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Matthews Cascon, L.; Laffoon, J.E.; Berger, M.E.; Françozo M.

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Case study

Shedding light onto early Amerindian objects of the National Museum of Ethnology, Leiden through the use of archaeometric analyses

Leandro M. Cascon*, Jason E. Laffoon, Martin E. Berger, Mariana Françozo

Faculty of Archaeology, Leiden University, Einsteinweg 2, 2333CC, Leiden, the Netherlands

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ABSTRACT

Given the recent attention to questions of ownership and restitution, museums are strongly investing in researching the provenance of their collections, using historical sources that document the context of acquisition and transfer of ownership of specific objects. However, many objects lack documented provenance, especially older collections (pre-1850). The present work is an interdisciplinary effort by archaeologists and anthropologists in applying archaeometric analytical methods on ethnographic Amerindians clubs housed in the Netherlands. In this article, we assess the promises and limitations of using strontium isotope analysis and radiocarbon dating to disentangle the archival knots that formed in museum catalogues since the early 19th century. Concretely, we analyzed five (supposedly) South-American wooden clubs from the collection of the former Dutch Royal Cabinet of Rarities, currently part of the collection of the National Museum of World Cultures in The Netherlands. Our results show that while cataloguing palimpsests can lead to the mislabeling of objects, archaeometric analyses can effectively help to correct these errors.

1. Introduction

The most prominent debate in ethnographic museums today revolves around questions of ownership and restitution [e.g. 1–4]. Broader calls to 'decolonize the museum' have led to scrutiny of how the acquisition of objects was interwoven with museums' historic involvement in the global Colonial project. Consequently, museums are strongly investing in researching the provenance of their collections, using historical sources that document the context of acquisition and transfer of ownership of specific objects.

However, many objects lack documented provenance and associated paper trails. This is especially true for older collections (pre-1850). Retracing the biography of these objects is further complicated by the fact that these often passed through different systems of cataloguing and inventorying, creating palimpsests of documentation that lead to objects being mislabeled and erroneously linked to archival material that actually pertains to different pieces. As a result, in trying to better understand the original context and acquisition history of these pieces, two main issues stand out: 1. We cannot be sure that the original information provided by donors is correct, and 2. Even if this information is correct, it is challenging to confidently link objects in the collections today to original archival documentation, as things may have been mislabeled or misplaced.

In this article, we assess the promises and limitations of using strontium isotope analysis and radiocarbon dating to disentangle the archival knots that formed in museum catalogues since the early 19th century. Concretely, we ask how these techniques can complement or correct archival documentation, as well as the association between objects and archival documents. While this methodology has been tried and tested in historical/archaeology research [e.g. 5,6], it is generally not mobilized in the context of (archival) provenance research looking at ownership, restitution, and Colonial collecting. Nonetheless, these technologies can help test divergent hypotheses based on archival documentation and ethnohistoric sources. In addition, we are interested in determining whether the objects included in this case-study can be confidently tied to Dutch Colonial expansion.

2. Context

2.1. The Dutch Royal Cabinet of Rarities (1816–1883)

For this study, we analyzed five supposedly South American wooden clubs from the collection of the former Dutch Royal Cab-

* Corresponding author.
E-mail addresses: lmcascon@gmail.com (L.M. Cascon), j.e.laffoon@arch.leidenuniv.nl (J.E. Laffoon), m.e.berger@arch.leidenuniv.nl (M.E. Berger), m.de.campos.francozo@arch.leidenuniv.nl (M. Françozo).

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Fig. 1. Clubs selected for study.: a) RV-360–5611 (48.2 cm); b) RV-360–8168 (77.2 cm); c) RV-360–1580 (43 cm) d) RV-360–5782 (73.5 cm); e) RV-360–1582 (95 cm). Measurements and photographs kindly provided by the NMWC.

inet of Rarities (RCR – see Fig. 1 and supplementary material 1). The RCR was founded in 1816, under King William I of The Netherlands, and included collections acquired in the 19th century, as well as earlier collections from the former Dutch stadholders (high executive officials responsible for the administration of provinces in the Dutch Republic). Currently, these pieces are part of the collection of the National Museum of World Cultures (NMWC), to which they were transferred in 1883 [7]. The archival documentation for these objects is notoriously spotty, if present at all. Moreover, cultural attributions based on archival documentation are not necessarily reliable, because a clear inventory of the RCR collections was lacking at the time of transfer. As a result, pieces were (often erroneously) matched to archival descriptions based solely on stylistic criteria. As a result, we cannot readily assume that the pieces currently assigned to certain donors are indeed the original pieces supplied by these individuals.

