The Conference on Historic Site Archaeology Papers 1967 - Volume 1

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THE CONFERENCE ON HISTORIC SITE ARCHAEOLOGY PAPERS
1965 - 1966

Volume 1
May 1967.

Presented at the Sixth and Seventh Annual Conferences

Stanley South, Editor
# TABLE OF CONTENTS

1. The Chairman's Report and Editor's Introduction  
   Stanley South .................................................. 1

2. On the Location of the Historic Taensa Villages  
   Stephen Williams ................................................. 3

3. Progress on a Chapbook and Bibliography for Historical  
   Sites Archaeology - John L. Cotter .......................... 14

4. Punch Card Design for Ceramic Analysis  
   Renee H. Marwitt ................................................ 19

5. The Importance of Archaeology at Jamestown, Virginia,  
   Site of the First Successful English Settlement in the  
   New World - J. Paul Hudson ................................... 27

6. The Ceramic Forms of the Potter Gottfried Aust  
   at Bethabara, North Carolina, 1755 to 1771  
   Stanley South .................................................. 33

7. A Preliminary Survey of Seven Coarse Earthenwares from the  
   Fortress of Louisbourg - Renee H. Marwitt ................. 53

8. Fort Michilimackinac, the Archaeology and Restoration:  
   A Progress Report - David Armour ........................... 60

   Bethlehem, Pennsylvania Historic Site Project  
   Vincent P. Foley ................................................ 66

10. The Stone Lined Shaft in Brigham Young's Backyard  
    (Nauvoo, Illinois) and its Contents  
    Clyde D. Dollar ................................................ 74

    Evaluation of the Concept  
    George G. Demmy ............................................... 89

12. Excavation of the Panton, Leslie and Company Store  
    on the Wakulla River - Pheriba K. Stacy ................. 93

13. Clay Pipes from the Fortress of Louisbourg, Nova Scotia,  
    Canada - Iain C. Walker .................................... 96

14. Suggested Design and Construction for Small Laboratory  
    Electrolysis Apparatus - Vincent P. Foley ............... 100

15. Russellborough, The Royal Governors' Mansion at  
    Brunswick Town - Stanley South ............................. 111

16. A Preliminary Report on Excavations at the Site of the  
    Camp of the Survivors and Salvagers of the Spanish  
    Fleet of 1715 - Carl J. Clausen ............................. 123

17. The Kaskaskia Indian Village Site 1700-1832  
    Gregory Perino ................................................ 127

18. APPENDIX - Names and Addresses of the Contributors  
    to this Volume ................................................ 133
    Papers Presented at the Sixth and Seventh  
    Annual Conferences on Historic Site  
    Archaeology not Included Herein ............................ 134
    A List of the Published Papers of the Conference  
    on Historic Site Archaeology - The First  
    Through the Fifth Conferences 1960-1964 .................. 135
PLATES AND FIGURES

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Williams</td>
<td>Location of the Taensa Villages. (Figures 1 and 2)</td>
<td>11</td>
</tr>
<tr>
<td>Marwitt</td>
<td>Punch Card Design for Ceramic Analysis. (Figures 1 through 5)</td>
<td>26</td>
</tr>
<tr>
<td>South</td>
<td>Excavation at Bethabara, North Carolina. (Plates 1 through 6)</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Ceramic Forms of Gottfried Aust. (Plates 1 through 7)</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>The Aust Pottery, the Bakery, and the Palisade Ditch at Bethabara. (Figure 1)</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>The Ceramic Forms of Gottfried Aust. (Figures 2 through 9)</td>
<td>42-50</td>
</tr>
<tr>
<td></td>
<td>The Ceramic Types and Forms of the Master Potter Gottfried Aust. (Figure 10)</td>
<td>51</td>
</tr>
<tr>
<td>Marwitt</td>
<td>Earthenware from the Fortress of Louisbourg. (Figures 1 through 7)</td>
<td>59</td>
</tr>
<tr>
<td>Armour</td>
<td>Fort Michilimackinac</td>
<td>65</td>
</tr>
<tr>
<td>Dollar</td>
<td>Brigham Young Site Map</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Back Yard Area</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Figure 3 and Figure 4</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Figures 5 through 8</td>
<td>87-88</td>
</tr>
<tr>
<td>Walker</td>
<td>Pipes from Louisbourg, Nova Scotia. (Figures 1 through 12)</td>
<td>99</td>
</tr>
<tr>
<td>Foley</td>
<td>Laboratory Electrolysis Apparatus.</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>(Figures 1 through 3, and Plate I)</td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>Excavating the Royal Governors' Mansion at Brunswick Town</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Russellborough Excavation Completed</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>Excavation of the Kitchen at Russellborough</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Interpreting the Ruin of Russellborough</td>
<td>121</td>
</tr>
<tr>
<td>Clausen</td>
<td>From the Camp of the Survivors &amp; Salvagers. (Plates 1 through 3)</td>
<td>126</td>
</tr>
</tbody>
</table>
The Society for Historical Archaeology was formed on January 6-7, 1967, during a conference held at Southern Methodist University in Dallas, Texas. The initial assembly consisted of archaeologists, historians, anthropologists, and ethnohistorians from Canada, Mexico, and the United States.

The society is an inter-disciplinary organization of interest to archaeologists, historians, architectural historians, students of American culture, and specialists in the history of technology, who are concerned with research, conservation, and restoration of historic sites and materials. Membership is open to all interested, scholarly investigators and students. Institutional memberships in the Society are $15.00 per year, and individual memberships are $7.50. Fellows are nominated by fellows, and are elected by the Board of Directors, with membership dues set at $10.00. An annual journal to be entitled Historical Archaeology is planned, to be edited by Glenn Little II, of the Department of Anthropology, Catholic University, Washington, D.C. Members for 1967 will receive a copy of the proceedings of the Dallas meeting.

Officers are John L. Cotter, National Park Service, Philadelphia, president; Edward B. Jelks, Southern Methodist University, Dallas, president-elect; and Arnold Pilling, secretary-treasurer. Board members are Charles Fairbanks, University of Florida; Malcolm Watkins, Smithsonian Institution; Bernard Fontana, University of Arizona; Merrill Mattes, National Park Service; I. Noël Hume, Colonial Williamsburg; Carlos Margain, The National Museum of Anthropology, Mexico City; Stanley South, North Carolina Department of Archives and History; and J.C. Harrington, Richmond, Virginia.

Membership checks should be made out to The Society for Historical Archaeology, and sent to Arnold R. Pilling, Sociology and Anthropology Wayne State University, Detroit, Michigan 48202.

The next meeting of the new Society for Historical Archaeology will be held in Williamsburg, Virginia in January, 1968.

The new organization will in no way conflict with The Conference on Historic Site Archaeology; one being a formally organized society, and the other a conference devoted to the presentation and publication of papers, and lacking in any organization at all; a non-organization.
The Chairman's Report and Editor's Introduction

The papers presented here were delivered at the Conference on Historic Site Archaeology held in Macon, Georgia on November 11, 1965, and at Avery Island, Louisiana on November 2, 1966. This publication of the papers from the sixth and seventh annual conferences brings up to date the publication of the papers from all seven conferences. It is hoped that the format presented here can be continued through the support of the membership dues. With this in mind this issue has been designated Volume 1 of The Conference on Historic Site Archaeology Papers, 1965-66.

The papers from the first two conferences were published as a special issue of the Southeastern Archaeological Conference Newsletter, Volume 9, No. 1, June 1962, and was made possible through the efforts of Dr. Stephen Williams at the Peabody Museum. The third and fourth conference papers were published as Volume XVII, No. 2, June, 1964 of The Florida Anthropologist by The Florida Anthropological Society, as were the papers of the fifth conference in Volume XVIII, No. 3, Part 2, September, 1965. These publications were made possible by Dr. Charles Fairbanks, editor of The Florida Anthropologist.

At the Seventh Annual Conference on Historic Site Archaeology held at Avery Island, Louisiana the membership dues were raised from one dollar annually to three, with the hope that this would allow the conference membership to support its own publication of papers in the future. This volume, therefore, is the first financed through conference membership funds.

With a budget from membership dues of $283.07, two hundred copies of this volume have been produced at a cost of $275.00, leaving $8.07 for postage for mailing the copies to the conference members. From these figures it becomes clear that the papers can be prepared in this form and distributed to the members while almost remaining within the amount on hand from membership dues. It appears, therefore, that another dues increase might be in sight in order to comfortably support this publication of papers.

In order to stay within this budget help was supplied by some of those contributing papers by furnishing their own plates and figures. Gregory Perino supplied his own copies of his list of French Clasp Knife makers, and Clyde Dollar made a considerable contribution by his own publication of plates and figures. The plates for South's paper on the ceramic forms of Gottfried Aust at Bethabara were supplied by the Bethabara Project, and those for the Russellborough paper were furnished by the North Carolina Department of Archives and History, and consist of reprints of articles published in the Newsletter of The Brunswick County Historical Society. These contributions aided considerably toward keeping publication costs to a minimum. In order to further keep down costs the plates and figures accompanying the papers were combined and presented as a single page. This considerably reduced the cost, but resulted in a smaller plate than would otherwise be possible, and this is regretted, but cannot be helped. Because of this, some of the groupings of plates appear crowded, particularly that accompanying the paper of Iain Walker, where twelve 8 X 10 glossy plates had to be reduced to one page. It is hoped that the result did not do too much violence to the intended illustration, while providing considerable saving of money.
Another saving was effected by the editor typing all stencils himself on weekends and evenings. It is hoped that in the future the conference budget will be such that this job can be assigned to a paid typist. The mimeographing was done on a borrowed machine in the home of a nice little lady, and it is hoped that a mimeograph machine can be purchased from conference membership dues in order to avoid this imposition in the future.

There has been no editing of the papers in the usual sense of this term other than to correct some obvious misspellings. Rather, an attempt has been made to retain the individual characteristics of each paper as written. For instance, when the author of the paper did not indent for paragraphs, this procedure was followed. When the term eighteenth century was treated with capital letters by one author and not by another, the author's choice was followed as written. In the use of the spelling of archaeology by some as "archeology", the editor has taken the liberty of changing this spelling to "archaeology", since his fingers automatically spell the word this way, and to change it throughout a paper would tend to produce a number of stumblings over this word. I hope those who prefer the absent "a" will forgive this liberty.

The appendix of this volume contains a list of the published papers from the previous conferences and where they may be obtained.

Stanley South, Chairman
The Conference on Historic Site Archaeology
On the Location of the Historic Taensa Villages

Stephen Williams*

Introduction

According to historic accounts, the Taensa Indians were a small Louisiana tribe living in several villages along the shores of a crescent-shaped lake on the west side of the Mississippi River. They were located north of the Natchez and south of the Tunica and Yazoo. Their language was the "same" as that of the Natchez, and they seemed to have shared a number of other cultural traits with their better-known neighbors. The Taensa are thought to have been in this specific location from 1682 until about 1706. By 1729-30, they had definitely left their Louisiana homeland, for they do not figure in the well-documented events which surround the Natchez massacre of this period.

The Taensa are best-known ethnographically from the stirring tale, related by French explorers, of the burning of their temple due to a lightning-strike and of the children that were thrown into the resulting fire to propitiate the gods. Many more children would have been destroyed had the French not intervened. Even this story has been incorrectly attributed to the Natchez by some of the early writers (Swanton, 1911: 4-6). The other memorable piece of ethnography relating to the Taensa is of less value; during the late 19th century, material was published in France which purported to be some Taensa songs and a grammar. An international controversy over these data was finally settled when the documents were conclusively established as fraudulent (Swanton, 1911: 9-24).

The Taensa, although small in numbers are, therefore, hardly obscure or unknown. Why then is their exact historic location something of a problem today? As I will show, there is considerable documentary evidence which bears on this matter but little direct physical evidence has been available until recent archaeological work was carried out in northeast Louisiana.

* This research was carried out under grants from the National Science Foundation (GS-554 and GS-661) whose support is gratefully acknowledged. The illustrations are by Eliza McFadden, and I am also indebted to her for considerable research help on the cartography of the Lower Mississippi Valley. The terminology used herein follows Swanton and the BAE - "Taensa" is the tribal name; "Tensas" is the spelling used for local geographic terms.
Documentary Evidence

Swanton (1911: 257-274) has presented most of the historical material in some detail and I will summarize it briefly:

1682: La Salle and his aide Tonty visit the Taensa on March 22.
Four documents are available including that of Father Membre and Nicolas La Salle. They were located on a crescent-shaped lake, near the Mississippi; Tonty gives a position of 31° north Latitude.

1682: La Salle and his party make a return visit in April or June.

1686: Tonty visits the Taensa again. The Calumet is sung.

1690: Tonty's fourth visit on his way west to seek La Salle.

1698: A group of missionaries including De Montigny, Davio, St. Cosme and probably La Suer visit the Taensa area.
Consensus of these reports is that the village is on the shore of a lake three leagues inland and less than 20 leagues north of the Natchez.

1699: De Montigny is in residence with the Taensa.

1700: Iberville, Father Du Ru and La Suer visit the Taensa in March. Iberville estimates location as 32° 47' north Latitude. Penicaut is also along with group and all record the burning of the temple.

1700: Father Gravier also visits them later in the year.

1701: St. Cosme visits the Taensa and finds them much diminished.
Locates them 12 leagues from the Natchez.

1706: La Harpe says the Taensa are forced to leave and have moved in with the Bayougoula.

1715: Taensa are located on Bayou Manchac (Iberville River).

1720: They are in the Mobile, Alabama area by this time, but as early as 1708 some Taensa show up in church records in this locality.

1763: After the change in administration from French to British, they leave Alabama and go into southwestern Louisiana where they amalgamated with other tribes and disappeared.

Other Sources: Butler, 1934; Delanglez, 1938; McWilliams, 1953.

Cartographic Evidence

I fully recognize the many pitfalls that beset the uncritical use of old maps as "direct evidence" as Phillips (1951: 392-393), and Griffin (1943: 11-35) have set forth. One must try to establish the historic source of the cartographers. Nevertheless I feel that there are three maps of the period which give good evidence of the location of the Taensa in the period prior to 1706. These are: (1) the Franquelin map of 1684 which shows 8 villages of the Taensa near a lake at about 30°15' latitude on the west side of the Mississippi; (2) Minet's map of 1685 showing 6 "houses" on both sides of a lake on west side of the Mississippi at about 31° 45', noted as "les Tainsa"; and (3) most importantly that of Pierre Charles La Suer who was with Iberville
in 1700 and who was an engineer of considerable skill. This map shows "les Tainsa" with 5 "houses" on a crescent lake just west of la Gouffre (Grand Gulf) at 32° 15'. La Sueur's map served as the basis for the drafting of the Mississippi River in the well-known De Lisle maps of 1701-1720.

Later maps of the 1720's show the Taensa far to the east near Mobile. Later in this same century following the Natchez massacre, the "Lake of the Tensas" is located just west of Natchez on the maps of D'Anville (1752) and Lieutenant Ross (1765).

**Interpretation of Evidence**

Attempts to locate the Taensa were made by several Nineteenth Century American historians. For example, Francis Parkman (1898: in p. 301), in discussing Tonty's visit, says that the Taensa were in Tensas County/parish/ Louisiana, but gives no information as to how he reached this conclusion. His collection of maps preserved at Widener Library, Harvard University does not indicate any new data on this matter.

Justin Winsor (1895), in his standard work on the Mississippi Basin, says that the Taensa "were/ a tribe upon one of that link of lakes which lay just west of the Mississippi." He published a few maps showing the "Lac des Taensa" far to the south near Natchez, so it is not too clear where he thought they were exactly. Shipp (1897: 203-205) also placed them near these lakes and incorrectly associates a large mound with the Taensa temple.

Twentieth Century anthropological opinion is represented by the work of one man - the ubiquitous John R. Swanton, who, in the Handbook of North American Indians (1910: 668) and in his classic monograph (1911) on the Lower Mississippi tribes, is very specific. He places them on Lake St. Joseph, near Newellton, Louisiana, in Tensas Parish. He even goes as far as to say that they were on the north side of the lake and illustrates a photograph of the location which he took himself while in the field. His work has been widely quoted without much comment ever since (Calhoun, 1934) and he did not change his mind on this (Swanton, 1952: 209-210). This location would place the Taensa at 32° 03' north latitude.

**Problems**

Well, then why is there any problem with all these fine data—especially when Swanton seems to have even visited the very spot? Many difficulties do exist in making this sort of identification of sites as Phillips has so ably demonstrated in detail for the region at the mouth of the Arkansas (Phillips, 1951: 347-421). The first problems are purely geographic. The alluvial valley is an area of many recent physiographic changes which relate to the ever-shifting course of the Mississippi River. It is one thing to stand on the shore of a lake and imagine French explorers paddling up to it, and quite another even to be sure that this lake, as such existed in 1682.
Thanks to the recent work of Fisk (1944) and others, the problem of dating channels and cut off lakes can be settled rather confidently, although trusting geological dating to have a degree of accuracy of ±100 years is putting rather more faith in another science than is wholly warranted. Phillips (1951: 393) goes so far as to say: 
"... the identification of historic sites in the unstable topography of the Mississippi Alluvial Valley is an undertaking just short of hopeless." Nonetheless, we have persevered.

Then, too, recent events such as flooding and levee breaks have caused many changes even within the last 100 years. There are plenty of crescent lakes (old oxbows) on the west side of the Mississippi from Natchez north, any one of which quite nearly fits the description of the French. The problem of converting Nineteenth Century French leagues to our modern quad sheets is rather complex too. It was rather difficult in 1700 to measure distances while traveling on a twisting river with different rates of current, and even compass bearings were not too accurate due to magnetic declination which, although recognized in the period of exploration, was not corrected for to any appreciable extent.

Pinpointing location by longitude and latitude was also no easy task. Longitude readings were very inaccurate until reliable chronometers were available about 1800. Instruments for measuring latitudes gradually improved between 1650 and 1731, when Hadley invented the prototype of the modern sextant.

This change will help explain some of the discrepancies in latitude readings by the French explorers. La Salle in 1682 probably did not have an accurate quadrant which might explain his reading of 31° north latitude for the Taensa villages. The French explorers in 1698-1701 probably had somewhat more accurate instruments. However, it seems they took actual sightings only at important landings. From internal evidence of his letters, Iberville most likely was calculating his latitude for the Taensa village from distance and compass bearings. As I said above, measuring distances traveling on a twisting river was difficult. Iberville's distance error was large by the time he got up to Natchez, therefore, it would not be surprising that his latitude estimate for the Taensa of 32° 47' was 44' off. His reading would put the Taensa on a parallel north of Vicksburg, Mississippi and thus north of the Tunica and Yazoo villages while every traveler uniformly states that the Taensa were to the south of these tribes on the Yazoo River. Interestingly enough, Swanton, who published the Iberville figure (Swanton, 1911: 266), never mentioned the fact that it was rather incompatible with his own location of the villages.

Perhaps silence is the best answer to this vexing problem which has many ramifications - for example, it is known that La Salle kept the location of the mouth of the Mississippi a secret for some time.

The cartography of the period is not a very accurate alternative to the documents that have just been discussed. The state of the mapmaking "art" was less than perfection especially when the maps were being finally put on paper far away in France with little opportunity to check the results. Because of the difficulties mentioned above, the laying out of large scale maps of North America was bound to be a rather inaccurate
business. Even the esteemed maps of the latter part of the 18th Century such as Lieutenant Ross' map of the Mississippi (1765) has substantial errors in such matters as the true bearing of the section of the Mississippi between Baton Rouge and Vicksburg. He shows the river heading much too north-south rather than in its actual northeast orientation, and his latitude readings are off by about 10 minutes.

Another example of the problem is to be seen in the location of the "Lake of the Tensas". Well established by the earlier cartographers and explorers as being far to the north of Natchez, one finds the well-known and respected maps of D'Anville (1752) showing it just to the northwest of Natchez. Soon it appears on all maps of the late 18th Century in this position, although there was no large lake in this location, much less one that has any known connection with the Taensa.

Despite these cartographic problems, many researchers have used old maps very uncritically. The late Jean Delanglez was an important exception to this statement. (See Griffin, 1943: 22 and Phillips, 1951: 392, for a discussion of his work.) Winsor, for example (1895: 5), suggests that the river channel was shifting away from the Tensas village. This idea represents an early recognition of some of the topographic problems of the Lower Valley, but it is unfortunately true that the maps that Winsor used to come to this conclusion, do not support this theory. As I have mentioned earlier the D'Anville map that he uses for his mid-18th Century data does not refer to the same lake as the one which the French located further north and closer to the river in the early part of that same century. Interestingly Father Hembre remarked in 1682 that the Taensa "dwell around a little lake formed in the land by the river Mississippi," (Shea, 1903: 174-175); and this is certainly an early observation on the oxbow derivation of most Lower Valley lakes.

The work of John R. Swanton was, in a sense, quite like that of these historians. His 1911 researches were good for the period, but are hardly acceptable today without critical reappraisal. As far as can be told, most of his evidence for the location of the Taensa villages was documentary, although there are some cartographic references in his Handbook article (Swanton, 1910: 669). As I have pointed out above, he does not discuss the fact that the documents contain a specific piece of evidence that suggest that the villages were much farther north. Indeed, we are not led through the evidence in a systematic way so that we can see why he chose the spot he did. He definitely did visit Lake St. Joseph in Tensas Parish, and he took photos of the locality he favored. Unfortunately, no field notes of this research are to be found at the Smithsonian Institution, although some rather helpful unpublished photographs are available. In the text of his monograph (Swanton, 1911: pl. 11), he does not give very exact information as to where he was standing on the bank of Lake St. Joseph when he claimed to be at the historic Taensa village. For example, there is no indication of how far he is from Newellton, the closest town. But from internal evidence in the photographs and their
captions, it is apparent that he is on the north shore (really east in this section of the lake) opposite Clark Bayou, in the Solomon Church locality (Figure 1). There is no hint that archaeology played any part in Swanton's selection of this locality, nor is there any indication that he took into account the possibility that the changes in the course of the river might radically affect the identification.

The New Data

New information on the location of the Taensa villages is presently available as a result of an archaeological survey of the Upper Tensas Basin carried out by the Peabody Museum, Harvard University, during the past four years. A relatively thorough surface survey has been made of the entire region, with especially intensive coverage of the area around Lake St. Joseph as well as the rest of Tensas Parish. Many sites were found, including a number dating from the Plaquemine Period (1200-1450 A.D.), but none looked very late.

During the first field season (1963) on the recommendation of Robert S. Neitzel, who was then involved in Natchez research, we investigated the next bayou system to the west of Lake St. Joseph, which dated somewhat earlier geologically than those channels in the Newellton area (Figure 2), and one site was test pitted. Nothing of any promise turned up, although many sites were located. Attempts to use local informants also came to naught. We could find no one who knew that Swanton had been in the area, and no one had ever seen any glass beads or clay pipes. Civil War relics were the oldest historic artifacts located. At the very end of this field season, work in the area around the mouth of Clark Bayou (24-L-9) turned up the first few sherds that even showed any prehistoric occupation on the banks of Lake St. Joseph. Further investigation at this site located a small trash pit that was being cut by erosion, and some Natchezan sherds were found, the first that the Survey had found on any site. Swanton's location began to look better.

During the following winter, Swanton's field photographs were obtained from the Smithsonian and on the basis of our new-found knowledge, his locality was identified as Solomon Church. The documents began to make more sense too, for one said that a few huts of the natives were on the other side of the lake where a bayou flowed in (our Clark Bayou site, so it seemed). In the Spring before the regular field season, I returned to Newellton briefly and went out to the Solomon Church locality with great expectations. Topographically, it certainly looked good; it is about the highest point on the whole shore-line, and is directly opposite the bayou entrance as the documents suggested. There was plenty of historic material there all right - 19th and 20th Century, that is. However, an interesting coincidence may be seen in the fact that the church is no longer there. It was destroyed by a storm, a tornado in this case, but the destruction of the Taensa temple is certainly brought to mind.
We have not found the six to eight villages mentioned in the documents. However, present evidence suggests that this was a very late move to the banks of Lake St. Joseph and the sites must be very shallow as are the two we did find. Nor have we located the five huts of the elusive Mosopelea (Griffin, 1943: 17-19) who had moved in with the Taensa.

Interestingly, none of the documents mention any mounds among the Taensa and none were found. The very location on this lake shore makes a late occupation necessary for the channel that was cut off to form the oxbow lake dated no. 16 by Fisk (1944) and is generally thought to represent the active channel of the Mississippi in the 16th Century. Thus, a late and short occupation by a dwindling population is suggested.

The location tends to fit the documentary evidence if you throw out some of the latitude measurements and do not take the distance estimates above the Natchez too seriously - they range from 12 to 20 leagues. But these are the only oxbow lakes on the west side of the Mississippi in that range. Topographically, it looks like the right place when you make the necessary channel correlation (Figure 2), and it fits the "good" early cartographic evidence, especially that of Le Sueur.

Apparently they resided for a short time in this favorable location on Lake St. Joseph, only to move away well before the Natchez massacre in 1730. They were rapidly decreasing in numbers as were many Lower Valley tribes in this period, and after some peregrinations about Louisiana, they died away as an important tribal entity in the 18th Century. Swanton (1911: 23) perhaps met the last speaker of the Taensa language.
Location of the Taensa Villages

Figure 1

Figure 2
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MAPS

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FRANQUELIN, JEAN B.L.

LE SUEUR, PIERRE CHARLES
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NINET

ROSS, LIEUTENANT
1765. Course of the River Mississippi from Balisle to Fort Chartres. Published London, 1775.
Editor's Note

Since Dr. Cotter wrote the following paper the bibliography of "Historical Sites Archaeology" which he discusses has been published. The following is a statement from Dr. Cotter issued in June 1966.

"University Microfilms, Inc. has published the bibliography of "Historical Sites Archaeology" as Xerox University Microfilms 1966 No. OP 25,190.
For more than 900 individual sheets, each representing one reference, the price is $40.25. As microfilm, the price is $13.45.
The new address of the University Microfilms, Inc. is:
University Microfilms, Inc.
300 N. Zeeb Road
Ann Arbor, Michigan
48103

The following was received from Dr. Cotter May 11, 1967.

"The Handbook for Historical Sites anthropologically known to its compilers as 'The Chapbook' has been assembled in its first form and is ready for a publisher. Several publication sources have been explored including making the Handbook available for publication in the forthcoming Annual of the Society for Historical Archaeology, the premise being that the Handbook could be expanded and updated progressively in each succeeding Annual.
The Bibliography of Historic Sites Archaeology which has been available from University Microfilms, Inc. on a custom order basis since 1966 at a price of $40.25 is being reevaluated by University Microfilms, Inc., Ann Arbor, Michigan in view of the additional 600 entries with the 1967 supplement and re-issuing the entire 1500 items completely retyped in standard bibliographical form. By this means it would be possible to issue the Bibliography for approximately $10.00 in book form. Annual increments would then be added as separate bibliographical compilations. It is believed that the sacrifice of the expendable bibliography using additional sheets for each item will be worth the reduced cost to the purchaser."
Progress on a Chapbook and Bibliography for Historical Sites Archaeology

John L. Cotter

There are three things the anthropologist-turned historical sites archaeologist or the historian-americanist-turned archaeologist will look for in addressing the problem of investigating a site: first, the available data, published references, archival resources, first-hand and second-hand or even traditional accounts; second, data on comparable sites; and, finally, the best way to identify and describe the artifacts he encounters. Unless he is collaborating closely with a team of researchers, the specific archival digging is up to him, as is the search for relevant references, written and oral, to the site and its history. But for comparative historical sites archaeology he needs a specialized bibliography on the subject. And, finally, he needs a ready handbook to give a preliminary outline of artifact identities.

Since the Symposium on the Meaning of Historical Sites Archaeology held at the Boulder, Colorado meetings of the Society for American Archaeology in 1963, an effort has been under way by the writer to carry out an assignment he undertook at that meeting with the concurrence of the other symposium members, Bernard Fontana, Kenneth Kidd, Edward Larrabee, Carlyle Smith, Arthur Woodward, Louis Caywood, Henry Hornblower, II, Louis Binford, and the classical archaeologist from The University of Kansas, Stephen Glass. This assignment was to collect and edit a bibliography of historical sites archaeology.

As one might expect with such a project, getting off to a start was a considerable task, rich in frustration. Larrabee devised a form listing the standard bibliographical requirements, and adding where or with whom the report could be found, together with a statement of contents, intended to do no more than state what the report treated, not venture a critique. The forms were duly mimeographed, and supplies sent to the symposium members and to a number of other activists in the field, including Stanley South, Noël Hume, Steven Williams, G. Hubert Smith, Hale Smith, and all National Park Service archaeologists who had, like Louis Caywood, worked in historical sites. One month followed another and it began to dawn upon the sender that scarcely a token of the material was being returned. What few forms did appear in the mail were no more than the title and author, the rest left blank. Plainly another tack had to be tried.

The next move was a simple invitation to all to donate bibliographical data already at hand, with the promise that the compiler would complete the forms himself—rash offer! This time whole bibliographies were received from Bruce Powell, Hubert Smith, Edward Larrabee, Louis Caywood, and Stanley South, and completed forms began to make their appearance sporadically from others, beginning with a very conscientious effort on the part of Paul Schumacher, John Griffin and other National Park Service archaeologists. For two years the compiler addressed himself to what compilation he could muster in what is referred to with often unconscious humor by non-civil servants as "spare time."
As the project grew, the next step was to devise some stratagem which would evoke a response from those who had not reported their unpublished but available and completed research. After considerable thought, it was decided to get up three sets of machine-copied sheets, raw and incomplete as many were, and send one set each to a group of four historical sites specialists to correct and add to. In each case, it was hoped that each specialist would discover the absence of his own works in the bibliography and compare the lacunae distastefully with the paltry contributions of the brazen compiler, who had taken the opportunity to list every one of his own reports, even to the most trivial. This time the response was encouraging. Reports that languished in the files or were published in foreign or forgotten journals were recalled and listed by their authors, as well as working reports produced for various developments and subsequently neglected, though lodged in readily available files. With respect to the last, there is a considerable body of reports concerning archaeological investigations at historical sites which were never published, but which were intended for documentation for restoration and interpretation of National Park Service features, and it has been at least one achievement for the bibliography, so far, that these reports are brought to light.

