The potters' perspectives: A vibrant chronology of ceramic manufacturing practices in the valley of Juigalpa, Chontales, Nicaragua (cal 300 CE - present)

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8 From traces on sherds to the vitality of human experience

8.1 CHALLENGES OF COMPOSING VIBRANT CHRONOLOGIES

The main goal of traditional chronologies is not only the placement of events and processes according to the order in which they occurred, but also their arrangement in regular intervals of measured time. As discussed in Chapter 3, the philosophical and theoretical implications of this paradigm of time—and our relationship with it—are not implicit and should not be overlooked. Events and processes are not boxes waiting to be placed on a pile; they are interweaving threads that connect to themselves and each other in capricious yet non-random ways that cannot be severed from each other—in the sense of being both constricted and enabled by structure. In the traditional view, the piles of boxes are not only vertical but also horizontal; chronological charts organize what happened before or after certain dates, as well as what was co-occurring. Synchronicity and diachronicity are the first two dimensions of periodization. In the case of ceramic chronology, the boxes are filled with vessels, but only certain arbitrary traits are allowed in the boxes. Types and modes, generally based on shape, decoration, and perhaps paste recipe, are grouped in categories with an arbitrary range of variability regarding differences and similarities (but see critical assessments such as Malmer 1962 and Sørensen 2015). These categories, the types, which are often expressed graphically in drawings, connect the two axes in ceramic chronological charts.

The foundation of typological classification is its formal sensorial—mostly visual—pattern recognition. Instead of asking questions about why things change, what those changes mean, why and how archaeologists group things, and if we should keep doing it the way we were taught to, archaeology is more interested in establishing classification systems that remain unquestioned (Sørensen 2015). Unlike Sørensen, I advocate for the abandonment of typologies, which are grammatically part of this two-dimensional geometric time paradigm of synchronicity-diachronicity. Typologies should not be seen as "(...) of central importance on a very fundamental level since in practice [they are] (...) one of the main tools that we use to create both order and direction, i.e. time, within our data." (Sørensen 2015, 93). There are other ways to observe, feel, and think about the unfolding bundles of traces, about the *things* we work with.

The complexity of human experiences and changes in practices can be more chaotic and complex than we wished for; the desire and disciplinary effort to order them is entirely paradigmatic. An excellent example of the interplay between variables and the two dimensions of this discursive formation is the current debate regarding Bronze Age Europe. Ancient DNA studies (Allentoft *et al.* 2015) have challenged the association between Bell Beaker and Corded-Ware ceramics and human migration/population displacement. Previously, these ceramics styles were referred to as both a people and a culture (see Furholt 2014 as an example regarding this debate). Unfortunately, instead of using the new lines of evidence to question this paradigm, especially the assumption that things or other aspects of human experience are just elements that conform to "cultures", DNA data is sometimes used in replacement of pottery shapes. However, people do not equate with DNA, just as they do not equate with pots or even with language. This is precisely one of the many other dimensions that should be considered in chronological assessments, the one that archaeology tends to exclude: the *function* or *purpose* of change. How do vessel shapes (for example) change? What is the relationship between vessel form and culinary practice? What if there is a morphological change not paired with a technical

one? (Donner *et al.* 2019). We tend to relate the appearance of a new morphology as a possible synonym of arrival or innovation of ideas, people, foodways, and even social organization (Gorin 1990), but we fail at questioning why certain things are incorporated, how they are integrated into life, and how we can archaeologically differentiate between massive movements of people and histories of interconnectedness.

Time—in both its synchronic and diachronic abstractions—as well as pots and past human groups, are at the core of the chronological debate in the archaeology of Central America. This paradigm is translated into Cartesian charts, as outlined in Chapter 3. Since the chronological proposal in this book intends to paradigmatically differ from these views, the data collected was purposely not systematized into one of those charts. Instead of denying the constant becoming of materiality and its palimpsestic ontology, a narrative was created that hopes to illustrate the complexity and (dis) continuities of different intersecting and divergent itineraries. As a reader interested in the research area, this can be somewhat disorienting, because one might simply expect the "new" chart that will replace Gorin's. That is precisely what everyone—including the author of these lines—expected from this project at its beginning, when macrotraces of manufacturing practices were intended to be used as chrono-markers. In fact, the first research questions outlined—now forgotten in discarded versions of an introductory chapter—directly asked which steps of the operational sequence of pottery manufacture were more variable along a diachronic axis and could serve as chronological proxies. Such questions were formulated because they were articulated within the rules of a certain paradigm. After concluding the analysis of the data contained in the previous chapters, it was clear that such goals were unachievable. In the beginning, the method was blamed, thinking that maybe technological changes are not good markers for "social" transformations, but the problem actually resided in the way in which the questions were being asked; they were just looking for another isolated trait that could help build a chronology rather than rethinking what a chronology should be. The nuanced complexity of the past was misunderstood, maybe due to a limited view of the palimpsestic complexity of the present. Therefore, the building blocks of Chapters 4 and 6 (Fieldwork and Laboratory methods), and especially of Chapters 5 and 7 (Spatiotemporal dataset and Ceramic technologies) hopefully demonstrate a reflexive development that took this research to a different *episteme*, in Foucault's (2005) sense.

