A REASSESSMENT OF MARÍA DE LA CRUZ CAVE SITE, PUERTO RICO: THE 2012 EXCAVATIONS

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Abstract

The results of the 2012 excavation at this cave are discussed and compared with those of obtained previously by Alegría. Our study confirms Alegría's stratigraphic sequence. The new date (Cal. AD 20-210) fits well with two others reported previously. The evidence shows that from its inception the Archaic group interacted with nearby Saladoid settlers. The cave had a specialized function: a locus for processing and consuming a limited range of hunted and gathered wild resources during this early phase. The upper strata indicate that by this time (AD400-600>) the Archaic group had vacated the cave and that the activities related only to groups bearing Saladoid and Monserrate ceramics. This late phase is marked by two changes: intensive limestone rock burning and a different funerary practice (random bone scattering). We conclude that the cave was not used as residential locus but as a logistical station for specialized food processing activities. The Archaic probably resided in open sites (yet to be identified), whereas the Saladoid most likely resided in Hacienda Grande and/or Vacía Talega. Although the cave was occasionally a locus of funerary rituals it was not exclusively dedicated to religious ceremonialism.

Resumen

Los resultados de las excavaciones del 2012 en esta cueva se discuten y comparan con los previamente obtenidos por Alegría. Nuestro estudio confirma la secuencia estratigráfica propuesta por Alegría. La nueva fecha (Cal. 20-210 d.C.) concuerda con las dos fechas reportadas anteriormente. La evidencia demuestra que desde el inicio los arcaicos ya interactuaban con saladoides asentados en poblados cercanos. Los estratos superiores indican que en la fase tardía (400-600> d.C.) el grupo Arcaico había abandonado la cueva y que las actividades se relacionan sólo a grupos portadores de cerámica saladoide y Monserrate. La cueva cumplía una función especializada: era un sitio para procesar y consumir una gama limitada de recursos silvestres que cazaban y recolectaban en la zona. La fase tardía muestra dos cambios: la quema intensa de rocas calizas y una práctica mortuoria diferente (dispersión aleatoria de huesos). Concluimos que esta cueva no fue utilizada como un lugar de habitación. Era una estación de logística especializada para procesar alimentos silvestres. Los arcaicos debían de residir en asentamientos a cielo abierto (aun por identificar); los saladoides probablemente residían en Hacienda Grande y/o Vacía Talega. Aunque ocasionalmente fue escenario de ritos fúnebres, ésta no fue un antro exclusivamente ceremonial religioso.

Résumé

Les résultats des fouilles archéologiques effectuées en 2012 dans la grotte Maria de la Cruz sont discutés et comparés avec ceux obtenus précédemment par Alegría. Notre étude confirme la séquence stratigraphique proposée par Alegría. La nouvelle date radiocarbonique (Cal. 20-210 AD) est contemporaine avec les deux dates précédemment rapportées. L'évidence montre que les groupes archaïques avait des relations avec les groupes saladoïdes dans les villages voisins. Les strates supérieures indiquent que, dans la phase tardive (400-660> AD), le groupe archaïque avait quitté la grotte et que les activités ne concerne que aux groupes fabriquant de la céramique saladoïdes et Monserrate. La grotte servait une fonction spécialisée: il était d'un lieu utilisée pour la préparation et consomption d'un nombre limité de ressources collectés et chassés pendant cette ancienne phase. La phase tardive est marquée par deux changements : le brûlage intensif de la roche calcaire, et la pratique des rites mortuaires différentes (la dispersion aléatoire de l'os). Nous concluons que cette grotte n'a pas été utilisée comme lieu d'habitat et qu'il s'agissait plutôt d'un campement spécialisé au traitement et préparation des aliments sauvages. Les groupes archaïques devaient être résider probablement aux sites de plein air (encore à déterminer); les saladoïdes résidant aux sites d'Hacienda Grande et/ou de Vacía Talega. Bien que ce site fût utilisé parfois comme site de rites funéraires, ce ne fut pas dédié exclusivement aux cérémonies religieuses.

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Introduction

In archaeology, iconic sites often shape what we know of cultural periods and assemblages. Given that archaeology is a dynamic discipline, that new techniques are developed, and that novel theoretical perspectives are brought to bear in our quest to amplify our knowledge of the aboriginal past, such iconic sites merit to be reinvestigated. In this synthesis paper we propose to reassess the Cueva María de la Cruz site focusing on micro-artifact analyses as a tool to understand stratigraphy and site formation processes and, on this basis, offer additional insights regarding its past history, its role and significance in the region.

Since any suggested reinterpretation of the past rests upon the empirical data base, this paper is supported by a "Supplement" that can be downloaded (via open internet access) from: http://figshare.com/articles/SUPPLEMENT_A_REASSESSMENT_OF_MAR_A_DE_LA_CRUZ_CAVE_SITE_PUERTO_RICO_THE_2012_EXCAVATIONS/1243318. Throughout this paper we will refer to figures and tables contained in the supplement by prefixing the reference with the letter 'S' (i.e., Figure S1, Table S1, S2, etc.); figures appearing within this paper will bear the usual reference (i.e., Figure 1, etc.).

Site Location and Background

Cueva María de la Cruz (hereafter CMLC) is located near the Grande de Loíza River, within the boundary of the modern town of Loíza (UTM: 20Q 195537mE – 2039766 m N; avg. 4.5 m ASL at entrance). The cave is one of several found in the easternmost extension of the Northern Karst belt, consisting of staggered east-west aligned *mogotes* (conical hills) in the alluvial plain of the Loíza Basin (Supplement: see cover page). It is 1500 m south of the Atlantic beach and almost 510 m west of the well-known site of Hacienda Grande (Rouse and Alegría 1990). The cave was well known to Alegría since it was located within his family's estate of Hacienda Grande. Both sites were first visited by J. Alden Mason (1941:269) in 1914-15, who dismissed them because they were of "little of value to the archaeologist". Mason, however, noted that on the floor of the cave there "is a large shell mound, probably artificial", which sharply contrasts with CMLC's current condition. The cave (Figure 1a) takes its name from its long ago owner and nearby resident, María de La Cruz, about whom legends arose due to her reputation as a *santera*. The cave thus acquired a popular aura of being a 'magic' place and focus of *santería* rites and ceremonies. In the mid-1960s, when Oliver first explored the area as a teenager, the terrain in front of cave was still very much as Rouse and Alegría (1990: Plate 1) photographed it in 1962: remnants of a coconut palm-tree grove and overgrown wild grass patches.

In the 1950s the cave was already being quarried for limestone, evidence that is still visible today on the eastern side. After the Hacienda Grande estate was dissolved the cave's function changed dramatically. From the early 1960s onward Hacienda Grande and CMLC were continuously looted —Hacienda Grande on a massive scale— ending up in the hands of private collectors. By the mid- to late-1970s CMLC was already a massive waste dump that included automobile parts. Afterwards it also became a den of drug-addicts, as our 2012 excavations attested (e.g., syringes, needles, even an old mattress). Around the mid-1980s, the town hall (*alcaldía*) of Loíza cleared the site's rubbish in order to develop a local park and play-ground area around the cave, but as late as 1987 (when Figure 1a was taken), the gates to enter the park were rarely open and thus was underutilized. The problem of garbage and drugs continued until around the middle or late 1990s, when it was completely redeveloped (Figure S3). The clearing activities included heavy machinery (JCB/backhoe) to scoop, scrape and haul-away rubbish from the interior of the cave, with several large rock-falls and some boulders being removed and or displaced and to grade the terrain around and into the northwestern entrance to the cave. Today, the park includes facilities that house Loíza's vibrant cultural center, where our crew learned to dance to the rhythm of the Afro-Puerto Rican *bomba* drums led by the *maestro* Tico Fuentes (Figure S31). This synopsis only serves to underscore the numerous changes in meaning and use that CMLC has had in just recent

history, let alone during the last two millennia of human utilization. All these activities had variously impacted the pre-Columbian deposits. Indeed, conventional wisdom had it that CMLC had nothing left to offer to archaeology. However, Miguel Rodríguez López insisted that CMLC deserved one more chance, especially given the anniversary of the passing away of Ricardo E. Alegría, who will always be linked to the Hacienda Grande and CMLC sites.

The first test excavations at CMLC were performed in 1948 by a young Ricardo Alegría, but it was in 1954 that intensive excavations were undertaken by Alegría and Nicholson (Alegría et al. 1955). The latter resulted in a seminal paper by Alegría et al. (1955) where the cave's data formed the basis to characterize, if not cement, the archetypical 'images' of the Archaic (Coroso) culture of Puerto Rico and its relationships to other such manifestations in the greater Circum-Caribbean region. Since 1954 there have been three other brief archaeological investigations. In 1962, Rouse and Alegría revisited the cave as part of the former's NSF-funded program of radiocarbon dating in the Caribbean. A 1x1m unnumbered test pit (herein designated Test Pit A) was located in the vicinity of N1991-E2015 (Figure 2 top) produced two dates (about which more later). In the late 1990s, Miguel Rodríguez López conducted a series of augers and two 1x1m test pits (Figures 2 bottom; S14) on the eastern side of the cave, resulting in an additional conventional radiocarbon date. Finally, as part of the re-development of CMLC into the community's cultural center, Pepe Ortiz Aguilú (no report left) conducted a systematic series of augers (shovel tests) in the property, but excluded sampling the interior of the cave. It is our understanding that predominantly scattered Elenan ceramics were encountered and that there was no evidence of substantial habitation deposits (Rodríguez López, pers. comm., 2014).

In July 2012, the Centro de Estudios Avanzados de Puerto Rico y el Caribe sponsored a new investigation at CMLC in honor of the late Dr. Ricardo Alegría and, appropriately, this occasion was devoted to train a new cohort of master students in the art of archaeological excavation methods (Figures 1c; S15, S16). The investigation was directed by J. R. Oliver whereas the geoarchaeology component and post-excavation laboratory work was undertaken and supervised by I. Rivera Collazo. The principal objective of this new investigation is to evaluate the extent to which the results and interpretations of the previous excavations are supported by the new data and, thus, draw broader conclusions on the Archaic (or Pre-Arawak) of Puerto Rico.

Some Notes on the Concept of 'Archaic'

For a couple of decades, if not more, the conventional definition of the Archaic period and the Coroso culture that emerged from both Alegría's work at CMLC and the other Coroso-related sites identified in 1937-38 by Rouse (Rouse 1951:355-357; Rouse and Alegría 1990:24) has been amply discussed and sharply criticized. There is neither glory nor gain in indulging yet in another round of critique of the Caribbean's 'Archaic' construct under the reign of the normative culture-historic approach. This is water under the bridge.