There must be many more such reports, however, that languish undiscovered in the files of city, county, and state agencies, museums and historical societies, and these remain to be ferreted out.

In the meantime, the bibliography now comprises 738 historical sites reports, and 94 artifact reports in a separate section, and is ripe for use. The next question is, in what format is it to be made available? This has been a major dilemma ever since the original data sheet was designed by Larrabee and accepted for the bibliography. Nearly everyone is in agreement that a format in which the bibliography can be expanded and kept current would be ideal. This, however, is deceptively hard to achieve. If cards are used, the production is expensive, and the card format may not be the one used for bibliographical collecting by the purchaser and user. Microfilm would be one way to use the same sheets and format on which the bibliography has been collected. University Microfilms, Inc. of Ann Arbor, Michigan, can put 70 sheets on a single negative and get the whole bibliography on 12 negatives. At 3½ cents a xerox copied sheet, the bibliography would come to about $29.00—much steeper than in book format, but capable of expansion to keep it current, both by the purchaser and, periodically, by the compiler, with the cooperation of his colleagues. Book form, on the other hand, would be a frozen format to which additions would have to be made and kept separately. At the rate references are being added, the bibliography will be doubled in five years. One of the purposes of discussing the bibliography at this session of the Conference on Historic Site Archaeology is to discover the preferences of those assembled and solicit their advice. And—incidentally—to invite most heartily those who may not have yet contributed, to do so.
Now, in concert with the bibliography task, an effort has been under way for the past three years to assemble a compendium of useful information for the historical sites archaeologist in the form of a handbook, or, as it is our foible to term it, a chapbook. The Chapbook has been slow to take form because it has been gathered together—appropriately I hope—as a training device for graduate students at The University of Pennsylvania's Department of American Civilization who are taking a course in Methods and Problems of Historical Sites Archaeology. The premise was that these students, who were already skilled in classifying colonial and federal period artifacts for cultural studies and museum training, and who were practiced in archival and reference usage, would, under guidance, understand what the archaeologist needed and contribute to an orderly presentation of useful data. Of course, the first results were shaky, and when their mentor was bold enough to send around the first draft for critical response to a few selected professional historical sites archaeologists, they responded variously with horrified scorn, polite acknowledgement or no acknowledgement at all, or, for those who were particularly forebearing, constructive suggestions for improvement. The responses were given to the students to consider and profit by, and the shock was highly beneficial and sobering for them. They began their efforts, for the most part, over again.

The Chapbook could logically be about a thousand pages of detailed and orderly description of classified artifacts which could conceivably be discovered in a historical site. Since this is obviously impossible, a skeleton classification of essential and common artifacts has been set up, beginning with ceramics, going on to glass, metals, wood and some specialized combinations of organic and inorganic materials. When all was put together this fall, a special introductory section was found necessary and appropriate, namely, a resume of essential methodology of search for documentary and archival references as the first step in investigating an historical site. This section is included because the Chapbook is primarily addressed to the student archaeologist or the archaeologist who may have specialized in prehistory or classical archaeology and who is addressing himself to the study of historical American sites investigations.

The ceramic section first defines the broad categories of earthenware, stoneware and porcelain, then summarizes New England pottery, and will, when completed, mention pottery of the Middle Atlantic and southern states. Glass and glasswares are discussed, up through machine-made items, then hardware of iron, builder's and cabinetmakers; then iron toys, agricultural, woodworking, household and vehicular implements, stoves—a large category—lighting fixtures, hearth equipment, ornamental iron, iron and brass harness pieces, all listed with dates of manufacture. American pewter is next referred to, followed by American silver and a section on coins, buttons, jewelry and watches. A separate section on treen or wooden ware follows, including a listing of characteristic woods used for certain classes of manufacture.
A final section deals with tools of crafts and industry, which, after a general discussion, treats those of the wheelwright, tinsmith, stoneworker, woodworker, currier, cooper, farrier, nailer, blacksmith, tanner, turner and shoemaker. Finally—that is, at present—the Chapbook winds up with a short note on the elemental conservation or preservation of iron, wood and leather objects to avoid fast post-excavation deterioration.

The chief difficulty has been in collecting appropriate and helpful illustrations. Ideally, each type artifact should be drawn, with its characteristic identifiers clearly and specifically portrayed. A couple dozen plates were made up quite competently by Richard Ellis, a commercial artist who was also a graduate student of American Civilization at Penn. But he has departed before the job could be completed, and there is presently no one with his talent in sight. A final note concerns illustrations of identifier marks. One thing every archaeologist at an historical site would like to have by his side is a complete register of illustrated pottery marks and metalware touchmarks, with dates, for ready reference. Alas, this is tedious, expensive business, and the best the Chapbook has been able to do to date is refer the reader to the several references which specifically illustrate such marks, notably for ceramics, silver and pewter. Let it be noted that copperware is hopeless.

When the Chapbook will be ready is uncertain. Presently the dilemma is whether or not to try to combine it with the bibliography of historical sites archaeology in one publication. Unless both were to be published in printed form, separate treatment seems indicated, with a specific topical list of references in the Chapbook. Comments of those in the field will be appreciated.
Punch Card Design for Ceramic Analysis

Renee H. Marwitt

INTRODUCTION:

Present and past excavations at the Fortress of Louisbourg have produced an estimated half million sherds and it became quite evident after working with only a small fraction of the material, that it would be physically impossible to view the collection as a whole, due to lack of layout space, time, and available staff.

To help overcome this difficulty, a punch card system was designed to handle the material in such a manner that each new type or variety could be coded on a card, doing away with the necessity of having to lay out any sizable portion of the collection at one time. The following paper deals with the card and the code design.

LOUISBOURG CERAMIC ANALYSIS PUNCH CARD:

The card (see Fig. 1) is 9½ by 13 inches with a single row of punches around its perimeter. Both sequence and direct sort fields are employed in the coding. Some of the disadvantages of an oversized card are balanced by the extra space on the front and the back for drawings, photographs and un-coded data. The basic code divisions along with examples of punches are listed below.

PROVENIENCE:

Both the Historic Sites Division and the Fortress of Louisbourg Restoration Project use a method of designating provenience based on the Site, Operation, Sub-operation, and Lot system used at Tikal (Rick, 1965: 1-28), the site and lot being the largest and smallest archaeologically defined units respectively. Using 1B.4J5 as an example, the 1B. stands for the landward fortifications at Louisbourg, operation 4 represents the right casemates of the King's Bastion, sub-operation J refers to the first right casemate and 5 is lot 5, in this instance a layer in casemate 4J.

CODE:

<table>
<thead>
<tr>
<th>Site</th>
<th>Operation</th>
<th>Sub-operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1B</td>
<td>1. 1</td>
<td>1. A</td>
</tr>
<tr>
<td>2. 16L</td>
<td>2. 2</td>
<td>2. B</td>
</tr>
<tr>
<td>3. 1L</td>
<td>3. 3</td>
<td>3. C</td>
</tr>
<tr>
<td>4. 5, ...etc.</td>
<td>4. 4</td>
<td>4. D</td>
</tr>
<tr>
<td>5. 5, etc.</td>
<td>24. Z</td>
<td>Note: I &amp; O not included</td>
</tr>
</tbody>
</table>
A. WARE

This is a direct sort triangular field designed so the different wares may be coded on the same basic card and stored in one place.

0. Coarse earthenware
1. Faience
2. Refined earthenware
3. French stoneware
4. 5... etc.

ex. Coarse earthenware

B. SHAPE

This category has three divisions; the first two triangular direct sort fields are based on Shepard's vessel form classes (1961: 226-232) and the third field deals with the common names for vessels. In this manner the various bowl shapes may be differentiated on a basic level.

<table>
<thead>
<tr>
<th>Structural Class</th>
<th>Contour</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. unknown</td>
<td>0. unknown</td>
<td>0. unknown</td>
</tr>
<tr>
<td>1. unrestricted</td>
<td>1. simple</td>
<td>1. bowl</td>
</tr>
<tr>
<td>2. simple restricted</td>
<td>2. composite</td>
<td>2. plate</td>
</tr>
<tr>
<td>3. dependent restricted</td>
<td>3. inflected</td>
<td>3. pitcher</td>
</tr>
<tr>
<td>4. independent restricted</td>
<td>4. complex</td>
<td>4. jug</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. lid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. pan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. jar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. pipkin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. porringer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. saucer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. platter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. chamber pot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14. bottle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15. tankard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16. sauce boat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20. etc.</td>
</tr>
</tbody>
</table>

ex. simple unrestricted porringer
C. RIM:

In this section each new rim form is added to a rim chart (see Fig. 2) and assigned a code number. Because of the likelihood of having a considerable number of different rim forms, a sequence sort field was used instead of a direct sort field to conserve coding area. If the card was double punched, direct sorting using this same type of field, would be possible.

1. rim 1
2. rim 2
3. rim 3
4. rim 4
5. etc.

D. BASE:

<table>
<thead>
<tr>
<th>Type</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>domed</td>
<td>round</td>
</tr>
<tr>
<td>flat</td>
<td>square</td>
</tr>
<tr>
<td>pedestal</td>
<td>oval</td>
</tr>
<tr>
<td>ring foot</td>
<td>5,...etc.</td>
</tr>
</tbody>
</table>

E. HANDLES:

0. Punch, if handled.

<table>
<thead>
<tr>
<th>No. of Handles</th>
<th>Position</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>single</td>
<td>1. horizontal</td>
<td>0. unknown</td>
</tr>
<tr>
<td>double</td>
<td>2. vertical</td>
<td>1. strap</td>
</tr>
<tr>
<td>multiple</td>
<td>3. both</td>
<td>2. loop</td>
</tr>
</tbody>
</table>

ex. porringer, type A, double, horizontal

In the triangular field of handle type, nos. 9 on deal with porringer handle types and are handled in the same manner as rim forms (see Fig. 3).
F. FEET:
No punch equals no feet
0. 3 feet
1. 4 feet
2. multiple
ex. no feet

G. SURFACE TEXTURE: (unglazed surface only)
No punch equals unknown
1. smooth
2. medium smooth
3. medium coarse
4. coarse
5. very coarse
ex. medium coarse

H. PASTE COLOR (Munsell system):
<table>
<thead>
<tr>
<th>Hue</th>
<th>Value</th>
<th>Chroma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 10R</td>
<td>1. 1</td>
<td>1. 1</td>
</tr>
<tr>
<td>2. 2.5YR</td>
<td>2. 2</td>
<td>2. 2</td>
</tr>
<tr>
<td>3. 5YR</td>
<td>3. 3</td>
<td>3. 3</td>
</tr>
<tr>
<td>4. 7.5YR</td>
<td>4. 4, etc.</td>
<td>4. 4, etc.</td>
</tr>
<tr>
<td>5. 10YR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 2.5Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. 5Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ex. 2.5YR 5/8 - red

I. PASTE TEXTURE:
No punch equals fine
1. medium
2. medium coarse
3. coarse
ex. medium coarse
0 - Punch, if major vessel dimensions known.
ex. punch
J. INCLUSIONS:

<table>
<thead>
<tr>
<th>Type</th>
<th>Particle Size</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. unidentified</td>
<td>pebble 65-4mm</td>
<td>1. light</td>
</tr>
<tr>
<td>1. iron oxide</td>
<td>granule 4-2mm.</td>
<td>2. moderate</td>
</tr>
<tr>
<td>2. grit</td>
<td>very coarse 2-1mm.</td>
<td>3. heavy</td>
</tr>
<tr>
<td>3. grog</td>
<td>coarse 1-1/2mm.</td>
<td></td>
</tr>
<tr>
<td>4. sand</td>
<td>medium 1/2-1/4mm.</td>
<td></td>
</tr>
<tr>
<td>5. limestone</td>
<td>fine 1/4-1/8mm.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>very fine 1/8-1/16mm.</td>
<td></td>
</tr>
<tr>
<td>7. etc.</td>
<td>silt 1/16-1/256mm.</td>
<td></td>
</tr>
</tbody>
</table>

ex. limestone, coarse, light

K. SLIP (Non decorative):
No punch equals no slip
1. interior
2. exterior
3. both

ex. interior slip

L. GLAZE:
0. Punch, if glazed

ex. glazed

M. EXTENT OF GLAZE:
1. interior
2. exterior
3. both
4. etc.

ex. interior

N. GLAZE MODIFIERS:
1. lead
2. soda
3. potassium
4. salt

ex. lead

0. GLAZE COLORANTS:
1. iron
2. copper
3. cobalt
4. manganese
5. antimony
6. iron and manganese
7. tin

ex. iron
P. BASIC GLAZE COLOR (Munsell system):

<table>
<thead>
<tr>
<th>Hue</th>
<th>Value</th>
<th>Chroma</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5R</td>
<td>21.</td>
<td>2.5BG</td>
</tr>
<tr>
<td>5R</td>
<td>22.</td>
<td>5BG</td>
</tr>
<tr>
<td>7.5R</td>
<td>23.</td>
<td>7.5BG</td>
</tr>
<tr>
<td>10R</td>
<td>24.</td>
<td>10BG</td>
</tr>
<tr>
<td>2.5YR</td>
<td>25.</td>
<td>2.5B</td>
</tr>
<tr>
<td>5YR</td>
<td>26.</td>
<td>5B</td>
</tr>
<tr>
<td>7.5YR</td>
<td>27.</td>
<td>7.5B</td>
</tr>
<tr>
<td>10YR</td>
<td>28.</td>
<td>10B</td>
</tr>
<tr>
<td>7.5Y</td>
<td>29.</td>
<td>2.5PB</td>
</tr>
<tr>
<td>10Y</td>
<td>30.</td>
<td>5PB</td>
</tr>
<tr>
<td>2.5GY</td>
<td>31.</td>
<td>7.5PB</td>
</tr>
<tr>
<td>5GY</td>
<td>32.</td>
<td>10PB</td>
</tr>
<tr>
<td>7.5GY</td>
<td>33.</td>
<td>2.5P</td>
</tr>
<tr>
<td>10GY</td>
<td>34.</td>
<td>5P</td>
</tr>
<tr>
<td>2.5G</td>
<td>35.</td>
<td>7.5P</td>
</tr>
<tr>
<td>5G</td>
<td>36.</td>
<td>10P</td>
</tr>
<tr>
<td>7.5G</td>
<td>37.</td>
<td>2.5RP</td>
</tr>
<tr>
<td>10G.</td>
<td>38.</td>
<td>5RP</td>
</tr>
<tr>
<td>7.5RP</td>
<td>39.</td>
<td>7.5RP</td>
</tr>
<tr>
<td>10RP</td>
<td>40.</td>
<td>10RP</td>
</tr>
</tbody>
</table>

ex: 5Y 8/6 - yellow

Q. METHOD OF DECORATION:

No punch equals non-decorated  
ex. slip and painted.

1. unknown  
2. slip  
3. painted  
4. sgraffito  
5. moulded  
6. stamped  
7. applied  
8. inlay  
9. incised  
10. luster  
11. variegated  
12. slip and painted  
13. slip, painted, sgraffito  
14. etc.

R. DECORATION GLAZE COLOR:  
Same code as section P, except that polychromes are coded from 40 on.

41. green and brown  
42. mottled green and yellow  
43. green, pale yellow and red  
44. etc.
S. DECORATIVE MOTIF:

This section is divided into five categories, the animal, geometric, floral, abstract and stylized motifs. Decorative motifs are handled in the same manner as rim forms; each new motif is placed on a chart under an appropriate heading and given a code number (see Fig. 4).

Code:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Geometric</th>
<th>Floral</th>
<th>Abstract</th>
<th>Stylized</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1</td>
<td>1. 1</td>
<td>1. 1</td>
<td>1. 1</td>
<td>1. 1</td>
</tr>
<tr>
<td>2. 2</td>
<td>2. 2</td>
<td>2. 2</td>
<td>2. 2</td>
<td>2. 2</td>
</tr>
<tr>
<td>3. 3</td>
<td>3. 3</td>
<td>3. 3</td>
<td>3. 3</td>
<td>3. 3</td>
</tr>
<tr>
<td>4. 4,...etc. etc.</td>
<td>4. 4, etc.</td>
<td>4. 4, etc.</td>
<td>4. 4, etc.</td>
<td>4. 4, etc.</td>
</tr>
</tbody>
</table>

ex. floral motif 19

An example of a completely punched card is shown in Figure 5. This same perringer has been used as an example throughout the code section except for the Method of Decoration, Decoration Color and Motif, since this piece is undecorated.

Comments and suggestions concerning the card and the code are welcome and may be sent to the following address:

Renee Marwitt
457 Warnock Ave.
Salt Lake City,
Utah

SOURCES

Munsell Color Company, Incorporated
1954 Munsell Soil Color Charts, Baltimore
1957 Nickerson Color Fan, Baltimore
Rick, John
1965 Archaeological excavation system of the National and Historic Resources Branch, Canada. Unpublished report.
Shepard, Anna O.
Explanation of Figures

Figure 1  Unpunched analysis card
Figure 2  Chart showing method of recording rim forms
Figure 3  Chart showing method of recording porringer handle forms
Figure 4  Chart showing method of recording decorative motifs
Figure 5  Example of a punched card
Punch Card Design for Ceramic Analysis

Figure 1

Figure 2

PORRINGER HANDLES

A
B
C
D

Figure 3

Figure 4

Figure 5
The Importance of Archaeology at Jamestown, Virginia, Site of the First Successful English Settlement in the New World

J. Paul Hudson

Mr. Chairman and members of the Conference on Historic Site Archaeology: I am most happy to be able to participate on your program and make a few remarks about Jamestown, Virginia, an historic site which has never received proper recognition.

A few years ago the President of the Virginia Historical Society, Mr. Samuel M. Bemiss, stated that Jamestown was the most significant historic site in the Western Hemisphere. In 1907, when Jamestown was 300 years old, Mr. James Bryce, the British Ambassador to the United States, emphasized in a speech that "the settlement of Jamestown was one of the great events in the history of the world."

Jamestown is important, and all Americans should remember that it is the site of the first permanent English settlement in America; the place where the first representative legislative assembly met in the New World, in 1619; the locale of stirring events throughout the 17th century; the place where many of our most cherished traditions of freedom were born; and the Capital of the Virginia Colony for 92 years, from 1607 until 1699.

Why is archaeology so important at Jamestown? A few years ago Professor Thomas J. Wertenbaker of Princeton made a profound statement regarding the significance of historic site archaeology in the United States. Dr. Wertenbaker stated:

Hitherto the historians have depended too much upon manuscript evidences. Perhaps the day is not distant when the social historian, whether he is writing about the New England Puritans, or the Pennsylvania Germans, or the rice planters of South Carolina, will look underground, as well as in the archives, for his evidence.

Since 1934 National Park Service archaeologists have excavated approximately 24 acres at Jamestown, and have recovered from the soil the physical evidence of everyday life which spanned almost a century of time. A total of 140 structures were uncovered, including foundations of frame houses, brick houses, outbuildings and workshops, as well as an ice storage pit, kilns, numerous refuse pits, wells, ditches, traces of ancient roads, and scores of miscellaneous features.

A study of the 17th-century artifacts - which were buried under the Jamestown soil for over 3 centuries - revealed in many ways how the English settlers lived on the small wilderness island between 1607 and 1699. Artifacts unearthed include pottery and glass, clay pipes, building materials and handwrought hardware, tools and farm implements, weapons, kitchen utensils and fireplace accessories, furniture hardware, lighting devices, eating and drinking vessels, tableware, costume accessories and footwear, medical equipment, horse gear, coins,
weights and measures, and numerous items relating to household and town industries, transportation, trade, and fishing.

The real drama of everyday life of the settlers - the life they knew 24 hours a day - was locked in the unwritten history beneath humus and vine-twisted foliage of the island. Today I have time to mention only four important facets of information revealed by archaeological excavations. And I would like to emphasize that before the excavations were undertaken very little was known about these aspects of the Jamestown story, namely (1) the Indians, (2) the houses and buildings constructed by the early settlers, (3) the early industries at Jamestown, and (4) pertinent information relating to the everyday life of the colonists.

Before the excavations were conducted it was not known whether Indians had lived on Jamestown Island prior to 1607. All that was known was that the Indians were not living there when the colony was planted, May 13-14, 1607. In 1955, while searching for the location of James Fort, archaeologist Joel Shiner discovered a well-defined zone of Indian occupation in direct contact with early Colonial period debris. This Indian occupation was characterized by flaked stone points and sherds. The latter were either plain, cord marked, fabric impressed, or incised. The stratigraphy indicated that the Indian site had been abandoned shortly before the English arrived. Hence we may regard the site as late prehistoric and safely assume that the culture here represented was not materially different from the historic Algonquians of the time of contact. This evidence unearthed by Dr. Shiner proved that Indians did live on the Island prior to 1607, and had left the site only a few years before the arrival of the whites.

Our main interest at Jamestown, however, is not the Indians who met the first settlers, but the settlers themselves, the houses they constructed, knowledge of their early industries, and glimpses of their everyday life.

Before archaeological excavations were undertaken at Jamestown very little was known about the 17th-century houses and buildings constructed there. As no contemporary pictures relating to the settlement had been found the street plan of the town was unknown. This dearth of information prompted many questions. What did the settlement look like at various periods of time? Where were the houses located? What materials were used? What size were the houses and public buildings? When were the first brick houses constructed? Were the bricks made in Virginia or were they imported from the mother country? What was the street plan of Virginia's first capital? None of these questions could be answered until archaeological excavations had been carried out.

Excavations revealed that the early houses were of frame construction. We now know that most of the dwellings built during the early years, until about 1630, had a rough and primitive appearance. During these early years, when the settlers were having such a difficult time staying alive, mud walls, wattle and daub, and coarse marsh grass thatch were often used.
Foundations and artifacts recovered reveal that the Jamestown colonists built their houses in the same style as those they knew in England, insofar as local materials permitted. There were differences, however, for they were in a land replete with vast forests and untapped natural resources close at hand which they used to advantage. The Virginia known to the first settlers was a carpenter's paradise, and consequently the early buildings were the work of artisans in wood. The first rude shelters, the split-wood fencing, the clapboard roof, puncheon floors, cupboards, benches, stools, and wooden plows and household accessories are all examples of skilled working with wood.

After Jamestown had attained some degree of permanency, about 1625 or 1630, many houses were constructed of brick. It is quite clear from the documentary records and archaeological remains, that the colonists not only made their own brick, but that the process, as well as the finished products, followed closely the English method. Four brick kilns were discovered on Jamestown Island during archaeological explorations.

Excavations revealed the kinds of building hardware used in the Virginia Colony, including nails, spikes, staples, locks and keys, hinges and pintles, shutter fasteners, door knockers, door pulls, foot scrapers, gutter supports, and ornamental hardware. Even parts of weathervanes were recovered. Excavations also revealed precise information regarding the size of hand wrought iron window casements used in many early houses as well as the kinds of window glass which were held in place with lead came. Archaeology also revealed that many houses had fireplaces decorated with attractive Dutch delftware tiles, and that a few of the pretentious homes were decorated with pargetry or ornamental plaster. One house was decorated with plaster letters bearing the motto of the English Order of the Garter, HONI SUI QUI MAL Y PENSE, or translated, EVIL BE TO HIM WHO EVIL THINKS.

Several public building foundations were excavated at Jamestown, including the sites of 3 state houses. The largest building foundation found, of brick, was approximately 240 feet long; a multiple-purpose building used in the second half of the 17th century as the third and fourth state house, a private dwelling known as the Country House, and Philip Ludwell's three houses or apartments. This large structure varied in width from 24 to 46 feet. Another large brick foundation uncovered was 160 feet long by 20 feet wide (inside measurement). This long house or "row" house had 10 fireplaces, and was divided into 4 main sections or apartments. This structure may have provided the precedent for the row houses which later came to characterize miles of Baltimore and Philadelphia streets during the 18th and 19th centuries.

Largely as a result of archaeological excavations a great deal has been learned about early Virginia industries. While contemporary records mention a few 17th-century industrial activities carried out at Jamestown, they do not mention all, including the making of pottery, bricks and roofing tile, lime, clay pipes, iron tools, ornamental plaster, and building hardware. Only after archaeological excavations were undertaken was it known that these industrial activities - and
others - were carried out at Jamestown. The Virginia Company was primarily a commercial undertaking, entered into with the hope, expectation, and planning necessary for a return, an increase, a profit. The Charter of 1609 created a joint stock company. In the list of incorporators were 56 guilds of the City of London, and 659 individual investors including peers, knights, artisans, merchants and professional men.

A search for useful and profitable commodities was a dominating activity at Jamestown. Shortly after the colonists arrived masts for ships, cedar logs, clapboard, and other timber products were assembled for shipping to England. In late 1608 Captain Christopher Newport on a return voyage to the mother country carried pitch, tar, glass, medicinal plants, soap ashes, and sassafras roots.

Jamestown has never received proper recognition as the place where many American industries were brought into being in the New World. Few people are aware that boatbuilding, timbering, glassmaking, tobacco cultivation, wine making, silk culture, iron smelting, and the making of pitch, tar, potash, and soap ashes were carried on in Virginia's Colonial Capital; nor is it generally known that there was production of pottery, bricks, tile, lime, and small tools long before Plymouth was founded. Attempts were made to produce cordage, silk-grass, dyes, salt, flax, hemp, alum, walnut oil, sweet gums, madder, indigo, sugar cane, cotton, citrus fruits, olives, roots and berries. A few brought profits to the planters while others, like indigo, cotton, sugar cane, and citrus fruits could not, of course, withstand the cold Virginia winters.

What has archaeology revealed about some of these early American industries? Scores of tools used by the carpenter, cooper, woodcutter and Sawyer have been found on Jamestown Island. A small, primitive hearth or furnace, where small amounts of iron were smelted during the early part of the 17th century, was uncovered during archaeological explorations in 1955. A few miles upriver from Jamestown, at Falling Creek, the English built their first large iron furnace in America, in 1620-21. Iron was made in the stone furnace and a few tools were forged, but in 1622 the Indians massacred the iron-workers and their families and destroyed the furnace. In 1955 archaeologists discovered the remnants of an early 17th century blacksmith's forge a few yards west of the brick church tower. Near the site blacksmith's tools, bar iron, slag, and unfinished hardware and swords were found.

Contemporary records revealed that small boats were built in Virginia in the 17th century. Now we know the kinds of tools used by the boatbuilders, as some have been recovered at Jamestown. A pottery kiln was discovered in 1955, evidence that pottery was made in the Virginia Colony over three centuries ago. Although manufactured for utilitarian purposes, many of the vessels recovered are symmetrical in form and not entirely lacking in beauty. The unknown Jamestown potters were artisans, trained in the mysteries of an ancient craft, who first transplanted their skills to the Virginia wilderness.
While the records indicated that glass was made at Jamestown in 1608 and 1609, and again in 1621-24, the site of the glasshouse and furnaces was not known until excavations were carried out. The archaeologist was able to determine the size of the glasshouse, 37 by 50 feet, and uncovered four furnaces - the main working furnace, fritting furnace, annealing furnace, and pot furnace. The latter was really a pottery kiln as highly fired clay pots (in which the glass ingredients were melted) were fired in this oven or kiln. Lime kilns and brick kilns excavated proved beyond a shadow of doubt that lime, bricks, and earthenware roofing tile were made at Jamestown over 300 years ago.

The history of American industries, like the history of the nation, is no longer a brief one. Over 350 years have now passed since the first adventurous Englishmen, with musket in hand and ears alert to the sound of moccasined feet, searched the wilderness area up and down the James River for New World wealth. As time permitted he worked in his small shop making utilitarian items out of clay, wood, sand, and metal - objects not entirely lacking in qualities pleasing to the eye. Busy as he was with these tasks, he still found time to tend his small vineyard and tobacco field. As he worked under the Virginia sun he may have dreamed of the day when his hogheads of sweet-scented tobacco and casks of red wine would reach England safely and be sold for a profit. Trying to better his condition in a new land, he never dreamed that the seeds of his incessant labors, which he was unconsciously planting, would some day grow and flower into a great industrial nation - the most prosperous in all the world.

In my opinion the most significant artifacts unearthed at Jamestown are those which revealed heretofore unknown information about the everyday life of the early settlers.

A brass thimble found near a small cottage foundation still retains a pellet of paper to keep it tightly on a tiny finger that wore it over 300 years ago!

A bent halberd in an abandoned well, a discarded sword, a dented iron helmet, a well-shaped breast plate from a suit of armor - all remind us of the ceaseless struggle required to drive the Indian from his land. This is a sad chapter in American history, nevertheless the Indian had to be driven westward if the new English settlements were to spread and prosper. The handwriting was on the wall for the stone age aborigine, for the English came to Virginia to build permanent homes and better their condition, and the Indian was forced to retreat forever into the distant hills and forests.

An earthenware bean pot, found at the site of the 1608 glasshouse, could very well be the first piece of pottery made in America by an Englishman. It reminds us of the frugal meals partaken by the glassmakers during the hard winters of 1608-09 and '1609-10. It is possible, too, that beans were cooked in the redware pot a decade or two before the town of Boston was established!
Bleeding cups, delftware drug jars, ointment pots, and surgical instruments bring to mind the first summer and autumn at Jamestown when two-thirds of the colony perished from disease, epidemics, and Indian arrows.

Oriental porcelain, silver spoons, a shiney pewter bowl, and artistically decorated Venetian goblets are just as meaningful as contemporary documents in revealing that some planters made profits from tobacco after 1616, and could afford to import a few luxury items from the mother country.

Anchors and ships’ gear take us back to a time when the most practical mode of transportation through Tidewater Virginia was by way of the many creeks and rivers which traverse the lowland area. But also found in fairly large numbers were ornamented brass spurs, iron stirrups, and handmade bits decorated with beautiful brass "bosses," reminders that horses were brought to the Virginia Colony a year or two after Jamestown was established, and that a few roads and trails were built which ran from the Capital City to a few nearby settlements.

A large earthenware baking oven made in North Devon, broken into over 200 fragments, was found under 3 feet of earth. Glued together, piece by piece, by a patient archaeologist, it recalled the days when the busy Jamestown housewife spent long hours kneading dough and baking round loaves of coarse bread for her large family. Numerous other items familiar to the Colonial housewife – scissors, needles and pins, brass thimbles, pots and pans, forks and skewers, and objects relating to spinning and weaving, and other household industries, attest that woman’s work was a never ending chore in 17th century Virginia dwellings.