2.2. Dutch colonial expansion

The Dutch colonial expansion is directly linked to the establishment of the East India Company (or Vereenigde Oost-Indische Compagnie, VOC) in 1602 and the West India Company (WIC) in 1621. While Dutch merchants had been trading with Indigenous and local peoples in the regions of the Guianas, some Caribbean islands, and in northern and northeastern coastal Brazil since the sixteenth century, their continuous presence and ongoing economic exchanges in the region only solidified after the occupation of Pernambuco and its larger surroundings (1630–54) organized by the WIC (Fig. 2). The objectives of the Dutch in South America were twofold: first, to (forcibly) take part in the promising profitable sugar-cane and slave-trade economy established almost a century earlier by the Iberian crowns in the region and, second, to concomitantly wage war against the Spanish Empire, whom they had been fighting since 1584 to obtain their independence, by forcing them to deviate their war efforts from Europe to the New World [8].

The Dutch Colonial occupation of northeastern Brazil was rather short-lived, ending after the sugar-plantation economy revealed itself to be a less quickly lucrative business than first hoped by the WIC, and after the Luso-Brazilian uprising of 1645 effectively drew Dutch forces away. Yet, already in the last decades of the 16th century, they had established trading ports along the rivers Essequibo, Surinam, and Berbice and even built a fort along the river Essequibo in 1616. After the fall of Dutch Brazil and until the late 18th century, the WIC invested in exploring the riches of the regions around Surinam and Berbice, while other Dutch trading societies focused on Essequibo and Demerara [9]. Moreover, from the mid-17th century, the WIC occupied and controlled the Caribbean islands of Sint Maarten, Curaçao, Aruba, and Bonaire, where Dutch colonists settled and became involved in the transatlantic slave-trade and other colonial businesses such as salt mining.

3. Materials and methods

3.1. Selection of artefacts

The RCR collection was selected because of its extraordinary archival palimpsest, including different inventories going back to the 18th century [10]. This collection contains a total of 14 clubs catalogued as coming from South America (Suriname, Guyana or Brazil). Of these, five were selected for this study, based on their current state of archival documentation.

Fig. 2. Geographical areas related to the studied material. Region under 17-th Century Dutch occupation of Brazil on the right of the image, and Guianas region on the top. Map developed by M. van den Bel based on data provided on the website Natural Earth.

Concretely, two clubs (RV-360-1580, RV-360-1582) are supposed to derive from a donation in 1824 by F.A. Kühn, head of the military medical service and hospital in Suriname between 1820 and 1828. This donation included archival information and an inventory of the pieces donated by Kühn. In contrast, the other three pieces (RV-360-5611, RV-360-5782, RV-360-8168) are not associated with any archival material. In 1966 an attempt was made by curators of the museum to 'clean up' the inventory and link pieces present at the time to donations made to the RCR between 1816 and 1883. In this process, RV-360-5611 was linked to a collection of Dayak objects from Indonesia, RV-360-5782 was gathered under 'all kinds of rarities', and RV-360-8168 was determined not to be attributable to any donation or culture [11]. As a result, these pieces represent different levels of archival documentation, allowing the affordances of Sr isotope analysis and radiocarbon dating to be tested in different situations.

3.2. Sampling and analytical procedures

Sampling for both Sr isotope analysis and radiocarbon dating required a minimum amount of 50 mg for each sample, and was done with the assistance of a conservator from the NMVW.

