archeological investigations

august 1984

HOPEWELL VILLAGE

IRONMASTER'S HOUSE



NATIONAL HISTORIC SITE / PENNSYLVANIA

ARCHEOLOGICAL INVESTIGATIONS OF THE IRONMASTER'S HOUSE HOPEWELL VILLAGE NATIONAL HISTORIC SITE PENNSYLVANIA

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ACKNOWLEDGEMENTS

Archeological investigation of the Ironmaster's House presented some special problems in that most of the deposits requiring investigation were beneath wood flooring which had to be replaced following the excavations. Investigation of these areas also necessitated restricting the normal visitor access to the "Big House." Superintendent Elizabeth Disrude, whose special concern for the resource was inspiring, was very patient and understanding as we methodically dismantled portions of the flooring.

Special thanks go to Mike Johnson, Bill Lutz, and Wilhelmine Melizzi, who were most helpful in providing logistical and administrative assistance. Charles Siedel generously extended to us the use of special tools and equipment.

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Sharon Dooley	Larry Childs	Jean Harris
Linda Grand	George Myers	Bill Jonas
	Louise Schmidlap	

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MANAGEMENT SUMMARY

The Ironmaster's House at Hopewell Village National Historic Site was recommended for major structural preservation and rehabilitation under National Park Service Development/Study Proposal No. 102-B in August 1977. The historic structure report generated by this proposal revealed that the most critical problem affecting the Ironmaster's House was "an excessive amount of moisture in the basement rooms caused by water vapor rising from the earth floor and condensation on the walls" (Dessauer 1978:46). In addition, the west porch was suffering from rot in the timbers, at least partially due to poor drainage away from the porch. Installation of a moisture barrier and an underground drain system, insulation of affected walls, and installation of concrete pads beneath existing historic floor fabric were the actions recommended to prevent excessive moisture and humidity in the basements. Regrading of the soil beneath the west porch was determined essential to preventing further deterioration of the porch. Implementing the measures to correct these conditions required extensive disturbance to soil deposits in these areas. Accordingly, an archeological investigation was designed (appendix) to determine the presence of buried cultural resources which would be affected by these two aspects of the rehabilitation.

Prior to the archeological investigations and structural rehabilitation of the Ironmaster's House, all proposed actions were reviewed by the State Historic Preservation Office and the Advisory Council on Historic Preservation, in accordance with Section 106 of the National Historic Preservation Act of 1966. Approval to proceed with the archeological investigations was received July 11, 1978.

The archeological investigations were conducted by the author and crew from July 11-29, 1978. A preliminary report of these investigations (Marie 1978) was distributed in August 1978.

The project scope of work stated two primary goals of the 1978 investigation: (1) to locate, record, and evaluate archeological resources

which would be disturbed by the preservation of foundation walls, basement floors, and the west porch of the Ironmaster's House; and (2) amend the existing history of the Ironmaster's House based on the interpretation of the archeological evidence, including analysis of the quality, quantity, and distribution of cultural debris recovered from the site.

Three primary areas were partially investigated to determine the presence and significance of cultural resources: (1) deposits beneath the existing floors of the north, south, and east wing cellars; (2) deposits beneath the west (front) porch; and (3) deposits within, and north of, the areaway. Site conditions and available time with which to complete the investigations dictated that only certain of the goals outlined for each area in the original scope of work could be satisfied.

The 1978 archeological investigations indicated the presence of significant cultural resources in the moulder's kitchen and under the west porch, and additional excavation was necessary in these areas prior to beginning the rehabilitation. In addition, the structural stability of a buried cistern and drain exposed in the north and east areaways (Abel 1964) required reexposure and evaluation of their present utility in the areaway, as well as any potential hazards their presence below grade might present. Consequently, in June 1979, additional excavations were conducted in the north and east areaways, south of the southern extent of the 1978 excavations under the west porch, and in the north half of the moulder's kitchen. These investigations were conducted under contract to the National Park Service, Denver Service Center by Wapora, Inc. The preliminary findings presented by the principal investigator (Righter 1979) added substantially to the information recovered in 1978, and the interpretations and recommendations offered in this report are based on the information reported by Righter as well as the completed analysis of the information recovered during the 1978 investigations. In addition, the information found in reports of archeological investigations and other historical studies conducted in the park since 1941 have been integrated into this report when applicable.

North of North Areaway

The sequence of deposition north of the north areaway wall indicates that original grade rests more than 4.5' below existing grade. Two lead pipes were uncovered running parallel to the north areaway wall. The 1" diameter pipe may be the continuation of the 1" lead pipe at the north side of the north wing (Cotter 1959). Both pipes north of the north areaway may have been installed in conjunction with the bathroom addition to the Ironmaster's House c. 1868-71.

Recommendations: additional limited archeological testing will not provide substantial new data for this area. The original occupation level is more than 4.5' below present grade and complete excavation is uncalled for unless extensive disturbances are planned in this area. However, since evidence of this original occupation level certainly lies north of this wall, future disturbances to this area should be accompanied by archeological investigations which will retrieve as much of this information as possible. Archeological excavation to completely expose these levels prior to the trenching to install a new drainage system would disturb a much more extensive area than the utility trench itself. Therefore, trenching north of the wall will be monitored by an archeologist who will trace and record these levels as they are exposed.

Cellar of the North Wing

Archeological investigation in the cellar of the north wing identified probable historic grade and floor fabric as a thin mortar floor 2" to 3" below existing grade; recorded selected wall junctures below cellar grade; and recorded the depth and dimensions below cellar grade of selected walls. Debris or features indicative of the original function of this cellar were not uncovered.

Thinly stratified, hard-packed layers of silt above the mortar floor in the cellar appear to have accumulated as a result of periodic flooding

which washed silt into the cellar through the north areaway and light vents in the north and west walls.

A few small sherds of pearlware and glass were recovered along the base of the east and center walls of the cellar but these were found in areas of rodent disturbance. It was not possible to date the installation of the mortar floor by association with the nondiagnostic window glass fragments found on its surface, and mortar analyses of a floor sample were inconclusive. The interpretation of the mortar surface as an historic floor derives from the fact that it is not a modern composition cement, and the observation that it is the earliest cultural level in the cellar, resting on sterile sandstone bedrock.

Recommendations: considering its potential historic origin, disturbances to this mortar floor should be avoided. The deteriorated condition of the floor where it was exposed by archeological tests indicates that it probably could not support regular use and exposure to the atmosphere in the cellar. If it becomes necessary to install a new floor in this cellar, it is recommended that rather than replace the mortar floor, the new floor be installed above it.

Cellar of the South Wing

A single excavation unit was opened in the south cellar. The depth and dimensions below grade of the north, east, and south wing walls which meet at the northeast corner of the room were recorded. Examination of this joint below grade supports the interpretation based on other architectural evidence that the north wing was constructed first, followed by construction of the east, and then the south wing. Although several possible posthole stains were exposed, the small area exposed by this excavation unit did not allow extensive interpretation of the evolution of this area before and after construction of the south wing.

Recommendations: cultural resources relating to the use of this area prior to construction of the south wing may remain below the concrete in

this cellar. This concrete floor apparently dates to at least 1965 (Souder 1965:4), but it is apparently sound and need not be disturbed by rehabilitation in the near future. However, additional archeological testing beneath the concrete will be necessary prior to making a determination as to the presence and significance of archeological resources here. Therefore, it is recommended that removal of the concrete in this room be accompanied by archeological monitoring. Any disturbances to the soil beneath the concrete should be preceded by archeological investigation.

Moulder's Kitchen and Dining Room

The investigations in the moulder's kitchen and dining room exposed and recorded the foundation of the west wall of the kitchen and the north and south walls of the dining room and kitchen indicating the construction of these two rooms as a single unit. The depth, dimensions, and alterations to the foundations below grade were recorded. Original grade and floor fabric in the kitchen was identified as a thin mortar floor 2" to 3" below the soil. Remnants of a former stone wall were found inside the limits of the moulder's kitchen. Three coins recovered from the historic backfill burying this former wall and the builder's trench to the east wall of the east wing, indicate the destruction of this former wall and construction of the east wing after 1825.

Approximately half of the moulder's dining room was excavated to sterile deposits in 1978. The only historic feature uncovered was the builder's trench and spread footing along the foundation walls. Some debris probably remains scattered in the soil in the area not investigated. However, analysis of the soil and debris recovered from the east wing in 1978 indicates its origin as late nineteenth century fill to help support the floor sleepers. Although the soil in the cellar was apparently brought in as part of an historic activity, the cultural debris in the soil was not originally deposited beneath the basement floor as a result of day to day activities in the moulder's kitchen and dining room. Therefore, any remaining debris in the dining room may be removed without loss of significant archeological information. Since the 1979 archeological

investigations resulted in complete investigation of the historic features exposed in the kitchen during 1978, rehabilitation of the east wing cellar may proceed without further archeological investigation.

West Porch

Excavations under the west porch extended from 1' south of the north end of the porch to 23' south. Features and deposits associated with the original and successive porch configurations were exposed and recorded. Porch wall dimensions were recorded and the relationships of these walls to each other and the west side of the house were interpreted. A builder's trench was not found for the original north wing on the west side. The juncture of the north and south wings was exposed and recorded. The impact of the construction of the south wing on the deposits beneath the west porch was interpreted. Significant features exposed beneath the west porch include a retaining wall associated with the north wing prior to construction of the south wing, traces of the original window well for the light vent on the west side of the north wing, and a spread foundation beginning just below existing grade along the west side of the north wing.

Recommendations: the grading of the surface beneath the west porch is not to exceed a maximum of 6" to achieve adequate drainage away from the walls and light vents. The north half of the west porch has been adequately tested to determine that 6" of disturbance will probably not affect significant archeological resources. However, some grading may also be necessary northwest of the northwest corner of the porch, an area which has not been archeologically tested. In addition, limited investigations beneath the south half of the west porch indicate archeological evidence of the original use of the site of the south wing, and features and debris related to the construction of the south wing, about 1' below the present surface (Righter 1979:13-5). Therefore, an archeologist must be on site to monitor the grading at the west porch to insure that significant cultural resources are not disturbed. Since significant cultural resources do remain beneath the west porch, future

disturbances below the newly graded surface should be preceded by archeological excavation.

In summary, the archeological investigations revealed that grade at the west and northeast sides of the Ironmaster's House has changed considerably as a result of construction of the west porch and the east and south wings. Present grade at the west side of the house under the west porch dates to about 1870 and the final enlargement of the west porch. Grade north of the north areaway wall approximates grade c. 1868-71 just after installation of the lead pipes which probably served the upstairs bathroom. However, original occupation levels are much lower in both these locations. Original grade under the north half of the west porch is 2'-3' lower than present. The original occupation level recorded by Motz (1941:8-9) east of the east areaway wall most likely represents the same occupation level which is certain to exist below 4.5' of fill north of the north areaway wall. These original occupation levels north and east of the areaway were probably initially buried beneath yellow sandstone and red clay excavated from the site of the east wing. The original construction and later alterations to the bake ovens, and archeological tests conducted east of the east areaway in search of the smokehouse, have certainly affected the integrity of original deposits in this area (Cotter 1979).

INTRODUCTION

DETAILS OF LOCATION

Hopewell Village National Historic Site is located on the border between Berks and Chester counties in the rolling hills of southeastern Pennsylvania (Fig. 1). The village is nestled between the Schuylkill and Conestoga valleys with elevations ranging from 450' to 925'. Hopewell lies on the edge of a meadow drained by French Creek, where it flows between Mount Pleasure and Brush Hill. The Ironmaster's House is at the northeast corner of the village, situated against the base of a hill about 496.66' AMSL (Fig. 2).

Naturally occuring soil deposits at the site of the Ironmaster's House are part of the Triassic Lowland beds of metamorphosed sandstone, shale, and conglomerate which are usually red. However, yellowish grey metamorphosed sandstone supports all three wings of the Ironmaster's House, and together with naturally occurring red clay, is found redeposited in varying degrees as part of culturally disturbed or created deposits around the house.

A tributary of the Schuylkill River, French Creek abounds with a variety of fish including: brook trout, creek chub, trout perch, sucker, sunfish, yellow perch, crappie, bluegill, catfish, eel, and largemouth bass. Whitetail deer, ruffed grouse, Canada goose, fox, marmot, mink, oppossum, cottontail rabbit, raccoon, skunk, and squirrel are the principal wildlife species to be found in the vicinity of the village today. Historically, beaver, bobcat, and black bear were also found in the area. The surrounding vegetation is primarily southern hardwood forest of oak, tulip poplar, red and sugar maples, and yellow birch. American plaintree, walnut, butternut, and hickory are also known from the historic village.

Of these natural resources, the fast flowing water, and abundant forest played a significant role in the history of Hopewell Village.

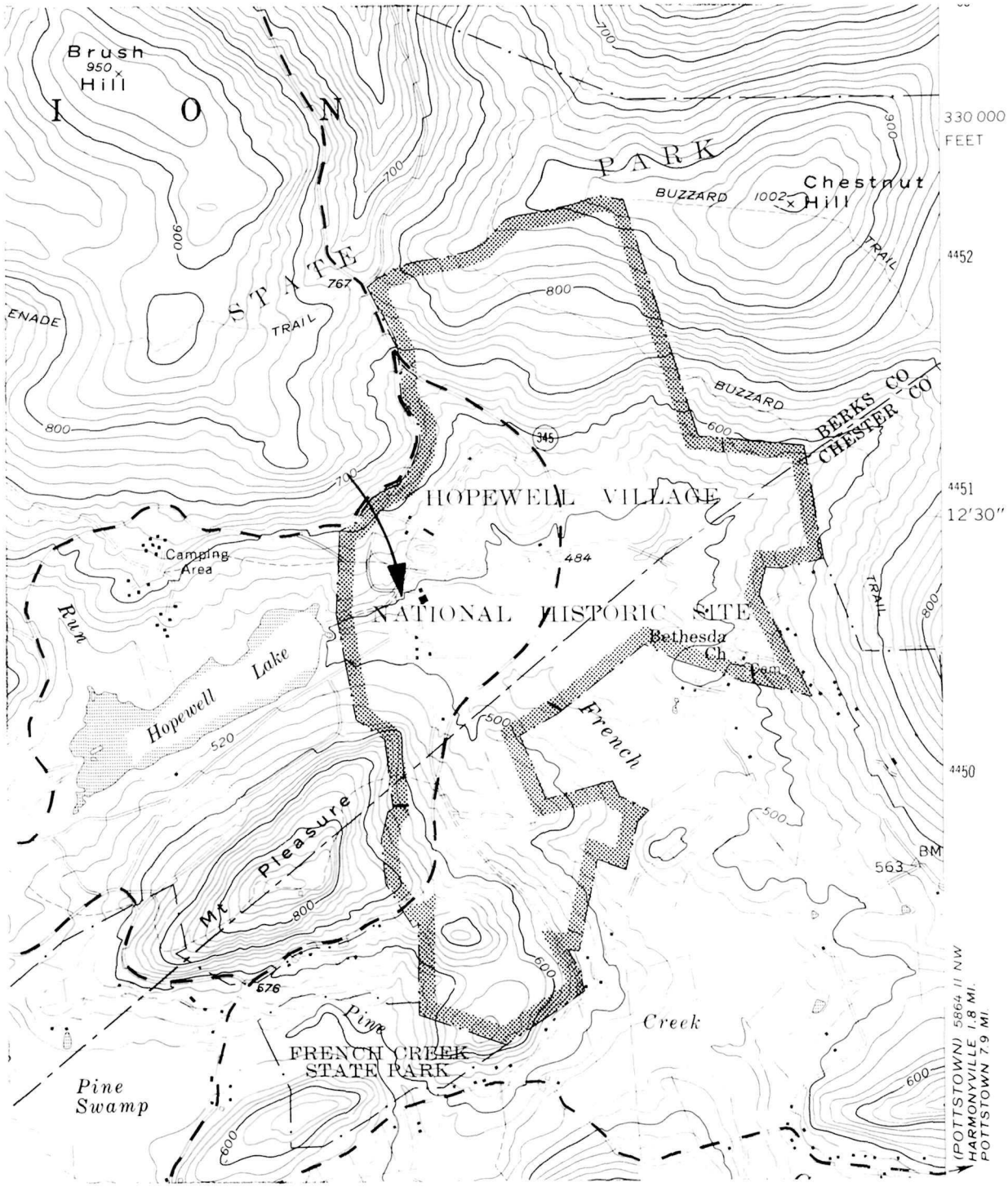


Fig. 1: U.S.G.S. Topographic Map, 7.5 Minute Series, Elverson Quadrangle. UTM coordinates of the Ironmaster's House (indicated by arrow), Hopewell Village National Historic Site: Zone 18, 434, 50E and 44,50,650N.

BUILDING LIST

1. IRONMASTER'S MANSION
2. BARN
3. FURNACE OFFICE - STORE
4. WAGON SCALES
5. HOG PEN
6. BLACKSMITH SHOP
7. HOPEWELL FURNACE
8. WHEEL HOUSE
9. CHARCOAL HOUSE AND SHED
10. BRIDGE HOUSE
11. ANTHRACITE BURNING FURNACE
12. ICE AND SUMMER HOUSE
13. GREEN HOUSE
14. GARDENER'S TOOL HOUSE
15. MANSION PRIVY
16. BAKE OVEN?
17. SPRING HOUSE
18. SCHOOL HOUSE
19. TENANT HOUSE (NO.1)
20. TENANT HOUSE (NO.2)
21. TENANT HOUSE (NO.3)
23. TENANT BARN
24. BOARDING HOUSE
33. CASTING HOUSE
34. ORE ROASTER
35. WHEELWRIGHT SHOP
38. CUPOLA
39. BRICK HOUSE (KILN)
41. SMOKE HOUSE
82. WATER WHEEL - BLAST MACHINERY
90. STROUCK HOUSE
92. CLEMANT HUGHES HOUSE
93. CARE LOG CABIN
94. CLEANING SHED
95. BATH HOUSE
96. NORTH - SOUTH WHEEL PIT

LEGEND

- STONE WALL
- UNDERGROUND RACE
- —I—I— POST AND RAIL FENCE
- --PR-- PICKET OR RAIL FENCE
- OPEN PILES
- BUILDING EXISTING 1830 - 1840
- BUILT AFTER 1840

BRUSHY HILL

NOTE: DETAIL OF HISTORICAL GARDENS TO BE SHOWN AT A LATER DATE

BASIC DATA

VILLAGE MEADOW

CEDAR PASTURE

MEADOWMINK ROAD (PRIVATE)

1827 TO COVENTRY FORGE

1825 TO BIRDSBORO

1804 TO HOPEWELL MINE

1804 TO BIRDSBORO

1809 TO JONES MINE

EAST HEAD RACE

WEST HEAD RACE

TAIL RACE

DITCH

FORD

SCOTT'S RUN (NOW FRENCH CREEK)

PRIVATE ROAD TO DAM

N.500,750

N.500,250

N.500,000

N.499,750

N.499,500

E.500,250

E.500,000

E.499,750

E.499,500

VEGETABLE GARDEN

MANSION GARDEN

VINEYARD - RASPBERRIES

BEE HIVES

FLOWERS

VEGETABLES

WALL LOCATION UNCERTAIN

GATE

STONE STEPS

BULL RING

IRON ORE

SLAG

GARDEN

BARN

PRIVY

BAKE OVEN

WO

CHARCOAL HEARTH

VEGETABLE GARDEN

SCARLET'S MILL

BARN (BUILDING 2) STAGES PER N. CARE JR.

1 2 3 4 6

80 40 0 80 SCALE 1"=80'-0"

See documentation for historical base map June 5, 1956 Historian - Russell A. Apple

This enlarged 2x from drawing no. NHS-HV-3000 A

50 30 10 0 50 100 FEET

SCALE: 1"=50'-0"

HISTORIAN Russell A. Apple

DATE July 26 1956

RECOMMENDED

APPROVED

DATE

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DIVISION - DESIGN & CONSTRUCTION
PREPARED BY
EASTERN
OFFICE

HISTORICAL BASE MAP - VILLAGE AREA 1830-1840
TITLE OF DRAWING
PART OF THE MASTER PLAN
LOCATION WITHIN AREA
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
NAME OF AREA

ORIENTATION REVIEWED

OPERATIONS REGION

WASHINGTON

INTERP. REGION

WASHINGTON

COOP. ACTV. REGION

WASHINGTON

DES. & CONST. EASTERN
A.
E.
L.A.

WASHINGTON
A.
E.
L.A.

OTHER

PREPARED
E.O.D.C.
DESIGNED
BONNET
DRAWN
HANSON
CHECKED

REVISED
DATE | INITIAL

REGION 5

PCP

SHEET 1 OF 1

DRAWING NO. NHS-HV 3007

DATE 7/27/56

Together with the abundance of iron ore near the surface and locally occurring limestone deposits, these resources not only determined the early economic success of Hopewell as an iron manufacturing community, but were the primary reasons for its original establishment.

CULTURAL AND REGIONAL CONTEXT

Although predominantly Germans originally settled this area, the early inhabitants of Hopewell Village were primarily of British and Welsh descent. Some were freemen. Others, including many children, were indentured servants. One hundred and seven Negroes were employed by the furnace during its history prior to 1883. Mark Bird, the son of Hopewell's founder William Bird, is known to have owned slaves. However, their use at Hopewell is not documented (Walker 1966:304-305).

In many respects, Hopewell Village is probably typical of other late eighteenth century rural Pennsylvania cold-blast "iron plantations" producing pig iron, stove parts, numerous small implements, and forge castings. Like other iron furnaces in Pennsylvania, Hopewell boasted its own "Big House" or Ironmaster's Mansion, which served as the residence of the furnace owner or acting manager, his family, servants, and guests (Plates 1 and 2). Hopewell also had the usual complex of furnace buildings and an array of support structures and outbuildings, including tenant houses, shops, barns, gardens, orchards, and grain fields. Essentially self-sufficient, rural industrial villages like Hopewell have often been likened to feudal manors of medieval Europe. The Ironmaster has been likened to a "baron" in governing the community, managing the furnace business, and organizing and supporting agriculture, husbandry, crafts, and other numerous skills and services which were necessary to support a large and stable work force under the relatively isolated conditions of the furnace operation.

