a unit from prior field seasons in an attempt to determine the extent, age, and purpose of the walls. The contexts in this unit include 75, 79, 71, 73, 84, 85, 86, and 87 and are number Unit 11- Stratum 1- 8.

Unit 11			
Stratum	Context	Munsell Value	Soil Description
Stratum 1	75	7.5 yr 2.5/1	Slightly grayish brown
Stratum 2	79	2 .5 yr 2.5/1	gravel
Stratum 3	71	Rock wall	
Stratum 4	73	Rock wall	

Stratum 5	84	2.5 yr 2.5/2	Dark brown
Stratum 6	85	5yr 2.5/1	Dark brown, gravel
Stratum 7	86	2.5 yr 2.5/2	Few rocks
Stratum 8	87	10 yr 3/2	Lighter brown

Table 2. Unit 11 context descriptions.

Unit 11-Stratum 1 consists of context 75 in the northwest corner of the unit and is described as slightly grayish brown with a Munsell Value of 7.5 yr 2.5/1 (2011 Unit 11: Context 75). Beneath this layer is Unit 11-Stratum 2 made up of context 79 with a Munsell value of 2.5 yr 2.5/1 with large amount of gravel (2011 Unit 11: Context 79). The next two stratum, Unit 11-Stratum 3 and Unit 11- Stratum 4 are walls below Stratum 2 that cut down below the remaining excavated contexts from this year. They are parallel and run the north- south length of the entire unit. However, although they were discovered immediately beneath Stratum 2 they continue down and so are temporally below the remaining stratum of this unit.

The next stratum, Unit 11- Stratum 5 is also context 84 and has a Munsell value of 2.5 yr 2.5/2. It is located on the west side of context 71 beneath context 79 (2011 Unit 11: Context 84). The close similarity between the Munsell values of context 84 and 79 could indicate that they are actually one stratum. However, the presence of gravel in context 79 is enough to consider them separate contexts. Unit 11-Stratum 6, context 85, is located beneath stratum 2 and is between the two walls, it has a Munsell value of 5yr 2.5/1 and is dark brown (2011 Unit 11: Context 79). On the east of context 73, is Unit 11-Stratum 7 or context 86 which is defined as having a Munsell value of 2.5 yr 2.5/2 and has few rocks in it (2011 Unit 11: Context 86). The last stratum of the unit, Unit 11-Stratum 8, context 87 is below context 84 on the west side of the wall and is identified by a soil color of 10 yr 3/2 that is described as lighter brown (2011 Unit 11: Context 87). The walls of stratum 3 and 4 would be below this last stratum, as they were deposited first.

In terms of temporal sequence, the oldest stratum are 3 and 4, the walls, because they continue down below unexcavated material The relationships between stratums 84, 85, 86, and

87 are impossible to determine except that they are all younger than the walls, that 87 is older than 84, and that they are all older than the top two strata. However, the soil in 84 and 86 are similar with a Munsell Value of 2.5 yr 2.5/2, indicating that there may be a temporal relationship between the soil on the outside of the walls in that they were laid down at a different time than the soils between the walls. A full interpretation of these relationships will depend on the analysis of excavations from prior years and so will be offered later on.

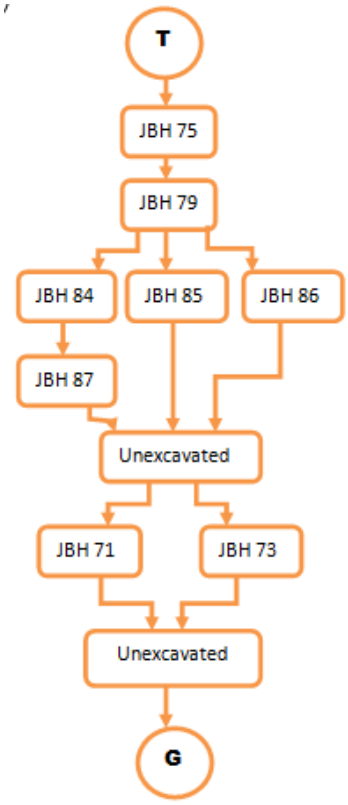


Figure 2. Unit 11 Harris Matrix.

The last unit opened during the 2011 field season was unit 14 in the north half of the site along Charlesfield Street. A 3 meter by 1 meter unit was placed because of evidence from Ground Penetrating Radar that indicated the existence of an anomaly. The contexts within the unit include 76, 80, 81, 83, and 88 and are numbered Unit 14- Stratum 1- 5.

Unit 14			
Stratum	Context	Munsell Value	Soil Description
Stratum 1	76	7.5 yr 3/2	sod

Stratum 2	80	10 yr 2/2	Dark, moist
Stratum 3	81	10 yr 2/2, 2.5 yr 5/6	Dark and moist, light and dry
Stratum 4	83	10 yr 3/6	Dark yellow brown
Stratum 5	88	10 yr 3/2	Very dark grayish brown

Table 3. Unit 14 Context descriptions.

The first layer is Unit 14- Stratum 1, which includes context 76, has a Munsell value of 7.5 yr 3/2, and is described as sod and topsoil (2011, Unit 14: Context 76). Unit 14-Stratum 2 is below stratum 1 in the western three-fourth of the unit, includes context 80, has a Munsell value of 10 yr 2/2 and is described as dark, moist, and homogenous (2011, Unit 14: Context 80). The next layer, Unit 14- Stratum 3 includes context 81 in the eastern one-fourth of the unit and is described as a mix of dark and moist and light and dry soil identified as 10yr 2/2 and 2.5 yr 5/6 (2011, Unit 14: Context 81). Beneath contexts 80 and 81 is Unit 14- Stratum 4 which includes context 83 and is distinct from the contexts above it by a Munsell value of 10 yr 3/6 or dark yellow brown (2011, Unit 14: Context 83). Unit 14- Stratum 5, context 88, is in the western one fourth of the unit below Stratum 4, has a Munsell Vale of 10 yr 3/2, and is very dark grayish brown (2011, Unit 14: Context 88). The rest of the unit was not excavated and so stratum 4 is the final layer in the eastern three-fourths of the unit while the western fourth goes down to stratum 5.

These strata relate to each other rather simply. Stratum 5 is the oldest, with stratum 4 above it being slightly younger though still older than strata 2 and 3. Stratum 2 and stratum 3 are older than stratum 1 and younger than Stratum 4. It is unclear if these two deposits were laid down at the same time, but it is safe to assume that they were deposited at nearly the same time because they were both laid down between the depositions of stratum 1 and stratum 4. If they were laid down at the same time then perhaps they represents different loads of soil, or there may

have been a barrier between the units at one time that separated depositional events between them.

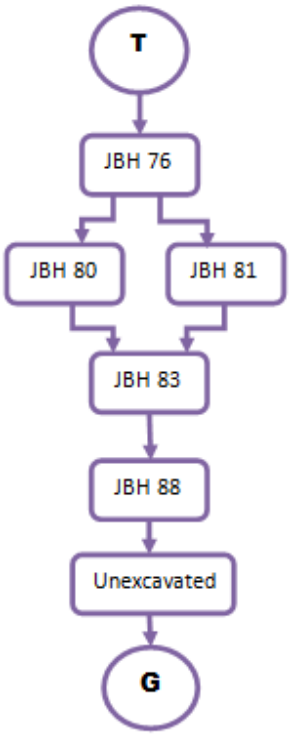
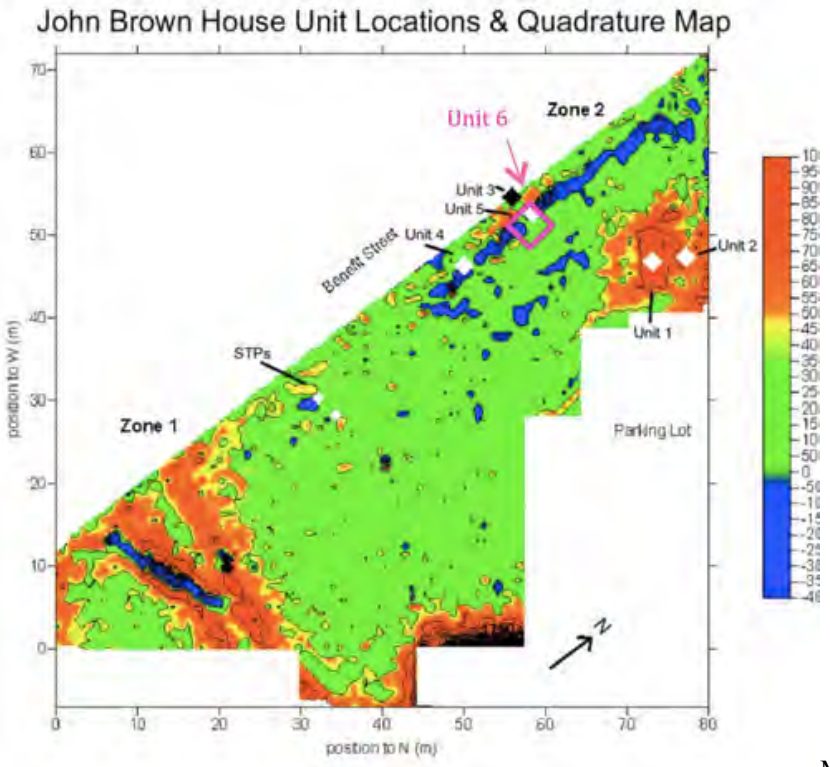


Figure 3. Unit 14 Harris Matrix.

2011 Site wide Stratigraphy

In order to understand each of these units in context it is necessary to relate them, as much as possible, through a site wide stratigraphy. The problems inherent to creating unit stratigraphy are amplified greatly in attempting to relate them to the whole site. The complexities of recognizing separate contexts is still problematic and is increased further by attempting to relate descriptions of strata from different units and excavators. As such, many comparisons across units are based on similar but not exact context descriptions and measurements of depth. Despite the problems of analyzing a site wide stratigraphy, it is still important in that it allows the temporal and spatial contextualization of artifacts and features that can be used to understand the site as a whole.



Map 1.
Map of the John Brown House Site. Note the relationship between the north and the south parts. (Leddy 2010: 19)

In the 2011 excavations it is clear that there is little stratigraphic relationship between unit 11 and units 13 and 14. There are no corresponding soil colors in the north and south parts of the site. This most likely indicates that these two parts of the site were used for very different purposes, and were possibly not a single site in the past. The lack of relationship emphasizes that even the boundaries of a site are determined by the excavator and do not necessarily relate to the finds on the ground.

Units 13 and 14 on the other hand had very similar soil in much of their contexts. In contexts 74, 77, 78, 80, and 81 the soils are all around Munsell Value 10 yr 3/2. Context 78 in unit 13 has gravel in it, context 74 in unit 13 is described as sod, and context 81 in unit 14 has inclusions which makes these contexts difficult to relate to the others. However, the similarities in context 77 in unit 13 and 80 in unit 14 are strong in that they are described as 10 yr 3/2 and 10 yr 2/2 respectively. Unfortunately, much of this part of the site is on a pronounced slope and so relating

strata by elevation is impossible. Furthermore, the depths across contexts were not very consistent making it difficult to correlate depth across units. However, the depth of context 77 was on average .154 meters and the depth of context 80 was .151 meters on average. These depths are certainly close, however if as has been suggested, context 74 and 77 represent the same event and so the depths would no longer be so close. Regardless, it possible that Unit 13-Stratum 1 and Unit 14-Stratum 2 are related given the similar soil types.

By relating these units in the north of the site it is clear that there was at least one event of deposition that may have affected the majority of that area. This could indicate a fill of construction debris, or land leveling for landscaping. This would account for the similar soil throughout the area and variation in depth across the site, because the dumping of soil may not have been to the same degree across the site. Furthermore, although there were few similarities between the north and the south this is enlightening in and of itself , and indicates that the two halves of the site may have been used for different purposes in the past.

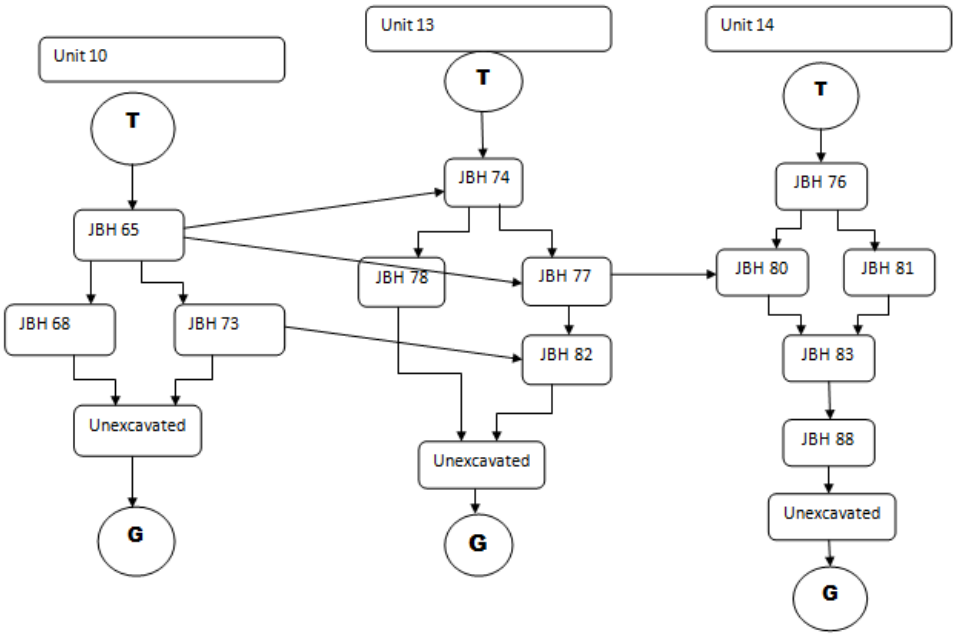


Figure 4. 2011 North Site Harris Matrix

2008- 2011 Site wide Stratigraphy

While the stratification of particular units and across units from the same year are important, site wide stratigraphy across all years of excavation is particularly enlightening. By contextualizing the strata within the entire site, spatial and temporal relationships between depositional events and artifacts can be determined. At a site like the John Brown House, where excavations have been ongoing for many years, in many different parts of the site, by many different crews, it is especially necessary to attempt to compare strata from all the years of excavation. It is particularly important to draw these comparisons because 2011 may be the last year of excavation. As such, the relationships between the current units are the best chance we have of determining what the nature of the use of the site was in the past.

The north part of the site has had many different units excavated since 2008. These units are 1, 2, 10, 13, and 14. As mentioned before, there is a possible temporal correlation between contexts 77 and 80 of units 13 and 14 respectively. Unit 10 from 2010, was also very close to this area. Contexts 65 and 73 from this unit have soil values of 10 yr 2/1 and 10 yr 2/2 respectively, which is very close to the 10 yr 2/2 and 10 yr 3/2 of units 80 and 77. However, 73 contains architectural debris and so unit 65, which does not, can be related to context 77 and 88 from units 13 and 14 (Bartos 2010: 70). Furthermore, the architectural debris from unit 73 could be similar to the architectural debris from 82, even though they have different Munsell Values, because they are each covered by comparable contexts, 65 or 77, and have similar inclusions (10 yr 2/1 and 10 yr 10/10). .

There were no units from 2009 in this area, but in 2008 Units 1 and 2 were. In Unit 1, stratum 1 consisted of contexts 5, 8, 9, 18, and 24 had a Munsell Value of 10 yr 2/2. This is very similar to context 77, 89, and 65 from 2010 and 2011. Stratum 3 included context 31 and had a

Munsell value of 10 yr 3/4 which is similar to contexts 83 (10 yr 3/6) and 88 (10 yr 3/2) in unit 14. It is unlikely that it is related to the same deposition event as 83 because of the distance and variations in soils that separate the two units, but 88 may be a similar strata to context 31 (Combs 2009: 44). In unit 2 from 2009, the top stratum with contexts 6 and 10, had a Munsell value of 10 yr 2/1 and is labeled stratum 4 , however the other layers are not accurately recorded so it is impossible to relate them to the rest of the site. Unit 2- Stratum 4 could be related to contexts 77, 89, and 65 and stratum 1 from unit 1 (Combs 2009: 47).

It is difficult to relate the contexts in this part of the site because so much of the soil is similar in color. However, based on close matches in Munsell Values it seems that at least one of the upper stratum of all of these units can be related. This would indicate a large fill episode that is more recent than anything else at the north end of the site and covered the entire area. Unfortunately, because it is so close to the surface, it could relate to the Rhode Island Historical society landscaping more than anything else.

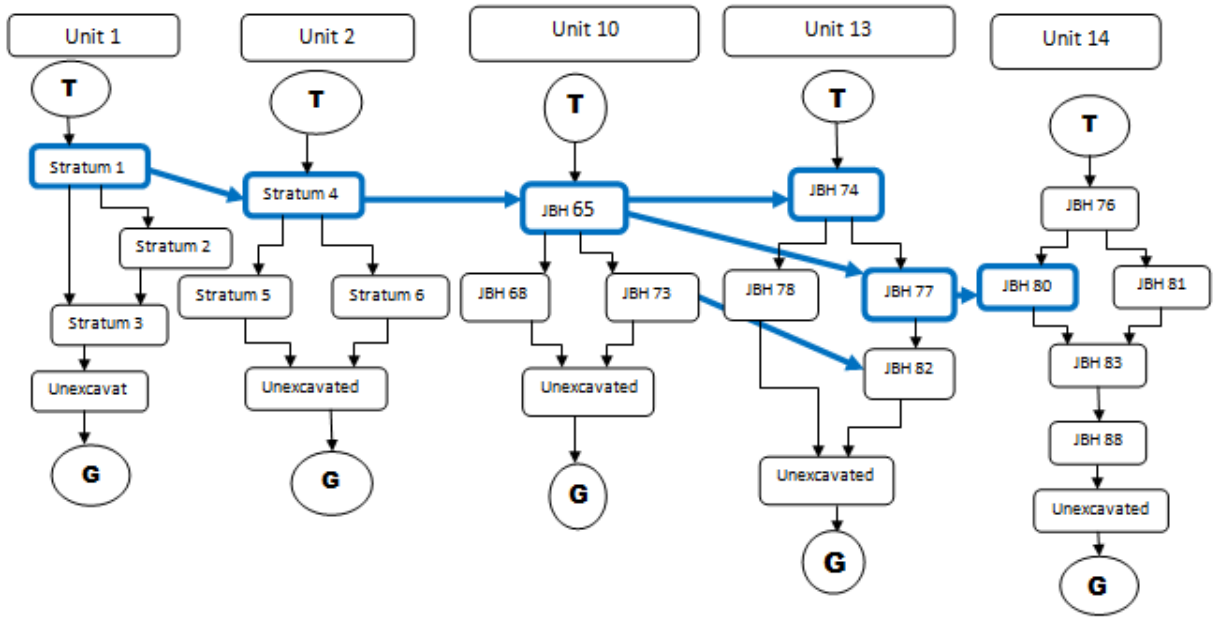


Figure 5. North Site Harris Matrix, all years.

The Southern part of the site has also had a number of units excavated in it that need to be related in order to better understand the site as a whole. The main seasons to compare to this year's excavation are 2009 and 2010 that excavated in Unit 11. By looking at Munsell Values and depths, an extended stratigraphy for unit 11 can be created that incorporates strata dug by all three years of excavation.

In combining the units Stratum 1 includes contexts 45, 55, 56, 66, and 75 which were described as having Munsell values similar to 10 yr 2/2 and sometimes with inclusions of 7.5 yr 2.5/1 and consisted of top soil and sod. Stratum 2 included contexts 79, 67, and 51 which had Munsell values of 2.5 yr 2.5/1 or 10 yr 2/2 but are characterized as similar based on the gravel found in each one. The walls are characterized as Stratum 9 and 10, which reflect their early deposition in relation to the other strata, and they are the defining boundaries of the following strata. Stratum 3 includes context 70 on the west side of the wall, is identified as 5 yr 2.5/1, and described as packed with no large rocks. Context 72 is between the two walls and is Stratum 4 with a Munsell value of 10 yr 2/2 and very loose and sandy soil with large rocks. Stratum 5 is on the east side of the eastern wall and includes context 86 which has a Munsell value of 2.5 yr 2.5/2 with few rocks. Stratum 6 is context 84 and is below stratum 3 with a Munsell value of 2.5 yr 2.5/2. It is possible that Stratum 3 and 6 could be collapsed because of their similar Munsell Values, however, the differences in color seem enough to delineate them as separate contexts for now. Stratum 7 consists of context 85, is between the two walls, below stratum 4, and is distinguished by a Munsell Value of 5yr 2.5/1 that is dark brown and contains gravel. Context 87 makes up stratum 8, which is below stratum 7 on the west side of the west wall and is differentiated by a Munsell Value of 10 yr 3/2 or a lighter brown. The last two strata, 9 and 10 are the walls in the unit.

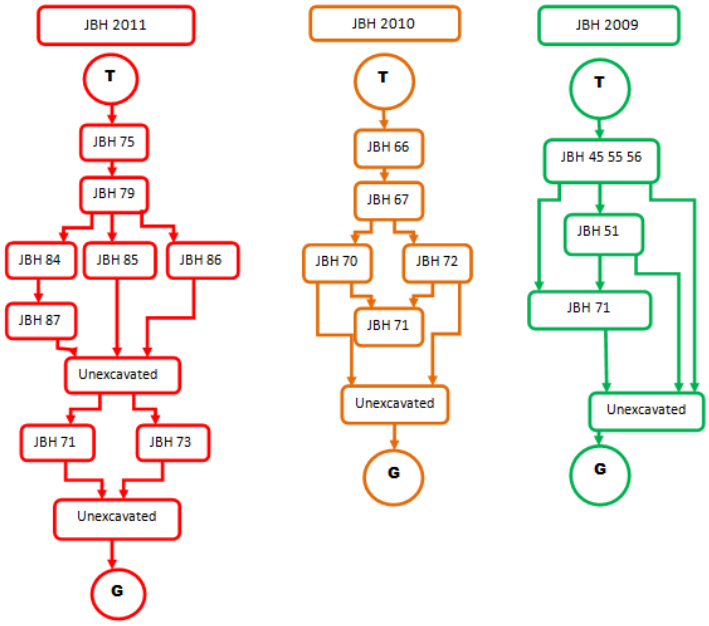


Figure 6. Unit 11 Harris Matrices

Unit 11 + 2010 +2009			
Stratum	Context	Munsell Value	Soil Description
Stratum 1	45+55+56+66+75	10yr 2/2, 7.5 yr 2.5/1	Sod, topsoil
Stratum 2	79 + 67+ 51	2.5 yr 2.5/1, 10 yr 2/2	gravel
Stratum 3	70	5Y/ 2.5/ 1	Packed, No Large Rocks
Stratum 4	72	10 YR/2/2	Very Loose, Large Rocks, Sandy
Stratum 5	86	2.5 yr 2.5/2	Few rocks
Stratum 6	84	2.5 yr 2.5/2	Dark brown
Stratum 7	85	5yr 2.5/1	Dark brown, gravel
Stratum 8	87	10 yr 3/2	Lighter brown
Stratum 9	71	Rock wall	
Stratum 10	73	Rock wall	

Table 4. Unit 11 context descriptions, all years.

By connecting the different excavations of unit 11 it is clear that the youngest depositional process were more or less contemporaneous. Despite being in different sectors of the unit contexts 45, 55, 56, 66,and 75 all had similar enough values to be considered one strata, as did the contexts in stratum 2. This indicates that, in each case, one event was responsible for their deposition across the units and on either side of the walls. Beyond that, the time line of deposition does not change much from incorporating past excavations. The walls are still the earliest thing visible and there is still little relationship between the contexts separated by the

walls. However, similar soil in 84 and 86 suggests that the soil on the outside of the walls was laid down at a different time than the soil between the walls. This could indicate that the space between the walls was filled-in first to make the wall strong and that the soil on the outside of the walls was a result of a later depositional events. Conversely, the walls could be part of an in-ground drainage feature that was filled because it was no longer useful and so the soil on the outside of the walls was deposited earlier, during the construction of the drain and the soil inside was later, after it fell out of use. Either way, after these events covered the walls subsequent depositional events did not follow along the wall features and instead covered the unit completely.

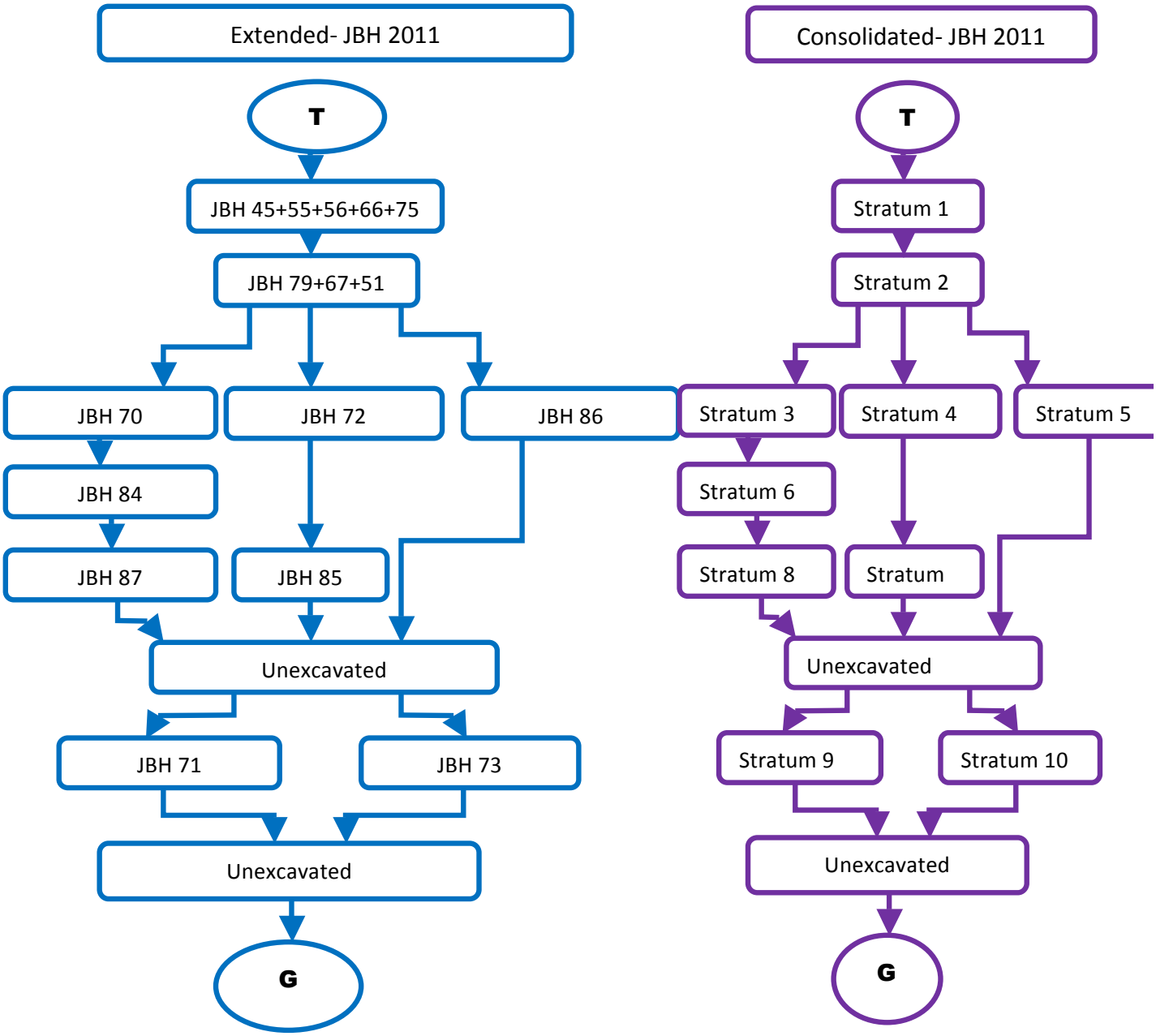


Figure 7. Unit 11 extended and consolidated Harris Matrices.

The John Brown House excavations have uncovered an interesting and complex history if the site. Nowhere is this complexity more evident than in the site's stratigraphy. Stratigraphic sequences within units indicate a number of depositional events that differed in time and content. However, it is by comparing stratigraphy across the site that the true nature of the site is revealed. The very different nature of the north and south sites becomes clearly evident from

such an exercise and the close relationship between all of the unit in the north indicate large scale landscaping that covered the majority of the area. In the south, the extended stratigraphy shows the construction of a feature, its abandonment, and the forgetting of it through relating the layers within the unit. Without this analysis, the different layers of the northern units would have no meaning for the site as a whole, and the different parts of unit 11 from different years would not be related and an understanding of the wall feature would be impossible. In what may be our last year of excavation at the John Brown House, this site-wide stratigraphic analysis offers the most comprehensive understanding of the site that can be shared with the public.

References Cited

2011 Unit 13: Field Context Sheets.

2011 Unit 14: Field Context Sheets.

2011 Unit 11: Field Context Sheets.

Baker, S. 2009. "Site---wide Stratigraphy Report." John Brown House Site Report. 26---46.

Bartos, Nick. 2010. "Site Wide Stratigraphic Analysis of the John Brown House.: John Brown House site Report. 68- 83.

Branch, Nick with Matthew Canti, Peter Clark, and Chris Turney. 2005. *Environmental Archaeology: Theoretical and Practical Approaches.* Hodder Education: London.

Combs, J.2008. "Stratigraphic Analysis of the John Brown House Units." John Brown House Site Report. 42-65.

East, Kaitlin. 2011. "John Brown House Object Biography: Rosy Tile." John Brown House Site Report.

Mills, Barbara J and Rafael Vega-Centeno. 2005. "Sequence and Stratigraphy" in Maschner, Herbert D.G. and Christopher Chippendale, *Handbook of Archaeological Methods.* Alta Mita Press: New York.

Chapter 7: The John Brown House Exhibit

Susana Ortega

My project consists of doing an exhibit for this year's *Archaeology of College Hill.* This year's class consisted of three units (11, 13, and 14). Unit 11 has already been excavated through the previous classes and information was already gathered, whereas 13 and 14 were new units. Unit 13 was located between 2 past sites, unit 2 and unit 10, where their goal was to find foundation walls of the Robert Hale Ives House. Unit 14 worked on finding the anomaly that was detected through the GPR results. Though all three units had found new and interesting features and contexts, each group also found artifacts. So this is where I come in. It was my job for the semester to choose objects and images that convey our course goals and to choose the most interesting or significant findings of the class's excavation. Because text panels could not be displayed alongside the exhibit, I also had to create a wiki in order to provide information about the objects I have chosen.

Before I began my process, I took the first step to look over all the artifacts that each unit had found and to see if there were any categories that it can fall into. Through this technique I would be able to find a common theme that would appear throughout each unit. As I went over the artifacts found that there were three basic categories that I was able to create. These categories are food, agriculture, and ceramics. A few artifacts that would fall into the category of food would be animal bones that were found and pieces of glass bottle. Tiles and bricks would fall into the agriculture category and pearl ware or porcelain would fall with ceramics. My original idea was to have each unit in my exhibit represent a theme but because of the mixture of these categories in each unit, I found this difficult to accomplish. There was no unit who had one theme that held a really strong theme that it would be able to stand on its own. So I began to

come up with a theme that would demonstrate all three units as a whole. As I began to review the artifacts and thinking of a theme that would pull all three units together, I finally noticed a theme that would best fit all three categories together, and that was household! I felt that food, agriculture, and ceramics fell into this theme because they provided some cultural and social explanation for household. So this is the theme that I wanted to portray the excavation through the artifacts we have found during our excavation. I wanted to choose household because it is a theme that demonstrated the artifacts we had found and it made sense to do a theme such as this since we are investigating about the John Brown House.

So the next step was my decisions in the object selection. My goal was to basically choose objects that demonstrated the theme of household and that would give information about the John Brown House. Second, I wanted to choose objects that was interesting to class and would be for the audience, who would also come and see the exhibit. I also wanted to choose the artifacts that were being done for the object biographies as well. In this fashion, people would not just read what the identified named of the artifacts but will get information about them as well. So as I looked at the artifacts and the artifacts chosen for the object biographies, if not all, was what I have chosen as well. I think one artifact that I decided to place in the exhibit was not chosen to be researched further as an object biography, which was the decorated brick from unit 11, context 79. The reason I chose this was because it was a very unique brick in such a way that it was decorated and there was a hole that ran in the middle of the brick that ran lengthwise. I also chose this because this could tell us more or show us how the structures of the walls were built and the architecture of the house. But I also found that all the objects chosen for the object biographies were great choices and it also were great choices that would explain more about the

theme of household. And with the object biographies, I hope with more information given it can help explain the household of the John Brown House more.

Besides these objects I have chosen certain photos to put on a panel to also put in the exhibit. For each unit I wanted to put a panel of the before and after shots of the unit and a picture of the excavators at work. The reason I wanted to show the before and after is to demonstrate the public of what Brown students are doing. To show how much progress and much we have dug up. I also wanted to have an action picture so the audience can have some sort of connection with us. So they know who were dealing with the units and artifacts. Basically to give the class some credit. Usually in museums people only look at the artifacts but I also wanted to show the excavators behind all this since this was for a class. So I wanted not to demonstrate the work found but also the hard we have accomplished by the end of the semester, which also shows how we are learning and reaching our course goals. And show we are learning a lot!

The style of my exhibit is pretty straightforward. I did not want it to be too complicated so people would not make out of it when they look at the exhibit. Since there was three units and three shelves that I have to occupy, I wanted each unit to have its own shelf so people can see what was being done or what was being discovered in that unit. Now when it came to deciding which unit will go on which shelf I wanted to be careful not put the smaller artifacts on the top shelf because the top shelf is pretty high and it is hard to see so therefore I did not want people to just look over these small artifacts. So I first looked at which unit had the most small artifacts and the ones that did not. So I found that unit 11 was the one with the smaller artifacts so I placed that at the bottom of the shelf. And found that unit 14 only had one artifact that was small and the rest was fairly medium sizes so I decided to put that on the top shelf, which left unit 13 on the middle shelf (Dane 41-7). The way I also arranged the items from left to right was due to

the sizes. I wanted the sizes to vary from left to right because if I had organized it from big to small most people would not focus on the right side but mostly on the left side and vice versa. This is why I put the larger artifact at either end of the shelf with the medium size at the middle and the small artifacts at either end of the medium artifacts. This will cause the audience to move from the large artifacts across the next large artifacts forcing them to view the small ones as the view across the shelf (36-7).

I hope that visitors are able to gain two things out of this exhibit and that is the work we had contributed to provide the information and artifacts and to walk away being more informed about the John Brown House. I want them to realize that what we are doing is important and that we are not just digging for a class but learning skills and techniques along the way. And that our class is helping gather information and will be added to past reports in order to help all future archaeologists or future students who decide to take this class. We are helping the Rhode Island Historic Society in gaining information about this well-known house and for others who are interested in New England's history or anyone interested in the academic persona.

After this hard work, I think with more time I would have added more to my wiki by adding more information for the public to view. I think the only problem was time and that with more time my wiki would have been all set instead of adding the object biographies later when the class is done or the photos needed for the wiki. I would have also put up pictures of each object instead of leaving it blank for the class to post up their object biographies. In addition to, maybe, a brief introduction on my approach to this exhibit and idea behind my experiences so that way the audience is able to know where I am heading with this organization and how I was able to set up and accomplish the exhibit as my final product.

Works Cited:

Dean, David K. *Museum Exhibition.* London: Routledge, 1996. Print.

Chapter 8: A Cataloging and Analysis of Ceramic Sherds Found at the JBH, 2008-2011

Hannah Sisk

Introduction

This year's class marks the fourth excavation season at the John Brown House. Each year has brought the discovery of numerous artifacts, presented new challenges, and has fostered interesting interpretations. Until now, however, there has not been a comprehensive study and analysis of finds from all four years. For this reason, I chose to examine ceramic sherds found during the 2008-2011 excavation seasons. Ceramics are often used by historical archaeologists, both for dating sites, as well as to aid in understanding "the family or household life cycle, life events, life course analysis, [and] generational analysis" of a specific site.[1] The purchasing, use, and deposition of different forms of ceramics can yield vital information about the life situations of the people who lived there. Acknowledging this, I sought to catalog and compare the variety of ceramics sherds that have been found over the last four years. This was accomplished by first calculating ratios of the number of specific ceramic types to the total ceramic count for each context, resulting in a rate of deposition for each type of ceramic found during the 2008-2011 excavation seasons. Next, working specifically with the ceramics data from this year and using the GIS volumetric diagrams and results provided by Ian Brownstein, I was able to compare the types of ceramics deposited by their densities within specific contexts.[2] I also attempted to compare the densities of ceramic types found in contexts from 2010 and 2011 that had been linked across units from Katie East's work on site-wide stratigraphy.[3]

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[1] Mark Groover, "Linking Artifact Assemblages to Household Cycles: An Example from the Gibbs Site," *Historical Archaeology*, 2001, 35(4): 38-57.
[2] See Brownstein 2011.
[3] See East 2011.

Procedure

I first went through the remains from the 2008, 2009, and 2010 excavation seasons. With the help of my instructor, Jessica Nowlin, I learned how to differentiate between different types of ceramics: creamware, whiteware, porcelain, semi-porcelain, pearlware, redware, and stoneware.[4] I counted sherds by type and within contexts, and, using the following chart, I then grouped each context (and its respective ceramics!) by unit number.

