THE EDGES OF WOOD: DENDROCHRONOLOGICAL ANALYSIS OF THREE SENECA IROQUOIS STRUCTURES AT LETCHWORTH STATE PARK, 1796-1831

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ABSTRACT

Letchworth State Park in Castile, New York, maintains three log structures originally built in Seneca communities along the Genesee River Valley in the late 18th and early 19th centuries: the Caneadea Council House, the Nancy Jemison cabin, and the "Buffalo Tom" Jemison cabin. Dendrochronology (tree-ring dating) provided more precise construction dates for the council house and cabins. This technique indicated a date for the council house's construction of ca. 1820, with a modification episode ca. 1831, rather than in the range of 1759 to 1780 derived from historic documents. Dendrochronological analysis supports the historic dates for the construction of the Nancy Jemison cabin around 1800 and the "Buffalo Tom" Jemison cabin ca. 1818. These dates, along with consideration of how the Letchworth structures compare to K. Jordan's (2008) intercultural/ creolized and Brown's (2000) Reservation Log House types, aid in examining the council house and cabins in relation to events leading up to and following the Revolutionary War, reservationization, and Seneca decisions to incorporate elements of European-style log construction. Senecas could have drawn on construction methods learned from Moravian missionaries, mixed native communities, and settlers building in Midland forms. The desire to erect more long-lasting buildings in more confined territory, in addition to increased European American settlement and infrastructure-building following the sale of Seneca lands in western New York, impacted Seneca decisions to adopt and employ such techniques as they saw fit.

BIOGRAPHICAL SKETCH

Cynthia attended the University of Wisconsin-La Crosse from 2008 to 2012 to obtain her Bachelor of Science in archaeology. She then worked for a year in cultural resource management at the Mississippi Valley Archaeology Center on the UW-La Crosse campus. After earning her master's in archaeology from Cornell University, she plans to work in the Cornell Tree-Ring Laboratory to continue to gain experience with dendrochronology and dating historic buildings.

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I also thank Brian Scriven, Historic Site Manager at Letchworth State Park, for his part in providing access to the council house and cabins for coring. Chris Flagg of the New York State Office of Parks, Recreation and Historic Preservation, granted official permission for sampling. Seneca faith keeper Peter Jemison offered his knowledge on Seneca history, the Letchworth structures, and Mary Jemison's family. Thanks go to Ted Bartlett and Tom Cook for identifying the oldest logs from the Caneadea council house and Nancy Jemison cabin for sampling during the October 2013 visit to collect samples. They provided information on the history of the structures, as well. Brita Lorentzen and Sturt Manning of the Cornell Tree-Ring Laboratory took samples during the October trip. A Hirsch Graduate Scholarship from the Cornell Institute of Archaeology and Material Studies (CIAMS) funded my travel to the park to take samples in May 2014. James D. Folts of the New York State Archives provided copies of the drawings of the Kanadesaga council house and Butler's house, as well as the house at Genesee Town, which I borrowed from Kurt. George Hamell kindly sent me a copy of his 1992 paper on Seneca housing.

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INTRODUCTION

Houses and other buildings, whether still standing or only indicated by subsurface post molds and features, allow archaeologists to examine cultural change and variation synchronically and diachronically. In the Northeast, a limited number of studies have addressed decisions to incorporate or reject certain European construction methods and architectural features and the longhouse-to-log house transition among the Haudenosaunee[1], or Iroquois, in the 18th and 19th centuries (Lantz 1980; Kenyon 1985; Hamell 1992; Brown 2000; K. Jordan 2002, 2008). Letchworth State Park in Castile, New York, currently retains three Seneca log structures under the jurisdiction of the New York State Office of Parks, Recreation and Historic Preservation. These buildings, all relocated from former reservation lands on the Genesee River to the park for preservation, include: (1) the Caneadea council house; (2) the Nancy Jemison cabin; and (3) the Thomas "Buffalo Tom" Jemison cabin. The Caneadea council house and Nancy Jemison cabin stand on display at the Council House Grounds at Letchworth, while the "Buffalo Tom" Jemison cabin remains dismantled and in storage at the park. These structures offer a glimpse into housing and related aspects of Seneca society and interaction with Europeans and Americans during the late 1700s and early 1800s. The ability to examine the superstructures of these buildings makes possible lines of investigation not feasible at most archaeological sites, namely dendrochronology and analysis of above-ground architectural features.

The Jemison cabins also constitute an important link to the famed Mary Jemison, a woman of Scots-Irish descent who was adopted by the Senecas in her youth after her capture by Shawnees in Pennsylvania in the 1750s. James E. Seaver (1990[1824]) recorded her story in

[1] The Haudenosaunee include the Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora nations.

1823, and it is widely known today in New York State and beyond. Mary settled on the Gardeau Flats, later part of the Gardeau Reservation established by the 1797 Treaty of Big Tree, after the 1779 American Sullivan campaign during the Revolutionary War. Nancy was one of her daughters, and "Buffalo Tom" was one of her grandsons. Seneca faith keeper Peter Jemison, another direct descendant, was involved in this project and offered important insight into Mary's life and family, as well as general knowledge concerning Seneca settlement and housing.

Three reports completed by the firm of Crawford and Stearns Architects and Preservation Planners in 1995 evaluated the historical significance and condition of the council house and Jemison cabins and explored documentary sources and local landowner accounts concerning the structures when they were later inhabited by European American settlers (Bartlett 1995a, 1995b, 1995c). Proposed building dates range from 1759 to 1780 for the council house, 1797 to 1800 for the Nancy Jemison cabin, and ca. 1818 for the "Buffalo Tom" Jemison cabin (Bartlett 1995a, 1995b, 1995c). Because the structures are composed of logs, dendrochronology provided a method to narrow down the dates when the council house and cabins were erected. Dendrochronology, the examination and comparison of growth patterns in annual tree-rings to create datable sequences, has not thus far been employed in the study of Haudenosaunee buildings. However, DeWeese et al. (2012) dated the Cherokee Chief John Ross' oak (*Quercus* sp. L.) house in Rossville, Georgia, to 1816-1817, and Griggs (2008) dated a dugout canoe of eastern white pine (*Pinus strobus* L.) recovered from Glass Lake in Rensselaer County, New York, to around 1777. Given the wide range of estimated building dates for the Caneadea council house in particular, determining more precise dates assists in clarifying the historical and cultural conditions surrounding its construction and use. Analyzing the edges of wood samples thus informs the study of Haudenosaunee culture, which recognized symbolic and practical

importance of the edge of the woods, the margin where the forest meets the clearing (Engelbrecht 2005:100-101).

Given the date ranges above, I concentrate most heavily on developments in the late 18th and early 19th centuries in the Genesee region and more widely in Iroquoia (Haudenosaunee territory) in this thesis. Evaluation of architectural features and construction methods, along with scholarship since the preparation of the Crawford and Stearns reports (in particular Brown [2000] and K. Jordan [2008]), further informs the study of the Seneca occupations of these dwellings. Relevant factors in Seneca decisions to exclude or incorporate European elements in their house forms include the influence of Moravians, culture change efforts of Quakers and the Seneca prophet Handsome Lake, and European American settlement and infrastructure. The persistence and adaptation of Seneca lifeways, including forms of land ownership, seasonal work in the form of timbering and hunting, and emphasis on the extended family, certainly impacted housing as well. A consideration of such factors produces a more nuanced understanding than only noting the presence or absence of traditional Haudenosaunee and European traits.

CONCEPTS AND DEFINITIONS

Frameworks developed by Brown (2000) and K. Jordan (2008) go beyond a simple dichotomy between traditional Haudenosaunee and European architectural styles. As such, they provide fertile ground for a reevaluation of the Letchworth structures and the role they play in clarifying the timing of the transition from longhouses to log houses among the Senecas and other Haudenosaunee. Whereas K. Jordan's (2008) *intercultural/creolized* type describes pre-reservation Haudenosaunee dwellings which were fundamentally longhouses adapted with log

house elements, Brown's (2000) *Reservation Log House Type* takes the log house form as a core but recognizes the incorporation of longhouse elements.

Senecas, and the rest of the Haudenosaunee, constructed bark-sided longhouses of various sizes before European arrival to the New World (Hart 2000), as well as special-purpose structures like council houses and hunting lodges. Short longhouses figured significantly in the range of Seneca building forms (Hamell 1992:15; K. Jordan 2008:245-246). Senecas continued to construct dwellings in these traditional forms up to and in some cases after the Revolutionary War. European log and frame styles were not common in Iroquoia outside of Mohawk territory for most of the 18th century (K. Jordan 2002:453-459, 2009:216-217, 276).

K. Jordan's (2008:34) intercultural/creolized designation, developed to specifically apply to longhouses, reflects the integration of European tools, techniques, and architectural materials or styles with Haudenosaunee design elements and construction materials. Thus, the type recognizes Haudenosaunee decision-making in selecting European features, not passive copying of European forms. Dwellings with these characteristics appeared by at least 1715 at the Seneca Townley-Read site near Geneva, New York, and possibly as early as 1690 at the multinational Conestoga site near Lancaster, Pennsylvania (K. Jordan 2008:95, 258). A number of attributes aid in defining the intercultural/creolized longhouse form in an archaeological context. These include posts greater than 10 cm in diameter or of varying sizes; posts of square or rectangular shape and/or inserted into pre-dug holes; low wall post density; high iron nail density; and siding such as hewn and planked logs employed in a Haudenosaunee style (as with bark) but produced with European technology (K. Jordan 2008:239-244). The absence of European-derived cornering methods and the presence of non-load-bearing corners merit attention for this type of hybrid longhouse (K. Jordan 2008:243-244). The Letchworth structures provide an opportunity

to apply the intercultural/creolized concept to Haudenosaunee log structures, with notched, weight-bearing corners and supplementary vertical posts, if any. In general, window glass, chinking, plaster, and hardware such as door hinges also indicate hybridity in Haudenosaunee housing. Though they do not factor into the study of the Letchworth structures because they are not in their original locations, cellars provide evidence of the influence of Europeans, Americans, or other native groups who incorporated European techniques into their own housing repertoires. Kenyon and Ferris (1984:24), for example, uncovered cellar features at Mohawk Village.

Dorcas Brown's 2000 master's thesis outlines another applicable framework: the Reservation Log House Type.[2] She defined this type through historical research and analysis of 61 log houses from the Allegany, Buffalo Creek, Cattaraugus, Onondaga, Six Nations, and Tonawanda Reservations based on firsthand examination, illustrations, and photos on file at the New York State Historical Association Education Department (Brown 2000:25). Eight criteria delineate this type: a single-pen (one room) plan; an interior gable-end fireplace; side lengths of 12 ft. to 20 ft.; a rectangular floor plan; a centered eave wall front door, with a possible opposite back door; a window in the front wall and possibly in other walls; square hewn logs; and half-dovetailed corner notching (Brown 2000:25-26). The one-room floor plan suggests the continuation of the compartment features of a Haudenosaunee longhouse in a free-standing structure, as well as the possible influence of the English single-pen plan (Brown 2000:29). The English single-pen plan contains doors on the eave walls, as opposed to a Finnish single pen plan with a door on a gable end (T. Jordan 1985:23, 25, Figure 2.14). The single-room plan, presence of interior chimneys, and consideration of loft or attic spaces as similar to overhead storage compartments in longhouses noted by Brown draw attention to subtle differences between

[2] Following the convention in her thesis, I capitalize the term here.

