Henri D. Grissino-Mayer and Saskia L. van de Gevel

Tell-Tale Trees:

The Historical Dendroarchaeology of Log Structures at Rocky Mount, Piney Flats, Tennessee

ABSTRACT

The Rocky Mount site has important historical and cultural significance for the state of Tennessee because it was built by one of its earliest settlers and served as the capital of the territory from 1790 to 1792. Questions had been raised concerning whether the two main log structures (the Cobb House and adjoining dining room) were built by William Cobb between 1770 and 1772. We used tree-ring dating to determine the year(s) of construction of these two log structures. Three nearby reference tree-ring chronologies anchored the Rocky Mount tree-ring chronology from 1667 to 1829. The cutting dates obtained from 19 logs revealed that the Cobb House was built beginning in 1827 and finished by 1828, while the Dining Room was begun in 1829 and finished by 1830. An additional six logs had outermost dates between 1820 and 1825. These 25 logs demonstrate that the house and dining room were constructed by Michael Massengill between 1827 and 1830, and not by William Cobb between 1770 and 1772.

Introduction

Dendrochronological research on historic structures in the southeastern U.S. has increased in recent years (Bowers and Grashot 1976; Stahle 1979; Bortolot et al. 2001; Mann 2002; Reding 2002; Wight and Grissino-Mayer 2004), often because many agencies charged with managing historical sites wish to authenticate the reported dates of construction. Occasionally, these reported dates are questionable (Mann 2002) and some structures in this region require verification. This verification can be accomplished using dendrochronological techniques that use reference tree-ring chronologies that currently exist for much of the U.S. In addition, historical structures that persist in the southeastern U.S. can yield tree-ring chronologies from trees that once grew in the original, minimally-disturbed old-growth forests (Stahle 1979; Mann 2002; Reding 2002). Historical structures can therefore be used to extend modern chronologies into the 16th and 17th centuries (and earlier) and help date other wooden historical structures in the eastern United States. Tree-ring dates from historical structures and archaeological sites must be interpreted carefully, however, because timbers can be reused and logs can be replaced (Dean 1997). Observing the degree of clustering associated with crossdated cutting dates can minimize possible sources of error (Stahle 1979).

The Rocky Mount site in northeastern Tennessee (Figure 1) has historical and cultural significance because it represents one of the oldest intact structures in Tennessee and served as the temporary capital of the “Territory of the United States South of the River Ohio” (as Tennessee was known then) from 1790 to 1792. The Cobb House was reportedly built between 1770 and 1772 by William Cobb (Cobb 1926), one of the earliest to settle west of the Appalachian Mountains in the new Watauga settlement, along with members from 16 to 20 other families (Ramsey 1853). In October 1790, William Blount arrived in Sullivan County as the territorial governor newly-appointed by President George Washington. Blount set up office in the Cobb House (Hamer 1932) and remained there until he relocated the government office to Knoxville in March of 1792 (Cobb 1926). William Cobb relocated his family ca. 1795 to Grainger County and the Cobb House passed to Henry “Hal” Massengill, Jr., who had married Cobb’s daughter, Penelope (Massengill 1955). However, no recorded deed exists in the Sullivan County Deed Books to verify this land transfer. Strangely, Hal and Penelope Massengill may never have actually lived in the Cobb House. At some point, Henry Massengill, Sr. (Hal’s father), must have obtained title to the land because he sold the property to his grandson, Michael, via deed dated 20 March 1827 (Massengill 1955). The Cobb House and property remained in possession of four generations of Massengills when, on 15 September 1959, the State of Tennessee purchased Rocky Mount (as the site was known) (DeFriece and Williams 1966). Today, the site is managed jointly by the Tennessee Historical Commission and the Rocky Mount Historical Association. Rocky Mount serves as Tennessee's only living history museum, providing interpretive tours of late 18th century lifeways.

The Cobb House is a two-story log house (Figure 2) constructed from oak (reported to be white oak, *Quercus alba* L.) logs likely cut from the surrounding forest. The house was considered extravagant for its period. The stairway leading to the top floor was paneled, the handrails were made from walnut, and a large fireplace decorated with a pine mantel warmed the great room. Of notable importance were the glass windows, a rarity in the frontier landscape, which seemed to please Governor Blount (DeFriece and Williams 1966). The Cobb House measures 29 x 22 feet. These dimensions are large for an early frontier cabin (Glassie 1968; Morgan 1990) if the structure was indeed built between 1770 and 1772. The floor plan of the house represents a hall-and-parlor plan that was common in the region in the 18th and early 19th centuries (Glassie 1975; Patrick 1981). The logs on the Cobb House and the dining room are well-preserved, possibly attributable to the weatherboarding that was installed in the late 19th century (DeFriece and Williams 1966). In 1959 and 1960, two logs were replaced because of decay (McGowen 1960; *Elizabethton Star* 1979), while another 16 were "partially or entirely replaced" during restoration in 1979 (*Elizabethton Star* 1979).

Beginning in the early 1950s, uncertainly arose whether the current Rocky Mount site was indeed the location of the original Cobb House (Rothrock 1957; Alderson 1957). Goodspeed (1887:1308) may have initially fueled this uncertainty by noting that "the Masengill [*sic*] farm was the one on which Gov. Blount called a meeting to organize the territory of Tennessee, and the farm was owned by Henry [Massengill, Jr.] and his father-in-law." Of course, William Cobb was the father-in-law. Goodspeed therefore suggests the farm was owned jointly by the Massengill and Cobb families. Price (1954) believed that land approximately 200 m west across U.S. Highway 11E (then the Abingdon-Jonesborough Road) was the site originally occupied by William Cobb. Massengill (1955) countered, noting that "Hal Massengill's home stood on the site of the present brick house built later by Isaac Devault… easterly from it about one-half mile stands the old William Cobb home" (the "brick house" is currently known as the "Sally Massengill House" built from 1840 to 1842 (Reeves 1951; Spoden 1976)). Pauline Massengill DeFriece, who single-handedly established Rocky Mount as a state-owned historical site, admitted that "We have no proof when Rocky Mount was built. My father and others thought about 1770" (DeFriece 1957). Williams (1966) noted "Whether Hal and Penelope Massengill lived at Rocky Mount or on adjacent Massengill property is not known," which countered Massengill's (1955) contention that Hal and Penelope lived on the Devault property across from the Cobb House. This uncertainty again raises the speculation that the Cobb House could have been located on the Massengill property across from Rocky Mount. Today, an impressive, privately-owned log structure that exhibits considerable age sits next to the Devault house. This structure was reportedly built by Henry Massengill, Sr., near his hewn-log plantation house (Spoden 1976), which could place the cabin's construction as early as the 1770s because evidence shows that Henry Massengill, Sr., was one of the earliest settlers in the Watauga River region (Holston Territory Genealogical Society [HTGS] 1993:507–508).

