



Two Great Oasis Village Sites of the Boone River Phase in Central Iowa

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ABSTRACT

An analysis of ceramics and other material culture from two sites along the Boone River in Hamilton County, Iowa, led to a reevaluation of Great Oasis ceramic taxonomy and an expanded view of Great Oasis–Mississippian contact. The Angstrom Village site (13HM8) consists of surface collections made over several years, and in 1938 Wedel collected and tested the Humble Village site (13HM2). Both are Great Oasis culture sites and components of the Boone River aspect, now termed the “Boone River phase.” A proposed new pottery type, Keyes Collared, is part of the Boone River phase ceramic assemblage.

KEYWORDS

Great Oasis ceramics;
Late Woodland ceramics;
Mississippian culture; Iowa
archaeology

Introduction

Lloyd Wilford (1945, 1949) first defined what archaeologists now term the “Great Oasis culture.” Great Oasis sites represent small unfortified farming hamlets that are radiocarbon dated between cal AD 950 and cal 1100 (Lensink and Tiffany 2005:126, 129.) Lensink and Tiffany (2005:126) identified over 130 known Great Oasis sites, clustered in 10 localities, largely in central and western Iowa, although there are outlier reports of Great Oasis pottery ranging from southwest Iowa to Wisconsin to Manitoba (Alex 2000:139). Large-scale excavations have been conducted at several Great Oasis sites, and dozens of radiocarbon dates are available (Lensink and Tiffany 2005; Tiffany 2020; Tiffany and Alex 2001). Great Oasis houses are subterranean rectangular-shaped structures with extended entryways, associated with hearths, and internal and external storage pits. There is longstanding concurrence among researchers that the Great Oasis culture is ancestral to the Mill Creek culture and other Initial Middle Missouri villages in the western prairie-eastern plains border region (Lensink and Tiffany 2005; Tiffany and Alex 2001; Whittaker and Tiffany 2025, 2026). With regard to rim decoration and vessel form, Great Oasis pottery is essentially the trailed decoration equivalent of single-cord decoration common on contemporaneous Late Woodland pottery in the upper Midwest (Benn and Green

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2000; Lensink and Tiffany 2005). Current work on collections reported from Lake Winnebago in eastern Wisconsin provides ample evidence for Mississippian contact with Late Woodland groups comparable to the context reported in this article (Boszhardt et al. 2025). In Iowa, trait-unit intrusions between Mississippian culture and regional Terminal Late Woodland cultures began with Great Oasis and were once believed to have occurred only in the western Iowa Great Oasis sites. Other foundational Great Oasis studies include Benn and Green's (2000) comprehensive review of the Late Woodland period cultures in Iowa and Greiner's (2005) use of geographic information systems (GIS) modeling to predict Great Oasis site locations. Whittaker and Tiffany (2025, 2026) provide recent observations on contact among Late Woodland, Mississippian, and Mill Creek cultures.

This article presents an analysis of ceramics and other material culture from Angstrom and Humble Villages, two sites along the Boone River in Hamilton County, Iowa. The Angstrom Village (13HM8) and Humble Village (13HM2) sites are part of the Central Des Moines Great Oasis locality and associated with the Boone River phase (the author's taxonomic preference to replace "Boone River aspect" [Bennett 1952:115; Lensink and Tiffany 2005:126]).

As discussed below, Keyes Collared is a new Great Oasis pottery type found in Boone River phase sites and represents a version of collared-ware types found in terminal Woodland and post-Woodland stage sites regionally, reflecting the rapid changes among different groups. The collared wares associated with the Terminal Late Woodland Hartley Fort (13AM103) phase in northeast Iowa (Whittaker and Tiffany 2025, 2026), the Grant phase in southwest Wisconsin (Finney 2013), and the appearance of collared and castellated ceramics in late Effigy Mound and at Mississippian sites in southeastern Wisconsin all reflect the dynamic of the regional impact of Mississippian culture on established Woodland pottery makers. Whittaker (2022, 2024:142–143) also reported on linear mound concentrations in central Iowa and suggests Great Oasis sites like Angstrom and others in central Iowa might reflect "a gradual development of Great Oasis from local Late Woodland populations."

The Sites

The Angstrom Village site (13HM8) spans 1.6 ha on a Roberts Creek Formation Holocene terrace along the Des Moines River just below the confluence of the Boone and Des Moines Rivers (Figure 1). The site soil is mapped as Du Page silt loam formed in alluvial soils that are classified as fine-loamy, mixed, superactive mesic cumelic hapludolls (USDA 2025).

The Humble Village site (13HM2) extends over 0.6 ha in Roberts Creek Formation alluvial soils that are part of a former active floodplain of the Boone River adjacent to a higher Gunder terrace (Figure 2). The site soil, mapped as Hanlon series, is a coarse-loamy, mesic cumelic hapludoll. These soils occur in nearly level floodplains with deep sandy loam A horizons (USDA 2025).

