‘Treasures. . . of black wood, brilliantly polished’: five examples of Taíno sculpture from the tenth–sixteenth century Caribbean

Joanna Ostapkowicz[1], Alex Wiedenhoeft[2], Christopher Bronk Ramsey[3], Erika Ribechini[4], Samuel Wilson[5], Fiona Brock[3] & Tom Higham[3]

Five wooden sculptures from the pre-contact Caribbean, long held in museum collections, are here dated and given a context for the first time. The examples studied were made from dense Guaiacum *wood, carved, polished and inlaid with shell fastened with resin. Dating the heartwood, sapwood and resins takes key examples of ‘Classic’ Taíno art back to the tenth century AD, and suggests that some objects were treasured and refurbished over centuries. The authors discuss the symbolic properties of the wood and the long-lived biographies of some iconic sculptures.*

Keywords: Caribbean, Taíno, wood, sculpture, tenth–sixteenth centuries AD

Introduction: Taíno wooden sculpture

Taíno carvings were among the first visual art forms from the New World to reach the shores of the Old after 1492: from ceremonial *duhos* (chairs) and sculptures to masks and belts

[1] *World Museum Liverpool, William Brown Street, Liverpool, L3 8EN, UK (Email: Joanna.Ostapkowicz@liverpoolmuseums.org.uk)*
[2] *Center for Wood Anatomy Research, USDA, Forest Service, Forest Products Laboratory, 1 Gifford Pinchot Drive, Madison, WI 53726-2398, USA*
[3] *Research Laboratory for Archaeology and the History of Art, University of Oxford, Dyson Perrins Building, South Parks Road, Oxford OX1 3QY, UK*
[4] *Dipartimento di Chimica e Chimica Industriale, Universita di Pisa, Via Risorgimento 35, Pisa 56126, Italy*
[5] *Department of Anthropology, University of Texas, Austin, TX 78712, USA*

Received: 29 September 2010; Accepted: 17 November 2010; Revised: 7 December 2010

Figure 1. At the time of European contact, Taíno communities occupied much of the Caribbean's Greater Antillean islands: Hispaniola (present day Haiti and Dominican Republic) was the heartland, and the likely source of the five carvings here discussed, two of which have specific provenances as shown.

of '*admirable artistry. . . and other things never before seen or heard of in Spain*' (Las Casas in Parry & Keith 1984: 66). Wood was the main component of many of these objects, whether hidden or featured: it could form the framework of a mask, the foundation around which cotton was woven to create the central figure on a belt, or quite simply — and most significantly — as the lustrous surface *par excellence* of indigenous 'treasures'. For the Taíno, wrote the contemporary historian Martyr D'Anghera (1530 [1970]: 125), '*treasure did not consist of gold, silver or pearls, but of utensils necessary to the different requirements of life, such as seats, platters. . .and plates made of black wood, brilliantly polished; they display great art in the manufacture of. . . these articles*'. A study of this versatile material, used for everything from house posts to feast platters, can offer insights into indigenous concepts of value, aesthetics and belief (Helms 1986; Saunders & Gray 1996).

Taíno, derivative of nitaíno, meaning 'good' or 'noble' has become a convenient term to refer to the people inhabiting the Hispaniola (Haiti/Dominican Republic), Puerto Rico, Jamaica, Cuba, the Bahamas and the Turks and Caicos islands (TCI) at the time of European contact (Figure 1). The name, however, masks the cultural complexity and diversity that was present in the region at this time, and should be viewed more as a '*spectrum or mosaic of social groups with diverse expressions of Taínoness*' (Oliver 2009: 27–8). As Peterson *et al.* (2004: 19) note, Taíno is a '*supra-cultural entity at a level well above an individual culture. . .*

[and] *refers to a widespread Antillean set of cultural practice and norms shared by several or more localized cultures in the Greater Antilles and beyond*.'

The ancestral roots of the Taíno can be traced back in the archaeological record to a sequence of rapid migrations by horticulturalists travelling up from the South American mainland through the Lesser Antilles to finally settle in Puerto Rico and Hispaniola by about 400 BC. Their descendants prospered, interacting with local inhabitants who had occupied the Greater Antilles for centuries, and both ancestries contributed to the culture most archaeologists refer to as the Taíno (Wilson 2007: 138). Populations expanded quickly and people began to explore and settle other islands, reaching Cuba, Jamaica and the Bahamas by about AD 600 (Wilson 2007: 102–110). The following centuries until the invasion of European powers saw the expansion of settlements, the construction of monumental ball courts, escalating socio-political complexity as *caciques* (chiefs) rose to power and, concomitantly, an artistic florescence.

By the time of Columbus' arrival in 1492, wooden sculpture is documented as being central to religious and social practices, taking a wide variety of forms, including *cemís* (depictions of spirits, deities or ancestors), canopied stands which held hallucinogenic snuff during ceremonies, and *duhos* reserved for the use of *caciques* and other elites during important ritual and social occasions. The Spanish described these pieces in their accounts, and sent examples back to Europe — others were preserved in caves for centuries: some 300 have survived in museum and select private collections (Ostapkowicz 1998). Some of these have become seminal examples of Taíno artistry, the highlight of museum displays and catalogues.