The primary objective of our research was to determine the history of construction of two log structures at Rocky Mount by determining the cutting dates of logs using dendrochronology. These dates were obtained using dendrochronological crossdating techniques that assigned precise calendar years to all tree rings. Of particular importance is the outermost ring, whether partial or complete. Each dated log supplies the actual year the tree was harvested, as well as the possible season of tree harvest. Also, we evaluated documentary evidence that may lend support to the construction dates obtained from our tree-ring analysis. The tree-ring chronology developed for Rocky Mount could potentially help date other historical structures in eastern Tennessee and southern Appalachia.

Methods

Field Methods

We extracted at least one core from all accessible logs in the Cobb House (Building "A") and the adjoining building (the Dining Room, Building "B," although this building was likely originally the kitchen) using a specially-designed tubular drill bit attached to a hand drill (Figure 3). Cores were numbered by building, direction (1 letter), log number (beginning with the bottom log = "01"), and core letter (e.g., "An05a" = Building "A", north side, log 5, core a). North was defined as the side of the Cobb House with the chimney, although the direction is more accurately northeast. Cores were also taken from the second floor of the Cobb House by accessing the attic of the Dining Room which spanned the dogtrot that separated the two buildings. Some cores were also extracted from logs located in the basement of the Dining Room.

Most cores were taken from the upper or lower curved surfaces of the logs where the sapwood and the outermost rings were likely preserved due to the chinking that is placed between logs to help insulate the structure. On a few logs, cores were taken from the hewn top of the half-dovetail notches because we encountered decayed sapwood elsewhere on the logs after repeated coring attempts. On logs with clearly defined outer surfaces, we drilled into the log about 5 to 7 mm, then removed the bit and placed a large black ink dot on the surface of the wood to later verify that the outermost rings remained intact after coring. We then reinserted the bit and drilled until we reached the middle based on a visual assessment of the end of the log. A specially-designed steel rod with a sharpened hook was then inserted alongside the core, then twisted to break the core free from the log. After the core was extracted, the hole created by the drill bit was plugged with a custom-fitted cork, then concealed with acrylic paint blended to match the color of the surrounding wood. Cores were immediately glued to wooden core mounts with cells vertically aligned to ensure a transverse view of the wood surface. The cores were later surfaced using progressively finer sandpaper, beginning with 100-grit and ending with 400-grit. This process produced a wood surface with cellular features clearly defined under 10x magnification for clear ring identification.

Internal Crossdating

Absolute dating was accomplished by (1) dating each series against all others ("internal crossdating") using graphical dating techniques, (2) measuring all ring widths, (3) creating an undated ("floating") chronology from the internally dated series, and (4) crossdating this chronology against a set of regional tree-ring chronologies ("external crossdating"). The internal crossdating process began by assigning the innermost complete ring on each core the relative year "1" and marking every subsequent tenth ring with mechanical pencil. We then created skeleton plots of all cores to relatively crossdate the tree rings of each series against all others. Skeleton plots rely on matching patterns of the narrower tree rings in one series against plots of the other series to ensure correct temporal placement (Stokes and Smiley 1968; Swetnam et al. 1985). We then measured the widths of all tree rings to 0.001 mm accuracy with a Velmex measuring stage coupled with MEASURE J2X software.

Statistical Verification of Crossdating

We confirmed the graphical crossdating and relative placements of all tree-ring series using COFECHA, a quality-control program that uses segmented time-series correlation techniques to confirm the temporal placements of all tree rings (Holmes 1983; Grissino-Mayer 2001). Because crossdating is essentially a "high-frequency" process (pattern matching of sequences of individual rings), COFECHA removes all low-frequency trends using both spline-fitting algorithms and autoregressive modeling (Grissino-Mayer 2001). Such trends could also arise due to natural and human disturbances that otherwise could mask the climate signal desirable for accurate crossdating. COFECHA then tests consecutive 40-yr segments (with 20-yr overlaps) on each series with a temporary master chronology created from all other series. Crossdating is verified when the correlation coefficient for each tested segment exceeds 0.37 ($p < 0.01$), although coefficients are usually much higher (for example, $r > 0.55$, $p < 0.0001$).

Assessing Crossdating Quality

Crossdating quality was assessed by two statistical descriptors. First, the average mean sensitivity is a measure of the year-to-year variability desirable for crossdating success. Values of 0.20 are common for tree-ring data from the southeastern U.S. (DeWitt and Ames 1978). Second, the average interseries correlation is calculated in COFECHA by averaging together the Pearson correlation coefficients calculated for each measurement series when correlated against a master chronology created from the remaining series (Grissino-Mayer 2001). Statistical probabilities will vary because of the varying degrees of freedom (i.e., number of years – 2) for each measurement series being tested, but in general an interseries correlation coefficient of at least 0.40 is desirable for each series. The series being evaluated was only included in further analyses if the graphical comparison and statistical analysis were both convincing.

Standardization of Tree-Ring Data

Next, we standardized all series, a necessary procedure to remove most of the adverse effects from age-related growth trends and possible natural or human disturbances that could add noise to the tree growth series unrelated to the climate signal desired in chronology development (Cook 1987, Fritts 2001). Each ring measurement for all series is divided by a predicted annual value of growth based on a trend line or curve fit to the measurement data, resulting in a dimensionless index of growth for that year. Once each individual series was standardized, a master "floating" (i.e., unanchored) chronology was created by averaging all indices of tree growth for each year from all series using the program CRONOL (Cook 1985). The early portion of the final chronology represented by only one series sometimes exhibits extreme fluctuations about the mean and therefore crossdating attempts with reference chronologies may be poor in the earlier years due to low sample depth. Only the portion of the chronology represented by two or more series was evaluated for final absolute crossdating.

External Crossdating

Absolute ("external") crossdating was achieved by first using COFECHA to compare the undated ("floating") master chronology with three regional white oak chronologies (Figure 1) obtained from the International Tree-Ring Data Bank (IGBP PAGES/World Data Center for Paleoclimatology) in Boulder, Colorado. These regional chronologies include: (1) TN008, Norris Dam State Park (36º13' N, 84º05' W) in Tennessee, AD 1633–1980, located approximately 99 mi. west-southwest of Rocky Mount; (2) KY003, Lilley Cornett Tract (37º05' N, 83º00' W) in Kentucky, AD 1660–1982, located 68 mi. northwest of Rocky Mount; and (3) NC007, Linville Gorge (35º53' N, 81º56' W) in North Carolina, AD 1617–1977, located 41 mi. southeast of Rocky Mount. The final suggested placement made by COFECHA had to be convincing both graphically (similar patterns in wide and narrow rings) and statistically (correlation significant at $p < 0.0001$) (Grissino-Mayer 2001). Once confirmed, we assigned calendar years to each individual undated measurement series.