Detailed critiques and substantive conceptual re-definitions currently attached to the notion of Archaic or, as our colleague Reniel Rodríguez prefers, the Pre-Arawak have been both widely published and accepted by now (e.g., Keegan 1994; Rodríguez Ramos 2008, 2014; Oliver 2008:11-18; Rivera Collazo 2011a, 2011b). The current characteristics of the Archaic on Puerto Rico includes, among others: (1) a display of greater variation in life-ways and food procurement/production strategies, including plant domestication, cultivation and of sedentarism/mobility; (2) an early and independent development of pottery technology among some though not all groups; (3) new understandings of the significance of personal adornments and other objects laden with ideological and/or religious symbolism, such as a proto-type of the three pointed objects (*cemí*) that became central to the exercise of both shamanistic authority and political power in the centuries to follow; (4) a deeper chronology that begins around 5000/5500 BP from sites such as Angostura and Laguna Tortuguero (Vega Alta), as well as Cueva Clara

(Arecibo); (5) a long period of co-existence (ca. 400 BC to ca. AD 400 or later) between late Archaic societies and groups displaying Huecoid and Saladoid material cultures with the concomitant differing webs of social interaction and materials' exchanges among these three 'populations'; finally, (6) the Archaic diversity of insular cultural (and social) manifestations owes much to a sustained network of interactions and exchanges encompassing a variety of routes (vectors) throughout the Circum-Caribbean, and not just all sourced to Belize or Trinidad-Venezuela (Burney et al. 1994; Rivera Collazo 2011a; Oliver 2009:11-18; Rodríguez Ramos et al. 2013, and this volume).

Archaic sites in Puerto Rico are found in caves and in the open, along the coastal margin and plains and also in the interior Karst mountain regions of island, such as Cueva Clara in the Arecibo Valley, El Abono and El Viento caves overlooking the Ciales Valley, and, possibly, Cueva de Los Muertos (SR-1) in Utuado (Ayes 1991; Pagan and Oliver 2008:139-140; Rodríguez Ramos et al. 2013:128; Rodríguez Ramos et al.: this volume). Cueva Clara, for example, has yielded clear-cut evidence that by around cal. 2400 BC (UMG-17566: 4250±25 BP) Archaic groups were already occupying the mountainous interior, and at least by 1455 BC starch residues recovered from lithic implements indicate the processing of both wild and domesticated cultivars (e.g., *Zea mays, Zamia erosa,* and *Ipomoea batata*), and ceramics (Rodríguez Ramos 2014: Tabla 1 & 2). While numerous early sites are situated on the coastal margins and plains (e.g., Angostura and Maruca), as archaeological surveys intensify in the mountainous interior, the chronological gap between the coast and the mountainous interior, as Cueva Clara shows, is narrowing rapidly. In sum, the notion that Archaic sites are principally or exclusively located on the coastal belt is not supported by current data. Further, the idea of caves as assiduous residential (base camps) or as specialized ceremonial/religious loci should neither be assumed nor extrapolated to all caves, whether of Archaic or Ceramic Age. Each case must be substantiated with empirical data.

An Overview of Alegría's Investigations, 1948-1990

The bulk of the excavations conducted by Alegría and Nicholson were concentrated on northwestern entrance of the cave (Figures 2; S5, S6). Based primarily on the stratigraphic profile of Pits 1A/1 (the east wall profile Pit 1A is the mirror image of the west wall of Pit 1), Rouse and Alegría (1990: Fig.5) identified five strata, from top to bottom:

St.-1: A mass of limestone fragments mixed with dark brown sandy soil (ca. 00-50 cm).
St.-2: A dark brown sandy earth (ca.50-110/120 cmBS).
St.-3: A concentration of food remains, especially crab claws, and some charcoal 100-110 cmBS).
St.-4: A 'thick' [meaning dense] ash (110-120 cmBS).
St.-5: sterile subsoil (below 110/120 cmBS).

Strata 3 and 4 were not continuous layers and hence should be regarded as lenses (but will keep the abbreviations St.-3, St.-4). St.-1 included a mixture of historic and Pre-Columbian artefacts; St.-2 was divided into an upper section (ca. 13-50 cmBS) that was interpreted as a Ceramic-Age deposit, whereas the lower portion of this stratum (50> cmBS) was associated with a relatively undisturbed Archaic deposit (Alegría et al. 1955: Fig. 37; Rouse and Alegría 1990: Fig. 21) that included the basal lenses St.-3 and St.-4.[1] The distinction between the Ceramic-age and Archaic-age deposits was entirely based on the vertical distribution of artifact types, since Alegría did not see any visible differences in the sediment matrix comprising St.-2. The presumed shift from a pre- or a-ceramic Archaic to Ceramic Age occupation therefore falls entirely within what —at a coarse glance— appears to be an undifferentiated Stratum 2 of "dark brown earth".

For Rouse and Alegría, the vertical distribution of pottery was *the* key index to differentiate between the upper Ceramic Age strata (St.-1 and upper part of St.-2) and the lower Archaic-age strata (lower part of St.-2 and lenses St.-3 and St.-4). The excavations in the northwestern entrance revealed a low frequency

of ceramic fragments within these strata (Rouse and Alegría 1990:19, Table1). The pottery recovered from the surface to the bottom of level 3 (00-40 cmBS) in Pits 1, D, E, and F were stylistically identified as Hacienda Grande (105 in total), Cuevas (4 in total) and Monserrate (36 in total). The mixture of different ceramic styles and historic artifacts appears to be largely confined to Stratum 1, but extended into the top of Stratum 2. Excluding clay griddle fragments (n=1), a total of 26 sherds from lower levels were all identified as Hacienda Grande style. These were found between level 4 (40 cmBS; St.-2) in Pits 1B and D and levels 8-9 (113 cmBS; St.-2) in Pit D only. However, Alegría and Rouse cautioned that some of the ceramics (and most lithics) excavated in 1948 and 1954 could not be re-located (i.e., these were not included in Rouse and Alegría's [1990] Table 1).

Only in Pit D ceramics of Hacienda Grande style were found below Level 5 and co-residing with what they characterized as a typical Archaic assemblage. The two sherds came from, respectively, levels 8 and 9 (87.5-112.5 cmBS) corresponding to the base of St.-2 and lenses St.-4 and St.-5. In their opinion, these two potsherds were "too few and too deep to have been deposited there by the people who made and used Hacienda Grande-style pottery" and suggested the possibility of crab burrowing or an accidental fall from the surface to account for their presence in an otherwise 'pure' Archaic deposit (Alegría and Rouse 1990:20).

Crucially, however, no radiocarbon dates were available for any of the northwestern entrance excavation pits (Figure 2 bottom). The two radiocarbon dates obtained from Pit A (in 1962) near the southern wall of CMLC are not directly associated with the deposits excavated in the western entrance (Figure 2: top). Samples Y-1235 (1920±120 BP; Cal. 197 BC–AD 383, 2σ) and Y-1234 (1910±100 BP; Cal. 121 BC–AD, 2σ) were associated with, respectively, a hearth-like feature found at 13-25 cmBS and a charcoal concentration or "pocket" within a "gray sand" layer at 50-63 cmBS that presumably resembled St.-2 described for Pits1A/1 (Rouse and Alegría 1990: 17-18; Tables S17, S18). Although Pit A yielded enriched organic sediments, food remains, and charcoal, it was entirely devoid of artifacts; therefore, these dates cannot be linked to any artifact types. Nonetheless, human activities that enriched the sediments on that south and eastern parts of the cave broadly date to a period between 200 BC and AD. 400. Such a broad temporal range is, of course, due to the large standard deviation of the returned radiocarbon ages.

The full results of the two test pits and augers excavated in the late 1990s by M. Rodríguez López have not been published. However, an additional date (Beta-41051: 2220±70 BP) was obtained from the base of Test Pit A (60-80 cmBS) located to the east side of the cave's interior (Figures 2: top; S11). Here the calibrated date (Cal. BC 402-97, 2σ) obtained from the bottom of the unit is statistically earlier than the two from Pit A obtained by Rouse and Alegría (for calibrations, see Table S17).

The food remains were cursorily inspected by Alegría (and Rouse?). The marine shells were identified to the level of family: Venerideae, Strombidae (genus *Lobatus*[2]), Donacidae, Ostriedae, Trochidae, Solenidae and Pectinidae. Manatee, turtle, bird, fish, and *hutía* bones were also present, as were abundant crab claw chitons. Some shells and bones bore the signatures of human-made incidental as well as intentional modification. Several charred seeds obtained from the 1948 excavations were identified as "wild avocado seeds [*Persea Americana*] and fragments of yellow sapote"; two other seed specimens could not be identified (Rouse and Alegría 1990:22-23). Later, charred seed samples from M. Rodriguez López's Test Pit A (bottom aceramic levels) were identified by L. A. Newsom as yellow sapote *(Pouteria campechiana)* and mastic bully *(Sideroxylon sp)* (Newsom and Wing 2004: 120-121, Table 7.1). The specific stratigraphic contexts or associations of all these seeds have not been reported; therefore, caution must prevail in assigning any of them exclusively to an Archaic deposit. The non-ceramic assemblages described by Alegría et al. (1955:116-117) included: "pebble-grinders" (n= 11), hammer stones (n=5), "pebble-choppers" (n=3) and "sharped-edge flakes" (n=6) with no secondary retouching, a

Lobatus spp. (Strombidae) plaque and whorl (n=2) and two cut/modified bones, one identified as a manatee rib (*Trichechus manatus*). In total, 25 lithics, 2 shells, and 2 modified bones comprise the entire non-ceramic assemblage analyzed.

Finally, two human burials and a fragment of a skull, all in poor conditions, were recovered from Pit 1 (Alegría et al. 1955:116; Rouse and Alegría 1990:15). Two (including the skull fragment) were secondary burials found at the "top of the sterile sand" (i.e., top of St.-5); the third one was a primary interment (extended body, face-up position) found ca. 20 cm below the base of the midden deposit (i.e., 130-150 cmBS). They noted that the "skulls appear to be undeformed", which was taken as further evidence of their Archaic rather than Ceramic-age affiliation, when cranial deformation was common. As well, "scattered human bones" were found in the first level (ca. 00-30cmBS, roughly our Strata A and B) during the 1948 campaign, concluding that "the Igneri people [i.e., Saladoid] may have occasionally used the cave for burial purposes; it is even more probable that this striking grotto so near the ceramic site [Hacienda Grande] was the scene of ceremonial activities" (Alegría et al. 1955: 116).

