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RESEARCH REPORT

DENDROCHRONOLOGICAL DATING OF WOOD FROM THE FOUNTAIN OF YOUTH PARK ARCHAEOLOGICAL SITE (8SJ31), ST. AUGUSTINE, FLORIDA, U.S.A.

NIKI A. GARLAND[1], **HENRI D. GRISSINO-MAYER**[1]*, **KATHLEEN DEAGAN**[2], **GRANT L. HARLEY**[1], and **GIFFORD WATERS**[2]

[1]Laboratory of Tree-Ring Science, Initiative for Quaternary Paleoclimate Research, Department of Geography, The University of Tennessee, Knoxville, TN, 37996-0925, USA

[2]Florida Museum of Natural History, The University of Florida, Gainesville, FL, 32611, USA

ABSTRACT

Settled in 1565 by the Pedro Menéndez de Aviles expedition, St. Augustine, Florida, holds great educational, historical, and anthropological interest for current researchers as the oldest continuously occupied European community in the continental United States. Archaeological excavations produced two large (*ca.* 20 cm diameter) posts from the Fountain of Youth Archaeological Park site. Our objective in this project was to use tree-ring dating to determine the outermost dates of the two posts and to use these dates to assist archaeological interpretations. Sample 8SJ31-2741 was pine and contained tree rings that were successfully crossdated using the Lake Louise reference chronology from southern Georgia to AD 1620–1668. Sample 8SJ31-2766 was a cypress sample that we could not crossdate using a nearby reference chronology from the Altamaha River in southern Georgia. The date for sample 8SJ31-2741 places its cutting and deposition within the Mission Period occupation and verifies that the Nombre de Dios mission village was still active and building after 1668 into the late 17th Century. Furthermore, the dendrochronological date confirmed the stratigraphic interpretation, suggesting that disturbance of the upper layers of the surface in this part of the site was perhaps not as disruptive to the soils as originally assumed. This project demonstrates the feasibility of dating wood extracted from sites from the historic Spanish-era period in the Southeastern US.

Keywords: dendrochronology, dendroarchaeology, tree rings, St. Augustine, Florida, Fountain of Youth, pine, cypress.

INTRODUCTION

The science of dendroarchaeology uses tree-ring dating techniques to determine when a tree was harvested to establish the year (or years) of construction for a structure that includes wood (Bannister 1962; Dean 1978). Using existing reference tree-ring chronologies developed in the US Southeast, structures of historical significance can be accurately dated (Mann 2002; DeWeese Wight and Grissino-Mayer 2004; Henderson *et al.* 2009; Lewis *et al.* 2009; Slayton *et al.* 2009). In the Southeastern US, dendroarchaeology has been most successful at determining the years of construction for historic period structures rather than prehistoric structures because often the latter do not have well-preserved rings or the type of wood that is conducive to dating techniques (Grissino-Mayer and van de Gevel 2007). Recent advances, however, are providing evidence that prehistoric sites and structures can eventually be dated (Koerner *et al.* 2009).

In general, the practice of dendroarchaeology in the Southeastern US has lagged behind other important archaeological practices because the prevailing view has been that tree-ring dating will not work in the humid Southeast where decay rates are especially high (Grissino-Mayer 2009). In

*Corresponding author: grissino@utk.edu; Phone 865-974-6029; Fax 865-974-6025

addition, few laboratories have ever existed in the Southeast capable of performing dendroarchaeological analyses. As recently as the early 1980s, researchers recognized that the potential existed for dating timbers from prehistoric and historic sites in the Southeast, but this potential was never realized despite its promise (Stahle and Wolfman 1985). Dendroarchaeological studies conducted in the Southeastern US, especially in the last 10 years, have accelerated because (1) a growing network of tree-ring sites provides reference chronologies for dating tree-ring sequences from historic structures, (2) historical agencies are becoming more aware of the possibility of successfully dating historic structures, and (3) a proliferation of laboratories in the Southeast provides guidance and analytical capabilities that greatly increase the probability of successfully dating timbers from historic structures. These recent studies have not always supported the reported construction date for a particular structure, even those dates reported in the National Park Service's National Register of Historic Places (Grissino-Mayer and van de Gevel 2007; Grissino-Mayer *et al.* 2009; Henderson *et al.* 2009; Mann *et al.* 2009). Nonetheless, these studies are proving valuable by providing a level of historical accuracy not previously achievable (Grissino-Mayer 2009).