Establishing Cutting Dates for Logs

The outermost dated ring on each core was inspected under high magnification (35X), then assigned a symbol to help evaluate the possible year of cutting (Bannister 1962; Nash 1999):

B: bark is present, indicating the outer ring is fully intact (certainly a cutting date);

r: outermost ring is continuous and intact around a smooth surface, but no bark is present (considered a cutting date);

v: the date is within a few years of the cutting date, based on presence of sapwood;

vv: impossible to determine how far the outer ring is from the true outer surface (no sapwood and rings in the heartwood are likely missing).

Although other symbols are used frequently in dendroarchaeology ("L" for surface patination), these were the only symbols needed for the oak logs. We also noted whether the outermost ring may have been a complete ring based on the presence of a complete row of earlywood vessels coupled with complete latewood formation. Inspection of the prior rings provided some guidance concerning complete ring formation. If the ring was complete, the tree was likely cut in the dormant season (fall of one year to spring of the next year), therefore spanning a period of several months across two years. Because we had no means to determine during which of the two years the tree was cut in these cases, we assigned the year of harvest based on the last ring formed, bearing in mind that the tree may have been cut in the following year before growth resumed.

Results

Internal Crossdating

The skeleton plots revealed several narrow rings that were common to most cores, which enabled strong visual crossdating of the tree-ring patterns among the logs. Of 55 cores extracted from both buildings, 43 could be confidently crossdated, 23 from the Cobb House (Table 1) and 20 from the Dining Room (Table 2), together representing 30 logs. Of 193 40-yr segments tested by COFECHA, only 18 were flagged due to low correlations (Tables 3 and 4), but inspection of these segments indicated correct temporal placements. Two cores had significant crossdating in at least half the 40-yr segments tested by COFECHA, but the plots of these cores were nonetheless unconvincing enough to warrant exclusion from further analyses. Ten cores could not be crossdated, either internally against the other cores or externally against the reference chronologies, and were excluded from further analyses.

Descriptive Statistics

The average mean sensitivity was 0.24 (lowest = 0.17 for core Aw05a; highest = 0.35 for core Bs04a; Tables 1 and 2), a value higher than those reported for 16 other white oak chronologies in the eastern and central U.S. (average of 0.16, with upper 95% confidence limit of 0.20; DeWitt and Ames 1978), and also higher than the values derived for the measurement series used to create the three reference chronologies used in this study (Norris Dam: 0.20; Lilley Cornett: 0.21; Linville Gorge: 0.20). These results suggest that the sampled trees were above-average in their sensitivity to year-to-year environmental fluctuations. The average interseries correlation for the 43 cores was 0.59 (lowest $r = 0.36$ for core Be02a, $n = 128$ yrs, $p < 0.0001$; highest $r = 0.74$ for core Ae10a, $n = 99$ yrs, $p < 0.0001$; Tables 1 and 2). For comparison, the average interseries correlations for the Norris Dam, Lilley Cornett, and Linville Gorge chronologies are 0.61, 0.63, and 0.50, respectively.

External Crossdating

Comparison of the standard index chronology created from the Rocky Mount measurement series graphically with a composite (i.e., averaged) chronology for the three reference chronologies revealed a strong agreement (Figure 4) that was verified statistically against the individual reference chronologies using COFECHA (Table 5). Furthermore, we found strong agreement between the Rocky Mount chronology and a composite chronology created by averaging all three reference chronologies. The Rocky Mount white oak chronology is anchored from 1667 to1829, although the match is less consistent prior to 1701 due to low sample depth (only one series extends from 1667 to 1700). The correlation between the two chronologies for the period 1701 to 1829 was 0.49 ($n = 129$, $p < 0.0001$) and was lower but still statistically significant over the entire period from 1667 and 1829 ($r = 0.39$, $n = 163$, $p < 0.0001$). The visual congruency is especially noticeable in certain narrow rings common to all four chronologies that were formed in 1737, 1748, 1755, 1773, 1774, 1796, 1807, and 1812 (although the actual magnitudes of the indices vary), and in the periods of low growth from 1746 to 1755, from 1771 to 1776, and from 1806 to 1807. Differences exist, however, such as the opposite patterns of growth in 1725, from 1730 to 1732, 1783, and from 1803 to 1804, but perfect agreement between two natural environmental records is unlikely. In general, year-to-year fluctuations are in agreement despite the relatively few discordant patterns.

Cutting Dates

The cutting dates for logs in the Cobb House clustered on the year 1828 (5 logs) although we found one log was cut in 1826 and three logs were cut in 1827 (Table 6). The outermost rings on three logs were 1821, 1822, and 1825. These were not cutting dates because a few rings on the outside likely disintegrated during the coring process due to the fragile nature of the sapwood. Four logs had outermost dates well before the dates in the 1820s because cores from these logs were extracted from the hewn surface of the log after repeated attempts at coring revealed decayed sapwood elsewhere. We found, however, that these cores contained older ring segments and helped extend the tree-ring record into the past, and also strengthened the sample depth in the earlier period. Cutting dates for the Dining Room clustered on the year 1829 (7 logs), while one log had a cutting date in 1828 and two logs were cut in 1830 (Table 7). Three logs additionally had outermost dates in the 1820s (1820, 1821, and 1825, all noncutting dates). Cores from the remaining log were taken from hewn sections of the log and dated earlier than the 1820s.

Discussion

Internal and External Crossdating

The number of flagged segments for our Rocky Mount data set (18 of 193 40-yr segments tested, or ca. 9%) warranted further inspection to ensure that our dating was precise, but we found no systematic dating adjustments that would indicate misdated series (Grissino-Mayer 2001). All alternate placements suggested by COFECHA were carefully inspected but found to be unreasonable (e.g., adjusting a 40-yr segment back 8 yrs while the adjacent segments on either side were dated correctly). Seven of the 18 flagged segments occurred in the two cores taken from log Be02 (Table 4), the oldest log found in the study (earliest ring is 1667) (Table 2). This log was retained because (1) the lower of the correlations for the two logs with the site master chronology was still statistically significant ($r = 0.36$ on core “A,” $n = 162$, $p < 0.0001$), and (2) its outer date of 1828 was similar to outer dates from other logs on the structure.