Upon close inspection the logic of the above statement is weak. It can reasonably assumed that most human burials (or disposals) involve some kind of ritual or ceremony, even if it is short-lived, so the questions is why then it would be "even *more probable*" that the cave was used (surprise!) "*for some kind of ceremony*? In any event, the label of "ceremonial" as the salient function of this cave stuck for years to come when, in fact, Alegría et al.'s evidence seems to suggest that a variety of activities were undertaken at different times within CMLC: from food processing and refuse dumping to, indeed, human burial and disposal. To merely claim an unspecified ceremonial role for CMLC is not a particularly illuminating insight. Indeed, questions that would matter in considering 'ceremonial' should ponder, for example: 'Who' had a right to be buried there, a community member, a stranger/outsider, an enemy, or anyone? What were the circumstances of death (violation of taboo, blood vengeance, disease, magic spell)? The answers would determine how and where the deceased was to be disposed, how the burial ceremony was performed, and how frequently commemorative or remembrance ceremonies (ancestor cult?) ought to be carried-out henceforth. Little is known of Saladoid human burials at Hacienda Grande (see Walker 1987), but it seems that primary internments (flexed) were common and contrast with the cave's scatter pattern. If so, there would be reasons (rules) of why some were buried in the village and others were 'dismembered' and scattered in the cave).[3] Of course, these questions may never be answered by archaeology, but they do point out the banality of assigning CMLC a blanket "ceremonial" status. It should be noted that CMLC lacks any signs rock art so that one dimension of ceremonial (political-religious) practice was, apparently, not displayed in this cave.

The Relevance of Cueva María de La Cruz

When seen in the context of other Archaic (or pre-Arawak) sites, CMLC presents an interesting case because it is a rather late site that substantially overlaps in time with the early (Cedrosan Saladoid and Huecoid) occupations of the nearby Hacienda Grande village. Such late Archaic sites are particularly intriguing for the possibilities they offer in expanding our knowledge about the process of ethnogenesis that ensues when societies with different ethnicities, cultural traditions, and heritages come not only into contact but also, *per force,* must work out ways of establishing mutual co-existence and social interaction (e.g., maintenance and adjustments of inter-group identities and ethnicities), as a viable alternative to total cultural/biological assimilation or extermination. We suspect that assimilation or even extermination (e.g., warfare) at a very local level must have occurred, but we are more confident that these were the exception, not the norm. The very fact that Archaic material culture can still be archaeologically identified up to 800 years *after* the early arrival of the earliest bearers of Cedrosan Saladoid and Huecoid *cultural traditions* (and not just ceramics) implies that that at least some of the multicultural, inter-group, social and political strategies of co-existence were negotiated and managed

quite successfully, so much so, that the by AD 600/700 a new cultural synthesis and reformulation arose as the "Ostionoid phenomenon". Put in another way, the Ostionoid of Puerto Rico is but the result of a *longue durée* process of ethnogenesis, whose reconfigured tradition owes —in equal measures— to the diverse and prolonged past interactions between Archaic, Saladoid and Huecoid groups.

Although this argument sounds elegant and logical, the details of precisely how such Archaic-Ceramic age groups interacted and its consequences (i.e., differing pathways toward ethnogenesis and the remaking of traditions) requires abundant and redundant empirical evidence examined on a site-by-site basis that for now has not yet reach a critical mass. Moreover, one should not presume that the same modes of social interaction between groups bearing different traditions were mimed and reproduced throughout the entire island, let alone throughout the 'Caribbean-scape'. Rather, one would expect that these were not only varied and multi-scalar (from the intimate and local to macro-regional and beyond) but also historically contingent. The question is what insights the archaeological evidence from CMLC can contribute to a more nuanced understanding of how such inter-group, inter-ethnic social dynamics played-out locally and how these might inform about the potentially varied pathways toward ethnogenesis —that is, toward the emergence of the Ostionoid tradition.

Methods and Results of the 2012 Archaeological Investigations

Excavation and Sampling Methods

In order to start the reevaluation of the site, we focused on site formation processes of the cave to determine cave use, periodicity and cultural affiliation. To these ends we conducted a topographical reconnaissance of the space within the cave in order to locate all the reported excavations that have impacted it so far and to identify which areas have received the least impact (Figures 2; S6). First we conducted nine auger or shovel-test-pits (STPs) in various locations in the interior of the cave (Figures 2: top; S16). We then selected two excavation areas, identified as Block 100 and Block 200, respectively located on the cave's northwestern entrance and along the interior abut the northeast wall. The three units excavated in Block 200 resulted in mixed, disturbed contexts, as did the STPs of which some were culturally sterile (Figures S12, S13).

Block 100 originally demarcated a 12 m^2 area that encompassed almost the entire northwestern entrance, an area we estimated to be north of Alegría's and Nicholson's test pits (Figures S5 to S9). Shortly after excavations began on the eastern half (a 3x2m area), we abandoned the idea of excavating the western half since it became evident that it had been severely impacted. In total six 1x1m units in Block 100 were excavated: Units 102, 103, 106, 107, 110 and 111 (Figures 1b-c, 2: bottom). Excavation proceeded with a combination of 10 cm arbitrary levels and sediment contexts. Since different contexts appear within a given level, the materials collected were bagged separately according to both level and context (Figures S17 to S20). In the course of the excavation we were able to identify a well demarcated disturbance on the south wall of Units 102-103 and the southwestern corner of Unit 103 that represents the back-filling of Alegría's Pit C (Figures 4; S22 to S23). It is clear that our excavation intersected some 15-20 cm of Alegría and Nicholson's northern portion of their Pit C (Figures S22, S23). A second broader disturbance was also identified in Units 106 and 110 that partly spilled into the adjacent Units 111-107 (Figures 5; S19, S20, S24). The irregular outline (boundaries) of this disturbance strongly suggests it was the result of the backfilling by a looter. (The disturbed contexts were identified as "strata" X [Alegría's Pit] and Y [Looter's Pit] in the *Supplement's* Tables S10 to S15.) By chance, the looter's and Alegría's pits did not come into contact, leaving a distinct very dark grayish brown 'hump' (i.e., a 'wall') of undisturbed sediment about 50 cm wide, visible in Unit 102's west wall profile (Figure 4) and running east into Unit 103 (Figure 5).

Despite these substantial disturbances, we identified and isolated *in situ* (undisturbed) sediment deposits in parts of Units 102, 103, 107 and 111. This we called Context 2 (in Units 102, 103, 107) or Context 3 (in Unit 111 only). As the plan view reveals (Figure 5), at a depth of 70-75 cmBD (60-65 cmBS), the undisturbed sediment deposit was largely confined to the eastern side of the block. Although we made every effort to keep the materials (and bagging) from different contexts separate (i.e., disturbed vs. non-disturbed), there is always a chance that a few materials were accidentally mixed. In large measure this is possible because of the very loose, fine sand or fine sandy loam matrices that characterize the sediments. As Alegría (and Rouse 1990) acknowledged in his excavation, it is impossible to be absolutely certain that a few specimens did not accidentally fall from the (dry sand) walls on to the floor of the level being excavated. However, crab burrowing is not a factor; these were absent from our units. In most instances this would not be critical, but in the case of CMLC a single potsherd falling off the walls can significantly alter our interpretation of the site.

Given the above, the remainder of this paper only discusses the undisturbed levels and contexts from Units 102, 103, and 107. Units 106 and 110 are excluded since they are almost entirely composed of the looter's backfill, the reason why Unit 106 was discontinued at 72 cmBD or 46 cmBS (Figures 4; S21, S22). Unit 111 is also excluded here since only a narrow band of undisturbed sediments hugged the eastern and northern wall of the unit; furthermore, much of the unit was occupied by a large limestone rock (Figures 3: bottom left; S21). Unit 106 was not completed; however, we have clear evidence that the looter did not reach the sterile sand and thus the backfill here rests over a 15cm remnant of the undisturbed Stratum E. It was purposefully preserved as a "witness" for future investigations.

The Stratigraphy and Its Micro- and Macro-remains

The definition of the undisturbed strata was established by both micro- and macro-artifact analyses and the characterization of its sediments (Figures S26 to S28). Micro-artifacts are components smaller than 4mm that are incorporated into the sediments when people perform various activities over dirt surfaces. The presence and density of micro-artefacts is evidence of human activity occurring directly over the surface and also of its intensity, as this sedimentary component tends to remain *in situ* or very close to the location where it was deposited, and seldom shows lateral or vertical transport in the profile (Rosen 1986; Dunell and Stein 1989; Stein and Telster 1989; Jeradino 1995). In the case of CMLC, the micro-artifact sample comprised bone, burnt bone, seeds, charcoal, and shell (Tables S1 to S9). Mollusks are also important for understanding the intensity of landscape use, as a reduction in size through time could be linked to human pressure on the resource. The most abundant species obtained from the macro-remain sample for all contexts were the various species of *Donax* (e.g., Unit 103, yielded a total of 2313 NISP) followed by *Lucina pectinata* (Unit 103, total NISP: 50; Tables S10-S12). Marine gastropods, however, were exceedingly rare (e.g., entirely absent in Unit 103).

Block 100 presents five distinct strata that were identified using the letters A to E (Figure 3). The deepest Stratum D represents the original cave surface before human occupation and consists of an aeolian deposit of yellow, fine, and loose sand (see the *Supplement* for additional photographs of the strata). Above it, we find a bleeding zone (i.e., D or C staining E) surmounted by the initial human occupation of the cave (Stratum E). This stratum extends only between the southern part of Unit 107 and through Unit 103, and is tilted downwards toward the interior (south) of the cave. It consists of a 35 cm thick stratum of very dark-grey, loose silty-loam with low quantities of ash, and a high density of micro-food remains (in all fraction sizes; 4mm to 0.125mm; see Tables S1-S9), particularly in the upper third of the stratum. A burnt limestone hearth feature with a manatee rib *in situ* was identified within this stratum (Figures 3; S-28). Stratum E was overlain by another dark-grey silty-loam layer (Stratum C) with about half the density of micro-artefacts. It also included a fair amount burnt limestone rocks. The contact between these two strata is diffuse. Above this, we found a dark grey sediment (Stratum B) containing a

very high density of burnt limestone (and a larger range of sizes) mixed with archaeological materials. The rock component of this stratum seems to reflect roof collapse and possibly as a result increased environmental humidity during the later phases of sediment accumulation.

We suspect, however, that the high density accumulation of *brunt* limestone (Stratum B) was not a protracted, gradual deposition and not simply accumulated natural rock fall (which alone would not explain thermal alteration), but mainly the result of a limited set of sweeping and dumping events to clear rubbish and burned stones from the cave's entrance. Possibly these stones were used as a heated rock bed roasting (e.g., manatee). If correct, this implies a significant behavioral-functional change around the cave's entrance at this time when compared to the previous depositional regime that gradually built Stratum C, where burned limestone is far less abundant. Alternatively, if heated rock waste was equally prevalent in the past (Stratum C), clearly they were disposed of elsewhere in or around the cave. If Oliver is correct, this also brings into play the likelihood that in the process of clearing and scooping burned rocks to pile onto the cave's side walls, the upper parts of Stratum C (already deposited) became mixed with the waste/artifacts discarded at the time of rock-clearing/scooping (i.e., the accretion of Stratum B). Finally, Stratum B was overlaid by a mechanically compacted layer of limestone rock and sandy silt (Stratum A) that very likely also reflects the heavy machinery operations (grading) at the time when the site's park and community cultural center were built. This surficial layer contained the highest density of modern materials (glass, plastic, metal, etc.).

