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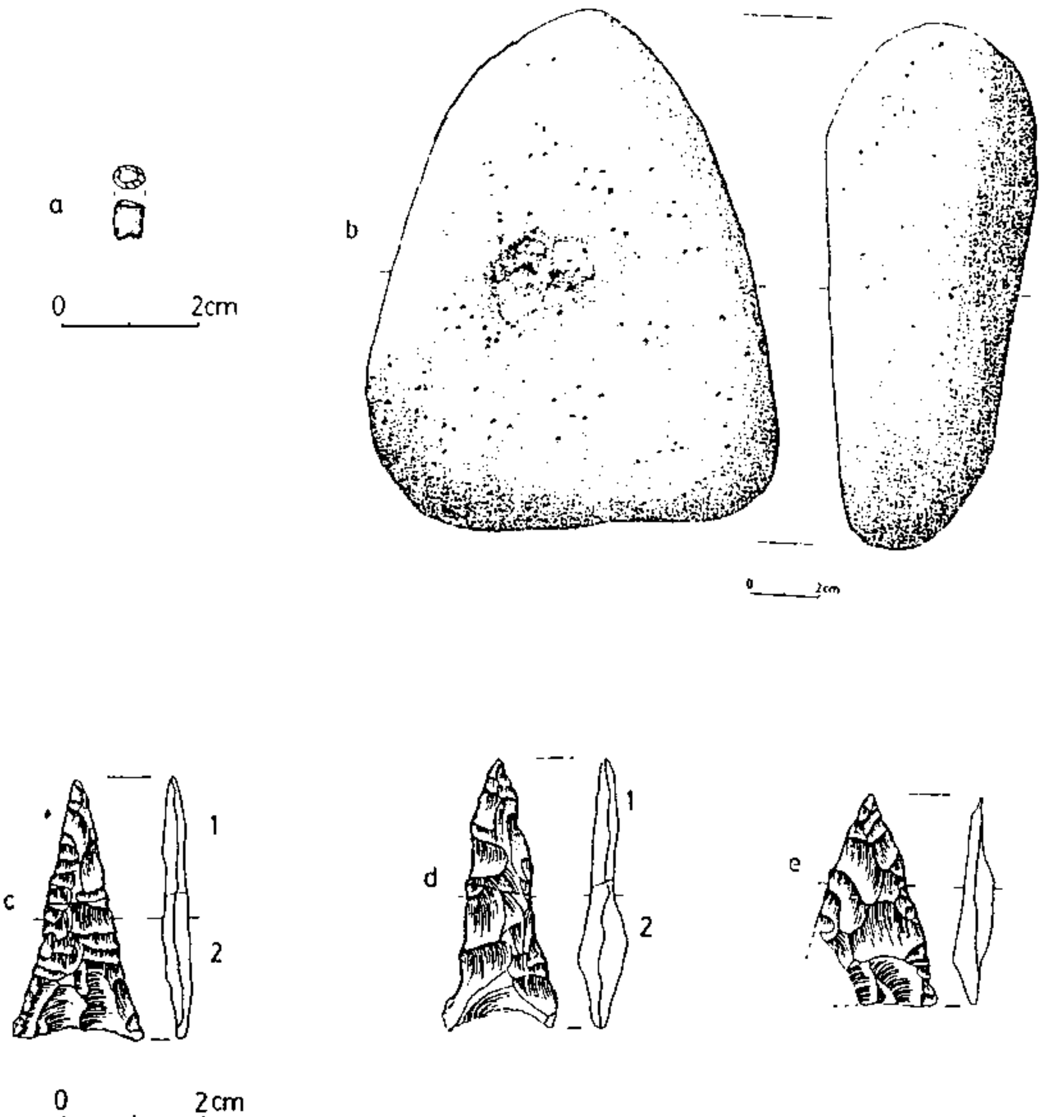

Artifacts from the Vanderwerken Site.

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Publications Chairman
William E. Engelbrecht
Dept. of Anthropology, Buffalo State College
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Editor ....Charles F. Hayes III
Assistant Editors ....Connie C. Bodner, Brian L. Nagel
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The Mount Mercy Site, Dobbs Ferry, Westchester County, New York

Edward J. Kaeser, 2404 Lancaster Drive, Sun City Center, FL 33573

Archeological excavation at the Mount Mercy Site revealed a body of data demonstrating the human presence and foraging lifeways of multiple cultural groups who exploited the area's oyster resources. Primary, secondary, and tertian- lithic chipping debitage infers that a complete pebble to pressure flake finishing procedure was carried out to manufacture the procuring and processing implements necessary to sustain camp life at this desirable location. The picture the site presents is of recurring short-period use, with no evidence of an extended year-round occupancy.

In the absence of absolute stratigraphic provenience, projectile points and ceramic vessel typology place the occupation of the Mount Mercy Site within the Middle Archaic to Late Woodland periods.

Introduction

At the northern limits of the village of Dobbs Ferry, Westchester County, New York, the Mount Mercy Site overlooks the broad expanse of the Hudson River's Tappan Zee to the north and the Palisades to the south. The site was formerly owned by Edwin Gould of stock market and railroad fame, but in 1958, the Sisters of Mercy acquired 85 acres of the estate and the following year began construction of their convent, two schools, and Mercy College, all situated on the mountain's crest.

Mount Mercy's southerly slope is cleft abruptly by a deep ravine cut by Wickers Creek, whose east-west-oriented stream flows westward into the Hudson. This brook rarely carries a water depth of more than a foot at present; however, waterworn embankment rock outcroppings and rounded boulders lining its route attest to a fast-moving water course with depths exceeding 10 ft and a 50- to 100-ft breadth at some time in the distant past.

The mountains gentle northern slope probably functioned as the site occupants' primary egress to the Hudson River. In the early 1970s, this slope was filled, graded, and terraced with gabion walls to form the college's west parking lots and athletic fields.

The Metro-North railroad track bed built along the Hudson's eastern shoreline obliterated most of a first beach terrace below the site, and with the addition of hill slope wash, a shallow cove possibly used as a canoe landing and shellfish collecting area was filled. A small portion of this terrace survives below the site and contains a midden of decayed oyster shells and organically blackened earth. Because of its close proximity to the railroad right-of-way and in the absence of permission to test within the railroad property, only a cursory surface inspection was possible. No artifactual material was recovered.

Viewed from the Hudson, the heavily wooded face of Mount Mercy rises steeply to a broad terrace ranging 44 to 60 ft in elevation above water level. A preliminary examination of the mid-terrace surface area (44 ft contour) showed scattered evidence of a shell midden spread. The tree- and weed-overgrown shelf extended upslope roughly 145 ft (58 ft contour) to a concrete footing wall topped by a wrought iron fence. This enclosure encompassed a terraced formal garden once part of the Gould estate. No surface midden evidence was visible within the garden area or in the weed-overgrown northern extremity of the terrace. Local children who frequent the site and a college faculty member indicated that the terrace had been generally known to produce "arrowheads," none of which could be examined by the writer.

Much of the southern portion of the terrace surface was badly disturbed by numerous open pits, some 8 ft in diameter and 3 ft in depth with adjacent piles of weed-covered midden debris, demonstrating the activity of clandestine digging by curio hunters. Shovel tests made within this locus of most abundant surface exposed midden refuse produced scant cultural material. The bottoms of the open pits were tested with a steel probe and in some instances shell was found to extend downward an additional 2 ft denoting shell deposits 5 ft in thickness. These exceptionally thick concentrations appear to be the product of aboriginal shell disposal into erosion modeled gullies and crags. Numerous woodchuck burrows in the general area produced fragmented shell, thermally shattered stones and flaking detritus at their entrances.

The spatial and temporal implications derived from a surface collection of waste flakes, identifiable pot sherds, several projectile points, and a large non-local knobbed whelk shell predicted the potential value of an archaeological investigation of the site. Although chances appeared slim that even a small portion of the site remained undisturbed, the decision was made to concentrate investigations within the central and northern portions of the terrace. A total area of probable aboriginal activity at this time, was estimated to cover approximately 25,000 sq ft of the terrace. My permission to commence archaeological excavation was received from the Provinciolate of the Sisters of Mercy in October 1975.

Area History

Prior to the initiation of excavation and during the ensuing years of my work on the site, some archival investigations were done to search out recorded evidence of the area's prehistoric or historic periods occupants and, if possible, clues to their identities and activities on or close to the site. The probability of error is compounded when attempting the identification of European Contact Period native resident groups by names attributed to them, tracing their movements or pinpointing their territories by way of the vagaries encountered in archival research. To illustrate one of these problems, 32 different spelling versions can be listed for the Weckquaeskeck (Parell 1976:16), the people who are reputed to have been the area's inhabitants while the southern Hudson Valley was in Dutch hands. The brook bordering the southern slope of Mount Mercy, currently referred to as Wickers Creek, traditionally derives its name from the early seventeenth-century Indian occupants of the area, the Weckquaeskeck. This Mohegan tribal group, allegedly part of the Wappinger Confederacy, was possibly the first to encounter Henry Hudson's ship, *Half Moon*, when it anchored off Spuyten Duyvil in 1609 (Bolton 1924:15-17).

A Dutch map of 1659 shows a Weckquaeskeck village lying along Wickers Creek near its outlet into the Hudson (Parell 1976:2-3). This map reference was probably instrumental in the erection of a bronze plaque by the Westchester Historical Society Landmarks Registrations in 1973. The plaque affixed to a glacial erratic reads, "Site of the ancient Indian Village of Weckquaeskeck." The monument rests on a small terrace about 100 ft below the mountain's crest, overlooking the wooded ravine of Wickers Creek. Within 25 ft of the monument, scattered fragments of stone chippage, oyster shells, and several small aboriginal potsherds were brought to the surface by the action of vehicle wheels and snowplow blades cutting through the sod and subsoil. Other than denoting a post-Archaic temporal period of activity, the non-diagnostic surface treatment and paste composition of the potsherds are not, as yet, amenable to an accurate ceramic typological classification. Surface examination and shovel tests made along the course and embankments of Wickers Creek from its junction with the Hudson through the Mercy estate failed to produce any sign of aboriginal activity.

Another map of 1698 marks the principal village of Sysquaqua, "The Place of the Bark Kettle;" containing two palisades situated somewhere within the present village area of Dobbs Ferry (Parell 1976:17-29). Also recorded is a village called Week-ques-guck, located at the mouth of the Weckqueghe or Wickers Creek (Bolton 1881:274).

On February 7, 1643, SO or 90 armed Mohawks visited the Weckquaeskeck and Tappan Indians "for the purpose of levying tribute:" The Weckquaeskeck begged assistance of the Dutch. On February 23, 1643, the openly contemptuous Dutch Governor William Kieft seized the moment to exterminate them, and the Weckquaeskeck dispersed in all directions (Jameson 1959:227-229, 277-279). Dutch soldiers and others searched them out even across the Hudson into New Jersey where some had fled. Nearly 100 Indians were killed in this action. The hard-pressed women and children refugees, when caught, were thrown into the Hudson and held under water until drowned. Thirty more native people were killed at Corlears Hook in Manhattan (Bolton 1881:262). In January 1644, an expedition was sent against the Weckquaeskeck Indians in the area of Stanford, Connecticut, under the mercenary New Englander, Captain John Underhill (or Van der Hye) (Brodhead 1859:1:387; Jameson 1959:281-282).

The slaughter suffered by these people ended with a final treaty signing. On July 14, 1649, the land identified as Wiequaes Keck on the east bank of the Hudson River was sold to the Dutch (Westbrook and van Ingen 1841:323-324). Sachem Seysegeckimum on July 19 signed a treaty ending hostilities between the Dutch and unreconciled elements of Weckquaeskeck and Raritan groups who did not sign the August 30, 1645 treaty ending the Governor Kieft War (NYHM 1974(4):607-609). The Weckquaeskeck survivors disappeared from their homes along the Hudson before the end of the eighteenth century (Parell 1976:17-18). During the Revolutionary War's New York campaigns, units of the British Army in November 1776, and Continental Army in January 1777 bivouacked somewhere in the Wickers Creek ravine seeking shelter from the winter cold (Parell 1976:32). The exact location of a palisade, village, or campsite of the Weckquaeskeck as sited above is presently unknown.

Excavation

In the spring of 1976, a topographic site map and grid overlay were prepared. Magnetically oriented base lines were laid out. The north-south base line paralleled the western face of the aforementioned concrete retaining wall 105 ft distant from the wall's north corner. The east-west base line was established perpendicular to the retaining wall's north corner. Squares were numbered at 5-ft intervals along the NO-NO base line and EO-EO base line, east and west of it. Four permanent metal base line stakes were implanted to insure future datum line identification.

Surface weed growth was cleared, and all squares were horizontally stripped, including portions of those squares containing large trees while making every effort to avoid damage to root systems. To prevent slope erosion, excavation wm terminated where the grid reached approximately 2 ft from the terrace's western embankment.

Forty-five 1 ft x 1 ft shovel test holes were dug to trace the sites perimeter. Twenty samples were taken from these tests to assay soil acidity. All averaged a pH value of 7.0, considered neutral.

During the 1976 to 1983 period of excavation, a total of 158 5 ft .x 5 ft squares were level stripped by trowel following the contours of natural stratigraphy. Where possible, each distinct stratum was laterally removed within the square and definable features were recorded. Artifact provenience was recorded by depth and relative position within the physical lavers. The excavation method found to be best suited to this site was to excavate a continuous line of east-west oriented squares and to then advance northward to the adjacent squares. The spoil earth was thrown back into the previously excavated trench. This method allowed a continuous examination of wall profiles, and the resulting earth piles were kept to a minimum height limiting their visibility, a constant concern regarding the potential of site vandalism. This practice also expedited the agreed upon restoration of the site area's original surface contours and weed cover.

Excavation was interrupted close to the terrace's northern extremity by the existence of a small parking area and turnaround portion of a dirt access road utilized by maintenance and security vehicles. The necessity of the road's constant accessibility prevented testing or excavation within the parking area or along the shell- and flake-strewn ruts of the roadway (Figure 1).

Scale drawings of wall profiles and plans were prepared recording features. Inventory sheets were maintained to record artifact finds within each excavation unit.

Stratigraphy

As excavation progressed, it became apparent that the shell midden varied considerably in thickness across the grid. In places the midden disappeared completely, showing no surface or subsurface evidence of modern or aboriginal disturbance. In addition, there were 3 locations in the northern terrace area where top- and subsoil had been removed for fill or gardening projects around the institution's buildings. Evidence of this midden soil transportation was discovered in several landscaping features on the grounds of Our Lady of Victory High School, located on the eastern perimeter of the Mount Mercy property.

The resultant holes designated H-1, H-2, H-3, were subsequently backfilled with leaves and other plant refuse collected on the institution's grounds, forming dark brown colored humus pits readily recognized as contemporary disturbances by their added fill inclusions of plastic trash bags, aluminum cans, glass, and other modern refuse. With the exception of the thick shell deposits located at the southern end of the terrace, the humus deposits noted above, and a few small areas in the -rid where the midden disappeared, the strata were essentially consistent in thickness and parallel to the site's modern surface.

It must be noted that no stratigraphic interface could be defined with less than a 2- or 3-in error. Within this margin of error, strata were subdivided and defined on the basis of soil color intensity and textural difference. As square profiles dried on exposure, closer observations and comparison of soil color to a Munsell chart did not help place stratigraphic interfaces any more accurately.

Four physically defined strata were distinguished in total independence of recovered artifact typologies. The recognizable major separate levels are referred to as Strata I through IV.

Stratum I: A weed-covered, dark brown fine-grained humus enriched topsoil, 2 to 8 in in thickness, containing scattered broken and whole oyster shell and artifacts derived from underlying strata brought to the surface by woodchuck burrowing and possibly tree blowdowns.

Stratum II: A 3- to 5-in thick shell midden layer comprised exclusively of 3- to 4-in oyster valves (Ostrea edulis). Surface composed of gray powdery soil derived from decayed shell. Unlike the typical black greasy midden soil found on coastal New York sites, the lower level shells were whole, tightly packed, and almost devoid of soil matrix. Interspersed within the lower portion of the stratum were unmodified whole and fire-broken quartzite cobbles, some coated with calcium carbonate leached from the surrounding shell.

Stratum III: Contacting the underside of Stratum II and in instances where the shell overburden was absent, a 12 in thick stratum of light brown fine sandy textured soil which graded in color to yellow at a depth of 8 to 12 in. 1-2-in thick lenses of yellow clay, sterile of cultural debris, separated the basal 4 in of the stratum discontinuously over the excavated area. Other than the basal yellowing of this soil, there was no distinct vertical separation within the stratum. No sign of internal stratigraphy which might designate an occupation floor was

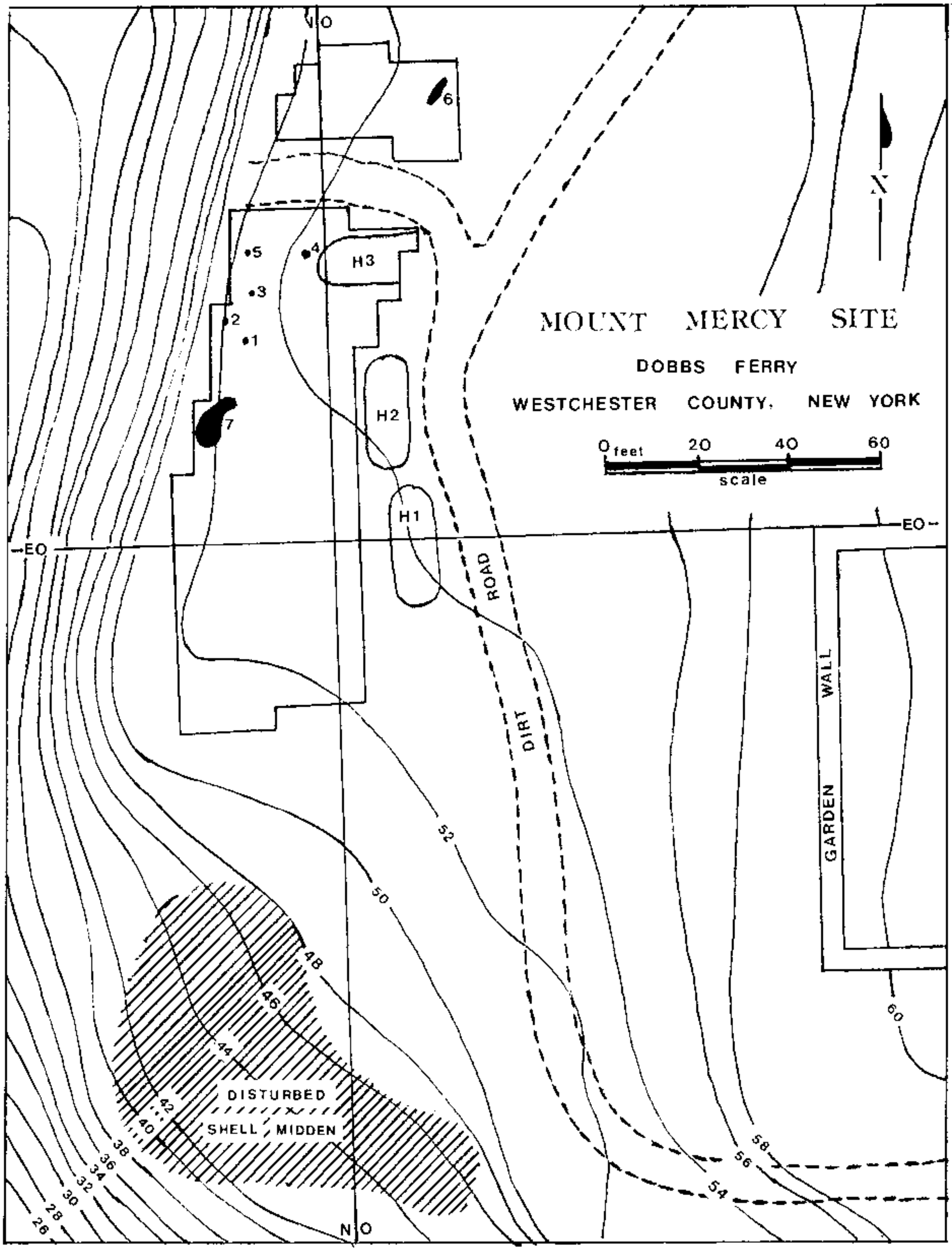

Figure 1. Excavations at the Mount Mercy Site, Dobbs. Ferry, Westchester County, New York. 1-5. cooking pits; 6. roasting platform; 7. Historic Period locus. H1, H2, and H3 are modern refuse pits.

preserved within the column. Three 4-in-thick horizontal subdivisions designated a, b, and c were devised to allow the interpolation of a possible successive series of depositions within the visibly unstratified Stratum III column.

Stratum IV: Tough orange-colored clayey soil, mottled brown from root penetration. This glacial till contained numerous water-rounded quartzite cobbles and pebbles which occurred downward to an undetermined depth. The maximum excavated depth of the squares was governed by the vertical extent of visual evidence of subsurface disturbance, soil texture, or discoloration. No square was excavated to a depth exceeding 3 ft from the surface. During the mid-summer months, the clayey soil of Stratum IV became dry and exceedingly hard, hindering the recovery of fragile materials. Excavation could be resumed only after the occurrence of extended periods of rain.

With few exceptions, it was within subdivisions a and b (the upper 8 in of Stratum III), and extending upward slightly into the Stratum II interface that all Archaic and Woodland period artifactual materials and the upper surfaces of features were recorded. Subdivision c exhibited a marked drop in artifactual frequencies.

Artifacts and Features

A total of -143 chipped, pecked, and ground stone procurement and processing tools, 57 whole and 69 fragmentary projectile point blanks, 5,329 pieces of lithic waste materials, 1 rolled copper bead, 15 bone and antler tools, 600 ceramic potsherds representative of 21 vessels, and 10 steatite bowl fragments, were recovered during the seven years of the author's intermittent work on the site.

Projectile Points (Figure 2)

A single example of a Muncie Bifurcate-like point (Figure 2-1) may denote the earliest time of occupation at Mount Mercy. The point type is named for Muncie, Lycoming County, Pennsylvania, and Fogelman (1988:95) has assigned it to the early Middle Archaic, c. 6300 B.C.

The frequency, distribution, and associated dates of projectile points recovered from the Mount Mercy Site are presented in Table 1. Over 90% of the identifiable 158 projectile points recovered came from the basal portion of the Stratum II shell and subdivisions a and b of Stratum III. Included in the projectile point inventory are 10 chert, 5 quartzite, and 4 quartz untyped fragmentary tips and 5 chert untyped fragmentary basal fragments.

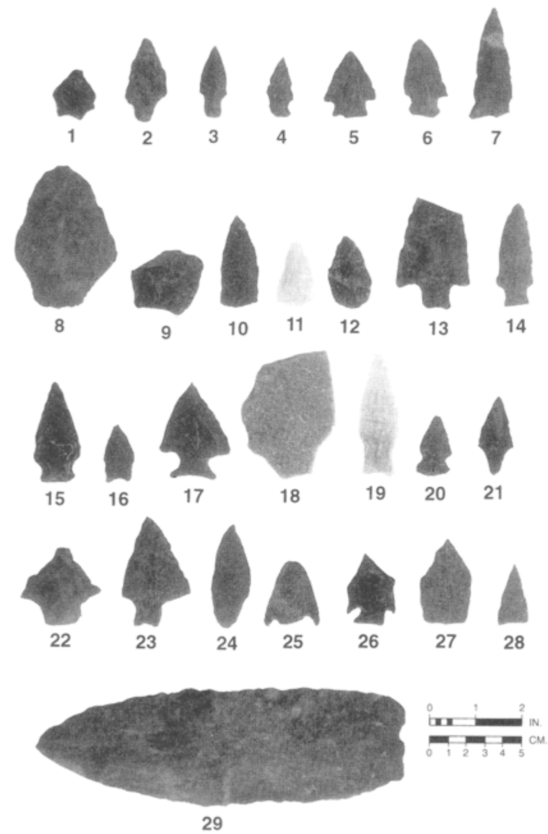

Figure 2. Diagnostic projectile points recovered from the Mount Mercy Site. l. Muncie Bifurcate; 2. Poplar Island; 3. Phase I Knobby Stemmed; 4. Phase III Pinched Stein, 5. Vosberg; 6. Brewerton Side-Notched; 7. Brewerton Eared-Notched; 8. Virginville-like; 9. Lower Hudson Lanceolate. Lanceolate A (Agate Basin shape); 10. Lower Hudson Lanceolate. Triaguloid (wide base): 11. Beekman Triangle; 12. Alpine Ovoid; 13. Atlantic Phase Blade; 14. Bare Island; 15, Normanskill; 16. Burwell-like; 17. Susquehanna Broad Point; 18. Koens Gispin; 19. Orient Fishtail; 30. Meadowood; 21. Adena; 22. Snook Kill; 23. Perkiomen Broad Point; 24. Rossville; 25. Erb Basal-Notched; 26. Jack's Reef Corner-Notched; 27. Jack's Reef Pentagonal; 28. Madison; 29. Petalas Blade.

Table 1. Frequency and Distribution of Projectile Points at the Mount Mercy Site.

	Stratum					
Type (Associated Date)	I	II	IIIa	IIIb	IV	Frequency
Middle to Late Archaic Period						
Muncie Bifurcate (c. 6300 B.C.)	—	1	—	—	—	1
Poplar Island (c. 4000-2000 B.C.)	1	—	—	3	—	4
Taconic Stemmed Tradition (c. 3000-1800 B.C.)						
Phase I Knobby Stem	—	—	—	1	—	1
Phase II Squared Stem	—	1	—	6	—	7
Phase III Pinched Stem	1	1	—	3	—	5
Vosberg (c. 3000-2524 B.C.)		—	—	2	—	2
Brewerton Side-Notched (c. 3000-2000 B.C.)		1	1	4	—	6
Brewerton Eared-Notched (c. 3000-2000 B.C.)	—		—	7	—	7
Virginville-like[1] (c. 3000-2000 B.C.)	—		—	1		1
Lower Hudson Lanceolates (pre-3000 B.C.)						
Lanceolate A (Agate Basin Shape)	1	1	1	2		5
Trianguloid C (Wide Base)	1	2	2	14	1	20
Beekman Triangle (c. 2780-2524 B.C.)	—	—	—	4	—	4
Alpine Ovoid (c. 2750 B.C.)		1	1	3		5
Atlantic Phase Blade (c. 2150-1650 B.C.)		—	—	3	—	3
Bare Island (c. 2000 B.C.)	2	4	2	4	1	13
Normanskill (c. 2000 B.C.)	1	3	5	10	—	19
Burwell-like[2] (c. 1900 B.C.)	—		—	1	—	1
Terminal Archaic						
Susquehanna Broad (c. 1600-750 B.C.)	—	1	—	2	—	3
Koens Crispin (c. 1900-1700 B.C.)	—	—		3	—	3
Snook Kill (c. 1850-1470 B.C.)	—	1	1	3	—	5
Perkiomen Broad (c. 1720-1500 B.C.)	—	—		4	—	4
Terminal Archaic-Early Woodland Period						
Orient Fishtail (c. 1230-763 B.C.)	1	2	—	4		7
Meadowood (c. 1000-385 B.C.)	1	3	2	5	—	11
Adena (c. 800-100 B.C.)	—	—	—	1	—	1
Middle Woodland Period						
Rossville (c. 520-100 B.C.)	1	2		4	—	7
Erb Basal-Notched (c. 0-A.D. 600)	—			1	—	1
Jack's Reef Corner-Notched (c. A.D. 630)	—	—	—	1	—	1
Jack's Reef Pentagonal (c. A.D. 905)		—	—	2		2
Petalas Blade (c. A.D. 700)	1	—	—	—	—	1
Late Woodland Period						
Madison (c. A.D. 500-1500)	1	3		4		8
Total	12	27	15	102	2	158
Percent	8%	17%	74%		1%	

[1] Named for Virginville, Berks County, Pennsylvania: probably related to the Lehigh. Snook Kill, and Koen Crispin types.
[2] Named for Burwell-Karako Site, New Haven County, Connecticut. Similar configuration present in assemblages of Southern Pennsylvania.

Chipped Small Tools (Figure 3)

Included in this category are drills, scrapers, and knives. Two kinds of drills are represented in the collection: expanded base and plain. None shows any wear marks of rotary motion. Seven types of tools with various scraping, cutting, or gouging functions were collected, and eight types of knives are defined. Table 2 presents the descriptions, material of manufacture, and frequency of tools of these types recovered from the Mount Mercy Site.

Flaked, Pecked, and Ground Stone Tools (Figure 4)

Flaked, pecked, and ground stone tools recovered from the site include axes, celts, choppers, abraders, anvil stones, hammerstones, and net sinkers, among others. Such tools recovered from the site are descriptively summarized in Table 3.

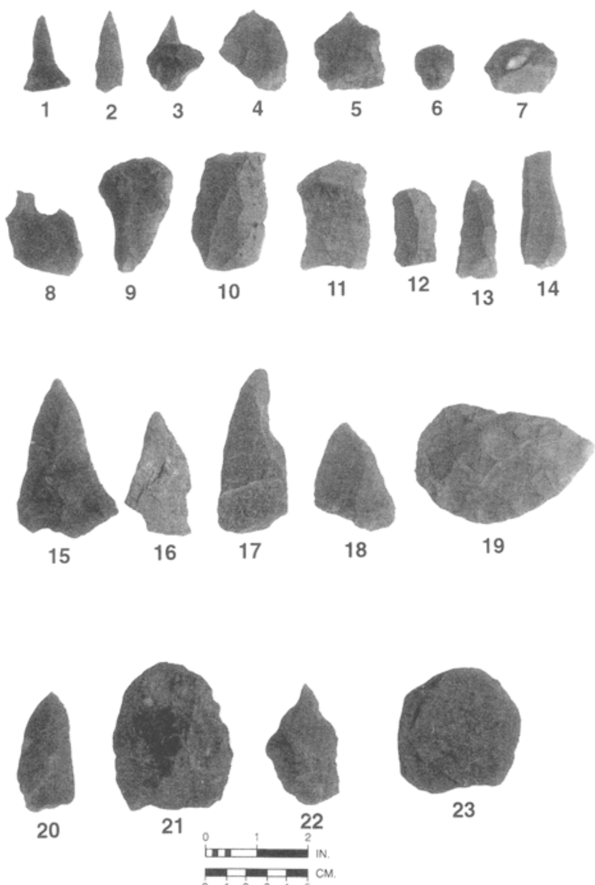

Figure 3. Chipped small tools recovered from the Mount Mercy Site. 1. expanded-base drill; 2. plain drill; 3. beaked flake-scraper; -1-5. combination flake-scrapers and burins; 6-7. Thumbnail steep-edge scraper; 8. spokeshave; 9. stemmed end scraper; 10. combination end-side scraper; 11. flake knife; 12, combination end-side scraper; 13-14. prismatic flake knives; 15. Snook Kill-like knife; 16-17. asymmetric flake knives; 18. flake knife; 19. flaked semilunar knife; 20. lanceolate flake knife; 21. ovoid knife; 22. beaked flake-scraper; 23. disc scraper.

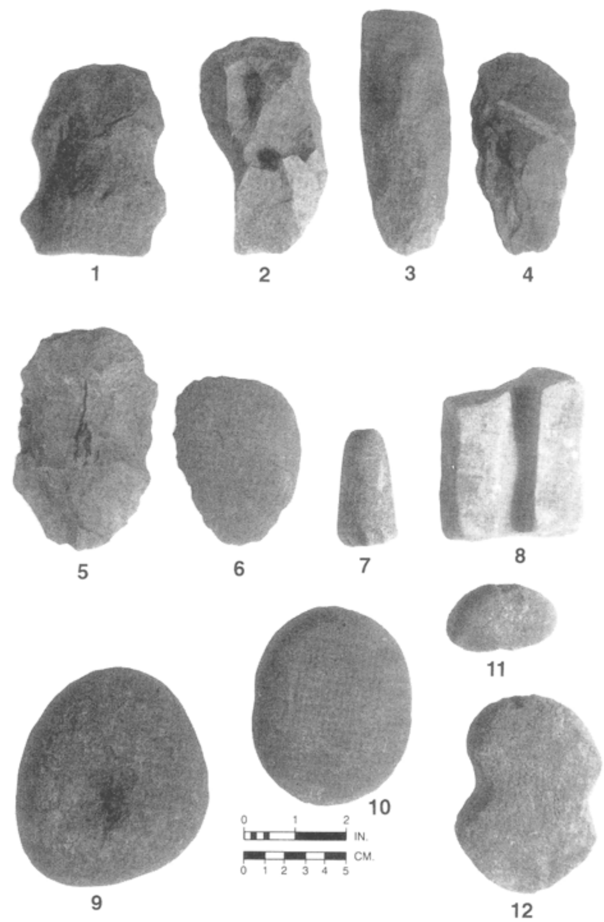

Figure 4. Flaked, pecked, and "'round stone tool, recovered from the Mount Mercy Site. 1. full-grooved ax; 2. chipped ax; 3. ground cell; 4. chipped celt; 5. chopper; 6. tesua; 7. pestle; 8. shaft abrader; 9. double-pitted anvilstone; 10. hammerstone; 11. full-groove net sinker or bola Stone; 12. side-notched net sinker.