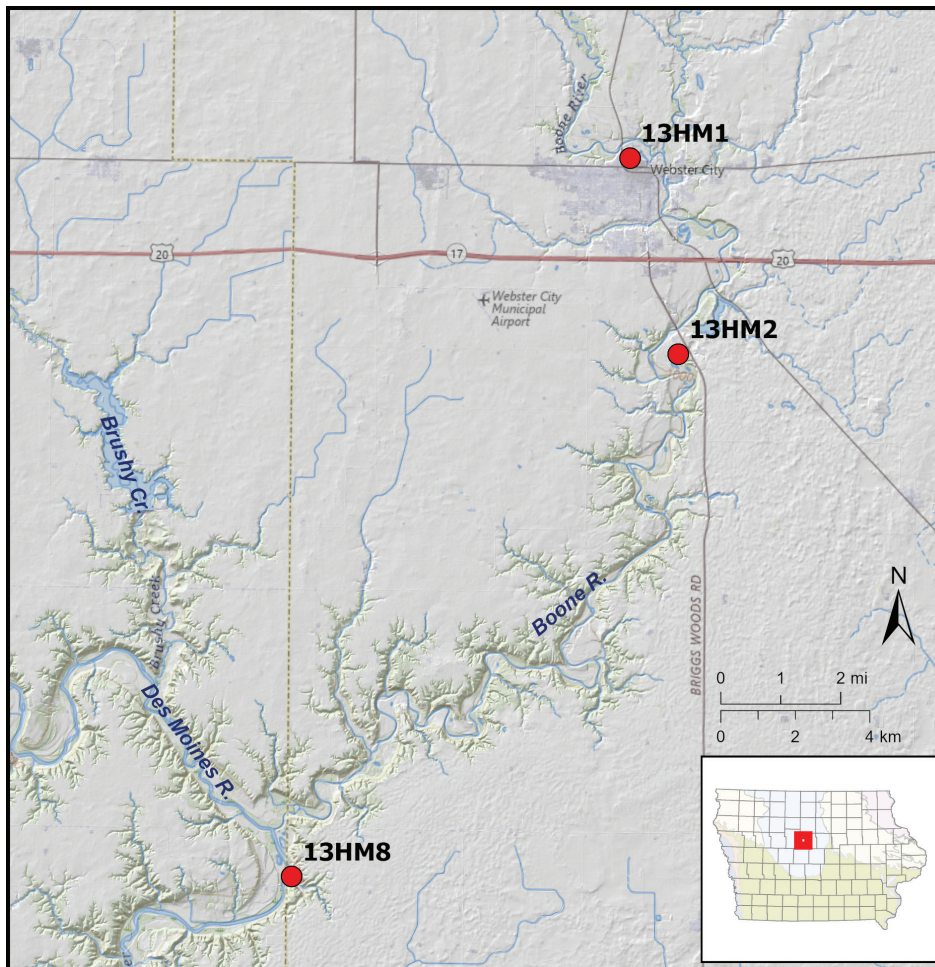


Figure 1. Boone River phase sites.

Keyes's (1926–1945) records containing correspondence, newspaper clippings, and the like are available for both sites (Notes and correspondence 1926–1945, Hamilton County folder, Office of the State Archaeologist [OSA], University of Iowa, Iowa City). E. H. Hawbaker of Stratford, Iowa, made several collections at the Angstrom site, which he donated to Keyes. Keyes documented whether Hawbaker found artifacts on the site or in nearby areas (Keyes, 1936–1943, OSA). Keyes also duplicated the catalog data in his Archaeological Record Book on lined notebook paper slips placed with each catalog item. This duplication process made collection documentation and analysis much easier. The author reinventoried, sorted, and typed the ceramic collection but did not pursue detailed data analysis except in one instance where a new pottery type was defined.

The Humble Village materials represent surface collections and material culture from small excavation units made in low midden mounds or refuse features at the site by Mildred Mott Wedel and MacKinlay Kantor in 1938 (Wedel 1938:11). This

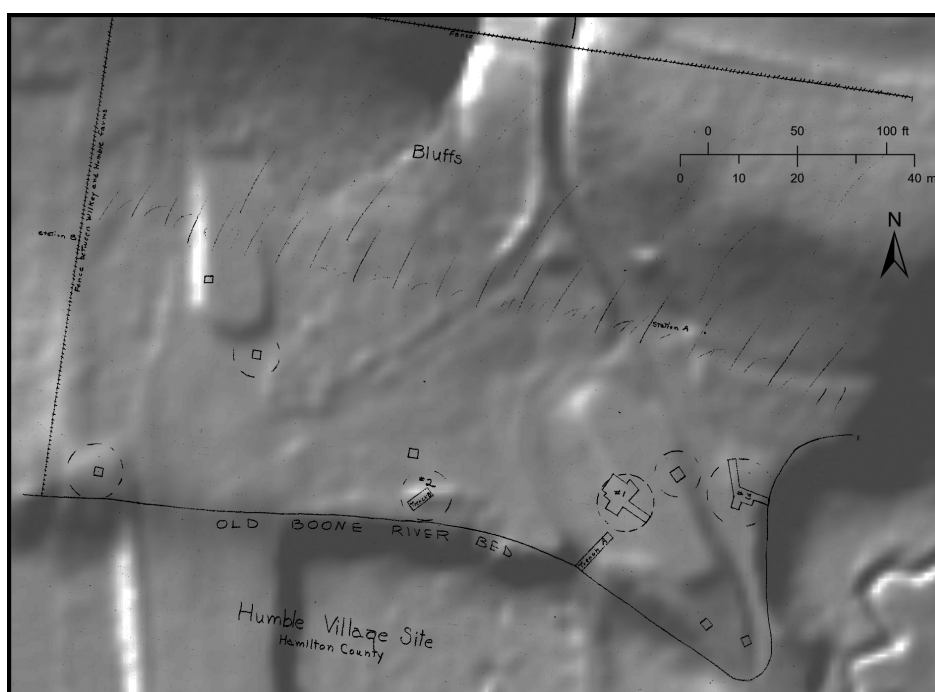


Figure 2. Humble Village site (13HM2) field map projected on lidar (ISUGISSRF 2025).

work was part of Wedel's research at the nearby Great Oasis Willson Mound Group (13HM1) documented in a report she prepared when she donated the Humble Village collection to Keyes. Wedel had a celebrated career in ethnohistory and Iowa archaeology (Gradwohl 2017); Kantor (1904–1977), a Pulitzer Prize-winning author and screenwriter, was born and grew up in Webster City, Iowa, near the sites.