The stratigraphy matches Alegría's profile for Pit 1A (summarized earlier). Alegría's St.-1 through ST.-5 correspond to our Strata A through E and D, even to the detail that his St.-3 is not a continuous layer. However Alegría's "thick" ash lens St.-4 in our unit is not differentiated; rather, ash occurs mixed in Stratum E. It is possible that this ash lens is related to our hearth feature (Figure 3 bottom) with the manatee bone. This is not surprising since our East Wall profile (Figure 3) is nearly aligned (along East 2002 axis) with the east profile in Pit 1A, located about a meter to the south (Figure 2).

The micro-artifact and the mollusk assemblages were retrieved mainly from two areas, Stratum B (levels 3 and 4) and stratum E (levels 7 and 8; see Figures 3: top; S28). The samples collected from the bottom of E showed a significantly higher content than any other stratum, while B showed higher concentration of micro-artifacts than C. The most abundant types of micro-artifacts are bone, burnt bone, charcoal and shell. The assemblage suggests the practice of subsistence activities, including cooking and consumption, directly over the surface. Strata A and D contained no micro-artifacts. Macro-remains were collected directly by hand (trowel) or through dry screening (1/4" mesh). The quantitative data supporting our analysis are provided in the *Supplement's* tables and graphics (Tables S1 to S9). Micro-remains extracted from the East Wall (Figures 3 top; S28) came from sediment samples whose volumes were standard and thus adequate comparative quantitative analysis.

Marine & Terrestrial Mollusks (Unit 103 & East Wall Profile). In terms of mollusk macro-remains, we have only analyzed Unit 103 in detail (Tables S10, S12) since this unit preserved the largest volume of undisturbed strata. Here *Donax spp.* is the most ubiquitous bivalve in all levels/contexts (NISP= 2378). Species diversity is very low. Besides *Donax spp.,* we identified only *Lucina pectinata* (NISP= 50) and *Neritina spp.* (NIPS=22) (Tables S10-S12). Two other species were noted: two (NISP) specimens of *Tivela mactroides*, both from Stratum A, and a single *Tagelus plebeius* that came from the disturbed context 'Y' (Looter's backfill). The marine mollusk assemblage reflects the use of sandy beaches; shallow water, low-energy areas; and rocky shores. Stratum C contains the highest NISP of *Donax spp*. (n= 939) macro-remains, followed by the overlying Stratum B (n= 796), while in the lower Stratum E it is lower (n= 386), which contrast with the micro-shell statistics. These figures however are misleading since in each level the context's volume of sediment varied, so as to keep the disturbed separate from the non-disturbed contexts. If the difference in volume sampled is taken into account then the density (NISP/cm^3) of

Stratum E is roughly comparable to that of Stratum C, while Stratum B remains lower than C. The exact volume figures by level/context, however, are not easily calculated owing to its changing volumetric shape through different depths. All these *Donax spp*., even if we triple or quadruple their numbers, would barely account for a bowl of *chipi-chipi* soup ever few decades or so (given CMLC occupation span), hardly evoking the image of a residential (habitation) base camp, as was suggested by Alegría and Rouse (1990). The mollusk remains, even considering Alegría's findings, is rather meager when compared to other Archaic sites.

While the size of *Donax spp.'s* valves recovered from Unit 103 remained basically unchanged, the *Lucina* presented a reduction in length-width size in the upper level (Stratum B), which might reflect exploitation pressure over this resource (Table S12). However, this is highly tentative since Stratum B yielded only 5 specimens against 24 from Stratum C and 21 from Stratum E. To demonstrate stress on this resource, we would need to identify the same trend in other sites in the local area. However, the 1948 and 1954 excavations located a few meters south of Block 100, yielded several more different genera than ours (see above summary). But, like in our case, *Donax spp.* appears to have been ubiquitous. Interestingly, our excavations in Block 100 did not yield any marine gastropods.

Terrestrial gastropods are represented by four species, dominated by *Megalomastoma croceum* (common in Karst environments) and *Pleurodonte spp.* (Table S13). All appear to be incidental, although *Pleurodonte spp.* may have been a delectable, edible *escargot.* However they naturally prefer disturbed environments, such as archaeological deposits, when seeking protection from sunlight (dehydration). The statistics provided in the *Supplement,* however, are not too reliable: specimens were not systematically retrieved during screening.

Bone Samples. The bone assemblage included fish, bird and *hutía* bones, and crab claws that have not yet been analyzed (except for the manatee rib). Reviewing the field excavation level forms and field journals, crab claws were regularly observed in most contexts, especially Stratum E.

Charred Sapotaceae Seed & AMS Date (Unit 102). We recovered one complete charred seed from Stratum E, at a depth of 103 cmBD (see Figure 4, top). The seed was sent to Dr. Lee A. Newsom (Penn State University) who graciously provided an extremely detailed report (*Supplement*, pp. 40-46) on its likely taxonomic identification (Figure 6: bottom). It is definitely a seed of the sapodilla (Sapotaceae) family. Its anatomical features narrowed its likely identity to either the genus *Pouteria* (cf. *caimito*) or *Chrysophyllum* (cf. *cainito*). As noted, seeds from earlier excavations included yellow sapote (*Pouteria campechiana*). A few charred seed fragments obtained from the 2012 excavation have not been analyzed. The AMS date (Beta-347456: 1910±30 BP) obtained from the seed is Cal. AD 70-126 (1σ) and Cal. 22-209 (2σ), although the latter's highest probability (0.96) is between cal. AD 22-145 (Table S17). Given the close stratigraphic match between Block 100 and Alegría's Pits 1-1A, we can reasonably link this date to Pit 1A's bottom St.-2 and lenses St.4/5. This date is also close to the dates (Y-1234, Y-1235) obtained by Alegría for his 1962 test pit at the back of the cave (vicinity of N1991-E2015; see Figure 2. Our AMS date, however, has a much narrower standard deviation and hence provides a tighter range of probability. The third date obtained by Miguel Rodríguez López from the eastern side of the cave is Cal. BC 402-97 (2σ), which suggests earlier activity area in that part of the cave (Table S17). The latter date is difficult to assess since we do not know what artefacts and sediments were associated with it.

Lithic Artifacts. There were three definitive lithic artifacts identified in the excavations. These represent domestic activities that are consistent with the food preparation/feasting activities suggested by the rest of the assemblage. The two instruments recovered from Stratum B are edge grinders, similar to those described by Alegría et al (1955) and by Walker (1987) for Hacienda Grande. The third one was recovered from stratum E that just missed being excavated by Alegría and Nicholson (Figure 6: top; for different angles, see Figure S1). It is a hand-held chopping tool with a particularly active distal edge.

Here characteristic overlapping flakes due to use-wear are visible in Figure S1. It is possible that this chopper could have been re-used as core to extract flakes that are visible in both the dorsal, ventral and one lateral side. All in all, lithic artefacts are very scarce in this locus of the cave. In addition, the absence of microlithics from the context indicates that these instruments were neither manufactured nor modified within the Block 100 area, having been brought as finished products.

Ceramic Artifacts. A total of 97 ceramic fragments were recovered from all excavations (excluding augers). In Block 100, a total of 69 were recovered, of which 43 came from the disturbed backfilling contexts. The remaining 26 fragments were distributed as follows: 15 from Stratum A; 4 from the base of Stratum A or top of B; 5 from Stratum B; and 2 from Stratum E. All but one fragment were plain body sherds, all tempered with relatively fine grit (sand/quartz) with one having also a small amount of grog (crushed sherds). White on red and ZIC decorations were absent. Surface finish for most of the specimens was smooth and had dull shine. The exception is a typical Cuevas style D-shaped strap handle with a decorative peg associated with Stratum A (Figure S2: c). The only other handle, slightly raised over the rim and oval in profile (Cuevas-Ostiones?) came from a disturbed context in Unit 202. Only because of their relative wall thinness and good firing conditions (hardness) we assign them to the Cedrosan Saladoid, but the lack of diagnostic decorative elements make it difficult to assign them to Hacienda Grande, Cuevas or even Monserrate's fine wares. The micro-artifact analysis did not yield ceramic less than 4mm, which may well be a function of the scarcity of ceramic vessels in use (and thus breakage) at any one time. Ironically, we also found two pot sherds in Stratum E (Level 8, Context 2 in Unit 103; Figure S1a, S1b), replicating for us the same dilemma faced by Alegría and Rouse in accounting for their two sherds in Pit D (levels 8-9). In our judgment, bioturbation (crab runs) can safely be ruled out. Of course, they may have accidentally fallen from the wall of the unit. However, given that the dates for CMLC overlap with at least two from Hacienda Grande's Cedrosan occupation (Y-1233, Beta-9972; but see Tables S-17, S18), three alternative, more plausible, explanations come to mind. First, the potsherds could have resulted from exchanges with Hacienda Grande individuals and brought to the cave by the Archaic. Second, Hacienda Grande individuals could have been invited to participate (e.g., as guests, allies, or affine) in activities at the cave bringing their own pots, thus joining the Archaic group for a feast of, say, *chipi-chipi* soup (*Donax spp.*) and roasted manatee meat to boot. Or third, they may have visited the cave when the Archaic group were away. Knowing what the (territorial) rights of cave utilization/visitation were is, of course, crucial but beyond archaeological recovery. One caveat remains. We are unfamiliar with the attributes of Archaic (Pre-Arawak) pottery. Although we think it less likely, it is still possible that the two plain body sherds were from vessels modeled after the Archaic pottery tradition rather than a Cedrosan Saladoid one.

To summarize, judging by the components of the archaeological assemblage, and in particular the hearth feature, ash content, burnt limestone, the density of micro-mollusks and micro-bones within the sediment, and the rather low macro-artifact frequency and diversity suggests this was a specialized site focusing on food preparation and consumption, certainly cooking and perhaps also the occasional feasting. The "occupation" events reflected by strata B and E were separated by stratum C which presents sediment mixing and a lower intensity of human activity suggesting its relocation to other areas of the cave. The modern surface (Stratum A) contains no archaeological micro-remains and reflects intense trampling as shown by its compact texture.