But despite such prominence, little is understood about the stylistic range of Taíno wooden sculpture, its regional and temporal variation or use within the complex chiefdom-level societies that produced them. The reliance on the same key pieces in exhibit catalogues and displays has in many ways rendered static our perceptions of Taíno carving, overshadowing the wide diversity of styles known from the region and instilling an impression of greater stylistic unity than actually exists. There is also an unexamined assumption that all complex wooden sculpture falls within the final century prior to European contact — yet prior to this project no major pieces were subjected to radiocarbon dating and this attribution appears to rely on a perceived late fifteenth/early sixteenth-century style based on *cronista* accounts. This, coupled with the perennial problem of poor documentation for many of the sculptures, with uncertainties over their provenance and subsequent histories, has in many ways limited our knowledge. The research introduced here presents the first detailed, multidisciplinary study of the woodworking industries of the pre-contact Caribbean, with the aim of placing this artistic heritage within a firm historical framework. It announces the work of a wider project, supported by the Getty Foundation and British Academy, which has brought together 66 wooden sculptures, selected on the basis of their historical significance, wide-ranging distribution (both Greater and Lesser Antilles) and stylistic attributes. The present paper focuses on five key carvings, illustrated in Figures 2–6, in order of their radiocarbon chronologies. These artefacts cut across the main catagories of Taíno carving — *cemís*, feast platters, *duhos*, reliquaries and *cohoba* stands. Each has undergone AMS radiocarbon dating and wood identification, as well as resin analysis (where applicable) while three have also been 3D laser scanned (Figure 7). The results offer the potential of

Figure 2. Cohoba *stand,* Guaiacum *sp., shell, AD 974–1020 (modelled dates), Dominican Republic/Haiti (?). H: 665mm; W: 220mm (max); D: 230mm. The Metropolitan Museum of Art, The Michael C. Rockefeller Memorial Collection, Bequest of Nelson A. Rockefeller, 1979 (1979.206.380).*

stepping beyond perceived aesthetics, to more concretely engage the aspects of their creation — from raw material to final product. Detailed overviews, from dating to wood and resin identification to charting the individual histories of each artefact and highlighting their placement in local chronologies, are in preparation.

Provenance

The majority of pieces under discussion entered museum collections — or were first inventoried — in the nineteenth century. The earliest documented is the Florence feast platter (Figure 6) which first came to light in the 1820 inventory of the city's Regio Museo di Storia Naturale (Ciruzzi 1983: 161). The Musée Barrois reliquary (Figure 3) was in the museum's collections by 1850. For the most part, these carvings — like the *cohoba* stand acquired by the Metropolitan Museum of Art (MMA) in 1979 (Figure 2) — were circulating in private hands prior to their deposit in museum collections: Edna Dakeyne, who sold the *cohoba* stand to Nelson Rockefeller in 1955, originally acquired it through an auction in Ireland sometime in the mid 1930s (Metropolitan Museum of Art Collection Database, Provenance) — its collection history is undoubtedly deeper still. The circulation of these objects, perhaps over centuries, has resulted in the loss of associated source information; they are tentatively attributed to Hispaniola based on their stylistic conventions.

The Kelsey *duho* (Figure 5) and Loma de Polo *cemí* (Figure 4) have provenance linking them to the north and south coasts of the Dominican Republic, respectively. The *cemí*

Figure 3. Reliquary, Guaiacum *sp., AD 1052–1176 (modelled dates), Dominican Republic/Haiti (?). H: 460mm; W: 249mm (max); D: 250mm. Courtesy of Musée Barrois, Bar-le-Duc, France, 850.20.38.*

was recovered from 'Loma de Polo' (possibly Loma Pie de Palo), near Barahona, southern Dominican Republic in 1916 by Theodoor de Booy, who was working on behalf of the newly established Museum of the American Indian. The Kelsey *duho*'s provenance is somewhat more tenuous: it was acquired from a merchant in San Felipe de Puerto Plata, which suggests it may have been found locally. Named after the collector Albert Warren Kelsey, whose name is boldly inscribed on the *duho*'s upper surface, it entered the Missouri Historical Society collection in 1878. A stylistically similar *duho*, now in the British Museum collections, was found in the neighbouring area of La Isabella, 48km from Puerto Plata, and may lend tentative support to the northern provenance of this unusual *duho*/platter style.

Woods employed

All 66 pieces in the study were identified to genus, revealing a range of wood choices: *Cordia* sp., *Carapa* sp., *Swietenia* sp., *Clusia* sp., *Andira,* sp., and *Petitia* cf. *dominguensis*. But it is *Guaiacum* sp. that clearly dominated the results, with nearly three-quarters of the sculptures identified to this genus, including all the pieces discussed in this paper. *Guaiacum* is among the world's hardest woods, heavy and very difficult to carve, even with today's metal tools (Ostapkowicz 1998). Its distinctive, interlocked grain can be worked to a smooth and uniform texture, taking on a high polish. The high concentration of extractive chemicals in the dark green to black heartwood makes the wood highly resistant to decay (Brush 1938: 9). It is this combination of features, among others, that make the wood one of such exceptional quality, creating a high demand for it since its first introduction to European markets *c.* 1508 (Record & Mell 1924: 315) and resulting in its near extinction in recent years (Convention for the International Trade in Endangered Species: Appendix II).