The Collections

In addition to Great Oasis ceramic materials, lithic artifacts, notably projectile points and a Mississippian stone hoe, were in the collections. The pottery from both the Angstrom Village and Humble Village sites consists of sand-tempered sherds with compact paste that includes occasional small grit inclusions, mica, and quartz chips. The paste commonly has dark cores with lighter interior and exterior surfaces. Firing clouds are present. Surface colors range from browns, very dark browns, reddish browns, and grays to very dark grays. Sherd thickness ranges from 6 mm to 10 mm. Generally, the pottery is well made with good control in firing. The potters applied smoothed-over cordmarking (SOCM) on the vessel bodies, and they smoothed the exterior rim surfaces prior to decoration. Lips can be flat, rounded in profile, or flat and beveled. Decoration consists of tool impressions on the exterior lip-rim juncture and trailed line decorations on the rim exterior, which the potters applied beautifully. Keyes originally numbered the

Angstrom Village site Hn1 and the Humble Village site Hn2, and these designations appear on artifact labels and in his catalog.

Great Oasis Ceramics

The Great Oasis vessels are subglobular (oblate spheroids) with straight, collared, and S-rim forms. The interior neck angle where the rim attaches to the vessel body is uniformly rounded in profile. The whole vessels illustrated in this report show commonality in vessel construction at the two village sites in vessel forms and exterior surface treatments and decoration.

There are 155 body sherds from the Angstrom Village site (Supplemental Table 1). This author added a small collection made by David Carlson in 1979, now in the OSA collections, as a separate entry for the Angstrom body sherds because of their rare shoulder decorations. All are grit tempered. Exterior surface treatments consist of plain dull (unpolished) and undecorated ($n = 48$) and smoothed over cordmarked (SOCM) dull unpolished ($n = 63$); two sherds have trailed elements on a plain dull surface (Supplemental Figure 1, Motifs 1–4). Eighteen sherds included in the surface treatments are the lower bases and necks of rim sherds whose rim types are unidentifiable but whose present upper-body portions are either SOCM or plain dull. Additional sherds from a more recent collection made at the site by David Carlson increased the total sample size (Table 1). Uncommon upper-shoulder decoration consists of four different trailed dull elements or partial motifs (see Supplemental Table 1; Supplemental Figure 1, Motifs 1–4).

The body sherds and other artifacts from Humble Village come from various levels in three shallow refuse mounds and one trench (see Figure 2). Two units have levels with unspecified depths (Supplemental Table 2). The refuse mounds

Table 1. Angstrom and Humble Villages Rim Types.

	Angstrom	Humble
Rim Types		
Great Oasis		
Hitchell Tool Impressed	25	4
Hitchell Trailed	13	6
Hitchell Plain	4	16
Hitchell Cord Impressed	6	4
Hitchell Cordmarked	1	0
St. John S-rim	6	1
Keyes Collared	6	4
Williams Wedge Lip	0	4
Beaker Handle	1	0
Bowl	6	0
Seed Jar	5	0
Beaker Handle	1	0
Other	0	0
Saylorville Tool Impressed	4	0
Madison Cord Impressed	5	0
Havana Cordmarked	1	0
Levens Stamped	1	0
Total	85	39

and trench were in unplowed floodplain deposits overlooking an old channel of the Boone River (see Figure 2; Wedel 1938:10–11). The sherds exhibit moderate-to-heavy erosion on their surfaces, and many are small. There are 233 grit-tempered Great Oasis body sherds from three units (see Supplemental Table 2), roughly divided between plain dull exterior surfaces ($n = 100$; 43.8%) and SOCM dull ($n = 132$; 56.7%). There is one body sherd from Refuse Mound 3 with a very eroded exterior surface that has a dentate stamped exterior surface like Lane Farm Cord Impressed pottery; this was not counted in the Great Oasis body sherds. There is one SOCM rim/shoulder fragment in the SOCM dull count from Refuse Mound 3, Level 2. Body sherds from Refuse Mound 1, Level 2 and Refuse Mound 3, Level 2 are separated and documented with identifying notes in the collection, but the artifacts lack catalog numbers. Additionally, researchers removed some body sherds from Refuse Mound 1, Level 2 to Iowa Hall for permanent exhibition.

Angstrom and Humble site rim totals by type are in Table 1 and displayed by catalog number in Tables 2–4. Rim profiles (Supplemental Figure 2) are reported with the appropriate rim table (see Tables 2–4). Tiffany and Alex (2001:81, 85–86) renamed Great Oasis pottery types to follow the standard type-ware system definitions long used by Plains researchers, including the Mill Creek pottery classification system, naming the main wares after the Great Oasis Hitchell (39CH45) and St. John sites (39HU213) in South Dakota and the Williams site (13PM50) in northwest Iowa. Hitchell ware includes all the formerly termed “Great Oasis High Rims,” Williams ware includes the formerly termed “Great Oasis Wedge Lip rims,” and St. John ware includes Great Oasis rims with S-shaped rim profiles. A defining characteristic of the Boone River phase recognized in earlier research is the presence of collared rims. The Angstrom collection has two earlier Woodland types, Havana Cordmarked and Levensen Stamped, in the assemblage as well (see Tables 1–2).

Hitchell Tool Impressed

Hitchell Tool Impressed rims (see Table 1) from Angstrom Village ($n = 25$) and Humble Village ($n = 4$) are flared with rounded interior neck angles and have a variety of lip profiles, including rounded, flat, and beveled forms associated with tool impressions on the exterior lip/rim or lip (see Tables 2–3). The vessel bodies are SOCM; SOCM can extend to the rim exterior. One restored vessel from Humble Village (see Table 3, Cat. Hn-2198) depicts an ovate spheroid vessel shape associated with Hitchell and other Great Oasis wares (Figure 3a).

