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The Hartley phase ceramics from the Hartley Fort are grouped into two wares, Hartley ware and French Creek ware, and four types, Hartley Plain, Hartley Tool Impressed, Hartley Crosshatched and French Creek Cord Impressed. This ceramic assemblage shows a blending of decorative traits commonly associated with well-established Late Woodland period pottery types of the Driftless Region and with early Plains Village ceramic complexes such as Cambria and Mill Creek. These features along with Mississippian trade pottery suggest the presence of cultural contact and interactive cultural change among Late Woodland groups of eastern Iowa, Plains Village farmers, and developmental Mississippian cultures with Hartley phase peoples.

Comparative study indicates that formal and decorative characteristics of the Hartley Fort ceramic assemblage were present as individual types or components of types in earlier ceramic phases in the region. It is argued that these diverse ceramic styles coalesced in eastern Iowa circa AD 900 into the distinctive Hartley phase ceramic assemblage along the same developmental lines that led to Plains Village ceramic assemblages.

INDEX DESCRIPTORS: Late Woodland period archaeology, ceramic typology, northeast Iowa.

The Hartley Fort (13AM103) is a Late Woodland fortified village situated on a terrace remnant at the confluence of French Creek and the Upper Iowa River in the Driftless Region of northeast Iowa. It is one of several sites associated with the Hartley Terrace (Fig. 1). These sites are: (1) the Grant village (13AM201) and the Lane Enclosure (13AM200), both Oneota sites; (2) a stone-lined burial chamber (13AM195) described by Thomas (1887, 1894); and (3) two Woodland cemeteries, the Brown's Hill Mound Group (13AM89) and the Lane Farm Mound Group (13AM104). McKusick (1973:7-11) gives a detailed description of the sites and the cultural succession on the Hartley Terrace. Other major published references on the Hartley Terrace sites include Logan (1976), Wedel (1959), Henning (1961) and McKusick (1964).

Archaeological work on the Hartley Terrace sites extends over a period of one hundred years. Alexander (1882:357-361) is apparently the first published reference to excavations on the Hartley Terrace. These excavations were conducted around 1875 by local amateurs who confined their activities to the Lane Enclosure. Artifacts typical of the Oneota culture were recovered. Norris' later excavations in 1882 in the Hartley Fort were subsequently published by Thomas (1887, 1894). Norris excavated three mounds inside the Hartley Fort, measured the rampart and described the site (Thomas 1894:101-102). The mounds excavated by Norris have been identified by McKusick (1969, 1973:92; Mounds 1, 3, and 7 in Fig. 2). Norris concluded that the enclosure was a fort and that it was older than the nearby Lane Enclosure.

From 1934 to 1936 Orr extensively excavated two Hartley Terrace sites and mapped the Hartley Fort (Orr 1963). In 1964, Marshall McKusick excavated the Hartley Fort rampart, the area inside the earthworks and some of the associated mounds (Figs. 2 and 3). His research design involved: (1) obtaining evidence on the structural features of the enclosure to resolve whether or not the site was fortified; (2) isolating houses and other architectural features if present; and (3) identifying the cultural affiliation of the site (McKusick 1974:8-10, 1969). His work resulted in the definition of two components at the site. The early occupation is called the Hartley focus (now phase) and represents the Late Woodland cultural manifestation responsible for construction of the enclosure (McKusick 1964:494, 1973:9). The other component is an Orr focus cemetery represented by intrusive burial mounds associated with Allamakee Trailed pottery, which postdates the Hartley phase occupation. These mounds are located within the enclosure or on the rampart (McKusick 1964, 1973:8-9, 1969; Fig. 2). There is some question, however, as to whether the mounds are of Late Woodland (Lane Farm) affiliation with intrusive Oneota burials or are an Oneota cemetery as McKusick has described them (Alex 1980: personel communication). If they were Late Woodland mounds, Mounds 1-3 and 7-8 would predate the Hartley phase and Mounds 4-5 would represent the spoil dirt from intrusive Oneota burials in the earlier Hartley Fort rampart. Occupations of the Hartley Fort identified by McKusick (1969) are shown in Fig. 4.

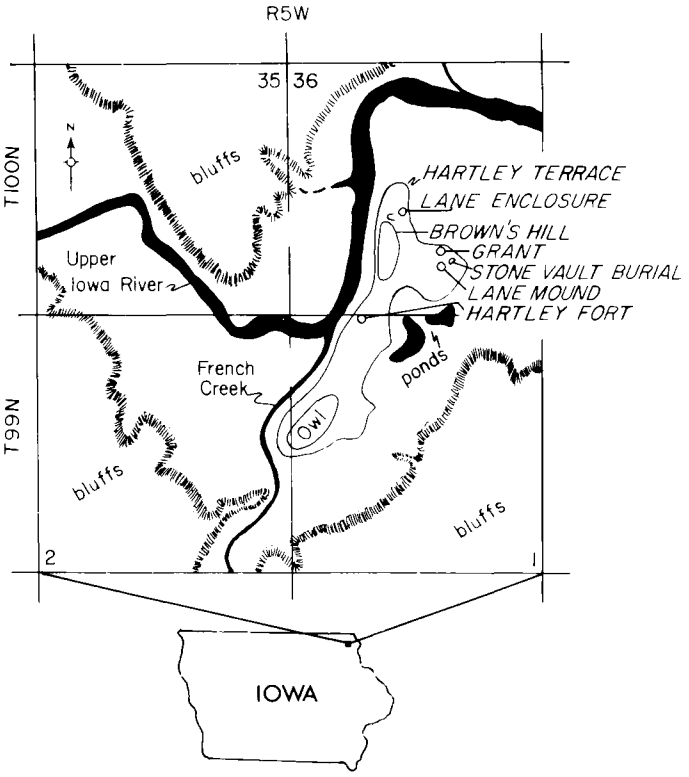

Fig. 1. Archaeological sites on the Hartley Terrace. Redrawn from McKusick (1973:91).

The Late Woodland component has been radiocarbon dated at AD 960±100 (GX-2002) and AD 870±95 (GX-1997). The Orr focus component is radiocarbon dated at AD 1480±20 (GX-2000) and AD 1290±120 (GX-1998) (McKusick 1973:10). McKusick

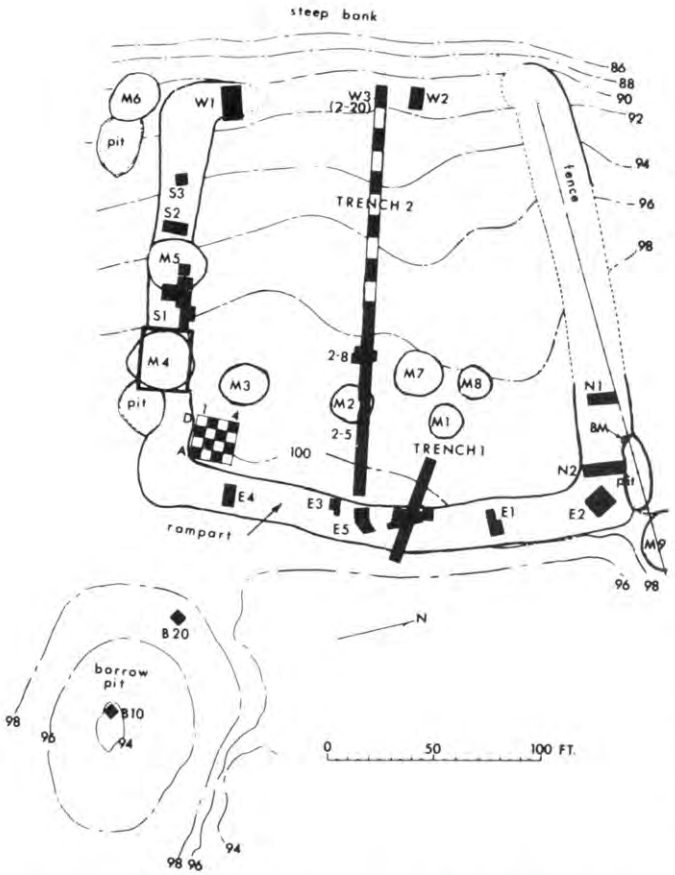

Fig. 2. Map of the 1964 excavations at the Hartley Fort. Reduced from map on file in The University of Iowa Main Library.

(1973:10) questions the reliability of the latter date because he feels it is too early.

The following brief site description is based on the work of Orr (1963), Norris (in Thomas 1894) and McKusick (1964:492-493, 1973:8-9, 1969). The Hartley Fort is a small, fortified enclosure consisting of a low earth-work with associated mounds and a borrow pit. The earthwork is three sided and has an average length of 213 feet to a side. It represents a rampart that was originally surveyed as 2-4 feet high, but now averages less than 2 feet due to farming activities. Excavations indicated the rampart supported a stockade consisting of posts 6-8 inches in diameter set on centers of approximately 18 inches. There is no evidence for an interior or exterior ditch around the rampart. An entryway of overlapping stockade posts was identified along the east rampart. A borrow pit, presumably for the construction of the rampart, was located just to the southeast of the fort. McKusick's excavation revealed storage pits within the stockade, but no house structures were found.

In summary, the Hartley Fort contains at least two and probably three cultural components. The earliest component is represented by five mounds within the enclosure. The second component is represented by a small, fortified site affiliated with Late Woodland and Mississippian trade pottery. The most recent component is represented by an Oneota cemetery consisting of a number of intrusive stone-capped burials associated with Allamakee Trailed pottery.

Fig. 3. Excavation of the Hartley Fort enclosure, 1964.

The Hartley Fort is crucial to understanding the cultural processes that led from Late Woodland to Oneota in the Driftless Region. Even so, the final site report has yet to be written and the artifacts recovered have not been analyzed. It is the purpose of this article to describe and interpret one portion of this artifact assemblage—the ceramics from the Hartley Fort. A ware/type classification is used. This descriptive method leads to the definition of a number of decorative types assumed to be culturally and chronologically important. The ceramic typology developed will then be used as a basis for a broader comparative study of Hartley phase pottery with contemporaneous cultures in the region.

THE CERAMIC ASSEMBLAGE

The ceramics recovered from the Hartley Fort excavations reflect the cultural components identified at the site and generally resemble the pottery types found at other Hartley Terrace sites. The shell-tempered pottery from the site represents Mississippian trade pottery

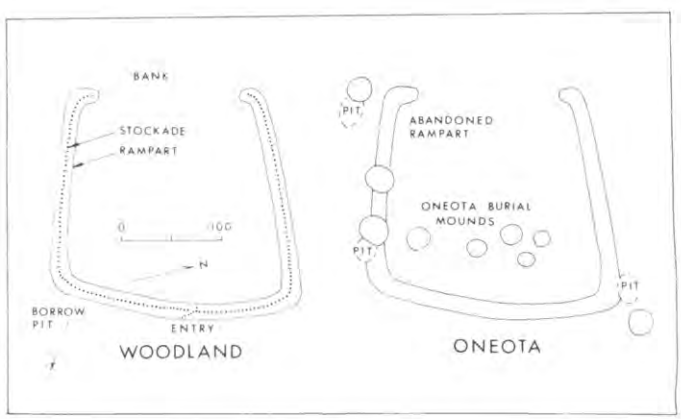

Fig. 4. Occupations of the Hartley Fort, 13AM103. Scale in feet.

Table 2. Grit tempered body sherds from the Hartley Fort.

