

ACCELERATOR-DATING THE WEISER SITE, KENT COUNTY, ONTARIO: NEW PERSPECTIVES ON THE WOLF TO FORT MEIGS PHASE TRANSITION IN THE WESTERN LAKE ERIE REGION

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The Weiser Site (AdHo-1) and the Wolf to Fort Meigs phase transition in the western Lake Erie region were formerly estimated to date to circa A.D. 1400, based on ceramic seriations and radiocarbon assays derived from research in northwestern Ohio. A new suite of radiocarbon assays, including two AMS assays obtained from the Weiser site itself has allowed a refinement of this estimate. Based on a consideration of these new assays along with expanded understandings of ceramic seriation, the Wolf to Fort Meigs phase transition is now believed to date to the middle of the fifteenth century. The implications of this revised chronology are discussed.

INTRODUCTION

The purposes of this paper are to report several new C¹⁴ assays pertaining to the Wolf to Fort Meigs phase transition, particularly two recent accelerator C¹⁴ assays obtained from the Weiser Site (AdHo-1), and to discuss the implications of these new assays in light of newer understandings regarding ceramic seriation and the late prehistoric cultural chronology of southwestern Ontario, southeastern Michigan and northwestern Ohio. In short, these new data allow the temporal refinement of the Wolf to Fort Meigs phase transition, and inferences regarding the dynamics of late prehistoric culture change in the western Lake Erie region between circa A.D. 1400-1500.

THE FORT MEIGS PHASE OF THE SANDUSKY TRADITION

The Sandusky Tradition developed in north central and northwestern Ohio (see Figure 1) (Stothers et al. 1994). Cultural continuity from a Middle Woodland base has been documented for an ensuing Late Woodland aspect, characterized by the Eiden (A.D. 1000-1250), Wolf (A.D. 1250-1450), Fort Meigs (A.D. 1450-1550) and Indian Hills (A.D. 1550-1643) phases. This cultural sequence is distinct from the neighbouring and somewhat temporally overlapping Western Basin Tradition, which appears to have emerged from the Lake St. Clair region during the Middle Woodland time period. At different times, both of these cultural traditions occupied southwestern Ontario, southeast Michigan, and northwestern Ohio. This temporal and geographic overlap has resulted in much debate over the taxonomy and ethnicity of Late Woodland populations in this region (*cf.* Murphy and Ferris 1990; Stothers et al. 1994).

In this paper we adhere to the Late Woodland taxonomy and interpretation we have espoused for some time. The Western Basin Tradition is believed to have been absorbed by Ontario Iroquoians and other groups by circa A.D. 1300. The Sandusky Tradition, on the other hand, is believed to have culminated in several named groups of the historic Assistaeronon, a Central Algonquian-speaking conglomeration traditionally believed to have inhabited the southern Great Lakes (Stothers et al. 1994,

DATE	TIME PERIOD	SANDUSKY TRADITION	WESTERN BASIN TRADITION	
AD. 1650	Protohistoric	Indian Hills Phase	Dispersal Into	
A.D. 1550		Fort Meigs Phase		
A.D. 1450		Wolf Phase	Southwestern Ontario, Northern Indiana, & Northern Michigan	
AD. 1350		Late Woodland	Elden Phase	Springwells Phase
AD. 1300				Younge Phase
AD. 1250			Green Creek Phase	Riviera Cu Vase Phase
AD. 1200				Gibraltar Phase
AD. 1000			Each Phase	Discontinuity
A.D. 750				Undefined Middle Woodland
AD. 500			Leimbach Phase	Providence Phase
AD. B.C.	Transitional		Kendera Phase	Williams Phase
600 B.C.			Firelands Phase	Riverside Phase
1000 B.C.				
2500 B.C.	Early Archaic			
7600 B.C.	PaleoIndian	Transient Populations		
10000 B.C.				

Figure 1. Cultural Sequence for Western Basin of Lake Erie.

Stothers 1994a; Stothers and Koralewski 1996). The Sandusky Tradition terminates at the end of the protohistoric Indian Hills phase with the dispersal of Central Algonquian populations from northern Ohio and southeastern Michigan, following hostilities with the Neutral and other groups in the early seventeenth century (Stothers and Graves 1983:121).

A decade ago, the Wolf to Fort Meigs phase transition was believed to be bracketed between A.D. 1350-1400. This estimate was based particularly on radiocarbon assays received from the Weiser and Fort Meigs sites (see Stothers et al. 1984). A model of gradual transition was assumed, from general Late Woodland Wolf phase culture characterized by grit-tempered Parker Festooned pottery, to Fort Meigs phase culture characterized by hallmarks such as shell tempering, applique strips, and strap handles (Stothers and Graves 1983, 1985). This development was seen as the extension of an Upper Mississippian horizon into the southern Great Lakes, firmly dated to the middle fourteenth through early fifteenth centuries A.D. (see Rutter 1984; Stothers and Graves 1985).

Since then, however, new radiocarbon assays have been obtained from numerous Wolf phase sites, making it the most heavily dated phase in the Sandusky Tradition sequence (Stothers et al. 1994). These new assays (Table 1) suggest that Wolf phase components, characterized by a dominance of grit-tempered Parker Festooned pottery (Abel 1995; Lee 1958), continue well into the fifteenth century. This temporal placement made them as late as or later than the earliest Fort Meigs phase components, understood at that time to date between A.D. 1400-1550. Given our relative lack of knowledge concerning the Fort Meigs phase, we decided that the Wolf phase should be extended to A.D. 1450. The Indian Hills phase, characterized by a dominance of Indian Hills Stamped pottery (Graves 1984; Tucker 1981), is firmly dated by radiocarbon assays and historical documentation between A.D. 1550-1643. This leaves the Fort Meigs phase pinched between A.D. 1450-1550. Noting that the developments of the Fort Meigs phase appear to have been in vogue for such a short duration of time, when compared to other developments in the sequence, we believed that a new look at the Fort Meigs phase seemed warranted.

To test the validity of a relatively short Fort Meigs phase development, we submitted several new Fort Meigs phase carbon samples for analysis, to see if these samples would confirm those run a decade ago. The first samples to be selected were from the Fort Meigs phase type site. Located on a bluff overlooking the Maumee River in Maumee, Ohio (Figure 2), the Fort Meigs site has been the location of several seasons of excavation that produced an abundantly rich cultural assemblage. From accounts of the site penned during the construction of the historical garrison at Fort Meigs, and from more recent archaeological excavations, it is clear that the Fort Meigs site represented a fortified village component greater than two hectares, and possibly approaching three hectares in size (Rutter 1984). Radiocarbon assays submitted in 1974 suggested that the site dated between A.D. 1350-1450 (Stothers 1975a:44), a placement believed to be supported by an assemblage diagnostic of the Midwestern Upper Mississippian cultural horizon (Rutter 1984).

The new assays obtained from the Fort Meigs site are 340 ± 80 B.P. (I-16,458), and 525 ± 70 B.P. (GX-16871). These calibrate, using

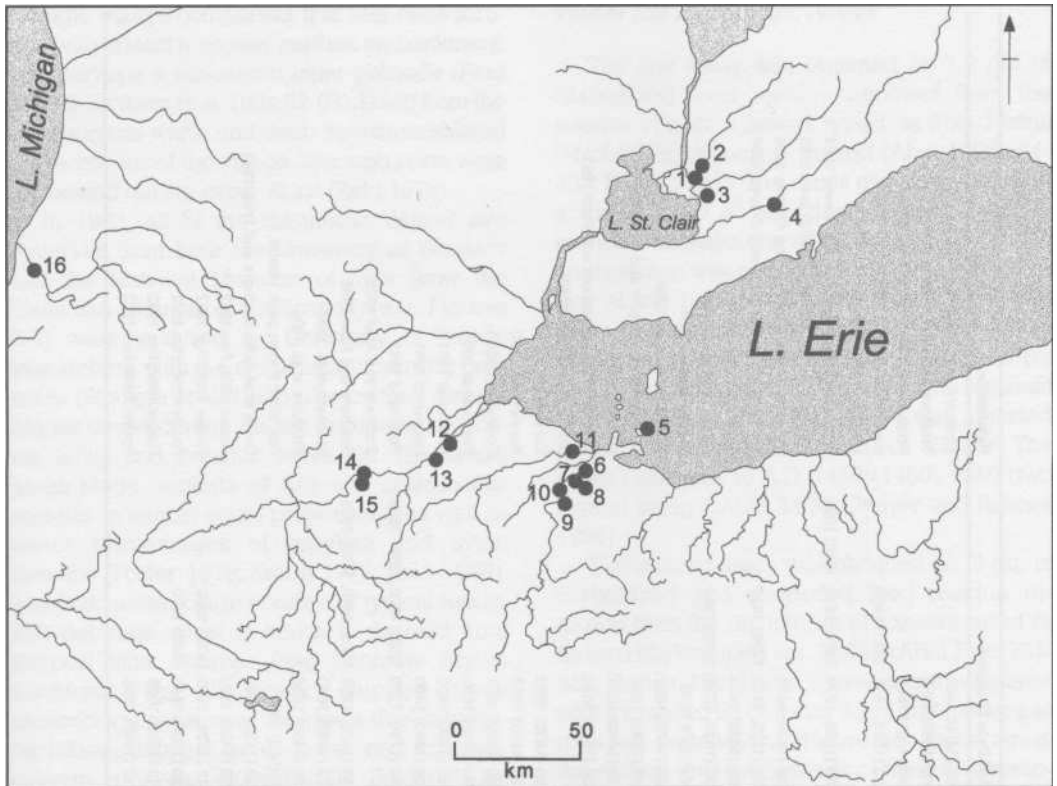


Figure 2. Sandusky Tradition Sites Mentioned in Text: Weiser (1), Libby-Miller (2) Liahn I(3), Wolfe Creek (4), Whittlesey Earthwork (5), Baker 1 (6), Pearson (7), Miller's Ridge and Hereford Hill (8), Blue Banks (9), Bear Fort (10), Petersen (11), Fort Meigs and Orleans Park (12), MacNichol (13), Dodge (14), LaSalle (15), Moccasin Bluff (16).