Hitchell Trailed

Hitchell Trailed rims from the Angstrom ($n = 13$) and Humble ($n = 6$) Villages are flared with rounded interior neck profiles and several lip profiles, including extruded lips (see Tables 1–3). Extruded lips have clay pulled up and extended onto the exterior surface, producing a thickened pronounced lip. The profile for a Hitchell Cord

Table 2. Angstrom Village Rim Sherds.

Catalog Number	Temper Grit	Surface Treatment										Lip			Tool Impressions	Cord Twist	Interior Neck Angle	Rim Profile Figure Sup.	Figure	Comment
		Plain Dull	Plain Polished	Plain Trilled	SOCM Dull	Rounded	Flat	Lip		Extruded										
								Beveled	Flat		Beveled	Interior								
Hn-61H	20	9	—	2	9	17	3	2	—	—	—	20	—	17	—	1, 2	4a, b			
Hitchell Tool	12	8	—	—	4	9	1	1	1	4	—	—	—	4	—	4	4f			
Hitchell Trilled	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	3	4q			
Hitchell Plain																				
Hitchell Cord	2	—	—	—	2	1	1	—	—	1	—	—	—	—	—	8	4i			
Impressed	1	—	—	—	1	1	1	—	1	—	—	1	—	—	—	7	5e			
Keyes Collared	3	2	—	1	—	1	1	—	1	—	—	2	—	—	—	5, 6	4r, s			
St. John S-rim	4	4	—	—	—	2	2	—	—	—	—	—	—	—	—	9	5j			
Bowl	3	2	—	1	—	1	2	—	—	—	—	—	—	—	—	10	5i			
Seed Jar																				
Madison Cord	3	3	—	—	—	—	2	—	—	—	—	1	—	—	—	—	4n			
Impressed																				
Hn1-843																				
Seed Jar	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	3b	Restored by Milwaukee Public Museum; with lithics, pottery Hn1-62H		
Hn1-62H																				
Hitchell Tool	2	1	—	—	—	1	1	—	—	—	—	2	—	1	—	11	4c			
Impressed																				
Hitchell Cord	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4j			
Impressed	1	1	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	Mid-rim section; no cat. no. on sherd		
Hitchell Plain	4	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—			
Keyes Collared	1	1	—	—	4	1	—	—	3	—	—	1	—	—	—	—	5c, g			
Seed Jar	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—			
St. John S-rim	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	Small lip-rim section; single cords in a alternating triangular pattern		
Hn1-677																				
Hitchell Plain	1	—	—	—	1	1	—	—	—	—	—	—	—	1	—	12	4p	Nearly vertical rim profile, possible beaker		
Hitchell Tool																				
Impressed	1	1	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	Diagonal tool impressions crosscut rim		
Hitchell Cord																				
Impressed	1	1	—	—	—	1	—	—	—	—	—	1	—	—	—	13	4k			
Hn1-H																				
Saylorville Tool																				
Impressed	4	—	—	—	4	—	—	—	—	—	—	1	—	3	—	14	5h	Part of a restorable vessel with rim; SOCM rim-shoulder, 39 SOCM body sherds		

continued

Table 2, continued.

Catalog Number	Temper Grit	Surface Treatment						Lip			Tool Impressions	Cord Twist	Interior Neck Angle	Rim Profile Figure Sup.	Figure	Comment
		Plain Dull	Plain Polished	Plain Trilled	SOCM Dull	Rounded	Flat	Beveled	Flat	Beveled Interior	Extruded	Lip	Rounded	2		
Hitchell Tool Impressed	1	1	—	—	—	1	—	—	—	—	—	1	1	—	—	Dentate tool impressions poorly executed
Keyes Collared	1	1	—	—	—	1	—	—	—	—	—	1	1	—	—	Tool impressions at the collar base
Hn-2802																
Hitchell Cord Impressed	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	Midsection of flared rim
	1	—	—	—	1	1	—	—	—	—	—	—	1	15	4l	Lug attached to exterior lip\rim
Hn-2809																
Havana Cordmarked	1	—	—	—	1	—	—	—	—	1	—	—	1	17	5m	
Havana																
Havana Cordmarked	1	—	—	—	1	—	1	—	—	—	—	—	—	16	5n	Exterior punctates
Hitchell Cordmarked	1	—	—	—	1	1	—	—	—	—	1	—	1	—	—	Upper rim\lip flares out like Minotts Cord Impressed
St. John S-rim	1	—	—	—	1	1	—	—	—	—	—	1	—	—	—	Upper portion of S rim; lower right to upper left tool impressions, poss. cords or dentate stamped (rim damaged)
St. John S-rim	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	Rim midsection; base of strap handle or lug present
Bowl	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	
Bowl	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	Angular tab (flared out and up) on lip
Beaker Handle	1	1	—	—	—	—	—	—	—	—	—	—	—	—	5k	Mississippian style bean pot handle; probably attached on mid\upper vessel shoulder
Levensen Stamped	1	—	—	—	1	—	—	—	—	—	—	1	1	—	—	Badly eroded
Total 13HM8	80	42	1	4	33	47	16	5	1	6	6	34	—	—	—	
Carlson Donation																
Hitchell Trilled	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Hitchell Cord																
Impressed	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	
Hitchell Plain	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	
Madison Cord																
Impressed	1	1	—	—	—	—	—	—	—	—	—	—	1	—	—	Rim midsection
Hitchell Tool																
Impressed	1	1	—	—	—	—	1	—	—	—	—	1	—	—	—	
Total	5	4	—	—	1	1	1	—	1	—	—	1	1	—	—	

Table 3. Rim Sherds, Humble Village Site, 13HM2.