One possible reason for the erratic ring sequences in some of these flagged segments for cores from Rocky Mount can be clearly seen on several logs in the two structures. We found a clear fire scar on several logs as indicated by (1) an injury along the curved circumference of just one tree ring, (2) the healing over of tree rings formed in subsequent years, and (3) the attendant change in growth rate that often accompanies a stand-level disturbance (Sutherland 1997; Smith and Sutherland 2001). The change in growth rate suggested the fire was beneficial to surviving trees by removing competing understory vegetation and adding nutrients to the soil during the combustion process. The change in growth rate was found in several logs, but its effect on ring widths could have been profound depending on how near the extracted core came to the internal defect. Based on several cores that came close to penetrating the fire scar, we believe this fire occurred in 1755.

Geographically, the location of the Rocky Mount site was advantageous for crossdating purposes because the site is centrally located among three sites where previously-developed white oak chronologies had been developed. These three reference chronologies had similar growth patterns, although differences were also obvious that caused low, statistically insignificant correlations in several 40-yr segments. These differences are expected because site-specific environmental conditions (e.g. forest-interior stand dynamics and disturbances) may over-ride the regional macroclimatic signal necessary for regional crossdating. Relative to western forests, the lack of regional congruency in eastern forests may be more acute because climatic factors are generally not as limiting in the eastern U.S. Tree growth in the eastern U.S. is often subject to effects from small-scale, often stand-specific disturbances, such as changes in light regimes and nutrient availability coincident with small-scale canopy gap events, such as ice storms, blowdowns (wind events), and insect outbreaks (Runkle 1982; Frelich 2002). Nonetheless, interseries correlations for all of the flagged 40-yr segments among the four chronologies are positive (though statistically not significant by dendrochronological standards, i.e. $p > 0.01$) which indicates a greater level of concordance than discordance.

Construction Dates for the Cobb House and Dining Room

Based on the earliest and latest cutting dates, construction on the Cobb House could have begun as early as spring of 1826 and been completed as late as spring of 1829. Three logs, however, have an outermost cutting date of 1827, a ring that appears to be complete, which implies that the logs could have been cut during the 1827 to 1828 dormant season period of tree growth. If this is the case, these trees could have been cut in the fall of 1827 or winter or early spring of 1828, just prior to the end of the dormant season. Two logs have unequivocal cutting dates in spring of 1828. Finally, three logs have outermost rings formed in 1828 that may be complete, implying that the logs could have been cut during the 1828–1829 dormant season. Based on the likely cutting dates from the other five logs, however, these trees were probably cut in summer or fall of 1828. Although the cutting dates have a range of years that could indicate construction from 1826 to 1829, the year of construction can be restricted to a single year, beginning in the winter/spring of 1828 and ending in the fall of 1828. The exception is the one log with a cutting date of 1826. This log was harvested earlier, then likely stockpiled or used for some other purpose before being incorporated into the Cobb House. Future sampling may indeed reveal additional logs with cutting dates in 1826 and 1827.

The years of construction of the Dining Room can be narrowed as well. Four logs were clearly cut in 1829. Two logs have unequivocal cutting dates of 1830. One log has an outermost ring of 1828 that appears to be complete, suggesting that the log may have been cut during the 1828 to 1829 dormant season. Based on the cluster of cutting dates for the Dining Room logs, this tree may have been harvested in winter or early spring of 1829. Three logs have outermost rings formed in 1829 that could be complete, implying that these trees were harvested immediately before or during the 1829 to 1830 dormant season. Although the cutting dates have a range of years that could indicate construction from 1828 to 1830, the years of construction can be restricted to just 1829 and 1830. If the logs for both structures were stockpiled, the year of construction can be narrowed further to just the year 1830.

These construction dates refute the widely-held belief that Rocky Mount was built between 1770 and 1772 by William Cobb. In fact, the year of arrival of William Cobb into northeastern Tennessee is unknown. Massengill (1955) noted that

> "William Cobb was among the first members of the County Court, for instance, May term 1779. Yet, up to this time there is no recorded evidence on the local records of his having acquired title to any tract of land… There are only two deeds and neither of the deeds is dated as early as 1779."

Washington County was established in November 1777 and a list of its first appointed court magistrates contains the name of William Cobb (Ray 1960). The first court was held February 23, 1778 (Browning 1942; Ray 1960), with William Cobb "present" (Ramsey 1853:181). The tax list for Washington County for 1778 also lists William Cobb (Alderman 1970).

The belief that William Cobb may have arrived early in the 1770s and constructed Rocky Mount can perhaps be traced to Ramsey (1853:142) who stated that "Soon after the arrival on the Watauga of the emigrants … came the Beans, the Cobbs and the Webbs, and, subsequently the Tiptons and Taylors." Just how soon after the initial arrival (ca. 1769) of the early settlers into the Watauga River region the Cobbs came is uncertain. Equally uncertain is whether the Cobb family transmontane migration included William Cobb. After moving from Virginia to South Carolina in the late 1760s, Benjamin Cobb, William Cobb's father, in 1768 deeded by gift the South Carolina land to "William Cobb, my son and heir apparent" (HTGS 1993:375). Whether this indicates William Cobb also lived in South Carolina is unknown. Nonetheless, Benjamin Cobb's deeding the South Carolina property to his son suggests William Cobb was not among the earliest settlers in the Watauga settlement because one likely would not deed property to an heir who was also making the same migration to a new territory. Later, Benjamin Cobb, as well as his brother Pharoah [*sic*] Cobb, were among the signers of the petition dated March 19, 1775, sent to the Congress of North Carolina to have the Washington District be made into a county of North Carolina (HTGS 1993:5–6). Noticeably absent from these signatures is that of William Cobb.

These observations, however, do not conclusively disprove that William Cobb built what became known as the Cobb House because a lack of land entitlement was common during the early years of settlement in the new territory across the Appalachian Mountains. This territory was held by the Cherokee Indians and off limits to settlers who nonetheless occupied the Watauga River area in the 1770s (Ramsey 1853; Goodpasture 1898; Williams 1937). Some may find it difficult to accept that this opulent nine-room, two-story structure would have been one of the first pioneer structures built in early Tennessee at a time (1770 to 1772) when smaller and perhaps hastily-constructed hewn-log cabins would have been the norm (Patrick 1981). Window glass was not being made anywhere near Rocky Mount at the time, and was still being imported from coastal Virginia and Maryland into eastern Tennessee in the late 1780s and 1790s (Patrick 1981:26). Nails were not manufactured commercially until approximately 1790 (Nelson 1968; Keene 1972; Fontana 1985). Prior to this, nails were hand-made by blacksmiths and this task required suitable iron and an ironworks, neither of which was available in the region until the late 1780s (Patrick 1981:25). Nails were not widely available in eastern Tennessee until the 1830s (Morgan 1990:70–72). Finished hardware (i.e. door latches, locks, hinges, and iron screws) also had to be imported into the region as late as 1792 (Patrick 1981:26). Perhaps based on these historical facts, Patrick (1981:17) supplied a date of "*c*. 1780" for Rocky Mount, despite the well-publicized dates of construction by William Cobb between 1770 and 1772.