Hopewell Village prospered as a cold blast iron furnace in the eighteenth and nineteenth centuries when operated under the active management of a resident Ironmaster who was as well the furnace owner.



Plate 1
View of Ironmaster's House from south.



Plate 2
View of Ironmaster's House from east.

However, new technology in the nineteenth century brought about Hopewell's eventual demise. In 1837, James B. Neilson of Scotland successfully smelted iron by using a hot air blast on anthracite coal. The efficient use of coal precluded the need to maintain great wood tracts for the production of charcoal which was necessary in the cold-blast method used at Hopewell. The cost of bringing anthracite coal to rural iron plantations such as Hopewell was too great and these rural producers could not benefit from the new method. By 1850, Hopewell Village was one of only twelve cold-blast iron furnaces surviving, of the more than one hundred which were built in Pennsylvania in the eighteenth century. The great demand for pig iron which developed at the end of the Civil War had allowed a few of the cold-blast furnaces, including Hopewell, to remain in production until the late nineteenth century. However, although there was an eager market for the pig iron produced by these cold-blast furnaces, they could not compete with the coal-burning furnaces in the production of stove parts, tools, or castings. Consequently, production of molded stove parts and implements ceased at Hopewell c. 1844.

EFFECTIVE ENVIRONMENT

Disturbances to the Site

The last furnace "blast" at Hopewell was in 1883. Ownership of Hopewell furnace came to Maria T. Clingan and her children about 1894. All furnace operations ceased in the village by 1896. The Clingans were the last private owners of Hopewell but apparently used the Ironmaster's House simply as a summer home until 1915. After that time caretakers occupied the east wing of the house until 1935 when the National Park Service purchased the property and began restoration of the village under Civilian Conservation Corps (CCC) and Works Progress Administration (WPA) programs. The only documented use of the house during this time was for the storage of artifacts in the east wing cellar (Heydinger 1965:8).

One would expect that the Ironmaster's House was the object of some of the CCC and WPA projects but any disturbance caused by these projects to archeological deposits in and around the house are not documented. We do know that the south areaway wall was built in 1922 by caretaker Nathan Care, in conjunction with earth grading between the house and the barn (Motz 1941:9). However, archeologist Motz also discovered the remnant of an earlier south areaway wall when he excavated below the stone steps in the southeast corner of the areaway west of the bake ovens. We know also that the steps into the south areaway are a post-1960 NPS addition (Souder 1962:Illustration No. 48).

Archeologist Abel (1964) expanded Motz' areaway investigations by following the course of the stone drain Motz had partially exposed in 1941. This led Abel around the east and north sides of the areaway. Abel also excavated two privies to the north and east of the house.

Photographs indicate that the soil banked against the south wall of the south wing is the result of grading between the house and the barn between 1958-62 (Souder 1962: Illustrations 18 and 45; Souder 1965: Illustration 2).

National Park Service archeologist John Cotter (1958) included an excavation along the north wall of the north wing of the Ironmaster's House in his investigation of the garden terraces.

As recently as 1975 some of the floorboards and sleepers in the moulder's kitchen and dining room required replacement and stabilization. This work included removing some of the soil around the sleepers to slow deterioration and laying new cement on the foundation footing (Hopewell Village 1975).

Percolation tests were conducted by the National Park Service in the spring of 1978 in the north wing cellar and north areaway. The deposits disturbed by these tests were recorded by an archeologist (Kent 1978). The archeological investigations July 10-29 were the first archeological investigations of the deposits in the cellars and under the west porch of the house.

Inferences Based on Documentation and Oral Tradition

The cellars of the north, south, and east wings of the Ironmaster's House do not interconnect, whereas each of the upper floors, except for the attic, make up continuous levels with interconnecting rooms. The isolation of the cellars from one another supports other architectural and historical evidence that the house is the product of three separate building stages. There has been speculation, though, that an earlier structure existed on the site prior to construction of the north wing. Archeologist Leland Abel (1964:86) postulated that an earlier house occupied the site of the existing east wing and that the north wing was not built until 1826. Abel suggested that this earlier structure was a frame building which was later enlarged and replaced with stone walls to become the existing east wing.

It is also conceivable that a separate kitchen existed on the site of the east wing contemporary with but separate from the north wing. This arrangement may have been necessitated by the need to feed a considerable number of furnace workers who were either unmarried or without homes of their own.

The Ironmaster's House was primarily the residence of the furnace owner or manager, his family, and guests. However, servants also apparently resided at the house after construction of the one and one-half upper story addition to the east wing. The use of the east wing cellar as a kitchen and dining room for the servants and furnace workers c. 1828-44, and the occupancy of the east wing by caretakers from 1915 to 1935, suggest that the deposits in the east wing basement might be qualitatively distinct from deposits from other areas of the house associated primarily with the Ironmaster and his family.

Because no taverns or inns were near enough to furnish meals, the primary function of the basement kitchen of the east wing had been to feed the single male workers. When Hopewell turned its energy solely to the production of pig iron, c. 1844, the iron moulders had to find employment elsewhere. Departure of the moulders must have meant a

significant reduction in the domestic activities which had been a normal routine in the basement kitchen. A decrease in the quantity of artifacts deposited in this area after 1844 was expected.

Legal ownership of Hopewell Furnace changed no fewer than eight times in the eighteenth century, nine times in the nineteenth century, and once in the twentieth century (Walker 1966:421). However, residency of the Ironmaster's House may have been more stable than the sequence of ownership implies. From 1800 to 1859 the house was occupied, and the furnace operation managed by members of the Brooke-Clingan family. This period of residency may have created a distinct pattern in the cultural deposits due to traditional family behavior.

During the period 1935 to 1939 both WPA and CCC work crews were camped in the vicinity of the village doing road work as well as restoration in the village itself. At one point there were over four hundred men temporarily residing in the area (Walker 1966:69). These activities may have affected the deposits around the Ironmaster's House, although documentation of specific activities by these groups at the house has not been found.

The Ironmaster's House was not utilized as a domestic home from 1935 to the present time. It has existed since that time as a NPS exhibit. Domestic deposits reflecting the period 1935-present should represent a very small proportion of the total deposits recovered from the site.

RESEARCH GOALS AND STRATEGIES

The National Park Service acquired the Hopewell Village complex in 1935. Since that time little but general maintenance has been provided for the Ironmaster's House. The restoration, preservation, and structural rehabilitation of the house was undertaken to halt accelerating deterioration of the structure before it reached a point where restoration was no longer feasible. The archeological investigations in 1978 were designed to support this goal by insuring that these activities would not disturb archeological resources. The explicit obligations of the 1978 archeological investigations were to: (1) determine whether significant cultural resources were present below grade in the areas to be affected by structural rehabilitation; (2) examine those areas requiring clarification of structural characteristics and relationships;, and (3) evaluate the cultural resources recovered from the predetermined impact areas for the knowledge they could impart to the chronology, historical functions, and current interpretation of the Ironmaster's House. The specific areas investigated to meet these goals were defined in the original scope of work (appendix) and need not be repeated here.

The methods for accomplishing goals one and two above were straightforward: record details of structural design and evolution, and interpret archeological features and deposits below grade in predetermined impact areas. Evaluating the chronology, functional history, and the current interpretation of the Ironmaster's House revolved around answering two questions: (1) did another structure occupy the site of the east wing prior to construction of the present wing? (2) does the north wing represent the original Ironmaster's House believed to have been constructed on this site c. 1772?

In addition to recording evidence of earlier structures on the site or previous structural configurations of the house, the artifacts recovered from the site were expected to provide information relative to the evolution of the site. If kitchen activities were carried out separately from the main house, in a contemporary but physically separate

structure, this should be supported by a particular distribution of kitchen refuse. That is, kitchen refuse of that early period should not be associated with the north wing in as great a density as it would be associated with the contemporary but separate kitchen area. If a kitchen serving the north wing was not constructed until significantly after the north wing, early types of kitchen ceramics should be associated primarily with the north wing, and later ceramic types should be associated primarily with the site of the new kitchen. In order to obtain this kind of information, it was necessary to be able to isolate and identify the trash deposition patterns associated with each configuration of the house as additional wings were added. This was attempted through stratigraphic correlation and statistical analyses of the incidence of various types of cultural debris recovered from excavation areas at the site.

Implicit in this problem-oriented investigation was the obligation to analyze and evaluate all cultural resources recovered from the site for their significance to anthropological knowledge and cultural process in general. To this end the site's resources were analyzed and evaluated for the extent to which they conformed to the empirical and predictive ranges suggested for the Carolina and Frontier culture patterns (South 1977). Stanley South was interested in identifying a common cultural process operating at five British colonial sites with varying functions and environments in the Carolinas. South identified closely clustered counts of identical artifact groups from each site and used these to suggest a normal range of occurrence for these groups. If this distribution or ratio of artifact groups was found at other archeological sites, it could identify them as British Colonial. This ratio of artifact groups was called the Carolina pattern and site specific, localized behavior could be identified at some of these sites by isolating deviations in the otherwise "normal" Carolina pattern of artifact distribution.

Since the Ironmaster's House is a domestic site which was originally occupied by people of Welsh and British descent in the last quarter of the eighteenth century, there are some historical similarities between South's British colonial sites in the Carolinas and the Ironmaster's House.

Therefore, it would not be suprising to find the Carolina pattern in eighteenth century deposits at the house.

South suggested two alternative causes for the creation of the Frontier pattern at a site: isolation from sources of supply or a very brief occupation. Although the Ironmaster's House was part of an essentially self-sufficient, rural industrial village which supplied many of its own agricultural products and industrial raw materials, access to the larger market was essential for the distribution and sale of its iron products. This relationship was constant and reciprocal and included the exchange of other generally available items and popular ideas into Hopewell (Walker 1966). Moreover, the Ironmaster's House was continuously occupied from c. 1772 to 1935, and maintained by the National Park Service from 1935 to the present time. Therefore, except for the fact that one of South's Frontier sites was occupied from 1763 to the present, there are no similarities between South's Frontier sites and the known history of the Ironmaster's House. Therefore, it was expected that eighteenth century deposits from the Ironmaster's House might fall within the Carolina range but none of the deposits should fall within the Frontier range of artifact distribution. Comparison of deposits from the Ironmaster's House with the Carolina and Frontier patterns would indicate whether either of these patterns were operative at the Ironmaster's House under conditions other than those suggested by South. If the Carolina pattern emerged at the Ironmaster's House in other than an eighteenth century deposit, it would suggest that the Carolina pattern may result from circumstances other than British Colonial occupation. If the Frontier pattern emerged at the site, explanations other than distance from source of supply or brief occupation of a site might be offered as a determinant of the Frontier pattern.

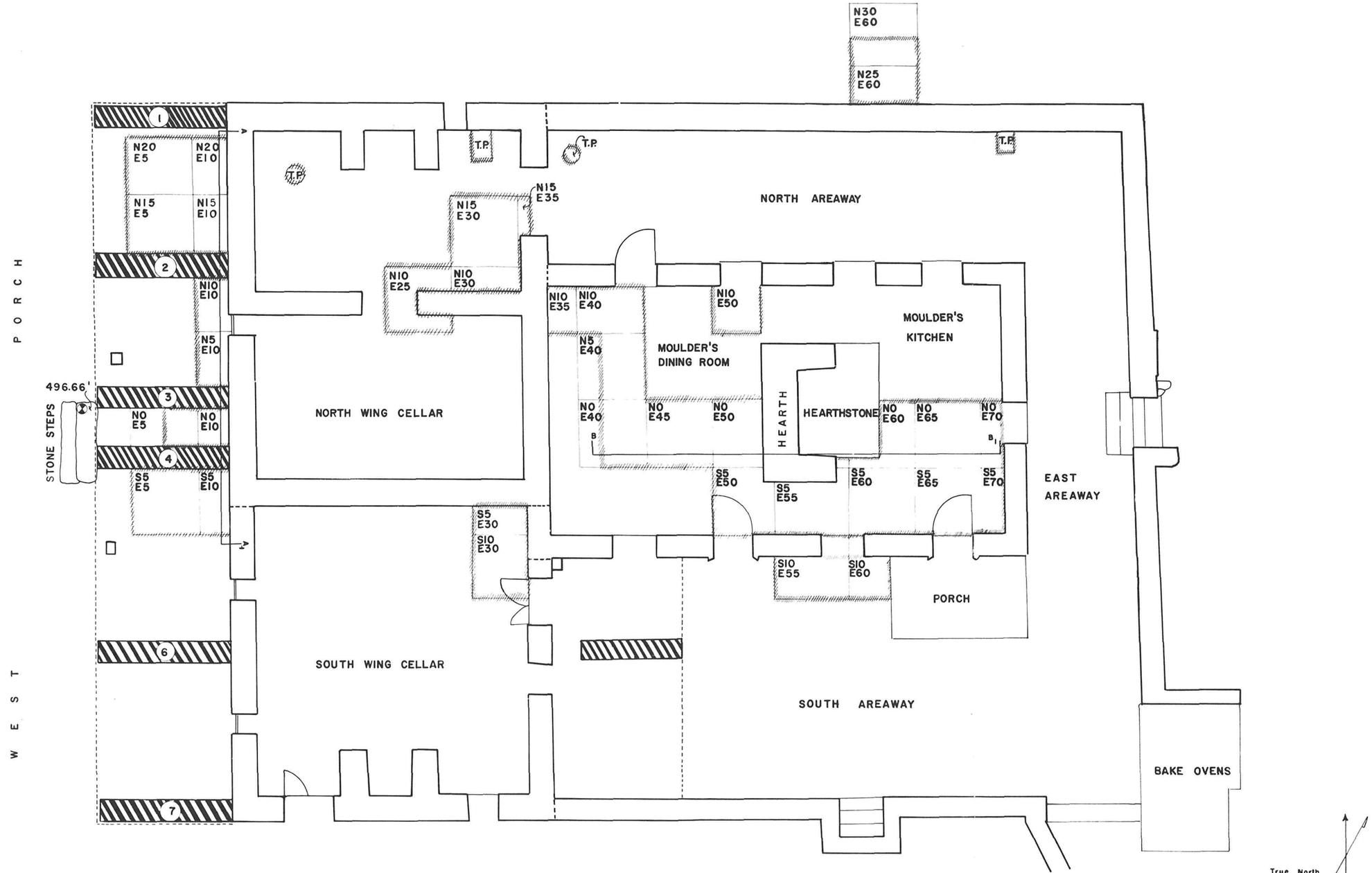
METHOD OF DATA COLLECTION

A 5' by 5' grid was imposed over architectural plans of the house, porches, areaways, and excavation units were transferred from this grid to the ground in locations to be affected by the rehabilitation (Fig. 3). Vertical datum was established as the chisel mark in the upper stone step against the west porch (496.66' AMSL). Horizontal datum was the northwest corner of the lower stone step against the west porch. Excavation units are identified by the number in the northwest corner. This number was assigned by proceeding in 5' increments from horizontal datum. All directional arrows in drawings and photographs indicate building north. True north is 30 degrees east of building north.

Areas known or suspected to be recent fill (post-1935 NPS acquisition) were removed in 6" arbitrary levels. Discrete cultural strata were excavated in 2" arbitrary levels. Features were excavated as a unit. Excavated soil was screened through 1/4" hardware cloth.

Graphic, photographic records, and detailed notes were maintained to describe all units, strata, and features investigated. All culturally modified floral and faunal materials as well as glass, ceramics, metals, cloth, and plastics were collected. Representative samples were taken of seeds, mortar, brick, and stone. Simple cleaning, conservation, and gross sorting of the artifacts were accomplished in the field laboratory. Complete conservation, detailed description, and cataloging of the artifacts was accomplished at the DSC preservation lab during the fall and winter of 1978-79.

In order to gain access to the archeological deposits, it was necessary to remove large sections of wood flooring from the west porch, the moulder's kitchen, and dining room. The historical architects accomplished this task with the assistance of the archeologists. This flooring was later replaced in a condition as much as possible approaching its former appearance.



SCALE: 1/4"= 1'

KEY:

- Major Structural Walls
- Porch Support Walls
- Limits of Excavation
- T. P. — Test Pit

EXCAVATION PLAN 1978 ARCHEOLOGICAL INVESTIGATION

IRONMASTER'S HOUSE

HOPEWELL VILLAGE NATIONAL HISTORIC SITE

FIG. 3

376 | 28,003
DSC | MAR 80

It was originally intended to replace the concrete floor in the south wing cellar as part of the rehabilitation of the house. Consequently, a small section of concrete was removed from the northeast corner of the south cellar to allow access to any archeological deposits below. After the test was completed, this hole was backfilled with soil to a level just below the level of the remaining concrete floor. Since that time it has been decided to maintain the existing concrete floor. The archeological test hole is to be repaired by Donald Riesinger and Company, the contractor conducting the structural rehabilitation of the Ironmaster's House.

Excavations beneath the west porch were backfilled in a manner advised by the historical architects. That is, the large rocks removed from this area during the excavation were redeposited in the excavation pits without the soil in order to temporarily improve drainage. Since all the back dirt was not replaced where it originated, the remaining dirt was hauled from the screening stations in the areaway, to the YCC construction site east of the parks maintenance building, to be used as fill. The excavation units in the areaway were returned to their former appearance. Excavations above the north areaway wall were backfilled and arrangements were made for replacement of several bushes removed to facilitate the archeological investigations.

All original field notes, drawings, photographs, and artifacts recovered during the 1978 archeological investigation have been assigned park accession numbers and are stored at Hopewell Village National Historical Park.

ANALYSIS

AREAWAYS

Excavation Unit N25E60

A single 5' by 5' unit was excavated north of the north areaway wall (Fig. 3). The major goal of this investigation was to determine the original grade of the hill against the north areaway wall.

At about 12" below the surface a number of 1" thick, broken pieces of finished concrete aligned parallel to the areaway wall were exposed, suggesting the former presence of a concrete path north of the north areaway wall. It appeared that reused pieces of concrete were laid on a former grade as temporary stepping stones, but a formal permanent sidewalk had apparently not been intended.

At 14" below the surface a porous concrete pipe surrounded by a 17" thick bed of coarse green gravel was exposed (Plate 3). This pipe runs parallel to the north areaway wall and apparently carries ground water east to an unknown outlet. Exposure of the north face of the north areaway wall revealed that it had been repointed with pink mortar to at least 14" below the top of the wall. Park staff reported that pink mortar was characteristic of NPS maintenance in the park in the 1950s and that the porous concrete pipe was installed c. 1958 (Siedel 1978).

At 28" below the surface, two lead pipes, 12" and 20" north of the concrete pipe were exposed. These lead pipes also run parallel to the areaway wall. Their origin and destination is as yet unknown, but they may have been installed c. 1868-1871, when the indoor bathroom was constructed on the second floor of the house (Fairbairn 1961:9). The 1" lead pipe closest to the areaway wall may be the continuation of the 1" lead pipe exposed by Cotter at 1.5' below the surface parallel to the north wall of the north wing (1958:3).

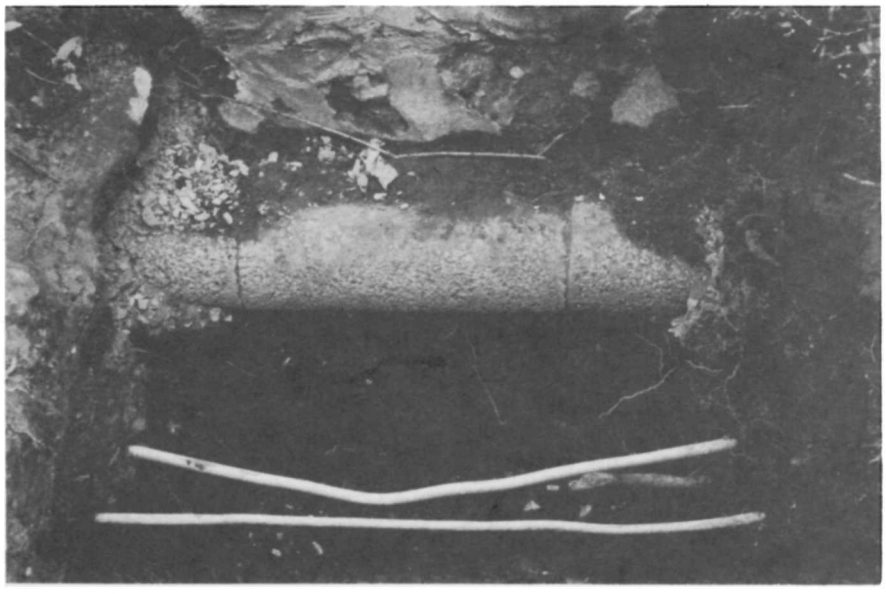


Plate 3
C. 1958 repointing on north areaway wall; c. 1958 porous concrete pipe, and c. 1867-70? lead pipes.

The soil deposits north of the north areaway wall began with 4" of humus at the surface (Stratum A), beneath which was an 18" deep, hard packed, mottled reddish clay containing gravel, mortar bits, and various cultural debris (Stratum B). It was in this deposit that the porous concrete pipe was buried. Essentially the same deposit buried the lead pipes to the north of the concrete pipe, although there this deposit had not been recently disturbed, as it had been nearer the areaway wall during installation of the concrete pipe. Beneath the mottled red clay was another red clay deposit, also about 18" deep, but containing large chunks of sandstone and very few artifacts (Stratum C). At the junction of Stratum C with the deposit below, a dense red clay at about 45" below the surface (Stratum D), artifact content suddenly increased, the sandstone chunks so prevalent in Stratum C significantly diminished, and charcoal bits became the most prevalent inclusion in the red clay. Stratum D was only 3" deep, however, and below it was a hard yellow sandstone deposit. A 12" deep test pit was excavated into the yellow sandstone which produced charcoal and a domestic pig mandible recovered at 55" below the surface.

Since naturally occurring deposits were not encountered as deep as 4.5' below the surface, it was evident that original grade must be more than 4.5' below existing grade. The disturbed redeposited yellow sandstone found at this depth very possibly was originally excavated during leveling of the site of the east wing and redeposited in its present location. The same is probably true for the 3" thick red clay and the mixed red clay and yellow sandstone deposits above it. The trench for installation of the lead pipes was excavated into this fill and then backfilled with additional soil. Since the installation of the lead pipes, this area experienced various other disturbances including the installation of the concrete pipe, possible use of a concrete path, and disturbances associated with landscaping.