SITE BACKGROUND

The Fountain of Youth Park site in St. Augustine is today a tourist attraction dedicated to the notion that Ponce de Leon landed in Florida near this spot (Figure 1). As an archaeological site, it is perhaps best known for its 16th Century Spanish associations, which include the original AD 1565–1566 settlement of St. Augustine, as well as the initial site of the Franciscan mission of Nombre de Dios, which was established in AD 1587 and endured in this location until sometime in the 17th Century. Before the arrival of Europeans, however, the site had been occupied for more than 1,000 years by the Timucuan Indians, and before that by the Native American group associated with the late Archaic period Orange archaeological culture (Goggin, 1968; Deagan 2009a, b).

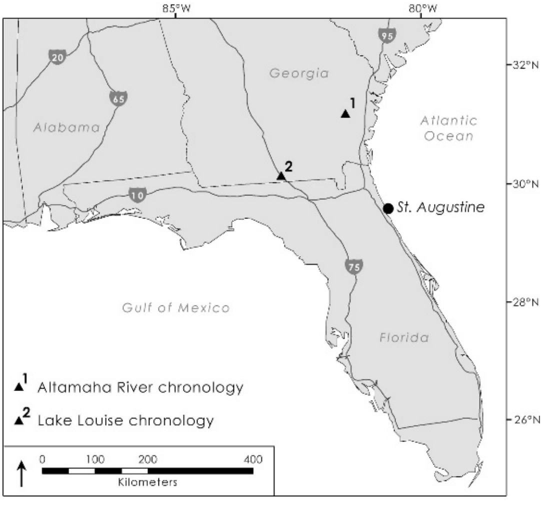

Figure 1. Location of St. Augustine and the Fountain of Youth Park site relative to the locations of the two reference chronologies used in the study.

Archaeological evidence for the initial encampment of Pedro Menéndez de Aviles' 1565 colonizing expedition to Florida has been located in the southeastern section of the park property. That settlement lasted only for nine months, when Timucuan hostilities and mutinies among disillusioned soldiers caused Menéndez to relocate the town and fort across the St. Augustine Bay to Anastasia Island (Lyon 1976, 1997; Manucy 1997). Relations between the Timucua and the Spanish remained hostile until the 1570s, when the town of St. Augustine was again moved back to the mainland to the downtown site it still occupies today (Lyon 1997). Efforts to convert the Timucua to Christianity began in the vicinity of the original 1565 Spanish settlement after 1577, when the first Franciscan friars arrived in Florida. The first Franciscan mission was established in 1587, also on the grounds of what is today the Fountain of Youth Park (Hann 1996). The mission, named Nombre de Dios, was occupied by Timucua converts, but by the mid-17th Century, the major part of the mission had relocated southward, closer to the Castillo de San Marcos and the walled city (Deagan 2009b, pp. 142–144).

Archaeological work at the Fountain of Youth Park site has been undertaken intermittently since the 1930s (Deagan 2009a). The archaeological deposits at the site, particularly in