Because the structures were built nearly 60 years later, the house could not have been occupied by William Cobb, nor could Governor Blount have governed the new territory from this particular house. The years of construction for both the Cobb House and the Dining Room fall soon after the land was deeded to Michael Massengill by his grandfather, Henry Massengill, Sr., on 20 March 1827. This suggests that the house and dining room were constructed by Michael Massengill between 1827 and 1830, and not by William Cobb between 1770 and 1772.

Several explanations for this discrepancy should be explored. First, could the tree-ring dates be incorrect? The visual crossdating between the Rocky Mount tree-ring chronology and the composite created from the three reference chronologies is convincing, despite the few discordant years. Further, the synchroneity between these two chronologies is prominent not only in the high-frequency (year to year) fluctuations, but also in longer-term, multi-year periods, such as the declining rates of growth between 1740 and 1755, the rebound to wider rings between 1755 and 1760, the period of narrower rings from 1760 to 1768, and the period of wider rings that formed between 1777 and 1795. Especially convincing is the period of much reduced growth rates and the extremely narrow rings that formed between 1773 and 1776. This visual congruency was confirmed statistically as the two chronologies have a positive and statistically significant correlation that has an extremely low probability of occurring simply by chance ($r = 0.49$, $n = 129$, $t = 6.3$, $p < 0.0001$, i.e. less than a 1 in 10,000 chance our tree-ring dating is in error).

Could the 25 sampled logs that yielded cutting dates have been obtained from another hewn-log structure in the region? This hypothesis is tenable because letters and newspaper accounts suggest that perhaps up to 20 logs had to be replaced during the two restoration phases in 1960 and 1979. The likelihood, however, of our having sampled and dated 25 logs in the Cobb House and Dining Room that came from another hewn-log structure built later between

1827 and 1830 is remote, at best. Replacing 25 logs from another nearby structure built during this interval would have required the complete dismantling of a possible historic structure itself, and this is implausible. Could the 25 logs have been replaced by previous tenants as the oak logs decayed over time? This explanation is also flawed for three reasons. First, oak was used by frontier settlers because of its durability and the possibility that 25 such logs decayed to the point that they required complete replacement is not likely. Second, had 25 logs decayed enough over time to warrant replacement, the range of years represented by the logs would be much wider (e.g. 1800 to 1950) than the clustered 1827 to 1830 range shown by the current logs. Finally, the dimensions of the Cobb House are large (29 x 22 feet) for a log structure. Finding suitable replacement logs of these lengths from another structure would have been difficult, especially considering the re-notching that would have been required on both ends of individual logs.

Rather, the logs that could not be dated with absolute confidence could have come from another hewn-log structure (or even a lumberyard). If these logs had come from trees that once grew within the region, we should have been able to date these against the regional chronologies. Because the ring patterns on these logs do not match those of the 25 dated logs, we can assume that (1) these logs were harvested from trees growing outside the immediate region, or (2) the effects of wildfire added considerable noise to the growth patterns that inhibited successful crossdating.

Finally, could an original Cobb House have occupied this site or the general vicinity prior to 1828? This hypothesis is plausible because hewn-log structures were often temporary living quarters. Of the thousands that once dotted the Tennessee landscape in the late 1700s and 1800s, only several hundred remain today and these are often dilapidated (Rehder 2004). Once in disrepair, the hewn logs can be harvested and reused in another log structure, or used as fuel. Additionally, wooden structures burned with distressing frequency. For example, the original hewn-log plantation home built by Henry Massengill, Sr., that once occupied the Devault property across from Rocky Mount, burned in 1798 (Spoden 1976). Archaeological testing of the soil in and around Rocky Mount for artifacts and charcoal could possibly determine whether one or more previous structures may have occupied the site.

Recommendations for Future Research

Future research at Rocky Mount should concentrate on two areas. First, additional dendrochronological sampling at Rocky Mount should be considered because our sampling on the Cobb House focused solely on logs that were accessible from ground level, and we therefore sampled logs only from the first floor. Sampling of logs on the second floor would have two advantages. First, these logs could extend our current tree-ring chronology back in time, while also possibly strengthening the sample depth in the earlier portions. Second, the more comprehensive sampling would reveal whether logs from an earlier structure exist or do not exist in the Cobb House.

Second, future research at Rocky Mount should focus on archaeological analyses of both the Cobb House and Dining Room and the thorough archaeological testing of soil in the immediate vicinity. Interpretations should note that the influx of materials and technology to pioneer settlements in Appalachia often lagged behind their development and use in heavily populated areas along the Atlantic seaboard. Two specific items should be targeted for archaeological evaluation in both the Cobb House and Dining Room in areas that escaped restoration.

First, the chronology of nail manufacture is well-known (Nelson 1968; Keene 1972; Ball 1991; Young 1994; Wells 1998). Hand-wrought, “rosehead” nails indicate pre-1790 construction, “square-head” nails indicate construction between 1790 and 1830, headless “machine-cut” nails indicate 1830 to 1890 construction, and wire nails indicate post-1890 construction. Second, the chronology of saw marks may be useful for dating the structures (Howard 1989:9–11; Wilbur 1992:48). Hand-powered pit saws were common prior to 1790 and left slanted, irregular but sometimes parallel saw marks. Water-powered “sash” saws (also called “up-and-down” saws) were introduced ca. 1790 and left regular, vertical saw marks. Circular saws only became widely used around 1830 and left circular arcs on lumber.

A comprehensive plan for archaeological testing of soil within and around Rocky Mount should be strongly considered because soil testing often reveals artifacts that not only help date the period of construction and occupation, but also provide information on lifeways of its occupants. Three artifact types should be specifically evaluated. First, the thickness of window glass can be diagnostic of its period of construction (Mann 2002). Moir (1987) developed a classification scheme that uses a simple formula to determine a range of years for glass of a particular thickness, and is particularly useful for evaluating 19th century glass. Second, ceramics are perhaps the most studied of all artifacts in historical archaeology (Quimby 1973) and their styles are diagnostic of the range of years in which they were created (Miller 1980). Ceramics already have helped date historical sites in eastern Tennessee (Polhemus 1977; Faulkner 1984; Mann 2002). Finally, nails are commonly dropped, lost, or discarded and their recovery from soil tests should aid in determining the history of construction of Rocky Mount.