Visual representation of these chronological views was not the only challenge encountered. Since a chronology is conceptualized in these pages as a story of the different intersections between divergent and convergent, as well as continuous and discontinuous, interweaving and unfolding itineraries, it was also hard to structure a history of the becoming of ceramic technologies within the valley of Juigalpa using typical terminology and references. The chronological charts mentioned above are usually accompanied by summaries in which the pictures of ceramic vessels included in the chart are thoroughly explained, together with references to site configuration, settlement patterns, radiocarbon dates, data regarding mortuary practices, lithic technologies, and inter-regional connections. These syntheses vary in the types of datasets that they integrate—as outlined in Chapter 2, where the different accepted chronologies for ancient Nicaragua were explained—but they do tend towards a certain standardization. Even though this research departs from this type of discursive structure, the chronological narrative that will be presented in the next pages was separated into the intervals arbitrarily established by the radiocarbon dates obtained during excavations. The choice is metaphorical, and this is further elaborated in section 8.2 (see below).

Apart from not presenting the "new chronological chart for central Nicaragua", a typology will not be outlined, and the operational sequences presented in Chapter 7 can hardly be used as types are normally applied. This can be linked to a broader debate regarding the actual value of technological approaches to ceramics, since they do not seem to be capable of creating observable abstractions such as types, which have proven to be extremely useful in the daily practice of the archaeological discipline. Typically, straightforward typologies are easily learned and recognized by any archaeologist in a relatively short amount of time. In contrast, even though technical traits are not that difficult to identify after proper training, their interpretation requires a greater investment in training and broader knowledge, including geology, geomorphology, geochemistry, ethnographic observations, and even experimenting with clays. Integrating technological

analysis into chronology building and beyond is thus a challenge because of the ubiquity of the typological approach within archaeology, a discipline that teaches to observe, recognize, and work with types. However, if practitioners become truly aware of the implications of grouping certain formal patterns into clusters, as stated above, disregarding how those things were made and used, and in connection with which other things they were experienced, then it is not that hard to understand the necessity of a paradigmatic shift. The switch would imply a discursive journey from the typological paradigm to the processual approach of looking at the intersecting microhistories of ancient peoples.

The level of detail achieved through microtechnological studies can also questioned: why do we want to know so much about these people? What does this detailed knowledge actually tell us about the bigger picture? Can we still produce grand narratives and answer relevant questions from a microtechnical approach? Additional inquiry that leads to new knowledge should never be an issue when adopting or discarding certain types of study, especially if the epistemological foundations of what we are currently doing are limited. Also, the chrono-narrative presented in the next pages is based on a technological examination of ceramics and, when contrasted to past culture-historical narratives (Gorin 1990; Rigat 1992), evinces the advantages of both its theoretical and methodological approaches.

8.2 THE VITALITY OF THE VALLEY OF JUIGALPA (CAL 300 CE - PRESENT)

In photography, a time-lapse is a method that shows a sequence of individual pictures taken at set intervals, showing a slow process in a short time. Thinking from a *longue durée* perspective, a time-lapse would be a fitting metaphor for this research endeavour, in which the objective of the camera (time-space) goes through constant transformations at different time scales, velocities, and durations, which are captured at specific intervals. A fundamental difference between an archaeological and a photographic time-lapse is that in archaeology, these intervals are not premeditated and cannot be predicted with specific rhythmic, systematic, and arbitrary gaps, but rather are defined by the capriciousness and probability of absolute dates. Therefore, the chronological sequence in archaeology is comprised of different frames shown at various velocities and with dissimilar intervals and durations.