Guaiacum sanctum and *G. officinale*, of particular interest here, have a natural distribution within the islands of the Greater Antilles and Bahamas/TCI, and thrive in hot, dry environments, preferring to take root in shallow, limestone-rich soils and low-lying but

Figure 4. Cemí, Guaiacum *sp., AD 1031–1299 (wood and resin dates), Loma de Polo (possibly Loma Pie de Palo) near Barahona, Dominican Republic. H: 192mm; W: 65mm (max); D: 56mm. Courtesy of the National Museum of the American Indian, Smithsonian Institution, Washington, 058307.*

well-drained areas (dry coastal or limestone forests) (Brush 1938: 3; Picó 1974: 184). Other than in horticultural contexts, the trees now mostly appear in small, scattered natural groves and, due to over logging, are restricted to fairly inaccessible regions — but it is likely that their distribution was more extensive during pre-contact times. They are considered slow growers, achieving a maximum height of around 10m, but beyond this comparatively little is known about their growth rate. For example, a plot of *G. officinale* growing in shallow soil over limestone in Puerto Rico, with an average annual precipitation of 750mm, measured 90mm in diameter after 49 years of growth, while another plot, in the same area, grew to a 130mm diameter after 41 years (Francis 1993: 2): undoubtedly, microclimatic variables influenced these growth rates. Two of the five artefacts — the *cohoba* stand and reliquary — were carved from boles or branches roughly 310–330mm in diameter (inclusive of 80mm sapwood estimates), suggesting that artisans had access to substantial trees, presumably near to their villages. There is also the possibility that the timber or final products were traded, as may have been the case with Anacaona's storehouses in the Xaraguá cacicazgo (Las Casas 1951: 1.447), which overflowed with wooden artefacts likely acquired from various sources.

Figure 5. Kelsey duho, Guaiacum *sp., AD 1298–1433 (wood and resin dates), Puerto Plata region (?), Dominincan Republic. L: 605mm; W: 205mm (max); H: 168mm. Courtesy of the Saint Louis Art Museum, Friends Fund and Primitive Art Society Fund in honor of Morton D. May, 168:1981.*

Carving techniques

The choice of raw material had direct impact not only on the quality and final appearance of the sculptures but, critically, on the labour involved in creating them. Each carving stage was likely based on the series of decisions focused on the most efficient means of manipulating the material in order to achieve the desired end. Given the difficulty of working *Guaiacum*, it is probable that the bole selected was only marginally larger than the final size of the carving to minimise labour investment. Indeed, several sculptures incorporate sapwood,

Figure 6. Florence platter, Guaiacum *sp., AD 1445–1523 (69.5% probability), Dominican Republic/Haiti (?). L: 506mm; W: 222mm (max); D: 63mm. Courtesy of the Museum of Natural History, Section of Anthropology and Ethnology, Florence, Italy, 308.*

suggesting either the carvers felt that it was unnecessary to remove this from the carving, or they wanted to include it specifically as a contrast to the dark heartwood. The latter may be a factor for some of the pieces discussed here: for example, sapwood features prominently in the Florence platter (Figure 6) — its location at the base perhaps evoking a bowl half filled with amber liquid. The strategic location of the sapwood in the genital region of the Kelsey *duho* (Figure 5) may have been intended to visually highlight this area of the reclining transformative figure.

Working such a dense wood required a versatile toolkit that demanded constant upkeep to maintain sharpness. Given the challenges of working *Guaiacum*, and to ensure the efficiency of the stone and shell tools, it is probable that the wood was carved green (fresh), when it was comparatively softer and easier to work, rather than when it dried to iron-like hardness.

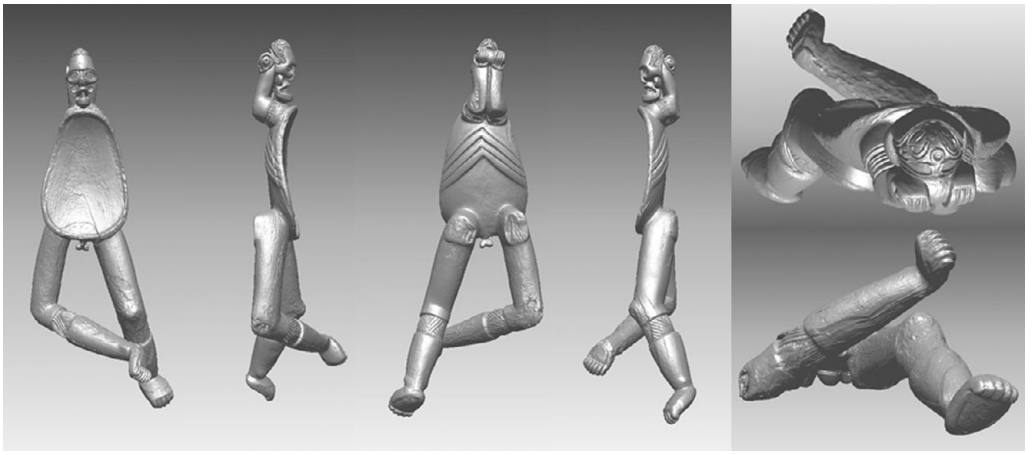

Figure 7. Screenshots of the Kelsey duho *3D computer model (3D laser scanning by Joseph Parsons, National Museums Liverpool). Artefact in the collections of the Saint Louis Museum of Art, Saint Louis, US, 168:1981.*

Some of the carvings in the wider corpus suggest that the wood changed dimension after it was carved, possibly indicating the use of fresh material. Tool marks imprint more readily on the moisture-rich surface of green wood (Sands 1997: 54), and there is a wide range of tool marks evident on the surfaces of many carvings to suggest that they were carved fresh. Perhaps the greatest challenge involved the hollowing of a drum or reliquary — such as the Musée Barrois example (Figure 3): here, dark discolouration on the inner surface, coupled with rough adzing, suggest the use of fire to excavate the interior. Considerable effort would be involved; quite apart from the difficulties of working such a hard wood within so confined a space — which likely required a specific set of smaller tools — the task demanded an intimate understanding of the wood's strengths and weaknesses.