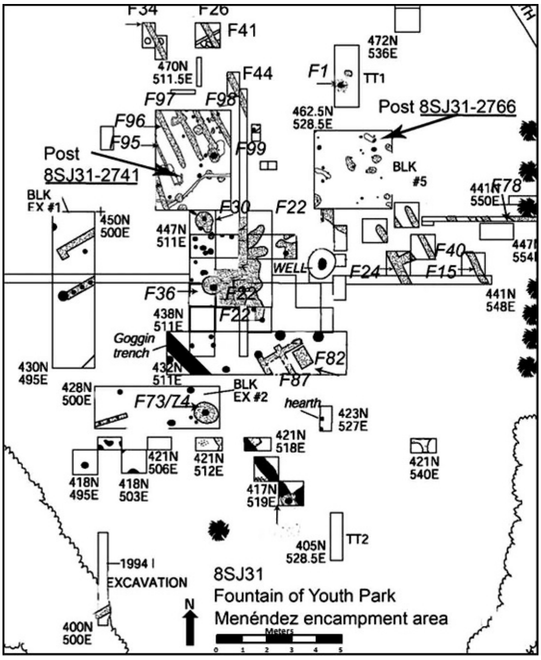

Figure 2. Site 8SJ31, the Fountain of Youth Park archaeological site, showing locations from which the two wooden posts (8SJ31-2741 and 8SJ31-2766) were extracted (large arrows at top).

Figure 3. Cypress sample 8SJ31-2766 (left) and pine sample 8SJ31-2741 (right) showing the original metal axe cut ends. Sample 8SJ31-2741 is 18 cm in width.

the area thought to encompass the Menéndez settlement, have been subjected to considerable natural and cultural alteration, and relatively few deposits are completely intact and undisturbed. Gardening activities during the 19th and early 20th Centuries homogenized approximately the upper 20–25 cm of the site deposits, which rarely exceed 50 cm in total depth. Although upper-level disturbances left the bases of pre-19th Century features intact, it obscured the stratigraphic initiation point of many of these deposits, and perturbed much of the sheet deposit associated with the features. Because of this, separating deposits from 1565 (Menéndez occupation) and 1587 (beginning of the Nombre de Dios mission) has been a particularly difficult methodological concern, because only a very few artifacts provide a *terminus post quem* (beginning date after which an artifact was fabricated) (Bauch and Eckstein 1970; Baillie 1995) between 1587 and 1650, that could help distinguish the post-1587 Mission Period deposits from the 1565–1566 Menéndez deposits. The great majority of remains from most historic-period contexts at the site are, however, Native American ceramics.

Two waterlogged posts were excavated from the Fountain of Youth Park site and preserved using polyethylene glycol (Brunning 1995; Bleicher 2008). The posts were discovered during the 2002 excavations at the site (Woods 2004) at the base of posthole features that extended below the water table, and labeled 8SJ31-2741 and 8SJ31-2766. Both were found in the vicinity of the Menéndez encampment area (Figure 2), and both showed evidence of preparation with European tools (metal axes) (Figure 3). The fabrication method and associated materials for 8SJ31-2766 indicated a historic period (post-1565) date. Our study had two objectives: (1) crossdate the ring patterns from these posts against previously established reference tree-ring chronologies in regional proximity to the Fountain of Youth Park site, and (2) use these dates to assist interpretation of the archaeological context from which these posts were extracted.

METHODS

Laboratory Methods

We processed the posts by first wrapping the samples in 2.5 inch strapping tape to ensure the stability of the fragile wood. We then sawed a *ca.* 4 cm-thick section from the cut end of each of the two posts using a band saw. We sanded each section with a belt sander using progressively finer sandpaper, beginning with ISO P-80 grit (177–210 μm) and finishing with ISO P-400 grit (20.6–23.6 μm) (Orvis and Grissino-Mayer 2002). To insure maximum visibility, we hand-sanded the

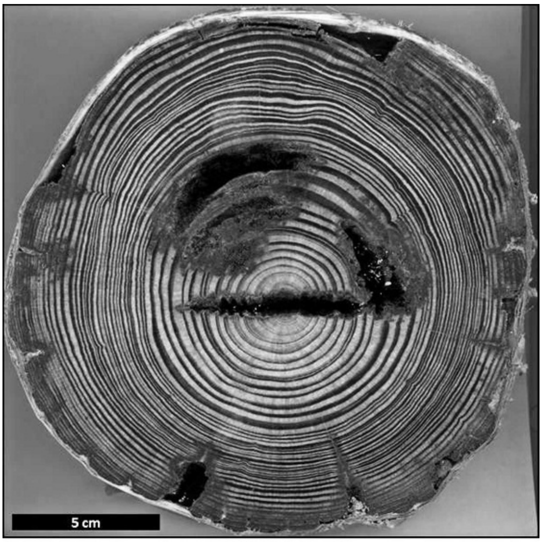

Figure 4. Pine sample 8SJ31-2741 after being sanded to reveal the interior ring structure.

finished surface using 800 grit (9.8–12.3 μm) finishing film (Figure 4).