CALIB 3.03c for Macintosh (Stuiver and Reimer 1995), to A.D. 1430 (1520, 1590, 1620) 1950 and A.D. 1300 (1420) 1480, respectively, using a two sigma deviation. GX-16871 appears to corroborate previous estimates of the Fort Meigs site temporal position, between A.D. 1350-1450. I-16,458, however, suggests a later placement for the site. This latter assay, on the other hand, more favourably agrees with ceramic seriation estimates that place shell tempering and other Fort Meigs phase hallmarks in the fifteenth to early sixteenth centuries (Abel 1995), rather than in the fourteenth century (cf. Stothers et al 1984). This alternative placement also makes more sense in light of sixteenth and seventeenth century assays derived from other Fort Meigs phase components such as Whittlesey Earthwork (Davis et al. 1976), Liahn I (Kenyon 1988), Wolfe Creek (Foster 1982, 1990; Fox 1978) and MacNichol (Stothers 1975b; Stothers and Pratt 1981).

We believed that the most telling assays would be those derived from a transitional Wolf to Fort Meigs phase site. This component should bracket the *inception* of those diagnostic hallmarks such as shell-tempering, notched applique strip pottery, and strap handles. To date, the only well documented site of this type is the Weiser site, located in southwestern Ontario (Stothers et al. 1984). Two carbonized samples scraped from the interiors of two Weiser site rimsherds were submitted for radiocarbon assay in 1993 and 1994.

THE WEISER SITE (AdHo-1)

The Weiser site (AdHo-1) is located in extreme southwestern Ontario, in the Lake St. Clair Delta area (Figure 2). Based on early reports and more recent research (see Kroon 1972, 1974; Reid 1978), the Weiser site seems to represent

Table 1. Radiocarbon Determinations from Fort Meigs Phase Components.

Site	Lab No.	Reported Age	C12/C13	Corrected Age	Calibrated Date (2 sigma)	References
Baker I	Beta-11682	360±60	-11.79	580	A.D. 1290 (1400) 1440	Stothers at al. 1994
Bear Fort	Beta-13234	280±7	-25.79	270	A.D. 1460 (1650) 1950	Stothers and Abel 1989
Blue Banks	Beta-7973	380±50			A.D. 1440 (1480) 1650	Stothers and Abel 1989; Abel 1995
Blue Banks	1-15,911	350±80			A.D. 1430 (1520, 1590, 1620) 1950	Stothers and Abel 1989; Abel 1995
Fort Meigs	Beta-6179	modern				Stothers et al. 1994
Fort Meigs	DIC-1672	180±45			A.D. T650 (1680, 1770, 1800, 1940, 1950) 1955	Stothers 1975a; Stothers and Graves 1984
Fort Meigs	DIC-1673	modern				Stothers 1975a; Stothers and Graves 1984
Fort Meigs	DIC-398	510±55			A.D. 1320 (1430) 1470	Stothers 1975a; Stothers and Graves 1984
Fort Meigs	DIC-399	610±50			A.D. 1290 (1320, 1340, 1390) 1430	Stothers 1975a; Stothers and Graves 1984
Fort Meigs	GX-16871	525±70			A.D. 1300 (1420) 1480	Stothers at al. 1994
Fort Meigs	1-T6,458	340±80			A.D. 1430 (1520, T570, 1630) 1950	Stothers at al. 1994
Hereford Hill	UGa-4283	795±165			A.D. 900 (1260) 1440	Stothers et al. 1994
Liahn I	DIC-1007b	400±60			A.D. 1420 (1470) 1650	Fox 1978; Kenyon 1988
Liahn I	DIC-1010b	270±45			A.D. T510 (1650) 1950	Kenyon 1988; Murphy and Ferris 1990
Libby-Miller	BGS-1596	410±70			A.D. 1410 (1460) 1650	Stewart 1994
MacNichol	DIC-1670	450±60			A.D. 1400 (1440) 1630	Stothers 1975a; Stothers and Pratt 1981
Miller's Ridge	Beta-5914	modern	-19.27			Stothers and Abel 1989
Miller's Ridge	Beta-84989	260±60			A.D. 1480 (1650) 1950	Koralewski 2000
Miller's Ridge	1-18,994	235±55	-26.1		A.D. 1520 (1660) 1950	Koralewski 2000
Miller's Ridge	1-T8,995	500±45	-24		A.D. 1400 (1430) T470	Koralewski 2000
Miller's Ridge	1-T8,996	415±45	-23.7		A.D. T430 (1460) T630	Koralewski 2000
Orleans Park	DIC-2004	700±50			A.D. 1250 (1290) 1400	Redmond 1981
Orleans Park	DIC-2005	480±45			A.D. 1400 (1440) 1480	Redmond 1981
Orleans Park	DIC-2592	130±50			A.D. 1680 (1700, T730, 1820, 1920, 1950) 1955	Redmond 1981
Pearson	Beta-5912	modern	-19.45			Stothers and Abel 1989
Pearson	Beta-7972	170±50			A.D. 1650 (1680, 1750, 1800, 1940, 1950) 1955	Stothers and Abel 1989
Weiser	AA-7458	425±55	-23.7	415	A.D. 1420 (1460) 1640	Stothers at al. 1994
Weiser	Beta-52339	430±80			A.D. 1400 (1450) 1650	Stothers et al. 1994
Weiser	S-1442	1545±60			A.D. 420 (540) 640	Fox 1980; Kroon pers. comm.
Whittlesey Earthwork	DIC-485	390±65			A.D. 1420 (1480) 1650	Davis at al.1976; Stothers and Pratt 198T
Wolfe Creek	RL-1486	580±110			A.D. 1250 (1400) 1620	Foster 1990; Fox 1982
Wolfe Creek	RL-1487	340±100			A.D. 1410 (T520, 1570, 1630) 1950	Foster 1990; Fox 1982
Wolfe Creek	RL-1488	320±100			A.D. T420 (1530, 1540, T640) 1950	Foster 1990; Fox 1982
Wolfe Creek	RL-1489	440±100			A.D. T310 (1450) 1660	Foster 1990; Fox 1982
Wolfe Creek	RL-1490	290±100			A.D. 1430 (1640) 1955	Foster 1990; Fox 1982

a single village component that was once fortified with at least a circular earthen embankment, and perhaps a concentric inner palisade (Reid 1978:5; Stothers et in. 1984:62-63). Daub from the site suggests wattle and daub structures existed in the interior of the village, although none were delineated during excavations (Reid 1978).

In 1982, all of the diagnostic Weiser site materials from both the University of Windsor and the National Museum of Man (now the Canadian Museum of Civilization) (e.g., Figures 3-4) were analyzed by University of Toledo researchers, with the aid of accompanying field notes (Stothers et al 1984). The cultural assemblages derived from the site include faunal, floral, lithic, and ceramic materials. The faunal assemblage consists of fish and mammalian remains in almost equal proportions, as well as minor percentages of reptilian and avian remains (Foster 1978; Kroon 1972; Reid 1978). The lithic assemblage consists of typical reduction debitage, most of which is derived from Bayport lithic sources from Saginaw Bay in Michigan. The diagnostic chipped stone assemblage consists of "Madison-like" triangular bifaces, bifacial "snub-nose" end-scrapers, graters, spokeshaves, and drills (Reid 1978:8). Notched limestone cobbles, undoubtedly fashioned for use as netsinkers, were also found in abundance (Kroon 1972). Several ceramic pipe fragments, including Ring Bowl, Elongated Ring Bowl, Barrel Bowl, and Trumpet Bowl types (Figure 4a-c) were analyzed by University of Toledo researchers (Stothers et al in. 1984:64-65).

The site has yielded a ceramic assemblage of 185 vessels, of which 91 percent (n=168) are grit-tempered, and nine percent (n=17) are shell-tempered. The majority of the diagnostic sherds have stylistic attributes typical of the Wolf to Fort Meigs phase transition such as push-pull, trailing, and notched horizontal applique strips. Fifty-six percent of the rims are typed as Fort Meigs Notched Applique (Rutter 1984), while 24 percent are of the Parker Festooned ceramic type (Abel 1995; Lee 1958). All of the Parker Festooned vessels are grit-tempered, while the Fort Meigs Notched Applique type was represented by both grit and shell-tempered variants. As suggested by ceramic seriation (Figure 5), the Weiser site represents an early Fort Meigs phase occupation (Stothers et al in. 1994; Stothers et al in. 1984:75).

Weiser Site Radiometric Assays

The first assay was obtained on 1.9 gm of carbonized food residue removed from the interior rim of a vessel typed as Fort Meigs Notched Applique var. Trailed (Abel 1995:354-357; Rutter 1984). The rim is grit tempered with a rounded lip (6 mm thick) and has simple rounded castellations (Figure 3b). The carbon encrustation was removed by scraping the interior of the rim with a clean dental pick. The sample was sent to the NSF-funded University of Arizona Accelerator Mass Spectrometry Facility to obtain an AMS C¹⁴ assay. The resultant assay of 415 ± 55 BP (AA-7458) was adjusted for a C²¹¹³ fractionation value of -23.7⁰⁰⁰. The assay calibrates to A.D. 1420 (1460) 1640 (two sigma) using CALIB 3.03c (Stuiver and Reimer 1995).