Ceramics Found at the JBH 2008-2011

	Creamware	Whiteware	Porcelain	Semi-Porc.	Pearlware	Redware	Stoneware
STP 3, JBH 55							
STP 3, JBH 60							
STP 35, JBH 2							
STP 30, JBH 4							
Unit 1, JBH 8							
Unit 1, JBH 18							
Unit 1, JBH 24							
Unit 1, JBH 31							
Unit 2, JBH 6							
Unit 2, JBH 11							
Unit 2, JBH 38							
Unit 3, JBH 12							
Unit 3, JBH 17							
Unit 3, JBH 23							
Unit 3, JBH 28							
Unit 3, JBH 34							
Unit 3, JBH 40							
Unit 4, JBH 16							
Unit 4, JBH 19							
Unit 4, JBH 20							
Unit 4, JBH 37							
Unit 4, JBH 39							
Unit 4, JBH 42							
Unit 5, JBH 32							
Unit 6, JBH 46							
Unit 6, JBH 48							
Unit 6, JBH 52							
Unit 6, JBH 54							
Unit 6, JBH 61							
Unit 7, JBH 45							
Unit 7, JBH 50							
Unit 7, JBH 56							
Unit 8, JBH 43							
Unit 8, JBH 49							

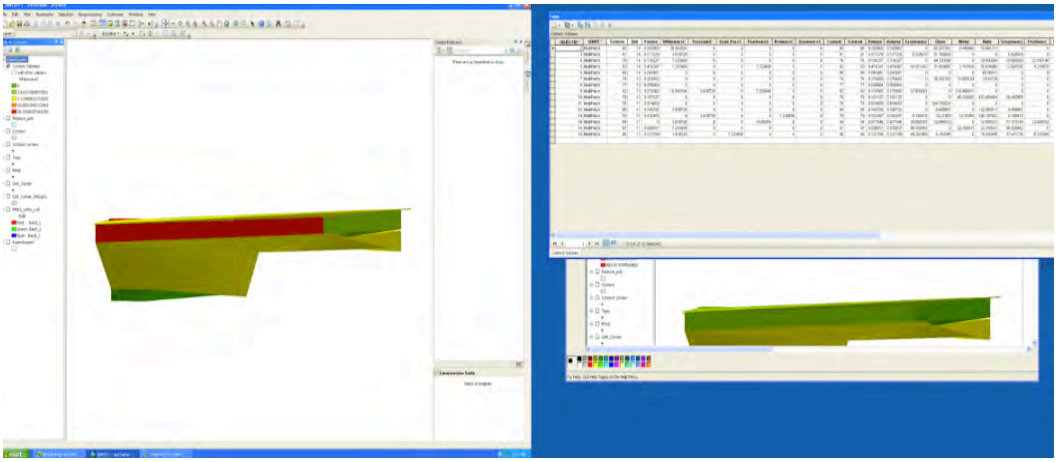
Next, I calculated ratios of the sherds found from 2008-2011. Because this is the first year that GIS mapping has occurred, no volumetric diagrams are in existence for the 2008-2010 excavation years. This meant that calculating context volumes in order to obtain density measurements for each ceramic type would have been incredibly difficult. Instead, therefore, I compared each specific type of ceramic to the total number of ceramics found in the context.

[4] See Historical Archaeology at the Florida Museum of Natural History's website (http://www.flmnh.ufl. edu/ histarch/gallery_types/type_list.asp) for helpful information on the differences between ceramic types.

This yielded a more realistic way to compare the raw sherd count data I had collected, based off comparative percentages found within each context, rather than sheer amounts. Each set of data (and resulting graph) tells how much of a certain type of ceramics was disposed of in comparison to all the other ceramics that were also found in the same context. Though this gives no indication of volume or size of the context, it does establish proportions amongst the types of ceramics within specific contexts, which can be indicative of deposition rates and, therefore, of daily use patterns. For this, I used following equation:

(Number of Specific Ceramic Sherds) / (Total Number of Sherds found in Context)

I then compared the GIS density measurements for each type of ceramic within each unit. Below is an example of a screenshot from Brownstein's work.[5] The left side of the screen shows the 3D volumetric representation of a given unit; the contexts are separated by color. The right side provides a chart with the volume (m^3) for each context, as well as the density of each type of ceramic within each context.



The values listed for each type of ceramic are the densities, aka how many of a particular ceramic per m^3. This facilitates a more equal (and accurate!) method of comparison between the amounts and types of ceramic sherds found in each context, each unit, and across the entire lawn.

[5] See Brownstein 2011.

Finally, I tried to compare types and percentage-amounts of ceramics found in JBH 65 and JBH 73 to those found in JBH 74 and 77, and JBH 82, respectively. These contexts were established as being linked in East's stratigraphic analysis of the site.[6] This connection suggests that they might have similar ceramic ratios.

Data

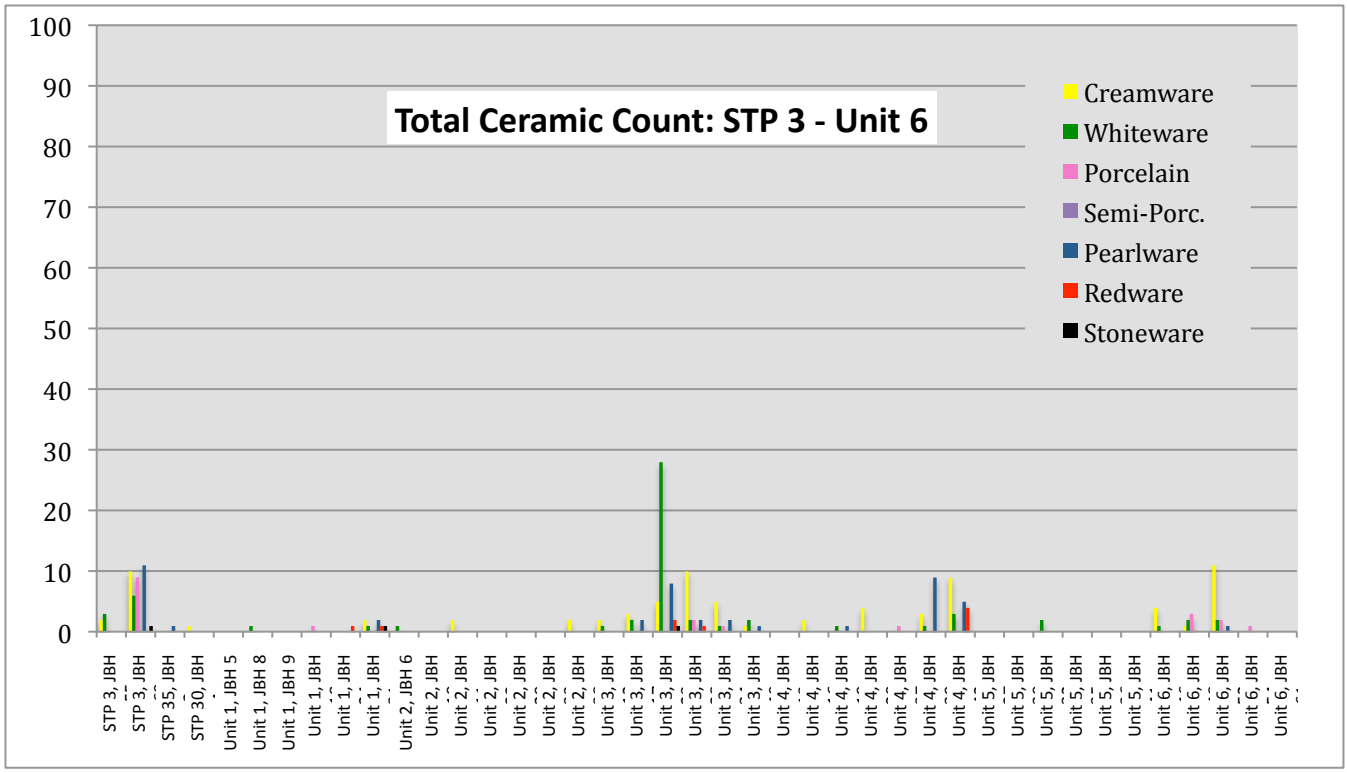
Raw sherd count for each context, grouped by unit or shovel-test pit:[7]

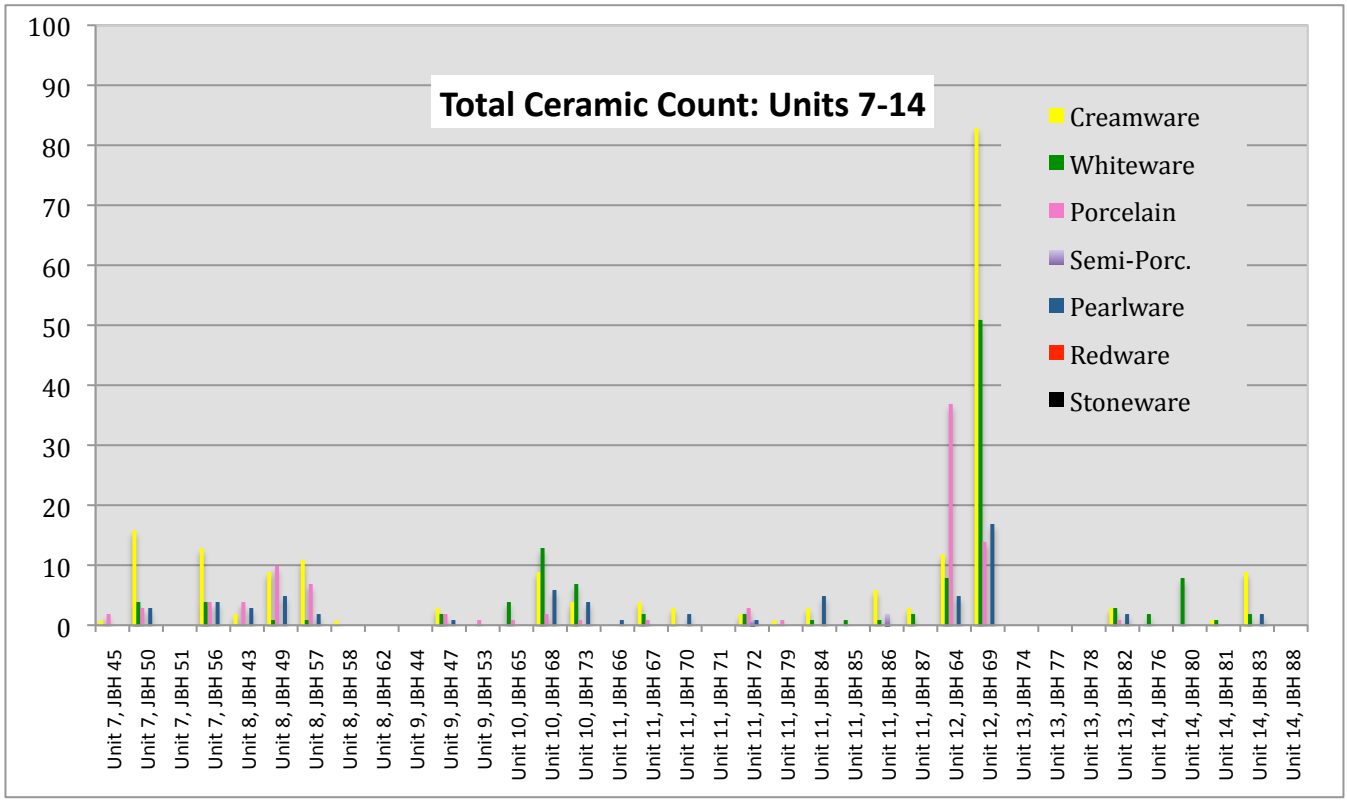
	Creamware	Whiteware	Porcelain	Semi-Porc.	Pearlware	Redware	Stoneware
STP 3, JBH 55	2	3	0	0	0	0	0
STP 3, JBH 60	10	6	9	0	11	0	1
STP 35, JBH 2	0	0	0	0	1	0	0
STP 30, JBH 4	1	0	0	0	0	0	0
Unit 1, JBH 5	0	0	0	0	0	0	0
Unit 1, JBH 8	0	1	0	0	0	0	0
Unit 1, JBH 9	0	0	0	0	0	0	0
Unit 1, JBH 18	0	0	1	0	0	0	0
Unit 1, JBH 24	0	0	0	0	0	1	0
Unit 1, JBH 31	2	1	0	0	2	1	1
Unit 2, JBH 6	0	1	0	0	0	0	0
Unit 2, JBH 10	0	0	0	0	0	0	0
Unit 2, JBH 11	2	0	0	0	0	0	0
Unit 2, JBH 22	0	0	0	0	0	0	0
Unit 2, JBH 29	0	0	0	0	0	0	0
Unit 2, JBH 33	0	0	0	0	0	0	0
Unit 2, JBH 38	2	0	0	0	0	0	0
Unit 3, JBH 12	2	1	0	0	0	0	0
Unit 3, JBH 17	3	2	0	0	2	0	0
Unit 3, JBH 23	5	28	0	0	8	2	1
Unit 3, JBH 28	10	2	2	0	2	1	0
Unit 3, JBH 34	5	1	1	0	2	0	0
Unit 3, JBH 40	1	2	0	0	1	0	0
Unit 4, JBH 13	0	0	0	0	0	0	0
Unit 4, JBH 16	2	0	0	0	0	0	0
Unit 4, JBH 19	0	1	0	0	1	0	0
Unit 4, JBH 20	4	0	0	0	0	0	0
Unit 4, JBH 37	0	0	1	0	0	0	0
Unit 4, JBH 39	3	1	0	0	9	0	0

[6] See East 2011.

[7] For reference, STP 3 is from 2009, STP W'30 and STP W'35 are from 2008, Units 1-5 are from 2008, Units 6-9 are from 2009, Units 10 & 12 are from 2010, Units 13-14 are from 2011, and Unit 11 is from 2010-2011.

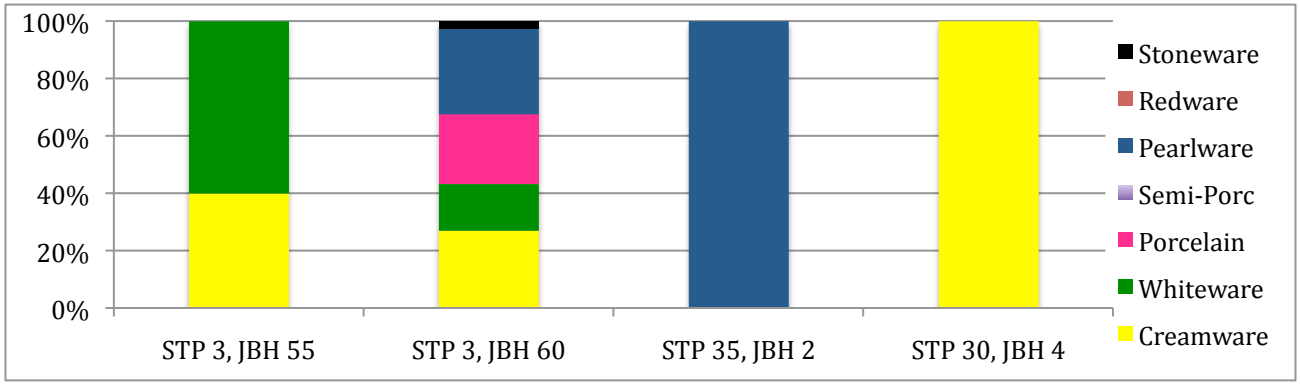
Unit 4, JBH 42	9	3	0	0	5	4	0
Unit 5, JBH 27	0	0	0	0	0	0	0
Unit 5, JBH 30	0	0	0	0	0	0	0
Unit 5, JBH 32	0	2	0	0	0	0	0
Unit 5, JBH 35	0	0	0	0	0	0	0
Unit 5, JBH 36	0	0	0	0	0	0	0
Unit 5, JBH 41	0	0	0	0	0	0	0
Unit 6, JBH 46	4	1	0	0	0	0	0
Unit 6, JBH 48	1	2	3	0	0	0	0
Unit 6, JBH 52	11	2	2	0	1	0	0
Unit 6, JBH 54	0	0	1	0	0	0	0
Unit 6, JBH 61	0	0	0	0	0	0	0
Unit 7, JBH 45	1	0	2	0	0	0	0
Unit 7, JBH 50	16	4	3	0	3	0	0
Unit 7, JBH 51	0	0	0	0	0	0	0
Unit 7, JBH 56	13	4	4	0	4	0	0
Unit 8, JBH 43	2	0	4	0	3	0	0
Unit 8, JBH 49	9	1	10	0	5	0	0
Unit 8, JBH 57	11	1	7	0	2	0	0
Unit 8, JBH 58	1	0	0	0	0	0	0
Unit 8, JBH 62	0	0	0	0	0	0	0
Unit 9, JBH 44	0	0	0	0	0	0	0
Unit 9, JBH 47	3	2	2	0	1	0	0
Unit 9, JBH 53	0	0	1	0	0	0	0
Unit 10, JBH 65	0	4	1	0	0	0	0
Unit 10, JBH 68	9	13	2	0	6	0	0
Unit 10, JBH 73	4	7	1	0	4	0	0
Unit 11, JBH 66	0	0	0	0	1	0	0
Unit 11, JBH 67	4	2	1	0	0	0	0
Unit 11, JBH 70	3	0	0	0	2	0	0
Unit 11, JBH 71	0	0	0	0	0	0	0
Unit 11, JBH 72	2	2	3	1	1	0	0
Unit 11, JBH 79	1	0	1	0	0	0	0
Unit 11, JBH 84	3	1	0	0	5	0	0
Unit 11, JBH 85	0	1	0	0	0	0	0
Unit 11, JBH 86	6	1	0	2	0	0	0
Unit 11, JBH 87	3	2	0	0	0	0	0
Unit 12, JBH 64	12	8	37	0	5	0	0
Unit 12, JBH 69	83	51	14	0	17	0	0
Unit 13, JBH 74	0	0	0	0	0	0	0
Unit 13, JBH 77	0	0	0	0	0	0	0
Unit 13, JBH 78	0	0	0	0	0	0	0
Unit 13, JBH 82	3	3	1	0	2	0	0
Unit 14, JBH 76	0	2	0	0	0	0	0
Unit 14, JBH 80	0	8	0	0	0	0	0
Unit 14, JBH 81	1	1	0	0	0	0	0
Unit 14, JBH 83	9	2	0	0	2	0	0
Unit 14, JBH 88	0	0	0	0	0	0	0


Total Ceramic Count: STP 3 - Unit 6
Creamware
Whiteware
Porcelain
Semi-Porc.
Pearlware
Redware
Stoneware
100
90
80
70
60
50
40
30
20
10
0


Total Ceramic Count: Units 7-14
Creamware
Whiteware
Porcelain
Semi-Porc.
Pearlware
Redware
Stoneware
100
90
80
70
60
50
40
30
20
10
0
Unit 7, JBH 45
Unit 7, JBH 50
Unit 7, JBH 51
Unit 7, JBH 56
Unit 8, JBH 43
Unit 8, JBH 49
Unit 8, JBH 57
Unit 8, JBH 58
Unit 8, JBH 62
Unit 9, JBH 44
Unit 9, JBH 47
Unit 9, JBH 53
Unit 10, JBH 65
Unit 10, JBH 68
Unit 10, JBH 73
Unit 11, JBH 66
Unit 11, JBH 67
Unit 11, JBH 70
Unit 11, JBH 71
Unit 11, JBH 72
Unit 11, JBH 79
Unit 11, JBH 84
Unit 11, JBH 85
Unit 11, JBH 86
Unit 11, JBH 87
Unit 12, JBH 64
Unit 12, JBH 69
Unit 13, JBH 74
Unit 13, JBH 77
Unit 13, JBH 78
Unit 13, JBH 82
Unit 14, JBH 76
Unit 14, JBH 80
Unit 14, JBH 81
Unit 14, JBH 83
Unit 14, JBH 88

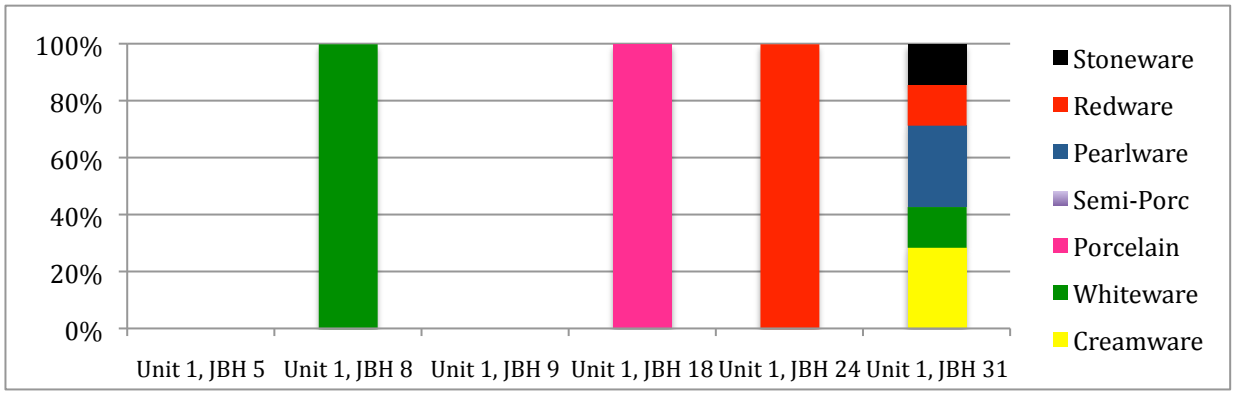
Ceramic occurrence ratios per context:[8]

STP Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
STP 3, JBH 55	0.4	0.6	0	0	0	0	0
STP 3, JBH 60	0.27027	0.162162	0.243243	0	0.297297	0	0.027027
STP 35, JBH 2	0	0	0	0	1	0	0
STP 30, JBH 4	1	0	0	0	0	0	0

Unit 1 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 1, JBH 5	0	0	0	0	0	0	0
Unit 1, JBH 8	0	1	0	0	0	0	0
Unit 1, JBH 9	0	0	0	0	0	0	0
Unit 1, JBH 18	0	0	1	0	0	0	0
Unit 1, JBH 24	0	0	0	0	0	1	0
Unit 1, JBH 31	0.285714	0.142857	0	0	0.285714	0.142857	0.142857

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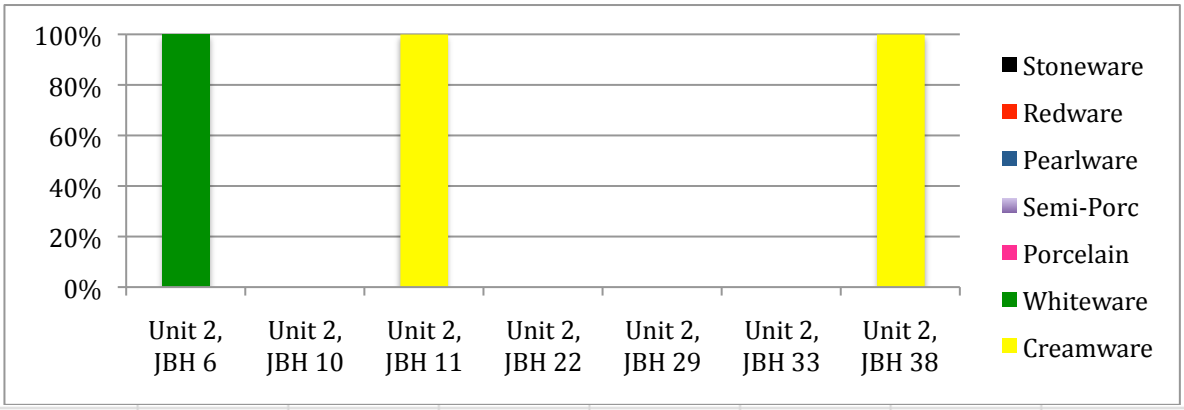
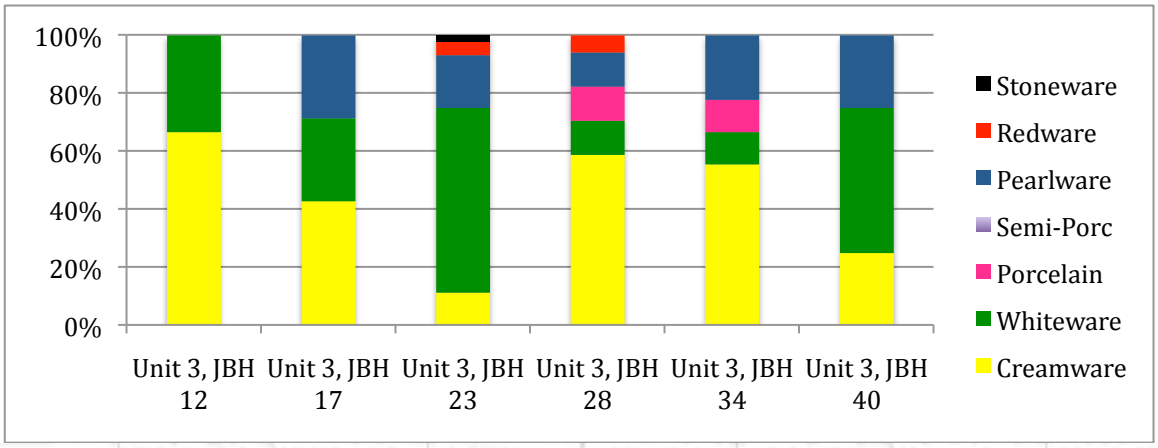
[8] A very special thanks to Ben LeVeque, ’13, who helped me by writing a Sage program to efficiently calculate the ratio data presented in my charts below. This would have been doable by hand, but this program expedited the process considerably.

Unit 2 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



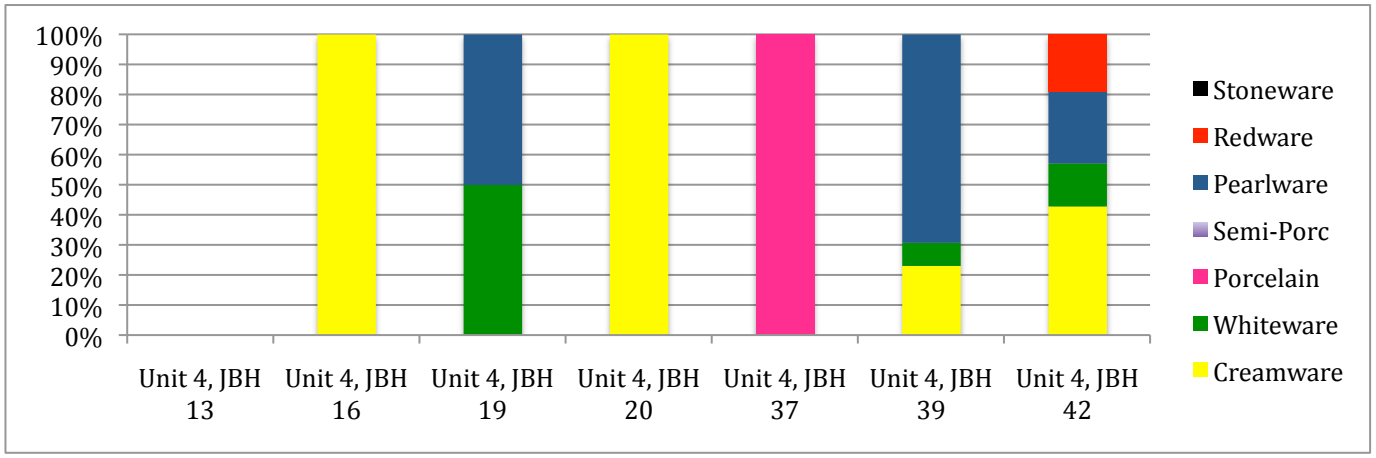
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 2, JBH 6	0	1	0	0	0	0	0
Unit 2, JBH 10	0	0	0	0	0	0	0
Unit 2, JBH 11	1	0	0	0	0	0	0
Unit 2, JBH 22	0	0	0	0	0	0	0
Unit 2, JBH 29	0	0	0	0	0	0	0
Unit 2, JBH 33	0	0	0	0	0	0	0
Unit 2, JBH 38	1	0	0	0	0	0	0

Unit 3 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



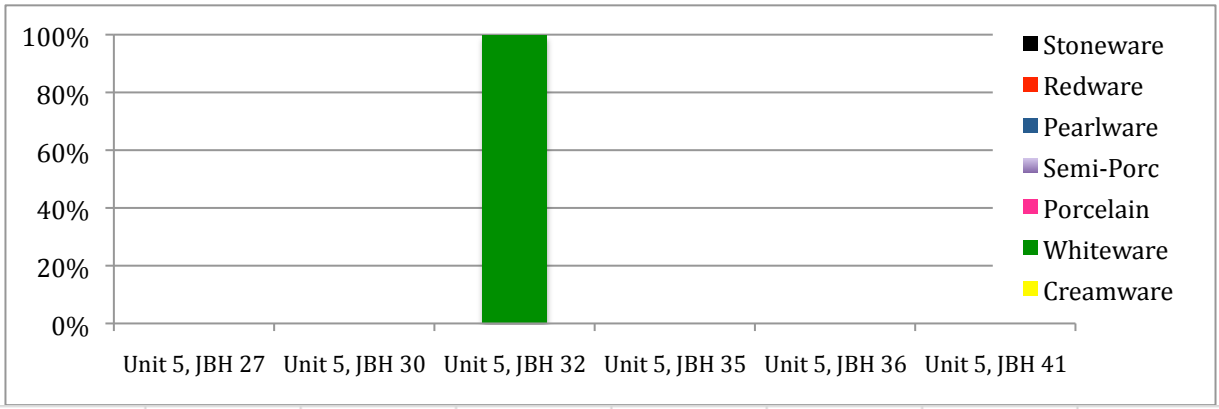
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 3, JBH 12	0.666666	0.333333	0	0	0	0	0
Unit 3, JBH 17	0.428571	0.285714	0	0	0.285714	0	0
Unit 3, JBH 23	0.113636	0.636363	0	0	0.181818	0.045454	0.022727
Unit 3, JBH 28	0.588235	0.117647	0.117647	0	0.117647	0.058823	0
Unit 3, JBH 34	0.555555	0.111111	0.111111	0	0.222222	0	0
Unit 3, JBH 40	0.25	0.5	0	0	0.25	0	0

Unit 4 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



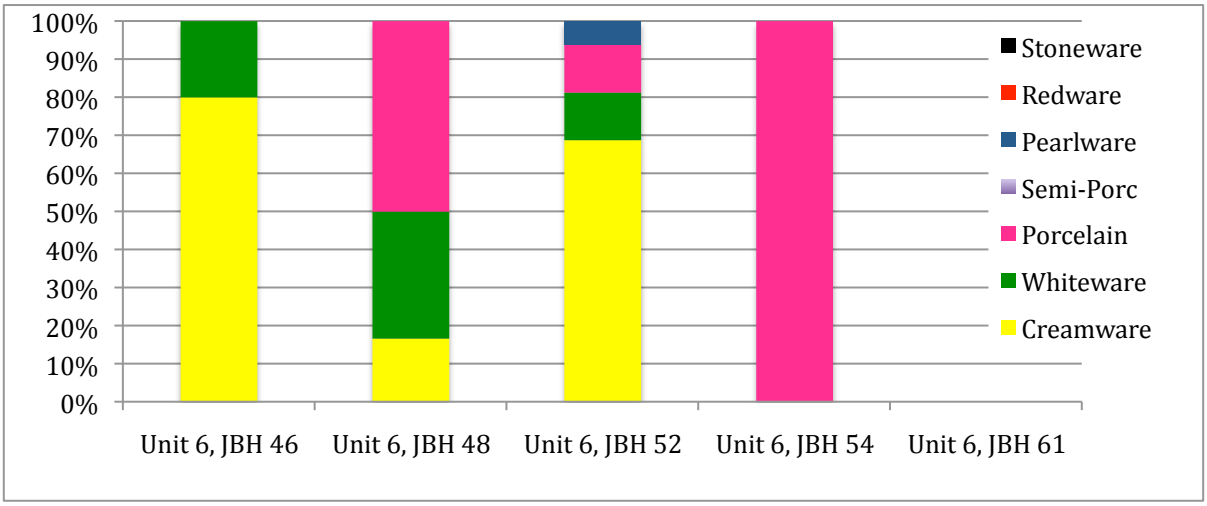
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 4, JBH 13	0	0	0	0	0	0	0
Unit 4, JBH 16	1	0	0	0	0	0	0
Unit 4, JBH 19	0	0.5	0	0	0.5	0	0
Unit 4, JBH 20	1	0	0	0	0	0	0
Unit 4, JBH 37	0	0	1	0	0	0	0
Unit 4, JBH 39	0.230769	0.076923	0	0	0.692307	0	0
Unit 4, JBH 42	0.428571	0.142857	0	0	0.238095	0.190476	0

Unit 5 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



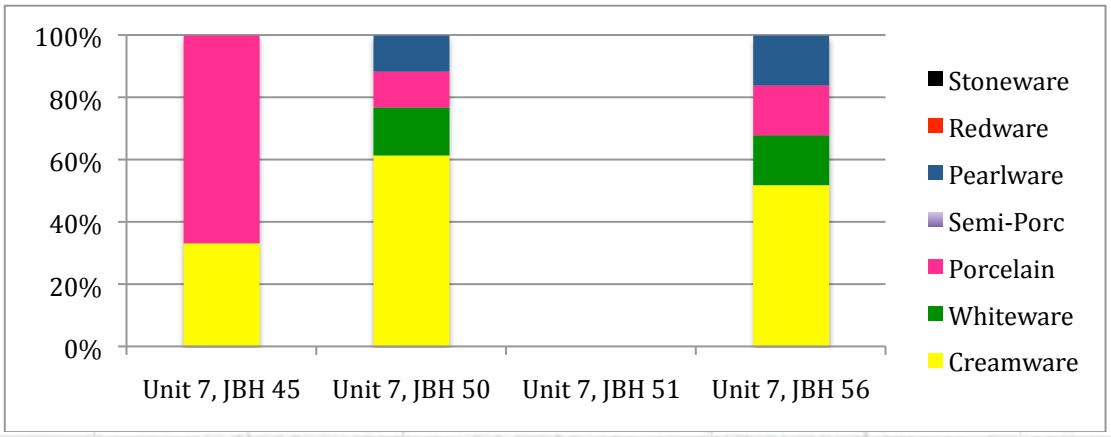
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 5, JBH 27	0	0	0	0	0	0	0
Unit 5, JBH 30	0	0	0	0	0	0	0
Unit 5, JBH 32	0	1	0	0	0	0	0
Unit 5, JBH 35	0	0	0	0	0	0	0
Unit 5, JBH 36	0	0	0	0	0	0	0
Unit 5, JBH 41	0	0	0	0	0	0	0

Unit 6 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 6, JBH 46	0.8	0.2	0	0	0	0	0
Unit 6, JBH 48	0.166666	0.333333	0.5	0	0	0	0
Unit 6, JBH 52	0.6875	0.125	0.125	0	0.0625	0	0
Unit 6, JBH 54	0	0	1	0	0	0	0
Unit 6, JBH 61	0	0	0	0	0	0	0

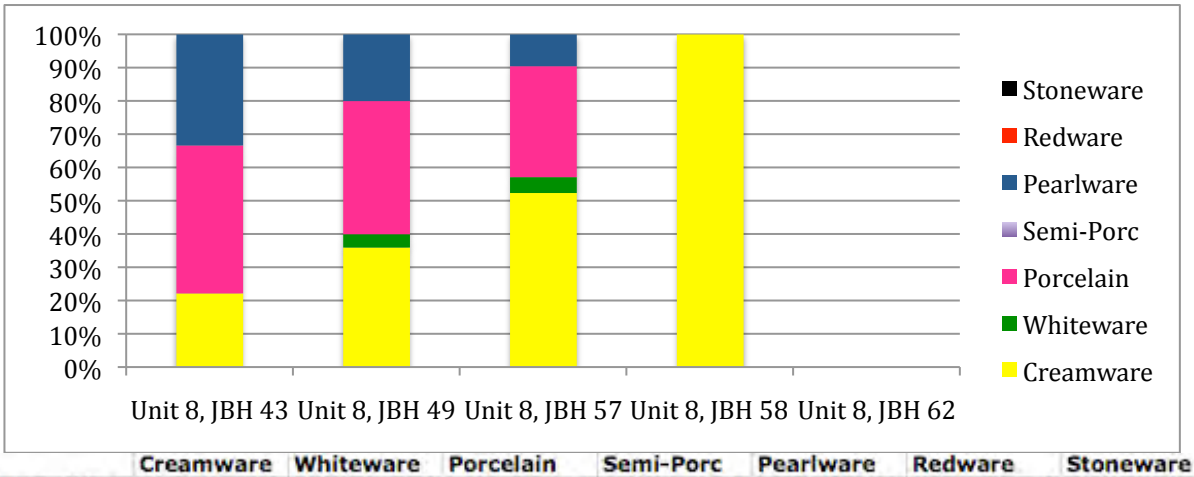
Unit 7 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)[9]



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 7, JBH 45	0.333333	0	0.666666	0	0	0	0
Unit 7, JBH 50	0.615384	0.153846	0.115384	0	0.115384	0	0
Unit 7, JBH 51	0	0	0	0	0	0	0
Unit 7, JBH 56	0.52	0.16	0.16	0	0.16	0	0

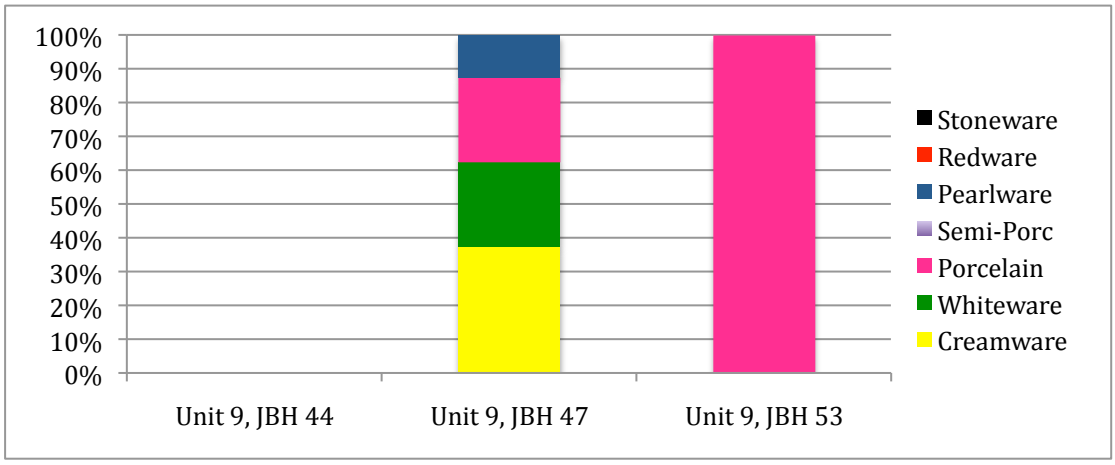
[9] Unit 7 (2009) become Unit 11 in 2010 and 2011. Therefore, the data from Unit 7 presented above is later repeated in the full chart for Unit 11.