Reducing the possibility of damage to the five selected clubs was of fundamental importance. For this reason, on two occasions it was not possible to collect samples: one for Sr isotope analysis and another for radiocarbon dating. Also relating to curatorial concerns, while it is customary to include taxonomic identification in research on wooden cultural heritage objects, only a limited number of samples could be taken from these objects. As a result, we prioritized the 14c and Sr analysis, as these presented priority objectives for research. Still, we acknowledge the importance of wood identification, also in relation to radiocarbon dating.

Wood samples for strontium ($^{87}Sr/^{86}Sr$) analysis were collected for four of the clubs (RV-360-5611, RV-360-8168, RV-360-5782 and RV-360-1580). Strontium analysis was conducted at the Faculty of Science, Vrije Universiteit Amsterdam. We applied standard protocols for strontium isotope measurements of archaeological plant samples - the details of the analytical procedures can be found in the literature [18]. Briefly, all wood samples were ashed in a muffle furnace, dissolved in nitric acid, and the strontium portion was isolated on ion exchange columns using Sr-specific ether resin. Strontium isotope ratios were measured on a Thermo Scientific Triton Plus mass spectrometer using a static routine and were corrected for mass fractionation to $^{86}Sr/^{88}Sr$ of 0.1194.

Wood samples for radiocarbon dating were collected from RV-360-1580, RV-360-1582, RV-360-5611, and RV-360-8168. We aimed to obtain material from the most recent moments of tree growth, temporally close to the event in which the tree was cut and the object manufactured. Areas of most recent growth were located by identifying growth rings through use of infrared (IR) photography, similar to the methodology presented by Ostapkowicz et al. [12] (Fig. 3).

In addition, three of the pieces in this corpus are decorated with cotton threads (RV-360-5611, RV-360-8168, RV-360-5782).

Fig. 3. (top): Example of area selection for radiocarbon analysis of clubs. Upper extremity of club RV-360–1580, under normal circumstances (left) and using an infrared camera (right). Blue circle indicates sampled area in a place of most-recent growth. Photos: L. M. Cascon. (bottom): Example of how sampling for strontium analysis can be minimally invasive, using already damaged areas. Upper extremity of club RV-360–5782. The drill hole seen on the left was present before sampling, and the drilling seen on the right is conducted within this existing hole Photos: L.M. Cascon, M. Berger.

Table 1
Radiocarbon and Strontium l($^{87}Sr/^{86}Sr$) results. Dates for clubs RV-360–5611, RV-360–8168 and RV-360–5782 were calibrated using the curve proposed for the Northern Hemisphere by Reitmer et al. (19), while dates for clubs RV-360–1580 and RV-360–1582 were calibrated using the curve proposed for the Southern Hemisphere by Hogg et al. (20).

Sample ID	Laboratory Number (Radiocarbon ORAU)	Measured Date BP	$^{13}C/^{12}C$ $^{0}/_{00}$	Calendar Date 2σ calAD	$^{87}Sr/^{86}Sr$ *mean*	$^{87}Sr/^{86}Sr$ *2 SE*
RV-360-5611-wood	OxA-41365	268 ± 17	−25.51	1526–1794	0.717555	0.000007
RV-360-5611-textile	OxA-41366	140 ± 17	−27.06	1674–1943	–	–
RV-300-8168-wood	OxA-41367	236 ± 17	−24.59	1640–1799	0.783829	0.000008
RV-360-8168-textile	OxA-41387	164 ± 18	−23.54	1666–1915	–	–
RV-360-5782-textile	OxA-41388	132 ± 17	−23.40	1680–1940	–	–
RV-360-5782-wood	–	–	–	–	0.712871	0.000007
RV-360-1580A-wood	OxA-41413	237 ± 17	−24.93	1659–1801	0.707870	0.000006
RV-360-1580B-wood	OxA-41414	257 ± 18	−24.52	1645–1800	–	–
RV-360-1582-wood	OxA-41415	370 ± 17	−26.15	1437–1681	–	–

Samples for radiocarbon dating were taken from these strands as well, to ascertain whether these were contemporaneous or added at a later date.

All radiocarbon samples were analyzed at the University of Oxford Radiocarbon Accelerator Unit (ORAU). For details of the chemical pretreatment, target preparation and AMS measurement see Bronk Ramsey et al. [13] and Brock et al. [14].