The second assay was obtained on .9 gm of carbonized and encrusted food residue removed from the rim interior of a vessel typed as Indian Hills Stamped var. Trailed (Abel 1995:354-357; Tucker 1981). The vessel is grit tempered with a rounded lip (5.5 mm thick) and has simple rounded castellations (Figure 4f). Once again, the carbon encrustation was obtained by scraping the interior of the rim segment with a dental pick. This sample was sent to the Lawrence Livermore National Lab, in care of Beta Analytic Inc. to obtain an AMS C¹⁴ assay. The resultant assay of 430 ± 80 B.P. (Beta 52339; CAMS 2683) calibrates to A.D. 1400 (1450) 1650 (two sigma) using CALEB 3.03C (Stuiver and Reimer 1995).

Implications

The new Weiser site radiocarbon assays, in conjunction with revised ceramic seriation estimates (see Abel 1995; Stothers et al in. 1994), suggest that the site was occupied during the middle of the fifteenth century A.D., not the middle of the fourteenth century as previously believed. This placement supports suggestions by Fox (1980:11) and Murphy and Ferris (1990:224) that the Weiser site is roughly contemporaneous with the Ontario Iroquoian Lawson site near London. Parker Festooned now appears to be the hallmark ceramic type of the Sandusky Tradition from at least A.D. 1250 until well into the fifteenth century A.D. (Stothers et al in. 1994). As such, the Wolf phase temporal bracket has been adjusted to reflect this understanding. This placement

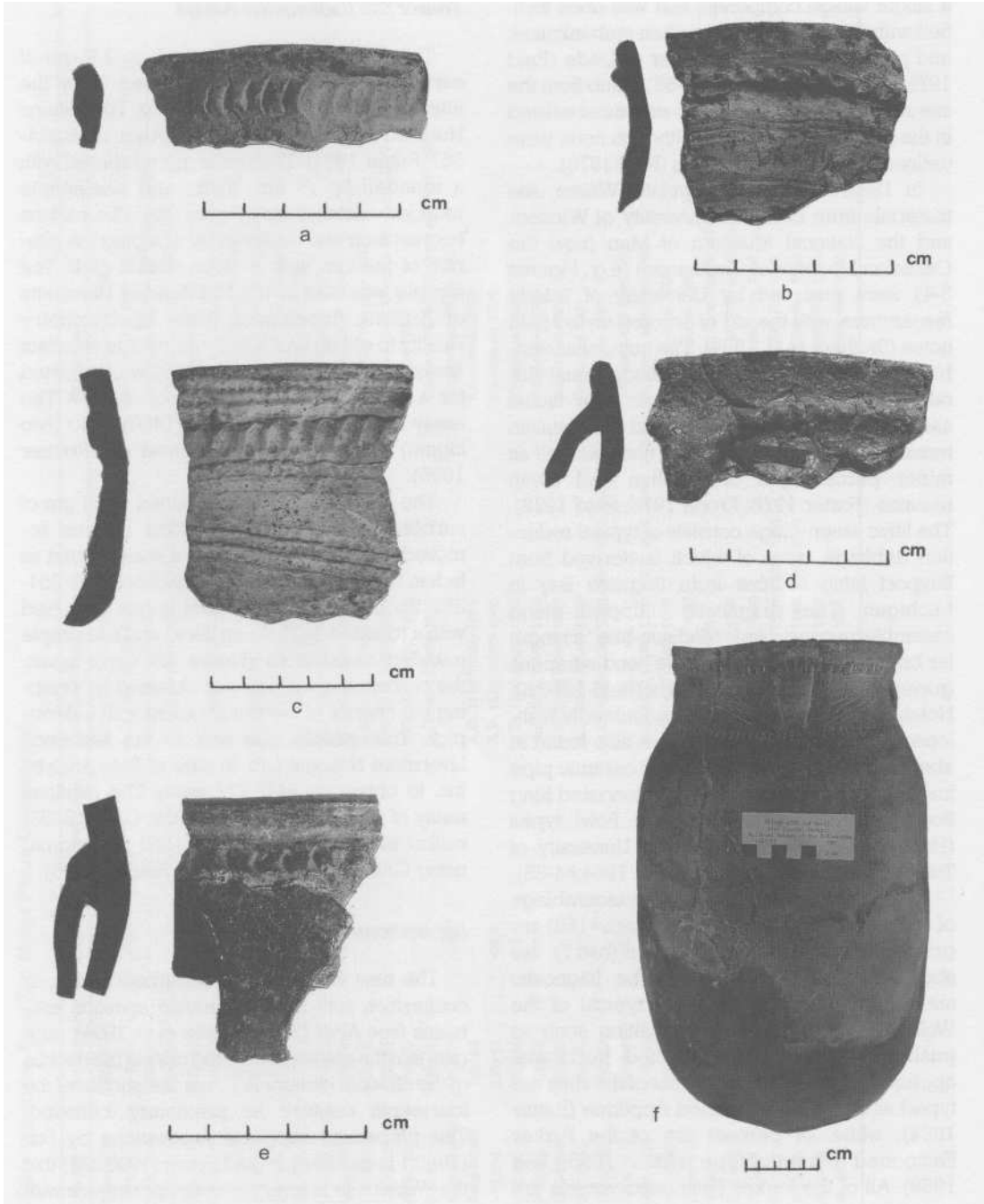


Figure 3. Selected Ceramic Vessels from the Weiser Site. Grit-tempered Fort Meigs Notched Applique Rim (a); Grit tempered Fort Meigs Notched Applique variety Trailed Rim from Vessel Radiocarbon Dated to 425 ± 55 B.P. (AA-7458) (b); Grit tempered Fort Meigs Notched Applique variety Push-Pull Rim (c); Grit tempered Fort Meigs Notched Applique Rim with tapered and bilaterally notched strap handle (d); Grit tempered Fort Meigs Notched Applique Rim with plain tapered strap handle (e); Reconstructed grit tempered Fort Meigs Notched Applique variety Trailed Vessel (f). All vessels are from the National Museum of Canada Collection.

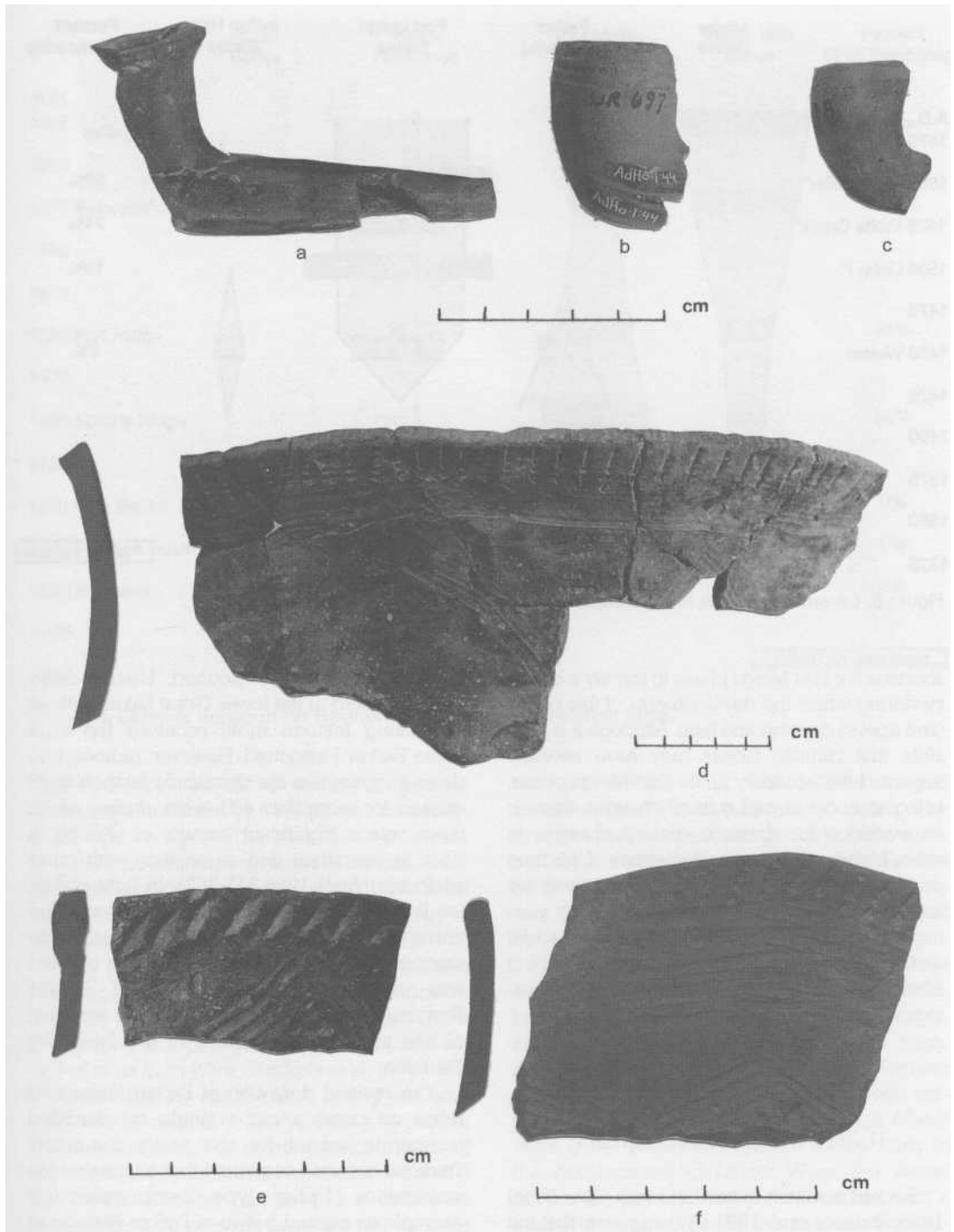


Figure 4. Selected Pipes from the Weiser Site and Indian Hills Series Ceramic Vessels. Plain Trumpet Bowl Pipe with Burnished Red Ochre Wash or Slip (a); Iroquois Ring Bowl Pipe Fragment (b); Short Barrelled Pipe Bowl with Annular Punctates (c); Shell tempered Indian Hills Stamped variety Trailed Vessel from the Petersen Site (d); Shell tempered Indian Hills Stamped variety Trailed Rim from the Indian Hills Site (e); Grit tempered Indian Hills Stamped variety Trailed Rim from the Weiser Site, Radiocarbon Dated to 430 ± 80 B.P. (Beta-52339/CAMS-2683) (f).