Resins

In some carvings, resins were used to inlay shell or *guanin* (a gold-copper alloy) into the eyes, mouth and earspools of a figure. A small quantity of resin from the Florence platter (7.6mg in size) was extracted for ^{14}C and gas chromatography/mass spectrometry (GC/MS) (Figure 8), the latter to better understand (1) what material was used; and (2) what was being dated (see below). The results revealed the presence of a diterpenoid material from the Pinaceae family: although it was not possible to establish the genus, it was probably *Pinus caribaea*. In contrast, triterpenoid resins from the *Protium* or *Bursera* genus were used for the inlays in the Musée Barrois and the Loma de Polo sculptures (Figures 3 & 4).

Pinus caribaea and certain species of *Protium* and *Bursera* have a long history of use in the Caribbean as adhesives: for example *Bursera* has been used as a '*glue, canoe varnish and as a gum smeared on branches to trap small birds*' (Gibney & White in Nicholls 2006: 17; see also Little & Wadsworth 1964: 236; Timyan 1996: 210) and *Pinus* resins continue to be extracted commercially in Cuba. In neighbouring Mesoamerica, *Bursera* was used by the Maya to adhere pigments such as cinnabar and 'Mayan Blue' to jade and ceramic surfaces (Stross 1997; Arnold *et al.* 2008), while among the Aztecs and Mixtecs, *Pinaceae*, *Bursera*

Figure 8. Florence platter, before (left) and after (right) sampling the top fragment of earflare resin. Courtesy of the Museum of Natural History, Section of Anthropology and Ethnology, Florence, Italy, 308.

and *Protium* resins were used as adhesives for fifteenth–sixteenth-century turquoise mosaics (Stacey *et al.* 2006).

AMS radiocarbon dating

Although there are no firm guidelines for the growth rates of *Guaiacum,* their evergreen nature and the deposition of extractives in the wood suggest that they would be slow to mature: this provides potential challenges to AMS dating. Slow growing woods can be several centuries old at the pith, as opposed to the much younger sapwood, and sampling indiscriminately within the artefact without knowing exactly what is being dated could dramatically skew results and their interpretation. This factor informed our methodology: the small radiocarbon samples, ranging between 10 and 90mg each, were critically targeted. Sapwood, where present, was sampled to provide the date closest to the felling time of the tree, otherwise the carving was oriented relative to its position within the original bole, and the sample extracted from the extreme outer edge to achieve the same goal. Several artefacts were sampled from multiple locations to gain insight into growth rates: from the pith to determine seedling establishment (i.e. the age of the tree), and at selected points to determine the sequence of growth. This approach was further fine-tuned by sampling resin inlays, where present: this provided an indication of the object's final stages of manufacture or its reuse. Together with each piece's terminus wood date, this sequence of dates provided insight into the timescale of artefact production — from harvesting the tree to final inlays. The five artefacts here discussed were selected to highlight some of these methodological issues.

The results (Table 1) indicate that the wooden carvings predominantly cluster around AD 900–1500 (all dates are calibrated, and reported at 95.4% probability, unless otherwise noted). It is clear that large-scale, iconographically complex sculptures were not, as often assumed, produced only in the last centuries before European contact, but have a longer

Table 1. AMS radiocarbon results for the MMA *cohoba* stand, Musée Barrois reliquary, Loma de Polo *cemí*, Kelsey *duho* and Florence platter. The Oxford Radiocarbon Accelerator Unit lab numbers (OxA) are provided alongside the sample site, the dates BP, and calibrations at 95.4% (the most likely dates are highlighted in bold). All dates were calibrated using the IntCal09 dataset (Reimer *et al.* 2009) and OxCal v4.1.6 (Bronk Ramsey 2009).

Title/Provenance	Museum, accession no.	Sample site	Lab no.	Date BP	Error	cal AD (95.4% probability)
MMA *cohoba* stand Hispaniola (?) (Figure 2)	Metropolitan Museum of Art, New York, US; 1979.206.380	L side: 89.9mm from pith	OxA-20626	1165	28	**AD 777–900 (75.9%)** AD 917–965 (19.5%)
		L side: 89.9mm from pith	OxA-21855	1093	24	**AD 891–996 (93.7%)** AD 1006–1012 (1.7%)
		R side: 115.4mm from pith	OxA-20627	1031	27	AD 902–916 (2.9%) **AD 968–1035 (92.5%)**
		Pith	OxA-20675	1107	26	**AD 886–993 (95.4%)**
		Pith	OxA-20676	1144	27	AD 781–790 (2.4%) **AD 808–977 (93%)**
Musée Barrois reliquary Hispaniola (?) (Figure 3)	Musée Barrois, Bar-le-Duc, France; 850.20.38	Outer wood	OxA-19399	927	28	**AD 1026–1170 (95.4%)**
		Inner wood, 25mm from edge	OxA-19398	904	28	**AD 1039–1208 (95.4%)**