Unit 8 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



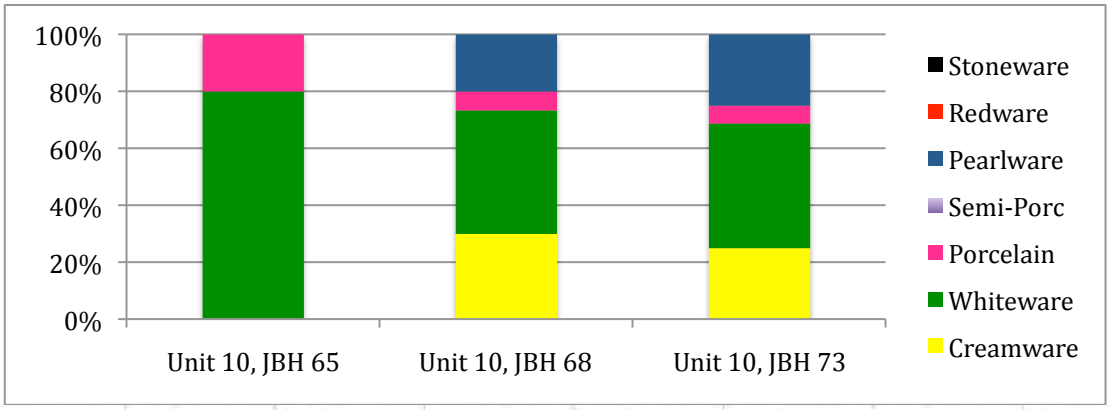
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 8, JBH 43	0.222222	0	0.444444	0	0.333333	0	0
Unit 8, JBH 49	0.36	0.04	0.4	0	0.2	0	0
Unit 8, JBH 57	0.523809	0.047619	0.333333	0	0.095238	0	0
Unit 8, JBH 58	1	0	0	0	0	0	0
Unit 8, JBH 62	0	0	0	0	0	0	0

Unit 9 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



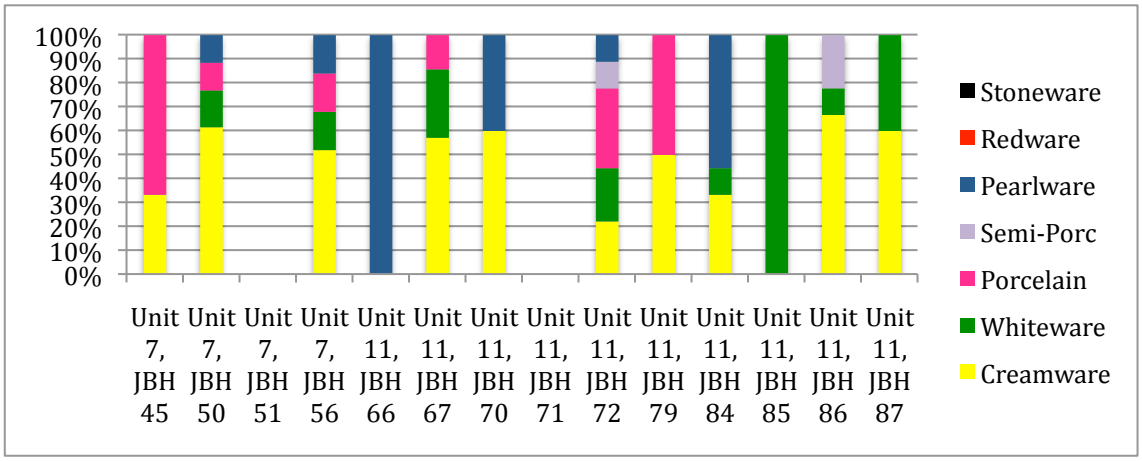
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 9, JBH 44	0	0	0	0	0	0	0
Unit 9, JBH 47	0.375	0.25	0.25	0	0.125	0	0
Unit 9, JBH 53	0	0	1	0	0	0	0

Unit 10 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



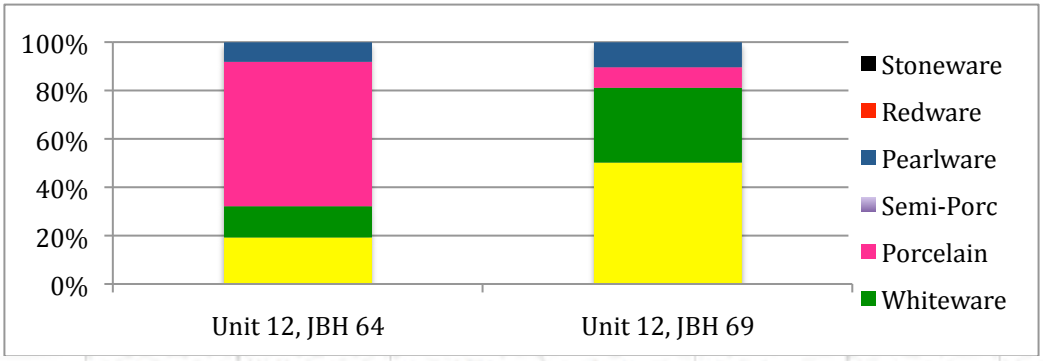
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 10, JBH 65	0	0.8	0.2	0	0	0	0
Unit 10, JBH 68	0.3	0.433333	0.066666	0	0.2	0	0
Unit 10, JBH 73	0.25	0.4375	0.0625	0	0.25	0	0

Unit 11 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



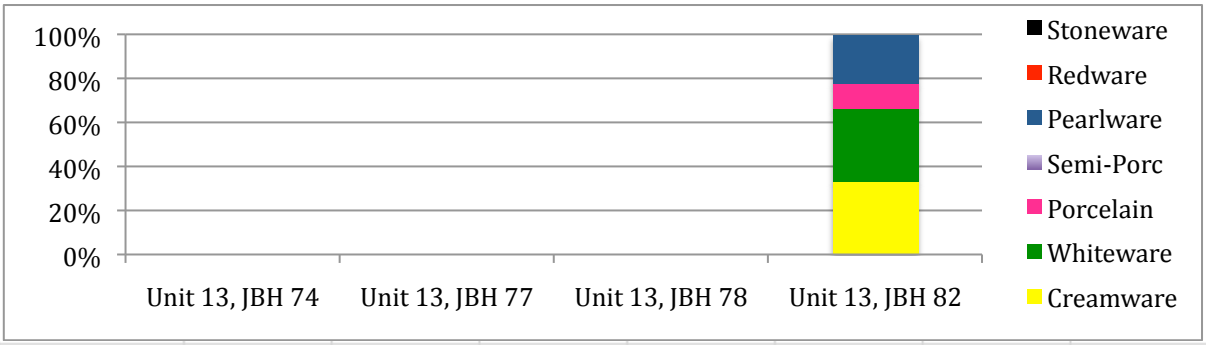
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 7, JBH 45	0.333333	0	0.666666	0	0	0	0
Unit 7, JBH 50	0.615384	0.153846	0.115384	0	0.115384	0	0
Unit 7, JBH 51	0	0	0	0	0	0	0
Unit 7, JBH 56	0.52	0.16	0.16	0	0.16	0	0
Unit 11, JBH 66	0	0	0	0	1	0	0
Unit 11, JBH 67	0.571428	0.285714	0.142857	0	0	0	0
Unit 11, JBH 70	0.6	0	0	0	0.4	0	0
Unit 11, JBH 71	0	0	0	0	0	0	0
Unit 11, JBH 72	0.222222	0.222222	0.333333	0.111111	0.111111	0	0
Unit 11, JBH 79	0.5	0	0.5	0	0	0	0
Unit 11, JBH 84	0.333333	0.111111	0	0	0.555555	0	0
Unit 11, JBH 85	0	1	0	0	0	0	0
Unit 11, JBH 86	0.666666	0.111111	0	0.222222	0	0	0
Unit 11, JBH 87	0.6	0.4	0	0	0	0	0

Unit 12 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



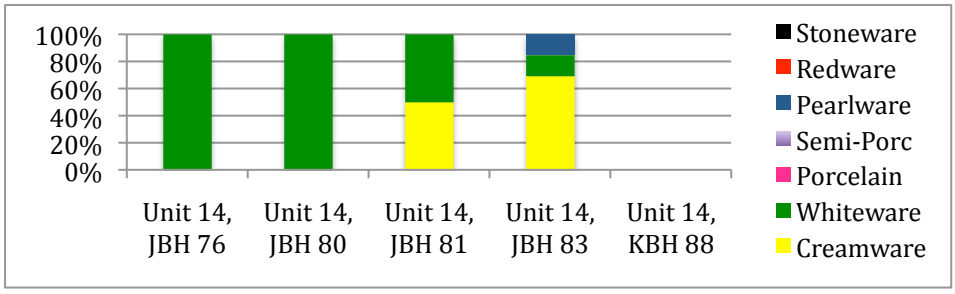
	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 12, JBH 64	0.193548	0.129032	0.596774	0	0.080645	0	0
Unit 12, JBH 69	0.50303	0.30909	0.084848	0	0.10303	0	0

Unit 13 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 13, JBH 74	0	0	0	0	0	0	0
Unit 13, JBH 77	0	0	0	0	0	0	0
Unit 13, JBH 78	0	0	0	0	0	0	0
Unit 13, JBH 82	0.333333	0.333333	0.111111	0	0.222222	0	0

Unit 14 Ratios (# of Specific Ceramics/Total Number of Ceramics Found in Context)



	Creamware	Whiteware	Porcelain	Semi-Porc	Pearlware	Redware	Stoneware
Unit 14, JBH 76	0	1	0	0	0	0	0
Unit 14, JBH 80	0	1	0	0	0	0	0
Unit 14, JBH 81	0.5	0.5	0	0	0	0	0
Unit 14, JBH 83	0.692307	0.153846	0	0	0.153846	0	0
Unit 14, KBH 88	0	0	0	0	0	0	0

Volumetrics and densities by ceramic types from JBH 2011 Excavations.[10]

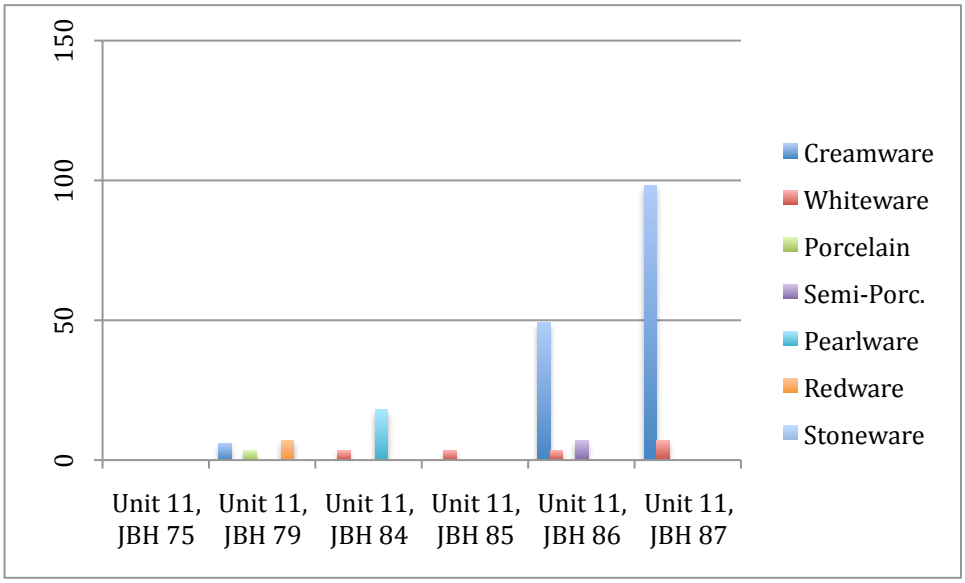
Context	Unit	Volume	Creamware	WhitewareC	PorcelainC	Semi_PorcC	PearlwareC	RedwareC	StonewareC
80	14	0.183903	0	28.933825	0	0	0	0	0
81	14	0.117279	8.526676	3.616728	0	0	0	0	0
76	14	0.134227	0	7.233456	0	0	0	0	0
83	14	0.474397	18.971452	7.233456	0	0	7.233456	0	0
88	14	0.045481	0	0	0	0	0	0	0
74	13	0.276483	0	0	0	0	0	0	0
77	13	0.009064	0	0	0	0	0	0	0
82	13	0.170365	17.609251	10.850184	3.616728	0	7.233456	0	0
78	13	0.151127	0	0	0	0	0	0	0
75	11	0.014653	0	0	0	0	0	0	0
85	11	0.105725	0	3.616728	0	0	0	0	0
79	11	0.162475	6.155475	0	3.616728	0	0	7.233456	0
84	11	0	38.686597	3.616728	0	0	18.08364	0	0
87	11	0.030517	98.305862	7.233456	0	0	0	0	0
86	11	0.121799	49.261488	3.616728	0	7.233456	0	0	0

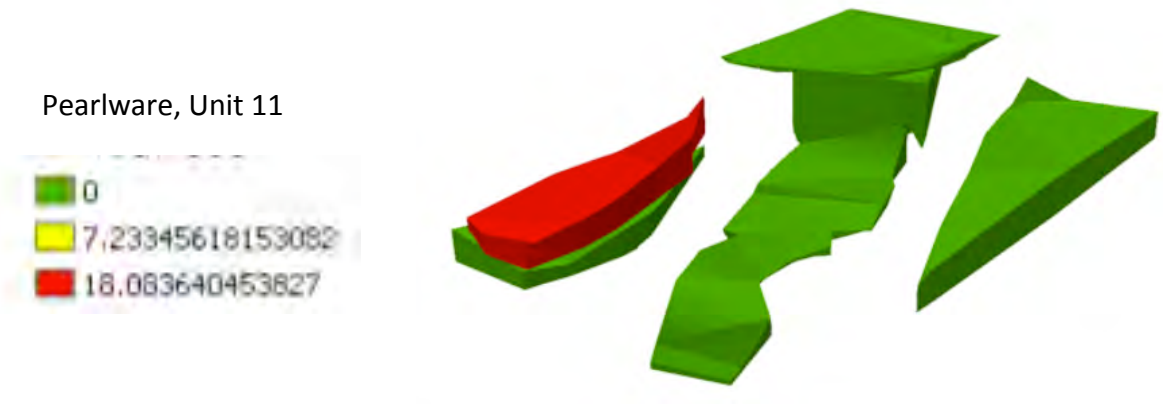
All density calculations are measured in (# of ceramics)/(m^3).

[10] Thanks again to Ian Brownstein (see Brownstein 2011) for calculating the volumes and densities for each context.

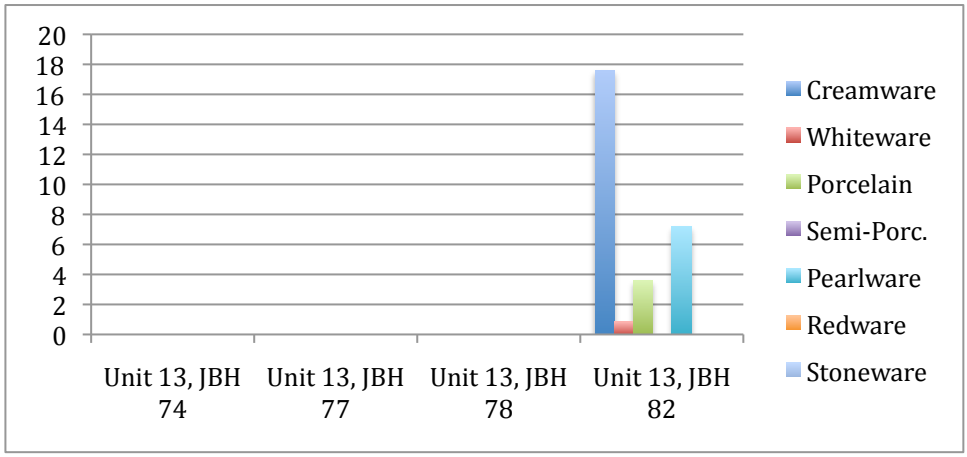
Unit 11 – Density Graphs and Examples of GIS Context Diagrams by Ceramic Type

Note the spaces in the diagrams from the two walls excavated in Unit 11. Many of the ceramics found are thought to have been refuse from when the areas between and the around the two walls were filled in.

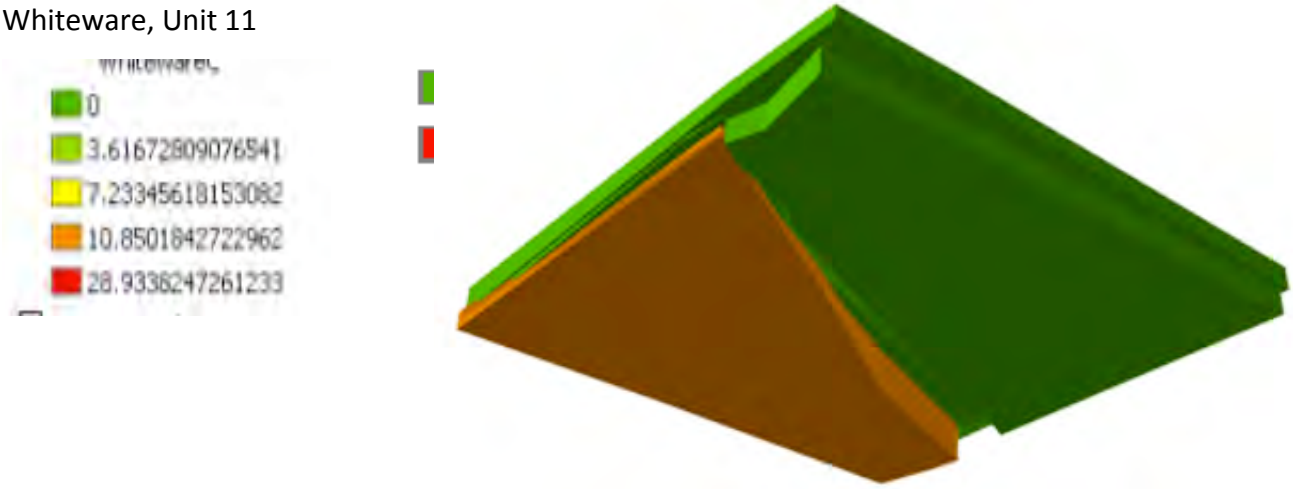


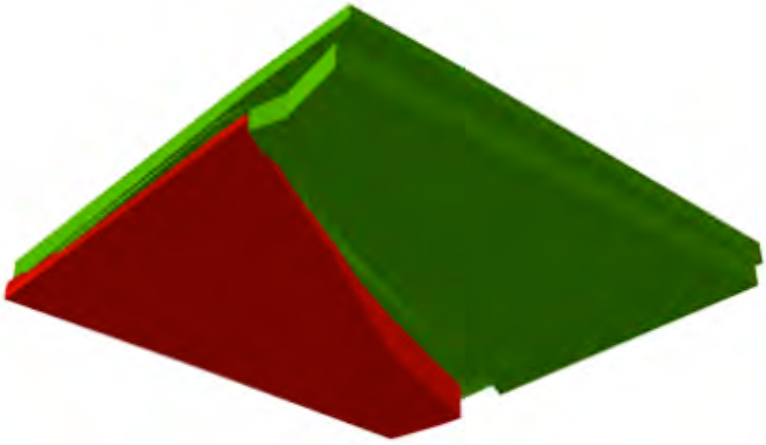


Unit 13 – Density Graphs and Examples of GIS Context Diagrams by Ceramic Type

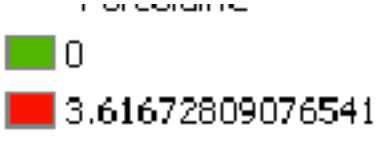


Whiteware, Unit 11

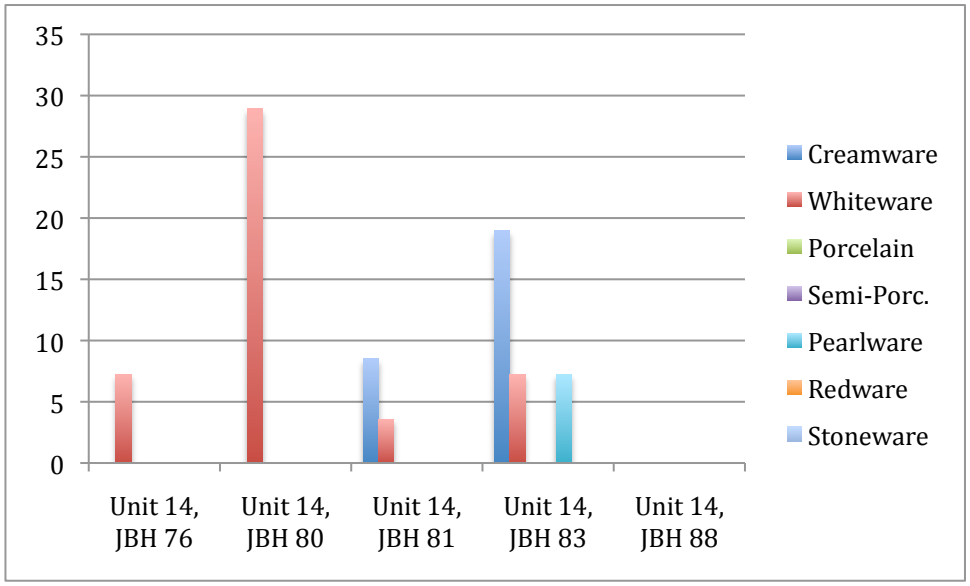




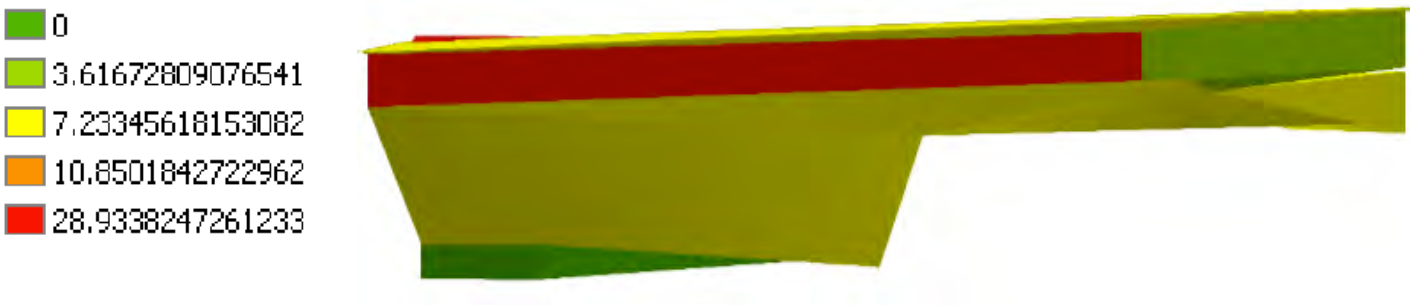
Porcelain, Unit 11



Unit 14 – Density Graphs and Examples of GIS Context Diagrams by Ceramic Type

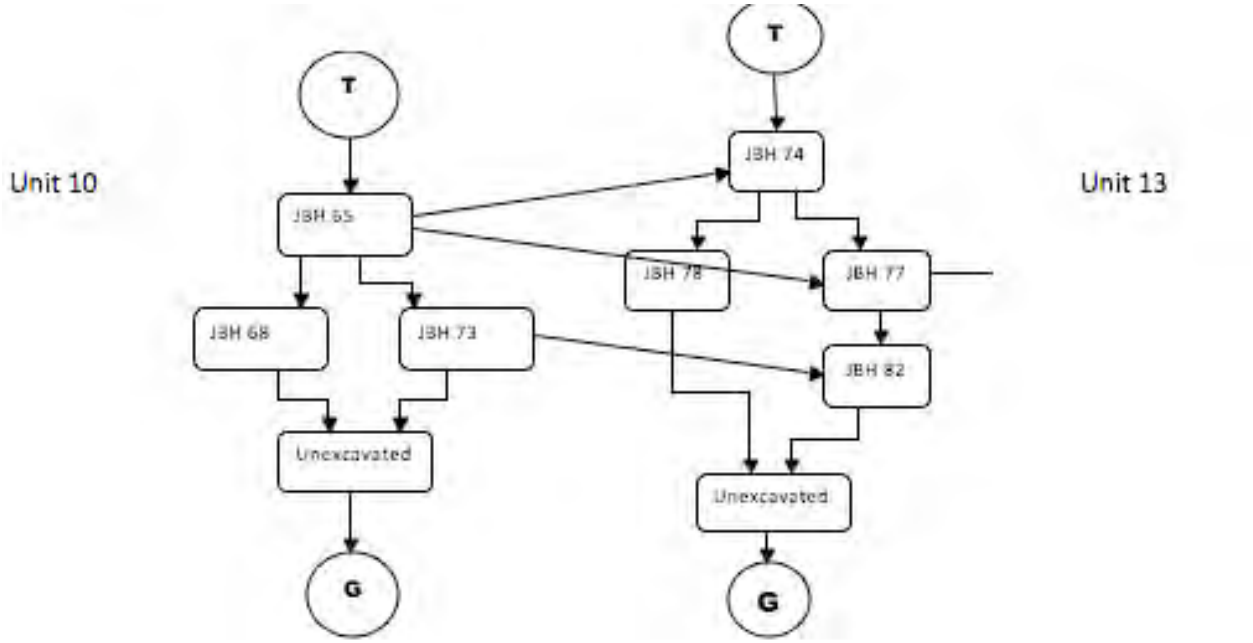


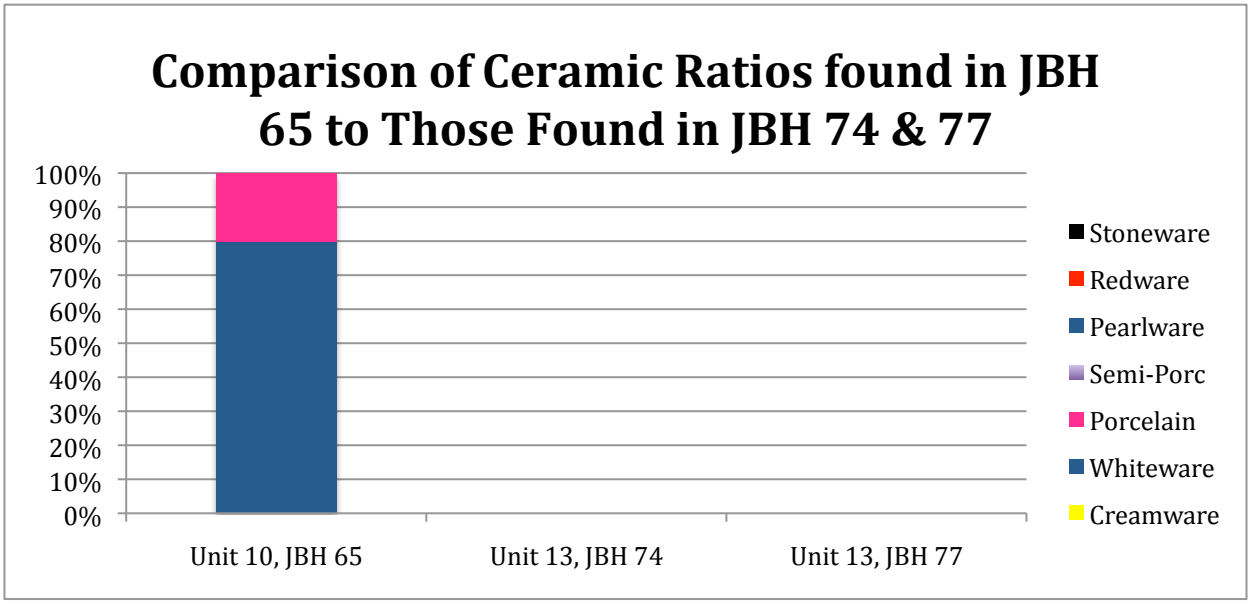
Whiteware, Unit 14



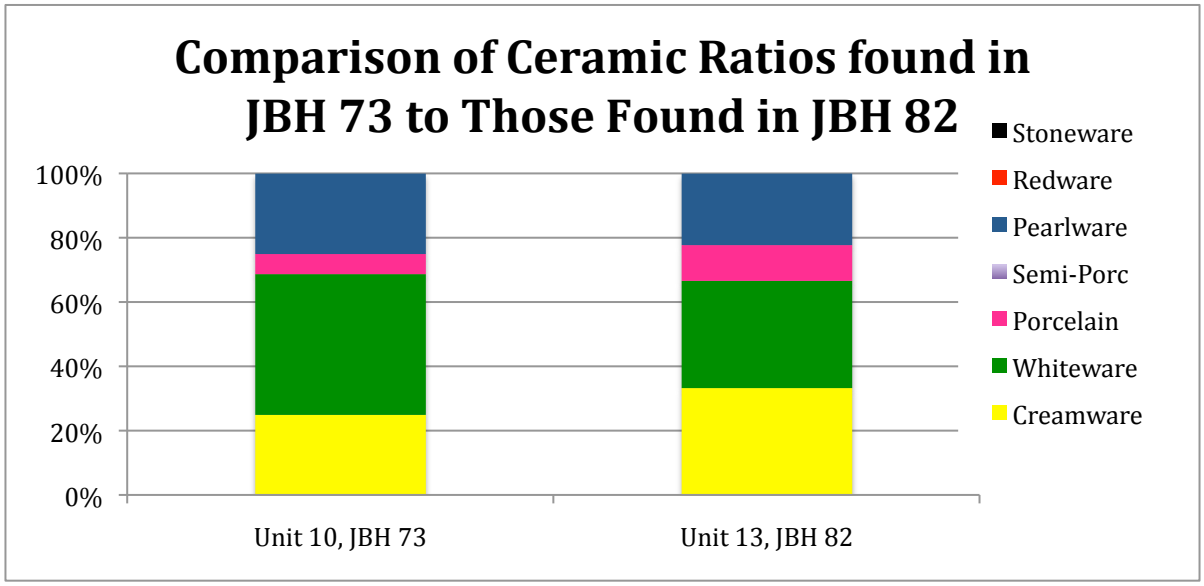
Pearlware, Unit 14

Linked Stratigraphy[11]





[11] See East 2011.



Analysis and Conclusions

This basic cataloging and comparison effort demonstrates the variety of ceramics that were used by inhabitants of the John Brown House over the years, as well as some basic trends in the use and prevalence of those ceramics. There is, indeed, a wealth of information that can be gleaned from these ceramic sherds, including further, more comprehensive and in-depth work on dating that goes beyond the general date conclusions reached in past unit summaries.[12] Similarly, further ceramic sherd studies, building upon the data I have recorded and analyzed here, could work to differentiate between sherds of a specific type that varied in style and design (i.e. red-patterned whiteware v. blue-patterned whiteware found in the same context). I was not able to account for such distinctions in this initial cataloging attempt, though recognizing and accounting for differentiation would inevitably lead to better dating and understanding of societal

[12] Due to the enormous nature of this task, I did not attempt to date the ceramic sherds or to use the ceramic sherds as a specific means of dating contexts. This would be an ambitious, though potentially rewarding, task for a further student. Additionally, see JBH Excavation Reports 2008-2011 for previously established TPQs for each context

lifestyles, and therefore to finer site interpretations. With enough analysis, one might even be able to link ceramic sherd assemblages to household cycles, as suggested by Groover.[13]

While such in-depth analysis would surely yield valuable information on the specifics of the site, equally interesting, if more general, conclusions can be drawn from the data presented above. One basic trend noticed throughout the Ratio graphs from 2008-2011 is that generally there is an increase in the percentage of creamware as the contexts become lower. Furthermore, overall, there is a larger amount of creamware sherds found in general. Pulling these four graphs (below) as examples, once can see the large percentage of creamware sherds (yellow), both in general, and relative to context depth. The graph for Unit 8 (bottom right) is particularly interesting, showing almost a uniform increase in percentage of creamware as the contexts get lower.

Also interesting is that these graphs represent Units from different sections of the lawn (Unit 12, Unit 7/11, Unit 3, and Unit 8). Large numbers of creamware sherds, relative to the total number of ceramics, are found throughout all the portions of the lawn that have been excavated. This is

[13] Mark Groover, "Linking Artifact Assemblages."

also reflected in the GIS density calculations for the 2011 excavation season: high densities of creamware, especially in the deeper contexts. This trend is supported by historical sources. Creamware is the earliest type of ceramic manufactured (1762), and was quite popular until the 1820s, when whiteware became widespread.[14] Creamware was likely used more often than porcelain, because it was cheaper and more easily acquired; porcelain had to be imported from China.[15] Given creamware's almost dispensable nature, it stands to reason that more of these sherds are found today, especially in deeper (i.e. earlier) contexts. Regarding the more expensive ceramics, there not only would have been less of them in general, and therefore less sherds, but these objects probably would have been better taken care of (since they were so expensive), as suggested by Adam's "curation effect."[16] Other trends in the data may appear in the graphs, especially ones that represent trends typical of changing time periods, though it would take further analysis to properly date and compare the different styles of ceramics (e.g. patterns and designs with ceramic type).

Another interesting insight taken from the data concerns the linked stratigraphy. East, comparing soil colors and consistencies in past and present data, had theorized that two sets of contexts were linked.[17] These contexts were in Units in the northern section of the yard (Units 10 and Units 13), and they had been excavated in the 2010 and 2011 seasons. Knowing this, I compared the ratios of ceramic types found, hypothesizing that if the contexts were linked and

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[14] "Creamware, plain," Historical Archaeology at the Florida Museum of Natural History, accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=CREAMWARE,%20PLAIN; "Whiteware, plain," Historical Archaeology at the Florida Museum of Natural History, accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=WHITEWARE,%20PLAIN.

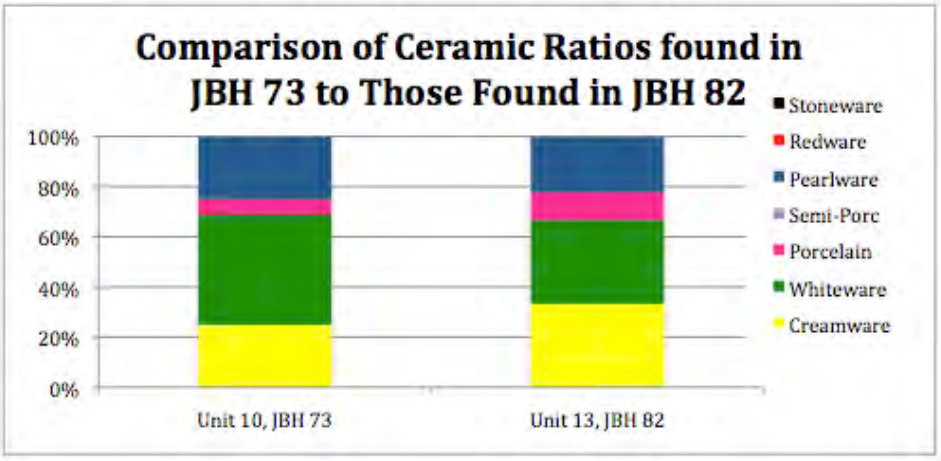
[15] See Sisk, "Object Biographies – Canton Porcelain" (2011).

[16] William Hampton Adams. "Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use, and Disposal of Artifacts," *Historical Archaeology*, 2003, 37(2): 50.

[17] See East 2011.

were also geographically close to each other, the rate of deposition of different types of ceramic (i.e. the ratios) would be similar.

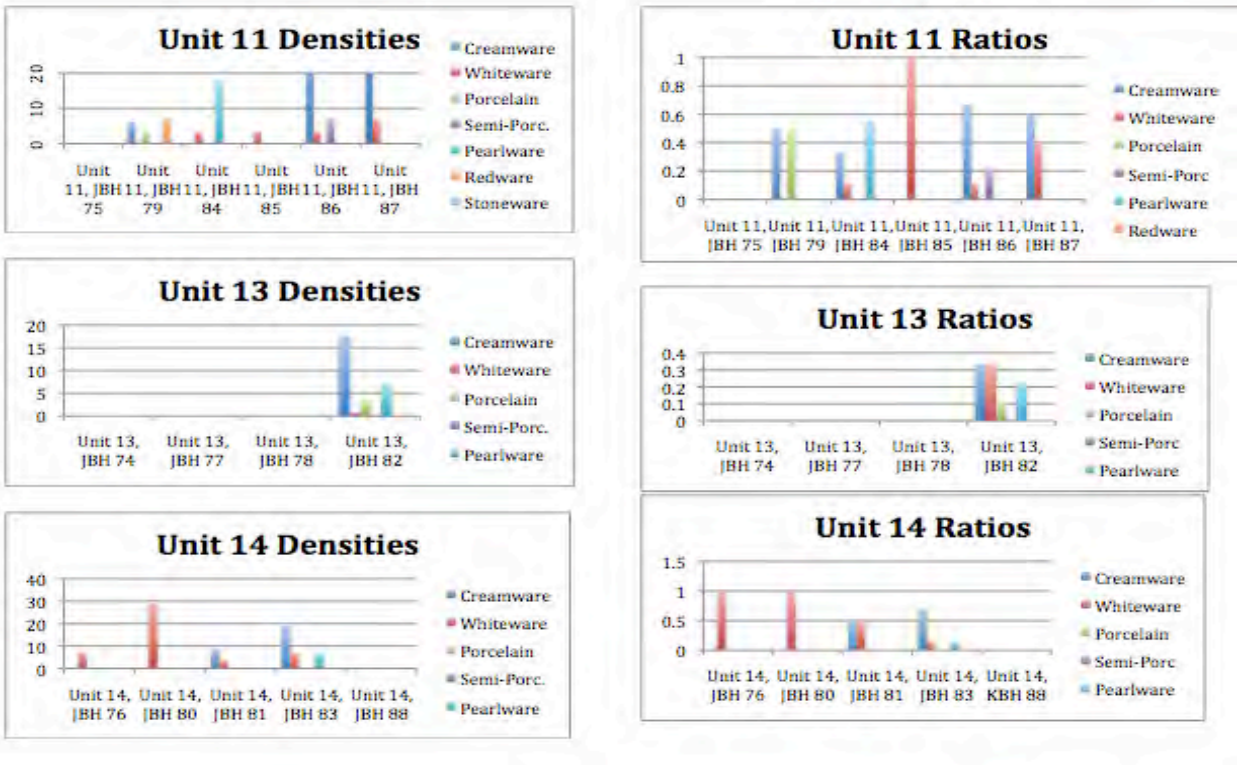
Comparing JBH 65 (Unit 10) to JBH 74 and 77 (Unit 13) did not yield any results as ceramics had not been found in either JBH 74 or JBH 77. However, comparing the ratios of ceramics found in JBH 73 (Unit 10) to those found in JBH 82 gave some very interesting results.



The two sets of ratio data are almost identical, showing the same variety and percentages of ceramic sherds. This initial discovery supports East's theory that the two contexts are linked stratigraphically. Further investigation would need to be conducted before any official conclusions could be drawn. Most notably, the sherds found in each context would need to be analyzed and compared on an individual basis, to see if designs, patterns, and dating were similar (or even if any of them matched up!).

Finally, it is important to understand and evaluate the two methods of analysis I used on the ceramics sherd count raw data: ratio comparisons and density calculations. Ideally, I would have used density calculations through the entire process, as that yields better comparable data than just simple sherd counts alone (taking into account not only the number of sherds, but the size of the context in which they were found). However, since 2011 was the first season when

GIS measurements and calculations were undertaken, I was only able to look at the density results of sherds excavated this year. For the other years, 2008-2010, I decided, with the much-appreciated help of Müge Durusu and Jessica Nowlin, to calculate the proportion of a specific type of ceramic found to the total number of ceramics found in a particular context. In this, the results, again, were more comparable. For example, if two different contexts each have six sherds of creamware, but Context A has a total of 50 ceramic sherds while Context B only has 8, then the presence of creamware in either context suddenly takes on a new meaning or significance. In this way, I essentially measured deposition rates, assuming that the rates and types of ceramics being deposited would be the same, regardless of size.