Provenience	Total	Plain		Trailed	Smoothed-Over Cord Marked		Cord Marked	Dentate Rocker
		Dull	Polish	Dull	Dull	Polish	Dull	Stamp
N-1	26	5	4	2	8	6	—	—
N-2	24	3	—	—	16	5	—	—
S-1	4	2	—	—	2	—	—	—
S-1A	20	2	4	—	11	3	—	—
S-1B	29	2	3	—	24	—	—	—
S-2	21	1	2	—	17	1	—	—
S-3	23	2	6	—	9	5	—	1
E-1	4	3	—	—	1	—	—	—
E-2	29	11	1	—	10	6	—	1
E-4	8	2	1	—	4	1	—	—
W-1	21	1	3	—	16	1	—	—
W-2	2	—	—	—	—	2	—	—
Mound 3	26	13	3	—	10	—	—	—
Mound 4	28	8	3	1	9	7	—	—
FEA. 2-1	11	3	1	1	5	—	—	1
FEA. 2-2	6	2	—	—	4	—	—	—
A-1	30	9	1	—	16	2	2	—
A-3	24	17	3	—	4	—	—	—
B-2	27	8	5	—	13	1	—	—
B-4	29	14	1	—	13	1	—	—
C-1	24	12	1	—	10	1	—	—
C-3	32	17	2	—	11	2	—	—
1-1	23	9	3	—	8	3	—	—
1-2	27	7	2	—	15	3	—	1
1-3	27	7	—	—	12	8	—	—
1-4	19	8	2	—	8	1	—	—
1-5	26	10	1	—	12	3	—	—
2-2	25	11	4	—	10	—	—	—
2-3	28	6	2	1	18	—	1	—
2-4	34	12	3	1	16	2	—	—
2-5	28	13	1	—	12	2	—	—
2-6	31	12	2	1	14	2	—	—
2-7	36	6	9	—	11	9	1	—
2-8	27	10	2	—	12	3	—	—
2-9	13	4	2	—	6	1	—	—
2-10	24	10	—	—	12	2	—	—
2-12	25	9	1	—	14	1	—	—
2-14	27	7	4	—	15	1	—	—
2-16	27	12	3	—	11	1	—	—
2-18	27	6	3	—	17	1	—	—
2-20	28	7	6	—	12	3	—	—
TOTALS	950	303	94	7	448	90	4	4
PERCENT	100	32	10	1	47	10	—	—

and Oneota. The grit-tempered pottery, which comprises the bulk of the sample, reflects: (1) the Hartley phase occupations; (2) locally made Mississippian-like pottery; (3) trade pottery from the Mill Creek culture; and (4) some earlier Woodland pottery types.

The Oneota pottery is representative of Allamakee Trailed (Wedel 1959; Henning 1961, 1970). The Hartley Fort Oneota assemblage is characterized by large jars and small funerary jars and bowls. A few Oneota bodysherds are also present in the sample.

The Mississippian trade pottery is represented by Powell Plain and Ramey Incised types (Griffin 1949) and a few bodysherds. Some grit-tempered seed jars and bodysherds with curvilinear design elements presumably reflect either Mississippian influence on the local ceramic tradition or Mill Creek trade vessels.

The Woodland pottery in the Hartley Fort assemblage consists of both Hartley phase ceramics and other Middle and Late Woodland period specimens which fit loosely into a few established types. These are Spring Hollow Cordmarked and Incised (Logan 1976), Madison Plain, Madison Cord Impressed and Lane Farm Cord Impressed (Hurley 1975; Logan 1976; Benn 1980). The latter three types are considered representative of the Effigy Mound tradition.

The Late Woodland Hartley phase pottery is characterized by grit-tempered, globular jars with smoothed-over cordmarked or plain bodies and plain, flared rims. Decoration is confined to the exterior lip and rim surfaces and consists of cord or tool impressions.

A ware/type classification as discussed by Lehmer (1954:41-42) was used to describe the Hartley Fort ceramics. The presence or absence of decoration on the rim or lip formed the main criterion for defining the ceramic types in this report. These decorative traits were chosen over other attributes because they are apparently the most sensitive to spatial, temporal and social variability.

The Hartley phase pottery has been grouped into two wares and four types. These types are compatible with established Initial Middle Missouri ceramic typologies because the Hartley phase ceramics parallel decorative trends and vessel forms identified in these early Plains Village cultures. Hartley ware is defined by rim and vessel form and temper. The three Hartley ware types have mutually exclusive lip/rim decoration. These types are Hartley Crosshatched, Hartley Tool Impressed and Hartley Plain. French Creek ware is composed of a single decorative type, French Creek Cord Impressed, and can be separated from Hartley ware and its component types on the basis of rim form and decoration.

The following ceramic descriptions are based on the pottery from McKusick's 1964 excavations presently stored in the repository of the Office of the State Archaeologist of Iowa. The bodysherds are a grab sample of 25-30 sherds from each catalog (excavation) unit. Larger sherds were chosen because more attributes are present on them. If less than 25 were present in a unit, all the bodysherds were inspected. The bodysherd sample represents 30% of the total assemblage and all of the shell-tempered sherds.

The ceramics are tabulated by the excavation units shown in Fig. 2. The ceramic descriptions used in this study follow established procedures for ceramic analysis (Wheeler 1952; Knudson 1967:252-255). Other descriptive features tabulated are derived from Henning (1968:192-198, 1970:32-42), Anderson (1972) and Calabrese (1972). Benn's (1978) descriptive attributes for Effigy Mound tradition pottery were used on the non-Hartley phase Woodland pottery. The fact that other researchers have already established methods for description of ceramics in the study area is considered ample reason to use them and not other approaches.

POTTERY DESCRIPTION

Bodysherds

The bodysherd sample consisted of 1016 sherds which were grouped into five classes: Oneota, Hartley/French Creek ware, Lane Farm, Mill Creek and Mississippian (Table 1). The description of each group is as follows:

Table 1. Body sherd sample from the Hartley Fort.

Body Sherds	Number	Percentage
Oneota	54	5
Hartley/French Creek	942	93
Lane Farm	4	1
Mill Creek	4	1
Mississippian	12	1
TOTAL	1016	

Hartley/French Creek Ware

950 sherds representing 93% of the sample were classified as Hartley or French Creek ware. The paste, method of manufacture and surface treatment are the same for both wares. The distinguishing characteristics among the wares and types are lip and rim decoration and rim form.

Table 3. Thickness in mm on grit tempered body sherds from the Hartley Fort.

Surface Treatment	Number	Range	Mean	Standard Deviation
Plain Dull	61	3.3-12.8	6	1.61
Plain Polish	25	3.2- 9.5	5.4	1.28
Smoothed-Over Cord Marked Dull	59	3.3-10.3	6	1.41
Smoothed-Over Cord Marked Polish	33	3.7- 8.7	5.6	.93
Cord Marked	4	4.9- 7.7	—	—
Trailed	7	3.7- 7.5	—	—
Dentate Rocker Stamped	4	4.8- 9.2	—	—
TOTAL	193			

Paste. Hartley/French Creek pottery is grit-tempered. The tempering agent appears to be crushed granite. While variable in the paste, the tempering is generally about 20% of the volume. There is usually not enough grit in the paste to alter the interior or exterior surfaces of the sherds. On some specimens, however, the grit is plainly visible on the sherd surfaces or can be felt as bumps or alterations on the planar surfaces. The range in variability observed is probably what could be expected among the fragments of several vessels.

The size of the grit is variable; most of the tempering is 1-2 mm in diameter. Where larger tempering agents were used, the result is slight fissure or a crackled effect on the sherd surfaces.

The texture of the sherds ranges from medium fine to medium coarse depending upon the amount of tempering present. The core is compact and hard, ranging from 2.5-4.5 on the Mohs' scale.

The color of the sherds is variable. They generally range from

Table 4. Thickness of Oneota body sherds in mm.

Surface Treatment	Number	Range	Mean	Standard Deviation
Smoothed-over cordmarked	4	3.7-5.5	—	—
Plain	40	3.1-10	5	1.38
Trailed	5	3.7-7	—	—

reddish-yellow (7YR7/6) and yellowish-red (5YR6/6) to dark browns (10YR7/4, 4/2), greys (10YR3/1, 5/2-3) and blacks (10YR2/1). The interior surfaces are usually darker than the exteriors.

Method of Manufacture. The method of manufacture could not be determined from the sample. A cord-wrapped paddle was used to shape and thin the vessel walls, however.

Surface Treatment. All the interior sherd surfaces are plain. The exteriors exhibit smoothed-over cordmarking and plain surfaces; few were cordmarked (Table 2). It could not be ascertained if the plain exterior sherds were a result of total obliteration of the cordmarks or if a plain paddle was used. Since over half the sample is smoothed-over cordmarked, this technique was apparently preferred.

On the smoothed-over cordmarked surfaces, the cord marks appear to be vertical. A few base-bottom sherds show overlapping or criss-cross cords. Where visible, the cords appear to be uniform, well spaced and approximately 2 mm in diameter. Surfaces with smoothed-over cordmarking vary from easily perceptible to near-obliteration of the cords.

The thickness of about 20% of the Hartley/French Creek ware bodysherd sample was measured to determine if any variability existed among the exterior surface treatments observed. The results suggest vessel bodies were generally uniform and average 6 mm in thickness regardless of surface treatment (Table 3). The range in thickness was generally the same for each surface treatment class. This suggests that several vessel sizes were made with no preference to exterior surface treatment and vessel size.

While the vast majority of the sherds are plain or smoothed-over cordmarked, the extent of the exterior surface areas treated could not be precisely determined. This is because there were few rim/shoulder sherds in the sample. Three variations are possible: (1) plain exteriors from rim to base-bottom; (2) smoothed-over cordmarked exteriors with plain shoulders and rims; and (3) smoothed-over cordmarked exteriors from rim to base-bottom. A sample with reconstructable vessels would clarify this problem.

Form. The sample indicates the vessels were globular jars with smoothly rounded shoulders and bottoms. A few specimens had carinated shoulders.

Decoration. In addition to smoothed-over cordmarking, three bodysherds had trailed lines over smoothed-over cordmarkings. These specimens are within the same thickness range and have the same paste characteristics as the Hartley/French Creek sample. They are, therefore, considered to be part of the Late Woodland component and may reflect influence from Plains Village cultures such as Mill Creek where trailing on the vessel bodies is common.

Oneota

The bodysherd sample contained 54 sherds comprising 5% of the total which have been classified as Oneota.

Paste. These vessels are heavily tempered with crushed shell and

Table 5. Oneota body sherds from the Hartley Fort.

		Smoothed-Over Cord Marked		Plain		Smoothed-Over	Line Width	Line Depth	Punctate Direction and Diameter		Dashes	
Provenience	Total	Dull	Polish	Dull	Polish	Trailed Dull	Medium	Shallow	Acute	Medium	Acute	Medium
1-1	5	2	—	3	—	—	—	—	—	—	—	—
1-3	1	—	—	1	—	—	—	—	—	—	—	—
1-4	3	—	—	2	—	1	1	1	—	—	—	—
A-1	8	—	—	8	—	—	—	—	—	—	—	—
B-2	2	—	—	1	—	1	1	1	—	—	—	—
B-4	1	—	—	1	—	—	—	—	—	—	—	—
C-1	2	—	—	1	1	—	—	—	—	—	—	—
Mound 4	2	—	—	2	—	—	—	—	—	—	—	—
N-2	3	—	—	3	—	—	—	—	—	—	—	—
S-1A	1	—	—	1	—	—	—	—	—	—	—	—
E-4	1	—	—	1	—	—	—	—	—	—	—	—
W-2	1	—	1	—	—	—	—	—	—	—	—	—
FEA. 2-1	2	—	1	1	—	—	—	—	—	—	—	—
2-3	2	—	—	1	—	1	1	1	1	1	—	—
2-6	3	—	—	2	—	1	1	1	—	—	—	—
2-8	8	—	—	8	—	—	—	—	—	—	—	—
2-14	1	—	—	1	—	—	—	—	—	—	—	—
2-16	5	—	—	5	—	—	—	—	—	—	—	—
2-18	3	—	—	2	—	1	1	1	—	—	1	1
TOTAL	54	2	2	44	1	5	5	5	1	1	1	1

range from 3.1-10 mm in thickness (Table 4). The shell is leached out of many specimens. Where present the tempering consists of linear shaped shell fragments that range in size from 1-4 mm; the smaller shell fragments predominate.