4. Results and discussion

Overall, the four clubs presented very different strontium isotope ratios (Table 1), indicating that they all came from different places.

Strontium isotope ratios ($^{87}Sr/^{86}Sr$) are privileged markers for investigating geographic origins. Bedrock weathering is commonly the dominant source of strontium to local terrestrial biospheres and, since Sr is incorporated into tissues during the lifespan of animals and plants, strontium isotope composition represents the environment in which these organisms grew and developed [15]. Details of the analytical procedures can be found in the literature [16].

The use of the strontium isotope method in archaeological provenance studies is quite effective for identifying nonlocal individuals and objects and determining if these derived from one or more locations. To date, however, the method has been less effective for assessing actual geographic origins [17,18], in part because

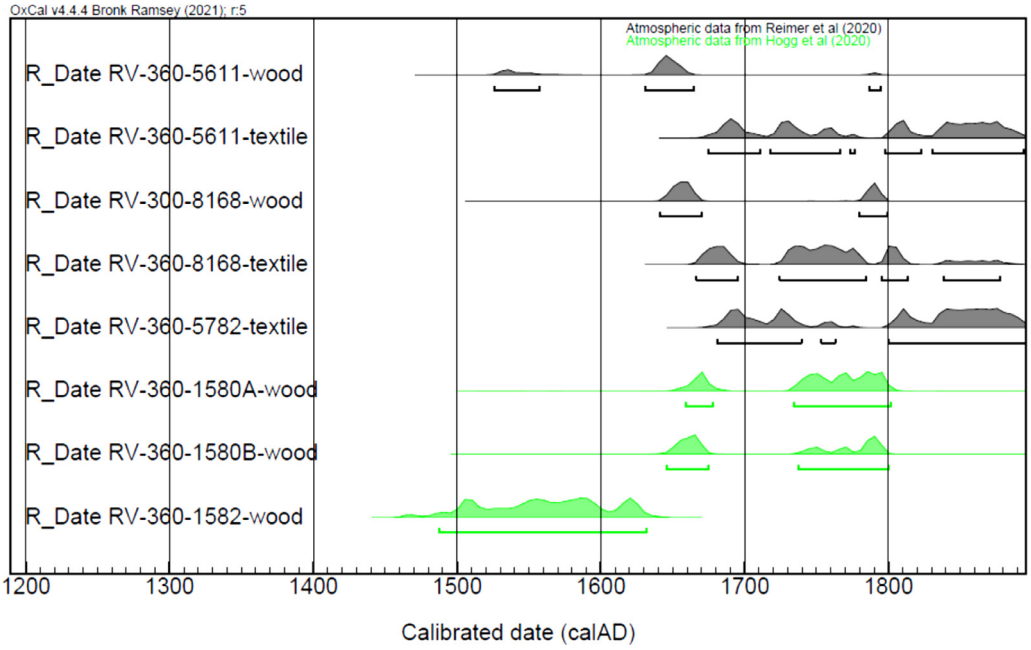

Fig. 4. Radiocarbon results. Dates for clubs RV-360–5611, RV-360–8168 and RV-360–5782 were calibrated using the curve proposed for the Northern Hemisphere by Reitmer et al. (19), while dates for clubs RV-360–1580 and RV-360–1582 were calibrated using the curve proposed for the Southern Hemisphere by Hogg et al. (20).

the spatial variation of (bioavailable) strontium isotope ratios has not been well characterized for most regions of the world. Owing to a lack of relevant, comparative baseline data for our study area, as well as other issues regarding the major contributors of strontium in plant tissues, we can only provide very tentative suggestions concerning the origins of the sampled wooden clubs. In the context of this research, geographic attribution is further complicated by the existence of geological microregions in the Guianas, which further hamper attempts in locating geographic locations.