Datable artifacts were recovered only from Strata A, B, and D. Ceramics from these strata produced mean ceramic dates (MCD) (South 1977:217) of 1846.86, 1840.14, and 1830 respectively. Although Strata A and B were disturbed as recently as 1958 during installation of the

concrete pipe, the MCD suggest that these deposits are much earlier. The ceramics found in these deposits must remain from the c. 1867-71, installation of the lead pipes, which were themselves installed within a fill deposit which probably contained early nineteenth century ceramics. If twentieth century ceramic debris had been allowed to accumulate around the house, recent ceramic types would have made up a much larger proportion of the ceramics from Strata A and B. This could have resulted in a much more recent and more appropriate MCD for the deposits surrounding the concrete pipe. However, since these deposits have apparently been disturbed a number of times, and since much of the soil north of the areaway wall is probably fill, the MCD provides only a very approximate date for the activities in this location.

Excavation Units S10E55 and S10E60

Two partial units (27 sq. ft.) were excavated in the south areaway along the south wall of the east wing, between the two south entrances to the east wing basement rooms (Fig. 3). Cultural deposits here were very shallow, consisting of only 3" of mottled, dark brown soil above naturally occurring yellow sandstone. A builder's trench for the south wall of the east wing was exposed in S10E55, but disappeared in Unit S10E60. No other features were exposed.

The south areaway wall was built by Nathan Care in 1920 and the steps into the south areaway were built after 1960. These activities, as well as the grading Care did between the house and barn, certainly disturbed deposits in the south areaway to some extent. The removal of soil around the sleepers in the east wing basement in 1975 may have contributed soil and artifacts to the south areaway deposits. Ceramic sherds from these units crossmended with sherds recovered beneath the west porch (Table 1), further indicating extensive disturbances to deposits in both areas.

The excavation units in the south areaway are significant in that they did not reveal the 9" deep clay deposit described by J. C. Motz in his investigations of the areaway west of the bake ovens in 1941, nor the

TABLE NO. 1

CERAMIC CROSSMENDS

EXCAVATION UNITS			STRATUM	ARTIFACT NUMBER
1)	N5E10	W. Porch	A-2	1,3
	N10E10	W. Porch	B-3	18,19,21,56
2)	N25E60	N. Areaway	Surface	10
	N25E60	N. Areaway	B-3	12,25
	N25E60	N. Areaway	Feat. 2	3
	S5E60	Moulder's Kitchen	A	50
3)	S5E5	W. Porch	B	11
	S5E10	W. Porch	D-1	9
4)	N0E60	Moulder's Kitchen	A-1	14
	N0E60	Moulder's Kitchen	Surface	1, 2
5)	S5E55	Moulder's Kitchen	A	48
	S5E60	Moulder's Kitchen	A	36,37
	N0E60	Moulder's Kitchen	A-1	15
6)	NI5E5	W. Porch	A-2	1
	N10E10	W. Porch	B-3	22,23
7)	S5E55	Moulder's Kitchen	A	52
	N10E50	Moulder's Dining Room	A	3
8)	N10E10	W. Porch	A-2	4,5,9,
	N5E10	W. Porch	A-2	2,3
	N5E10	W. Porch	A-3	1,2
	N10E10	W. Porch	B-2	1,5,7
9)	N10E10	W. Porch	Feat. 8	4
	N25E60	N. Areaway	B-3	8
10)	N0E60	Moulder's Kitchen	A-1	6,13
	N0E65	Moulder's Kitchen	A-1	37
	S5E55	Moulder's Kitchen	A	55
	S5E10	W. Porch	B-3	3
	S5E10	W. Porch	B-4	3
11)	S5E65	Moulder's Kitchen	A	43
	S5E70	Moulder's Kitchen	Surface	1
12)	N10E10	W. Porch	B-3	1
	N10E10	W. Porch	A-2	1

EXCAVATION UNITS		STRATUM	ARTIFACT NUMBER
13) S10E60	S. Areaway	A	2
S10E60	S. Areaway	B	1,2
S10E55	S. Areaway	B	24,25,26,27,30
14) S5E10	W. Porch	B-2	2
S5E5	W. Porch	A	11
15) S5E65/			
S5E70	Moulder's Kitchen	A-2 (Feat 1)	2
S5E70	Moulder's Kitchen	A	31
16) N10E10	W. Porch	A-2	7
N10E10	W. Porch	A-3	1,2
N10E10	W. Porch	B-2	2,11
N10E10	W. Porch	B-3	5,11,6,23
17) N10E10	W. Porch	B-3	24,33,34,47,49,56
S5E60	Moulder's Kitchen	A	57

clay and deeply buried cultural deposit reported by Righter in the east areaway (1979:9). Motz interpreted the origin of the clay as fill deposited over the original surface of the areaway to "level it up" (1941:10). Motz' conclusion that prior to 1850 the surface of the areaway had been 1' 4" lower than it was in 1941, may have led to a lowering of the areaway grade by the NPS to return it to its "historic" appearance, thus explaining the absence of the clay at the south wall of the east wing today.

North Wing

Excavation Units N10E25, N15E30, N10E30

A total of 48 sq. ft. were investigated in the cellar of the north wing, including archeologically monitored percolation tests dug in June (Kent 1978). Layered slit deposits 1/8" to 2" thick, containing bits of charcoal and a few wooden match sticks, were removed above a 1/2" to 2" thick mortar floor at 489.2' AMSL (Plates 4 and 5). Numerous tiny glass fragments were imbedded in the surface of the mortar within the doorway of the center wall. The mortar had been laid on naturally occurring sterile yellow sandstone. The base of the foundation of the center wall was 14" to 16" below the level of the mortar floor. Builder's trenches were not evident on the interior sides of the foundation wall nor the center wall. Although the yellow sandstone was somewhat looser close to the walls, rodent disturbance was also evident along the walls. Except for a few pieces of slag lying against the base of the center wall, it was not possible to differentiate the rodent disturbance from evidence for an original builder's trench.

A nonstratified mound of soil containing redeposited bits of mortar was removed above the layered silt deposits. This feature suggested that the silt and some part of the mortar floor in the cellar had been previously excavated. The mortar floor was very fragile and deteriorated where it joined the center and side walls. A weak bond with the walls and pooling of moisture condensation at this joint probably caused the

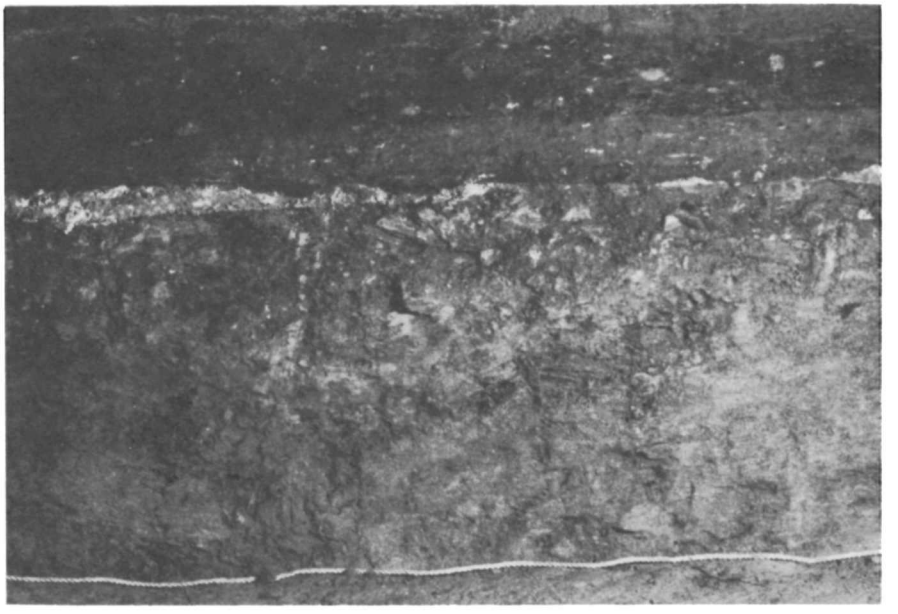


Plate 4
North profile in N15E30 showing layered silt deposits, mortar surface and yellow sandstone.

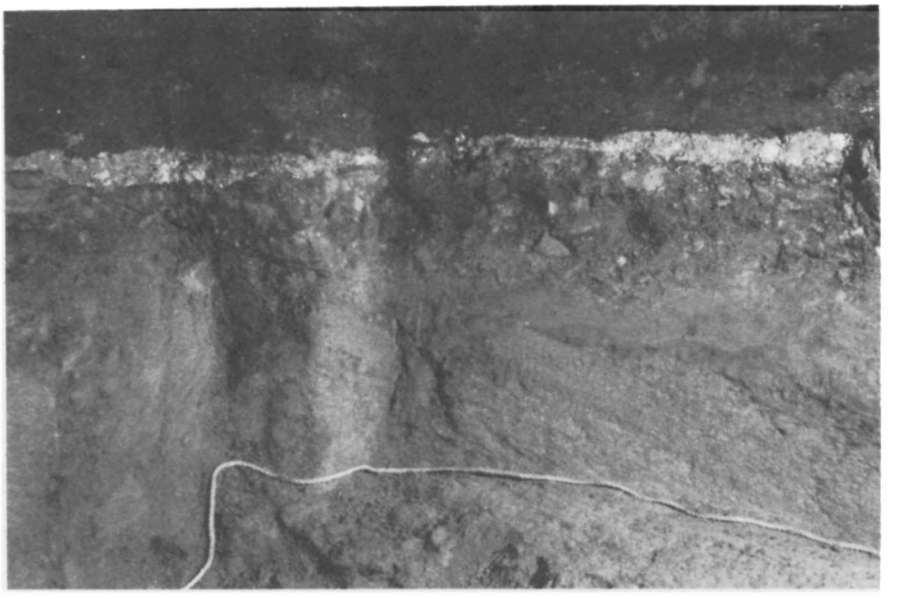


Plate 5
Northwest view of deposits in N15E30.

deterioration of the floor at its bond with the walls. The mortar is not a modern composition and this floor may be historic since it represents the earliest remaining cultural deposit in the cellar.

South Wing

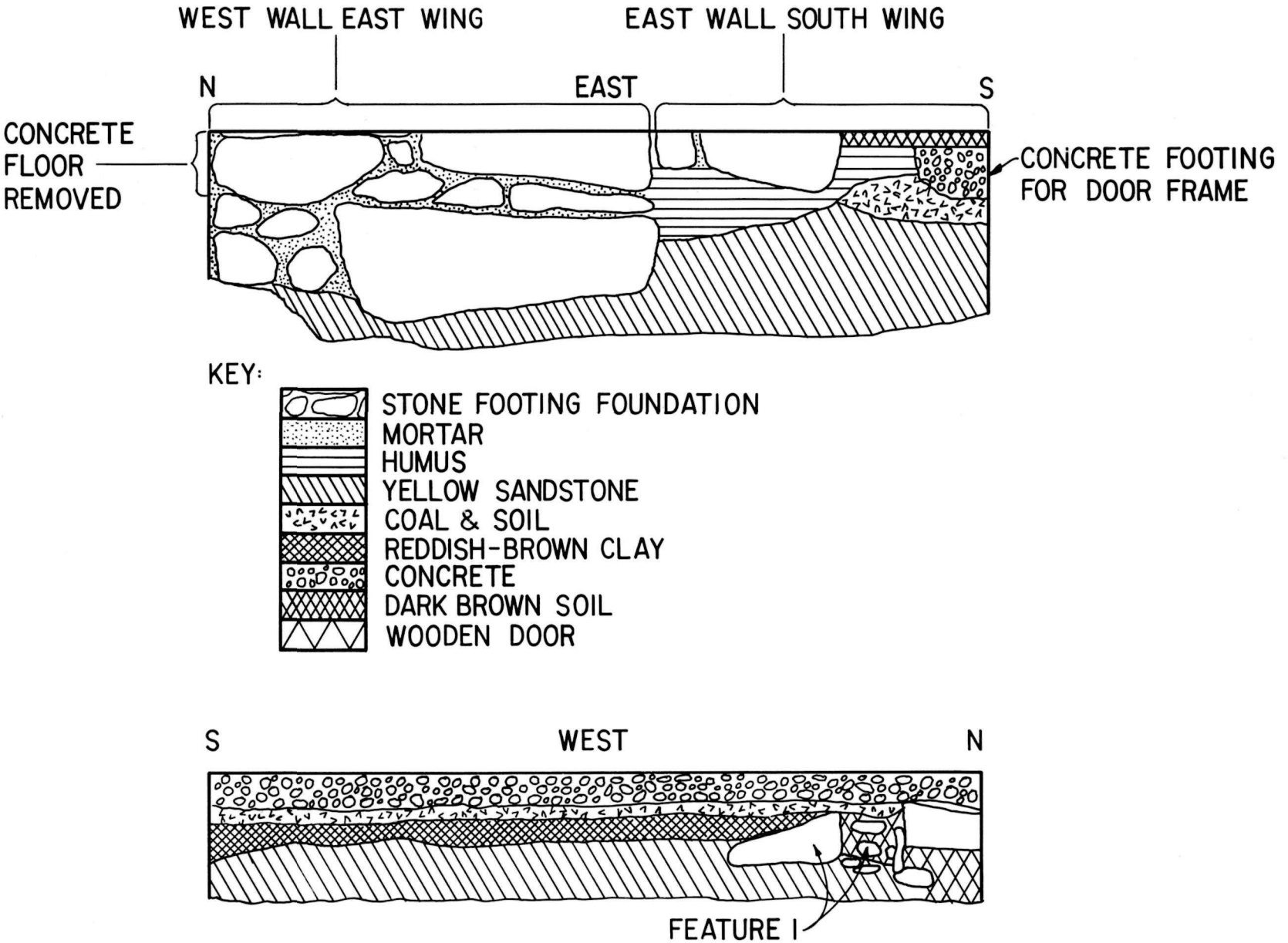
Excavation Units S5E30 and S10E30

The floor of this cellar is currently concrete. Use of a jackhammer to break up the floor was considered potentially damaging to the walls and the concrete had to be removed by hand with picks and sledge hammers. A 4' by 6' 8" unit was opened in the northeast corner of the cellar. A number of structural details were exposed and recorded which support the existing architectural interpretation of the sequence of construction of the three wings.

The concrete floor averaged 3" in thickness and rested on 2" to 3" of iron slag (Fig. 4). A thin sheet of red clay lay beneath the slag with naturally occurring yellow sandstone and clay beneath the red clay. A few undiagnostic nail and glass fragments were recovered from the slag and the surface of the red clay.

Several roughly circular (5" by 6-1/2") stains of dark brown soil were exposed in the red clay deposit. These stains were only 3/4" to 1" deep and contained no artifacts. These stains may be postholes left by scaffolding used in the erection of the north wing. However, leveling of this site for construction of the south wing, as well as installation of the concrete floor, may have obliterated most traces of earlier activities or structures here.

The spread footing of the north wall was exposed only 3/4" to 2" below the base of the concrete floor. This spread footing conformed to archeologist Cotter's description of the spread footing recorded for the north wall of the north wing. That is, the "joints were independently raked between rocks so as to produce almost a 'dry' masonry, the mortar



SCALE: 1" = 10"

PROFILE S5E30, S10E30

FIG. 4

having disintegrated on the outside" (1958:3). However, this footing of the south wall of the north wing, which acted also as the north wall of the south wing, was only one course (6") deep resting on the sterile sandstone at 485.83' AMSL. According to Cotter, the spread footing of the north wall began at 2-1/2' to 3' below the ground surface and continued to the base course of the foundation wall. However, the north wall of the north wing had to withhold the weight of the hill on the north side and apparently required a more massive wall. The shallow footing of the south wall of the north wing suggests that historic grade south of the north wing was probably very similar to existing grade south of the south wall of the south wing.

All three wings of the Ironmaster's House meet at the northeast corner of the south cellar. The east wall of the south wing abuts the 3-1/2' west wall of the east wing, which in turn abuts the southeast corner walls of the north wing. From that point northward, the east wall of the north wing also serves as the west wall of the east wing. The abutting relationship of these walls indicates initial construction of the north wing, followed by construction of the east wing, with the final addition of the south wing. Excavation below grade supports this interpretation.

Only the north wall of the south wing exhibited a spread footing. The 3-1/2' west wall of the east wing descended below grade to the same depth as the north wall of the south wing, but rested in a trench excavated into the yellow sandstone without a spread footing for additional support. The east wall of the south wing was resting in dark brown humic soil at the same level as the surface of the concrete floor and also lacked a spread footing.

Much of the south wing cellar remains to be tested for evidence of cultural resources. In the event that the existing concrete floor is replaced by an improved floor, removal of the concrete should be monitored by an archeologist followed by archeological testing and excavation in this area. The posthole stains and partial exposure of

several large stones extending south from the footings of the north wall in S5E30 (Feature I, Fig. 4), suggest that additional archeological resources may survive beneath the concrete floor.

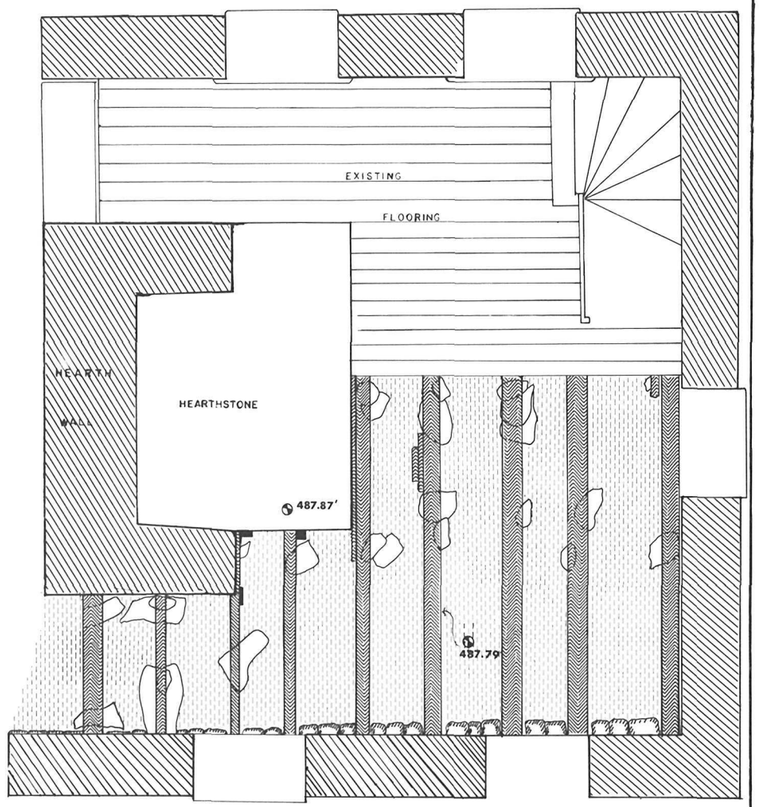
East Wing

Several controversies cloud the history of the east wing. There is no documented date for its construction and there is debate on whether a structure contemporary with, but separate from the north wing, existed on this site prior to construction of the present east wing, or whether the present east wing was added on the north wing in its entirety at a later date. The archeological investigations were successful in determining that the original one and one-half story east wing was constructed and added on to the north wing no earlier than 1825. Archeological evidence from the kitchen also suggests that the site of the east wing was probably part of a walled courtyard east of the north wing prior to construction of the east wing. Also, the cultural debris recovered beneath the wooden floor is essentially a secondary deposit brought in to the east wing to support the sleepers of a raised wooden floor.

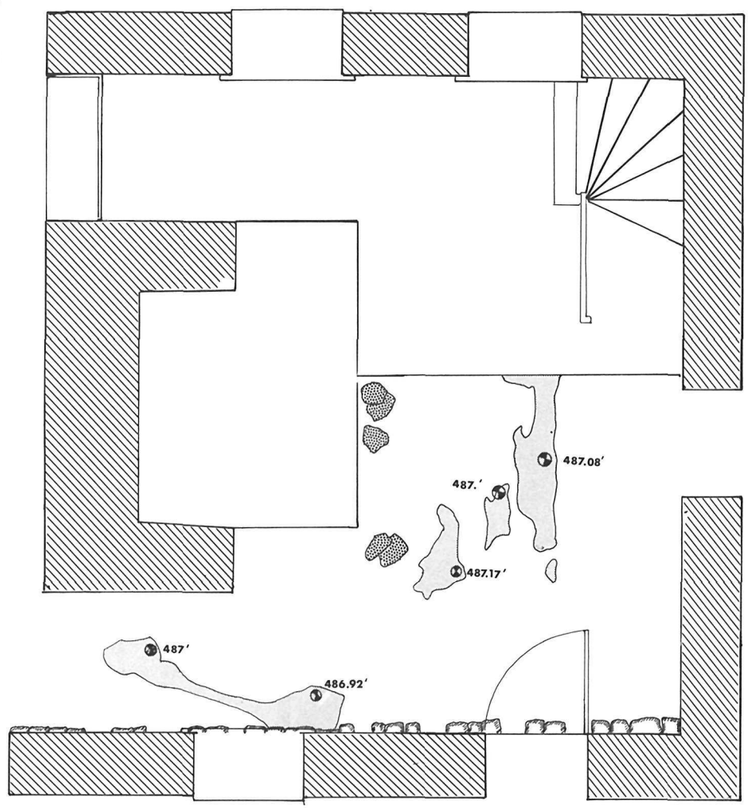
The moulder's kitchen and dining room will be discussed as a unit since the stratification in these two rooms was similar. Sixteen excavation units covering a surface area of 268 sq. ft. were investigated in the east wing basement (Fig. 3).

The surface deposit (Stratum A) revealed below the floorboards and sleepers was dark yellowish-brown loam only several inches deep but containing a wide chronological and functional range of artifacts. This stratum rested on a layer of sterile red clay which was very thin (1/4" to 1/2") in the dining room and much deeper (6" to 14" in the kitchen).