The sherd surfaces are smooth. Any roughness is due to cells left from the leached shell. The core of the sherds is compact and generally grey (10YR5/1, 6/1). Laminations from the shell tempering are visible in the core.

The Oneota sherds are variable in color. Exterior surfaces range from reddish-yellow (7.5YR6/6, 7/6) and light yellow-brown (10YR6/4) to dark grey (10YR4/1). The interior sherd surfaces have the same color ranges, but with more greys (10YR4/1, 3/1) present.

Method of Manufacture. The method of manufacture could not be determined from the sample.

Surface Treatment. The interior and exterior surfaces are plain.

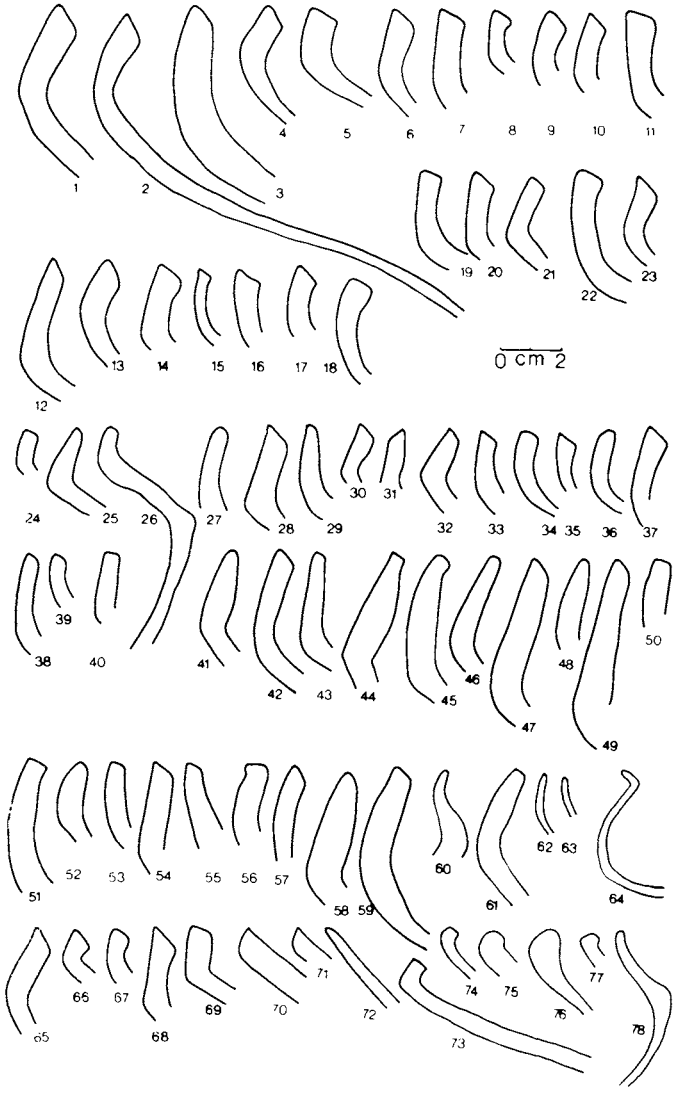

Fig. 5. Rim profiles. 1-23, Hartley Cross-Hatched; 24-33, Hartley Tool Impressed; 34-41, Hartley Plain; 42, Sanford Plain; 43-59, French Creek Cord Impressed; 60, Miniature; 61-64, Allamakee Trailed; 65-69, Mitchell Modified Lip; 70-72, Seed Jars; 73-78, Mississippian.

Table 6. Mississippian body sherds from the Hartley Fort.

Location	Plain	Decorated	Thickness	Remarks
FEA. 2-1	2	—	3.9-4.1	1 vessel
Mound 4 (Fill)	3	—	4.3-4.5	1 vessel
2-7	1	—	3.9	—
2-8	3	3	3.5-4.5	—
TOTALS	9	3	MEAN 4.1,	S.D. .35

Decoration. Decoration, if present, consists of trailed lines, punctates and dashes which form geometric, triangular motifs. Decorative attributes have been tabulated by representative excavation units and appear in Table 5.

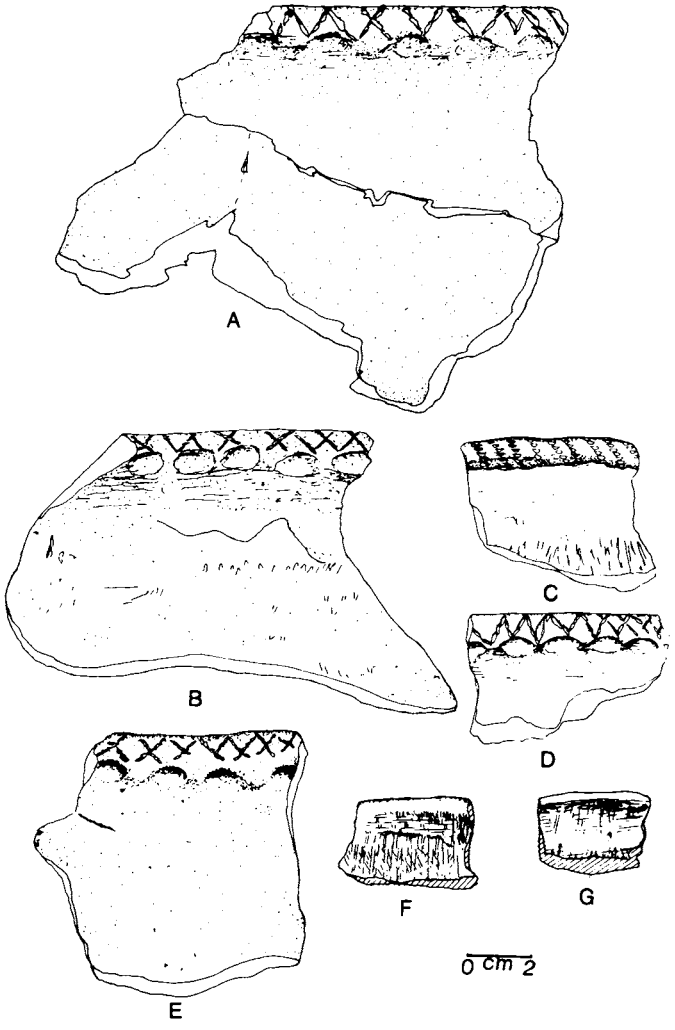

Fig. 6. Hartley ware pottery types. A-E, Hartley Cross-Hatched; F-G, Hartley Plain.

Fig. 7. Tool impression types used in this study. 1, perpendicular to lip; 2, perpendicular to lip, left to right; 3, perpendicular to lip; right to left; 4, downward impression; 5, downward impression, left to right.

Other. Four of the undecorated, shell-tempered sherds had smoothed-over cordmarked exteriors (Tables 4, 5). One specimen was thinner than the mean thickness for the Oneota bodysherd sample; the other three were thicker. The paste for these sherds was similar to other Oneota sherds inspected.

These specimens may be associated with either the Hartley phase occupation or the Oneota component at the Hartley site. If the former, they may represent Mississippian influence on the Late Woodland ceramic tradition. If the latter, they may represent Woodland influence on the Oneota occupation in this portion of the Hartley terrace. Their distribution in the site (Table 5) does not clearly indicate to which component they belong. Since Iowa Oneota ceramic assemblages usually have a few smoothed-over cordmarked shell-tempered sherds, these specimens have tentatively been placed with the Oneota component for descriptive purposes.

Mississippian

Twelve bodysherds representing 4-5 trade vessels were classified as Mississippian. Even though paste characteristics of these sherds are similar to the Oneota specimens inspected, it was possible to segregate these sherds from the Oneota bodysherds on the following basis: (1) the Mississippian sherds are uniformly thinner; (2) the sherd surfaces are dark greys and black; (3) all have a high lustrous exterior polish; and (4) three were decorated with curvilinear trailed lines (Table 6).

Mill Creek

Four of the grit-tempered bodysherds in the sample were classified as Mill Creek. These sherds had plain, dull exterior and interior surfaces and are characterized by one or more horizontal, trailed lines on the exterior sherd surface (Fig. 11, I-K; Tables 2-3). Trailed over plain bodysherds are commonly found on Mill Creek sites and are considered the distinctive attributes in the segregation of these sherds from the grit-tempered bodysherd sample.

Lane Farm Cord Impressed

Four bodysherds were classified as Lane Farm Cord Impressed. These sherds are generally thicker, ranging from 4.8-9.2 mm, and have dentate rocker stamping on a plain surface (Fig. 11, O-Q; Tables 2-3). These two features are characteristic of Lane Farm Cord Impressed pottery (Benn 1978; Logan 1976).

Hartley Ware

The diagnostic features of Hartley ware are sub-globular to

Table 7. Attributes on Hartley Cross Hatched Rims from the Hartley Fort.

Provenience	Total	Surface Finish: Plain	Smoothed over cord marked	Dull	Polish	Lug	Cord Twist: S	Z	Tool Impression: Present	Type	Cross Hatch Direction: xxx	\\\	///	x 2-1	x 1-2	Tool Impression: Before Cross Hatching	After Cross Hatching	Rim Form: (	<	Lip Form: ⊓	⊓	⊓
Surface	1	—	1	1	—	—	1	—	1	3	1	—	—	—	1	1	—	1	—	—	—	1
Mound 4 Fill	2	1	1	1	1	—	—	2	2	1	2	—	—	—	2	1	1	—	2	—	2	—
N-2	1	—	1	—	1	—	—	1	1	1	1	—	—	1	—	—	—	1	—	—	1	—
C-1	1	—	1	—	1	1	—	1	—	—	1	—	—	1	—	—	—	—	1	—	1	—
C-3	1	1	—	1	—	—	—	1	1	1	1	—	—	—	1	1	—	1	—	—	1	—
Mound 3	1	—	1	1	—	—	—	1	1	1	1	—	—	—	—	1	—	1	—	—	1	—
S1B	2	2	—	2	—	—	—	2	2	1	2	—	—	2	—	2	—	—	—	—	2	—
S1C	1	1	—	1	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	1
E-1	2	1	1	1	1	1	—	2	1	3	1	1	—	1	—	—	—	1	1	—	1	1
E-2	4	4	—	2	2	—	—	4	4	1	4	—	—	1	2	1	1	2	2	—	2	2
1-2	1	—	—	1	—	—	—	1	1	3	1	—	—	1	—	1	—	—	—	1	—	—
1-3	1	—	—	1	—	—	—	1	1	1	1	—	—	—	—	—	—	—	—	—	1	—
1-5	1	1	—	1	—	—	—	1	1	1	1	—	—	—	1	—	1	1	—	—	1	—
2-1	1	1	—	1	—	—	—	—	1	—	1	—	—	1	—	1	—	1	—	—	1	—
2-3	1	—	—	1	—	—	—	1	1	1	1	—	—	—	—	—	—	—	—	—	—	1
2-4	2	—	1	2	—	—	—	2	—	—	2	—	—	1	1	—	—	1	—	—	2	—
2-5	1	—	—	1	—	—	—	1	—	—	1	—	—	—	1	—	—	—	1	—	—	1
2-6, 2-8	1	—	—	1	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	1	—	—
2-7	2	2	—	2	—	—	—	1	2	1	2	—	—	1	1	1	1	1	—	—	2	—
2-8	4	1	—	3	1	—	1	3	3	1,3	4	—	—	3	—	2	1	1	—	—	2	2
2-12	1	—	—	1	—	—	—	1	1	1	1	—	—	1	—	1	—	—	—	—	1	—
2-14	2	2	—	2	—	—	—	2	1	1	2	—	—	—	1	1	—	2	—	—	—	2
TOTAL	34	17	7	27	7	2	2	30	25	—	31	2	1	14	11	14	5	14	7	2	21	11