Discussion: Rethinking and Reimagining Cueva María de la Cruz

The archaeological evidence from CMLC suggests that people of the (late) Archaic cultural tradition made strategic, logistical use of this cave, but with varying intensities throughout its earlier history (strata E to C). Saladoid ceramics are present from its inception —albeit in minimal numbers— suggesting occasional (or opportunistic?) contacts/exchanges with nearby contemporaneous Saladoid

communities, such as Hacienda Grande and Vacía Talega (0.5-1.5 km distant). Given contemporaneity, there is no need, in our view, to explain away the presence of Saladoid ceramics from the lower strata at CMLC as accidental post-depositional intrusions in order to fit CMLC into Alergía and Rouse's (1990) cultural-chronological model where a pre-ceramic, mobile hunter-gatherer stage was to be drastically replaced by a period when the sedentary agricultural and agro-ceramic-bearing *arrivistes* (Saladoid-Huecoid) assimilated (or exterminated) the Archaic because their presumed cultural 'superiority'. This is a key point where Alegría and Rouse's (1990:25-27) interpretation depart from ours.

It is not just Saladoid ceramics showing up at CMLC but also the edge grinders present at Hacienda Grande that indicate inter-group interaction (mimicry, exchange). Our two edge grinders came from Stratum B, but Alegría (et al., 1955) reports them for his lower St.-2. It is a testament of tenacity and persistence that Archaic people were still, during the first century AD, using choppers, hammer stones and other implements as their forebears had for millennia. One of these implements, the pebble-grinder or, more accurately, the edge grinder (Rodríguez Ramos 2010) is present "in sufficient numbers" at Hacienda Grande site so as "to demonstrate that they are not isolated intrusive examples" (Walker 1987:190). We agree with Walker's argument that when comparing CMLC's and Hacienda Grande's edge grinders there are no "striking dissimilarities, save for the slightly greater tendency of the Hacienda Grande specimens to exhibit multiple working surfaces (usually three) while the earlier Cueva María la Cruz often (but not always) have only one" (Walker 1987:190-191 and Fig. 10). (Our chopper also has three worked facets: Figures 6; S1.) The above evidence strongly suggests that at least one of the lithic reduction protocols of a clearly Archaic tradition were mimed by Hacienda Grande's settlers. Rouse and Alegría (1990:66) however remained skeptical: "it is uncertain whether these artifacts were made locally [at Hacienda Grande] or were obtained by trade with the Coroso [i.e., CMLC] people". Their rejection of the Cedrosan ceramics at CMLC as accidental intrusions coupled with their ambiguity in how to appraise the (for them anomalous) edge grinders produced out of an Archaic template for use-wear at Hacienda Grande blinded them from the obvious: the persistent inter-ethnic/cultural interaction, whether it is by trade or mimicry. It is not about a choice between local manufacture versus trade/import; what matters is that the reduction protocol or template is undeniably sourced to the Archaic tradition. If it was locally produced it could only be so through mimicry —the adoption of an Archaic lithic reduction technique. If instead it was by trade, this also indicates inter-group interaction. Both require *face-to-face* interactions. However, as others have noted, there was a high degree of selectivity in what was mimed and/or exchanged between contemporaneous late Archaic, Saladoid and Huecoid populations throughout Puerto Rico (Rodríguez Ramos 2010; Chanlatte-Baik 2013).

Considering the temporal framework of CMLC —within the first century AD for the early phase—, the Archaic, Saladoid, and Huecoid populations of Puerto Rico had already been engaged in diverse forms of social interaction for half a millennium (since ca. 400 BC). Thus, it is not surprising that selected Saladoid ceramics and Archaic lithic artifacts, like the edge grinder, already formed an integral part of their respective material cultures. Henceforth, they should be regarded as 'diagnostic' of *both* cultural complexes. There is one further observation. Although at CMLC the early phase interaction involved Saladoid and not Huecoid pottery, Luis Chanlatte-Baik's (in Roe 1987:168-169) 1970 excavations at Hacienda Grande and the adjacent Cueva Mela led him to argue for an early presence of a La Hueca component that Alegría (and Rouse, 1990) had missed and/or mixed with the Hacienda Grande component. Although it remains a hypothesis, we know from Reniel Rodríguez's research (2010) that it was the Huecoid groups who widely systematically adopted Archaic tradition lithic reduction schemes rather than the early Cedrosan groups. Assuming, for the sake of argument, that Chanlatte-Baik's hypothesis is correct, that there is an earlier or at least contemporaneous but spatially segregated Huecoid occupation at Hacienda Grande (as at Sorcé-La Hueca on Vieques Island), then edge grinders

and other lithic types of Archaic heritage studied by Walker could have been the result of a more complex web of inter-cultural interaction —even though, no La Hueca ceramics were identified at CMLC.

The latest known radiocarbon date for an Archaic complex in Puerto Rico is Cal. AD 400 (see Rodríguez Ramos et al., this volume, Figs. 1-3, 5). The late phase mixture of Hacienda Grande, Cuevas and Monserrate pottery styles at CMLC (Strata A-B) should not necessarily be regarded accidental. Radiocarbon data from all Puerto Rico indicates that the chronological overlap of Hacienda Grande and Cuevas ceramic styles began ca. AD 400 and continued to about AD 1000 and often these are not just contemporaneous but also co-occur in the same stratigraphic context. If the 36 sherds reported by Alegría and Rouse (1990:19) are indeed Monserrate in style, rather than Cuevas, the *earliest* date when both styles are found together is around AD 600. Around this time range (AD 400-600), all three ancestral cultural traditions (Archaic, Saladoid, and Huecoid) were well on their way of reformulating, recasting, their ancestral cultural traditions to create (i.e., tradition-making) the Ostionoid cultural tradition. We suggest that the late phase at CMLC (most of our Stratum B) dates to this AD 400-600 period. In sum, ethnogenesis resulted in the emergence of the Ostionoid phenomenon. Ethnogenesis was not 'an event' but a long term process, the ingredients of which (CMLC-Hacienda Grande interaction) are in evidence at the cave's northwestern entrance from the early phase (AD 20-210) onward into the late phase (ca. AD 400-600) at CMLC.

The next point for discussion is the issue of caves as special religious-ceremonial abodes (Alegría et al. 1955:116; Rouse and Alegría 1990:23). Although Rouse and Alegría (1990:23) briefly noted that in the *late* phase ("Ceramic-age") the cave may have also been "inhabited… for brief periods" (alluding to the presence of clay griddles as evidence!) and used as a temporary refuge "during hurricanes", it is clear that they favor the idea of its ceremonial role being paramount, and attempted to reinforce it by citing its recent use for curing ceremonies or *santería*. Secondary and primary burials, together with the lack of cranial modification are taken as signatures of the Archaic 'body aesthetics' tradition documented for the early phase of cave use (Stratum E). Their presence suggests that it was the Archaic group who likely had an (initial) territorial claim on the use/control of this cave. After all, CMLC was the locus where at least three of their deceased relatives (and *opías)* resided. The deceased were likely to be remembered (memories) through ceremony at appropriate times in the ritual calendar. One might suspect that, at least, some of the food remains in the cave may well be the rubbish left from such periodic feasts to honor their ancestors. But declaring CMLC as a locus permanently and/or fundamentally devoted to religious ceremonial acts seems a step too far. That 'burial' ceremonies took place is warranted by Alegría's evidence, but that does not confer the cave a special ceremonial-religious status. The late phase, nearing the end of the cave's use (Alegría's Level 1, 40cmBS; or Strata A-B), is marked by a shift in mortuary practice. It consisted of human bones randomly scattered throughout parts of the cave. This "body parts dispersal pattern" we think is qualitatively different from the two secondary burial *bundles* described by Alegría et al. (1955) for the early phase (our Stratum E into D). These human bones also were mixed with a low density scatter of Saladoid and Monserrate style potsherds which, as noted, we think likely dates from no earlier than ca. AD 400-600, and certainly not later than AD 1000 (see Rodríguez Ramos et al., this volume: Figs. 4, 5). Interestingly, the random scatter of human bones is also a practice reported for some caves in the Caguana-Angeles-Santa Rosa districts in Utuado (e.g., Cueva de Juan Miguel and Cueva de Los Muertos [SR-1]) that, so far, began around AD 800/900 and continued well into the 1400s in that region (Oliver 2009: 143-144; Pagán and Oliver 2008). CMLC data seems to fit this pattern, although for now it appears to be an earlier funeral practice in CMLC than in Utuado.

While the food and seed remains identified demonstrate the use and processing of wild edibles only, it is highly unlikely that groups maintaining an Archaic ethos at CMLC would not have consumed a wide range of cultivars (domesticated and wild) that in any case have been around for at least 1.5 millennia

(e.g., Pagán 2005) prior to the initial occupation of CMLC or, for that matter, Hacienda Grande. Furthermore, given the evidence for interaction with Hacienda Grande's and (likely) Vacía Talega's Saladoid farmers, there is no reason to characterize the diet of CMLC's Archaic group restricted to only hunting and gathering wild edibles. Rather, this particular cave only indicates that its use was as a specialized locus for processing resources hunted and gathered in the local area. We are quite confident that future starch residue analyses on CMLC's lithics will confirm this view.

The final point of discussion is on the issue of caves as habitation or residential sites. The evidence CMLC strongly argues that CMLC is not a place for permanent or assiduous residence at any time during its pre-Columbian history; we see it more like a convenient, strategic and naturally sheltered locus for processing collected food, not unlike a farmer's field shed and food processing facilities next to their cultivation fields, as Oliver observed among the modern Mapoyo in Venezuela, 2011. In the Mapoyo case, the farmer's field structure erected next to the *conuco* primarily for processing food (mainly manioc and maize) also functioned as a charged ceremonial locus (including inhaling 'yopo', *Anadenathera peregrina*) at particular dates of their annual ritual calendar. At CMLC the ceremonial or ritual events were linked to burial and (probably) to periodic rituals of remembrance of the dead, both in the early and late phases. Like the Mapoyo case, at CMLC the analogous logistical and non-residential structure (the cave) temporarily assumed ritual and ceremonial functions (burial and mortuary ceremonies). Ordinary food processing and highly charged and intense cyclical ceremonialism in the same locus are not mutually exclusive or antagonistic.