Mention could be made of other artifacts recovered at Jamestown which reveal in many ways how the pioneer settlers lived in their small settlement over 30 decades ago. These seemingly commonplace objects are important clues as they divulge many little-known aspects of everyday life in a colorful and perceptible manner. Cutlery, pottery and glass, tools and scientific instruments; buttons and buckles, leather shoes found in abandoned wells; Indian trade items including glass beads, brass bells, knives and axes; household and kitchen accessories, and countless other artifacts left behind by unknown Englishmen – all contribute irrefutable evidence about the everyday activities of the men and women who established a beachhead on the fringe of a vast continent and helped lay the cornerstone of a new nation.
The Ceramic Forms of the Potter Gottfried Aust at Bethabara,
North Carolina, 1755 to 1771

Stanley South

The Moravian settlement at Bethabara, North Carolina was begun on November 17, 1753 by pioneers from Pennsylvania who came to send missionaries to the Cherokee Indians. This first settlement of Moravians in North Carolina was an important nucleus of craftsmen who set standards of excellence that would make them admired and envied throughout the Carolina frontier. Among those of a new group arriving on November 4, 1755 was a man whose skill as a potter would result in his becoming a major economic force in the Moravian community. Gottfried Aust was a forceful eccentric whose talent was unquestioned, but his patience was short with those less skilled in the potter's art. He felt himself working with what he considered incompetent asses as apprentices, but to whom he was able to pass a great deal of his knowledge and skill.

Aust was indeed an important artisan contributing to the success of the Bethabara Oecomnie, the term they used to describe their communal way of life. Sales of his pottery brought huge crowds to the little town. On May 21, 1770 a Bethabara resident remarked,

There was an unusual concourse of visitors, some coming sixty or eighty miles to buy milk crocks and pans in our pottery. They bought the entire stock, not one piece was left; many could only get half they wanted and others, who came too late, could find none. They were promised more next week. (Fries, v. 1, p. 412)

The following year, on June 17, 1771, Brother Aust took down the half-timbered addition to his pottery shop and moved to the new town of Salem, having worked at Bethabara for fifteen years.

In 1963 a cooperative project of the North Carolina Department of Archives and History and The Southern Province of the Moravian Church, and the generosity of Mr. Charles H. Babcock, Sr. made possible the archaeological examination of Bethabara, including Aust's pottery shop. The waster dumps used by Aust from 1756 to 1763, and from 1763 to 1771 were located and carefully excavated. The pinpointing of the pottery shop site was made possible by maps of the town drawn by Gottlieb Reuter in 1760 and 1766, both of which show the pottery shop site. As excavation progressed the stone foundation of the shop was revealed, along with two clay wedging platforms with stone floors on which potter's clay was still lying. From the waster dumps over four thousand fragments of pottery as well as kiln furniture such as trivets, saggars, sagger pins and the spout from a slip cup were found. These undisturbed pottery deposits have revealed over thirty-five ceramic forms being made by Gottfried Aust between 1755 and 1771, and provide us with an excellent picture of the variety of wares being produced by this exceptionally talented colonial potter. Many facets of Aust's ware and that of his apprentices, also recovered at Bethabara, will be studied, but the focus of this paper will be the variety of forms produced by Aust at Bethabara.
In 1789 an inventory of the wares being made by Gottfried Aust at his Salem shop was taken, and from this list the terms for forms recovered at his Bethabara shop have been obtained. The major forms being made by Aust at this time were milk pots and pans, over one thousand pans and 3325 pots being inventoried. These forms, no doubt, were always major items of production. Other forms, however, recovered from the Bethabara excavation, were probably never made in great abundance. Delicate stemmed egg cup or wine glass forms in the shape of the familiar blown glass goblets of the period were being made on the wheel, as well as salt dishes that are almost exact parallels of silver forms of the mid-eighteenth century. Teacups and saucers with carefully turned feet, as thin as Oriental porcelain examples, were being masterfully thrown. Apothecary jars, tea cans and mugs were being made, similar to the delft and white salt-glazed stoneware forms of Europe.

Ware for cooking on the hearth was apparently made in some quantity as indicated by the number of fragments of what the German Brethren called "cook pots" found in the ruins of the town as well as in the pottery waster dumps. These cook pots were as shallow as skillets, or as deep as sauce pans, but are all characterized by having three legs and a hollow handle. A number of lids made by Aust were recovered, some fitting these cook pots. This form is more familiar in cast iron, but similar pottery examples have been recovered by Ivor Noël Hume in Virginia at the Challis Site.

A companion piece to the cook pots on the hearths at Bethabara was the brazier. This unusual form had a double bottom with holes punched through the upper bottom, and one or more triangular draft holes cut into the side of the chamber between. The rim had three knobs upon which a teapot or other vessel sat. Charcoal was placed inside and the ashes fell through the upper bottom into the lower chamber. A hollow handle with a bulbous end is characteristic of this form, and is apparently the ceramic counterpart of turned wooden handles with a similar form found on silver chafing dishes or braziers of the mid-eighteenth century. Here we see again the versatility of Aust in providing a ceramic adaptation of a form more familiar in silver than pottery.

The gentle art of tea drinking was apparently popular at Bethabara as indicated from the teacups and saucers, teapots and tea cans found in the waster dumps. PorringerS with flat pierced handles in imitation of the pewter and silver porringerS were being made, as well as bowls, flasks, roasting pans, jugs, funnels and beakers.

For lighting Bethabara homes Aust was making candlesticks in the same form as the silversmiths. Candle holders with a saucer shaped bowl were also made. The most interesting of the lighting devices, however, are the stand lamps with double bowls and a pottery wick tube. Only a very few of this type lamp are known, and they apparently occur primarily in Pennsylvania German settlements. This form is sometimes called a grease lamp, and is usually said to have been used to burn grease or tallow. However, this type fuel requires constant maintenance to keep the grease pressed around the wick, whereas oil requires much less maintenance. It is thought that this lamp was used to burn linseed oil, the lower bowl serving to catch the drippings from the wick, and as a safety factor to catch any oil that might be spilled from the upper bowl. In this regard we notice that an oil press was set up in Bethabara.
and was producing oil in May 1757, and that at one time twenty gallons
of linseed oil was on hand. I have tried using this oil in the
excavated lamps and find that it burns very efficiently.

A number of short clay tobacco pipes were recovered from the
waster dumps, and their presence in a context dating before 1771 was
something of a surprise since it had been generally thought that this
type of anthropomorphic pipe dated somewhat later. However, we know
Aust was making pipes in 1755, and passing them on to the Indians in
1756, and his inventory of the pottery shop in 1766 listed one tobacco
pipe press with eight molds. By examining the 175 fragments of pipes
from the two waster dumps we find that there are seven of these molds
represented. Four plain, smooth-surfaced pipe types were recovered,
one fluted type with a fleur-de-lis motif, and two anthropomorphic
types with relief faces on the bowl were found. These pipes were
referred to as "pipe heads" in the 1789 inventory when 5568 were on
hand to be sold at one cent each. A reed was used for the stem of these
pipes, which were glazed green, brown, black or clear, (which produced
a creamy yellow pipe), or were left unglazed. In his inventory of 1772
Aust listed only three lead pipe molds and one brass pipe mold, indicating
that he had lost or discarded four of his molds since 1766. Pipes con-
tinued to form a vital part of the production of the pottery shop in
Salem until the late 19th century, when a photograph shows hundreds
of similar pipes drying in the sun in front of the pottery shop.

Pipe sagger with pins attached excavated along with the pipes
provide information as to the method of placing the pipes in the kiln
for firing. The sagger were made in the form of a cylinder with clay
pins pressed while wet against the side of the sagger, allowing the
end to protrude, over which the pipe bowl was placed. These pins
were fastened in rows around the interior of the cylinder on small
stepped-back shelves, or around the exterior of the cylinder. Another
pipe sagger had a pin that was inserted into a hole punched through
the sagger wall. The pins for the sagger were made by pressing the
clay into half of a two-piece mold and then fitting the two halves
together. The resulting pins were uniform in size, and clearly show
the mold marks on each side of the pin. One example of a sagger pin
was found that was made by forcing clay through a round hole, forming
a long, compact uniform coil. This coil was then cut into short lengths
for pins, and tapered at one end to fit the hole in the sagger by using
a knife. A fragment of a pipe bowl was stuck to the pin with brown
glaze, revealing a problem that apparently arose as a result of glazing.
Sagger rims had three pins or posts of clay fastened to the rim which
allowed another sagger to be placed on top without touching the top row
of pipes.

Saggers for holding small objects during firing were also found.
Some of these had a hole in the center of the base to allow heat to
move from one sagger to another. Others clearly showed the marks of
small round objects placed on the bottom of the sagger during firing.
Flat tiles were often used for small cups and bowls during firing;
rippled and ridged tiles were also used to allow less sticking of the
ware to the tile by the flowing glaze. Trivets with three arms were
hand molded, and had three points on which to sit the ware in the kiln.
Another type had three prism shaped arms without points which allowed only a small surface of the foot of the vessel to touch the trivet. Ring trivets were made by throwing a cylinder on the wheel and cutting this into rings with a wire. A knife was then used to make three points on the two edges of the ring, producing a very effective means of stacking teacups in the kiln, a method still in use today.

White slip was used to cover the exterior or interior of some vessels before glazing. A clear glaze would then produce a yellow or cream colored ware, which was often dotted with spots of green glaze. The entire slipped exterior surface could be covered with a green glaze, producing a green exterior and a red interior. A clear lead glaze over a bowl slipped on the exterior only would produce a red interior and a yellow exterior. A yellow and brown slipware was produced by slipping the interior and applying a clear lead glaze, with a lead-manganese glaze on the exterior. These plain varities of slipware were accompanied by the slip decorated ware applied with a slip cup.

The inventory of Aust's shop in 1766 lists three slip cups, and after he moved to Salem in 1772 three slip cups are again listed. In waster dump #2 a bone spout for one of these slip cups was found. By trailing colored slip over the surface of plates and bowls Aust produced decorative motifs such as tulips, pumpkins, wavy lines, leaves and stylized designs. It is particularly significant that no sgraffito-type decorated slipware typical of the Pennsylvania slipwares was found, indicating a closer tie with European tradition than with that of Pennsylvania for the Aust ceramics.

In order to apply the slipware design in something of a controlled manner and to gain some degree of standardization, Aust roughed out the design he was to make by incising a general outline into the greenware plate surface and using these lines as a guide in applying the slip. These incised scratches can be seen when the slip decoration has flaked from the surface of a vessel in places, revealing the guide lines. A possible reference to this practice is found in the Moravian records of 1779 when Aust reported that Rudolph Christ had carried away from the pottery several of the forms which were used for making flowers for the fine pottery. This would seem to refer to a type of stencil into which the outlines of various flower designs had been cut.

The design motifs were applied by Aust by using dark slips on a white slipped background or light slips on a dark background. Brown slip or red slip could be obtained by various colors of clays, but how did he apply green slip? Several sherds indicated that the slip had fired green beneath the clear lead glaze, and that this slip was not a green glaze, but an applied slip. Some bisque fired sherds had similar designs, but instead of the bright green color of the glazed slip examples, this slip appeared as grey; pale blue, or very slightly green. The question immediately arose as to what type of slip Aust was applying that would appear slightly blue or grey on a bisque piece, but would fire bright green under a lead glaze. Obviously an analysis of the slip would answer this question. Fortunately the Federal Saline Water Research Station is located near our archaeological laboratory, and when this
problem and others dealing with the glazes and slips made by Aust was presented to the chemists there, they accepted the challenge with enthusiasm, and conducted an analysis. Their findings verified what we had suspected regarding the green-firing slip, that it contained copper. However, they found that it contained both copper oxide and metallic copper, indicating that Aust was using copper filings as well as burnt copper in his slip. During the bisque firing this slip would remain grey or only slightly oxidized, but during the glost firing the copper would be trapped beneath the lead glaze, staining it green.

When the 1789 inventory of Aust’s Salem pottery was made he had on hand 1,568 pounds of glazing. This was no doubt, lead, which was the major glazing ingredient. When Aust was at Bethabara in 1763, a wagon brought 1,000 pounds of lead from Fort Dobbs to exchange it for pottery. In 1761 the Moravians opened a lead and silver mine on New River, about eighty miles from Bethabara, and it was from here that lead was brought to the pottery shop; three hundred pounds arriving in June 1764. Also listed in the 1789 inventory were burnt copper, manganese, and “iron color”, obviously for use in making colored glazes, and as we have seen, for adding to slip for use in making decorated polychrome slipware. Lumps of brown and black slag with pockets of blue-green glassy substance were found throughout the area of the waster dumps, which upon analysis has proved to be a combination of iron, lead and copper, and are apparently lumps of unground glaze material. A mortar, probably for grinding such lumps, was inventoried by Aust in 1766 and 1772, and may be the same one now in the restored pottery shop museum at Old Salem.

The ware of Gottfried Aust has been classified into types based on the variations produced through different colors of clay and glazes. There are four types with white paste. A clear lead glaze over this paste produces a cream colored, or light yellow ware. A clear lead glaze on the interior and a lead plus manganese glaze on the exterior produces a brown and yellow ware. Clear lead glaze on the interior and a lead plus copper glaze on the exterior produces a green and yellow ware, and of course, coating both sides with the copper-lead glaze results in a green glazed ware.

Five types are made with a red paste. When a clay free of small specks of manganese-iron particles is used for the paste and covered with a lead glaze, a clear redware is produced. When clay with small particles of manganese-iron nodules (found as natural inclusions in the subsoil at Bethabara) is used, a ware that varies from red to brown is produced, and is characterized by brown bleeding dots and streaks. When manganese is added to the clear lead glaze, a dark brown to black glaze is produced through which the paste cannot be seen. These three types actually represent a continuum from red to dark brown-black depending upon the number of manganese-iron nodules present in the paste, and the amount of manganese added to the glaze mixture.

The fourth of the five red paste types is characterized by a paste that is more orange to buff than the deeper range of red, and is covered with a dull black glaze resembling a black slip. In the field we referred to this type as lampblack glazed ware, and when the glaze was analyzed, carbon was found, verifying this conjecture. The last of the red paste types is a ware that is glazed on the interior with a clear
lead glaze, and on the exterior with a manganese-lead glaze, producing
a red interior and a brown exterior; a red and brown ware.

Besides the clear lead glazed decorated slipware types there are
four plain types of slipware previously mentioned which are: yellow
and red slipware, green and red slipware, green-spotted yellow slipware,
and yellow and brown slipware.

It becomes clear from an examination of Aust's ceramics that he
was able to produce a range of fourteen types by varying the combinations
of clays, glazes and slips, and as was probably also the case with many
other colonial potters, capable of producing a far greater range of
types than "the common redware" so often said to have been the sole
product of eighteenth century potters. It is true that many of Aust's
types are made with red clay, but his treatment of form, glaze and slips
was such that it would be unfair and inaccurate to refer to his pottery
as "the common redware".

The records of the Moravians describe Aust's temperament and success
as a potter, and the recovery of examples of his work amply illustrate
his skill. Another facet of the man is illustrated in fragments of
several oriental porcelain sherd sherds and scratch-blue stoneware fragments
with green glaze along the edges. These were found not only in Aust's
waster dumps, but in other ruins throughout the town, and raised the
question as to their function. A detailed examination revealed that this
green glaze was being used as a bonding agent to cement together broken
porcelain and stoneware, its success in this respect being reflected in
this type sherd being found in a number of the ruins of the town, reflecting
a return of the patched vessels to their owners. Thus a handful of
unique sherds reaffirm the degree to which Gottfried Aust served the needs
of the people of Bethabara, and at the same time, tell us a bit more of
the ingenuity and inventiveness of the man himself, at the same time
revealing a previously unknown method of patching pottery practiced
(by one potter at least) in colonial America.

After the fragments of Aust's pottery were glued together the
archaeologist used the Stockton profile gauge to produce exact scale
drawings of the pottery forms. These were then reduced with a pantograph
to produce the drawings illustrated in the plates accompanying this paper.
These drawings, therefore, are not sketches of Aust's forms, but the
exact form as thrown by Aust on the wheel. I am indebted to George
Demmy for the final polishing and preparation of the plates. The analysis
chart illustrates the relationship between Aust's forms and the type
of paste and glaze characterizing each type. One of the most promising
aspects of the study of Aust's pottery is the comparison of his ware
with that of his apprentices Rudolph Christ and Gottlob Krause....
but that is another story.
Excavation at Bethabara, North Carolina

**Plate 1**
Aerial View of Bethabara Showing Palisade Fort and Open Cellars.

**Plate 2**
Pottery in Gottfried Aust's Waster Dump

**Plate 3**
The Outline of the West Bastion Ditch of the Fort with Aust's Pottery Shop Ruin in the Background.

**Plate 4**
Fort Bastion Ditch During Excavation

**Plate 5**
The Doctor's Laboratory During Excavation

**Plate 6**
The Laboratory after Stabilization with Palisades Replaced in the Original Fort Ditch in the Background.
Ceramic Forms of Gottfried Aust
1755 - 1771

Plate I  Cook Pan and Plate
Plate 2  Restored Teapots
Plate 3  Anthropomorphic Pipes
Plate 4  Restored Brazier with Teapot in Position as Used
Plate 5  Egg Cup and Salt Dishes
Plate 6  Water Bottle with Lamp Black Glaze
Plate 7  Stand Lamp Burning Linseed Oil
Ceramic Forms of Gottfried Aust
The Ceramic Forms of GOTTFRIED AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Scale

FUNNELS

COOK POTS

SKillet

BRAZIERS

MILK POTS

ROASTING PAN STOPPER

Figure 2

HOLE FOR ESCAPING STEAM

INCISED ON BARE
The Ceramic Forms of GOTTFRID AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Figure 4
The Ceramic Forms of GOTTFRIED AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Figure 5

HONEY JUG
STOPPER

TOP VIEW SHOWING PARTITION CLOSING HALF THE NECK OPENING

JUG

BLUE AND GRAY STONEWARE EUROPEAN CREAMER FROM THE AUST MASTER DUMP

CREAMERS
ETCHED OWNER’S MARK

MILK JUG

WATER JUGS

SCALE 0 1 2 3 4 5 6 INCHES
The Ceramic Forms of GOTTFRIED AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Figure 6

TEACUPS
BEAKER
SAUCERS
EGG CUP
TEA CAN
SALTS
MUGS
COFFEE POT
TEAPOT
The Ceramic Forms of GOTTFRIED AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Figure 7

Hand Basin

Stove Pipe Thimble

Acorn Stove Tile

Figure 7
The Ceramic Forms of GOTTFRID AUST
MADE AT BETHABARA FROM 1755 TO 1771
Stanley South, ARCHAEOLOGIST

Scale

Figure 8

INCISED MARKS ON POTTERY FROM THE AUST KILN WASTER DUMPS
The Ceramic Forms of Gottfried Aust
Made at Bethabara from 1755 to 1771
Stanley South, Archaeologist

KILN TRIVETS

KILN FURNITURE

KILN TILE FOR SUPPORTING GREEN WARE IN THE KILN

SAGGERS

PIPE SAGGERS

Figure 9

Scale 0 1 2 3 4 5 6 Inches

Figure 9
ANTHROPOMORPHIC ROCOCO
ANTHROPOMORPHIC FLUTED
FLUTED

Aust's Decorated Types

4.
5.
6.
7.

Aust's Plain Types

ANTHROPOMORPHIC FLUTED

A Christ-Krause Type

SECTION SHOWING BOWL AND STEM MANDREL PROFILES
EIGHTEENTH CENTURY CLAY PIPES
FROM THE KILN WASTER DUMPS
IN THE MORAVIAN TOWN OF
BETHABARA, NORTH CAROLINA

Notes from Records of the
Moravians in North Carolina

BETHABARA

December 1, 1755
"Dr. Augst dug clay and made pottery, for which the people were eager; he also began to make clay pipes."

May 26, 1756
"We gave them [Cherokee Indians] a few clay pipes, for which they were grateful..."

June 17, 1771
"Br. Aust took down the addition to the potter’s shop, in order to move the woodwork to Salem this week."

SALEM

January 7, 1783
"Br. Aust is willing to employ Br. Tycho Nielsen in making clay pipes, which can be burned and sold in the pottery."

January 13, 1789
"We wish the demand for clay pipes could be increased by shipments to Petersburg or in some other way so that [Br. Tycho Nielsen] could have more of that work."

April 30, 1799
Inventory, "16 dz glazed Pipes ... 100 dz unglazed Pipes"

April 30, 1797
Inventory, "200 dz glazed Pipe Heads ... 1000 dz unglazed Pipe Heads ."

The Gottfried Aust Kiln Waster Dump
1755 to 1771 Context
(84 & 851)

Unglazed Anthropomorphic Fluted
(With Ear)

Unglazed Anthropomorphic Rococo

Unglazed Smooth

Green-glazed Fluted

Unglazed Anthropomorphic Fleur-de-lis on Stem

Brown-glazed Smooth

The Christ-Krause Kiln Waster Dump
1786 to 1802 Context
(845)

Unglazed Anthropomorphic Fluted
(No Ear)

Brown-glazed Anthropomorphic Fluted
Two Types of Pipe Saggers from the Kiln Waster Dumps

<table>
<thead>
<tr>
<th>Pipe Type Distribution in Three Kiln Waster Dumps</th>
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<tbody>
<tr>
<td>AUST KILN WASTER DUMP # 1</td>
</tr>
<tr>
<td>B4</td>
</tr>
<tr>
<td>ANTHROPOMORPHIC FLUTED SMOOTH TOTAL %</td>
</tr>
<tr>
<td>Fluted Rococo Fleur-de-lis</td>
</tr>
<tr>
<td>Unglazed 3 1 2 1 3 54 79.4</td>
</tr>
<tr>
<td>Clear-glazed 1 1</td>
</tr>
<tr>
<td>Brown-glazed 3 1</td>
</tr>
<tr>
<td>Mottled-glazed 2 1 3 1</td>
</tr>
<tr>
<td>Green-glazed 2 1</td>
</tr>
<tr>
<td>Black-glazed Total 44 13 2 4 5 68 100.0</td>
</tr>
<tr>
<td>% 64.7 19.1 3.0 5.6 7.4 100.0</td>
</tr>
<tr>
<td>AUST KILN WASTER DUMP # 2</td>
</tr>
<tr>
<td>B61</td>
</tr>
<tr>
<td>Unglazed 21 2</td>
</tr>
<tr>
<td>Clear-glazed 56 79 73.9</td>
</tr>
<tr>
<td>Brown-glazed 2 24 26 24.3</td>
</tr>
<tr>
<td>Mottled-glazed 1 1 2</td>
</tr>
<tr>
<td>Green-glazed Total 24 2 81 107 100.0</td>
</tr>
<tr>
<td>% 22.5 1.8 75.7 100.0</td>
</tr>
<tr>
<td>CHRIST-KRAUSE KILN WASTER DUMP</td>
</tr>
<tr>
<td>B45</td>
</tr>
<tr>
<td>Unglazed 25 25 67.6</td>
</tr>
<tr>
<td>Clear-glazed 4 4 10.8</td>
</tr>
<tr>
<td>Brown-glazed 4 4</td>
</tr>
<tr>
<td>Mottled-glazed 1 1 2</td>
</tr>
<tr>
<td>Green-glazed 1 1</td>
</tr>
<tr>
<td>Black-glazed Total 37 7 37 100.0</td>
</tr>
<tr>
<td>% 100.0</td>
</tr>
</tbody>
</table>

South 10/64
N.C. DEPT. OF ARCHIVES & HISTORY
### The Ceramic Types and Forms of the Master Potter

Drawing based on material made by Aust from 1756 to 1771 at the Moravian settlement of Bethabara in N DINOLIVION conducted by the Archaeologist in 1964.

#### Forms of the Master Potter

<table>
<thead>
<tr>
<th>Earthenware</th>
<th>Stoneware</th>
<th>Porcelain</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Bethabara</td>
<td>Oriental</td>
</tr>
<tr>
<td>Red</td>
<td>European</td>
<td>Blue and Grey Salt-Blazed</td>
</tr>
<tr>
<td>Glazed</td>
<td></td>
<td>Blue and Grey Salt-Blazed</td>
</tr>
</tbody>
</table>

#### Ceramic Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CREAM COLORED WARE</td>
<td>(clear lead)</td>
</tr>
<tr>
<td>2. BROWN and YELLOW WARE</td>
<td>(lead plus manganese and clear lead)</td>
</tr>
<tr>
<td>3. GREEN and YELLOW WARE</td>
<td>(lead plus copper and clear lead)</td>
</tr>
<tr>
<td>4. GREEN WARE</td>
<td>(lead plus copper)</td>
</tr>
<tr>
<td>5. RED WARE</td>
<td>(clear lead)</td>
</tr>
<tr>
<td>6. RED to BROWN WARE</td>
<td>(lead plus iron)</td>
</tr>
<tr>
<td>7. BROWN to BLACK WARE</td>
<td>(lead plus manganese and iron)</td>
</tr>
<tr>
<td>8. DULL BLACK WARE</td>
<td>(lead plus lampblack)</td>
</tr>
<tr>
<td>9. RED and BROWN WARE</td>
<td>(clear lead and lead plus manganese)</td>
</tr>
<tr>
<td>10. PLAN UNGLAZED SLIPWARE</td>
<td></td>
</tr>
<tr>
<td>11. DECORATED UNGLAZED SLIPWARE</td>
<td></td>
</tr>
<tr>
<td>12. DECORATED GLAZED SLIPWARE</td>
<td></td>
</tr>
<tr>
<td>13. YELLOW and RED WARE</td>
<td>(clear lead)</td>
</tr>
<tr>
<td>14. GREEN and RED SLIPWARE</td>
<td>(lead plus copper and clear lead)</td>
</tr>
<tr>
<td>15. GREEN-SPOTTED YELLOW SLIPWARE</td>
<td></td>
</tr>
<tr>
<td>16. YELLOW and BROWN SLIPWARE</td>
<td>(clear lead and lead plus manganese)</td>
</tr>
<tr>
<td>17. UNGLAZED REDWARE</td>
<td></td>
</tr>
</tbody>
</table>

#### Ceramic Types and Forms Diagram

[Diagram showing various ceramic types and forms with illustrations and numbers indicating quantities or compositions.]
Bethabara is one of a continuing series of projects of the Archaeological Program of the North Carolina Department of Archives and History and a joint project with the Southern Province of the Moravian Church.

Stanley South, ARCHAEOLOGIST


Original Records at Old Salem, Inc., Winston Salem, North Carolina


A Preliminary Survey of Seven Coarse Earthenwares From the Fortress of Louisbourg

Renee H. Harwitt

INTRODUCTION:

The Fortress of Louisbourg, situated on the easterly tip of Cape Breton Island, Nova Scotia, was founded after the Peace of Utrecht in 1713. Under the conditions of this treaty, France was forced to give up her naval base located at Placentia, Newfoundland, which guarded the entrance to the St. Lawrence and the colonies of Montreal and Quebec. To offset the loss of this important base, the French began construction of a large fortress in 1720 near the entrance to the ice free harbour of the present town of Louisbourg (see Fig. 7 for a plan of the fortress area). In 1745, New England colonials with the aid of the British navy succeeded in capturing the Fortress but it was returned to the French in a treaty of peace. During the Seven Years War the English under Amherst and Wolfe retook Louisbourg in 1758 and by 1760 completed the total destruction of the site, ending the French occupation of Cape Breton.

The present restoration program was undertaken by the Federal Government in 1961 and areas now scheduled for restoration include the Citadel complex, the Dauphin Demi-Bastion complex, the curtain wall and outer works, and certain selected areas of the town proper. Part of this restoration program includes the refurnishing of the Chateau St. Louis, a three story masonry building over 360 feet in length, believed to be, at its time, the largest masonry building in North America (Thorpe, 1962:2). The refurnishing of the Chateau involves a wide range of artifact materials and a tremendous amount of both archaeological and historical research. At the present time the archaeological laboratory staff is compiling reports on glass, small finds, building and household hardware and other classes of objects as well as doing a major study of the ceramic material from the citadel. While a great deal is known about English, German, and Chinese ceramics of the period, little work of an archaeological nature has been done with French ceramics, the common earthenwares in particular, and it is these wares that make up the bulk of the ceramic assemblages. Thus, it became imperative that these wares be systematically recorded and grouped into meaningful types. This paper is the first step toward that aim.

METHOD OF ANALYSIS:

The present survey includes 70 whole or nearly complete vessels which were recorded on punch cards specifically designed for this study (Harwitt, 1965: 1-10). Seven preliminary types emerged from this experimental study group. These wares are based primarily on body characteristics and surface treatment as well as vessel form. The cultural associations and chronological range is unknown at the present time. Data such as size range, hardness, wall thickness, etc., that
are usually part of a formal type series have not been included in
the present study but will be part of a more comprehensive study to be
presented at a later date. Also the present study is limited to
examples from Fortress Louisbourg although the author has seen
eamples of these same wares from other historic sites in Florida,
Alabama and from the French fort at Michilimackinac, Michigan and
Placentia, Newfoundland. At a later date, it is hoped that these
other sites as well as kiln sites in France can be properly surveyed and
the ceramic data be included in a more comprehensive study.
At the present time the wares have been given number and letter
designations only in the hope that historical and archaeological
research will provide a more meaningful terminology. Vessel form
descriptions are based on the system found in "Ceramics for the
Archaeologist" (Shepard, 1961: 226-232). The Munsell system was
used for all body and glaze color descriptions (Munsell Soil Color
Charts, 1954 and Nickerson Color Fan, 1957). The Type Description
format is based on the system used in the Southeast as found in the
Florida Anthropologist (Fairbanks, 1962:43).