Haudenosaunee houses of the reservation era with these features and typical European-style log dwellings.

The investigation of hybrid structures and other artifacts requires careful consideration of not only cultural origin but the ways different cultural groups took up specific traits and materials from others and made them their own. Though an architectural element may have European or native roots, groups which incorporated it into their housing repertoire could have considered it as standard after a time. Silliman (2009), citing the Eastern Pequot reservation as an example, discusses the nuanced study needed to more fully understand "hybrid" artifacts and critiques the assumptions of origin and cultural practices which accompany strictly labeling artifacts as "native" or "European." He also cautions against seeing change and the use of European or European American traits and materials "in ways that insure their survival as individuals, families, and communities" as "loss or passive acquiescence" on the part of native peoples (Silliman 2009:226). To do so is not only deceiving but biased, as archaeologists tend not to consider European settlers' adoption of native culture, such as consumption of certain crops, in the same manner (Silliman 2009:214, 227). Whatever the perceived origin of the construction methods and architectural features of the Caneadea council house and Jemison cabins, Senecas constructed them with their own labor and included elements derived from various pathways of introduction and which they adapted to their culture.

HAUDENOSAUNEE HOUSING, 1750-1869

An overview of housing in Haudenosaunee territory puts the Caneadea council house, Nancy Jemison cabin, and "Buffalo Tom" Jemison cabin in context with shifts in housing linked

to changes in culture, settlement, and political economy. Because Seneca people built the Letchworth structures, I emphasize Seneca examples.

Pre-1750

Following the advent of indirect and direct interaction with Europeans, modifications in Haudenosaunee longhouse, short longhouse, council house, and more cabin-like special purpose forms occurred only under specific conditions. European-style log structures did not feature prominently in the range of housing forms for most of the Haudenosaunee, including the Senecas, through the first half of the 18th century (K. Jordan 2004). Rather, the Haudenosaunee continued to use longhouses and at times employed intercultural/creolized forms (K. Jordan 2008:275). Intercultural/creolized longhouses provided greater durability for use in dispersed settlements, where people stayed for longer periods of time because they did not deplete natural resources as quickly as in nucleated villages (Hamell 1992:3). They also retained basic Haudenosaunee features and their "functional and symbolic purposes" (K. Jordan 2008:272).

The Mohawks present a divergent case from that of the other Haudenosaunee nations.[3] The Mohawks adopted European-style housing earlier, at the beginning of the eighteenth century, with differentiated elite and common residences built in European styles by 1777 (K. Jordan 2009:216-217). Greater interaction with Europeans; the pressure of European settlement facilitated by the establishment of Fort Hunter in 1711; economic inequality; the shift to more European ideas of property ownership and intensive farming; and culture change efforts by

[3] Moravian missionary David Zeisberger noted another possible case of divergence in Iroquoia. He recorded in 1768 that upon entering Garochati (likely the Seneca settlement of Caneadea), he saw "houses built in various styles," including "weather boarded block-houses" which in some cases had chimneys and "two story houses, having a staircase on the outside" with "a tower-like appearance" (Hulbert and Schwarze 1912:82). A further investigation of the original text and its translation may clarify the unusual description of the outer staircases and "tower-like" structures from this possibly erroneous account.

Europeans such as Sir William Johnson all influenced Mohawk lifeways and the switch to more European-style housing (K. Jordan 2002:456; 2009:221-226).

1750-1779

Illustrations and personal accounts from the Sullivan campaign provide examples of Seneca housing from the middle of the 18th century through 1779. A man named Major Brice completed two such illustrations (New York State Archives [NYSA], Albany, New York 1779). His sketch of the council house at Kanadesaga appears to be mainly traditional and perhaps intercultural/creolized (Figure 1). Two columns of smoke denote the presence of multiple hearths in the center of the structure. It also contains vestibule areas and presumably doorways at each gable end, along with vertical wall posts. Compared to the Tory Colonel John Butler's house[4] on the left, which actually stood some distance away near Seneca Lake (F. Cook 1887:30), the council house does not exhibit the same stacked horizontal log construction or have windows. The council house does appear to contain a similar peaked, rather than rounded, roof. However, based on its texturing the roof of the council house is composed of bark, a Haudenosaunee standard.

[4] Butler led a group of British rangers during the Revolution and attempted to muster Haudenosaunee and other Native American support while based at Fort Niagara; he had an outpost at Kanadesaga (Graymont 1972:215; Taylor 2006:85, 93). He led rangers who fought alongside Senecas and other native people in various military actions, such as combat in the Wyoming Valley (Graymont 1972:167-174, 208-215).

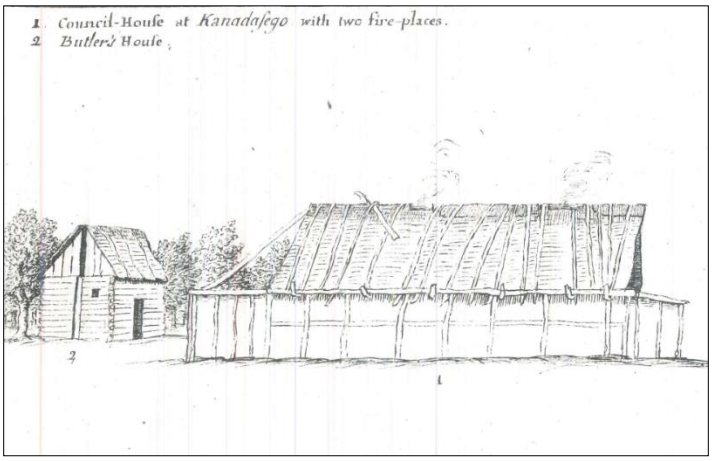

FIGURE 1. Copy of Major Brice's drawing of a council house and Butler's house at Kanadesaga (NYSA 1779).

Brice's depiction of a Seneca house at Genesee Town also appears intercultural/creolized (NYSA, 1779; Figure 2). The house includes various traditional elements. Smoke designates the presence of a central hearth, the doorway shown is in a gable end, and a large squared post stands in the center of the wall of the structure. In addition, texturing on the roof may indicate bark covering. However, the eave side displays a butting board or pole system, which has Savo-Karelian and Midland American pioneer connections (T. Jordan and Kaups 1989:169-170, Figure 6.26). The sides of the structure consist of horizontal logs, though the nature of the corners is difficult to determine. The logs of each side appear to end at a perpendicular angle to one another rather than interlocking with a notch. If this is not a product of the illustrator's interpretation of the dwelling, the lack of notching implies that the corners did not bear the brunt of the weight of the structure and that interior posts not shown in the drawing probably performed this function, similar to the traditional Haudenosaunee manner.

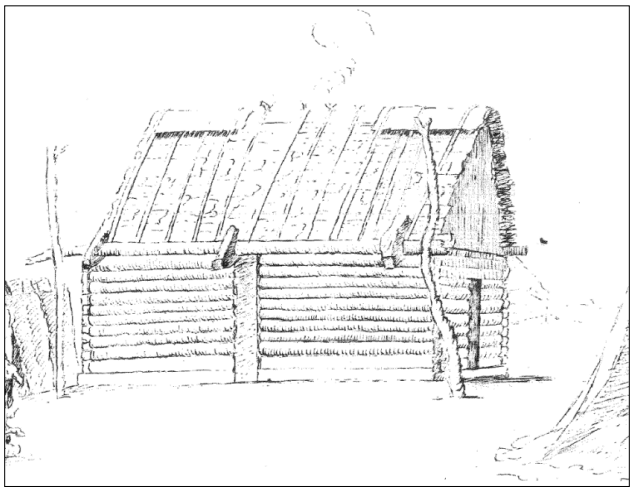

FIGURE 2. Copy of Major Brice's drawing of a house at Genesee Town (NYSA 1779).

The American Lieutenant James Fairlie sketched a structure at the Seneca town of Kendaia during the 1779 Sullivan campaign (Division of Archives and History [DAH] 1929:174; Figure 3). The building could be an intercultural/creolized longhouse, with an apparently bark-covered, rounded roof, a door in a gable end, no chimney, horizontal siding which could be logs, and a possible window in the upper left corner of the eave side. Fairlie's drawing does not depict any corner joinery, leaving open the possibility that vertical internal posts supported the structure in a fundamentally Haudenosaunee longhouse design. Fairlie also reported on the other houses in the town, around a dozen at his count. Like the sketch, his description provides evidence that at least some of the houses at Kendaia were of a hybrid variety and intercultural/creolized longhouses specifically. They were approximately "20 feet by 12 some of them very neatly built of hewn logs and nicely Roofd with bark" (DAH 1929:176). They also had central fires, no chimneys, and side-wall births (DAH 1929:176). Importantly, Fairlie's account does not mention corner notching, and the side-wall births suggest that internal posts could have supported the bark roofs.

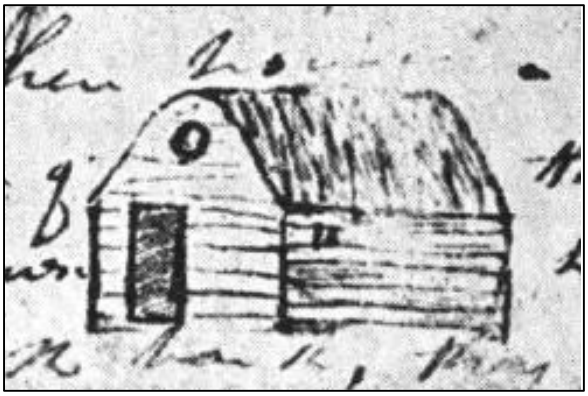

FIGURE 3. Lieutenant Fairlie's depiction of a house at Kendaia (DAH 1929:174).

K. Jordan (2004:42-44) contends that during this time intercultural/creolized short longhouses and multifamily longhouses were prevalent among the Senecas, while European-style houses were rare and likely a recent introduction given their presence mainly in newer villages. Hamell (1992:35-42) similarly notes diversity in housing in Iroquoia. Thus, European elements and styles did not replace traditional forms. The lack of European settlement or pressure to modify their culture allowed Senecas to embrace certain European practices and material culture as they saw fit (K. Jordan 2009:224-225). In contrast, among the Oneidas from the 1770s to 1780, a shift to more European-style housing occurred as a result of a desire to use architecture to display inequality, culture change endeavors led by Samuel Kirkland, European infrastructure, and to a lesser extent intensive agriculture (K. Jordan 2002:453-455).

1790-1869

After the Revolutionary War and the establishment of reservations through measures such as the 1797 Treaty of Big Tree, Haudenosaunee people saw their landholdings and freedom of movement decrease. While Haudenosaunee people may have continued to construct homes in

traditional and intercultural/creolized forms, K. Jordan (2002:458-459, 466-467, 2008:275) posits that Haudenosaunee people on reservations took up residence in more long-lasting cabins influenced by European log styles as a workable solution to imposed restricted mobility, increased settlement duration, and the influence of European American ideas of property ownership. Post-Revolution examples, the earliest of which included here possibly dates to 1790, generally support this assertion.

Lantz (1980) excavated the vestiges of a Seneca cabin occupied from ca. 1790 to 1850 or 1869 at the Vanatta site near Salamanca, New York. European American construction materials recovered included lime mortar and window glass (Lantz 1980:20-21, 39). Two post molds of 20.3 cm diameter, possibly from leveling blocks for the cabin, and the remnants of two support posts of 10.2 cm diameter for a porch or shed extending from the cabin remained (Lantz 1980:19). These construction materials and large, ancillary posts, along with an assemblage which did not contain metal housing hardware or evidence of a chimney (Lantz 1980:21), are consistent with an intercultural/creolized form, but in terms of a log form incorporating traditional Haudenosaunee longhouse features. The low proportion of manufactured personal items, prevalence of deer in the faunal assemblage, and a high proportion of European American arms-related artifacts also demonstrate the persistence of pre-reservation Seneca lifeways, such as deer hunting (Lantz 1980:36-38, Table 3).