Measurement

To begin the dating process, we used a stereozoom boom-arm microscope to locate radial transects across the sanded surface of each section that contained the maximum number of rings. We carefully examined the entire outer edge of each section to search for possible bark or inner phloem that would provide cutting dates and therefore a possible year of construction. Each radial transect was marked with a black felt-tipped marker. We then began counting from the innermost complete ring beginning with the relative year 1 and continued until the end of the transect was reached. Each 10th ring was marked with a single dot and the 50th ring with two dots (Speer 2010). We scanned the surface of each section using an Epson 10,000 XL scanner at 1,200 dpi using WinDendro software. We then measured the widths of all identified tree rings to 0.001 mm precision (Tables 1A and 1B) once the WinDendro software automatically identified the tree-ring boundaries. If the software misidentified a ring boundary (not uncommon using scanner-based technology), we manually corrected the mistake using the true rings previously marked on the wood surface with the black marker.

Crossdating

We began the process of absolute dating of the tree rings from the two samples by first crossdating each measured series against the other measured series for each post. Because of the short length of these series, we used the "list method" (Yamaguchi 1991) of crossdating, sometimes called the "extreme ring match-mismatch method" (Phipps 1985), a technique pioneered by Douglass (1941) along with the familiar "skeleton plotting" technique. This process ensured that all rings were properly identified to minimize potential misdating problems. We then crossdated the rings on each sample using skeleton plots (Stokes and Smiley 1968; Swetnam *et al.* 1985; Schweingruber *et al.* 1990; Speer 2010). The graphical crossdating results were confirmed using COFECHA software (Holmes 1983; Grissino-Mayer 2001). COFECHA removed all low-frequency growth trends, such as those caused by normal physiological aging, local or stand-wide disturbances, or by biological inertia (*i.e.* autocorrelation) (Grissino-Mayer 2001), that could complicate the crossdating process.

To accomplish absolute crossdating, we used two nearby reference tree-ring chronologies (Figure 1). The first chronology was developed from longleaf pine (*Pinus palustris* P. Miller) trees collected at the Lake Louise Biological Station located 15 km south of Valdosta, Georgia, just north of the Georgia-Florida state line off Interstate 75. These samples were obtained primarily from stumps and other pieces of remnant wood found around the periphery of Lake Louise (Grissino-Mayer *et al.* 2010). This chronology extends from AD 1421 to 1999. The second reference chronology was developed by Dr. David W. Stahle of the University of Arkansas from bald cypress (*Taxodium distichum* (L.) Rich.) trees growing along the Altamaha River in southeastern Georgia, which was used to reconstruct spring precipitation from a network of bald cypress chronologies throughout the Southeast (Stahle and Cleaveland 1992). This data set was downloaded from the International Tree-Ring

Table 1A. Measurements from the three measured radii for pine sample 8SJ31-2741 in Tucson Decadal Format. Each value represents the ring width in 0.001 format (*e.g.* "3706" = 3.706 mm). Each row contains 10 annual measurement values. "−9999" is the end of series marker.