Between the surface loam and the sterile red clay in the kitchen were remnants of a mortar surface (Figs. 5 and 6; Plates 6 and 7). The remaining patches of this surface were deteriorated, fragile, and varied

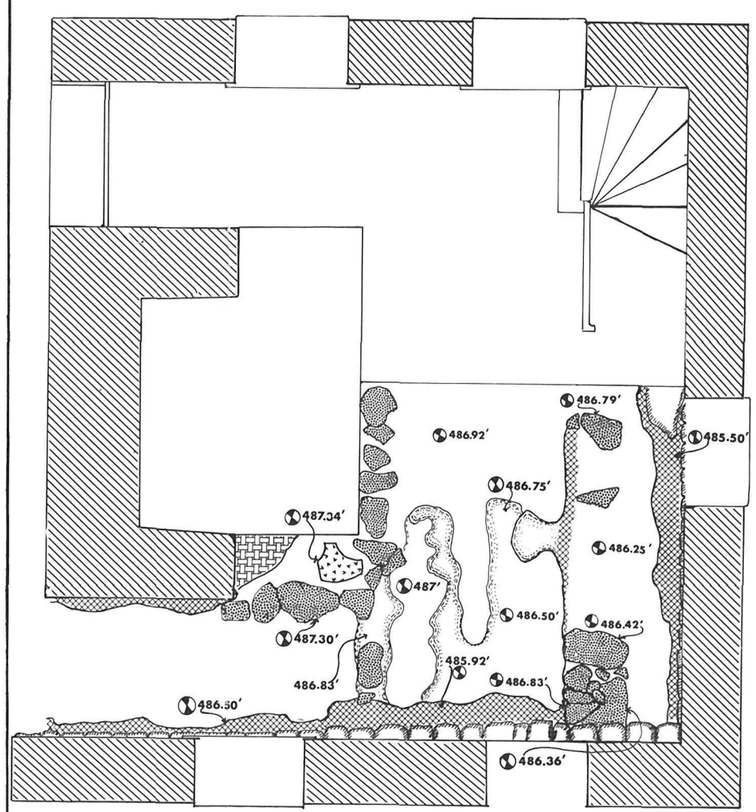


SLEEPERS AND STONE SUPPORTS RESTING ON STRATUM A



BOTTOM STRATUM A

LENSES OF THIN MORTAR SURFACE



SURFACE STRATUM B

FOOTINGS AND BUILDER'S TRENCHES EXPOSED

KEY:

- STRATUM A
- STRATUM B
- SLAG
- SLEEPER SUPPORT STONES
- BELOW GRADE FOUNDATION STONES EAST WING
- STRUCTURAL WALLS EAST WING
- ASH SURFACE
- BUILDER'S TRENCH
- DEPRESSIONS IN STRATUM B
- YELLOW SANDSTONE - STRATUM C
- SLEEPERS
- BRICK
- RUBBLE STONE AND MORTAR

SCALE: 1/2" = 1'

HOPEWELL VILLAGE NATIONAL HISTORIC SITE

MOULDER'S KITCHEN, ROOM NO. 5

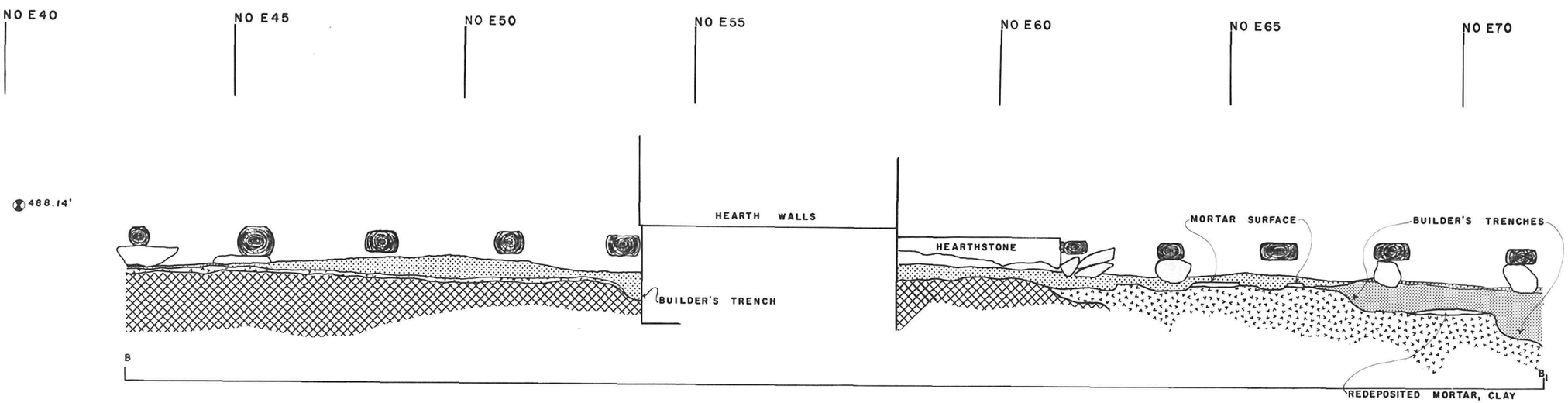
Plan of Features
Exposed by Archeological Investigation, July 1978

FIG. 5

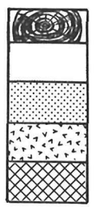
TRUE NORTH

BUILDING NORTH

PREPARED	DRAWING NO.
A. MARIE DESIGNED	376 28,001
A. MARIE DRAWN	PCIP PKG 102 / SHEET 1
P. DESSAUER CHECKED	
9-78 DATE	OF 1



KEY:



SCALE: 3/4" = 1'

PROFILE OF DEPOSITS IN EAST WING OF

IRONMASTER'S HOUSE

CROSS SECTION THROUGH SOUTH END OF HEARTHSTONE

IN MOULDER'S KITCHEN

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FIG. 6



Plate 6
Remnants of mortar surface in moulders kitchen above Stratum B clay. The surface is pitted by what appears to be shovel marks.

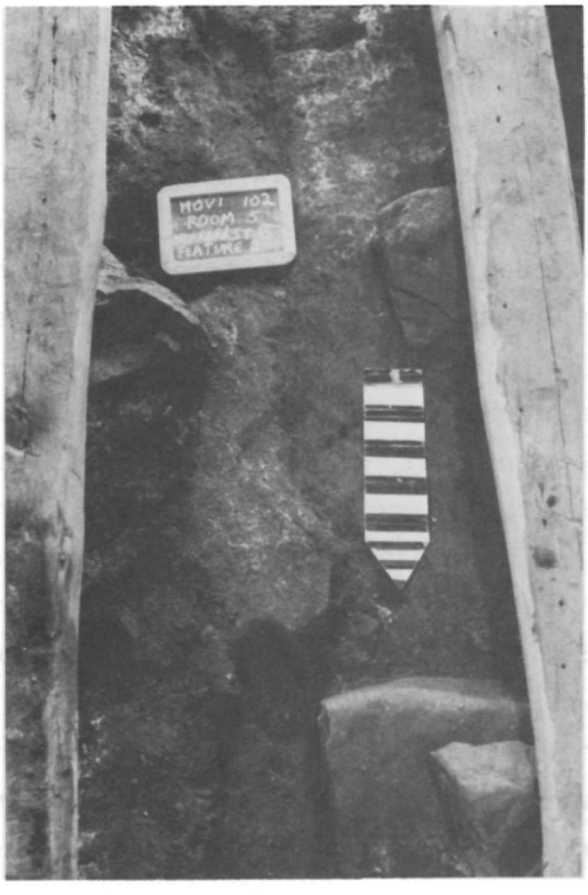


Plate 7
The mortar surface appears to have been excavated for placement of the stone supports beneath the sleepers.

from 1/16" to 1/4" in thickness. It appeared that this surface was originally continuous but had been largely obliterated when the wooden floor and the stone supports were installed. The fact that this former mortar surface rests on the sterile red clay indicates that the mortar could not have been deposited until after the site had been leveled for construction of the east wing and after any loam or humic soils on the original surface east of the north wing had been removed. Therefore, the original prepared surface in the kitchen appears to have been this thin mortar veneer laid over naturally occurring clay. A mortar surface was not found in the dining room, which had a very uneven sandstone base beneath the loam and thin red clay (Plates 8 and 9). Perhaps this room was not initially used as a dining room but was used primarily for storage until the wooden floor was installed.

Just east of the easternmost remnants of the mortar surface in the kitchen a mottled reddish sandy soil was exposed beneath Stratum A which extended to the east wall of the east wing. Complete removal of this deposit, designated as Feature 1, revealed several builder's trenches which had been excavated into the natural red clay in a north-south direction, descending towards the base of the east wall of the kitchen (Figs. 5 and 6). Remnants of a stone wall which predates the east wing were found buried at the base of the more shallow builder's trench to the west, extending north from the south foundation of the kitchen. The east wall of the kitchen had been constructed in the deeper builder's trench to the east. However, both trenches and the remnants of the former wall had been buried with the same soil, so these features must have originally been excavated and backfilled at the same time. The trench west of the wall remnant was probably opened in order to dismantle the wall and allow construction of the east wall of the east wing. The dates on several United States pennies recovered from this backfill indicate destruction of the former wall and construction of the east wing no earlier than 1825. Excavations by Righter (1979:13) proved that this double trench extended to the north wall of the kitchen but was not keyed into that wall. Whether or not the southern wall remnant was keyed into the south wall was not determined, since mortar obscured the joint. However, a large flat stone supporting both the southern wall

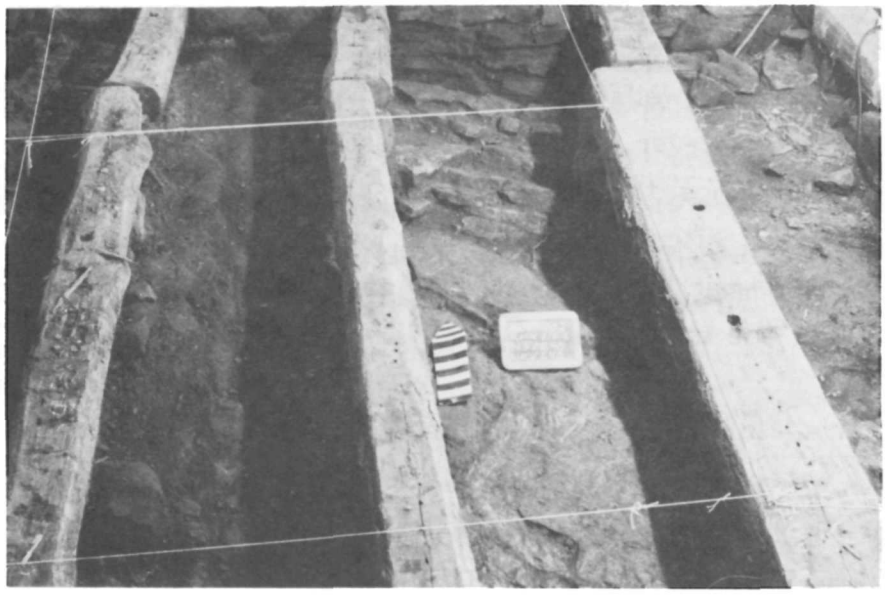


Plate 8
Stratum C sandstone exposed on right of photograph after removal of loam and clay.

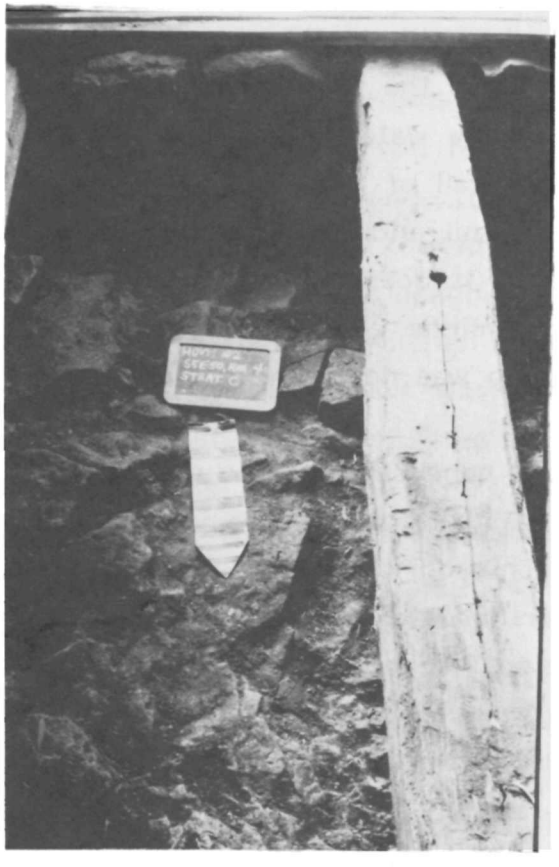


Plate 9
Detail of Stratum C surface.

remnant and a section of the south wall of the kitchen suggested that both walls were constructed at the same time. Possibly these walls were part of a structure which occupied the site prior to construction of the east wing and these walls were later incorporated into the construction of the east wing. However, Righter's investigation of the east areaway did not produce evidence that any walls extended eastward from the former wall inside the kitchen area. The interior wall remnant probably represents a former courtyard wall east of the north wing prior to construction of the east wing.

Righter's investigation in the east areaway recovered several discarded water pipe fragments (1979:11) which suggest former water systems in the location of the east kitchen wall, in addition to the present stone drain, and 3" iron pipe in the east areaway. A 5/8" diameter nonmagnetic utility pipe fragment was also recovered from the fill of the former wall trench inside the moulder's kitchen. It is possible that the cultural deposit Righter found beneath the red clay bed of the stone drain in the east areaway (1979:7) is fill of the original construction trench for the wall remnant in the moulder's kitchen and a water pipe which emptied in the yard east of the north wing. This conjectural water pipe may have originally paralleled the former wall and construction of the east wing included removal of the water pipe as well as the former wall. After construction of the east wall of the east wing, all the old and new trenches were backfilled with soil and debris and a new water pipe was laid in the new east areaway. It does not appear that water pipes ever entered the moulder's kitchen since evidence of former openings in the wall at the east end of the wing was not found.

Evidence for earlier walls connecting to the wall remnant beneath the kitchen floor was not found west of the wall remnant, nor east of the wall remnant in the areaway. This former wall was apparently never any longer than the present north-south dimension of the kitchen. Unless earlier walls rested in the same trenches now occupied by the north and south walls of the east wing, or the existing walls were added on to, to create the present walls, the wall remnant must be what remains of a solitary, freestanding wall east of the north wing. However, a solitary north-south retaining wall would have been illogical prior to construction

of the east wing and deposition of soil to the north and east of the site. The former presence of a retaining wall where the north wall of the east wing now rests would mean that the below grade entrance to the north wing cellar probably dates no earlier than the construction of the east wing and north areaway (Plate 10). Abel (1964:13) states that the framing around this north wing cellar entrance contained relatively recent cut nails and the entrance probably dates no earlier than the time when the north areaway was dug. This, then, would be no earlier than 1825, after the east wing was built.

Builder's Trenches

All the structural walls investigated in Rooms 4 and 5 were built into trenches excavated into the red clay and yellow sandstone to a maximum of 16" and a minimum of 3" in depth. The lateral extent of these builder's trenches was very inconsistent, extending from 3" to 20" from the walls.

Removal of the fill of the builder's trenches associated with the north and south walls revealed continuous footings from one room to the other. Investigations were made into the deposits on the east and west sides of the interior doorway between Rooms 4 and 5, as well as on the west side of the cabinet between the hearth and the north wall in the dining room. Evidence at these locations for an originally continuous west wall would indicate that the kitchen was originally separate from the north wing and that the dining room was built to connect the north and east wings at a later date. Earlier, abandoned wall trenches or footings were not found in these locations. The builder's trench for the hearth wall indicated that this wall had never extended further north or south than it does at present.

Several shallow trenches were exposed in the red clay roughly below and parallel to the sleepers in the kitchen (Fig. 5 and 6). An earlier wooden floor may have been supported by sleepers set directly into the clay rather than supported intermittently by stones and soil, and pocketed into a modified footing in the foundation as is the present



Plate 10
Below grade entrance to the north wing cellar.

wooden floor. Righter (1979:12) suggested that the height of the original footing of the north foundation in the kitchen had been raised about 10" some time after the initial construction of the wall and footings. The modern portland cement Righter observed on the footing is surely the result of park maintenance to the kitchen floor in 1975 which noted that ". . . the mortar had fallen out of the footing stones and had to be replaced with new cement" (Miller 1975). However, the height of this footing on the interior of the north and south walls of the east wing is apparently the result of historic modifications to the original footing. The original footing stones are single large stones on which the foundation stones are centered. On the interior of the north and south walls, stones have been set on the part of the footing which extends into the room. These stones are not keyed into nor supporting the walls (Plates 11 and 12). This feature was not repeated on the outside of the footing of the south foundation of the kitchen nor did it occur on the east and west walls which were not supporting sleepers. These interior stones resting on the footings of the north and south walls were apparently added in order to pocket the sleepers and support the wooden floor. This modification of the footing was probably accomplished in the mid to late nineteenth century based on the beginning manufacturing dates of various artifacts found in the soil (Stratum A). This soil must have been brought in to stabilize the sleepers after the wooden floor was raised.

Hearth

The hearthstone in the moulder's kitchen was made up of several smoothed stone slabs which were cracked and patched with mortar (Plate 13). Excavation of Stratum A near the hearthstone exposed an L-shaped stone footing which bordered, but did not support, the east and south sides of the hearthstone. The east leg of this footing was two to three courses deep and showed old mortar, containing bone and shell, adhering to the surface of the stones and between the joints (Plates 14 and 15). The southern leg of the footing was less definitive, being one course deep, discontinuous, and resting in a shallow trench in the red clay, but



Plate 11
Northwest corner of moulder's dining room. The Third course of stone has been added to the original footing. A sleeper formerly occupied the pocket.



Plate 12
Same view as above.

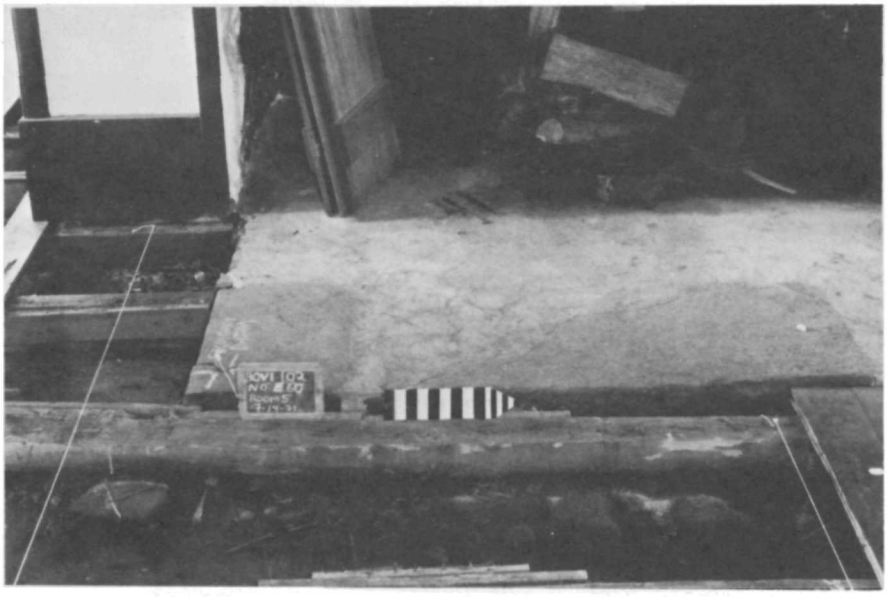


Plate 13
Hearthstone in moulder's kitchen before removal of
Stratum A loam beneath sleepers.



Plate 14
Old footing east of hearthstone after removal of Stratum A.
Mortar on stones was not for bonding
to the present hearthstone or the sleeper.

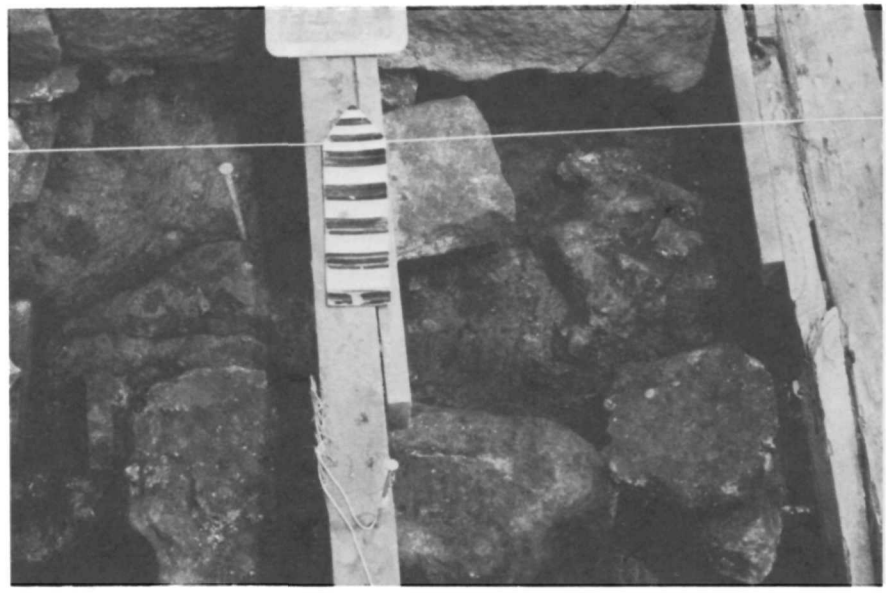


Plate 15
Old footing south of hearthstone after removal of Stratum A.
Old mortar remains on the surface of the stones.

also showing old mortar adhering to the surface of the stones. This south footing joined the south end of the fireplace wall but was not supporting the hearthstone which began several feet further north. Within the small space between the L-shaped footing and the fireplace wall a high concentration of charcoal and one large piece of slag were removed. Since the north end of the hearthstone terminated at the north end of the fireplace wall, it appeared that this southern footing may have originally supported a hearthstone which extended to the south end of the fireplace wall and which would have made the hearth area symmetrical to the fireplace. However, the hearthstone appeared to be resting directly on soil which was a continuation of Stratum A (Plates I6 and I7). If Stratum A does extend beneath the hearthstone, the placement and use of this hearthstone must postdate the deposition of Stratum A. Should the existing hearthstone require replacement or stabilization in the future, archeological investigation of the deposits beneath it could provide valuable information on the configuration and sequence of earlier hearths associated with this fireplace.