Table 8. Measurements in mm on Hartley Cross Hatched rims from the Hartley Fort.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Mouth Radius	Neck Radius	Lip Angle	Neck Angle
Number	23	33	34	14	7	6	31	7
Range	13-39.7	3.8-11.5	4.9-11.4	4.5-11.4	70-110	60-90	55-90	115-130
Mean	22.9	5.7	8.4	6.9	92.9	77.5	67.9	122.9
Standard Deviation	6.4	1.6	1.5	1.6	—	—	9.6	—

Table 9. Attributes on Hartley Tool Impressed rims from the Hartley Fort.

Provenience	Total Rims	Surface Finish: Smoothed - Over: Plain	Smoothed - Over: Cord Marked	Smoothed - Over: Dull	Interior Neck Angle: Rounded	Interior Neck Angle: Angular	Lip Form: ∩	Lip Form: ∩	Lip Form: ∩	Smoothed-Over Cord Marking: On lip	Smoothed-Over Cord Marking: Up to lip	Tool Impression Type
2-8	2	—	X	X	—	X	X	—	—	X	X	—
2-8	1	—	X	X	—	—	—	—	X	—	X	5
2-9	1	X	—	X	—	—	—	—	X	—	—	—
1-1	1	—	X	X	—	X	X	—	—	—	X	5
1-2	1	X	—	X	—	X	—	—	X	—	—	3
1-3	1	X	—	X	X	—	—	—	X	X	X	3
N-1	1	—	X	X	—	X	X	—	—	—	X	1
N-2	1	—	X	X	—	X	X	—	—	X	X	3
E-2	1	X	—	X	X	—	—	—	X	—	—	3
Mound 4 Fill	1	—	X	X	—	—	—	X	—	—	X	3
TOTALS	11	4	6	10	2	5	4	1	5	3	7	

globular, grit-tempered vessels with short, straight-sided, flared rims, flat lips and constricted necks. Interior neck forms are both angular and smoothly curved with the former predominant. Rims range from 11.7 to 39.7 mm in height but average around 21 mm. The lips are usually bevelled to the exterior, producing a wedge-shaped profile in some instances.

Exterior surface treatment and other formal characteristics have been discussed under Hartley/French Creek ware bodysherds. Exceptions to these general descriptive features are noted under the component type descriptions.

Hartley Cross-Hatched. These vessels generally have plain, dull exteriors, smoothly curved interior necks and bevelled lips (Table 7; Fig. 5). The type is defined on the basis of cross-hatching decoration on the lip which is generally in association with tool impressions on the exterior lip/rim juncture (Fig. 6). The cross-hatching is formed by Z^s_4 twisted cords. Some of the cords were applied singly on diagonals to form the cross-hatching. On many specimens, however, the cords do not meet at a uniform depth, indicating they were probably wrapped around a rod.

No handles were present on the specimens classified; two had lugs, however. When tool impressions were present, two types, defined on the basis of tool application, were identified following Calabrese's classification with modification (1972:52; Fig. 7). Other attributes tabulated and measurements on Hartley Cross-Hatched rims are summarized in Tables 7 and 8.

Some variability was observed in this general decorative theme for Hartley Cross-Hatched. The shoulder on the rim from Square C-3 is decorated with a geometric design consisting of two parallel horizontal lines joined by a lower left to upper right diagonal line. The design element was made with a Z^s_4 twisted cord. One rim from Square E-2 has a single horizontal tailed line on the shoulder. Four rims have double "X" cross-hatching on the top and one rim from Square 2-8 has a chevron design formed by twisted cords on the lip.

With respect to vessel form and decorative elements, Hartley Cross-Hatched is quite similar to Initial Middle Missouri types such as Anderson Low Rim (Lehmer 1954:49), Mitchell Modified Lip (Hurt 1954; Ives 1962:14-15) and Linden Everted Rim: Nicollet Variety (Knudson 1967:261-262) from the Cambria site. The main distinguishing characteristic between Hartley Cross-Hatched and these three types is the use of twisted cords rather than incising to form the cross-hatching on the lip. Contact with some Initial Middle Missouri groups is firmly established by the presence of Mill Creek pottery at the Hartley Fort and the recovery of Hartley Cross-Hatched rims from the Chan-ya-ta site (13BV1), a Mill Creek culture site on the eastern periphery of the Little Sioux locality in northwest Iowa (Tiffany 1978:430-432); Knudson (1967:262) describes two vessels which may have Hartley Cross-Hatched-like decorations.

The Hartley Cross-Hatched type was provisionally defined on the basis of the Chan-ya-ta sample. The only difference between the Hartley Cross-Hatched pottery from the Hartley Fort and from the Chan-ya-ta site is that the Chan-ya-ta specimens generally lack tool impressions on the exterior lip/rim juncture.

Hartley Tool Impressed. Eleven rims representing ten vessels were classified as Hartley Tool Impressed. These rims have smoothed-over cordmarked or plain exteriors with angular interior necks and bevelled or rounded lips (Fig. 5, Table 9). Other formal features and metric attributes are consistent with Hartley ware (Table 10). One Hartley Tool Impressed rim, however, has a carinated shoulder (Fig. 8, C).

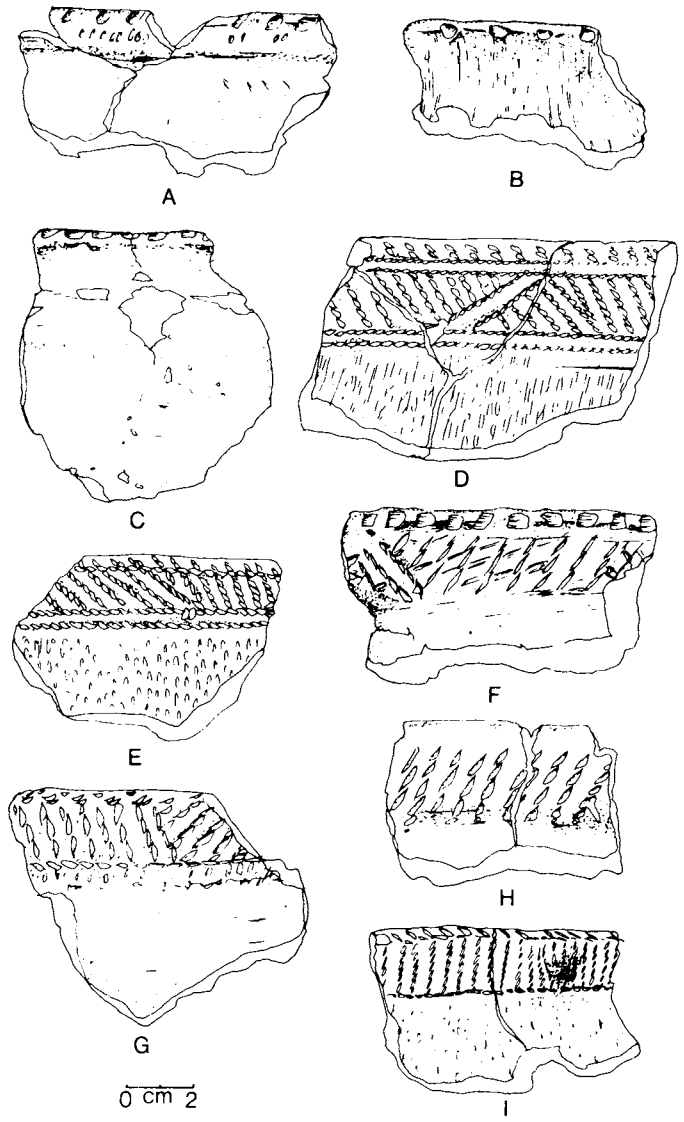

Fig. 8. Pottery types from the Hartley Fort. A-C, Hartley Tool Impressed; D-I, French Creek Cord Impressed.

Decoration consists of tool impressions on the exterior lip/rim juncture. The application of the tool impressions apparently produced the higher frequency of rounded lips in this type.

Hartley Tool Impressed is similar in form and rim decoration to Linden Everted Rim: Nicollet Variety (Knudson 1967:261-262) from the Cambria site and to Kimball Modified Lip of the Mill Creek culture and other Middle Missouri sites (Ives 1962:14).

Hartley Plain. Nine rims representing eight vessels were classified as Hartley Plain. These rims share the general formal attributes of Hartley ware but lack decoration on the rim or lip (Tables 11, 12; Figs. 5, 6). These features include globular vessels with smoothed-over cordmarking or plain exteriors, flared rims with straight sides, flat, bevelled lips and smoothly curved interior necks. Hartley Plain is seen as a companion type to Hartley Cross-Hatched and Hartley Tool Impressed and is meant to parallel in classification Sanford Plain of Sanford ware pottery found at Mill Creek sites (Ives 1962:15) or Linden Everted Rim from the Cambria site (Knudson 1967:260-26).

The two Hartley Plain rims from Square 2-16 (Table 11; Fig. 5, Profile 42) have attributes similar to Sanford Plain. The Hartley Plain sample is so small, however, and the Hartley Plain and Sanford Plain types so ubiquitous, that it is difficult to distinguish them.

French Creek Ware

The diagnostic features of French Creek ware are sub-globular to globular, grit-tempered vessels with high, straight rims, flat and often bevelled lips and constricted necks (Tables 13, 14). Exterior body surfaces are both plain and smoothed-over cordmarked; the rims are plain. There are three classes of rims: (1) those which have straight interiors and curved exterior surfaces producing rims which are thick at the necks and narrow at the lip; (2) those which are parallel sided; and (3) those which are channeled on the interior (Fig. 5, Profiles 43-59). The latter may constitute a separate ware/type grouping. Other features include lugs or nodes on the exterior lip or rim and castellations on the rim. The rim/neck joints are weak in French Creek ware rims which resulted in a largely fragmentary rim sample.