Table 1. Continued

Title/Provenance	Museum, accession no.	Sample site	Lab no.	Date BP	Error	cal AD (95.4% probability)
Loma de Polo *cemí* Possibly 'Loma de Polo', Barahona, Dominican Republic (Figure 4)	National Museum of the American Indian, Washington, US; 058307	Outer wood	OxA-19060	936	24	**AD 1031–1157 (95.4%)**
		Resin	OxA-19181	722	24	**AD 1255–1299 (94.0%)** AD 1370–1380 (1.4%)
Kelsey *duho* Puerto Plata (?), Dominican Republic (Figure 5)	Saint Louis Museum of Art, Saint Louis, US; 168:1981	Sapwood	OxA-20840	596	26	**AD 1298–1370 (70.9%)** AD 1380–1410 (24.5%)
		Resin	OxA-20841	543	25	AD 1319–1351 (28.0%) **AD 1390–1433 (67.4%)**
Florence platter Hispaniola (?) (Figure 6)	Museum of Natural History, Section of Anthropology and Ethnology, Florence, Italy; 308	Resin	OxA-18331	383	25	**AD 1445–1523 (69.5%)** AD 1573–1628 (25.9%)

history. Pieces such as the MMA *cohoba* stand (Figure 2), long considered the apogee of Taíno art and attributed to the fifteenth–sixteenth centuries (Newton 1978: 159), reveal that this scale and artistry was present as early as AD 902–1035 (latest of four dates at 95.4% probability). A series of samples was taken from the base of the sculpture to assess the growth rate of the selected tree and to estimate its felling date, and hence time of carving (assuming the wood was carved fresh). Collectively, these AMS dates appear to push the threshold for this accomplished sculpture back by several centuries, from *c*. AD 1400–1500 to AD 1000.

The dates for the equally remarkable Musée Barrois reliquary (Figure 3) indicate that it was likely carved between AD 1026 and AD 1208 (95.4% probability, 2 dates). Two radiocarbon samples were taken from the inner and outer edges of this hollow carving, roughly 25mm apart, to gauge whether it would be possible to fine-tune the tree's growth rate. The two dates overlapped, indicating that within the margin of error ($\pm$28) there is nothing to distinguish between samples taken so close together, at least in this instance — and implying that the selected tree was not as slow growing as originally assumed.

To further investigate the growth rate of *Guaiacum* boles, 16 measurements were obtained from a variety of pieces with multiple dates. A consistent model, in the form of a probability density estimate for the period elapsed for 10mm of growth, was constructed to estimate this growth rate (Figure 9). The results indicate that the growth rate was between 4 and 14 years for 10mm of wood. This information also allows us to tighten up the age estimates for all of the pieces for which there are multiple measurements, including the MMA and Musée Barrois carvings (Figure 10). Modelling the dates for the two sculptures reveals that the MMA *cohoba* stand is likely to be slightly earlier (AD 974–1020) than the Musée Barrois reliquary (AD 1052–1176). The *cohoba* stand's minimum diameter of 220mm represents between 59 and 165 years of growth.

The ^{14}C result on the resin from the Florence platter revealed a date ranging from AD 1445–1628, with the greatest probability of AD 1445–1523 (*c*. 70%). This falls within the last, 'Classic' phase of Taíno carving. Comparative information on radiocarbon dating of resins is not available, but nonetheless we would expect dates obtained from any resin to be within a decade of the use of the fresh resin since they are generated as part of the metabolically active elements of the tree (Tans *et al.* 1978).

The dating of these pieces offers insight into their curation and re-use by subsequent generations. On the one hand, some carvings are consistent with a single phase of manufacture, with overlapping dates for the outer wood (providing a date as close to the felling time as possible) and for the resin used to affix inlay (providing an indication of the last stages of manufacture): such is the case with the Kelsey *duho*, with the determinations suggesting that it was carved and finished with inlay at some point between AD 1298 and AD 1433. On the other hand, there are other carvings that indicate a gap of decades if not centuries between the felling of the tree and the finishing — or perhaps 'refreshing' of the piece through inlay: the Loma de Polo *cemí*, for example, has an outer wood date of AD 1031–1157, and a resin date of AD 1255–1299 (94% probability). Even taking into account a couple of decades of missing sapwood, the two dates suggests that a span of at least 100 years elapsed between the wood being harvested — and likely carved — and the resins added to secure the now missing shell or *guanín* inlay. This

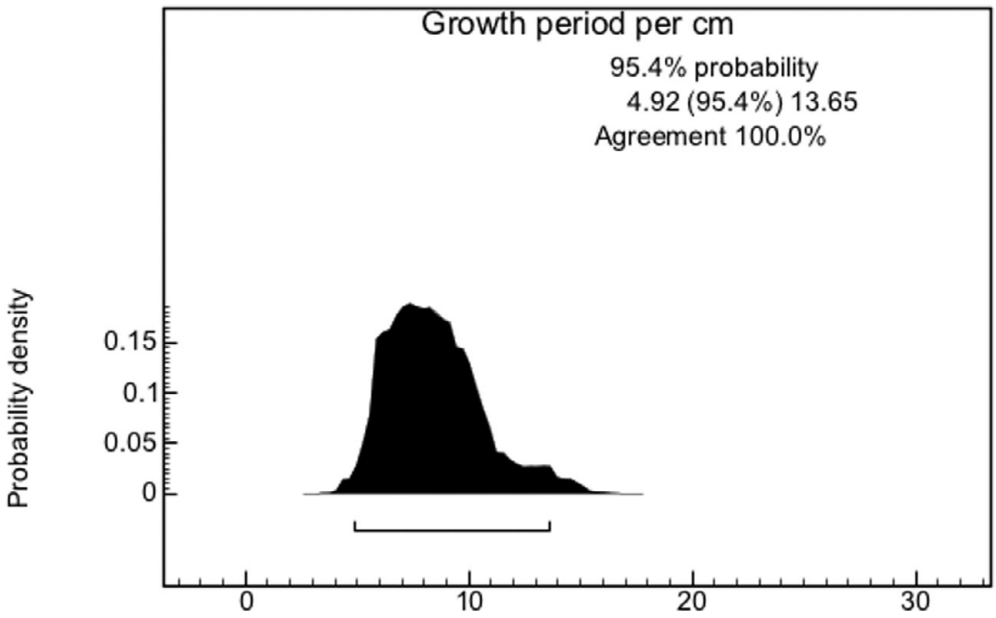

Figure 9. Estimate of the period required for the radial growth of 10mm of wood in the bole of a Guaiacum *sp. tree.*