In this narrative, the camera is shooting the valley of Juigalpa, and the story starts around 300 cal CE, with a lot of emphasis and details between 400 and 1420 cal CE, and overlapping calibration issues between 1650 and 1950, probably related to the de Vries acute effect.[84] Even though the story is neverending from an individual lifetime perspective, because it still unfolds as the author writes these pages and as you read them, the text does not delve too much in what is commonly referred to as present, which would go beyond its goals. However, some insights into it will be provided, because in this story, the valley has, is, and will continue to vibrate and become with the flows of intersecting trajectories of different processes and practices, portrayed in various frequencies of depth (ceramic manufacture and consumption, lithic technologies, human-animal entanglements, site configurations, climate, etc.) and amplitude.

Ceramic manufacture within the valley is a continuous thread over the different time scales: the *l'histoire événementielle, l'histoire conjoncturelle,* and *la longue durée* (Braudel 1949). For example, a volcanic event transects the itineraries of medium-velocity social processes, such as community organization, which can cause one or a series of events (i.e. migration). However, if looked closely, the various tiny threads in a mass that seemed to be uniform become apparent. Therefore, the next pages will explore these finer threads, the steps of the *chaîne opératoire*, their historical unfolding, how stable and prone to change they have been, and the interconnections between them to other interrelated practices, such as foodways, organization of daily life, relationships with the landscape, etc. All of these itineraries will be integrated into narratives whose duration has been arbitrarily determined by radiocarbon dating. Therefore, what follows is a heterodoxical "chronology", one that will not provide a Cartesian chart, or the triade "*tipo, época y cultura*" that is so beloved in the archaeology of

84 Fluctuations in the concentration of athmospheric radiocarbon have naturally taken place between the 16th and 19th centuries, which challenge probabilistic interpretations (de Vries 1958; Lerman *et al.* 1970; Damon *et al.* 1978).

the Americas,[85] but a rich narrative of the unfolding universes of what has been possible in this valley.

8.2.1 GEOMETRIC WORLDS (CAL 300 - 900 CE)

Between cal 300 and 900 CE, the valley of Juigalpa went through several transformations. Human practices became deeply interwoven with the valley, involving procurement of raw materials for construction practices, the manufacture of stone and ceramic objects, agriculture, and other practices related to nourishment such as hunting, gathering, and rock carving. Humans shared their livelihoods with the local plants, animals, soils, hills, rains, winds, streams, and rivers. In the next pages, threads of these intersecting itineraries will be threshed in an attempt to better describe the first vibrant "photo" of the time-lapse, which includes two places: Alberto Obando (in particular, excavation unit AO1) and Aguas Buenas excavation units AB3, AB4, AB5, AB6, and M1.

As far as the research methods have demonstrated, sometime around cal CE 300, groups of humans that knew the valley well—or were familiar with similar settings—engaged in certain practices that left concrete and identifiable evidence of their doings observable for us today. It is not clear if this shift in human traces might be related to the effects in the study area caused by active volcanic activity in the Managua region between 1 and 300 CE, or to the Las Isletas flank collapse of the Mombacho volcano between 270 and 300 CE (Dennett 2016). Whatever happened before this moment is very speculative, but the start of construction projects such as Aguas Buenas and even much smaller scale endeavours like Alberto Obando denote a profound knowledge and shared perceptions about the valley. Both sites were built on the slopes of the sheltering Cordillera, next to seasonal streams and creeks, covered by the fertile and malleable *lanilla* soil, and at a cautious distance from both the floodplain located a few kilometers south and from the Mayales river to the west, which overflows during heavy rainy seasons, as evinced by its several meters of sedimental deposition on its shores, as well as its paleochannels. The Carca stream shores—situated to the east of both sites—were also subject to intense flooding episodes around this time, as suggested by the results of the stratigraphic analysis of later sites (i.e. Oporta). The spatial configuration of both sites is mainly circular or elliptical (Alberto Obando's general design and Aguas Buenas concentric arches), but with an angular logic as well, as evidenced by Aguas Buenas's quadrangular central flat space. The builders of these first architectural sites were also aware of the different materials around them; they were familiar with the plants, animals, rocks, clays, subsoils, bedrock, hills, streams. Their interactions unfolded in building technologies, as well as the manufacture of cooking, storage, serving, and cutting implements, as well as rock carving practices. Since material culture from the earliest practices at Aguas Buenas is scarce at excavation units AB3, AB4, AB5, and AB6, it is challenging to offer a comparative overview with Alberto Obando. However, the results of this research provide some insights into both sites. Ceramic technologies at AO1, AB3, AB4, AB5, AB6, and M1 display a homogenous set of manufacturing steps aimed at obtaining similar end products. To begin with, the ratio between unrestricted, restricted, and unidentified vessel shapes was coherent, with 75.0%-15.0%-15.0% for AO1, 77.0%-8.0%-15.0% for AB3, 85.0%-15.0%-0.0% for M1, 62.0%-11.0%-27.0% for AB4, and 43.0%-6.0%-51.0% for AB6. Differences between AB4 and AB6 and the rest of the excavated contexts could be explained by a statistical bias related to reduced sample size as well as fragmentation and erosion of samples, which made vessel shape identification challenging, and augmented the proportion of unidentified forms. In contrast, differences between AO1 and AB3 could be interpreted as contextual, suggesting a lower frequency of cooking and storage practices at a public space such as the *Empty Area* of AB (AB3). Seen in this light, it is not surprising that restricted vessel number is lower when compared to AO1. Higher proportions in the sample analyzed for M1 could in turn be related to sample bias, due to the fact that the sampling strategy was designed with different research goals (Kwast 2013). However,