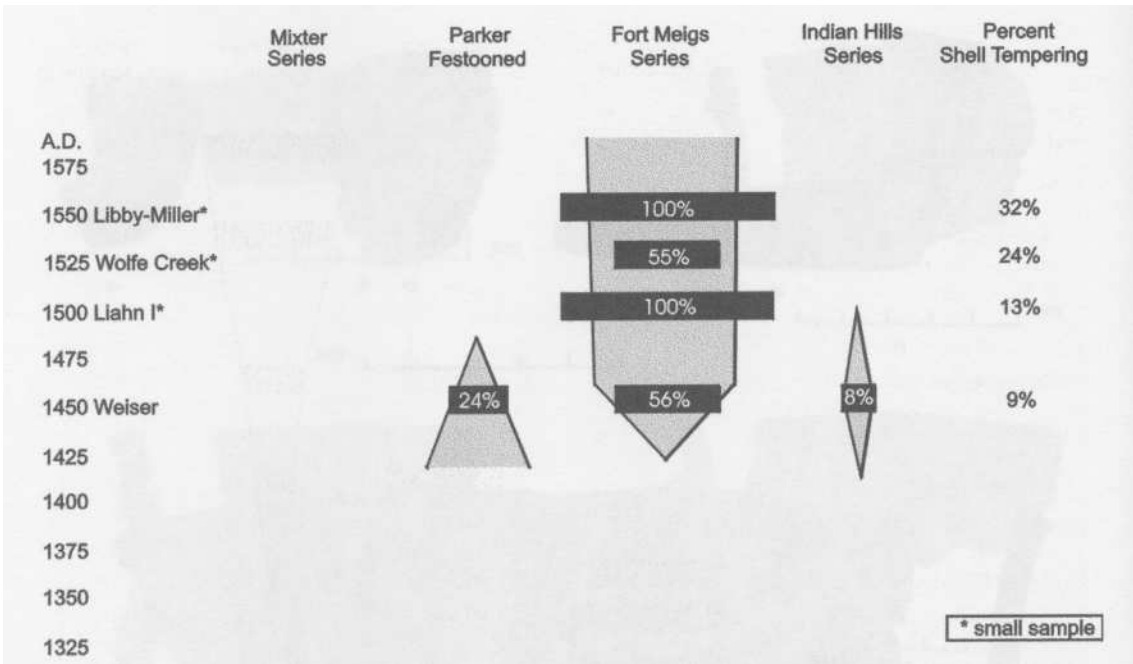


Figure 5. Ceramic Seriation for Southwestern Ontario Sandusky Tradition Sites.

shortens the Fort Meigs phase to merely a century, during which the developments of this phase (see above) develop and fade. Although it is possible that climatic factors may have severely impacted the economy of the Fort Meigs phase, bringing about abrupt cultural changes, there is no evidence for dramatic dietary changes in either botanical or chemical analyses of this time period (Stothers and Abel 2000). Alternatively, we suggest this relatively swift transition may perhaps be best explained with reference to social and political developments that had sweeping effects on the Sandusky Tradition and neighbouring cultures during the fifteenth century

NEW PERSPECTIVES ON THE SANDUSKY CERAMIC TRADITION

Recent research in northwestern Ohio (Abel 1995; Stothers et al. 1994:146) suggests that the Parker Festooned ceramic type began to decline beginning in the early fifteenth century (Figure 6). This assessment is based on a revised definition of the Parker Festooned ceramic type that attempts to correct nearly 40 years of increasing confusion about what is and

what is not Parker Festooned. Nearly every ceramic sherd in the lower Great Lakes with an undulating festoon motif receives the type name Parker Festooned. However, radiocarbon dates suggest that the diagnostic festoon motif existed for more than 400 years, during which there was a significant amount of change in both its execution and association with other attributes (Abel 1995:345-357). In light of this, the Parker Festooned ceramic type would and currently does constitute a poor temporal indicator in most assemblages. What was needed was a meaningful definition of Parker Festooned that could be useful in the seriation of late prehistoric ceramics of the Sandusky Tradition.

The revised definition of Parker Festooned relies on constructing a single standardized taxonomic model for the entire Sandusky Tradition ceramic sequence that eliminates the ambiguities of phase-type discrimination (for example as existed between Parker Festooned and Indian Hills Trilled, or between Fort Meigs Stamped and Indian Hills Stamped; see Rutter [1984] and Graves [1984]). The new taxonomic model for the Sandusky Tradition ceramic sequence employs a monothetic classification system, in conjunction with a ranked system of

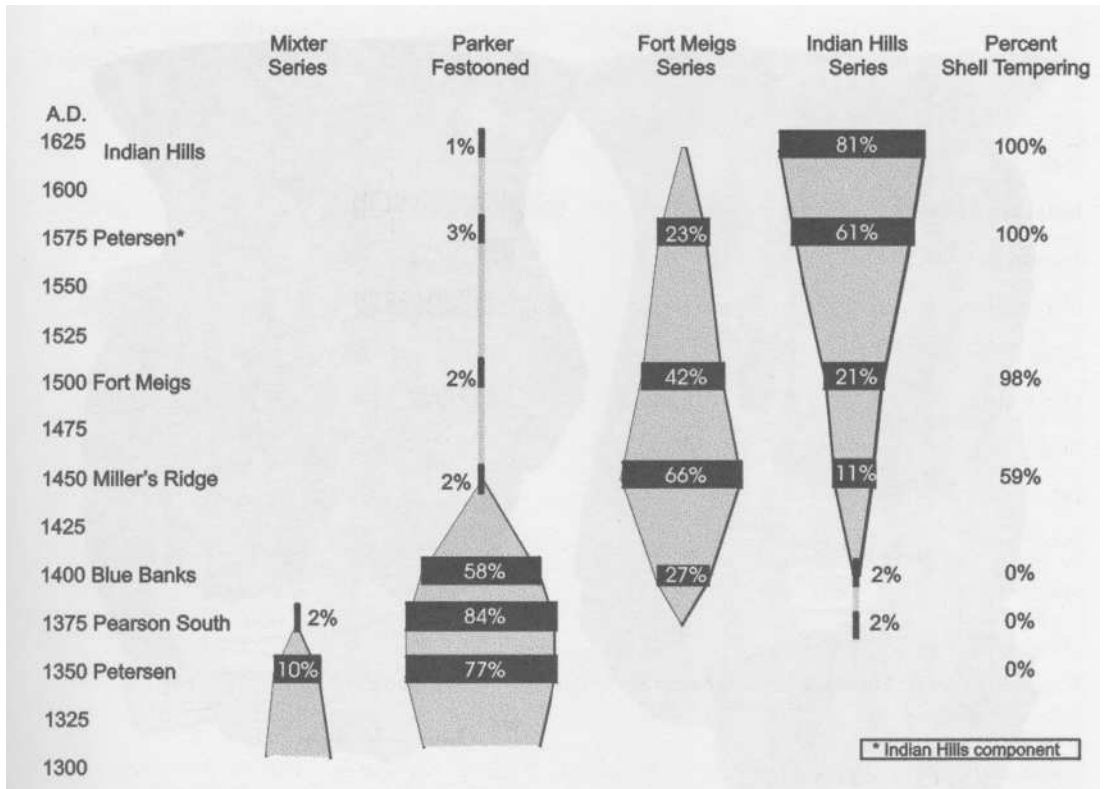


Figure 6. Ceramic Seriation for Northern Ohio Sandusky Tradition Sites.

definitive attributes, that allows the assignment of any ceramic sherd to a single and unambiguous type category. The end result is an extremely time-sensitive seriation of the Sandusky Tradition ceramic sequence, and a basis from which to begin reassembling the chronology of the western Lake Erie region (Abel 1995).

The redefinition of the Sandusky Tradition ceramic sequence begins with the recognition of three Late Woodland ceramic wares (Abel 1995). The first of these has been widely referred to as *Esch Ware* (Stothers et al. 1979). It is characterized by short, squat, coiled jars with incurvate to vertical collarless rims and conical to rounded bases. The entire exterior surface of the vessel is predominantly cord-marked with a fine fabric-wrapped paddle and is otherwise undecorated. At present, there are two ceramic types associated with this ware. *Esch Cord-marked* (Shane 1967) is characterized by predominantly oblique fabric impression over the entire exterior surface of the vessel. *Green Creek Cordmarked* (Stothers and Abel 1990) is characterized by predominantly vertical-

rimmed vessels with well-defined angled shoulders and more sub-conical bases. The rims are undecorated save for deliberate vertical fabric impressions. The vessel shoulder and body are plain and fabric-impressed. At present, *Esch Wares* seem to remain predominant between circa A.D. 1000-1000.