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Henri D. Grissino-Mayer

Laboratory of Tree-Ring Science

Department of Geography

1000 Phillip Fulmer Way

The University of Tennessee

Knoxville, TN 37996-0925

Saskia L. van de Gevel

Laboratory of Tree-Ring Science

Department of Geography

1000 Phillip Fulmer Way

The University of Tennessee

Knoxville, TN 37996-0925

TABLE 1
STATISTICS FOR CORES FROM BUILDING "A": COBB HOUSE

Series	Begin Year	End Year	Mean Sensitivity	Interseries Correlation
Ae03a	1740	1810	.25	.70
Ae05b	1728	1827	.21	.62
Ae06a	1755	1826	.25	.50
Ae07a	1730	1827	.21	.67
Ae07b	1730	1826	.28	.48
Ae10a	1729	1827	.26	.74
Ae10b	1779	1827	.22	.63
Ae12b	1729	1821	.25	.73
Ae12c	1743	1815	.21	.69
Ae14a	1729	1826	.21	.58
An04a	1714	1827	.25	.61
An04b	1736	1827	.23	.68
An05a	1729	1827	.22	.55
An05b	1718	1816	.25	.67
An06a	1743	1815	.27	.60
As02a	1729	1802	.21	.63
As03c	1711	1823	.25	.61
As04a	1705	1764	.23	.45
As04b	1703	1824	.24	.58
As05a	1723	1826	.23	.59
Aw03a	1725	1782	.19	.39
Aw05a	1736	1797	.17	.48
Aw05b	1719	1820	.18	.55

TABLE 2
STATISTICS FOR CORES FROM BUILDING “B”: DINING ROOM

Series	Begin Year	End Year	Mean Sensitivity	Interseries Correlation
Be02a	1667	1828	.20	.36
Be02b	1701	1824	.19	.44
Be03a	1735	1827	.27	.73
Be04a	1734	1828	.20	.71
Bn03a	1726	1829	.27	.66
Bn04a	1750	1828	.27	.71
Bn05b	1733	1828	.23	.58
Bn06a	1757	1828	.25	.57
Bn06b	1726	1828	.22	.61
Bn07a	1730	1829	.21	.71
Bs04a	1760	1827	.35	.49
Bs04b	1731	1824	.23	.46
Bw04a	1728	1808	.22	.56
Bw04b	1752	1829	.24	.49
Bwind01b	1737	1813	.21	.56
Bbase01a	1732	1817	.23	.52
Bbase01b	1727	1806	.21	.52
Bbase03a	1726	1803	.21	.55
Bbase03b	1720	1808	.27	.67
Bbase05a	1724	1810	.28	.56

TABLE 3
CORRELATION TESTING, BUILDING “A”: COBB HOUSE

Series	40-Yr Tested Segment					
	1700–1739	1720–1759	1740–1779	1760–1799	1780–1819	1800–1839
Ae03a			.60	.66	.77	
Ae05b		.51	.76	.77	.65	.61
Ae06a			.33*	.35*	.61	.60
Ae07a		.71	.64	.60	.73	.70
Ae07b		.41*	.42	.36*	.52	.53
Ae10a		.53	.64	.76	.86	.84
Ae10b				.62	.61	.65
Ae12b		.66	.79	.70	.74	.73
Ae12c			.71	.72	.74	
Ae14a		.55	.57	.78	.71	.59
An04a	.45	.45	.58	.73	.74	.69
An04b		.54	.55	.60	.79	.79
An05a		.34*	.34*	.61	.81	.75
An05b	.58	.59	.67	.78	.81	
An06a			.63	.64	.62	
As02a		.58	.68	.62	.64	
As03c	.65	.65	.60	.39	.69	.67
As04a	.29*	.45	.61			
As04b	.37	.51	.72	.76	.62	.62
As05a		.33*	.66	.64	.73	.72
Aw03a		.24*	.39	.43		
Aw05a		.47	.49	.51		
Aw05b	.47	.46	.67	.61	.59	.59

* indicates flagged segment

TABLE 4
CORRELATION TESTING, BUILDING “B”: DINING ROOM

	40-Yr Tested Segment					
Series	1700–1739	1720–1759	1740–1779	1760–1799	1780–1819	1800–1839
Be02a	.26*	.33*	.55	.61	.27*	.24*
Be02b	.37	.59	.59	.41*	.34*	.34*
Be03a		.65	.66	.68	.83	.80
Be04a		.72	.75	.64	.76	.73
Bn03a		.62	.71	.64	.82	.76
Bn04a			.73	.75	.69	.69
Bn05b		.73	.55	.35*	.63	.64
Bn06a			.42	.41	.68	.68
Bn06b		.65	.74	.70	.58	.54
Bn07a		.63	.70	.76	.82	.73
Bs04a				.55	.56	.49
Bs04b		.37	.46	.65	.57	.52
Bw04a		.35*	.60	.65	.69	
Bw04b			.68	.67	.66	.40
Bwind01b		.65	.68	.73	.54	
Bbase01a		.51	.68	.72	.52	
Bbase01b		.55	.66	.62	.50	
Bbase03a		.49	.66	.60	.61	
Bbase03b		.70	.84	.62	.64	
Bbase05a		.59	.61	.69	.53	

* indicates flagged segment

TABLE 5
CORRELATION TESTING, REGIONAL CHRONOLOGIES

Chronology	40-Yr Tested Segment 1660–1699 [a]	1680–1719	1700–1739	1720–1759	1740–1779	1760–1799	1780–1819	1800–1839 [b]	IC [c]
Lilley Cornett	.30*	.05*	.05*	.38	.69	.75	.51	.47	.39
Norris Dam	.51	.42	.47	.67	.59	.34*	.32*	.31*	.47
Linville Gorge	.18*	.42	.49	.45	.55	.49	.28*	.16*	.34
Rocky Mount	.21*	.20*	.37*	.48	.67	.59	.36*	.36*	.42

* indicates flagged segment
[a] analysis begins at 1667 (n = 33)
[b] analysis ends at 1829 (n = 30)
[c] IC = interseries correlation