Decoration of French Creek ware rims consists of both S and Z single and re-plied cord impressions. In some cases, tool impressions were observed on the exterior lip/rim juncture. The cord impressions were used to form a few simple geometric designs on the rim exterior. French Creek ware has a single decorative type, French Creek Cord Impressed. As the only type in French Creek ware, French Creek Cord Impressed is defined to encompass the variability in cord-impressed rim decoration. The design elements in French Creek Cord Impressed generally form triangular and diagonal/hatched motifs or a combination of the two elements (Figs. 8-9). Two curvilinear motifs were observed, however (Fig. 9, Profiles 14 and 18). Except for one rim, the exterior lip/rim juncture cord decoration is made with the same cord twist as the cords forming the rim decoration. This indicates that twisted cord decoration on the rim and lip of some specimens may be part of a single twisted cord decorative element. On other rims, the lip decoration is separate from the rim decoration. In these cases, regardless of whether tool or cord impressed, the lip decoration was added after the rim decoration. Other decorative variations include: (1) one rim from Square E-2 with a smoothed-over cordmarked lip; (2) one rim from Square C-3 with two horizontal trailed lines on the rim paralleling the lip; (3)

Table 10. Measurements in mm on Hartley Tool Impressed rims.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Mouth Radius	Neck Radius	Lip Angle	Neck Angle
Number	8	10	10	3	4	2	4	5
Range	11.7-27	5-8.1	3.8-9.1	5.5-7.7	50—80	60-70	70-80	90-135
Mean	19.7	6.2	5.2	—	—	—	—	—

Table 11. Attributes on Hartley Plain rims from the Hartley Fort.

Provenience	Number of Rims	Surface Finish: Smoothed - Over Plain	Smoothed - Over Cord Marked	Smoothed - Over Dull	Polished	Interior Neck Angle: Round	Angular	Lip Form: ⊓	∩	∩	∩	Smoothed-Over Cord Marked: On lip	Up to lip
N-1	1	X	—	X	—	X	—	—	—	X	—	—	X
A-3	1	—	X	X	—	X	—	—	—	—	X	—	X
1-3	1	—	X	—	X	X	—	—	—	X	—	X	X
2-2	1	—	X	X	—	X	—	—	—	X	—	X	—
2-2	1	—	X	X	—	X	—	—	X	—	—	X	X
2-8	1	—	X	X	—	X	—	—	—	X	—	X	X
2-16	1	X	—	X	—	X	—	—	—	X	—	—	—
2-16	2	X	—	X	—	—	X	X	—	—	—	—	—
TOTALS	9	3	5	7	1	7	1	1	1	5	1	4	5

Table 12. Measurements in mm on Hartley Plain rims from the Hartley Fort.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Lip Angle	Neck Angle
Number	8	8	8	2	7	1
Range	15.7-26.2	5.4-6.8	5-8.1	5.2	65-110	125
Mean	19.7	6.1	6.4	—	79.2	—

one rim from Square 1-1 with tool impressions on the lip and not the lip/rim juncture; (4) two rims with cord impressions cross-cutting the lip; (5) one rim from Square 1-2 with lower left to upper right diagonal tool impressions on the interior lip/rim juncture; and (6) five rims with cord impressed decoration on the interior rim surface consisting of parallel, horizontal bands of twisted cords.

With respect to rim form and decoration. French Creek Cord Impressed has its closest similarity to Chamberlain Cord Impressed pottery characteristic of Initial Middle Missouri sites in Central South Dakota (Hurt 1954). Chamberlain Cord Impressed is also found sparingly in Mill Creek sites (Ives 1962; Henning 1968). Discounting the use of cord impressions to form the decorative motifs, French Creek Cord Impressed is similar to Chamberlain Incised, Chamberlain Incised Triangle and Great Oasis Incised (Ives 1962:15-17; Henning and Henning 1978; Johnson 1969). Similar parallels can also be seen between Cambria village types like Judson Composite and Mankato Incised with French Creek Cord Impressed (Knudson 1967:258-269, 266-269).

Several specimens have castellated rims. These rims and the exterior rim decoration on them parallel Late Woodland period pottery types of the Upper Mississippi river valley such as Maples Mills pottery in Illinois (Fowler 1952:138-139; Wray 1952:156), and Minott's Cord Impressed of east central Iowa (Logan 1976). French Creek Cord Impressed has different rim forms than Maples Mills and Minott's, however. French Creek Cord Impressed represents a broad Late Woodland period ceramic horizon involving the use of single cords or incising to form a few stylized geometric motifs on globular vessels with high flared rims. French Creek ceramics occur between Plains Village sites to the west where incising predominates and Late Woodland ceramic complexes of the Upper Mississippi river valley where single cord-impressed decoration is used.

Miniatures

Miniatures are small, nondescript pots. They are usually poorly tempered and are classified as bowl-like or jar-like (Anderson 1972:140). One jar-like miniature, presumably associated with the Hartley phase occupation, was identified in the sample from Square 2-7 (Fig. 5, Profile 60). It has a plain dull exterior surface and a rounded lip. The rim is 4.6mm thick, the lip is 2.7mm thick, and the shoulder is 9.5mm thick.

Allamakee Trailed

The Oneota bodysherds described previously and the Oneota rims in the Hartley Fort ceramic collection have attributes consistent with the definition of Allamakee Trailed pottery (Henning 1961; Wedel 1959). This is not surprising because the Lane Enclosure (13AM200), one of the type sites for the Orr focus, is nearby.

The rim sherd sample includes two with flared rims, one rim shoulder fragment, one bowl fragment, four miniature vessels and one flared rim vessel (Fig. 5, Profiles 61-64). The rim-shoulder fragment is from Square 2-8. It is undecorated and has a smoothly curved interior neck juncture. It is 7.1mm thick. One undecorated rim fragment, also from Square 2-8, is represented by the upper rim and lip only. It is parallel sided and has a rounded lip. The rim is 5.4mm thick, and the lip is 4mm thick.

The other rim is from Square 2-18. It is flared, has parallel sides, and a smoothly curved interior neck juncture (Fig. 10, B). The lip is narrow, rounded, and is decorated with a continuous band of tool impressions, giving it a notched effect. The upper shoulder is decorated with a series of everted triangles of shallow trailed lines. The triangles are filled with short (ca. 8mm), vertically oriented, shallow dashes. Other unjoined bodysherds from Square 2-18 associated with this vessel are listed in Table 5. The dimensions on this rim are: rim thickness, 7.8mm; lip thickness, 6mm; rim height, 28mm; shoulder thickness, 7.5mm; and the lip angle is 90 degrees.

The bowl fragment is from Square 2-14. It is parallel sided and undecorated with a flat square lip. The lip is 4.9mm thick; the shoulder is 5.4mm thick.

The four miniature vessels were associated with burials (Table 15). Two are bowl-like and two are jar-like. All but one are undecorated. The bowls are fragmentary; both are from out-curving bowls with narrow, rounded lips (Fig. 5, Profiles 62-63). One fragmentary jar-like miniature is thick, crude and apparently a practice pot (Fig. 10, C). The other is a finely made Allamakee Trailed miniature (Fig. 5, Profile 64 and Fig. 10, D). The lip on this specimen is decorated with a continuous band of impressions and the shoulder is tool decorated with parallel vertical trailed lines, separated by punctates.

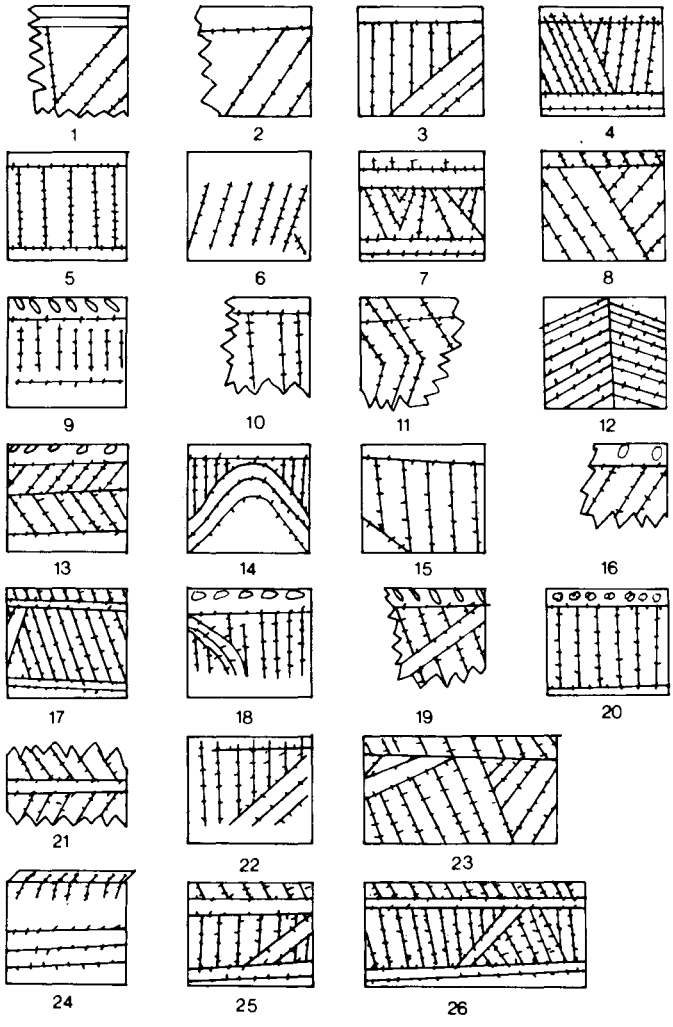

Fig. 9. Decorative motifs on French Creek Cork Impressed pottery.

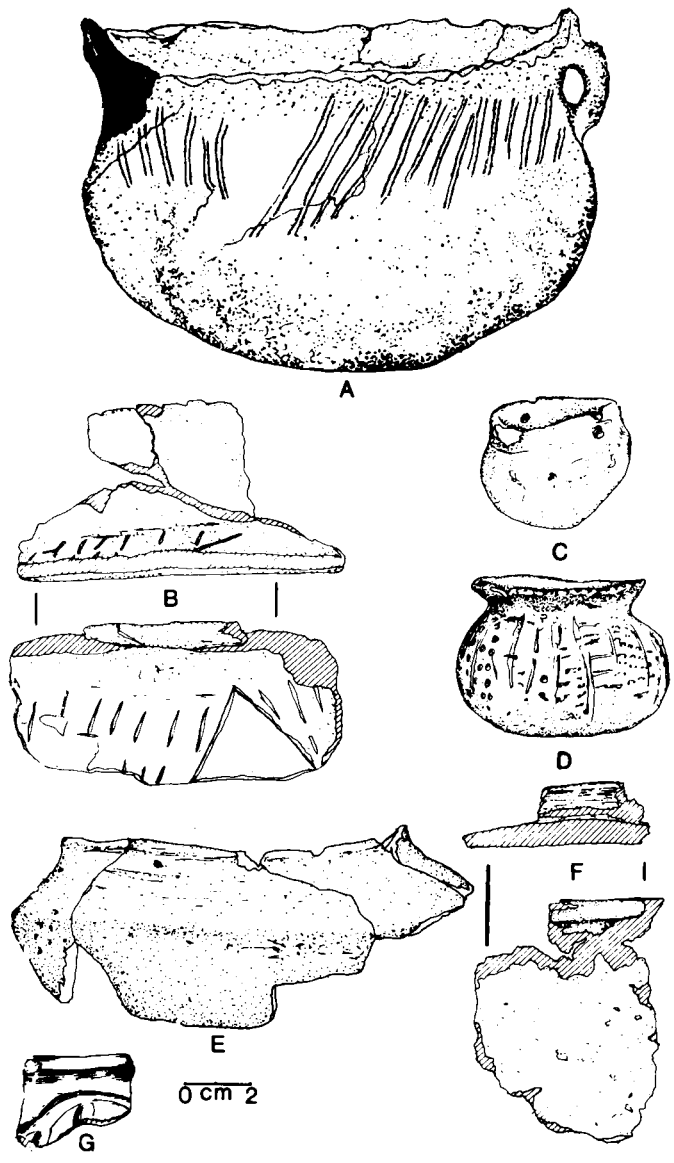

Fig. 10. Hartley Fort pottery. A-D, Oneota pottery; E-G, Mississippian pottery.