Ware 1

| BODY |
| Method of Manufacture: Wheel-thrown. |
| Inclusions: Light to moderate amount of granule to medium |
| (4mm to 1/2mm) size iron oxide particles. Fine |
| sand also present. Both are probably naturally |
| occurring. |
| Texture: Fairly compact, medium coarse body. |
| Color: Most examples are reddish yellow (5YR 7/6), strong orange |
| (5YR 7/11) or a pinkish white (5YR 8/2). A few are |
| light red (10R - 2.5YR 6/8). |

| SURFACE FINISH |
| Modifications: Unglazed portion has a slightly roughened appearance |
| caused by the protrusion of the non-plastic inclusions |
| at the surface and by the drag marks of the same |
| particles acquired during the smoothing process. |
| Throw rings are usually visible. Surface generally |
| smooth to the touch. |
| Glaze and Slip: Interior of most vessels is covered with a thin |
| white slip and a lead-copper oxide glaze. |
| Glaze Color: Most examples are Munsell hue 7.5GY with values and |
| chromas of 5/7, 6/8, and 8/7; moderate, strong, and |
| brilliant yellow green respectively. A few are pale |
| yellow (5Y 8/3-8/4) and yellowish green (10GY 6/9). |
| Decoration: Both decorated and non-decorated varities occur, the |
| non-decorated variety being the most common form. |
| VESSEL FORM: Most common vessel forms are simple unrestricted deep and |
| shallow bowls and simple unrestricted plates. Cups, |
| pitchers, and jars do occur but at present appear to |
| be minor vessel forms and are restricted to Variety |
| 1A, the non-decorated form. |
Variety 1A
BODY:  Same as Ware 1 description.
SURFACE: Same as Ware 1 description.
Decoration: Non-decorated.
VESSEL FORM: See figure 1, a-g.

Variety 1B
BODY:  Same as Ware 1 description.
SURFACE: Same as Ware 1 description.
Decoration: Circle and dot motif done in a thin red slip fired at the same time as the basic green glaze. See figure 5, a-c.
VESSEL FORM: Only unrestricted bowls and plates thus far known for this variety. See figure 1, a-c for vessel shapes and rim types.

Variety 1C
BODY:  Same as Ware 1 description.
SURFACE: Same as Ware 1 description.
Decoration: Abstract glaze decoration done to give a splotch effect. Some examples are done with manganese oxide glaze, resulting in dark reddish brown splotches on a green background. Others are done with a copper oxide glaze of a darker shade than the background glaze. See figure 5, f-h.
VESSEL FORM: Simple unrestricted deep and shallow bowls only. See figure 1, a and b.

WARE 2
BODY:
Method of Manufacture: Wheel-thrown.
Inclusions: Light to moderate amount of granule to medium (3 mm - 1/4 in) size limestone inclusions. Fine sand also present.
Texture: Compact, well wedged, medium textured body.
Color: Most examples are red (2.5YR 5/6 or 5/8); a few are light red (2.5YR 6/8).

SURFACE FINISH:
Modifications: Unglazed portion generally medium smooth and lighter in color than the body. Throw rings usually visible.
Glaze and Slip: Thin white slip and a lead-iron glaze usually covers the vessel interior.
Glaze Color: Most examples are yellow (2.5YR 8/6 or 5Y 8/6); a few are pale yellow (2.5Y 8/3).
Decoration: Most examples are undecorated; however, glazed and
sgraffito forms do occur. Two sgraffito motifs are known at present, one in the form of a fish and the other a bird motif. A dot motif is also known for this ware. It consists of an outer circle of green dots with a central dot of red slip. See figure 5, i, j, and k.

VESSEL FORM: At the present time 3 basic vessel forms are known for this ware; these are bowls, plates, and porringers.

1. Bowl forms:
   Simple unrestricted bowls
   a. Rim form 17 - see figure 2 a
   b. Rim form 21 - see figure 2 b
   c. Rim form 18 - see figure 2 c
   d. Rim form 19 - see figure 2 h

2. Plate forms:
   a. Composite unrestricted plate
      Rim form 22 - see figure 2 d
   b. Simple unrestricted plate
      Rim form 28 - see figure 2 e

3. Porringer forms:
   Simple unrestricted porringer
   a. Rim form 20 - see figure 2 f
      Handle form A
   b. Rim form 7 - see figure 2 g
      Handle form B

WARE 3

BODY:
Method of manufacture: Wheel-thrown.
Inclusions: Moderate to heavy amount of granule to medium (2 - 1/4mm) size grit. Fair amount of mica also present in the clay. Both probably represent naturally occurring inclusions.
Texture: Generally a coarse, poorly wedged body.
Color: Most examples are red (2.5YR 4/8 - 5/8); a few are reddish brown (5YR 5/4).

SURFACE FINISH:
Modifications: Unglazed portion medium smooth to medium coarse, often gritty to the touch.
Glaze and Slip: Interior of vessels have a thin white slip with a lead glaze with copper and iron impurities as coloring agents.
Glaze Color: Light yellow green (7.5GY 7/4) to a pale yellow (5Y 8/3 - 8/4).
Decoration: All examples thus far examined have a glazed geometric decoration sometimes done solely in green, at other times in combination with a brownish wash. Four rim motifs are known, all examples have the same central motif which consists of a spiral which runs into a double green circle with interior dots. See figure 5, 1 - 0.
VESSEL FORM: Only two vessel forms are known at present, a simple unrestricted bowl and a composite unrestricted plate. See figure 3, a and b.

BODY:

Method of Manufacture: Both wheel-thrown and moulded.
Inclusions: Light amount of fine mica and sand present.
Texture: Homogeneous, very compact and well wedged, fine textured body.
Color: Red (10R 5/8 and 2.5YR 5/6), and light red (2.5YR 6/6).

SURFACE FINISH:
Glaze: Both the vessel interior and exterior covered with a lead-iron glaze.
Glaze Color: Dark red (2.5YR 3/6 or 10R 3/6).
Decoration: Most examples have a trailed decoration done with an iron-manganese glaze, Decoration color is a dark reddish black (2.5YR 3/4). See figure 5, p.

VESSEL FORM: Oval platters, inflected unrestricted plates and inflected independent restricted pitchers are thus far recorded. See figure 3, c - e.

WARE 4

BODY:

Method of Manufacture: Wheel-thrown.
Inclusions: Light amount of medium size (1/2 to 4mm) iron oxide and grit. Mica also present in the body.
Texture: Poorly wedged, coarse body.
Color: Light red (2.5YR 6/8).

SURFACE FINISH:
Modifications: Unglazed portion generally has a smooth surface.
Glaze: Bottom of interior and the interior rim covered with a transparent lead glaze.
Glaze Color: Color same as body color.
Decoration: No decoration present.

VESSEL FORM: Only one form known, a composite independent restricted jar or cooking pot. Heavy carbon deposits usually present on the vessel exterior. Two vertical strap handles also present. See figure 4, a.

WARE 5

BODY:

Method of Manufacture: Wheel-thrown.
Inclusions: Light amount of granule to medium size (2-1/4mm) limestone inclusions.
Texture: Poorly wedged, medium coarse body.
Color: Generally pink, 5YR 8/4.

SURFACE FINISH:
Modifications: Unglazed portion medium coarse in texture, often gritty to the touch.
Glaze and Slip: Interior of vessel covered with a thin white slip and a lead-iron glaze.

Decoration: Non-decorated.

VESSEL FORM: Only one vessel form known at present; a simple unrestricted truncated-cone shaped jar with two lug handles and a flat base. See figure 4, b.

WARE 7

BODY:
Method of Manufacture: Wheel-thrown.
Inclusions: Light amount of fine sand.
Texture: Medium coarse body.
Color: Red, 2.5YR 4/8.

SURFACE FINISH:
Modifications: Unglazed portion medium smooth in texture. Throwings usually visible.
Glaze: Glazed portions have lead-iron glaze.
Glaze Color: Dark red, 2.5YR 3/6.
Decoration: All known examples have a white slip, vaguely floral decoration which fires to a yellow (2.5YR 9/9 - 7/6) color. See figure 5, q and r.

VESSEL FORM: Only two vessel forms are known at present, a simple unrestricted milk pan and a simple restricted chamber pot. See figure 4, c and d.

SOURCES


McLennan, Katharine 1965 Fortress of Louisbourg National Historic Park, Department of Northern Affairs and National Resources, Ottawa. (Pamphlet)

1957 Nickerson Color Fan, Baltimore.


Explanation of figures

Figure 1. Ware 1 vessel forms, a-g.
Figure 2. Ware 2 vessel forms, a-h.
Figure 3. Ware 3 vessel forms, a-b.
Ware 4 vessel forms, c-e.
Figure 4. Ware 5 vessel forms, a.
Ware 6 vessel forms, b.
Ware 7 vessel forms, c-d.

Figure 5. Decorative motifs
Ware 1B, a-e, slip geometric circle and dot motif.
Ware 1C, f-h, glazed abstract-splotch motif.
Ware 2, i-j, sgraffito animal motifs.
Ware 3, k, glazed geometric dot motif.
Ware 3, l-o, glazed geometric motifs.
Ware 4, p, glazed trailed motif.
Ware 7, q-r, slip floral motifs.

Figure 6. A. Ware 1A.
B. Ware 1B.
C. Ware 1C.
D. Ware 2.
E. Ware 3.
F. Ware 4.
G. Ware 5.
H. Ware 6.
I. Ware 7.

Figure 7. Plan of Fortress area with insert map of Nova Scotia and Cape Breton, showing location of Louisbourg.
Earthenware from the Fortress of Louisbourg

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7
Fort Michilimackinac, the Archaeology and Restoration: 
A Progress Report 

David Armour

Fort Michilimackinac, located on the southern shore of the Straits of Mackinac which separates Lakes Michigan and Huron, is situated at one of the most strategic sites in the upper Great lakes. All boats going between Lake Huron and Lake Michigan passed this spot and a short distance to the eastward the Sainte Mary's River gives access to Lake Superior.

The Huron, Ottawa and Chippewa Indians had long resided in the area but it was not until the 1630's that Europeans passed this way. The first visit by a French voyageur was only temporary, and settlement did not take place until 1671 when Father Claude Dablon set up a mission station on Mackinac Island. A short time later the mission was moved to the north side of the Straits where Fort De Baude was erected toward the end of the Seventeenth Century but was officially abandoned in 1701.

Private traders remained at Mackinac, however, and around 1715 the French government recognized the value of stationing troops in the area and dispatched a contingent of soldiers to reoccupy the region. These soldiers constructed a new fort on the south side of the Straits near an Ottawa village.

During the first half of the Eighteenth Century the population of this fort increased as traders made it their major supply point. Women and children augmented the population and a village outside the fort enclosure developed to house the two-three hundred residents of Michilimackinac.

In 1760, at the conclusion of the French and Indian War, Canada was surrendered to the English and in the following year a detachment of English soldiers occupied the post. The French garrison fled to Louisiana but the majority of the villagers stayed and accepted British rule. The local Indians, however, disgruntled with the English and encouraged by Chief Pontiac's attack on Detroit, surprised Fort Michilimackinac and slaughtered the garrison on June 2, 1763. Though the British were driven out, they returned in the following year and remained at the fort until 1780. In that year, fearing a naval attack by the Americans the garrison was moved to a more defensible position on Mackinac Island where a stone fort was constructed. The former fort and adjacent town were partially dismantled and left to decay.

Within a few years signs of human habitation were completely obliterated. The site of the fort became a park when Mackinaw City was founded in the mid-Nineteenth Century and local residents spent many a Sunday afternoon digging for beads and a rumored hidden treasure trove. In the process of this unauthorized excavation, the buried butts of the palisades were discovered. Interest in the fort revived and the palisades were rebuilt in the 1930's. At that time the palisades line was traced but no archaeological records were kept.
The current scholarly archaeological investigation of Michilimackinac began in 1959 through a half million dollar revenue bond program financed by the Mackinac Island State Park Commission. A concerted effort was made to acquire historical data relating to the fort and a contract for the archaeological work was given to Michigan State University who has supervised the work in each succeeding year.

Dr. Moreau Maxwell and his assistant Lewis Binford laid out the fort area in a grid of ten foot squares which has been the basis for all subsequent investigation. Working with a crew composed for the most part of trustees from a local correction camp they carefully excavated in three-inch levels. Though plagued by the ravages of the bead-seeking pot hunters, they found that windblown sand had sealed over and protected much of the 18th century cultural debris. Before sterile sand or beach gravel was reached it was normally necessary to remove from three to six feet of sandy earth.

In their search for structural remains the archaeologists were aided by three surviving maps of the fort which plot over 30 structures within the fort enclosure. Unfortunately all of the maps date from the late 1760's so that earlier and later buildings, many of which were superimposed over each other, were left to the archaeologists to discover and interpret. One such building was the soldiers barracks, constructed in 1769, the stone foundations of which were easily identifiable. Most of the buildings, however, did not have stone foundations but were constructed of vertical logs implanted upright in trenches. Though an occasional rotted post survived, these structures are usually identifiable only by the stained sand of the wall trenches. The houses were generally small, measuring only 20 by 16 feet, and were often connected together in rows of five or six units. A few houses had stone fireplace footings and a number had small storage cellars underneath their floors making possible the identification of the residential buildings. In 1960 the site of the church was excavated and in 1961 an abandoned French well, 16 feet deep and rich in artifacts which had fallen into it, was unearthed. During 1960 and 1961 a brick kiln, guardhouse and blacksmith shop associated with the priest house were also located. From 1962 to 1965 the archaeologists, first Ronald Vanderwal and later Lyle Stone, focussed their attention on the southwest quadrant of the fort which maps indicated was the site of two parallel rows of houses. One row of these houses has been excavated and the second has nearly been completed.

During the past season the site of the Priest's house was excavated but conclusive results have not yet been obtained. Further digging was also continued in the southwest quadrant of the fort. An exploratory trench in the presumed area of the village outside the fort did not disclose any structural remains. In the eight years since excavation began less than half the fort area has been explored. Plans call for a careful excavation of the entire fort area and the adjacent village so that the archaeological investigation at Michilimackinac is likely to continue annually for a number of years.
In the process of searching for structural remains over 175,000 artifacts have been recovered. Hand forged nails and broken window and bottle fragments are the most numerous items but a wide range of other objects have been found. Since there was a sizable residential population at Michilimackinac it is not surprising to find numerous household items. What continues to amaze the investigators is the fine quality of the items. They illustrate a relatively high standard of living which is somewhat different from the common conception of a rude frontier.

Wine was sipped from delicately engraved wineglasses and Chinese export porcelain cups and saucers were commonly used for tea. Chips of porcelain are encountered throughout the fort but in 1965 all the pieces of an exquisite cup and saucer were retrieved from a refuse pit. In the same season several completely restorable creamware plates were also found. Creamware or Queensware, manufactured only after 1760, has served as a useful chronological indicator. Delftware, both English and French, was commonly used during the entire occupation of the fort while white salt-glaze ware was brought in by the English. Other domestic items include a pewter plate retrieved from the well, spoons and two-tine forks, a variety of buckles and buttons, brass pins and even an ivory chess pawn.

The trading community at Michilimackinac is also well represented in the artifact assemblage. Lead baling seals, placed on bales of merchandise in France and England to guarantee that they were not tampered with until they reached their destination deep in the North American wilderness, have been found where the traders tore them off to open their bundles. Many of them bear the name of an European trading firm and a few even are dated, the earliest of which is 1733. One of the major items in the traders’ bundles was cloth, only a few bits of which have survived by their close proximity to brass or iron. Another major commodity was rum, identified archaeologically by iron barrel hoops and brass spigots. Other trade merchandise includes a wide variety of beads, glass set and plain brass trade rings, vermilion, jew’s harps, kettle fragments, and clasp knives. Also numerous are the locks used to secure the traders’ wares. Most of the trade was conducted by barter and only a few well-worn French and English coins have been found. One pie-shaped Spanish "bit" attests to the wide reaching trade connections which focused on Michilimackinac. Though the archaeologists reveal a wide range of trade objects, the 1778 inventory of John Askin lists an even greater variety of material objects such as a sedan chair and numerous books which were at one time at Michilimackinac.

Besides being the major trading center west of Detroit, Michilimackinac was also a military post. The garrison soldiers who numbered at various times from thirty to a hundred cluttered the ground with lost and broken items most notably gun parts and military buttons. Numbered regimental buttons, used by the British after 1768, are another chronological indicator employed at Michilimackinac. A hollow cast iron mortar shell found in 1965 attests to the presence of mortars and artillery. Military supplies were usually shipped in barrels and the brass hoops from powder casks bear the chiseled mark of the King’s broad arrow.
The military at Michilimackinac kept watch for illegal traders and conducted negotiations with the Indians of the upper Great Lakes. Indians visited Michilimackinac in numbers that sometimes exceeded a thousand and prior to the 1740's a village of Ottawas lived adjacent to the fort. Yet the collection of distinctly Indian artifacts is surprisingly meager. A small quantity of stone projectile points and ceramic fragments attest the Indians' presence but give no real indication of their large numbers. The scarcity of distinctly Indian items does demonstrate, however, the extent to which the Indians in the Upper Lakes had adopted European culture by the Eighteenth Century. The most numerous artifacts of Indian origin, or at least inspiration, are stone acorn-shaped "micmac" tobacco pipes of which we have several hundred examples. A few are carved from red catlinite or pipestone brought from Minnesota but the majority are fabricated from other stones. Their wide distribution throughout the fort both in area and stratigraphy indicates their continued popularity.

A tremendous quantity of bone has also turned up in the sifting screen. More than thirty skeletons have been located, buried under the church and other structures, but most of the bones are from discarded garbage. Apparently the residents of Michilimackinac were none too tidy, for though some of the refuse was deposited in garbage pits the bulk was scattered all over the occupational area. Charles Cleland from the Michigan State University Museum has analyzed these faunal remains to determine the relative reliance upon wild and domesticated animals by the French and the English. His conclusions support the written records which make clear that the French relied heavily upon wild game while the English consumed large quantities of beef and pork. Corn, the major staple of Michilimackinac, is also found occasionally in charred form.

The project at Michilimackinac is not designed simply to provide data for scholarly publications but is to furnish the archaeological evidence upon which the fort and the buildings within it can be reconstructed and interpreted for the modern visitor. As archaeological and historical data becomes available the various structures are rebuilt. Due to the long occupation of the site the palisades have been expanded several times to accommodate a growing population and buildings have tumbled down and been rebuilt. Consequently all the structures which once existed at Michilimackinac cannot be reconstructed and the policy is to rebuild the fort as it existed at the height of its importance in the early 1770's. The first structure to be rebuilt was the twenty-foot high palisades with four corner bastions and watch towers over both the North and South gates. This was a sizable undertaking for the roughly hexagonally shaped fort measures 380 feet long by 360 feet wide. Five buildings inside the fort enclosure have thus far been erected namely: the barracks, the commanding officer's house, a trader's house, the church, and the King's store house. Evidence for other buildings is available and within the next year a row of traders' houses will be reconstructed. Besides the structures rebuilt on their exact sites there are three houses outside the fort erected to portray the presence of an exterior village. These three buildings are temporary, however, and will be removed when the land upon which they are placed is excavated.
Buildings alone cannot tell the story of Michilimackinac. A museum tracing the rise and abandonment of the fort is housed in the barracks. A period setting with animated mannequins fills the King's store house and in the church there is a light and sound presentation of a 1752 wedding. Most unusual is an archaeological tunnel which permits the visitor to go below ground level and peer into the side of the abandoned French well, view a partially excavated storage cellar left in situ and cringe before the gaping skeleton of a former resident of Michilimackinac. Above ground the visitors watch the archaeological crew plotting the structures which in future years will be rebuilt. Over two hundred thousand visitors each year are transported back in time to the Eighteenth Century by their visit to the Fort Michilimackinac restoration.

To make their visit more meaningful and to provide scholars with the results of our research the Mackinac Island State Park Commission has an ambitious publication program. Moreau S. Maxwell and Lewis H. Binford's Excavation at Fort Michilimackinac, Mackinac City, Michigan: 1959 Season has received wide acclaim and additional reports are in the process of being written. A series of leaflets deals with subjects as clay pipes, the food of the residents, craft activities, the Askin inventory, the rebuilding of the church and the women of Michilimackinac. Historical sources written during the Eighteenth Century have been published including the Journal of Dr. Daniel Morrison and the memoires of the trader Alexander Henry who survived the massacre of 1763.

Thus historical records are combined with archaeological data to provide a re-creation of eighteenth century life at Michilimackinac both in the form of published records and reconstructed buildings. As research, publication and rebuilding proceed a pace, Michilimackinac is becoming one of the most significant eighteenth century historic sites.
Fort Michilimackinac

Archaeological investigations in recent years have been conducted in the areas on either side of the reconstructed church.
Bethlehem, Pennsylvania, an 18th Century frontier settlement was the creation of a religious community of immigrants, the Unitas Fratrum, commonly called the Moravians. The settlement was established as the center of the Moravian Church in the New World—the religious see for its subsequent missionary communities in many of the original American Colonies—Labrador, the West Indies and Surinam.

The raison d'être for these unique social and physical communities was the Christianization and education of the aboriginal populations. Such an undertaking demanded detailed planning of an economically austere, communistically-oriented center of authority. To provide this, the founders transplanted an east German baronial estate to the New World and erected it in Bethlehem. Detailed plans and orientations of needed buildings were designed prior to leaving Europe.

Bethlehem, settled in 1741, rose full-blown within twenty years as a permanent, self-sufficient community. Herrnhut, their Old World home, remained the economic and religious hub of the Moravian Church, while Bethlehem represented it in the New World. Copies of detailed reports from mission stations were sent to Bethlehem and Herrnhut. Much of the New World records lie untouched and, in the main, uncatalogued in the Moravian Archives in Bethlehem.

To sustain the Church's activities, an industrial section was created in Bethlehem, housing trades of all descriptions*, including certain unique frontier endeavors, such as silk worm cultures, a bell foundry, and an extensive pharmaceutical herb garden.

The complexion of modern-day Bethlehem little resembles its 18th Century beginnings. The largest church in town is still the Central Moravian Church, though Moravians are but a small segment of the population. The multi-industry frontier showcase has been reduced to a one-industry town—that being the Bethlehem Steel Corporation.

The writer was introduced to Bethlehem in 1964, having been asked to supervise a course in field methods for the University of Pennsylvania (Foley, 1965). At that time there were two groups avowing interest in

* Pottery of 1749 and its 1756 addition; 1750 blacksmith and nailsmith forge and its 1761 addition; 1751 grist mill (an 1869 version exists on the site); 1753 butchery; 1759 fulling mill; 1761 tannery; 1754 & 1762 water works; 1762 slaughter house; 1764 spring house; 1745 and 1765 oil mill; 1769 tawry; 1769 bark shed; 1771 dye house. There were also dwelling attachments on many of these later structures, but only the separate miller's house deserves specific mention (1784, extended 1831), because it is still extant.
the community’s past. One was the Moravian Historical Society, an adjunct of the Church, operating a small but excellent museum of historic (but not exclusively 18th Century) material. However, their interest is passive and they are not, at present, interested in increasing their scope of activity.

Furthermore, there exists a tendency among some in this quarter to raise objections to studies of certain anthropologically interesting aspects of the early settlement. As an example, the record is clear that the original colonizers strictly segregated the sexes. The single boys and girls, men and women, lived in separate buildings and had different areas for entertainment. This segregation was carried to the extreme by setting aside separate areas of the cemetery for men and women, whether married or not.

For a time, marriages were arranged by the Church. When the elders considered a man or woman ready for marriage, they composed a list of suitable mates. The criteria for placement on the roster was principally economic. A bachelor miller’s marriage list, for example, would predominantly have women capable of replacing him in his function should missionary duties, incapacitation or death overtake him. If no such women were available, others would be selected on the basis of possessing talents of equal importance to the well-being of the community. When the list was completed, initially the choice was left to the Almighty, His will being revealed through casting of lots. In a later period, the bachelor approached the women on his list, proposing to them in order, until he was accepted.

Such a system, aside from its humorous aspects, demands an anthropological study of its implications and effects on those involved, and the frontier community at large.

The other interested organization is a nonprofit foundation called Historic Bethlehem Incorporated, formed in 1957, and composed of social and professional segments of the town. Its avowed purpose was the preservation of historic buildings no longer owned by the Moravian Church, principally the early industrial complex.

As such organizations are prone to do, they employed as director an individual who had no professional training or orientation. Little was accomplished by Historic Bethlehem after seven years of existence under the management of three such directors. But certain elements and factors outside the organization were forcing a change.

First, the City instituted a rejuvenation project with Urban Renewal funds which included the acquisition of seven "slum" structures within the Old Industrial Quarter. Three of these were razed through ignorance.

* The pottery, blacksmith and nailsmith forges, and the cloth-weaving shop.
While this destruction was under way, a stranger to Bethlehem pointed out the fact that one of the still-partially-standing walls was of 18th-Century construction. That wall was saved, but stands as the sole, and somewhat unattractive, remnant of the 18th-Century Bethlehem pottery. However, this unfortunate incident stressed the need for professional guidance for the town, and a better disposition of the four remaining structures.

Arrangements were made for an architect employed by the Urban Renewal Authority to historically evaluate the Industrial Quarter and the town, and to recommend a plan for continued preservation and development.

Historic Bethlehem Incorporated benefitted from this study which recommended that the land and extant buildings of the Old Quarter be turned over to the City, which would, in turn, lease them to Historic Bethlehem Incorporated.

The architect, unusually enlightened, also recommended detailed archaeological and archival study of the area with an eye to future reconstruction and/or restoration of principal historic industrial structures.

The then-director of Historic Bethlehem Incorporated, taking his lead from the architect's plan, read one of Kathleen Kenyon's books to "qualify" himself to perform the archaeology. After weeks of literal destruction of archaeological soils and data, it became evident that such an approach would not yield the desired ends.

This was the scene upon which we entered in the Spring of 1964. The Old Water Works of 1754 and 1762, allegedly providing the first pressurized water system in North America, became the locus of the University of Pennsylvania's field course. The productivity of that session revealed to many in the town that a re-evaluation of their approach was in order. The publicity that accompanied the project pleased the Board of Directors, as did the ensuing search I made for the cemetery of the Revolutionary War dead on a Bethlehem hillside.

My research for the water works project revealed incidentally the fact that the Single Brethren's House had served as the Continental Army's General Hospital after the Battles of Princeton and Brandywine, and that approximately 500 men were supposed to have succumbed there. With such information, I was able to successfully compel the previously-unmovable State Highway Department to recognize the Federal Aid in Highway Act 1956, and to allocate appropriate funds for an archaeological search for the cemetery. The detailed background and results of these projects are the subjects of other papers.

These circumstances, and others, led to a reorganization of Historic Bethlehem Incorporated with a view to depending more on professional advice. This is not, as yet, entirely successful.

One of the principal factors affecting future activities in the Old Industrial Quarter derived from the 1964 project. Soil profiles indicated radical changes in the level of the modern Monocacy Creek and flood plain. My report pointed out that, while the present Creek and land levels are probably similar to historic ratios, they are so because both had risen from four to six feet (Foley, MS, 1965), the Creek by
natural silting and the plain by deliberate filling. Consequently, if the industrial buildings were to be restored to their original condition, the Creek level and water table would have to be lowered by that amount. I recommended that the Corps of Engineers be approached while the area was still officially the property of the Urban Renewal Authority. The Corps is probably the most experienced and best-equipped organization in the world to deal with dredging and flood control problems. The alternative to such action would be the total reconstruction of buildings, pipe line, race ways, etc., at present levels, which in itself is not only undesirable, but more costly from both the reconstructionist's and archaeologist's points of view; the latter because sterile soil coincides with glacial gravels at an average of 10.5 feet below present grade. The water table is encountered at two to three feet below the surface. Obviously, archaeology is frustrating, slow and complicated by the necessity of continuous pumping when excavating below three feet.

The writer was recalled to Bethlehem in 1964-65 to make a written evaluation of the entire situation. The resulting report contained recommendations dealing with the physical site problems and advised the reorganization of Historic Bethlehem mentioned above. Specifically, it suggested that its staff include professional advisors from the two local institutions of higher learning, Moravian College and Lehigh University. This staff would be the governing body of future activity, employing specialists as needed, and being responsible to the Board of Directors only on a success or failure basis. The report further prescribed hiring a professional fund raiser as executive director.

The recommendations were accepted, in whole or in part. The advisory committees were formed, composed of professionally-oriented members from the local colleges. A professional staff was acquired—an historian to handle archival research needs, and an archaeologist to organize an over-all approach towards study and preservation, and who would represent not only Historic Bethlehem Incorporated, but also the local colleges. This was based on my appraising them of the need for a training grounds for historic site archaeologists, and Bethlehem's unique opportunity to provide same.

Thus, in addition to the writer's duties at Historic Bethlehem Incorporated, we are organizing a program at Moravian College to include theoretical and practical courses, which would be arranged in seminar fashion using original sources and materials. The writer has designed the first Moravian College field course to fulfill the needs of anthropology students and students from related disciplines. They will be drawn from various areas of the country and, by their own prior choice, be able to work first-hand with materials that most interest them. The largest segment will be engaged predominantly in field excavations, while others will specialize in laboratory techniques, photography, archaeological surveying and draftsmanship, archival research, museum organization and display of excavated materials, and for the advanced student, formal training in field assistantship and supervision of site workers, and development of site reports for publication.
We have also begun the organization of a slide series for distribution to primary and secondary schools in the area, as well as exploring the possibilities of educational television.

All these projects and plans require a great deal of money. The combined resources of Moravian College, Lehigh University, and Historic Bethlehem Incorporated would not long sustain the burden alone. As we still do not have a fund raiser on our staff, other sources must be sought for support. Bethlehem Steel Corporation is a likely contributor which has not, as yet, been fully exploited. Nor is that as easy a source to probe as it might seem, when one remembers that the very Board members seeking funds are employees of the Corporation.

There is Federal legislation which should prove beneficial and which is presently being investigated. One of the most obvious is the Housing Act of 1949 which created the Urban Renewal Authority. In 1965 at another site in Germantown, Pennsylvania, we were able to obtain $10,000 (under Section 604) for excavation of a limited area. In Bethlehem, however, the Urban Renewal Authority has already been of great assistance, and may consider their involvement in our area completed.

The original portion of the town rests on the east terrace of the Monocacy Creek and Lehigh River. In the interests of simplicity, the Creek may be considered to lie on a north-south axis and the River on an east-west axis. The town was settled in the northeast corner formed by the confluence of these two waterways, with the Old Industrial Quarter along the Monocacy.

The historic Industrial Quarter was acquired by the Urban Renewal Authority, released to the City, which has in turn, leased it to Historic Bethlehem. A new project on the west bank of the Monocacy is under study by the same Authority. If properly exploited, this study could increase our land holdings and sites, and provide funds for the relocation of a sewer line bisecting the Old Industrial Quarter. This is a 54-inch trunk sanitary sewer whose upper surface lies about 18 inches below present grade. With the average depth of sterile soil at 10.5 feet, exposure of historic remains leaves this concrete tube in full view. Furthermore, the sewer runs through the ruins of every foundation yet excavated, with the exception of the Old Water Works. Even in this case, it has been laid across the path of both the head and tail races of that industry.