TABLE 6
CUTTING DATES FOR BUILDING “A”: COBB HOUSE

Log	Outer Ring	Ring Type	Comments	Inferred Period for Cutting
An04	1828	r	1828 ring appears complete	tree cut any time from summer 1828 to spring 1829
An05	1828	r	1828 ring appears complete	tree cut any time from summer 1828 to spring 1829
Ae05	1828	r	1828 ring appears complete	tree cut any time from summer 1828 to spring 1829
Ae07	1828	r	1828 earlywood vessels present, no latewood	tree cut in spring or early summer 1828
Ae10	1828	r	1828 earlywood vessels present, no latewood	tree cut in spring or early summer 1828
Ae06	1827	r	1827 ring appears complete	tree cut any time from fall 1827 to spring 1828
Ae14	1827	r	1827 ring appears complete	tree cut any time from fall 1827 to spring 1828
As05	1827	r	1827 ring appears complete	tree cut any time from fall 1827 to spring 1828
As04	1826	r	1826 earlywood vessels present, no latewood	tree cut in spring 1826
As03	1825	v	sapwood present	close to cutting date, but not possible to determine
Ae12	1822	v	outer rings missing, some sapwood present	close to cutting date, but not possible to determine
Aw05	1821	v	sapwood present, outer rings decayed	close to cutting date, but not possible to determine
An06	1818	vv	outermost rings indistinct	cutting date not possible to determine
Ae03	1810	vv	taken from hewn portion of log	cutting date not possible to determine
As02	1803	vv	taken from hewn portion of log, no sapwood	cutting date not possible to determine
Aw03	1782	vv	taken from hewn portion of log, no sapwood	cutting date not possible to determine

B: bark is present, indicating the outer ring is fully intact (certainly a cutting date);
r: outermost ring is continuous and intact around a smooth surface, but no bark is present (considered a cutting date);
v: the date is within a few years of the cutting date, based on presence of sapwood;
vv: impossible to determine how far the outer ring is from the true outer surface (no sapwood and rings in the heartwood are likely missing).

TABLE 7
CUTTING DATES FOR BUILDING “B”: DINING ROOM

Log	Outer Ring	Ring Type	Comments	Inferred Period for Cutting
Bw04	1830	r	1830 ring possibly complete, latewood present	tree cut in summer or early fall 1830
Bn07	1830	B	1830 ring possibly complete, latewood present	tree cut in summer or early fall 1830
Be04	1829	r	1829 ring appears complete	tree cut any time from fall 1829 to spring 1830
Bn05	1829	r	1829 ring appears complete	tree cut any time from fall 1829 to spring 1830
Bn06	1829	r	1829 ring appears complete	tree cut any time from fall 1829 to spring 1830
Be02	1829	r	1829 earlywood vessels present, no latewood	tree cut in spring 1829
Be03	1829	r	1829 earlywood vessels present, no latewood	tree cut in spring 1829
Bn03	1829	r	1829 earlywood vessels present, no latewood	tree cut in spring 1829
Bn04	1829	r	1829 ring could be partial	tree cut in 1829
Bs04	1828	r	1828 ring appears complete	tree cut any time from fall 1828 to spring 1829
Bwind01	1825	v	hewn sill log next to basement window, sapwood	close to cutting date, but not possible to determine
Bbase05	1821	v	hewn floor log in basement, sapwood	close to cutting date, but not possible to determine
Bbase01	1820	v	hewn floor log in basement, sapwood	close to cutting date, but not possible to determine
Bbase03	1809	vv	hewn floor log in basement, no sapwood, decayed	cutting date not possible to determine

B: bark is present, indicating the outer ring is fully intact (certainly a cutting date);
r: outermost ring is continuous and intact around a smooth surface, but no bark is present (considered a cutting date);
v: the date is within a few years of the cutting date, based on presence of sapwood;
vv: impossible to determine how far the outer ring is from the true outer surface (no sapwood and rings in the heartwood are likely missing).

FIGURE CAPTIONS

FIGURE 1. Map showing location of the Rocky Mount site in northeastern Tennessee, along with the locations of the three reference tree-ring chronologies used in this study: Norris Dam, Lilley Cornett, and Linville Gorge.

FIGURE 2. The Cobb House (right, Building “A”) and Dining Room (left, Building “B”). The two are separated by a dogtrot (not visible).

FIGURE 3. Extracting a core using a tubular drill bit and electric hand drill.

FIGURE 4. Graph showing the correspondence between the Rocky Mount chronology (dashed line) and the composite chronology (solid line) created by averaging the three reference chronologies. Numbers at top show the sample depth (number of cores) for the Rocky Mount chronology.

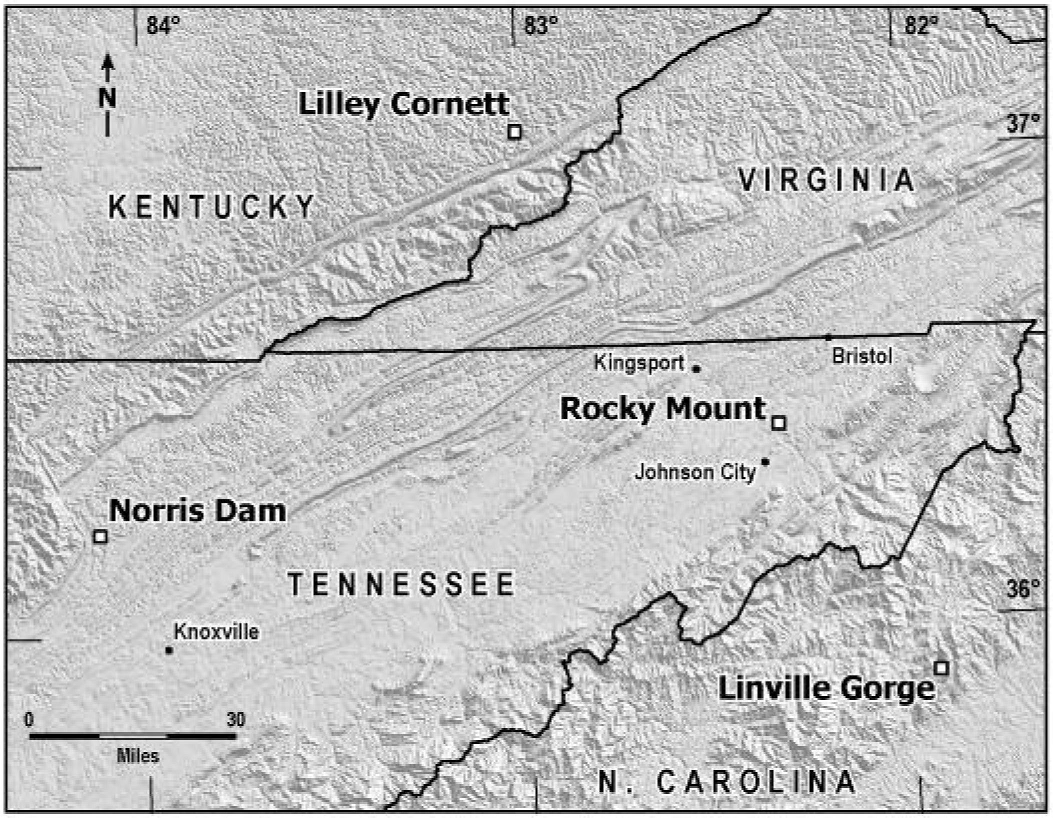
84°
83°
82°
N
37°
36°
Lilley Cornett
KENTUCKY
VIRGINIA
Kingsport
Bristol
Rocky Mount
Johnson City
Norris Dam
TENNESSEE
Knoxville
Linville Gorge
0
30
Miles
N. CAROLINA