Table 2. Chipped Small Tools Recovered from the Mount Mercy Site.

Tool	Description	Material	No. of Specimens	Figure Reference
Drill	Expanded base	chert	3	Figure 3-1
	Plain	chert	2	Figure 3-2
		jasper	1	
Scraper	Beaked flake-scraper unifacially chipped to beak-like protrusion	chert	3	Figures 3-3, 3-22
	Combination flake-scraper and burin	chert	4	Figures 3-4, 3-5
	Thumbnail steep-edge scraper	chert	4	Figures 3-6, 3-7
		jasper	1	
	Stemmed end scraper, unifacially chipped distal end, modified for probable hafting	chert	1	Figure 3-9
	Combination end-side scraper, thick uniface, steep edge flaked on end and along sides	chert	2	Figures 3-10, 3-12
	Disc scraper, spall, unifacially chipped around periphery	slate	1	Figure 3-23
	Large thumbnail steep-edge end scraper	chert	11	
		quartzite	1	
		quartz	3	
	Spokeshave, uniface, thick flake, concave edge steeply beveled to a cutting edge	chert	1	Figure 3-8
Knife	Flake knife: careful unifacial retouch flaking on both edges of elongated spall	chert	5	Figures 3-11, 3-18
		quartzite	1	
		argillite	1	
		shale	1	
	Prismatic flake knife: elongated uniface flake struck from core. Both long edges unmodified, presenting sharp concave cutting edges	chert	2	Figures 3-13, 3-14
	Snook Kill-like knife: large thin, unifacially flaked trianguloid blade, configuration similar to Lehigh and Koens Crispin. Tip and both edges concave pressure flaked. Shoulders well defined, sloping away from crude stem	chert	3	Figure 3-15
	Asymmetric flake knife: roughly trianguloid unifacially chipped large flake. One straight or slightly concave edge carefully flaked cutting edge	chert	1	Figures 3-16, 3-17
		argillite	1	
		quartzite	1	
		jasper	1	
	Flaked semilunar knife; large oval unifacially flaked spall. Three-quarters of periphery carefully pressure-flaked to form cutting edge. One unmodified straightedge, blunted for hand hold.	chert	1	Figure 3-19
	Lanceolate flake knife: unifacially flaked leaf-shaped blade, both edges pressure flaked, stem blunted for possible hafting	chert	1	Figure 3-20
	Ovoid knife: thick ovoid spall, unifacially chipped, pressure flaked around two-thirds of periphery, one edge blunted for hand hold	chert	1	Figure 3-21
	Lanceolate blade knife: thin, unifacially flaked blade, edges pressure-retouched, bases steep edge flaked	chert	2	Figures 5-13, 5-14

Table 3. Flaked, Pecked, and Ground Stone Tools Recovered from the Mount Mercy Site.

Tool	Description	Material	No. of Specimens	Figure Reference
Full-grooved ax	Flaking on bit, pecking on hafting groove, grinding and polishing on bit cutting edge.	sandstone	2	Figure 4-1
Chipped ax	Oblong unifacial spall, large flakes removed from one central face to allow handle attachment. End section steep edge flaked to ax bit.	sandstone	1	Figure 4-2
Ground celt	All flaking scars obliterated by pecking and grinding. Rounded poll polished, biconvex cross-section bit.	sandstone	1	Figure 4-3
Chipped celt	Oblong unifacial spall. Large flakes removed from one face to thin specimen to poll and bit. Bit pressure flaked.	chert	1	Figure 4-4
Chopper	Large oblong spall, bifacially steep edge chipped on all edges. End section blunted for hand hold.	chert quartzite	1 1	Figure 4-5
Tesua	Cortex spall, steep edge flaking around periphery, possibly from use.	quartzite	5	Figure 4-6
Shaft abrader	Tabular stone fragment. One face centrally grooved which would hold approximately ½-in diameter shaft. Reverse face shows v-shaped grooves from possible small tool (bone or needle) sharpening.	fine-grained sandstone	1	Figure 4-8
Double-pitted anvil stone	Waterworn pebble, both faces pitted by battering of hard stone edge in tool manufacture. All other surfaces unmodified. 3-5 in in diameter.	quartzite	2	Figure 4-9
Single-pitted anvil stone	Similar to above, one face pitted.	quartzite	1	
Hammerstone	Waterworn pebble to cobble size, 3 to 6 in, battered perimeter.	quartzite limestone	9 1	Figure 4-10
Muller	Waterworn cobble, face pecked and rubbed flat to slight hollow.	fine-grained quartzite	1	
Full-groove net sinker or bola stone	Waterworn ovoid pebble, groove pecked around circumference.	quartzite	1	Figure 4-11
Side-notched net sinker	Waterworn ovoid pebble, side-notched by flaking and pecking.	quartzite chert	3 1	Figure 4-12
Whetstone	Bar-shaped fragment, worn smooth by abrasion. Surfaces show long axis rubbing scratches, apparent use against soft materials which did not deeply groove stone. One surface coated with calcium carbonate leached from contiguous mollusk shells.	limestone	1	Figure 5-15

Miscellaneous Stone

Three stone items were not assigned to other categories. First, an ovoid atlatl weight made of slate is represented by a single fragment. The techniques of preliminary manufacture have been obliterated by final grinding and polishing. The central bore measures 9/16 in in diameter and exhibits rotary drill striations (Figure 5-b).

Second, a serrated biface doodle of unknown use exhibits steep-edge pressure flaking around its periphery, which resulted in sawtooth edges. This item is made of chert (Figure 5-7).

Third, a fossil mollusk shell is contained within an asymmetrical piece of limestone (Figure 5-16) (Kaeser 1962).

Miscellaneous Other

Also recovered from the site was a single rolled copper bead, measuring 7/16 in in diameter and 1 ¼ in in length. The bead has a green copper patina and appears to have been made by beating an irregular lump into a bead form (Figure 5-8). Three amorphous lumps of ochre, measuring 2 to 3 in in diameter, were also recovered. These were possibly used as pigments. Additional ochre recovered includes two pieces of yellow ochre measuring 1 ¼ to 2 ½ in in diameter, and one piece of pink ochre, measuring 2 ¼ in in diameter.

Preforms

Fifty-seven bifaces or blanks from which projectile points or similar implements could be produced were recovered from the site. Flakes were removed by percussion, and many show pressure retouch. The blanks of various lithic materials were roughed out in trianguloid form (Figure 6-1 through -10) and lanceolate form (Figure 6-11 through -20) (Table 4). Most fragmentary bifaces were broken across the blade near center, indicating considerable stress on that element of the tool during manufacture.

Figure 5. Miscellaneous antler and stone tools recovered from the Mount Mercy Site. 1-5. bone splinter awls; 6. atlatl weight fragment; 7. serrated biface doodle; 8. copper bead; 9. worked antler tine; 10-11. antler flaking tools; 13. antler-base flaking tool; 13-14. lanceolate blade knives; 15. whetstone; 16. fossil in limestone.

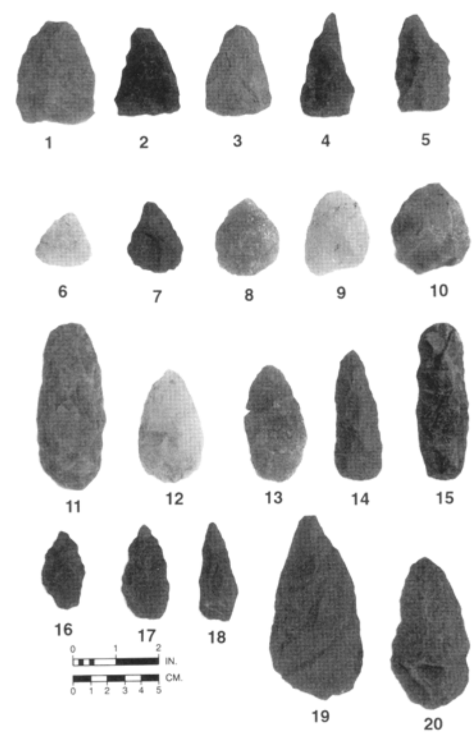

Figure 6. Selected trianguloid and lanceolate preforms recovered from the Mount Mercy Site. 1-10. trianguloid forms: 11-20. lanceolate forms.

Table 4. Frequency and Materials of Preforms and Fragmentary Bifaces.

Morphology	Material	No. Specimens	Figure Reference
Preforms			
Triangloid	quartzite	9	Figure 6, 1-10
	chert	4	
	quartz	1	
	shale	1	
Total		15	
Lanceolate	chert	18	Figure 6, 11-20
	quartzite	17	
	shale	5	
	quartz	2	
Total		42	
Fragmentary Bifaces			
Base	quartzite	10	
	chert	10	
	quartz	9	
	jasper	1	
	shale	1	
	chalcedony	1	
Total		32	
Tip	chert	18	
	quartzite	15	
	quartz	2	
	argillite	1	
Total		36	

Bone and Antler Artifacts

Several artifacts made on bone or antler were recovered from the site. An antler tip projectile point was made on a sharpened antler-tine tip, and its base was hollowed out for shaft insertion.

Ten bone splinter awls were made on split long-bone fragments. On each, one end was ground to a point. These may have been used to pierce green hides or as a fork to eat hot foods (Figure 5-1 through -5).

A worked antler tine of unknown use exhibits a tip ground to a triangular wedge shape with two flat facets (Figure 5-9). Two antler flaking tools are identified on the basis of wear and cut use marks on the tips of cut antler-tine sections (Figure 5-10 and 5-11). An antler-base flaking tool showing use cut marks consists of a basal fragment of antler and a short section of beam ground to a wedge shape (Figure 5-12).

Debitage

A sample of 5,239 primary (some retaining cortical surfaces), secondary, and tertiary stone flaking debris was collected, sorted for size, and identified to material (Table 5). Under magnification, no distinction was seen between raw flakes and some that might display minimal modification relating to use as casual tools.

Flake counts and in-ground distributions were inconsistent across the grid and showed little stratigraphic patterning. No definite flaking station could be pinpointed. Because of the complications recognized in the site's natural stratification, no in-depth study of the debris was attempted. However, the large quantity of stone flaking debris and preforms indicates that projectile points and other lithic implements were produced on the site.

Table 5. Debitage Frequency and Material of Manufacture.

Material	Primary Flakes with cortex [1½ in in diameter]	Secondary Flakes [1-3 in diameter ⅛-⅜ in thick]	Tertiary Flakes [¼-½ in diameter ⅛ in thick]	Total
Chert	350	1,040	1,552	2,942
Quartzite	38	327	1,036	1,401
Quartz	54	112	768	934
Jasper	0	27	0	27
Chalcedony	0	16	0	16
Argillite	0	9	0	9
Total	442	1,531	3,356	5,329

Ceramics

Over 600 sherds of unglazed aboriginal ceramics were collected. Their vertical distribution was restricted to the subdivisions a and b of Stratum III and the Stratum II interface.

Since many of the sherds are small (i.e. less than 2 cm in dimension) and/or their surface condition is unsuited to typological identification, the total sherd count is not significant. Four hundred eighty-eight sherds were studied individually to quantify attributes. Two hundred sixty-six decorated body and 42 rim sherds were sorted into 21 groups sufficiently consistent to represent discrete vessels. Once defined, vessel lots were compared to pottery types familiar to the author and in the literature. One hundred eighty plain and cord-wrapped paddle-marked body sherds were linked to specific vessels on the basis of surface treatment, paste composition, thickness, and color, including fire cloud patterns. Descriptive accounts of selected sherds follow.

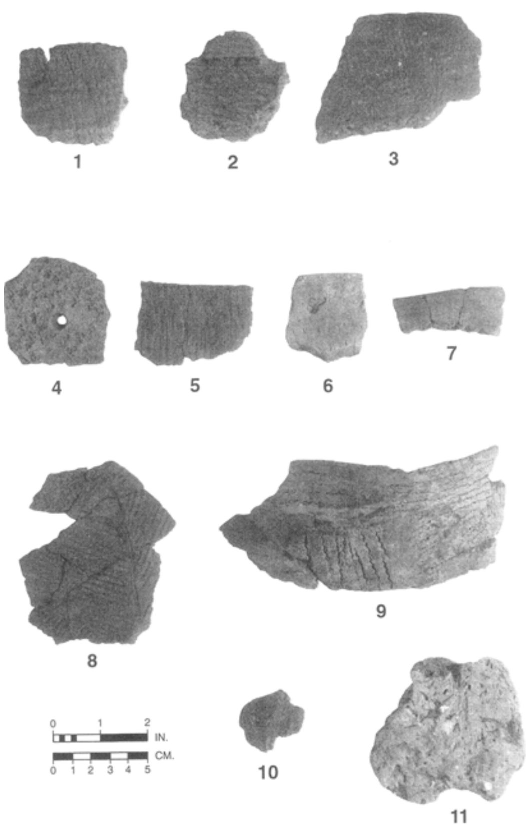

Figure 7. Selected ceramic sherds recovered from the Mount Mercy Site. 1. modified Vinette rim; 2. Vinette I body sherd; 3. East River Cord-Marked rim; 4. North Beach Net Marked body sherd with repair hole; 5. East River Cord-Marked rim; 6. plain, cord-wrapped-stick impressed; 7. Plain; 8. Abbott Zoned Punctate, sherd near rim; 9. Sebonac Stamped rim; 10. ceramic vessel lug; 11. Unfired clay.

Early Woodland Period

Vinette I body sherd (Figure 7-2)
Exterior surface treatment: vertically aligned, coarse, cordwrapped paddle marked. Interior surface treatment: horizontal paddle marked. Coarse quartz temper, some protruding through surfaces. Paste friable and poorly consolidated. 7/16-in thick. Tan exterior, blackened interior surface. Coil manufactured. Six corresponding body sherds recovered.

Early Middle Woodland Period

Modified Vinette rim (Figure 7-l)
Exterior surface treatment: vertically aligned cord-wrapped paddle marked. Interior surface treatment: horizontally paddle marked. Slightly everted rim, 1/4-in below rolled rim lip are two single rows of cord-wrapped paddle-edge impressions encircling neck. Medium grit temper. ¼-in thick. Brown with black fire clouds. Coil manufactured. One corresponding body sherd recovered.

Middle Woodland Period

North Beach Net Marked body sherd with repair hole (Figure 7-4)

Exterior surface treatment: bunched net impressions. Interior surface treatment: smoothed. Shell temper shows through interior surface. 5/16 in thick. Light tan. Coil manufactured. Two contacting body sherds recovered.

Abbott Zoned Punctate, sherd from near rim (Figure 7-8)

Exterior surface treatment: smoothed, decorated with opposing triangles and plats filled with stab-and-drag punctates and linear dentates. Interior surface treatment: smoothed with coarse fabric impressions. Fine grit temper. Exterior brown, tire clouded. Interior red-brown. Compact paste. 5/16 in thick. Coil manufactured.

Abbott Zoned Punctate body sherd

Exterior and interior surface treatments: smoothed parallel lines of stab-and-drag punctates forming a plat. Fine grit temper. Compact paste. ¼ in thick. Tan. Coil manufactured.

Sebonac Stamped rim (Figure 7-9)

Exterior surface treatment: smooth. Outflaring neck, tapered and rounded rim lip. Below lip are six horizontal rows of scallop-shell-edge impressions. Below neck band of impressions are vertical and diagonally oriented plats of scallop-shell-edge stamping impressions. Rim lip nicked with fingernail or scallop-shell edge. Interior smoothed by scraping. Fine grit temper. Compact paste. 3/8 in thick. Light tan, tire clouded. Coil manufactured. 110 corresponding body sherds recovered. This vessel is recognized as well defined and of a known source. Probably introduced to site from eastern Long Island or coastal Connecticut (Latham 1959:9-10).

Mount Mercy Punctate (Figure 8)

Twelve rim and contacting body sherds restored. Exterior surface treatment: smoothed over cord-wrapped paddle marked. Interior smooth. Outflaring, rounded rim lip. Constricted neck. ½ in below lip are side-by-side horizontal rows of hollow reed or bone impressions arranged in hands. A wider band of horizontal impressions is on the shoulder, and a narrow band is on the lower portion of the vessel body. One overlapping diagonal band of impressions runs from the neck to the lower portion of the vessel body. There are faint punctates on the inside of the rim. Impressions measure 3 to 4 mm in diameter, 2 mm deep,

Figure 8 Mount Mercy Punctate sherd, recovered from the Mount Mercy Site.

and are spaced approximately 2 mm apart. Medium grit temper. Paste flaky. ¼ in thick. Exterior tan, fire clouded. Interior black. Coil manufactured.

The punctations observed in this vessel were replicated by impressing the distal side and end of a Vi(,-in diameter tube into Plastalina at an approximate angle of 3 degrees. At the end of a groove-like impression, the tool's hollow end left a clearly defined protrusion within an annular punctation. This suggests that the clay was still damp and leather-hard when the vessel was decorated. Forty-six additional corresponding sherds from near the rim and the upper body were recovered.

Late Woodland Period

East River Cord-Marked rim (Figure 7-3)

Exterior surface treatment: partially smoothed, haphazard fabric- or cord-wrapped paddle marked. Insloping rounded rim. Interior surface treatment: smoothed with finger impressions. Medium grit temper. Compact paste. 5/16 in thick. Reddish brown. Coil manufactured. One additional rim and nine corresponding body sherds recovered.

East River Cord-Marked rim (Figure 7-5)

Exterior surface treatment: cord-wrapped paddle marked. Everted rim. Rim lip flattened and beveled downward to exterior. Fine grit temper. Compact paste. 1/4 in thick. Brown exterior, black interior. Coil manufactured. Ten corresponding rim and body sherds recovered.

Plain, Cord-Wrapped-Stick Impressed (Figure 7-6)

Exterior surface treatment: smoothed. Straight-walled rim. Lip flattened. 1 ¼ in below rim lip are two parallel horizontal rows of loosely wrapped cord-wrapped-stick or - paddle edge impressions. Interior surface treatment: smooth. Fine to medium grit temper. Compact paste. ¼ in thick. Tan. Coil manufactured.

Plain (Figure 7-7)

Plain straight walled rim, rounded lip. Exterior scraped smooth, interior smoothed without tool marking. Fine grit temper. Compact paste. ¼ in thick. Color brown. Coil manufactured.

East River Cord-Marked rim sherd

Exterior surface treatment: cord-wrapped paddle marked. Interior surface treatment: smoothed. Rounded outsloping rim lip. Medium grit temper. Sandy compact paste. 6/16 in thick. Tan. Coil manufactured. Ten corresponding body sherds collected.

East River Cord-Marked rim sherd
Exterior surface treatment: straight-walled rim covered with coarse cord-wrapped paddle. Interior surface treatment: smoothed. Coarse temper. Paste granular and flaky. ¼ to 9/16 in thick. Brown to black. Coil manufactured.

Fingernail Impressed, sherd near rim
Exterior and interior surface treatments: smooth. Horizontal row of fingernail impressions on exterior surface. Fine grit temper. Compact paste. 5/16 in thick. Tan to dark brown. Coil manufactured.

East River Cord-Marked rim sherd
Exterior surface treatment: diagonally cord-wrapped paddle marked. Interior surface treatment: smoothed. Outsloping rounded rim with paddle-edge nicks on exterior and interior of rim lip. 5/16 in thick. Medium grit temper. Compact paste. Brown. Coil manufactured.

East River Cord-Marked rim sherd
Exterior surface treatment: diagonally cord-wrapped paddle marked. Interior surface treatment: smoothed. Outsloping flattened rim.5/16 in thick. Fine grit temper. Compact sandy paste. Tan. Coil manufactured.

Fabric Impressed. basal sherd
Exterior surface treatment: impressed with fabric weave. Interior surface treatment: smoothed. Fine grit temper. Compact paste. 5/16 in thick. Tan. Coil manufactured.

Plain Punctate, body sherd
Exterior and interior surface treatments: smoothed. On exterior, there are two rows of 1/8 in diameter hollow tool circular punctates. Medium grit temper. Friable paste. 3/8 in thick. Brown, fire clouded. Coil manufactured.

Plain Punctate, sherd near rim
Exterior and interior surface treatments: smoothed. Horizontal rows of 1/8-in diameter, solid round punctations spaced ¼; in apart. Medium grit temper. Compact sandy paste. 5/16 in thick. Brown. Coil manufactured.

Linear Dentate, sherd near rim
Exterior and interior surface treatments: smoothed with some scraping. Exterior impressed with 1-in wide horizontal bands of side-by-side dentates. Below horizontal band are similar vertical and diagonal bands of 1/8-in by 1/16-in dentates, ¼ in apart. 5/16 in thick. Medium grit temper. Compact paste. Brown. Coil manufactured.

Fingernail Impressed, sherd near rim
Exterior surface treatment: cord-wrapped paddle marked. Interior surface treatment: smoothed. Horizontal row of fingernail impressions on exterior surface. Medium grit temper. Paste flaky. ¼ in thick. Tan to black. Coil manufactured.

Fingernail Impressed, sherd near rim
Exterior and interior surface treatments: smooth. Horizontal row of fingernail impressions on exterior surface. Fine grit temper. Compact paste. ¼ in thick. Tan to dark brown. Coil Manufactured.

Miscellaneous Ceramic Recoveries

Vessel base
Flattened, cone shaped. 2 ½ in diameter, ½ in thick at pointed base. Wall thickness 5/16 in. Exterior surface smooth and pitted. Interior smooth. Fine grit temper. Hard paste. Exterior tan; interior brown to black. Appears to have been hand molded.

Ceramic vessel lug (Figure 7-10)
1 3/8 in diameter at proximal end, tapering to rounded ½ in diameter at distal end. Tenon 1/2 in 1ong centered in proximal face of lug. Coarse cord-wrapped paddle impressed on lug exterior. Medium grit temper. Friable paste. Brown. Hand molded.

Unfired clay (Figure 7-11)
Flattened lump of unfired clay. One surface smooth. Reverse surface rough with leaching holes. Shell tempered. Approximately 1 in thick. Light tan.

Steatite Stone Bowl

Rim and contacting body sherd (Figure 9-1)
Exterior and interior smoothed. Vessel upper wall tapered to rounded rim lip. Wall ¾ in thick.

Vessel wall sherd with fragmentary lug base (Figure 9-2)
Exterior surface scraped smoothed. Base formed by scraping concave grooves on four sides of lug. Interior surface broken away. Lug size approximately 1 ½ in by 1 ¼ in.

Two contacting vessel body sherds (Figure 9-3)
Exterior and interior surfaces smoothed with some scraping ½ in thick.

Two contacting vessel body sherds (Figure 9-4)
Exterior and interior surfaces smoothed. Near one break edge is a 3/16 in deep horizontal groove possibly used for straight line breakage. 5/8 in thick.

Four additional steatite bowl body sherds
All surfaces smoothed. 1/4 in to 1/2 in thick. The smoothed exterior and interior sherds are characteristic of Orient Phase vessels.

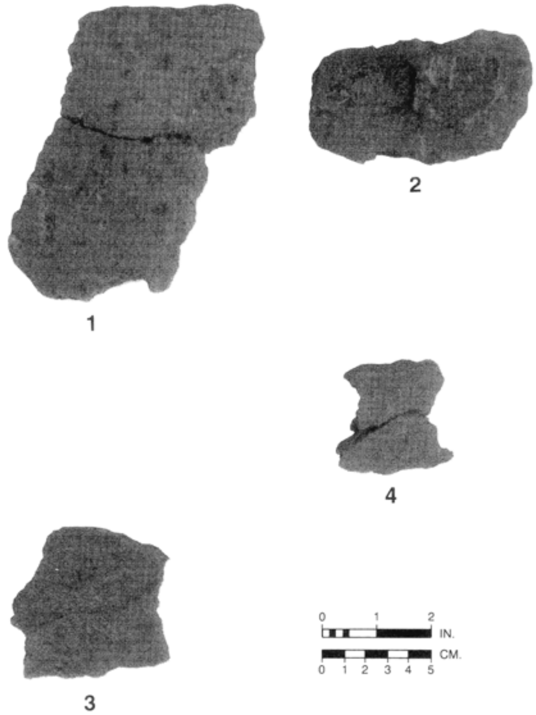

Figure 9. Steatite stone bowl fragments, recovered from the Mount Mercy Site. 1. Rim and contacting body sherd; 2. Vessel wall sherd with fragment and lug base; 3. two contacting vessel body sherds; 4. two contacting vessel body sherds.

Historic Period Artifacts

The Historic Period locus, designated Feature 7, was confined to an irregular deposit of dark brown to black colored earth contacting the topsoil and within the top 4 in of Stratum I. The deposit measured approximately 3 in deep, 4 ft 6 in wide, and 10 ft long. Close to the terrace embankment, it was localized within squares N30-W20, N25-W25, and N20-W25.

Reddened earth at the base of this dark deposit showed signs of fire. No evidence of a structure in the form of a foundation, wood frame, or remains of a stone fireplace was present to suggest the destruction of a house. The artifacts recovered from this context are descriptively summarized in Table 6.

Animal Bone

Although the soil pH of 7.0 was expected to be conducive to bone preservation, a surprisingly small collection of food bone survived. Aside from a few eastern box turtle (*Terrapene carolina*) plastron fragments, the 375-piece bone collection is attributable to the white-tailed deer (*Odocoileus virginianus*). The most frequent and best-preserved bones were those having the least food value such as the calcanea, astraguli, cuniforms, and phalanges (the near solid bones of the foot). Most of these had been split to extract their collagen or fat. All humeri and radii had been shattered to extract the marrow, leaving only the articulating ends intact. No axial skeleton or hip girdle bones were found. With the exception of small mandible fragments holding teeth, no skull elements were collected. No unmodified broken-out or shed antler was present.

The bone collection indicates that hunting was most likely done at some distance from the site. The elements of the animal producing little usable meat were left at the kill site. The fore - and hindquarters, brain, mandible with tongue, and presumably the hide were carried back to camp.

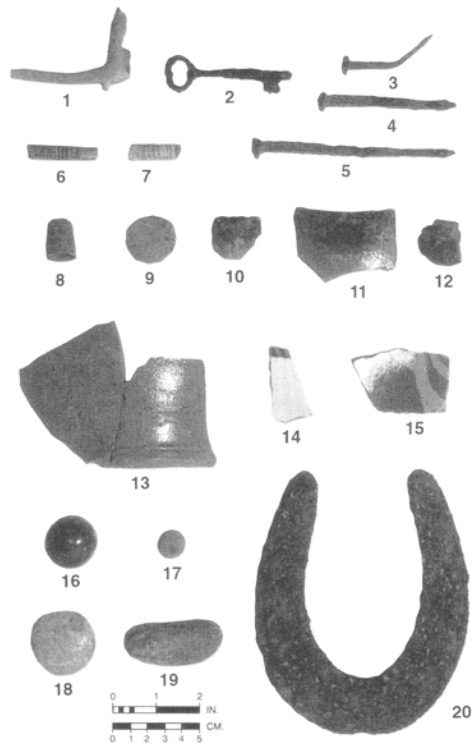

Figure 10. Historic Period artifacts recovered from the Mount Mercy Site. 1. white kaolin smoking pipe bowl and stem fragment; 2. skeleton key; 3-5. rose head, hand forged, square-shanked nails; 6. "Peter Dorni" smoking pipe stem fragment; 7. white kaolin smoking pipe stern fragment; 8. brass thimble; 9. circular lead disc; 10. chert gun flint; 11. glass wine or rum bottle fragment; 12. glass wine or rum bottle neck fragment; 13. stoneware jug basal fragment; 14. English shell-edge pearlware fragment; 15. redware fragment; 16. ceramic marble, glazed; 17. ceramic marble, unglazed; 18-19. glass-coated pebbles; 20. horseshoe.

Table 6. Historic Period Artifacts Recovered from the Mount Mercy Site.

Tool	Description	Material	No. of Specimens	Figure Reference
Smoking pipe	Bowl fragment and stem portion. Bowl facing smoking shows *"D" portion of "TD" encircled with stars in relief. Row of leaves* in relief centered in front of bowl. Stem bore 5/64 in diameter. Similar pipes recovered in War of 1812 camps and early nineteenth-century settlements (Calver and Bolton 1950:282).	white kaolin	2	Figure 10-1
Key	Badly rusted. Type called "Skeleton Key." Used mostly on late nineteenth- and early twentieth-century closets and interior door locks.	iron	1	Figure 10-2
Nails	Rose head, hand forged, square shanked. 2½ to 4 in long. Ends flattened.	iron		Figure 10, 3-5
Smoking pipe	"Peter Dorni" pipe stem fragment. Side-by-side lines of milled impressions frame word DORNI in relief on either side of stem. Bore 5/64 in diameter.	white kaolin	1	Figure 10-6
Smoking pipe	Stem fragment. Fine line, side-by-side milled line and diamond roulette impressions encircling stem. Bore [illegible]/64 in diameter. Similar to a fragment of Dutch manufacture from Pearl Street, New York City. Possibly deposited between 1660 and 1690 (Apuzzo and Cohn 1982:22-24).	white kaolin	1	Figure 10-7
Thimble	Type used from seventeenth to twentieth century	brass	1	Figure 10-8
Circular disc	Possible flattened lead ball. Irregularly trimmed with knife. Both surfaces smooth. 1 /8 in diameter by /8 in thick. Possible lead to sheathe gun flint in hammer.	lead	1	Figure 10-9
Gun flint	Wedge shaped, unifacially chipped. Steep edge flaked at widest dimension. Dark brown chert with tan cortex. Possible French origin.	chert	1	Figure 10-10
Bottle	Wine or rum bottle wall fragment. Exterior coated with gold-colored mineral deposit	green glass	1	Figure 10-11
Bottle	Wine or rum bottle neck fragment. Flattened lip with broad neck collar. Exterior coated with gold-colored mineral deposit.	green glass	1	Figure 10-12
Stoneware jug	Basal fragment of salt-glazed stoneware jug. Blue-gray glazed exterior. Interior red-brown with parallel tool turning marks. Core gray brown. Hard paste.	stoneware	1	Figure 10-13
English shell-edge pearlware	Fragment. Shell-like molded edge. Light and dark blue color. White-glazed body.	pearlware	1	Figure 10-14
Redware	Fragment. Yellow line decorated red slip ware. Terra cotta core and obverse.	redware	1	Figure 10-15
Marble	Exterior surface glazed. 1 /8 in diameter. Color mottled red-brown.	ceramic	1	Figure 10-16
Marble	Unglazed. Smooth surfaced. /8 in diameter. Color light terra cotta.	ceramic	1	Figure 10-17
Glass-coated pebbles	Round and ovoid quartzite pebbles. One surface each coated with green-colored glass	stone, glass	2	Figure 10, 18 and 19
Horseshoe		iron	1	Figure 10-20

Features

A total of five cooking pits, one roasting platform, and two associated post molds were exposed during level strippin2. All features originated several inches below the shell layer interface of Stratum II within Stratum III. Recognized by a radical contrast in soil color, their orifice shapes and sizes were estimated by the darkest evidence of stained earth or pit bottom contents.

Showing no distinct zones of fill or strata, the cooking pits all had tire-reddened and baked soil lining their bases. In the lower portions were tire-cracked and reddened quartzite cobbles, which were probably used to confine the tire at the hearth surface and were thrown into the pit with the meal refuse and embers after use. Most pits contained deposits of burned gray, delaminated oyster shell and occasional small bits of charcoal, usually, clustered on the interior surfaces of oyster shell.

Feature l, Square N40-W 15

Shallow basin-shaped cooking pit. Orifice round, 1 ft 2 in diameter, 4 in deep. Fill: red-stained earth and burned oyster shell.

Feature 2, Square N45-W20

Shallow basin-shaped cooking pit. Orifice round, 1 ft 3 in diameter, 6 in deep. Fill: red-stained earth, burned oyster shell, deer bone fragments.

Feature 3, Square N50-W 15

Bowl-shaped cooking pit. Orifice round, 2 ft 1 in diameter. 8 in deep. Fill: red-stained earth, burned oyster shell, charcoal flakes.

Feature 4, Square N60-W0

Bowl-shaped cooking pit. Orifice round, 2 ft 6 in diameter, 11 in deep. Fill: red-stained earth, burned oyster shell, deer bone fragments.

Feature 5. Square N60-W 15

Bowl-shaped cooking pit. Orifice round. 2 ft 1 in diameter. 14 in deep. Fill: red-stained earth, burned oyster shell. charcoal flakes, deer bone fragments.

Feature 6, Square N90-E25

Roasting platform. 6 ft long, 2 ft 4 in wide, 3 to 7 in thick tightly packed layer of quartzite cobbles; few showed heat alteration. Interspersed within the stone concentration were many small fragments of split deer long bones and a few flecks of charcoal.

Feature 7, Square N50-W 15

Paired post molds, round stains approximately 2 in in diameter, 8 in apart, originating at base of Stratum II. Intruded into Stratum III to 12 in and 9 in in depth. Post molds filled with brown organically stained earth and fragmented oyster shell. Molds round ended. Profile showed that posts had been driven into subsoil at an angle of approximately 45°. Associated with Feature 3. Although it is not possible to determine how far the posts extended above the ground or their original purpose when in use, the posts appear to have been intentionally placed at an angle so that a cooking vessel or meat could be suspended above the flames of a fire.