Catalog Number	Location	Level	Number	Temper	Lip						Tool		Interior Neck Profile Rounded	Figure	Comment
					Plain Dull	SOCM Dull	SOCM Polished	Rounded	Flat	Beveled Interior	Beveled Exterior	Impressions Lip			
Hn-2788 Hitchell Trilled	Refuse Mound 1	1	1	1	1	—	—	1	—	—	—	1	—	4g	No body broken above neck
Hn-2786 Hitchell Plain	Refuse Mound 1	2	1	1	—	1	—	—	1	—	—	—	—	4o	Body is SOCM dull
Hitchell Plain			11	11	7	4	—	—	4	—	—	—	—	4	
Hitchell Tool Impressed			2	2	1	—	1	—	—	—	—	2	—	4e	Rim and body plain dull
Williams Wedge Lip Tool Impressed			1	1	1	—	—	—	—	—	—	1	—	1	
St. John S-Rim			1	1	1	—	—	—	1	—	—	1	5	1	Tool impressions on exterior lip/rim; rim and body exterior are plain dull
Hitchell Cord Impressed			4	4	2	2	—	—	1	3	—	3	S = 4	1	Body is plain dull; 2 rims are broken above neck.
Hitchell Trilled			3	3	1	2	—	—	3	—	—	—	—	2	Two are nonjoining parts of larger rim; body is SOCM dull
Keyes Collared			3	3	1	2	—	—	1	—	2	—	S = 3	3	Smaller damaged exterior
Hn-2791	Refuse Mound 3	2	2	2	1	1	—	—	—	1	—	1	—	—	One rim is a miniature.
Williams Wedge Lip Plain			1	1	—	1	—	—	—	1	—	—	—	1	SOCM exterior rim and body sherds
Hitchell Tool Impressed															Upper rim only; bands of horizontal trailed lines on rim exterior below tool impressions
Hitchell Trilled			1	1	1	—	—	—	—	—	—	1	—	—	SOCM exterior on rim and body
Keyes Collared			1	1	—	1	—	—	1	—	—	—	—	1	
Williams Wedge Lip Tool Impressed			1	1	—	1	—	—	—	1	—	1	—	1	Body SOCM
Hn-2198															
Hitchell Tool Impressed	Refuse Mound 3	1	1	1	—	—	1	1	—	—	—	1	5	3a	Restored pot; other catalog designation, 224-1
Hn-2791a	Refuse Mound 3	1													
Hitchell Plain			2	2	1	1	—	—	1	1	—	—	—	—	
Hitchell Trilled			1	1	1	—	—	—	—	1	—	—	—	—	
Williams Wedge Lip Plain			1	1	1	—	—	—	—	—	—	—	—	—	
Total	Refuse Mound 1	2	38	38	20	16	2	2	10	13	2	2	12	19	—
Other															
Hn-2788	Refuse Mound 1		1												
Rim-shoulder fragments	Hn-2788		2	2	—	2	—	—	—	—	—	—	—	—	2 small midsections
Small ladle handle			1	1	—	—	1	—	—	—	—	—	—	—	Plain dull exterior
Hn-2792	Refuse Mound 3	2													
Rim-neck fragments			5	5	2	3	—	—	—	—	—	—	—	5	
Total			9	8	2	5	1	—	—	—	—	—	—	5	—

Table 4. Keyes Collared Ware, Angstrom and Humble Villages.

Catalog Number	Number	Temper Grit	Level	Plain Dull	SOCM Dull	Cord Impressed	Lip		Cord Twist	Interior Neck		Figure	Comment
							Rounded	Beveled Interior		Rounded	Beveled Interior		
Angstrom Village													
Hn1-61H Keyes Collared	1	1		—	1	1	1	1	S	1		5e	Rim exterior is plain dull; shoulder exterior is SOCI
Hn1-H Keyes Collared	1	1		1	—	—	1	—	—	1			Tool impressions at collar base
Hn1-62H Keyes Collared	1	1		—	1	1	1	—	Z	1		5g	
	1	1		—	1	1	—	1	Z	1			
	1	1		—	1	1	—	1	S	1			
	1	1		—	1	1	—	1	S	1			
Total	6	6		—	5	5	3	3					
Humble Village													
Refuse Mound 1			2										
Hn-2786	3	3		—	—	—	—	—	—	—			
Hn-2791													
Keyes Collared	1	1		—	1	—	—	—	S = 3	1			Smaller damaged exterior
Total	4	4		—	1	—	—	—	—	—			



Figure 3. Angstrom site ceramics: (a) Hitchell Tool Impressed (Cat. Hn-2198) jar and (b) restored seed jar (Cat. Hn1-843).

Impressed rim shows this feature (see Table 2; Figure 4i). One rim from the Angstrom site has parallel diagonal-line decoration on the rim, with tool impressions on the exterior lip/rim (see Figure 4f). These rims have several variations of trailed triangles filled with horizontal or diagonal trailed lines. A rim from the Humble site is a modal example of this type (see Table 3, Cat. Hn-2786; see Figure 4h).

Hitchell Cord Impressed

This type is like Hitchell Trailed; the difference is in the use of twisted cords rather than trailed lines to make the exterior rim decoration. There are six Hitchell Cord Impressed rims from the Angstrom site and four from Humble Village (see Table 1; see Figure 4i–l).