Looking at the graphs above, it is easy to see that the two tactics yield different results. Both give important information, though it is important that one realizes what exactly each graph is or is not representing. For example, in JBH 85 (Unit 11), an initial glance might conclude that

many sherds of creamware were found. And, while the graph does accurately show that only creamware was found, a comparison with the adjacent density graph shows that the density of creamware found was ultimately quite low, especially considering the densities of other types of ceramics throughout the unit. The ratios may yield interesting comparisons and indicate important relationships between ceramic types (relationships that, given more time and future investigation, could certainly be researched, analyzed and interpreted); however, I believe the density measurements are still the best method of analysis and unit/site comparison, as they best quantify physically what was found in the soil.

The frustrating aspect of this is, of course, that GIS volumetric programming is difficult to do, and, even when done precisely, it does not always have the most accurate results.[18] Ultimately, however, the volumetric results *are* going to be far more accurate (and less tedious to calculate) than what excavators are able to do by hand. The volumetric diagrams are an excellent resource for trying to understand and place objects (e.g. ceramic sherds) in a 3D space. I highly suggest that future ARCH 1900 excavation seasons make use of GIS, so that the most complete sets of data can be recorded and considered. I also recommend that the data recorded, graphed, and preliminarily analyzed here be used in future research. Excellent work has been conducted at the John Brown House these last four seasons, work that should be considered in its entirety and interpreted as a whole. Ceramics were most certainly used in all aspects of life for the inhabitants of the John Brown House, and I am certain there is much more information that can be gleaned from sherd analysis. Ultimately, I present here a catalogue and preliminary analysis of the 2008-2011 sherd remains, with the hopes that a future ARCH 1900 student will build upon my work and reach deeper, richer interpretations and conclusions about the JBH inhabitants.

[18] See Brownstein 2011.

Works Cited

Adams, William Hampton. "Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use, and Disposal of Artifacts." *Historical Archaeology*, 2003, 37(2):38-61

Groover, Mark. "Linking Artifact Assemblages to Household Cycles: An Example from the Gibbs Site," *Historical Archaeology*, 2001, 35(4): 38-57.

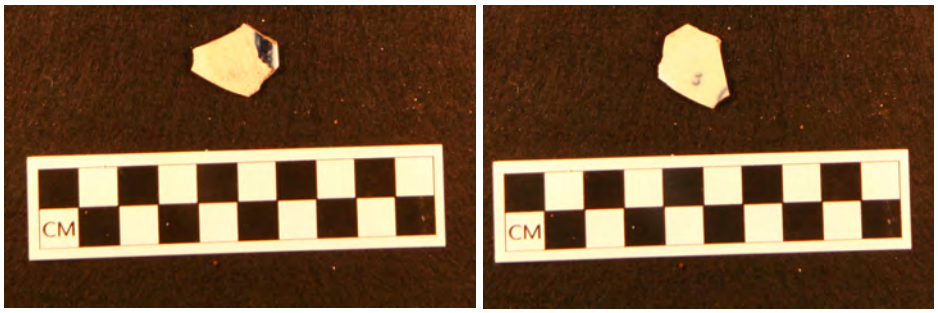
Historical Archaeology at the Florida Museum of Natural History's website, accessed December 11, 2011: http://www.flmnh.ufl.edu/histarch/gallery_types/type_list.asp).

Ryzewski, Krysta, et. al. John Brown House Archaeological Report 2008. Available at http://proteus.brown.edu/archaeologyofcollegehill/Home

Ryzewski, Krysta, et. al. John Brown House Archaeological Report 2009. Available at http://proteus.brown.edu/archaeologyofcollegehill/Home.

Ryzewski, Krysta, et. al. John Brown House Archaeological Report 2010. Available at http://proteus.brown.edu/archaeologyofcollegehill/Home

Pearlware Sherd
Allison Barker



This pearlware pottery sherd was recovered from Unit 11 Context 84. Sherds, also found in Context 84, include 1 sherd of whiteware, 1 sherd of semi-porcelain, and 6 sherds creamware. Overall 28 sherds of pottery where found in Unit 11 this year; only 2 sherds were pearlware. Due to the small size of the pottery sherd, approximatley 2 cm by 2 cm, it is quite hard to distiniguish a pattern. However, there is a notable cc like patern on one side of the surface, and on the other side is a notable dark blue border line potentially.

Pearlware characteristics include a cream colored, soft paste, a pale blue to almost white glaze, a hand-painted underglazed to transfer-printed blues for decoration, thin-like creamware form, and are usually tea, table, kitchen, and toliet wares (Brown 17). Sussman describes pearlware as having a harder and whiter body than creamware and a tinted blue glaze due to the addition of colbat (Steele). Charles Orser describes pearlware as “lead-glazes earthenware” (Orser 466). In essence, pearlware was a deliberate attempt by the British to imitate and create Chinese porcelain through color and decoration.

The contemporary name for pearlware was ‘china glaze’, however Josiah Wedgewood who perfected the pearlware coined his pottery ‘pearl white’ in 1779 (Orser 466). Wedgewood, though credited with the creation of pearlware, implemented the

production style of George Miller, who by 1775 in Staffordshire was already creating 'china glaze'. (Brown 17). This pottery type was created by "white-firing ball clay from Devon and Dorset, and china clay from Cornwall. Calcined flint strengthened the clay body, which was biscuit fired before decoration and glazing. The liquid glaze was bsed upon lead oxide, but had a bluish-grey derived from minute quantities of cobalt and copper" (Orser 466).

This sherd seems to be not handpaint, but instead transfer printed, which would date from 1787 to 1840 (Brown 18). The most simple "surface treatment of pearlware was a plain body to which was applied the blue tinted glaze" (Steele) and this was assigned the production median of 1805. Very little pearlware was plain though, and most were either printed, painted, or molded (Steele). Hume suggest that by 1810 "pearlware had become the common table ware of America" (Steele). Though by 1820, pearlware was on its way out while "whiteware", "stone china" and "ironstone" began making their appearances (Brown 19). Underglazed transfer printed pearlware decoration became popular in blue in the the 1780s. Initially, Chineses landscapes designs became dominant on teawares, and by 1810 botanical and European themes were also becoming popular themes. From the 1820s to the 1840s, 'flow blue' decorations, associated with the United States market became popular, and due to the lack of obvious decoration this could enitrely be a flow blue pearlware. Printed wares were the "most expensive decorated earthenwares of thie period, although their price in relaiton to undecorated wares declines streadily from the edn of the eighteenth century" (Orser 466). However, upon closer examination of the decorative cc's, these decorational marks could in fact be bird and/or line decorations, and not leters.

Pearlware pieces that support this idea are below. The images on the top left and right are of an English 1790-1800 pearlware coffeepot. The designs of this coffeepot and the sherd have a simliarity through the marks. Both the birds and line markings on this coffeepot seem very simliar to the deisgn on the sherd. Two other images, bottom left and right, of a pearlware bowl dates to 1790 also include these bird motifs, which are essentailly three c-like shapes painted together.

This could in fact just be poorly decorated pearlware. The color difference of 'white' background between the sherd and the coffeepot and plate are very different; the sherd is almost most of a cream color than the other two pearlware pieces. Early pearlware and creamware pottery are in fact interchangeable (Orser 466), and it was not until during the 1820s and 1830s that a lightening of the color towards white is made (Orser 467).

The purpose of the sherd is hard to distignsh. These wares - tea, table, kitchen, and toliet - were made by major British factories, especially in “Stoke-on-Trent, Yorkshire, Newcastle-upon Tyne and Sunderland, South Wales, Scotland, and Belfast, and it is difficult to distinguish between wares and individual centers” (Orser 467). Due to this small 2 cm by 2 cm sherd noticably without any evidence of a circumfrance it is really inconclusive as to the purpose of this piece. However, the sherd, due to its thinness, would probably have been used as a tea cup or tea plate for elegant fine dining.

Bibliogrpahy:

"Hanes and Ruskin Antiques - Accessories - Archives - SOLD PEARLWARE BOWL WITH A GREAT DEER." *Hanes & Ruskin Antiques*. Web. 12 Dec. 2011. <http://www.hanesandruskin.com/mp.php?item=909>.

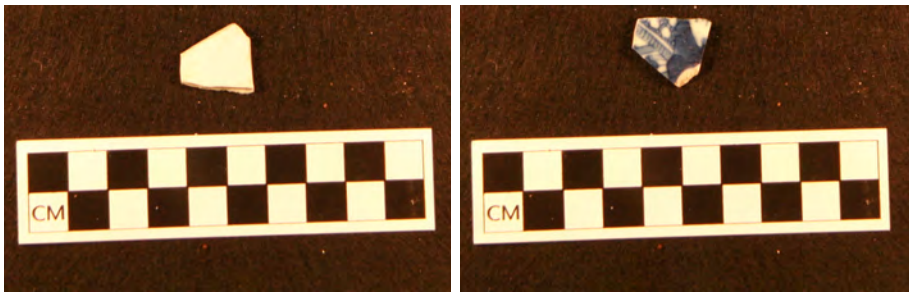
"Hanes and Ruskin Antiques - Ceramics - 18th Century - Pearlware Coffeepot." *Hanes & Ruskin Antiques*. Web. 12 Dec. 2011. <http://www.hanesandruskin.com/mp.php?item=1464>.

Brown, Ann R. *Historic Ceramic Typology: with Principal Dates of Manufacture and Descriptive Characteristics for Identification*. Dover: Delaware Dept. of Transportation, 1982. Print.

Steele, Lenville J. "AN ARCHAEOLOGICAL GUIDE TO HISTORIC ARTIFACTS OF THE UPPER SANGAMON BASIN, CENTRAL ILLINOIS, U.S.A." *Http://virtual.parkland.edu/lstelle1/len/archguide/documents/arcguide.htm*. Web.

Orser, Charles E. *Encyclopedia of Historical Archaeology*. London: Routledge, 2002. Print.

Semi- Porcelain Sherd
Allison Barker



This semi-porcelain pottery sherd was recovered from Unit 11 Context 84. Sherds, also found in Context 84, include 1 sherd of whiteware, 1 sherd of pearlware, and 6 sherds creamware. Overall 28 sherds of pottery where found in Unit 11 this year; only 3 sherds were semi-porcelain. Due to the small size of the pottery sherd, approximatley 2 cm by 1 cm, it's hard to distinguish the overall pattern of the pottery. However, there is a lot of decoration motifs in just this one sherd, including circles, lines, and solid patches of color. The back of this sherd is undecorated.

Semi-porcelain is commonly refered to as "ironstone", "ironstone china", "stone china", and/ or "granite ware". The characteristics of ironstone include a harder than whiteware tinted blue, grey, or stark white paste and a deeper than whiteware glaze (Brown 20). When comparing whiteware and ironstone, ironstone should be thicker, fine textured, and have a bluish white hue. Though it would seem that ironstone "received all of the surface treatments earlier identified for pearlware or whiteware" (Steele) To tell the difference between whiteware and ironstone Steele stuggest the "tongue test" (but with caution). Due to higher firing tempatures of the ironstone, ironstone should be "less sticky to the tongue than whiteware and more sticky then porecelain" (Steele). Brown notes that by this age most of the pieces were marked and could be dated (20), however

this small piece included no makers marks. The general dating for ironstone is from 1840 to 1885+ for trasnfer printed decoration ironstone (Brown 20).

Ironstone was introduced in Stoke-on-Trent in the early 1800s, however the name is deceiving for it was not china, nor stoneware, and did not contain any traces of iron. It was given this name due to its strong, durable, and afforable nature in comparison to Chinese porcelain. In was in the early 1790s, that China ceased imports into Britian, which caused the creation of ironstone. Several manufacures made ironstone, the most notable was Mason's Patent Ironstone China, which was introduced by Charles James Mason of Fenton in 1813 as 'English Porcelain' (Orser 336). By 1842, James Edwards started to ship variations of the ware to the United States (Steele).

There are many variations for ironstone, "but all included signifcant proportions of china clay, china stone, and calcined flint, together with other clays and other raw materials. The ware was thrown of moulded, twice-fired, lead-glazed and decorated in the manner of other contemporary refine earthenwares, although ironstone bodies appear more dense and more highly vitrified than earthenwars, and their glazes frequently have a blue tint" (Orser 336). The term 'ironstone china' was the more commonly used name, for it suggested durability but also exoticism through China. The more highly decorated pieces were used as diner, dessert, and teawares, which was a market for the higherclass and remained a desireable ware throughout the 1800s (Orser 336). Interestingly, other manufactures used the different names of ironstone on lesser and cheaper wares to enhance their value and desirablity and were widely used throughout Britian, Europe, and America. Two of these designs were called 'flow blue' and 'flow mulberry irontsone', which were both export goods (Orser 337).

There were no similar ironstone ware designs to the sherd. Below is an image of an 18th century blue and white Staffordshire ironstone meat plate. The designs on these plates are very elaborate and pattern styles seem to collide with one another. On the sherd alone, there is the collision of circle, lines, and block shapes – all on this very small 2 by 1 cm piece. From comparison of these two pottery pieces, the sherd could have originated from the border rim of the plate, since this seems to be the main location of geometric patterns.


This pattern below was a woman's family heirloom, was not dated, and could be either ironstone or porcelain. However, the circle pattern on this plate reflects the circle pattern found on the sherd. Of course, the sherd's circle pattern is smaller and more condensed than the plate's, but the two seem to be of a similar pattern.



The purpose of this sherd is hard to distinguish. As mentioned above diner, dessert, and teawares were most commonly the purpose of printed ironstone. However

due to the size of the sherd and lack of a circumfrance, the purpose of this piece is inconlcusive. It does seem highly probable though that this was useable for fine dinning.

Bibliography:

"Denhams." *Antique Furniture Clocks Auctions and Free Valuation - Denhams*. Web. 12 Dec. 2011. <http://www.denhams.com/search.php?page=50>.

"Could I Have Your Thoughts on This Teabowl & Saucer? - Antiques & Collectibles Forum - GardenWeb." *That Home Site! Forums - GardenWeb*. Web. 12 Dec. 2011. <http://ths.gardenweb.com/forums/load/antiques/msg1013373222315.html?17>.

Brown, Ann R. *Historic Ceramic Typology: with Principal Dates of Manufacture and Descriptive Characteristics for Identification*. Dover: Delaware Dept. of Transportation, 1982. Print.

Steele, Lenville J. "AN ARCHAEOLOGICAL GUIDE TO HISTORIC ARTIFACTS OF THE UPPER SANGAMON BASIN, CENTRAL ILLINOIS, U.S.A." *Http://virtual.parkland.edu/lstelle1/len/archguide/documents/arcguide.htm*. Web.

Orser, Charles E. *Encyclopedia of Historical Archaeology*. London: Routledge, 2002. Print.

Object Biography: Metal Crucifix, JBH082
By Valerie Bondura

The discovery of a metal crucifix in context JBH82 of Unit 13 was as exciting as it was problematic. Late in the 2011 season, the routine sifting of soil removed from Unit 13 was interrupted by the immediately recognizable shape of a small crucifix. The object, about 2cm wide at its widest point and 4cm tall, provided an instant reminder of the proximity of the historical past. Clearly a historic material as evidenced by its somewhat corroded state upon removal from JBH082, the crucifix is still extremely similar to Christian jewelry worn today. Further analysis of the crucifix in the Brown University Archaeology Laboratory proved disappointingly inconclusive, and the object was unable to be dated. However, the object is unique in terms of the John Brown House site and is obviously linked to a larger ideological system, making it worthy of discussion.

Figure 1: Metal crucifix, JBH082

Other material recovered from JBH082 has been dated to the period between 1830-1880.[1] Because the crucifix is part of this artifact assemblage, it is tentatively dated to the 19th century. More advanced analysis of the type of metal

[1] See Valerie Bondura, "Summary of Excavation: Unit 13, Fall 2011", this volume.

it is wrought from could result in a more confident dating. The metal crucifix is extremely thin, making the idea that it was some sort of decorative structural feature unlikely despite the fact that the vast majority of material from JBH082 was determined to be structural.[2] It has peripheral raised edges, present on the entire object on both sides, and bore holes located in the places nails were used in crucifixion: the head, feet, and each hand. These holes could represent the places where a Jesus figure was attached to the crucifix, but if this Jesus figure existed, we have no other evidence of it.

The crucifix also has a small loop attached to the top, presumably so it could be looped on a chain or string. There is not much scholarly literature on Christian imagery in jewelry in 19th century North America; small crucifixes are often interpreted as remnants of rosaries rather than of necklaces or bracelets. Rosaries, of course, immediately imply Roman Catholic praxis. As such, the discovery of such a crucifix at a site is often interpreted as indicative of historic Roman Catholic presence.[3] This hypothesis has interesting implications for the John Brown House in light of the history of Roman Catholicism in Rhode Island.

We know from primary source documents presented by the Roman Catholic Church that the city of Providence has long had ties to that particular religion, with the presence of Roman Catholicism gradually increasing throughout the 19th century with continual waves of Irish immigration. In February of 1783, the Rhode Island colonial state legislature removed all legal restrictions on Roman Catholic worship in the state that had been in existence

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[2] See Bondura, *ibid.*

[3] See pg. 314, *Encyclopedia of Historical Archaeology,* Charles E. Orser, ed. Taylor and Francis e-Library (2005).

since 1719.[4] By 1844, Providence, population 23,000, had 2,000 declared Roman Catholics and by 1847, Providence was the official episcopal seat of New England. July of 1847 saw the opening of the first Roman Catholic Church, St. Patrick's, in the vicinity of the John Brown House; St. Patrick's still stands just 1.3 miles from the John Brown House.[5] It is conceivable to think that a resident of a house on the John Brown property could feasibly walk from their home to Sunday mass at St. Patrick's. Moreover, these mid-19th century dates for increasingly Catholic activity in the city and the College Hill area coincide with the date range assigned to context JBH082. Unfortunately for this study, the religious life of the John Brown family and all others who resided on the property at some point in time has been left largely unexplored. None of the previous excavation work done on the John Brown House property has yielded any artifacts that indicate historic religious activity at the site. Considering this lack of analogous finds and our current inability to firmly date the object, the metal crucifix from JBH082 largely remains a mystery.

Historically, Catholicism in Providence and St. Patrick's Church on Smith Street in particular have been associated with Irish immigration to the area.[6] The ethnic heritage of residents of the property from the years 1830-1880 is unclear, and there is no suggestion that anyone of Irish descent ever lived at either the John Brown House or the Hale-Ives House. Not all Roman Catholics in

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[4] See Ch. 3 of "Rhode Island History", electronically published and maintained by the Rhode Island General Assembly, http://www.rilin.state.ri.us/rhodeislandhistory/chapt3.html

[5] For the history of Catholicism in Rhode Island, see Fr. Robert Hayman, *The Beginnings of Catholicism in Rhode Island*, Diocese of Providence, http://dioceseofprovidence.org/?id=19.

[6] See Hayman, *ibid.*

Providence were Irish immigrants, but it is undeniable that those of Irish descent made up the majority of the Providence Catholic community during the 19th century.[7] As such, investigation into the ethnic heritage of the John Brown and the Hale-Ives families would be useful for further study of religious practice at the site. Future excavation may be needed for this sort of research to be realized, as the history of the Hale-Ives House residents is patchy at best. Excavation in the areas of Unit 13 (2011), where the crucifix was found, and Unit 14 (2011), which sits over a geophysical anomaly resembling an architectural feature presumed to belong to the Hale-Ives House, could yield more religious artifacts or provide clues as to the ethnic heritage of its residents. Discovery of either type of material would greatly enhance general understanding of the site and would contextualize the metal crucifix uncovered in JBH082.

References

1. Bondura, Valerie. "Summary of Excavation: Unit 13, Fall 2011". In Nowlin, Jessica, Müge Durusu, and students of ARCH1900. *Archaeology of College Hill: John Brown House, Providence, Rhode Island: Archaeological Report, Fall 2011*. 2011. http://proteus.brown.edu/collegehill2011/home

2. Fr. Robert Hayman. *The Beginnings of Catholicism in Rhode Island*. Providence: Diocese of Providence. http://dioceseofprovidence.org/?id=19.

3. Orser, Charles E., ed. *Encyclopedia of Historical Archaeology*. Taylor and Francis e-Library (2005).

4. "Rhode Island History: Chapter 3." *Rhode Island History*. State of Rhode Island General Assembly. <http://www.rilin.state.ri.us/rhodeislandhistory/chapt3.html>.

[7] See Hayman, *ibid.*

Object Biography: Cobalt Blue Glass Shards
By Valerie Bondura

Two pieces of cobalt blue glass were found in context JBH082 of Unit 13 during the fall 2011 season. The two shards represent pieces of the sides of the vessel from which they came. This makes analyzing the two shards challenging, as "finishes and bases are best for general dating and classification" (Rose 1979: 12) of glass. However, despite the fact that the base and/or neck of the vessel were not discovered along with the shards, they still manifest enough diagnostic characteristics to make analyzing them a useful exercise. These important diagnostic characteristics are the deep cobalt color of the glass and the shape of the shards, whose squared off sides with curved edges could indicate that they are from an octagonal, hexagonal, or ribbed bottle.

Figure 1: Cobalt blue glass shards, JBH082

In order to produce glass of such a brilliant color, a glassmaker would first have to be knowledgeable about how to create extremely clear, impurity-free glass. Clear glass is made using a combination of silica, sodium dioxide, and calcium oxide, with a higher percentage of silica in relation to the percentage of other minerals used creating a clearer, purer glass.[1] Because producing a high quality clear glass was necessary in order to eventually obtain a vibrant cobalt

[1] See *Bottle/Glass Colors,* Society for Historical Archaeology, http://www.sha.org/bottle/colors.htm, for information on basic glass production.

color,[2] it seems reasonable to assume that glassmakers making this color of glass were skilled in their craft and produced objects that were not inexpensive. After mixing the basic three ingredients together, the glassmaker would add cobalt metal oxide to achieve the deep blue color of the final product.[3] By the late 18th century, European producers had developed a way to powder cobalt blue glass so that it could be added to other mixes in larger quantities.[4] In the United States, cobalt glass began being produced in large quantities beginning in the 1840s.[5]

The particular hue of the two shards from JBH082 appears to coincide with what is known as "dark sapphire" or "medium cobalt blue".[6] I have determined the date range of production for this color of glass in North America to be between 1840 and 1930. This date range is a combination of the dates given by the Society for Historical Archaeology as well as production dates given for antique cobalt bottles in auction catalogues.[7] Thus, the color of the glass does not have great utility for dating, providing a range of about a century. But the color does give some indication to the function of the bottle the two shards came from. Dark sapphire cobalt glass was often used to make bottles for pharmaceutical and cosmetic products.[8] This information, combined with the unique shape of the shards found, provides an interesting picture of the bottle in question.

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[2] See *Cobalt-blue Glass Steins*, Jim Sauer, http://www.steincollectors.org/library/articles/glass/cobalt.html
[3] Sauer, *ibid.*
[4] Sauer, *ibid.*
[5] Society for Historical Archaeology, *ibid.*
[6] SHA, *ibid.*
[7] See SHA, *ibid.* and *American Glass Gallery*, Auction Number 1, November 17th, 2008: http://antiquebottleandglasscollector.com/assets/files/catalog/AGG-john-and-catherine-moore.pdf
[8] SHA, *ibid.*

Figure 2: Cobalt glass shards, vertical. JBH082

The exact shape of the original bottle is difficult to determine because the shards found are so small. They each measure a mere 1cm wide and 2-3cm tall. However, even with such a small sample, it is still possible to see that the sides are flat or beveled and give way to slightly curved edges. This shape suggests that the bottle was neither cylindrical nor square in shape, but was rather much more unique. Possible shapes for a cobalt bottle with sides like those represented by the shards under investigation include octagonal, hexagonal, and round with ribbing.[9]

Figure 3: Example of an octagonal cobalt blue medicine bottle, ca. 1900, Garret Museum

All three of these shapes were used as bottles to hold medicines and, more specifically, such an unusual bottle shape is usually indicative of a poison bottle.[10] The reason for this was that growing government involvement in the pharmaceutical business in the mid-19th century led to increased regulations about bottle color and shape that were dependent upon the type of chemical mixture the vessel contained.[11] With the case of poison bottles, government officials decided that it was in the public's

[9] See *Bottles and Shop Rounds*, The Garret Museum Collection, http://www.thegarret.org.uk/collectionbottles.htm#2002141 for a wide variety of cobalt glass bottle shapes.
[10] See SHA, *ibid.* and *Poison Bottles*, Robert E. Kravetz, American Journal of Gastroenterology, 2004.
[11] Kravetz, *ibid.*

best interest to ensure that vessels containing poison were distinctive.[12] Thus, in 1853, the American Pharmaceutical Association passed a law declaring that poison bottles had to be clearly marked and that ideally, they should also be so distinctive so that the bottle could be identified as a vessel containing poison by the mere handling of it.[13] One imagines that this was to prevent any fatal mistakes that could happen in the middle of the night when someone was fumbling around in their medicine cupboard looking for relief from nausea and heartburn.

Figure 4: Example of ribbed cobalt blue bottle, embossed with text reading "poison". Antiquebottletrader.com

Analysis of the two cobalt glass shards found in context JBH082 depends on comparison with bottles that analogous in both color and shape. Examples of these analogous vessels have been given in this piece and the similarities are readily apparent. However, as previously mentioned, the extremely small size of the shards limits their utility in dating and categorization. It is possible, especially considering their small size, that the flat sides are simply beveling on the corners of a square shaped bottle rather than representing the sides of the bottle itself. These square bottles were also used to hold poisons, but were also

Figure 5: Example of a square bottle with beveled edges, used to hold poison. SHA.

[12] Kravetz, *ibid.*
[13] Kravetz, *ibid.*

frequently used to hold mineral water and soda, depending on the volume of the vessel.[14] The smaller the bottle, the more likely it was to contain poison.

Ultimately, the color of the two shards discovered in JBH082 does allow for some certainty of classification. Deep cobalt blue was the color of choice of pharmacists and chemists during the 19th century. The true function of the bottle from which these shards came is undeterminable due to the small size of the material available. However, the shape of the shards does indicate that the larger vessel was unique and different than a bottle used to hold liquor or other, more common liquids. The intersection of cobalt blue glass being used in the unique bottle shapes discussed in this investigation occurs between the years 1840-1930, with serious use of cobalt blue glass for poison and medicine bottles peaking between 1870-1930.[15] Although these date ranges are relatively large, they have the benefit of likely being indicative of usage ranges as well as production ranges. Medicine and poison, as substances that would be used up, were probably not held in containers that would not be treasured or kept by the owner beyond a few years (maximum) of obtaining the vessel. As such, it seems reasonable to assume that the shards were deposited in the late 19th to early 20th century.

[14] SHA, *ibid.*
[15] SHA, *ibid.*

References

1. American Glass Gallery. Advertisement. *Antique Bottle Trader*. 17 Nov. 2008. <http://antiquebottleandglasscollector.com/assets/files/catalog/AGG-john-and-catherine-moore.pdf>.

2. Hume, Ivor Noël. *A Guide to Artifacts of Colonial America*. Philadelphia: University of Pennsylvania, 1969.

3. Kravetz, Robert E. "Poison Bottles." *The American Journal of Gastroenterology* 99 (2004): 1876. *The American Journal of Gastroenterology*. The American College of Gastroenterology. <http://www.nature.com/ajg/journal/v99/n10/full/ajg2004364a.html>.

4. Lindsey, Bill. "Historic Bottle Identification and Information." The Society for Historical Archaeology. <http://www.sha.org/bottle/index.htm>.

5. "Museum Online Collection : Bottles." *Old Operating Theatre Museum and Herb Garret Web Site*. The Garret Museum. <http://www.thegarret.org.uk/collectionbottles.htm>.

6. "Poison Bottles." *Antique Bottle Trader*. <http://www.antiquebottletrader.com/poison.htm>.

7. Rose, Mark. "A Nineteenth Century Miami House on the Mississinewa." Thesis. Ball State University, 1979. *Ball State University Library: Student Theses*. Ball State University. <http://www.bsu.edu/libraries/virtualpress/student/honorstheses/pdfs/R67_1979RoseMark.pdf>.

8. Sauer, Jim. "Cobalt-Blue Glass." Stein Collectors International. <http://www.steincollectors.org/library/articles/glass/cobalt.html>.

Stoneware Piping Fragment
Ian Brownstein

For the last 4,000 years clay has been the preferred material for sewer pipe[1]. Until the invention of easily produced cast iron pipes, vitrified clay pipe, with a salt glazing applied to both the pipe's interior and exterior surfaces, was the material of choice for many of the sewers up to 30" I.D[2]. Unit 14 at the JBH excavations may have found a fragment of such a pipe during their excavation of context 83 during the 2011 season. The fragment is shown in the two figures below.

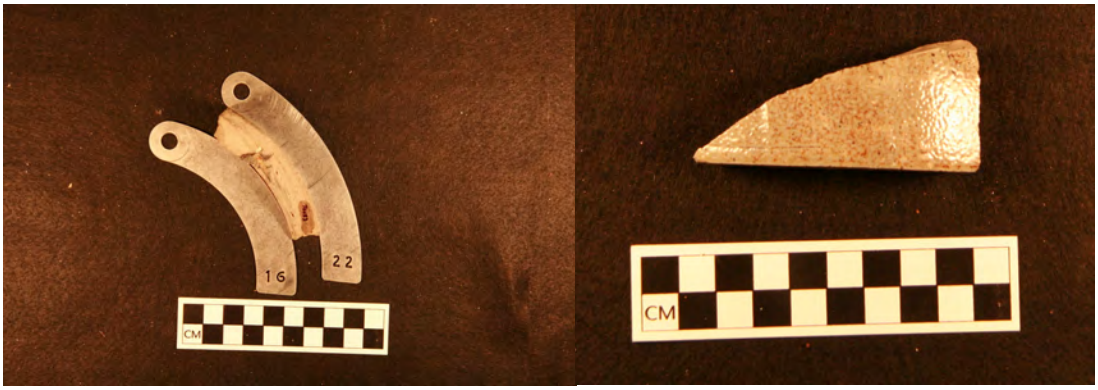

Figure 1: Two views of the Stoneware Fragment

Early American wares before 1700, consisted mainly of coarse lead-glazed earthenware used for food preparation and hygiene. This type of wares was used because of the availability of the necessary clays and the low firing temperature required to successfully make these wares[3]. Unlike these early earthenware pieces, stonewares must be fired at temperatures around 1200°C and required specific clay which is found only in scattered locations in North America. While they are far superior to other wares in that they become glasslike, nonporous, nonabsorbent, and have hardness close to that of steel[4], they did not become widely used in the Americas until local manufacturing facilities could be developed to import the expensive clay and run a high temperature furnace until after 1750 due to competition from imported German and English stonewares[5].

The clay used to make stoneware is high in alumina and silicates. Other components to the clay mixture and the slip determine the color of the resulting ware, which was usually brown, grey, or white. Shoveling salt into the kiln at maximum temperature produces the salt glaze. The salt vaporizes in a kiln at high temperatures and the vaporized sodium bonds with the silicates in the clay to produce the thin, but hard and water resistant salt glaze[6]. The distinct texture of

[1] http://www.ncpi.org/
[2] http://www.sewerhistory.org/
[3] Skerry and Hood 2009: 1
[4] Barber 1907: 5
[5] Skerry and Hood 2009: 2
[6] Skerry and Hood 2009: 1

stoneware pieces, similar to that of an orange peel, is a characteristic of the salt glaze. These glazes are what make stonewares impervious to water and corrosion resistant[7]. Salt glazed stonewares are also very resistant to temperature changes due to the tight bonds the glazing creates[8].

In colonial America, the clays necessary for stonewares were harvested in the spring or fall from areas such as the Morgan Family clay bank in Cheesequake, New Jersey. These deposits were rare and clays were shipped from them at a high cost across the eastern seaboard. Before shipment, the clays were left to 'season' for several months to improve their plasticity. The clay was then washed to remove excess particles of grass by watering the clay down to a slip and filtering it through a screen. The clay was then put into a vat to dry. After the clay had dried it was cut and stored till needed. The clay would go through a specialized mule driven mill to shape the clay into the final product for shipment[9].

Clay was not the first material used in pipe production in the Americas. Originally, colonists would use hollowed out wooden logs to transport sewage short distances, but during the 1800's, stoneware was the most common material for sewage piping in the United States[10]. Stoneware piping is heavy and expensive to manufacture due to the limited supply of the required clays in the United States. Some stoneware pipes have been recorded having at 157-year use span[11].

The process of manufacturing stoneware is illustrated in an article from The Manufacturer and Builder, Volume 13, Issue 4 from April 1881, shown in Figure 2. The article emphasizes the superiority of stoneware clays and describes the process of preparing the clay before it is molded into shape. The images shown in the article show an approximately 2-3' tube with a bell and spigot join at one end. This is significant because early American piping did not have joints to bring pieces together because it was thought that groundwater would come into the pipe and help move sewage through the piping. There was no concern for sewage leaking into the ground water at the time[12].

[7] Barber 1907: 5
[8] Skerry and Hood 2009: 1
[9] Skerry and Hood 2009: 2
[10] http://www.dawgsdrainservice.com/History.htm
[11] http://www.dawgsdrainservice.com/History.htm
[12] http://www.sewerhistory.org/

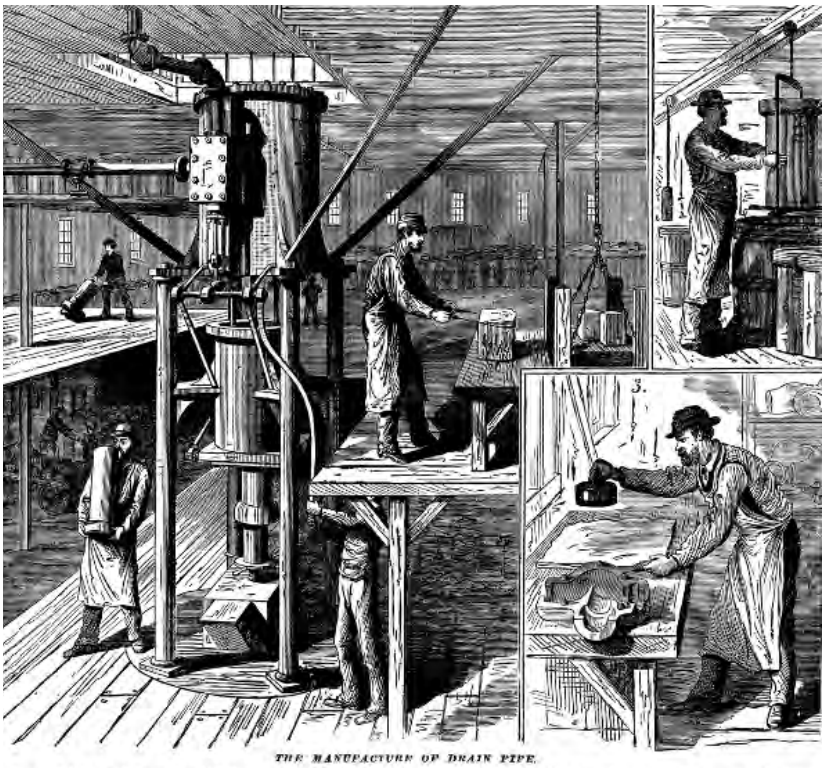

Figure 2: Manufacture of Drain Pipe in 19th Century America

The pipe fragment found in context 83 is most likely from the rim of the bell and spigot joint. It's obvious stoneware texture with the 'orange skin-like' texture on both sides in addition to its large O.D of 22cm indicates that it came from a piece of piping. This pipe most likely originated in the New Jersey area, where the closest deposit of stoneware clays were available, and was manufactured at a plant similar to the one described in *The Manufacturer and Builder* article. It would then have been shipped by boat or rail to Rhode Island and installed into the college hill sewage network. Due to its close proximity to the expected area where the Hale Ives House once stood, it may have been part of the sewage network leaving the house. During the houses destruction this fragment may have been left behind near the foundation cement possibly found at the bottom of Unit 14.

Prior to the invention of a cheap process for producing cast iron piping, salt glazed stoneware sewage pipes were far superior to any other piping material. The wares are strong and impervious to water and corrosion, making them ideal for sewage applications. Cast iron piping was first installed in the United States in Philadelphia in 1804. This cast iron pipe was produced in England, but later in the 1800's when processes form making this kind of piping were refined, it would begin the process of replacing stoneware piping in America. Today, iron pipes are now being replaced by fiber pipes such as PVC and Orangeburg[13].

[13] http://www.dawgsdrainservice.com/History.htm

Works Cited:

Barber, Edwin Atlee. *Salt glazed stoneware*. London: Hodder & Stoughton, 1907.

"Dawg's Drain Service :: 24/7 Drain and Sewer Cleaning and Maintenance." *Some History on Drain Pipe*. Web. Dec. 2011. <http://www.dawgsdrainservice.com/History.htm>.

"National Clay Pipe Institute - NCPI | Vitrified Clay Pipe Gravity Sewer Systems | VCP Technical Resource for Design-Installation-Operations." *National Clay Pipe Institute - NCPI | Vitrified Clay Pipe Gravity Sewer Systems | VCP Technical Resource for Design-Installation-Operations*. Web. Dec. 2011. <http://www.ncpi.org/>.

Skerry, Janine E., and Suzanne Findlen Hood. *Salt-glazed stoneware in early America*. Williamsburg, Va.: Colonial Williamsburg Foundation ;, 2009.

"The History of Sanitary Sewers." *The History of Sanitary Sewers*. Web. Dec. 2011. <http://www.sewerhistory.org/>.

"The Manufacture of Drain Pipes," The Manufacturer and Builder, Volume 13, Issue 4 (April 1881), p. 82-83. Courtesy of The Making of America Digital Collection, Cornell University Library

Large Machine-Cut Nail
Ian Brownstein

Nails are found all over the world from most periods where the ability of fashion metals was possessed.[1] They are probably the most common artifacts found on early American historical sites[2] and were essential to the development of the American colonies where wood was the primary building material.[3] Unit 14 at the John Brown House (JBH) excavations was no exception to these rules. Even with the relatively small number of finds, that this unit produced 26 nails were found in it during the excavation. A small selection of the nails found in context 83 is shown in Figure 1 below.

Figure 1: Selection of Nails from JBH Unit 14, Context 83

The largest of these nails, shown in Figure 2, is an approximately 120mm long and has a square cross section with tapers to a point at one end. It is approximately 10mm wide at the top of the nail and has a somewhat square head. The nail has a red-brown, rust color and is heavily corroded making it difficult to determine the original geometry of the top of the nail.