At approximately A.D. 1000, *Esch Wares* begin to be replaced by proportionately tall bag-shaped paddled jars with globular or sub-conical bases, elongated necks, and high straight, and everted collarless rims (Stothers and Abel 1990). These vessels have been collectively characterized under the term *Mixer Ware* (Abel 1995:334; Figures 7c, 8b). Early in the development of *Mixer Ware*, the vessel bodies are predominantly cord-marked with cordwrapped paddle. By the fourteenth century, these cord-marked body treatments appear to yield to predominantly smoothed body treatment. Among *Mixer Wares*, there are two predominant motifs that define three ceramic types. Large, blocky tool or dentate stamps, forming a checkered motif on the rim define the

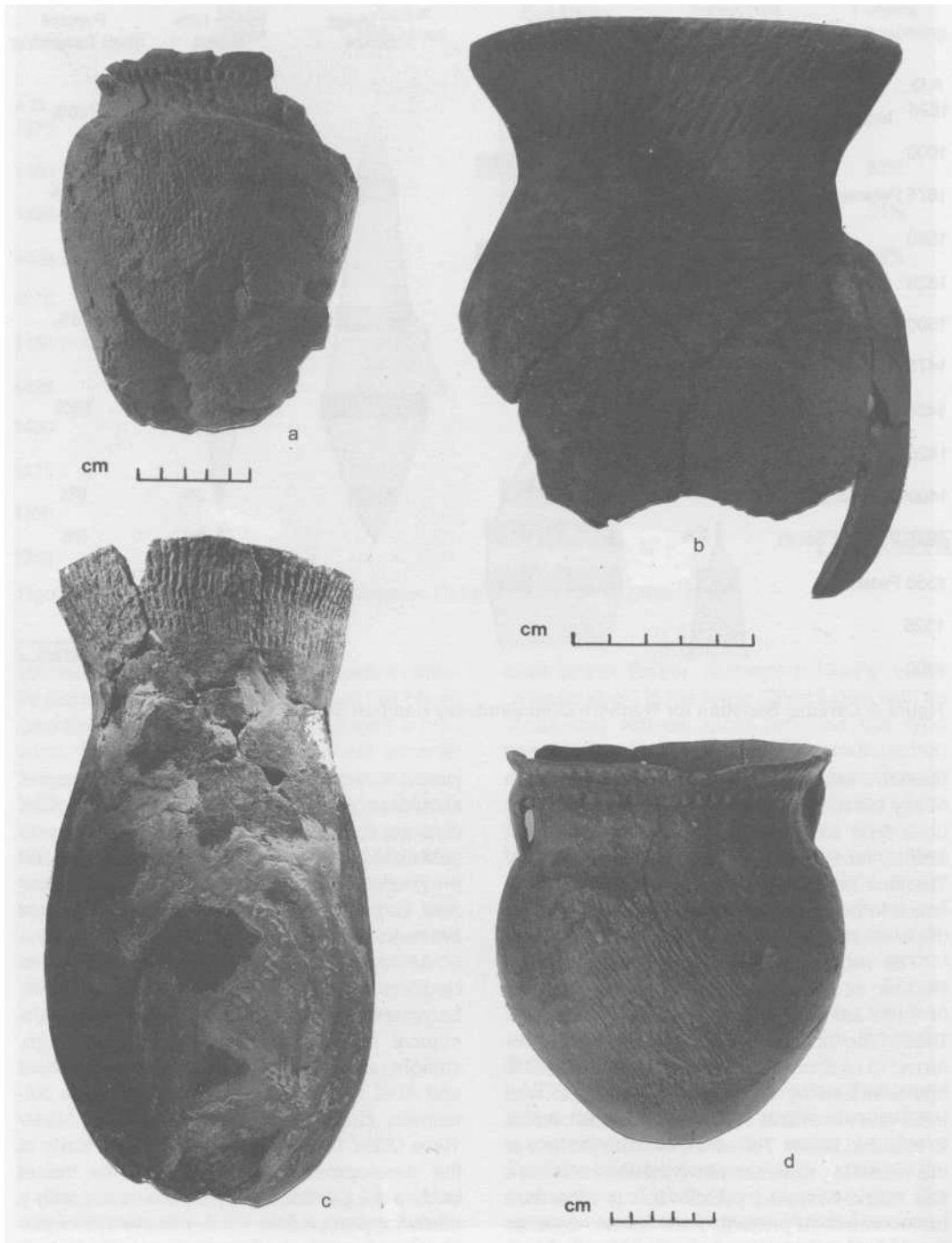


Figure 7. Selected Fort Meigs and Mixer Series Vessels. Shell tempered Fort Meigs Notched Applique Vessel with cord-roughened, fabric impressed body from the Hereford Hill Site (a); Grit tempered Mixer Stamped Vessel with plain smooth body from the Cemetery Ridge Site (b); Grit tempered Mixer Stamped Vessel with plain smooth body from the Weilnau Site (c); Shell tempered Fort Meigs Notched Applique Vessel with cord-roughened, fabric impressed body and fluted neck from the Pearson Site (d).

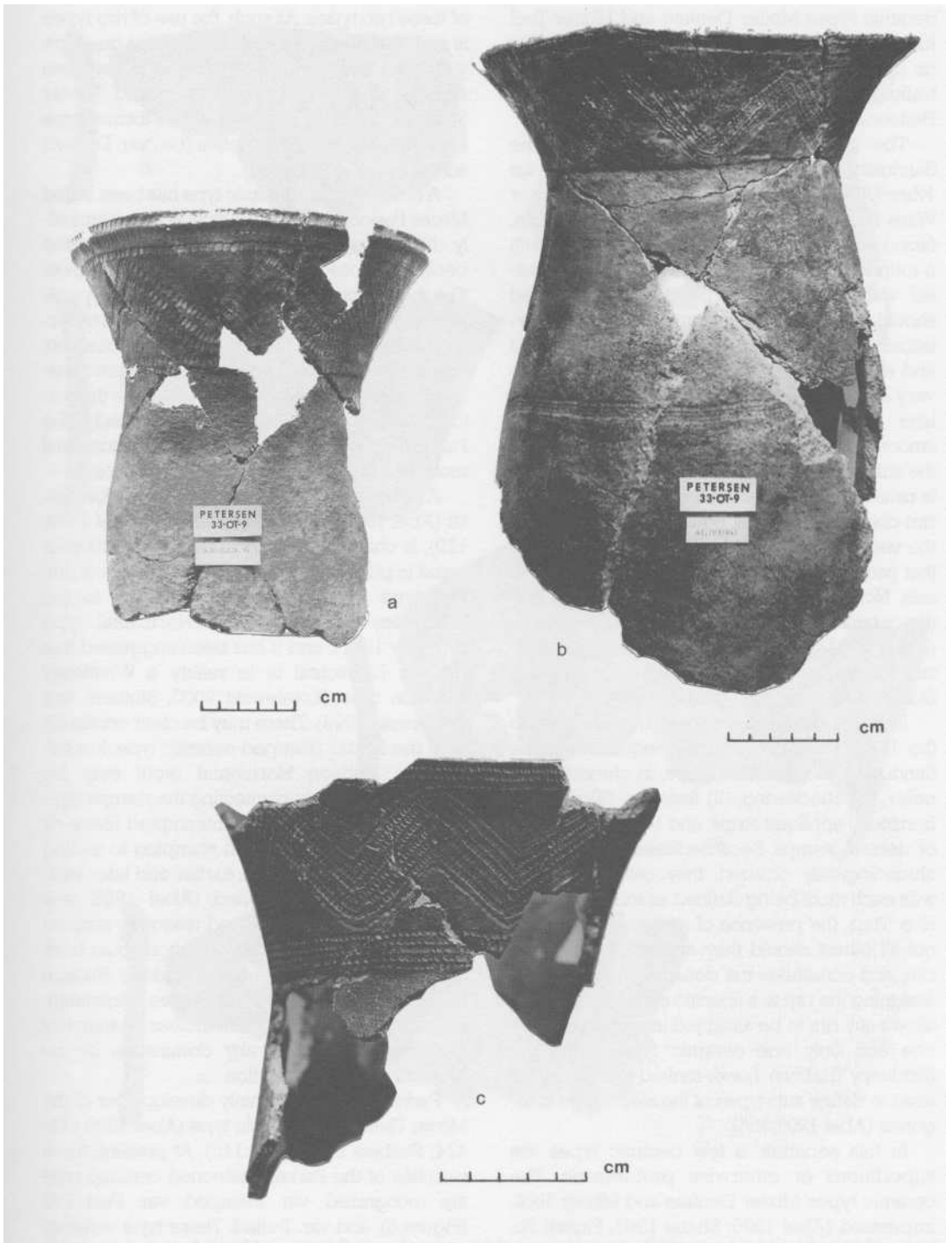


Figure 8. Grit tempered Parker Festooned variety Push-Pull Vessels from the Petersen Site (a-c).

ceramic types Mixer Dentate and Mixer Tool Impressed (see below) (Shane 1967). Festoons on the rim executed in stamping, push-pull or trailing define the ceramic type Parker Festooned (Abel 1995; Lee 1958).