Stratum A

The presence of the mortar surface in the kitchen has important implications for Stratum A, whose presence must postdate use of the mortar surface. Since any naturally occurring loams were removed during leveling of the site for construction of the east wing, and the mortar surface was the first culturally deposited level above the sterile clay and sandstone, Stratum A loam could not have developed naturally, in situ, beneath the wooden floor. Stratum A did not exhibit the stratification suggestive of periodic flooding as did the silt deposits above the mortar floor in the north cellar. The only alternative explanation is that Stratum A was brought in from outside the basement rooms of the east wing. The important question then, is whether the artifacts from Stratum A were brought in with the fill deposit. Or, was "clean" loam deposited in the cellar to stabilize the wooden sleepers and the artifacts accumulated above the loam fill during historic repairs and/or replacements of the floor. If the artifacts were brought in with the fill, they cannot provide

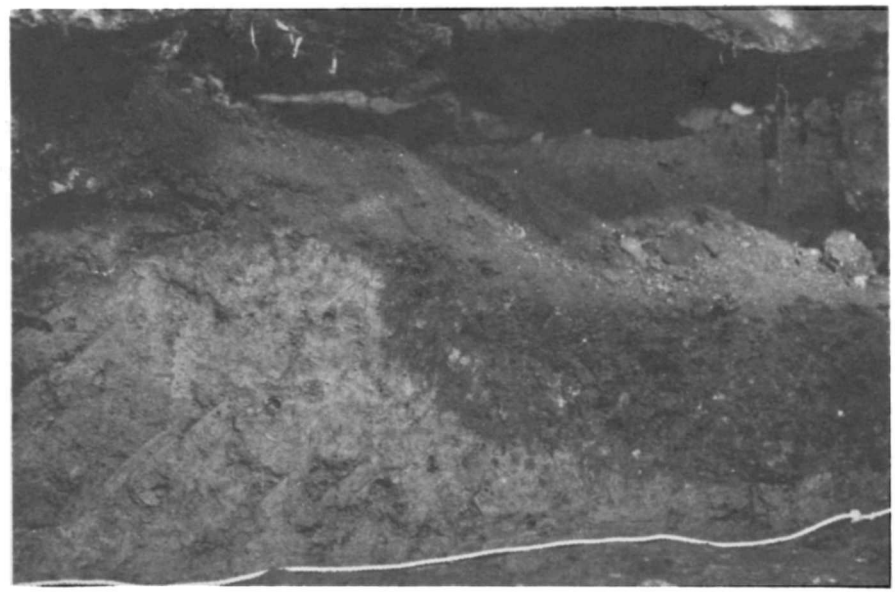


Plate 16
Profile of deposits beneath east edge of hearthstone.
Dark soil is Stratum A.



Plate 17
Profile of deposits in moulder's kitchen beneath east edge of hearthstone.
From the top of the photograph:
Stratum A loam, Stratum B clay, Stratum C sandstone.

significant information on the behavior of those people using the east wing basement rooms. Souder reported that the sleepers of the kitchen floor were "set in earth" (1965:4). The conditions beneath the floor in 1975, reported by park maintenance personnel (Miller 1975), also indicated that soil buried the sleepers and that much of this soil was removed at that time in order to provide circulation to the deteriorating log sleepers. These reports do not suggest that cultural debris was separate from the soil around the sleepers. Some mixing of originally separate levels could have occurred during earlier repairs to the floor, which would have trampled artifacts into the soil. However, if the loam and artifacts originated separately the profile of the deposit should exhibit an essentially sterile loam layer with most of the cultural debris occurring on and imbedded in the surface of the loam. However, Stratum A contained a wide range of artifacts throughout the deposit and there was no indication in the profile that the soil and artifacts had originally been separate.

Much of the debris itself suggests that Stratum A is fill material. Food bone recovered beneath the kitchen and dining room floors represented 7.5 percent of the total cultural debris from the east wing (Table 2). Rat bone represented 62.06 percent of the nonfood bone found beneath the kitchen and dining room floors. It is very improbable that fresh food scrap was discarded beneath the floor during the active use of the east wing basement. Surely the occupants realized that this practice would attract vermin, not to mention the odor they would have to endure from garbage thrown beneath the floor. Also, all of the swine and cattle bone collected from Stratum A had been sawn. Use of the saw rather than a hatchet or cleaver in butchering large animals was not common until the late nineteenth century.

Almost 87 percent of the clothing fasteners recovered from the site came from Stratum A beneath the moulder's kitchen Table 3). Identical utilitarian buttons occurred repeatedly, which was not surprising. However, a particularly ornate button occurred five times in three different excavation units in the kitchen (Plate 18). A distinctively styled cuff link occurred three times in two separate excavation units in the kitchen. While individual buttons could easily be lost through seams

TABLE NO. 2

ARTIFACT DISTRIBUTION BY EXCAVATION UNIT

EAST WING BASEMENT

Artifact Group & Class	Moulder's Kitchen Count								Moulder's Dining Room						TOTAL East Wing			
	N0 E60	N0 E65	N0 E70	S5 E55	S5 E60	S5 E65	S5 E70	TOTAL	N10 E35	N10 E40	N10 E50	N5 E40	N0 E40	N0 E45	N0 E50	S5 E50	TOTAL	
KITCHEN																		
Ceramics	18	24	14	21	27	27	15	146	4	6	21	6	0	0	3	49	89	235
Containers	25	48	2	66	42	23	8	214	33	32	22	33	0	0	11	123	254	468
Tableware	1	4	2	0	0	0	0	7	0	0	0	0	0	0	0	1	1	8
Kitchenware	0	0	2	1	0	0	0	3	0	0	0	0	0	0	0	0	0	3
TOTAL	44	76	20	88	69	50	23	370	37	38	43	39	0	0	14	173	344	714
ARCHITECTURE																		
Window Glass	39	27	21	67	30	59	24	267	76	86	3	24	1	5	28	336	559	826
Nails/Spikes	103	79	22	110	45	64	26	449	4	16	25	9	1	6	20	46	127	576
Construction Mats.	7	2	0	9	3	0	3	24	0	0	0	0	0	0	1	103	104	128
Door/Window Hardware	1	0	0	0	0	0	1	2	0	0	1	0	0	0	0	3	4	6
TOTAL	150	108	43	186	78	123	54	742	80	102	29	33	2	11	49	488	794	1536
FURNITURE	5	4	0	5	1	7	1	23	0	0	0	0	0	1	1	0	2	25
ARMS	2	2	0	3	2	0	0	9	0	0	0	0	0	0	0	2	2	11
CLOTHING																		
Fabric/ Apparel	9	1	0	4	1	2	0	17	0	1	1	0	0	1	0	2	5	22
Make/Repair	1	6	0	4	0	3	0	14	0	0	0	0	0	0	0	6	6	20
Fasteners	42	23	11	51	31	48	19	225	0	1	0	0	0	0	2	19	22	247
TOTAL	52	30	11	59	32	53	19	256	0	2	1	0	0	1	2	27	33	289

Artifact Group & Class	Moulder's Kitchen Count								Moulder's Dining Room						TOTAL East Wing			
	N0 E60	N0 E65	N0 E70	S5 E55	S5 E60	S5 E65	S5 E70	TOTAL	N10 E35	N10 E40	N10 E50	N5 E40	N0 E40	N0 E45	N0 E50	S5 E50	TOTAL	
PERSONAL																		
Coins	2	0	2	3	2	0	0	9	0	1	0	0	0	0	0	1	2	11
Keys	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Personal	2	5	0	7	2	6	1	23	1	0	0	0	0	0	0	3	4	27
TOTAL	6	5	2	10	4	6	1	34	1	1	0	0	0	0	0	4	6	40
KAOLIN PIPES	0	1	0	0	1	1	0	3	0	0	0	0	0	1	0	1	2	5
ACTIVITIES																		
Leisure	3	4	2	7	7	9	8	40	0	0	1	0	0	0	0	1	2	42
Misc. Hrdware	8	5	4	19	2	8	2	48	1	0	3	0	0	0	1	8	13	61
Toys	0	2	2	1	0	2	0	7	0	0	1	0	0	0	0	1	2	9
Fishing Gear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stable & Barn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Construction Tools	0	1	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
TOTAL	11	12	10	27	9	19	10	98	1	0	5	0	0	0	1	11	18	116
TOTAL	270	238	86	378	196	259	108	1535	119	143	78	72	2	14	67	706	1201	2736
FOOD BONE	16	18	3	102	18	8	9	174	5	3	7	0	0	1	10	39	65	239
NON-FOOD BONE	7	11	1	58	12	8	2	99	0	13	1	0	0	0	9	52	75	174
TOTAL	23	29	4	160	30	16	11	273	5	16	8	0	0	1	19	91	140	413
GRAND TOTAL	293	267	90	538	226	275	119	1808	124	159	86	72	2	15	86	79	97	1341

TABLE NO. 3

TOTAL ARTIFACT DISTRIBUTION BY EXCAVATION AREA

ARTIFACT GROUP	West Porch	East Wing	South Areaway	North Areaway	North Cellar	South Cellar	Total Artifact Inventory
KITCHEN							
Ceramics	293	235	44	74	7	0	653
Containers	49	468	34	104	3	0	658
Tableware	0	8	0	1	0	0	9
Kitchenware	0	3	0	0	0	0	3
TOTAL	342	714	78	179	10	0	1323
ARCHITECTURE							
Window Glass	1854	826	129	122	30	1	2962
Nails/Spikes	239	576	20	73	5	1	914
Construction Mat.	6	128	0	4	0	0	138
Door/Window Hardware	0	6	0	0	0	0	6
TOTAL	2099	1536	149	199	35	2	4020
FURNITURE							
Lighting Device	2	9	0	0	1	0	12
Decoration	3	8	0	0	4	0	15
Hardware	0	8	0	0	0	0	8
TOTAL	5	25	0	0	5	0	35
ARMS	0	111	0	1	0	0	12
CLOTHING							
Fabric/Apparel	4	22	0	0	0	0	26
Make/Repair	3	20	0	1	0	0	24
Fasteners	12	247	0	0	0	0	259
TOTAL	19	289	0	1	0	0	309

ARTIFACT GROUP (Cont.)	West Porch	East Wing	South Areaway	North Areaway	North Cellar	South Cellar	Total Artifact Inventory
PERSONAL							
Coins	2	111	0	0	0	0	13
Keys	0	2	0	1	0	0	3
Personal	2	27	0	2	0	0	32
TOTAL	4	40	0	3	0	0	47
KAOLIN PIPES	0	5	0	0	0	0	5
ACTIVITIES (includes pamplin pipes, writing paraphanalia)							
Leisure	8	42	0	0	2	0	52
Misc. Hardware	2	61	2	1	2	0	68
Toys	1	9	0	1	0	0	11
Fishing Gear	1	0	0	0	0	0	1
Stable & Barn	0	1	0	0	0	0	1
Construction Tools	0	3	0	0	0	0	3
TOTAL	12	116	2	2	4	0	136
TOTAL	2481	2736	229	385	54	2	5887
FOOD BONE	80	239	12	15	7	0	353
NON-FOOD BONE	63	174	1	1	5	0	244
TOTAL	2624	3149	242	401	66	2	6484

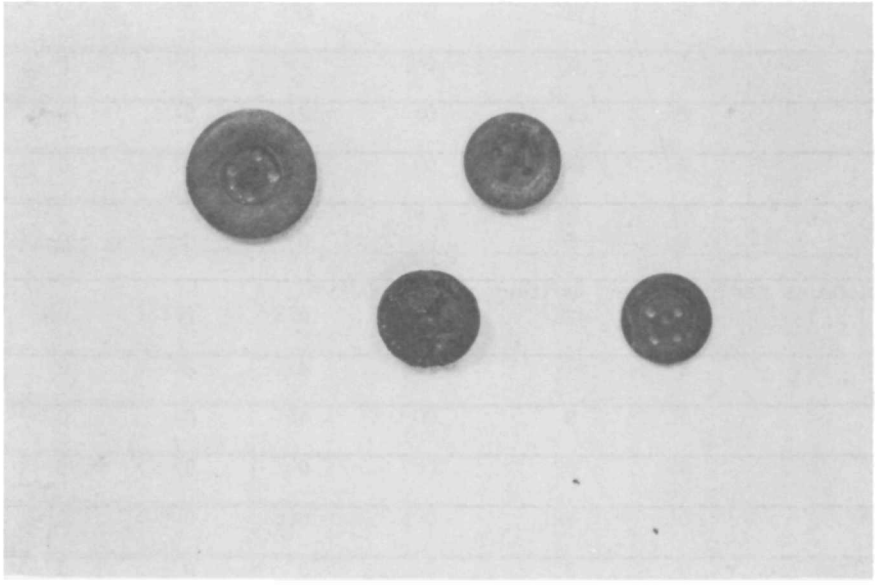


Plate 18
Sample of buttons recovered from moulder's kitchen, Stratum A. Four more buttons identical to the third button in the photograph were found in the kitchen. The five-holed buttons were first manufactured c. 1837. Buttons are actual size.

or breaks in the wooden floor, it seems unlikely that five especially ornate, identical buttons would occur so frequently if they were accidentally lost from a piece of clothing. Most of the buttons may be part of a discarded sewing kit or button collection. The latter possibility seems most likely because a proportional increase in other clothing paraphernalia was not recovered from Stratum A. Whatever the context of the buttons prior to their loss or discard, they were apparently a common late nineteenth century item in trash deposits around the house. A large quantity of buttons were also recovered from the 1876 family privy northeast of the house (Abel 1964:71). Since the indoor bathroom in the Ironmaster's House was apparently built by 1871, this privy may have been used primarily as a trash pit. The buttons from the moulder's kitchen may have been transferred from another trash deposit which was disturbed as part of the fill brought into the east wing basement.

Twenty-four pencil fragments made up 18 percent of the activities-related artifacts beneath the moulder's kitchen floor. In 1817 one pencil cost 12.5 cents, one half day's pay at the furnace (Walker 1966:350). Such an expensive item would have been highly curated in the first half of the nineteenth century at Hopewell, and it is very unlikely that these pencils represent activities associated with the use of the east wing during the 1825-44 period of furnace operation.

If the artifacts in Stratum A were brought in as part of the fill dirt, they should exhibit a random distribution between and within the kitchen and dining room. However, if the artifacts beneath the floor represent a primary deposit, and their place of deposition reflects their place of use, their location at the time of recovery should approximate their place of use in the room above, and these artifacts should exhibit a nonrandom distribution reflecting human behavior in these rooms.

The chi square one sample test (Siegel 1956) was used to compare the occurrence of various categories of artifacts between the kitchen and dining room, as well as between the excavation units within each room. The results of this test, shown in Table 6, indicate that in the majority of artifact categories tested, a nonrandom distribution of artifacts occurs

both between the rooms and within the rooms. However, looking at the distribution of artifacts in individual excavation units (Fig. 3; Table 4), the greatest concentrations of debris generally occur at doorways and along the edges of the room, and the smaller concentrations of artifacts tend to be towards the centers of the rooms. This is the distribution to be expected when you consider that removal of soil around the sleepers would logically proceed by scraping the soil towards the exists to facilitate its removal from the structure. Therefore, the statistically significant nonrandom distribution of artifacts in these rooms could easily be the result of the documented partial removal and disturbances to Stratum A in 1975.

The presence of early, middle, and late nineteenth century items in Stratum A (Plates 19-21), suggests that the fill was brought from an area which had been accumulating debris for a long time. Some of the smaller, late items could have been lost through cracks in the wooden floor and actually be directly associated with behavior in these rooms. However, it is impossible to segregate the date of deposition of the earlier and later artifacts due to the lack of stratification in Stratum A. It is most likely that four periods or activities are represented by the debris recovered from the east wing basement: (1) the use of these rooms with a clay and mortar floor; (2) replacement of the mortar floor with a wooden floor supported by the clay subsoil; (3) the raising of the wooden floor and filling around the sleepers with soil and debris; (4) repairs to the wooden floor. The loss of small items beneath the wooden floor was probably continual and not restricted to a specific period.

The raising of the wooden floor and filling with soil around the sleepers certainly had the most profound influence on the character of material culture found beneath the floor. The date the filling was accomplished is probably associated with one of two major construction and renovation periods at the house: c. 1834-46, when a one and one-half story addition was made to the original one and one-half story east wing, or c. 1869, when other renovations were made in anticipation of renewed production at the furnace (Walker 1966: 64-5). These later

TABLE NO. 4

CHI-SQUARE ONE-SAMPLE TEST FOR DISTRIBUTION OF ARTIFACT GROUPS IN EAST WING BASEMENT

A. H_o - Artifacts are randomly distributed in east wing basement.

B. H_1 - Artifacts are not randomly distributed in east wing basement. Accept Ho if X^2 is equal to or less than tabled value of X^2 at alpha .05.

Distribution of Artifact Groups Between Kitchen and Dining Room

ARTIFACT GROUP	TABLE VALUE X^2	SAMPLE VALUE X^2 RANDOM	SAMPLE VALUE X^2 NON-RANDOM	LOCATION OF SIGNIFICANT CONCENTRATION
ARMS	df=1, X^2=3.84		4.46	KITCHEN
FURNITURE	df=1, X^2=3.84		33.40	KITCHEN
ARCHITECTURE	df=1, X^2=3.84	1.96		------
KITCHEN	df=1, X^2=3.84	.68		------
CLOTHING	df=1, X^2=3.84		167.84	KITCHEN
PERSONAL	df=1, X^2=3.84		50.42	KITCHEN
PIPES	df=1, X^2=3.84	3.0		------
ACTIVITIES	df=1, X^2=3.84		36.5	KITCHEN

Distribution of Artifact Classes Between Kitchen and Dining Room

CLASS				
Ceramics	df=2, X^2=5.99		11.76	KITCHEN
Containers	df=1, X^2=3.84	3.42		DINING ROOM
Construction Mat.	df=1, X^2=3.84		50.00	DINING ROOM
Ceramics	df=6, X^2=12.59	8.38		KITCHEN
Ceramics	df=5, X^2=11.07		11.63	DINING ROOM
Containers	df=3, X^2= 7.82		13.35	KITCHEN
Containers	df=6, X^2=12.59		72.44	DINING ROOM
Furniture	df=6, X^2=12.59		17.30	KITCHEN
Window Glass	df=6, X^2=12.59		60.50	DINING ROOM
Fasteners	df=6, X^2=12.59		43.83	KITCHEN
Writing Paraphanalia	df=6, X^2=12.59		39.39	KITCHEN
Activities	df=6, X^2=12.59		21.83	KITCHEN

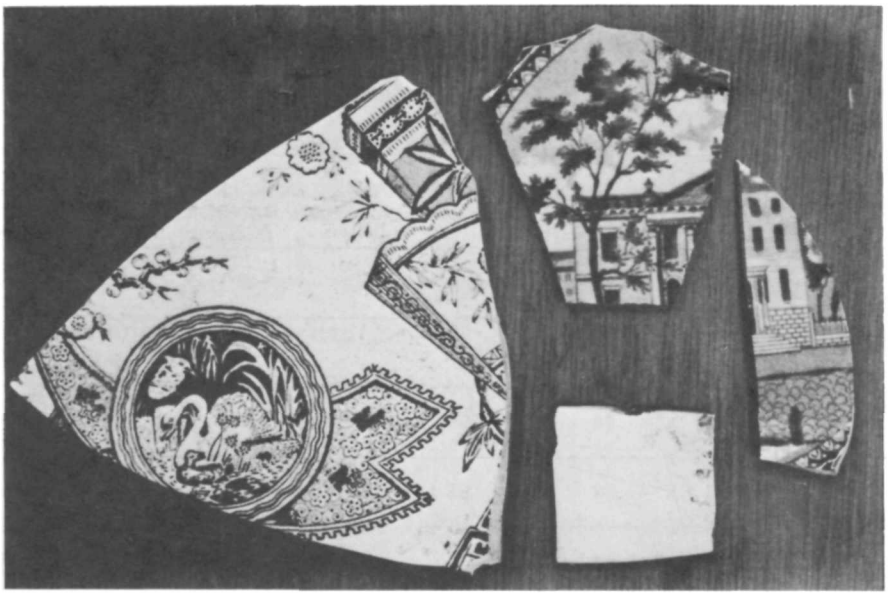


Plate 19
Variety of ceramics from early to late 19th century in Stratum A: Japanese motif on stone china manufactured from 1842 to 1914; Ridgeway Beauties of America, Philadelphia Library, manufactured c. 1814 to 1830; Ridgeway Beauties of America, Boston Athenaeum, manufactured c. 1814 to 1830; stone china, maker's mark indicates manufacture after 1893. Sherds are shown half actual size.

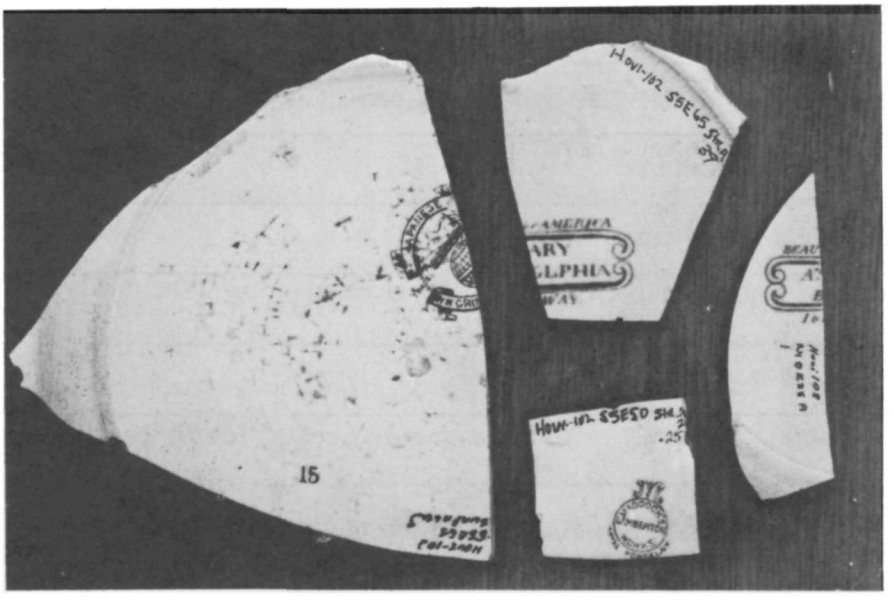


Plate 20
Maker's marks of Plate 19 ceramics.