Other Archaic sites from much earlier dates and situated in open-air areas, such as Maruca, Angostura or Paso del Indio (Rodríguez López 1999; Walker 2005; Rivera Collazo 2011a, 2011b), differ from the pattern observed for the early phase of CMLC in that most present more intensive and continuous occupation without strong evidence for seasonality. The absence of sumptuary objects, including rock art, suggests that the cave was not primarily used for ritual or ceremonial purposes, other than the occasional events related to the funeral ceremonies already noted. Given what we now know of the Archaic settlement pattern, it seems that occupation sites were located in the open, as can be seen in Angostura, Paso del Indio or Puerto Ferro, for example, while caves such as CMLC were used occasionally for food processing activities obtained through fishing/hunting-gathering, but such subsistence activities were only a part of their *broad spectrum diet*, which likely included domesticated plants. It is thus quite likely that the locus of assiduous residential occupation of the Archaic groups that used CMLC during the early phase, was located elsewhere in the area, at a site yet to be identified. The same argument applies to the late phase at CMLC. The cave site was still used in the late phase as a convenient, opportunistic locus for processing mainly hunted and gathered resources by farmers who resided in permanent villages nearby, such as Hacienda Grande and Vacía Talega.

Conclusions

To conclude, CMLC's history (in the northwestern entrance area at least) consists of an early phase (AD 20-210) of use by people bearing an Archaic tradition and ethos that was already entangled in a web of interactions and exchanges (including ceramics and edge grinders) with people bearing a Saladoid tradition (and, if Chanlatte-Baik is correct, Huecoid also) who resided in nearby Hacienda Grande and Vacía Talega. This phase gave way to a late phase marked by changes in both mortuary practices and activities (intense limestone burning), and the coexistence of Hacienda Grande, Cuevas and Monserrate ceramic styles (AD 400-600>). Around this time, the Archaic of CMLC had likely re-located their activities elsewhere. Rather than the Archaic becoming assimilated and replaced by the Saladoid culture, the ancient and still ongoing web of Archaic, Saladoid and Huecoid interactions resulted in ethogenesis — the reformulation, if not reinvention, of tradition; in short, the making of the Ostionoid tradition. Finally, the early 400BC-90BC date for the northeast side of the cave cannot be ignored, but the lack of

associated data makes it difficult to assess. If the latter date is related to assemblages comparable or similar to our Strata E-C and/or Alegría's Stratum 2 (and basal lenses), then the process of *local* Saladoid-Archaic interaction/exchange was in an early phase of development in the Loíza area. This would depend on the actual date of the *foundation* of Hacienda Grande and Vacía Talega sites, which remains open to debate, because the dates that exist for the Hacienda Grande site are problematic (see Table S18). But if —and it is a big 'if'— the earliest rather than latest sigma of probability of sample Beta-9970 (Cal. 350 BC – AD 80, 2σ) is accepted, the initial contact and interaction between the two groups is further extended into the very beginnings of this cave's utilization on the northeast side, at a time not earlier than 400/350 BC.

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End Notes

[1] cmBS= centimeters below surface; cmBD= centimetres below datum

[2] Annoyingly, taxonomists have revised the Linnaean nomenclature of our beloved *Strombus* genus to that of *Lobatus*. See http://www.stromboidea.de/?n=Species.LobatusGigas

[3] In 1972 Oliver witnessed a looter named "Laureano" digging a flexed individual whose skull rested on a stack of intentionally broken flat ceramic bases of Saladoid manufacture (perhaps Cuevas) accompanied by a miniature three-pointed stone on the rib cage. This is quite a different body treatment than the random scatter at CMLC; hence our comments in this paragraph. Other than a Saladoid dog burial, the documented burials at Hacienda Grande are related to the later Elenan occupation (Walker, 1987; Roe 1987).

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Figure Captions

Figure 1. (A) View of Cueva María de La Cruz in 1987; (B) Excavation in progress at the NW entrance; (C) L. Chanlatte-Baik and Y. Narganes Strode view the excavation while I. Rivera Collazo prepares to take soil samples; (D) The excavation crew and MA students of the Centro de Estudios Avanzados de Puerto Rico y El Caribe (left to right): J. Benitez, B. Moreno, B. Feliciano, I. Lagares, K. Alonso, J. R. Oliver; R. Garland, K. Reinicke, M. Declet, A. Declet, I. Meléndez Y. Valdes (Project Filed Assistant) and a local visitor.

Figure 2. Top: The topographic map of Cueva María de La Cruz; Bottom: The plan view of the western side of the cave, showing the location of the 1948, 1954, 1990s and 2012 excavation units.

Figure 3. Drawing and photograph of the East Wall stratigraphy of Block 100 and a detail of the hearth feature with a manatee rib *in situ* into the wall of the SW corner of Unit 103.

Figure 4. Drawing and photograph of the West Wall profile where the disturbed contexts are in clear view.

Figure 5. Plan view of Block 100 (at ca. 72-82 cmBD) and photographs illustrating various features from various perspectives.

Figure 6. Top left: A typical Archaic chopper recovered from Stratum E. Top right: chopper *in situ,* just outside the backfill of Pit C. Bottom: The archaeological Sapotaceae seed and modern references.

Supporting figures and data tables and graphs can be downloaded from :
http://figshare.com/articles/SUPPLEMENT_A_REASSESSMENT_OF_MAR_A_DE_LA_CRUZ_CAVE_SITE_PUERTO_RICO_THE_2012_EXCAVATIONS/1243318.

Figure 1

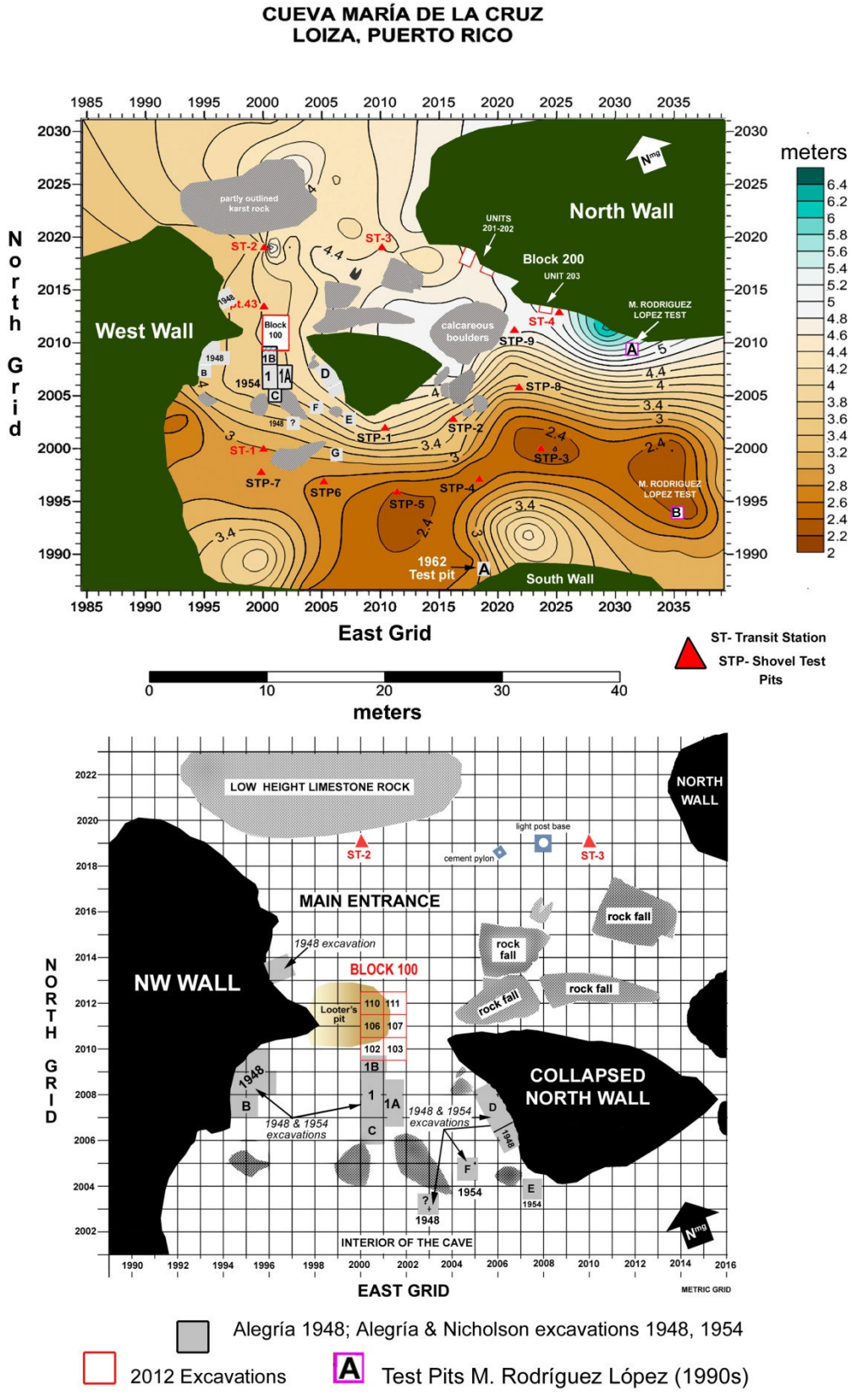
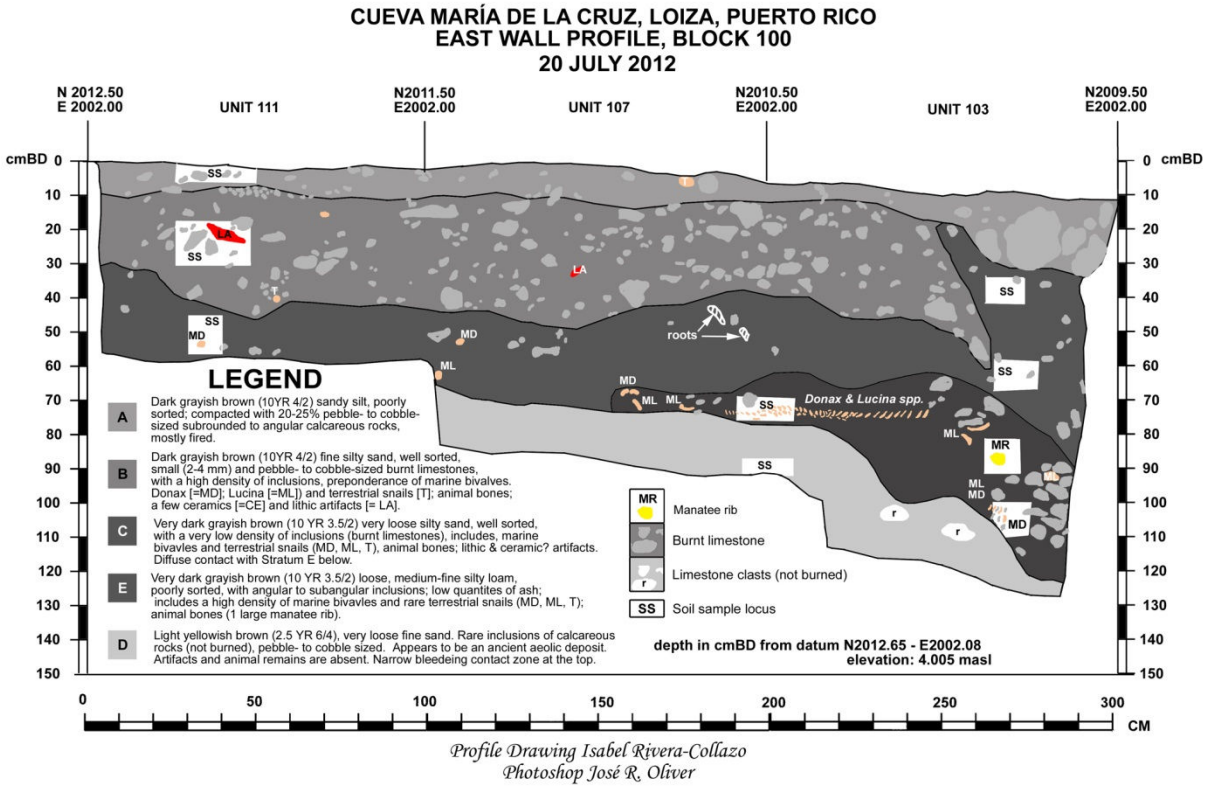