Discussion and Conclusion

In terms of horizontal distribution, the artifact and feature frequencies suggest that the heaviest occupation of the Mount Mercy site lay within the northern two-thirds of the excavated -rid. It was also apparent that this portion of the terrace was subjected to considerable disturbance from prehistory to the present. As a result, the absolute sequence of deposition of the artifacts could not be determined by their position within the soil profile. Artifacts deposited on or below -round could have been relocated as the result of animal burrowing and/or human excavation (e.g. pit digging). Such activity could have mixed contemporary artifacts with earlier deposited artifacts encountered in lower contexts. Tree uprooting could raise deep soils in the root ball which wash off on the surface, and thus reverse the natural stratigraphic deposition sequence.

The Stratum II shell layer illustrated a complex series of overlapping lenses of shell distributed linearly along the terrace by people who, over centuries of seasonal utilization, made use of different portions of the site. Transient hunter-gatherer groups may have sequentially occupied any part of the site, avoiding the shell and offal accumulations of previous visitors, adding a variety of new artifacts of their own while further displacing previously deposited artifacts. Any combination or all of the above and possibly other actions still not considered could have contributed to the confusing jumble of the wide variety of Hudson Valley, coastal New York projectile points and ceramic types whose cultural history spanning roughly 6000 years was found compressed within an approximate 8 in thick homogeneous-appearing stratum.

In the absence of clear stratigraphic separation, the recovered cultural remains could not be confidently assigned to particular occupation floors. No particular clustering of projectile points, ceramic types, or lithic debitage was apparent within any profile. No charcoal or burned shell was found in close proximity to a diagnostic artifact which might produce a reliable associated 14C date. Nevertheless, the use of typological comparisons to determine temporal sequences and to help isolate artifact assemblages provided numerous insights pertaining to the cultural affiliations and activities of the site's prehistoric occupants.

Projectile points representative of nearly all Middle Archaic to Late Woodland types associated with terrace sites in the Lower Hudson Valley were identified in the Mount Mercy collection. Based on the large number of Archaic point types recovered and their relative chronological age, the longest temporal span of site use was during the Archaic Period.

The ceramic assemblage presented a genuine taxonomic challenge to discover the degree of relationship between the groups of sherds. No grouping of sherds representative of several individual vessels occurred within a discrete stratigraphic position to suggest contemporaneity. On the whole, the Mount Mercy ceramic collection is associated with coastal New York's Early to Middle Woodland pottery traditions, sharing attributes with vessels found in other Lower Hudson Valley sites and southward into New Jersey.

Stylistically, elongated vessel forms show slightly constricted necks below an everted round or flattened rim lip. Grit appears to have been the preferred aplastic in coil construction. Surface treatments show overall cord-wrapped paddle malleation, the salient determinant in identifying the earliest type (Vinette I), chronologically followed by interior and partial exterior smoothing, fabric and net impressions, and plain, smoothed surfaces.

Decorative techniques run the gamut from simple linear horizontal, vertical, and oblique cord-wrapped-stick stamping, incision, punctation, fingernail and shell-edge stamping, to complicated geometric-platting motifs.

The Mount Mercy Punctate vessel differed from all the known types in decorative techniques and motif. The unique decorative treatment employed does not correspond to types defined in the literature or within the author's span of knowledge. This vessel could be identified as intrusive, indicative of a contemporaneity of occupation or possibly evidence of trade. This also applies to the Sebonac Stamped vessel and knobbed whelk shell recoveries, both commonly collected from eastern Long Island shell midden sites.

The recovery of a ceramic, lobate-shaped vessel lug is also a perplexing find. The ½ -in long tenon used to anchor the lug into the vessel wall necessitated a wall thickness exceeding the tenon length. No sherds of this thickness or of similar ware were recovered. Parts of a trough-shaped clay vessel with lugs, copying the steatite bowl style, were recovered from the Jamesport Cemetery Site and the Sugar Loaf Hill Site, Suffolk County, New York. These vessels are linked to the Late Archaic to Early Woodland Orient Transitional stage of cultural development on Long Island (Ritchie 1965:72).

Having personally experienced the severity of winter on Mount Mercy for a decade, it is extremely difficult for me to accept a postulation of human occupation of the terrace during the winter, even if substantial shelter were available. Acknowledging the probably hardy physical nature of the aboriginal residents, an oyster-collecting venture other than that of a last resort survival effort in the winter season at Mount Mercy is nearly unthinkable. Another factor to consider is the annual winter ice build-up along the Hudson's east shore and the prevailing northwest wind and tide-born accumulation of ice blocks which would make it difficult, if not possible to reach open water or inshore oyster beds.

Archaeological evidence of architectural features was absent within the excavation, but the writer feels certain that some form of temporary mild-weather shelter of light, shallowly planted post framework was used. In spite of a careful search for post molds which might delineate a living shelter or food-processing frame, only two angularly positioned posts in close proximity to a cooking pit were recorded within the -rid. This method of paired posts positioned to hold a cooking vessel suspended by its rim above the flames was observed used by the Montagnards, a highlands tribal group occupying the Annamite Mountain Range of western Vietnam.

It is assumed that 1Vickers Creek provided a ready source of fresh water and waterworn cobbles useful in tool manufacture and other necessities of camp life. At present, the stream is a favored drinking place for deer and a variety of small game. During the late fall, when weed cover is flattened, a well-trod deer trail can be seen ascending from the riverside, crossing the terrace at near site center, and then descending the south slope to the creek.

Seasonality of the site's use is not clear. Although notched pebble net sinkers and a possible grooved pebble bola stone are present, no migratory bird or anadromous fish remains were collected. Market fishermen still net shad within sight of the terrace, and Mercy College ecology class students regularly seine at least six varieties of fish at the foot of the mountain during the warm months.

The few box turtle carapace fragments might denote warm weather collecting; however, these animals could have been duo from their places of winter hibernation. No fall-ripening nut remains were found. No unmodified deer antler was found which might indicate if the inhabitants hunted hard-antlered deer during August to December or picked up antlers usually shed from January to March for use in tool manufacture.

Generally, as seen in most Lower Hudson River terrace sites, shellfish collecting appears to have been the major activity. The deposit may represent the use of shellfish as a portion of their subsistence while in residence, or it may represent an oyster-processing site whereby the oysters were shucked, their shells dumped in a convenient spot, and the meat dried or smoke-preserved for future use or trade. No real evidence seems to indicate when this pattern of activity was established.

Beside projectile points and the tools related to their manufacture denoting large game hunting as a food resource, additional site-function interpretations can be based on recovered specialized procurement and processing tools. Cutting, scraping, piercing, and grinding tools reflect the many tasks performed to provide food, clothing, and shelter for the transient occupants in their seasonal collecting rounds.

Unquestionably, the oyster was the main food source that drew the native people to the numerous terrace sites that line the lower Hudson River. During the 6000-year span of the Middle to Late Archaic and possibly through the Woodland Period, the occupants of the Mount Mercy Site carried on a hunting, gathering, and fishing way of life which ultimately changed in the seventeenth century in response to the arrival of Europeans.

Postscript

Four years after my excavation was finished at the site, the area was sold for condominium development, and an impact investigation was required before construction could begin. The first was replaced after short duration by Greenhouse Consultants, Inc. Unfortunately, the site was named the Wickers Creek Site and documented as such in their report (Roberts et al. 1988). Naming the site after the adjacent Wickers Creek implies the actual discovery of the historically chronicled Weckquaeskeck village site allegedly located at the creek's junction with the Hudson River or somewhere within the bounds of the present-day village of Dobbs Ferry. Since neither Greenhouse's nor my own archaeological efforts produced any evidence necessary to place a village of the historic Weckquaeskeck on the Mount Mercy terrace and because such a village site could be discovered elsewhere in the future, it is my intention in this report to maintain the Mount Mercy site designation. The site is located on Mount Mercy, not on Wickers Creek, and aside from a small concentrated assemblage of early nineteenth-century, non-Indian artifacts, all artifactual remains recovered are of temporal periods predating Weckquaeskeck archival references.

Acknowledgments

I wish to thank the Sisters of Mercy for their permission to conduct archaeological excavations on their land and gratefully acknowledge their interest and encouragement in this effort.

Special gratitude goes to my spouse. Doris, for her patience while correcting spelling, grammar, and syntax errors and for the numerous drafts she retyped. This report would not have been possible without her support.

Last, but not least, I thank the long-gone native people who left their material culture remains on Mount Mercy for me to ponder.

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The Vanderwerken Site:
A Protohistoric Iroquois Occupation on Schoharie Creek

Daniel F. Cassedy and Paul A. Webb, Garrow & Associates, Inc. and James Bradley, Robert S. Peabody Museum of Archaeology

The Vanderwerken Site is a previously unknown late sixteenth-century Mohawk site in the Schoharie Valley. In 1991, during survey for a gas pipeline, a backhoe testing program uncovered the site buried deep in the Schoharie Creek floodplain. Chronological markers for the site include Garoga incised pottery, possible Huron pottery, radiocarbon dates, and a rolled copper head derived from Basque sources in Europe. Data from this protohistoric Mohawk occupation c. A.D. 1575-1000 are used to address questions concerning demography and settlement patterns for the Iroquoian populations in the main Mohawk Valley 25 km to the north. Population movements from previously undiscovered sites in the Schoharie Valley - such as Vanderwerken - may help explain the sudden Mohawk Valley population increase around the beginning of the seventeenth century.

Introduction

The Vanderwerken Site is a late sixteenth-century Mohawk site in Schoharie County, New York, approximately 2.5 miles (4 km) southwest of the community of Esperance (Figure 1). This location on the south bank of Schoharie Creek was investigated in 1991 during archaeological studies for a project known, coincidentally, as the Iroquois Pipeline. The pipeline encompassed a 370-mile (595-km) right-of-way across New York and southwestern Connecticut from the St. Lawrence River to Long Island. In addition to the conventional archaeological survey, a deep testing program was implemented to search for buried sites in the floodplains of a number of watercourses along the pipeline route.

At Schoharie Creek, the deep testing program identified the Vanderwerken Site buried in the floodplain beyond the reach of the plow, and subsequent hand excavations sampled numerous cultural features. Diagnostic artifacts recovered directly from the features include Madison projectile points, incised Iroquoian pottery, and a rolled copper bead. The bead has been identified through trace element analysis as being likely derived from Basque sources in Europe. The combined data suggest a protohistoric Mohawk occupation c. A.D. 1575-1600, just prior to substantial direct contact with Europeans.

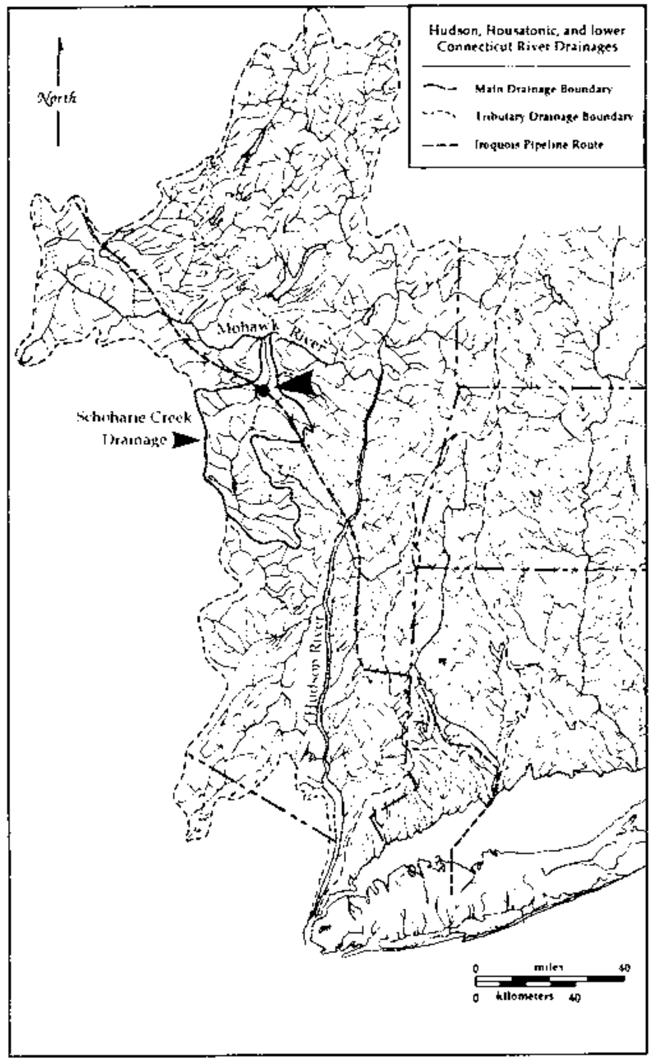

Figure 1. Location of the Vanderwerken Site in the Schoharie Creek drainage.

Setting

Schoharie Creek originates in the northern portion of the Catskill Mountains and flows north across the Allegheny Plateau and Hudson-Mohawk Lowlands physiographic provinces before joining the Mohawk River. The creek drains an area of approximately 5054 sq km, and approximately 2287 sq km of the drainage are upstream from the pipeline

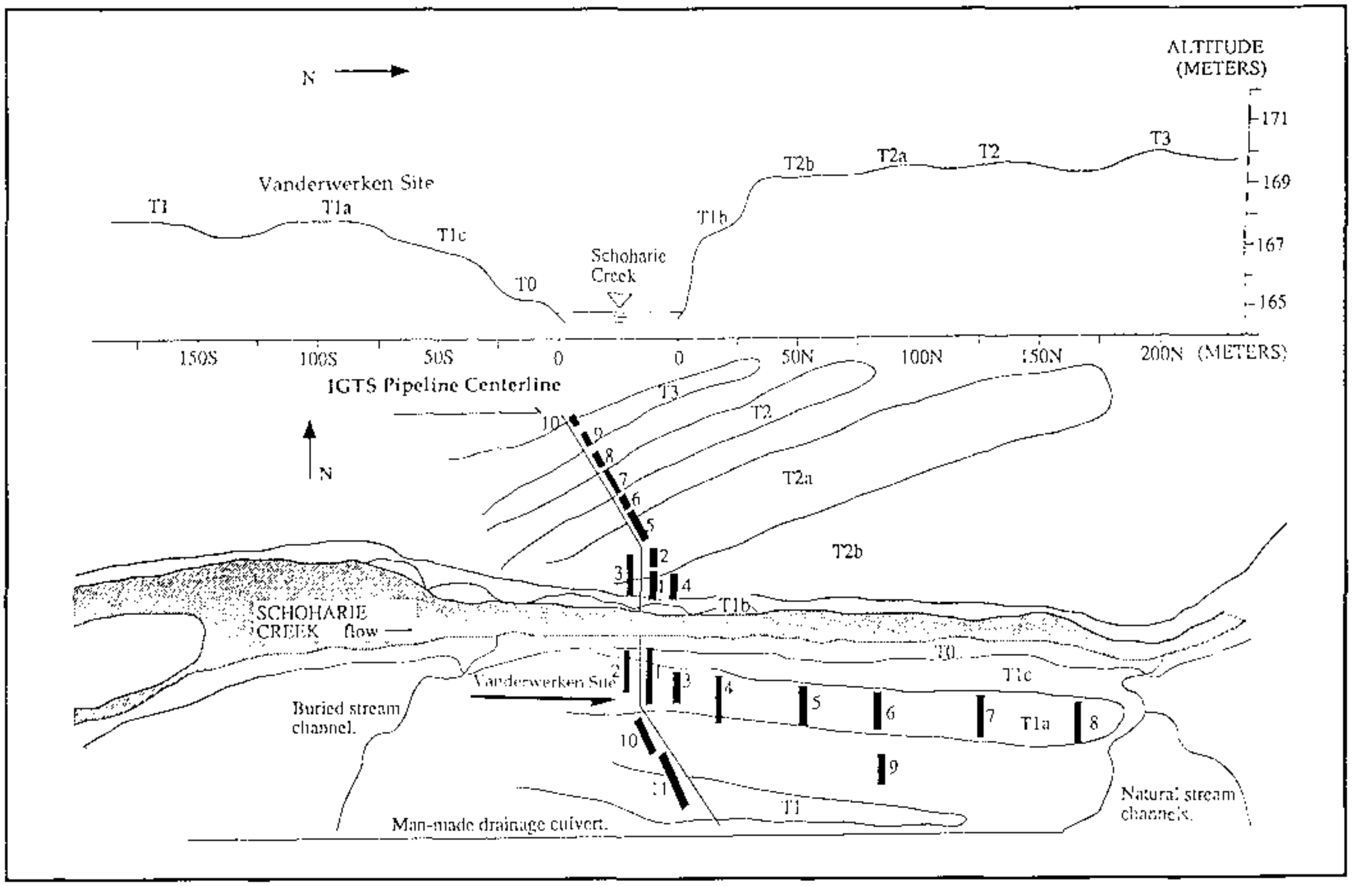

Figure 2. Schematic cross section of the Schoharie Creek Valley at the Iroquois Pipeline crossing.

crossing. The creek flows northeast from the pipeline crossing and joins the Mohawk River in Fort Hunter, New York, approximately 25 km from the site. The creek is 90 m wide at the crossing and flows within a 700-m-wide floodplain (Figure 2).

The Soil Conservation Service classifies the soil at the Vanderwerken Site as Barbour silty loam (Flora 1969). Formed in alluvium, mainly from red sandstone and siltstone, this soil is deep, well drained, and is exceptional for growing. Both sides of the valley floor are characterized by levee-swale row terraces, with the terraces on the north side of the creek being considerably higher than those on the south side. A Late Archaic site was found on the north side of the creek during the pipeline survey.

The floodplain on both sides of the river is broad and is extensively cultivated. The Vanderwerken Site is located in an expansive, slightly rolling corn field on the south side of the creek. Oak, willow, cherry, and maple trees are present in a narrow strip along the creek along with a variety of shrubby undergrowth and herbaceous plants. The cultural deposits are situated on an old east-west trending levee, defined as the T1a terrace by our geomorphological studies (Brakenridge et al. 1991), and lower terraces are present to the north (Figure 3).

Field Methods

The field studies at the Vanderwerken Site included both backhoe trenching and hand-dug excavation units. No prehistoric artifacts were visible on the surface, and the site was not discovered until the trenching. The backhoe trenches were excavated first, and hand-dug units were then placed adjacent to selected trenches to investigate cultural features and artifacts exposed in the trench walls.

The objectives of backhoe trenching were to provide adequate recognition of archaeological materials by careful cleaning and examination of the trench walls, and to provide sufficient wall lengths and depths to allow accurate characterization of the overall alluvial stratigraphy. Full methodological details for archaeological and geomorphological data retrieval from deep trenching are provided in Turner et al. (1981). In brief, (1) both trench walls were cleaned and scraped by hand, and artifact, charcoal, or other clast locations were marked by flagging; and (2) detailed cross sections were prepared by mapping one of the trench walls and noting features such as sediment texture and sedimentary structures, buried soils, pedogenic features, and the locations of the flagged cultural materials.

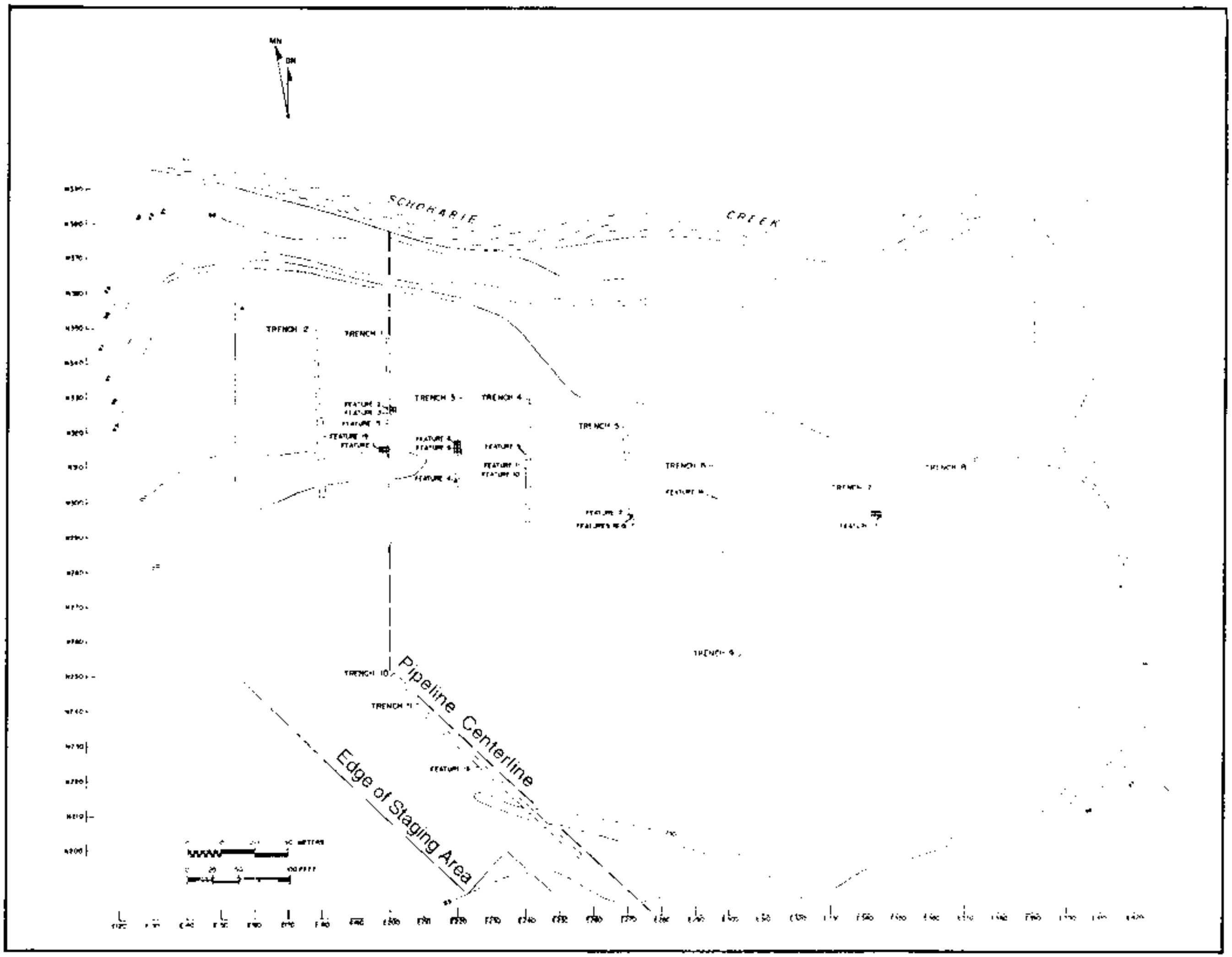

Figure 3. Location of backhoe trenches and hand-excavation units at the Vanderwerken Site.

The level lines used as datums in the trenches were cross referenced with each other and with the channel bed level. Prior to archaeological hand excavations, the site was mapped with transit and tape, and a metric grid was established. All features exposed in the trenches were first profiled and photographed. Hand-dug units were then placed in and adjacent to backhoe trenches that had uncovered cultural features.

The hand-dug units were excavated by shovel skimming, with troweling at interfaces and features. In the initial 1.00 m x 1.00 m test units, the plow zone was screened through 1/4 in mesh. Once the excavators had developed sufficient familiarity with the stratigraphy, the topsoil strata above the cultural deposits were stripped away by shoveling, with only a single 50 cm x 50 cm quadrant screened as a control in each block. Units were only excavated an average of 10 cm below feature levels. Feature fill was collected and taken to the lab for geochemical sampling and flotation processing,

Eleven backhoe trenches and 25 sq m of hand excavation were completed. The 25 sq m included four 50 cm x 50 cm test pits excavated into trench-bottom features, and the remaining 24 sq m was divided between four large blocks of excavation units placed adjacent to the trenches.

Excavation Results

Backhoe-excavated Trenches 1 through 8 were placed near the creek channel on the Tla terrace, with Trench 2 west of the pipeline route, and Trenches 1 and 3 through 8 east of the pipeline. The testing covered an area wider than the regular right-of-way because a large construction staging area had been proposed initially for the creek crossing. Trenches 9, 10, and 11 were placed further back from the creek, with Trench 11 on the TI terrace and Trenches 9 and 10 in the swale between the TI and Tla terraces. Cultural features and artifacts were exposed in the trench walls (and sometimes in the trench floors) along the entire length of the T1 a terrace in Trenches 1 through 8.

Hand excavation of a sample of the cultural features identified in the backhoe trenches was conducted after the trenches were opened. Four block excavations (a total of 24 1.(X) m x 1.00 m test units) were placed along various trench edges (Trenches 1, 3, and 7) to excavate down to the most substantial features (1, 2, 6, 8, and 13). Four 50 cm x 50 cm test pits were also excavated into trench-bottom features (Features 4, 12, 16, and 17). Only 25 sq m, or 0.48 per cent of the site's minimum 5,220 sq m, were hand excavated during the testing, so the abundance and quality of the data obtained are all the more notable.

Site soils are generally loose and well sorted. Three major stratigraphic units were revealed by the trenching operations on the main occupation terrace (Figure 4). These consist of the following:

? Stratum I is the current plow-zone horizon and ranges between a very dark grayish brown silty sand and a dark brown fine sandy loam. It averages 30 cm in depth but occurs as deep as 38 cm below surface. Based on an absence of aboriginal artifacts, and based on Lindner's (1987, 1991) data on historic alluviation in the Schoharie Valley, Stratum I is probably less than 100-150 years old. According to the landowner, one comparatively minor flood episode in 1987 deposited close to 5 cm of sediment on the site.

? Stratum II is a brown/dark brown silty sand that was documented in most but not all trench profiles. It postdates the Stratum III terrace landform and is interpreted as an alluvial deposit that filled in the topographic low points adjacent to and sometimes on top of the original Tlb terrace. Its probable age is between A.D. 1600 and 1800.

? Stratum III is the original levee/terrace on which the aboriginal occupation occurred. This stratum is composed of alternating layers of dark brown/brown clayey silty sand and dark-grayish brown/olive brown fine sand, indicative of recurrent flood episodes. The fine sand layers are 5-10 cm thick, and the clayey silty sand layers are 10-25 cm thick. In Trenches 1 through 6, the northern end of these layers were inclined toward the creek, demarcating, the former northern edge of the T1b terrace. Trench 3 also appeared to intersect inclined strata marking the southern edge. The top of Stratum III ranges from 30 to 60 cm below the current ground surface, and it extends to a depth of at least 250 cm. All the cultural features were found within Stratum III, and as is described in more detail below, all are thought to date to c. A.D. I500-1600.

A total of 16 definite or possible cultural features were identified during the trenching (Table 1), and 11 of the 16 features were confirmed as clearly cultural by hand excavations. These are Features 1, 2, 4, 6, 8, 12, 13, 14, 16, 17, and 19. The features range from small remnant hearths to large apparent cooking pits yielding large amounts of fire-cracked rock, bone, and pottery fragments. These are generally shallow oval stains or amorphous patches of fire-reddened soil, with diameters ranging as large as 1-2 m. The depths of these features range between 45 and 185 cm below surface within or in the top of Stratum III, and they occur across the known site. One isolated artifact grouping-a "nutting stone" and two closely associated manuport stones-was recovered at 230 cm below surface in the east wall of Trench 6 and was designated a feature. All the features have been protected from modern cultivation by the heavy mantle of alluvium. The distribution of features revealed in backhoe trenches indicates that the site covers a minimum of 5,220 sq m (at least 174 m east-west and 30 m north-south), or approximately 1.3 acres.

Diagnostic artifacts recovered directly from features include four chert Madison projectile points, Iroquoian (Garoga Phase) pottery, a probable Huron sherd, and a rolled copper bead (Figures 5 and 6). Charcoal samples were recovered from ten definitively cultural features. Three of these samples were radiocarbon dated (Table 1), including Feature l, which produced the copper bead. The major features are discussed below, and the summary is arranged spatially starting with the westernmost features and moving east across the site.

Centered at N314.4 E198.28 at a depth of 140-159 cm below surface in Trench 1, Feature 1 consisted of a large ovoid stain measuring 1.2 m along its widest axis. This remnant hearth was slightly basin-shaped in profile and consisted of a dark reddish brown silty sand surrounded by a dark brown fine sand with charcoal dispersed throughout. Numerous artifacts were recovered, including over 1,000 small bone fragments. Fish vertebrae, antler fragments, and nutshells were also identified in the flotation sample. Within the feature, the copper bead came from 148 cm below surface, and a faintly incised rim sherd was found at 140 cm below surface. The abundance of faunal and vegetal remains indicates that this activity area's primary function was as a food-processing station.

The large sherd recovered in association with the copper bead in Feature 1 is quite unusual (Figure 6). This sherd derives from a low-collared vessel, and it has an exaggerated, squared castellation and very faint incising. The design

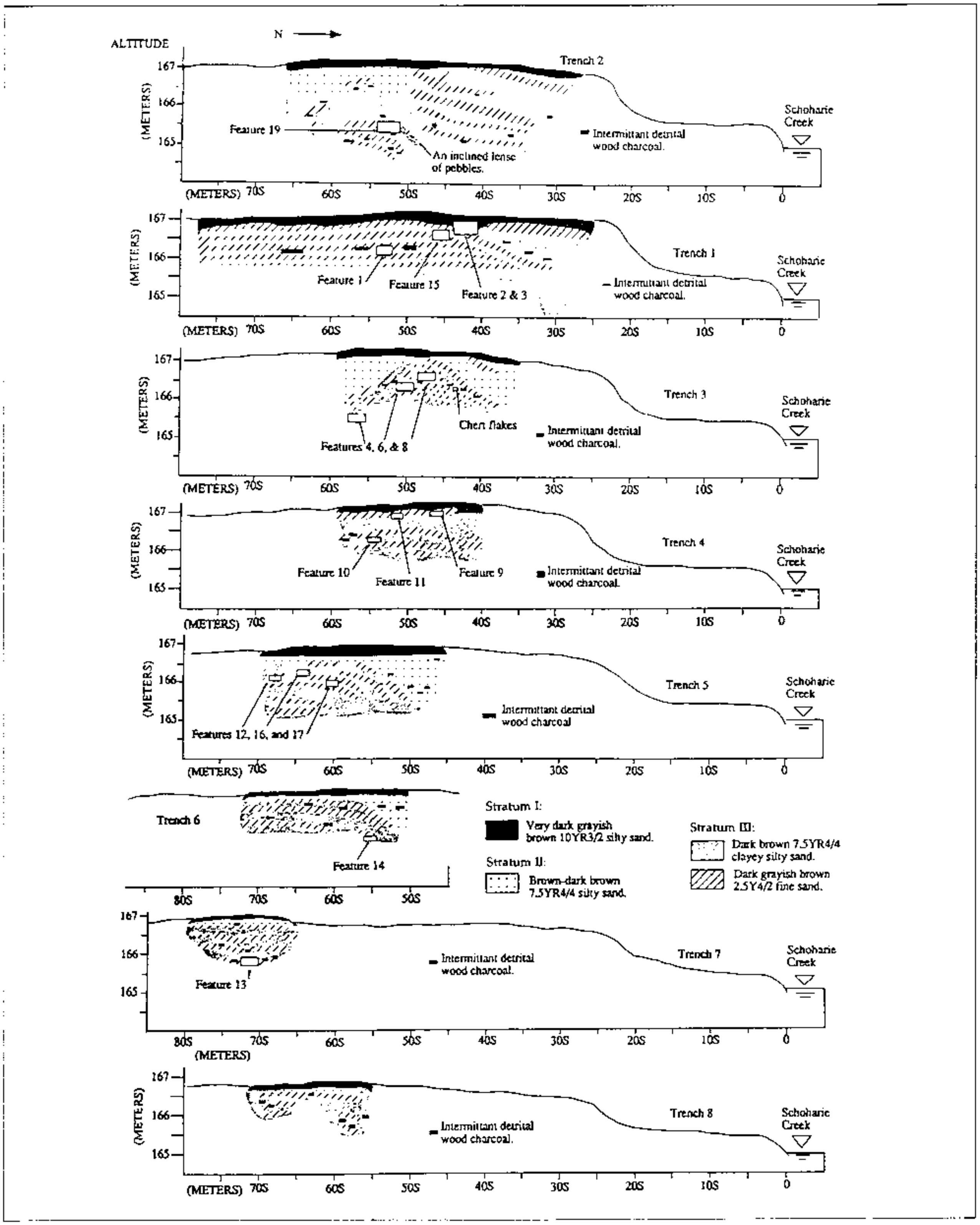

Figure 4. Composite stratigraphic profile of the backhoe trenches at the Vanderwerken Site.

Table 1. Summary of Features from the Vanderwerken Site (arranged from west to east).