Intercultural/creolized abodes with traditional longhouse elements and log walls, persisted in other villages and settlements. During his travels in 1795-1797, La Rochefoucauld-Liancourt (1799:155-156) reported log houses with bark covering, sleeping compartments, central fireplaces and smoke holes in the roof at Squawky Hill and Mount Morris. L. L. Doty (1876:89) reported in his history of Livingston County that in 1816, “a dozen bark-roofed houses

of small logs" stood at Squawky Hill, along with a council house which had a central fire. The council house at the early-1800s Canawaugus Village site on the Canawaugus Reservation near Avon, New York, had a roof of bark over a ridge pole, a smoke hole in the center of the roof, and was approximately 60 ft. long (L. R. Doty 1925:862; Hayes 1965:4-5; Omwake 1965:31). Bark roofs also topped Seneca dwellings at Big Tree, even in 1820 (L. L. Doty 1876:86). On the Canadian side of the border, Ferris (2006:245) asserts that some Haudenosaunee houses along the Grand River in present-day Ontario resembled longhouse compartments in the 1810s, and council houses featuring longhouse aspects continued to serve political and ceremonial functions in Grand River settlements into the late 1800s (Kenyon 1985:12-14; Ferris 2009:133-135).

Principally Mohawk settlements along the Grand River exhibited significant elements of European-derived housing in the 1800s (Kenyon and Ferris 1984; Ferris 2009; Beaudoin 2013). Similarly to the case in the 1700s, the Mohawks at Mohawk Village and Davisville differ from the Seneca examples cited above in having more European traits. Archaeological investigations of the elite Powless family residence occupied from around 1800 to the late 1830s at Mohawk Village revealed postholes for a possible porch, a cellar, bricks for a probable fireplace or chimney, window glass, nails, and door hardware (Kenyon and Ferris 1984:24-26; Ferris 2009:146). The remains of the family's later dwelling, occupied from the late 1830s to 1860, included a cellar, postholes forming the boundaries of a possible porch or addition, bricks probably from a chimney, nails and screws, plaster, and door and window hardware (Kenyon and Ferris 1984:26; Ferris 2009:147). The inhabitants of Mohawk Village had a different relationship with surrounding settlers, which in their case were Euro-Canadians, than did Senecas in the Genesee. Beaudoin (2013:107-108) proposes that the Powless family maintained their elite status

in both the Mohawk and Euro-Canadian sense and that they continued certain practices and adopted others as the meaning of "elite Mohawk" changed.

Davisville formed under the leadership of Mohawk war chief Thomas Davis in the 1820s, in large part due to dissatisfaction with the practices, alcohol consumption, and leader Joseph Brant at Mohawk Village (Beaudoin 2013:54-55). Archaeological work focused on the Davisville 1 and 2 sites, dated to 1800 to 1830, and Davisville 7 and 8, dated to 1830 to 1860. Davisville 1 contained flat cobble stones and a likely cellar (Beaudoin 2013:59). In Davisville 2, excavators found post molds from what could have been a porch and entryway, a cellar, a feature with bricks, and a feature with stones which may have come from a chimney (Beaudoin 2013:61-63). Davisville 7 and 8 contained window glass and brick, and Davisville 8 had one piece of plaster (Beaudoin 2013:93). Beaudoin (2013:89, 93) argues that Davisville 7 was a traditional or creolized house (following in part K. Jordan 2008), whereas Davisville 2 and 8 were "more substantial." Differences between Davisville 1 and 7 and Davisville 2 and 8 suggest that the inhabitants of each group of sites may have differed in social status (Beaudoin 2013:94).

The incorporation of specific European housing elements, and even occupation of European-style dwellings, highlighted above did not signify the end of long held social patterns. For example, drawing on evidence from other matrilineal, matrilocal societies, K. Jordan (2008:273-275) argues that the development of short longhouses did not mark the end of Haudenosaunee matrilineality. Senecas at Tonawanda in the 1800s maintained extended family ties though no longer living in longhouses, as demonstrated by the "Clute, Fish, Jemison, and Brooks families, all living in this [the same] corner of the Tonawanda Reservation" and maintaining close ties (Brown 2000:13, 49, 53-58). Senecas at Squawky Hill arranged their homes near the council house (L. L. Doty 1876:89). Finally, Shoemaker (1991:330, 333, Note 8)

notes that even in 1900 the Seneca families of Allegany and Cattaraugus were more vertically and laterally extended than U.S. families (Shoemaker 1991:330, 333, Note 8).

A number of factors influenced the degree to which Haudenosaunee people adopted European-style housing elements or styles all together. These include the degree of interaction with and territorial encroachment of Europeans; presence of European American infrastructure such as sawmills and roads carrying goods, settlers, and travelers; the ability to control land (communally, as with the Senecas [K. Jordan 2009:223]) or alternatively being driven to adopt European notions of land as property; and colonialist attempts to push Haudenosaunee practices into line with European American culture (K. Jordan 2008:276). For Senecas, these factors mainly came into play after the Revolutionary War and reservationization. Moravian activity in particular may have been a major driver in spreading the use of European-style housing elements, and missionized groups such as the Delaware could have shared Moravian techniques with Haudenosaunee people (Brown 2000:18, 20, 24, 28-29; K. Jordan 2002:455).

SENECA BACKGROUND

A summary of Seneca history with emphasis on the Genesee Valley, from 16th-century settlement in palisaded nucleated villages and a focus on hunting, gathering, and farming to the reservation era, provides further context to frame discussion of the Letchworth structures. The Senecas were the westernmost nation of the League of the Haudenosaunee. Seneca territory extended from the Genesee River east to Seneca Lake, with hunting lands extending as far as Cayuga Lake and southern Ontario to Ohio (Abler and Tooker 1978:505). From around 1560 to

1687, the Senecas lived in two major nucleated villages at a time, one western and one eastern (Abler and Tooker 1978:506-507).

This system continued for a short time after the French Denonville attacks in 1687 but changed as the 1700s wore on (K. Jordan 2004). Eastern Senecas began to occupy smaller, more dispersed settlements which provided ecological and labor benefits but were in less naturally defensible locations after the onset of peaceful conditions in 1713, and in the west the Senecas claimed a middleman role in the trade with posts at French Fort Niagara and British Fort Oswego in the ensuing decades (K. Jordan 2004:37-38, 52-53; 2008:210-213, 326-333). In a related move, substantial year-round Seneca settlement began in the Genesee River Valley in the 1740s, after a nearly two-hundred-year hiatus. The Senecas were likely attempting to more firmly link themselves to the Ohio territory in conjunction with developments in the fur trade and to establish a position closer to Fort Niagara (K. Jordan 2008:195-196). Few European Americans, save for a limited number of traders, squatters, and settlers, lived in the Genesee region to impede such movement at this time (Turner 1976:128). Seneca settlement patterns shifted again mid-century. Mainly semi-dispersed communities provided greater security than fully dispersed settlements for Senecas during the Seven Years' War, but after hostilities concluded in 1763 they formed intra-regional settlements, and intercultural short longhouses became prominent in the range of housing styles (K. Jordan 2004:42-44, 53).

Despite attempts to remain neutral during the Revolutionary War, Senecas and other native groups took part in military actions along with the British against the Americans (Graymont 1972:167-174, 208-215; Calloway 1995:140-141). Many Senecas and other native refugees fled to British Fort Niagara after the American Sullivan and Brodhead expeditions destroyed most of their settlements in 1779 (Calloway 1995:137; Hauptman 1999:107).

Calloway (1995:129-157) highlights the violence, alcohol use, and the lack of resources available near the fort as the British sporadically gave gifts to leaders to curry their favor. Native groups, Indian Department officials, military men, and traders jockeyed for influence and power among themselves and with each other (Calloway 1995:156-157). However, Mt. Pleasant (2007:28-37) points out the independence and at times interdependence of Senecas, a continuation of earlier autonomy to a degree, near Fort Niagara during the Revolution. Indeed, Taylor (2006:133) asserts that one of the reasons other native refugees left the Niagara area after the Revolution was to escape Seneca "domination." Though some settled along the Grand River in British Ontario, Senecas and other Haudenosaunee moved back to western New York State and settled in the Genesee and Allegheny valleys and the Finger Lakes (Calloway 1995:153-155; Taylor 2006:133-134).

However, such freedom of movement did not to last. At the same time, American interest in the Genesee region resulted in increased encroachment from European American settlers. Plentiful timber, bountiful game, land suitable for European American farming, and a position near waterways lured settlers (many from New England) who learned of this abundance from American soldiers returning from duty in the valley (Franklin 1791; Turner 1976:130). The 1784 Treaty of Fort Stanwix delineated a western boundary for the Haudenosaunee from Lake Ontario south along the north and western borders of Pennsylvania to the Ohio River (Kappler 1904:6). The Phelps and Gorham Purchase brought almost all land east of the Genesee River in New York into American hands in 1788 (Wallace 1972:153; Abler and Tooker 1978:508). Development of European American infrastructure also began, including road projects driven by the Holland Land Company starting in the 1790s (Wallace 1972:210-211; Hauptman 1999:144-146; Dennis 2010:39, 101, 160). In 1794 Seneca territorial lines were drawn with the Treaty of Canandaigua

(Kappler 1904:35). The 1797 Treaty of Big Tree established the reservations of Buffalo Creek, Allegany, Tonawanda, Oil Spring, Cattaraugus, and Tuscarora, as well as smaller tracts along the Genesee River (Kappler 1904:1028-1029). These Genesee reservations included Big Tree, Canawaugus, Caneadea, Gardeau, Little Beard's Town, and Squawky Hill (Kappler 1904:1028-1029; Figure 4). More settlers poured in following reservationization. According to the 1800 national census, 16,818 "free white" males and females, 79 slaves, and 109 "other free persons, except Indians not taxed" lived in Ontario and Steuben counties, a great increase from 1,058 residents identified as white, 6 slaves, and 11 other free persons in 1790 (U.S. Census Bureau 2013a:9; 2013b:32).