Figure 2: Long iron nail

[1] Loveday 1983: 3
[2] Hume 2001: 252
[3] Loveday 1983: 4

The abundance of wood in colonial North American made it the obvious choice as a building material. This created a large demand for nails in colonial America.[4] Prior the American Revolution, England was the largest manufacturer of nails in the world. In the colonies nails were items of great value and difficult to obtain.[5] The British Parliament disallowed the production of the iron necessary to produce nails in the American colonies, allowing them to maintain high prices on imported English nails.[6] In reality, these laws did not dissuade the colonists from producing the material themselves. While it is difficult to determine when nail production began in American colonies, it is certain that wrought nail production began before their independence from the English.[7] It was common practice for families to produce nails in the household using their fireplaces for use and barter.[8] It was also common practice for Americans to burn down unused buildings and retrieve the nails from the ashes before 1850.[9] Even Thomas Jefferson was known to produce nails of his own and was quite proud of this fact.[10]

As the 18th century came to a close, nail production began to change rapidly. Machinery was developed in the late 1700's to eliminate manual steps from the nail production process.[11] This sudden change in nail producing technology has allowed us to help date buildings from the 19th century due to the variations in the resulting nails from the different methods.[12] The transition from hand wrought nails to machine cut nails took place in period from 1790-1830 in the United States. Factories were established in the northern states and there volume of production surpassed that of England by 1800.[13] Thomas Jefferson was among the first to purchase the newly invented nail-cutting machine in 1796 and produce nails for sale.[14] Cut nails could be manufactured much faster than hand-forged nails. As the process was mechanized, the cost per nail was reduced.[15] Rapid production rates for machine made nails led to, by 1870, wrought nails accounting for less than 5% of all nails produced in the United States.[16] By the mid-nineteenth century, nails were a truly mass produced item.[17]

A nail can be roughly dated by determining the process used to make it. There have been four nail types used in North America, shown below in Figure 3. Hand wrought nails, produced before the 1800's, are the type of nails, which could be produced by anyone with access to nail rod. These rods were imported from

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[4] Condit 1968: 40
[5] http://www.fourshee.com/history_of_nails.htm
[6] Loveday 1983: 5-6
[7] Loveday 1983: 5
[8] http://www.fourshee.com/history_of_nails.htm
[9] http://www.appaltree.net/aba/nails.htm
[10] http://www.fourshee.com/history_of_nails.htm
[11] Loveday 1983: 11
[12] http://www.uvm.edu/~histpres/203/nails.html
[13] Condit 1968: 44
[14] http://www.fourshee.com/history_of_nails.htm
[15] http://www.appaltree.net/aba/nails.htm
[16] Loveday 1983: 20
[17] Loveday 1983: 16

England, but Americans most certainly illegally locally produced these rods. The nail rod was heated and hammered into shape for use. The first machine made nails were cut nails, classified as either type A or type B. These can be distinguished by examining the burr along the edge, which was cut from the iron sheet the nails were made from. Type A nails have burrs on the diagonally opposite edges, while the type B nails have both burrs on the same side because the metal was flipped for each stroke.[18] Hand wrought nails can also be distinguished from cut nails because all four sides are tapered on hand wrought nails, while only two sides are tapered for cut nails and the other two sides are parallel. This is because they represent the thickness of the plate they were sheared from.[19] The final type of nail produced in North America is now the most commonly used one: the wire nail. The Bessemer process allowed for the production of steel wire, which could be extruded to produce cheaper nails.

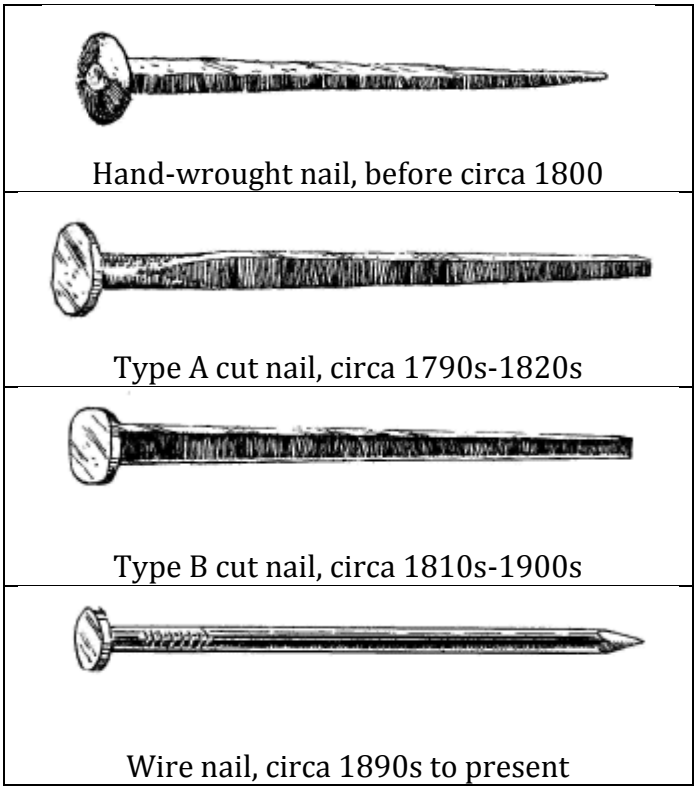

Figure 3: North American Nail Types[20]

The large nail found in Unit 14, context 83 is definitely an iron cut nail. It appears to be a type B nail, based on how the taper goes all the way to the nail head like the type B nail shown above, but it is difficult to tell because of the heavy corrosion that the nail has undergone. This prevents the nail from being dated based on the burr directions. Based on this fact the TPQ for this nail must be set at 1790. The material is certainly iron because of the heavy rusting which it has undergone

[18] http://www.uvm.edu/~histpres/203/nails.html
[19] http://www.appaltree.net/aba/nails.htm
[20] http://www.uvm.edu/~histpres/203/nails.html

and the fact that all American cut nails were made from iron sheets. The damp New England soil is most likely the cause of the heavy corrosion that this nail and all other iron pieces found during the 2011 JBH excavation, underwent.

The heavy concentration of nails in context 83 indicates that either a wooden structure existed here or that it is some sort of repository for nails. Since we are confident, based on historical photographs, that the Hale Ives house stood on top or near Unit 14 and we know the house was destroyed, it can be assumed that these nails are from the destruction of the Hale Ives House. This makes sense because the house would have been constructed in the 1800's, when cut nails were produced. Even though through the 1900's many builders preferred using cut nails because of their holding power, but in the early 1900's wire nails had all but replaced the cut nail. It is because of the tremendous holding power and hardness that cut nails are still used today for specific functions such as flooring, boats and masonry.[21]

Works Cited:

"All about nails." *Appaltree*. Web. 12 Dec. 2011. <http://www.appaltree.net/aba/nails.htm>.

Condit, Carl W.. *American building: materials and techniques from the first colonial settlements to the present*. Chicago: University of Chicago Press, 1968.

Fourshee, Paul. "History of Nails." *Home*. Dec. 2011. <http://www.fourshee.com/history_of_nails.htm>.

Hume, Ivor. *A guide to artifacts of colonial America*. 2001. Reprint. New York: Knopf, 1969.

Loveday, Amos J.. *The rise and decline of the American cut nail industry: a study of the interrelationships of technology, business organization, and management techniques*. Westport, Conn.: Greenwood Press, 1983. Print.

"Nails." *The University of Vermont*. Web. Dec. 2011. <http://www.uvm.edu/~histpres/203/nails.html>.

[21] Appletree

Stamped Brick

Kaitlin East

At the John Brown House excavations this year, Unit 13 had a large quantity and variety of interesting finds. Most of the artifacts consisted of architectural debris including miscellaneous metal pieces, slate, some limestone, and bricks. The brick pieces were by far the most numerous and so the analysis focused solely on bricks that were unique and diagnostic. While most of the finds were nothing more than small pieces of red brick a few brick pieces proved to be quite interesting, especially the stamped brick from context 78.

The interesting brick from context 78 was one of the last finds of the season. It had been face down in the middle of the context, and had been left in situ in order to document it, photograph it, and preserve the evenness of the layer. On the last day, however, it was removed for analysis. It was a yellow, tan color with lots of black splotches on the surface that were most likely mold. The clay had a great deal of inclusions, including stones and small pebbles, one of the other bricks also may have had a shell within it. The brick of this type were each about 10 cm wide and 3.5 cm thick, but it was impossible to determine length because all of the pieces were fragmentary and did not constitute a whole brick. The most exciting part of the brick however was the stamp on the front. The stamp was within a rectangle with a thin border. The words that were stamped were “SAYRE & F” on the top line and the bottom line read “SAYRE\”.

Photo was taken in the lab by the team and shows the stamped brick from context 78, unit 13 from 2011.

This brick was found in context 78. 78 is found in the southeast corner of the unit and is beneath context 74 which may also include context 77 and is next to context 82 in the northwest half of the unit. Other finds from this context included many nails and other bricks both of this yellow color and of the more common red color. The context was distinguished by an increase in gravel and large, flat rocks which correlate with an anomaly on the Ground Penetrating Rader and so might be a path.

After some research it was determined that the bricks read, “SAYRE & FISHER CO, SAYREVILLE, NJ” and were made by Sayre and Fisher Co. This particular company made bricks from 1850 up until 1970, was one of the largest brick manufacturers in the United States,

and was located in Sayerville, New Jersey. (Karcher 1953: 1-4). The type of brick that we found is known as grey or buff, Dutch brick. Buff brick can be made from clay that lacks iron oxide or has been mixed with limestone. If the process including limestone is used, the bricks are fired at a much lower temperature. However, if the nothing is added to the clay, the buff bricks are fired at a higher temperature and so lack moisture and are stronger (Bancroft 1908: 736). Sayre and Fisher advertised their buff bricks for use in fireplaces and so were probably made in the process without limestone and were able to withstand the high temperatures (Sayre & Fisher, 1895: 5). These buff bricks are used as front bricks by the Sayre and Fisher company, which were made of a higher quality clay than other bricks (Ries and Kummel 1904: 221-231).

This brick fragment was found with a great deal of architectural debris but no associated architectural feature other than a possible path. As such, it seems likely that it was deposited here after being moved from somewhere else, and so its original context and what it can tell us about this unit is difficult to discern. Regardless, the brick was probably an aesthetic choice as it was of higher quality material and Sayre and Fisher also offered red brick. It could also have been used in a fireplace. As such, we can say that the original context of this brick could have been as part of decorative element around a fireplace by someone who cared a great deal about appearance and having high quality material. Furthermore, the brick can tell us that the depositional event that lead to its location in Unit 13 happened after 1850 when Sayre and Fisher Co, opened, and before 1970 when they closed. It can also tell us that the debris we are finding could have come from the stripping of an inside of a home as it could have been used in a fireplace and much of the other pieces are small and decorative. Therefore, although this brick is not decorative or very large, in context, it can offer a great amount of information about the area of the yard we found it in, and the lifestyles of the people who used it.

References Cited

Bancroft , Wilder D. and Joseph E. Trevor. 1908 Journal of physical chemistry, Volume 21. Cornell University, NY.

Karcher, Joseph T., 1953. History of the Sayre & Fisher Brick Co. of Sayreville, N.J. 1850-1948. Sayreville, NJ.

Ries, Heinrich and Henry B. Kummel, 1904. The Clays and Clay Industry of New Jersey, Vol. 6. Geological Survey of New Jersey. Trenton, NJ.

Sayre & Fisher Company, 1895. " Adamantine Brick Works at Sayreville, on Raritan River:" New York, NY.

Rosy Tile

Kaitlin East

The excavation of Unit 13 at the John Brown House uncovered a variety of interesting artifacts this year. Unfortunately, while many of these were large and interesting they were more often than not an unidentified mass of corroded metal that revealed little information about the unit. As such, it was necessary to turn to more mundane and often smaller materials in order to understand the unit. One of the more informative categories was the ceramics found in the unit and in particular a few small pieces of possibly glazed tile with a rose-colored design.

The pieces of rose colored ceramic fragments include two pieces with glaze and a rose colored, blotchy design, two pieces with just the unglazed half, and one piece with both. It is only by chance that the piece with the glazed design on one side and the unglazed side survived, otherwise it would not be known that the other pieces are just two sides of one item. Of the pieces that survive, it is clear that they came from an object that had one glazed side with a marbled or blotchy pink design and one side that was unglazed but had a rectangular depression running the length of it. Both sides are flat and perfectly smooth besides the depression on the back. The largest piece is about 3.1 cm by 2.5 cm and has one straight, smooth and finished edge. The only piece that contained both the glazed and unglazed side measured about 1.1 cm thick.

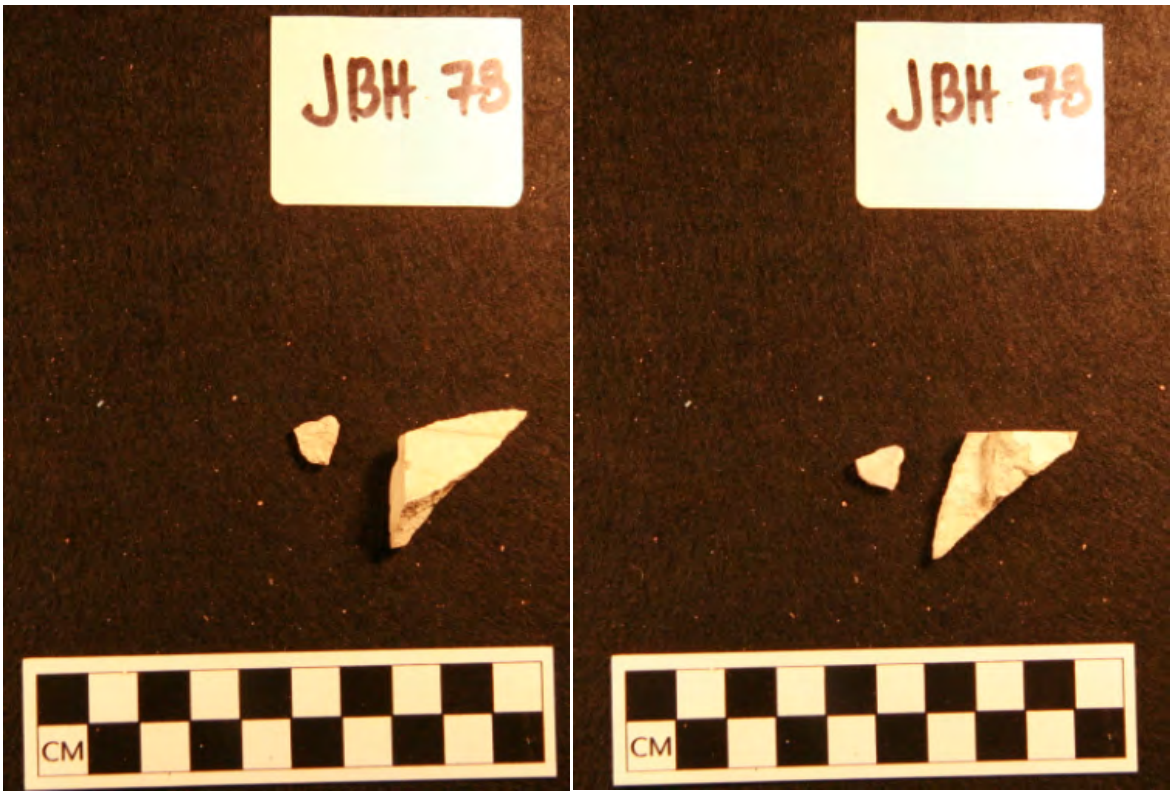

Photo was taken in the lab by the teams, showing a piece of rosy tile from Context 78, Unit 13 in 2011. Notice the rectangular depression on the left, and small amount of preserved glaze remaining on the right.

A second piece of rosy tile from Context 82, Unit 13 year 2011 showing the rose colored glaze.

The rectangular depressions on the back of these pieces proved to be diagnostic. They are indicative of dust pressed tile, which originated in 1840 and was used to produce wall tiles in 1850 (McEntire 1991:994, 995). The imprints help reduce drying time and cut down on pressing time and allow the tiles to be made thinner with less shrinkage. In creating the tiles, "prepared clay was dried and ground up to a fine powder, retaining a small moisture content of between five and eight percent, which, when subjected to extreme pressure between steel dies, forced the clay into a compressed state forming a slab or tile about one centimetre thick, the design could also be imprinted at the same time using a patterned die stamp" (McEntire 1991: 994). The process allowed for mass production of tile.

The pieces of tile were found in two contexts of Unit 13: contexts 78 and 82. Context 78 was below 74 and was characterized by gravel while context 82 was below 77, which was below 74. However, it has been suggested that contexts 74 and 77 are actually one context, which could put context 78 and 82 at roughly the same level. The fact that the tile was not in the top strata indicates that they were probably not deposited as a result of recent landscaping work done by the Rhode Island Historical Society. It was most likely deposited at the same time as the creation of the path like feature that characterized context 78 and so is not associated with its original context.

These small pieces of ceramic are definitely tile as they have the rectangular depression on one side and they are flat, think, have no curve, and one side is left unglazed. It is difficult to determine whether or not they were used on the floor or the wall or in a bathroom or possibly around a fireplace. What can be said is that they were meant for decoration because of the color and the glaze and so they were most likely located indoors. Furthermore, the subtle and light decoration indicates that they were not used as a centerpiece but as part of the wall or floor to

add color but not be the focus of attention. Regardless of what the original context of the tiles were, there was probably an intervening event between their original context and their deposition in unit 13. Therefore, their location can tell us about the human action that put them there but not about their original context. They indicate that there was probably a large fill episode of soil and debris for landscaping purposes that relocated the pieces. However, they cannot tell us much about the structure that may have once been in the area because they cannot be related to a particular part of the house as their original context is unknown.

These tile pieces are extremely small and at first glance are much less exciting than the large metal pieces in the same unit. However, they were able to offer a date for the earliest possible deposition of the context at 1840 and showed that contexts 78 and 82 may have been related considering they contained some of the same fragments. Unfortunately, they cannot reveal much about their original use or context or the structure that may have once stood in the area. Regardless these pieces proved to be quite interesting and useful in understanding the relationships between different parts of the unit.

References Cited

McEntire, B J. 1991. *ASM International, Engineered Materials Handbook*. Vol. 4: Ceramics and Glasses 141-146.

Knee Buckle

Brian Kelly

Excavation in Unit 14 at the John Brown House uncovered a large number of non-personal items. That being said, the few personal effects pulled from the trench are of the utmost importance as they help shed light on the daily lives of the people living in the area. Of these items, a small buckle discovered in Context 83 provides an interesting outline of the timeframe of its presence in the area, the social status of its owner, and the fashion trends of the time.

The buckle is small, roughly 30x35mm, and made of iron (see Figure 1). Due to degradation caused by oxidation, the surface of the buckle itself is not visible, however, it is safe to assume that, due to its iron construction, this buckle is fairly plain.[1] Instead of being crafted from more expensive materials, such as silver, brass, copper, pewter, paste, or steel, iron had a limited level of workability and could only be

Figure 1

[1] Hume, Ivor N. *A Guide to Artifacts of Colonial America*. Pliladelphia: University of Pennsylvania, 2001. Print. p. 86.

crafted into simple rectangles.[2] The buckle is a plain, single-framed rectangle with a pin running through its center (see Figure 2). The other parts of the buckle's chape, the tongue and roll, are missing (see Figure 3). It is fairly common for buckles to be recovered in separate pieces, and pieces of the chape are frequently found apart from the frame.[3] That being said, no other pieces of the buckle were recovered over the course of this year's excavations.

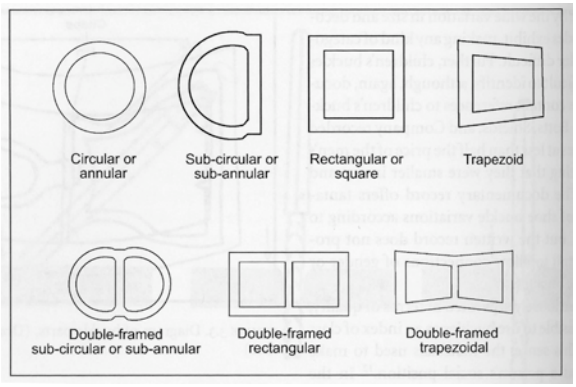

Figure 2

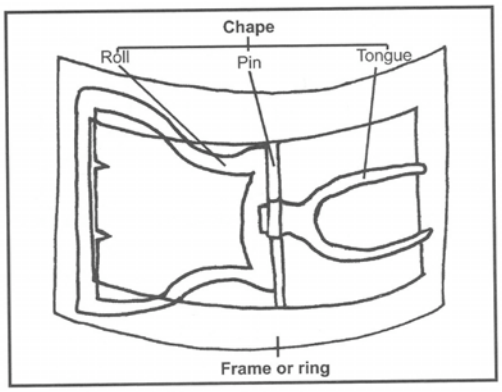

Figure 3

Looking at the size and shape of this buckle, it is likely a knee buckle, used to tightly hold breeches above or below the knee.[4] In relation to size, knee buckles were usually no larger than 30x40mm, so this object falls within the normal dimensions of these artifacts, but certainly rests on the larger end of the size-spectrum. This will be an important factor in dating the buckle. Over time, the fasteners for breeches' knees have seen an evolution with buckles coming into vogue around 1750. From the 1750s to the 1770s, buckles were small and mostly square. In the 1770s and 1780s, larger buckles dominated the fashion trend and oval buckles began to become popular. During the 1790s, knee buckles were almost exclusively oval, as would remain the trend until

[2] Hume 86, White, Carolyn L. *American Artifacts of Personal Adornment, 1680-1820*. Lanham: AltraMira, 2005. Print. p. 36-37.
[3] White, p. 33-34.
[4] *Ibid*, p. 43.

buckles were replaced by ties at the end of the 18th century.[5] Using this data, it is reasonable to believe that this particular buckle was purchased sometime after 1770, and due to its iron construction, could have been used for many years after its acquisition. That being said, since knee buckles felt the strong effects of changing fashion tastes, the buckle certainly wouldn't have been purchased after the 1790s due to the rise of oval buckles and ties, and likely wouldn't have been worn long after its lifespan as a fashionable accessory had expired. The shape, already discussed briefly in the dating of the buckle, also suggests this to be a knee buckle. Knee buckles were single-framed flat squares (or ovals), unlike shoe, sword, belt, and spur buckles, and relatively plain, unlike girdle and stock buckles.[6]

Figure 4

Having identified the type of buckle, it is important to briefly note the social importance of these objects. In addition to their utilitarian value, buckles often indicated social and economic standing. Worn by every gender, class, race, and age, buckles had

[5] *Ibid*, p. 43-45.
[6] Hume, p. 86-87, White p. 43-47.

an important performative role in conveying socio-economic information of their wearers'.[7] Simply put, fancier buckles were owned by the wealthy and powerful, while plain buckles were worn by the lower classes.[8] This significance even permeated into the art of the time, whereby painters would frequently highlight their subject's buckles in portraiture, as in Ralph Earl's *Portrait of Elijah Boardman*[9] (see Figure 4 and accompanying inset, a detail of the knee buckle).[10]

This knee buckle was found in Unit 14, which was located on the northern edge of the property and was originally opened in order to locate remains of the Hale-Ives house that stood on the area from its construction between 1834 and 1857 until its destruction somewhere from 1923 to 1926. Context 83 was opened under Contexts 80 and 81, and contained numerous other finds including plaster pieces, brick fragments, coal, nails, glass fragment, creamware, whiteware, pearlware, stoneware, a tobacco pipe fragment and an animal nail, bone, or shell. These objects can all roughly be dated to have come from the late 18th or early 19th century.[11] When viewed against these dates, the approximate dating of the buckle from 1770-1790 seems entirely accurate, and it is a chronologically sound match with the rest of the objects recovered from Context 83. Having thoroughly analyzed this artifact, with a little imagination, it is now possible to begin piecing together a story for the buckle itself.

Working as a mason at the John Brown House is pretty sweet. It keeps me in shape, I get a great view of the ships coming into port, and the pay is decent. I mean, I

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[7] White, p. 47, 50.
[8] *Ibid*, p. 33.
[9] It is interesting to note that the painting, dated to 1789, portrays Boardman wearing oval buckles, suggesting that he was keeping up with the fashion trends of the era as oval buckles began to overtake their rectangular counterparts in popularity.
[10] *Ibid*, p. 47.
[11] For more information on dating this context's finds, see p. 12-16 (esp. p. 15-16) of Sandra Mastrangelo's *Unit 14 Excavation Summary* (available at http://proteus.brown.edu/collegehill2011private/14894).

can't afford anything crazy, but I do my best to keep up with the fashion world. So when my employer gave me a bonus in the summer of 1772 (he'd been in a great mood ever since the whole Gaspée affair), I knew exactly what I was going to buy. After work, I headed straight to a merchant and was glad to fork over the £0-6-0 for a brand new set of knee buckles fresh off a ship from England.[12] I'd always buttoned my breeches, but that looks soooo plebian, and, man, were these things fresh. Well, not *that* fresh. Boss man wears a really nice silver pair that are embossed and mad shiny. But these were still pretty dope. Everybody was giving me compliments and all the other masons were jealous. And these keep my breeches super tight above my knee. Definitely a great buy; life was awesome after I got my knee buckle swag on. I wore these things everywhere: to the pub, to work, to my mom's place in Warwick. And let me tell you, ladies love a nice pair of knee buckles. Which is probably why one day, a new guy at work named Isaac, asked to borrow them. He said he had some date with a barmaid or something, and I liked the kid so I let him have them. Big mistake. The next day, we're laying bricks and Isaac hand me a buckle frame and tells me that things had gotten a little crazy the night before (not a surprise considering he was rocking some fly accessories) and he'd totally wrecked my knee buckles. Like, completely tore up the chape and lost the tongue and the roll, so I couldn't even try to get them fixed.[13] Not cool man. Not cool. I was so angry, I just tossed the broken thing out on the John Brown property then and there. I certainly learned my lesson though; that will definitely be the last time I lend an item of personal adornment that denotes socioeconomic status to anyone. Anyway, by this point it was already the 90s (time flies), so I figured the buckles had had a pretty good run. Plus,

[12] White, p. 35, 37.
[13] *Ibid*, p. 47.

buckles were headed out. Anyone who's *anyone* is tying their breeches now, so I'm not that torn up.

Works Cited

Hume, Ivor N. *A Guide to Artifacts of Colonial America*. Pliladelphia: University of Pennsylvania, 2001. Print.

Mastrangelo, Sandra. "Unit 14 Excavation Summary." *John Brown House Excavation 2011 Final Projects*. Providence: Brown University, 2011. Print.
Found online at: http://proteus.brown.edu/collegehill2011private/14894

White, Carolyn L. *American Artifacts of Personal Adornment, 1680-1820*. Lanham: AltraMira, 2005. Print.

Slip Glazed Drainage Pipe

Brian Kelly

While every artifact pulled from the ground may not be exciting at first, each has a rich history whose engagement transforms an otherwise blasé item into an exciting find with an interesting, and unique, story to tell. Such is the case with fragment of a drainage pipe found in Unit 14, within Context 88. This fragment has much to say about the history of piping in America and the lifestyle of the inhabitants of the Hale Ives house.

The fragment is 9cm long, 7cm wide at its broadest point, and roughly 2cm thick (see Figure 1 & 2). It was measured to have a circumference of roughly 18cm (had the pipe been intact). It is made of white stoneware with a brown slip glaze in line with the fashion of Albany glazes.

Figure 1

Figure 2

Stoneware has long played a role as the key material for making utilitarian objects such as jugs, jars, crocks, architectural elements and plumbing pipes (Orser 594). While the precise origin of stoneware is unknown, it was first produced in the West in the area that is modern day Germany some time in the Middle Ages, and by the early 16th century, salt glazed stoneware was being made (Skerry & Hood 1). However, in early America, most ceramics produced were coarse earthenware due to its ease of creation (1). It wasn't until the early 18th century that stoneware production was firmly established in the US (Barber 23). Most stoneware from this period found in New England was actually made in (or at the very least, the clay was taken from) New Jersey due to local clay deposits that lent themselves to the production of stoneware (Rhodes 33).

While clay has been used to craft pipes since 4000BCE in Babylonia, stoneware pipes are still a relatively new creation in America, only gaining prominence around 1880-1900 (Sewer History, Clay 1-2). These vitrified pipes, of which this artifact is a prime example, were glazed on the inside and the outside, a process adopted from English pipe makers as America's pipe industry grew (Sewer History, Roots 22). Large-scale production started in 1849 in Middlesberry, OH and continued to improve until, roughly 30 years later, the production process was largely mechanized (23). Due to the heavy weight of pipes and the requirement of appropriate clay that was easily extractable and from a local source, most pipes, if not produced locally, had to be shipped via rail or water (23).

A copy of the New York publication, *The Manufacturer and Builder* from 1881 thoroughly describes the process of producing drain pipes. Starting with clay sourced from Woodbridge, NJ—a state already noted for its clay—the workers temper the clay with water, wire it to check for impurities (specifically iron), cast it in a mold at which point a

collar can be added to the pipe via the mold, remove the pipe from the mold (and bend it by hand if a curve is desired), then set to dry until it is ready for firing (82-83). For pipes such

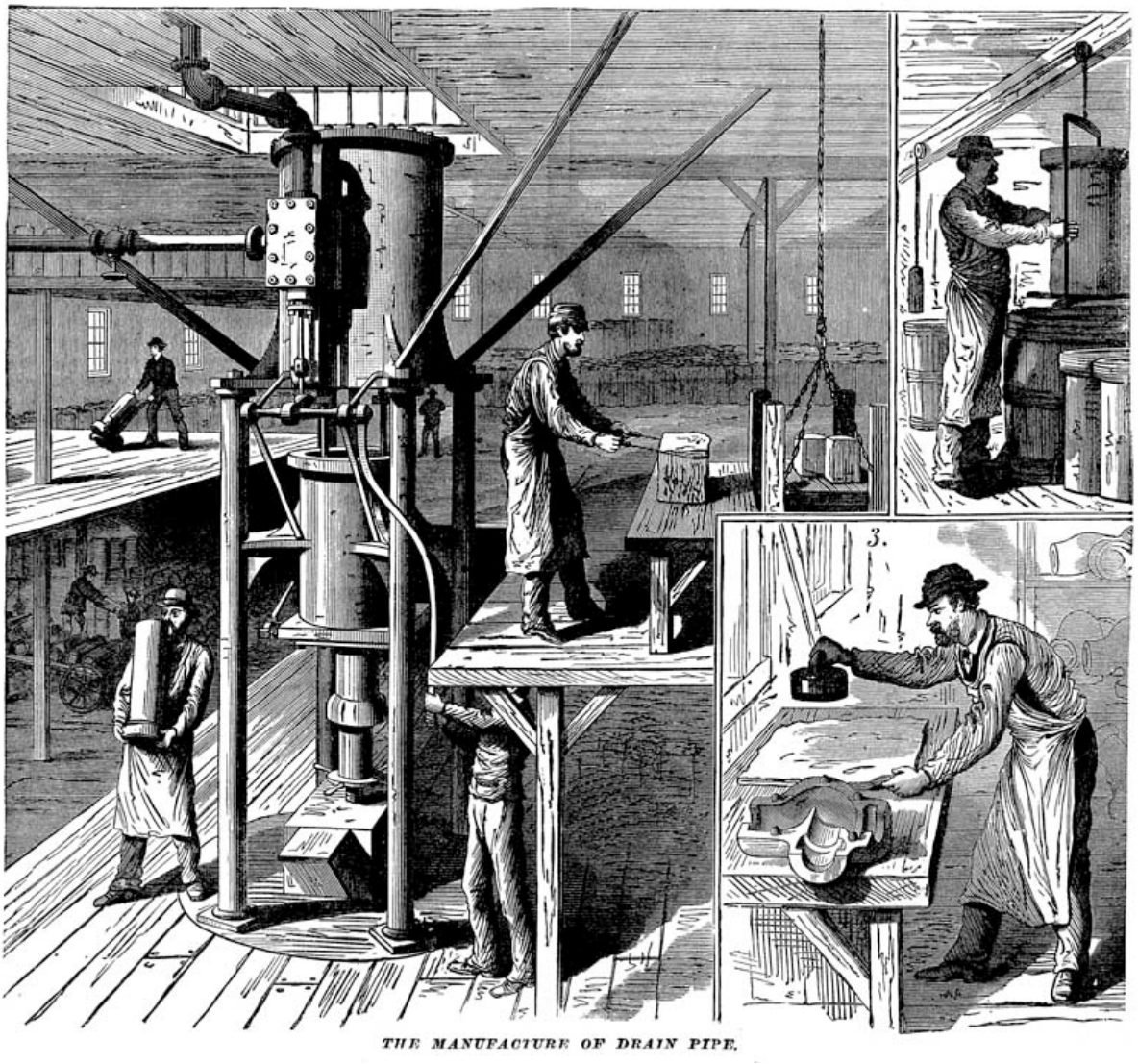


Figure 4: An etching from *The Manufacturer and Builder* illustrating pipe production.

as this one, where slip is to be applied, the item is dipped in the glaze before being placed in the kiln. This glaze comes from a species of clay native to Albany, NY and is rich is carbonate of lime and alkalies which, when fired, results "in the formation of a vitreous double silicate of the lime and alkalies with the alumina of the clay." It is interesting to note

that slip glazing was more popular among pipe makers in eastern states while salt glazing was more widely used by manufacturers in western states. The pipe is baked for 54 to 56 hours, until the glaze has turned "a dark-brownish, glossy hue" (as can be seen in Figure 1 & 2), and the finished product is complete (83).

Figure 3: An advertisement for a company that produces stoneware and sewer pipes.

This account is certainly in line with the artifact recovered from Unit 14 so, while the pipe may not have been made in the factory in New York feature in the article, it is reasonable to assume that a very similar process was used. The clay was likely sourced from New Jersey, the slip from New York, and the pipe was either produced locally or transported to Providence via ship from an eastern state (as can be assumed by its slip glaze)—an easy assumption due to the city's port history.

This drain pipe would likely have carried water or waste from the Hale Ives house and not the John Brown house for two reasons. For one, the location of the fragment sits within or directly adjacent to the assumed location of the Hale Ives house, and it is more plausible that it has remained in relatively the same location since it was installed, as

opposed to migrating across the lawn. Secondly, we can date this pipe to have been produced somewhere around 1880-1900. While stoneware pipes were made before then, there is evidence that this pipe was manufactured by machinery (see the horizontal markings in Figure 1 and the preceding description of machining pipes) which was not in use until the late 19th century. This date is especially interesting when compared to the construction date of the Hale Ives house: somewhere between 1834 and 1857. The latest date of the house's construction and probable date of manufacture of the pipe are 20+ years apart. This suggests that, while living in the house, residents had a drainage system installed, significantly modernizing their living quarters.

By examining the history of this particular artifact, its source, age, method of production and more have come to light. More intriguingly, its age and location have revealed an interesting anecdote about the occupants of the Hale-Ives house.

Works Cited

Barber, Edwin A. *Salt Glazed Stoneware*. London: Hodder & Stoughton, 1907. Print.

"The Manufacture of Drain Pipes." *The Manufacturer and Builder* Apr. 1881: 82-83. *Cornell Library: Making of America*. Web. 12 Dec. 2012. <http://ebooks.library.cornell.edu/cgi/t/text/pageviewer-idx?c=manu;cc=manu;rgn=full%20text;idno=manu0013-4;didno=manu0013-4;view=image;seq=88;node=manu0013-4%3A19;page=root;size=200>.

Orser, Charles E. *Encyclopedia of Historical Archaeology.* Florence: Psychology Press, 2002. Print.

"Pipe-Clay." *Sewer History*. 2004. Web. 12 Dec. 2011. <http://www.sewerhistory.org/grfx/components/pipe-cly1.htm>.

Rhodes, Daniel. *Stoneware & Porcelain: The Art of High-Fired Pottery*. New York: Chilton Company, 1959. Print.

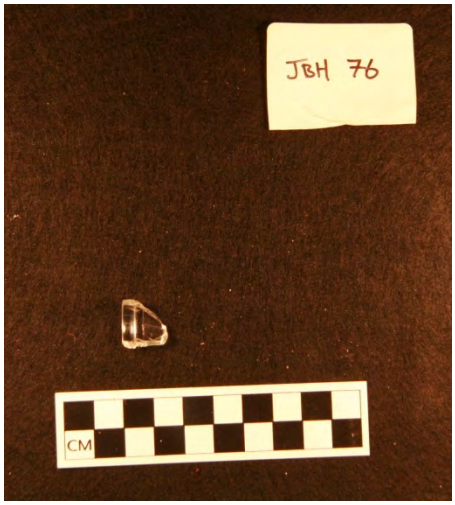
Skerry, Janine E., and Suzanne F. Hood. *Salt-Glazed Stoneware in Early America*. Hanover: University of New England Press, 2009. Print.

"Tracking Down the Roots of Our Sanitary Sewers." *Sewer History*. 2004. Web. 12 Dec. 2011. <http://www.sewerhistory.org/chronos/convey.htm#clay>.

Glass Bottle Fragment with Seam
Sandra Mastrangelo

Glass production and use has a long history internationally and as a commercial material in the United States. The first evidence of deliberately produced glass can be dated to approximately 3000 BC, while natural volcanic glass such as obsidian, rock crystal, agate, or onyx may have been used even millennia before as adornment or tools.[1] Now a ubiquitous material manufactured internationally for a multitude of uses, glass containers were first crafted around 1500 BC. Early American craftsmen recognized the demand for glass in the new world, and the first glass furnace was constructed at the Jamestown, Virginia colony in the early 1600s.[2] During this time, a skilled glassblower created each piece of glassware individually, and production was costly and slow.

The industry relied exclusively on individual labor until 1903, when the first automatic glass bottle blowing machine was patented by Michael Owens. It was called the Owens Automatic Bottle Machine and it eliminated the need for individual artisans.[3] By 1905, mass production of glass bottles began in earnest with almost 90% produced by machine. Products became more uniform in size, thickness and capacity; glass bottles were no longer cherished, saved, and reused. During that time, bottles from various time periods were rapidly discarded making dating glass a difficult undertaking.



[1,2] http://www.texasglass.com/glass_facts/history_of_Glass.htm

[3] Lockhart, B.S., Pete, & Lindsay, B. 2010. "The Dating Game - The Owens Bottle Co." *Bottles and Extras*. Web. 5 Dec. 2011 <http://www.sha.org/bottle/pdffiles/owensbottlecompany.pdf>

The fragment of glass recovered from context JBH 76 in Unit 14 (pictured) is likely a piece of this early commercially produced glass. However, several other possibilities are considered based on distinguishing features such as color and seaming.