Fea.	Trench #	Coord.	Depth (cm BS)	Description	Function	Contents	Sample %
19	2	N318.50 E170.30	82-90	oxidized stain, unknown plan view, shallow basin-shaped profile	hearth	4 flakes < ¼", 16 unmodified bone, charcoal	<50
1	1	N314.4 E198.28	140-159	oxidized stain, ovoid plan view, basin-shaped profile	hearth, food processing	1 copper bead, 1 incised rim sherd, 118 debitage (26 flakes, 6 chunks, 16 shatter, 70 flakes <¼"), 19 FCR, 11 burned bone frg., 1,015 unmodified bone frg., 15 fish vertebrae, 35 antler frg., 28 seed frag., 236 nutshell frg., charcoal (butternut and wild plum) C14 280±50	66
2	1	N325.7 E199.8	50-60	oxidized stain, ovoid plan view, basin-shaped profile	hearth	2 flakes < ¼", 1 calcined bone frg., charcoal	100
3	1	N327.8 E199.26	45	oxidized stain, unknown plan view, basin-shaped profile	indeterminate	NA	0
15	1	N322.00 E199.26	60	oxidized stain, unknown plan view, basin-shaped profile	indeterminate	NA	0
4	3	N306.00 E220.00	185-188	oxidized stain, ovoid plan view, thin lens profile	hearth	1 plain body sherd, 379 debitage (20 flakes, 39 shatter, 3 chunks, 317 flakes <¼"), 8 burned bone, 132 unmodified bone, 8 tooth frg., 1 claw, 1 nutshell frg., charcoal	100
6	3	N314.30 E219.20	130-142	oxidized stain, ovoid plan view, basin-shaped profile	hearth, roasting pit assoc. with Fea. 8	1 plain body sherd, 5 flakes <¼", 1 groundstone frg., 1,029 FCR, 16 unmodified bone, 1 antler frg., 4 seed frg., 135 nutshell frg., butternut charcoal, C14 380±50 BP	100
8	3	N316.00 E219.20	128-143	oxidized stain, ovoid plan view, basin-shaped profile	hearth, roasting pit assoc. with Fea. 6	8 flakes, 5 shatter, 4 burned bone, 2 unmodified bone, 400 FCR, charcoal	100
9	4	N312.80 E240.20	40	oxidized stain, unknown plan view, basin-shaped profile	indeterminate	NA	None
10	4	N307.50 E239.50	120	oxidized stain, ovoid plan view, shallow basin-shaped profile	indeterminate	Charcoal	50
11	4	N308.50 E239.50	40	oxidized stain, unknown plan view, basin-shaped profile	indeterminate	NA	None
12	5	N295.60 E271.00	84-93	oxidized stain, indeterminate plan view, linear profile	hearth, associated with Fea. 17	16 plain body sherds, 3 flakes < ¼", 23 unmod bone frg., 1 fish vertebrae, 16 seed frg., 115 nutshell frg., 3 maize kernels, charcoal	100
16	5	N294.80 E271.00	60-63	oxidized stain, ovoid plan view, basin-shaped profile	hearth	2 plain body sherds, charcoal, C14 540±70 BP	100
17	5	N295.00 E271.02	88-98	oxidized stain, indeter. plan view, basin-shaped profile	hearth, associated with Fea. 12	1 plain body sherd, 1 flake < ¼", 1 bone frg., charcoal	100
14	6	N305.25 E294.70	230	isolated artifact cluster	food processing	1 igneous mano, 1 sandstone mano, 1 igneous other groundstone tool	100
13	7	N294.30 E344.65	155-165	oxidized stain, ovoid plan view, basin-shaped profile	hearth, food, processing and lithic reduction	5 incised rim sherds, 3 incised body sherds, 5 plain sherds, 1 ceramic pipe fragment, 4 Madison points, 2 biface frg., 13,203 lithic debitage (278 flakes, 348 shatter, 20 chunks, 3 cores, 12,554 flakes < ¼"), 1 mano, 51 FCR, 77 burned bone, 3,605 unmodified bone, 69 tooth frg., 4 antler frg., 3 claws, 1 seed frg., 5 maize kernels, 12 nutshell frg., 3 uncharred wood frg., charcoal	100

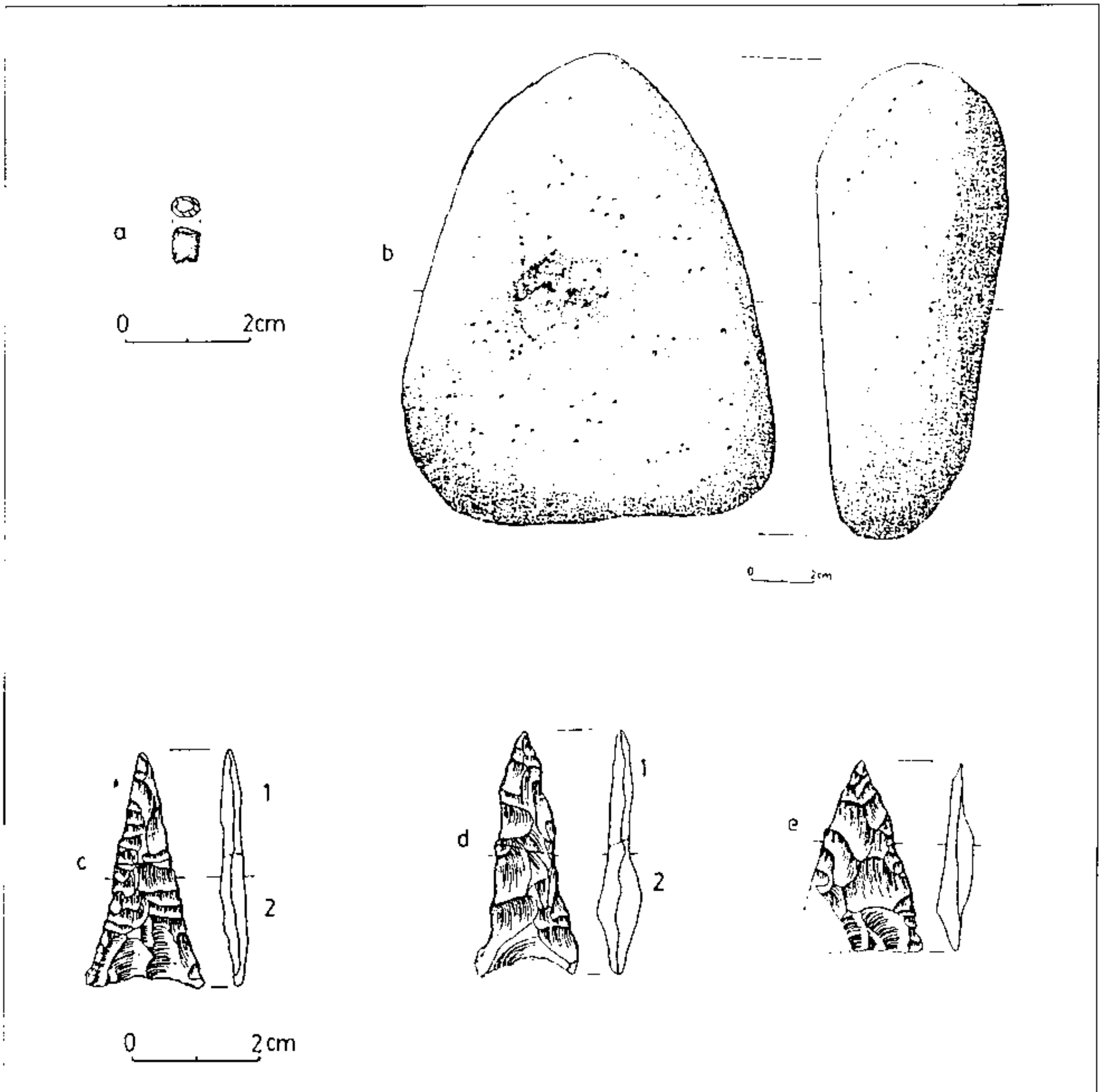

Figure 5. Selected artifacts from the Vanderwerken Site. a, rolled copper bead. Feature I. Trench I: b, unifacial pitted mano, Feature 13, Trench 7; c-e, Madison projectile points, Feature 13, Trench 7.

consists of broad, shallow, vertical incised lines on the collar with chevrons on the castellation. A pitted irregularity on the surface of the collar may have once held an effigy or other stylized attachment that has since spalled off. During her analysis of pottery from the pipeline project, Prezzano (1991) commented that this vessel is similar to Huron Incised vessels found on other Mohawk sites. Kuhn (1986: 86) reported that these Huron types usually have squared castellations and simple designs without basal notching. He has examined an illustration of the Vanderwerken sherd and agrees that it may well be from a Huron vessel (Robert Kuhn, personal communication 1993).

A charcoal sample from Feature 1 yielded a radiocarbon age of 280 ± 50 BP (Beta 45145). This mean date translates to A.D. 1670 (with a 2-sigma range of A.D. 1570-1770), or A.D. 1642 when calibrated, but given the other chronological

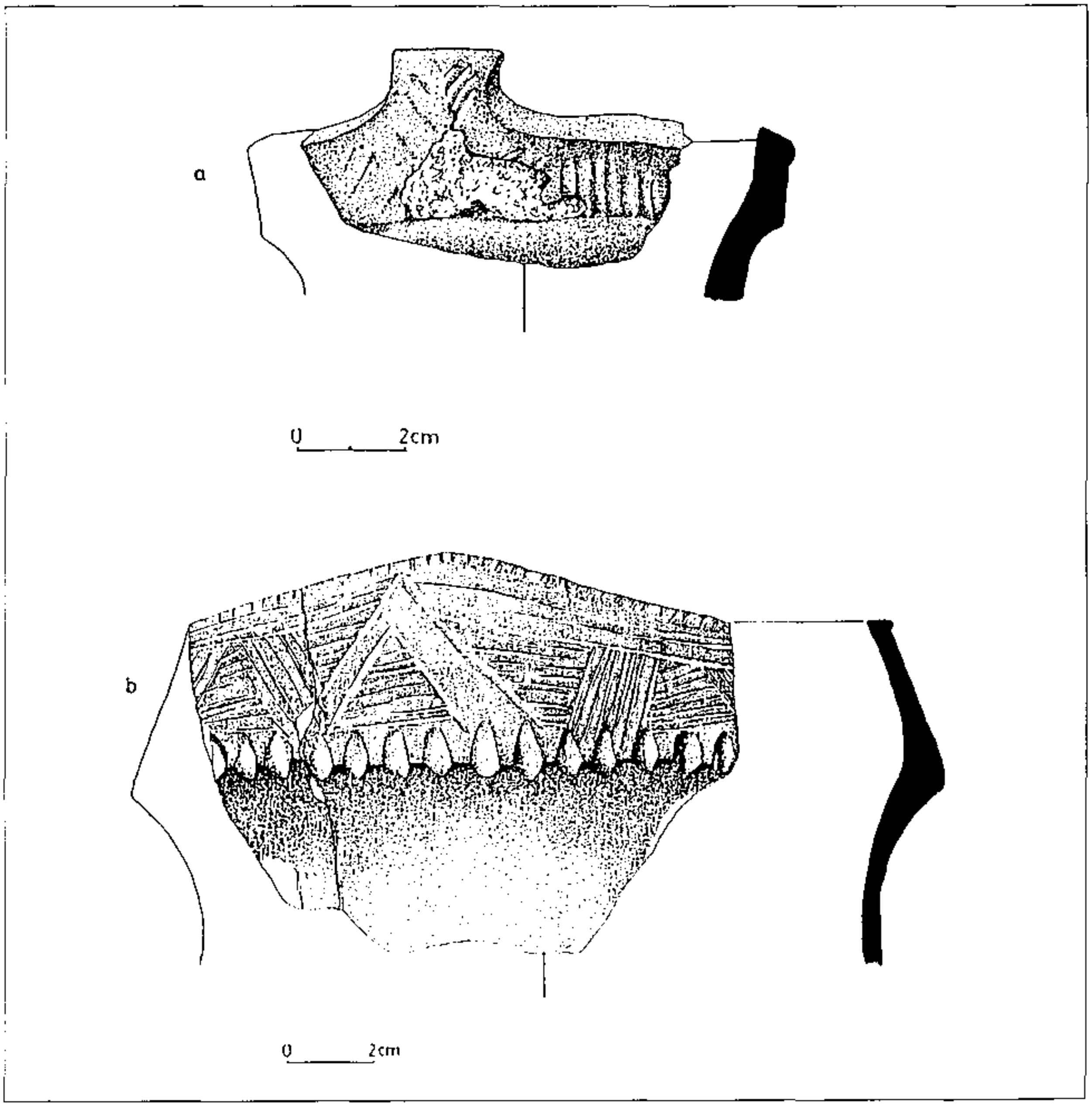

Figure 6. Diagnostic ceramics from the Vanderwerken Site. a, possible Huron rim sherd. Feature 1, Trench l: b. Garoga Incised rim sherd, Feature 13, Trench 7.

indicators from the site, we believe the occupation is actually within the earlier part of the standard deviation of this date.

Trench 3 contained three of the major features, including Feature 4 at 185 to 188 cm below surface and Features 6 and 8 from 128 to 143 cm below surface. Feature 4 was a thin hearth remnant that produced a single sherd, several hundred small pieces of chert debitage, and an assortment of faunal material including bone, teeth, and a claw.

Closer to the surface in Trench 3, Features 6 and 8 appear to have been closely related portions of a hearth/roasting pit complex. Feature 6 was found at a depth of 130-142 cm below surface and was an ovoid concentration of over 1,000 fire-cracked rock fragments. It also produced a sherd of undecorated pottery, over 100 bone fragments, nutshells, and charred butternut wood. A charcoal sample recovered close to 130 cm below surface within Feature 6 produced a radiocarbon date of 380 ± 50 years BP (Beta 44850). Feature 8 was located about a meter north of Feature 6, and was of similar size and shape. It had a much lower density of cultural material, including debitage, burned bone, 400 pieces of firecracked rock, and charcoal.

Trench 5 also contained three of the major features. Feature 16 was located at about 60 cm below surface, and Features 12 and 17 were found between 80 and 100 cm below surface. Feature 16 was a remnant hearth characterized by oxidized stains or lenses with charcoal and two plain body sherds. A charcoal sample from within the feature yielded a radiocarbon date of 540 ± 70 BP (Beta 44848).

Features 12 and 17 were hearth remnants with indeterminate plan views and long, thin basin-shaped profiles. They both produced plain body sherds, bone fragments, a small amount of debitage, and charcoal. Feature 12 also produced a fish vertebra and charred hawthorn seeds, three maize kernels, and nutshells.

The largest and most productive feature was found in Trench 7 at the eastern edge of the known site. Feature 13 was a large hearth and associated midden area found in the fourth layer of dark brown clayey silty sand in Stratum III. The hearth component of this artifact-dense feature occurred at a depth of 150-165 cm below surface and was slightly basin-shaped in profile. Ovoid in outline, the immediate hearth itself measured approximately 60 cm x 70 cm. A wide variety and abundance of cultural materials were recovered from the hearth and surrounding midden; included were lithics, ceramics, fire-cracked rock, bone, antler, claws, nutshells, charcoal, and maize kernels.

A total of 93 well-preserved, grit-tempered ceramic vessel sherds were recovered from Feature 13, and these sherds form almost one-third of a complete collared, incised vessel (Figure 6). Close to 50 per cent of the rim of this vessel was recovered. The rim diameter is 17 cm, and the rim itself varies between 4.1 and 7.1 mm in thickness. At least one well-defined castellation is present. The body sherds on this diagnostic vessel are unusually thin (less than 5 mm).

The design consists of opposed triangles composed of parallel lines. Diagnostic characteristics include several parallel lines beneath the lip and broad notches at the base of the collar. Also temporally significant is the well-defined collar with a somewhat concave interior and a flat exterior. These combinations of attributes fit within the type known as Garoga or Cayadutta Incised. The ambiguity in terminology derives from there being at least three different ceramic classifications relevant to this material. In essence, the original typology by MacNeish (1952) had several types that were later grouped together. Lenig (1965) called the type which includes this sherd Garoga Incised, while Funk (1967) lumped the MacNeish types into Cayadutta Incised.

The ten bowl and stem pipe fragments recovered from Feature 13 indicate a late variety of rimless trumpet pipe. The bowl area is only slightly wider than the stem, and the top portion of the exterior rim is decorated with cross-hatching executed with fine incising, with shallow punctations below the rim. These pipes occur from the Garoga Phase into historic times.

Feature 13 produced four Madison projectile points (Figure 5), two biface fragments, and three chert core fragments. In addition, more than 13,000 chert flakes were recovered. The debitage category is numerically dominated by 12,554 tertiary pressure flakes less than ¼ in, which were recovered by flotation processing. Intensive late stage lithic reduction clearly took place around this hearth. In addition, at least one of the three finished Madison points recovered at Feature 13 had apparently already been put to effective use. This point was recovered in contact with a deer scapula amidst other general feature refuse; its close proximity suggests that it may have once been embedded in now-decayed tissue.

The other obvious primary activity evidenced by Feature 13 was intensive food processing. These activities apparently included the final butchering of at least one deer (with at least one deer mandible and a number of long bone fragments recovered from the associated midden along with the scapula mentioned above) and the preparation of various floral resources. A unifacially worked mano was found in the feature, and a large quartzite metate was recovered at 165 cm below surface near the base of Trench 7 within 3 m of Feature 13. Nutshell fragments and five maize kernels were also recovered from this feature.

Copper Bead Analysis

The copper bead recovered from Feature 1 is small and cylindrical in shape (Figure 5). It is 6 mm in length and 4.2 mm in diameter, and it was made from a long, thin, slightly irregular piece of sheet copper <0.5 mm thick, 8.5 mm long-, and from 4 to 6 mm across.

Though small, this bead is not as simple as it initially appeared. Unlike many protohistoric beads, which were formed by rolling a piece of copper sheet into a tube with the edges either butted together or slightly lapped, this bead was made by rolling a strip deliberately to overlap itself. Close examination indicates that, in the completed bead, the original strip laps around itself two and a half times. These layers fit together tightly, and the final piece was carefully smoothed and finished. In spite of its diminutive size, this bead is the product of technically skilled and controlled work. Copper beads of similar construction have been observed from other protohistoric Iroquois sites (e.g., the Seneca Tram and Cameron sites, and the Oneida Diable Site); however, the

Vanderwerken bead is not nearly as massive as these "rounded" examples (Wray et al. 1991:71-74, 246-248).

Recent research on the fabrication of copper objects by Native American people in the Northeast has demonstrated that the technology used was more sophisticated than is frequently assumed. Childs has examined a series of small, tightly rolled copper beads from the Boucher Site, an Early Woodland site in northern Vermont. Her analysis, which included metallography on 12 beads, concluded that these beads had been fabricated through a combination of techniques, including hammering, folding, annealing, hot forging, and cold working (Childs 1994). The Boucher copper artifacts indicate that as early as 2,500 BP. native people in the Northeast possessed a sophisticated understanding of copper and how to manipulate it.

Recent analysis of Contact Period copper artifacts has demonstrated that many of these same techniques - specifically shaping, multiple anneals, and the joining of smaller pieces to form a larger finished object - were used by Iroquoian craftsmen during the sixteenth century (Bradley and Childs 1991). Within this context, the Vanderwerken bead fits in comfortably as a good journeyman example of Native American copper work.

A key question raised by this bead is whether the material is of European origin or native copper. The most reliable method for making this determination is a combination of quantitative analysis (to determine chemical composition) and metallography (cutting, polishing, and etching a cross section to examine physical structure). In this case, given the small size of the object and the requirement to alter it as little as possible, a decision was made to perform quantitative analysis only.

A small (1 mm square) sample from this bead was submitted for instrumental neutron activation analysis (INAA) to the SLOWPOKE Reactor Facility at the University of Toronto along with 28 other samples of copper or copper alloys from sixteenth- and early seventeenth-century sites in the Northeast. Neutron activation is a powerful analytical technique that can yield relatively precise (=-3 per cent) concentration measurements for a number of elements in a range of samples. Even for copper samples of widely variable mass (<1-50 mg), shape, and composition, neutron activation can be used to provide concentration data good to ± 3- 10 per cent. Such data provide an adequate basis for discriminating the different chemistries of Contact Period European metal artifacts.

Results indicate the presence of several distinct clusters including brass, European copper (indium rich), European copper (indium poor), and possible native copper. The Vanderwerken bead, along with five other specimens, was placed in the European copper (indium rich) cluster (Table 2). The distinguishing characteristic of this cluster is the copper's high degree of purity; other alloying elements are present only in trace amounts. In addition to the Vanderwerken bead, the other five samples in this cluster were:

1. a "shelf" fragment from a Basque banded kettle, Chase Site, Fabius, New York (C2A5-3) (Bradley and Childs 1991:15, Table 30)
2. a tubular bead (8.5 cm long x 0.6 cm diameter), Chase Site, Fabius, New York (Bradley 1987:71, Figure 7f for similar example)
3. a spiral, Dwyer Site, Fabius, New York (Bradley and Childs 1991:14 and Figure 10)
4. a fragment of tubular bead (>3 cm long x 0.7 cm diameter), Sandy Point Site, Stockton Springs, Maine (Moorehead 1922:219)
5. an unperforated disc (approx. 2 cm diameter), Clark's Pond Shell Heap, Ipswich, Massachusetts (Bullen 1949:128 and Plate XX. #4)

Table 2. Selected Elements from the European Copper (Indium Rich) Cluster as Determined by Neutron Activation.

	Per cent			Parts per million				
Sample description	Copper	Zinc	Tin	Arsenic	Silver	Gold	Indium	Antimony
Vanderwerken bead	98	<0.03	<0.3	720	1300	33	12	2300
Chase kettle shelf	97	<0.02	<0.1	590	580	20	6	2400
Chase bead	97	<0.02	<0.2	130	1000	40	46	140
Dwyer spiral	96	<0.03	<0.1	350	800	26	10	1100
Sandy Point bead	96	<0.02	<0.2	120	1300	46	32	130
Clark's Pond disc	96	<0.02	<0.2	390	1500	60	24	130

While INAA (instrumental neutron activation analysis) does provide detailed elemental assessments, the primary strength of this analysis is its ability to indicate clusters of similar samples. Individual values reported here should not be taken as absolute quantitative measurements. Values indicated are at a 67% confidence level and are rounded off to two significant figures. For additional information on analytical procedures and detection limits at SLOWPOKE, see Hancock et al. 1991.

Based on this analysis, there can be little doubt that the Vanderwerken bead is made of European copper. In addition, although the six objects in this cluster come from sites a considerable distance apart, the analysis suggests that all were made from a similar material from a common source. Recent research on the use of European copper in northeastern North America has identified a distinctive type of high purity copper kettle used by late sixteenth-century Basque fur traders in the Canadian Maritimes and St. Lawrence Valley (Fitzgerald et al. 1993). Described as Basque Banded Kettles, this type was defined through a combination of historical documentation, morphological traits, and chemical analysis. Although tested through a different analytical process (i.e., emission spectroscopy), analyses of nine banded kettles produced an elemental cluster strikingly similar to that presented here (Fitzgerald et al. 1992:51). While small sample size and the error inherent in INAA limit the ability to make comparisons, these analyses suggest that the source of copper for the Vanderwerken bead was a Basque banded kettle.

Chronology

Information on the chronology of the Vanderwerken occupation can be gained from the radiocarbon dates, the ceramic assemblage, and the presence of the bead made from European copper. The Madison projectile points are of course diagnostic, but they cover a broad time span relative to the other chronological markers. Figure 7 illustrates the combined chronological information, and each of the data categories is discussed in turn below.

Given the late occupation of the site, the three radiocarbon dates were calibrated to facilitate correlation with the historic calendar (Stuiver and Reimer 1993). At two standard deviations, the calibrated dates from Features 1 and 6 overlap between A.D. 1481 and 1648. The Feature 16 sample is quite a bit older than the other two, and only overlaps the Feature 6 sample for a 40-year period from A.D. 1434 to 1474. Although Feature 16 could indicate an earlier Chance Phase component, all three features are in roughly comparable

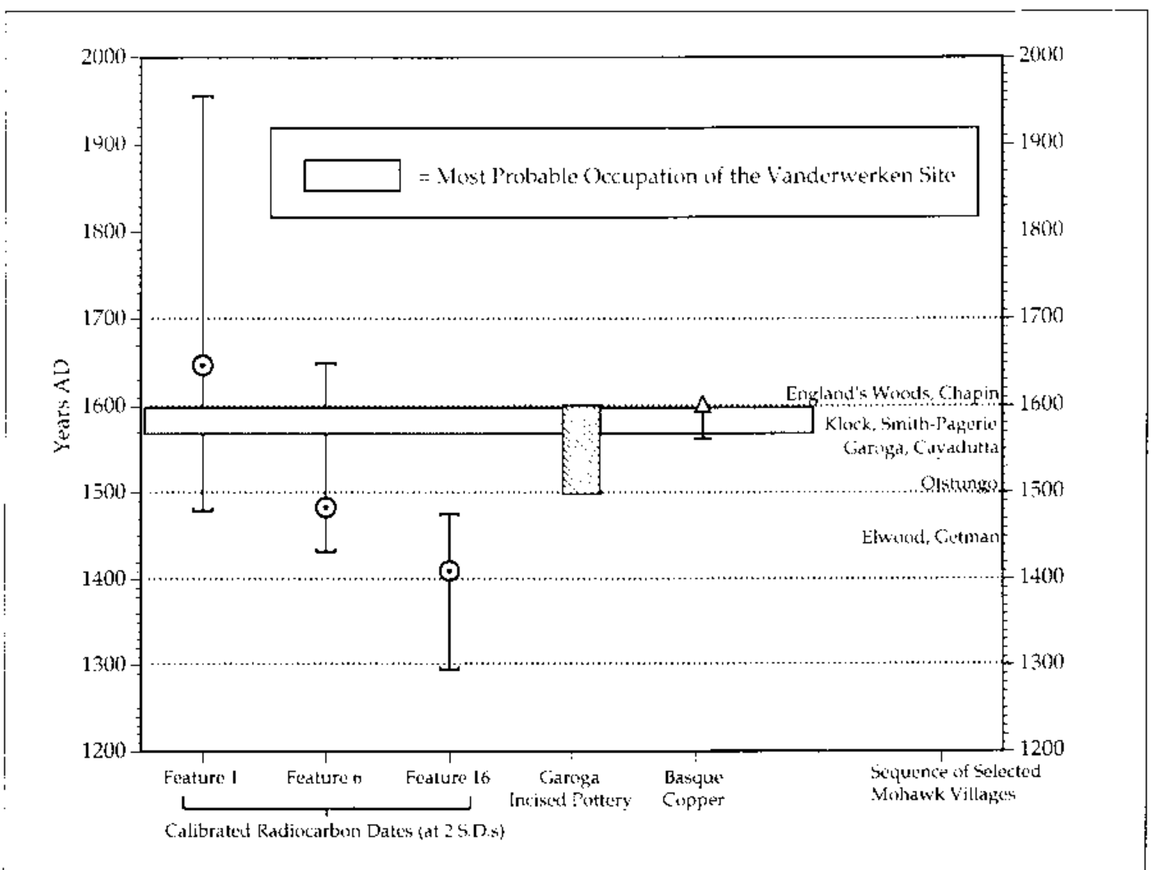

Figure 7. Chronology of the Vanderwerken Site in relation to the Iroquois Tradition in the Mohawk drainage.

stratigraphic contexts, and no Chance pottery was recovered from our testing. The three are all at an elevation of about 166.25 m, and Features 1 and 6 are in the third and fourth layers of dark brown clayey silty sand within Stratum III. Feature 16-the anomalously old sample-is only in the first or second dark brown clayey silty sand layer, which by stratigraphic location should be a bit younger than the other two samples. Aboriginal use of old firewood in Feature 16 may help explain this anomaly.

The vessel from Feature 13 is quite clearly Garoga/Cayadutta Incised pottery, and this type is common through most of the sixteenth century in the Mohawk and Schoharie drainages. The presence of a possible Huron Incised sherd from Feature 1 fits with regional data on the occurrence of Huron pottery in Mohawk sites. Kuhn (1985b) has reported that Huron pottery first appears in low numbers on mid-sixteenth-century sites, such as Garoga, and the frequency rises into the seventeenth century. He has interpreted this as evidence of the presence of female Huron war captives among the Mohawk, and given Mohawk-Huron antagonisms over European trade (among other reasons), he has also suggested that "the coincidence of the first occurrence of Ontario Iroquois/Huron style pottery on Mohawk sites and the earliest appearance of European trade goods might have been predicted" (Kuhn 1985b:37).

The presence of European copper, but no other trade goods, at Vanderwerken suggests that the occupation can be placed in the last quarter of the sixteenth century. Based on the work of Laurier Turgeon (1990), current evidence suggests that Basque involvement in the fur trade is a post-A.D. 1580 phenomenon, even though Basque fishing began before A.D. 1550. Basque copper kettles were being traded from Bordeaux and other Biscay ports through the Canadian Maritime Provinces and the St. Lawrence drainage (Bradley and Childs 1991:14). Basque copper can occur earlier than A.D. 1580, but at present there is little documentary evidence for this. In contrast, brass trade goods were being supplied to the mid-Atlantic Coast in the third quarter of the sixteenth century by Norman merchants from ports such as Honfleur and Havre (Bradley and Childs 1991:15).

Conclusions

The combined chronological data from the Vanderwerken Site document an intensive habitation occupation on the Tla terrace dating in the range of A.D 15001600, and probably from the last quarter of that century. This is indicated by the radiocarbon dates, pottery types, and a lack of Euroamerican trade goods other than the bead of Basque copper. This would place the occupation two or three decades later than well-known Mohawk sites such as Garoga, Klock, and Cayadutta (Snow 1991:36).

As one of the few protohistoric sites in the Schoharie drainage, the discovery of the Vanderwerken Site has been significant for regional settlement pattern studies. This is a fairly substantial, late sixteenth-century occupation 25 km upstream from the Mohawk River. Our limited sample identified a high density of hearth and midden features and recovered evidence of substantial plant- and animal-food processing. These attributes are indicative of a relatively intensive settlement, not an ephemeral resource-procurement locale. However, we did not identify any storage pits such as one might expect at a permanent village, which raises the possibility that the site is a seasonal hamlet established to support horticulture on the rich bottomlands of Schoharie Creek. A wider horizontal exposure of the site would be needed to confirm or deny this assessment.

The site's location along an exposed, difficult to defend, low area is anomalous. As Ritchie and Funk (1973:363) previously noted, "all known village sites of the Garoga Phase, and the immediately following sites of the early contact period, are located on high, readily defended hills, well back from the Mohawk River or major tributaries:" Snow has suggested that:

> From about A.D. 1475 on there were big hilltop villages like Otstungo and Garoga, but there were also smaller unfortified sites like Wormuth that were probably occupied seasonally. Vanderwerken might be like Wormuth in this regard, or it might have been permanent. In any case, smaller year round villages in open locations (like Getman and Elwood) were mostly abandoned by A.D. 1500 [Snow, personal communication 1993].

Given the Vanderwerken Site's exposed location close to the southeastern boundary of Mohawk territory during a known time of internecine warfare, the existence of some type of protective palisade seems likely, but our excavations were too limited to identify this feature.

In his research into the Iroquoian sites of the Mohawk drainage, Snow (1995:235) has reported that he knows of no other sites this late in the Schoharie Valley. The previous interpretation has been that the Mohawks concentrated in the main Mohawk valley as early as Chance Phase or before. Lindner (1987:i) has also reported that "discoveries of features and pottery from the prehistoric Chance period Iroquois are unusual in the [Schoharie Valley] from locations on the floodplain."

Snow's (1991:38) regional demographic data document a substantial population increase for the Mohawk villages of the main valley in the late sixteenth and early seventeenth centuries. He has suggested that while some of this increase may be due to southward migrations from the St. Lawrence Valley and Jefferson County, population movements from previously undiscovered sites in the Schoharie Va lley-such as Vanderwerken-may help explain the sudden Mohawk Valley population increase (Snow 1995:199).

While it is probably safe to assume that almost all of the major upland Mohawk village sites in the region have been identified, this does not appear to be the case for valley sites. In combination with Lindner's (1987, 1991) previous research in the Schoharie drainage, the discovery of the Vanderwerken Site deep in the Schoharie Creek floodplain suggests there may be additional pieces of the regional settlement pattern yet to be uncovered. Although the depths of these sites mean that they are more difficult to find and excavate, the demonstrated potential for well-preserved features containing both chronological and subsistence data makes them a valuable resource.

Postscript

Based on our testing, the state and federal agencies regulating the Iroquois Pipeline project determined that the Vanderwerken Site was significant and required impact mitigation measures. As an alternative to data recovery excavations, the Iroquois Gas Transmission System received permission to bore underneath the entire floodplain, including the site and the creek itself. Despite the avoidance by boring, the pipeline company still maintains a right-of-way through the western edge of the site above the buried pipe.

Acknowledgments

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High Precision Calibration of the Radiocarbon Time Scale: CALIB 3.0.3 (Method 'A'') in a St. Lawrence Iroquoian Context

James F. Pendergast, Canadian Museum of Civilization
With calibrations by Gordon D. Watson, Trent University, and Roelf P. Buekens, IsoTrace Laboratory, University of Toronto

Revisions introduced in 1993 by the University of Washington, Seattle, radiocarbon decadal and bidecadal calibration program CALIB 3.0.3 are compared and contrasted with the CALIB 2.1 calibrations for 17 St. Lawrence Iroquoian archaeological sites, the results for 15 of which were published in Northeast Anthropology, No. 46. Problems encountered in the application of the CALIB 2.1 and CALIB 3.0.3 radiocarbon calibrating techniques to St. Lawrence Iroquoian archaeological sites .sequences and chronology are examined. Heretofore unpublished calibrated radiocarbon dates for two additional St. Lawrence Iroquoian sites, Masson and Royarnois, are included.