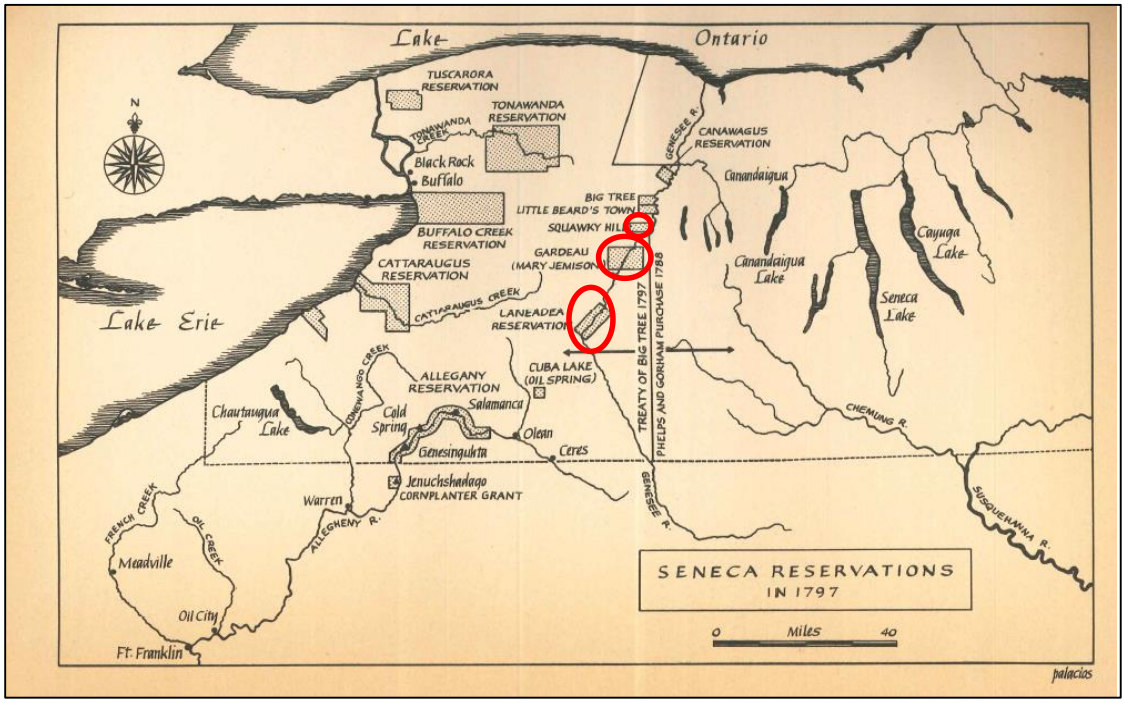

FIGURE 4. The Squawky Hill, Gardeau, and Caneadea reservations. (Adapted from Wallace 1972:xv.)

The War of 1812 only reduced the European American influx into the Genesee and western New York for the conflict's duration (Benn 1998:182-183; Dennis 2010:182). By 1819, only 456 Native Americans resided in the Genesee reservations (Minard and Merrill 1896:34). Mary Jemison, owner of the Gardeau Reservation, sold most of her land in 1823 (Seaver 1990[1824]:122-124). She later moved to Buffalo Creek in 1831 after selling the last of her tract and died there in 1833 (L. L. Doty 1876:93, 132; Milliken 1925:446). Further reduction of Seneca territory followed. The Senecas lost the Caneadea and Squawky Hill lands in 1826 in dubious efforts involving the Ogden Land Company and a contested treaty (Minard and Merrill 1896:87; Hauptman 1999:154-155, 160). The 1820s in general saw a great increase in European American population to 26,276 (including enslaved African Americans and non-white free persons) in Allegany County, up from 1,942 in 1810 and 9,330 in 1820 (U.S. Census Bureau 2013c:60; Minard and Merrill 1896:76, 90).

Quaker missionaries impacted some Seneca communities in the late 18th and early 19th centuries. They settled at Genesinguhta in the Allegany Reservation beginning in 1798 with the Seneca leader Cornplanter's permission, formed a new town off the reservation at Tunesassa in 1803, and were active at Cattaraugus (Rothenberg 1976:155; Abler and Tooker 1978:509; Dennis 2010:130-134). The Quakers encouraged Senecas to adopt certain features of their European American lifestyle, including house forms, farming methods, male involvement in agriculture, and an emphasis on the nuclear family (Deardorff and Snyderman 1956:591; Wallace 1972:281-282; Lantz 1980:15, 21). Even before Quaker arrival residents of Cornplanter's Town on the Allegheny River lived in log houses, but they also dwelled in bark structures, and these buildings had longhouse features beyond the use of bark, such as center smoke holes in the roofs, bunks, and a lack of windows (Wallace 1972:189). Cornplanter himself

lived in a home, which also served as a council house, made of two pens connected by a bark roof (Wallace 1972:187; Deardorff and Snyderman 1956:588). This description bears similarity to the dogtrot European American log form (T. Jordan and Kaups 1989:179), but with longhouse elements in the bark roof and if the pens were seen as connected compartments. Quaker Halliday Jackson recorded "near 100 new houses" of notched hewn logs, "many of them covered with shingles & hav[ing] pannel Doors and Glass windows," built since Tunesassa's inception during his 1806 visit (Snyderman 1957:582). His colleague and fellow traveler John Philips recorded the Quaker reaffirmation shared at a council at Cold Spring to teach Senecas how to build European American houses, fences, and roads (Deardorff and Snyderman 1956:603).

However, Senecas did not fully capitulate to Quaker efforts. Seneca men, for example, chose to continue to engage in hunting for furs, wage labor, and lumbering activities which drew them into interaction with American markets, rather than becoming sedentary farmers as the Quakers desired (Rothenberg 1976:206-216, 1980:75-76; Dennis 2010:151, 177). Such work fit a familiar Haudenosaunee seasonal model of varying activity types and levels (Dennis 2010:158). While Philips saw recently-constructed notched hewn houses, including two-story dwellings, upriver from Cold Spring, he also noted Haudenosaunee features, including bark covering, earthen floors, and side wall benches (Deardorff and Snyderman 1956:606). Therefore, Quaker influence was likely not the main factor in shifting house forms, especially in the Genesee, which lacked a prominent Quaker presence.

The Seneca prophet Handsome Lake, who was born on the Genesee near Avon, New York, in 1735, sought to change Seneca society as well. Handsome Lake received the first of a series of revelations directing the reformation of certain Seneca practices, such as alcohol consumption, and the revitalization of others in 1799 (Parker 1968; Wallace 1972:239, 252-253).

Part of his social movement advocated the use of European American-style housing (Tooker 1968:191; Wallace 1972:281). Though he did not mention log or frame forms specifically, his code called for following the example of European American men, who constructed substantial houses for their families (Parker 1968:38). At Cold Spring, for instance, he supported the building of hewn log houses with clapboard roofs and later glass windows, chimneys, and paneled doors (Wallace 1972:288). John Philips also noted "good houses and fences" on the way there in 1806, as well as a seemingly traditional council house with two central fires which he claimed was large enough to fit 200 people (Deardorff and Snyderman 1956:599, 601). In addition to longstanding Seneca attitudes regarding family organization and the ownership and inheritance of land, Shoemaker (1991:336) suggests that the influence of the Code of Handsome Lake in part drove the continued importance of extended families after a revival in the 1830s.

Yet, Handsome Lake did not spread his message in the Genesee Valley as successfully as he did to areas such as the Allegany Reservation, near which his half brother Cornplanter lived on his own plot and the Quakers founded their missions, before his death in 1815 (Wallace 1972:299-301; Abler and Tooker 1978:510). He also faced opposition from Seneca leader Red Jacket at Buffalo Creek (Wallace 1972:167, 259, 299-301; Dennis 2010:101-105). As with the Quakers, Handsome Lake's mix of culture change and retention may not have heavily impacted residential housing styles in the Genesee Valley. However, the presence of a council house longer than a single-family home at Caneadea, similar to others used in the Longhouse religion inspired by Handsome Lake, and more permanent log housing suggest a possible weak influence of the Code of Handsome Lake in the Genesee. Longhouses with interior fireplaces at the ends, planked or hewn log walls, windows, and shingled roofs built by residents of the Cattaraugus and Six Nations reservations, St. Regis Mohawks, Upper Cayugas, and Tonawanda Senecas for

ceremonial purposes illustrate the continued impact of the Longhouse religion's combination of tradition and innovation into the 20th century (Fenton 1968:Plates 3, 5-8).

THE LETCHWORTH STRUCTURES

The Caneadea Council House

The Caneadea council house formerly served the Seneca community at Caneadea, near present-day Houghton, New York. The Sullivan campaign left Caneadea intact (Graymont 1972:218), and the settlement and surrounding area became the Caneadea Reservation under the Treaty of Big Tree. The Crawford and Stearns report places the construction of the council house between 1759 and 1780 based on Mary Jemison's account, Guy Johnson's 1771 map, and the biographies of Captain Horatio Jones and Major Moses van Campen of the American army, who ran the gauntlet there in 1781 and 1782, respectively (Bartlett 1995a:36-37). Historian John S. Minard (Hubbard and Minard 1893:233) stated in a biography of Moses Van Campen that British troops aided in the construction of a council house with dovetailed corners at Caneadea around 1780, but he only cited an unnamed "good authority on such matters" as the source of this information. Jones purportedly saw "a few bark huts, ordinary houses, and a large building of hewn logs" at Caneadea (Harris 1903:407). This "large building," supposedly the council house, had a staff with a white flag (Harris 1903:407). Though the council house mentioned in this account may be an earlier council house than the one now at Letchworth, or a different building altogether given the strange presence of a staff and flag, this record describes a mix of housing forms at Caneadea in the early 1780s.

Henry Howland (1903:102) later suggested an even earlier date than Minard for the council house now at Letchworth and stated that "Indians ascribe it a venerable antiquity and it is believed to long antedate the American Revolution." However, he may have exaggerated this claim or misunderstood his Native American informants. They may have been describing an earlier version of the council house or when a council house was first erected at Caneadea.

The Senecas of Caneadea used the council house now at Letchworth until about 1826, when most left the area after losing their claim to the territory (Minard and Merrill 1896:87; Hauptman 1999:154-155, 160). The European American settler Joel Seaton then purchased the plot of land containing the building. He and his family lived in it and subsequently repurposed it as an outbuilding (Minard 1896:658). Seaton at some point moved the structure a short distance east on the property and added three or four courses of logs at some point during his family's occupation (Hubbard and Minard 1893:233). He also installed a gable end chimney and may have been responsible for adding two of the windows present today and replacing the roof (Bartlett 1995a:92, 94, 116). Prior to Seaton's modifications, the structure may have featured no windows and had a central fireplace or fireplaces at either end with smoke hole(s) in the roof, like a traditional longhouse (F.W. Beers & Co. 1879:52; Minard 1896:658).

In 1871-1872, philanthropist William Pryor Letchworth purchased the council house and had it moved and reassembled at his Glen Iris estate, now part of Letchworth State Park (Bartlett 1995a:22). John Shanks, a Seneca, then directed efforts to restore the building. Though little information on the renovations survives, it is known that Shanks replaced rotted timbers and the roof, removed the courses of logs added by Seaton, and installed interior wall benches which were later removed (Bartlett 1995a:105-106, 110, 118). The council house was repositioned on the Council House Grounds at the park in 1912-1913 to provide a more open view of the nearby

Nancy Jemison memorial (Bartlett 1995a:10-11; Figure 5). More recent roof work took place in 1986 (Bartlett 1995a:127).

FIGURE 5. The Caneadea council house viewed from the west, October 2013. (Photo courtesy of Ted Bartlett, Crawford and Stearns Architects and Preservation Planners.)

By providing a firmer construction date for the structure, dendrochronology allows for a more confident situating of the council house in time and context. The results discussed below shed doubt on whether this particular building is actually the one referred to in texts and the map by Guy Johnson. Rather, a construction date in the early 19th century is more likely.