Historical archaeologists categorize glassware in a multitude of ways. Depending on the completeness of an object, factors such as color, thickness, imperfections like bubbles or surface marks, weight and size are noted. This fragment has a visible seam, likely a result of the production process and is of a clear or "colorless" glass. The piece is 1.1 cm in diameter, with a rim width of 0 .4cm. The most notable feature, the seam running along the side of the fragment, is 0.2 cm from the rim.

Given the diagnostic features of this fragment, two possibilities for means of manufacture emerge, each corresponding to a distinct time period in American glass manufacturing. While the possibility that the vessel from which this fragment originated was crafted abroad and brought into the United States, it is more likely the piece was produced domestically before its deposit at the John Brown House site given the historical scale of American glass manufacturing. If manufactured before 1903, the bottle was almost certainly produced by a glassblower using a mold rather than free-blowing. Generally, in this country, utilitarian glassware was not free-blown by a skilled artisan following the American Civil War (circa 1860). Mouth blown glassware lacks the seams created by molding glass bottles, and thus can be ruled out as a means of manufacture for this fragment.

This piece appears to have some wavy marks on the surface, although its small diameter makes it difficult to assign further characteristic to the imperfections. These are generally referred to as "whittle marks", and are the result of hot glass hitting a cold mold. Whittle marks result when molten glass, over 2000 degrees Fahrenheit, hits a metal, clay or wood mold that is

not sufficiently hot.[4] These marks affect the surface of the glass but do not compromise the structure or function of the vessel. Most mass-produced glassware had whittle marks until the early 1900s, when mass production methods eliminated some of the temperature variables.

Seams were present at mold joints, whether the mold was constructed of wood, metal or clay. Two piece and three-piece molds left distinctive seams on intact glassware (Images 3 & 4, Appendix). The majority of bottles in the United States used two-part metal molds. From the post-civil war era to 1903, bottle molds were widely used, but the glass was injected into the mold by a skilled glass blower (Image 1, Appendix). Although the mold greatly sped up the process, the limits of human work capacity kept production number relatively low. The seam present on the fragment recovered from JBH 76 indicates the vessel was manufactured in a mold, but without the full vessel a definitive production method cannot be determined. Use of molds did not come into widespread practice until the latter half of the 1800s, and a rough estimate would date this fragment sometime between 1860s-1950s, when bottle seams and imperfections were commonplace.

Since its inception, glass bottles have been produced in myriad colors. Blues, greens, browns and clear or colorless glass are all typical of distinct time periods. This particular fragment is composed of colorless glass. Most glass used for household vessels, beverages and pharmaceuticals was soda-lime glass, produced of silica, soda and lime. Color is a result of oxidation and various imperfections in the composition of the glass.

Colorless glass requires controlling impurities, and most colorless glass before the 1950s maintained a blue tint. Pure silica glass would be completely colorless, but it is not practical for mass manufacturing given the expense of procuring such pure raw materials and the high melting

[4] Lindsey, B. "Bottle Typing/Diagnostic Shapes." *Historic Glass Bottle Identification & Information Website.* United States Department of Interior Bureau of Land Management. Web. 7 Dec. 2011 http://www.sha.org/bottle.htm

temperatures needed during production. The methods and impurities used to create various colors of glass were carefully guarded by artisans and commercial glass companies alike. Better understanding of glass chemistry in the late 19th century led to an increase in less-expensive colorless glass manufacturing and a rise in production of clear glass.

Color is a fantastic diagnostic tool for glassware dating. Generally, colorless glass was uncommon prior to the 1870s, as glass chemistry was not refined enough to eliminate impurities. Following the patenting of the Owens Automatic Bottle Machine, colorless glass manufacture exploded to dominate commercial glass products. This fragment is very small, and it is difficult to ascertain the exactly coloring of the piece, however as it is colorless, it likely can be comfortably dated post 1870.

Given the small diameter (1.1 cm) of this glass artifact, it is possible that it was a bottle used for liquid pharmaceuticals. The shape of the lip in addition to the straightness of the neck further suggests that this fragment may have been part of pharmaceutical bottle. The shape is very consistent with a bottle labeled "Barth's Tasteless Castor Oil", which had several medicinal uses in the 1900s. Castor oil was typically used to treat constipation and various skin abnormalities.

In the United States, the transformation of glass from a coveted luxury good to a mass produced item, happened extremely quickly. The rapid rise of industrial glass production changed Americans' attitude towards glass. Glass bottles and vessels were no longer coveted and saved, but became inexpensive, disposable, and ubiquitous. Glass was used for beverages, pharmaceutical bottles, and other containers. While it is difficult to ascertain from a small fragment what the larger vessel was, the features of this piece from the John Brown House property provide useful information and avenues of inquiry nonetheless.

References

Lindsey, B. “Bottle/Glass Colors.” *Historic Glass Bottle Identification & Information Website.* United States Department of Interior Bureau of Land Management. Web. 7 Dec. 2011 < http://www.sha.org/bottle/colors.htm>

Lindsey, B. “Bottle Typing/Diagnostic Shapes.” *Historic Glass Bottle Identification & Information Website.* United States Department of Interior Bureau of Land Management. Web. 7 Dec. 2011 < http://www.sha.org/bottle.htm>

Lockhart, B.S., Pete, & Lindsay, B. 2010. “The Dating Game - The OwensBottle Co.” *Bottles and Extras*. Web. 5 Dec. 2011 <http://www.sha.org/bottle/pdffiles/owensbottlecompany.pdf>

Martin, S.W. 2001. "Glass," *History of Glass.* Discovery Channel School. Web. 5 Dec. 2011 <http://www.texasglass.com/glass_facts/history_of_Glass.htm>

Appendix

Image 1. A skilled glass blower injects molten glass into a mold assisted by workshop crew. http://www.sha.org/bottle/Glassmaking/gafferandmoldboy.jpg

Image 2. A colorless glass bottle. Blumaur & Heubner Pharmaceuticals. Circa 1878. http://www.sha.org/bottle/Bases/blumauer.jpg

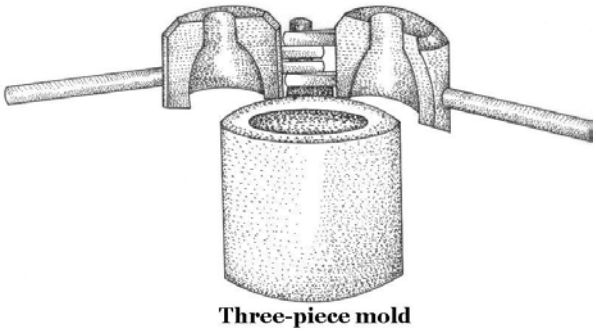


Image 3. A three-piece mold for mouth-blown glassware.

http://www.texasglass.com/glass_facts/history_of_Glass.htm

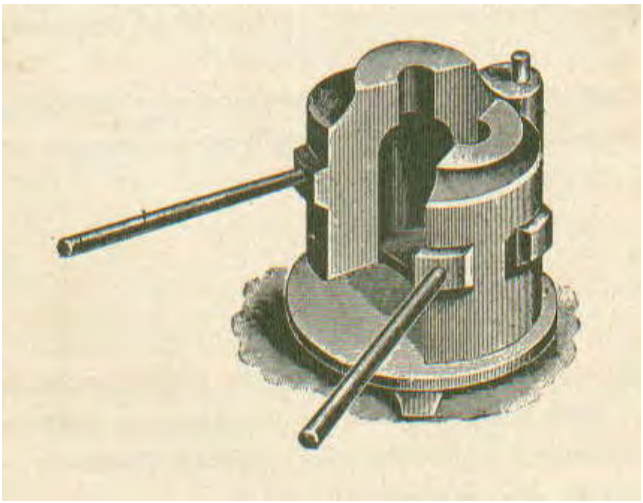


Image 4. A two-piece mold for mouth-blown glassware.

http://www.texasglass.com/glass_facts/history_of_Glass.htm

Decorated Whiteware

Sandra Mastrangelo

Throughout the 18th century, Chinese export porcelain heavily influenced colonial western interior décor, particularly table settings and silverware. Following the American Revolution, Chinese potters began to produce objects specifically for Western export.[1] As the export trade increased, the demand for familiar, utilitarian forms of tableware was also on the rise. Chinese porcelains were commonly regarded as objects of luxury and ceramic manufacturers often attempted to replicate the designs embossed on these costly pieces. Whiteware was a popular medium on which Chinese porcelain designs were emulated, as whiteware contains a significant vitreous component giving this tableware the appearance of porcelain.[2]

During the early 19th century, potters in Staffordshire, England began producing whitewares as an alternate to porcelain. This enabled their tableware be mass-produced and accessible to the cheaper market. A less costly method of applying decoration was also introduced, whereby designs were initially engraved on copper plates and then transferred to tableware before glazing and firing.[3] The resulting transfer-printed whitewares were widely imported throughout Europe and North America; the most popular designs were oriental motifs.

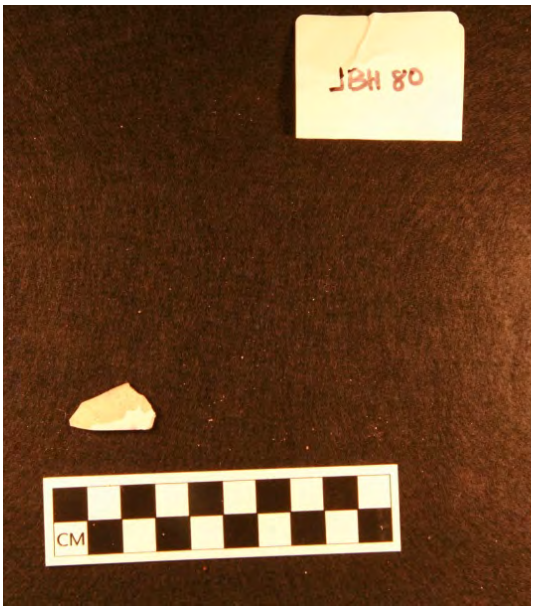
[1] The Metropolitan Museum of Art. "East and West: Chinese Export Porcelain." New York, New York. Web. 5 Dec. 2011 http://www.metmuseum.org/toah/hd/ewpor/hd_ewpor.htm

[2] Richerson, D.W. 1992. Modern Ceramic Engineering: Properties, Processing, and Use in Design, 2nd ed., revised and expanded.

[3] Halsey, R. T. Haines. 1974. "On Dark Blue Staffordshire Pottery, Together With Pictures of Boston and New England, Philadelphia, the South and West." Dover Publications. New York, NY.

These whiteware dishes had a functional purpose as they lacked the delicacy of the more expensive Chinese porcelain.

A small whiteware fragment was discovered in Unit 14 context JBH 80 on October 24, 2011. At initial glance in the field, this artifact seemed unremarkable, displaying no apparent diagnostic features. However, upon closer inspection in the laboratory, the fragment was actually marked by a petite pink floral motif with a light green stem.



While the majority of the fragment is plain, there is a distinctive floral design along the edge of the recovered piece. The fragment is 0.3cm thick and the visible part of the design extends 0.7cm along the edge of the fragment. The observable portion of the flower measures 0.2cm. Unfortunately, a diameter could not be obtained from the small sherd and the shape of the artifact could not be ascertained. Because it is a glazed piece of whiteware, it was likely part of a plate or saucer and was probably owned and used by the inhabitants of the John Brown House. Since porcelain may not have served a purely utilitarian purpose in the household, this whiteware emulation would constitute an acceptable substitute.

Although the Brown Family was actively involved in the China Trade, the name given to the early commerce between the Qing Empire and the United States under the Canton System from 1783 to 1844, the ceramic fragment that was unearthed from Unit 14 does not appear to be

porcelain. While the white glaze is very similar and the particular motif is one that often appears on porcelain, the clay paste is not vitrified enough to be classified as such.

Whiteware is characterized by its off-white, glassy appearance and is a commonly used material for fine china dinnerware. Whitewares are impervious to fluid, and have low conductive properties. Most of the clay used in fine whiteware is called kaolin, which is also known as china clay. It is the only type from which a white ceramic with a glassy appearance can be produced. It is refractory clay, which means that it can be fired at high temperatures without deforming. It is also white burning, meaning that it imparts whiteness to the finished ware.[4]

By 1820s, whitewares and semi-porcelains gained popularity throughout North America. While whitewares are difficult to accurately date, the approximate production range for whitewares is 1820-1900. It is plausible that this type of ceramic represents a transition type between pearlware and ironstone ware. Whitewares are typically denser than pearlwares and the glaze is much whiter in appearance, although a bluish tint can be present.[5] Perhaps the most obvious difference between whitewares and pearlwares is the introduction of a broader color palette to hand decorated and transfer-printed whitewares including pink, green, yellow and purple.

After research on hand-painted porcelain with floral motifs, this whiteware fragment appears to be emulated from Polychrome Chinese Export Porcelain, which has a broad

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[4] Reinhart, T.J. 1991. *Engineered Materials Handbook*, vol. 4, *Ceramics and Glasses*, ed. by Samuel J. Schneider

[5] Historical Archaeology at the Florida Museum of Natural History. 1995. "All Types in Collection: Ceramics." Florida Museum of Natural History. Web. 5 Dec. 2011 http://www.flmnh.ufl.edu/histarch/gallery_types/type_list.asp

production range of 1680-1850. According to the Florida Museum of Natural History Archaeology database, there are several defining attributes of this popular floral design. Fragments are typically decorated with opaque overglaze enamels in a variety of colors including green, pink, plum and yellow and motifs include detailed floral elements combined with animals, birds and geometric designs.

The motif depicted on the particular artifact recovered from context JBH 80 is most consistent with the "Famille Rose palette", which is distinguished by its predominately floral design featuring clear, bright, pink roses detailed in white. The date range for this family is between 1720 and 1850. Since the recovered artifact is not porcelain, it makes sense that the date range assigned to the whiteware falls after the production of this type of porcelain. Since it is a design that was most likely emulated onto the whiteware between the years 1820 and 1900, the dates are consistent with this proposition.

Interestingly, context JBH 80 contained a significant amount of ceramic sherds, primarily of the whiteware variety. While most of the recovered whiteware was plain, one other fragment appears to be transfer-printed with a Chinese motif. The sherd is distinguished by its scalloped design that is printed in powder blue.

References

Archaeology 1900: Archaeology of College Hill Field Notes. Fall 2011.

Haines, R.T. 1974. *On Dark Blue Staffordshire Pottery, Together With Pictures of Boston and New England, Philadelphia, the South and West,* Dover Publications. New York, NY.

Historical Archaeology at the Florida Museum of Natural History. 1995. "All Types in Collection: Ceramics." Florida Museum of Natural History. Web. 5 Dec. 2011 <http://www.flmnh.ufl.edu/histarch/gallery_types/type_list.asp>

The Metropolitan Museum of Art. "East and West: Chinese Export Porcelain." New York, New York. Web. 5 Dec. 2011 http://www.metmuseum.org/toah/hd/ewpor/hd_ewpor.htm

Reinhart, T.J. 1991. *Engineered Materials Handbook*, vol. 4, *Ceramics and Glasses*, ed. by Samuel J. Schneider

Richerson, D.W. 1992. *Modern Ceramic Engineering: Properties, Processing, and Use in Design*, 2nd ed., revised and expanded

Ryzewski, K. ed. 2009. *Archaeology of College Hill: John Brown House: Results and Interpretations from the Fall 2009 Excavations.* Providence, RI: Joukowsky Institute for Archaeology and the Ancient World, Brown University. Accessed at: http://proteus.brown.edu/collegehill2011/Home

Glass Top

Susana Ortega

My second object biography is a glass top that was found in Unit 11 context 85. This was also found on November 14, 2011. The bottle has a diameter of 8cm. The measurements are about 5cm in length and about 4cm wide. The glass top is broken in half across in length. On the outside half of the glass rim the color is dark green almost a brown color with some scratches and stains of yellow. The tip of the rim has two rings on top of each other forming the style of this glass top. On the other side of the glass top it curves inward making it a 'U' shape because it was one the circular glass bottle it was. On this side the tip of the glass rim is stained with the yellow color and the bottom is dark green. The middle section is also stained and scratched out with yellow. At the moment of finding we thought it might be some sort of liquor glass bottle.

My research included looking up at the website of glass in the social historic society. I found that it was a two part v-shaped glass that dates to the 18th century. So with my research I was able to find that it was a wine bottle but it was hard to define since I was only working with the top piece that I only have. The wine bottles came in a shade of olive green, with amber and aqua/colorless glass. And these bottles varied from small bottles that hold a few ounces to a bottle that can hold gallons. Wine bottles began to be used in the United States from the mid 17th century to present day. So it is safe to date this rim bottle as early as the mid 17th century. In wine bottles were rarely embossed but instead identified with label or blob seals. However, wine bottles turned away from blob seals and instead were unadorned. Wine bottles came in a variety of shapes it is especially diverse before 1860. The Belgian type bottle can be dated from 1700 and 1730, which was used for wine as well as rum. This bottle is thought to have a European origin and imported into the country and also thought to be used for sparkling wines because of

the heavy glass which could withstand the pressure of carbonation. The chestnut flask is early American made by a New England glasshouse from 1790-1820. This type is free-blown and has a color of medium olive green. The black glass, which is very dark olive amber, was used for wine, spirits, ale/cider bottle. This also is of early American origin and blown by the *New England Glass Bottle Company,* 1827-1845. The name of the company is usually embossed faintly on the base of the bottle. And then there was the utility bottle that was blown in a dip mold, which dates from 1850 to 1870. And looking at this last bottle type we notice that as time progressed there was a change of shape of the bottle that were wider and then turned to be taller and narrower.

This glass top is olive green and amber. The use of iron, chromium, and copper all produce different green glass. By the reduce conditions in the glass furnace, the glass would be more emerald green, and with chromium oxide it will make a more yellowish green. The use of olive greens and ambers were found in a lot of different bottles from different eras. But generally were used and were common in the 19th century than the later 20th century (Historic Glass Bottle Identification and Information)

Because this is glass top was found in the John Brown House it would make sense that its shape would be a chestnut flask because this was made in New England. But it could be possible that it has been imported like the Belgian type. Though the black glass was also made in New England, due to the dark color I am not so sure that this could be the body shape of this glass top. As having the rim as my only evidence to find information I began to look up wine finishes, which consist of the lip, string rim, and bore. The string rim is what the lower ring is; the lip is the upper ring. From mid-17th century to 1760s the finishes of wine bottles has been of cracked-off or fire-polished lip and a string rim, where the string rim would be the more dominate

feature. By 1760s the work of the lip began to be done and by the end of the 18th century the lip was extensively tooled and glass was added onto the neck not only the string rim but also the lip. And soon the lip became wider and taller but the string rim became constant in its size. This was done so the string rim can have a suitable ledge for attaching the wire to hold down the cork. And no practical reason for change only for appearance (Jones 33). But it is interesting because once looking up the finishes in the website it seems that my rim is indicated as a double ring which is said most commonly medicine bottles used this but the examples shown are of clear, aqua, or blue color which contradicts the color of what I have. But it does mention it is from liquor flask but rarely found in wine/champagne bottles. Though I was able to indicate this as wine bottle it is still difficult to be certain and an expert is needed to determine to bottle type.

Works Cited:

Jones, Olive R. *Cylindrical English Wine and Beer Bottles 1750-1850.* Ottawa: Minister of the Environment, 1986. Print.

Animal Bone

Susana Ortega

My first object biography is an animal bone from Unit 11 context 85. This artifact was found on November 14, 2011. This bone is measured to 3 ½ inches long and about 1 ½ inches wide with the diameter as a little less than 8cm. The bone appears to be broken in half from length from what appears to be a whole bone. On one side it curves out and the other side it is more flat but the middle is carved in. This could have been a more circular, whole bone. The bone itself is very wood-like and the color is light brownish/ yellowish. In fact, this is what exactly I and my other team workers this was: a piece of wood. But it only was later when we truly found out it was a piece of animal bone. Though the bone's side is curved as a 'U' for being a broken half bone, on one side of the bone it is flat. Because the bone is broken the side narrows from the top and gets wider in the middle and then goes back to being narrow. The widest part of the flat side is measured as more or less ½ inch wide across. So this was pretty interesting. The edges of the bone is cracked and broken in an angular edge. During the process of getting the bone from the excavated site to the lab two little pieces were broken from the tip of the edge due to the fragileness and because it was damp from the rain in the ground. In the front and back side of the bone there are scratches and lines, especially the side where it curves inward and giving itself the features of wood.

Based on the small sample of animal bone I have, it was hard for me to indentify which of the animal skeleton this animal bone came from. However, because of the width of the bone it looks as if it belonged to either a cattle or pig. I think it is also safe to say how this came from a long bone. Davis also reminds us how not all mammals had the same number of diagnostic bones (36). This also shows the difficulty in which mammal this would have come and in order to do

this we do need other samples from cows or pigs to compare this bone with other bones. He also points out how the bones represent what was killed not what the proportions of husbanded animals or the "the life assemblage" (36). Davis explains how the amount of identified bones can give us certain amount of information. For example, he mentions how 100 identified bones can tell us what proportions man exploited the species, while 10 identified bones told us which species were exploited (46). However, with my situation I only have one animal bone sample and am not too certain of the species it had come from. Remains may also indicate in what kind of environment existed in the past based that the "animal's present-day dietary and climatic preference were the same in prehistory" (61). The methods that can be used to do analyze the past's environment is to by the "presence or absence of animals […], their abundance within an assemblage and the diversity of the assemblage, body size, [and] body shape" (61). In order to date this animal bone, we would need to use radiocarbon dating, though it is known to be a long and expensive process (Luff 7). Another way to analyze the dating of this bone is to see if the fluorine and uranium contents of the mineral component have increased whereas nitrogen decreases. This is another technique to find out whether the bone is of recent date or of the latter (8-9).

I think the steps needed are to get a specialized zoo archaeologist, who knows what they are doing. With that, we will be able to have a certain verified result of the species that this bone belonged to and then find out what part of the bone it is from. After, it would be a good idea to get further comparisons with other bones from that species so that way we can figure out the sex and other important information. Lastly is to get a date from this bone so we can see if it has anything that is relation with the John Brown House. So I think further investigation is needed for this animal bone.

Works Cited:

Davis, Simon J.M. *The Archaeology of Animals.* New Haven and London: Yale University Press, 1987. Print.

Luff, Rosemary-Margaret. *Animal Remains in Archaeology.* Risborough: Shire Publications, 1984. Print.

Clay Pipe Fragment

Nicholas Sinnott-Armstrong

This piece of kaolinite clay smoking pipe was found in Context 82 of Unit 13. It is approximately 2cm long and just under a centimeter in outside diameter and is just a fragment of the stem. While Oswald's bowl typology is not relevant to the recovered piece, there is a clear diameter and the internal dimension of the pipe was measured at 3/32 inch. Deetz's formula gives a date range between 1680 and 1720 for such pipes, and this is confirmed by Binford's (which gives 1702) and Heighton and Deagan's formula (which gives 1712) as the most likely range. At that time, the United States had not yet been formed and the primary colonial power in New England was Great Britain. As the price of tobacco increase over the period of North American colonization, the bore diameter of pipes shrunk quite linearly with it, thus giving a good indication of the age of a pipe from its diameter. Gojak and Stuart provide a detailed overview of another British colony's history of pipe use, showing how Australian pipe recovery can lead to a powerfully complete image of trade throughout the Empire. While this pipe stem piece has none of the identifying marks or bowl shape indications discussed therein, it does provide a good indication that further excavations could lead to more, and perhaps more diagnostic, discoveries regarding usage at the time.

One thing remains clear, however; the date range of the Hale Ives House, which has a first recorded year in the mid 19th century, and even Providence itself, which was first settled by Europeans by Roger Williams in 1636, show how early the bore dating of this pipe actually is. With such a temporal discrepancy between even the John Brown House's late 18th century construction and the age of this fragment, one must further postulate on the use or construction of such a pipe. One possible explanation is that this pipe is simply an outlier, a large-bore pipe produced in an era primarily of a smaller diameter smoking. Harrington shows that, while rare, smaller diameter pipes were produced up through the end of the 17th century. In fact, Mallios argues that we should focus less on bore diameter and more on the shape of the bowl as a dating technique, as the variation in bore size along in the length of a pipe is significant. As there is no indication in this fragment of where on the stem it came from, this could present some difficulty in dating the artifact. One other potential option is the acid and moisture characteristics of the soil have altered the bore diameter post hoc, but the durability of kaolinite clay makes this unlikely.

The question remains, however, how such an early, utilitarian artifact was kept around for so long in the presence of human activity. One possibility is that it was brought to the site as a trinket or

from an earlier time, though this is unlikely because of the fragility of pipes and low value of their broken pieces. That such a fragment rested with artifacts dated mostly to the mid-19th century is quite puzzling. Suppose for a moment that, in the construction of the Hale Ives house, there were trenches or holes dug around the house in order to level the foundation. This upturned soil would have come before the Hale Ives house, and could plausibly be the origin of such an artifact. The pipe fragment is similar to a cigarette butt, something that we see every day and rarely bat an eye. Thus, it is unlikely that it would have been preserved intentionally. Instead, a more plausible explanation is just that a happenstance led to its reconstitution in the later soil. This might give clues to the process by which the soil was deposited.

As another possibility, suppose that this pipe was indeed in an outdated style but produced during the era of the Hale Ives house. This is not impossible, as this was an expensive and important neighborhood that might be rooted in old ways. If an individual within the family was a fan of the larger bore diameter – or addicted to the larger quantity of nicotine there absorbed – then it would make sense that they would attempt to get the larger sizes available. This is akin to the small number of dedicated individuals who use fountain pens today.

All in all, it is difficult to tell exactly what the origin of this pipe fragment is. Without more pipes to do bulk dating or written evidence of their use, little can be said for sure. The pipe segment itself, however, is interesting as a cultural object and gives a better sense of a home and past life to the site.

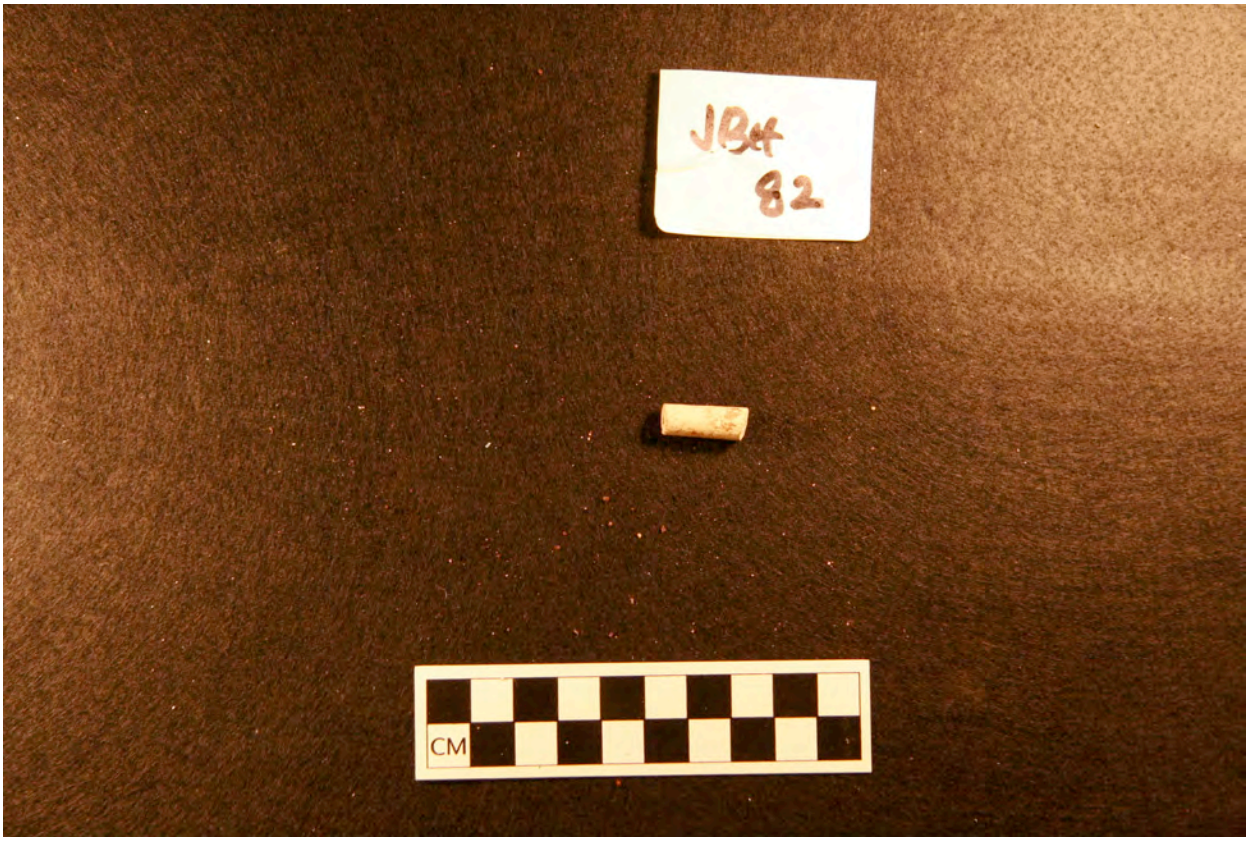
Citations

James Deetz. In small things forgotten: an archaeology of early American life. Anchor Books/Doubleday (1996).

Denis Gojak and Iain Stuart. The Potential for the Archaeological Study of Clay Tobacco Pipes from Australian Sites. AUSTRALASIAN HISTORICAL ARCHAEOLOGY Vol 17 (1999), pp. 38-49.

Seth Mallios. Back to the Bowl: Using English Tobacco Pipebowls to Calculate Mean Site-Occupation Dates. Historical Archaeology, Vol. 39, No. 2 (2005), pp. 89-104

Sean Michael Rafferty and Rob Mann. Smoking and culture: the archaeology of tobacco pipes in eastern North America. University of Tennessee Press (2005).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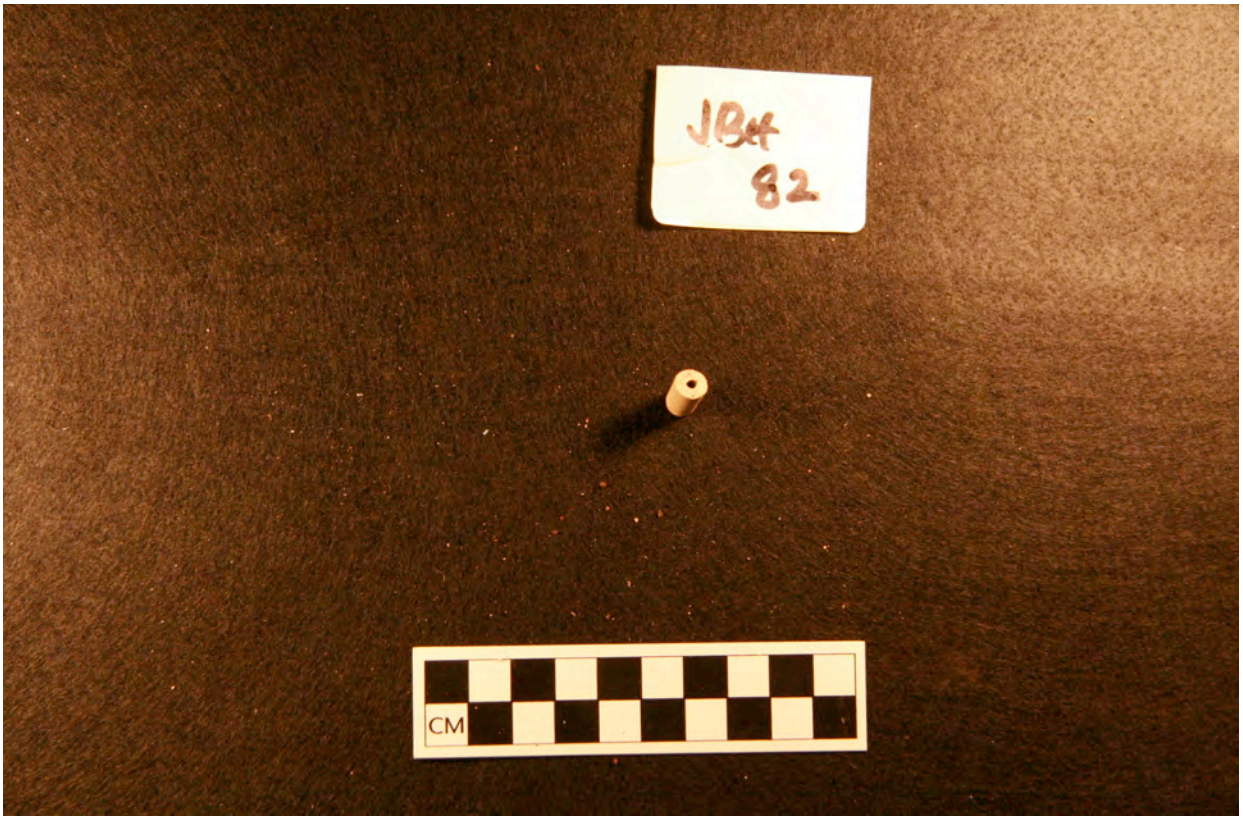

JBef
82
CM

Unidentified Metal Fragment
Nicholas Sinnott-Armstrong

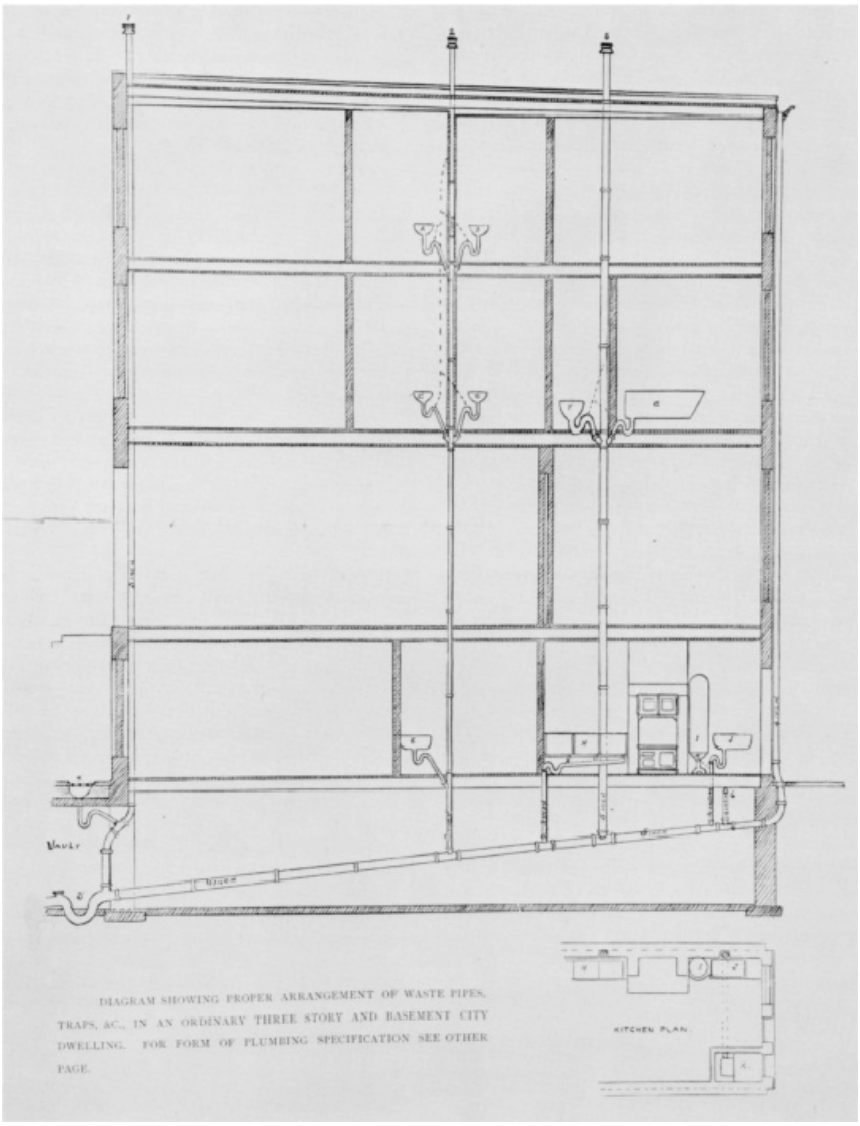
This highly corroded metal fragment, made of iron, was found in Context 78 of Unit 13. Surrounded by many other similar shards of nearly the same vintage, this piece is 9.5cm long and 1cm thick with an interesting bend in it and threads, along with an extruded head, on one end. The piece is very rusted and hard to identify, but it seems to be part of a pipe fitting. The threads would have screwed into the rest of the pipe system and the other parts of the connector, now corroded through with age, would have sealed it for water transport. This would have provided a rigid system to route all manner of human material, from refuse to bathing water, throughout the house.

It is likely that this pipe was for water transport, given that was the predominant form of piping at the time. Providence built its first sewage system in 1870, one of the first cities in the country to do so, during the same era one would expect were this the Hope Ives House remains.

The mid-19th century was a time of great change in the use of technology at home. Piping, water

heating, and more brought the advances of the industrial revolution to the citizens at their homes. Iron production was central to this change, as it allowed for durable, relatively low cost devices to be mass manufactured. Stone discusses some of the early history of drainage in America; she also presents this image from the April 1878 edition of Plumber and Sanitary Engineer, detailing the layout of a “proper” set of sewer pipes.

Note the number of fittings, particularly bent ones, in the image. These would have needed to be well sealed in order to fit the newly enforced sanitation codes, and iron piping was an effective way to do this.



While sewage systems are a possible source of this unidentified iron, the more likely explanation is water that was meant as a source. This is because the relatively small diameter is more

fitting of something where a higher pressure is desired, namely the application of water. It is unclear what sort of fitting it actually is, but either one associated with a small (hand) sink's runoff or the pressurized water for a sink or spigot are all possibilities.

In placing this artifact in the larger context of colonial America, the context is critical for a proper interpretation. Cast iron production is quite technologically complex, with temperatures required to produce it near 1500 C (Hodges 1988). While iron plumbing had not yet become an essential part of the domestic life of most Americans in the mid-19th century, it was pervasive among the rich aristocracy, precisely the site which we are excavating. In contexts 78 and 82 were enormous numbers of nails and other iron pieces, which would give me the impression that one (or both) was some sort of waste pile. Given that most of the artifacts which survived were highly durable and that there were small pieces of charcoal (and even slag!) present, it seems that there was some sort of fire or destruction event that occurred earlier in the history of these rubble. This is consistent with the idea that, at some point in the 1920s, Marsden Perry ordered the Hope Ives House destroyed; it would be through such a catastrophic event that so many disparate iron pieces could end up so close together.