Regarding radiocarbon dating, dates for clubs RV-360-5611, RV-360-5782 and RV-360-8168 were calibrated using the calibration curve proposed for the Northern Hemisphere by Reitmer et al. [19], while dates for clubs RV-360-1580 and RV-360-1582 were calibrated using the curve proposed for the Southern Hemisphere by Hogg et al. [20]. Such choices were based on the probable region of origin of these clubs, associating related documentation and Sr results. Radiocarbon results for the wooden samples were successful, with a 95.4 % probability (see Table 1. Fig. 4 and supplementary material 2).

Radiocarbon results for the textile samples, however, presented very ample ranges, spanning from the mid-17th century to the 20th century (see Table 1. Fig. 4 and supplementary material 2). This occurred even for cotton samples from two clubs also dated using wooden samples, and which presented dates from the 16th to the 18th century. Therefore, we cannot rule out the possibility that this material was added after the production of these clubs, probably while still in native contexts, given similarities with textiles from other ethnographic material. Recent addition of textile would further explain the imprecise dates obtained, resulting in imprecise or abnormally recent dates.

A possibility also exists that the wide range of dates for the cotton samples can be due to contamination, since the physical characteristics of cotton threads allows their permeating by organic or chemical contaminants difficult to remove during cleaning and preparation of samples prior to dating, as opposed to wooden samples, which density and homogeneity allows proper cleaning. Whether this might be a recurring problem is unclear, as Richardin et al. [21] were able to give convincing dates for cotton threads attached to a club very similar to RV-360-1582.

RV-360-1580

The museum catalogue classifies this piece as ‘Warao’ from ‘Guyana’. Stylistically, however, the shape of this club is anomalous, when comparing it to known examples from the ethnographic, ethnohistoric or archaeological record in the region [12,22-fig.58, 23]. Although there are descriptions in the literature of clubs in possession of Warao men [24:875], historical accounts mention only “paddle-shaped and block-shaped” club-types [24:878]. The classification as ‘Warao’/‘Guyana’ is based on archival documentation that suggests that these clubs were given to the RCR in 1824 by Frederik Kühn (1782–1828). The original inventory for Kühn’s donation lists four clubs, made by the ‘Accorari’ (now known as Akuriyo), ‘Warrou’ (Warao), ‘Arrowouca’ (Arawak), and ‘Caraïben’ (Caribs). Currently, two of these clubs are assigned to the Warao (RV-360-1580, RV-360-1581). Kühn himself only listed one Warao club, which shows that at least one of these clubs was erroneously linked to archival documentation. Furthermore, one of the clubs listed as coming from the Kühn collection (RV-360-1579) is actually an Iroquois ball-headed club, which clearly does not belong to the Kühn collection from Suriname.

The $^{87}Sr/^{86}Sr$ ratio (0.70787) for this club is very low and is similar to that expected for areas with volcanic or older marine limestone formations. Such low strontium isotope ratios are not expected to be widespread in interior continental regions underlain by older geological formations. Since this ratio is also considerably lower than that of modern seawater (~0.7092), it is also not consistent with a two-source mixing model consisting of inputs from continental bedrock weathering and marine-derived strontium. Hence, based on our current understanding of the geology of the region, it is highly unlikely that this piece comes from Guyana or Suriname.

The closest possible location to the Guianas is the Lesser Antilles. However, clubs of this shape are not known from the ethnographic or ethnohistoric record of the Caribbean islands. As a result, the low $^{87}Sr/^{86}Sr$ ratio (0.70787) opens up the possibility that this club is not actually from northern South America or the Caribbean, but rather from an oceanic island in a different region of the world. Interestingly, *ula drisia* clubs from Fiji are stylistically highly similar to RV-360-1580. While sometimes decorated

with a zig-zag pattern on the handle, [25: 209], undecorated examples were more common in Colo, the highlands of Viti Levu [Andrew Mills, personal communication].[1] Analysis of both archaeological human remains and bioavailable strontium has shown that the $^{87}Sr/^{86}Sr$ ratio found for RV-360-1580 is in line with values found in Fiji [26].