The Nancy Jemison Cabin

The Nancy Jemison Cabin initially stood near present-day Castile on the Gardeau Reservation, close to the home of Nancy's mother Mary Jemison. It may be the dwelling which Mary "built on the Gardeau flats about the year 1800 for one of her daughters" (Milliken 1925:446). Nancy and her husband Billy Green lived in the cabin with their children from around

1800 to 1831, when they moved to the Buffalo Creek Reservation, as did Mary (Milliken 1925:446; Bartlett 1995b:15, 26). The single-pen cabin at this time had one doorway, one window, and likely a gable end chimney and fireplace (Bartlett 1995b:32-34). A series of settlers later owned the cabin and surrounding land, including Nehemiah Westbrook, then Simeon K. Westbrook, followed by Elijah Strong and later his son Charles, and finally Jonathan R. Olmstead (Bartlett 1995b:36). A second doorway and more windows probably were added during this time (Bartlett 1995b:43-44). The building was moved to Letchworth in 1880. John Shanks again led renovations, including the addition of a porch, the replacement of some timbers, and the construction of a new gable end chimney, until 1884 (Bartlett 1995b:51, 54-56). In 1912-1913, the cabin, like the council house, was repositioned on the Council House Grounds (Bartlett 1995b:61, 63; Figure 6). Porch and roof replacement took place in 1986 (Bartlett 1995b:59).

FIGURE 6. The Nancy Jemison cabin viewed from the east, May 2014. (Photo by author.)

The "Buffalo Tom" Jemison Cabin

Mary's grandson, Thomas "Buffalo Tom" Jemison, and his family lived in his cabin on the Squawky Hill Reservation, near present-day Leicester, from around 1818 to 1828 (Bartlett 1995c:15). They subsequently moved to Buffalo Creek (L. L. Doty 1876:89). American Warren C. Hatch then occupied the cabin, which was incorporated into a frame home (Bartlett 1995c:3, 24). In his history of the Genesee area published in 1925, Lockwood R. Doty (1925:863) noted that "part of the log hut of Thomas Jemison, grandson of the White Woman [Mary Jemison], is still standing." The brothers Joseph, Frank, and Charles Cipriano later assumed ownership of the property and worked with Letchworth State Park officials to transport what remained of the cabin to the park in 1969 (Bartlett 1995c:29). However, the cabin was not reconstructed. Its timbers, now too deteriorated to reassemble, remain in a storage shed at the park.

METHODS

Dendrochronology

In October 2013 and May 2014, I traveled to Letchworth and obtained samples from the council house and cabins for dendrochronological analysis with researchers from the Cornell Tree-Ring Laboratory, based at Cornell University in Ithaca, New York. Peter Jemison joined in the May visit and observed as Carol Griggs from the lab and I filled in holes in the cored logs. He also examined the council house and Nancy Jemison cabin, specifically iconography on the west wall and northeast corner of the council house. I do not further address the carvings, which include a snipe and cross of unknown date, as this is beyond the scope of this thesis. Cores were drilled from logs with rounded or minimally worked corners with bark or possible waney edge.

A waney edge contains the tree's final annual growth ring, known as the terminal ring. Cores were taken using either a Henson or Rinntech borer, and cross sections were sawn from loose council house beams which had been removed and replaced due to deterioration.

In the Cornell Tree-Ring Laboratory, each analyzed core sample was mounted in a wooden holder with common glue. The cores and the two council house cross sections were then sanded and polished using belt and orbital sanders, and on occasion by hand, with paper up to 1000 grit to clearly view the annual growth rings. The widths of the complete rings in each core and across two radii of each cross section were then measured at least twice. This process entailed using a measuring platform placed under a microscope equipped with crosshairs to view and measure straight across each ring. Tellervo and Corina software recorded the ring-widths to the nearest 0.01 mm, with 0.03 mm error, from a counter connected to the platform. An attempt was made to measure around cracks in the cores and to link separated segments into an accurate sequence. When needed, fragmented cores were compared visually and through graphs of the ring-width sequences to other samples from the same beam and structure to confirm that the sections were in the correct order and not missing rings. Portions of cores were excluded when breaks resulted in possible errors in mounting the pieces in order. The sequence of measurements for each sample was then indexed or detrended. Indexing involved creating a new data set by fitting the raw values of a sample’s sequence to a curve using Corina software. This removed the impact of age and non-climatic factors on the growth trend and enabled easier comparison of different sequences (E. Cook 1990; E. Cook et al. 1990).

Visual comparisons of the graphs of the indexed sequences and statistical analyses performed by Corina indicated the best match of each Letchworth specimen’s ring pattern to those of the other samples from the same structure to create relatively dated chronologies.

Correlating these with established tree-ring chronologies using the same methods then provided calendar dates for the samples, a process known as crossdating (Baillie 1995:16, 20-21). Single Letchworth specimens of a species were only compared with dated chronologies of the same species, not other Letchworth samples. The relevant statistics calculated were Student's T-score (*t*), the correlation coefficient (*r*), and the trend coefficient (*tr*). They represent how well the patterns of peaks and dips in individual sequences and multi-sample chronologies match one another. Significant values are usually above 3.50 for the T-score, 0.32 for the correlation coefficient, and 60% for the trend coefficient, which gauges how often the compared sequences rise and fall simultaneously (Carol Griggs 2014 pers. com). The COFECHA program checked the correlation of each sample from the council house chronology with the others and verified the crossdating of the chronology (Holmes 1983; Grissino-Mayer 2001).

In terms of determining a construction date for the Letchworth buildings through dendrochronology, the final ring of a core or cross section containing bark or waney marks the terminal year of growth and thus the felling date of that timber. If the log was employed in construction soon after, this also indicates when the building was erected or modified (Baillie 1995:21). Therefore, each Letchworth specimen was examined to determine if such an edge was present. Even without the terminal growth ring, dendrochronology still provides a *terminus post quem*, a date after which the tree was felled.

Analysis of Construction Methods and Architectural Features

In addition to dendrochronology, Jordan's (2008) intercultural/creolized and Brown's (2000) Reservation Log House Type concepts, outlined above, highlight construction methods and features such as corner notching, log siding and hewn log walls, and floor plans associated

with Haudenosaunee longhouses with log house elements from different European and European American groups and log houses incorporating Haudenosaunee longhouse elements. Applying these frameworks provides a better understanding of the Letchworth buildings and the transition from structures which were fundamentally longhouses to log houses among late 18th- and early 19th-century Senecas in the Genesee Valley and their other remaining territory.

Information on extant and past architectural features and construction methods for this analysis came from the historic structure reports on the Caneadea council house and Nancy Jemison cabin and the preservation report on the Buffalo Tom Jemison cabin (Bartlett 1995a, 1995b, 1995c). I also examined the council house and Nancy Jemison cabin firsthand, in particular the corner notching and the manner of log hewing. I assessed how the council house and Jemison cabins compare to the intercultural/creolized form and Reservation Log House Type based on extant or documented elements related to the Seneca occupation of the structures. These included corner joining techniques, floor plans, and the presence and placement of doorways, windows, and chimneys. Because the roofs of the Caneadea council house and Jemison cabins have been replaced multiple times, I do not explicitly consider roofing style. As European Americans at one point occupied these structures, it was imperative to avoid including alterations from the European American occupations and any restoration or maintenance work after their removal to Letchworth.

RESULTS

Dendrochronology

In total, 19 cores and sections were collected from the council house and Jemison cabins. During sampling in October 2013, Ted Bartlett of Crawford and Stearns Architects and Preservation Planners assisted in identifying logs which had not been replaced since the relocation of the council house and Nancy Jemison cabin to the park. A log numbering system employed to reassemble the council house as it stood on the Seaton farm in 1871 aided in these efforts (Bartlett 1995a:197). Logs determined to belong to the structure in 1871, and possibly from the original construction, were selected for sampling.

Ten core samples were taken from the walls of the council house: two each from three separate timbers (1-, 2-, and 3A and -B) and a single from a fourth (4A) in the north wall, as well as one each from the west (8A), south (9A), and east (10A) walls (Figure 7). Having samples from each wall allowed more secure dating of the building as a whole. One sample (7A) came from a loose council house timber stored in the attic of the Nancy Jemison cabin after its replacement during Shanks' maintenance in the 1870s. Two cross sections (5A and 6A) were cut from two other council house logs stored in the Nancy Jemison cabin attic. Eight of the cores came from timbers which appeared to contain bark or waney edge, denoting the presence of the final growth ring of the tree. All are eastern white pine[5] (*Pinus strobus* L.) (Carol Griggs 2013, pers. comm.).

[5] Few dendrochronology studies of historic structures in the Northeast have included white pine (e.g., Bonzani et al. 1991; Griggs 2008; Young-Vigneault et al. 2012), and they have mainly focused on European American constructions. This study thus expands on historical dendrochronological research with this species and Native American buildings in the Northeast.

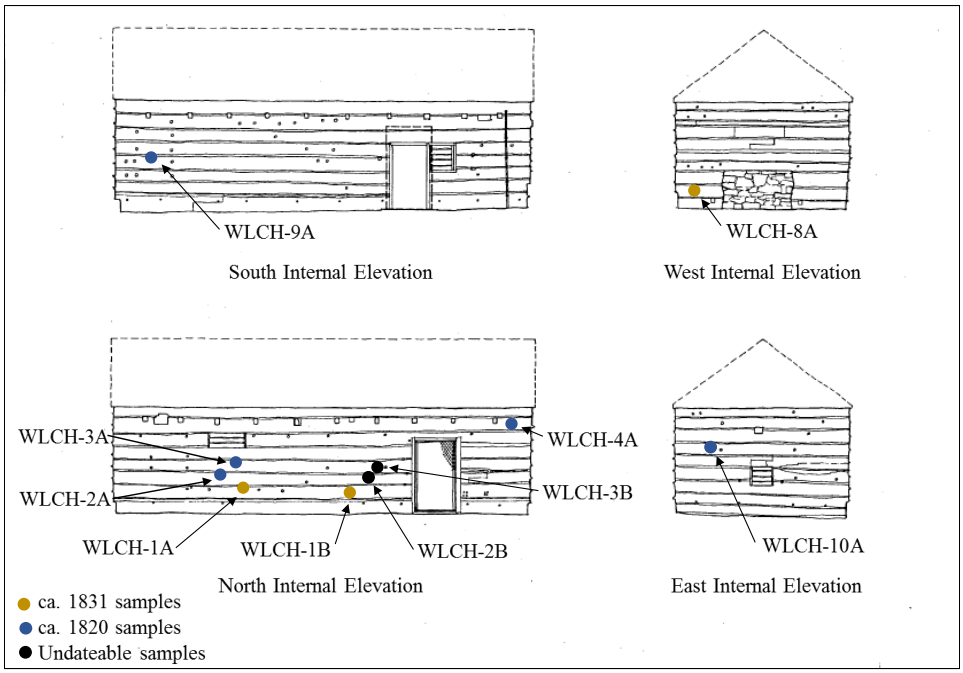

FIGURE 7. Locations of samples from the council house. (Adapted from Bartlett 1995a:CH-5.)

Three cores were taken from different logs in the Nancy Jemison cabin: one from the east wall in the lower floor (1A), one from the south wall in the attic (2A), and one from a crossbeam in the attic (3A) (Figure 8). As with the council house samples, the cores from the walls are eastern white pine, but the crossbeam core is eastern hemlock (*Tsuga canadensis* [L.] Carr.) (Carol Griggs 2013, pers. comm.). Attempts to sample the "Buffalo Tom" Jemison cabin's decayed oak beams (*Quercus* sp. L.) (Carol Griggs 2013, pers. comm.) only yielded three heavily fragmented cores.