During October, 1966, Senate Bill S. 3035, Program of Preservation of Additional Historic Properties, was signed into law (P.L. 89-665). Basically, it amends Title VII of the 1961 Housing Act. The new law, the Demonstration Cities and Metropolitan Development Act of 1966, avows the need for additional parks, historic preservation, and empowers the Housing and Home Finance Administrator to "make grants to States and local public bodies to help finance..." the acquisition and development of such properties (Sec. 700-702). An appropriation of 310 million was made for such grants on a shared-cost basis with a 50% limitation. This type of legislation can help our and similar organizations raise capital funds for long-term projects.
Paragraph "B," Section 707 also provides the Administrator $50,000 per fiscal year for the publication of results of studies performed under the Act. In some cases of unusual merit the Administrator may finance projects up to 90%, within a $10 million limitation (Section 707, paragraph "C").

The problems of the Creek level, sewer line and scarce funds tend to slow and frustrate our archaeological efforts. The present approach is based on my 1964 survey of the Industrial area, at which time I divided the region into fourteen sub-areas with alphabetical designations. The Water Works, being the first project, was arbitrarily designated "Area A." The other parcels were determined on the basis of traditional trade locations, archival references and topography.

In selecting Area B for the 1966 field season study, several factors were considered. First, it lay adjacent to the Old Water Works and reputedly included the site of the spring which provided fresh water for the pumping station. The area supposedly was the locus of the tawry, bark shed (used to store processed bark for the tanning industry) and milk house, where the dairy products of the community were stored and kept cool by runoff from the spring.

The other principal considerations involved economics and the water and sewer problems. As Area B lies upstream from the Water Works, it was hoped that the water table might be somewhat deeper. Also, as there are no visible remains and documentation tends to picture the buildings of that area as rather small, only wall shadows and/or cellar holes were to be expected. If it were found that the water situation were similar to Area A, efforts could be concentrated on a particular section of Area B, removing all information pertinent to future reconstruction. Necessary backfilling would not present the economic loss as was manifested in the 1964 project. In that year when the water table difficulties first presented themselves, archaeological funds were limited and stabilization funds nonexistent. Much of the above-ground 1762 water works structure remains; hence, if backfilling there had not been necessary, restoration of that structure could be well under way.

The Creek problem manifested itself in the extreme in Area B. It was abetted by the fact that we did indeed find the spring site—still active and impossible to shut off once exposed. In a 10' x 20' excavational unit over the "tawry" site, waters from Creek and spring inundated the excavators. When at a depth of 10.0' below surface datum, 26,000 gallons of water had to be pumped every morning before work could proceed. The pumps had to be reactivated every ten minutes throughout the day to keep pace with the seepage. A similar situation maintained in all the other excavational units.

This paper is not designed to be a site report, but simply to elucidate some of the problems encountered in the hope that future similar projects may avoid them.

While it will be dealt with more fully in the forthcoming report on the 1966 season, a problem of historical interpretation and translation arose relative to the "tawry" or Weissgerberei. Tawing, of course, is the method of treating leather, usually skins, by chemical means, as opposed to organic tannins. I have found no references to a tawer using anything but alum for this purpose since Egyptian or Roman times.
Research on this aspect is not exhausted. However, the historic debit/credit records of the "tawry/Weissgerberei" trade show no purchases of alum, salt or any chemical preparation with similar characteristics. The results of additional archival research may reveal a long-standing misinterpretation of the original German Weissgerberei.

The excavations exposed five large wooden vats of proportions and arrangements strongly suggestive of hide preparation use. Some of these had the remains of plaster-like lining on their interiors which could be a sealer for the vats or a residue of the material they contained. Recent liaison has been established between my department and the Bethlehem Steel Corporation's Research Center. They have offered their facilities for the analysis of such materials. The results should be quite interesting.

The future of archaeology in the Old Industrial Quarter is still plagued with difficulties. The Water Works project's archaeological success, reinforced by the results of this year's finds has increased the desire of Historic Bethlehem to continue studies of the industries along the Creek, despite the water problem. There are several trades in the area, such as the pottery and forge on higher ground, which have been repeatedly built upon. Though archaeology there would be slower and more complicated, in the long run it would be more economical until the Creek problem were alleviated. However, the general feeling is that moving our excavations up the hill would make our efforts appear scattered. On this basis, I am orienting the forthcoming project towards the tannery (Rotgerberei), which still has a complete above-grade structure. We can only hope that the buried walls of the building can retard water seepage, allowing for a complete and proper study.

As was stated above, these exigencies of historic site archaeology, in a restorational context, will be present in greater or lesser degree in all privately-operated institutions. This realization demands that our profession recognize that similar problems await many archaeologists in the future. This field is growing and will indeed need archaeologists who are conversant with the difficulties that must be faced. At the same time, it behooves us to consider what we can do to smooth the way for these institutions, while simultaneously insisting on proper scientific studies of the remains involved. It appears to this writer that the most logical means of providing this guidance is to educate such institutions as to the need for professional help, and not be afraid to step "out" of our profession fora while when asked to organize and direct such operations. Furthermore, it seems that our educational duties do not end with informing institutions of the need for professional archaeological and archival researchers. It is our long-standing professional duty to compile and publish reports on sites studied and reburied. In traditional archaeology these reports serve as the physical evidence of the site and the materials it contained. But on sites slated for reconstruction or restoration, our work can continuously be scrutinized by the profession and public at large. The value of such work is therefore somewhat dependent upon the use to which it is put. Our responsibility thus does not end with the excavation and analysis of the site, but extends to the future use of the remains and interpretations we have produced.
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The Stone Lined Shaft in Brigham Young's Backyard (Nauvoo, Illinois) and its Contents

Clyde D. Dollar

During the 1965 summer excavations which took place at the Brigham Young House, Nauvoo, Illinois, a rectangular stone lined shaft, approximately 6' by 8' and 7' deep, was located and excavated. A superficial examination of the physical characteristics of this structure, its location, and the artifacts found within its depths, if analyzed solely from an archaeological standpoint, would suggest that the feature was a remnant of an historic outdoor toilet facility. In fact, this seems to be the current thinking of some individuals. As the person under whose direction the shaft was excavated, I hold a different opinion and in this paper will present evidence, both historical and archaeological, to support a different thesis. The structure, its history, the artifactual material taken from it, and its probable use function all represent what might be a somewhat unique facet of early 19th century American cultural tastes and habits, and, as such, possibly will be of interest to others doing research in the field of Historical Archaeology. As the cultural significance of any such feature can only be understood within the framework of its historical context, we must begin our examination by reviewing events which took place over 120 years ago.

In the early part of 1839, the Mormon Prophet, Joseph Smith, purchased several hundred acres of land along the banks of the Mississippi River in western Illinois, in an effort to find a new home for his followers. The particular area in which the purchase was made had been the site of three different attempts by land speculators to establish communities, and each of these communities, by the names of Venus, Commerce, and Commerce City respectively, had proven unsuccessful, and, for all practical purposes, never existed. Smith, however, not discouraged by the future possibilities of this swampy but verdant lowland area and its attendant clouds of mosquitoes, called the area, and the city which he established there, Nauvoo, a name said to be taken from the Hebrew meaning "beautiful place."

When Brigham Young, a follower of the Mormon Prophet and the man who was destined to lead his people away from their homes in Nauvoo and further on into the western vastness, first settled in the Nauvoo region, it was in an old military barracks across the Mississippi to the west. He left his family there when he departed for a mission to Great Britain on the 4th of September, 1839. On his return in July, 1841, he found that a remarkable and well planned city had been constructed during his absence. Its wide streets were laid out in an orderly fashion, its drainage problems were in the process of being lessened, and its fences, sidewalks, gardens, and businesses gave the community an appearance of neatness and propriety. His family, in the meantime, had crossed the river and taken up their residence in a log house in the city proper. His journal states:
On my return from England I found my family living in a small unfinished log-cabin in Nauvoo, situated on a low, wet lot, so swampy that when the first attempt was made to plow it the oxen mired; but after the city was drained it became a valuable garden spot. (Millennial Star, XXVI, p. 88, Feb. 6, 1964)

After purchasing this lot, measuring 198.0 x 181.5 feet (Carthage, Illinois, Deed Records, Book I, p. 545, Transaction #4476, Lot 2, Block 126, November 1, 1841), and while still living in this log house, Young described the improvements which he had made in his damp city lot:

Although I had spent the principal part of my time, at the call of brother Joseph, the Prophet, in the service of the Church, the portion of time left me I spent draining, fencing, and cultivating my lot, building a temporary shed for my cow, and chinking and otherwise finishing my house; and as the ground was too damp to admit of a cellar underground, I built one with brick walls about four or six inches apart, arched over with brick. Frost never penetrated it, although in summer articles would mildew in it... (Millennial Star, ibid.)

Young makes no mention in his journal of any plans for building a more permanent house to replace the log structure in which he and his family had been living. The first we learn of this construction is in a journal entry, dated May 31, 1843:

I moved out of my log cabin into my new brick house, which was 22 feet by 16, two stories high, and a good cellar under it, and felt thankful to God for the privilege of having a fine, comfortable, though small, habitation. (Ibid., p. 184)

These dimensions agree with the size of the center portion of the brick structure still standing on this lot in Nauvoo. By 1845, two wings had been added to the center portion of the house, Young's well had been dug and curbed, and a stable built for him by the city police.

Unfortunately for those of the Mormons whose efforts were so well spent, the fruits of their labors only produced a prosperity that aroused jealousy, hatred, and suspicion on the part of the non-Mormons in the surrounding countryside. The founding and equipping of a well armed and highly disciplined militia, estimated to have been more than 3,000 strong, the rapid growth of the city's population to more than 12,000 (larger than any other city in Illinois at the time), and the somewhat overt practice of polygamy did little to insure a pacific acceptance of these 'intruders' with their 'strange' religion and practices. Violence was perhaps inevitable; it certainly was not long in coming. With the killing of Joseph Smith during the summer of 1844 in nearby Carthage, Illinois, Brigham Young was chosen to head the Mormon theocracy. He
almost immediately began to plan their withdrawal from Nauvoo, and, against notable opposition from within his own Church, the first elements of the evacuation crossed the Mississippi in the early spring of 1846. Young and his family were in this first group to leave the city. Later in the summer of that year, his house and lot were sold at a public sale for the sum of $600 - the price paid originally for the unimproved lot (information in Abstract of Title, Nauvoo Restoration, Inc., files).

The city of Nauvoo, after the departure of its original founders, rapidly shrank in size until it almost disappeared as an inhabited community. An attempt was again made by land speculators to persuade incoming English immigrants to settle the area, and many of the more substantial structures, including the Brigham Young house, continued to be occupied until only very recently. For one reason or another, the city's former prosperity did not return, and its subsequent history, which included the arrival and ultimate dissolution of the Icarian Movement, a communalistic economic and religious social experiment, is a story of waning florescence. The city's population of today, numbering slightly more than 1100, is larger than at any other time since the close of 1846.

During 1962, a non-profit organization backed by the Mormon Church in Utah, Nauvoo Restoration, Inc., was formed for the purpose of preserving and developing the historic areas of the old city of Nauvoo. In May, 1965, I was engaged as Archaeological Project Supervisor by this organization to conduct the excavations for one season at the Brigham Young house. Other members of the 1965 season research staff were: Dr. T. Edgar Lyon, Research Historian for Nauvoo Restoration, Inc., to whom I am indebted for much of the information contained in the above paragraphs; Mr. J.C. Harrington, who, prior to his retirement from the National Park Service served as archaeological advisor; Mr. Eduard Bullerjahn and Mr. Andrew Hepburn of the firm of Bullerjahn and Hepburn, historic restoration architects, of Boston, Massachusetts. The competency and cooperation of these men materially aided the progress of the excavation and its attendant research.

Field work was started early in June of 1965 and was concluded in mid-September of that year. Among the features which were uncovered during the season's work were: the original fence posts and sidewalks, the original well, a brick terrace and a walkway in the rear of the house, the original front door step (including its original limestone blocks which had been re-used in other areas), the probable location of Brigham Young's log house, the original brick lined cistern, and a rectangular stone shaft measuring 5.6' x 8.0' located in the backyard some thirty feet away from the house. This feature, which was slightly more than seven feet deep, was designated Structure One. In addition, the historical authenticity of certain other features was disproven. Among these were an existing cistern and well, a backyard cellar entrance, and an extension of some eight feet which had been added to the West Wing of the original house (see Figures #1 & #2).
From an archaeological standpoint, Structure One turned out to be by far the most interesting, and controversial, finds of the season. This feature originally had been found several years ago, and some two feet of earth had been removed from its interior at that time. Fortunately, however, this intrusive digging was stopped in time to prevent serious damage to the feature's archaeological significance, and the foundation (as it was thought to be at the time of its discovery) was boarded over and the earth placed on top of it as a protective cover.

During the season's field work, the interior of the structure was fully excavated and stratigraphic cuts made at its top (see Figure #3). Three of the walls of the shaft are constructed of double course limestone masonry and were found to vary from 1.2' to 1.5' in thickness at the top. The fourth wall, the western wall, is constructed of limestone laid in a single course and is only 1.0' in thickness at the top. The structure's interior dimensions are 3.2' x 5.8' x 7.2'. The walls of the shaft are constructed of rough quarry faced coursed rubble masonry the stones for which were laid from the shaft's interior. Mortar very probably was used as a bond, but because of the high moisture situation, and the resulting leaching action, few traces of this material were found. The top two courses of these stones appear to have been placed to form a 'splash guard' indicating that these were the stones approximately level with the ground when the shaft was constructed. Today, these courses are some six to eight inches below the present ground level. There was no indication of floor joint slots, sill attachment methods, or any other architectural evidence to suggest the type of material used in constructing the superstructure over the shaft. However, a notable concentration of historic type brick fragments were found scattered around the shaft as well as within its depths. The greatest abundance of this brick material was found within the top foot of the shaft fill (as the shaft was found in 1965).

The interior of Structure One's shaft was filled with a highly concentrated deposit of wood, brick, earth, ashes, animal remains, and broken artifacts which ranged in dates from the early to the very late 19th century. The bottom of the shaft, which had been dug quite deep into sandy clay sterile soil, was left unfloored but smooth by the builder. Prior to the shaft's being filled with debris, each year's accumulation of ground water had seeped in, dried out, and in so doing had deposited silt in the form of varve marks on this earthen floor. While these varve marks, of which there were only two, and in one area possibly three, are not necessarily infallible indicators of a yearly rise and fall of seepage water, the sparsity of such marks in the bottom of Structure One suggests that this seepage occurred (or is recognizable) for only a very brief period, perhaps not longer than two to three years. Overlying these varve marks, and considerably disturbing them, was the first deposit of debris, thus indicating that the shaft had been left unfilled for a relatively short period of time after its construction and prior to the start of its use as a garbage deposition area. Once it began to be used for such purposes, the accumulation of debris seems to have been constant over a long period of time, and artifacts suggest that it was finally filled to within two feet of the structure's top by the turn of the twentieth century.
There was no clear stratification of material within the shaft, and definite levels could not be recognized. Nor was there any possibility of defining arbitrary levels within the material because of the dishevel and justaposition of timbers and brick in both vertical and horizontal positions. However, at various time intervals, mortar and some coal ash had been thrown into the shaft so that this material formed recognizable layers across most or all of the existing floor at that time. These ash and mortar layers were therefore used to designate 'zones' as opposed to 'levels', a word which would imply more obvious stratigraphy than what existed within the fill material. The earth removed during the shaft's original excavation was scattered around the then existing ground surface of the structure, presumably in an attempt to raise this ground surface slightly. By analyzing the stratigraphic profiles of a series of excavated squares that connected Structure One with the brick house, it was possible to determine that the sandy clay lens of soil formed by the excavated sterile earth from the shaft underlay a similar lens deposited by the excavators of the brick house cellar. In other words, Structure One had been constructed prior to the start of Brigham Young's second house, i.e., sometime during late 1842 or early 1843.

The artifactual material taken from the interior of the shaft of the structure fell roughly into two time periods, pre- and post-Civil War. In the upper two thirds of the shaft's depth, this material primarily consisted of large amounts of broken post Civil War pressed glass, white undecorated ironstone ceramics, and such architectural debris as rotted wood, brick fragments, badly rusted nails, mortar, and shattered window glass.

About two thirds of the way deep into the shaft, both the dates and types of artifacts began to change noticeably. The lower zones yielded such items as clay and stone marbles, 'china' (bisque porcelain) doll head and body fragments, bone toothbrush and comb fragments, straight pins (apparently bronze), cloth, buttons of the 'glass' and bone types common to the 19th century, slate lead pencils, oil lamp chimneys and an oil lamp base, water glasses, bone handled knives and forks, cosmetic, medicinal, and whiskey bottles and flasks, and dishes (ceramics) of a wide variety of types. All of this material can be dated, based on manufacturing characteristics and/or known proveniences, to the pre-Civil War period, at least as far as date of manufacture goes. From the fragments found in these lower zones, over fifty complete or nearly complete fragments found in these lower zones, over fifty complete or nearly complete household artifacts of the first half of the 19th century could be reconstructed.

The ceramic forms found in these lower zones included plates of several sizes, cups, bowls, water or milk pitchers, meat and vegetable dishes, and a ladle. The ceramic types included examples of Feather Edge (Blue), several varieties of Banded Cream Ware, bone porcelain (possibly English), Queensware, Pearl Ware, Staffordshire Transfer Print Ware of several colors and patterns, Early Ironstone, Cottage Ware, and Salt Glaze utilitarian crockery, some pieces of which were probably made locally. The majority of this material is English in origin and can be dated to the 1830/1840 period (see Figures #4 & #5).
One specific pattern of transfer ware deserves some special examination since its occurrence in historic sites apparently has been rather rare (see Figures #6 & #7). Six complete or nearly complete specimens could be reconstructed from the material taken from the bottom two zones of Structure One (the bottom 18 inches; see Figure #4). There are three dished plates, each 10\(\frac{1}{2}\) inches (0.87 feet) in diameter, one 7 inch (0.59 feet) bread plate, a medium sized oblong vegetable server 10 inches (0.83 feet) on the long side, and a tureen cover shaped to fit a bottom dish (not found) of approximately 12 inches in length. The pattern is a highly stylized leaf, floral, and geometric design underglaze printed in tones of blue ranging from light to deep cobalt set against a warm white background. The bisque is cream colored, rather rough in texture, quite friable, but has a tendency to spall or split rather than shatter. The glaze is thin, contains minute traces of cobalt (the 'puddling effect' is bluish in color) and air bubble irregularities, quite soft (there are knife cuts visible), mildly but extensively crazed, and has a decided 'wet sand' appearance. All pieces except the tureen cover have a potter's mark underglaze printed also in tones of blue ranging from light to deep cobalt. This mark, which so far has not been identified is in the form of an elaborate and intricately decorated circle strongly reminiscent of a sunburst. Within this circle, and clear of decoration, are the identifying words of the mark: across the top half is written in script the words "Granite Ware"; bisecting the circle is written in block print the word "POONAH"; underneath this word is the block print initial "J" (complete with period!). No other marks, either printed or impressed into the bisque, have been found. Because of its somewhat enigmatic mark, I took the liberty to name the ware Poona Blue Transfer Ware, sometimes shortened to 'Poonah Ware'.

The manufacturing characteristics of this ware indicate that it is almost certainly an early type of English ceramic, perhaps even earlier than the founding of Nauvoo (in 1839). It could hardly be any later than 1842, and, in my opinion, there is sufficient justification to suggest a manufacturing date centering around the late 1820's. The name 'Poonah' probably refers to the pattern. If this is the case, then it is interesting to speculate on the relationship between this name and that of Poona (sometimes spelled 'Poonah'), the cultural center and summer capital of the Mahratta Indian State which fell to the British Army in 1818.

The presence of such an array of household goods plus the configuration of Structure One certainly suggests that this was the location of an early historic toilet facility. However, additional investigation of the site revealed that the presently existing modern facility for such use overlies a stone lined shaft apparently constructed very similar to Structure One, with the exception of dimensions. Probing operations (this feature was not excavated in 1965) indicated that the stone lined shaft underneath this modern toilet facility extends as deep as, if not deeper, than Structure One. As it is not likely that two such toilet facilities would have been constructed during the short period of site occupancy by Brigham Young, and, since the two stone shafts appear to be so nearly
identical in construction techniques that it is unlikely that one is appreciably older than the other, and, since the one is still being used as the toilet facility, it would seem logical to suspect that Structure One was not used as an outdoor toilet.

It will be recalled from the opening paragraphs of this paper that Brigham Young constructed an above ground cellar of brick. He implies that he had attempted to build such a feature underground but that the ground "...was too damp to admit of..." such construction. As Young later did construct a full basement underneath his new brick house, located only some thirty feet north of Structure One, his statement no doubt refers to the moisture within the ground preventing the storage of goods and not to the soil's ability to support the actual construction of such a feature. Furthermore, in reference to this above ground cellar, he stated that it was constructed

...with brick walls about four to six inches apart, arched over with brick. Frost never penetrated it, although in summer articles would mildew in it...

This statement certainly suggests that even the above ground cellar was somewhat moist the year around.

Towards the end of the 19th century, probably around 1870, an unknown photographer took what is apparently the earliest known photograph of the Brigham Young House in Nauvoo. The photograph, which is quite clear and sharp, shows several figures (possibly the occupants at that time) in front of the considerably altered house. While the photographer was clearly interested in the main structure and its picturesque appearance, his camera angle of view included a portion of a small peak roofed brick outbuilding located in the back yard of the house (this can be seen in the far right hand corner of Figure #8). As a result of the (perhaps unwanted) inclusion of this small outbuilding in his photograph, the photographer has left us the evidence with which to possibly construct an acceptable solution to the problem of Structure One's use.

A copy of this late 19th century photograph was taken to the Brigham Young House site and compared with the existing features and structures in the area. By means of visual inspection and matching of angles, it was possible to relocate the photographer's original position, and the location of the photographed brick structure was then compared with the location of the shaft of Structure One. Based on this experiment, it was found that the small brick building was in fact the shaft's superstructure. The duplication exactness of these two compared positions leaves no room for doubt of this fact.
Some additional information can be wrung from this photograph (see Figure #8). Under high magnification, the number of bricks within any stretcher course along the peaked end of the building (the north wall) can be counted. Since only one-half of a stretcher course can be seen, the additional half must be calculated. There appears to be only seven such brick in each stretcher course. By assigning each of these brick the length of "nine inches and one quarter long" which is prescribed by the Nauvoo Ordinance on Size of Bricks, dated April 22, 1842, this wall measures a distance of 66 and one-quarter inches including mortar spacings between brick. Almost incredibly, this length is one-quarter of an inch shy of Structure One's measured distance along this wall! It should be noted, however, that not all bricks used in Nauvoo conform to this length, and indeed, the referenced Nauvoo City Ordinance was not passed until presumably after Brigham Young had constructed his above ground cellar. On the other hand, judging from the photographic evidence, which is quite clear in the original, there can be no less than seven nor any more than eight bricks along this wall as shown in the ca. 1870 photograph (Figure #8), and even if the length of each brick varied somewhat from those dimensions prescribed by the Nauvoo City Ordinance, the length of the north wall of the photographed brick structure is so strikingly close to being identical with the measurable distance along this same wall of Structure One that there seems to be only one possible conclusion: Structure One had a brick superstructure. The size and method of construction of the shaft walls of Structure One certainly would not preclude this structural arrangement.

In the above paragraphs, I have attempted to present historical and archaeological evidence to support the following facts and/or hypotheses regarding Structure One:

1). That Brigham Young states that he constructed his above ground brick cellar prior to the construction of his new brick house (finished in May, 1843);
2). that the shaft of Structure One actually was dug prior to May, 1843;
3). that the historic outdoor toilet facility still exists underlying the modern feature of this nature;
4). that it is therefore unlikely that Structure One was also used for this purpose;
5). that the evidence strongly suggests that the deposition of the lower levels of debris which filled the shaft of Structure One did not take place until after the shaft had remained empty for two, possibly three, years;
6). that the large amount of 1830/1840 ceramics and household artifacts found in the shaft, while these cannot be directly equated to the period of Young's occupancy, at least suggest that the shaft began to be filled at a very early date;
7). that a small brick outbuilding existed as a superstructure over the shaft of Structure One as early as ca. 1870;
8. that, since there is no architectural evidence which would suggest that a wooden superstructure had ever been constructed over the shaft, which would tend to preclude the possibility of brick veneering being added at a later date (by ca. 1870), the brick superstructure shown in Figure #8 was in all probability the original superstructure over the shaft.

Using the above evidence, an hypothetical history of Structure One now can be developed. This reconstruction is presented in the following paragraphs.

The shaft was excavated by Brigham Young sometime after July, 1841, for use as an underground cellar. During the course of its construction, Young probably decided that the ground "...was too damp to admit of a cellar underground...", and converted his labor into a cooling shaft on top of which he then built a double walled brick cellar "...arched over with brick...". Such an architectural feature would have required a slatted floor, no doubt constructed of wood, at the top of the shaft. This floor was most likely an integral part of the brick superstructure and not necessarily of the stone shaft. Atmospheric conditions within such a building would have been humid indeed but nonetheless stable from a temperature standpoint. Under these conditions, most woods would not have retained their structural strength for a long period of time, and only a very few years would have been required for the floor to weaken considerably or collapse entirely.

Less than two years after the construction of this above ground cellar, Young moved into his new brick house with its full sized brick cellar underneath. The completion of this structure, with its indoor storage facility, would have lessened the importance, and no doubt the usage of his outdoor cellar, especially if this outdoor cellar had a deteriorating floor. With the collapse of this floor, perhaps within another year, and not having any need to convert it into a toilet, since it is logical to assume that he would have constructed another outdoor toilet sometime previously, Young probably converted his former above ground cellar with its cooling shaft into a feature for which he would have had a use, i.e., a seven foot deep garbage disposal area. Later occupants of the house continued to use the structure, or more correctly, its shaft, for this purpose, until the entire feature was filled in and the superstructure obliterated sometime around the turn of the twentieth century.
This completes the examination of the stone lined shaft found in Brigham Young's backyard at Nauvoo, Illinois. In summary, it would seem that, when all discernable archaeological and historical evidence is considered regarding the purpose of Structure One, there is a noteworthy amount of this evidence which would suggest that the structure originally had been built by Young for use as his outdoor storage facility, which, for architectural and convenience reasons, was later converted into a garbage disposal area. It will be noted that if this structure were to be considered only from archaeological evidence without attempting to discern its significance from an historical context, it would be entirely possible to construct and perhaps justify an erroneous hypothesis regarding its purpose, i.e., as an outdoor toilet facility. With due consideration being given to historical evidence, however, a somewhat unique but much more plausible (and therefore perhaps more probable) hypothesis can be propounded. It is the very uniqueness of the structure's function and purpose, as outlined in this paper, which will make it of interest to others researching the field of Historical Archaeology.
BRIGHAM YOUNG SITE
(Lot 126-2)
Nauvoo, Illinois

Site Map

Figure No. 1

Excavated Areas =

scale: 0 10 20 ft

cdd dollar
oct 66
BRIGHAM YOUNG SITE
(Lot 126-2)
Nauvoo, Illinois

Back Yard Area

Structure One

Figure No. 2

Scale: 0 5 10 ft.

c. d. dollar
oct66
Figure #3. View of Structure One showing top of stone lined shaft. Exterior dimensions 5.6' x 8.0'; interior dimensions 3.2' x 5.8' x 7.2'. Scale in feet. Photographed by author.

Figure #4. General view of material taken from bottom two zones (1.5 feet) of Structure One. Left to right, back row: Feather Edge (Blue) group includes three dinner plates, one smaller plate, one incomplete deep vegetable dish; Banded Cream Ware group includes a household toilet jar lid (yellow/brown), one bowl and one large pitcher (both blue, white, and brown); an Early Ironstone pitcher; blown glass whiskey flasks, a lamp chimney and an oil lamp base (also glass); middle row: Pearl Ware and Porcelain handleless cups, a Queensware ladle, three drinking glasses (molded), eight hand and/or mold blown medicinal/cosmetic bottles, a Staffordshire Transfer Ware bowl and plate (both brown and white but with different patterns; plate is datable to early 1849); center group: Poona Blue Transfer Ware group includes three dinner plates, one bread plate, one deep vegetable dish, and the tureen cover; far right: a portion of the fired clay and stone marble collection. Photographed by the author.
Figure #5. Close-up view of a portion of the ceramics shown in Figure #4. Note Salt Glaze cup, bowl, and kitchen crock in upper left hand corner. Photographed by author.

Figure #6. Poona Blue Transfer Ware dinner plate, diameter 10½ inches (0.87 feet). The pattern is a highly stylized leaf, floral, and geometric design underglaze printed in tones of blue ranging from light to deep cobalt set against a warm white background. Photographed by author.
Figure #7. Reverse of Figure #6. This potter's mark, which so far has not been identified, is in the form of an elaborate and intricately decorated circle strongly reminiscent of a sunburst. Within this circle, and clear of decoration, are the identifying words of the mark: across the top half is written in script the words "Granite Ware"; bisecting the circle is written in block print the word "POONAH"; underneath this word is the block print initial "J". No other marks, either printed or impressed into the bisque, have been found. Photographed by author.

Figure #8. Photograph of the Brigham Young House in Nauvoo, Illinois, taken by an unknown photographer ca. 1870. Photograph dated by computing the approximate age of the two trees (which still exist) located in front of the house. Note the small brick outbuilding referred to in text at the far right hand side of the photograph. Courtesy of Nauvoo Restoration, Inc.
A Progress Report on:
Glass Dating, An Archaeologist's Evaluation of the Concept

George G. Demmy

The fact that old glass "corrodes" forming a layered crust, or patina, which is quite distinct from the unaffected glass itself has been scientifically observed for about one hundred years. Scientific investigation of this phenomenon however, is very recent.