Hitchell Plain

This type encompasses the undecorated Hitchell ware rims. There are four examples from the Angstrom site and 16 from Humble Village (see Table 1). One example from Humble Village has the high flared rim with a rounded lip and rounded

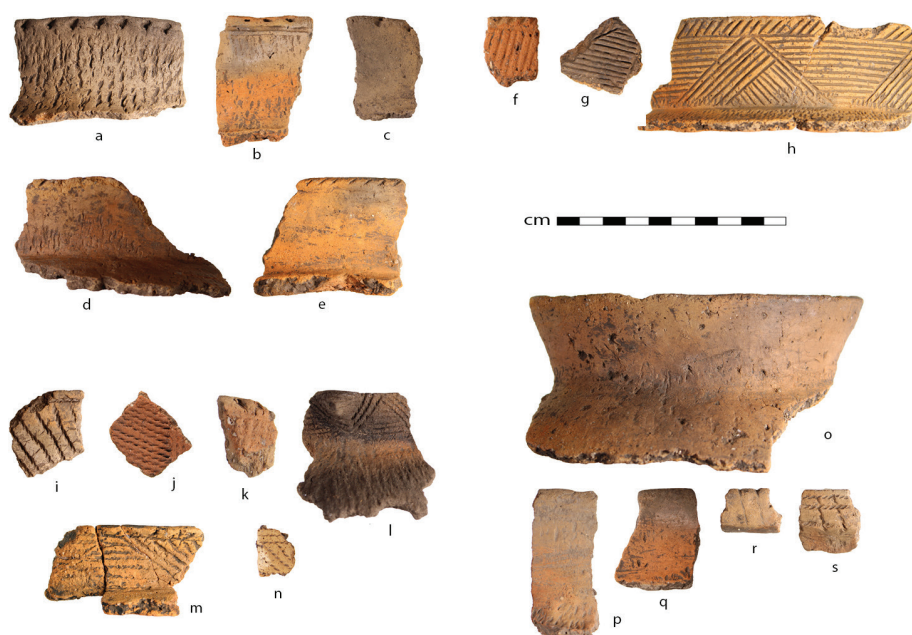


Figure 4. Great Oasis pottery. Hitchell Tool Impressed: (a) Cat. Hn-2789, (b) Cat. Hn-61H, (c) Cat. Hn-1-62H, (d) Cat. Hn-2791, and (e) Cat. Hn-2786; Hitchell Trilled: (f) Cat. Hn-61H, (g) Cat. Hn-2788, and (h) Cat. Hn-2786; Hitchell Cord Impressed: (i) Cat. Hn-61H, (j) Cat. Hn-62H, (k) Cat. Hn1-677, (l) Hn-2802, and (m) Hn-2786; Madison Cord Impressed: (n) Cat. Hn-61H; Hitchell Plain: (o) Cat. Hn-2786, (p) Hn1-677, and (q) Hn-61; and St. John S-Rim: (r-s) Cat. Hn-61H.

interior neck angle and SOCM dull body sherd treatment (see Figure 4o). Another Hitchell Plain rim from the Angstrom site (see Table 2, Cat. Hn1-677) has a nearly vertical high rim profile and may be a beaker (see Figure 4p). The Hitchell Plain rim from the Angstrom site (see Figure 4q) is characteristic of the modal attributes of Hitchell ware.

St. John Ware

This group includes the few S-rim profiles recovered from Angstrom Village ($n = 6$) and Humble Village ($n = 1$; see Table 1). Two illustrated have plain dull exterior surfaces (see Figure 4r-s). One has shallow parallel diagonal lines on the upper panel with tool impressions that cut across the lip, and the other has a Z-twist cord decoration on the upper panel.

Williams Wedge Lip

There are four examples of Williams Wedge Lip Plain rims, all from Humble Village (see Tables 1 and 3). They are undecorated with flat exterior beveled lips and SOCM dull vessel bodies (Figure 5a). One is a miniature. The other two are



Figure 5. Keyes Collared and other rims. William Wedge Lip: (a) Cat. Hn-2791 and (b) Cat. Hn-2791; Keyes Collared: (c) Cat. Hn-2791, (d) Cat. Hn-2786, (e) Cat. Hn-61H, (f) Cat. Hn-2786, and (g) Cat. Hn-62H); Saylor Tool Impressed: (h) Cat. Hn-1H; bowl: (i) Cat. Hn-61H; seed jar: (j) Cat. Hn-1H; handle: (k) Cat. Hn-2807; fired clay lump: (l) Cat. Hn-2789; and Woodland pottery: (m–n) Cat. Hn-2809.

examples of Williams Wedge Lip Tool Impressed with tool impressions on the exterior lip/rim (see Figure 5b).

Keyes Collared

There are 10 Keyes Collared rims from the Angstrom Village ($n = 6$) and Humble Village ($n = 4$) sites (see Tables 1 and 4). These rims constitute a new pottery type

diagnostic of the Great Oasis Boone River phase. These rims are grit tempered with straight to slightly flared profiles (see Figure 5c–g); have SOCM dull treatments on the vessel bodies; and have rounded lips ($n = 3$) or lips that are flat and beveled to the rim interior ($n = 3$). This pottery has a Central Plains tradition rim form and, as such, supports the idea that Caddoan speakers were present in the western prairies earlier than most researchers think. Researchers posit continuity in ceramics and peoples from the Great Oasis and Mill Creek phases into the early Initial Coalescent Helena phase (Blakeslee 1988; Tiffany et al. 2011:11).

Measurements on three rims are as follows: rim height, range = 13.8–40.6 mm, mean = 31.3 mm; rim thickness, range = 7.3–11.6 mm, mean = 7.5 mm; lip thickness, range = 5.4–6.8 mm, mean = 6 mm; shoulder thickness, range = 7.9–8.3 mm, mean = 8.1 mm; and panel height (Billeck 1993:54), range = 13.8–22.9 mm, mean = 18.3 mm. One measurable rim has a rim diameter (orifice) of 24 cm and an interior neck diameter of 21 cm.

Other

Madison Cord Impressed There are five rims typed as Madison Cord Impressed from the Angstrom site (see Table 2). One is illustrated (Cat. Hn-61H, Figure 4n) and depicts fine, evenly spaced S-twist cords. These rims are thinner than Hitchell Cord Impressed and are contemporaneous with the Great Oasis occupation at the site.