Introduction

The 1993 fall issue of Northeastern Anthropology, No. 46, includes a paper entitled, "Some Comments on Calibrated Radiocarbon Dates for St. Lawrence Iroquoian Sites" (Pendergast 1993a:1-32). These calibrated dates were derived from the MASCA calibration tables published by Klein et al. (1982:103-150); and from the then state-of-the-art University of Washington. Seattle, 1986 CALIB 2.0 terrestrial calibration program as revised by the 1987 CALIB 2.1 program (Stuiver and Becker 1986:863-910; Stuiver and Pearson 1986:805-838); and from the University of Toronto IsoTrace Laboratory program C14 CAL based on the CALIB 2.0 and CALIB 2.1 programs (Beukens 1991, personal communication June 1994; Litherland et al. 1991). During the period the paper was in press, the January 1993 issue of Radiocarbon 35/1 introduced the new University of Washington calibration program CALIB 3.0 together with four papers crucial to this discussion. These were Minze Stuiver's paper, "A Note on Single-Year Calibration of the Radiocarbon Time Scale A.D. 1510-1954" (Stuiver 1993); Stuiver's and Gordon Pearson's paper, "High Precision Bidecadal Calibration of the Radiocarbon Time Scale A.D. 1950-500 B.C. and 2500-6000 B.C." (Stuiver and Pearson 1993:1-24); Stuiver's and Bernd Becker's paper, "High Precision Bidecadal Calibration of the Radiocarbon Time Scale A.D. 1950-6000 B.C:" (Stuiver and Becker 1993:35-40); and the paper "Extended $_{14}$C Data Base and Revised CALIB 3.0 $_{14}$C Age Calibration Program" by Stuiver and Paula Reimer (1993a:215-230). Subsequently these revisions were incorporated in a program designated CALIB 3.0.3.

This paper will compare and contrast the St. Lawrence Iroquoian decadal and bidecadal calibrated dates obtained from the 1987 CALIB 2.1 program (Pendergast 1993a: Table 1. Figs. 1-16) with those derived from the 1993 CALIB 3.0.3 program in the context of the four papers mentioned above to determine whether the introduction of the CALIB 3.0.3 program constitutes grounds to adjust the conclusions derived from the CALIB 2.1. program (Pendergast 1993a:1-32). This opportunity will also be used to expand the sample of St. Lawrence Iroquoian sites examined by the introduction of heretofore unpublished calibrated radiocarbon dates for the Masson (Benmouyal 1990:215) and Royarnois (Chapdelaine 1993a:96) sites.

The Masson Site

The Masson Site is located in Portneuf County near Deschambault on the north side of the St. Lawrence River approximately mid-way between Trois-Rivieres and Quebec City (Figure 1). The site lies on the brow of a terrace some 30 m high overlooking a riverside flat which extends to the St. Lawrence River more than1km to the east. Charles Martijn recorded the site location in 1971, and subsequently collections were made by Rene Ribes and Rene Levesque. Following preliminary excavations by Laurent Girouard in 1979 and subsequently over the period 1981-1982, Jose Benmouyal excavated two areas within the village perimeter totaling approximately 2,500 sq m. These excavations revealed, in part, portions of five dwellings, four of which have been identified as longhouses. Benmouyal has concluded the site was a small Iroquoian village (Benmouyal 1983. 1990).

Benmouyal and Anne Baulu generously invited Pendergast to examine the Masson archaeological assemblage and in particular their sample of 244 rim sherds (Benmouyal 1990:130). Certainly there is a strong resemblance between this sample of Masson rim sherds and the rim sherds from the Roebuck Site. a classic St. Lawrence Iroquoian village

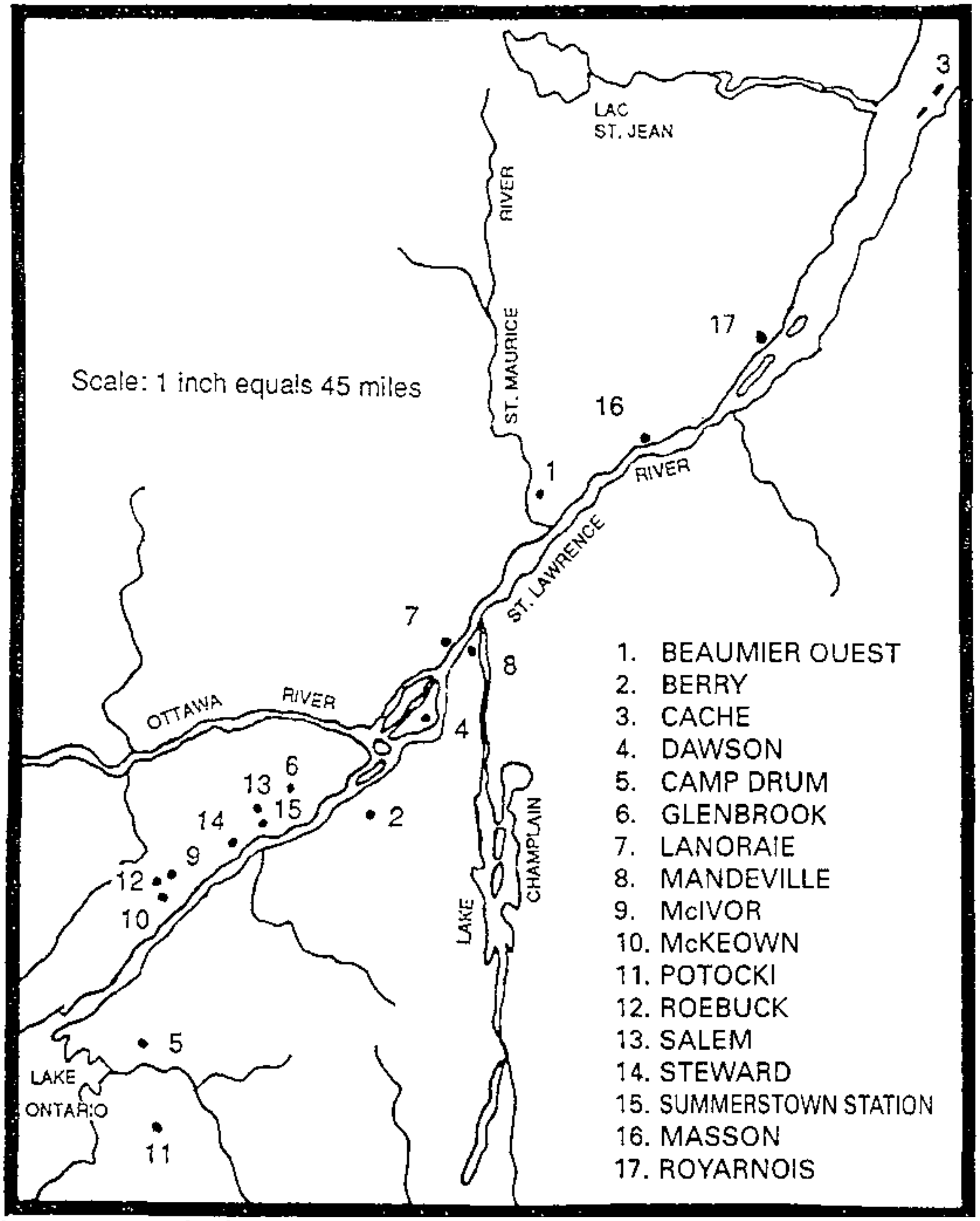


Figure 1. Site locations mentioned in the text.

site near Prescott, Ontario, some 400 km (approximately 250 mi) farther up the St. Lawrence River (Pendergast 1973; Wintemberg 1936).

The Masson Site is particularly significant because it is both the northernmost Iroquoian archaeological village site and the northernmost St. Lawrence Iroquoian village attributable to a Roebuck-horizon Iroquoian population, c. A.D. 1400-1450 (Pendergast 1975:54, 1993b:16). However, apart from the Dawson Site (Hochelaga?) (Pendergast and Trigger 1972) and representation in the St. Lawrence Iroquoian component of the Pointe an Buisson fishing station at the head of Lake St. Louis (Girouard 1975), and to a lesser extent the Mandeville Site on the Richelieu River near Tracy (Chapdelaine 1988), there is an anomalous absence of Roebuck-like sites on the St. Lawrence River axis in the 400 km between Masson and the type site at Roebuck. The earlier

St. Lawrence Iroquoian Lanoraie Site some 60 km (approximately 40 mi) east of Montreal (Trudeau 1971) in this intervening gap is not germane in this context because it is not a Roebuck-horizon component as demonstrated, for instance, by the abundance of cord-wrapped-stick decorated pottery present (Clermont et al. 1983:77-110; MacNeish 1952:62-64, 87; Trudeau 1971), a trait that does not occur on Roebuck-like sites.

The Royarnois Site

In 1989, Claude Chapdelaine inaugurated a 3-yr field program to examine the Cap Tourmente lowlands in search of archaeological evidence of the four native villages Jacques Cartier mentioned in 1535 on the north shore of the St. Lawrence River below Stadacona, present-day Quebec City. In addition, Chapdelaine sought to establish a comprehensive cultural sequence and to define how the St. Lawrence Iroquoians in this region adapted their Iroquoian agriculturally oriented subsistence patterns to the ecological conditions that prevailed on the lower St. Lawrence River (Chapdelaine 1993a:89). Of the ten Late Woodland sites he located, the Royarnois Site (CgEq-19) with a St. Lawrence Iroquoian component has emerged as the most significant (Figure 1). Extensive excavations have revealed settlement pattern data, including trench walls reminiscent of those observed on some Huron sites (Kapches 1980). Six radiocarbon dates are available from the Royarnois Site: two from charcoal samples from hearths (samples A and B), two from charcoal in a trench wall (samples C and D), and two from charcoal samples from within different longhouses. Sample B 59144 is associated with "a medium sized collared vessel typical of the late Late Woodland period." Sample B 59146 is from a large pit at the end of a longhouse "very close to the highest concentration of rim sherds typical of the St. Lawrence Iroquoian ceramic tradition" (Chapdelaine, personal communication October 1994). Significantly in this context, the Masson and Royarnois radiocarbon-dated samples do not contain marine material or shell.

The investigations of the Masson and Royarnois sites, coupled with recent work by Claude Chapdelaine, Greg Kennedy, Michel Plourde, Roland Tremblay, Laurier Turgeon, and Dominique Lalande at several locations east of Quebec City (Pendergast and Chapdelaine 1993), have elaborated upon this northward extension of archaeological sites where Roebuck-like St. Lawrence Iroquoian ceramics occur in varying quantities on the north side of the St. Lawrence east of Quebec City (Chapdelaine 1992, 1993a, 1993b, 1993c; Chapdelaine et al. 1992; Chapdelaine and Kennedy 1990; Chapdelaine and Tremblay 1991). In conjunction with Michel Plourde's excavation of the Owasco-like Ouellet Site near Tadoussac (Plourde 1993:101-119), this research constitutes a significant contribution to understanding the nature, timing, and significance of this recently recognized extension of St. Lawrence Iroquoians into the lower St. Lawrence River basin.[1]

Calibrated decadal and bidecadal radiocarbon ranges and ages for the Masson and Royarnois sites obtained from Klein et al. (1982) tables, from the University of Washington 1987 CALIB 2.1 and 1993 CALIB 3.0.3 programs, and from the 1994 University of Toronto IsoTrace Laboratory calibrations are set out in Table 1.

CALIB 2.1 and CALIB 3.0.3 Calibration Programs

Essentially the MASCA tables, the 1987 CALIB 2.1 program, and the 1993 CALIB 3.0.3 program calibration techniques are the same, although the CALIB 3.0.3 program provides a significantly improved data set. The CALIB 3.0.3 data sets are derived from University of Washington, Seattle, radiocarbon ages obtained from dendrochronologically dated Douglas fir and Sequoia samples, and from The Queen's University, Belfast, radiocarbon ages obtained from dendrochronologically dated Irish oak samples, each with a span of 20 yr (bidecadal) (Pearson and Stuiver 1986: Stuiver and Pearson 1986; Stuiver and Reimer 1993b:215). Both the CALIB 2.1 and the CALIB 3.0.3 data sets include minor corrections in the A.D. 1700-1800 and the 6000-2500 B.C. ranges (Reimer, personal communication May 1994). Fortuitously, reservations regarding the CALIB 3.0.3 program for the interval between 9,840 and 11,440 calibrated yr BP, when the dendrochronology has not been fixed absolutely

1. An Iroquoian movement into the lower St. Lawrence River basin, a climatic region marginally suited to corn farming, has been postulated before by William Fenton (1940:170-171). Bruce Trigger (1978:359) has noted that "the down-river bands [Stadaconans] had adopted themselves toward an Algonquian type of hunting and fishing economy." The effect of this recently demonstrated Iroquoian utilization of marine animals, still to be quantified, remains to be contrasted with the pan-Iroquoian characterization of Iroquoians as farmers of corn, beans, and squash. There comes to mind, for instance, the possibility that some less-appropriate traditional pan-Iroquoian seasonal ceremonies associated with growing and harvesting corn, beans, and squash may have given way to new and more germane marine-oriented seasonal rituals to propitiate the spirits responsible for good harvests of marine food sources. Settlement patterning archaeology conducted by Chapdelaine at the Royarnois Site suggests that this Iroquoian exploitation of marine food sources may be the result of seasonal forays to coincide with marine migrations, or to semi-sedentary habitation sites located at known permanent or seasonal concentrations of marine animals. Because neither marine animals nor shells are included in the Masson and Royarnois site radiocarbon-dated samples, the calibrated dates attributed to these sites are not subject to the reservations accorded the carbon reservoir effect (Stuiver et al. 1986), nor is the fluvial deposition of old terrestrial carbon (Little 1993) germane in this context.

(Stuiver and Reimer 1993a:3), do not concern the period in which the St. Lawrence Iroquoians were present. The discrepancies during the interval 5 180 B.C. and 5500 B.C., when the Seattle dates differ from the bidecadal dendro curve by 27 yr and the Seattle ages are on average 54 yr younger than the Belfast ages (Stuiver and Reimer 1993b:220), do not concern us here.

The 1987 CALIB 2.1 calibration data set ATM $10.{}_{14}C$ and ATM $20.{}_{14}C$ and the 1993 CALIB 3.0.3 calibration data set INTCAL93.${}_{14}C$ and UWTEN93.${}_{14}C$ permit calibrations against both a 10-yr- and 20-yr-interval terrestrial set. It should be noted that the decadal UWTEN93.${}_{14}C$ is not as precise as the bidecadal INTCAL93.${}_{14}C$ curve. This is because the UWTEN93.${}_{14}C$ data set incorporates University of Washington data that have not been averaged with The Queen's University data, as has the INTCAL93.${}_{14}C$ data set. However, in the event the radiocarbon age deviation is ± 30 yr or less, the UWTEN93.${}_{14}C$ calibration may best be used to date short-lived samples such as small tree branches (Reimer, personal communication July 1994).

Both the CALIB 2.1 and CALIB 3.0.3 programs offer two methods of calibration. Method ‘A’ provides calibrated ages and Gausian ranges, while Method ‘B’ provides calibrated age probability (Stuiver and Reimer 1993a:1.4.2; 1993b: 226). Method 'A' ranges and ages have been used throughout this paper. The decision to limit this paper to an examination of the Method ‘A’ option alone simply reflects the reality of time and space constraints at the moment. It is not a judgmental conclusion regarding the relative merits of Methods ‘A’ and ‘B’ in a St. Lawrence Iroquoian context. Plans are in hand to examine Method ‘B’ in a St. Lawrence Iroquoian context soon.

The calibrated ages and the 1- and 2-sigma ranges obtained from the CALIB 2.1 and CALIB 3.0.3 decadal and bidecadal programs for the 80 radiocarbon-dated samples available for 17 St. Lawrence Iroquoian sites (Figure 1) are set out in Tables 2 and 3.

Discussion

General

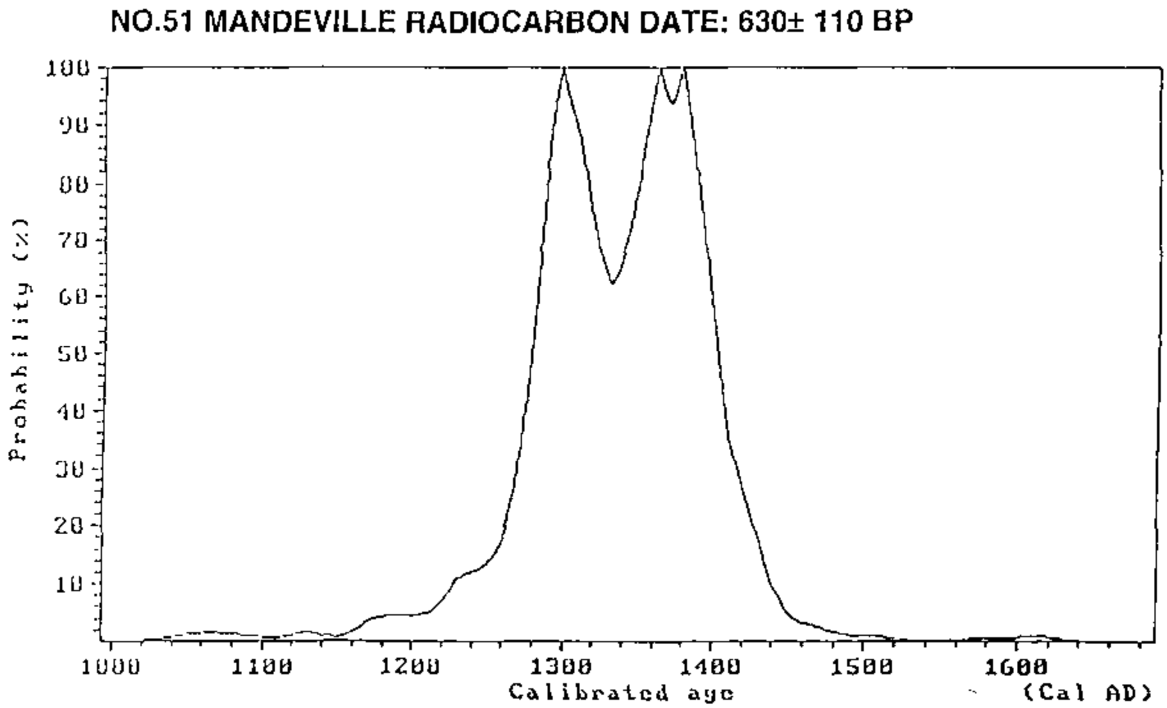
This paper examines recent proposals by the Quaternary Research Center, University of Washington. Seattle, regarding the calibration of radiocarbon dating to discover how this radiocarbon dating technique can enhance research that seeks to establish calendrical St. Lawrence Iroquoian site sequences. It is not intended to challenge the research on which Stuiver's. Reimer's, Becker's, Pearson's, Polach's, and Beuken's calibration proposals are founded. Nevertheless, this opportunity will be used to examine the impact of the CALIB 3.0.3 calibrations on current St. Lawrence Iroquoian orthodoxy (Chapdelaine 1988; Jamieson 1990a, 1990b; Marois 1978; Pendergast 1975, 1982, 1985, 1991, 1993b).

In a context wholly defined by archaeological factors, it might be best to establish chronologies for the St. Lawrence Iroquoian semi-sedentary villages before attempting to date their associated hamlet, farm, fishing station, and swamp sites. However, current realities regarding the scope and nature of the archaeological data available make it advantageous to use this opportunity to examine all the St. Lawrence Iroquoian radiocarbon dates at hand.

The value of calibrated radiocarbon ages and ranges as a means to establish a St. Lawrence Iroquoian chronology and site sequence depends largely upon the certainty that can be attributed to the contemporaneity of the archaeological features targeted for dating and the sample selected for dating. Calibrating techniques can not correct errors regarding target and sample contemporaneity. In the data at hand, the credibility of contemporaneity is destroyed by those CALIB 2.1 and CALIB 3.0.3 calibrated dates and ranges that indicate St. Lawrence Iroquoian sites were present prior to A.D. 1000 (e.g., Tables 2 and 3, serials 16, 17, 19, 25, 34, 35, 40, 62, 71, 72, 73, 78, 79) and in the era B.C. (e.g., Tables 2 and 3, serials 21, 53). Upon occasion, anomalous dates and ranges such as these have been attributed to the presence of "old wood" in the sample, although this has not been demonstrated conclusively (Pendergast 1993a:18, 30; Timmins 1985:46-48). In these data, the presence of wood as old as 2000 yr is not a credible explanation for the anomalies in the radiocarbon ranges and dates for the McKeown Site, for instance.

The CALIB 3.0.3 Method ‘A’ option, used throughout this paper, records calibrated ages when a radiocarbon age intersects linear interpolation of the dendro calibration curve obtained from radiocarbon-dated decadal and bidecadal samples of tree-ring growth (Stuiver and Reimer 1993a: 2.3A). In the IsoTrace calibrations, interpolations that do not intersect the dendro curve are accorded a probability of less than "100 per cent" (Figure 2). Only intersects, which IsoTrace has designated "100 per cent probabilities:" are used in this paper. The 1- and 2-sigma standard deviations accorded a calibrated age constitute the calibrated range (Stuiver and Reimer 1993a:1.4.3).

Stuiver and Reimer (1993a:1.4.4) have advised that CALIB 2.1. and CALIB 3.0.3 calibrated ages should be rounded to the nearest 10 yr for samples radiocarbon dated with a deviation greater than 50 yr. Apart from the McKeown Site samples (serials 41-47, 49, 52-54) and Masson Site samples (serial 74) (Tables 2 and 3), all these St. Lawrence Iroquoian samples have deviations greater than 50 yr. As a result, apart from the serials mentioned, the calibrated ages set out in Tables 1, 2, and 3 should be rounded to the nearest



Probability	Cal Age	68.3 % c.i.	95.5 % c.i.
100 %	1298 cal AD	1270 AD - 1413 AD	1191 AD - 1451 AD
100 %	1362 cal AD	1270 AD - 1413 AD	1191 AD - 1451 AD
100 %	1377 cal AD	1270 AD - 1413 AD	1191 AD - 1451 AD

Figure 2. Isotrace calibration: 14C CAL Bidecadal Program.

10 yr. The effects of nuclear testing prevent the calibration of post-A.D. 1950 dates (Stuiver and Reimer 1993a:1.3.7), although these have been included here for statistical completeness in Tables 2 and 3 with notes to that effect.

Decadal and Bidecadal Calibrations

It is axiomatic that, apart from interpolations, calibrated ranges and ages obtained from decadal and bidecadal calibration curves cannot be expected to measure periods less than the 10- or 20-year-old radiocarbon-dated tree-ring samples from which the dendro calibration curve was compiled. Halving the age of tree-ring samples to be radiocarbon dated from 20 to 10 yr does not necessarily improve, let alone double, the accuracy of the calibrated ages obtained from the decadal dendro calibration curve.

Experience has shown that the highest precision radiocarbon dates have an error of 10-20 yr (Reimer, personal communication July 1994). Indeed Stuiver (1993) has demonstrated that when calibrated radiocarbon ages were obtained from dendro curves compiled from radiocarbon-dated tree-ring growth samples less than 10 yr old, the identification of calibrated dates becomes significantly more difficult. When radiocarbon-dated samples were calibrated against dendro curves compiled from radiocarbon-dated 5-, 3-, and 1-yr-old tree-ring samples, the number of calibrated ages (intercepts) rose sharply within virtually identical calibrated ranges (Stuiver 1993:71-72). For instance, in one sample radiocarbon-dated 120 ± 15 BP (Figure 3), the number of calibrated age options (intercepts) rose from 5 in the calibration obtained from the bidecadal calibration curve, to 8 from the decadal calibration curve, to 15 when calibrated against a curve derived from a 5-yr dendro span, 18 when calibrated against a curve derived from a 3-yr dendro span, and 37 when calibrated against a curve derived from a 1-yr dendro span. The range also increased significantly in the 1-yr dendro span calibration (Figure 3). Stuiver has attributed this proliferation largely to the great number of variations, "wiggles:" and the

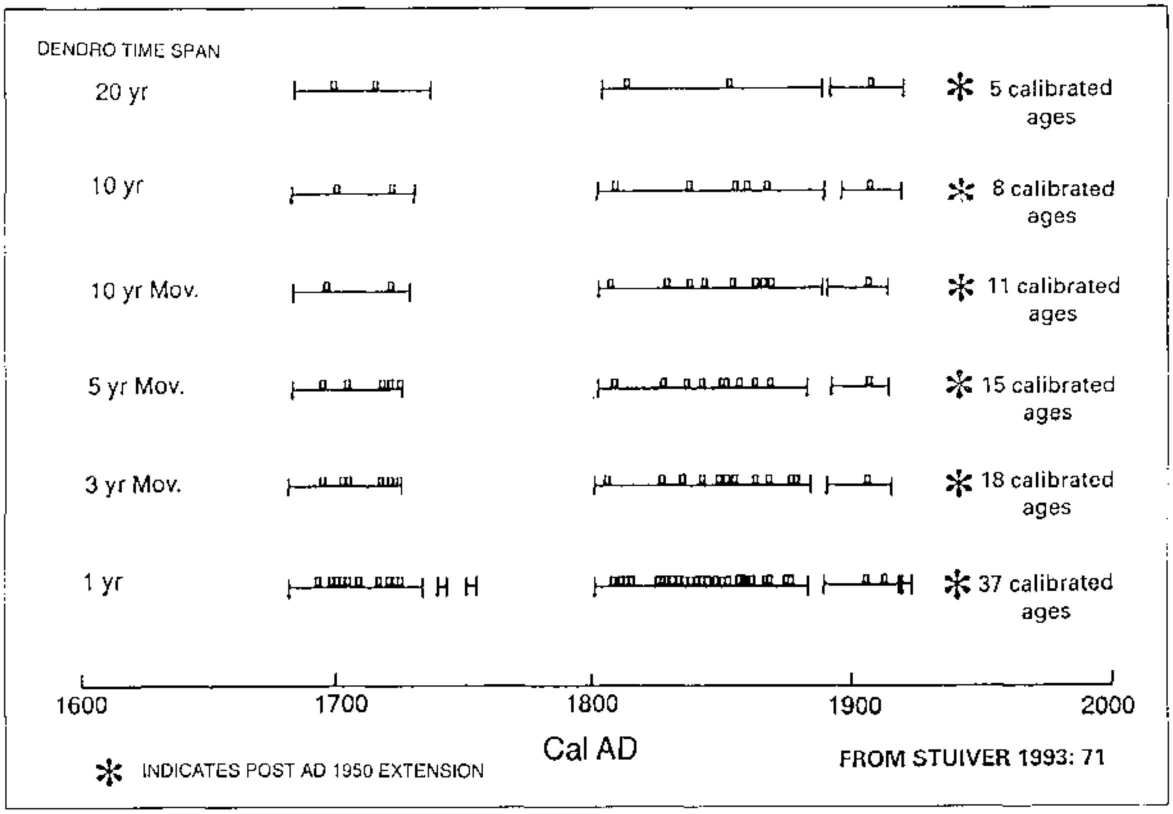


Figure 3. Calibrated ages and ranges obtained from various dendro-calibration curves for a sample radiocarbon dated 120 ± 15 BP.

age uncertainties represented by the horizontal portions on calibration curves plotted for tree-ring growth samples of less than a 10-yr span. These "wiggles" and horizontal components are removed from the dendro calibration curve to a large extent by the "smoothing" that takes place when the calibration curve is plotted from 10- and 20-year-old tree-ring growth samples (Figure 4). This might be moot in the context at hand where the large majority of radiocarbon-dated samples (Tables 2 and 3) have deviations greatly exceeding the 20-50-yr deviation on which CALIB 3.0.3 is premised.

Nevertheless, Reimer has opined that:

> the single-year calibration curve might be appropriate for some samples which were formed in a single year or less, such as leaves and annual plants. In general, the uncertainty from single-year measurement is larger than for 10- or 20 year averages, calibrating with the single-year curve results in numerous intercepts and ranges. The production of latitude-dependent ^{14}C and variable atmosphere mixing ratios may cause single-year regional ^{14}C variations as great as 20 ^{14}C years [Reimer, personal communication July 1994 with reference to Stuiver 1993].

It is significant to note that these anomalies lie in the 10-20-yr lifespan usually attributed to the Iroquoian villages we seek to date with precision.

Stuiver's and Pearson's data (1993: Figs. 1A-L and 1B) indicate that during periods when the "wiggly" calibration curve is flat, calibrated ranges are increased. This occurs during the periods A.D. 1300-1400 and A.D. 1500-1600, not throughout the whole of the 200-yr period A.D. 1400-1600 when the St. Lawrence Iroquoians were present. In this context, a comparison of the decadal and bidecadal differences in calendar years between the end-points of the 2-sigma ranges for the 80 St. Lawrence Iroquoian samples at hand is noteworthy (Table 4). At the early (low) end of the range, they are identical in 6 per cent of the sample of 80. Seventy-six per cent of the sample differs by 10 yr or less, 22 per cent differ by from 10-100 yr, and 1 per cent differs by over 100 yr. At the late (high) end of the range, after 16 CALIB 2.1 and 19 CALIB 3.0.3 post-A.D. 1950 skewed calibrations were removed for the purpose of this comparison, they are identical in 13 per cent of the sample of 60. Sixty-five per cent of the sample differ by 10 yr or less, 17 per cent differ by 10-60 yr, and 5 per cent differ by over 100 yr (Table 4). Eighty-two

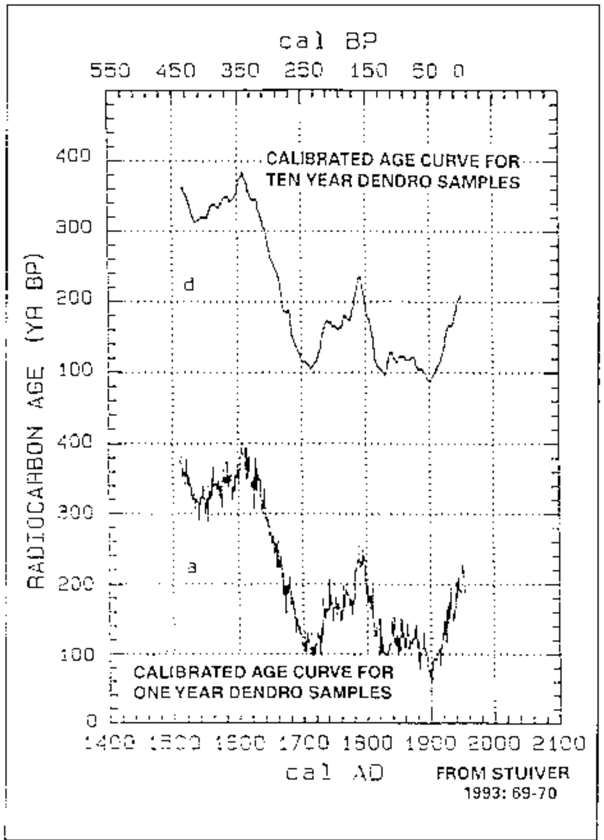


Figure 4. University of Washington dendro-calibration curves.

per cent of the early ends of the ranges and 78 per cent of the late ends of the ranges differing within 10 yr or less indicate a close correlation between decadal and bidecadal ranges in the 2-sigma range.

A comparison of the decadal and bidecadal differences in the sample of 124 CALIB 2.1 calibrated ages, which excludes those in the post-A.D. 1950 period, is also revealing (Table 4). Thirteen per cent are identical. Sixty-five per cent differ by less than 10 yr. 22 per cent differ by 10-100 yr, and less than 1 per cent differs by over 100 yr. The samples of 143 decadal and bidecadal CALIB 3.0.3 calibrated ages in the 2-sigma sample, excluding those in the post-A.D. 1950 period, indicate 12 per cent are identical. Fifty-eight per cent differ by less than 10 yr. and 30 per cent differ by 10-80 yr (Figure 4). Seventy-eight per cent of the CALIB 2.1 calibrated decadal and bidecadal ages differ by 10 yr or less. Twenty-two per cent differ by 10-100 yr. Seventy per cent of the CALIB 3.0.3 calibrated decadal and bidecadal ages differ by 10 yr or less. Thirty per cent differ by 10-80 yr. While this comparison of St. Lawrence Iroquoian decadal and bidecadal calibrated ages might appear to favor the CALIB 2.1 program, it is emphasized that the CALIB 3.0.3 was more able to identify the post-A.D. 1950 results for exclusion and thereby provide a more valid sample for analysis.

It is important to note that, because no calibrated age can be identified with certainty as the *true* age, it is impossible to indicate whether the differences noted in these decadal and bidecadal calibrations represent a movement toward or away from the correct range or age. As a result the data presented above represent variations in the decadal and bidecadal data and should not be interpreted as a measure of their relative accuracy. Decadal and bidecadal differences in the 1-sigma range for both CALIB 2.1 and CALIB 3.0.3 programs may be obtained from Tables 2 and 3, should comparisons in the l -sigma range be necessary.

Calibration Curves: Uncertainties and Fluctuations

Stuiver and Reimer invited attention to:

> uncertainties and fluctuations in the [dendro] calibration curve cause the discrete calibrated ages [of the dendro samples] to broaden [horizontally] into ranges *even for ^{14}C [ages BP] with (hypothetically) zero error* [my emphasis]. The [extent] of the[se] spreads of the calibrated year ranges, obtained from the age calibration of the ^{14}C dates between 0 and 10,000 ^{14}C years BP (bidecadal data set) are given at Figure 3 [Stuiver and Reimer 1993b:279-220] [Figure 5 this paper for range 0-2500 yr BP].