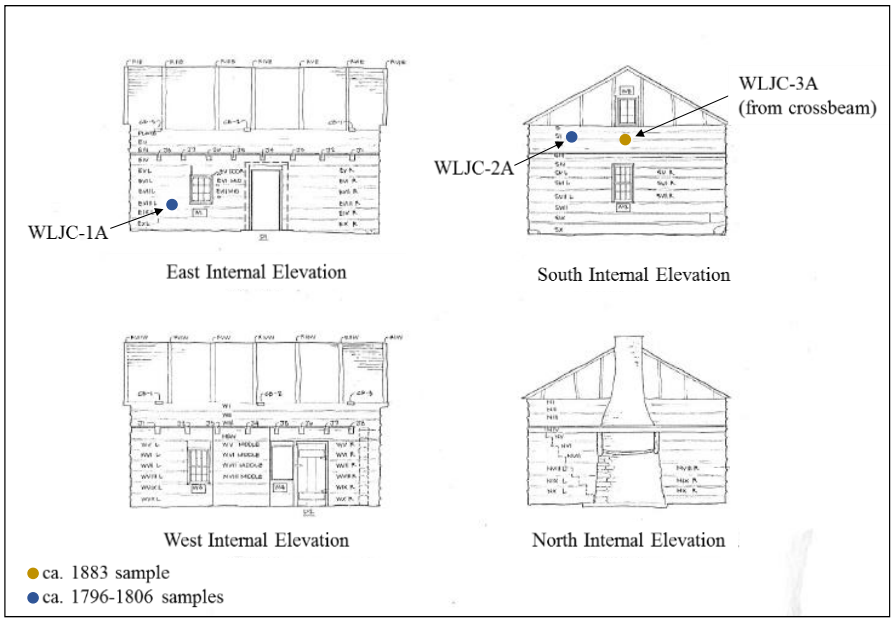

FIGURE 8. Locations of samples from the Nancy Jemison cabin. (Adapted from Bartlett 1995b:126.)

Nine cores and the two cross sections from the Caneadea council house yielded dateable ring-width sequences. Samples WLCH-2B and 3B were too fragmented into small pieces to include in the final council house chronology. All three Nancy Jemison cabin cores contained dateable portions or full sequences. Only one "Buffalo Tom" cabin sample proved sufficiently intact for dating. Crossdating the Letchworth samples with established tree-ring chronologies for central and western New York produced probable cutting dates for the council house and Jemison cabin logs (Tables 1 and 2; Figure 9). The statistical values for the placements of the Letchworth chronologies with the dated chronologies are significant, suggesting that the dating is correct (Tables 1 and 2). Eastern white pines also tend to exhibit highly variable growth patterns (Carol Griggs 2014, personal comm.), but the substantial number of samples in the council house chronology reduced the impact of inconsistencies among the trees (Schweingruber et al. 1990:28).

TABLE 1. Dated Letchworth samples and their statistical correlations

		Sample Length			Years Compared						
Sample	Condition of Outer Edge	FY[1]	LY	n	FY	LY	n	*r*	*t*	P value	*tr*
WLCH-8A	+1W (LW)	1731	1830	100	1731	1829	99	0.51	4.16	<0.001	65.8%
WLCH-5A	P, +1 swr (22) (EW), SQ	1707	1829	123	1707	1829	123	0.61	5.51	<0.001	64.7%
WLCH-1A and -B		1721	1805	85	1721	1805	85	0.66	11.18	<0.001	75.0%
WLCH-1A only	+1v (EW)	1813	1829	17	1813	1829	17	0.62	3.91	0.001<*p*<0.002	75.0%
WLCH-4A		1704	1751	48	1704	1751	48	0.52	6.00	<0.001	63.8%
	+1v (C)	1797	1819	23	1797	1819	23	0.63	5.03	<0.001	72.7%
WLCH-3A		1696	1770	75	1696	1770	75	0.63	5.20	<0.001	69.6%
	++23v (U)	1772	1796	25[2]							
WLCH-10A	++6W (LW)	1686	1813	128	1686	1813	128	0.57	5.02	<0.001	67.0%
WLCH-9A	+1W (EW)	1675	1818	144	1686	1818	133	0.46	4.68	<0.001	65.2%
WLCH-2A		1693	1768	76	1693	1768	76	0.59	6.02	<0.001	70.0%
	++5W (EW)	1771	1814	44	1771	1814	44	0.35	3.78	<0.001	60.5%
WLCH-7A	+1v (EW)	1704	1817	114	1704	1817	114	0.522	4.37	<0.001	64.8%
WLCH-6A	+1 swr (5) (EW), SQ	1701	1807	107	1701	1807	107	0.56	4.72	<0.001	67.3%
WLJC-1A	+1v (LW)	1711	1806	96	1742	1796	55	0.45	3.68	<0.001	61.1%
WLJC-2A	+P, +1vv (LW)	1742	1796	55	1742	1796	55	0.45	3.68	<0.001	61.1%
WLJC-3A[3]	+1v (EW)	1789	1882	94	1789	1882	94	0.51	5.69	<0.001	72.0%
WLBT-1A[4]	++7vv (LW)	1714	1800	87	1714	1800	87	0.40	3.97	<0.001	67.4%

[1]FY = first year measured, LY = last year measured, n = measured ring count, W = waney edge, v = last ring is close to the waney edge, vv = proximity of last ring to the waney edge is unknown, swr = sapwood rings (count in parentheses), SQ = sample came from a squared log, P = pith present, +P = sample ends close to pith, EW = early wood in outer ring, LW = latewood in outer ring, C = complete outer ring, U = unknown completeness of outer ring, +1 = add one year for incomplete last ring, ++ = unmeasured extant rings. Completely separated segments of cores occupy their own row and were dated separately in case of missing rings at the breaks.

[2]Becuase this segment of WLCH-3A was broken off from the rest of the core and contained extremely small, unmeasurable outer rings, it was not included in the statistical calculations.

[3]Compared to central and western New York hemlock chronology (Data from Cornell Tree-Ring Laboratory, Ithaca, New York).

[4]Compared to Wixson Cabin oak chronology, Campbell, New York (Griggs 2003).

TABLE 2. Crossdating with the central New York pines chronology.

			Years Compared						
	Chronologies in Central New York Pines Master[1]	Approximate Distance between Structures (nearest 5 miles)	FY	LY	n	*r*	*t*	P value	*tr*
Caneadea Council House	Gregoire Farm, Burdett, NY[2]	80	1675	1826	152	0.36	4.68	<0.001	67.5%
	Shoneman House, Burdett, NY[3]	80	1691	1830	140	0.53	7.27	<0.001	68.7%
	Beardslee House, New Berlin, NY[4]	170	1675	1823	149	0.41	5.40	<0.001	69.3%
	Kopelson House, Ithaca, NY[1]	100	1688	1830	143	0.25	3.08	0.002<p<0.005	64.1%
	Kopelson House Renovation, Ithaca, NY[1]	100	1685	1830	146	0.34	4.27	<0.001	66.2%
	Hull House, Lancaster, NY[5]	50	1675	1823	149	0.41	5.41	<0.001	65.5%
	Central New York Pines Master	N/A	1675	1830	156	0.50	7.16	<0.001	69.4%
Nancy Jemison Cabin	Gregoire Farm, Burdett, NY[2]	80	1711	1806	96	0.47	5.10	<0.001	71.6%
	Shoneman House, Burdett, NY[3]	80	1711	1806	96	0.57	6.65	<0.001	77.4%
	Beardslee House, New Berlin, NY[4]	165	1711	1806	96	0.46	5.03	<0.001	76.3%
	Kopelson House, Ithaca, NY[1]	105	1711	1806	96	0.36	3.76	<0.001	64.2%
	Kopelson House Renovation, Ithaca, NY[1]	105	1711	1806	96	0.29	2.99	0.002<p<0.005	65.3%
	Hull House, Lancaster, NY[5]	45	1711	1806	96	0.22	2.19	0.2<p<0.5	55.8%
	Central New York Pines Master	N/A	1711	1806	96	0.54	6.29	<0.001	74.7%

[1]Data from Cornell Tree-Ring Laboratory, Ithaca, New York.
[2]Griggs 2010a
[3]Griggs 2010b
[4]Griggs 2007
[5]Griggs and Wazny 2011

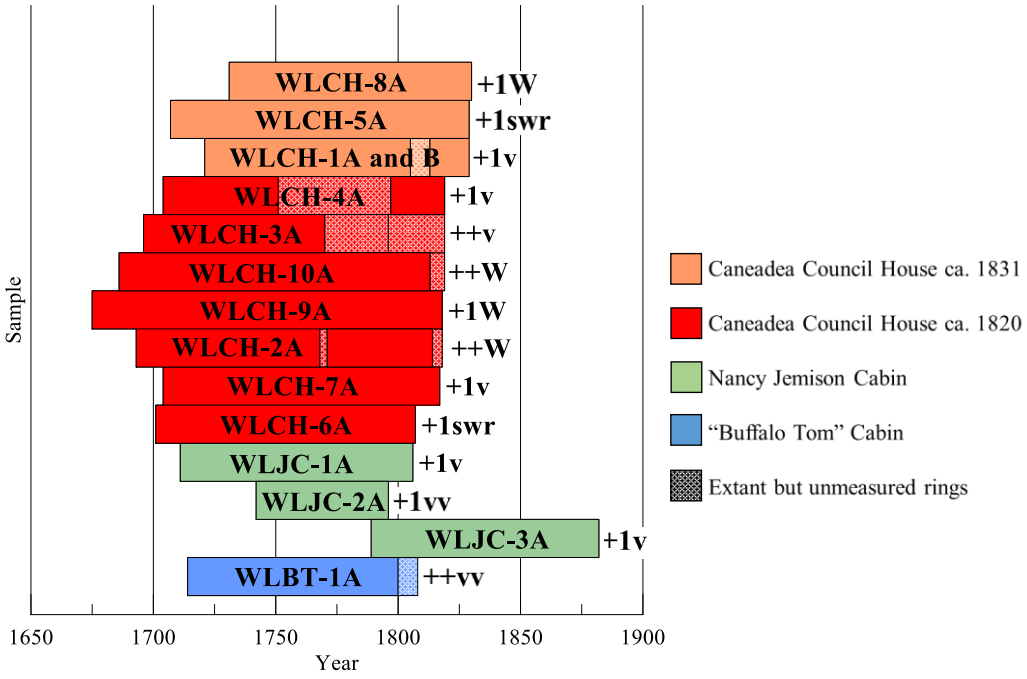

FIGURE 9. Letchworth sample dates (see Table 1 for key to abbreviations).

The cores and two cross sections from the council house were first relatively dated through comparison of their ring-width sequences with one another (Table 1, Figure 10). The resultant 156-year Caneadea council house chronology, combining the sample measurements, was then crossdated with a central New York pines chronology ranging from 1591 to 1852. This crossdating produced a dated chronology spanning from 1675 to 1830, which correlates significantly with the central New York pines series (Figure 11, Tables 1 and 2). COFECHA confirmed the results with an intercorrelation of 0.552 and flagged no problems with the position of any of the samples as tested in 50-year segments with a 25-year overlap (Holmes 1983; Grissino-Mayer 2001). All dated council house specimens were included in COFECHA except the outer section of sample 3A, as it contained many small, unmeasurable rings.