The same wood sample for club RV-360-1580 was dated twice, as part of a results check protocol by ORAU. Both dates are very similar and, according to the same laboratory, can be equally considered. One analysis yielded equiprobable range of dates of AD 1659–1801, while the other a range of AD 1645–1800. When considering both measurements, this club was produced between the mid 17th to late 18th century. It is possible that the creation of the object would predate the first contact between native Fijians and Europeans by >100 years. In addition, Fijian clubs were also widespread in Tonga, raising the possibility that this club was collected in Tonga in 1616 by the Dutch during the voyage of Jacob Le Maire and Willem Schouten [Wonu Veys personal communication].

RV-360-1582

Like RV-360-1580, RV-360-1582 is linked in the museum catalogue to the archival records pertaining to the Kühn donation. According to the museum database, this piece would be the 'Carib' club from Kühn's collections. However, like RV-360-1580, this club is stylistically anomalous for the region and quite different from any club known from the Guianas or the Caribbean. In contrast, this club shares many stylistic characteristics with clubs from the Tupinambá people of coastal Brazil. Such clubs were first described by Europeans in the sixteenth century and made their way to Europe as part of the earliest collections of Indigenous artefacts from the Americas [27: 241]. Wooden clubs stylistically similar to RV-360-1582, and attributed to the Tupinambá, can still be found in ethnographic museums in Vienna, Dresden, Berlin, Paris, and Florence [28].

The Dutch occupation of Northeastern Brazil (1630–1654) was marked by attempts to form alliances with Indigenous groups [29,30], in order to obtain intelligence about the territory and the movements of Portuguese troops, as well as for military reinforcements. The exchange of diplomatic gifts with Indigenous leaders was important in negotiating alliances, particularly so during the governorship of Johan Maurits van Nassau-Siegen (1637–1644), resulting in the forming of a collection of curiosities by Johan Maurits [31].

A comprehensive inventory of Johan Maurits' collection has never been found. Historians have relied on contemporaneous descriptions of his house and archival documents to identify pieces in the collection. Recently, Abbing found and published a list compiled by E. Brink of Harderwijk of items belonging to Johan Maurits. The last item in this list reads "Allerlei Brasiliaensche ende ander geweer" [32:111], loosely translated as 'All kinds of Brasilian and other weapons'. While there is no further detailed description of these weapons, based on the prominence of these clubs in Tupinambá culture, it is likely that at least one wooden club was part of Nassau's collection.

Unfortunately, sampling RV-360-1582 was complicated because the club is in extremely good condition and no already damaged area for sampling could be located. Additionally, in contrast to the other objects discussed here, this piece is displayed in the permanent galleries of the museum, further complicating the museum's approval process for destructive sampling. As a result, only one sample of sufficient size could be taken from a small hole that was already present in the handle of the club. This sample was submitted for radiocarbon dating because comparative baseline strontium data for Northeastern Brazil is scarce. In contrast, the historical date range for the Dutch occupation of the region is clear, making dating a useful exercise.

The dated wood sample of club RV-360-1582 yielded range of dates of AD 1437-1681. Considering the mid 15th to mid 17thth century results for this club, the most recent date in this range, coincides with the period of the colony of Dutch Brazil. Hence, the combination of this dating with the clear resemblance of this club with ethnohistoric depictions of Tupinambá clubs and other still extant such clubs, make it probable that RV-360-1582 was collected during the Dutch occupation of Northeastern Brazil (thus, pre-1654).

RV-360-5611

Even though RV-360-5611 is classified as 'Surinamese' in the museum database, archival documentation links this club to a selection of weapons and other ethnographic objects from the Dayak of Indonesia. Why this link was made is not clear, since the only documented gift of Dayak objects made to the RCR did not contain any wooden clubs [7: 271–272]. Stylistically, this club is similar to other clubs known from the Guianas region, and is especially characteristic for those made by the Kari'na (Carib) Indigenous communities, who live along the coastal zone of Suriname and French Guiana. Known also as the macana [33] and as *mossi* or *mushi* (Arawak) and *potu, butu, pyty*, or *aputu* (Carib), this club type has a geographic distribution similar or even wider than paddle-shaped clubs [22:173].