8SJ3127A	1		3706	2401	3179	3202	3099	3021	809	3228	2444
8SJ3127A	10	4441	3406	3774	2460	1132	1302	1631	219	614	874
8SJ3127A	20	1575	1074	1105	1715	1215	1635	375	862	1241	1071
8SJ3127A	30	654	1125	1143	1665	2098	1627	1866	1515	1182	1032
8SJ3127A	40	511	560	1185	601	1049	556	934	910	−9999	
8SJ3127B	1		4136	3776	3549	3157	2529	2772	1300	2881	2607
8SJ3127B	10	4011	2772	4642	2429	1016	1231	1544	200	510	969
8SJ3127B	20	1364	747	1049	1612	1560	897	355	1047	1473	1193
8SJ3127B	30	541	1313	1484	1666	2051	2003	1455	1682	1360	1105
8SJ3127B	40	421	818	1397	909	1280	630	1025	1011	1087	811
8SJ3127B	50	−9999									
8SJ3127C	1		3422	2216	2667	3073	2585	3898	1329	3801	3154
8SJ3127C	10	6198	5939	4864	2703	1523	1466	2550	153	1195	1525
8SJ3127C	20	2540	1193	1570	1369	1825	1576	734	1303	1195	819
8SJ3127C	30	777	2269	1932	1645	2560	3079	3202	3323	1846	2101
8SJ3127C	40	817	1169	2004	1163	1155	439	−9999			

Table 1B. Measurements from the two measured radii for cypress sample 8SJ31-2766 in Tucson Decadal Format. Each value represents the ring width in 0.001 format (*e.g.* "2754" = 2.754 mm). Each row contains 10 annual measurement values. "−9999" is the end of series marker.

8SJ3166A	1		2754	3347	2625	2722	2199	1390	1224	357	819
8SJ3166A	10	880	1057	1160	1194	1430	1415	994	1170	1244	1646
8SJ3166A	20	2012	1765	1230	1862	2847	2204	1540	1168	2821	4178
8SJ3166A	30	1784	756	890	1675	2074	1202	1745	1616	904	1219
8SJ3166A	40	2061	1581	1615	1809	1095	1604	1137	886	1029	1838
8SJ3166A	50	977	1228	565	641	825	1113	1666	1239	954	1227
8SJ3166A	60	752	1186	666	875	676	672	832	1141	800	−9999
8SJ3166B	1		2670	3201	2008	2428	1188	1129	742	670	741
8SJ3166B	10	618	904	907	1338	1216	1486	663	742	1627	1594
8SJ3166B	20	1124	1896	2003	1298	1748	1667	1998	2101	2155	980
8SJ3166B	30	1420	1500	1629	2244	1389	1124	1330	2963	2305	1621
8SJ3166B	40	1771	1710	1952	1424	1171	2067	1290	982	1076	948
8SJ3166B	50	1616	1339	1028	1307	1210	1110	1337	1030	1233	1014
8SJ3166B	60	887	656	732	995	627	759	519	581	535	894
8SJ3166B	70	−9999									

Data Bank (GA002). Crossdating was verified when the correlation coefficient between the floating chronology developed from the posts and the anchored reference tree-ring chronology was statistically significant (usually $p < 0.001$) in COFECHA, and corroborated the temporal placement found in the graphical crossdating.

RESULTS

After cutting sections from the post, we found that sample 8SJ31-2741 was a pine with 49 rings. This sample likely represents a longleaf pine based on the presence of indistinct rings that surround the pith, indicative of the ability of longleaf pine to exist in a grass stage for up to 6–10 years. The second sample, 8SJ31-2766, was more troublesome to identify. We consulted Hoadley (1990) to identify potential conifer species based on physical ring properties seen on the wood. The thin latewood preceded by abrupt transition from earlywood to latewood, in addition to the lack of resin ducts, conclusively identified this sample as a cypress (*Taxodium* sp.).

The skeleton plot of the pine sample showed that six narrow marker rings stood out and we focused our dating on this unique ring pattern. When compared to the plot from the chronology