One other option for the origin is that these artifacts are all deposited from a bathroom, or outhouse. The metal decorations, hinges, latches, nails, and pipes would support this hypothesis, as would the charcoal, which would heat the outhouse in the winter, and the medicine bottle, which could have been associated with the medicine cabinet as it is today. The irregularly shaped iron pieces could be parts of larger structural elements or simply functional locks and bolts. It is not unlikely that, upon the installation of a plumbing system in the main house which attached to Providence's sewage system, the outhouse would be destroyed. In fact, the pipe found in Unit 14 could be just that, though the amount of time available for excavation of Context 88 makes it difficult to say.

In conclusion, it appears that the fitting, while somewhat puzzling at first, fits well into a larger set of iron artifacts and materials remains from the era. Given the durability of iron, further excavations would likely reveal more details as to how this piece work in the domestic setting of the Hope Ives House.

Citations

Edward Fitzpatrick. "Rhode Island was one of first states to build sewers and treatment plants ," 2010. Available from http://www.politifact.com/rhode-island/statements/2010/nov/28/jamie-samons/rhode-island-was-one-first-states-build-sewers-and/.

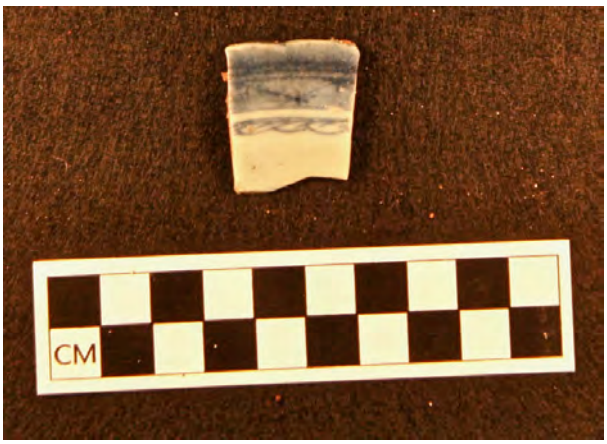
H. Hodges. Iron and Steel, Ch. 5 in *Artifacts: An Introduction to Early Materials and Technology,* p.80-90 (1988).

Steven Mintz. "Housework in the Late 19th Century America." Digital History. Available from http://www.digitalhistory.uh.edu/historyonline/housework.cfm.

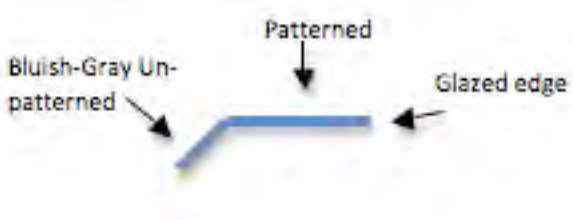
Maureen Ogle. "When Household Plumbing was Do-It-Yourself." New York Times Opinions, September 5, 1996. Available from http://www.nytimes.com/1996/09/05/opinion/l-when-indoor-plumbing-was-do-it-yourself-181960.html.

Mary Stone. "The Plumbing Paradox: American Attitudes toward Late Nineteenth-Century Domestic Sanitary Arrangements." *Winterthur Portfolio*, Vol. 14, No. 3 (Autumn, 1979), pp. 283-309.

Porcelain Sherd
Hannah Sisk



This Canton porcelain sherd was pulled from Unit 11, JBH 86, on November 7, 2011. It measures approximately 2.5 cm along its blue-patterned edge, 2 cm along the opposite, inner edge, and is just over 2.5 cm tall (from patterned to un-patterned). The sherd is not very thick, suggesting that it comes from the edge of a plate, bowl, or platter; this is further supported by the presence of glaze and some patterning fully covering one unbroken edge of the sherd, nearest the patterned area. The sherd is curved such that the patterned area and the glazed edge are parallel to a table surface when the un-patterned portion is positioned out and down at a slight angle to the surface below (see adjacent diagram).[1] This suggests that the sherd belonged to a plate, or, more likely given the larger angle of the curve, a larger serving platter. The side opposite the patterned side was originally a glazed white color, though today is covered by dirt, sand, and mortar that was unable to be removed, acquired from its time buried in JBH 86.



Though initially thought to be a pearlware fragment, due to the distinctive bluish-white hue covering the body of the sherd, a further examination showed that the clay was even and pure throughout, diagnostic of porcelain. The pattern on the porcelain sherd is, specifically, similar to those found on Canton Porcelain plates, platters, and bowls (see below for examples).[2]

[1] Note: the sherd is more curved and lipped in reality than the diagram above might indicate.
[2] "Porcelain, Canton," Historical Archaeology at the Florida Museum of Natural History, accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PORCELAIN,%20CANTON.

The sherd is white/grayish-white with a "glass-like vitreous paste" that, indeed, is "slightly thicker than other porcelain types."[3] Unlike fine "bone china," this sherd is heavily glazed and somewhat sturdier, further supporting the idea that it came from a plate or serving platter. The glaze on the sherd also seems to have a "slightly oatmeal texture," again indicative of Canton Porcelain, though it is difficult to determine whether the texture comes from the glaze itself or as remnants of being buried.[4] As mentioned above, the patterning on the sherd is also diagnostic of Canton Porcelain. Typical Canton Porcelain plate designs included Chinese garden or village scenes.[5] Though there is not enough remaining of this sherd to tell what the main, center design might have been, the outer rim design is comparable and diagnostic, displaying the characteristic blue scalloped or wavy line design.[6] Finally, the sherd also displays an odd indent on the glazed edge that at looked like part had been broken or chipped off). However, the indent was still covered in glaze, and upon looking at more Canton Porcelain examples, it appears that this "chipped look" was actually intentional, a stylistic choice indicative of Canton Porcelain (see image below, with indented rim).

Above: Sherd from JBH 86. Below: Example Canton Sherd. Note the similar scalloped-edge design.

Image from: http://www.flmnh.ufl.edu/histarch/gallery_types/individual_display.asp?PhotoID=188

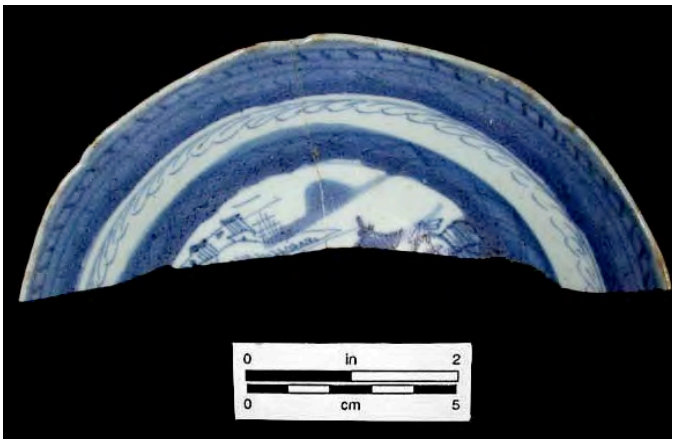


Image from: http://www.flmnh.ufl.edu/histarch/gallery_types /individual_display.asp?PhotoID=180).

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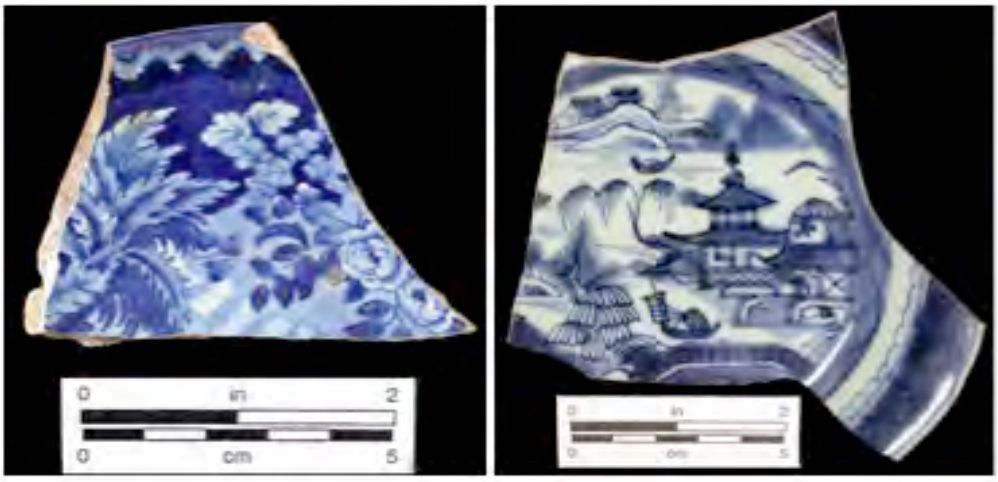
[3] "Porcelain, Canton."
[4] Ibid.
[5] Ibid.
[6] Ibid.

The method for creating porcelain was developed originally in China, where pieces were baked in temperatures ranging from 1250-1400 degrees Celsius to yield the "most highly vitrified of the basic [clay] paste types." [7] Like in the sherd found in JBH 86, true porcelain sherds yield no difference between the body and the glaze.[8] Another unique aspect to porcelain that added to their value was the fact that most porcelain pieces were hand painted. [9] This becomes another diagnostic tool with this sherd, as on the unbroken, glazed edge of the piece, there is the distinctive presence of dark-blue paint; whoever painted the piece must have accidentally gotten some on the edge. Though potentially viewed as flaws by today's standards, the presence of slight imperfections on 18th-19th century porcelain was the sign of expensive craftsmanship, of things that had been hand painted rather than solely mass produced, such as the comparatively cheaper Transfer-Printed Pearlware that became popular during the same period (see below for a comparison of the two).[10]



The crisp lines, definite shapes, and vibrant blues of a Transfer Printed Pearlware sherd (L) versus the hand painted style and gray-blues of the Canton Porcelain (R).

Images from:
http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PEARLWARE,%20TRANSFER%20PRINTED
http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PORCELAIN,%20CANTON

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[7] Stelle, Lenville J., "An Archaeological Guide to Historic Artifacts of the Upper Sangamon Basin," Center For Social Research, Parkland College, Accessed December 11, 2011. http://virtual.parkland.edu/lstelle1/len/archguide/documents/arcguide.htm.

[8] Stelle, "An Archaeological Guide."

[9] Ibid.

[10] "Pearlware Transfer Printed," Historical Archaeology at the Florida Museum of Natural History, accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PEARLWARE,%20TRANSFER%20PRINTED.

Canton Porcelain was manufactured in Canton, the capital of the Chinese province of Guangdong, between 1790 and 1835.[11] Interestingly, given its refined nature and the fact it was hand painted, the ware was quickly produced and exported in bulk to the masses in the United States, shortly following the American Revolution.[12] The amount of ware, and its sheer speed of production, accounts for its relatively low price (even though it was porcelain!).[13] This rapid nature of production also accounts for the simple designs and, at times, sloppy latticework, that makes up many Canton Porcelain scenes and rims. It also might explain the excess paint that is present on the unbroken rim of the sherd found in JBH 86. Because of its sheer popularity and presence in post-war colonial America, it is quite appropriate to suggest that Canton Porcelain would have been used in the John Brown Household. Furthermore, John Brown was a wealthy merchant with a particular interest in China and Chinese goods, as seen in the some of the pieces on display in the John Brown House. Similar sherds of Canton Porcelain have also been found during past excavations,[14] so it is likely that the John Brown House owned many porcelain pieces, especially, again, given Canton Porcelain's popularity, cost and, nevertheless, elegance during the time period when the Brown family would have been living in the house. These pieces, broken and thrown away over the years, would certainly have ended up in places throughout the yard, especially areas such as Unit 11, where there seems to be a great deal of refuse in between and around the two stone walls.

Works Cited

Historical Archaeology at the Florida Museum of Natural History. "Pearlware Transfer Printed." Accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PEARLWARE,%20TRANSFER%20PRINTED.

Historical Archaeology at the Florida Museum of Natural History. "Porcelain, Canton." Accessed December 11, 2011. http://www.flmnh.ufl.edu/histarch/gallery_types/type_index_display.asp?type_name=PORCELAIN,%20CANTON

Stelle, Lenville J. "An Archaeological Guide to Historic Artifacts of the Upper Sangamon Basin." Center For Social Research, Parkland College. http://virtual.parkland.edu/lstelle1/len/archguide/documents/arcguide.html.

[11] "Porcelain, Canton"

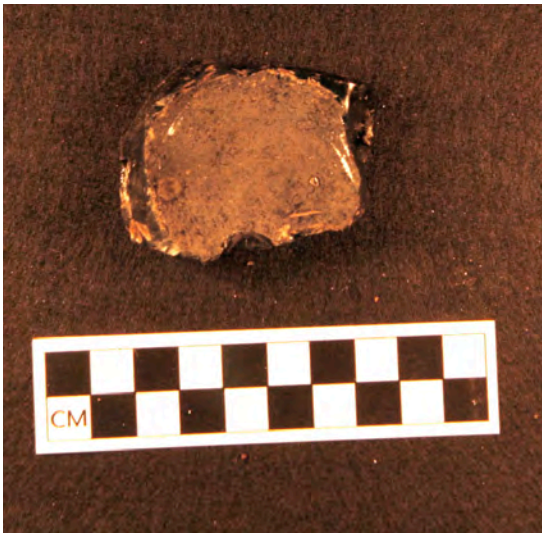
[12] Ibid.

[13] Ibid.

[14] See JBH Excavation Reports 2008-2010, specifically the sections on Object Biographies.

Wine Bottle Base

Hannah Sisk



This "black glass" bottle base from a wine bottle was found in JBH 86 of Unit 11 on November 7, 2011. It measures 5.5 cm wide, just over 4 cm high, and is 2 cm thick. The shape of the base is circular and curves concavely inward (seen in the photo below, lying on its side). It is important to note that the base is broken itself (not whole), probably displaying only 10-20% of the actual, original base. On the side of the glass fragment that is curved outwards, there is a distinctive circular indent (see in the photo on the left) that is the pontil mark, or the mark leftover from when the glassblowers broke off the rod used to heat the glass in the fire.[1] Finally, the color of the glass is a very dark, early opaque green, which can be seen when the piece is held up to the light; otherwise, it looks almost black.[2]

This unique color was the first diagnostic tool, suggesting that the fragment came originally from an

[1] Olive Jones and Catherine Sullivan, *The Parks Canada Glass Glossary: for the description of containers, tableware, flat glass, and closures*, (Hull, Quebec, Canada: Minister of Supply and Services, 1989), 86.

[2] Note: the cloudiness on the glass fragment in the photos is do to residual grime from being in the soil. Even after multiple cleanings, it always dried like that. This grime may have added to the fact that initially looked solidly black.

alcohol bottle. 17th, 18th, and 19th century liquors were typically held in "black," or dark green glass that would have kept the alcohol from spoiling.[3] This practice was first developed in the early 17th century and instantly became a popular reliable way to store alcohol.[4] The dark color protected the product from light, while the thick nature of the glass provided a more secure structure and, therefore, less breakage.[5] This thick nature matches the solid-nature of the sherd found in JBH 86, further suggesting that the bottle base belonged to some sort of alcohol bottle.

Bottles are best identified by both their bases and their necks.[6] Working here with only the base proves slightly challenging, though the shape of the base itself proves helpful. One unique feature of 17th-19th century alcohol bottles was their variety of shapes; each type of alcohol was typically manufactured and sold in a distinctive shape.[7] After examining examples and descriptions of these shapes, it seems that the glass fragment found in JBH 86 most likely came from a wine bottle. A "wine bottle" was considered the "generic term to describe the dark green glass bottles with a circular cross section first developed in England in the mid-18th century;" the "bottle in question should have a two-part finish, *an indented base*, a rounded, well-defined shoulder, and a neck one-fourth or one-third of the total body height, and *be dark-green in color*.[8] The sherd displays two of these characteristics. Unfortunately, we do

Figure 1 Image from http://www.sha.org/bottle/typing.htm

[3] Jones and Sullivan, *The Parks Canada* 71.
[4] Olive Jones, *Cylindrical English Wine and Beer Bottles 1735-1850 (English)* (Hull, Quebec, Canada: Minister of Supply and Services, 1986), 11.
[5] Jones, *Cylindrical English Wine*, 11-14.
[6] Jones and Sullivan, *The Parks Canada* 73.
[7] Jones and Sullivan, *The Parks Canada* 72.
[8] Jones and Sullivan, *The Parks Canada*, 72-73.

not know for certain what the neck and mouth was like, though because of its alcoholic nature, we can assume that the opening of the body was narrow-mouthed.[9]

Regarding manufacturing techniques, all English-made bottles made before the 1730s were mouth-blown. This process involved the glassmaker attaching the glass to a long iron rod and sticking it in the fire to shape it.[10] Once the glass was shaped properly, the glassmaker would break the rod off, yielding a pontil mark or scar, like the circular indentation on the fragment.[11] During the 1730s, English wine bottles started to primarily become "mould-blown," a technique that yields not a pontil mark, but seams and distinctive mould-blown textures.[12] Even if there was enough remaining of the JBH 86 fragment to distinguish mould seams, it is highly unlikely that they would be there, given the presence of the pontil mark.

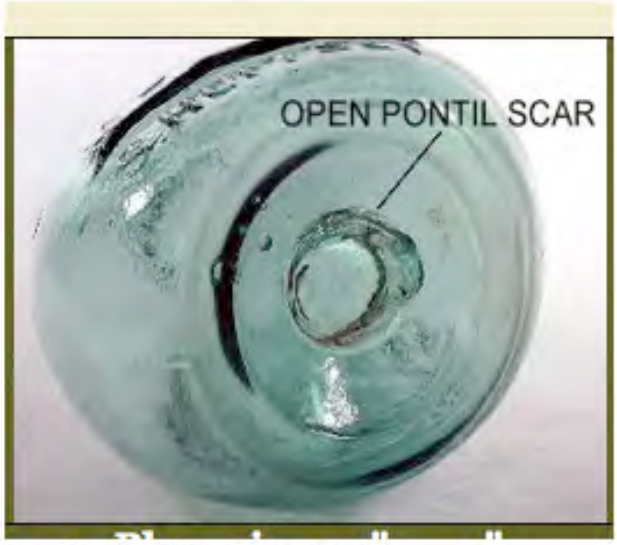


Image from http://www.sha.org/bottle/

Since people have been drinking wine for centuries, dating this piece has proven especially challenging. The manufacturing processes described above have not changed considerably over the years. For example, even though the English switched their primary bottle making method in the 1730s, mouth or free-blown bottles continued to be produced well into the 19th century (and even today!).[13] Furthermore, different countries developed different techniques, and all were exporting regularly to the United States when the John Brown House was occupied. Because of this, a definite date cannot be determined. Judging from the resources examined here, the bottle was probably manufactured sometime between the early

[11] Ibid.
[12] Ibid., 17.
[13] Ibid., 129.

18th to the mid-to-late 19th centuries. Part of what facilitates this huge age-range is that wine bottles were often reused, so a bottle that was manufactured in the late 18th century might be used pretty regularly throughout the 19th century.[14] Another aspect that makes it difficult to date is that the base itself is broken. As explained above, about only 10-20% of the original base is probably seen in the fragment today, meaning that the size of the base and therefore the bottle remains unknown, which is unfortunate because the base size can help with dating.[15] One example of a wine bottle that is potentially like the one this sherd was from is below, showing a wide base; however, we can't know for certain (there are also examples with skinnier bases, all from similar time periods).[16]

http://www.sha.org/bottle/Colors/nebottle.jpg

It is unfortunate that the absolute date and size of the bottle from this fragment remains unknown. What is known for certain, however, is that the inhabitants of the John Brown House would have had much alcohol (like all colonial households). As a merchant, John Brown especially would have had access to imported wines (in their imported bottles). It is likely that such bottles were used over and over again until they finally broke, and only then would be they have considered rubbish and thrown away.

Works Cited

Jones, Olive, *Cylindrical English Wine and Beer Bottles 1735-1850 (English)* (Hull, Quebec, Canada: Minister of Supply and Services, 1986).

Jones, Olive and Catherine Sullivan, *The Parks Canada Glass Glossary: for the description of containers, tableware, flat glass, and closures*, (Hull, Quebec, Canada: Minister of Supply and Services, 1989).

"Bottle Typing (Typology) & Diagnostic Shapes" website. Accessed December 11, 2011. http://www.sha.org/bottle/typing.htm#Liquor%20bottles.

[14] Jones, *Cylindrical English Wine*, 11-14.

[15] Jones and Sullivan, *The Parks Canada* 78.

[16] http://www.sha.org/bottle/typing.htm#Liquor%20bottles

John Brown House Ground Penetrating Radar Survey

Prepared by Thomas Urban

December, 2011

Introduction:

Ground penetrating radar (GPR) was used to ascertain volumetric properties (3-D imaging) of previously discovered features at the John Brown House site. Two areas were investigated. First, the northwest portion of the yard was the subject of a dense, gridded survey. This area had previously presented prominent anomalies with magnetic and electromagnetic methods and was also investigated with excavation. Second, the southern portion of the yard, west of the main house, was the subject of a more coarse survey (several profiles). This area had previously presented several pipe-like anomalies with electromagnetic methods.

Method:

GPR relies primarily on reflected energy from the propagation of electromagnetic pulses generated at the surface (figure 1). The two-way travel time of the observed signal can then be used to estimate the depth to an object or interface in the ground. Due to the very short wavelengths involved, GPR is capable of resolving finer detail than most other geophysical methods (though it may not work well where the ground is very conductive or insufficient contrast exists between the electrical properties of the target and the host medium). With appropriate processing, GPR data can be presented as profiles, planar images (depth slices), 3-D volumes, or combinations thereof. GPR data are most often expressed as relative amplitudes.

Technical Parameters

Instrument: Sensors and Software Noggin System

Mode of operation: reflection profiling (zero offset)

Frequency: 250 MHz center frequency

Transect interval for gridded survey: 20 cm (unidirectional east to west)

Processing: dewow, envelope, migration, total background-removal, time-depth conversion

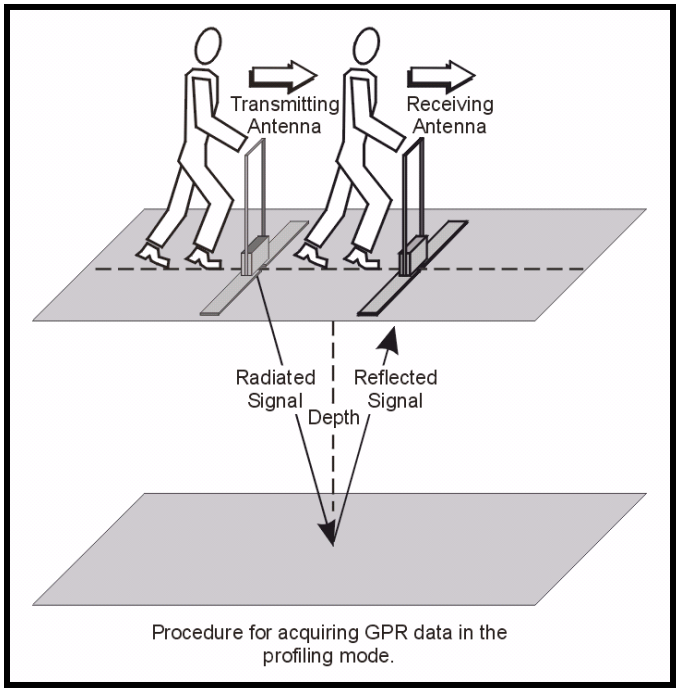


Figure 1: Principle of ground penetrating radar.

Results:

In survey area 1 (northwest yard) a complex palimpsest of features manifested in the survey results. While it is difficult to establish how many of the observed features are related, the geometry of particular features clearly demonstrates that they are human-constructed. These features occur over a fairly broad depth range and in many instances exhibit inconsistent strike directions, suggesting that there may be several episodes of activity represented here. It is certainly possible that some of the observed features are historical while others may be related to more recent infrastructure (e.g. sprinkler system). Excavation in the upper 2 meters at any given location in the survey area would likely reveal cultural deposits. The GPR results for survey area 1 are given below as a series of images (figures 2 – 14).

In survey area 2 (south yard) the coarse survey revealed anomalies consistent with the presence of pipes and associated trenches, supporting the previous electromagnetic survey results. The area 2 results are given below as a single figure with several section-view images (figure 15).

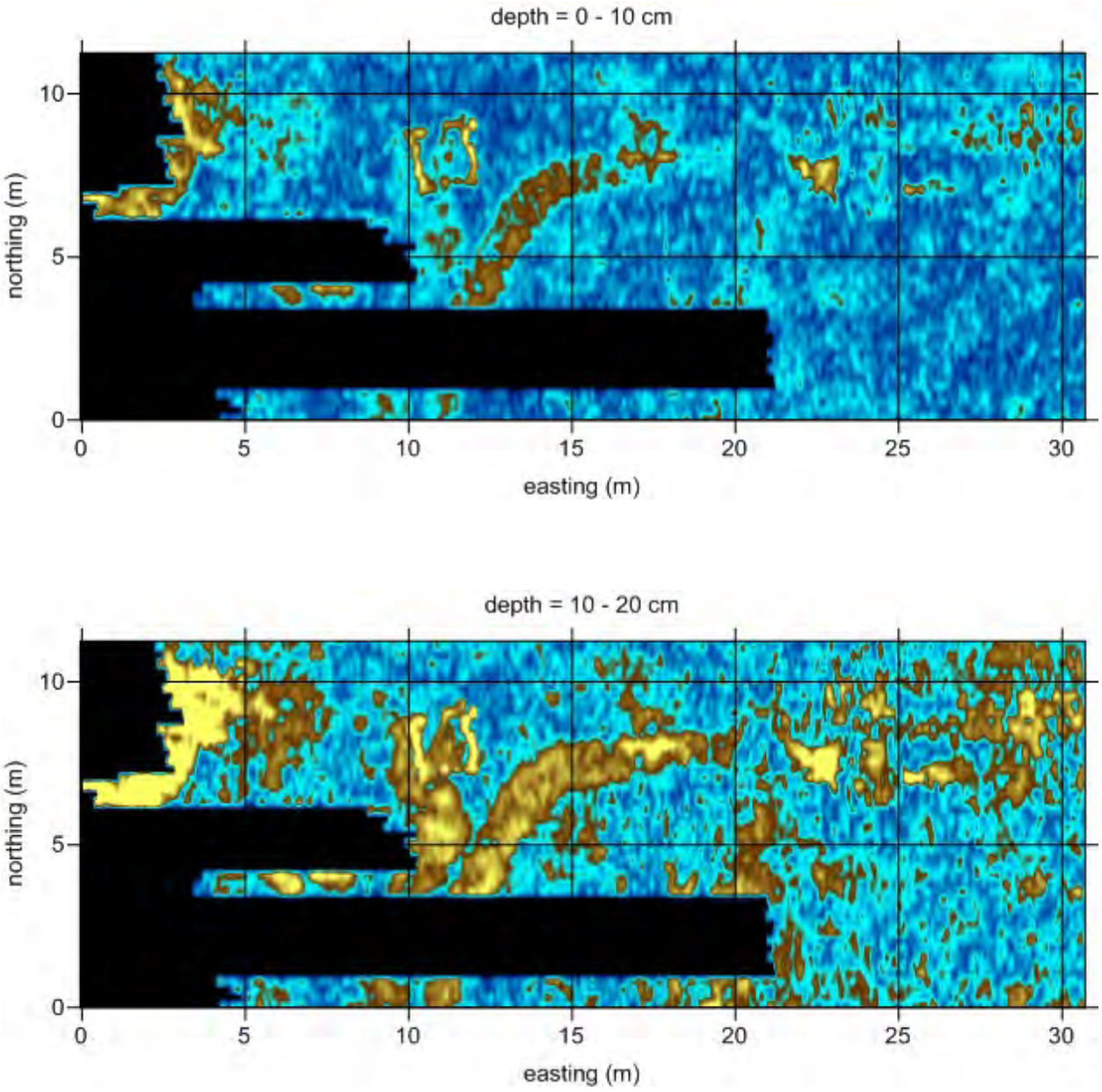


Figure 2: 0 – 20 cm depth slices. Prominent features begin to appear at very shallow depths within the survey area. The small rectilinear feature at approximately E12 N8 is the location of a previous excavation unit. The broader, linear feature appearing most prominently in the center of the survey area may be related to a shallow gravel-path as suggested with excavation. This feature appears clearly in several images below.

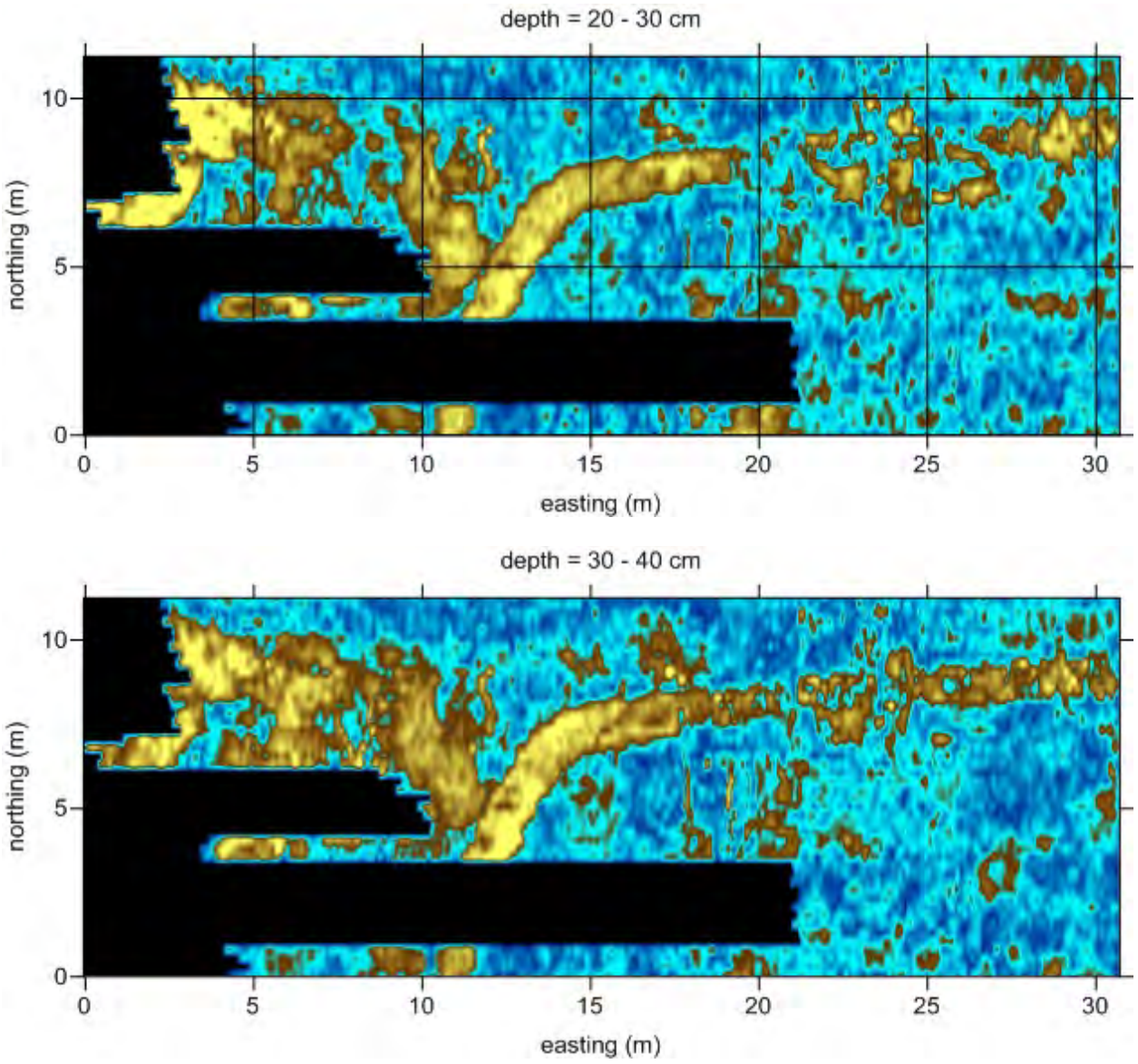


Figure 3: 20 – 40 cm depth slices.

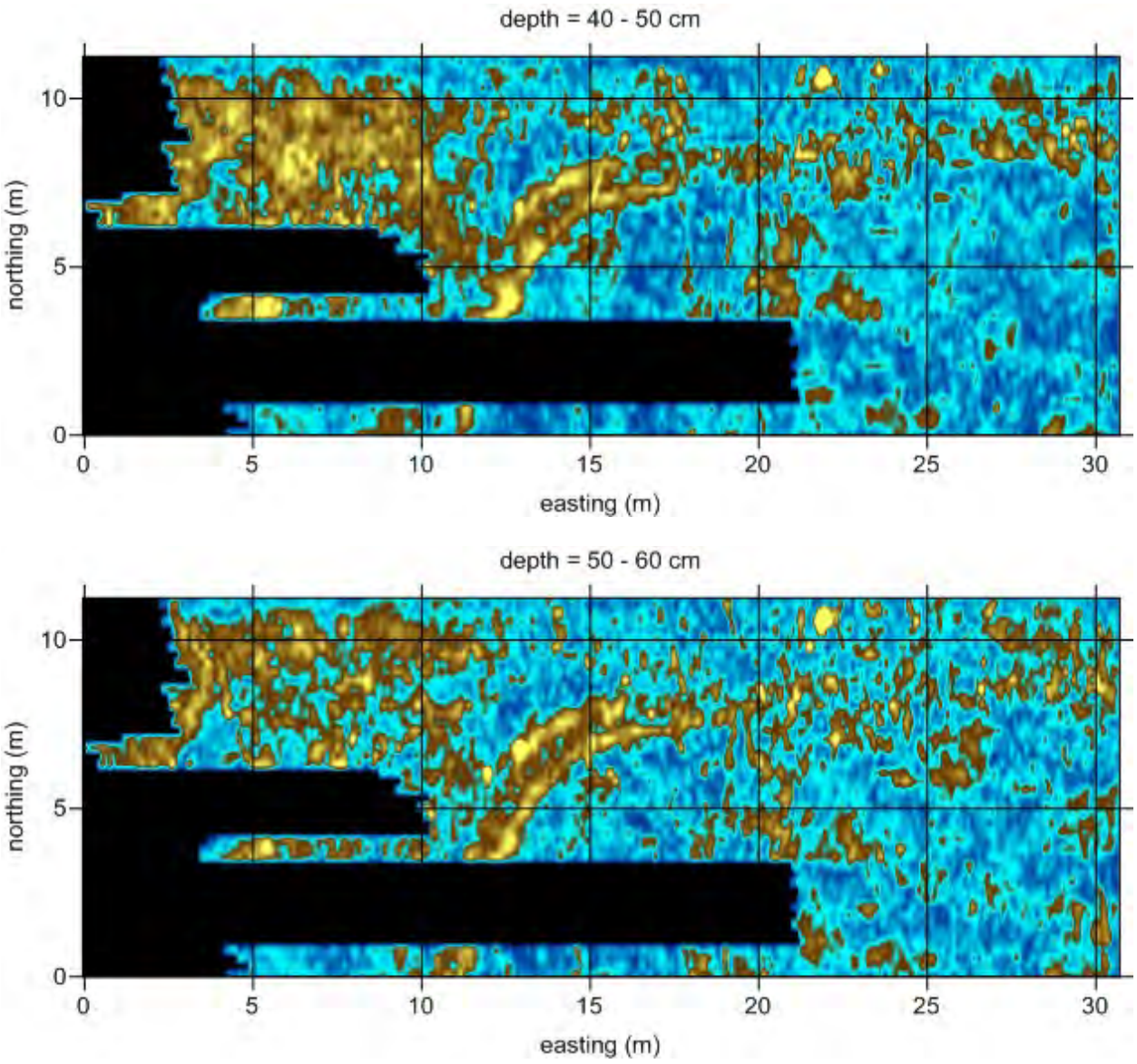


Figure 4: 40 – 60 cm depth slices.

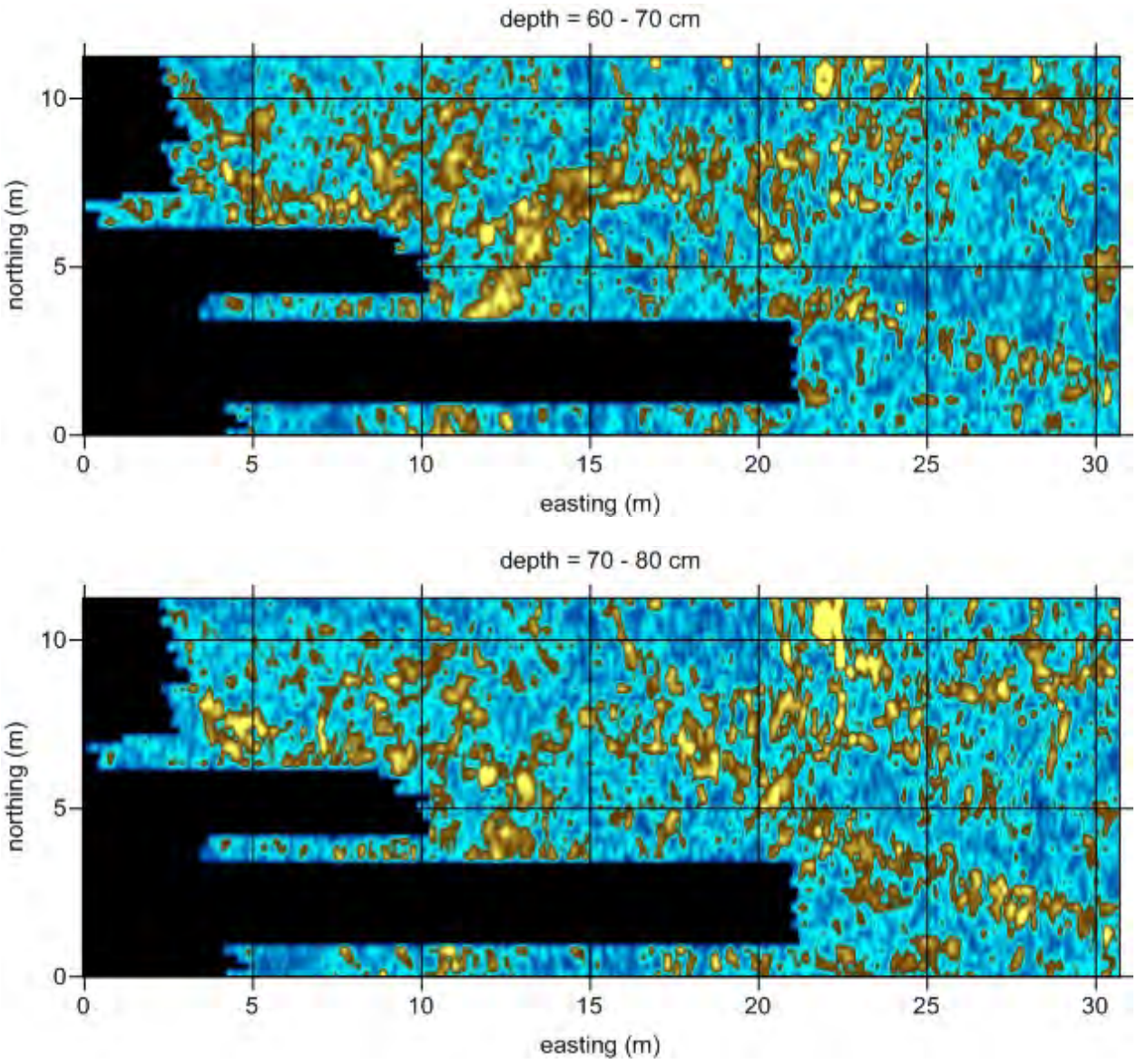


Figure 5: 60 – 80 cm depth slices. An odd, bowing linear feature appears at this depth range (striking from SE corner to N center) at the same depth as the shallower path-like feature begins to dissipate.