FIGURE 1

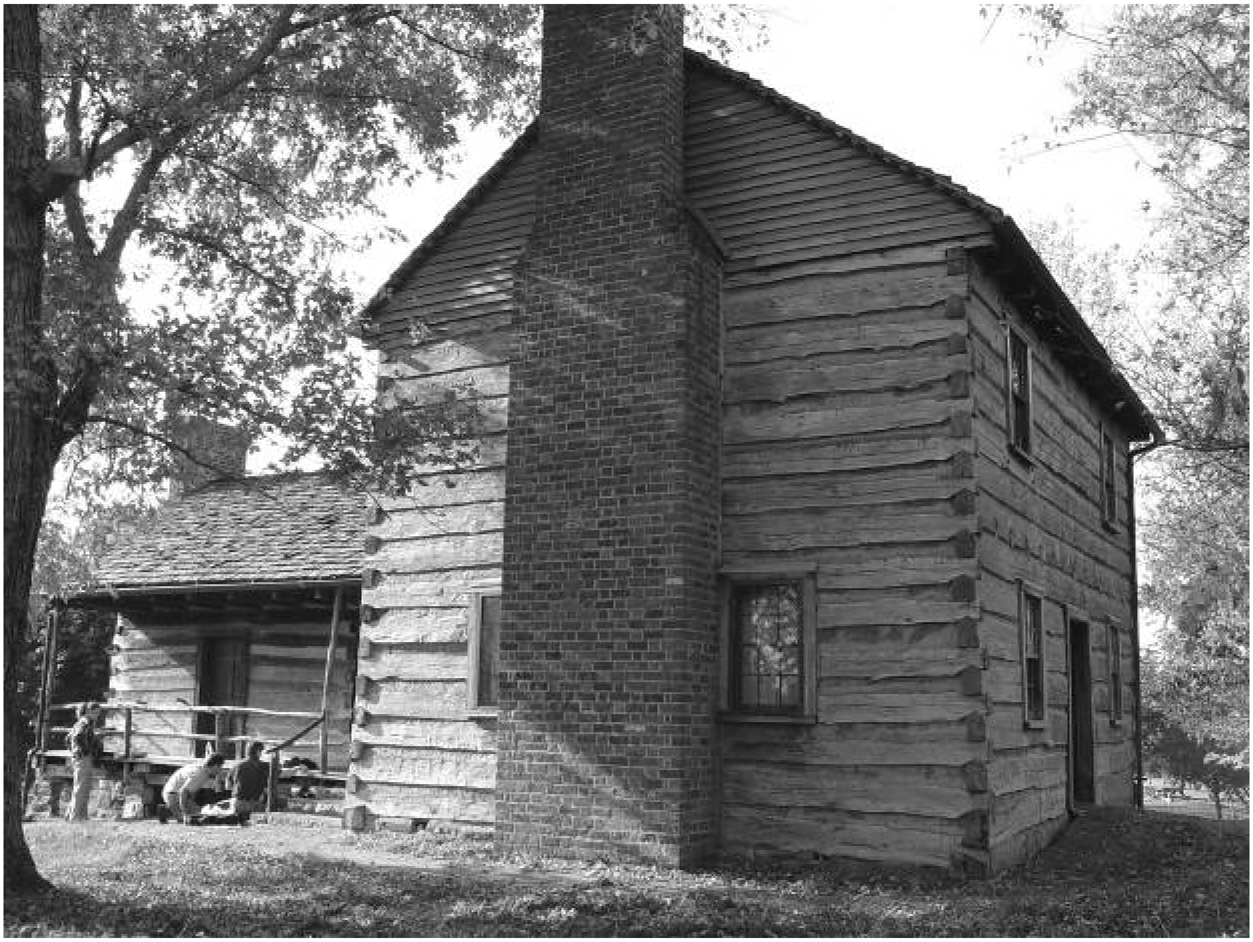

FIGURE 2

FIGURE 3

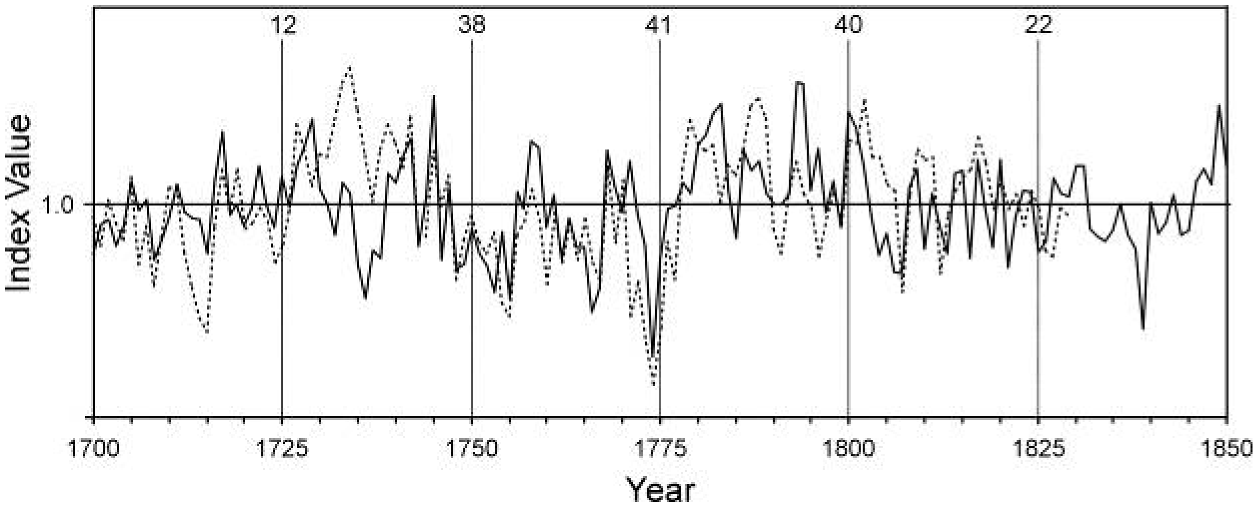
12
38
41
40
22
Index Value
1.0
1700
1725
1750
1775
1800
1825
1850
Year

FIGURE 4