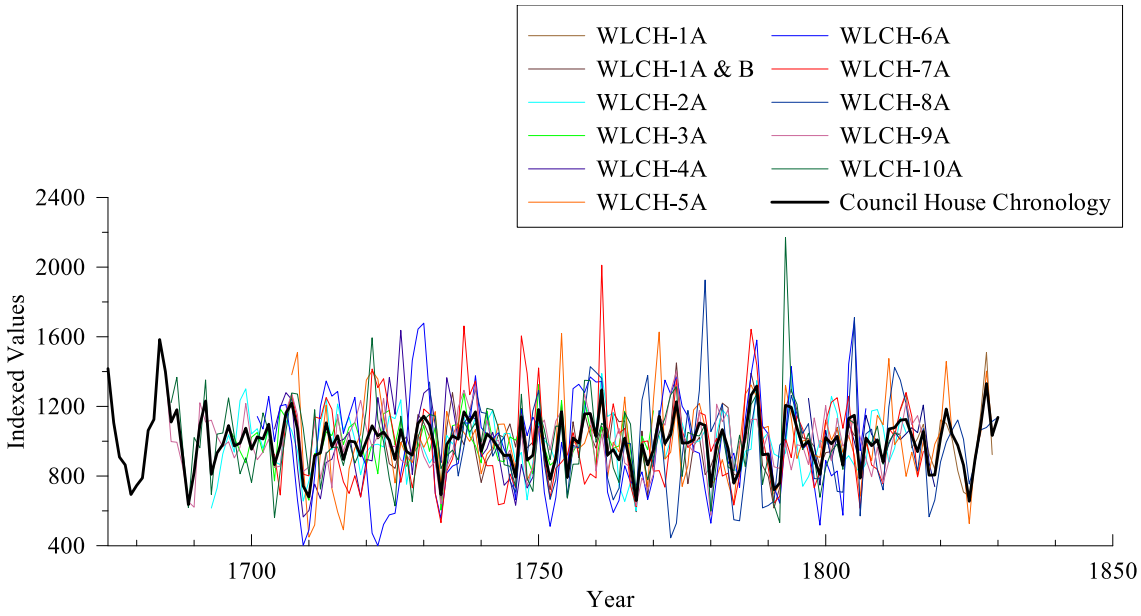

FIGURE 10. The Caneadea council house ring-width sequences.

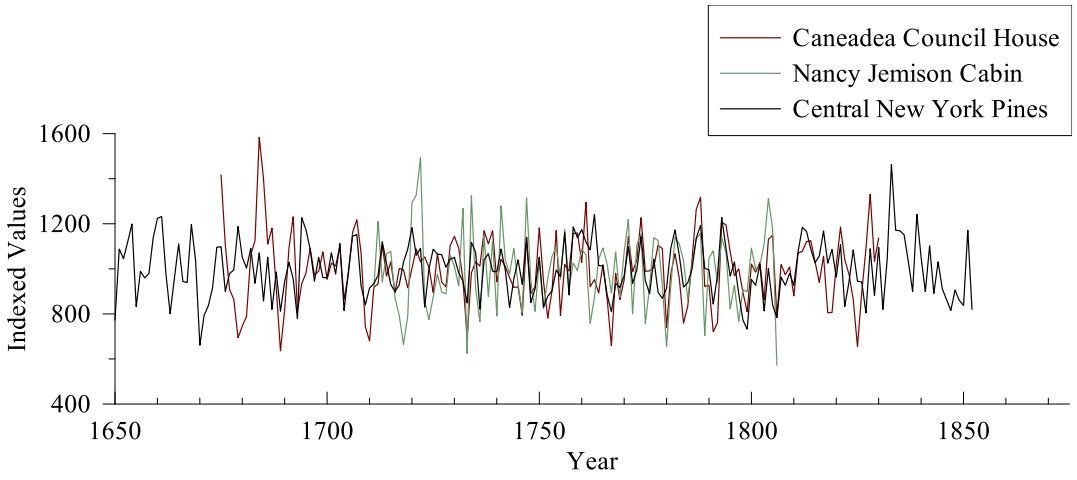

FIGURE 11. The Caneadea council house, Nancy Jemison cabin, and central New York pines chronologies. The New York pines chronology has been truncated at 1650 for ease of viewing.

Most of the dateable council house samples end around 1820 when accounting for the presence of waney edge and proximity of the terminal growth ring to the final complete, measured ring (Figure 9, Table 1). Core 4A, though split into two measurable segments by a section mounted backwards, dates to 1819 at the final complete ring, close to the waney edge. The last measured ring of sample 3A dates to 1796, but with approximately 23 rings too miniscule to accurately measure counted after it, the core dates to around 1819. The measured rings of 10A end with a break at 1813, but six rings after the break put the terminal date at 1819. A crack after 1814 obliterated approximately two rings in 2A, but the following three unmeasured rings end the sample at 1819. Sample 9A's last complete, measured ring dates to 1818. Core 7A, from a removed council house log, dates to 1817 at the last measured, complete ring. The outer rings of samples 7- and 9A are incomplete and consequently were not measured. Therefore, these logs were actually felled at least one year later, in 1819 and 1818, respectively. Sample 6A, a cross section from a timber removed during Shanks' restoration, dates to 1807. It does not contain bark or waney edge and was squared, removing a number of the rings, so the log was actually felled sometime after. The specimen contains roughly five sapwood rings (the outermost of the tree), so the terminal ring could date to around 1820.

A later group of three timbers dates to around 1831 (Figure 9). Core 8A dates to 1830 at the last measured, complete ring. Its observed waney edge in the field suggests that the outer, incomplete ring is the terminal one at 1831. Sample 5A ends at 1829, but an incomplete outer ring brings the date to at least 1830. This is likely close to the felling date based on 5A's 22 sapwood rings. The sequence from cores 1A and -B, combined to represent a single pattern for the log, comes to 1829 as well, but an incomplete outer ring close to the waney edge dates the felling to at least 1830. All of the dates taken together suggest two building episodes for the

council house: one around 1820, shortly before the Senecas left Caneadea, and another ca. 1831, when the Seaton occupation began. None of the samples support the claim of a mid-18th-century construction date.

Results for the Nancy Jemison cabin eastern white pine cores, 1A and 2A, fall close to the estimated 1797-1800 date given by the Crawford and Stearns report (Bartlett 1995b; Table 1). These two cores were first matched with the council house samples, because they are also eastern white pine, and then combined into their own 96-year chronology (Table 3). Crossdating with the central New York pines chronology provided a best fitting date of 1711-1806 (Figures 9 and 11). As with the council house chronology, the correlations between the chronologies are statistically significant, save for the comparison with the Hull House chronology from Lancaster (Table 2). The cores did not contain waney edge, but 1A came from a lightly shaped log. Therefore, its terminal ring may date to shortly after 1806.

TABLE 3. Statistical correlations between the Caneadea council house and Nancy Jemison cabin chronologies.

	Years Compared						
Distance between the Structures (nearest 5 miles)	FY	LY	n	*r*	*t*	P value	*tr*
20	1711	1806	96	0.59	7.09	<0.001	71.6%

The single hemlock sample from a Nancy Jemison cabin crossbeam (WLJC-3A) correlates significantly with a central and western New York eastern hemlock chronology, extending from 1506 to 2006, at 1882 (Figure 9, Table 1). The last ring of the sample was not measured because it is incomplete. The core does not contain bark, and the crossbeam was shaped into a roughly squared form. However, the sample came from a fairly rounded side of the

timber. Thus, the log was felled in 1883 or shortly after. This could have coincided with John Shanks' maintenance, which concluded in 1884 (Bartlett 1995b:33-34, 49).

Crossdating with the Wixson Cabin oak chronology from Campbell, New York, dating from 1707 to 1847 showed that "Buffalo Tom" Jemison cabin sample 1A dates to 1800 (Figure 9, Table 1). Campbell is approximately 60 miles from the "Buffalo Tom" cabin's original location near present-day Leicester. The last ring of the sample was not measured because it is incomplete, and the outermost section, which was detached from the rest of the core, contains seven rings. These unmeasured rings push the felling date to 1808 at the earliest. Additionally, the sample includes no sapwood rings. Accounting for the 6 to 20 sapwood rings oaks normally have brings the date to between 1814 and 1828. Though the lack of bark or waney edge, as well as limited sample size, prohibits the establishment of a secure construction date for the cabin based on dendrochronology, this finding generally aligns with the 1818 date from the Crawford and Stearns report (Bartlett 1995c).

Analysis of Construction Methods and Architectural Features

Study of the construction methods and architectural features of the Letchworth structures and their origins and later cultural affiliations revealed similarities to, as well as differences from, the intercultural/creolized and Reservation Log House types. Even though I discuss housing styles and construction techniques with Haudenosaunee and European roots, ultimately Seneca people constructed the Letchworth dwellings and incorporated traits they considered desirable given relevant social, political economic, and ecological factors of the time.

The Caneadea council house's traditional Haudenosaunee longhouse traits, such as a likely central fireplace or fireplaces, lack of windows, earthen floor, and "shake" roofing during

the original Seneca occupation (F.W. Beers & Co. 1879:52; Hubbard and Minard 1893:233; Minard 1896:658), as well as walls of hand-hewn logs half-dovetailed at the corners evidence its intercultural/creolized character as a log building, with only certain longhouse elements. Bartlett (1995a:34-35) specifically likens the council house to a short longhouse based on these same features. The half-dovetailed cornering, hewn logs, eave-wall front and back doorways, and rectangular English single-pen floor plan fit the Reservation Log House Type. On the other hand, the council house's dimensions, at 17 ft. by 47 ft., exceed that of Brown's type and exhibit greater similarity to a longhouse than the more square English single-pen plan (T. Jordan 1985:23-25). This is also consistent with the Haudenosaunee designation of council houses as special-purpose structures and not additionally as everyday living spaces in the early 1800s (Hamell 1992:33-34, 49). In addition, the logs are hewn on two sides with rounded upper and lower sides instead of completely square. As noted, the council house may also have had neither windows nor a gable-end chimney during Seneca use, which differs from the Reservation Log House Type. Finally, the doorways are not centered in the eave walls. This placement along with the rectangular floor plan is similar to the Scots-Irish variant of the English single-pen plan (T. Jordan 1985:23-25). However, it could alternatively reflect a Seneca variation on the longhouse gable-end doorway.

The Nancy Jemison cabin contains some traditional components which make it intercultural/creolized, but with a log house rather than longhouse core design. The dwelling has an earthen floor. If the original fireplace and chimney were internal, this would have been in line with more traditional forms but in a varied position from the center. The single-pen, one-room form with an attic may also be likened to a single family longhouse compartment, as argued by Brown (2000:29). However, the walls interlock at the corners to carry the weight of the dwelling,

as in a European-style log cabin. The rectangular single-pen plan and hand hewn logs of the Nancy Jemison cabin are consistent with the Reservation Log House Type, as are the doorway (thought to be the only one in the original period of occupation) in the middle of an eave wall and the presence of at least one window in the front wall. The interior chimney and fireplace location on a gable-end wall was presumed by the Crawford and Stearns report to be the same in Nancy Jemison's time as subsequent documented periods (Bartlett 1995b:34, 55), so this feature also fits with Brown's type. The cabin's walls measure only slightly longer than Brown's criterion at 21 ft. and 26 ft. The V notching corner joinery does not conform to the Reservation Log House model, though. In this type of notching, timber ends are cut into an upside-down "V" shape, with a corresponding cut-out in the joining beam (T. Jordan 1985:19).