CUEVA MARÍA DE LA CRUZ
LOIZA, PUERTO RICO
North Grid
East Grid
meters
North Wall
West Wall
South Wall
partly outlined karst rock
UNITS 201-202
Block 200
UNIT 203
M. RODRIGUEZ LOPEZ TEST
calcareous boulders
Block 100
1962 Test pit
ST-1
ST-2
ST-3
ST-4
STP-1
STP-2
STP-3
STP-4
STP-5
STP6
STP-7
STP-8
STP-9
ST- Transit Station
STP- Shovel Test Pits
0 10 20 30 40
meters
LOW HEIGHT LIMESTONE ROCK
NORTH WALL
light post base
cement pylon
MAIN ENTRANCE
1948 excavation
BLOCK 100
NW WALL
Looter's pit
rock fall
COLLAPSED NORTH WALL
1948 & 1954 excavations
INTERIOR OF THE CAVE
NORTH GRID
EAST GRID
METRIC GRID
Alegría 1948; Alegría & Nicholson excavations 1948, 1954
2012 Excavations
Test Pits M. Rodríguez López (1990s)

Figure 2



Profile Drawing Isabel Rivera-Collazo
Photoshop José R. Oliver

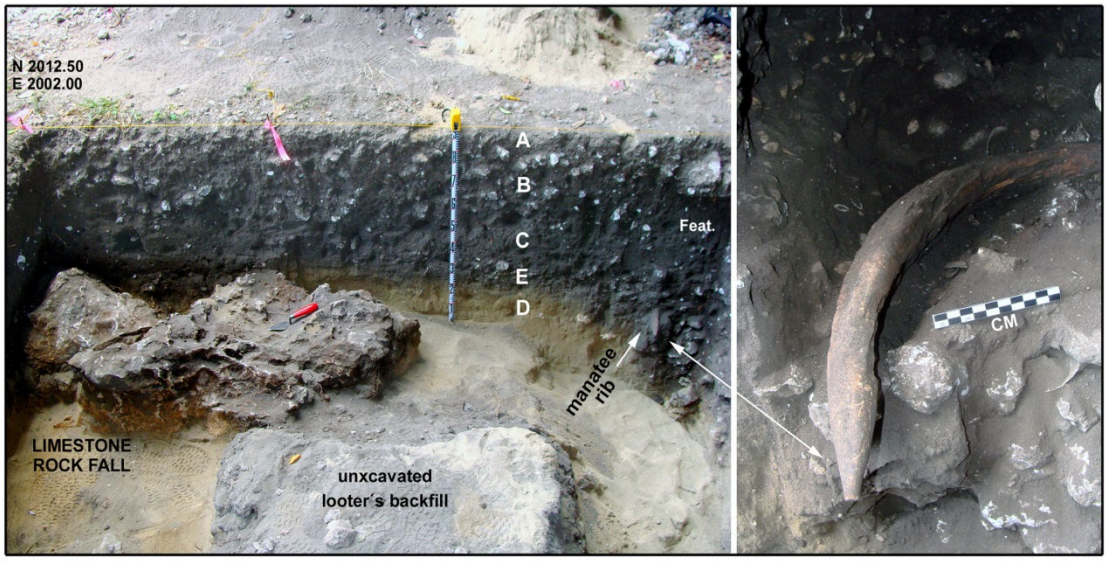
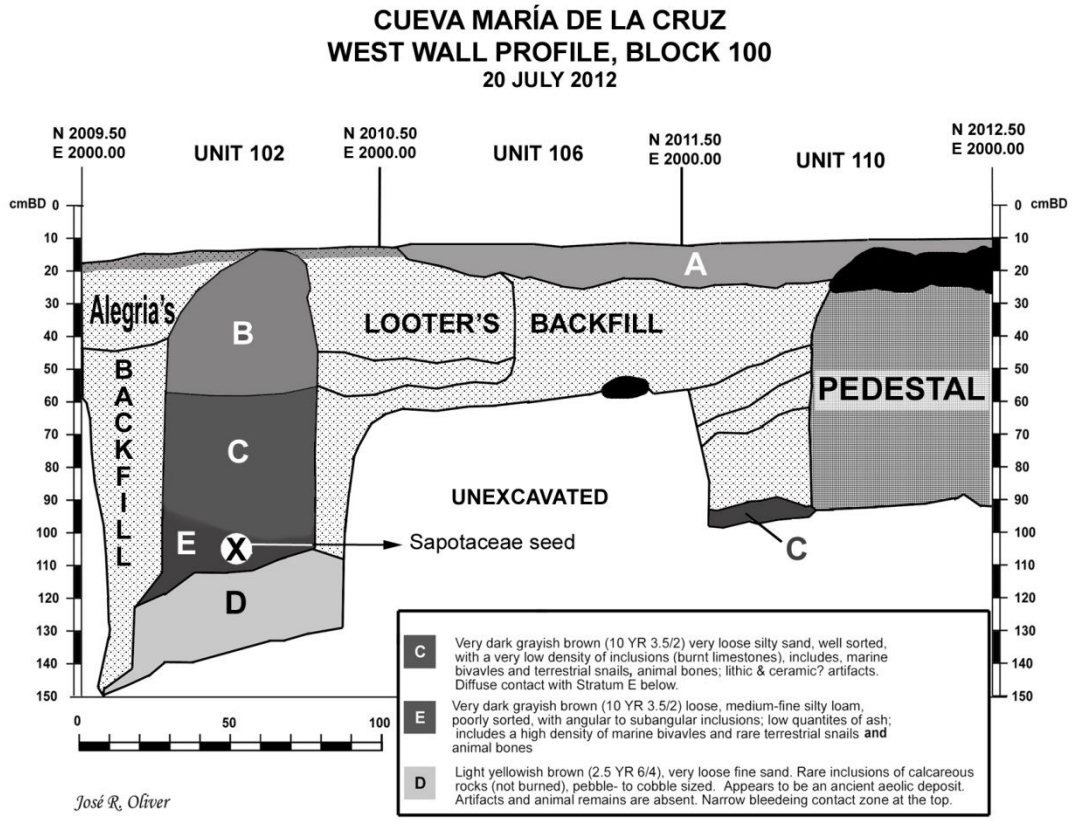


Figure 3


CUEVA MARÍA DE LA CRUZ
WEST WALL PROFILE, BLOCK 100
20 JULY 2012
N 2009.50
E 2000.00
UNIT 102
N 2010.50
E 2000.00
UNIT 106
N 2011.50
E 2000.00
UNIT 110
N 2012.50
E 2000.00
cmBD
Alegria's
BACKFILL
B
C
E
D
A
LOOTER'S BACKFILL
PEDESTAL
UNEXCAVATED
Sapotaceae seed
C
0
50
100
C Very dark grayish brown (10 YR 3.5/2) very loose silty sand, well sorted, with a very low density of inclusions (burnt limestones), includes, marine bivavles and terrestrial snails, animal bones; lithic & ceramic? artifacts. Diffuse contact with Stratum E below.
E Very dark grayish brown (10 YR 3.5/2) loose, medium-fine silty loam, poorly sorted, with angular to subangular inclusions; low quantites of ash; includes a high density of marine bivavles and rare terrestrial snails and animal bones
D Light yellowish brown (2.5 YR 6/4), very loose fine sand. Rare inclusions of calcareous rocks (not burned), pebble- to cobble sized. Appears to be an ancient aeolic deposit. Artifacts and animal remains are absent. Narrow bleedeing contact zone at the top.
José R. Oliver

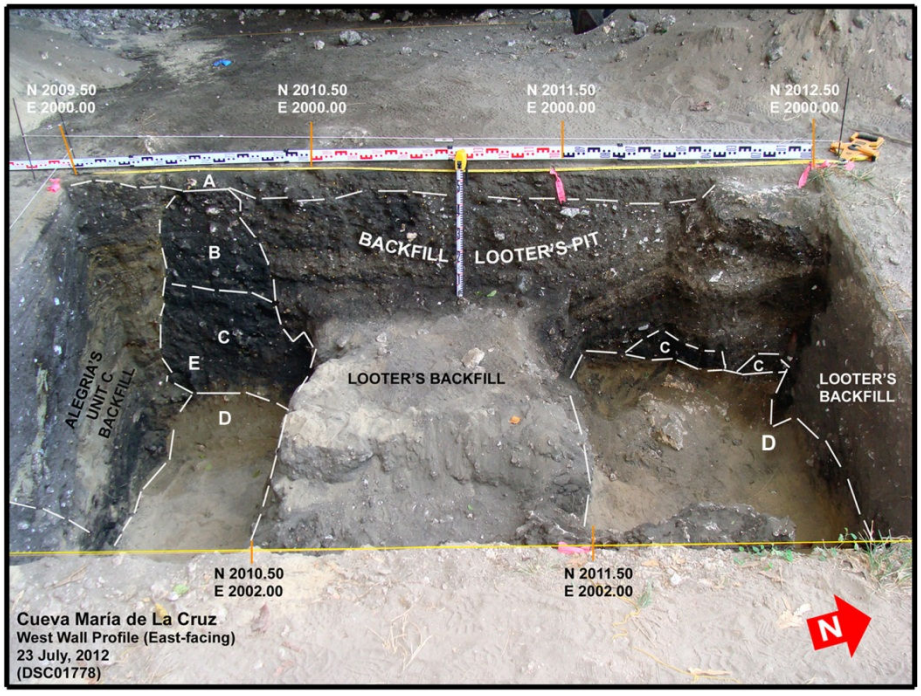

N 2009.50
E 2000.00
N 2010.50
E 2000.00
N 2011.50
E 2000.00
N 2012.50
E 2000.00
A
B
BACKFILL
LOOTER'S PIT
C
E
D
ALEGRIA'S UNIT C BACKFILL
LOOTER'S BACKFILL
LOOTER'S BACKFILL
N 2010.50
E 2002.00
N 2011.50
E 2002.00
Cueva Maria de La Cruz
West Wall Profile (East-facing)
23 July, 2012
(DSC01778)
N