The third and final ceramic ware of the Sandusky Tradition has been called *Fort Meigs Ware* (Abel 1995; Figure 7a, d). Unlike Mixer Ware, Fort Meigs Ware is characterized by thin, fabric impressed, and globular-shaped jars with a rounded or sub-conical vessel base. The vessel walls constrict sharply at a well-defined shoulder to a shallow neck, creating a characteristically wide-mouthed vessel. The rims are short and excurvate, usually with modified, or at the very least splayed lips. The lips are rounded and later flat, facing outward, and predominantly smoothed during the Fort Meigs phase. During the subsequent Indian Hills phase, the vessel lip is usually embellished with dentate stamps. The rim diameter is almost equal to the diameter of the vessel at the shoulder. There are two motifs that predominate among Fort Meigs Ware vessels. Notched horizontal applique strips define the ceramic type Fort Meigs Notched Applique (Rutter 1984). Vertical or oblique linear or dentate stamps define the ceramic type Indian Hills Stamped (Graves 1984; Tucker 1981).

In summary, then, four core motifs make up the Late Woodland ceramic sequence of the Sandusky Tradition. These are, in chronological order, (1) checkering, (2) festoons, (3) notched horizontal applique strips, and (4) vertical linear or dentate stamps. Because these attributes are chronologically ordered, they can be ranked, with each motif being defined as mutually exclusive. Thus, the presence of attribute (4) cancels out all others should they appear on the same rim, and constitutes the defining attribute when assigning the rim to a specific ceramic type. This allows any rim to be assigned unambiguously to one and only one ceramic type within the Sandusky Tradition. Lower-ranked motifs maybe used to define sub-types of the major type categories (Abel 1995:355)

In this seriation, a few ceramic types are superfluous or otherwise problematic. The ceramic types Mixer Dentate and Mixer Tool-Impressed (Abel 1995; Shane 1967; Figure 7b, c) are ambiguous under this taxonomic method, differing only in execution and not in motif. No significant differences exist in either the geographic distribution or temporal duration

of these two types. As such, the use of two types is superfluous under this method, and one type yields the same resulting seriation. It has been suggested that this type be named Mixer Stamped (Abel 1995:472). The two former type taxa would constitute varieties (i.e., var. Dentate and var. Tool-Impressed).

A newly defined ceramic type has been called Mixer Festooned (Abel 1995:343-344). It typically displays a single chevron or festoon nested between zones of stamping above and below the zone above the chevron or festoon is typically Mixer-like, displaying a horizontal motif of vertical stamping. The zone beneath is similar, but the stamping is oblique. It is neither characteristic of the previous Mixer types, nor are the festoons distinct enough to warrant placement in the Parker Festooned type. It is clearly a transitional motif, and is placed as such in the seriation.

A second new type, named Hudson Horizontal (Abel 1995:360-362; Stothers and Abel 1989: 120), is characterized by horizontal motifs executed in push-pull or trailing on a smoothed rim. The type displays striking similarity to the Whittlesey Tradition Reeve Horizontal type (Murphy 1971), and it has been suggested that Hudson Horizontal is in reality a Whittlesey Tradition type (Koralewski 2000; Stothers and Koralewski 1996). There may be clear continuity from the Mixer Stamped ceramic type, however. The Hudson Horizontal motif may be achieved by simply connecting the stamps typical of Mixer Stamped by interrupted linear or trailing. This transition from stamping to trailing also takes place between earlier and later varieties of Parker Festooned (Abel 1995; see below). Hence, there is good reason to suspect that a similar stylistic transformation could have occurred in Mixer Stamped, making Hudson Horizontal part of a Mixer Series continuum. Hudson Horizontal is nonetheless a minority type, never reaching any dominance in the Sandusky ceramic tradition.

Parker Festooned plainly develops out of the Mixer Festooned ceramic type (Abel 1995:472-474; Stothers et al. 1994:145). At present, three varieties of the Parker Festooned ceramic type are recognized: var. Stamped, var. Push-Pull (Figure 8), and var. Trailed. These type varieties are defined on the basis of the technique used to execute the festoon motif. The Stamped variety of Parker Festooned appears to be the earliest of the three, emerging circa A.D. 1200 based on

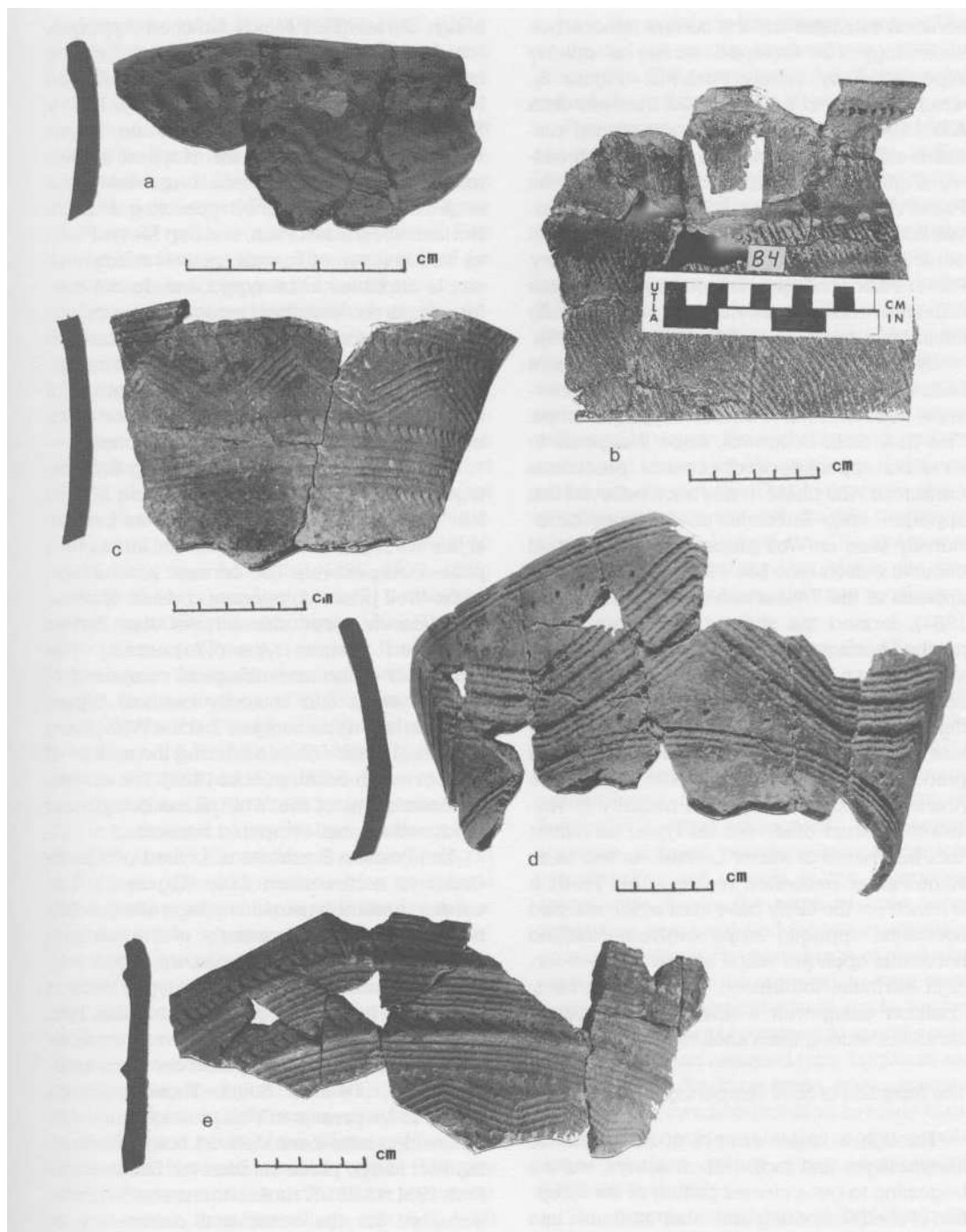


Figure 9. Selected Fort Meigs and Parker Festooned Ceramic Vessels. Grit tempered Fort Meigs Notched Applique variety Trailed Rim from the Weiser Site (a); Shell tempered Fort Meigs Notched Applique Vessel with Fluted Neck from the Weiser Site (b); Grit tempered Parker Festooned variety Trailed Rim from the Petersen Site (c); Grit tempered Parker Festooned variety Trailed Rim from the Pearson Site (d); Grit tempered Parker Festooned variety Trailed Rim from the Bluebanks/Hudson Site (e).

seriation estimates and the current radiocarbon chronology. The Stamped variety is quickly superseded by variety Push-Pull (Figure 8), which appears to be bracketed between circa A.D. 1250 and 1450 based upon seriation estimates and radiocarbon assays. The Trilled variety (Figure 9c-e) appears to evolve out of the Push-Pull variety around A.D. 1400, and continues through the decline of the Parker Festooned ceramic type through the fifteenth century. Parker Festooned appears occasionally in some sixteenth century assemblages, but virtually faded from existence by A.D. 1500 (Abel 1995).

By circa A.D. 1400, there appears to be a radical shift in Sandusky Tradition motif preference, from festoons to notched applique strips. This new motif is curious, since it appears to have no apparent developmental precursors during the Wolf phase. It was once believed that applique strip festoons, an attribute occasionally seen on Wolf phase Parker Festooned ceramic vessels (see Lee 1958), and which also appears at the Weiser site (see Stothers et al. 1984), formed the stylistic base from which notched horizontal applique strips evolved. The analysis of an increasing sample of Wolf phase ceramic assemblages, however, has suggested that the applique festoon attribute is present on less than 10 percent of the vessels. It appears predominantly during the middle Wolf phase (the fourteenth century), on a minority of vessels that would otherwise be typed as Mixer Tool-Impressed or Mixer Dentate, as well as on some Parker Festooned vessels (Abel 1995). It is hence not the likely base from which notched horizontal applique strips evolved. Notched horizontal applique strips appear to be a foreign attribute, introduced into the Sandusky Tradition along with a host of other cultural attributes, among them shell-tempering.