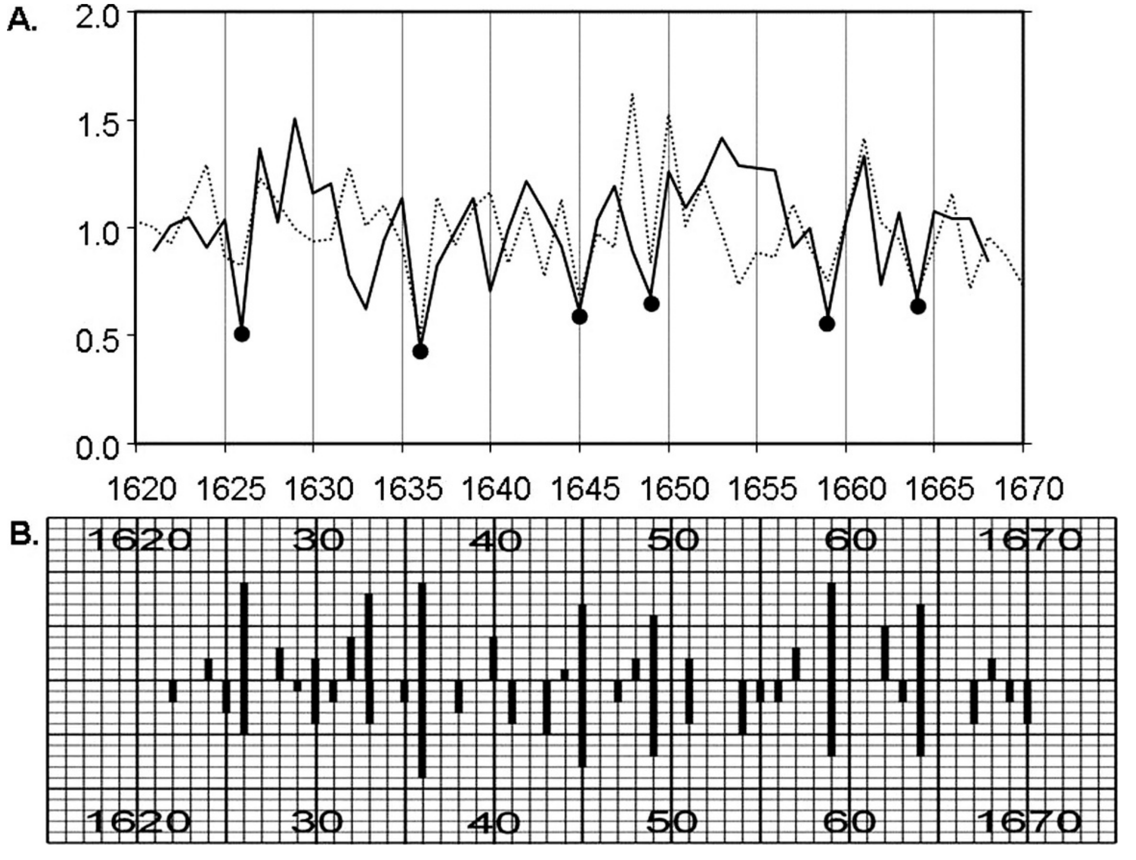

Figure 5. **A.** Line graphs comparing the Lake Louise RESIDUAL chronology (dashed line) with the RESIDUAL chronology from sample 8SJ31-2741 (solid line) ($r = 0.53$, $n = 48$, $t = 4.24$, $p < 0.001$). Circles accentuate the unique pattern of narrow rings common to both plots. **B.** Skeleton plot comparing the Lake Louise narrow rings (bottom) with those from sample 8SJ31-2741 (top), highlighting the unique pattern of six narrow rings common to both series.

for the Lake Louise site, a match was readily found on which all six marker rings aligned perfectly. Nowhere else along the master chronology did these rings match up so well; in fact, the second best match aligned only three of these marker rings and was unconvincing. The skeleton plot indicated the innermost ring on the 49-year sequence for sample 8SJ31-2741 was the year AD 1620 while the outermost ring was AD 1668 (Figure 5).