Stuiver and Reimer (1993:221; 1993b:200) have used a device, "time warps" (Figure 5), to depict the effect these "wiggles" (Figure 4) have on the dendro calibration curve. In the St. Lawrence Iroquoian era, c. A.D. 1400-1600, these time warps obliterate much of the 10- to 30-yr period in which St. Lawrence Iroquoian villages were extant. As a result, they seriously inhibit the use of CALIB 3.0.3 calibrated radiocarbon dates and ranges to compile precise St. Lawrence Iroquoian site sequences and chronologies.

Statistical Consideration

Long and Rippeteau (1974) have demonstrated the merits of averaging multiple radiocarbon dates in an archaeological context, and Timmins (1985:49-56,142-147) has applied this technique to several St. Lawrence Iroquoian site samples. Apart from the standard deviation, which becomes smaller than their computed average because of the increased number of disintegrations being measured, averaged dates are the same as mid-point dates. However, because the true date remains unknown, it is difficult to assess whether the averaged date derived from the radiocarbon data is moving toward or away from the true date. Alternatively, a preliminary evaluation suggests that, faced with the current lack of

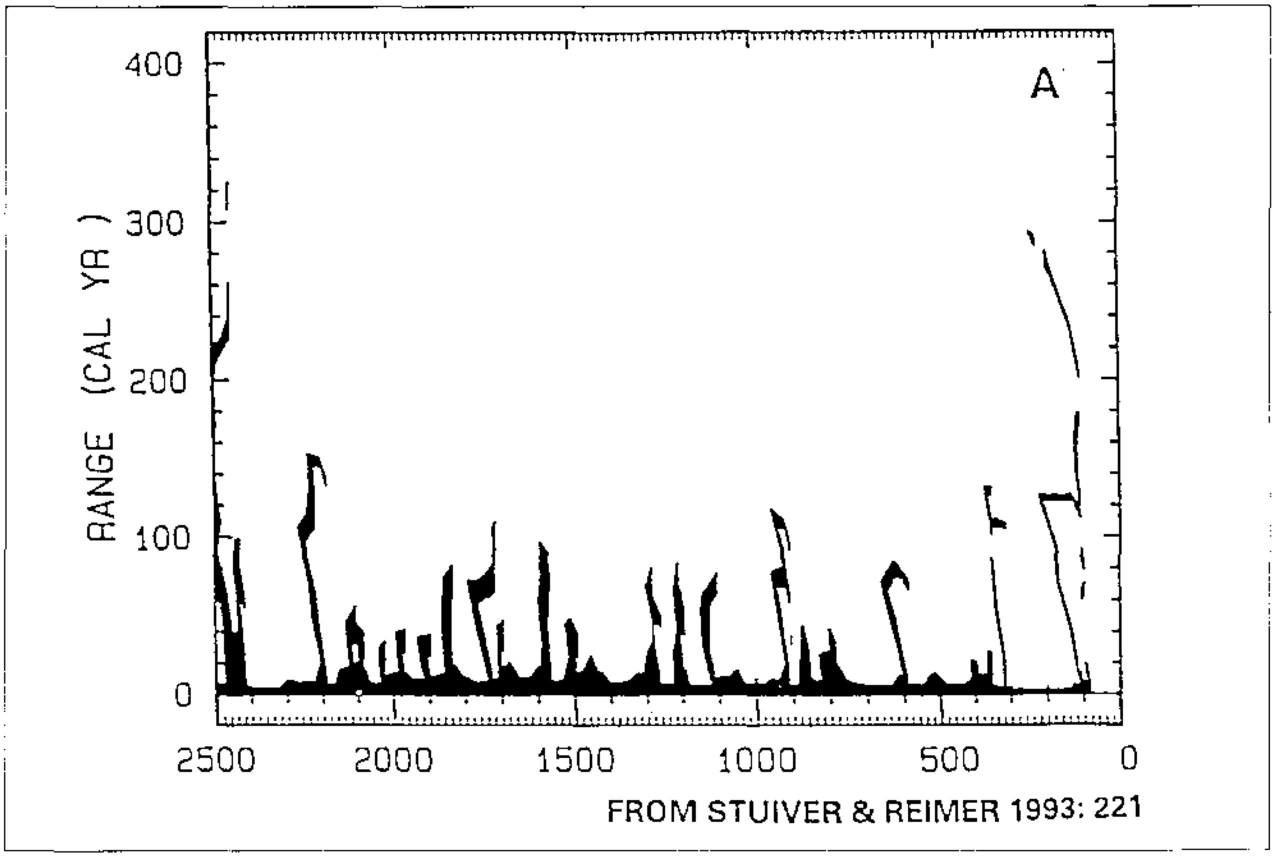


Figure 5. Time warps in radiocarbon-dated dendro samples dated 0-2500 years BP.

appropriate St. Lawrence Iroquoian archaeological data, it would be premature to introduce the Bayesian statistical theorem method suggested by Buck et al. (1991) and Biasi et al. (1994) for combining St. Lawrence Iroquoian radiocarbon and archaeological information.

In a more recent paper "Making the Most of Radiocarbon Dating: Some Statistical Considerations;" Buck et al. (1994) provided advice regarding "the right judgments and statistical considerations [that] must be followed if the real information held in the determinations is to be found" in the results of the CALIB 3.0.3 calibration program. Having proposed three models that reduce the effective range of calibrated dates, including the model suggested by Ward and Wilson (1978), they have concluded:

> 1. Where the magnitude of the intervals between events in the group targeted are small (in comparison to the precision of the radiocarbon results), then the radiocarbon dating is not sufficiently precise (Buck et al. 1991:262).

In the context of compiling a St. Lawrence Iroquoian village sequence and chronology where the village lifespan may be taken to be 10-30 yr, the intervals between consecutive villages is frequently significantly less than the standard deviation available from the CALIB 3.0.3 calibrated date (Tables 2 and 3).

> 2. When the chronology under assessment lies on the steep part of the dendro calibration curve, radiocarbon dating may be of considerable benefit. When the chronology being examined lies on a flat part of the dendro calibration curve, little is to be gained from radiocarbon dating. Where inversions on the calibration curve (Stuiver's "wiggles") are marked, the probability of making correct inferences from radiocarbon dating "is actually lower than by guesswork" (Buck et al. 1994:262).

In the period A.D. 1510-1600 when St. Lawrence Iroquoians were present (Figure 4), the curve is assessed as being flat (relative to the curve for the period A.D. 1600-1700. for instance) and marked inversions are present.

> 3. When there are large standard deviations (in comparison to the length of time between events in the targeted group), radiocarbon dating will provide slight benefit (Bucket al. 1991:263).

Buck et al. suggested that "high precision radiocarbon dating should be able to quote standard deviations around 20, whereas normal precision laboratories produce standard deviations around 40 and 60" (Buck et al. 1991:263). With the exception of 11 McKeown Site samples and 1 Masson Site sample (Tables 2 and 3, serials 41-47, 49, 52-54, 74), all the radiocarbon ages examined here have a standard deviation in excess often-grossly in excess-of 50 yr.

Selection of Calibrated Dates

Serious problems arise when a portion of a calibrated range is extracted from the full calibrated range interval (in which all dates inherently are equally valid) to be attributed to a St. Lawrence Iroquoian target simply because the calibrated range fragment selected best matches chronologies derived from the archaeological data. This cannot be claimed to be radiocarbon dating. It reverses the original intention to obtain a St. Lawrence Iroquoian chronology and site sequence from calibrated radiocarbon dating data. It substitutes a subjective procedure in which radiocarbon dating credibility is measured by the extent to which the radiocarbon calibrated data match a chronology derived from St. Lawrence Iroquoian archaeological data.

The incidence in which the period A.D. 1400-1600 (when the St. Lawrence Iroquoians were present) appears in the data examined here can serve as an example in this con text. These radiocarbon data indicate that approximately 75 per cent of the aye calibrations obtained from the 2-sigma bidecadal CALIB 2.1 and CALIB 3.0.3 programs are located in the period A.D. 1400-1600. But scrutiny of Tables 2 and 3 indicates that in the calibrated ranges in which the period A.D. 1400-1600 is present, it frequently is but a component of a longer span of calendrical years attributed to the radiocarbon-dated samples. Nevertheless, the period A.D. 1400-1600 possesses no particular synchronic value relative to the remainder of the range simply as a result of its being present as a component of a longer calibrated range. It is but a component of the whole range within which it shares the same validity. It is only when a chronology derived from St. Lawrence Iroquoian archaeological data is introduced that the A.D. 1400-1600 component of the calibrated range takes on a particular significance in a St. Lawrence Iroquoian context.

Parenthetically, it might be explained that the period A.D. 1400 -1600 is used here to represent a period in which the St. Lawrence Iroquoians were certain to be present. This avoids the need to engage in tangential discussion regarding the earliest date by which the St. Lawrence Iroquoians were present as a discrete Iroquoian population. Should the need arise to extend the St. Lawrence Iroquoian era into the period prior to A.D. 1400, the incidence of calibrated ages and ranges in an extended St. Lawrence Iroquoian period can be identified from the data set out in Tables 5 and 6.

A Comparison of CALIB 2.1 and
CALIB 3.0.3 Bidecadal 2-sigma Ages

This comparison of bidecadal CALIB 2.1 and CALIB 3.0.3 calibrated 2-sigma ages relative to the period A.D. 1400-1600 when the St. Lawrence Iroquoians were present, excluding post-A.D. 1950 calibrations, indicates (Table 5):

a. Only 43 of the 110 CALIB 2.1 ages (39 per cent) and 42 of the 115 CALIB 3.0.3 ages (36 per cent) lie within the period A.D. 1400-1600, when the St. Lawrence Iroquoians were present.

b. Interestingly, 43 of the 110 CALIB 2.1 ages (39 per cent) and 41 of the 115 CALIB 3.0.3 ages (36 per cent) are prior to A.D. 1400, the earliest date postulated for the St. Lawrence Iroquoian era. This distribution is almost identical to that attributable to the period A.D. 1400-1600 in (a) above.

c. Incongruously, 24 of the 110 CALIB 2.1 ages (21 per cent) and 33 of the 115 CALIB 3.0.3 ages (29 per cent) are after A.D. 1600, the latest date attributed to the St. Lawrence Iroquoian era by the ethnohistoric record and the archaeological data.

d. As unrealistic post-A.D. 1950 calibrated ages. 5 of the 115 in the CALIB 2.1 SAMPLE (4 per cent) and 5 of the 120 in the CALIB 3.0.3 sample (4 per cent) have been excluded in this comparison.

e. Exclusive of the post-A.D. 1950 unrealistic terminal dates. CALIB 2.1 ages span the period 110 B.C.-A.D. 942 (Table 3, serials 53, 12) with the early dates being for the McKeown Site and the late dates for the Camp Drum #1 Site. The CALIB 3.0.3 ages span the period 90 B.C.-A.D. 1949 (Table 3, serials 52, 10) with the early and late dates being attributed to the McKeown and the Camp Drum #I sites again.

Parallel data for CALIB 2.1 and CALIB 3.0.3 I- and 2-sigma decadal ages can be derived from Table 2, and from Table 3 for 1-sigma bidecadal ages. Should the need arise to extend the St. Lawrence Iroquoian era into the period prior to A.D. 1400, the incidence of calibrated ages in the extended era can be identified from Table 5.

A Comparison of CALIB 2.1 and CALIB 3.0.3 Bidecadal 2-sigma Ranges

This comparison of bidecadal CALIB 2.1 and CALIB 3.0.3 calibrated 2-sigma ranges, relative to the period A.D. 1400-1600 in which the St. Lawrence Iroquoians were present, has been derived from 266 CALIB 2.1 calibrated dates and 256 CALIB 3.0.3 calibrated dates spanning the period 400 B.C. - A.D. 1949 as calendrical centuries set out in Table 3. Post-A.D. 1950 calibrations have been excluded. The data indicate that (Table 6):

a. Only 72 of the 266 CALIB 2.1 ranges (27 per cent) and 61 of the 256 CALIB 3.0.3 ranges (24 per cent) lie within the period A.D. 1400-1600, when St. Lawrence Iroquoians were present.

b. Interestingly, 167 of the 266 CALIB 2.1 ranges (63 per cent) and 169 of the 256 CALIB 3.0.3 ranges (66 per cent) are prior to A.D. 1400, the earliest date postulated for the St. Lawrence Iroquoian era.

c. Incongruously 27 of the 266 CALIB 2.1 ranges (10 per cent) and 26 of the 256 CALIB 3.0.3 ranges (10 per cent) are later than A.D. 1600, the latest date in the St. Lawrence Iroquoian era established by the ethnohistoric record and the archaeological data.

d. As unrealistic post-A.D. 1950 calibrated ages, 14 of the 266 CALIB 2.1 ranges available (5 per cent) and 19 of the 256 CALIB 3.0.3 ranges available (7 per cent) have been excluded from this comparison.

e. Exclusive of the post-A.D. 1950 unrealistic terminal dates, CALIB 2.1 ranges span the period 400 B.C. - A.D. 1790 (Table 3, serials 21, 56) with the early date for the Lanoraie Site and the late date for the Potocki Site. CALIB 3.0.3 ranges span the period 397 B.C. - A.D. 1663 (Table 3, serials 21, 3) with the early date for the Lanoraie Site and the late date from the Beaumier Ouest Site.

Parallel data for CALIB 2.1 and CALIB 3.0.3 1- and 2-sigma decadal ranges can be derived from Table 2 and from Table 3 for 1-sigma bidecadal data. Should the need arise to extend the St. Lawrence Iroquoian era into the period prior to A.D. 1400, the incidence of calibrated ranges in the extended St. Lawrence Iroquoian era can be identified from Table 6.

Establishing- a St. Lawrence Iroquoian Site Sequence

The greatest obstacle to the establishment of a realistic St. Lawrence Iroquoian chronology and site sequence does not lie in the realm of radiocarbon dating. This distinction can be attributed to the paucity of detailed and comprehensive site reports for St. Lawrence Iroquoian locations akin to the reports available for the Huron Draper Site (Finlayson 1985; Pearce 1978; von Gernet 1985). This has a particularly debilitating effect in Jefferson County, New York, where our knowledge of the 60-odd sites located there, the largest concentration of St. Lawrence Iroquoian sites known, is still premised on only four or five incomplete site reports. Revisions that seek to adjust this skewed image by adjusting existing chronology to accommodate the few radiocarbon dates available so as to have them better match the dates derived from the archaeological data could be counter-productive. Realistic revisions must accommodate St. Lawrence Iroquoian occupations to mesh well with their neighbors in both time and space. Revised concepts must not conflict temporally or spatially with established collateral archaeological chronologies and site sequences on the periphery of St. Lawrence Iroquoian territory. This has a particular significance in a St. Lawrence Iroquoian context because their terminal date is so closely confined by the archaeological data and the ethnohistoric record to the period c. A.D. 1580-1600.

Following Champlain's advice regarding the Hurons c. A.D. 1615 (Biggar 1929(3):124), the establishment of a St. Lawrence Iroquoian village site sequence will be influenced heavily by the common wisdom that semi-sedentary Iroquoian villages had a lifespan of 10-30 yr. Starna et al. (1984:197-198) noted that longer and shorter lifespans have been postulated for prehistoric Iroquois villages (Abler 1970: Fenton 1978; Heidenreich 1971; Sykes 1980; Tooker 1964; Trigger 1976, 1981). Historic Mohawk and Onondaga villages have been attributed lifespans as long as 50, 80, and 100 yr (Snow 1995:46; Starna 1980; Tuck 1971). If calibrated ranges for radiocarbon-dated samples from these villages were to reflect this reality in tight periods within a 30- or even a 50-yr span, village sequences might be easier to establish. However, the span of years encompassed by the CALIB 2.1 and CALIB 3.0.3 calibrated ranges for the 17 St. Lawrence Iroquoian archaeological sites examined here in which to locate 10-30-yr lifespans can vary widely and grossly (Table 7). Indeed, only 13 of the 275 radiocarbon ranges examined here for these 17 archaeological sites (Table 7, serials 6, 42, 44, 45, 49, 51 and 54) have a range of less than 50 yr. Only 2 (Table 7, serial 54) have a range of less than 30 yr.

The CALIB 2.1 bidecadal 1-sigma calibrated ranges vary from 20 yr (A.D. 1252-1272) for the McKeown Site (Tables 3 and 7, serial 54) to 650 yr (100 B.C.-A.D. 550) for the Lanoraie Site (Tables 3 and 7, serial 21). In the CALIB 2.1 bidecadal 2-sigma data set, calibrated ranges vary from 88 yr (A.D. 1400-1488) for the McKeown Site (Tables 3 and 7, serial 45) to 1202 yr (A.D. 268-1470) for the Lanoraie Site (Tables 3 and 7. serial 40).

In the CALIB 3.0.3 bidecadal 1-sigma data, calibrated ranges vary from 31 yr (A.D. 1400-1431) for the McKeown Site (Tables 3 and 7, serial 49) to 628 yr (A.D. 660-1288) for the McIvor Site (Tables 3 and 7, serial 40). In the CALIB 3.0.3 bidecadal 2-sigma data, calibrated ranges vary from 66 yr (A.D. 1228-1294) for the McKeown Site (Tables 3 and 7, serial 54) to 1183 yr (397 B.C.-A.D. 786) for the Lanoraie Site (Tables 3 and 7, serial 21).

A comparison of some particularly short 1-sigma decadal or bidecadal ranges with equivalent 2-sigma ranges demonstrates the folly of limiting consideration of these data to 1 sigma context only. For instance, the McKeown Site I - sigma calibrations of 45-, 37-, and 20-yr spans (Tables 3 and 7, serials 44, 45, and 54) and 27-, 31-, 39-, and 40-yr spans (Tables 3 and 7, serials 54, 49, 45, and 42), and the Steward, McIvor, and Berry site 1-sigma calibrations of 51-, 56-, and 58-yr spans (Tables 3 and 7, serials 65, 33, and 7) compared with their 2-sigma equivalents of 81-, 212-, 66-, 128-, 198-, 321-, and 312-yr spans, respectively (Tables 3 and 7), illustrate the magnitude of the differences that occur in the best instances.

Conclusion

An earlier assessment of the CALIB 2.1 calibrations (Pendergast 1993) suggested that they not be used to revise current St. Lawrence Iroquoian chronology and site sequences derived from the archaeological data (Chapdelaine 1988:372; Pendergast 1975; 1993a: Figs. 5-16; 1993b). These data indicate that relatively few of the bidecadal 2-sigma calibrated ages and ranges are located in the period A.D. 14001600 when St. Lawrence Iroquoians were present. In the CALIB 2.1. calibrated ages data set (Table 5), only 39 per cent lie in this period. 39 per cent are earlier than A.D. 1400, and 21 per cent are later than A.D. 1600. In the CALIB 3.0.3 calibrated age data set, only 36 per cent are located in the St. Lawrence Iroquoian period A.D. 1400-1600, 36 per cent in the period prior to A.D. 1400, and 29 per cent in the period after A.D. 1600 (Table 5).

On the other hand, the span of years encompassed by the CALIB 2.1 and CALIB 3.0.3 bidecadal 2-sigma calibrated ranges (Table 7) suggests that the chances of selecting a 10 20-yr span to which St. Lawrence Iroquoian villages can be attributed solely on the basis of radiocarbon dates, is slight. Indeed, in the CALIB 2.1. calibrated range data set (Table 6), only 27 per cent lie in the period A.D. 1400-1600 when the St. Lawrence Iroquoians were present, 63 per cent are earlier than A.D. 1400, and 10 per cent are later than A.D. 1600 (exclusive of those in the period post-A.D. 1950). In the CALIB 3.0.3 calibrated range data set (Table 6), only 24 per cent lie within the period A.D. 1400-1600, 66 per cent before A.D. 1400, and 10 per cent after A.D. 1600 (exclusive of those in the period post-A.D. 1950).

Several alterations to the CALIB 2.1 bidecadal 2-sigma calibration ranges have been introduced by the CALIB 3.0.3 calibrated ranges (Table 8). For instance, CALIB 3.0.3 calibration have moved 33 samples from 13 of the 17 sites examined to an earlier date in the period A.D. 1400-1600 than the CALIB 2.1 calibrations indicate (Table 8, serials 11-43).

Generally, these CALIB 3.0.3 data, whether in isolation or in concert with the CALIB 2.1 data, do not accord well with St. Lawrence Iroquoian chronology and site sequences derived from the archaeological data and the ethnohistoric record. It is not recommended that the archaeological chronologies and site sequences be revised to accommodate the CALIB 2.1 or the CALIB 3.0.3 radiocarbon calibrations examined here.

The inability of the CALIB 2.1 and the CALIB 3.0.3 calibration program to date St. Lawrence Iroquoian sites with the precision required to isolate discreet village sites with a 10-30-yr lifespan may be attributed, in part at least, to the following circumstances, assuming corrections for 13C and 12C isotopic fractionation have been incorporated:

1. The recurring and ever-present difficulties encountered regarding the certainty claimed for an archaeological sample selected for radiocarbon dating being in fact contemporary with the archaeological feature targeted for dating

2. The large number of calendrical years in the 1- and 2-sigma calibrated ranges, all of which are equally valid in this context, in most instances so far exceeds the 10-30-yr lifespan attributed to Iroquoian villages as to make unrealistic the selection of a very particular 30-yr span using radiocarbon dating data alone.

3. Three factors inherent in the CALIB 3.0.3 calibration methodology serve to inhibit the isolation of discrete periods of less than 30 yr in which to locate St. Lawrence Iroquoian village lifespans of 10-30 yr. They are:

   a. the proliferation of calibrated ages attributable to the "wiggles" that occur when radiocarbon dates are calibrated against dendro-calibrated curves derived from tree-ring samples spanning less than 10 yr (Stuiver 1993) denies the use of these short-term dendro curves, except in certain particular circumstances (Figure 3); and,

b. the presence of the "wiggles," "time-warps" associated with the radiocarbon dates obtained from dated dendro samples, which obliterate most and in some instances all of the first 20-yr period over the interval in which the St. Lawrence Iroquoians were present c. A.D. 1400-1600 (Stuiver and Reimer 1993b:220-221) (Figure 5); and,

c. advice that calibrated ages should be rounded to the nearest 10 yr when the radiocarbon date has a deviation greater than 50 yr (Stuiver and Reimer 1993a: 1.4.4).

The data examined here are, in effect, a case study of calibrated terrestrial radiocarbon dating, which, apart from anomalies in some particular circumstance, might be expect ed to prevail throughout Iroquoia on this time level. They demonstrate in a St. Lawrence Iroquoian context the hazards that attend adjusting chronologies and site sequences on the basis of calibrated radiocarbon dates alone, particularly when only a single calibrated date is available. These data also demonstrate how the selection of a particular calibrated radiocarbon date from several equally valid options can erroneously appear to endow a subjective selection with the veracity of precise radiocarbon dating techniques.

It is recommended that St. Lawrence Iroquoian radiocarbon research should plan to complete the analysis of these ^{14}C dates using CALIB 3.0.3 Method ‘B’ to permit the results of Method ‘A’ and Method ‘B’ CALIB 3.0.3 calibrations to be compared and contrasted. Every opportunity should be exploited to obtain radiocarbon dates with a deviation of less than ± 20 yr to make the best use of the CALIB 3.0.3 methodology. Generally, St. Lawrence Iroquoian research should proceed so as to quickly make St. Lawrence Iroquoian archaeological and radiocarbon data amenable to statistical analysis using the Bayesian theorem. Concurrent research exploiting these methodologies throughout Iroquoia appears to offer an attractive opportunity to obtain a coherent pan-Iroquoian temporal profile not possible at present for the lack of a standardized methodology. It would be helpful if Iroquoian site radiocarbon dates were consistently calibrated using CALIB 3.0.3, now that it has overtaken CALIB 2.1.

Table 1. Calibrated Radiocarbon Dates for Masson (Deschambault) and Royarnois Sites.

Serial	Calibration	Masson (Deschambault)				Royarnois					
		UQ-1457	UQ-1458	UQ-1459	UQ-1460	B-59144	B-59146	A	B	C	D
1	Uncalibrated	1200+/-100	1250+/-100	1250+/-100	800+/-50	500+/-90	310+/-80	830+/-100	1070+/-80	1540+/-80	1150+/-100
U of Washington 1987 CALIB 2.1 ATM10.14C decadal data set											
2	1 sigma	AD 680-980	AD 660-890	AD 660-890	AD 1436-1611	AD 1327-1447	AD 1455-1656	AD 1039-1280	AD 888-1021	AD 419-601	AD 733-990
3	2 sigma	AD 640-1019	AD 603-990	AD 603-990	AD 1420-1640	AD 1280-1631	AD 1430-1955	AD 1000-1385	AD 789-1155	AD 263-650	AD 660-1148
4	cal. age	AD 780, 790, 802, 843, 853	AD 735,772	AD 735,772	AD 1450	AD 1422	AD 1529, 1556 1634	AD 1215	AD 983	AD 537	AD 889
U of Washington 1987 CALIB 2.7 ATM20.14C bidecadal data set											
5	1 sigma	AD 680-960	AD 660-890	AD 660-890	AD 1439-1510	AD 1322-1451	AD 1468-1657	AD 1043-1270	AD 888-1021	AD 420-605	AD 770-990
6	2 sigma	AD 650-1020	AD 610-990	AD 610-990	AD 1420-1640	AD 1280-1630	AD 1430-1955	AD 1010-1375	AD 780-1157	AD 340-660	AD 660-1040
7	cal. age	AD 812, 847 852	AD 772	AD 772	AD 1460	AD 1422	AD 1528,1554 1633	AD 1221	AD 980	AD 539	AD 889
U of Washington 1993 CALIB 3.0.3 UWTEN93.14C decadal data set											
8	1 sigma	AD 691-982	AD 664-941	AD 664-941	AD 1440-1623	AD 1332-1469	AD 1484-1664	AD 1066-1285	AD 894-1025	AD 425-637	AD 776-998
9	2 sigma	AD 647-1023	AD 609-998	AD 609-998	AD 1426-1642	AD 1293-1635	AD 1436-1954	AD 1001-1388	AD 778-1157	AD 358-659	AD 663-1150
10	cal. age	AD 783, 788 814, 818 831, 839, 869	AD 776	AD 776	AD 1454, 1457 1478	AD 1429	AD 1638	AD 1218	AD 990	AD 541	AD 895, 925, 940
U of Washington 1993 CALIB 3.0.3 INTCAL93.14C bidecadal data set											
11	1 sigma	AD 689-973	AD 668-891	AD 668-891	AD 1443-1621	AD 1398-1463	AD 1477-1663	AD 1052-1286	AD 890-1026	AD 427-620	AD 779-1005
12	2 sigma	AD 654-1023	AD 626-1005	AD 626-1005	AD 1429-1641	AD 1297-1635	AD 1438-1954	AD 1013-1386	AD 785-1162	AD 380-660	AD 667-1150
13	cal. age	AD 872	AD 779	AD 779	AD 1473	AD 1431	AD 1638	AD 1225	AD 989	AD 544	AD 891
IsoTrace C14 CAL 1994 (U of W UWTEN93.14C data set) decadal data set											
14	1 sigma					AD 1395-1450	AD 1485-1665				
15	2 sigma					AD 1290-1530	AD 1435-1685				
16	cal. age					AD 1430	AD 1640				
IsoTrace C14 CAL 1994 (U of W INTCAL93.14C data set) bidecadal data set											
17	1 sigma	AD 690-975	AD 670-890	AD 670-890	AD 1440-1515	AD 1400-1460	AD 1475-1665				
18	2 sigma	AD 655-1020	AD 625-1005	AD 625-1005	AD 1430-1640	AD 1295-1530	AD 1435-1685				
19	cal. age	AD 875	AD 780	AD 780	AD 1475	AD 1430	AD 1640				
Klein et al. 1982											
20		AD 615-1025	AD 600-910	AD 600-910	AD 1405-1662	AD 1310-1515	AD 1410-1950	AD 1025-1325	AD 770-1190	AD 245-625	AD 630-1045

Note: 1) Benmouyal 1990:215, 2) Chapdelaine 1993:96, pers. comm. July 1994

Table 2. Comparison of St. Lawrence Iroquoian Calibrated C14 Dates Derived from University of Washington 1987 2.1 and 1993 3.0.3 Programs Decadal Data Sets.