The Inception of Shell Tempering

Through a larger sample of both ceramic assemblages and radiocarbon assays, we are beginning to get a clearer picture of the inception of shell-tempering and other attributes into the Sandusky ceramic tradition. Figures 5 and 6 provide frequencies from ceramic assemblages of several Sandusky Tradition components. The frequencies are of selected ceramic series including the Mixer Series (Mixer Tool-Impressed/Dentate, Mixer Festooned), Fort

Meigs Series (Fort Meigs Notched Applique, Fort Meigs Modified Lip, Fort Meigs Exterior Impressed Lip), and Indian Hills Series (Indian Hills Stamped, Indian Hills Punctate). Parker Festooned currently belongs to no larger series. The percentages are of typed vessels relative to the total typed vessel assemblage for each component. Minority types (e.g. Hudson Horizontal, Petersen Plain, and Fort Meigs Plain) as well as untyped vessels (vessels which have ample attributes to be typed, but do not conform to currently-defined types), are not included in this report since they are not pertinent to the discussion at hand. As such, not all of the frequencies may total 100%. The percentage of shell-tempering is derived from the total number of typable vessels for each component.

The Petersen site is located along the Portage River in northwestern Ohio (Figure 2). Two late Woodland village components are present at this site representing the Wolf and Indian Hills phases, respectively. The ceramic assemblage of the Wolf phase component consists of some 382 vessels, predominantly of the Parker Festooned ceramic type (77 percent). The remainder of the assemblage is composed of Mixer series and minority ceramic types. Radiocarbon dates suggest that the Wolf phase component was occupied during the middle of the fourteenth century (Abel 1995). The ceramic assemblage of the Wolf phase component produced no shell-tempered ceramics.

The Pearson South site is located on Green Creek in northwestern Ohio (Figure 2). The ceramic assemblage of this village site consists of 57 vessels, predominantly of the ceramic type Parker Festooned (84 percent; Figure 9d). Minor frequencies of the ceramic types Hudson Horizontal, Mixer Festooned, and Indian Hills Stamped are also present. It is now interpreted that there are no shell tempered ceramics associated with Pearson South. Those reported earlier to be present in Wolf phase features are believed to have been derived from an overlying Fort Meigs phase midden (cf Stothers and Pratt 1981:97-98). A similar interpretation is now accepted for the occasional occurrence of shell-tempered sherds in Wolf phase contexts at the MacNichol, Dodge, and LaSalle sites (Figure 2) (Stothers and Pratt 1981:97-98). Pearson South is believed to date to the late fourteenth century based on ceramic seriation estimates. The only radiocarbon assay from the

component, cal A.D. 1400(1440)1630 (UGa-2536, two sigma) (Bowen 1980; Stuiver and Reimer 1995), seems to support this placement (cf. Stothers and Abel 1989).

Excavations of the late Wolf phase component of the Blue Banks site (Figure 2) yielded a ceramic assemblage of 73 vessels, of which 58 percent are characteristic of Parker Festooned (Figure 9e) and 27 percent are characteristic of Fort Meigs Notched Applique. The remainder of the assemblage is composed of minority types, predominantly Hudson Horizontal. A single detached notched applique strip, two separated strap handles, and several bodysherds are the only shell tempered sherds found in the late Wolf phase layers. Like above, however, it is suspected that these sherds are intrusive into these deposits from a stratigraphically overlying Fort Meigs phase occupation. This later component of the Blue Banks site may be the source of two radiocarbon assays of A.D. 1440(1480)1650 (Beta 7973) and A.D. 1430 (1520, 1590, 1620) 1950 (I-15,911) (see Abel 1995:471), calibrated to two sigma (Stuiver and Reimer 1995). The late Wolf phase component of the Blue Banks site is believed, on the basis of ceramic seriation estimates, to date to circa A.D. 1400, which agrees well with the third and final calibrated radiocarbon assay of A.D. 1320(1430)1610 (I-15,910, two sigma) (Stothers and Abel 1989).

The Miller's Ridge site is located a short distance to the east of the Pearson South component (Figure 2). Excavations there beginning in 1979 have revealed sections of a peripheral ditch feature, as well as several interior refuse pits and house structure segments. The ceramic assemblage of the Miller's Ridge site consists of 121 vessels, of which 66 percent are Fort Meigs Series vessel types. There are only minor frequencies of Indian Hills Stamped (11 percent), Fort Meigs Plain (nine percent), and Parker Festooned (two percent) (Koralewski 2000). Approximately seven percent of the assemblage consists of the Whittlesey Tradition Tuttle Hill Notched ceramic type (Murphy 1971). Four acceptable radiocarbon assays are now available from this village site: A.D. 1480 (1650) 1950 (Beta-84989), A.D. 1520(1660) 1950 (I-18,994), cal A.D. 1400(1430)1470 (I-18, 995), and A.D. 1430(1460)1630 (I-18,996) (previously unpublished; Stuiver and Reimer 1995). We believe the latter two assays to be most representative of the true age of the site, estimated

to be in the middle to late fifteenth century. This would make it roughly contemporary with the Weiser site. The percentage of shell tempering at the Miller's Ridge site is 59 percent.

The ceramic assemblage of the Fort Meigs phase type site contains a majority of Fort Meigs Series vessels (42 percent) and only a small percentage of Parker Festooned vessels (two percent). The remaining percentage in that assemblage belongs to Fort Meigs Plain and Indian Hills Series (Indian Hills Stamped, Indian Hills Punctate) ceramic types. The frequency of shell-tempered ceramics at the Fort Meigs site approaches 100 percent (Rutter 1984). Based on our current understandings of ceramic seriation discussed above, the Fort Meigs site is estimated to date to the early sixteenth century, or the end of the Fort Meigs phase. If our estimates are correct, the Fort Meigs type site is roughly contemporary with the late prehistoric component of the Liahn I site. The absence of European artifacts at the Fort Meigs site (see Rutter 1984) seems to support this conclusion.

Ceramic Trends in Southwestern Ontario

The sequence of shell-tempering in southwestern Ontario is now also beginning to be clarified (cf. Murphy and Ferris 1990:224). Figure 5 illustrates the seriation of ceramic assemblages from four southwest Ontario Sandusky Tradition components. The percentages are of typed vessels relative to the total number of typed vessels in the component assemblage. Again, the same ceramic series categories were used, and the same categories omitted for clarity. The percentage of shell tempering is relative to the appropriate component assemblage. Assumptions were made regarding the assignment of ceramics to specific components based on assigned type. Iroquoian and Western Basin Tradition types were assumed, based on our own interpretation, to relate to different components or at least to captive populations residing within those components (Stothers et al. 1994).

The ceramic assemblage of the Weiser site (Stothers et al 1984:76) contains a 56 percent frequency of Fort Meigs series ceramic types and a 24 percent frequency of the Parker Festooned type. This ceramic type composition suggests an initial Fort Meigs phase component dating to the middle of the fifteenth century, rather than to the

middle of the fourteenth century as previously believed. The two recently obtained radiocarbon assays support this proposed temporal placement. The Weiser site ceramic assemblage contains a nine percent frequency of shell tempering.

The late prehistoric Sandusky Tradition ceramic assemblage of the Liahn I site (Kenyon 1988) (Figure 2) is composed of eight vessels, all of which may be assigned to Fort Meigs series ceramic types. All but one of these vessels is grit-tempered (shell tempering = 12.5 percent). Based on two radiocarbon assays of cal A.D. 1420(1470)1650 (DIC-1007b) and cal A.D. 1510 (1650)1950 (DIC-1010b) (Fox 1982; Kenyon 1988), the Liahn I site is believed to represent an early sixteenth century occupation (see also Murphy and Ferris 1990:224). Due to the extremely small ceramic sample, however, these interpretations are viewed as tenuous at best.

The Wolfe Creek Site (Figure 2) has been interpreted by Foster (1990) as a Late Iroquoian village component. There is a sizable sample, however, of Sandusky Tradition Fort Meigs phase ceramics (36 percent of the overall vessel count) which, along with overlapping longhouse structures, may suggest two components, followed closely in time. The Sandusky Tradition ceramic assemblage at the Wolfe Creek site consists of 20 vessels, of which 45 percent are Fort Meigs Notched Applique, 45 percent are Fort Meigs Modified Lip, and the remaining 10 percent are Fort Meigs Plain (Figure 5). The percentage of shell tempering in this vessel count is 24 percent. Radiocarbon determinations from the site cluster in two temporal brackets, one of which nicely complements an early sixteenth century estimate for the age of this Fort Meigs phase ceramic assemblage.

The Sandusky Tradition ceramic assemblage of the Libby-Miller site (cf. Murphy and Ferris 1990; Stewart 1994), contains 32 percent shell tempering based on surface-derived assemblages (Figure 5). Of 41 rim and neck sherds derived from excavated contexts, 90 percent are grit-tempered, and 10 percent are shell-tempered. Eleven vessels of the Fort Meigs Notched Applique ceramic type were identified in these excavated contexts, while the majority of the fragmentary rim and neck sherds display attributes typical of Fort Meigs ceramic types. European trade goods and ceramic seriation estimates augment a calibrated date of A.D. 1410(1460) 1650 (BGS

1596; Stewart 1994:56; Stuiver and Reimer 1995), suggesting a temporal placement near the middle to late sixteenth century

Discussion

It appears that the transition from grit to shell tempering began in northwestern Ohio ceramic assemblages circa A.D. 1450 and progressed until circa A.D. 1550, at which time the percentage of shell-tempering appears to have been at or near 100 percent. In southwestern Ontario, the inception of shell-tempering as reflected at the Weiser site appears to have progressed little in the ensuing century. In the absence of sites displaying predominantly shell-tempered ceramic assemblages in southwestern Ontario, a complete transition from grit to shell tempering does not seem apparent (see also Murphy and Ferris 1990:224).