Both miniature jars have holes drilled in the neck area after firing.

The other Oneota vessel is also an example of Allamakee Trailed (Fig. 10, A). It, too, is from Mound 4 and is associated with a burial. This vessel is ellipsoidal in shape and has a flared rim with strap handles that do not extend up to the lip. Shoulder decoration consists of opposed, diagonal trailed lines which are narrow in width and shallow in depth. The lip is decorated with a series of continuous tool impressions which create a scalloped effect. The dimensions of the vessel are: rim height, 19.4mm; rim thickness, 5.7mm; and lip thickness, 4.2mm.

Mitchell Modified Lip

Seven rims were classified as Mitchell Modified Lip. They have plain, dull or smoothed-over cordmarked exterior surfaces, square or bevelled lips and tool impressions on the exterior lip/rim juncture which are associated with trailed crosshatching or diagonal lines on the rim (Table 16, Figs. 5 and 11, C-G). Measurements made on these specimens show they are consistent with similar measurements on Mitchell Modified Lip from Mill Creek sites (Anderson 1972; Tiffany 1978). These measurements also fall within the range of Hartley Cross-Hatched (Table 17).

Kimball Modified Lip

One rim fragment in the sample was identified as Kimball Modified Lip (Fig. 11, H). The rim is flared with a flat, bevelled lip. The exterior lip/rim juncture is decorated with a band of tool impressions characteristic of this type. This specimen was not measured.

Seed Jars

Six grit-tempered rims representing four vessels were classified as seed jars. Seed jars are vesels with a constricted orifice and no rim (Ives 1962:21). The two lip forms identified were rounded and angular (Fig. 5, Profiles 70-72; Table 18). Four rims were polished

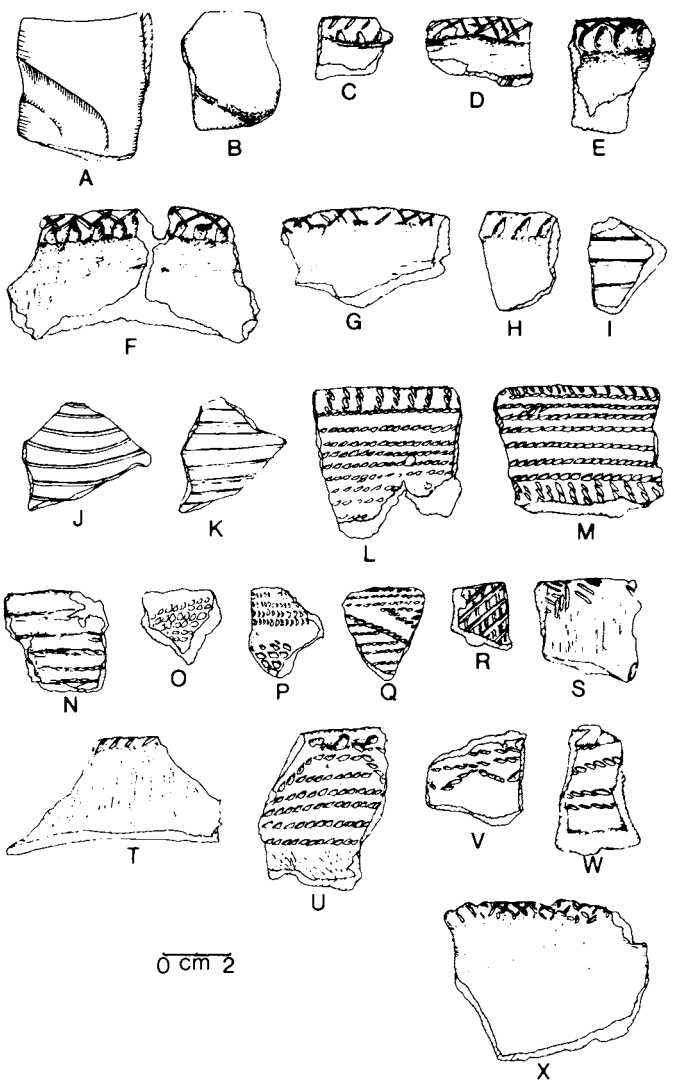

Fig. 11. Other rim and body sherds from the Hartley Fort. A-B, Seed Jars; C-G, Mitchell Modified Lip; H, Kimball Modified Lip; I-K, Mill Creek body sherds; L-N, Lane Farm Cord Impressed; O-Q, Lane Farm Cord Impressed body sherds; R, T-X, untyped rims; S, Spring Hollow Cord Marked.

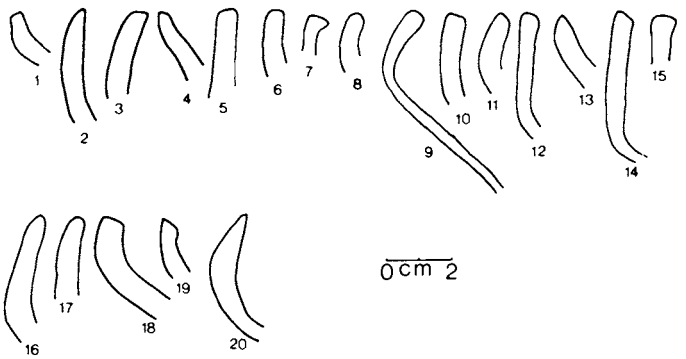

Fig. 12. Rim profiles. 1, Mississippian copy; 2-4, Lane Farm Cord Impressed; 5, Spring Hollow Cord Impressed; 6-20, untyped rims.

Fig. 12, Profile 1). In Mill Creek assemblages these vessels are considered to be locally made Mississippian copies. This rim may represent the equivalent in the Hartley phase occupation of the Hartley Fort. Its dimensions are: rim height, 9.6mm; rim thickness, 6.1mm; lip thickness, 5.7mm; shoulder thickness, 6.4mm; neck angle, 100 degrees; lip angle, 95 degrees.

Lane Farm Cord Impressed

Nineteen rims representing seventeen vessels were classified as Lane Farm Cord Impressed. These specimens are within Benn's (1978) definition of this type (Tables 20-22). The rims are recurved or flared with plain exteriors and are decorated with unpaired single cord impressions (Table 20, 21). The single cord impressions are mostly horizontal and form a few simple geometric designs consistent with the type (Logan 1976; Figs. 11, L-Q and 12, Profiles 2-4). Some interior rim single cord impression decoration is present, however.

These rims indicate globular vessels. All but four of them are associated with the fort embankment or very near to it.

Lane Farm Cord Impressed is found throughout the Upper Iowa River Valley. The Hartley sample has a number of distinctive features, however, including: (1) globular vessel form; (2) flared rim profiles as well as recurved; and (3) interior cord-impressed decoration. These aberrant characteristics point to ceramics later than those described by Benn (1978) for the F-T-D site (13AM210) and by Logan (1976) from the nearby type site—the Lane Farm Mound Group (13AM104).

Spring Hollow Cord Marked

One grit-tempered rim from Square 2-6 was classified as Spring Hollow Cord Marked (Logan 1976:97-98). The rim is straight, parallel-sided with a flat lip (Fig. 12, Profile 5). The interior surface is plain; the exterior surface has vertical smoothed-over cordmarking on the lip. Decoration is confined to the exterior lip/rim margin and consists of lower left to upper right diagonal cord-wrapped stick impressions (Figs. 11, 5). The cords are re-plied ($S\frac{4}{4}$) and are spaced at 2 mm intervals on the rod. Similar pottery in the Driftless Region is classified as Leland Cord-Marked (Witry 1959). The lip and rim are 6.9 mm thick.

Table 15. Descriptive information on Oneota miniature vessels from the Hartley Fort.

Provenience	Catalog Number	Rim Thickness	Lip Thickness	Shoulder Thickness	Form	Remarks
Mound 4, Burial 8	372	—	—	4.2	Bowl	Adult female
Mound 4, Burial 10	373	3.4	2.4	—	Jar	Child
Square 2-8, Levels 3, Burial 3	374	4.2	3.3	—	Jar	Child
Feature 2-2, Burial 1	375	—	—	3.6	Bowl	Child

Table 13. Attributes on French Creek Cord Impressed rims from the Hartley Fort.

Provenience	Total	Surface Finish				Cord Impression				Lip Decoration			Rim Form		Lip Form			Lug/ Mode	Castilated Rim
		Plain	SOCM	Dull	Polish	Z^{z}_{s}	S^{z}_{z}	Z^{zz}_{ss}	S^{zz}_{zz}	Present	Cord	Tool	⟨	(	⊓	∩	∩		
A3	1	—	—	1	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—
B4	1	—	—	1	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—
C3	1	—	—	1	—	1	—	—	—	—	—	—	—	—	1	—	—	1	—
S1	1	—	—	1	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—
S1A	2	—	1	1	1	1	—	—	1	2	1	1	—	1	1	—	1	2	2
S1B	1	—	1	1	—	—	—	—	1	—	—	—	1	—	—	1	—	—	—
S1C	1	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Mound 3	1	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Mound 4	5	2	3	2	3	1	2	—	2	—	—	—	2	2	2	1	2	1	—
N-1	2	—	1	1	1	2	—	—	—	2	2	—	1	—	1	—	1	1	1
W-1	2	—	—	2	—	2	—	—	—	+1	—	+1	—	1	1	—	1	—	—
E-2	2	1	1	2	—	1	1	—	—	1	—	1	—	2+	—	1	1	1	1
1-1	5	—	—	5	—	4	—	—	1	1	—	1	—	—	1	1	1	1	1
1-2	1	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	1	—	—
1-3	1	—	—	1	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—
1-4	2	—	—	2	—	1	1	—	—	—	—	—	—	1	—	—	—	—	—
1-5	1	—	—	1	—	—	1	—	—	1	1	—	—	—	—	—	1	1	1
2-3	3	—	—	3	—	2	—	—	1	1	—	1	1	1	1	2	—	—	—
2-4	2	—	—	2	—	—	1	1	—	2	2	—	—	—	1	1	—	—	—
2-5	1	—	1	1	—	1	—	—	—	—	—	—	1	—	—	—	—	1	1
2-7	2	—	—	2	—	1	1	—	—	1	1	1	—	—	1	—	—	—	—
2-8	3	—	1	3	—	2	—	—	1	2	2	—	1	1	1	1	—	1	—
2-12	1	—	—	1	—	—	—	1	—	1	1	—	—	1	—	—	1	1	1
2-16	2	—	—	2	—	1	—	1	—	—	—		1	—	—	2	—	—	—
2-18	1	—	—	1	—	1	—	—	—	—	—	—	—	—	1	—	—		
2-20	4	1	2	4	—	3	1	—	—	1	1	—	—	3	1	—	—	1	1
TOTALS	49	4	11	44	5	26	10	5	8	16	11	6	8	13	19	10	10	12	9

Table 14. Measurements in mm on French Creek Cord Impressed rims from the Hartley Fort.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Mouth Radius	Neck Radius	Lip Angle	Neck Angle
Number	19	48	40	12	9	10	29	11
Range	15.5-45.4	5-11	3.4-8.5	5.2-8.3	70-130	50-110	65-95	105-140
Mean	31.3	7.5	5.4	6.7	90	76	84.7	119
Standard Deviation	8.8	1.5	1.2	—	—	—	8.9	—

but two from Squares 1-1 and 2-9 were smoothed-over cordmarked. More grit tempering is present in the smoothed-over cordmarked seed jars. The difference in paste coupled with the exterior surface treatment on these two specimens might indicate local manufacture. Three rims representing one vessel from Square S-3 were decorated with a broad, curvilinear trailed design characteristic of Mill Creek seed jars (Fig. 11, A-B).