Serial	Sample	Radiocarbon Age B.P.	1 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)	2 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)	CALIBRATED AGE 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)
Beaumier Ouest (1)								
1	S-816	145 +/- 80	AD 1657-1955 (h)	AD 1665-1955 (h)	AD 1529-1955 (h)	AD 1640-1955 (h)	AD 1683, 1732, 1807 1925, 1955 (h)	AD 1688, 1731, 1810 1925, 1954 (h)
2	S-817	280 +/- 135	AD 1440-1955 (h)	AD 1449-1954 (h)	AD 1410-1950 (h)	AD 1410-1955(h)	AD 1642	AD 1648
3	S-836	370 +/- 70	AD 1439-1637	AD 1442-1642	AD 1420-1660	AD 1422-1664	AD 1487	AD 1492, 1604, 1610
4	S-837	185 +/- 75	AD 1647-1955 (h)	AD 1653-1954 (h)	AD 1517-1950 (h)	AD 1525-1955(h)	AD 1670, 1749, 1760 1945, 1953 (h)	AD 1675, 1777, 1802 1941, 1954 (h)
5	S-838	375 +/- 70	AD 1437-1636	AD 1441-1640	AD 1410-1660	AD 1418-1662	AD 1484	AD 1491
Berry (2)								
6	GSC-451	500 +/- 65	AD 1332-1441	AD 1407-1441	AD 1301-1490	AD 1319-1611	AD 1422	AD 1429
7	GSC-453	450 +/- 65	AD 1415-1473	AD 1420-1488	AD 1329-1632	AD 1333-1635	AD 1437	AD 1441
Cache (3)								
8	GaK-148	780 +/- 150	AD 1040-1385	AD 1066-1388	AD 980-1430	AD 985-1436	AD 1259	AD 1263,1273, 1275
Dawson (4)								
9	GSC-687	470 +/- 80	AD 1407-1464	AD 1410-1487	AD 1302-1636	AD 1320-1638	AD 1432	AD 1437
Camp Drum #1 (5)								
10	Fe-80	210 +/- 60	AD 1645-1955 (h)	AD 1650-1954 (h)	AD 1520-1955 (h)	AD 1527-1955(h)	AD 1662	AD 1669,1783,1797 1948, 1952 (h)
11	Fe-93	370 +/- 60	AD 1441-1635	AD 1444-1638	AD 1420-1650	AD 1430-1656	AD 1487	AD 1492, 1604, 1610
12	Fe-99	170 +/- 80	AD 1650-1955 (h)	AD 1655-1955 (h)	AD 1519-1950 (h)	AD 1527-1955 (h)	AD 1674, 1743, 1801 1941, 1955 (h)	AD 1680, 1742, 1750 1759, 1806, 1937, 1954 (h
Glenbrook (G)								
13	GaK-1491	390 +/- 70	AD 1534-1629	AD 1439-1635	AD 1410-1650	AD 1413-1656	AD 1455	AD 1486
Lanorah (7)								
14	RL-178	580 +/- 90	AD 1283-1426	AD 1296-1434	AD 1260-1450	AD 1278-1483	AD 1330, 1347, 1393	AD 1334, 1338, 1402
15	RL-179	550 +/- 105	AD 1280-1440	AD 1300-1442	AD 1260-1619	AD 1278-1627	AD 1407	AD 1410
16	RL-180	1330 +/- 105	AD 610-798	AD 641-802	AD 540-944	AD 540-979	AD 668	AD 687
17	RL-181	1410 +/- 105	AD 540-680	AD 544-758	AD 420-857	AD 425-871	AD 642	AD 646
18	QU-218	660 +/- 100	AD 1262-1405	AD 1278-1409	AD 1164-1440	AD 1209-1440	AD 1284	AD 1299
19	QU-219	1630 +/-160	AD 240-636	AD 257-639	AD 60-759	AD 74-766	AD 426	AD 427
20	QU-220	810 +/- 160	AD 1020-1300	AD 1030-1381	AD 894-1430	AD 898-1434	AD 1223	AD 1224, 1227, 1245, 1257
21	QU-221	1790 +/- 280	94 BC-AD 540	50 BC-AD 577	400 BC-AD 796	397 BC-AD 800	AD 231	AD 244, 305, 315
Mandeville (8)								
22	RL-1971	400 +/- 90	AD 1425-1635	AD 1432-1638	AD 1329-1660	AD 1333-1667	AD 1450	AD 1454 1457 1478
23	QU-222	410 +/- 120	AD 1410-1640	AD 1414-1645	AD 1280-1955(h)	AD 1302-1954 (h)	AD 1446	AD 1451
24	QU-223	710 +/- 130	AD 1210-1393	AD 1214-1403	AD 1020-1440	AD 1030-1442	AD 1280	AD 1288
25	#9	1060 +/- 120	AD 782-1149	AD 880-1151	AD 680-1220	AD 690-1256	AD 985	AD 995
26	#51	630 +/- 110	AD 1280-1420	AD 1282-1421	AD 1194-1450	AD 1211-1473	AD 1304,1371,1384	AD 1323,1354, 1356 1368, 1387
27	#54a	1120 +/- 100	AD 777-1000	AD 780-1020	AD 670-1153	AD 678-1155	AD 898 920, 942	AD 901, 916, 978
28	#54b	1170 +/- 130	AD 680-1000	AD 691-1016	AD 614-1155	AD 641-1157	AD 784, 786, 874	AD 887, 935

Table 2. Continued

Serial	Sample	Radiocarbon Age B.P.	1 SIGMA 1987(2.1)e(g)	1993(3.0.3)e(m)	2 SIGMA 1987(2.1)e(g)	1993(3.0.3)e(m)	CALIBRATED AGE 1987(2.1)e(g)	1993(3.0.3)e(m)
McIvor (9)								
29	GSC-441	320 +/- 65	AD 1468-1649	AD 1486-1654	AD 1440-1953 (h)	AD 1440-1954 (h)	AD 1525, 1563, 1628	AD 1532, 1547, 1635
30	GSC-412	280 +/- 65	AD 1513-1661	AD 1521-1952 (h)	AD 1450-1955 (h)	AD 1449-1954 (h)	AD 1642	AD 1648
31	GSC-457	380 +/- 65	AD 1437-1633	AD 1445-1636	AD 1420-1650	AD 1424-1657	AD 1472	AD 1483
32	GSC-460	330 +/- 65	AD 1453-1646	AD 1474-1652	AD 1430-1952 (h)	AD 1440-1953 (h)	AD 1521, 1590, 1623	AD 1525, 1558, 1631
33	S-2006	480 +/- 70	AD 1407-1443	AD 1410-1430	AD 1303-1620	AD 1326-1627	AD 1429	AD 1436
34	S-2007	1350 +/- 70	AD 640-765	AD 643-769	AD 560-852	AD 565-865	AD 661	AD 665
35	S-2008	980 +/- 80	AD 981-1157	AD 994-1186	AD 890-1220	AD 895-1257	AD 1023	AD 1027
36	S-2009	410 +/- 100	AD 1420-1635	AD 1424-1638	AD 1320-1660	AD 1328-1952 (h)	AD 1446	AD 1451
37	S-2010	430 +/- 80	AD 1418-1611	AD 1424-1622	AD 1327-1650	AD 1331-1650	AD 1441	AD 1445
38	S-2011	430 +/- 70	AD 1421-1491	AD 1428-1618	AD 1331-1640	AD 1335-1645	AD 1441	AD 1445
39	S-2012	530 +/- 80	AD 1320-1437	AD 1328-1441	AD 1280-1490	AD 1291-1611	AD 1412	AD 1414
40	S-2064	1050 +/- 330	AD 650-1280	AD 656-1286	AD 263-1460	AD 345-1486	AD 990	AD 997
McKeown (10)								
41	TO-1032	360+/-40	AD 1449-1630	AD 1453-1635	AD 1438-1644	AD 1441-1648	AD 1490	AD 1498, 1512, 1516 1599, 1618
42	TO-1033	430 +/- 40	AD 1430-1468	AD 1436-1487	AD 1415-1617	AD 1419-1623	AD 1441	AD 1445
43	TO-1034	560 +/- 40	AD 1325-1416	AD 1329-1423	AD 1297-1431	AD 1303-1438	AD 1334, 1338, 1403	AD 1408
44	TO-1035	780 +/- 40	AD 1217-1277	AD 1220-1283	AD 1163-1281	AD 1195-1293	AD 1259	AD 1263, 1273, 1275
45	TO-1036	460 +/- 50	AD 1417-1448	AD 1423-1473	AD 1332-1493	AD 1407-1618	AD 1435	AD 1439
46	TO-1037	340 +/- 40	AD 1476-1637	AD 1487-1642	AD 1443-1648	AD 1445-1653	AD 1516, 1599, 1618	AD 1523, 1565, 1578, 16
47	TO-1038	380 +/- 40	AD 1442-1620	AD 1446-1627	AD 1432-1639	AD 1437-1642	AD 1476	AD 1489
48	TO-1039	390 +/- 90	AD 1428-1637	AD 1435-1642	AD 1331-1660	AD 1405-1952 (h)	AD 1455	AD 1486
49	TO-1040	540 +/- 40	AD 1329-1424	AD 1333-1431	AD 1304-1437	AD 1325-1441	AD 1410	AD 1412
50	TO-1041	580 +/- 70	AD 1285-1419	AD 1302-1426	AD 1280-1440	AD 1285-1444	AD 1330, 1347, 1393	AD 1334, 1338, 1402
51	TO-1042	480 +/- 60	AD 1409-1444	AD 1412-1449	AD 1323-1490	AD 1329-1618	AD 1429	AD 1436
52	TO-1043	820 +/- 40	AD 1164-1260	AD 1209-1276	AD 1070-1278	AD 1155-1284	AD 1219	AD 1221, 1253, 1256
53	TO-1044	2090 +/- 50	200-48 BC	169-1 BC	351 BC-AD 21	346 BC-AD 49	164, 145, 114 BC	89, 77, 57 BC
54	TO-2166	760 +/- 30	AD 1233-1278	AD 1260-1285	AD 1214-1282	AD 1216-1293	AD 1263	AD 1279
Potocki (11)								
55	GX-2213	475 +/- 95	AD 1331-1480	AD 1406-1490	AD 1280-1640	AD 1297-1646	AD 1430	AD 1436
56	GX-2214	390 +/- 95	AD 1427-1638	AD 1433-1643	AD 1329-1952 (h)	AD 1333-1953(h)	AD 1455	AD 1486
Roebuck (12)								
57	M-1538	800 +/- 100	AD 1132-1280	AD 1158-1291	AD 1003-1390	AD 1022-1394	AD 1230, 1243, 1256	AD 1259
Salem (13)								
58	M-1541	300+/-100	AD 1450-1952 (h)	AD 1454-1953 (h)	AD 1420-1955 (h)	AD 1427-1954 (h)	AD 1532, 1541, 1637	AD 1642
59	GSC-446	410+/-65	AD 1430-1616	AD 1436-1625	AD 1410-1640	AD 1411-1618	AD 1446	AD 1451
60	GSC-458	390+/-65	AD 1435-1626	AD 1439-1633	AD 1410-1650	AD 1415-1653	AD 1455	AD 1486
Steward (14)								
61	I-11229	845 +/- 140	AD 1020-1280	AD 1025-1289	AD 896-1400	AD 899-1408	AD 1210	AD 1214
62	I-11230	1800 +/- 80	AD 82-338	AD 130-376	AD 27-410	AD 32-422	AD 185, 186, 228	AD 241
63	I-11231	690 +/- 210	AD 1132-1430	AD 1158-1436	AD 901-1650	AD 902-1650	AD 1281	AD 1292
64	I-11232	290 +/- 80	AD 1486-1662	AD 1492-1952 (h)	AD 1440-1955 (h)	AD 1440-1954 (h)	AD 1640	AD 1645
65	I-11233a	510 +/- 80	AD 1327-1442	AD 1332-1445	AD 1280-1615	AD 1295-1623	AD 1418	AD 1425
66	I-11233b	510 +/- 180	AD 1280-1623	AD 1292-1631	AD 1162-1955 (h)	AD 1165-1954 (h)	AD 1418	AD 1425
67	S-1960	630 +/- 120	AD 1264-1420	AD 1280-1426	AD 1162-1460	AD 1164-1487	AD 1304, 1371, 1384	AD 1323, 1354, 1356 1368, 1387
68	S-1961	530 +/- 120	AD 1300-1450	AD 1302-1467	AD 1260-1640	AD 1264-1645	AD 1412	AD 1414

Table 2. Continued

Serial	Sample	Radiocarbon Age B.P.	1 SIGMA 1987(2.1)(e)(g)	1 SIGMA 1993(3.0.3)(e)(n)	2 SIGMA 1987(2.1)(e)(g)	2 SIGMA 1993(3.0.3)(e)(n)	CALIBRATED AGE 1987(2.1)(e)(g)	CALIBRATED AGE 1993(3.0.3)(e)(n)
Summerstown Station (15)								
69	M-1539	340 +/- 100	AD 1440-1650	AD 1442-1660	AD 1410-1955 (h)	AD 1411-1954 (h)	AD 1516, 1599, 1618	AD 1523, 1565, 1578, 1627
70	GaK-1390	200 +/- 75	AD 1643-1955 (h)	AD 1649-1954 (h)	AD 1490-1950 (h)	AD 1519-1955 (h)	AD 1665, 1784, 1788, 1949, 1952 (h)	AD 1671, 1781, 1799, 1945, 1953 (h)
Masson/Deschambault (16)								
71	UQ-1457	1200 +/- 100	AD 680-980	AD 691-982	AD 640-1019	AD 647-1023	AD 780, 790, 802, 843, 853	AD 783, 788, 814, 818, 831, 839, 869
72	UQ-1458	1250 +/- 100	AD 660-890	AD 664-941	AD 603-990	AD 609-998	AD 735, 772	AD 776
73	UQ-1459	1250 +/- 100	AD 660-890	AD 664-941	AD 603-990	AD 609-998	AD 735, 772	AD 776
74	UQ-1460	400 +/- 50	AD 1436-1611	AD 1440-1623	AD 1420-1640	AD 1426-1642	AD 1450	AD 1454, 1457, 1478
Royarnois (17)								
75	B-59144	500 +/- 90	AD 1327-1447	AD 1332-1469	AD 1280-1643	AD 1293-1635	AD 1422	AD 1429
76	B-95146	310 +/- 80	AD 1455-1656	AD 1484-1664	AD 1430-1955 (h)	AD 1436-1954 (h)		AD 1638
77	A	830 +/- 100	AD 1039-1280	AD 1066-1285	AD 100-1385	AD 1001-1388	AD 1215	AD 1218
78	B	1070 +/- 80	AD 888-1021	AD 894-1025	AD 780-1155	AD 778-1157	AD 983	AD 990
79	C	1540 +/- 80	AD 419-601	AD 425-637	AD 263-650	AD 358-659	AD 537	AD 541
80	D	1150 +/- 100	AD 733-990	AD 776-998	AD 660-1148	AD 663-1150	AD 889	AD 895, 925, 940

REFERENCES

1) Marois 1978:26
2) Wilmeth 1969:111
3) Wilmeth 1978:145
4) Wilmeth 1969:112, Pendergast and Trigger 1972:285
5) Hotopp 1991:66-7
6) Wilmeth 1978:122; Pendergast 1981
7) Clermont et al. 1983:155
8) Chapdelaine 1988:88-9
9) Wilmeth 1978:128, J.V. Wright 1985:62
10) Isotrace correspondence with Pendergast 19 Oct '88; 20 Jun 91 Canadian Museum of Civilization files
11) Geochron correspondences with Marion White 18 May '71; SUNY Buffalo files.
12) Wilmeth 1969:107
13) Wilmeth 1969:108
14) P.J. Wright 1981:5
15) Wilmeth 1969:110
16) Benmouyl 1990
17) Chapdelaine 1993:96; pers. comm. July 1994

NOTES:

With the exception of a new note, (n), these notes use the same identification letters used in Pendergast 1993, Tab. 1: Northeast Anthro. 46:2-4

(e) Point where the radiocarbon date intersects the dendro calibration curve.
(g) Univ. of Washington CALIB 2.1 1987 dates provided by Gordon D. Watson, Nov., 1991
(h) 1950 dates indicate influences of nuclear testing generated C-14.
(n) Univ. of Washington CALIB 3.0.3 1993 Program dates provided by Gordon D. Watson, October 1993.
(o) Royarnois site calibrations provided by Gordon D. Watson, July 8, 1994

Table 3. Comparison of St. Lawrence Iroquoian Calibrated C14 Dates Derived from University of Washington 1987 2.1 and 1993 3.0.3 Programs Bidecadal Data Sets.

Serial	Sample	Radiocarbon Age B.P.	1 SIGMA 1987(2.1)(e)(g)	1 SIGMA 1993(3.0.3)(e)(h)	2 SIGMA 1987(2.1)(e)(g)	2 SIGMA 1993(3.0.3)(e)(h)	CALIBRATED AGE 1987(2.1)(e)(g)	CALIBRATED AGE 1993(3.0.3)(e)(h)
Beaumier Ouest (1)								
1	S-816	145 +/- 80	AD 1658-1955 (h)	AD 1664-1955 (h)	AD 1530-1955 (h)	AD 1639-1955 (h)	AD 1684, 1738, 1806, 1932, 1955 (h)	AD 1687, 1735, 1811, 1927, 1954 (h)
2	S-817	280 +/- 135	AD 1450-1955 (h)	AD 1457-1954 (h)	AD 1400-1950 (h)	AD 1407-1955 (h)	AD 1642	AD 1647
3	S-836	370 +/- 70	AD 1442-1636	AD 1446-1641	AD 1420-1660	AD 1425-1663	AD 1480	AD 1488, 1609, 1611
4	S-837	185 +/- 75	AD 1648-1955 (h)	AD 1654-1954 (h)	AD 1516-1950 (h)	AD 1522-1955 (h)	AD 1671, 1767, 1794, 1947, 1953 (h)	AD 1676, 1774, 1800, 1942, 1954 (h)
5	S-838	375 +/- 70	AD 1441-1635	AD 1445-1639	AD 1410-1660	AD 1422-1661	AD 1477	AD 1485
Berry (2)								
6	GSC-451	500 +/- 65	AD 1399-1444	AD 1404-1448	AD 1299-1480	AD 1309-1611	AD 1422	AD 1431
7	GSC-453	450 +/- 65	AD 1415-1472	AD 1423-1481	AD 1327-1630	AD 1400-1635	AD 1440	AD 1444
Cache (3)								
8	GaK-148	780 +/- 150	AD 1043-1374	AD 1052-1385	AD 930-1430	AD 984-1436	AD 1259	AD 1275
Dawson (4)								
9	GSC-687	470 +/- 80	AD 1403-1468	AD 1407-1478	AD 1299-1633	AD 1310-1638	AD 1434	AD 1438
Camp Drum #1 (5)								
10	Fe-80	210 +/- 60	AD 1645-1955 (h)	AD 1651-1954 (h)	AD 1519-1955 (h)	AD 1525-1955 (h)	AD 1663	AD 1669, 1786, 1793, 1949, 1952 (h)
11	Fe-93	370 +/- 60	AD 1445-1633	AD 1448-1638	AD 1430-1650	AD 1432-1657	AD 1480	AD 1488, 1609, 1611
12	Fe-99	170 +/- 80	AD 1651-1955 (h)	AD 1657-1955 (h)	AD 1518-1950 (h)	AD 1525-1955 (h)	AD 1676, 1747, 1799, 1942, 1955 (h)	AD 1680, 1753, 1804, 1937, 1954 (h)
Glenbrook (6)								
13	GaK-1491	390 +/- 70	AD 1436-1630	AD 1441-1635	AD 1410-1650	AD 1414-1657	AD 1468	AD 1478
Lanorale (7)								
14	RL-178	580 +/- 90	AD 1285-1427	AD 1300-1433	AD 1260-1460	AD 1279-1473	AD 1328, 1333, 1395	AD 1400
15	RL-179	550 +/- 105	AD 1290-1440	AD 1304-1445	AD 1260-1617	AD 1279-1627	AD 1404	AD 1408
16	RL-180	1330 +/- 105	AD 630-780	AD 637-788	AD 540-941	AD 544-962	AD 669	AD 676
17	RL-181	1410 +/- 105	AD 550-680	AD 557-688	AD 420-853	AD 427-873	AD 642	AD 651
18	QU-218	660 +/- 160	AD 1260-1400	AD 1279-1405	AD 1180-1400	AD 1213-1441	AD 1287	AD 1302
19	QU-219	1630 +/- 160	AD 230-600	AD 244-610	AD 60-680	AD 71-686	AD 416	AD 423
20	QU-220	810 +/- 160	AD 1030-1290	AD 1032-1373	AD 890-1430	AD 895-1433	AD 1230	AD 1245
21	QU-221	1790 +/- 280	100 BC-AD 550	50 BC-AD 591	400 BC-AD 780	397 BC-AD 786	AD 233	AD 244
Mandeville (8)								
22	RL-1971	400 +/- 90	AD 1427-1633	AD 1433-1638	AD 1327-1660	AD 1400-1952 (h)	AD 1460	AD 1473
23	QU-222	410 +/- 120	AD 1410-1640	AD 1415-1644	AD 1290-1955 (h)	AD 1305-1954 (h)	AD 1453	AD 1462
24	QU-223	710 +/- 130	AD 1220-1395	AD 1221-1400	AD 1030-1440	AD 1032-1444	AD 1277	AD 1290
25	#9	1060 +/- 120	AD 880-1040	AD 883-1153	AD 680-1230	AD 689-1230	AD 985	AD 997
26	#51	630 +/- 110	AD 1270-1410	AD 1284-1421	AD 1200-1450	AD 1217-1464	AD 1300, 1365, 1374	AD 1310, 1353, 1385
27	#54a	1120 +/- 100	AD 780-1010	AD 789-1017	AD 670-1154	AD 680-1159	AD 897	AD 898, 906, 961
28	#54b	1170 +/- 130	AD 680-1000	AD 689-1011	AD 630-1157	AD 640-1162	AD 883	AD 886

Table 3. Continued

Serial	Sample	Radiocarbon Age D.P.	1 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(m)	2 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(m)	CALIBRATED AGE 1987(2.1)(e)(g)	1993(3.0.3)(e)(m)
McIvor (9)								
29	GSC-441	320 +/- 65	AD 1471 1649	AD 1479 1655	AD 1440 1953 (h)	AD 1443-1954 (h)	AD 1523,1566,1629	AD 1530,1537,1635
30	GSC-442	280 +/- 65	AD 1512 1662	AD 1518 1952 (h)	AD 1450-1955 (h)	AD 1459-1954 (h)	AD 1642	AD 1647
31	GSC-457	380 +/- 65	AD 1441 1632	AD 1445 1636	AD 1420-1650	AD 1424-1657	AD 1474	AD 1483
32	GSC-460	330 +/- 65	AD 1464-1646	AD 1474 1652	AD 1440 1670	AD 1440 1953 (h)	AD 1519, 1587, 1623	AD 1525, 1558, 1631
33	S-2006	480 +/- 70	AD 1403-1454	AD 1407-1463	AD 1305 1617	AD 1315 1627	AD 1431	AD 1436
34	S-2007	1350 +/- 70	AD 636 690	AD 646 766	AD 566-790	AD 599-862	AD 663	AD 668
35	S-2008	980 +/- 80	AD 985 1160	AD 996-1165	AD 890-1230	AD 893 1230	AD 1024	AD 1028
36	S-2009	410 +/- 100	AD 1420 1633	AD 1425-1638	AD 1311 1660	AD 1321 1953 (h)	AD 1453	AD 1462
37	S-2010	430 +/- 80	AD 1418-1509	AD 1425 1621	AD 1322 1650	AD 1397 1651	AD 1445	AD 1449
38	S-2011	430 +/- 70	AD 1422-1487	AD 1430 1616	AD 1400 1640	AD 1402 1644	AD 1445	AD 1449
39	C-2012	530 +/- 80	AD 1311 1440	AD 1321 1444	AD 1280-1480	AD 1295-1611	AD 1409	AD 1415
40	S-2064	1050 +/- 330	AD 650 1270	AD 660-1288	AD 268 1470	AD 347 1478	AD 991	AD 1005
McKeown (10)								
41	TO-1032	360 +/- 40	AD 1459-1630	AD 1471 1635	AD 1441-1643	AD 1445-1648	AD 1486	AD 1511, 1600, 1616
42	TO-1033	430 +/- 40	AD 1433 1469	AD 1438-1478	AD 1417-1611	AD 1424 1622	AD 1445	AD 1449
43	TO-1034	560 +/- 40	AD 1316-1414	AD 1327 1422	AD 1293 1432	AD 1307-1437	AD 1401	AD 1405
44	TO-1035	780 +/- 40	AD 1225 1270	AD 1229 1285	AD 1180-1279	AD 1212 1293	AD 1259	AD 1275
45	TO-1036	460 +/- 50	AD 1417-1454	AD 1425 1464	AD 1400-1488	AD 1404-1616	AD 1437	AD 1441
46	TO-1037	340 +/- 40	AD 1474 1636	AD 1482-1641	AD 1448-1648	AD 1451-1654	AD 1514, 1600, 1616	AD 1520, 1569, 1627
47	TO-1038	380 +/- 40	AD 1448 1617	AD 1452-1627	AD 1436 1637	AD 1440 1641	AD 1474	AD 1483
48	TO-1039	390 +/- 90	AD 1431 1636	AD 1435-1641	AD 1400-1660	AD 1402 1953 (h)	AD 1468	AD 1478
49	TO-1040	540 +/- 40	AD 1327-1423	AD 1400 1431	AD 1304-1438	AD 1314-1442	AD 1407	AD 1410
50	TO-1041	580 +/- 70	AD 1289 1413	AD 1305-1426	AD 1270 1440	AD 1288 1447	AD 1328,1333,1395	AD 1400
51	TO-1042	480 +/- 60	AD 1406 1449	AD 1410-1454	AD 1316-1488	AD 1327 1616	AD 1431	AD 1436
52	TO-1043	820 +/- 40	AD 1180 1260	AD 1213-1277	AD 1129 1270	AD 1164-1285	AD 1225	AD 1229
53	TO-1044	2090 +/- 50	187-49 BC	174 36 BC	350 BC-AD 10	199 BC-AD 20	110 BC	90, 67 BC
54	TO-2166	760 +/- 30	AD 1252 1272	AD 1260 1287	AD 1224-1279	AD 1228 1294	AD 1265	AD 1280
Potocki (11)								
55	GX-2213	475 +/- 95	AD 1398 1475	AD 1403-1483	AD 1290 1640	AD 1301-1646	AD 1432	AD 1437
56	GX-2214	390 +/- 95	AD 1429-1637	AD 1434 1643	AD 1327-1790	AD 1400-1953 (h)	AD 1468	AD 1478
Roebuck (12)								
57	M-1538	800 +/- 100	AD 1160 1280	AD 1165 1293	AD 1020 1389	AD 1022 1396	AD 1245	AD 1253
Salem (13)								
58	M-1541	300 +/- 100	AD 1460 1670	AD 1472-1953 (h)	AD 1420 1955 (h)	AD 1430-1954 (h)	AD 1636	AD 1641
59	GSC-446	410 +/- 65	AD 1432-1613	AD 1437 1624	AD 1410-1640	AD 1409 1647	AD 1453	AD 1462
60	GSC-458	390 +/- 65	AD 1438 1627	AD 1442-1626	AD 1410 1650	AD 1419-1654	AD 1468	AD 1478
Steward (14)								
61	I-11229	845 +/- 140	AD 1020-1280	AD 1027 1292	AD 900-1400	AD 897-1404	AD 1214	AD 1220
62	I-11230	1800 +/- 80	AD 118 333	AD 129-341	AD 30 410	AD 65 420	AD 227	AD 239
63	I-11231	690 +/- 210	AD 1160 1430	AD 1165 1436	AD 900 1640	AD 967-1651	AD 1281	AD 1295
64	I-11232	290 +/- 80	AD 1480-1663	AD 1487 1953 (h)	AD 1440-1955 (h)	AD 1443-1954 (h)	AD 1639	AD 1664
65	I-11233a	510 +/- 80	AD 1322 1446	AD 1398-1449	AD 1290-1510	AD 1300 1621	AD 1418	AD 1426
66	I-11233b	510 +/- 180	AD 1280 1623	AD 1295 1631	AD 1170 1955 (h)	AD 1192 1954 (h)	AD 1418	AD 1426
67	S-1960	630 +/- 120	AD 1270 1420	AD 1281 1426	AD 1170 1470	AD 1191 1478	AD 1300, 1365, 1374	AD 1310, 1353, 1385
68	S-1961	530 +/- 120	AD 1290 1450	AD 1305 1463	AD 1260 1640	AD 1277 1644	AD 1409	AD 1415

Table 3. Continued

Serial	Sample	Radiocarbon Age B.P.	1 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)	2 SIGMA 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)	CALIBRATED AGE 1987(2.1)(e)(g)	1993(3.0.3)(e)(n)
Summerstown Station (15)								
69	M-1539	340 +/- 100	AD 1440-1650	AD 1446-1660	AD 1410-1955 (h)	AD 1410-1954 (h)	AD 1514, 1600, 1616	AD 1520, 1569, 1627
70	GaK-1490	200 +/- 75	AD 1643-1955 (h)	AD 1649-1954 (h)	AD 1500-1950 (h)	AD 1515-1955 (h)	AD 1666, 1790 1951 (h), 1952 (h)	AD 1662, 1781, 1946 1953 (h)
Masson/Deschambault (16)								
71	UQ-1457	1200 +/- 100	AD 680-960	AD 689-973	AD 650-1020	AD 654-1023	AD 812, 847, 852	AD 872
72	UQ-1458	1250 +/- 100	AD 660-890	AD 668-891	AD 610-990	AD 626-1005	AD 772	AD 799
73	UQ-1459	1250 +/- 100	AD 660-890	AD 668-891	AD 610-990	AD 626-1005	AD 772	AD 799
74	UQ-1460	400 +/- 50	AD 1439-1510	AD 1443-1621	AD 1420-1640	AD 1429-1641	AD 1460	AD 1473
Royarnois (17)								
75	B-59144	500 +/- 90	AD 1322-1454	AD 1398-1463	AD 1280-1630	AD 1297-1635	AD 1422	AD 1431
76	B-59146	310 +/- 80	AD 1468-1657	AD 1477-1663	AD 1430-1955 (h)	AD 1438-1954 (h)	AD 1528, 1554, 1633	AD 1638
77	A	830 +/- 100	AD 1043-1270	AD 1052-1286	AD 1010-1375	AD 1013-1386	AD 1221	AD 1225
78	B	1070 +/- 80	AD 888-1021	AD 890-1026	AD 780-1157	AD 785-1162	AD 980	AD 989
79	C	1540 +/- 80	AD 420-605	AD 427-620	AD 340-660	AD 380-660	AD 539	AD 544
80	D	1150 +/- 100	AD 770-990	AD 779-1005	AD 660-1040	AD 667-1150	AD 889	AD 891

REFERENCES
1) Marois 1978:26
2) Wilmeth 1969:111
3) Wilmeth 1978:145
4) Wilmeth 1969:112, Pendergast and Trigger 1972:285
5) Hotopp 1991:66-7
6) Wilmeth 1978:122; Pendergast 1981
7) Clermont et al. 1983: 155
8) Chapdelaine 1988:88-9
9) Wilmeth 1978:128; J.V. Wright 1985:62
10) Isotrace correspondence with Pendergast 19 Oct '88; 20 Jun '91 Canadian Museum of Civilization files.
11) Geochron correspondences with Marian White 18 May '71; SUNY Buffalo files
12) Wilmeth 1969:107
13) Wilmeth 1969:108
14) P.J. Wright 1981:5
15) Wilmeth 1969:110
16) Benmouyl 1990
17) Chapdelaine 1993:96; pers. comm. July 1994

NOTES: With the exception of a new note, (n) these notes use the same identification letters used in Pendergast 1993, Table 1, Northeast Anthropology 46:2-4
e) Point where the radiocarbon date intersects the dendro calibration curve.
g) Univ. of Washington CALIB 2.1 1987 dates provided by Gordon D. Watson Nov. 1991.
h) 1950 dates indicate influences of of nuclear testing generated C-14.
n) Univ. of Washington CALIB 3.0.3 1993 Program date provided by Gordon D. Watson October 1993.
o) Royarnois site calibrations provided by Gordon D. Watson, July 8, 1994.

Table 4. Differences in Calendar Years between Calibrated Decadal and Bidecadal 2 Sigma End-Points and Calibrated Ages.

	Range		Calibrated Age			Range		Calibrated Age	
Serial	**2.1**	**3.0.3**	**2.1**	**3.0.3**	**Serial**	**2.1**	**3.0.3**	**2.1**	**3.0.3**
1	1-X	1-X	1, 6, 1, 7, X	1, 4, 1, 2, X	41	7-1	4-0	4	13, 1, 5, 1, 2
2	10-X	3-X	0	1	42	2-6	5-1	4	4
3	0-0	3-1	7	4, 5, 1	43	4-1	4-1	67, 63, 2	3
4	1-X	3-X	1, 18, 34, 2, X	1, 3, 2, 1, X	44	17-2	17-0	0	12, 2, 0
5	0-0	4-1	7	6	45	68-5	3-2	2	2
6	2-10	10-0	0	2	46	5-0	6-1	2, 1, 2	3, 4, 9, 0
7	2-2	67-0	3	3	47	4-2	3-1	2	6
8	10-0	1-0	0	12, 2, 0	48	69-0	3-X	13	8
9	3-3	10-0	2	1	49	0-1	11-1	3	2
10	1-X	2-X	1	0, 3, 4, 1, X	50	10-0	3-3	2, 14, 2	66, 62, 2
11	10-0	2-1	7	4, 5, 1	51	7-2	2-2	2	0
12	1-X	2-X	2, 4, 2, 1, X	0, 11, 3, 6, 1, 0, X	52	49-8	9-1	6	8, 24, 27
13	0-0	1-1	13	8	53	1-11	147-29	51, 35, 4	1, 10, 10
14	0-10	1-10	2, 12, 2	66, 62, 2	54	10-10	12-1	2	1
15	0-2	1-0	3	2	55	10-0	4-0	2	1
16	0-3	4-17	1	11	56	2-X	67-X	13	8
17	0-4	2-2	0	5	57	17-1	0-2	15, 2, 11	6
18	16-40	4-1	3	3	58	0-X	3-X	104, 95, 1	1
19	0-79	3-80	10	4	59	0-0	2-1	7	11
20	4-0	3-1	7	21, 18, 0, 12	60	0-17	4-1	13	8
21	0-16	2-69	2	12, 59, 73	61	4-0	2-4	4	6
22	2-0	6-X	10	19, 16, 5	62	3-0	33-2	42, 41, 1	2
23	10-X	3-X	7	11	63	1-10	65-1	0	3
24	10-0	2-2	3	2	64	0-X	3-X	1	1
25	0-10	1-26	0	2	65	10-105	5-2	0	1
26	6-0	6-9	4, 6, 10	13, 1, 29, 17, 2	66	8-X	27-X	0	1
27	0-1	2-4	1, 23, 15	3, 10, 18	67	8-10	0-0	4, 6, 10	13, 1, 29
28	16-2	1-5	99, 97, 9	1, 49	68	0-0	3 -1	3	1
29	0-X	3-X	2, 3, 1	2, 10, 0	69	0-X	1-X	2, 1, 2	3, 4, 9, 0
30	0-X	10-X	0	1	70	10-X	4-X	1, 6, 2, 1, X	9, 0, 7, X
31	0-0	0-0	2	0	71	10-1	7-0	32, 22, 45, 4, 1	1, 84, 58, 54, 41, 37
32	10-X	0-X	2, 3, 0	0, 0, 0	72	7-0	7-7	37, 0	23
33	2-3	11-0	2	0	73	7-0	17-7	37-0	23
34	6-62	34-3	2	3	74	0-0	3-1	10	19, 16, 5
35	0-10	2-27	1	1	75	0-189	4-0	0	2
36	9-0	7-X	7	11	76	0-X	2-X	1, 2, 10	0
37	5-0	66-1	4	4	77	4-10	12-2	3	7
38	69-0	67-0	4	4	78	90-2	7-5	3	1
39	0-10	4-0	3	1	79	77-10	22-1	2	3
40	5-10	2-8	1	8	80	0-108	4-0	0	4, 34, 49

Table 5. CALIB 2.1 and 3.0.3 Bidecadal 2 Sigma Calibrated Age Distribution in Calendrical Centuries.

		2.1		3.0.3		2.1	3.0.3	
Serial	Century	f	%	f	%	%	%	
1	BC 101-200	1	1	—	—			
2	BC 1-100	—	—	2	2			
3	AD 101-200	—	—	—	—			
4	AD 201-300	2	2	2	2			
5	AD 301-400	—	—	—				
6	AD 401-500	1	1	1	1			
7	AD 501-600	1	1	1	1			
8	AD 601-700	3	3	3	3	39	36	
9	AD 701-800	2	2	2	2			
10	AD 801-900	6	5	4	3			
11	AD 901-1000	3	3	4	3			
12	AD 1001-1100	1	1	2	2			
13	AD 1101-1200	1	1	1	1			
14	AD 1201-1300	12	10	10	8			
15	AD 1301-1400	10	9	9	8			
16	AD 1401-1500	33	29	32	27			ST. LAWRENCE
17	AD 1501-1600	10	9	10	8	39	36	IROQUOIAN ERA
18	AD 1601-1700	14	12	19	16			
19	AD 1701-1800	6	5	6	5			
20	AD 1801-1900	1	1	3	3	21	29	
21	AD 1901-1950	3	3	5	4			
22	post AD 1950	5	4	5	4	4	4	
	TOTALS	115		120				

Note: Should the need arise to extend the St. Lawrence Iroquoian era into the period prior to AD 1400, the incidence of calibrated ages in the extended era can be identified from these data.

Table 6. Distribution of Calib 2.1 and Calib 3.0.3 Bidecadal 2 Sigma Calibrated Ranges.