NEW PERSPECTIVES ON THE WOLF TO FORT MEIGS PHASE TRANSITION

The Wolf to Fort Meigs phase transition is mainly characterized by a marked shift in vessel manufacturing and decoration preferences (Abel 1995). The characteristic of this shift appears to be the relatively quick adoption of Fort Meigs Ware, in the beginning almost exclusively associated with the ceramic type Fort Meigs Notched Applique (Rutter 1984). By about A.D. 1500, other motif types such as Fort Meigs Exterior Impressed Lip and Indian Hills Stamped (Graves 1984; Tucker 1981) emerge on Fort Meigs Ware vessels.

Neither Fort Meigs Ware, nor the Fort Meigs Notched Applique ceramic type, have any stylistic precursors in the western Lake Erie region. The notched horizontal applique strip appears with no other continuous attributes (such as festoons carried over from Parker Festooned) until A.D. 1500, when it is often associated with trailed festoons and/or vertical dentate stamps. There are ceramic continuities that are contemporary, however. The ceramic type Fort Meigs Plain (Rutter 1984) appears to develop from its grit-tempered Wolf phase equivalent, Petersen Plain (Abel 1995), retaining the basic Mixer Ware vessel shape (see Stothers and Abel 1989:Figure 9e). Indian Hills Stamped (Graves 1984; Tucker 1981) appears to have a stylistic

development from Parker Festooned, in which the horizontals above the festoon are replaced first by punctates, then by large linear impressions or dentate stamps (see Abel 1995). With the addition of these linear impressions or dentate stamps above the festoon, the vessel is more properly typed Indian Hills Stamped, while the festoon motif becomes less frequent during the Indian Hills phase (see Graves 1984). Parker Festooned, as well, continues as a minority type into the sixteenth and early seventeenth centuries (Abel 1995).

The Wolf to Fort Meigs phase transition is also accompanied by changes in the mortuary programme of the Sandusky Tradition. Wolf phase mortuary patterns are characterized by predominantly single extended primary burials in rows *outside* the village palisade. The Fort Meigs phase mortuary pattern consists of single extended primary burials in rows *within* the palisade, but many of these appear to have been exhumed for secondary bundling and cremation. The bundles and cremations occur as mass graves inside or outside of the village palisade. This mortuary programme continues into the ensuing Indian Hills phase (Stothers et al. 1994).

There is also a shift in settlement patterns during this transition. Wolf phase villages appear to be predominantly located on river flats along the mainstems. These villages appear to be about a hectare in size. Fort Meigs phase villages appear to be predominantly located on high bluffs overlooking these flats, where these physiographic features are available. Fort Meigs phase villages are nonetheless large by Wolf phase standards, ranging between 1.5 and 2 ha. They may well represent the fusion of two or more Wolf phase village populations (Stothers et al. 1994).

The Wolf to Fort Meigs phase transition is characterized by what at this time appears to be the rapid adoption of an entire complex of new traits. These new traits contrast with the typical Wolf phase trait complex to such a degree that the adoption of a *foreign cultural complex* may be suggested (Abel 1995:476-477; Koralewski 2000; Stothers and Koralewski 1996). Fort Meigs phase ceramic assemblages share a great deal of similarity to those derived from Berrein phase sites of the southwestern Michigan Huber-Fisher tradition (Rutter 1984). Given these similarities, it may be suggested that the culture of the Fort Meigs phase is a

direct result of the adoption of several Huber-Fisher traits by the Sandusky Tradition. Contacts between the peoples of southwestern Michigan and northwestern Ohio are known to have been going on for some time prior to A.D. 1400, based upon the presence of Parker Festooned ceramics in association with the Moccasin Bluff phase (circa 1100-1300 A.D.) occupation of the Moccasin Bluff site (Bettarel and Smith 1973:Plate 37G; see also Stothers 1994a).

THE FORT MEIGS PHASE AND THE ORIGIN OF THE "FIRE NATION"

Several authors have discussed the origins of various tribal groups and confederacies in the Northeast (e.g., Engelbrecht 1985; Fitzgerald 1990; Jirikowic 1990; Kapches 1995; McHale-Milner 1991; Niemczycki 1984; Noble 1972; Pearce 1984; Trigger 1976:87, 1985, 1990; Warrick 1984). Most place these origins in social and political movements of the late pre-historic time period, evinced in the archaeological record by sudden settlement shifts and cultural transformations. If our interpretation of the data is correct, then it is apparent that sweeping changes also occurred in north-western Ohio societies beginning in the fifteenth century. These changes appear to have rippled from neighbouring populations to the southwest and west, through northwestern Ohio and southwestern Ontario, and into populations residing east and northeast. Rapid settlement consolidation and shifts appear to have occurred throughout the Great Lakes during the late prehistoric time period, seemingly in a west to east temporal cline (see also Kapches 1995; McAllister 1980:97; Pearce 1984:320-334; Timmins 1985; Trigger 1990: 127).

Just prior to the contact period, settlement reorganizations resulted in the clustering of late prehistoric and protohistoric sites into recognizable groups, interpreted as tribal configurations (Fitzgerald 1990; Pearce 1984; Ramsden 1990; Stothers 1994a). From the Fort Meigs phase into the contact period there are three late prehistoric site clusters, one in the lower Saginaw Valley (the Saginaw Tradition), another in the lower St. Clair River Estuary (the Lake St. Clair Tradition), and the last in the lower Maumee Valley (the Sandusky Tradition). We

suggest that these site clusters represent the prehistoric to protohistoric development of the Kouattoehronon (Sauk), Skenchioronon (Fox), and Totontaratonhronon (Mascouten) tribal groups, respectively (see Stothers 1994a). The late prehistoric to protohistoric Whittlesey Tradition, located in the lower Cuyahoga Valley of northeastern Ohio, has been identified as the Ontararonon (Kickapoo) (Stothers 1981, 1998a, 1994a, 1998b).

Ethnohistoric accounts suggest a close affinity between the historic Mascouten, Kickapoo, Sauk, Fox, and Potawatomi in opposition to a Neutral-Odawa alliance (summarized in Baerreis et al. 1974; Callender 1962, 1978a, 1978b; Goddard 1972, 1978). Stothers (1994a, 1994b, 1998a, 1998b) has gone further to suggest that this affinity represented an alliance among the Central Algonquian tribes of the southern Great Lakes. The use of the term "Fire Nation" in several ethnohistoric documents refers more generally to the Central Algonquian tribes as a whole (Campeau 1987). Based on similarities in material culture and language (Stothers and Graves 1985), Stothers sees this usage as referring to a formal confederacy, or perhaps what its authors saw as a confederacy, of five tribes including the Mascouten, Kickapoo, Sauk, Fox and Wea (Ouiatonon) Miami. Based on the above data, we believe that the formal Central Algonquian tribes had their genesis during the Fort Meigs phase (A.D. 1450-1550). A Central Algonquian "Fire Nation" confederacy, if real, probably appeared during the early sixteenth century. Noting the apparent west to east consolidation of tribes in the Northeast, the formation of the Neutral Confederacy may have partially been a response to pressures exerted by allied Central Algonquian forces.

There have been several attempts to explain the formation of tribal confederacies in the Northeast (Trigger 1990). We do not believe that these changes were influenced directly by resistance to Mississippian domination or economic forces emanating from a Mississippian "core" (cf. Dincauze and Hasenstab 1989; Jamieson 1992). While others have suggested that these changes were ultimately caused by environmental degradation (Fecteau 1985; Fitzgerald and Jamieson 1985), there is no evidence for dramatic dietary shifts in northwestern Ohio during the late prehistoric time period (Stothers and Abel 2000). Alternatively,

we see changing social relations and the struggle for security as being the primary forces influencing the spread of social change across the Great Lakes during the fifteenth and sixteenth centuries (Trigger 1990; Williamson and Robertson 1994). Ultimately, these transformations may be a response to the decline of Mississippian hegemony in the Midwest, and the inception of a "new world order", or more probably, several competing world orders in the southern Great Lakes.

CONCLUSIONS

The current temporal model for the Wolf to Fort Meigs phase transition in the western Lake Erie region is in need of reassessment and further research. On the surface, the temporal inconsistencies in the current model may be resolved by a simple modification of the temporal scale. It is suggested that the Wolf phase time bracket should be shifted to A.D. 1250-1450, while the Fort Meigs phase time bracket should be shifted to A.D. 1450-1550. The acceptance of this modification, however, raises several questions concerning the dynamics of the Wolf to Fort Meigs phase transition. The proposed chronology suggests a long Wolf phase, followed by a very short and ecliptic Fort Meigs phase. It is suggested that this transition may now be viewed as representative of abrupt and radical social changes of the sort that may be produced by the adoption of exogenous populations, concepts, and culture. The transformations accompanying this adoption may represent the genesis of the five Central Algonquian tribes in the southern Great Lakes. Their later historically documented affinity with one another may represent the formation of a formal alliance between these groups in the early contact period.

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