In 1961, Dr. Robert Brill, Research Director of the Corning Research Center in New York, discovered that a certain type of experimental glass would develop a series of visible layers in response to varying experimental environments, particularly combinations of temperature and humidity. The question of a relationship between experimentally induced layering in glass and the familiar patina of old glass was an immediate one for Brill. His ensuing studies of old glass "crusts" in the light of his experimentally gained knowledge led him to hypothesize that patina layers were a reflection of either seasonal fluctuations in temperature or annual variations in wet and dry seasons and by simply counting the layers, one could determine the length of time the specimen had been in its patination causing environment.

Many of Brill's attempts at dating proved fruitless but those successes he had were encouraging as well as impressive: A piece of window glass from the First State House at Jamestown, Virginia, built in 1639, burnt and razed in 1670 was dated by a layer count at 1669 plus or minus 10 years. This date agrees most satisfactorily with the date of destruction, that is, the date the glass entered its patination inducing environment, in this case a rubble and earth covered ruin. An idea of the potential of the technique and the complexity of the mechanism of patination is given by another of Brill's impressive datings: A fragment of a wine bottle neck recovered from Port Royal on Jamaica was dated at 1691 plus or minus 10 years. The specimen, submerged in the earthquake of 1692, was under several feet of silt in an environment in which the annual water temperature variation is on the order of but a few degrees Farenheit a year.

Brill's accuracy with older material is somewhat more difficult to assess since few if indeed any closely dated Classic contexts exist. Count dates on glass from these sites do however fall into relatively narrow date ranges based on stylistic criteria.

My association with glass dating came in 1964, when as a graduate student in the Department of Anthropology at the University of Florida, I fell heir to the glass samples and knowledge gained by Dr. Charles Fairbanks and John Eaton when they were professor and student at Florida State University at Tallahassee.

Published material on patina dating, all of it by Brill, consisted then of about an hour's worth of reading and it simply didn't provide a suitable base from which to launch my own work so, in December of 1964 I visited Dr. Brill and spent two days doing a lot of listening.
I soon learned that it would be impossible to say anything about the concept from the archaeological standpoint because all of the work done on the subject was directed at substantiating the hypothesis and not with the establishment of a readily useable archaeological tool and so it was to this end that I applied my research.

The mechanism of patination very briefly is a process in which water soluable constituents are selectively leached out of the body of a piece of glass leaving behind a lattice of relatively insoluable silica which by some as yet to be described process, repolymerizes itself into a distinct layer with the "yearly cyclical factor" as Brill calls it, providing for the development of the layers on an annular basis. The process of patination results in the development of two physically distinct areas in a patinated specimen. Whereas the unaffected glass is very hard, strong, and homogenous; the patina is always fragile and composed of a series of distinct, physically separate layers. Since the thickness of an individual layer can range from perhaps .3 of a micron at the thinnest to approximately 15 microns at the upper range it can readily be shown that a cross section composed of say 300 of the thickest layers would scarcely be 1/8 of an inch in thickness. Since the depth of field at 300 to 700 magnifications which is the approximate range used in counting is extremely small, it becomes essential that a cross section to be investigated be as flat as possible. To achieve this property, the sample is embedded in a plastic mount to reinforce the patina, then cut, ground, and polished. These steps, so easily stated, were actually major areas of research. I might add here that many types of embedding resins were tried and evaluated, several techniques of embedding patinated samples as well as fragments of patina alone were developed and evaluated as well as various techniques of cutting, grinding, and polishing samples. The great bulk of this data has been eliminated from this paper but will be contained in a final manuscript. I will include in this paper those techniques which I felt to have been the most effective.

The purpose of embedding a specimen as has been pointed out, is to reinforce the patina to the extent that it can withstand the rigors of preparation. The primary criteria in evaluating the effectiveness of an embedding resin was the extent to which it would permeate the patina and then harden properly. A series of successive baths, a standard technique in biology, was used to insure complete permeation. Each bath lasted for 24 hours, the whole process requiring one week. The baths consisted of first: acetone, followed by four baths of uncatalized resin diluted with acetone in the proportions of 1 to 4, 3 to 2, 2 to 3, and 4 to 1 with the sixth bath undiluted, uncatalized resin. The final bath, the actual embedding step, consisted of placing the permeated specimen in a mold and pouring in catalized resin. The specimen in a mold and pouring in catalized resin. After curing, the samples were cut with a diamond saw, the cut being more or less at a right angle to the area of patina to be investigated. Although a fresh cut surface appears smooth, microscopic examination revealed that the entire surface of the specimen is fractured in appearance, the diamond saw being in this case, a crude tool. Its primary function is simply to get you near the area of interest. The approach to the desired plane is made by grinding away the excess material with a lapidary wheel. It is during the initial grinding operation that the final orientation of the plane through the
specimen is established. The final grinding operations were done by hand using four grades of silicon carbide paper placed over a sheet of glass with kerosene used as a lubricant. All of the above cutting and wheel grinding operations were carried out on a 10 inch lapidary wheel. The final step, polishing, was done on a variable speed metallographic polishing wheel using ½ micron diamond paste polishing compound.

An ideal specimen would consist of a series of laminar planes extending inward, from the original but now patinated surface of the glass to the as yet to be affected glass. Unfortunately, such a cross section is a rarity. The majority of cross sections consist of series upon series of laminated convolutions with an occasional unconvoluted area interspersed among and connecting them. These non-convoluted areas are useable in determining a layer count for a sample displaying them because only in this type of configuration can you be certain that the area being viewed represents an unbroken continuum of layers from the inner, most recent, to the outermost layer, which being the first to form is the oldest. Theoretically, the outer layer formed in the first year the sample entered a patination inducing environment and the process continued until, in our case, the sample is recovered in excavations at which time the process ends. One of Brill's Jamestown samples however was a notable exception to the "clear continuum" rule: Instead of a useable area, the sample displayed a series of "plugs" as Brill called them. These were distinct cone-shaped intrusions spread sporadically throughout the patina. All were completely layered and although there was no discernable "first" or "last" layer, the date was based on a count of the oldest plugs, that is, those with the greatest number of layers.

Not all glass patinates. A myriad of factors, chemical as well as physical are involved in the process whereby a piece of "fortunately unstable" glass as Brill calls it, will patinate as well as the degree to which it will patinate and the quality it will display. The higher the quality, the more potentially datable.

My research was based on a study of 17th and 18th century samples primarily because well dated samples were available and because of this my observations and remarks are confined to material from this time period thereby excluding ancient glass although much of this information would, I feel be universally applicable.

Not too many samples had to be handled before it could be generalized that specimens with relatively thick crusts had a better chance of being datable than those that appear to be no more than a thin film of iridescent powder. On this basis alone, a great percentage of samples can be culled as unuseable. In a personal communication, Dr. Brill informed me that he had handled hundreds and possibly thousands of pieces of glass in an effort to first test and secondly to give substance to his theory. At the time of our meeting Brill had no more than ten which he had dated.
Feeling that the technique of sample preparation developed did enable the patina cross sections to be ground and polished yet retaining a relatively planar surface, I selected a group of samples to date. My evaluation of the concept of glass dating would be based on the results of these datings.

Nineteen samples from a wide range of geographical areas were selected with a bias toward those which displayed well developed crusts. Roughly half were from the land sites and the remainder were from underwater sites. The land sites were in Canada, Nova Scotia, Florida, and Panama Vieja in the Carribean. The underwater sites were off the coasts of Jamaica, Bermuda, Florida, and Virginia. Six samples were selected from the land sites and from them 14 specimens were prepared. Seven samples were selected from the underwater sites and from them 18 samples were prepared. Two of the 33 samples were culled as unusable when microscopic examination revealed that they had patinated completely thereby making them unusable.

The 31 specimens were investigated on a metallographic microscope. It might be pointed out here that this type of microscope is the only kind on which patina specimens can be effectively studied, the reason for this being that this type of microscope was designed specifically for the study of the surfaces of opaque objects. Of the 31 specimens, only one was considered as usable but the success was only a partial one. The sample in question was from a bottle neck recovered in excavations conducted in Saint Augustine, Florida, in 1964. The problem here was the lack of a tight date on the context from which the bottle neck came. A date of 1707 was attributed to the specimen on the basis of two independant count dates, one by myself in which I determined a date of 1706 and a date of 1708 determined by John Eaton, then a graduate student at the University of Florida.

The major conclusion that I would have to draw from the research I have conducted is that the phenomenon of patination is simply too random a process upon which to base a dating technique. I will say, in support of Robert Brill, that I feel the concept to be a valid one for the simple reason that a one to one relationship has been demonstrated in several cases. I have no statistics on Brill's work other than to assume that he was trying to date as many as possible of the "hundreds or thousands of pieces of glass" he handled. At this writing I would have to conclude that a performance on the order of 2 to 3 percent using a select group of samples doesn't indicate a satisfactory degree of dependence. Accuracy isn't the problem for as I have said, when it works, it does so remarkably well. The real problem is the random nature of a highly complex physiochemical process. Further research must be done in the realm of glass chemistry before archaeologists can comfortably use patina dating of glass as an everyday tool.
Excavation of the Panton, Leslie and Company Store on the Wakulla River

Pheriba K. Stacy

From April through October, 1966, the author with the aid of a student field crew from the Florida State University carried out excavation of Swa39, a Panton, Leslie and Company trading post site on the west bank of the Wakulla River approximately four miles above the present town of St. Marks.

William Panton, John Leslie and John Forbes, the major partners in the firm of Panton, Leslie and Company were Scotch Loyalist traders who, prior to their partnership, were separately based in Savannah and Charleston as minor partners of other trading firms. With the advent of the American Revolution, these Loyalists fled to Florida and joined forces to establish a trading empire that eventually would obtain a commercial monopoly for Indian trade in Florida's Second Spanish period. At various times during the letter part of the Eighteenth Century Panton, Leslie and Company maintained stores in Mobile, Pensacola, at Prospect Bluff on the Apalachicola River, on the Wakulla River, on the St. Johns River, and at St Augustine.

The Panton, Leslie and Company store on the Wakulla River was established in 1784, after the firm obtained permission from the Spanish Crown to monopolize the Creek Indian trade for preservation of political relations with the Indians. Its manager was Charles McLatchey, minor partner of the company. This post apparently handled Lower Creek trade from 1784 to 1792 without incident. On January 16, 1792, William Augustus Bowles, a Creek half-breed representing the rival trading firm of Miller, Bonna my and Company in the Bahamas arrived with a band of Indian allies and seized the Wakulla River store. The post was reestablished and commercially transacted with the Indians until 1800, when it was once again raided by Bowles. At this point, Panton, Leslie and Company moved their Wakulla River store to the protective confines of the fort at St. Marks.

With reference to location of the site itself, a 1767 British sketch map by Gould and Pittman shows "cleared land" at the approximate location of the recently excavated site. This may indicate an area of former settlement, either European or Indian, though neither is indicated on the map at this date, and an earlier reference to the site has not been found. An 1800 sketch map shows the location of six structures belonging to the trading house on high ground above a bend in the river. Another 1800 map of the fort at St. Marks with plan of attack when retaken from Bowles depicts the Panton, Leslie and Company store site above the fort. Finally, an 1817 map of the Forbes Purchase in west Florida shows the routes of General Jackson's campaign and designates an old store at the apparent location of Swa39 on the Wakulla River.
Excavations at 8Wa39 attempted exploration of one of the more peripheral Panton, Leslie and Company posts to be compared structurally and culturally with material excavated from the Panton, Leslie headquarters site in Pensacola in 1964 by a Florida State University student field crew under the direction of Dr. Hale Smith. Another important aspect of the Wakulla River excavations was obtaining additional material for an understanding of European-Aboriginal contact at the time of the Second Spanish period in Florida. An additional goal was a better analysis of artifacts imported as trade wares for the Indians.

Field work consisted of two major aspects: an underwater archaeological survey, and a transit-controlled, experimental trenching excavation on the land. The underwater survey involved use of a team of divers from the Big Bend Council for Underwater Safety, Conservation and Research. The survey area adjoining the site was gridded with 50.00 foot grid intervals.

Artifact recovery was accomplished by use of a floating water jet for uncovering artifacts on the river bottom, and in below the waist water use of shovel, screen, and bailing bucket. The floating water jet consisted of a self-priming pump mounted on a wooden platform tied to four inflated inner tubes, with pump intake suspended a short distance under the mechanism, so that only clear water flowed through the attached canvas fire hose. The survey showed a general lack of European artifacts, possibly due to differential collecting by divers not connected with the present project. The majority of material recovered from the water was aboriginal ceramics, largely from the Fort Walton Complex. The only pilings located parallel the existing dock at the site, and probably do not relate to the Eighteenth Century occupation. There were no artifacts intact from the river bottom. It is impossible with results of this survey to determine whether the underwater portion of the site represents land subsidence, or accumulation of artifacts directly from activities connected with the area of land now exposed at the site.

Excavation at 8Wa39 began with a 2.00 foot by 50.00 foot experimental trench, which was widened at its northern extremity upon discovery of a posthole pattern to a major excavation area 20.00 feet by 20.00 feet, with peripheral 5.00 foot by 5.00 foot test pits at 50.00 foot intervals from the temporary bench mark to the east, south and west of the major excavation.

Trench profiles showed a root and topsoil layer, a midden stratum containing all material pertinent to period of occupation of the site, a stratum of white Pleistocene beach sand containing chert chips and Archaic projectile points, and an underlying stratum of limestone bedrock of the Tampa Formation. Water table was reached at approximately 3.50 feet below surface. Excavation revealed no zonation of any cultural materials other than those indicating presence of an Archaic component in the white Pleistocene beach sand below the dark humus midden stratum. Cultural stratigraphy in the dark humus midden material was determined by excavation begun in arbitrary 0.50 foot levels, later narrowed to 0.30 foot levels to determine any significant stratigraphic variation in cultural material. There proved to be no zonation of any pottery type or complex. European material occurred mixed with aboriginal predominantly in the first foot of excavation, after which aboriginal ceramics predominated. There was a slight tendency for Chattahoochee Brushed, though always in small quantities,
to limit its distribution to upper levels of the site. It was, however, even in upper levels, mixed with types from the Leon-Jefferson phase and the Fort Walton phase. Types belonging to the latter two ceramic groupings continued together into the lower levels of the midden stratum, and intruded into the white Pleistocene sand where postholes had entered this formation. The occurrence of ceramics of the Fort Walton complex with Leon-Jefferson types, and in upper levels with Chattahoochee Brushed indicates either that there was great disturbance of cultural materials throughout the site, which seems unlikely, or that this site adds support to the growing knowledge of sites in which it may be observed that the Fort Walton ceramic tradition continued well into historic contact times.

Structural evidences at Swa39 consisted solely of postholes visible only against the white Pleistocene beach sand. Posts apparently were not hewn, and not set into wall trenches. Building patterns have not been determined at present writing, as postholes have not yet been plotted or elevations examined.

Charred corncobs surrounded by limelock fragments appeared as a feature at 1.00 foot below surface, with several postholes situated nearby. Fairbanks (1962:55) has stated that pits of charred corncobs are a frequently occurring feature in historic Creek sites, and even extends back to the Fort Walton Period. Botanical analysis of the cobs has not been completed.

An artifact list from the site includes European material of the period of Panton, Leslie and Company occupation, and associated aboriginal material of Fort Walton phase, Leon-Jefferson phase and Seminole phase affiliation. European artifacts usually do not extend in significant quantities below a depth of 1.00 foot below surface, with Cream ware, Direct Painted Semiporcelain as the preponderant European ceramics. Associated with these are musket balls, swan shot, gunflints, barrel strap fragments, dark green bottle glass fragments and kaolin pipe stems and bowls. There were, scattered throughout the site, a few earlier sherds of the Weeden Island phase and the Deptford phase.

At the present stage of interpretation of archaeological data from excavation and underwater survey at Swa39, it is impossible to determine the nature of structural evidence manifested in posthole patterns. Nor is it yet possible to make any definite statement as to cultural affiliation of the area under examination, as to whether it is the site of the post itself superimposed on earlier Indian habitation, or whether excavation took place in an aboriginal camping or dwelling area coeval with the post itself. This report is in every sense a series of preliminary notations, not an attempted total analysis.

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Clay Pipes from the Fortress of Louisbourg, Nova Scotia, Canada

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The following is an abstract of the paper given, and is basically an expanded and illustrated version of the abstract which appeared in the Eastern States Archeological Federation Bulletin No. 25, (May 1966), 14-15. Two major studies of these pipes, one dealing with those from Casemate Right One, the other dealing with Casemates Right 10-15, and both dealing in detail with their archaeological and historical context, have been complete since January 1966 and await publication in the proposed new Canadian Historic Sites Division publication series.

It is assumed that the reader is aware of the general history of the Fortress of Louisbourg, but briefly it may be noted that the initial settlement by the French took place in 1713, that the fortifications were commenced in 1719, that the fortress was captured by the New Englanders and British in 1745, and by the British again in 1758, and that the defences were systematically demolished in 1760. The British garrison was withdrawn in 1768, but the area has never been wholly uninhabited between that date and the present century.

Any information on occurrences of similar pipes in other contexts will be gratefully appreciated by the writer.

Studies of pipe material at Louisbourg by the author covered two areas of the King's Bastion: Casemate Right One and Casemates Right 13-15.

In Casemate R1 the stratigraphy was divisible into three major depositions, the topmost datable to 1755-60, the next to 1749/50-55 and the third to c. 1700-49/50 (S. Walker, 1966). The material from Casemates R13-15 was datable to 1720-c. 1732.

Pipe material from Louisbourg came from two sources, The Netherlands and England. Dutch pipes differ from English pipes of this period in shape, size (Dutch bowls being smaller), in the plane of the bowl not being parallel to the line of the stem, and in the lip of the Dutch bowl having a form of rouletting. Dutch material is usually more delicate and better made than English, frequently having a polished surface (Fig. 1). For reasons as yet uncertain the shape shown in the upper row was popular in the New World to the total exclusion of the more traditional barrel-shaped English bowl, but was in a minority in Britain.

The Dutch pipe industry was centered on Gouda, where a register of makers' marks were kept. However, these marks could be bought, traded, willed, etc., so that it is rarely possible to date the marks except by context. The letters FS surmounted by a crown, found on a pipe in a 1758 context elsewhere at Louisbourg are still used by a Gouda firm (I. Walker, 1966b). However, in 1739-40 Gouda pipemakers were allowed to place the city
coat of arms on their products to try to prevent plagiarizing, and shortly afterwards they added the letter S (for the Dutch word for "ordinary") to pipes that belong to that class, the lowest of their three classes. Thus pipes with the coat of arms (a shield divided vertically in two, with three vertical stars in each half) and/or the letter S are not earlier than 1739-40 (Fig. 2).

Dutch marks found at Louisbourg include the crowned 6 (Fig. 3) (with and without the arms, and found in 1755-60 and c. 1700-1749/50 contexts); the letters SVO (1755-60) (Fig. 4); the mermaid (1755-60); the trumpeter (1720-32) (Fig. 5); and a monogram-like design which appears to be the letter V with a C and a reversed C overlaid (1720-32). The letters LV, surmounted by a crown, with what appears to be a flying bird underneath, occurred in a 1720-32 context, and pipes with this mark carried complex stem decoration (Figs. 6, 7). In bowl shape these pipes appear to be a version of a pipe which was popular only briefly in The Netherlands but which was introduced to England by the troops of William of Orange in 1688, and which had a major influence on the bowl shape seen in the upper row in Fig. 1. Both the Dutch and English used rouletting as a stem decoration, the Dutch edging their bands of decoration with small impressed triangles (I.Walker, 1966b), the English adding lines of conjoined circles. These types of decoration occur throughout the Louisbourg occupation period.

A common English pipe in 1755 and later contexts is that with the letters TD, encircled, on the bowl facing the smoker, and the same letters on either side of the heel. A preliminary study of these pipes has been made by the writer (I.Walker, 1966a). Common among the earlier material were pipes made by the Robert Tippet family of Bristol (3 in 1720-32 contexts, 5 in c. 1700-49/50 contexts, 1 in 1749-50-55 context probably from preceding deposit). However, two Robert Tippet pipes came from Fort Gaspé, New Brunswick, in a 1750-56 context, during excavations by the writer in 1966. One Louisbourg example, made by J(o)ane Tippet, widow of the first of the three Roberts, must date to c.1700 at the latest (Fig. 8).

John Stephens' pipes occur in 1755-60 contexts (twice) and 1720-32 contexts (six times) (Fig. 9, left). The only known documentary reference to him is in 1751 and, as a pipe of his has also been found at Louisbourg in an undated context but with a bowl typologically datable to not much before 1800, it is possible that there were in fact two John Stephens, father and son, working.

The letters EC encircled in the side of the bowl (1755-60) appear to represent Evans Cheevers, who commenced work in 1741. Various small motifs sometimes occur with these initials, but not always.

A stem with the name Carter on its top surface occurred (c.1700-49/50). The name, but not the manner of marking (which is, however, common in NE England) is known in Bristol at this time.

*(or conceivably C)*
Marks at present unidentified include what appears to be a heart surrounded by a circle of dots (5 examples) (Fig. 11), and the number 8 on the base of the bowl (both 1755-60). Stems with elaborate decoration (all 1755-60) seem to be from Chester (Fig 12), though the nearest parallels there date to c.1700-30; while another decorated stem (1720-32) closely resembles pipes made both in Chester at this time, and The Netherlands.

One rare mouthpiece fragment with a red wax coating was also found. Independent dating by marks, supplemented by Binford dates, gave very accurate dating, as subsequent comparison with archaeological and historical data proved. However, prior to the English occupations the French used Dutch pipes as often as English, and this affected Binford dates, making them as much as 15 years too late (I. Walker, 1965).

Bibliography

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Pipes from Louisbourg, Nova Scotia
Figure 1  Upper Row: Three typical English export type pipebowls of the period c. 1720-60

Lower Row: Three typical Dutch pipe bowls of the same period

Figure 2  Dutch pipe showing Gouda coat of arms surmounted by the letter S on side of heel

Figure 3  Dutch pipe with mark of the Crowned 6 (Registered at Gouda) and Gouda coat of arms on one side of mark. The use of one such imprint (as opposed to two and the use of the letter S) denotes that this pipe belongs to the second —Fine— class of Gouda pipes

Figure 4  Dutch pipe showing the Gouda mark S°O

Figure 5  Gouda marks of the Trumpeter

Figure 6  Gouda marked of the Crowned LV, with an unidentified mark resembling a flying bird beneath. Elaborate stem ornament

Figure 7  Dutch pipe with same mark as that shown in Fig. 6; note shape of bowl and rim of bowl lying parallel to stem

Figure 8  Four pipes produced by the Robert Tippet family of Bristol. Top example shows hitherto unknown badge used in medallion in place of name, and a heel, likewise hitherto unknown on Tippet pipes in the New World. Centre lower example reads IR/TIP/ET, indicating J(o)ane widow of the first Robert Tippet

Figure 9  Left: John Stephens pipe, name appearing here as [JOHN/STEP/ HENS], the T and E in the second line and the H and E in the third always appearing monogrammed, as here. The letter N is frequently, though not always, reversed, as here.

Right: Reuben Sidney pipe, name appearing here as [RE/UB/ENG/ DNEY], lowest part of third line here being partly broken

Figure 10  English bowl with lion guardant, partly encircled, and surmounted by a crown with the letters G (or conceivably 6) on one side and R on the other. Another example with its heel surviving had the letters W on one side of the heel and M on the other, both crowned

Figure 11  Unidentified English pipe-mark, apparently comprising a heart surrounded by dots

Figure 12  Ornately decorated stems similar to one known from Chester, England
It can safely be assumed that the case for electrolytic treatment of ferrous artifacts has been proven. Among those archaeologists engaged in research involving the preservation and study of historic metals, the electrolysis method of reducing unwanted oxidation is known, and in the main, understood. Plenderleith (1962: 194-197), Dunton (1964: 37-45) and others describe the electro-chemical principles involved, but none give detailed information on the construction of apparatus suitable for long-term use, and designed to handle a number of artifacts simultaneously. Although Plenderleith describes an arrangement more desirable than Dunton's battery charger, his unit is restricted to processing a single artifact at a time. However, the more-than-16-year-old warning of Plenderleith about exceeding a maximum current deliverable to the artifacts is ignored by Dunton. This writer's experience and experiments have tended to substantiate Plenderleith's cautions as has been stated elsewhere (Foley, 1965: 65).

Commercial battery chargers are unsatisfactory sources of current for several reasons. Most units have inadequate instruments for the control of amperage output. Often the only choice is from 25 to 100 amperes in pre-set increments of 25 amperes. The entire range is too gross for artifact processing. Well-constructed units are also clumsy, and expensive in initial cost and maintenance in the event of component failure. These factors led the writer to design an electrolysis unit that would fulfill the following desired criteria:

1. A stable, controllable power supply, inexpensive to construct, operate, and repair. The circuit which resulted allows the archaeologist to rapidly diagnose and repair or replace any element within the system.

2. A method of recording the time, voltage and current delivered to the artifact, allowing the archaeologist to control the length and the severity of treatment, while arriving at a mental standard by which he can pre-judge time and current factors for particular types of artifacts in his geographical area. Delicate artifacts can be pre-sorted and treated together under controlled conditions.

3. A processing tank built to standard dimensions, by which evaporation and needed electrolyte replenishment can be judged at a glance.

4. A method of suspending the artifact under treatment, allowing easy adjustment of its depth in the electrolyte, thus providing for variously-sized artifacts and the ability to treat a portion of a specimen.
5. An entire apparatus not to exceed the cost of a new, heavy-duty commercial battery charger. The reader will recall my caution (ibid.) that inexpensive chargers sold at local automotive stores are not of safe or stable construction, being underwired and with circuit-breaking relays which function erratically. Though these relays can be disconnected or bypassed in the circuit, they also serve as safety devices against overheating and prevent overcharging in battery use. Thus, an unsafe situation may obtain if this relay is disconnected to avoid switching the unit off and on when used for electrolysis.

6. A unit that would serve as its own packing and shipping case to on-the-site field laboratories when house current was available.

An examination of the wiring diagram (Figure 1) reveals that the essentials of any such unit are present. That is initially the reduction of 110 volts house current to a more manageable level. Traditionally, 12 volts is preferred. In my unit, a step-down filament transformer (T-1) is used, and delivers about 13-15 volts. Such a transformer is relatively compact, stable, and when properly wired and cooled, able to withstand the inevitable surges that occur in electrolytic treatment. It is a Grade 1, Class A type manufactured by the Industrial Transformer Corporation. There are eleven terminals attached designating it as a "buck boost" transformer and may be wired by the user for a variety of output voltages. This particular component is boosted for maximum continuous service of 12.8 volts at 20.0 ampere output.

Two additional advantages accrue from the use of such a transformer. First, it is a more critical component than that used in most battery chargers. While the latter type also reduces voltage and boosts amperage, they draw significant amperage from the primary circuit. That is, while they may deliver 12 volts and 20 amperes at the secondary phase, they may draw as much as 4-6 amperes at 110 volts in their primary circuitry. Thus, if operated on a normal house circuit, caution must be exercised that the wiring is not overloaded with other instruments or machinery. My circuitry, while supplying the desired voltage and amperage from the secondary phase, draws less than one ampere from the house line—or, in common terms, about the same as a 75-100 watt light bulb.

Secondly, neither type of transformer delivers an electrical current that is immediately usable in electrolysis. It is the nature of a transformer to reduce somewhat the voltage frequency fluctuations of the input electricity while performing its principal function. That is, the electricity that leaves the transformer is more of a direct current than that with which it was activated. However, it must be "smoothed" out even more to perform our needs.

The transformer under discussion does more of this needed filtering than the type commonly found in battery chargers. Consequently, the filtering, "smoothing," or rectifying components needed are smaller and lighter while being equally effective.
As originally designed, the rectifier used was a Directron Selenium Rectifier. Though smaller than battery charger types, it was based on the same principle. While serviceable, its nature consumed and thus wasted substantial amounts of voltage in the rectifying process.

I have since replaced that rectifier with four 1 N 250 A Silicon diodes, wired in series-parallel and mounted on a heat sink. The total rectifier and sink is one-quarter the size of the Selenium unit, and with none of its undesirable voltage loss. Anyone wishing to construct a similar apparatus with this type of rectifier may reduce the size of the housing cabinet shown in Figure 2 by about 20%, as long as adequate ventilation is provided for the diodes. Heat is their most destructive enemy. The only method of providing a completely filtered direct current is through a complicated circuitry of electronic vacuum tubes or transistors. While commercial battery charger rectifying circuits are less effective than the type suggested herein, most do nothing further to retard the deliterious effects of remaining voltage fluctuations upon the unit's components. My circuit includes a Mallory 35 volt DC capacitor (C-1) in parallel between rectifier and the electrodes, thus helping to prevent falling voltage and harmful backfeed surges to the diodes.

It will be noticed from the schematic, Figure 1, that the system has two principal segments, each controlled by its own master switch. With the exception of the female outlet in the lower left of the control panel (Plate I, Figure 1, O-1), none of the components is electrically active when both switches are in the "off" position. The purpose of the outlet is purely one of convenience, serving the operator as a handy source of current for a non-related electrical appliance. As such it may be omitted from the circuitry if desired.

The first phase switch (S-1) activates the transformer (T-1), rectifier (R-1), capacitor (C-1), volt meter (M-2), first stage pilot lamp (L-1) and both fans (B-1 and B-2). It can be seen that the circuitry is somewhat complicated in the interests of economy. Both switches are of the double-pole single-throw variety (DPST) and one half carries 110 volts while the other supplies 12 volts. This method of wiring was dictated in part by the desire to use components already on hand at the time of construction. Fan B-1 is wired for 110 volts and is employed to cool the internal components of the apparatus. Fan B-2 is attached to the control panel by a 25-foot wire and is used to blow the irritating fumes given off by the electrolyte away from the operator. The most suitable fan for the purpose already available was a 12 volt automotive type and is able to be attached by clamps or screws to a variety of surfaces in almost any desired location (see B-2 in upper left of Plate I). However, one using this suggested diagram could readily modify the circuitry and have both fans wired for 110 volts AC thus eliminating the need for a double-pole (S-1) switch.

The volt meter is wired into the primary phase as a continual source of information for the operator. The readings should be constant and reflect the condition of the transformer and rectifier. When the second phase, governed by switch S-2 is inactive, and if an unusual surge or fall in voltage is indicated, one knows there is failure in one or the other of these two components. A pair of test leads should be constructed and kept with the unit. By connecting these leads to the volt meter and in turn to the output side of the transformer and the rectifier, the particular component causing the difficulty can be pinpointed. There will, of course, be a loss of voltage when the entire circuit is in use and artifacts are being processed.
This fall will be increased as the amount of amperage to the artifacts is increased. However, even at maximum amperage output, the voltage should not drop below 12 volts on the meter.