85 In Mexican archaeology, it was believed until one decade ago that ceramic typologies were unequivocally congruent with both temporal and cultural affiliations. For example, at a pottery analysis seminar at Universidad Veracruzana in 2005, exams presented students with a set of sherds that they had to classify according to their type, phase, and culture, paradigmatically equating types not only with defined temporal intervals (which is possible when following a type-variety method, for example), but also with identity formation processes and even linguistic affiliations.

it might also be contextual, reflecting a higher intensity of cooking practices before and during the construction of the mound compared to after its erection. Maybe the sole act of building Aguas Buenas (A. Geurds, pers. comm. 2018), with its own duration and technological unfoldings that included material procurement and preparation, shaping of structures, finishing, and maybe also decorating, was enmeshed in most of the practices related to the site.

Some culinary practices of these communities can be inferred from an examination of vessel morphologies. For example, the end products of all excavated units consisted of mainly CRD (Ø 13.0-40.0 cm, 4.0-8.0 mm wall thickness) followed by CR (Ø 13.0-30.0 cm, 3.5-6.0 mm wall thickness), but also contained the presence of CCC (Ø 4.0-21.0 cm, 3.0-5.0 mm wall thickness), CCo (AO1: Ø 30.0-33.0 cm, 4.5-5.0 mm. AB6: Ø 5.0 cm, 6.0 mm wall thickness), CC, and CRC. Therefore, cooking wares at Alberto Obando and Aguas Buenas show a preference for thin walled unrestricted and partially restricted small (individual), medium (individual or small group), and large jars (larger amounts of people) for cooking, serving, and storing. Presence of plates (AO1: Ø 6.50-30.0 cm, 3.0 mm wall thickness; one Ø 40.0 cm and 5.0 mm thickness - AB6: 20.0-40.0 cm Ø, 4.0-5.0 mm wall thickness) might suggest serving and storing but could instead have been used as lids for the unrestricted vessels, in order to keep the contents undisturbed and help maintain temperature (either hot or room temperature) for cooking, storing, or serving. Absence of *ollas* at AO1, AB3, AB4, AB5, and AB6 is remarkable, especially when contrasted with their presence—although minimal—in M1. Constructors of M1 at Aguas Buenas apparently cooked and stored food and beverages in *ollas*, while dwellers of Alberto Obando and the people who left their ceramic traces at AB3, AB4, AB5, and AB6 apparently did not include this vessel shape in their kitchenware, at least in the excavated contexts.