In our first analysis using COFECHA, we crossdated the pine sample measurements against the Lake Louise tree-ring chronology using 35-year long segments lagged by 5 years. This analysis returned a dating adjustment of +1619 to be added to the first ring on the majority of all segments tested for the three segments (Table 2). In the second analysis, we crossdated the three pine measurement series as complete series against the Lake Louise reference chronology. This analysis also returned a systematic dating adjustment of +1619 to all measurements in the three series. The correlation for series 8SJ31-2741A was 0.49, statistically significant at the 0.001 level. The correlations for series 8SJ31-2741B and C were 0.48 and 0.53, respectively, both statistically significant at the 0.001 level (Table 3). The third analysis tested a floating RESIDUAL chronology created using ARSTAN (Cook 1985) from the three pine measurement series against the Lake Louise anchored RESIDUAL chronology. This analysis returned a dating adjustment of +1619 with a correlation of 0.53, which is statistically significant at the 0.001 level (Table 4). The results

Table 2. COFECHA output showing the five best dating adjustments ("Add") based on the five highest correlation coefficients ("Corr #") for pine sample 8SJ31-2741 against the Lake Louise master chronology in 35-yr long segments (5-yr lag). The dating adjustment "+1619" (in bold) shows consistently for all segments on all three series.

Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127A	1	35	1629	.58	**1619**	**.48**	1439	.43	1723	.42	1684	.41
8SJ3127A	6	40	1629	.58	**1619**	**.48**	1562	.41	1684	.40	1723	.39
8SJ3127A	11	45	**1619**	**.54**	1744	.52	1517	.44	1451	.43	1593	.40
8SJ3127A	13	47	**1619**	**.56**	1744	.47	1517	.47	1658	.44	1593	.41
	Add No R_av			**Add No R_av**			Add No R_av			Add No R_av		
	+1593 4 .39			**+1619 4 .51**			+1451 3 .39			+1744 3 .46		
Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127B	1	35	1744	.50	**1619**	**.49**	1492	.47	1629	.43	1638	.43
8SJ3127B	6	40	**1619**	**.51**	1492	.47	1570	.46	1629	.42	1562	.40
8SJ3127B	11	45	**1619**	**.54**	1451	.45	1732	.38	1658	.37	1547	.37
8SJ3127B	15	49	**1619**	**.55**	1681	.42	1686	.41	1658	.40	1732	.40
	Add No R_av			Add No R_av			Add No R_av			Add No R_av		
	+1619 4 .52			+1745 4 .36			+1593 3 .35			+1596 3 .35		
Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127C	1	35	**1619**	**.54**	1593	.52	1424	.48	1684	.44	1724	.44
8SJ3127C	6	40	**1619**	**.54**	1593	.53	1562	.47	1424	.46	1492	.44
8SJ3127C	11	45	**1619**	**.57**	1732	.49	1593	.46	1448	.38	1744	.38
	Add No R_av			Add No R_av			Add No R_av			**Add No R_av**		
	+1424 3 .42			+1562 3 .39			+1593 3 .50			**+1619 3 .55**		

from all three analyses, along with the results from the list method and skeleton plot, anchor the tree rings for pine sample 8SJ31-2741 from AD 1620 to 1668 (Figure 5). Because the sample did not contain bark, the outermost date is not a cutting date for the post.

Our attempts to date the two cypress measurement series from sample 8SJ31-2766 against the Altamaha River reference chronology were unsuccessful. None of the shorter segments tested from the 69-year long series correlated significantly. We observed that the rings on the cypress sample displayed double bands of latewood that often wedged into a single band of latewood. This characteristic means that the ring widths are not concentric around the entire circumference of the sample in that particular year. Circuit uniformity is a necessary prerequisite for successful crossdating (Fritts 1976; Speer 2010). The lack of circuit uniformity means that the ring widths vary even between nearby radii on the cross-section. We observed no statistically

Table 3. COFECHA output showing the five best dating adjustments ("Add") based on the five highest correlation coefficients ("Corr #") for pine sample 8SJ31-2741 against the Lake Louise master chronology, this time using the entire length of each series. The dating adjustment "+1619" (in bold) shows consistently for all three series.

Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127A	1	47	1629	.56	**1619**	**.49**	1734	.34	1593	.33	1439	.32
Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127B	1	49	**1619**	**.48**	1596	.33	1686	.32	1745	.32	1696	.31
Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
8SJ3127C	1	45	**1619**	**.53**	1593	.42	1424	.41	1562	.38	1682	.37

Table 4. COFECHA output showing the dating of the RESIDUAL chronology created from pine sample 8SJ31-2741 against the Lake Louise RESIDUAL master chronology. The dating adjustment "+1619" suggests a strong match.