When the second phase is activated by switch S-2, current is allowed to flow from the rectifier to the treatment tank through the variable rheostat, P-1. At the same time the ammeter (N-3) and timer (N-1) become operative. If the same parts are used and wired as suggested herein, it will be noticed that the lowest setting of the rheostat will indicate approximately three amperes on the meter (N-3). The reasons for this arrangement will be explained later.

It will be noticed also that there are three safety fuses in the circuit. The first (F-1) is inserted in the AC portion of the first phase. It is a 10 ampere house-type fuse protecting the unit in the event of major internal short circuit, component failure and also in the event trouble should develop in any external apparatus deriving its power through the auxiliary outlet (O-1). A regular "porcelain" light bulb socket is used as the fuse receptacle.

The other two fuses are 12 volt, 30 ampere automotive cartridge types and are placed in the cathode and anode lines from the control panel to the treatment tank. All three fuses are located at the lower left rear of the panel case (Figure 2, Section "C") with access to them through a door along the back of the unit (Figure 2, Section "D"). This same opening serves as the access and storage area for the AC, anode and cathode wires. The panel's internal components are mounted on a raised platform (Figure 2, Section "B"), beneath which ample storage area is provided for the twelve-foot AC line and the six-foot cathode and anode lines. Each line when stored is separated from one another by non-conducting wooden partitions as shown in the cut-away top view, Figure 2, Section "C".

The face of the control panel and its general dimensions and plan can be seen in Plate I and Figure 2. Section "A" identifies the components mounted on the face panel. The door on the right side of the cabinet provides a storage place for fan B-2. It is held in position by three bolts during shipment. Section "B" shows the approximate placement of internal components, the storage compartment for wires, and the location of and vent door for fan B-1. Immediately to the left of the capacitor (C-1) is an unlettered plastic container which is riveted to the component platform, serving as a conveniently-located carrier for spare fuses, nuts and bolts, test leads and terminal clips.

Section "B" also shows in cut-away form a cover over the face of the panel to protect it in transit. The cover is mounted with slide-out hinges and held in place with three luggage type fasteners at the top (Plate I).

Access for repairs or adjustments to the interior of the panel is either through the fan storage door (B-2) or the panel itself, which is piano-hinged along the bottom and held in place by two internal cabinet friction clasps and a desk top slide to limit its opening arc.

One of the principal difficulties in using glass, wood or hard rubber containers as electrolysis tanks lies in the necessity of providing a separate anode. It has been suggested that anodes be suspended in the electrolyte (Pflenderleith, 1956: 195; Dunton, 1964: 38) near the artifact being treated. This, of course, does work, assuming that the anode is of more "noble" metal than the artifact. But, if the old axiom that
"electricity seeks the path of least resistance" is valid, then it would seem that the portion of the artifact facing the anode would be more quickly treated than its reverse side. If this is true, difficulty could arise, and time would be wasted on massive or large flat artifacts.

Because of this, and desiring to treat several artifacts simultaneously, I discarded the separate anode technique and made the entire treatment tank itself the anode. This was simply accomplished by using a stainless steel tank and welding a terminal to it (Plate I). Thus, a single artifact under treatment would be polarized in all directions; several artifacts under treatment would have at least three surfaces exposed to them. It should be stated at this juncture that the total cost factor of the apparatus may be somewhat open to question in that the tank was made to my specifications by Bethlehem Steel Corporation gratis. However, they assure me that an equivalent tank could be produced for about $18.00 – $25.00 on the open market. Another caution is in order. The seams of such a vessel should be welded, as opposed to soldering, as the sodium hydroxide will eventually weaken solder. Furthermore, the stainless steel selected should be of a gauge proportionate to size and of a quality made for use with acids.

Another advantage to the use of stainless steel is the ease of removing the inevitable sludge that accumulates from the electrolysis process. There is no appreciable staining of the metal by this sludge, and as the iron particles released from the artifact do not adhere to the tank there is no loss of electrical contact surface through prolonged use.

The dimensions of the tank were chosen because of transit considerations, portability, and the ability to equate each 3/4" of its depth directly with one gallon of liquid. Thus, by scribing the interior of the vessel in 3/4" increments and filling those scribed lines with a brilliant epoxy paint, the depth and evaporation factors of the electrolyte are readily discernible.

A rough finish on the tank may be seen in Plate I. While such a low-resistance circuit provides very little danger of electric shock to an operator, several of my temporary laboratory assistants were reluctant to use the apparatus. In an attempt to pacify them I tried various non-conductive coatings on the tank and artifact suspension bar, with a liquid rubber, Rubamold (Stewart Clay Co., Inc., New York City), being the most effective. This may be brushed or poured on the surface, allowed to set, and then cured over an electric bulb or hot plate, yielding a fairly stable surface. However, repeated splashing with sodium hydroxide has caused the rubber to break down in certain areas of the tank. The rubber coating on the brass artifact suspension bar became "uncured" before ever being subjected to use, and is now simply a sticky mess. However, the substance has completely isolated the operator from electrically active metal. It is hoped that a more stable substitute for the Rubamold will be found in the near future.

Figure 3 shows a framework which rests upon the rim of the processing tank and which provides a support for the artifact suspension bar. The frame is constructed of 1 - 1/8" wooden corner guard, with mitered corners. It is reinforced with iron "L" brackets riveted to the seams. A recess is cut in the cross member at each end to house the artifact bar. As the corner guard stock is thin, the recesses were cut completely through the wood and small pieces of hardboard were secured across the bottom of the cut to form the bar supports. The entire frame was then fiberglassed.
using readily available fiberglass tape and resins. It was finished with an epoxy paint, resulting in a sturdy acid-resistant frame. Corner guards were used, of course, because they prevent any movement when fitted to the tank.

A companion framework was designed for the bottom of the tank to allow air to circulate and prevent damage to the rubber coating. Time has prevented its completion and the tank illustrated simply rests on makeshift pedestals.

The artifact suspension bar is formed from a two-foot length of 1" x ¼" flat brass stock. It is fitted to accommodate seven specimens. Wooden handles are provided at each end and were secured from an old Stanley "Surform" plane.

Artifacts are held to the bar by means of electric terminal clamps fastened to the ends of round ½" brass rods, each 12" in length. A dozen such rods were fabricated with two sizes of clamps (2" and 3" in length) which accommodate a wide range of artifacts. The rods fit into ½" holes through the artifact bar and through brass collars secured over the holes on the upper surface of the bar. These collars are electronic supply items designed for radio application. They are provided with two set screws in each collar which may be used to lock the rod in place, offsetting the weight of the artifact. However, these screws are too small, easily lost and of soft metal. If one prefers screw clamping of the rods, it would be advisable to drill and tap new, larger screw holes.

In the unit shown, the writer preferred to avoid the screw problem entirely and fastened 2-3/8" "spring-back" or "release springs" to the bottom of the bar in such a way that they exert pressure against the rod or rods in use, holding them in position. The upper two sketches of the artifact bar in Figure 3 illustrate their manner of attachment and use. The top diagram shows the bottom view of the bar. Tension is applied to the spring, and the artifact rod is inserted past it into the rod collar from below. The spring is then released, clamping the rod in place. Those rods not in use are simply raised to their maximum height out of the sodium hydroxide.

In each case a person copying this technique should experiment with the weight of his average artifact vis-a-vis needed spring tension before fastening them to the bar. Furthermore, considering the abuse the springs inevitably receive, it is wise to secure them by the strongest method. The writer's silver-soldered them in place, fearing that a hotter welding would destroy their temper. It will also be noticed that most settings of springs on a bar of similar dimensions will necessitate the cutting of excess length from the fastened leg.

The collars are affixed to the top of the bar with common 60/40 solder. If this method is used, the springs should be attached first, then the collars. Greater heat is needed for the brazing of the springs; the collar solder joint could not withstand such temperatures.

Initially the artifact-holding clamps were silver-soldered to the ends of the rods, but the required heat deprived the clamps and their coil springs of tensile strength. Each clamp comes with a screw terminal. By flattening the rod ends with hammer or vise and drilling a hole through the worked portion, the clamps can be attached by means of longer screws.
As was stated at the outset, one of the construction criteria was for the unit to serve as its own shipping case. The cover over the control panel as shown in Figure 2 "B" has already been noted. Not shown on the diagram are two trunk handles affixed to the sides of the cabinet. Figure 3 shows one of the two handles on the side of the processing tank. By removing all the rods from the artifact bar and inverting the bar in the tank frame recesses, nothing protrudes above the frame. A piece of hardboard, not shown, of dimensions equal to the exterior of the frame and with thin blocks of wood fastened to it to prevent lateral shifting, is laid over the tank and secured to the side handles by means of webbing. A portion of one of these tie-downs is visible on the left tank handle in Plate I. This arrangement provides protection for the tank and bar while also offering extra space within the tank for the storage of dry chemicals and an assortment of other items.

The operation of this suggested apparatus has in the main already been covered in the description. Only a few points need be added.

The wire leads from the panel to the tank are labeled on the rear of the case. As a further protection against improper connections the anode and cathode wires end in different types of terminals. The anode cable's eye-type connector is affixed to the tank stud by means of a wing nut, while the cathode simply snaps onto the artifact bar terminal (Plate I). These leads are #10 "multi-strand" wires affording maximum flexibility with teflon insulation to avoid damage from the electrolyte.

The fundamental reason for the two-phase design of the electrical circuits and the minimum setting of three amperes on the rheostat, is that the artifacts under treatment must be removed from the electrolyte while current is still flowing through it. The unit must never be turned off while artifacts are still in solution. To do so would allow an immediate change of polarity in the solution causing much of the oxidized sludge in solution to "replate" itself on the artifacts with more cohesion than the original oxide. As such, prior to removing treated artifacts, the amperage may be decreased to the minimum level, still maintaining the desired polarity. The artifacts may then be removed and the second phase shut off. This will break any electrical connections to the bar and tank, but will still allow the fans governed by the first phase to continue dissipating irritating fumes and cooling the internal components.

While a 15 ampere maximum is recommended in the treatment of any artifact, the variable rheostat should be set at a maximum of 10 amperes on the meter at the beginning of treatment. As the oxide is broken down, and thus the electrical resistance between anode and cathode, the amperage flow will substantially increase. The ammeter should be observed on several occasions during the first ten minutes of treatment and the rheostat adjusted to maintain the treatment at proper level. Furthermore, the ammeter should be used as the principal indicator of amperage delivered to artifacts. While most of the recommended rheostat types come with dials, the calibrations will not be the same as shown on the ammeter.
Although the foregoing has been directed towards the small archaeological laboratory, the circuitry and design are sound and could serve as the basis for a larger arrangement. I have included an appendix with this paper listing the parts used, their source, and where possible, the costs. I have not included any accounting of the time expended in construction or the related housing materials, such as lumber and small hardware, as these were selected from supplies on hand, and may be substituted with other equally effective materials.

At this juncture, the writer must express his appreciation to Mr. Bob Mace of Baynton Electronics for his criticism of my circuitry and his aid in selecting the electronic components best suited to my needs. With his advice and assistance, as well as Bethlehem Steel Corporation and others, the production cost of this unit was below eighty dollars. With some solicitation, improvisation and imagination, a maximum cost should not exceed one hundred dollars, still well below that of a commercial heavy-duty battery charger.

References

Dunton, John V.N.

Foley, Vincent P.

Plenderleith, H.J.
Laboratory Electrolysis Apparatus

Electrolysis Schematic
Figure 1

Figure 2

Figure 3

Plate 1
Appendix

Commercially available parts used in the construction of the electrolysis apparatus:

Electronic Components

1 Ohmite Potentiometer, Model R, 3ohm, 12.9 amp. maximum
1 DC voltmeter 0-25 volts (Simpson)
1 DC ammeter 0-20 amps (rewired for 12 volts) (Simpson)
Redline at 15 amperes
1* JBT elapsed time meter, hours and tenths.
   Lafayette #38R6701.......................... $15.63
1 Rontron whisperfan (B-1)
1 Automotive fan, 12 volts, metal frame and blade
1 Filament transformer, Grade 1, Class A, Family 01
   (Industrial Transformer Corporation, Gouldsboro, Pa.)
1 Capacitor, 35 VDC, + 7500 MFD (Ballory - 20 - 71879,
   maximum surge 40 VDC)
1 Selenium Rectifier, 20 amp., 36 volt input ("Directron,"
   Sanford Miller Company, Brooklyn 11, New York)
   OR
4 Silicon diodes 1 N 250 A with heat sink
15 Feet multi-strand #10 wire, teflon coated

With the exception of the automotive fan (B-2) and the elapsed time meter, all the above components were purchased from Baynton Electronics Company, 2914 North 16th Street, Philadelphia, for $45.00.

* It is very likely that Baynton can also supply an elapsed time meter at substantially less cost.

Other Parts

7 Couple collars (Lafayette #33R1204 @ $.43)............... $3.01
7 Release or spring-back handle springs (local hardware
   stores @ c. 5¢)........................................... .35
12 Feet brass rod ¼" (hardware store - prices vary,
   averaging about 10¢ per foot)......................... 1.20
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Clamps (for artifact rods) Mueller 3&quot;, #25C, 75 amp. (Lafayette #32R3537, @ 40¢, or 30¢ in lots of 10)</td>
<td>10</td>
<td>$3.00</td>
<td></td>
</tr>
<tr>
<td>10 Clamps (for artifact rods) Mueller 2-7/16&quot; #27C, 40 amp. (Lafayette #32R3512)</td>
<td>10</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2 Feet brass bar stock, 1&quot; x 3/4&quot; (hardware item, usually sold by pound)</td>
<td></td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>2 Cartridge fuse mounts for 3 AB type fuses (Lafayette #13R1177, @ .45¢)</td>
<td>2</td>
<td>.92</td>
<td></td>
</tr>
<tr>
<td>1 Pack 12 volt, 30-32 amp. type 3 AB fuses (Lafayette #13R1209)</td>
<td>1</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td>1 2&quot; porcelain light receptacle (without switch) (for F-1)</td>
<td>1</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>12 Feet 2- or 3- wire #18 heavy duty insulation line cord</td>
<td>12</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>2 Heavy duty, DPST toggle switches (Lafayette #34R3335 @ $1.85)</td>
<td>2</td>
<td>2.70</td>
<td></td>
</tr>
<tr>
<td>2 Pilot lamp assemblies (Lafayette #32R2611 and #32R2613 or equivalent @ $1.80)</td>
<td>2</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>1 Chassis AC receptacle (for 0-1) (Lafayette #13R0904)</td>
<td>1</td>
<td>.15</td>
<td></td>
</tr>
</tbody>
</table>
Late in September 1748, Spanish ships sailed twelve miles into the Cape Fear River and attacked the little town of Brunswick, taking possession of all the vessels in the harbor and plundering the town for three days before being driven away by townspeople under the leadership of William Dry. During the rout of the invaders from the town, the Spanish ship Fortune blew up and sank in the harbor, killing captain Vincent Lopez and all of his officers.1

Probably as a result of this dramatic incident at Port Brunswick, His Majesty's Sloop Scorpion was stationed there by 1751 under the command of Captain John Russell. On October 31 of that year, William Moore of Orton Plantation, near Brunswick, sold 55 acres of land adjoining the northern boundary of Brunswick Town to Captain Russell for one pound per acre. It was on this land that Russell began to build his home.2 By April of 1753 the home was still incomplete, but Russell had died and the ownership of the property returned to William Moore. The following year Moore too was dead, and his executors, including William Dry, took over the property,3 now known as Russellborough, though it had likely not been occupied by Russell, being just the shell of a house.4

During these years there was no fixed seat of government in North Carolina, the records and assemblymen moving from place to place as each town competed to become the center of government. The executors of William Moore's will were interested in further development of Brunswick Town, not only as an official port of entry, but as the seat of royal government in North Carolina. With this in mind, they approached Royal Governor Arthur Dobbs, who was living in New Bern at the time, and offered him the 55 acres of Russellborough with its unfinished house for the sum of 5 shillings and one peppercorn, the latter to be delivered at the end of one year of residency on the property.5 This arrangement with the peppercorn was apparently an attempt on the part of the executors to retain some degree of control over the property for one year, and in doing so, insuring that Brunswick Town would be the seat of Colonial North Carolina Government for at least that period of time, and hopefully longer.

Governor Dobbs was approached at an opportune time by the gentlemen from Brunswick. His health was bad and he attributed this to the "augish" climate of New Bern. He wished for a healthier climate. Dobbs was also concerned over the high rent he was paying and so the offer of 55 acres plus the shell of a fine house at Brunswick looked good to him. Consequently he moved to Russellborough in 1758.6 Although New Bern and Brunswick were both coastal towns, equally subject to fevers and "ague", Dobbs felt that the move helped his health, and indeed it must have, for in 1762, when he was 73 years old, he married Miss Justina Davis, a fifteen year old maiden.7
With the move of Dobbs to Russellborough, the building was completed and several outbuildings were added. This home would be the residence of two royal governors for the next twelve years, resulting in a great increase in the political activity for the little town of Brunswick. During the years that Dobbs and his teen-age bride were living at Brunswick their residence was known as "Castle Dobbs" in reference to the Governor's ancestral home in Ireland.

In 1765 Dobbs died and "Castle Dobbs" went to his son, Edward Brice Dobbs, who sold it in 1767 to Royal Governor William Tryon for 300 pounds sterling, quite an increase over the 5 shillings and a peppercorn paid by his father for the property.

Within a month following the death of Dobbs in March of 1765, the new governor William Tryon moved into the home Dobbs had occupied. The first days were occupied by the governor and his. Tryon in renovating the house that was to be their home for the next five years. Tryon wrote a friend telling of his new situation and giving a description of his home, called "Castle Tryon" by a contemporary,\(^9\) the only such description of a Brunswick Town home yet found:

As you are acquainted with Mrs. Tryon's neatness you will not wonder that we have been pestered with scouring of Chambers, white washing of Ceilings, Plaisters work and Painting of the House inside and out. Such is the sickness and indolence of the Workmen in this hot Climate that I shall not, I am persuaded, get rid of these Nuisances this month.

This House which has so many assistances is of an oblong square, built of wood. It measured on the outside faces forty five by thirty five feet and is divided into two Stories exclusive of the Cellars; the parlor is about five feet above the surface of the earth. Each Story has four Rooms and three light closets. The parlor below and the Drawing Room are 20 X 15 feet each: Ceilings low. There is a Piazza runs around the House both stories of ten feet wide with a Ballustrade of four feet high, which is a great security for my little Girl. There is a good Stable and Coach Houses, and some other Out Houses. If I continue in this House, which will depend on Captain Dobbs's Resolution in the manner he disposes of his effects here, I shall and must build a good kitchen, which I can do for forty pounds sterling of 30f X 40f. The Garden has nothing to boast of except Fruit Trees, Peaches, Nectrs. Figgs and Plumbs are in perfection and of good sorts. I cut a Musk Melon this week which weighed 17\(\frac{1}{2}\) pounds.\(^{11}\)

In November of 1765 and again in 1766, the Lower Cape Fear area was the scene of violence as citizens arose in arms to protest the Stamp Act. Tryon's home was surrounded by five hundred "citizens in arms" as he called them and he was placed in virtual house arrest. These incidents were among the first in which armed resistance was used against the officers of the King by American colonists.\(^{12}\)
In April, 1769, C.J. Sauthier drew a detailed map of Brunswick Town showing "His Excellency Governor Tryon's House and Plantation". This map shows the main house at Russellborough and reveals that in 1769 there were eleven outbuildings associated with it. These buildings would include the stable and coach houses mentioned by Tryon in his description, and the kitchen he planned to build. The garden is shown with walks and the position of individual trees; to the south of the house a flag is flying on a flagpole. The low marsh area between the house and the river is extensively cut with canals to enable the growing of rice. This map will continue to be a valuable aid in the interpretation of this site.

In 1770 William Tryon moved to New Bern into the controversial "Tryon's Palace" and in January, 1771, he sold "Castle Tryon" to William Dry for 600 pounds.

William Dry, the port collector for Brunswick, was a man of some means. He called his house "Bellfont", and entertained men such as Josiah Quincy who said: "Col. Dry's mansion is justly called the house of universal hospitality." Although Dry was employed in the King's business, his politics was such that one visitor, after listening to Dry's views said: "He is deeply engaged in the new system of politicks, in which they are all more or less, tho Mr. Dry, the collector of customs, is the most zealous and talks treason by the hour." His views eventually resulted in his being removed from his official duties for the King, and he continued to devote his energies to the cause of the Revolution.

On April 5, 1776, the Virginia Gazette reported:

Captain Collett has lately committed divers acts of piracy and robbery. Amongst others he set fire to the elegant house of Col. Dry... destroying therein all the valuable furniture, liquors, etc....

With the burning of the house, its eighteen year period of occupation was sealed in the earth and fortunately, the site was never again occupied and this ruin, along with those of the town of Brunswick, was sold to Orton Plantation by the State of North Carolina in 1842 for $4.25.

During the Civil War, earthworks of Fort Anderson were built nearby but the area of the ruin of Russellborough was not disturbed. By the late nineteenth century the fields to the west of the area of the ruins of Russellborough were known as "governor's fields" but by then the site of the house had been lost in a dense jungle-like growth. James Sprunt, owner of Orton Plantation and historian of the Cape Fear area at that time inquired of an old slave as to the location of the home of Governor Dobbs or Governor Tryon. The old man answered that he did not know of those governors, but that he did know the location of the ruin of the house of "governor palace" and the old slave took Mr. Sprunt to the site of Russellborough.

By 1909, through the interest of Mr. Sprunt and the North Carolina Society of the Colonial Dames of America, the site of Russellborough was marked by a monument faced with small yellow Dutch bricks dug from the floor of one of the cellar rooms of the ruin. An access road was constructed to the monument across two corners of the ruin. A laborer involved in this work remembered seeing the mouth of a tunnel being revealed and that some of the workmen wanted to dig into the tunnel to look for treasure but Mr. Sprunt ordered that the tunnel be covered, explaining that some day someone might want to come and uncover the ruin to learn about the governors who
lived there, reflecting a most admirable attitude of the historian. Fifty years after seeing the tunnel, the laborer predicted to the archaeologist that a brick tunnel would be found when the excavation was carried out at the site of Russellborough.

When the excavation of Russellborough began in May, 1966, a number of pits dug by treasure and relic hunters could be seen, indicating that some disturbance of the context of the ruin could be expected. As excavation progressed however, it became apparent that these holes seldom reached sufficient depth to disturb the cellar floors or the plaster layer lying over them.

Removal of the brick and stone rubble from the area revealed a stone foundation wall two feet thick, measuring 36 by 44 feet with a central stone wall paralleling the long axis of the house. These two halves were bisected by a partition wall of yellow Dutch brick on one side and the charcoal remains of a wooden partition wall on the other side. These partitions resulted in the division of the ruin into four rooms. Ten feet from this central ruin and extending around it was a brick wall with engaged footings for columns, obviously the support for the "piazza" mentioned by Governor Tryon. With this porch foundation, the ruin measured 56 by 65 feet.

Excavation of the area between the porch wall and the foundation wall of the house yielded no artifacts of any kind except along the north side where thousands of fragments of wine bottles revealed the apparent location of the wine storage area beneath this part of the porch. In this deposit were 158 bottle seals impressed with "W.Dry Cape Fear 1766" providing dramatic evidence for the reference in the Virginia Gazette of April 5, 1766 which bemoaned the loss by fire of "the elegant house of Col. Dry... destroying therein all the valuable...liquors, etc...." By weighing a whole bottle and dividing this figure into the weight of all the bottle fragments recovered from this deposit, it was determined that at least 300 bottles were stored in this area of the cellar when the house was burned.

The floor of the northeast room of the cellar was found 18 inches below the surface of the ground and was paved with yellow Dutch bricks placed on edge. Extending into the room three feet from the north wall were two brick arms sixteen feet apart, probably representing supports for a wooden framework for the storage of barrels lying on their sides. The arms of a central chimney extended into the room from the south wall, in front of which was found the fragments of a very large storage jar that had been sitting beside the fireplace when the burning house fell. This jar has been restored, revealing the letters "IF" in a relief seal on opposite sides of the vessel. Similar jars have been recovered in Williamsburg, are known in the West Indies, and it is assumed that they are Iberian in origin. Also found beside this fireplace was an amphora shaped bottle, another rare type at Brunswick. The presence of a fireplace in this room would indicate that this cellar room was once probably used as a servant's quarters, although at the time of the fire it was not likely used for this purpose.

The adjoining room to the south also had a Dutch brick floor over most of the room. Many of the artifacts were recovered from this room in the layer of plaster from the walls that covered the floor in a thick white deposit. The fragments of a marble mantelpiece were lying with a flintlock musket and bayonet on the hearth in front of the arms of the fireplace.
The bricks forming the back of the fireplace were laid in a herringbone pattern, providing a clue to the quality of workmanship that went into the construction of the house.

Lying on the floor where they had fallen was a mass of wine bottle fragments, indicating that wine was stored here also. Lying together were two William Dry bottles, a pair of brass dividers, broken medicine bottles, one still containing medicine whose primary ingredient was lead, a whole porcelain teacup, and several straight razors. With these objects were cabinet hinges and cabinet door locks, indicating that these objects had been stored together in some type of enclosed cabinet. Nearby was a copper teakettle and the remains of four fire damaged grindstones. This room too, had apparently been originally designed as a servants quarters and may have been used as such at the time of the burning of the house.

The adjoining room to the west was floored with sand and also had two brick arms extending into the room as did the northeast room; probably also for the support of barrels of rum or wine placed on a wooden platform between these arms. Between these brick supports, the charcoal remains of what may have been this platform was found. In the northwest corner of the room a number of crucibles of varying sizes were found. Each will nest inside the other to make a set. Just why William Dry would have so many of these little vessels stored in his home provides food for conjecture. We know he was interested in copper mines in the western part of the state, and copper ore and metallic copper were also found in the ruin. Perhaps Dry was testing various ore samples. Also found in the room with these crucibles was a flintlock pistol.

The northwest room of the ruin was of particular interest because it was covered with a plaster floor whose surface was quite irregular. Several whole wine bottles were recovered here. Two feet from the north central part of the room a brick well was found. This well proved to be five feet deep with a two foot stand of water. Inside this well, an iron ring slightly smaller than the diameter of the well was found. It had hooks mounted around the ring at regular intervals; obviously a device for suspending objects inside the well for cooling and the wine bottles found in the well might indicate that this was one of the items being cooled there. In the corner of this room, barrel bands of iron were found lying, one inside the other, indicating that barrels were present here also. This room was probably connected with the wine storage area beneath the porch through an opening in the stone foundation wall at one time, but this opening was later sealed with small stones, using clay instead of cement as mortar. This room probably served also as the dairy for Russellborough.

As the northeast corner of the brick foundation for the porch support was being excavated, an arched row of bricks was seen forming part of the foundation wall. As more of this arch was revealed the mouth of a tunnel was seen. Immediately in front of the tunnel opening was a tabby object, twenty inches square at one end with a round, tapering hole throughout its 18 inch length. Just what this object was used for is unknown, though it might have been a liner for a water closet associated with the tunnel and the porch.
The area immediately in front of the mouth of the tunnel had been disturbed to a depth of the bottom of the mouth of the tunnel, and was filled with bricks and sections of the brick wall support for the porch. A fragment of modern red glass indicated that the mouth of the tunnel must have been exposed sometime during the 20th century but was re-covered. This fact correlated with the information provided by the old man who had seen the mouth of a tunnel at Russellborough in the early years of the 20th century. The tunnel mouth was located directly beneath the access road to the 1909 monument, and this fact would indicate that in order to construct this road over the edge of the ruin, parts of the brick wall had to be leveled to make room for the road, accounting for the disturbance of the soil near the tunnel mouth.

As excavation of the tunnel was carried out it was determined that the lower half was filled with quantities of artifacts such as wine glasses, plates, teacups, saucers, bottles, and a whole earthenware, olla shaped jar. The tunnel proved to be thirty feet long, sloping downhill toward the river, and resolving into an open brick-sided ditch at its opposite end. The floor of the tunnel was bricked and unmortared, whereas the arched overhead was constructed with lime-mortared bricks. Obviously this tunnel constituted some sort of drainage system from the cellar to the river, most likely a sewer for a privy located on the porch.

Forty feet north of the ruin of Russellborough a stone foundation wall could be seen standing two feet above the surface of the ground. Excavation of this ruin revealed a foundation of a building 32 by 52 feet, constructed of stone and brick, with an "L" on the south end. This building was shown on the 1769 map of Russellborough, and may represent the kitchen Governor Tryon said he planned to build sometime after 1765. Its interpretation as a kitchen is based on the fact that a foundation for a bake oven was found attached to a seven foot wide fireplace. An interesting feature of this fireplace was a bricked storage box at the left side of the hearth containing soot and ashes, apparently having fallen from higher up, from the level of the hearth itself, some distance above the excavation level. The function of this separate "soot box" beneath the hearth is not known. The kitchen was divided into three rooms, the central room having a small hearth, likely for supplying heat for the servants, whose quarters were probably located here. The northernmost room, with a brick foundation, was probably a storage room for supplies for the kitchen. A small section of Dutch brick flooring was found in the "servants quarters" room of this building.

Few artifacts were found in the area of the ruin itself, but directly to the east, on the downhill slope, a round pit outline was seen when the topsoil was removed from this area. This pit was only three feet across and one foot deep, but it contained an incredible amount of broken dishes and bottles. Fragments of broken china were so tightly packed into this pit that sand had not been able to sift between the broken fragments, leaving hollow spaces between the fragments. A total of 2,320 fragments of china were recovered, from which over 40 ceramic vessels were completely restored including teacups, saucers, sauce boats, chamber pots, bowls, plates, platters, pitchers, and jugs. Besides this unusual collection of objects there were two William Dry bottle seals, and 9 "Pyrmont.Water" bottle seals, and 163 pounds of bottle fragments. Using a whole bottle weight of 1.5 pounds, the total number of bottles in this pit would be 108. This compared
favorably with the count of 103 bottle necks, and 112 bottle bases
determined from fragments of these parts present.