The manufacturing processes involved procurement of local clays, often used without any visible modification, but with recurrent sieving, sorting, and tempering practices. Clays of very coarse to coarse grains were preferred for potting, but some medium grain ones were also employed (AO1 and AB3). Tempering within all excavation units consisted of grinded quartz and feldspar fragments, but M1 also featured grog in all of its petrographic groups except for one (Casale 2017, 95-96). Grog tempering is absent in the rest of the sample analyzed for this manuscript, except for one sherd at OP1, a later context. Geochemistry has established that these clays were local (Casale 2017), so a divergent microtechnical tradition at M1 should be considered. Fashioning involved coils between 0.5 and 2.5 cm, placed equidistantly with gestures from outside to inside, inside to outside, or alternate. Lip coils were either the same size of the rest of the vessel's coils or larger. Pressure was exerted through pinching and drawing bodily gestures, while finishing was usually undertaken on wet clay with a dry tool or fingers, leaving traces such as threaded striations combined with protuberant grains. Leather hard clay finishing (shaving) was also present but in minimal quantities. Surface treatment involved leather hard clay smoothing, coating with slips, and occasional burnishing. Firing was done in oxidizing atmospheres (M1 is the only context where reduction is also present), with temperatures below 750 °C.

Decoration practices were also homogeneous not only in regards to technique but also aesthetic preferences. Fragments featuring slips comprised 75.0-80.0% of the sample analyzed for both AO and AB excavation units, but the ubiquity of other decorative techniques was differential depending on the context. At AO1, for example, only 5.0% of the assemblage was decorated with other techniques, while AB3 featured 21.0%, an increase that is interpreted as a result of the contextual differences between the two excavation units—AB3 is from a large public area, while AO1 is associated with a low platform mound. These techniques involved double slips, with a preference—in decreasing occurrence—for red on white and red on orange within both AO1 and AB3, as well as orange on white and brown on red in AB3, and brown/orange, black/red, and brown/white exclusively excavated at M1. A fragment featuring triple slip coating (red/orange/white) was exclusively found at AO1. The rest of the techniques involved appliqués (coils), incisions (parallel and chaotic thin lines <0.5-1.0 mm, done on leather hard clay), and corrugated external surfaces (present only at AO1 and AB3), as well as appendages (zoomorphic adorno at AO1 and M1, mammiform support exclusively at AO1, geometric supports, handles, and lugs on both AB and AO contexts, and a zoomorphic support at M1). Additionally, AB4 featured a sherd with red-on-white decoration. Chromatic preferences also include the minimal yet consistent presence of fine orange paste sherds, which contrast with the more common brownish tones.

Regarding lithic technologies, chipped stone industries are, along with ceramic fashioning and mound construction, a ubiquitous and continuous thread in human experiences throughout the valley of Juigalpa. In contrast, paralleling surface survey results, ground stone fragments were found in minimal quantities during excavations for the contexts analyzed in this section; only three fragments were retrieved from excavation unit AB4 (layers II and III, between 10-50 cm below topsoil). Chipped stone technologies at Alberto Obando were characterized by a flake industry (17.3 mm average longitude), with a preference for white 56.4%, purple 18.5%, and pink 8.7% chert for raw materials (Jiménez Castillo *et al.* 2019). Only 2.0% of the flakes presented marginal denticulated retouching, which did not feature techno-morphologic standardization related to a specific use and function (Jiménez Castillo *et al.* 2019). Additionally, five "Cuapa scrapers" (Rigat 1992) were retrieved from excavation unit AO1; this lithic tool is now being re-evaluated as a debitage core related to flake and sheets (Moreno de Souza *et al.* 2020) and with an earlier occurrence than previously outlined (Gorin 1990; Rigat 1992). These cores were absent within the Aguas Buenas units, whose chipped stone industry was also characterized by end products consisting mainly of small-sized flakes mostly manufactured from flint, as well as a few unifacial scrapers. In general, all chipped stone fragments seem to have been subjected to fire after their deposition, possibly as part of waste discarding processes. However, it is important to note that ceramic fragments did not show evidence of fire after discard, suggesting different disposal practices for the materials. Apart from that, the bifacial tools show intentional thermal alteration related to their manufacture as well (Jiménez Castillo *et al.* 2019).