Plate 21

Early to late 19th century objects in Stratum A: cartridge casings, both manufactured by UMC Cartridge Company prior to merger with Remington, C. 1867-1902; bottle base with machine made valve mark, manufactured popularly c. 1930-1940; crude sheared lip and laid on ring on light green glass, c. 1830-1870; red earthen-ware elbow type pipe bowl, c. 1885?; kaolin pipe bowl similar to Hume's type 25 (1974"303) c. 1790-1820; blue lead glazed crockery marble, first manufactured c. 1842. Artifacts are shown half actual size.

renovations included completion of the west porch and construction of the second floor bathroom and supporting utilities.

It is a long held assumption, based on oral tradition, that with construction of the original one and one-half story east wing c. 1828-30, the first floor hearth and the basement hearth were simultaneously finished and intensively utilized for meal preparation and consumption: the first floor hearth provided meals for the Ironmaster's family, and the basement kitchen provided meals for the furnace workers. However, why would two new kitchens be outfitted and used simultaneously? It seems unfounded to build two, new, separate kitchens to feed an increased number of furnace workers, when one large facility would have served equally well. If both kitchens were used simultaneously right after construction of the east wing, it must have been due to a desire of the Ironmaster for private kitchen and dining space on the first floor. However, it may be that the basement kitchen was not used on a daily basis simultaneous with the use of the first floor kitchen, and a thin mortar floor was considered adequate for any additional cooking which was necessary in the basement. The addition of the one and one-half upper story between 1834-46 (Abel 1964:46) implies that additional people were to be housed in the Ironmaster's House at that time, requiring a greater volume of meal preparation. It may have been in anticipation of greater use of the basement kitchen to feed these new residents that the basement floor was replaced with an improved wooden floor, supported by sleepers set in earth and pocketed into a raised footing.

Minimal early use of the basement rooms gains further support by the fact that the first floor hearth was originally much larger. Its original cooking capacity was reduced after 1840 by installation of a brick lining in the fireplace recess in order to install a Kisterbock stove (Abel 1964:40). This suggests to the author that the first floor kitchen may have provided meals for the furnace workers as well as the Ironmaster, prior to the need to use both kitchens following the addition of the upper story to the east wing.

A c. 1834-46 period of maximal use of the basement kitchen is also supported by the overwhelming presence of stone china and whiteware in the deposit beneath the basement floor. These two ceramic types did not reach their peak of popularity until 1857-1860 (South 1977:211) yet represented 67.50 percent of the ceramics recovered from the east wing. Abel found thousands of stone china sherds in the 1876 privy, but the 1830 privy gave up almost none of the stone china (1964:82-4). Stone china from Stratum A in the east wing represented 78.33 percent of the stone china recovered during these excavations, 20 percent of the remainder coming from the south areaway and above the north areaway wall. If the presence of stone china in the 1876 privy represents its period of greatest popularity at the house, the presence of the stone china in the fill dates the fill and modifications to the footing and sleepers to the late nineteenth century.

It is very doubtful that the amount and variety of debris found beneath the floor in the east wing basement would ever have been allowed to accumulate in the kitchen and dining room, to be lost or thrown beneath the floor during repairs to the floor. Although parts of Hopewell Village were in disuse and disrepair for a number of years, this was not the case for the Ironmaster's House. Even after 1915, when the Clingan family ceased using the house as a summer home, caretakers occupied the east wing until 1935, when the National Park Service acquired the property. From 1935 until 1959, the dining room was used for storage of artifacts and in 1959, the kitchen was furnished and used in interpretive tours of the house (Heydinger 1965:8). In addition, the debris recovered beneath the floor represented numerous sherds of various ceramic types from the late eighteenth through mid-nineteenth century (Plates 19 and 20). No vessels were reconstructed from the sherds recovered, few pieces even mended, and no sets or coordinated types of wares were recovered. Several ceramic sherds from Stratum A in the kitchen crossmended with other pieces of the same vessel found in fill deposits under the west porch and north of the north areaway wall (Table 3). This suggests that Stratum A fill in the kitchen, the 2' to 3' of fill beneath the north half of the west porch, and the fill north of the north areaway wall may have had the same origin.

West Porch

Excavations beneath the west porch were expected to produce evidence of original and successive porch dimensions, location, and original grade at the west side of the Ironmaster's House. Also, examination of the fill of any builder's trenches associated with the foundation walls of the north and south wings would allow comparison of construction periods for these two wings.

Removal of large sections of the porch floorboards revealed structural differences suggesting varying periods of porch construction or repair. The sleepers in the northernmost section of the porch were 2" by 6" milled boards. All other sleepers under the porch were rough-hewn logs, about 8" to 9" in diameter. Regularly spaced nail holes were observed down the length of these logs suggesting their reuse from another structure. Park records indicate that the west porch was stabilized in 1963 (Heydinger 1965:8).

Historically, the west porch experienced at least two major modifications whose dates are known based on oral tradition. In 1867, a 20' porch was built replacing a small square veranda, and in 1870, the 20' porch was lengthened to conform to the entire 53' western extent of the house (Abel 1964:8). However, the location of the 20' porch in relationship to the west side of the house is not documented. Based on the archeological examination of three of these porch walls, the small square veranda originally measured 5' 10" east-west by 6' northsouth, was extended west another 4' in 1867 to support the 20' porch extension to the north, the latter which was 10' wide, and extended from the south edge of Wall No. 4 to the stone wall constructed about 26' to the north (Wall 1). Prior to the construction of Walls 1 and 2, several feet of fill were deposited at the north side of the porch on which these shallow walls were built and partially buried.

Righter (1979:17) observed that the south face of Wall 6 was whitewashed and that the log beam supports of the central section of the west porch terminate on Wall 6 beside logs which have been added to elongate the porch to Wall 7. This may indicate that the west porch

experienced an additional interim lengthening to Wall 6 prior to the final lengthening of the porch to its 53' configuration c. 1870.

Excavation Units N20E5, N20E10, N15E5 and N15E10

In many cases, complete 5' by 5' units could not be excavated due to structural features of the porch which could not be removed. A total surface area of 66.5 sq. ft. was investigated within these excavation units.

Initial excavations revealed that the west wall of the south wing expanded several inches in thickness just below the soil surface in units N20E10 and N15E10 (Plate 22). Cotter (1958:1) also noted a widening of the north foundation of the north wing beginning 2-1/2' to 3' below the soil surface and extending below cellar grade.

The first 2" to 4" of soil removed from these units was a fine, powdery, brownish-orange deposit which contained a few artifacts including nine sherds of pearlware and two sherds of whiteware which produced a MCD of 1814.8182. Although this MCD suggests an early nineteenth century date, four wire nails were also recovered from this deposit. Wire nails were apparently not used at Hopewell prior to 1935 (Heydinger 1972:12). Three of the wire nails came from the first 4" and one wire nail was found between 12" to 18" below the surface. This suggests that in spite of the presence of the early nineteenth century ceramics, this deposit has been much disturbed since 1935.

Below the first 2" to 4" of soil, to a depth of 18" below the surface, gravelly red clay and many randomly dispersed 8" to 10" diameter rocks were removed (Plate 23; Fig. 7). Some isolated occurrences of humic brown soil were noted during the excavation of the first 24". However, these proved to be associated with sycamore roots which had grown through the deposit. Much of unit N20E10 was also disturbed by a large animal burrow which tunneled through this area.

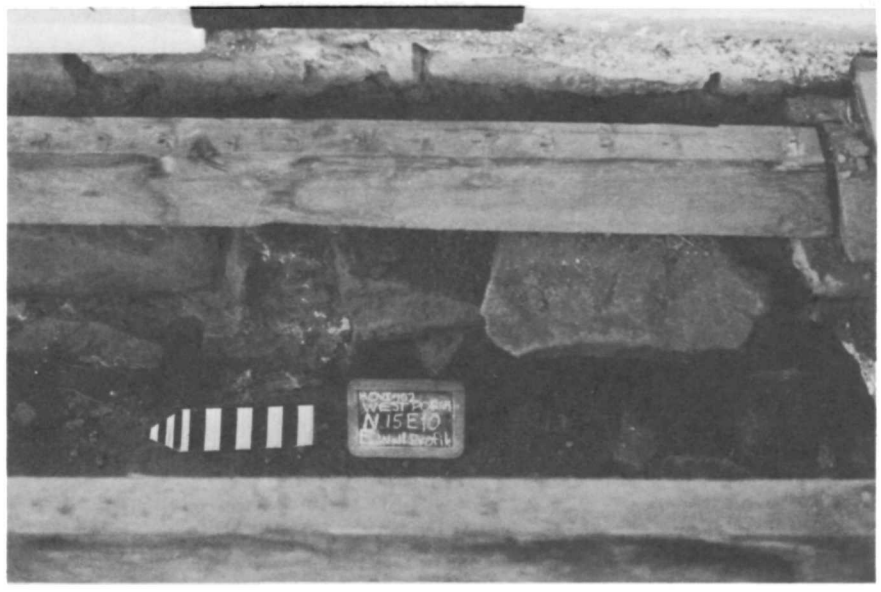


Plate 22
West foundation of Ironmaster's House. Portion of wall below sleeper expands wall several inches in thickness to below cellar grade.

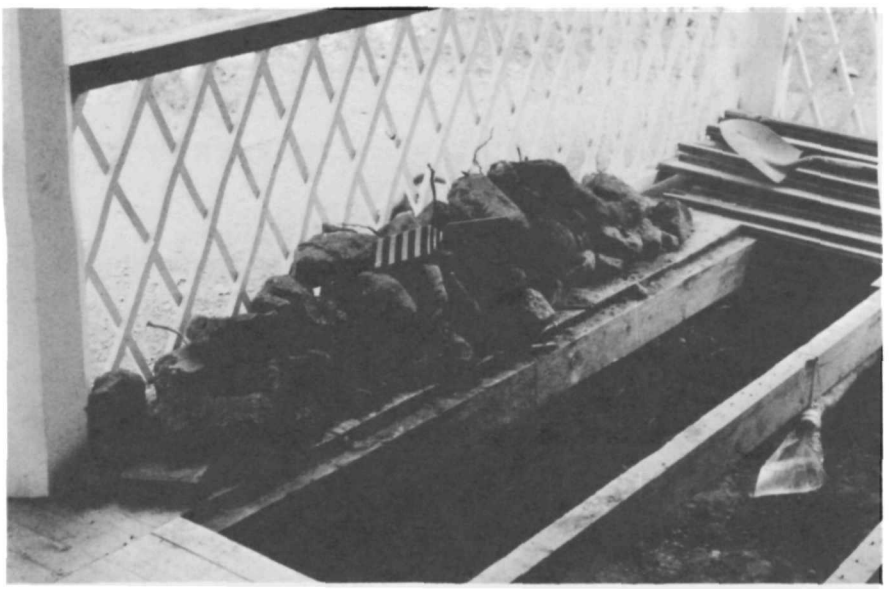
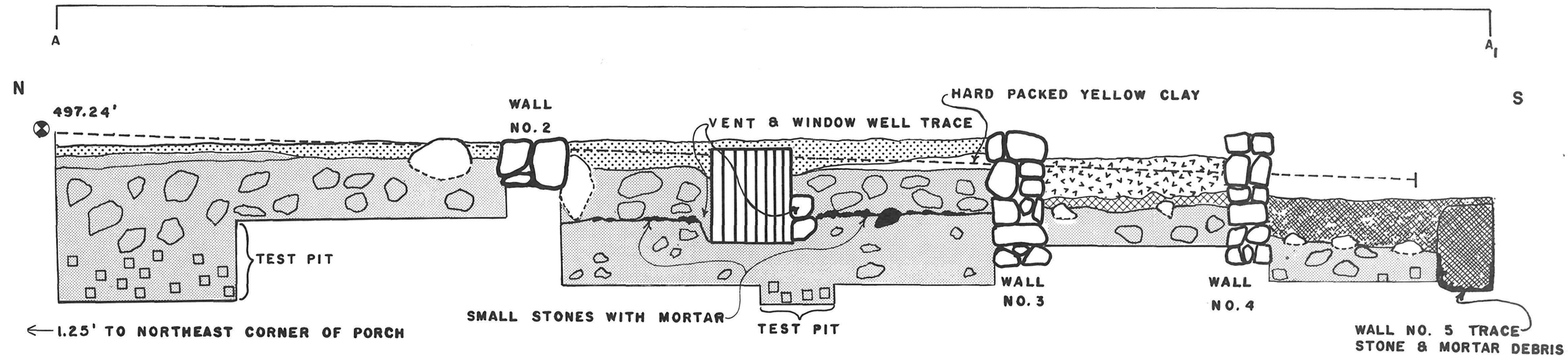


Plate 23
Some of the 8 to 10 inch diameter rocks removed from first 18 inches beneath N15E5 and 10 and N20E5 and 10.



KEY:

- LIGHT BROWNISH-ORANGE POWDERY SOIL
- REDDISH-ORANGE CLAY
- LINE OF SPREAD FOUNDATION
- LOOSE TRASH, DEBRIS
- HUMIC, DARK BROWN SOIL
- DARK YELLOWISH BROWN HARD CLAY
- STONE FILL
- NATURALLY OCCURRING SANDSTONE
- FIELDSTONE WALLS

SCALE: 1/2" = 1'

PROFILE OF FEATURES AND STRATIFICATION

WEST PORCH, IRONMASTER'S HOUSE

FIG. 7

376	28,002
DSC	MAR 80

Since planned disturbances to this area were not to exceed 6" of grading below the present surface, and significant cultural resources had not been uncovered at 24" below the surface, further investigation of this area was limited to a 2' by 3' test trench which extended 40" below the surface (Plate 24). This test trench was located directly against the west foundation wall of the north wing, and exposed a section of that wall also to 40" below the surface. There was no builder's trench for the west foundation in this area. A soil change occurred at about 30" below the surface. At this point, naturally occurring red clay and yellow sandstone conglomerate replaced the gravelly red clay and large rocks. This change from a natural deposit to the rock and gravel filled red clay must mark the transition from original grade to fill deposits at the west side of the north wing. However, if 30" below grade represents an historic occupation level of any duration, it is disturbing that the surface of the natural red clay and sandstone conglomerate was not more clearly defined by some accumulation of cultural debris. Just by chance, the location and size of the test pit may account for the lack of cultural debris between these two deposits. It is also possible that deposition of the gravelly red clay and large rocks disturbed the former surface. Cotter's archeological investigation of the north foundation indicated that existing grade on the north side of the north wing was only several inches above original grade (1958b:3). This dichotomy in original grade at the north and west sides of the house is puzzling. However, the existence of original grade 30" below the surface at the west side of the north wing is supported by other archeological evidence. Most significant to this interpretation is the fact that there was no builder's trench for Wall 2 and it was resting on the same gravelly red clay that buried the wall to a level just beneath the porch floorboards. The gravelly red clay, large rocks, and several boulders found above the sandstone and red clay conglomerate must be fill deposited c. 1867 in conjunction with the construction of the 20' north porch addition (Plate 25). Wall 2 was a shallow (10" deep), haphazard construction of field stones reinforced by thin, grey roofing slates and brick rubble (Fig. 8). The clay and gravel which buried this wall was probably deposited to increase the stability of the wall. It is very doubtful that the boulders supporting the sleepers and the numerous large rocks removed from the first 18" of the red clay,



Plate 24
Test trench in N20E10. What remains of the animal burrow is seen in the upper left. The sandstone chunks are the light colored inclusions in the profile.

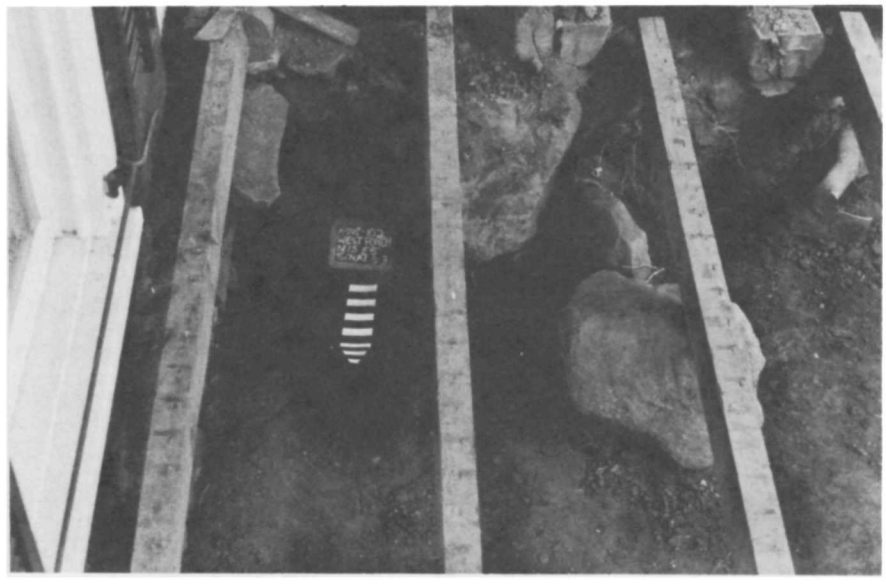
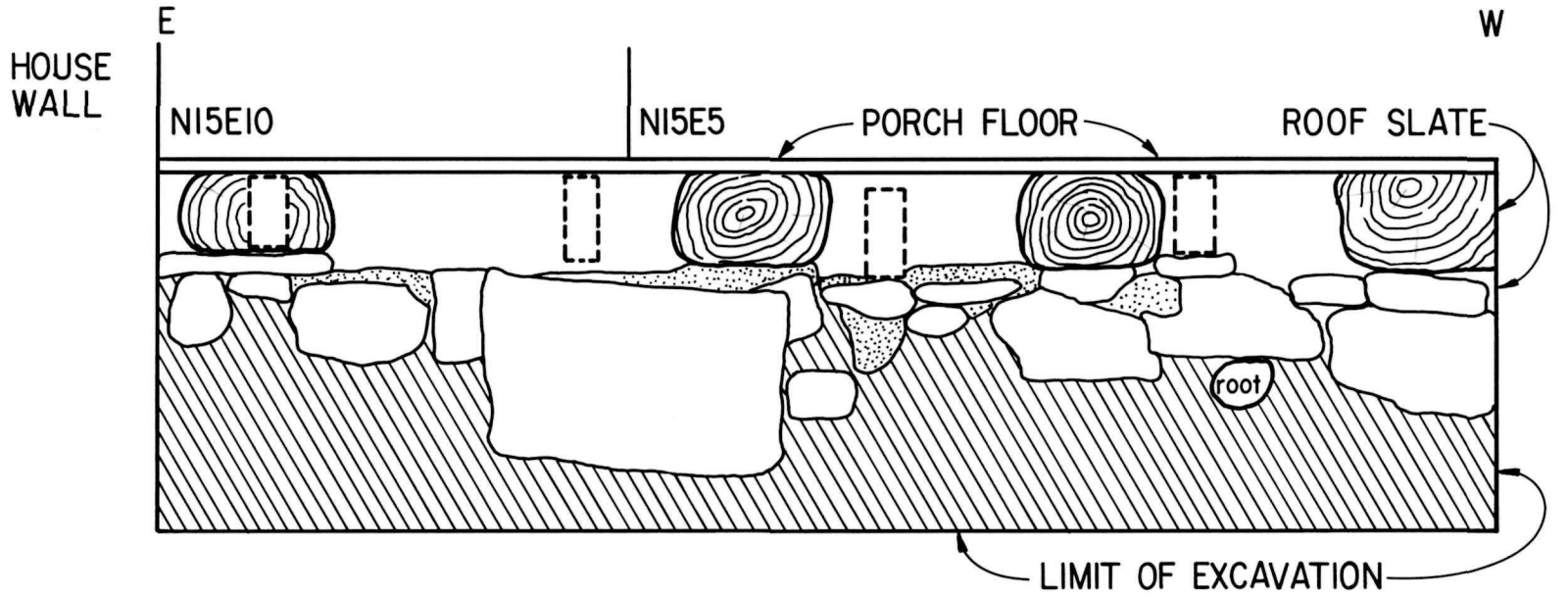


Plate 25
After removal of several feet of fill, these boulders remained supporting the porch sleepers. The hewn timber sleepers meet the log sleepers above wall No. 2.



KEY:

- HEWN TIMBER SPANNING WALLS 1 & 2
- LOG SLEEPER
- STONE
- MORTAR
- REDDISH-ORANGE CLAY

SCALE: 1" = 10"

PROFILE OF WALL NO. 2

FIG. 8

remained as grade at the front of the house for any extended period prior to construction of the north porch addition.

Excavation Units N10E10 and N5E10

These two units spanned the distance between Porch Wall 2 and Porch Wall 3 8' to the south (Fig. 7). These two excavation units extended 3' west of the west foundation wall of the north wing and covered a surface area of 27 sq. ft.

The surface deposit here was a pebbly, light brown, powdery soil at the same elevation as the surface north of Wall 2. A thin, hard-packed yellow clay occurred at 4" to 6" below the surface, being 6" thick near Wall 2 and thinning out to about one-half in at its northern extent. Beneath this yellow clay, a mottled, hard-packed orange clay containing numerous 8" to 10" diameter rocks was removed to a depth of between 18" and 24" below grade. Removal of all the large rocks and their orange clay matrix exposed an uneven surface at 18" to 24" below grade. This new surface was defined by small, mortar covered stones imbedded in a reddish-orange clay. This new deposit was excavated to 38" below grade, at which point a test pit was opened. This test pit was taken down to 44" below the surface and indicated a change from the reddish-orange clay to the naturally occurring red clay and sandstone conglomerate at about 42" below the surface. Cultural debris was not recovered below the 42" level. Natural clay and sandstone deposits here appear to occur 10" to 12" lower than they were first encountered in the units to the north.