Of the ceramic types recovered from this pit 55% were of white
salt-glazed stoneware, 20% were of creamware, and 7% were Oriental porcelain.
A surprising fact is that there were no fragments of mottled-glazed creamware
present, as one might have expected from a pit of this date. From the
presence of the 1766 bottle seals, and the fact that the site was sealed
in 1776, we know this group of artifacts dates during the ten year period
from 1766 to 1776. The fact that the objects were closely packed into
the pit in a solid mass of fragments would tend to indicate that this
deposit is the result of a mass breakage of china and bottles during
the occupation of the site, and that they were disposed of by throwing
them into the open hole at one moment in time. One restored teacup was
of blue transfer-printed ware with the "O" mark of the Worcester pottery,
the earliest transfer-printed ware yet found at Brunswick Town.

The contents of this pit, along with the artifacts recovered from
the tunnel and the ruin of the house and kitchen at Russellborough are
still being cataloged, processed and restored. The final results of this
excavation should prove of considerable value to archaeologists and
historians interested in this most significant ruin yet recovered at
Brunswick Town.

NOTES

1. South Carolina Gazette (Charlestown), October 31, 1748.
11. Copy of a letter from Tryon to Sewallis Shirley in the Bruce Cotten
    Collection in the University of North Carolina Library, Chapel Hill.
13. Sauthier, Plan of the Town and Port of Brunswick...1769 (a map) on file
    at the Department of Archives and History, Raleigh.
14. Dill, Governor Tryon and His Palace, p. 117.
16. Ibid.
17. Dill, Governor Tryon and His Palace, p. 119.
20. Virginia Gazette (Williamsburg), April 5, 1776.
23. Virginia Gazette (Williamsburg), April 5, 1776.
EXCAVATING THE ROYAL GOVERNOR'S MANSION AT BRUNSWICK TOWN

In May 1966 excavation began on the ruin of the once elegant home, which was for twelve years the residence of the Royal Governors of North Carolina. Built by Captain John Russell in the 1750's, and completed by Governor Arthur Dobbs in 1758, the home was known as Russellborough, Castle Dobbs, Castle Tryon, and Bellfont. After the death of Dobbs in 1765, Governor William Tryon resided here for five years until he moved to the more elegant Tryon Palace in New Bern. William Dry, collector for Port Brunswick made his home here from 1770 until it was burned in December 1775 or during the early days of 1776, a casualty of the Revolution. Dry's home, known as Bellfont, was said to be a house of universal hospitality, containing fine wines and elegant furnishings when it was burned.

Excavation revealed that the ground floor cellar was divided into rooms with floors made of Dutch bricks laid on edge. Lying on the floor of one room were the fragments of a vessel, broken when the flaming house collapsed. These were carefully uncovered and have been glued together to make a large jar, apparently of Iberian origin, with a raised seal on each side with the letters "I F". In the adjoining room on the floor in front of the fireplace the remains of a flintlock musket were found. Also in this room were large hinges and a massive lock for the door, with the brass key still in the keyhole. In the third room a large number of crucibles were recovered, five will nest to make a graduated set. These were used for melting metals by silversmiths, and why so many were in William Dry's home when it burned is not known. In another area of the cellar a mass of broken and melted bottles with numerous bottle seals marked "W Dry Cape Fear 1766" was found. Obviously the collection of wines and liquors of William Dry had been stored in this area.

Beyond these exciting finds a more interesting one was discovered in the corner of the foundation wall for the porch. This was the mouth of a tunnel leading in the direction of the river and filled with a wealth of wine bottles, plates and wine goblets, as well as a complete pottery jar, bone handled knives, and other fine museum objects dating from the period prior to the burning of the house. This deposit of artifacts is one of the most important ever discovered at Brunswick Town, promising to reveal many more pieces for the soon to be completed visitor center museum. As excavation continues during the summer the ruin will reveal more of its secrets locked for two centuries in the soil of Brunswick.
During the summer the excavation of the ruin of the mansion known as Russellborough, Castle Dobbs, Castle Tryon and Bellfont, was completed at Brunswick Town. One of the interesting features of the ruin, besides the Dutch brick floors and the tunnel to the river from the cellar, was a brick-lined well inside one of the rooms of the cellar. During excavation of the well a number of restorable bottles were found, but most interesting of all was a large iron band with an eye for suspension, with a number of hooks attached to the rim. This band was apparently used to hang bottles of wine, buckets of butter, or other items inside the cool well before serving. When completely excavated the well was only six feet deep, and stood almost half full of water, revealing the high water table beneath the house, and supplying a clue to the function of the tunnel as a drain.

In the southeast room of the cellar the remains of a burned cabinet were found. As the fire consumed the house and its contents the cabinet burned, leaving only the hinges and locks to reveal its position, along with its contents. Two wine bottles with "W Dry, Cape Fear, 1766" were lying side by side. Near-by were a group of straight razor blades, a pair of brass dividers, and a whole earthenware teacup, fragments of a patched porcelain teacup, a copper teakettle, and a medicine bottle with its contents still inside, objects once held inside the destroyed cabinet.

In the adjoining room a flintlock pistol was lying among the fallen plaster and charcoal and ashes from the burned West Indies style mansion, the first complete pistol yet recovered from the Brunswick Town ruins. As excavation progressed inside the northwest room, a whole bottle was found against the foundation wall of the house. This was the first whole bottle recovered at Brunswick, but this discovery was soon followed by the finding of several more whole bottles that had been thrown against the outside of the brick-lined well.

These objects and others recovered during the Russellborough excavation will be on exhibit in the visitor center-museum soon to be completed.

Stanley South, Archaeologist
N. C. Dept. of Archives & History

Figure 2
EXCAVATION OF THE KITCHEN AT RUSSELLBOROUGH

When William Tryon became royal governor of North Carolina in 1765, and moved into Russellborough, the governor's mansion at Brunswick Town, he wrote a friend telling of his plan to build a kitchen. Apparently the cooking for the mansion had not been done in a separate kitchen until this time. Tryon stated that "...I shall and must build a good kitchen, which I can do for forty Pounds sterling of 30f x 40f."

Forty feet north of the ruin of Russellborough a stone foundation wall could be seen standing two feet above the surface of the ground. Excavation of this ruin revealed a foundation of a building 32 by 52 feet, constructed of stone and brick, with an "L" on the south end. This building was shown on the 1769 Sauthier map of Russellborough, and may represent the kitchen Governor Tryon said he planned to build sometime after 1765. Its interpretation as a kitchen is based on the fact that a foundation for a bake oven was found attached to a seven foot wide fireplace.

The kitchen was divided into three rooms, the cooking and baking area, the quarters for the servants, and a storage room. Few artifacts were found in the area of the ruin itself, but directly to the east, on the downhill slope of the hill, a round pit outline was seen when the topsoil was removed from this area. This pit was only three feet across and one foot deep, but it contained an incredible amount of broken dishes and bottles. Fragments of broken china were so tightly packed into this pit that sand had not been able to pack between the broken fragments, leaving hollow spaces. A total of 2,320 fragments of china were recovered, from which over 40 ceramic vessels were completely restored, including teacups, saucers, sauce boats, chamber pots, bowls, plates, platters, pitchers and jugs. Besides this unusual collection of objects there were two William Dry bottle seals, and nine "Pyrmonti Water" bottle seals, and 163 pounds of bottle fragments. Using a whole bottle weight of 1.5 pounds, the total number of broken bottles represented would be 108.

In restoring objects from a pit such as this the fragments are first carefully washed, then the catalog number is written on each piece. They are then separated into piles according to types based on color, hardness, texture, design, etc., and then from these groups individual dish fragments are separated whenever possible. These selected fragments are then glued together. If pieces are missing when all glueing is completed these areas are filled with water putty. The restored sections are then painted to match the original color of the dish, and designs are completed whenever possible. The restored vessel is then ready for exhibit in the Brunswick Town Visitor Center-Museum.
INTERPRETING THE RUIN OF RUSSELLBOROUGH

During the summer of 1966 the ruin of the home of Royal Governors Arthur Dobbs and William Tryon was excavated at Brunswick Town. There is no known description of how the houses of Brunswick appeared in the eighteenth century, therefore the interpretation of the buildings has been carried out on the basis of archaeological information. At Russellborough, however, we have a description of the house from a letter Governor Tryon wrote to Sewallis Shirley on July 26, 1765. With this account and the archaeological floor plan, a most complete interpretation is possible. The foundation of the building measured 56 by 65 feet including a brick foundation wall for a ten foot wide porch on all sides of the house. The 1769 Sauthier map of Brunswick shows the steps for the porch on the north and the south side of the house. The Tryon letter, however, was valuable in that it revealed details as to the height of the porch and balustrade, and the fact that there was a porch around both floors of the house above the cellar. Tryon described Russellborough as follows:

This House which has so many assistances is of an oblong square, built of wood. It measured on the outside faces forty five feet by thirty five feet and is divided into two Stories exclusive of the Cellars; the parlour is about five feet above the surface of the Earth. Each Story has four Rooms and three light Closets. The Parlour below and Drawing Room are 20 x 15 feet each; Ceilings low. There is a Piazza runs around the House both stories of ten feet wide with a Balustrade of four feet high, which is a great security for my little Girl. There is a good Stable and Coach Houses, and some other Out Houses.

By combining this description with the archaeological foundation plan, plus what is known of the details of similar houses of the period, a model could be constructed that would be a close approximation of what the building looked like from 1753 to its destruction by fire in 1776. Such a model would be an aid in creating a conjectural drawing of the appearance of the building. With this in mind archaeologist George Demmy built a model utilizing the historical and archaeological information combined with knowledge of the evolution of the West Indies house style in the area. Included with the model was the kitchen, the ruins of which were also excavated in 1966.

Before sunrise the little model was placed on the bank of the Cape Fear River where the full-scale Russellborough stood two hundred years ago, and as the sun appeared over the horizon photographs were made by the archaeologists. These reveal a scene familiar to Governor Dobbs and his teen-age bride, and later to William Tryon and his little daughter, as on an early morning they watched the same sun as its dawn rays reflected in the Cape Fear and cast an amber glow on the porches of Russellborough, their home.

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George Demmy with the study model of Russellborough

Russellborough, home of royal governors on the Cape Fear

Figure 4
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A Preliminary Report on Excavations at the Site of the Camp of the Survivors and Salvagers of the Spanish Fleet of 1715

Carl J. Clausen

Introduction

In a paper given before this group last year, brief mention was made of the then-recent discovery by several amateur enthusiasts of an additional land site which appeared to be associated with the loss of the Spanish fleet of 1715. The site is located on the barrier island paralleling the southeast Florida coast approximately 35 miles south of Cape Kennedy. Some 1,500 - 1,700 feet further south is the Higgs site, IR-24, formerly BR-134 (Smith 1949) and BR-139 (Rouse 1951:212) which was discovered and reported on by Charles Higgs (1942: 25:39) and excavated by Hale Smith. On the basis of his finds there, Dr. Smith (1949:24) postulated that the Higgs site probably was a salvage camp associated with the loss of the 1715 fleet.

It is now apparent that this assumption was well founded. However, the Spanish camp evidently was considerably larger than previously thought, covering an area perhaps in excess of seven to ten acres. The Higgs site proper marks only the southerly end of the camp area, which runs intermittently for many hundreds of feet along the island.

The owner of the land, a retired Atlanta attorney now living in Vero Beach, Robert McLarty, was contacted. Soon realizing the historical value of the site, Mr. McLarty generously deeded some 300 feet of Atlantic Ocean frontage, containing a portion of the northern end of the Spanish camp, to the Florida Board of Parks with the provision that an archaeological survey be conducted and a museum erected on the land to relate to the public the history of the ill-fated fleet of 1715.

The museum, funds for which must be appropriated by the 1967 Legislature, is tentatively scheduled to be one of the new interpretive series erected by the Park Board in cooperation with the Florida State Museum, which will design and construct the displays. Funds for the archaeological survey of the land were provided by the Park Board through the Florida State Museum, which is supervising current excavations at the site.

Historical Background

On July 31-August 1, 1715, a fleet of Spanish ships, bound from Havana to Cadiz and loaded with the products of the New World, was destroyed by a hurricane in an area some 27 miles long just south of Cape Kennedy. According to the Spanish documents we have had translated, some 1,500 or so survivors gathered at a narrow point known then as the Barra de Ays.
Just offshore lay the northernmost wreck of the fleet, one of the capital ships, possibly the flagship of the flota portion of the convoy (Clausen 1966:78). Survivors from the other wrecks of the fleet strung out to the south had to pass by on their way to safety in St. Augustine. In this place the surviving admiral of the fleet, taking command, organized a camp and dispatched longboats to St. Augustine and Havana requesting aid. We know that St. Augustine responded with food and other necessities, also sending a group of Indians to forage for the castaways. A stockade was reportedly erected, apparently less for defense than for locking up errant survivors, some of whom had revolted, stolen treasure from the wrecked vessels and fled north.

As soon as practicable, most of the survivors were returned to Havana where they again took ship for Spain. At the site of the disaster, the difficult business of salvaging the valuable cargo and treasure carried by the fleet was begun.

We are led to believe that temporary storehouses and possible defensive positions were erected at the camp by the Spanish military who apparently were attacked on at least one occasion by English privateers from New Providence in the Bahamas.

The Site

The site was covered by a dense growth primarily of palmetto, sea grape and cabbage palm. Hand clearing preserved many of the useful trees on the site.

After gridding, mapping and surface collecting, the area was systematically surveyed with an induction detector for metals. Areas where contacts were concentrated were selected for testing. Because of persistent local rumors concerning cannon buried in the sand dunes near the beach, a proton magnetometer was used to survey that area, and, for control purposes, several other sections of the site. No cannon were found.

It was apparent from the rather large quantities of oyster shell exposed on the surface and in the considerable number of pits dug by treasure hunters, that there was, in addition to the Spanish occupation, a period of aboriginal occupation. Excavations confirmed this, indicating that for the most part, the Spanish occupation was represented, as might be expected by the temporary nature of the camp, by a thin veneer overlying in some cases apparently pre-contact shell midden deposits. In addition there was evidence, in the form of scattered glass shards and ceramic fragments, of a brief 19th century occupation.

In areas of the site where less shell occurred, the bulk of the European material was also encountered in the upper six inches. In all cases, aboriginal ceramics and shell artifacts were found in association with the European, although the quantity and type varied somewhat. For example, San Marcos type sherds, probably representing the Indian foragers from St. Augustine area mentioned in the translated documents, were always found in association with European material. Invariably both St. Johns and plain sand-tempered types were also represented in these same unit levels. Occasionally, European materials were found in association with the St. Johns and plain sand-tempered types but without the San Marcos pottery.
European materials recovered included a variety of forged spikes and nails, washers, fragments of barrel bands, and sherds of various types of coarse Spanish earthenware, particularly olive jars, and fragments of the heavy shipboard containers for water or oil. Several majolica types were present as were sherds of typical lead-glazed vessels, and Oriental porcelain. Also encountered were Kaolin pipe fragments, musket balls, small trade bells and fragments of fabric-marked sheet lead which may represent the lining from spice or tea chests. All of these materials, with the exception of the trade bells, have been encountered in the shipwrecks of the 1715 fleet.

Faunal remains ran particularly high, occasionally 50 to 100 identifiable examples from a single six inch level. It is anticipated that their analysis will provide information on not only the diet of the Spanish and Indians during their occupation but of earlier aboriginal occupations as well.

This is in every sense a preliminary report. We are still in the process of excavating and as yet have done little in terms of analysis. It is anticipated that a full report of the excavations and interpretation of the findings will follow this brief paper.

If plans become reality and an interpretive museum is erected on the site relating the exciting history of the 1715 fleet it should provide an interesting and possibly unique contribution to the Colonial Period History of Florida.

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From the Camp of the Survivors & Salvagers

Plate 1

Plate 2

Plate 3
Plate I  Aboriginal Pottery Types, IR-24
A. St. Johns Check Stamped
B. Glades and Belle Glade Plain
C. San Marcos Complicated and Cross Simple Stamped

Plate II  Miscellaneous European Ceramics, IR-24
A. Above: Fragment of Blue on White Majolica Deep Dish
   Below: Blue on White Majolica Bowl
B. Lead Glazed Ware Fragments
C. Blue on White Majolica Plate Fragments

Plate III  Miscellaneous European Material, IR-24
A. Clay Pipe and Stem Fragments
B. Lead Shot and Hawks or Trade Bell
C. Fragment of Fabric Impressed Sheet Lead
D. Left: Spirit Bottle Shards,
   Below: Small Ballast Stone
The Kaskaskia Indian Village Site
1700-1832

Gregory Perino

This was the last village of the Kaskaskia Indians, once the leading tribe of the Illinois Confederacy consisting of the Kaskaskia, Cahokia, Tamaroa, Michigamea, Peoria, and Moingwena tribes. These were Algonquian speaking peoples who in 1674 were living in North-Central Illinois, near the present town of Utica, across the Illinois River from Starved Rock, a pinnacle on which a group of these people were said to have been starved and exterminated by a war party of Iroquois. It was at this time, 1674, that Father Marquette established the mission of Immaculate Conception among them.

The Illinois were also constantly harassed by the Sioux, Fox, and other northern tribes, and it is probably on this account that they banded together. Early in 1700 the Kaskaskia wished to leave the confederation to join their French friends in Louisiana. Father Gravier was opposed to this movement and though he arrived at this post near Utica too late to stop them from leaving, he did check the blow which the deserted and indignant Peoria and Moingwena were about to inflict on them. Gravier influenced the Kaskaskia to halt their migration in southern Illinois at the mouth of the Kaskaskia River. There, they made their home near the French town of Kaskaskia, Randolph County, Illinois, until their removal to west of the Mississippi under the treaty of Castor Hill, October 27, 1832. In the treaty a single tract of land in Illinois was reserved for Ellen Ducoigne, the daughter of the chief, Jean Baptiste Ducoigne. He was the last chief of the Kaskaskia Indians, and probably died there prior to the Castor Hill Treaty.

In 1674, the Kaskaskia numbered more than 1500 men, not counting the women and children, which some sources say totaled 6500 individuals. About 1764, the Kaskaskia numbered 600 people. The murder of Chief Pontiac an Ottawa, at Cahokia courthouse in 1769 by a Kaskaskia Indian (some sources say a Peoria) provoked vengeance of the lake tribes on the Illinois and a war of extermination began. In 1778 they had been reduced to 210 individuals, greatly degenerated and debauched. Some of the reduction of course was due to Frenchmen marrying Indian women, but the offsprings were considered French, thus increasing the French population, but reducing the Indian population.

After the treaty of Castor Hill, the survivors, represented by the Kaskaskia, and Peoria left their lands in Illinois and went to northeastern Oklahoma where they were consolidated with the Wea and Piankashaw. By 1885, all these people numbered 149, most being mixed bloods.

The Kaskaskia Indian village site is located three (3) miles northeast of the historic French town of Kaskaskia and is on the north side of the Kaskaskia River, midway between the bluffs and the Mississippi River. J. Dan Will was the first to collect from the site having hunted it for fifty years. He was born on a farm near the site and lived there sixty-four (64) years. His great-grandmother was a Kaskaskia Indian. Mr. Will made the collection in the fifty years prior to 1935 in which time he gathered a mass of materials. These consist of French gun flints, bits of glass bottles,
thousands of glass beads, many triangular flint arrow points, copper ornaments, lead bullets, metal crucifixes, holy medals, hammered lead discs, discs made of limestone or crockery, trade axes, pipes and pipe fragments, Catlinite ornaments, Catlinite mauls, brass buttons and buckles, occasional small silver ornaments, brass Jews harps, sheet brass or copper cones, a large steel spearhead, an antler powder charger, several gun parts, and clasp knife blades.*

Virtually all the gunflints were of French manufacture, made of amber-colored flint, and of the bulb of percussion type rounded on one side. A few were made of native flint, and one or two were made of English flint and of a late type. Glass from the site was from French wine bottles, amber in color. Beads were also made of glass. They were imported from the bead factories near Venice, Italy, and were of many types. The most outstanding were the large milky glass beads, some large as marbles, varying from 3/8 of an inch to 3/4 of an inch in diameter, and the smaller, elongated or tubular white glass beads having rows of blue stripes lengthwise or spiraled lengthwise. These are 1/8 of an inch in diameter and 3/8 to 5/8 of an inch in length having rounded ends. Another well known bead type is the "Cornaline d'Alleppe". In shape, they may be short, tubular, and oblate spheroidal, and vary in length from about 1/8 to 1/2 of an inch. They are made of two distinct colors of glass, one inside the other (a cored bead). The outer layer is always opaque red. The interior portion, exposed at both ends of the bead, is transparent but has the appearance of being black, until it is held close to a light, and the true color...a greenish shade, can be seen. Perhaps the most popular, or at least, most abundant beads on the site are small and made of white glass and are called "porcelain beads". Many of these were seed beads. Those that are larger are round or tubular in form and up to 5/16 of an inch in diameter and from 1/8 to 1/2 of an inch in length, the elongated beads being rounded on the ends. Another early bead type is predominantly blue in color, although a few have been found made of clear or yellow glass. These are crudely and unevenly faceted, the facets on one side extend beyond the center and the facets on the opposite side alternate with them. Such beads range from 5/16 of an inch to more than 1/2 of an inch in diameter. Of the same period, there are smaller blue glass beads either short or long of about the same sizes as were found in the porcelain beads. Among the rarer beads are round, flat amber-colored beads that look like goosberries having internal stripes, some spiraled, and beads of clear glass having nodes on them so that they look like blackberries. After 1800 evenly faceted (with opposed facets) beads, mostly made of blue or clear glass, but sometimes red or green, began to appear on the site in limited numbers. This is by no means the entire list of bead types found on the site, but they are the more important, abundant, and earlier types.

* The collection was given to Mr. A.J. Throop by Mr. Will, and Mr. Throop presented it to the Gilcrease Institute, Tulsa, Oklahoma, where it may be studied by students of historic archaeology.
Many arrow points were found; most being made of white, pink or gray flint. They are triangular in shape and have straight or convex sides. One point is made from a French gunflint and two are made from wine bottle glass. Metal points were extremely rare. Those found, are triangular or stemmed and made of sheet copper or brass.

A few ornaments were made from brass gun parts, but most were made from sheet copper or brass, Catlinite, and a few from sheet silver. Silver ornaments seem to have been cut from figured objects such as snuff boxes. Sheet copper or brass ornaments no doubt were made from copper or brass kettles as kettle bail loops occur on the site attached to kettle fragments. These ornaments are triangular in shape, have a suspension perforation in one corner, and have a scalloped, bifurcated or trifurcated side opposite the hole. The latter two are reminiscent of the weeping eye design used in prehistoric times. Conical sheet copper or brass objects sometimes worn on strands of hair were also found. Similar objects having closed ends, but larger may have been projectile points.

Round lead balls, including buckshot were commonly found on the site together with fired and mutilated balls, sprues and lead scrap. A class of artifact for which we have no known use are made from round, lead balls flattened into discs about 1½ inches in diameter, having a central perforation. One similar disc was made of sheet copper, also perforated in the center. Some of the lead discs were toothed on the edge.

Another type of disc was made of limestone or crockery. The limestone discs were quite common, averaging ⅝ of an inch thick and 1⅝ inches in diameter. Only one was perforated. The others had center marks on one side. Ceramic discs are smaller and unperforated, being made from dish fragments. One was made from a fragment of Spanish olive jar.

Holy medals were made of brass and probably given to the Indians by the Catholic priests. Small crucifixes were made of lead, sand cast or made in Catlinite molds. Catlinite molds were also used for making circular ornaments or buckshot. Iron tools were rarely found on the site, but when present, consisted of axes, hatchets, adzes, and iron celt, and an iron spearhead. Gun parts were extremely rare, consisting of lock parts, particularly hammers and frizzens. Items made of brass include Jews harps, buckles and buttons, but none were found in quantity.

Perhaps the most interesting artifacts were the two (2) types of pipes found. One type was the Mic Mac pipes made of Catlinite or limestone, and only one made of pewter. The other was the early, small L-shaped pipe usually having a web in the angle, made of baked clay, limestone or Catlinite. Mic Mac pipes were often found unbroken, but the L-shaped pipes were always found in fragments. If the bowls of either kind of pipe were still intact, the Indians used them by relocating the stem holes and plugging other perforations with lead. Both the Mic Mac pipes and the L-shaped pipes were sometimes embellished with lead or pewter inlays and this may have set the trend for the manufacture of later inlaid stone pipes found on the plains.
The two (2) pipe types represented at the Kaskaskia site may indicate the presence here of at least two (2) tribes, the Kaskaskia and the Peoria, the pipe types indicating their having northern antecedents. It is not known which had the Nic Mac pipes and which utilized the L-shaped pipes.

An item not yet discussed are the clasp knife blades, but these will be listed in the following table. Since these blades were found early and subsequent finds at the site may not be legible, the names of makers of the blades herein reported may be all that will be procure from the site, hence they are of historic importance.
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APPENDIX
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Papers Presented at the Sixth Annual Conference on Historic Site Archaeology November 11, 1965 at Ocmalgee National Monument, Macon, Georgia that are not Included Herein
(In the order presented)

Marwitt, John P., "Archaeology at Fortress of Louisbourg - A Progress Report"
Symes, Martha I., "Searching for the Old Spanish Road"
Smith, Hale, "St. Joseph's Peninsula Spit Spanish Site"
Peeples, Christopher S., "Early Seminole Sites Along the Suwannee"
Walker, Iain, "Excavation with a Backhoe"
Clausen, Carl, "Salvage Archaeology on the 1715 Plate Fleet Wrecks - Second Season"
Dean, Jesse J., "The Ultrasonic Cleaning of Metal Artifacts"
Fairbanks, Charles, "Indian Made Silver Beads from Florida"
Clausen, Carl, "Locating Historic Wrecks with a Proton Magnetometer"
Kelly, A.R., "Priest Houses on the Bell Field Mound, Carter's Dam, Georgia"

Papers Presented at the Seventh Annual Conference on Historic Site Archaeology November 3, 1966 at Avery Island, Louisiana that are not Included Herein
(In the order presented)

Huscher, Harold A., "Okfuskenena, The Burnt Village (9FF9) An Eighteenth Century Lower Creek Site on the Chattahoochee River"
Stone, Lyle M., "Anthropology, History and Historic Sites Archaeology"
Cleland, Charles, "Comparison of the Faunal Remains from British and French Refuse Pits at Fort Michilimackinac; a Study in Changing Subsistence Patterns"
Kirk, Glenn, "The Wetherburn Tavern Excavation Findings 1965-66"

The above papers are not included in this volume because some are to be, or have been, published elsewhere. Others were in the form of progress reports for which no formal paper was prepared. They are presented here in the order in which they were presented at the conferences as a matter of record.
A List of the Published Papers of The Conference on Historic Site Archaeology

The First and Second Conferences 1960-61


Available from: Out of print.

South, Stanley A., "The Ceramic Types at Brunswick Town, North Carolina"
Hudson, J. Paul, "English Glass Wine Bottles of the 17th and 18th Centuries"
Fairbanks, Charles H., "European Ceramics from the Cherokee Capitol of New Echota"
South, Stanley A., "A Method of Cleaning Iron Artifacts"
Binford, Lewis R., "A New Method of Calculating Dates from Kaolin Pipe Stem Samples"
South, Stanley A., "Kaolin Pipe Stem Dates from the Brunswick Town Ruins"
South, Stanley A., "Salvaging Seals from the Earth and the Archives"
Webb, Clarence H., "Early 19th Century Trade Material from the Colfax Ferry Site, Natchitoches Parish, Louisiana"
Powell, B. Bruce, "Classification of Ceramics from Historic American Sites"
Cotter, John L., "Perils and Pleasures of Historic Sites Archaeology"
Binford, Lewis R., "A Discussion of the Contrasts in the Development of the Settlement at Fort Michilimackinac under British and French Rule"
Williams, Stephen, "Historic Archaeology in the Lower Mississippi Valley"
Fairbanks, Charles, "Late Creek Sites in Central Alabama"

Third

The Third and Fourth Conferences 1962-63


Available from: Dr. Charles Arnade, Treasurer, Florida Anthropological Soc.
Price: $1.50 Department of History, University of South Florida, Tampa.

Dunton, John V.N., "The Conservation of Excavated Metals in the Small Laboratory"
Fairbanks, Charles H., "Underwater Historic Sites on St. Marks River"
Noël Hume, Ivor, "Historic Archaeology in Virginia 1961-1962"
South, Stanley A., "Interpreting the Brunswick Town Ruins"
Neitzel, Robert S., "The Natchez Grand Village"
South, Stanley A., "Some Notes on Bricks"
Morrell, L. Ross, "Two Historic Island Sites in the Coosa River"
Green, Dee F., and Larry Bowles, "Excavation of the Mormon Temple Remains at Nauvoo, Illinois: First Season"
Larrabee, Edward McH., "Industrial Archaeology in Great Britain"
Fourth

Hudson, J. Paul, "Seventeenth Century Glass Excavated at Jamestown"
Long, George A., "Excavations at Panama Vieja"
Fairbanks, Charles H. and Charles J. Fleener, "The Trial Ethnohistory Project at the University of Florida"
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Lazarus, William C., "A Sixteenth Century Spanish Coin from a Fort Walton Burial"

The Fifth Conference 1964


Available from: Dr. Charles Arnade, Treasurer, Florida Anthropological Soc. Price: $1.50

Noël Hume, Ivor, "Excavations at the Amelung Glass Factory in Maryland"
Gregory, Hiram A., and Clarence H. Webb, "European Trade Beads from Six Sites in Natchitoches Parish, Louisiana"
South, Stanley A., "Excavating the 18th Century Moravian Town of Bethabara, North Carolina"
South, Stanley A., "Anthropomorphic Pipes from the Kiln Waster Dump of Gottfried Aust - 1755 to 1771"
Foley, Vincent F., "Historic Sites Investigations in Bethlehem, Pennsylvania"
Foley, Vincent F., "Another Method for the Treatment of Ferrous Artifacts"
Lazarus, William C., "A Study of Dated Bricks in the Vicinity of Pensacola, Florida"
Fontana, Bernard L., "The Tale of a Nail: On the Ethnological Interpretation of Historic Artifacts"
Wilson, Rex L., "The Search for Jackson's Mud Rampart"