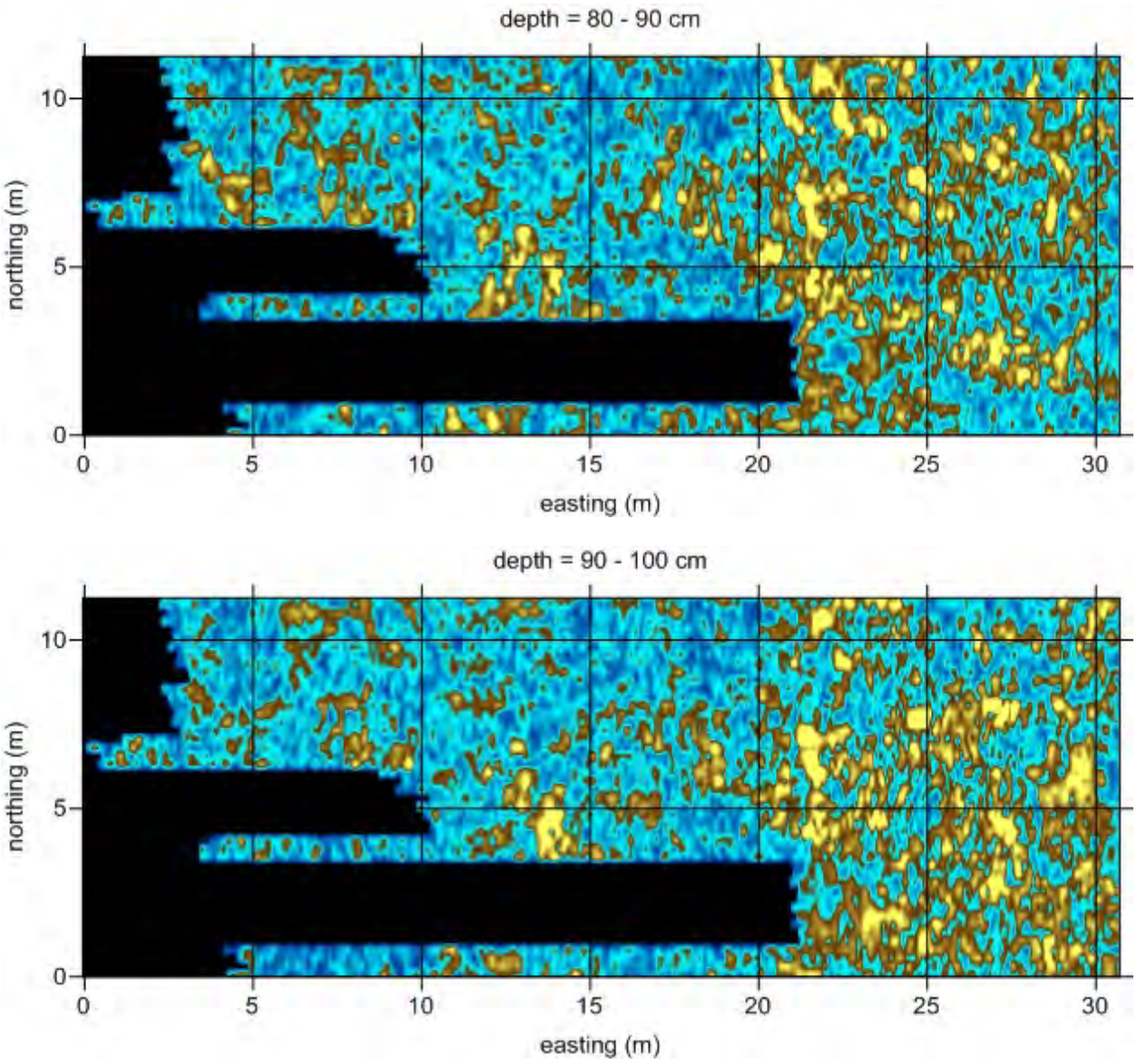


Figure 6: 80 – 100 cm depth slices. With the path-like feature gone, the odd, bowing feature dissipates at depths approaching 1 meter, while a new rectilinear feature (approximately 10x10 m) emerges in the eastern portion of the survey area. This feature seems to correspond closely in spatial distribution to a conductive anomaly detected with the previous electromagnetic survey.

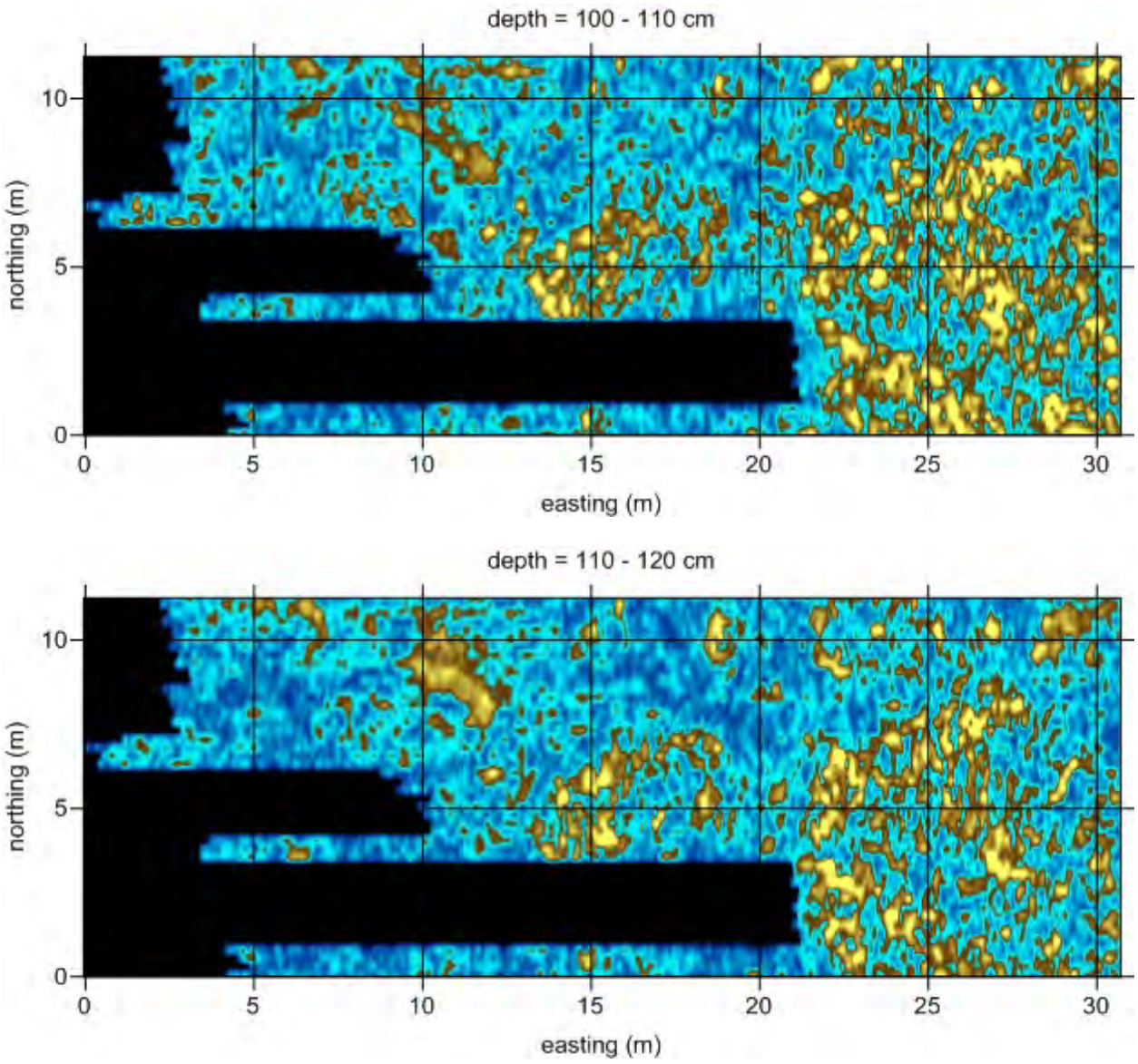


Figure 7: 100 – 120 cm depth slices.

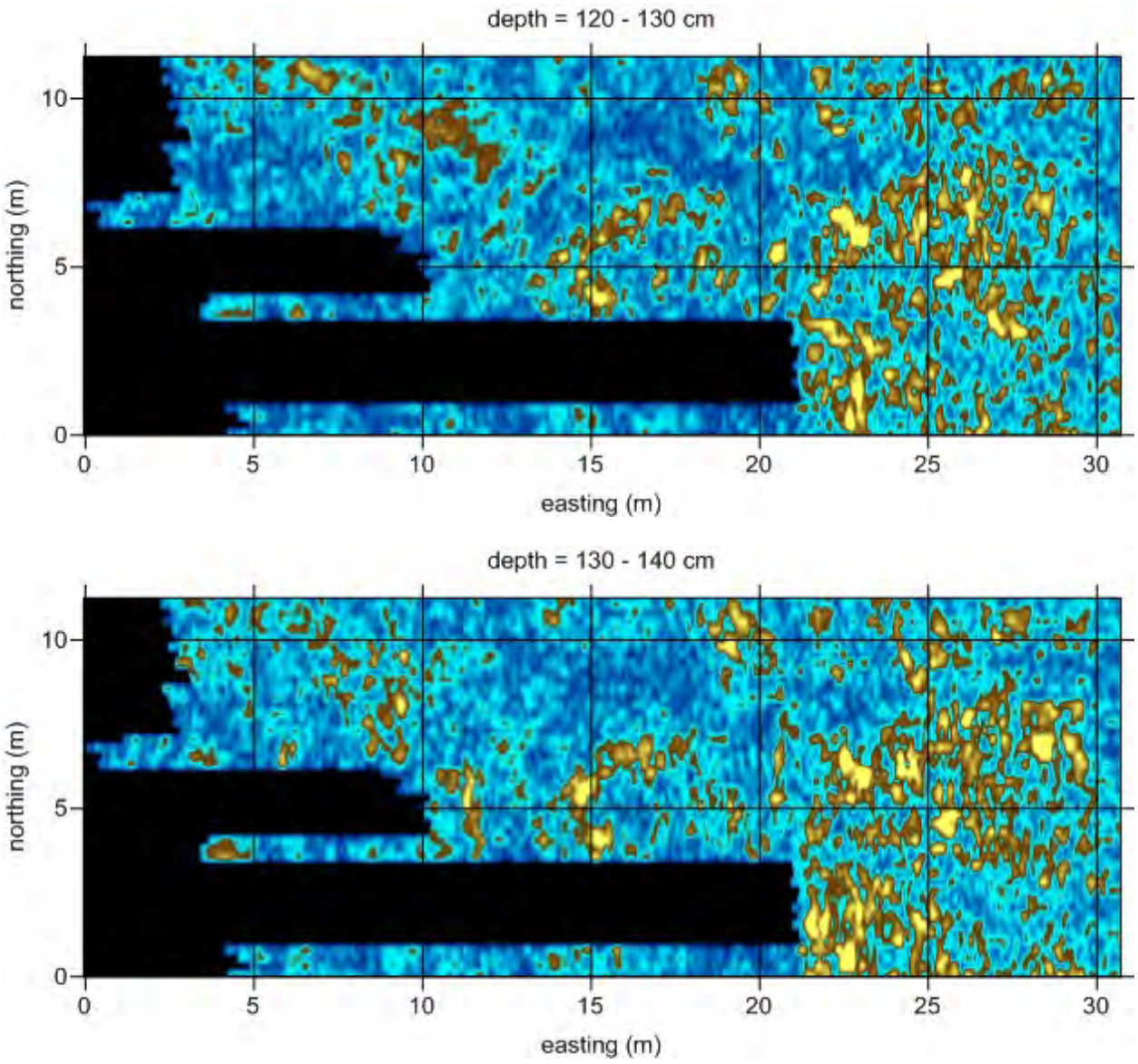


Figure 8: 120 – 140 cm depth slices.

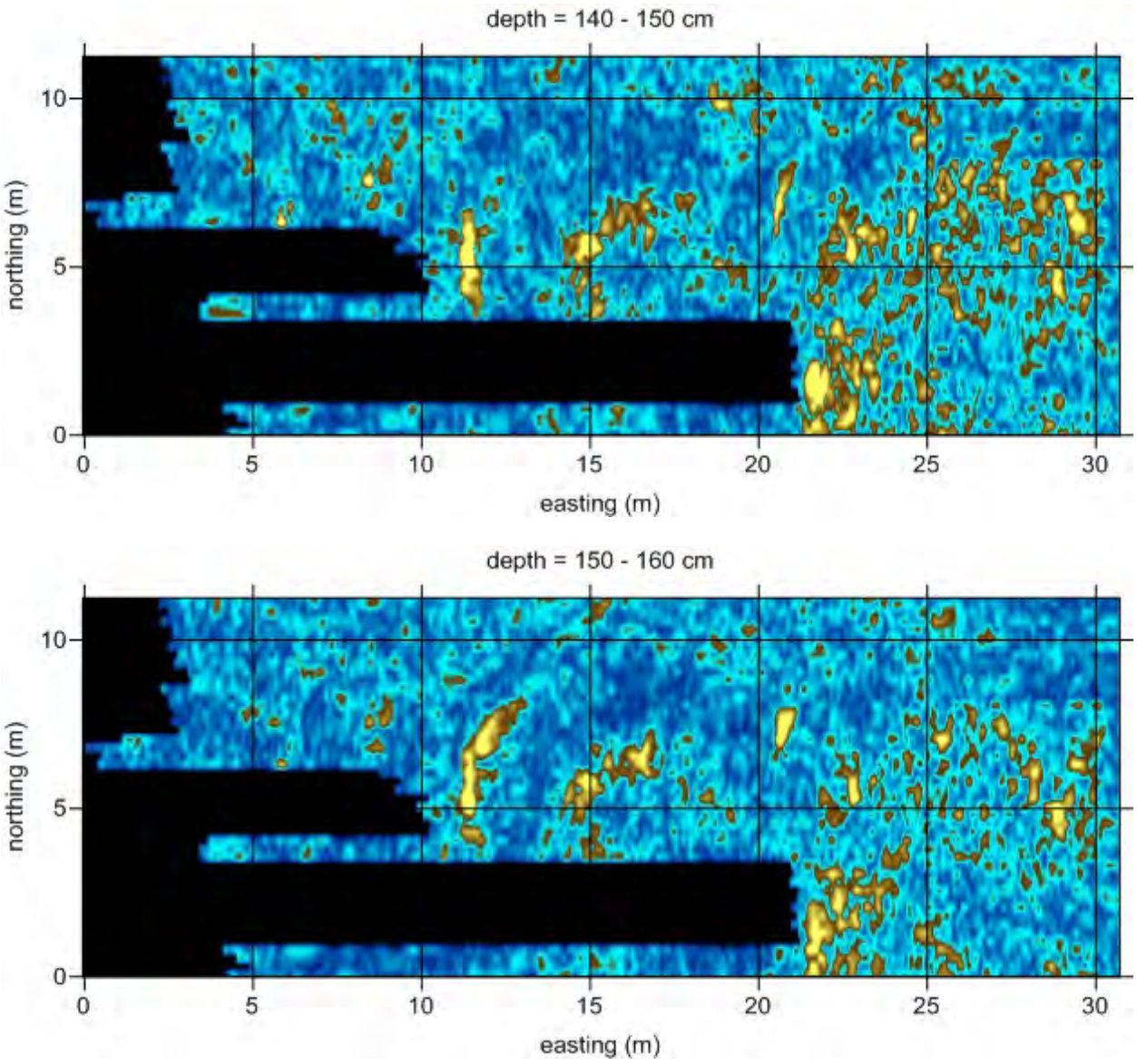


Figure 9: 140 – 160 cm depth slices. As the rectilinear feature in the east dissipates, a new linear feature emerges to the west. It will become clear in the following images that the rectilinear trend in the east appears to give way to another similar trend with a different orientation. The linear trend in the west will also continue to emerge as a curved, cane-like feature.

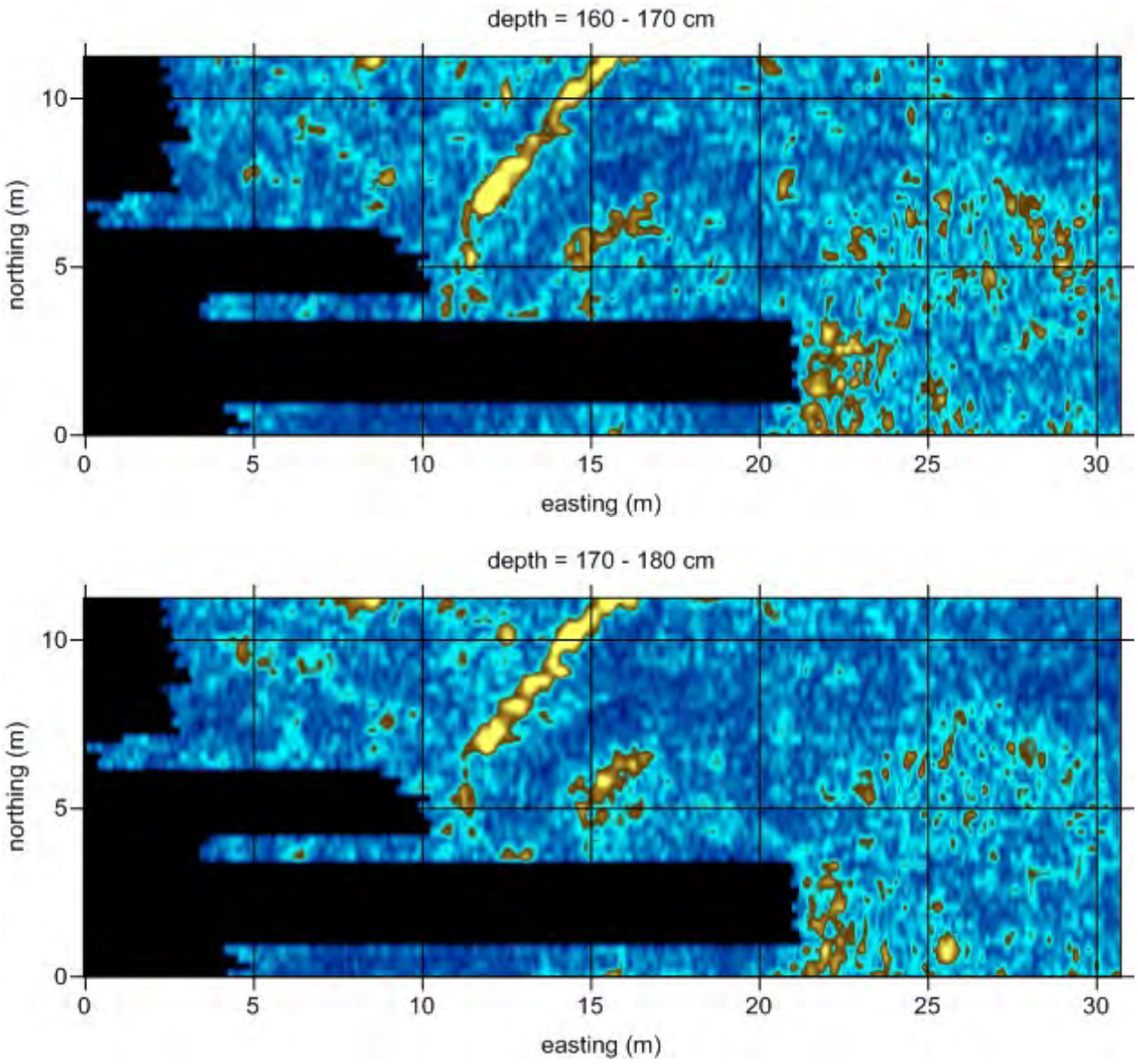


Figure 10: 160 – 180 cm depth slices.

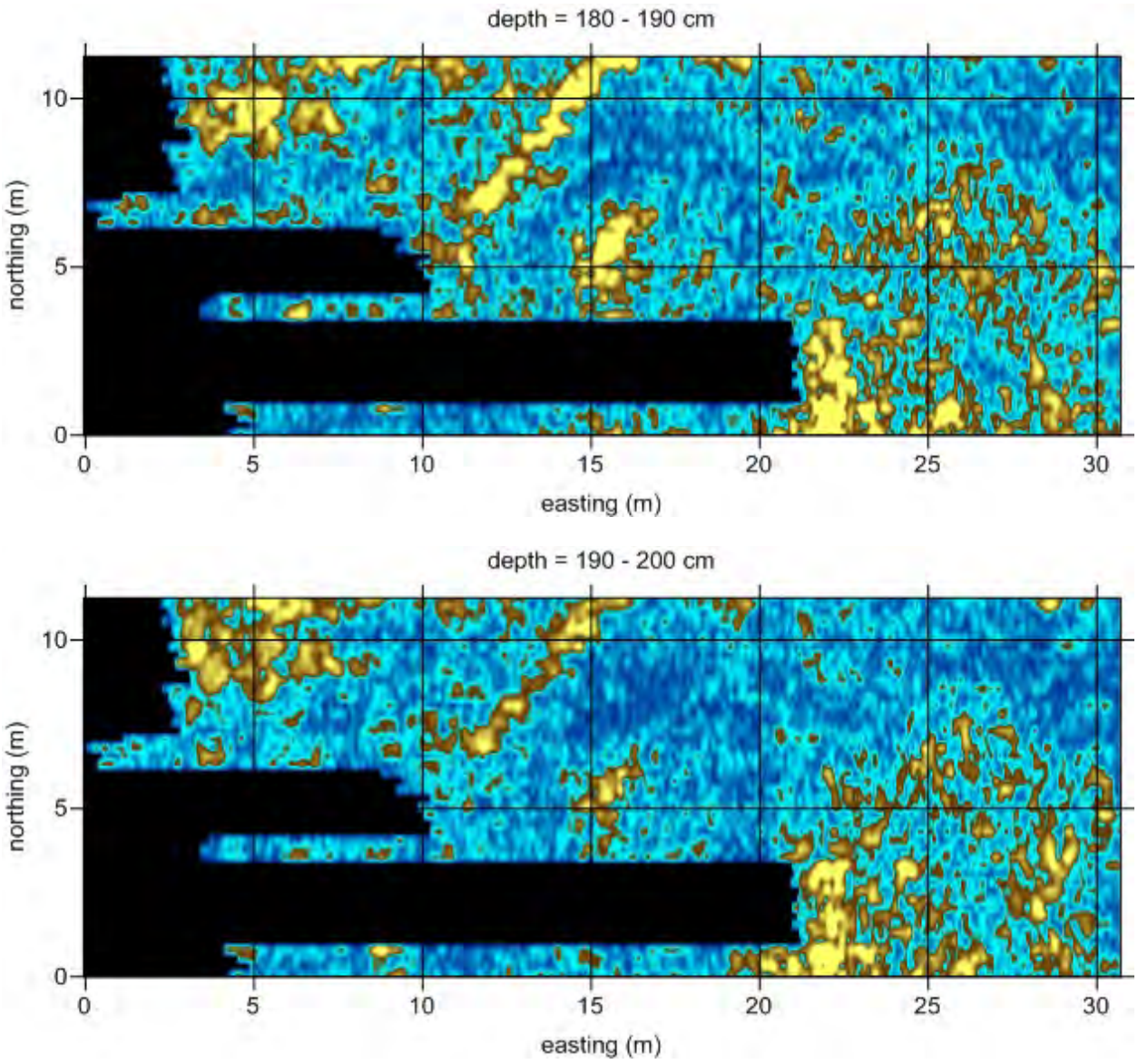


Figure 11: 180 – 200 cm depth slices.

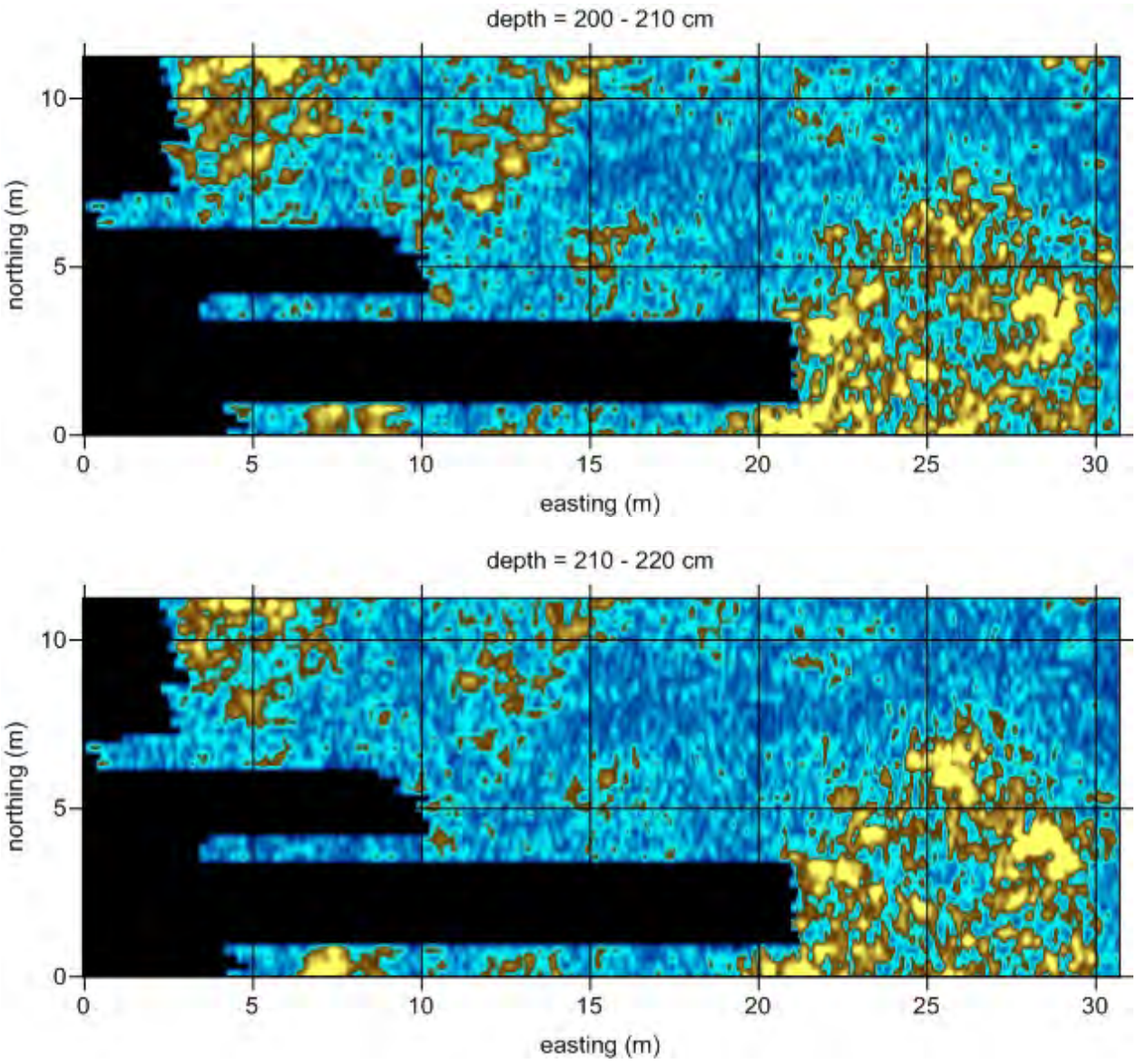


Figure 12: 200 – 220 cm depth slices. Here it is finally clear that another rectilinear feature with a different orientation than the first is present. The two features are compared below.

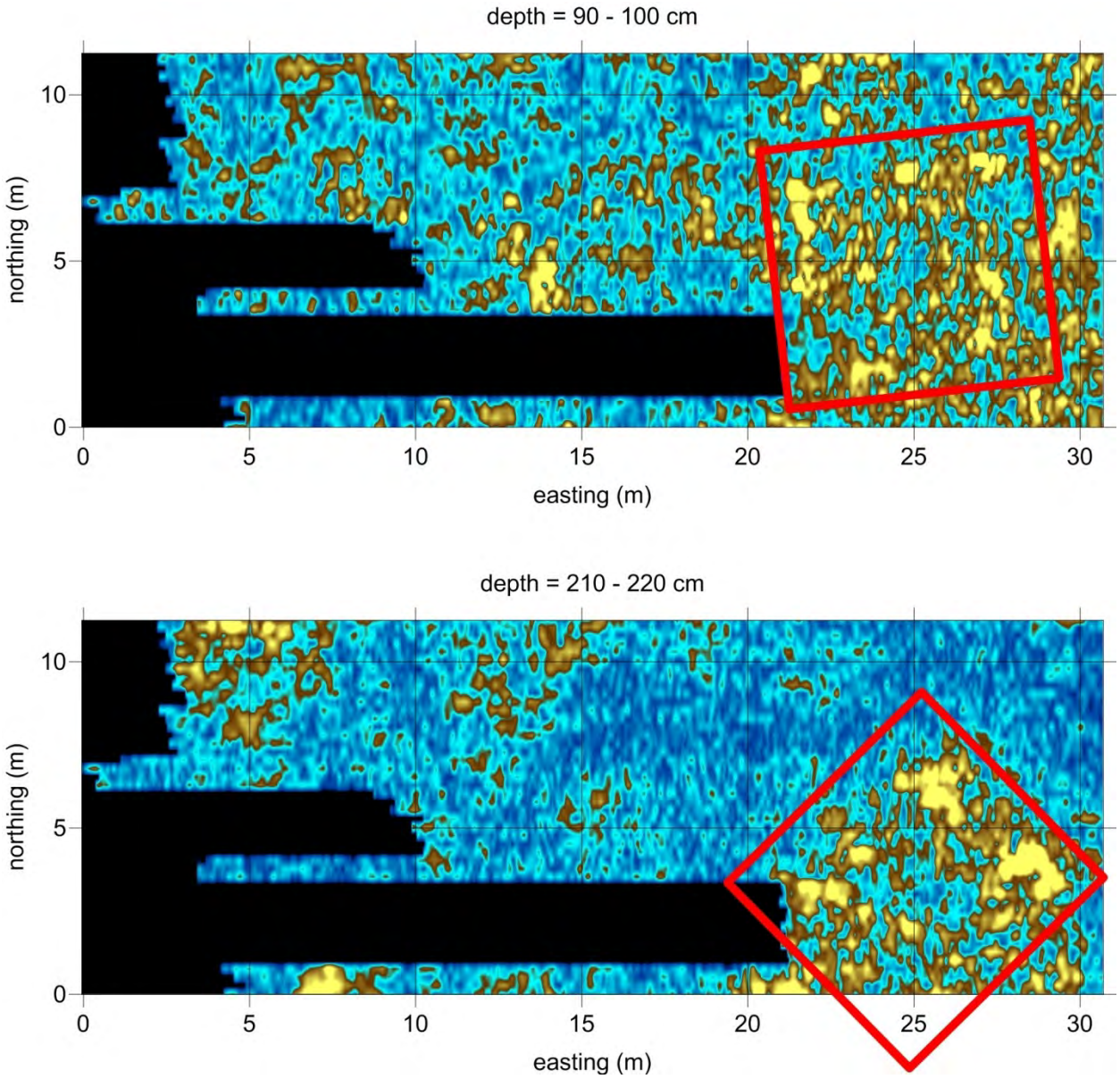


Figure 13: Comparison of two rectilinear features appearing at different depths within the same horizontal space. The red boxes indicate the difference in orientation. Whether this indicates that the deeper anomaly represents the remnants of a different structure is unclear, and can likely only be determined invasively.

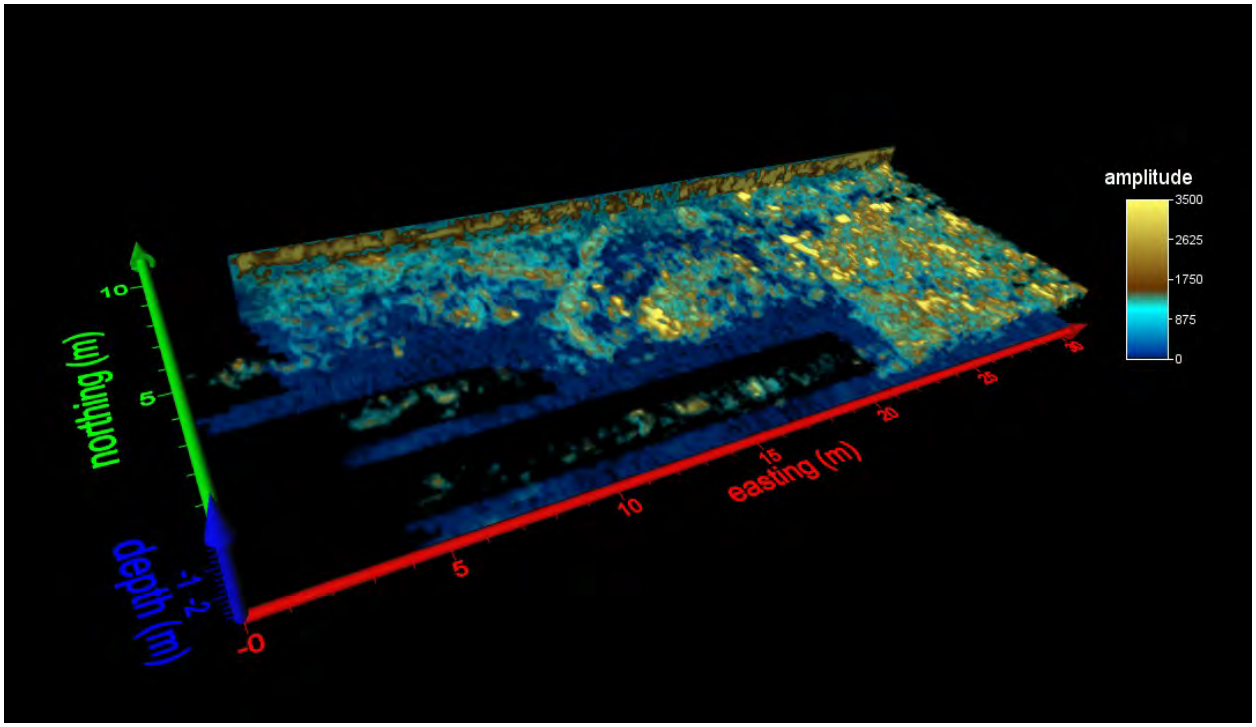


Figure 14: In this image a 3-D rendered volume is offered as a perspective-view visualization of features below 1 meter in depth. Many of these features appear to have different orientations from some of the shallower features detected in the survey.

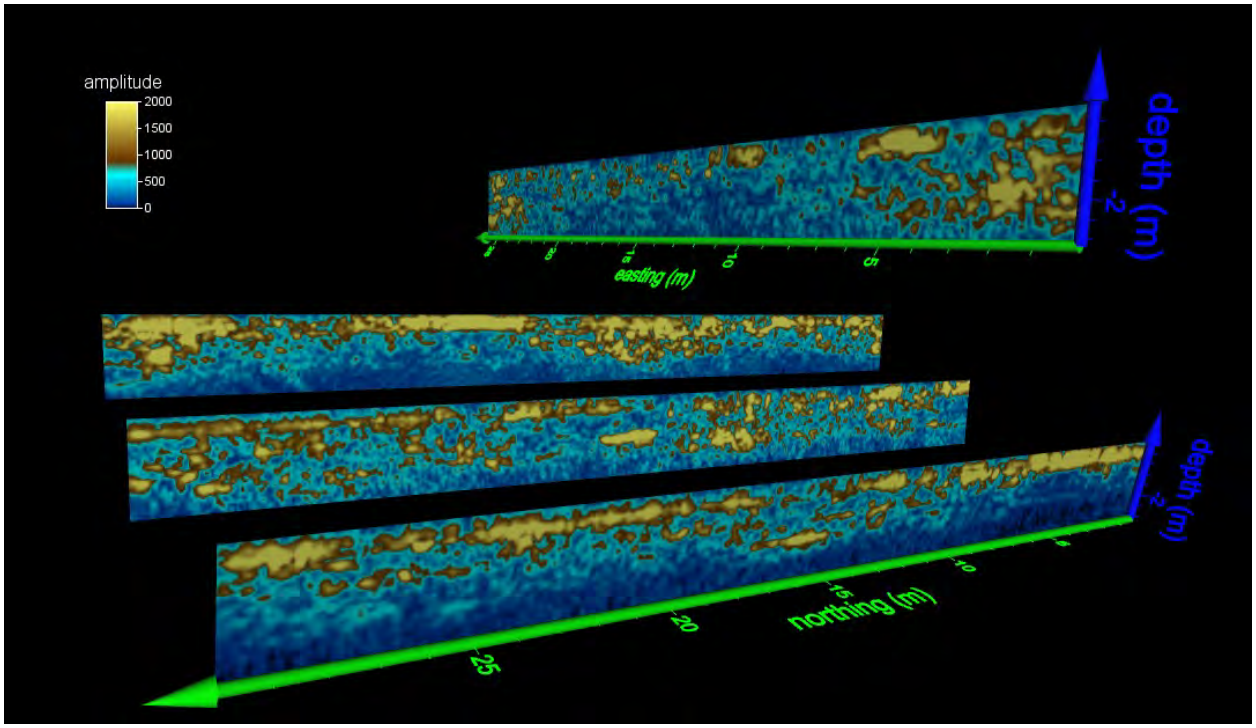


Figure 15: A coarse survey of the northern portion of the yard supports previous interpretations of electromagnetic survey results in showing cross-sections of several pipe-like features and disturbances likely associated with pipe trenches. Whether these are related to modern or historical infrastructure is unclear, though the inconsistent layout of the features suggests some combination thereof. Several disturbances also manifested from the presence of prominent tree roots.