As outlined in Chapter 2, rock art in the research area is characterized by sculpture, petroglyphs, and carved *metates*. Aguas Buenas is characterized for its large amount of petroglyphs, not only within the site (Vlaskamp 2012; Vlaskamp *et al.* 2014; Arteaga 2017; Auziņa 2018; Donner *et al.* 2018), but also in the surrounding ones, both mounded (Lázaro Villegas, Sebastián Ríos, Juan Suárez, and Adam Martínez) and unmounded: for example the particular case of Las Pocitas (Arteaga 2017; Donner *et al.* 2018). Petroglyphs were always found on bedrock outcrops, except for two samples that were "mobile" (carved on a piece of quarried bedrock). First, a spiral motif recorded on the surface at Barillas, and a second one, extremely relevant to the contexts discussed in this section, that was excavated from M34 at Aguas Buenas (Vlaskamp *et al.* 2014, 11). This petroglyph, which features lines and spiral motifs, was part of the construction materials, specifically one of the rocks forming the outside ring of the mound (Vlaskamp *et al.* 2014, 10). Since the construction of M34, part of the *Outer Arches*, is possibly related to the construction of M177 (cal 622 ± 20 CE), this would entail the first attempt to date rock carving practices at the valley. While sculpture has already been found in dated contexts (Gorin 1990; Rigat 1992; Arteaga 2017), petroglyphs had been elusive.[86] Now, we can confidently state that at least between cal 622 ± 20 CE and cal 1268 ± 12 CE, rock carvings were part of the lives of the dwellers of the valley, occurring with more intensity alongside the construction and practices of Aguas Buenas. The strong relationship between petroglyphs, geomorphology, and Aguas Buenas is clear in the distribution of the rock carvings recorded during survey (Arteaga 2017, 129; Donner *et al.* 2018) and the more detailed surveys conducted within the site itself (Vlaskamp 2012; 2014; Auziņa 2018). Examples of both two- and three-dimensional sculpture in clay, such as zoomorphic adornos and supports, and bas-relief representations on pottery, were excavated from Alberto Obando and Aguas Buenas. Even though no sculpture fragments or basalt columns in archaeological context have been found in Aguas Buenas or the sites within its vicinity (Arteaga 2017), the intersection between the itineraries of two- and three-dimensional representations in different materials of similar *subjects* should be explored.[87]

As stated in Chapter 2, no paleoenvironmental studies have been conducted in the area at the time of this research; therefore, it is important to discuss any relevant data available. Two samples from Aguas Buenas were tested through AMS for Carbon-13 (13C) signatures. The sample retrieved for mound 177 (M177) yielded -17.9%, which could be related to CAM plants, while the sample excavated at AB1 featured -27.2%, suggesting C3 plants. Even though

86 In spite of this, dating sculptures in context is also complicated due to decontextualization practices.

87 At Lázaro Villegas, located less than 200 m south of Aguas Buenas, a basalt column was found, but preliminary assessment of the excavated portion of this site—still yet to be fully analyzed—points to dates later than cal 900 CE. However, it is possible that other sections of the site might be earlier or later than this hypothesized time frame.

macro and microbotanical analysis of the excavation units is still underway, preliminary results have identified several starch grains and phytoliths within a sample excavated at AO3 that shared stratigraphic relationships with the charred residues dated through AMS. Even though identification was not possible, the starch grain yielded evidence of a dry cooking environment involving high temperatures, while most phytoliths were grouped within the Poaceae family, and one was identified as maize (Angeles Flores 2019). This limited evidence represents a unique insight regarding ancient foodways, particularly placing the production and consumption of maize related dishes as early as cal 300 CE for the valley of Juigalpa. Since no ancient faunal remains were collected in association to these contexts, it is not possible to establish consumer-consumed and hunter-prey relationships. However, ceramic tools possibly related to fishing practices were excavated at M1 in Aguas Buenas, so it is feasable that the builders of at least this structure procured fish from the streams and rivers throughout the valley, and maybe also from Lake Cocibolca as well. Apart from that, representations of animals in ceramics (usually 3D) and rock art (2D) are common (Vlaskamp 2012; 2014; Arteaga 2017), and they evince relationships between humans and—at least—small to medium sized mammals, reptiles, amphibians, and birds. These interactions were deep enough to inspire their planning, modelling and carving, and maybe one of the many unintended consequences (Joyce 2004) of these palimpsests is memory work. In lieu of the absence of zooarchaeological remains to further illuminate the interactions of humans and fauna, it is possible to at least ascertain glimpses of them through these representations.