Series	Counted	Segment	Add	Corr # 1	Add	Corr # 2	Add	Corr # 3	Add	Corr # 4	Add	Corr # 5
FOY	1	49	**1619**	**.53**	1593	.40	1682	.35	1696	.34	1836	.34

significant correlation between the two measurement series from the cypress cross-section. Our inability to date this sample was unfortunate because bark was present on this post, which would have provided a cutting date.

DISCUSSION

The dates for sample 8SJ31-2741 (AD 1620–1668) place its cutting and deposition squarely within the Mission Period (AD 1565–1702) occupation. The artifact materials associated with the posthole into which the post was placed included no European items but were exclusively local indigenous St. Johns pottery (*ca.* AD 800-*ca.* 1700), which gives no specific clue to the date of deposition. The posthole did not conform to any evident structural pattern, but it did intrude into a feature that is currently thought to be a log sleeper sill support (a pad on which the large bottom "sill" log is placed) for a large mid-16th Century building. The dendrochronological date for the post, combined with the stratigraphically intrusive position of the posthole, suggest that the building represented by the sleeper sill was destroyed before the 17th Century. This strengthens the hypothesis that the log-sill structure was associated with the Menéndez era.

The dendrochronological date for post sample 8SJ31-2741 furthermore verifies that the Nombre de Dios mission village was still active and building after 1668 and possibly later. In 1654, a smallpox epidemic was reported to have virtually wiped out the population of Nombre de Dios (Hann, 1996: 154–157; Worth, 1995: 50–51), and it had been assumed that the mission settlement relocated after that date. The dendrochronological date recovered from sample 8SJ31-2741 suggests that village occupation continued at the Fountain of Youth Park site into the late 17th Century.

Finally, the dendrochronological date for sample 8SJ31-2741 has implications for strictly archaeological interpretation at the site. The posthole in which the dated pine post was emplaced did not contain any associated European material, whereas the feature containing the undated cypress post contained obvious European materials such as iron and an olive jar. The depth at which the two features became apparent is also quite different (Table 5). The Mission Period pine posthole appeared at 21 cm higher in the ground than the cypress posthole, and its base was 25 cm higher than the base of the cypress post. The different elevations, as well as the different wood varieties, suggest two distinct building episodes.

In stratigraphic terms, the undated cypress post should be earlier than the pine post, despite the fact that it contains post-1565 European material, and the pine post does not. However, because the upper layers of soils in this part of the

Table 5. Provenience information for the two features from which the posts were extracted.

Field designation	Catalogue Number	Wood Type	Top Elevation of Feature	Base Elevation of Post[1]	Associated Material[2]
Feature 105	8SJ31-2741	Pine	1.96 mbd 0.94 mmsl	2.40 mbd 0.5 mmsl	2 indigenous pottery sherds; 421 gr shell; 10 gr charcoal
Posthole 18B5-U3	8SJ31-2766	Cypress	2.17 mbd 0.73 mmsl	2.65 mbd 0.25 mmsl	5 indigenous pottery sherds; 1 Spanish olive jar sherd; 3 gr iron

[1] mbd = meters below datum plane; mmsl = meters above mean sea level of 1976.

[2] gr = grams.

site were significantly disturbed, assignment of relative depositional sequences based solely on stratigraphic position were considered only tentative, particularly when the artifact contents of the deposits were different. The dendrochronological results in this case confirmed the stratigraphic interpretation, suggesting that disturbance in this part of the site was perhaps not as disruptive to the soils as originally assumed.

CONCLUSIONS

The dating of this one pine sample represents one of the first absolute datings of any timber extracted from a Spanish-era settlement in the eastern United States. This successful dating demonstrates that dendrochronological dating of wood as early as the 17th Century from archaeological sites along the east coast is possible. We recommend that additional wood samples excavated from archaeological sites in the eastern US that are well preserved and contain an adequate number of tree rings routinely be sent for dendrochronological dating at an established tree-ring laboratory in the eastern US.

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