Mississippian Vessels

Several rims are considered to be shell tempered trade vessels. All have rolled or low, square rim profiles and are highly polished (Figs. 5, Profiles 73-78; 10, E-G). One is red slipped; another has a carinated shoulder (Table 19; Fig. 10, E).

Two rims from Squares 2-8 and E-2 are decorated with curvilinear trailed lines (Fig. 10, G). The others are undecorated. The Hartley Fort specimens represent examples of Powell Plain (Fig. 10, F; Table 19, Mound 4) and Ramey Incised (Fig. 10, G) (Griffin 1949). They are present in only a few areas in the site and are associated with the Hartley phase occupation (Fig. 2; Table 19).

Other

One small, flared, grit-tempered rim from Square 2-2 is decorated with two (Z^{zz}_{ss}) twisted cords on the interior rim. The exterior is plain. Rounded, rolled or short flared rims with rounded or angular shoulders are characteristic of the Mill Creek group (Anderson 1972;

Table 16. Attributes on Mitchell Modified Lip rims from the Hartley Fort.

Provenience	Total	Surface Finish				Tool Impression		Cross Hatch Direction				Tool Impression		Rim Form		Lip Form	
		SOCM	Plain	Dull	Polish	Present	Type	xxx	///	x 2-1	x 1-2	Before Cross	After Hatch	(	(	⊓	⊓
N-2	1	—	1	1	—	1	1	1	—	1	—	1	—	—	1	1	—
A-3	1	—	1	1	—	1	4	—	1	—	—	—	—	1	—	—	1
S1A	1	—	1	1	—	1	1	1	—	—	1	1	—	—	1	1	—
2-2	2	1	1	1	—	2	1,3	2	—	2	—	1	—	—	2	1	1
2-6	1	—	—	1	—	—	—	1	—	—	1	—	—	—	—	1	—
2-20	1	—		1	—	—	—	—	1	—	—	—	—	—	—	1	—
TOTAL	7	1	4	6		5	—	5	2	3	2	3	—	1	4	5	2

Table 17. Measurements in mm on Mitchell Modified Lip from the Hartley Fort.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Lip Angle	Neck Angle	Neck Radius	Mouth Radius
Number	6	7	7	4	6	4	2	2
Range	10.4-27.5	5.7-7.4	7-10.2	6-6.4	65-85	120-135	90	80-100

Table 18. Seed jars from the Hartley Fort.

Provenience	Dull	Po-lished	Hole in rim	Lip (	Form ⌐	Deco-rated	Lip Thickness	Shoulder Thickness
S-3	—	3	—	3	—	3	10.2-10.5	8.3-9.0
1-1	1	—	—	1	—	—	8.3	7.2
E-2	—	1	1	1	—	—	7.3	5.9
2-9	1	—	—	—	1	—	4.5	6.2
TOTAL	2	4	1	5	1	3		

Other Rims

Several rims in the sample could not be readily classified into existing types because they exhibit a number of aberrant characteristics. They have been grouped and are described below.

1. Two rims have trailed lines over exterior cord marking. One rim from Square C-2 is straight, parallel-sided with a flat lip (Fig. 12, Profile 6). The interior surface is plain. The exterior is cordmarked and the lip is smoothed-over cordmarked. It is decorated with a band of lower left to upper right diagonal tool impressions on the exterior lip/rim juncture. There is also a band of lower left to upper right parallel-trailed lines on the rim exterior (Fig. 11, F). The rim is 5.3 mm thick and the lip is 5.4 mm thick.

The other rim from Square B-4 is slightly flared with a wedge-shaped lip (Fig. 12, Profile 7). The exterior is cordmarked; the interior is plain. Decoration consists of: (1) two smoothed-over Z_s^s horizontal cord impressions on the interior rim near the lip; (2) a band of lower left to upper right diagonal cord impressions on the exterior lip/rim juncture; and (3) two lower left to upper right diagonal trailed lines on the exterior. The rim is 3.9 mm thick; the lip is 6.8 mm thick.

Both rims are Spring Hollow Incised-like (Logan 1976), but their paste characteristics and thinness make them aberrant to this type if one considers Spring Hollow Incised to be the Iowa equivalent in time to Black Sand pottery of Illinois. Incised over cordmarking as a decorative form is apparently quite common throughout the eastern Iowa Woodland sequence. These specimens are thought to predate the Hartley Phase, however. They probably are late Middle Woodland in time and could be associated with groups who were beginning to use Linn Ware pottery in the Hartley terrace vicinity.

2. One grit-tempered, flared rim from Square N-1 is an aberrant form of Hartley Tool Impressed. It has smoothed-over cordmarking on the rim exterior that extends up to the lip (Fig. 12, Profile 8). The lip is flat and undecorated. The interior lip surface is plain. Decoration on the rim consists of lower right to upper left diagonal Z_s^s twisted cord impressions on the lip/rim exterior rather than tool impressions. The rim thickness is 5.3 mm; the lip thickness is 4.8 mm.

3. Six grit-tempered rims in the sample have surface treatment and paste characteristics similar to Madison ware in Iowa (Benn 1978, 1980). They have smoothed-over cordmarked exteriors, straight to slightly flared rims, and the lips range from flat to rounded (Table 22; Fig. 12, Profiles 9-13; Fig. 11, T). Exterior cordmarking extends up to the lip. Decoration consists of tool impressions on the interior or exterior lip or both, the latter producing a scalloped or crenellated lip. This decorative process probably accounts for the rounded lip profiles on some specimens.

The closest analog to these rims is Madison Plain. If Benn's (1978) chronology is correct, these rims would predate the Hartley phase.

4. Two rims have features like those described for the previous five specimens but, in addition, have cord or warp-faced fabric impressions over cordmarkings on the exterior rim surface. One rim from Square E-2 has a smoothed-over cordmarked rim and shoulder exterior and a plain interior. The lip is also plain. The rim is high, straight sided and slightly flared with a flat, wedge-shaped lip (Fig. 12, Profile 14). Decoration consists of tool impressions (type 3) in the interior and exterior lip rim area and re-plied (Z_{ss}^{ss}) twisted cord impressions, apparently a warp-faced fabric, which forms a triangular motif on the rim exterior (Fig. 11, U). The dimensions of the rim are: rim height, 41.7 mm, rim thickness, 5.6 mm, lip thickness, 6.7 mm, and lip angle, 75 degrees.

The other specimen is from Square S-3, and is similar to the one just described except the re-plied cords (Fig. 12, Profile 15) are

Table 19. Attributes on Mississippian rims from the Hartley Fort.

Provenience	Surface Finish		Red Slip	Shoulder	Interior Neck Angle		Lip Form		Rim Height	Rim Thickness	Est. Mouth Radius	Est. Neck Radius	Shoulder Thickness
	Dull	Polish			Rounded	Angular	⊓	ᖇ					
Fea. 2-1,2-3	—	X	—	X	X	—	—	X	6.8	5.0	—	55	—
Mound 4	X	—	—	—	—	X	X	—	10.5	5.5	5.7	—	—
E-2	—	X	X	—	X	—	—	X	6.2	6.4	5.8	—	—
2-2	X	—	—	—	X	—	—	X	7.0	—	5.0	—	—
2-8	—	X	—	—	X	—	—	X	11.1	8.6	—	—	—
2-8	X	—	—	—	X	—	—	X	10.3	8.7	—	—	—
TOTALS	3	3	1	1	5	1	1	5					

Table 20. Attributes on Lane Farm Cord Impressed pottery from the Hartley Terrace.

	Rim Form		Surface Finish		Interior Rim/Horizontal Decoration				Exterior Lip/Rim Decoration					
	(	ᑕ	Plain Dull	Plain Polish	Present	Number of Cords	Z	S	Tool Impressed	Cords	///	\\\	||	Z
Mound 4	X	—	X	—	—	—	—	—	X	—	—	—	X	—
Mound 4	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Mound 4	—	—	X	—	X	2	X	—	X	—	—	—	X	—
1-2	—	X	—	—	X	1	X	—	—	X	—	—	X	X
1-2	—	—	—	X	—	—	—	—	—	X	—	X	—	X
1-2	—	—	X	—	—	—	—	—	—	X	X	—	—	X
1-3	—	—	X	—	—	—	—	—	—	—	—	—	—	—
1-3	—	—	—	X	X	2	X	—	X	—	—	—	X	—
1-3	X	—	X	—	—	—	—	—	—	X	X	—	—	X
1-3	—	—	X	—	X	1	X	—	—	X	—	X	—	—
E-2	X	—	—	—	—	—	—	—	—	—	—	—	—	—
D-4	X	—	X	—	X	—	—	—	—	X	—	—	X	—
A-1	—	—	X	—	—	—	—	—	—	—	—	—	—	—
2-2	—	—	X	—	X	3	—	—	—	—	—	—	—	—
2-4	—	—	X	—	—	—	—	—	—	X	—	X	—	X
2-8	—	—	X	—	—	—	—	—	—	—	—	—	—	—
2-8	X	—	X	—	—	—	—	—	—	—	—	—	—	—
2-9	—	—	X	—	—	—	—	—	—	X	—	X	—	X
TOTALS	5	1	13	3	6	—	4	—	3	8	2	4	5	6

twisted differently (S_{z}^{s}) and the lip is smoothed-over cordmarked. Its dimensions are: rim thickness, 4.8 mm; lip thickness, 6.5 mm, lip angle, 80 degrees.

5. Two grit-tempered rim shoulder fragments have decorative traits consistent with Madison Cord Impressed and Lane Farm Cord Impressed. These are unpaired single cord impressions on a plain exterior rim surface, but in a hanging triangle or pendant motif (Fig. 11, V). The specimen from Square 1-1 has S_{z}^{s} cord impressions and is 5.5 mm thick. The specimen from Square 2-18 has an S twisted cord impression and is 6 mm thick.

6. Two grit-tempered flared rims have characteristics that blend Lane Farm Cord Impressed and Hartley Cord Impressed (Fig. 12, Profiles 16-17). Both have smoothed-over cordmarkings on the exterior rim with plain rounded lips. Both are decorated with tool impressions (type 6) on the exterior lip/rim juncture. The rim from Square 2-7 is decorated with re-plied cord impressions (S_{z}^{s}) forming horizontal bands (Fig. 11, W). Its dimensions are: rim height, 32.6 mm, rim thickness, 8.5 mm, lip thickness, 5 mm.

The other rim from the Mound 4 fill is decorated with re-plied cord impressions (Z_{s}^{z}) forming a geometric pattern of upright-inverted-upright triangles. The rim thickness is 7.8 mm; the lip thickness is 4.1 mm. These rims are most similar to those described in group 4 in this section but lack interior tool impressing.

7. One rim from Square S-3 has traits consistent with Mitchell Modified Lip, but it is shell-tempered (Fig. 12, Profile 18). The exterior is plain and polished, the rim flared with a square lip and a smoothly curved interior neck. Decoration consists of trailed cross-hatching on the lip. Its dimensions are: rim height, 14.7 mm, rim thickness, 7.5 mm, lip thickness, 7.8 mm, side thickness, 6.7 mm, and lip angle, 85 degrees.