The geology of the Guianas, as well as parts of Venezuela, Colombia, and Brazil, is determined by the underlying Guiana Shield, an old geological formation with variable but generally very radiogenic (high) $^{87}Sr/^{86}Sr$ ratios [34,35]. While this ancient Pre-Cambrian Craton underlies most of the region, it does not stretch all the way to the ocean. A strip of land along the coast of Suriname and eastern Guiana consists of Phanerozoic sedimentary cover, for which significantly lower ratios are to be expected [36]. The $^{87}Sr/^{86}Sr$ ratio of this club (0.717555) does not align with values expected for the inland geology of Suriname, suggesting that this object could indeed have been made from a tree that grew in the coastal zone (which stretches from eastern Venezuela to French Guiana). This would also support a cultural attribution to the Kari'na, whose traditional territories largely overlap with the coastal zone of Suriname. Finally, it is unsurprising that objects from the coastal zone would have been collected during the Colonial period, as this was the primary area concentration of plantations and colonial presence [12].

Considering the dated wood sample, the yielded range of dates for club RV-360-5611 is AD 1526-1794. When considering the very small probability that the late 18th century range is correct, this club was probably produced between the mid 16th and 17th centuries. The proposed dating of this club falls quite a bit earlier than might be expected for an object acquired in the 19th century. In fact, the mid 17th century date range coincides with the first European attempts at colonization of Surinam, under the auspices of the Englishman Francis Willougby around 1650. This date range even predates the Dutch capture of the English colony in Suriname (1667) by a few years. However, considering the lack of any information on the exact provenance of this club, it is not possible to definitively tie RV-360-5611 to these historical events.

RV-360-5782

The inventory card for this object classifies it as 'Northern Brazil'. What this attribution is based on is not entirely clear, as this club is not linked to any archival information. Stylistically, this club is similar to pieces in collections of other museums, where they are classified as 'Macushi' or 'Arecuna', Indigenous peoples

[1] e.g. see nn16386 Horniman museum https://www.horniman.ac.uk/object/nn16386/, or X51030 from the Museums Victoria collections https://collections.museumsvictoria.com.au/items/205374 [both last accessed 13.09.2024].

that indeed live in southern Guyana and northern Brazil.[2] Several other clubs of the same stylistic type are classified as 'Indigenous Surinamese' in the collections of the NMWC. However, the Macushi and Arecuna never lived in Suriname, complicating a cultural attribution for this stylistic type.

The strontium isotope ratio for this club (0.712871) is unlikely to occur on the Guiana Shield. However, as mentioned there is a great number of geological microregions in and around the shield, which complicate attributions. Interestingly, part of the Macushi territory of southern Guyana and northern Brazil is underlain by the Takutu basin, a younger Mesozoïc sedimentary basin, in which values lower than those for the Guiana Shield proper are expected to occur more readily [36,37]. Interestingly, one of the clubs studied by Ostapkowicz et al. [12] has a very similar Sr isotope ratio of 0.712518. Still, these relations remain highly speculative due to local variability and a lack of baseline data.

Unfortunately, sampling for radiocarbon dating of club RV-360-5782 was not possible, as no suitable locations could be found that aligned with the museum's sampling policy. Consequently, samples were taken by drilling into the club and collecting the material that fell out in the process. This did amount to sufficient material for Sr isotope analysis.

RV-360-8168

The digital database of the museum lists this piece as 'Guyana'. Stylistically, this is a paddle-shaped club, one of the four types of "war clubs" found across the Guianas and known to have had a wide geographical distribution [22:171-172].

No archival information for this piece exists. The first ca. 6000 items of the RCR collection were catalogued based on earlier archival documentation. Inventory numbers higher than 6000 were catalogued around 1875, based on the presence of objects around this time without a link to any accession records. It is possible that these undocumented pieces were actually part of earlier acquisitions and may have been mislabeled in the process of inventorying the collections when they were transferred from the RCR to the NMWC.

The $^{87}Sr/^{86}Sr$ ratio for this club (0.783829) is significantly higher than any of the other pieces sampled. Values this high are rare and only expected to be found in areas underlain by bedrock geology comprised of an ancient (Pre-Cambrian) Craton. As mentioned, one such area is the Guiana Shield, which underlies much of the region under study [36]. This finding is relevant, since, as mentioned before, the colonial sphere of influence was centered around the coastal zone of the Guianas and earlier analysis of clubs from this region found Sr ratio values much lower than these [12]. Unlike the other clubs analyzed for this study, RV-360-8168 was made from a tree that would have grown further inland.