Saylor Tool Impressed The Angstrom site produced a partially restorable Saylor Tool Impressed rim ($n = 4$) and 39 plain dull ($n = 2$) and SOCM dull ($n = 37$) body sherds (see Table 1; see Figure 5h). Osborn et al. (1989) defined Saylor ware at the Saylorville Village site (13PK165) in Polk County located along the Des Moines River at the Saylorville Reservoir. Tiffany (2020:22–23) reported Saylor ware pottery with Great Oasis pottery from the multicomponent Carr site (13MR31), in Marshall County, approximately 50 km to the east of the Saylorville site.

Bowls and Seed Jars There are six bowls and five seed jars, all from Angstrom Village (see Tables 1 and 2; see Figure 5i–j), including a seed jar found by Peter Angstrom on the north end of the site (Supplemental Appendix A; Cat. Hn1-843) and later donated to Keyes and restored by the Milwaukee Public Museum (see Figure 3b; Supplemental Figure 3).

Lithics

Stone tools and other lithic items represented in the collections reflect collector biases, especially those from the Angstrom site (Supplemental Tables 3–5). The tabular data on lithics include the biface reduction stage (Callahan 1979). Projectile points are the largest grouping; collectors particularly at the Angstrom



Figure 6. Mississippian stone hoe (Cat. Hn1-57H).

cm

site clearly focused on them rather than on the apparent broader range of lithic materials derived from professional excavations that Wedel (1938) reports from Humble Village. Lithic materials from Angstrom ($n = 157$; Supplemental Table 3) include flakes (one made on Tongue River silicified sediment and another on Knife River chalcedony), utilized flakes, retouched flakes, a drill tip and partial shaft, several bifaces, end scrapers (one made on Hixton orthoquartzite; Supplemental Figure 4a), and a stone hoe (Supplemental Table 3; Figure 6). The end scrapers have varied shapes, although most are teardrop. Humble Village lithic materials ($n = 115$) include flakes, shatter, cores, bifaces, and an end scraper. There are a few examples of rocks, including a quartzite pebble and two cobbles, one each from both sites (Supplemental Tables 3 and 4). Inhabitants collected and worked rock as evidenced by six rock flakes (Supplemental Table 3; Cat. Hn1-H, Hn-2810) from Angstrom Village.

Stone Hoe Cobb (1989) reviewed the role of stone hoes in Mississippian exchange systems. On the eastern prairies, Mississippian culture contact began with Great Oasis, first reported in northwest Iowa, and continued with the Mill Creek culture and other Initial Middle Missouri variant components (Lensink and Tiffany 2005; Tiffany and Alex 2001). The recovery of this stone hoe and a large seed jar

from the Angstrom site shows that Great Oasis and Mississippian contact occurred in central Iowa as well. This rare, traded item recovered at the Angstrom site is a Mississippian stone hoe made on Mill Creek chert (see Figure 6; Supplemental Table 3, Cat. Hn-57H). This tool has a highly polished blade, is double notched, was split from use along one long tool edge, and was subsequently retouched along the vertical break. Fugle (1962:26–27) described other unnotched triangular and teardrop-shaped stone hoe forms from Aztalan and the Initial Middle Missouri Swanson site (39BR16). Tiffany (2007:39) discussed choppers from the Swanson site, which may be the items Fugle references; however, these choppers do not have the polished faces and edges characteristic of stone hoes. Fugle illustrated two large unnotched forms from the Phipps Mill Creek culture site (Fugle 1962:Figure 5a–b).

Projectile Points Projectile points range in age from Late Archaic to post Woodland (Supplemental Table 5; Supplemental Figures 5–6) and include a Cahokia point. Most are Late Woodland forms associated with the predominant Great Oasis material culture found at the Angstrom and Humble Villages. Only a few predate the Great Oasis component, but they suggest long-term use of the landforms on which the points were found. A check of the proveniences (Supplemental Appendix A), however, indicates the collectors picked up some of the points “on or near” the Angstrom site, not from the Angstrom site per se. Of these 18 points, 4 were untyped (Supplemental Table 5).

Ground Stone Artifacts Several items from the Angstrom site are in the collections (Supplemental Table 3). These include a small piece of worked red pipestone, possibly catlinite (Supplemental Table 3), a three-quarter-grooved ax (Supplemental Figure 6c), two hematite celts (Supplemental Figure 6d–e), four hammerstones (Supplemental Figure 6f), and two manos (Supplemental Figure 6g).

Cobble/Core The Angstrom site produced one large split and retouched chert cobble (Stage 2; Cat. Hn1-677; Supplemental Table 3).

Spheroid A small quartzite cobble (Cat. Hn2790; Supplemental Table 4; Supplemental Appendix A) from the Humble Village, probably a surface find, is spheroid and apparently unworked.

Other Items The Angstrom site collection also has a mammal rib with a cut mark, three deer teeth, a section of a turtle carapace, small pieces of weathered sandstone, and 0.3 g of charcoal (Supplemental Table 6). The Humble Village collection has two molded and fired clay lumps (Figure 5I), some mammal bone fragments in poor condition, and five pebbles, one of which is worked (Cat. Hn-2793; Supplemental Table 7).

Collection Summary

The artifacts reported are the first formal presentation of the Boone River phase Great Oasis material culture in the Keyes Collection legacy assemblages. With the exception of Humble Village (Wedel 1938), the inventoried items in this article are the collections made over the course of several years by amateurs. E. A. Hawbaker was the principal local collector and donator for the Angstrom site materials in the Keyes Collection, but as the information in Supplemental Appendix A documents, while Hawbaker collected most of the artifacts himself, he also received artifacts from the landowner and the landowner's children; some of these artifacts have questionable provenance. Collections from Angstrom provide evidence for site use and occupation prior to Great Oasis in the form of Archaic and Woodland projectile-point types. This is not surprising given the site location, but the documentation of those finds, as discussed earlier, is not the best.