8. One small, grit-tempered rim from Square S1-B exhibits a combination of Mississippian and Woodland features. The specimen is apparently from a globular vessel and has a rolled lip (Fig. 12, Profile 19). The exterior is smoothed-over cordmarked up to the lip. Decoration consists of cross-hatching formed with Z twisted cord impressions on the lip. Its dimensions are: rim height, 9.2mm, rim

Table 21. Additional Attributes on Lane Farm Cord Impressed pottery from the Hartley Terrace.

Provenience	Exterior Middle Rim Decoration	Cord Type Exterior Z_4^4	S_4^4	$Z_{4/4}^{4/4}$	$S_{4/4}^{4/4}$	Exterior Lower Rim Decoration and Cord Type	Remarks
Mound 4	single cords in horizontal bands	X	—	—	—	single, diagonal bands, Z_4^4	
Mound 4	paired cords in horizontal bands	X	—	—	—	—	fragmentary
Mound 4	single cords in horizontal bands	—	—	X	—	—	fragmentary
1-2	single cords in horizontal bands	—	—	X	—	—	possible fabric impression on exterior
1-2	single cords in horizontal bands	—	—	X	—	—	fragmentary
1-2	single cords in horizontal bands	—	—	X	—	—	fragmentary
1-3	single cords in horizontal bands	X	—	—	—	—	fragmentary
1-3	—	—	—	—	—	—	fragmentary
1-3	single cords in horizontal bands	X	—	—	—	—	
1-3	single cords in horizontal bands	X	—	—	—	—	fragmentary
E-2	single cords in horizontal bands and triangular bands	—	—	X	—	—	possible fabric impression on exterior
D-4	—	—	X	—	—	—	—
A-1	paired and single cords in horizontal bands	X	—	—	—	—	fragmentary
2-2	single cords in horizontal bands	X	—	—	—	—	dentate inverse decoration fragmentary
2-4	single cords in horizontal bands	X	—	—	—	—	fragmentary
2-8	single cords in horizontal bands	X	—	—	—	—	fragmentary
2-8	single cords in horizontal bands	—	X	—	—	—	—
2-9	single cords in horizontal bands	X	—	—	—	—	fragmentary
TOTAL		10	2	5	—		

thickness, 4.4mm, lip thickness, 4.2mm, side thickness, 4.5mm.

9. One plain grit-tempered rim from Square 1-3 has a rounded interior neck juncture and a very narrow, square lip (Fig. 12, Profile 20). It is decorated with Z_4^4 cord-impressed cross-hatching on the rim exterior (Fig. 11, X). It is very similar to specimens with trailed cross-hatching found at: (1) the Chan-ya-ta (13BV1) site (Tiffany 1978: 428-430); (2) Walter's (13JH42) and Sandy Beach (13JH43) sites in Johnson County (Anderson 1971a:6, Fig. 1-8, D-E; 1971b:29-30, Fig. 2-6, A-C); (3) the Minott's Rock Shelter (13LN210) and Spring Hollow Rock Shelter No. 1 (13LN211) in Linn County (Logan 1976:98, Fig. 63, C, E; Anderson 1971a, b); and (4) from the Crim site (13ET403) (Anderson 1977) in northwest Iowa. This rim apparently represents a wide-ranging but infrequent decorative form associated with Late Woodland complexes in Iowa. Its dimensions are: rim height, 17mm, rim thickness, 1.7mm, lip thickness, 2mm, side thickness, 6.4mm.

10. One grit-tempered, smoothed-over cordmarked rim from Square E-2 has a rounded interior neck juncture and a wedge-shaped lip. The smoothed-over cordmarking on the exterior extends up to the lip. Like the previous specimen, it is decorated with cross-hatching on the lip. Its dimensions are: rim height, 10.9mm, rim thickness, 5.7mm, and lip thickness, 7.2mm. Similar rims have been reported from Mill Creek sites (Anderson 1972: Fig. 18-2, F; Tiffany 1978:432-433) and are described as Sanford/Great Oasis combinations (Anderson 1972:260, 262).

DISCUSSION

Although the Hartley Fort is the type site of the Hartley phase, McKusick (1964:494; 1973:9) never defined the Hartley phase. The

Table 22. Measurements in mm on Lane Farm Cord Impressed rim sherds from the Hartley Fort.

Measurement	Rim Height	Rim Thickness	Lip Thickness	Mouth Radius	Neck Radius	Lip Angle
Number	1	15	12	2	1	7
Range	20.2-31.1	3.5-7.1	2.7-5.5	46-50	40	75-105
Mean	—	5.7	4.1	—	—	88
Standard Deviation	—	1.1	.99	—	—	—

Hartley phase is a Late Woodland period culture, provisionally dating from AD 900-1100, limited to the Hartley Terrace and the immediate locality, and characterized by the pottery described in this article. To date there is one known component, the Hartley Fort, which is a small, fortified farming village. Other features of the subsistence-settlement system or the artifact assemblage are either unknown or undescribed.

The Hartley phase postdates the Keyes phase (Benn 1980: 211-213) but is probably contemporaneous with the Minott's focus (phase) of eastern Iowa. In the Wisconsin sequence, the Hartley phase would fall late in the Early Effigy Mound period or in the Middle Effigy Mound period (Hurley 1975:365). These temporal relationships are based on two premises: (1) the general similarity of French Creek Cord Impressed pottery of the Hartley phase with Late Woodland single cord-impressed decorated and collared or castellated rim types such as Point Sauble Collared and Minott's Cord Impressed; and (2) the idea that the relationship of Lane Farm Cord Impressed and Madison Cord Impressed to French Creek Cord Impressed is developmental.

Benn (1980: personal communication) feels that the Lane Farm Cord Impressed sample from the Hartley Fort is late in the Lane Farm pottery sequence and is most similar to Lane Farm pottery from the Red House Landing Site (13AM228) in Effigy Mounds National Monument. The Lane Farm sample from Hartley should be contemporaneous with Madison Cord Impressed, however, and if Benn's temporal placement of the Hartley sample is correct, Lane Farm Cord Impressed should still predate the Hartley phase. The aberrant characteristics of this sample, then, may reflect Lane Farm pottery in transition, making these rims representative of a local precursor to French Creek Cord Impressed. If this is the case, the Woodland cultural sequence in northeast Iowa would begin with the Ryan focus and be followed by the McGregor phase, the Allamakee Phase, the Keyes phase and Minott's phase, the Allamakee Phase, the Keyes phase and Minott's focus, and finally by the Hartley phase (Benn 1979:47-82).

Various Late Woodland ceramic wares in the Driftless Region have undecorated companion types such as Madison Plain or Minott's Plain. Logan (1976:59, 85, 105, 107-108, 141) and Anderson (1971a: 6; 1971b: 29-30, 32-35, 48-49) describe and illustrate pottery from several eastern Iowa sites that stylistically could be classified as Hartley Plain, Hartley Cross-Hatched or even French Creek Cord Impressed. Pottery like Hartley phase ceramics, however, is a rare component of the ceramic assemblages at these sites. None of these sites have the diverse assemblage of Hartley and French Creek ware ceramics appearing as a single, cohesive unit like they do at the Hartley Fort.

Although the radiocarbon dates show that the Hartley Fort is contemporaneous with Emergent Oneota sites in the region (notably the Grant site on the Hartley Terrace) (McKusick 1973:10), there are no contemporaneous Oneota materials associated with the Hartley phase occupation of the Hartley Fort. Stratigraphically, chronologically and typologically, the Orr focus materials from the Hartley Fort postdate the Hartley phase occupation. This shows there is no developmental relationship between the Hartley phase peoples and Oneota groups in the region. To speculate, I suggest that Hartley phase people built the Hartley Fort to protect themselves from the Oneota and that the spread of Oneota groups onto the prairie plains from the Driftless Region may account for the abandonment of the Hartley Fort. If these assumptions are true, the Hartley phase would represent one of a number of local Late Woodland groups involved with trade and interaction with other groups to the east and west while living in an area being occupied by Oneota groups.

The Mississippian trade pottery at the Hartley Fort is important and reflects Mississippian intrusions into the Upper Mississippi river valley exemplified by the Apple River focus and the Mississippian sites in the Red Wing-Diamond Bluff area. The Hartley phase can be placed into an even larger sphere of culture contact and culture change in the Driftless Region when one considers the potential for

Table 23. Madison Plain-like rims from the Hartley Fort.

Provenience	Exterior Smoothed Over Cord Marked	Interior Plain	Rim Flared	Tool Use Interior	Tool Use Exterior	Rim Height	Rim Thickness	Lip Thickness	Shoulder Thickness	Lip Angle	Neck Angle	Remarks
N-1	2	2	X	3	3	21.9	4.3-	5.5	3.8	90°	—	Neck is rounded; twisted
1-1	X	X	X	3	—	21.9	5.5	6	—	90°		Z$\frac{4}{4}$ cord marking on exterior
S1-A	X	X	X	—	3	17	7	7.1	—	—	130°	
1-3	X	X	X	3	3	28.9	4.7	6.4	—	100°	135°	Thickened lip by folding clay over, trimming lip- very sloppily done
Mound 4 Fill	X	X	X	*	*	11.3	5.5	—	—	—	—	S$\frac{4}{4}$ single cord decoration; 2 knot impressions on exterior neck area
TOTALS	6	6	5	3	3	11.3-21.9	4.3-7	5.5-7.1	3.8	90-100°	130-135°	

interaction among Mississippian, Oneota, Effigy Mounds, Late Woodland and Hartley phase peoples as suggested by radiocarbon dates.

Even though the Hartley phase is part of a broad Late Woodland ceramic development involving cord-impressed decoration and collared or castellated rimmed globular vessels, the temporal placement and ceramic assemblage of the Hartley phase, as seen in Hartley ware, grit tempered seed jars and Mill Creek pottery, indicate regional interction and influence from Plains Village cultures to the west. The distinctive character of Hartley phase ceramics lie with its Plains Village influence.

The coalescence of various diverse formal and decorative Late Woodland ceramic elements found in Hartley phase pottery is the result of the same formative processes that instigated the development of early Plains Village ceramic assemblages in northwest Iowa, southern Minnesota and eastern South Dakota. These processes were the spread of corn agriculture, the bow and arrow, and Mississippian expansion and influence in the upper midwest around AD 900. It can be hypothesized, then, that these factors led to the development of the Mill Creek culture out of some Great Oasis groups in northwest Iowa and to the coalescence of various Late Woodland groups into the local and apparently short-lived Hartley phase in northeast Iowa. These processes would account for the Hartley phase ceramic assemblage—one that shows roots in the regional Woodland tradition but has Plains Village influence.

The assumptions made regarding Hartley Fort ceramics characterize the development of regional exchange among Late Woodland, Plains Village, Mississippian and Oneota groups in northeast Iowa. These conclusions are thus far speculative due to a lack of a broader data base on the Hartley phase. Research questions associated with the Hartley phase are clear. Future studies should be directed towards site survey to locate more Hartley phase components, ceramic seriation and additional radiocarbon dating to provide a better chronology, and analysis of whole Hartley phase assemblages including lithics, environmental and subsistence information to get a better understanding of the lifeway of Hartley phase peoples. With these data, sounder generalizations can be drawn based on the idea of continuity and coalescence in Hartley Fort ceramics.

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