would imply that the piece may have been refurbished after some four generations of use, the resins refreshed during its long history. This curation element should not be surprising given that these objects were not only labour-intensive to make, but were spiritually significant 'beings', with biographies and reputations accrued over the course of their long 'lives' with their various human trustees (Oliver 2009). Although it is important to acknowledge the possibility of carvers recycling older wood, which may impact on our understanding of these manufacturing sequences, there is evidence to suggest that carvers used unseasoned, freshly harvested wood. If so, the above dates would certainly stand as reasonable indicators for the carving/inlay sequences and, hence, curation over long periods of time.

Discussion

Ongoing research is revealing intriguing insights into the materiality, chronologies and curation of Taíno wooden objects, indicating a longer and more complex history than previously thought. The preliminary results outlined in this paper suggest that wooden sculptures were important aspects of Caribbean chiefdoms as early as AD 1000, undoubtedly reflecting a deeper prehistoric use. The MMA *cohoba* stand and the Musée Barrois reliquary emerged decades, if not centuries, prior to AD 1200, the date long accepted as the start of the 'mature' or 'Classic' period of Taíno art (Rouse 1992: 123). Chiefly accoutrements, in the form of *duhos*, and other complex carvings have long been considered part of this mature phase (Rouse 1992: 123; Curet 1996: 126). Yet these two large-scale sculptures appear to push the date for this period back by some two centuries, to AD 1000: both feature complex iconography painstakingly cut into the dense, interlocked grain of *Guaiacum*, revealing a remarkable level of artistry and skill. Although their provenance is not clear, together with

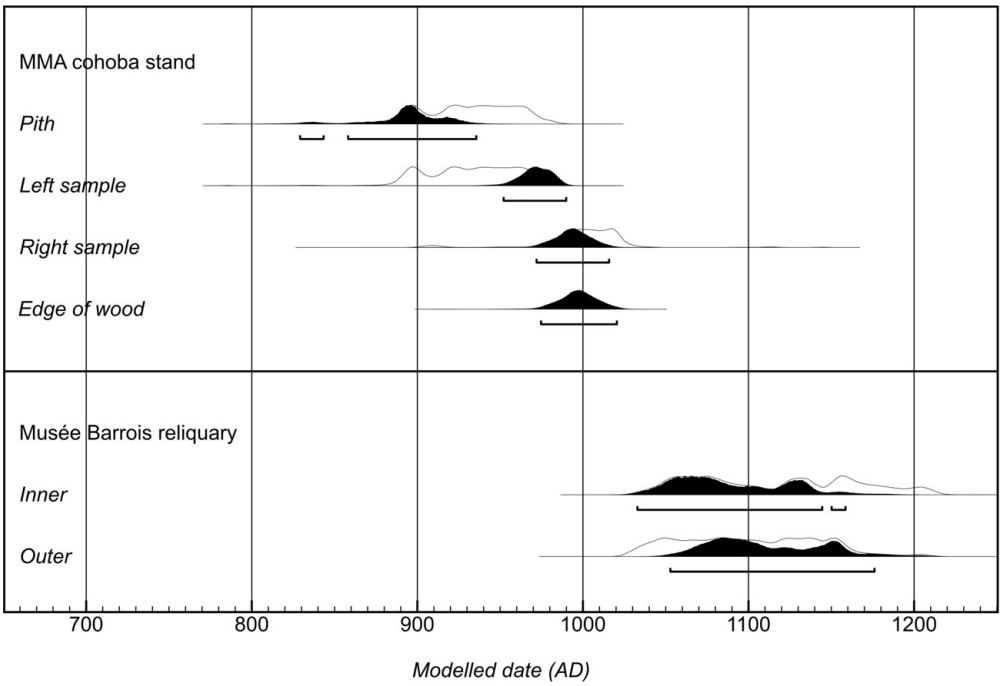

Figure 10. The effect of modelling the growth rate of the wood on the MMA stand, where we have estimated the date of the outer edge of the wood, and the Musée Barrois reliquary, where we have estimated the date of the outer sample. The simple calibrated radiocarbon date distributions are shown in outline and the modelled distributions in black with the corresponding 95.4% probability ranges as brackets below the distributions.

the Florence platter they display stylistic features that would link them to Hispaniola, the source of the other artefacts discussed (Figure 1). From about AD 600, dramatic changes were occurring on Hispaniola: the population expanded and pushed out into areas that had been sparsely inhabited or unpopulated, material culture diversified (e.g. pottery styles changed — Rouse 1992: 109–112), large ceremonial centres emerged and, critically, social ranking began to be distinguished (Wilson 2007; Rouse 1992). It is not surprising, therefore, that as increasingly competitive Taíno chiefdoms were emerging, the calibre of sculpture production was beginning to escalate as well, including pieces that in their scale and drama had impact on the entire community (small sculptures, such as the Loma de Polo *cemí*, which easily fits in the palm of the hand, may have been more personal — but no less potent — items). The presence of these larger-scale carvings, at a time when there is archaeological evidence for the emergence of social hierarchy, would suggest the development of 'art' in the service of leaders vying for power (Curet 1996).