Important findings include definitive Keyes Collared pottery, presently unique to the Boone River phase, and indications of contact with contemporary Late Woodland inhabitants at sites downstream on the Des Moines River, documented by the presence of Saylor ware. Perhaps most important is evidence of Mississippian contact, which originally was believed by researchers to have occurred initially only at western Iowa Great Oasis sites. The presence of a traded Mississippian stone hoe, a Cahokia point, and a locally made seed jar at the Angstrom site points to early and contemporaneous Mississippian contact at Great Oasis sites regionally in the form of trait-unit intrusions. Another defining feature of the Boone River phase is Hitchell Cord Impressed ceramics, a type not found in other localities. There are indications of other regional contacts present at the Angstrom site and include an end scraper made of Hixton orthoquartzite; a flake made on Tongue River silicified sediment and another made on Knife River chalcedony—both found regionally in the northwest Iowa till deposits; a worked piece of red pipestone; and Madison Cord Impressed pottery.

Interpretations

To summarize, Great Oasis culture represents a transitional taxonomic unit linking terminal Late Woodland farming peoples along the western prairies and eastern Great Plains border (Lensink and Tiffany 2005:133). The Angstrom Village and Humble Village sites are examples of the Great Oasis culture, which Lensink and Tiffany (2005:129) date to AD 950–1100. Lensink and Tiffany (2005:133; Tiffany 1981:79) further define 10 Great Oasis site localities representing five phases in the prairie plains. One of these is the Central Des Moines locality that includes the two Boone River sites, Angstrom Village and the Humble Village, reported in this study.

Much of the historical literature context for Great Oasis relevant to the current research is summarized in an article on the Carr site (13MR31; Tiffany 2020).

Tiffany (2020:23–24) noted the Boone River aspect is a long-discontinued taxonomic referenced by Bennett (1952:115). Griffin (letter to Keyes, 2 April 1948, OSA) designated the Carr site as the type site of the Boone River aspect (Tiffany 1986:244). Great Oasis was unknown at the time Keyes prepared the letter draft in 1939 to George Quimby (Keyes, letter, 24 June 1939, OSA). Keyes (letter, 24 June 1939, OSA) and later Griffin (letter, 2 April 1948, OSA) related the yet undefined Great Oasis culture to the Mill Creek culture. The Mississippian cultural expansion into the upper Mississippi Valley circa AD 1050 resulted in contact and interaction to varying degrees by the Mississippians with regional cultures, such as Great Oasis, and later with Mill Creek peoples and the Terminal Late Woodland inhabitants of Hartley Fort (13AM103) in northeast Iowa (Alex 2000; Esarey and McCullough 2017; Logan 1976:5; Whittaker and Tiffany 2025, 2026). Mississippian contacts among these cultures are evidenced by trait-unit intrusions that include incorporation of locally made or traded Mississippian vessels and other artifacts into regional Late Woodland and post-Woodland assemblages, resulting in developmental changes in the regional ceramic traditions and in the representative cultures themselves after AD 1050 (Alex 2000; Esarey 2000:397, 401–405; Finney 2013:88, 98, 121; Logan 1976:80–81, 173; Tiffany 1986).

For example, late Effigy Mound tradition pottery of the Lewis phase in southwest Wisconsin indicates contact with Great Oasis groups (Theler and Boszhardt 2003:164). In Iowa, this author reported a restored Great Oasis vessel, from the South Marble Rock Mound Group (13FD1) along the Shell Rock River in Floyd County, that has typical Great Oasis trailed decoration bordered by two horizontal Z-twist cord bands (Tiffany 2018:Figure 19). Great Oasis has the same general vessel form and rim decoration as the local Madison ware pottery except that the cord-impressed decoration is replaced with trailed lines (Tiffany 1977:109).

The Angstrom Village and Humble Village sites were occupied at the cusp of dramatic culture change when coalescing band-level farming groups formed into tribal-level societies who shared maize horticulture and new vessel forms made with traditional surface treatments and decoration, all by-products of the spread of Middle Mississippian culture into the upper Mississippi Valley (Tiffany 1986:245).

Even with this new data from the Angstrom Village and Humble Village sites, the author's recommendation (Tiffany 2020:24) remains the same: Determining the cultural and developmental relationships among Iowa's Late Woodland peoples making shared ceramic types influenced by Mississippian contact requires establishing better chronological and cultural placement among these sites. More exacting chronological placement requires AMS dates from more Late Woodland sites regionally and Great Oasis components specifically. Despite revisions suggested here, Benn and Green's (2000) study is the most comprehensive review on the Late Woodland period in Iowa. Even after 50 years, however, Late Woodland archaeology in Iowa has not advanced much beyond Logan's (1976) pioneering research in many respects. There is plenty of work to do.

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Supplementary Materials

Supplementary material for this article can be found at <https://www.midwestarchaeology.org/mcja/supplemental-materials>.

Supplemental Table 1. Angstrom Village Body Sherds
Supplemental Table 2. Humble Village Body Sherds
Supplemental Table 3. Lithics from the Angstrom Village Site
Supplemental Table 4. Lithics from the Humble Village Site
Supplemental Table 5. Projectile Points, Angstrom and Humble Villages
Supplemental Table 6. Other Items, Angstrom Village
Supplemental Table 7. Other Artifacts, Humble Village
Supplemental Figure 1. Shoulder decorative elements
Supplemental Figure 2. Rim profiles
Supplemental Figure 3. Angstrom site looking northeast
Supplemental Figure 4. Other lithics
Supplemental Figure 5. Projectile points
Supplemental Figure 6. Projectile points
Supplemental Appendix A. Catalog Information from Keyes Archaeological Record Book

Disclosure Statement

There is no financial interest or benefit that has arisen from the direct applications of this research.

Note on Contributor

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