During the excavation of this section we expected to expose the vent which was visible from inside the cellar of the north wing but which was buried below existing grade beneath the west porch. The deposits burying this vent under the west porch must postdate considerably the construction of the north wing, assuming that the vent was originally exposed, as are the vents in the south wing cellar, or protected by a window well, as was the vent on the north side of the north wing (Cotter

1958a:1). After removing the light brown powdery surface deposit, the thin layer of yellow clay and the hard packed, mottled orange clay and rocks which buried the vent on the outside, it was discovered that a stone window well had originally protected the vent (Plate 26). Part of the south wall of the window well was still extant and mortar on the surface of the upper stone indicated it had originally been at least three courses high. A trace of the west and north sides of the stone window well was visible as a rectangular depression northwest of the vent. The active use of this window well was apparently associated with the uneven surface defined by the small, mortar covered stones embedded in the reddish-orange clay. Since original grade, which appears to be the surface of the sandstone and red clay conglomerate, occurs 10" to 12" lower here (42" below grade) than at the northwest corner of the north wing, the base of the vent must have been 15" to 16" above original grade immediately following construction of the west wall of the north wing. Therefore, it must have been necessary to mound additional soil beneath the vent in order to construct the window well.

The thickened west foundation of the north wing first exposed in the units to the north was also exposed here, continuing its gentle dip to the south. A builder's trench for the west wall of the north wing was not found in this section.

Most of the artifacts recovered from these two excavation units were removed from the window well trace and must have accumulated in the well prior to its destruction. The window well may have been destroyed when the mottled, orange clay and rock fill was deposited here in conjunction with the north porch addition c. 1867, causing some mixing of the artifacts from the window well with the new fill.

The MCD of the ceramics from the window well is 1808.5088. Of the total assemblage of debris removed from the window well trace, 64.21 percent was kitchen refuse, including food bone. This is significantly higher than the precentage of kitchen refuse recovered from other sections beneath the west porch (Table 5). Ninety-eight percent of the food bone was chicken and rabbit; bone of pig, cattle, and sheep was



Plate 26
Vent in west wall of north wing after removal of soil and rock fill. Remnant of stone window well is to the right and slightly above the photo board. Photo board is resting in trace of well left by missing stones.

TABLE NO. 5

DISTRIBUTION OF ARTIFACTS BY EXCAVATION UNIT
WEST PORCH

Kitchen	N0E5/E10	N5E10/N10E10	NI5E5&10N20E5&10	S5E5&10
Ceramics	20	126	13	134
Containers	7	6	4	32
Tableware	0	0	0	0
TOTAL	27	132	17	166
Arch.				
W. Glass	1700	48	35	71
Nails/Spikes	33	44	20	142
Const. Mats.	1	0	2	1
Struct. Hrdware.	2	0	0	0
TOTAL	1736	92	57	214
Clothing				
Make/Repair	0	1	0	2
Fabric/Apparel	0	0	1	3
Fasteners	0	0	0	12
TOTAL	0	1	1	17
Furniture				
Lighting Device	0	0	1	1
Hardware	0	0	0	
Decorations	0	0	0	3
TOTAL	0	0	1	4
Personal				
Coin	0	1	1	0
Ornament.	0	0	0	1
Groom.	0	0	0	1
TOTAL	0	1	1	2
Activities				
Leisure	3	1	1	1
Misc. Hardware	0	1	1	0
Fishing Gear	0	1	0	0
Toys	0	0	0	1
Smoking	0	0	1	1
TOTAL	3	3	3	3
TOTAL	1766	292	80	406

almost nonexistent (Table 6). Sherds from several early nineteenth century ceramic teapots or pitchers, the only examples from the site, were recovered from the window well trace, as well as fragments of several tea cups, cups, and small saucers (Plate 27). The window well was located just 3' from the original small square veranda. The high percentage of chicken and rabbit bone suggests meals eaten by hand rather than with utensils. This evidence in addition to the presence of mostly teaware in the identifiable ceramic sherds, suggest that the window well may have served as a convenient trash pit for debris from light meals or refreshments taken on the veranda in the early nineteenth century, prior to the filling north of the veranda.

Excavation Units N0E5 and N0E10

Porch Walls 3 and 4 made up the north and south limits respectively of these two excavation units. Ten inches of loose trash and debris including broken glass, concrete, wood, newspaper, plaster, and broken mortar were removed before exposing the surface of a soil deposit in this area (Plate 28). This soil surface occurred 16" lower than the surface of the soil deposits to the north.

Walls 3 and 4 were three times as deep as Wall 2, averaging 30" in total height compared to the 10" height of Wall 2. About 6" of the base of Walls 3 and 4 rested below grade in sterile red clay and builder's trenches were not found. Both walls had been plastered on the outside.

Window glass fragments recovered from the loose surface trash deposit in unit N0E10 totaled 1068 pieces, or 86.73 percent of the total glass, and 64.81 percent of the total artifacts recovered from the west porch excavations (Table 5). This accumulation of window glass brings to mind the replacement of the first floor windows at the west side of the house c. 1867. The glass sherds from this area could represent either the older six-over-six, 10" by 12" glass panes or the two-over-two, 14" by 43" panes which replaced them in 1867. Many of the fragments recovered measured at least 6" on a side, but none of them could be definitely associated with a documented pane size.

TABLE NO. 6

DISTRIBUTION OF FOOD BONE, WEST PORCH AND EAST WING

EXCAVATION UNIT	BONE TYPE	COUNT
WEST PORCH		
N5E10,N10E10	Chicken	26
	Rabbit	15
	Sheep/Pig	1
TOTAL		42
N0E10, N0E5	Chicken	2
	Rabbit	1
	Turkey	2
	Pigeon	4
TOTAL		9
N20E10, N20E5, NI5E10, N15E5	Chicken	3
	Rabbit	1
	Cow	1
	Pig	1
TOTAL		6
S5E5, S5E10	Chicken	1
	Rabbit	1
	Cow	17
	Pig	1
	Sheep/Pig	3
TOTAL		23
EAST WING		
Stratum A	Chicken	82
	Rabbit	13
	Turkey	19
	Goose	4
	Pigeon	2
	Duck	1
	Quail	2
	Fish	1
	Sheep	2
	Cow	38
	Pig	26
	Pig/Sheep	57
TOTAL		247
TOTAL WEST PORCH AND EAST WING		= 270
23 + 247		



Plate 27
Ceramics recovered from window well trace: left to right: blue shell edge pearlware; silver luster finish on red earthenware with embossed rim; mocha pattern on light yellow creamware; blue handpainted pearlware; hand painted polychrome pearlware. Sherds are shown half actual size.

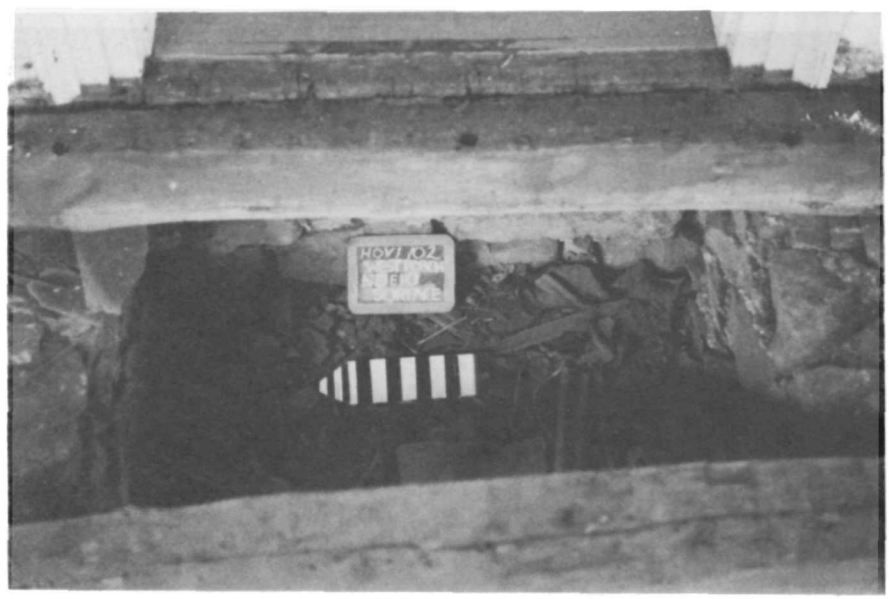


Plate 28
Loose trash and debris on surface of NOE10 before excavation.

Two distinct types of glass were represented by the collection from N0E10. One was greenish tinted, thick (.25 cm) glass which showed few flaws, bubbles, or other stress marks and was probably no earlier than late nineteenth century. The second group was thinner (.15 cm), had a bluish tint and numerous bubbles, ridges, and other manufacturing stress marks. It was initially thought that this apparently poor quality glass might represent the earlier 10 by 12 panes based on the apparent manufacturing flaws. However, upon closer examination these stress marks became suspect. Some sherds did not consistently exhibit circular or elongated stress patterns, but often showed a mixture of the two. This condition suggested, as Hume has noted (1969:17-8), that perhaps this group of window glass is a modern imitation of old glass. In this case, the window glass may have been specially fabricated for the National Park Service to approximate the quality and appearance of early nineteenth century glass used historically in the Ironmaster's House.

Red paint adhered to the edges of a few pieces of the poor quality glass where the pane originally met the sash. The most recent documented use of red trim on the house is 1961 (Fairbairn 1961:3). Therefore, the stained sherds may have been deposited during a window replacement which might have been included with the 1963 stabilization of the west porch (Heydinger 1965:8). That other twentieth century repairs were done on the porch floor prior to 1963 is suggested by c. 1929-33 newspaper scraps found with the glass debris.

A mortar scar adhered to the interior of Walls 3 and 4 at about 15" below the top of the walls (Plate 29). The scar was almost a foot deep against the foundation wall of the north wing. However, it tapered out to a minimum of 5", 4' west of the house, which was the limit of the excavation in this location. Occurring at the same elevation as the scar on the walls but resting on the soil were broken pieces of what appeared to have been a poured mortar slab. This feature rests too far below the front door sill to be interpreted as an earlier porch associated with the present doorway, unless a stairway originally connected the mortar slab with the entrance to the house. No riser or treader marks were visible on the walls to support this theory. The presence of the scar on the



Plate 29
NOE10 after excavation. Mortar scar is visible to right of photo board.

walls indicates that these walls were already present when the mortar was deposited.

The deposit beneath the trash and mortar was a loose, dark brown humic soil about 4" deep. The surface of this deposit was pitted and uneven, which was evidently caused by the trash and mortar having been imbedded in this surface to some extent. A shallow trench had been excavated into this deposit to about 20" below the surface and extended 15" west of the west foundation of the north wing. The trench had been filled with stone rubble and the broken mortar. A builder's trench for the west foundation of the north wing was not found here.

As will be discussed under excavation units S5E5 and S5E10, Wall 4 was extended 4' west c. 1867 in conjunction with construction of the north porch addition. The broken mortar found between Walls 3 and 4 may originally have been mixed here during the additions to these walls. Since this area between Walls 3 and 4 must have been accessible during the 1867 porch construction, the shallow trench, mortar debris, stone rubble, and other trash may have been dumped here during that time.

A deposit of reddish-orange clay and large rocks like the fill north of Walls 2 and 3 was excavated from a test pit opened in the southwest corner of these units. The clay and rocks were present from 5" to at least 31" below the surface, at which point the test pit was closed.

Excavation Units S5E5 and S5E10

These units were located west of the juncture of the north and south wings. Evidence of the dates of construction of the north and south wings as well as data on the evolution of the west porch was expected in this location.

The most significant discoveries in these units included the termination of the thickened foundation at the juncture of the two wings (Plate 30); a previously undocumented wall (Wall 5) (Plates 31 and 32);



Plate 30
Approximate center of photo shows junction of west wall of the north wing with the west wall of the south wing. The thickened foundation wall does not occur on the south wing.

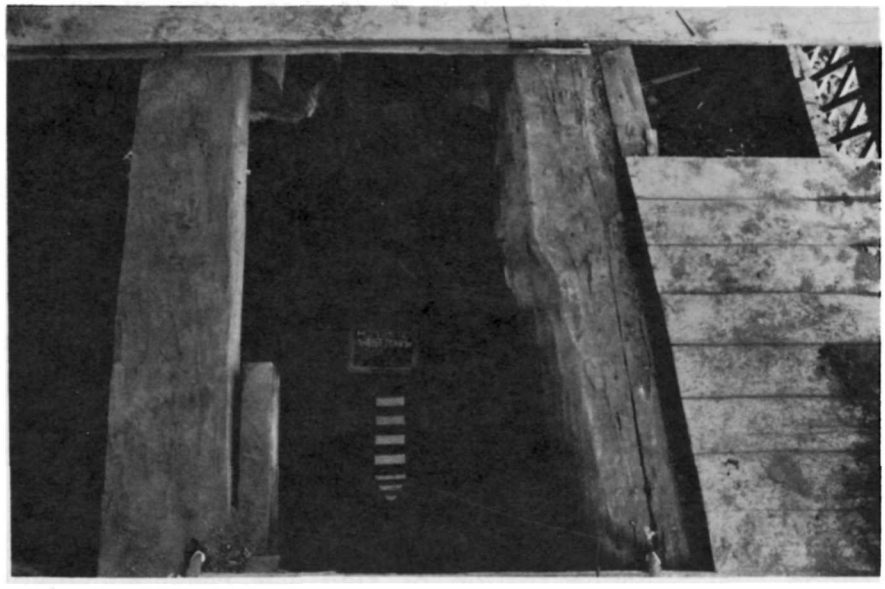


Plate 31
Wall 5 after excavations, in top center of photo. Several inches of soil separated the porch support which appears to rest on Wall 5.



Plate 32
Detail of Wall 5, looking south. Wall continues west for an undetermined distance.

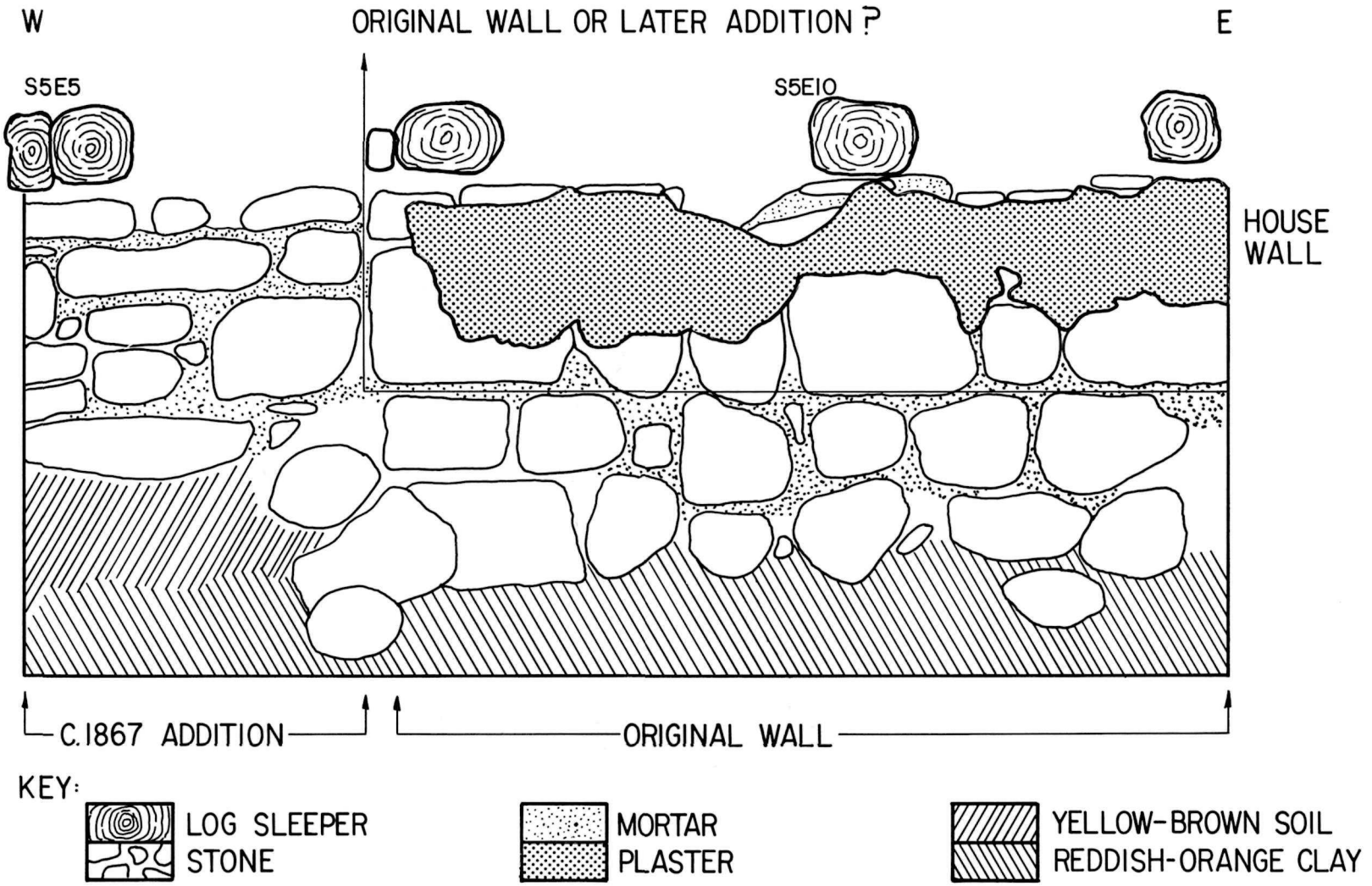
and the discovery that Porch Wall 4 is the product of two building periods, as evidenced by an abutting wall extending the original 6' porch wall another 4' to the west (Fig. 9; Plate 33).

The surface deposit here was a dark yellowish-brown, hard-packed, mottled clay which occurred at the same elevation as the soil surface in Units N0E5 and N0E10 (Fig. 7). This yellowish-brown clay continued 8" to 10" below the surface where it graded into a deposit of reddish-orange clay and 6" to 10" diameter rocks.

Evidence for a builder's trench for the west wall of the north wing was not uncovered in these units. However, at the level of the reddish-orange clay a concentration of slag was removed against the west wall of the north wing. Slag was not found along the west wall in any other excavation unit under the west porch. The historic excavation to join the west wall of the south wing to the west wall of the north wing probably disturbed the area around the southwest corner of the north wing, and this disturbance was apparently backfilled with slag. The only other instance of slag found in a wall trench was on the north side of the center wall in the cellar of the north wing.

The undocumented Wall 5 was exposed 3" to 4" below the surface of yellowish-brown clay (Fig. 7). Archeological excavation completely exposed the wall on the north side but a builder's trench was not evident in the reddish-orange clay into which the wall was built.

Wall 5 had originally extended from the southwest corner of the west foundation of the north wing at least 5'. The east 2-1/2' had been dismantled or destroyed. The impression left in the soil by this wall was defined by bits of mortar and stone chips which lined a depression in the reddish-orange clay. The depression itself had been filled with the yellowish-brown clay. The reddish-orange clay sloped down from Wall 4 towards Wall 5 and probably represents grade during construction of Wall 5.



SCALE: 1" = 10"

PROFILE OF WALL NO. 4

FIG. 9

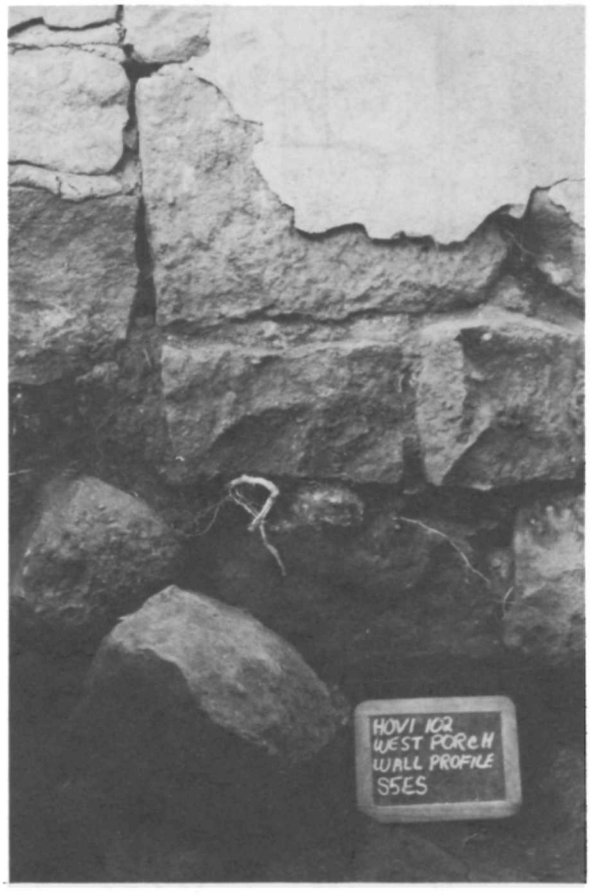


Plate 33
Original portion of Wall 4 meets C. 1867-70
west extension at upper left of photo.

Wall 5 was about 6" wider than Walls 2, 3, or 4. Its base rested 8" lower and its top was 17" lower than any of the other porch walls. This stone wall certainly was not associated with the existing porch. However, Wall 4 shows a possible break in construction periods about 18" below the top of the wall (Fig. 9), suggesting that Walls 3 and 4 originally may have been only as high as Wall 5. The suggestion that Walls 3, 4, and 5 originally supported a lower porch would mean that major modifications would have been necessary in the north wing in order to bring the first floor level and front door to their present level, which corresponds to the existing porch floor. However, Wall 5 extended much further west than Walls 3 and 4 at their original elevations. This, in addition to the location of Wall No. 5 at the southwest corner of the north wing suggest that this wall functioned as a retaining wall prior to the construction of the south wing. Probing west of the porch by Righter (1979:18) was inconclusive in determining the total extent of this wall.

A 2' by 2' test pit opened in S5E5 was excavated to a depth of 22" below the surface. The large stones were no longer evident at this depth, but the red clay showed a dense concentration of undisturbed, fist-sized pieces of yellow sandstone. It appears that Wall 5 was built on the naturally occurring red clay and sandstone at approximately the same time as the north wing was built. When the west wall of the south wing was joined to the west wall of the north wing, Wall 5 was partially destroyed. After completion of the south wing, Wall 5 was no longer compatible with the 53' west dimension of the house. Thus, Wall 5 was abandoned and the area west of the south wing leveled by the addition of about 1' of yellowish-brown clay.