Serial	Temporal Period	Calib 2.1 f	% (a)	Calib 3.0.3 f	% (a)	
1	301-400 BC	2		1		
2	201-300 BC	2		1		
3	101-200 BC	2		2		
4	1-100 BC	4		4		
5	AD 1-100	—		—		
6	AD 101-200	3		3		
7	AD 201-300	4		3		
8	AD 301-400	5		5		
9	AD 401-500	6		6		
10	AD 501-600	7	63	7	66	
11	AD 601-700	14		14		
12	AD 701-800	12		13		
13	AD 801-900	13		15		
14	AD 901-1000	15		15		
15	AD 1001-1100	15		17		
16	AD 1101-1200	17		16		
17	AD 1201-1300	22		22		
18	AD 1301-1400	24		25		
19	AD 1401-1500	44	27	39	24	ST. LAWRENCE
20	AD 1501-1600	28		22		IROQUOIAN ERA
21	AD 1601-1700	26	10	26	10	(c)
22	AD 1701-1800	1				
23	AD 1801-1900	—				
24	AD 1901-1949	—				
25	AD *post* 1950	14	(b)	19	(b)	
TOTALS		266		256		

Note:

a) CALIB 2.1 percentages calculated on basis of 266 sample components. CALIB 3.0.3 on basis of 256 sample components.

b) AD post 1950 calibrations are not included in the percentage calculations.

C) Should the need arise to extend the St. Lawrence Iroquoian era into the period prior to AD 1400, the incidence of calibrated ages in the extended era can be identified from these data.

Table 7. Bidecadal Calibrated Ranges Expressed in Terms of Calendar Year Intervals (vide Table 3).

	1 sigma		2 sigma			1 sigma		2 sigma			1 sigma		2 sigma	
Serial	2.1	3.0.3	2.1	3.0-3	Serial	2.1	3.0.3	2.1	3.0.3	Serial	2.1	3.0.3	2.1	3.0.3
1	—	—	—	—	28	320	322	527	522	55	77	80	350	345
2			—	—	29	178	176	.	.	56	208	209	463	—
3	194	195	240	238	30	150	—	—	—	57	120	128	369	374
4	—	—		—	31	191	191	230	233	58	240	—	.	—
5	194	192	250	239	32	182	178	230	—	59	181	187	230	238
6	45	44	181	302	33	51	56	312	312	60	189	191	240	235
7	57	58	303	235	34	54	120	224	263	61	260	265	500	607
8	331	333	460	452	35	175	169	340	337	62	215	212	380	355
9	65	71	339	328	36	213	213	349	—	63	270	271	740	684
10	—	—	—	—	37	91	196	328	254	64	183	—	—	
11	188	190	220	225	38	65	186	240	242	65	124	51	220	321
12		.	—	—	39	129	123	200	316	66	150	336	—	—
13	194	194	240	243	40	620	628	1202	1104	67	160	145	300	287
14	142	133	200	194	41	171	164	202	203	68	150	158	380	367
15	150	141	357	348	42	36	40	194	198	69	210	214	—	—
16	150	151	401	418	43	98	95	139	130	70	—	—	-	—
17	130	131	443	446	44	45	56	99	81	71	280	284	370	369
18	140	126	220	228	45	37	39	88	212	72	230	223	380	379
19	370	366	620	595	46	162	159	200	203	73	230	223	380	379
20	260	341	540	538	47	169	175	201	201	74	71	178	220	212
21	650	641	1180	1183	48	205	206	260	—	75	132	65	174	338
22	206	205	333	—	49	96	31	134	128	76	189	186	—	—
23	230	229	—	—	50	129	121	170	159	77	227	234	365	373
24	175	179	410	412	51	43	44	172	289	78	133	136	377	377
25	160	270	550	541	52	80	64	141	121	79	185	193	320	320
26	140	137	250	247	53	136	138	450	219	80	220	226	380	483
27	230	228	484	479	54	20	27	48	66					

Note: Ranges with post - AD 1950 dates have been omitted.

See Table 2 or 3 for site and sample identification of the serials listed in this table.

Table 8. Alterations to CALIB 2.1 Bidecadal 2 Sigma Calibrated Ranges
Introduced by CALIB 3.0.3 Bidecadal 2 Sigma Calibrations in the St. Lawrence Iroquoian Era.

Serial	Table 3 Serial	Sample	Site
A. Added to AD 1400-1500 Range			
1	7	GSC-453	Berry
2	22	RL-1971	Mandeville
3	56	GX-2214	Potocki
B. Removed From AD 1400-1500 Range			
4	6	GSC-451	Berry
5	39	S-2012	McIvor
6	44	TO-45	McKeown
7	51	TO-1042	McKeown
C. Removed from AD 1500-1600 Range			
8	1	S-816	Beaumier Ouest
9	65	I-11233a	Steward
D. Became Older in Period AD 1400-1600			
10	59	GSC-446	Salem
E. Became Younger in Period AD 1400-1600			
11	2	S-817	Beaumier Ouest
12	3	S-836	"
13	4	S-837	"
14	5	S-839	"
15	7	GSC-453	Berry
16	10	FE-80	Camp Drum
17	11	FE-83	"
18	12	FE-99	"
19	13	GaK-1491	Glenbrook
20	22	RL-1971	Mandeville
21	24	QU-223	"
22	26	#51	"
23	29	GSC-441	McIvor
E. Became Younger in Period AD 1400-1600 (continued)			
24	30	GSC-442	"
25	31	GSC-457	"
26	38	S-2011	"
27	41	TO-1032	McKeown
28	42	TO-1033	"
29	43	TO-1034	"
30	45	TO-1036	"
31	46	TO-1037	"
32	47	TO-1038	"
33	48	TO-1039	"
34	49	TO-1040	"
35	51	TO-1042	"
36	56	GX-2214	Potocki
37	58	M-1541	Salem
38	60	GSC-458	"
39	61	I-11229	Steward
40	64	I-11232	"
41	70	GaK-1490	Summerstown Stn.
42	74	UQ-1460	Masson
43	76	B-59146	Royarnois
F. Added to the Post 1950 Period			
44	32	GSC-460	McIvor
45	36	S-2009	"
46	48	TO-1039	McKeown
47	56	GX-2214	Potocki
48	58	M-1541	Salem

Postscript

Recently, the University of Washington Quaternary Isotope Laboratory, DOScalib News File, dated 21 March 1995, advised that the CALIB 3.0.3 terrestrial program was being revised to correct a problem that arises when calibrating very young samples. This is being done under a test program CALIB Rev. 3.0.3c. When fully verified, a new program CALIB Rev. 3.0.3d will be made available on the Internet from the University of Washington ftp site. Collateral revisions are also being prepared for the calibration of marine sample dates.

Conversation with Reimer (18 September 1995) has confirmed that minor deviations from CALIB 3.0.3 dates may occur in the dates derived from CALIB 3.0.3c in the period A.D. 1400-1600, when the St. Lawrence Iroquoians were present. Nevertheless, a comparison of decadal and bidecadal CALIB 3.0.3 and CALIB 3.0.3c calibrations using random samples from the Beaumier (S-816), Berry (GSC-451), and McKeown (TO-1044) sites indicates no variation in either the 1-sigma or 2-sigma ranges. Reimer's assessment and this random comparison of CALIB 3.0.3 and CALIB 3.0.3c calibrated dates do not suggest that the introduction of the CALIB 3.0.3c methodology will require revisions to the thesis set out above.

Acknowledgments

I am indebted to Jose Benmouyal and Claude Chapdelaine for providing me with heretofore unpublished radiocarbon dates for the Masson and Royarnois sites. This has enabled me to extend the investigation of the St. Lawrence Iroquoians eastward into areas on the lower St. Lawrence River heretofore not examined in this context. Critical comments by Bruce Trigger, James Wright, James Herbstritt, Robert Kuhn, and Gordon Watson have enhanced this paper significantly. Paula Reimer. Roelf Buekens. Elizabeth Little, and Robert Casagrand have generously provided detailed technical advice regarding the use of radiocarbon dating technology, which, together with James Byme's advice regarding statistical analytical techniques, has facilitated my work significantly. Nevertheless, responsibility for the manner in which all this advice has been used rests wholly with me.

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Editor's note: The issues raised concerning CALIB 3.03 (Method 'A') in this paper are not confined to St. Lawrence Iroquoian research. A discussion of accelerator mass spectrometry (AMS) by Duccio Bonavia of Peru places contemporary archaeological dating methods in an even broader context (SAA Bulletin 14(4):3, 30; September, 1996).

Minutes of the 79th Annual Meeting
New York State Archaeological Association

Syracuse. New York

Combined Business and General Meeting

The NYSAA annual meeting was called to order on April 21. 1995, at 7:40 pin by President Robert J. Gorall. The roll was called with the President, Vice President and Secretary in attendance. The Treasurer was absent. Eleven of the fifteen chapters were represented at the time of the roll call.

Report of the Officers

President

During the past year, the President has been involved in a number of activities concerning the Association's business. As a follow-through on the Metropolitan Chapter's reorganization, the Secretary and I traveled to New York City for two days where I presented a talk to those interested parties assembled in a meeting room at the New York State Armory located in Central Park. I am happy to report that through the continuing efforts of long-time members of that chapter, Leonard Cohan and Michael Cohn, the Metropolitan Chapter is well on its way to recovery.

Over the last 12 months, I have given numerous talks to various NYSAA chapters, historical societies, church groups, fourth-grade elementary school classes, and even a nursing home. The topics included archaeology, of course, and also peripheral subjects such as Indian history and the 1794 Canandaigua Treaty for a total of 22 lectures in 12 months. It has been a very busy year.

And by the way, I was happy to see that so many, members of the NYSAA attended the 200th anniversary commemoration of the Canandaigua Treaty on November 11, 1994. Police officials estimated that over 5,000 people were in attendance to enjoy this great event. It was undoubtedly the biggest crowd ever. The participants included Ada Deer of the Federal Bureau of Indian Affairs, a Congresswoman, Quakers from Philadelphia, many Indian Chiefs, Clan Mothers, state, and local officials.

The ESAF meeting was held in Albany this past November 3-4, and we had a good turnout. The Van-Epps Hartley Chapter sponsored the affair and at this time on behalf of the NYSAA I would like to thank them for an outstanding job.

On June S of this past year, in order to expedite the acceptance of a new chapter into the Association, I personally contacted the NYSAA Executive Members in order to take a telephone vote on the acceptance of the Thousand Islands group which had applied for NYSAA membership in 1994. My feeling was that by contacting the president and secretary of each chapter (the Executive Committee) the preliminary vote could be taken at the next state meeting (this one), and the final ratification could be approved, thereby saving an entire year which would have otherwise been required. The results of my efforts will be addressed later this evening under Old Business.

A few weeks ago I received word that past NYSAA President, the late Earl F. Casler, had remembered our Association in his will. A copy of his last will and testament and a notice of probate proceedings was forwarded to me, and I will give them over to the Secretary to be kept with the Association's papers. In summary, it revealed that the NYSAA will be the beneficiary of 1/15th of the Casler estate consisting of some stock funds and corporate stock sometime in the future, after the death of his brother who has the right of taking any dividends during his lifetime.

In conclusion, I would like to thank all the members of the Association for your cooperation during the past year, and 1 feel that continuing success awaits the NYSAA in the future. Thank you.

Vice President

No report

Treasurer

Dolores Elliott made the motion to accept the Treasurer's report as read. Tyree Tanner seconded it. The motion was carried by all present.

Secretary

The minutes for 1994 were read with corrections included. David Fuerst made the motion to accept the minutes as read, and Don Rumrill gave the second to accept. The motion was carried. As of April 1, 1995, there were 717 memberships with 861 members including the members-at-large.

Report of the Treasurer, April 15, 1995

Adirondack Trust Company	
4/15/94	
CD#37220016112	$7,693.87
MMD#7922385	$1,756.27
NOW#2945406	$2,451.34
Cash Receipts 1994-1995	
Dues	$7,493.72
Publication Sales	$267.14
Interest NOW Account #2945406	$41.15
TOTAL	$7,802.01
TOTAL RECEIPTS	$7,802.01
Balance Checking Account (4/15/95)	$2,451.34
Total	$10,253.35
Disbursements (1994-1995)	-$5,940.88
Total	$4,312.47
Minus Checking Account Service Charge	$15.40
BALANCE (4/15/95)	$4,297.07
4/15/95	
Adirondack Trust Company	
CD#37220016112	
(Interest 1994/1995 $341.41)	$8,035.28
MMDA#7922385	
(Interest 4/15/94-4/15/95 $30.92)	$1,787.19
NOW#2945406	
(Interest 04/01/94-4/15/95 $41.15)	$4,297.07
TOTAL ASSETS	$14,119.54
Disbursements (1994-1995)	
Treasurer Expenses	$15.00
1995 ESAF Dues (704 members)	$155.00
Secretarial Expenses (postage/bulletins, copies, and supplies)**	$809.13
The Bulletin No. 107	$4,116.25
The Bulletin No. 108	$845.50
TOTAL	$5,940.88

** Does not include printing costs

The list is as follows:

Adirondack Chapter	25
Auringer-Seelye Chapter	9
Chenango Chapter	43
Frederick M. Houghton Chapter	40
Incorporated Long Island Chapter	55
Incorporated Orange County Chapter	96
Incorporated Upper Susquehanna Chapter	22
Lewis A. Brennan-Lower Hudson Chapter	31
Lewis H. Morgan Chapter	75
Metropolitan Chapter	19
Mid-Hudson Chapter	16
Triple Cities Chapter	22
Van Epps-Hartley Chapter	43
William M. Beauchamp Chapter	45
Members-at-large	146

Committee Reports

Awards

Peter P. Pratt. The meeting will be held Saturday La noon with results given at the banquet on Saturday night.

Constitution

Richard Wakeman. No report

ESAF

Karen Hartgen. The meeting was hosted by the NYSAA in November 1994. Total attendance was 265 with 103 from New York. The next ESAF meeting will be October 26-29, at the Radisson Wilmington. Delaware.

Editor

Charles F. Hayes III, during 1994 and early 1995, two issues (Nos. 107 and 108) of *The Bulletin* were published with a combined total of 90 pages. Eleven papers on New York State-related archaeology and one obituary were included along with the 1993 Annual Meeting Minutes. Monroe Graphics of Rochester, New York printed *The Bulletin* and shipped bulk copies to Muriel Gorall for distribution.

Assistant Editors Dr. Connie Cox Bodner and Brian Nagel contributed their valuable services to the preparation and review of the manuscripts. Patricia Miller, Graphic Designer, PM Design, was responsible for the composition and layout of both issues. The Editor would like to express his appreciation to these reliable individuals for providing the NYSAA with contemporary design, editorial accuracy, and scientific integrity.

Issues Nos. 109 and 110 are currently being assembled and should be out in late 1995 and early 1996. Manuscripts are coming in steadily after a call for papers.

Finance

Roger Moeller. No report. He has resigned.

NYAC/NYSAA

Dolores Elliott. Archaeology Week will be May 7-13, 1995. There will be displays and activities. Would like each chapter to participate? There will also be posters available.

Nominating

William Engelbrecht. 1996 will be an election year, and a call for nominations will be sent out at the appropriate time.

Legislative

Paul R. Huey.

Federal

The Advisory Council on Historic Preservation published its proposed new regulations governing Section 106 of the National Historic Preservation Act of 1966, as amended. The amendments of 1992 to the Historic Preservation Act strengthened the Section 106 requirements for federal agencies to take into account the effect of their undertakings on historic properties. However, the proposed new regulations that the Advisory Council has re-issued have been rejected outright, and the Advisory Council will rewrite them to satisfy the requirements of the present anti-regulatory political atmosphere.

Last July 26, the Senate passed its version of the Appropriations Bill for Fiscal Year 1995 with a slight increase for the Historic Preservation Fund. Presently, the budget for Historic Preservation for 1996 is being drafted, and the bill will be proposed and introduced in the House in May. It is important to write to Senators and Congressmen now in support of continued funding for historic preservation programs. The historic preservation programs of the National Park Service operate partnerships with New York State (National Register of certification) and the National Trust for Historic Preservation.

In February, it was announced that the National Park Service will merge its North Atlantic and Mid-Atlantic regions by 1998, subject to final approval by the Senate. The new region will include New York State. The total number of administrative employees will fall to 228 from 400. It is feared this will reduce the number of Park Service archaeological staff, which is already small in number.

The U.S. Court of Appeals for the Seventh Circuit Court in Chicago has upheld the constitutionality of the Abandoned Shipwreck Act. The Court rejected arguments by a commercial salvage company that the new law violates the Admiralty Clause of the U.S. Constitution. Under the new law title to the wreck of Seabird, a side-wheel steamer that sank in Lake Michigan in 1868, is vested in the State of Illinois. The operator of a commercial salvage company that located the wreck in 1980 challenged the law in an effort to gain title to the wreck for salvage.

Last June, the Supreme Court in Washington decided against the arguments of environmentalists and land-use planners, making it more difficult for local authorities to require property owners and developers to set aside public green spaces (which could include archaeological sites for preservation) if they want building permits. While the Court was sharply divided, the issue was the Fifth Amendment clause that prohibited government seizure of property without "just compensation" to the owner.

Last July, property-rights advocates also condemned the American Heritage Area bill proposed in the House by Maurice Hinchey that would have created a ten-county American Heritage Area along the Hudson River from Troy to the New York City line. Under the bill, the National Park Service would have provided recognition for as well as financial help to local governments in the valley. The bill has died; it was bill No. HR-4720.

On September 27, the House passed the Interior Appropriations bill which included Representative Sherwood Boehlert's requirement directing the National Park Service to study Oriskany Battlefield State Historic Site to ascertain its development and inclusion into the Fort Stanwix National Monument. Representative Boehlert has also been instrumental in organizing the nonprofit "Friends of the Northern Frontier" to raise funds to help maintain and manage historic and cultural resources.

State

A new state law has expanded the existing Urban Cultural Park program into a New York State System of Heritage Areas. The bill designates the Mohawk Valley heritage corridor as the first component in the expanded heritage areas system. It also established a planning commission to develop a Mohawk Valley corridor management plan, funded with a $300,000 State appropriation.

State legislation in 1994 also directed the Department of State, in consultation with Parks, Recreation and Historic Preservation, to submit a study which was to have been done by March 1 identifying mechanisms to recognize and support historic maritime communities on Long Island Sound.

For the fourth consecutive year, the Legislature failed in 1994 to act on the Native American burial sited bill that was supported by Parks, Recreation and Historic Preservation. The Legislature also failed to agree on a series of bills that would have provided additional protection of wrecks in State waters and would have created an interagency clearing house for dredging projects.

Efforts are underway to keep the Environmental Protection Fund at $43.5 million. It is important to insure that local preservation projects, as well as State projects, receive funding.

Administrative problems within the State Transportation Department have stalled scores of projects amounting to millions of dollars in the Intermodal Surface Transportation Efficiency Act (ISTEA). These projects include much historic preservation activity.

Finally, I regret that I must relinquish my role with the Legislative Committee, at least temporarily. My position with the Bureau of Historic Sites as Senior Scientist (Archeology), which I have held for 26 years, has been abolished due to the State's fiscal crisis. I will be downgraded and assigned to a different unit with as-yet unspecified assignments. I do not expect to be in a position to monitor legislative developments effectively. Also lost from the Bureau's archaeological research unit is Chuck Fisher, a very productive and capable archaeologist, who is being laid off. This reduces the archaeological unit to only two full-time professionals, Lois Feister and Charles Florance. In addition, a third person will be available for six months each summer to help with excavations. The Bureau of Historic Sites archaeological research program was hurt badly in 1991 when two professional staff were laid off, after which two remaining vacant positions were abolished. However, the elimination of the Senior Scientist position has now virtually dismantled the unit and its potential to conduct on-going statewide research focused on the state historic sites.

Public Archaeology

Vacant

Program Committee

Vacant

Publications

No report.

Librarian

Gordon De Angelo stated that for many years the NYSAA Library has been stored at MALFA, Katonah, New York, under the care of the L.A. Brennan-Lower Hudson Chapter. As of last year the L.A. Brennan-Lower Hudson gave the indication that they no longer wanted to continue the care and updating of the library.

Old Business

President Robert Gorall stated that on November 8, 1994, he made telephone calls to the Executive Committee for a vote as whether to accept the Thousand Islands as a new chapter of NYSAA. The vote was unanimous with the 12 out of 14 chapter committee persons he was able to reach. A motion was made by Gary Wimple and was seconded by Jack Lee to accept the Thousand Islands group as a new chapter of the NYSAA Association. The motion was carried.

Gerry Hayes brought forth a proposal that the organization reconstruct its By-laws and Constitution to allow a member to join as many chapters as the member wishes with the provision that the member would pay NYSAA dues and be a NYSAA member listed under the first chapter joined and therefore receive only one issue of each NYSAA bulletin published. If a member wished to join any other chapters the member would ask the original chapter to supply him or her with a membership card stating that this person was already paid up as a member of the NYSAA. Then all other chapters that the particular member joined thereafter would only charge that particular member their chapter's dues.

Notice was then made to the By-laws and Constitution Committee to make the necessary changes to the By-laws and Constitution.

New Business

Gordon De Angelo, Librarian, stated that since he has two boxes of books belonging to the library and Bob Gorall, the President, has at least one box, he would like to raise two issues. Issue 1: If the L.A. Brennan-Lower-Hudson Chapter still wishes to be responsible for the NYSAA Library, then they should be given the books that have accumulated. Issue 2: The committee of Librarian was originally set up to assist the President and now will no longer be needed. The President said that he had been in touch with Bob Kelly, president of L.A. Brennan-Lower-Hudson Chapter, and they would like to continue to receive the materials for the library. There was a question of how big the library was (cubic feet) and if there was a list of the contents of the library available. It was noted that there was at least a 50-page index of the library. It was suggested that the list be made available to chapters. A motion was made by Gordon De Angelo and seconded by David Detrich that the Library still be stored at MALFA Katonah, New York. The motion was carried. A motion was also made by Tyree Tanner, that the title of Librarian be eliminated. The motion was seconded by Barbara De Angelo. The motion was carried.

It was brought forth that a letter had been received from SAA inviting the NYSAA to join their group. No decision was made at this time. The President will set out information for any one to look over.

The question was asked what the NYSAA's position was on the Repatriation Act. What were our thoughts on the fact that the Massachusetts Robbins Museum had endorsed repatriation? After much discussion on the subject and statements from members that the NYSAA did not own any artifacts, that there was no reason for us to make a public statement at this time. Others thought that we should make a stand since institutional collections were in jeopardy. A motion was made by Fran McCashion and seconded by Annette Nohe that since the regulations were not out yet on repatriation, we should gather any information on the Repatriation Act and the Secretary should mail this information to all chapters for review and discussion. Comments should be brought back to the next business and regular meetings in 1996. The motion was carried.

The President has suggested certification of avocational members. He has been in contact with Dolores Elliott and Gordon De Angelo for help in accomplishing this project. Everyone thought this would be a good idea and that it would be very beneficial to have certified avocational archaeologists available. The President said he had also been in contact with Hester Davis of the Arkansas Archaeological Society, which is supposed to be the best certification group in the country. She will help in any way that she can. Because of pressing items, the President has not had the opportunity to go ahead on this project further. He hopes to do so in the near future. He also stated that the Society for Pennsylvania Archaeology will meet in Morgantown, May 5-7.

The question was asked if the deceased fellows should be listed as such in the NYSAA bulletins. Peter Pratt answered that this would be discussed at the awards meeting later.

The Secretary, Muriel Gorall, made a proposal that since the association has enough back issues of NYSAA bulletins, we should donate a set of these issues to a high school library of each chapter's choice. Updated issues would be provided as they are published. A discussion was held with Peter Pratt making the motion and Al LaFrance, the second, to distribute these sets of back issues to high schools chosen by the chapters. The motion was carried.

Peter Pratt, just returning from the NYAC meeting, gave us their views on the elimination of the Senior Scientist position held by Paul Huey. The NYAC membership would like the NYSAA membership to join with them in presenting this resolution to the State Legislature, the Ways and Means Committee, the Finance Committee, the Tourist Committee, and other groups. The modified resolution reads as follows:

The New York Archaeological Council, since 1974 the professional organization of archaeologists interested in the state, and the New York State Archaeological Association wish to express serious concerns over the impending elimination of the supervisory position of Senior Scientist (Archeology) at the Bureau of Historic Sites.

> WHEREAS, the Bureau of Historic Sites deserves coordination as a comprehensive program directed by active research and over the last twenty-six years has received great reception for its excellence;
>
> WHEREAS, with the impending reduction in staffing level, the program will not be able to do more than small testing operations driven by the proposed alterations of the historic properties;
>
> WHEREAS, without the Senior Scientist's expertise, the Bureau will no longer be able to serve the public as extensively, by identifying finds and offering advice on preserving sites;
>
> WHEREAS, the current historic sites collections deserve to be administered by a well-known scholar so as to attract researchers, who will continue to make use of them;
>
> WHEREAS, even an interruption of research will make attraction of high quality personal very difficult in the future should support decreases;
>
> WHEREAS, the current high value of the staff's activities pertaining to tourism and public education will undoubtedly diminish because of a decreased ability to interpret sites,
>
> now therefore be it resolved that the NYAC membership combined with the NYSAA membership strongly recommends that the supervisory Senior Scientist (Archeology) position at the Bureau of Historic Sites be restored and the other current positions in the unit be maintained.

Gordon De Angelo moved that the resolution previously read by the representative of NYAC be incorporated with the same wording and supported by the New York State Archaeological Association. Al LaFrance seconded the motion. The motion was carried.

The Orange County Chapter will host the 1996 NYSAA Annual Meeting at Eddy Farms Resort in Sparrowbush, New York. The meeting was adjourned at 9:55 pm.

Muriel E. Gorall, Secretary

Program
79th Annual Meeting
New York State Archaeological Association

April 21, 22, and 23, 1995
Syracuse, New York
Host: William M. Beauchamp Chapter

Friday, April 21, 1995

12:00-5:00 pm	NYSAA Registration
2:30-3:30 pm	NYAC Board Meeting
3:30-4:30 pm	NYAC Committee Meetings
6:00-9:00 pm	NYAC General Business Meeting
6:00 pm	Buffet Dinner
7:30 pm	NYSAA Awards Committee Meeting
7:30 pm	NYSAA Executive Committee Meeting General Business Meeting
9:00 pm	Social Gathering

Saturday, April 22, 1995

8:00 am	NYSAA Registration
9:00 am	Welcome Robert J. Gorall, President NYSAA Valerie Bell, William M. Beauchamp Chapter Chair: Ellis E. McDowell-Loudan, SUNY College at Cortland William M. Beauchamp Chapter
9:10 am	*Local History: If It's Written Down, Why Dig?* Ellis E. McDowell-Loudan, SUNY College at Cortland Gary L. Loudan, Lamont Free Memorial Library William M. Beauchamp and Triple Cities Chapters, NYSAA
9:35 am	*The History and Archaeology of Van Cortlandt Park, Bronx, New York* Chris Ricciardi, College of William and Mary Member-at-large, NYSAA
10:00 am	*Archaeological Research at the Zimmer Site in the Chenango Valley: Colgate University Field Methods Project* Jordan E. Kerber, Colgate University Chenango Chapter, NYSAA
10:25 am	Coffee Break
10:45 am	*Early Seventeenth Century Lenape or Susquehannock Ethnographic Specimens from New Sweden Colony at Skokloster Castle, Sweden* Herbert C. Kraft, Seton Hall University Museum Incorporated Orange County Chapter, NYSAA
11:10 am	*Morgan, Ward and the Three Age System* Ann Morton, Rochester Museum & Science Center Lewis Henry Morgan Chapter, NYSAA
11:35 am	*Trade Beads from the Mid-Hudson Valley* Joseph E. Diamond, SUNY College at New Paltz Mid-Hudson Chapter, NYSAA
12:00 noon	Lunch Chair: Vicky Jayne William M. Beauchamp Chapter, NYSAA
1:30 pm	*An Aerial View of the Homeland of the Historical Onondaga* Bob Hiler, Lewis Henry Morgan Chapter, NYSAA
1:55 pm	*Excavations at Ten Rock Overhangs in the Ashokan Catskills* Christopher Lindner, Bard College and Hudsonia Incorporated Orange Chapter, NYSAA
2:20 pm	*Sizing Up the Oneida: Keeping Pace with van den Bogaert* Daniel H. Weiskotten, Chenango Chapter, NYSAA William M. Beauchamp Chapter, NYSAA
2:40 pm	Coffee Break
3:00 pm	*Early Seventeenth- Century Iron Assemblages: Can You Help?* Martha L. Sempowski, Rochester Museum & Science Center Lewis Henry Morgan Chapter, NYSAA
3:25 pm	*Elemental Metal Analysis of IHS and L-Heart Finger Rings from Four Mid-17th Century Oneida Iroquois Sites* Richard E. Hosbach, Chenango Chapter, NYSAA
3:45 pm	Adjourn
5:30 pm	Social Hour
7:00 pm	Annual Banquet Raffle Drawing Master of Ceremonies: Robert J. Gorall Keynote Address: *What's New at the New York State Museum*? Lynne P. Sullivan Anthropological Survey, New York State Museum NYAC Presentation of NYSAA Awards: Peter J. Pratt, SUNY College at Oswego William M. Beauchamp Chapter, NYSAA Presentation of the William M. Beauchamp Scholarship: Gordon C. De Angelo William M. Beauchamp, Chenango, and Thousand Islands Chapters, NYSAA

Sunday, April 23, 1995

	Chair: Gordon C. De Angelo William M. Beauchamp, Chenango, and Thousand Islands Chapters, NYSAA
9:00 am	Slide Presentation: *The Making of a Museum: Chittenango Landing Canal Boat Museum*
9:15 am	*The Fort Hill Site, Auburn, New York* Robert N. DeOrio Cayuga Museum, Auburn, New York William M. Beauchamp Chapter, NYSAA
9:40 am	*St. Lawrence Site: Preliminary Excavations at a St. Lawrence Iroquoian Village, Jefferson County, New York* David N. Fuerst and Kenneth J. Knapp Thousand Islands Chapter, NYSAA
10:05 am	*The Cazenovia Cemetery Project* Daniel H. Weiskotten Chenango and William M. Beauchamp Chapters, NYSAA
10:30 am	*The Rev. William M. Beauchamp and His Contributions to New York Archaeology* Lisa M. Anderson, New York State Museum
11:00 am	Farewells

Past and Present NYSAA Award Recipients

The Achievement Award

Charles M. Knoll (1958)
Louis A. Brennan (1960)
William A. Ritchie (1962)
Donald M. Lenig (1963)
Thomas Grassmann O.F.M. (1970)
Paul L. Weinman (1971)
Robert E. Funk (1977) (1994)
Peter P. Pratt (1980)
Herbert C. Kraft (1989)

Fellows of the Association

Monte Bennett
James W. Bradley
Louis A. Brennan
William S. Cornwell
Dolores N. Elliott
William E. Engelbrecht
Lois M. Feister
Stuart J. Fiedel
Charles L. Fisher
Robert E. Funk
Thomas Grassmann O.F.M.
Alfred K. Guthe
Gilbert W. Hagerty
Charles F. Hayes III
Franklin J. Hesse
Richard E. Hosbach
Paul R. Huey
R. Arthur Johnson
Edward J. Kaeser
Herbert C. Kraft
Roy Latham
Lucianne Lavin
Donald M. Lenig
Edward J. Lenik
Julius Lopez
Richard L. McCarthy
James F. Pendergast
Peter P. Pratt
Robert Ricklis
William A. Ritchie
Bruce E. Rippeteau
Donald A. Rumrill
Bert Salwen
Lorraine P. Saunders
Harold Secor
Martha L. Sempowski
Dean R. Snow
David W. Steadman
Audrey J. Sublett
James A. Tuck
Stanley G. Vanderlaan
Paul L. Weinman
Thomas P. Weinman
Marian E. White
Theodore Whitney
Charles F. Wray
Gordon K. Wright

Certificate of Merit

Thomas Amorosi
Roger Ashton
Charles A. Bello
Monte Bennett
Daniel M. Barber
Malcolm Booth
James W. Bradley
Ralph Brown
Art Carver
Gordon De Angelo
Elizabeth M. Dumont
Lewis Dumont
William F. Ehlers
Dolores N. Elliott
Garry A. Elliot
John Ferguson
Joan H. Geismar
Stanford J. Gibson
Gwyneth Gillette
Robert J. Gorall
R. Michael Gramly
George R. Hamell
Elaine Herold
Franklin J. Hesse
Richard E. Hosbach
Paul R. Huey
Dale Knapp
Albert D. La France
Kingston Larner
Edward J. Lenik
William D. Lipe
John H. McCashion
Ellis E. McDowell-Loudan
Dawn McMahon
Jay McMahon
Brian L. Nagel
Marjorie K. Pratt
Peter P. Pratt
Louis Raymond
Saul Ritterman
William Sandy
Barbara Sciully
Harold Secor
Annette Silver
Mead Stapler
David W. Steadman
Marilyn C. Stewart
Neal L. Trubowitz
Charles E. Vandrei
James P. Walsh
George R. Walters
Beth Wellman
Henry P. Wemple
Roberta Wingerson
Stanley H. Wisniewski