There is evidence that *Guaiacum* was a wood that had value and meaning on many levels. It was a dominant fuel and construction wood in several Caribbean sites stretching from the Saladoid to Ostionoid periods (*c.* 500 BC–AD 1500) (Berman 1992; Newsom 1993: 148; Pearsall 2002: 114, 118, 134; Righter 2002: 301) but was also a source of various cures — as befitting its common title, *lignum vitae,* the 'wood of life'. It is identified in sixteenth-century European treaties as 'the Indian Cure' for syphilis, '*after the people of that lande*

[Hispaniola] *hadde taught. . .that medycine. . .*' (von Hutton 1536: 11; see also de Oviedo 1526 [1959]: 2.9–11). The choice of wood may also have been based on more intangible, esoteric perceptions of the material — from symbolic parallels between potentially auspicious tree qualities to the spiritual embodiment of the material itself. Ramón Pané, the Jeronomite friar who was hosted by both Macorix and Taíno/Arawak speakers in northern Hispaniola between 1494 and 1498, noted that certain trees were specifically selected because they were animated by *cemís* (Arrom 1999: xiv; xxi, 25). These beings — '*nocturnal shadows among the trees*' (Martyr D'Anghera in Arrom 1999: 51) — were far from pliant forces, but rather dictated the way they should be carved, revealing their names only after a *behique* (shaman) had performed the *cohoba* ceremony (involving the ingestion of hallucinogenic drugs). Such nuances of meaning and belief are difficult to access from the material that now remains, although they hint at the overall picture of Taíno understanding of their animated and interactive world — quite literarily, a *living* forest.

As discussed here, there is growing evidence to suggest that some wooden objects were carefully curated and passed down through the generations. This could have been done for any number of reasons, from the piece being seen as imbued with powerful numinous forces to having important histories and names associated with it (Oliver 2009). Resin dates, which complement the wood samples taken from some sculptures, reveal that several objects may have been curated over a significant period of time, having their inlay 'refreshed' periodically. This is the first direct evidence of cross-generational use of Taíno wooden artefacts — which, given their labour-intensive manufacture, alongside the possible belief in their continued spiritual relevance, is only unexpected because of our assumptions about the ephemeral nature of wooden artefacts. It is the care and attention that went into safeguarding these pieces that speak of their long life and high value for Taíno lineages, which themselves spanned many generations.

Conclusion

Rather than remaining isolated artefacts in specialist exhibits and catalogues, bearing only a vague connection to the rest of the archaeological record, these five carvings — and the others that comprise the wider study — can now be used to enrich and expand discussions on the development of Taíno culture and aesthetics. Other aspects of the study are ongoing — such as stable isotope analysis, which aims to help clarify provenance issues by measuring various light isotope 'signatures' in the wood, indicative of the specific island region from which the tree originated. This aims to investigate stylistic variations within and between islands. Further analysis of resins and pigments is also underway. Through these various techniques, and through the detailed radiocarbon study, the histories of these pieces are at long last beginning to emerge.

Acknowledgements

The authors would like to thank the following: the Getty Foundation; the British Academy; National Museums Liverpool; Julie Jones, Heidi King, Ellen Howe and Marjin Manuels, The Metropolitan Museum of Art, New York, US; Mathew Robb, Laura Gorman, Saint Louis Art Museum; Etienne Guibert and staff, Musée Barrois,

Bar-le-Duc, France; Monica Zavattaro, Museum of Natural History, Anthropology and Ethnology section, Florence and Andrea Santacesaria, Opificio delle Pietre Dure di Firenze, Italy; Patricia Nietfeld, Jessica Johnson, Ramiro Matos, José Barreiro, Jorge Estevez, Roberto Borrero and the Taíno Nations who gave their permissions for destructive sampling at the National Museum of the American Indian, Washington, US; Martin Cooper, Joseph Parsons and Annemarie LaPensée of the Conservation Technologies department at National Museums Liverpool, for 3D laser scanning; Rick Schulting and the two anonymous reviewers for their comments on an earlier version of this article.
Unless otherwise noted, all photographs are by Joanna Ostapkowicz.

References

Arnold, D., J.R. Branden, P.R. Williams, G.M. Feinman & J.P. Brown. 2008. The first direct evidence for the production of Maya Blue: rediscovery of a technology. *Antiquity* 82: 151–64.

Arrom, J.J. 1999. *An account of the antiquities of the Indians*. Durham (NC): Duke University Press.

Berman, M.J. 1992. Fuel wood selection and the Lucayan-Taíno landscape: a preliminary view, in W. Hardy Eshbaugh (ed.) *Proceedings of the fourth symposium on the natural history of the Bahamas*: 1–12. San Salvador: Bahamian Field Station, Ltd.

Bronk Ramsey, C. 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* 51(1): 337–60.

Brush, W.D. 1938. *Lignum vitae* (Guaiacum *species*). Washington (DC): Foreign Woods, Forest Service, United States Department of Agriculture.

Ciruzzi, S. 1983. Gli antichi oggetti americani nelle collezioni del Museo Nazionale e Etnologia di Firenze. *Archivo per l'Antropologia e la Etnologia* 113: 151–65.

Curet, A. 1996. Ideology, chiefly power and material culture: an example from the Greater Antilles. *Latin American Antiquity* 7(2): 114–31.