Figure 4

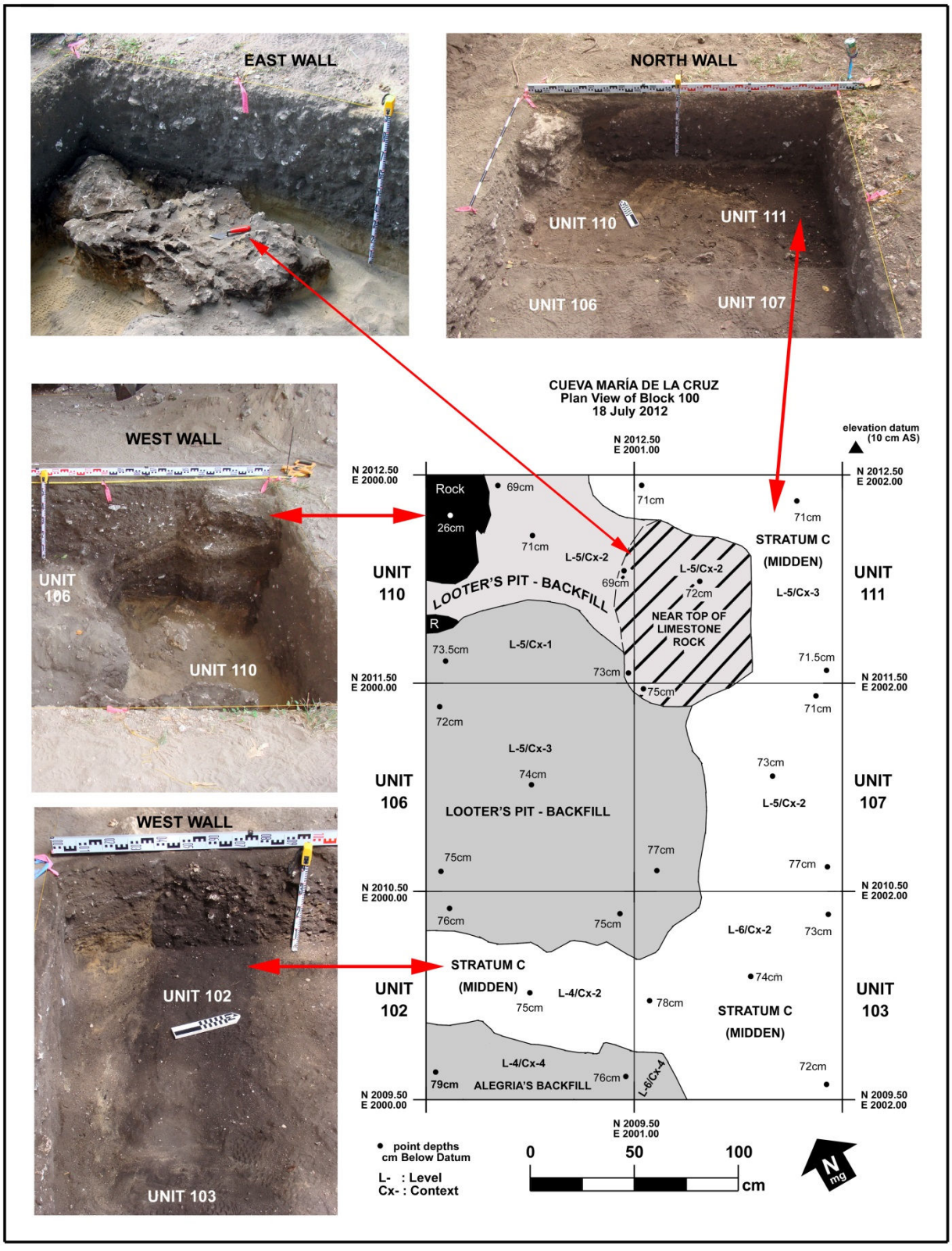

EAST WALL
NORTH WALL
UNIT 110
UNIT 111
UNIT 106
UNIT 107
WEST WALL
UNIT 106
UNIT 110
WEST WALL
UNIT 102
UNIT 103
CUEVA MARÍA DE LA CRUZ
Plan View of Block 100
18 July 2012
elevation datum
(10 cm AS)
N 2012.50
E 2001.00
N 2012.50
E 2000.00
N 2012.50
E 2002.00
Rock
69cm
71cm
71cm
26cm
71cm
L-5/Cx-2
STRATUM C
(MIDDEN)
UNIT
110
L-5/Cx-2
69cm
72cm
UNIT
111
LOOTER'S PIT - BACKFILL
L-5/Cx-3
R
NEAR TOP OF
LIMESTONE
ROCK
73.5cm
L-5/Cx-1
71.5cm
73cm
75cm
N 2011.50
E 2000.00
N 2011.50
E 2002.00
72cm
71cm
L-5/Cx-3
73cm
74cm
UNIT
106
LOOTER'S PIT - BACKFILL
L-5/Cx-2
UNIT
107
77cm
75cm
77cm
N 2010.50
E 2000.00
N 2010.50
E 2002.00
76cm
75cm
L-6/Cx-2
73cm
STRATUM C
(MIDDEN)
74cm
UNIT
102
L-4/Cx-2
75cm
78cm
STRATUM C
(MIDDEN)
UNIT
103
L-4/Cx-4
72cm
79cm
ALEGRIA'S BACKFILL
76cm
L-6/Cx-4
N 2009.50
E 2000.00
N 2009.50
E 2002.00
N 2009.50
E 2001.00
point depths
cm Below Datum
L- : Level
Cx- : Context
0
50
100
cm
N
mg

Figure 5

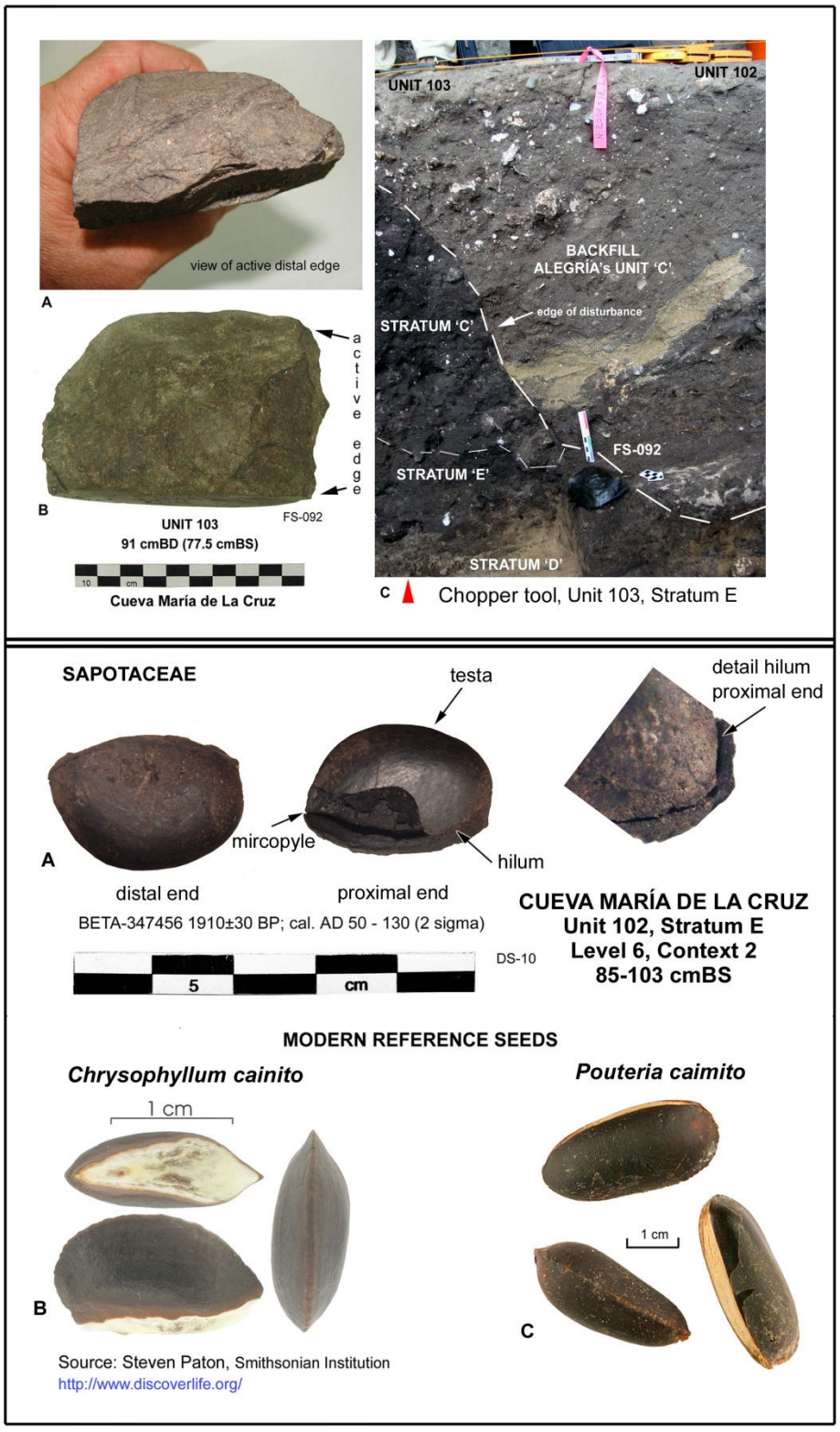

view of active distal edge
A
active edge
B
UNIT 103
91 cmBD (77.5 cmBS)
FS-092
Cueva María de La Cruz
UNIT 103
UNIT 102
BACKFILL
ALEGRÍA's UNIT 'C'
edge of disturbance
STRATUM 'C'
FS-092
STRATUM 'E'
STRATUM 'D'
C
Chopper tool, Unit 103, Stratum E
SAPOTACEAE
testa
detail hilum
proximal end
A
mircopyle
hilum
distal end
proximal end
BETA-347456 1910±30 BP; cal. AD 50 - 130 (2 sigma)
DS-10
CUEVA MARÍA DE LA CRUZ
Unit 102, Stratum E
Level 6, Context 2
85-103 cmBS
MODERN REFERENCE SEEDS
Chrysophyllum cainito
Pouteria caimito
1 cm
B
1 cm
C
Source: Steven Paton, Smithsonian Institution
http://www.discoverlife.org/

Figure 6