The wood sample for club RV-360-8168 yielded date ranges of AD 1640-1799. The mid 17th to late 18th century results for this club point to a date that is significantly earlier than the foundation of the RCR. This time range encompasses the earliest attempts of colonization in Suriname in mid 17th century, but also the late 18th century which directly precedes the presence in Suriname of F.A. Kühn, raising the (highly speculative) possibility that RV-360-8168 may actually be the 'Accorari' club from the Kühn donation in 1824. Suggestions pointing to this are: 1. the high Sr isotope ratio, which suggests a possible inland Guiana Shield origin of this club, 2. The fact that the Accorari (Akuriyo) live in the interior of Suriname and were documented to have lived in the region already in 1664 [38], and 3. the style of RV-360-8168 is unique in the RCR collection and Kühn mentions that Accorari clubs were 'rare' in the early 19th century [39].

[2] For Macushi, see NMAI_209557 and, for Arecuna, see NMAI_209559, at the National Museum of the American Indian, Smithsonian website https://americanindian.si.edu/explore/collections/search.

5. Conclusion

This study tried to determine to what extent radiocarbon dating and strontium isotope analysis can contribute to disentangling archival cataloguing palimpsests in old museum collections. Of the five pieces analyzed, two were linked to archival information, describing their cultural attribution and acquisition by F.A. Kühn in Suriname between 1820 and 1828. Our analysis showed that these objects (RV-360-1580 and RV-360-1582) were most likely mislabeled and that the pieces currently linked through archival material to Kühn do not coincide with the objects listed in Kühn's original inventory of 1824. Moreover, our results suggest that one of these clubs (RV-360-1580) is more likely to come from Oceania than from the Americas. These results are relevant within the context of provenance research on (supposedly) Colonial collections, as this often relies on archival documentation for addressing questions of ownership and restitution. Our results show that cataloguing palimpsests can lead to the mislabeling of objects, but that these can be corrected by using the methodology suggested here.

Our analysis also suggests the possibility that RV-360-8168, a club not linked to the Kühn collections in archival records, might actually be part of the original Kühn donation, reestablishing links between objects and documentation. Similarly, the radiocarbon results for RV-360-1582 show that there is a probable connection between the acquisition of this piece and the Dutch colonial presence in Northeastern Brazil. While no isotope results are available for this piece, the radiocarbon results and the recognizable style makes it probable that this club was made several decades before the Dutch invasion of the region and subsequently came to the Netherlands through the collections of Johan Maurits van Nassau-Siegen. Likewise, radiocarbon dates for RV-360-5611 coincide with the first attempts at colonization of the area of what is now Suriname, in the mid-17th century, and dates for RV-360-8168 might also be related to the same time period or the following century, when Dutch colonial occupation of the area was consolidated.

Another relevant finding of our research is that, despite their 19th century acquisition date by the RCR, the moment of manufacture of these objects predates their entry into the collection by $>$100 years. This is relevant because the overwhelming majority of objects of this type currently in museums was acquired in the 19th century. Based on the assumption that these clubs were created shortly before their acquisition, these objects are normally catalogued as 19th century. However, our research shows that many of these pieces are likely considerably older, pointing to the continued curation and use of these clubs within Indigenous communities and networks for decades, if not centuries. This pattern was also established by Ostapkowicz et al. [12] and seems more widespread than previously thought.

Ultimately, this research aimed to produce a more holistic (though by no means definitive) understanding of the provenance of objects from old, undocumented collections, combining and contrasting knowledge from archival, ethnohistoric, and ethnographic sources with archaeometric techniques. It is our hope that, as $^{87}Sr/^{86}Sr$ analysis for lowland tropical South America progresses, the data presented here will further contribute to the process of elucidating provenance histories of these clubs and other artefacts from the same collecting contexts.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.culher.2024.11.012.

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