Francis, J.K. 1993. Guaiacum officinale *L. Lignumvitae. Guayacan. Zygophyllacea. Caltrop family*. Washington (DC): USDA Forest Service, International Institute of Tropical Forestry, (SO-ITF-SM; 67).

Helms, M.W. 1986. Art styles and interaction spheres in Central America and the Caribbean: polished black wood in the Greater Antilles. *Journal of Latin American Lore* 12(1): 25–43.

von Hutton, U. 1536. *Of the wood called guaiacum, that healeth the Frenche pockes, and also healeth the goute in the feete, the stoone, the palsey, lepree, dropsy, fallynge euyll, and other diseases in Aedibus*. London: Tho. Bertheleti.

Las Casas, B. 1951. *Historia de las Indias* (Biblioteca Americana 1–3). Mexico City: Fondo de Cultura Economica.

Little, E.L. & F.H. Wadsworth. 1964. *Common trees of Puerto Rico and the Virgin Islands* (Agricultural Handbook 249). Washington (DC): US Department of Agriculture.

Martyr D'anghera, P. 1530 [1970]. *De orbe novo: the eight decades of Peter Martyr D'Anghera*. Translated by Francis August MacNutt. New York: Burt Franklin.

Newsom, L.A. 1993. *Native West Indian plant use.* PhD dissertation, University of Florida. Ann Arbor (MI): University Microfilms.

Newton, D. 1978. *Masterpieces of primitive art: the Nelson A. Rockefeller collection.* New York: Alfred Knopf.

Nicholls, R.W. 2006. *Remarkable big trees in the US Virgin Islands*. St Thomas: University of the Virgin Islands and the Urban and Community Forestry Assistance Program, VI Department of Agriculture.

Oliver, J.R. 2009. *Caciques and cemí idols: the web spun by Taíno rulers between Hispaniola and Puerto Rico*. Tuscaloosa (AL): University of Alabama Press.

Ostapkowicz, J. 1998. Taíno wooden sculpture: rulership and the visual arts in the 12–16th century Caribbean. Unpublished PhD dissertation, University of East Anglia.

de Oviedo, G.F., edited by J. Perez de Tudela Bueso. 1959. *Historia general y natural de las Indias. Volumes 1–5* (Biblioteca de autores españoles 119). Madrid: Ediciones Atlas.

Parry, J.H. & R.G. Keith (ed.). 1984. *New Iberian world: a documentary history of the discovery and settlement of Latin America to the early 17th century*. New York: Times Books.

Pearsall, D.M. 2002. Analysis of charred botanical remains from the Tutu site, in E. Righter (ed.) *The Tutu archaeological village site: a multidisciplinary case study in human adaptation*: 109–134. London: Routledge.

Petersen, J.B., C.L. Hofman & L.A. Curet. 2004. Time and culture: chronology and taxonomy in the eastern Caribbean and the Guianas, in A. Delpuech & C.L. Hofman (ed.) *Late Ceramic Age societies in the eastern Caribbean* (British Archaeological Reports international series 1273): 17–32. Oxford: Archaeopress.

Picó, F. 1974. *The geography of Puerto Rico*. Chicago (IL): Aldine Publishing Company.

Record, S.J. & C.D. Mell. 1924. *Timbers of tropical America*. New Haven (CT): Yale University Press.

Reimer, P.J., M.G.L. Baillie, E. Bard, A. Bayliss, J.W. Beck, P.G. Blackwell, C. Bronk Ramsey, C.E. Buck, G.S. Burr, R.L. Edwards, M. Friedrich, P.M. Grootes, T.P. Guilderson, I. Hajdas, T.J. Heaton, A.G. Hogg, K.A. Hughen, K.F. Kaiser, B. Kromer, F.G. McCormac, S.W. Manning, R.W. Reimer, D.A. Richards, J.R. Southon, S. Talamo, C.S.M. Turney, J. van der Plicht & C.E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0–50,000 years cal BP. *Radiocarbon* 51(4): 1111–50.

Righter, E. (ed.) 2002. *The Tutu archaeological village site: a multidisciplinary case study in human adaptation.* London: Routledge.

Rouse, I. 1992. *The Taínos: rise and decline of the people who greeted Columbus*. New Haven (CT): Yale University Press.

Sands, R. 1997. *Prehistoric woodworking: the analysis and interpretation of Bronze and Iron Age toolmarks*. London: Institute of Archaeology.

Saunders, N.J. & D. Gray. 1996. *Zemís*, trees, and symbolic landscapes: three Taíno carvings from Jamaica. *Antiquity* 70: 801–812.

Stacey, R.J., C.R. Cartwright & C. Mcewan. 2006. Chemical characterization of ancient Mesoamerican 'Copal' resins: preliminary results. *Archaeometry* 48: 323–40.

Stross, B. 1997. Mesoamerican Copal resins, in C. & T. Jones (ed.) *U-Mut Maya 6: reports and readings inspired by the advanced seminars led by Linda Schele and the University of Texas at Austin, 1994–1996*: 177–86. Austin (TX): University of Texas.

Tans, P.P., A.F.M. De Jong & W.G. Mook. 1978. Chemical pretreatment and radial flow of ^{14}C in tree rings. *Nature* 271: 234–5.

Timyan, J. 1996. *Bwa yo: important trees of Haiti*. Washington (DEC): South-Eastern Consortium for International Development.

Wilson, S. 2007. *The archaeology of the Caribbean*. Cambridge: Cambridge University Press.