The V notching of the "Buffalo Tom" Jemison cabin again differs from Brown's defined type. However, the possible fireplace at a gable end (based on a wall opening seen when the house was deconstructed for transport to Letchworth), single-pen rectangular floor plan, doorways in the eave walls in the center and near center, glass windows on the front (two) and back (one) walls, and hand hewn planked logs (Bartlett 1995c:18) do fit the type proposed by Brown. The one-room floor plan, as with the council house and Nancy Jemison cabin, could indicate an English single-pen origin but is also consistent with single compartment divisions of the longhouse form, as is the loft space (Bartlett 1995c:16). These traits also fit an intercultural/creolized designation, but in the sense of a basic log house form with longhouse features rather than a longhouse with log elements. The walls measure close to Brown's figures, at 21 ft. 6 in. and 16 ft. 11 in. (Bartlett 1995c:16). Bartlett (1995c:15-16, 18) argues that the cabin resembles the Midland type (described by T. Jordan 1985). However, this does not fully recognize the possible longhouse elements of the dwelling.

DISCUSSION

Dendrochronology revealed a significantly later date around 1820, rather than the mid- to late 1700s, for the initial construction of the Caneadea council house, as well as a probable modification episode around 1831. Admittedly, the early samples may come from replacement logs in the structure and this analysis does not preclude other portions of the building from dating to the 18th century, but this is unlikely given that multiple samples taken from different logs at different heights in the council house cluster around 1820. The logs dating to the ca. 1831 episode come from lower courses in the council house (Figure 7), and from a loose log (5A). The date suggests that Seaton may have added these timbers as replacements for rotting logs when he acquired the property and moved the council house. The long history attributed to the building may apply not to the specific structure now at Letchworth, but to a council house existing in multiple iterations over time in the Caneadea community. To rebuild a structure, as did other Haudenosaunee at the time, following damage or destruction would not have been unusual.

The ca. 1820 date for the Caneadea council house also makes sense when considered with accounts of housing around the time of the Revolutionary War. A fairly traditional council house stood at Kanadesaga on the eastern side of Seneca territory, even with Butler's rangers in the area, as noted by American participants in the Sullivan campaign in 1779 (Figure 1). The sketches included above (Figures 1-3) are more consistent with traditional longhouses or intercultural/ creolized longhouses than log houses, with which the half-dovetailed council house fits more closely. The Crawford and Stearns report contends that the British may have had a hand in building the council house during the Revolutionary War based on the abovementioned biographical sketch of Moses Van Campen (Hubbard and Minard 1893:233; Bartlett1995a:34,

39-40), the style and proficiency of the log hewing, and the dovetailing which Rempel (1980:50-51) asserts featured prominently in European military hewn log buildings in central Canada. British officers, such as Lieutenant Nelles at Caneadea (Harris 1903:408) and Colonel Butler, and soldiers were active in Seneca territory during the war (Graymont 1972; Taylor 2006). However, the dendrochronology dates make the British assistance scenario implausible for the specific structure now standing at the park. They do not definitively rule out the possibility of Senecas learning techniques such as dovetailing from British troops before or during the war.

The council house's half-dovetailed cornering could alternatively reflect the effects of Moravian missionaries. Senecas at Caneadea around 1820 may have drawn upon the earlier introduction of Moravian construction. The dendrochronology dates could also point to an influence from interactions with Delawares[6] who had adopted elements of Moravian-style housing earlier in the 1700s, especially during the period of settlement near Fort Niagara following the Sullivan campaign (T. Jordan 1985:132, Figure 6.1; Brown 2000:18, 20, 24, 28-29). Delawares, Cayugas, Onondagas, Mohawks, some Oneidas and Tuscaroras, and a handful of Native Americans of other affiliations, sought greater protection and formed mixed communities near the fort (Calloway 1995:137). These Moravian connections could explain the log construction elements of the council house without requiring direct British involvement in building the structure.

As European American settlers from the east infiltrated the Genesee following the contracts and treaties which dispossessed Senecas of lands to the east and then the west of the

[6] Delawares who had settled at Fairfield on the Thames River in Ontario with missionaries staring in 1792 built a number of log houses (Ferris 2009:84-86). They contained Delaware longhouse traits, such as central hearths, uncovered floors (though some had planked floors and glass windows), and moss chinking, as well as cornerstones or log sections which Ferris (2009:86-88) contends could indicate that the corners were dovetailed.

Genesee River, they may have brought with them Midland log construction forms which Seneca people drew from in building their own structures, including the Caneadea council house. Midland architecture tended to make great use of half-dovetailed cornering and logs hand-hewn on the inner and outer facing sides (T. Jordan 1985:19). T. Jordan and Kaups (1989:233-235) point out that German and Scots-Irish immigrants spread the Midland style westward as early as the 1720s, making their way into Pennsylvania and along the Delaware and Susquehanna Rivers into New York State[7]. In the midst of discussing these European-derived forms, it is imperative to also bear in mind the traditional Haudenosaunee aspects of the council house, as it is not an example of mere acculturation or deterioration of Seneca forms but a blend of traits producing a more durable structure suited to Seneca lifeways under more confined reservation conditions.

The dates obtained for the Nancy Jemison cabin match the ca. 1797-1800 Crawford and Stearns (1995b) timeframe for its initial construction. The V notching of the cabin suggests the influence of Midland construction. This notching type, with Fenno-Scandinavian roots, was common from eastern Pennsylvania to the Ohio Valley (T. Jordan 1985:19, 146, Table 6.1; T. Jordan and Kaups 1989:144). Nancy's mother Mary lived in Pennsylvania before her capture and resided near the Ohio River at Wiishto before moving to the Genesee region (Seaver 1990[1824]:3, 27-28). She also lived with Delawares at Wiishto and married a Delaware man named Sheninjee (Seaver 1990[1824]:1824:28). She may have observed V notching and log construction techniques in her childhood home, among backwoods settler neighbors, and as learned and employed by the Delawares. In addition, she lived in a house built by two African Americans when she first moved to Gardeau (Seaver 1990[1824]:59-61), which could have

[7] Native Americans, including Delawares, influenced what became Midland American culture, for instance through sharing hunting strategies, when Europeans established New Sweden (Jordan and Kaups 1985:90-92, 247). Hamell (1992:43-45) notes instances of European American drawing from Haudenosaunee and Algonquian house styles.

influenced her later decisions in housing style. However, Mary resided in a log home with some Haudenosaunee features at the time of James E. Seaver's visit to record her life history in 1823. Seaver (1990[1824]:xxix) noted that her cabin "was 20 feet 28 feet; built of square timber, with a shingled roof, and a framed stoop," and had a chimney "of stone and sticks, in which there are two fire places" situated in the center of the dwelling as in a longhouse.

European American infrastructure and industry, in addition to settlement, could have affected housing styles after the Revolution in the Genesee and elsewhere in western New York. Sawmills promoted the lumbering industry and could have impacted Seneca housing by providing, or at least increasing exposure to, European American-style lumber shaping and building techniques. For instance, in the account of her life recorded by Seaver (1990[1824]:127), Mary Jemison mentioned obtaining boards for a house from Ebenezer Allen's nearby mill on Silver Lake. Such building materials could have also been available for Nancy's house, which Mary may have helped to build (Milliken 1925:446). A number of Seneca men also worked cutting and selling timber (Rothenberg 1980:75-76; Dennis 2010:151, 158).

With confinement to reservations and European American settlement restricting movement, more permanent dwellings with logs would have been beneficial to Senecas. Indeed, intercultural/creolized longhouses had already provided sturdier residences in 18th-century dispersed settlement configurations in which settlement duration increased because local resource depletion occurred more slowly (Hamell 1992:3; K. Jordan 2008:273). Log housing did not require a complete shift to European forms or include abandonment of other Seneca practices. Particularly in the case of the Nancy and "Buffalo Tom" Jemison cabins, one can observe the continued importance of extended family, noted later in 1900 by Shoemaker (1991). The inhabitants of Squawky Hill, where "Buffalo Tom" lived, arranged their homes around the

council house (L. L. Doty 1876:61). Mary's married daughters Nancy and Betsey lived approximately 0.25 miles south and north of her, respectively, and her daughter Polly and her family lived with Mary in her home on the Gardeau Reservation, which only approximately 80 residents called home in 1816 (Seaver 1990[1824]:129). Thus, at least some families remained geographically close even while not living together under the same roof. Further, more permanent structures in the early 1800s could have conveyed a more prominent, visible Seneca presence amid impinging European American settlement and increasingly restricting land contracts, especially considering that the ca. 1820 dendrochronology date for the council house falls shortly before most Senecas would have left the Caneadea area in 1826, and that "Buffalo Tom" occupied his cabin for only around ten years.

Though beyond the scope of this thesis, the impact of Seneca and European American timber cutting on Seneca decisions to build more permanent structures to conserve this resource also deserves attention. Other ecological factors likely impacted settlement as well. Incoming settlers reduced the amount of game available, owned pigs and cattle which destroyed plants (though Senecas too had domesticated animals), and dammed waterways for mills, in addition to lumbering (Taylor 2006:140-141).

CONCLUSION

The results from dendrochronological analysis of the Caneadea council house and Jemison cabins support the assertion that Seneca people incorporated traditional housing elements even when building in log styles into the early 19th century, thus indicating Seneca continuation and control of certain lifeways through the reservation era. The Caneadea council

house dates cluster around 1820 and 1831 and likely correspond to the initial Seneca construction and changes made by settler Joel Seaton when he moved to the property, respectively. The dendrochronology dates of 1796 and 1806 for the eastern white pine Nancy Jemison cabin samples correlate well with the estimated building date between 1797 and 1800 from historic sources and the Crawford and Stearns report (Bartlett 1995b). The hemlock crossbeam sample was felled in the early to mid-1880s, which coincides with roof work on the cabin at Letchworth (Bartlett 1995b:51, 54-56). The single dateable core from the remains of the "Buffalo Tom" Jemison generally supports the reported construction date around 1818 (Bartlett 1995c).

Because the public can visit the council house at Letchworth, the signage at the Council House Grounds must change to reflect the dendrochronology results. This also presents an opportunity to share with the public where the council house and the Jemison cabins fit within current research on the chronology of shifts in Seneca housing. The switch to log dwellings more similar to European-style cabins took place when reduced mobility and encroaching European American settlers made it necessary or more viable.

Given the restricted movement and threats to landholdings from European American settlers and business interests in the late 18th and early 19th centuries, the log construction forms employed by the Senecas at Caneadea and in the Nancy and "Buffalo Tom" Jemison cabins allowed for more long-term occupation as well as the persistence of certain aspects of traditional Haudenosaunee architecture. The council house and cabins all bear traits at least partially consistent with intercultural/creolized and Reservation Log House styles as defined by K. Jordan (2008) and Brown (2000). They represent neither completely traditional Haudenosaunee nor European forms and contain features indicative of Haudenosaunee and Moravian and Midland

styles. In terms of the longhouse-to-log house transition, they more closely resemble log forms with longhouse elements than vice versa.

Finally, this dendrochronological analysis demonstrates that more precise dates of construction and modification episodes derived from dendrochronology can, when coupled with other lines of evidence, contribute to a fuller understanding of when, how, and why Haudenosaunee housing changed in different areas at different times. Future investigations involving dendrochronology and other standing 18th- and 19th-century Haudenosaunee structures, such as those in New York State at the Rochester Museum and Science Center, the Iroquois Indian Museum in Howes Cave, and the Fenimore Art Museum in Cooperstown (Brown 2000:36), could also prove beneficial for dating and contribute to the Northeast dendrochronological database. They also present opportunities to work with descendant groups, with their own perspectives and knowledge, whose ancestors actually lived in such dwellings and lived through the transition from longhouses to log houses and the variations in between.

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