Twelve clothing fasteners recovered from the deposits in units S5E5 and S5E10 represent 100 percent of the fasteners from the west porch excavations (Table 5). This is noteworthy since a significant percentage of clothing fasteners was also recovered from the deposits in the moulder's kitchen. In addition, pieces of ceramic dishes from S5E5 and S5E10 crossmend with pieces of the same vessel found in the moulder's kitchen and the south areaway (Table 1). This suggests that the fill deposits from S5E5 and S5E10, and the fill deposits beneath the moulder's kitchen floor, originated from the same source.

INTERPRETIVE SUMMARY

This summary is based primarily on the archeological information gathered during the 1978 archeological investigation of the Ironmaster's House. This interpretation may be modified after completed analysis of the information gathered by Righter during the 1979 investigations. This summary suggests the probable appearance of the site and the house at various stages of its development.

The contour of the hillside into which the north wing was built has changed significantly since the original construction. The surface of the hillside was originally more than 4.5' lower where it met the northeast corner of the north wing. With such a lower original surface elevation than now present, there would have been no need for the present retaining wall, which provides an areaway north of the east wing by retaining 5-1/2' of soil. Since original grade north of the north areaway must be at least 4.5' lower than present grade, original grade at the sites of the east and south wings must have been no more than 1' higher than present grade in the areaways. This interpretation is supported by architectural evidence as well. The widened foundation utilized in the construction of the west wall of the north wing, beginning just below present grade, and extending below cellar grade, and the spread footing beginning 3' below grade in the north wall of the north wing (Cotter 1958) were not repeated in the construction of the east and south walls of the north wing. The spread footings associated with these latter walls were 6" to 10" in total depth at the base of the walls. This suggests that these latter two walls were exposed above grade with only the lower 1' of these walls buried below grade prior to construction of the east and south wings.

The wall remnant found beneath the floor of the moulder's kitchen was dismantled and the east wing constructed c. 1825. The soil excavated during the leveling of the site of the east wing was deposited north and east of the site, burying the original occupation level in these areas. The addition of this recently excavated soil to these areas necessitated

construction of a retaining wall north of an earlier, lower retaining wall which was probably located where the north wall of the east wing is now located. A new wall also had to be built east of the east wing to retain the recently excavated fill from washing into the areaway.

Circa 1868-71, a pipe trench was cut into the new surface north of the east wing for placement of two lead pipes which probably supplied water to the indoor bathroom constructed at about that time. This pipe trench was backfilled and topsoil and cultural debris accumulated until c. 1958, when another trench was opened and a porous concrete pipe installed, also paralleling the north areaway wall.

Shallow 3" to 6" deep trenches were dug into the naturally occurring red clay and yellow sandstone exposed after leveling of the site of the east wing. The stone walls of the original one and one-half story shed roofed east wing were set into these trenches. The hard yellow sandstone retained a thin (1/4") layer of moist clay in the moulder's dining room. These natural deposits apparently served as the original surface in the dining room. The deeper deposit of moist red clay in the kitchen was covered with a thin mortar floor. When the one and one-half story east wing was altered to a three story structure c. 1835-46, or c. 1868-71, when other major additions were made to the Ironmaster's House, the height of the original spread footing of the north and south walls of the east wing was raised by adding one course of stone, the sleepers were pocketed into the new footing, additional stones were placed intermittently beneath the sleepers, and the sleepers were stabilized with soil brought in from outside the east wing. Since the level of the original hearth associated with the mortar floor and fireplace was no longer compatible with the raised wooden floor, the hearth area was raised by placement of a 6" deep hearthstone in front of the fireplace.

A 2' wide by 2-1/2' deep stone wall extended west from the southwest corner of the north wing dividing the west side of the north wing from the yard to the south and east of the north wing. Grade at the west side of the north wing originally sloped from an elevation of about 495' AMSL at the north end to 494' AMSL where it met the stone

wall (Wall 5) (Fig. 7). This constituted a 2' to 3' lower historic grade along the west side of the north wing prior to con-struction of the north porch addition.

Walls 3 and 4 under the west porch originally measured 5' 10" east-west by 6' north-south. This remained the configuration of the west porch until c. 1867 when it was extended another 4' west to support a new porch measuring about 10' east-west by 20' north-south. Construction of this 20' addition was preceded by abandonment of the window well at the west side of the north wing and deposition of several feet of new fill in the area. This increase in elevation permitted the construction of shallow, dry laid walls (1 and 2) which were laid on the new fill and partially buried with additional fill after their construction. The filling of this area prior to construction of the north porch addition created the abrupt change in elevation from the north to the south of Wall 3 which is seen today. Finally, c. 1870, Wall 7 was constructed and the front porch was extended to its present 53' dimension along the west side of the house. Since the basement windows on the west side of the south wing never had window wells, present grade under the south half of the west porch probably approximates original grade after construction of the south wing. After construction of the south wing, grade along the west side of the house remained at approximately 497' AMSL at the north end sloping down to about 494' AMSL at the south end of the porch just north of Wall 7 (Fig. 7).

Based on his observation of architectural details of the upper level, Abel felt that the original one and one-half story east wing was converted into a three story structure c. 1835-46. The one and one-half story addition could not have been accomplished prior to construction of the south wing, on which the third story of the east wing depended for structural support. Abel concluded, then, that the south wing must have been built prior to 1835-46 (Abel 1946:46). Some excavation south of the south wall of the north wing must have been necessary in order to level the site for construction. Just west of the site, where the south half of the west porch would later extend, the original occupation level in this area was disturbed by the excavation of the site of the south wing and

deposition of construction debris. This resulted in the mixture of this construction related debris with the cultural debris which had been accumulating in this location since the construction of the north wing. Completion of the south wing included backfill of the traces of the construction at the west side of the wing. This final activity buried the construction debris and the original occupation level under fill which had probably been excavated from the site of the south wing as well.

The original occupation level at the west side of the north wing occurs between the sterile red clay/yellow sandstone conglomerate and the gravel and boulder filled red clay above which contained cultural debris. This original surface was most notable in units N5E10 and N10E10 where it was associated with use of the stone window well.

Artifacts recovered from the window well trace must have accumulated in the well after construction of the north wing but prior to filling under the west porch. Creamware, pearlware, and several sherds of whiteware from the window well provided a MCD of 1808.5088. However, no mid-eighteenth century ceramic types which were being manufactured as late as 1775 (South 1977:211) were recovered beneath the porch. This supports the conclusion that the north wing must have been built prior to 1808 but not earlier than 1775.

Except for deposits in the cellars of the north and south wings, the deposits investigated at the Ironmaster's House in 1978, shared a major feature in common. That is, they contained ceramics which spanned the late eighteenth to mid-nineteenth century. This also holds true for the deposits investigated north of the north wing (Cotter 1958a:2) and east of the east areaway (Cotter 1979). The excavations east of the east areaway showed early nineteenth century ceramics occurring above recent twentieth century items. Of the ceramic sherds which crossmended, some pieces were found 30' to 40' apart. Table 1 shows ceramic sherds from various excavation units which crossmended to a piece of the same vessel found in other excavation units at the site. The most significant of these crossmends are those that indicate an association between the deposits under the west porch with the deposits north of the north areaway wall, the south areaway, and in the moulder's kitchen.

The stratification of cultural debris in several privies used by residents of the Ironmaster's House suggests that a recognizable sequence of ceramic types was in use at the Ironmaster's House in the nineteenth century (Abel 1964). A similar sequence was expected in other trash deposits of the period at the house, the indiscriminate association of a wide chronological range, variety of nonmending ceramics in the unstratified soil beneath the west porch, and east wing suggests the origin of the artifacts in these areas as part of the fill deposit brought in from another location.

As has been demonstrated, statistical analyses of the artifact distributions in the east wing basement were inconclusive and could not be used to interpret Stratum A as a primary deposit resulting from day to day use of the moulder's kitchen and dining room. Moreover, correlation of soil types and artifact types between major excavation areas at the site present a strong argument that any remaining original eighteenth and early nineteenth century deposits remain buried beneath from 1' to 5' of nineteenth century fill deposits which created the present grade levels around the house. Since nineteenth century modifications to the house added significant amounts of fill to the site, inferences based on the debris in the fill as to the behavior of the occupants of the house, or the quality of life enjoyed by occupants of the east wing, would be highly suspect.

Comparative Results

Several of the artifact collections with which Stanley South defined the Carolina and Frontier culture patterns were from sampled sites. Therefore, the fact that the grounds of the Ironmaster's House were not completely excavated should not prohibit a comparison of the Frontier and Carolina patterns to the inventory of cultural debris recovered from the house. However, South was usually dealing with deposits created by a single occupation of a site over a relatively brief period of time. This usually meant that the deposits created during this single occupation had experienced minimal physical disruption by later occupations of the site.

Also the culture pattern operative during that single, brief occupation, would have experienced minimal influences from new or evolving culture patterns.

Except for the fill of the window well under the west porch, the deposits uncovered at the Ironmaster's House were secondary, disturbed deposits which had been removed from their original place of deposition to their present location. Assuming the fill could have come from the vicinity of the Ironmaster's House, the debris in the soil can reflect at most a continuum of occupation at the house rather than specific occupations.

As pointed out earlier, the very early history of the Ironmaster's House had a British Colonial element in the first quarter of the eighteenth century. If the Carolina pattern was originally reflected in the deposits at the house due to this influence, it was not possible to recognize it. Any deposits associated with that early period remain buried beneath nineteenth century fill. The window well deposit could not be compared with the Frontier and Carolina patterns because only three of the seven artifact groups necessary for comparison were represented in the window well material. As discussed earlier, neither the Ironmaster's House nor the whole of Hopewell Village could be considered a Frontier site because of its extensive commercial interests and its continued 163-year occupation. With this background, the presence of either of South's patterns at the house would be very surprising.

The artifacts recovered during the archeological investigation of the Ironmaster's House were classified according to the functional groups suggested by South. In some cases, such as the kitchen group, it was necessary to collapse classes within a group. For example, bottle glass from the site was not specifically identifiable and various types of bottle glass were subsumed under the class "containers." New classes were added to artifact groups such as the clothing group, to account for objects not found in South's classification.

Table 7 compares the artifact group totals from the Ironmaster's House with the empirical and predictive range of the Frontier and

Carolina artifact patterns. To prepare Table 7, the 1608 sherds of window glass from unit N0E10, as well as the artifacts from the window well in units N5E10 and N10E10 were deleted from the count. This was done because the window glass sherds were possibly associated with restoration of the house by the National Park Service rather than with historic activities. The debris from the window well was not included since it was a primary deposit not originally associated with the fill deposits around the house. From the comparison in Table 7 it is seen that the data fit the predictive range of the Frontier pattern in six of the eight artifact groups with the clothing and furniture groups exceeding the predictive totals. Buttons made up 48.88 percent of the clothing group recovered from the moulder's kitchen. As discussed earlier, they did not appear to be part of a larger assemblage of clothing related items and they could have been part of a button collection. Transferring these buttons from the clothing group to the activities group produces a pattern which fits within the Frontier range. The furniture class exceeds the predictive range of the Frontier pattern due probably to the high resident turnover at the house. This would encourage frequent redecoration and rehabilitation, including minor as well as major alterations to the house to satisfy each new resident's tastes or needs. A high resident turnover and frequent redecoration might include disposal at the site of old or unwanted furniture both by the former resident as well as the new resident.

Possibly, more significant than the comparable values of the seven artifact categories, is the inverse ratio of the kitchen group to the architectural group. South feels a high architectural group/low kitchen group relationship is the distinguishing trait of the Frontier pattern, that ". . . the interplay of these two variables . . . results in the Frontier pattern" (1977:146).

The compatibility of the Ironmaster's House artifact inventory with the Frontier pattern range of artifacts advises caution against interpreting historic sites, whose inventory falls within the Frontier range, as having resulted from the site's distance from sources of supply or brief occupation. It appears, based at least on the data from the

TABLE NO. 7

COMPARISON OF ARTIFACT RATIOS FROM IRONMASTER'S HOUSE
WITH CAROLINA AND FRONTIER ARTIFACT
PATTERN RATIOS

IRONMASTER'S HOUSE ARTIFACT GROUP	COUNT	RATIO	EMPIRICAL RANGE FRONTIER	EMPIRICAL RANGE CAROLINA	PREDICTIVE RANGE FRONTIER	PREDICTIVE RANGE CAROLINA
Kitchen	1213	29.79	16.8-34.5	51.8-69.2	10.2-45.0	47.5-78.0
Architecture	2319	56.95	42.6-58.6	19.7-31.4	29.7-74.3	12.9-35.1
Furniture	35	.86	0.1- 0.3	0.1- 0.6	0.0- 0.5	0.0- 0.7
Arms	12	.29	1.4- 8.4	0.1- 1.2	0.0-15.6	0.0- 1.5
Clothing	(*110) 308	(2.70) 7.56	0.3- 3.8	0.6- 5.4	0.0- 6.9	0.0- 8.5
Personal	46	1.13	0.1- 0.4	0.1- 0.5	0.0- 0.7	0.0- 0.6
Kaolin Pipes	5	.12	1.9-14.0	1.8-13.9	0.0-27.1	0.0-20.8
Activities	(**332) 134 4072	(8.15) 3.29	4.1-26.4	.9- 2.7	0.0-11.8	0.1- 3.7

* Adjusted total after transfer of 198 buttons to activities group.

** Adjusted total after addition of 198 buttons from clothing group.
With the increased mobility brought about by train and automobile travel

Ironmaster's House, that the Frontier pattern can result from other, very different influences. At the Ironmaster's House, the Frontier pattern was found in fill deposits associated with a structure which was neither distant from sources of supply nor briefly occupied. These unstratified deposits suggest that extensive disturbances to primary cultural deposits or levels may produce a "Frontier effect." The longer a site is occupied and the closer it comes to being continuously occupied to the present time, frequent changes in occupancy of the structure, and frequent maintenance and alterations to the structure will probably result. These disturbances may be significant enough to create the "Frontier effect": a higher than normal frequency in the furniture group, but otherwise "normal" Frontier ratios in the other artifact groups and a high architecture group/low kitchen group ratio.

With the increased mobility brought about by train and automobile travel in the late nineteenth and early twentieth century a higher resident turnover rate may be expected at domestic sites beginning with this period. Artifact ratios comparable to the Frontier pattern might be expected to occur frequently at such sites which have been continuously occupied to the present time by various individuals or families. In fact, this pattern might be expressed most frequently at late nineteenth century and early twentieth century urban sites where modern trash disposal practices removed most if not all kitchen refuse from domestic sites, and where maximal use of available space resulted in frequent disturbances to soil and debris around the structure. The close approximation to the Frontier pattern of the artifact collection from the Ironmaster's House suggests that the predictive range of the Frontier pattern is too broad to be used in accurate interpretations of undocumented sites. A much greater number of sites with documented histories of a brief occupation or distance from source of supply must be examined to delimit the predictive range of the Frontier pattern before it can be used to establish a cause and effect relationship between a site's history and its artifact pattern.

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APPENDIX

SCOPE OF WORK
ARCHEOLOGICAL INVESTIGATIONS OF THE IRONMASTER'S HOUSE

Three areas at the Ironmaster's House have been identified as needing archeological investigation: (1) the areaway; (2) the unconnected basements of the three wings; (3) the deposits and features beneath the front (west) porch. The purpose of the archeological investigations at the Ironmaster's House is twofold: (A) locate, record, and examine archeological resources to be affected by actions necessary to preserve the structure; (B) amend existing theories based on archi-tectural and historical data about the chronological, functional, and structural evolution of the three connecting wings which make up the Ironmaster's House.

A. Locate, record and examine archeological resources to be affected by actions necessary top reserve the structure:

The basement floors are to be damp-proofed. This will require installation of concrete in the cellar of the north wing, replacement of concrete in the cellar of the south wing, and removal of soil beneath the sleepers in the basement of the east wing. The earth beneath the front porch may need to be regraded to direct drainage away from the house.

B. Amend existing theories based on architectural and historical data about the chronological, functional, and structural evolution of the three connecting wings which makeup the Ironmaster's House:

The Ironmaster's House was apparently built in three stages between 1770-1849. Each wing has experienced modifications at various times through the early twentieth century. The relationship of some of these modifications will be examined by the archeologist and recorded for the use of the historical architects. In addition, the cultural deposits associated with each of these wings are expected to reflect the reality of

any of the various theories of site development, as well as the reality of suspected structural characteristics of each wing prior to their modification.

The specific areas to be investigated will include those areas most likely to provide data needed by the architects. Additional units in all three areas will be excavated which will ultimately produce a complete north-south and east-west cross section of the cultural and natural deposits around and beneath the Ironmaster's House. These additional units will serve to adequately sample for the existence of significant features or deposits.

The cross section will permit comparison of the depth and nature of sterile deposits in relation to the foundations of each wing and allow comparison of the beginning and ending dates for cultural deposits associated with each wing, and possibly provide firm dates for construction of the three wings.

In addition to determining the chronological and structural relationships of the three wings, the archeological data will attempt to demonstrate the functional evolution, or uses, of each wing. The type of fireplace in the moulder's kitchen and first floor kitchen of the east wing suggest an earlier date than is generally accepted for construction of the east wing (c. 1825-30). It is possible that an earlier kitchen was constructed on site close to the north wing. However, kitchen as well as dining and social activities may have been carried out in the original north wing. If this latter suggestion is true undisturbed deposits associated with the north wing should show significant frequencies of kitchen refuse. If kitchen activities were performed separately from the north wing, in a contemporary but physically separate structure, this should be supported by a particular distribution of kitchen artifacts. Kitchen artifacts of that early period should not be associated with the north wing in the high density they would be found associated with the site of the separate kitchen. If a separate kitchen was not constructed until significantly later than the north wing, earlier ceramic types should be associated with the north wing and later ceramic types should be

concentrated on the site of the kitchen. The archeological investigation will attempt to identify the trash deposition patterns associated with the use of each wing, prior to completed construction of the house in its present configuration. Distribution studies will be based on the assumptions that variability in artifact frequencies and location will reflect behavior.

Following is a list of the specific areas to be investigated and the goals for each area. The priority of these goals will be coordinated with the historical architects.

AREAWAY

(1) Identify historic grade in areas not previously excavated by Motz (1941) or Abel (1964) and compare this data with their interpretations of the deposits in the areaway.

(2) Determine the original and successive slope of deposits against the north areaway wall.

(3) Examine and record the juncture between the north foundation wall and the north areaway retaining wall.

(4) Determine the original configuration and function of the east access to the north wing cellar and the north access to the moulder's dining room.

(5) Investigate the south and east walls of the moulder's dining room and kitchen. This will allow examination of the fill and configuration of any builder's trenches associated with construction of those walls.

CELLAR OF NORTH WING

(1) Identify historic grade and floor fabric.

(2) Examine and record wall junctures.

(3) Record depth and dimensions of foundations/footings.

(4) Locate and record deposits and features indicative of evolutionary uses of the cellar.

MOULDER'S KITCHEN AND DINING ROOM (INTERIOR)

(1) Examine and record wall junctures, specifically the juncture of the west wall of the moulder's kitchen to the north and south walls of the moulder's dining room.

(2) Identify historic grade and floor fabric.

(3) Determine the original configuration and function of the access to the moulder's dining room from the north wall.

(4) Record depth and diminsions of foundations/footings.

(5) Determine historical presence or absence of water supply to moulder's kitchen. Was there a pump, sink, wash basin, or other water supply within the walls of the moulder's kitchen? What relationship did it have to the lead pipe, oil drum, and rock drain excavated by Motz in 1941 at the southeast corner of the areaway up to the southeast corner of the moulder's kitchen, and by Abel (1964) along the east and north walls of the kitchen in the areaway?

(6) Locate and record deposits and features indicative of evolutionary uses of these rooms.

BASEMENT OF SOUTH WING

(1) Examine and record wall junctures, specifically those to the north and east wings.

(2) Determine and record the depth and dimensions of foundations/footings.

(3) Locate and record significant features and deposits beneath the existing concrete floor, particularly features or activities associated with the north wing prior to construction of the south wing.

FRONT PORCH

(1) Locate and record features and deposits associated with the successive porch enlargements.

(2) Record dimensions of porch supports and their relationship to one another and to the north and south wings of the house.

(3) Examine any builder's trenches associated with the north wing and the south wing.

(4) Examine buried windows in basement of south wing.

(5) Examine juncture of walls of north to south wing.

(6) Make further tests to provide an adequate sample of total area beneath the porch to provide an indication of any other features or deposits beneath the porch.

All excavations will be performed by an archeologist or under the direct supervision of an archeologist. A primary datum point will be selected for permanent location of all features and deposits exposed during the investigation. A 5 by 5 grid system, tied in to the permanent

datum point, will locate the horizontal provenience of all significant discoveries. The 5 by 5 excavation units may be expanded in individual cases to conform to the requirements of specific features. Individual excavation units will be referred to by the number assigned to their northwest corner stake. All excavation units will be backfilled and returned to their former appearance at the conclusion of the archeological investigation. Exceptions may be made if specific areas require special maintenance, rehabilitation, or preservation which would be hampered by backfilling of the unit.

Reference north will be used rather than magnetic north for alignment of the grid system along north-south and east-west coordinates.

All recently undisturbed cultural deposits will be screened through one-quarter inch hardware cloth for maximum retrieval of artifacts. Excavations will proceed according to arbitrary levels until natural levels or features are exposed. Areas known to be recent fill or recently disturbed will be excavated in 6" levels. Areas exhibiting depositional integrity will be excavated in 2" levels.

Graphic and photographic records as well as detailed written notes will be maintained for all units, strata, and features investigated. All artifacts as well as representative samples of unmodified materials, will be collected and their provenience recorded. Cleaning, simple conservation, and gross sorting of artifacts will be accomplished in the field laboratory.

A preliminary report consisting of maps, drawings, photographs, and tentative interpretations of the materials uncovered will be submitted one month after field work is completed. A final report will be submitted one year after field work is completed. The final report will incorporate the results of analysis of artifacts, soils, features, and all other data collected, and will present final conclusions regarding the cultural remains encountered and recovered during the excavations.

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