Stratigraphy at Aguas Buenas was quite homogenous, with the core of material culture present in one single soil horizon (AE) for all excavation units except for unit AB3, which featured the highest cultural intensity in horizon AB, right below AE. The earliest radiocarbon date from Aguas Buenas was excavated precisely within this soil horizon (AE)— containing ceramics, chipped stone, and burnt clay—and yielded cal 486 ± 65 CE. Therefore, practices at the *Empty Area* of the site, and possibly within the *Central Area,* predate the construction of the mounds forming the *Outer Arches*, which dated to cal 622 ± 40 CE. For Alberto Obando, excavation units also yielded one main stratigraphic unit impacted by human practices: horizon AB for excavation units EAO1 and horizon AE for excavation units EAO2 and EAO3. At excavation AO1, within horizon AB, a sherd with charred incrustations on its internal surface dated to cal 433 ± 97 CE and was found in stratigraphic association with other ceramics, chipped stone and burnt clay. Variations in the ubiquity of various types of traces of human presence in the different soil horizons might then be interpreted as a result of depositional processes related to the location of each excavation unit in relationship to the slopes that characterize the area and is not necessarily suggestive of temporal differences.

Since sedimentation and soil formation processes in these kinds of contexts are subject to constant erosion, taphonomic and stratigraphic analysis should be undertaken cautiously. For example, all sites located within this same geomorphological unit (Lázaro Villegas, Sebastián Ríos, Aguas Buenas, and Alberto Obando) featured faunal remains of European-introduced species—particularly *Bos taurus*, due to contemporary cattle ranching practices—within levels and layers where archaeological materials were found (Gill *et al.* 2019). Also, attempts to date these sites using charcoal fragments (Aguas Buenas, n=2) and charred seeds (Lázaro Villegas, n=1) were unsuccessful. In spite of the above, stratigraphic analysis, in combination with the evaluation of the material evidence previously discussed, allows for certain interpretations to be made regarding the sites' chronology and use.

A comparative overview between Aguas Buenas and Alberto Obando can shed more light on human experiences at the valley between cal 300 - 900 CE. To begin with, both sites share low material densities on the surface, which are not linked to depositional processes, since—as stated above—sedimentation is very thin in this portion of the valley, featuring highly shallow stratigraphic columns and mixed deposits, which can represent thousands of years in a few centimeters (Donner & Geurds 2018). However, it is important to note that off-mound ceramic fragments at Aguas Buenas yielded higher erosion than those excavated at Alberto Obando, possibly suggesting a longer surface exposure after their deposition in spite of similar stratigraphic positions. These differential post-depositional erosion processes might be connected to how the sites were experienced. Therefore, Aguas Buenas was possibly cleaned regularly, which would have delayed soil formation processes, but material evidence apart from the mound construction events themselves is elusive.

The differential depositional histories of these two sites suggest that they were not used for similar purposes. The first impressions regarding Alberto Obando pointed towards a domestic use of the space, and analysis of the datasets partially supports this. For example, the different rates of variability among ceramic technologies related to all the different steps of the operational sequence suggest that Aguas Buenas' practitioners were much more socially heterogeneous than Alberto Obando's. Ceramic manufacture suggests that Aguas Buenas ceramics were produced following different microtechnical traditions, whereas Alberto Obando's assemblage was probably manufactured by a group of potters who had visual contact with each other during their learning processes. Also, construction of the geometric section of Aguas Buenas took at least 200 to 300 hundred years, whereas the building of Alberto Obando likely occurred within a much shorter time span.

Consequently, Aguas Buenas—at least between cal 400 and 700 CE—was not "permanently" occupied but was visited by several different communities who built it and possibly used it for gatherings related to the consumption of food and drinks (Donner *et al*. 2017; Geurds & Terpstra 2017), which were possibly associated with the main goal of the site: the construction process itself (A. Geurds, pers. comm. 2019). The assiduity of these gatherings is unclear, but the depositional history of the site suggests that it was probably cleaned—even of vegetation—for most of the year and shows no stratigraphic "gaps", indicating continuous periodic use for a certain amount of years, with uses of lower intensities both before and after that time frame. Even though the architectural geometric patterns of the site suggest design and planning, construction techniques are variable (Geurds & Terpstra 2017; Auziņa 2018). Therefore, both ceramic and building technologies are highly variable within the site and imply the confluence of divergent microhistories in one monumental project. Radiocarbon dating suggests its transgenerational nature as well.

In contrast, Alberto Obando seems to correspond with a house or groups of different houses belonging to a cohesive social group that probably lived in or used the site for a limited number of generations. Mounds circumscribing the flat central area of the site were highly standardized in measurements (both width and height), construction materials, and their relationship to the landscape (sometimes defying topography, a trait shared by Aguas Buenas' structures) (Arteaga 2017). Thus, both morphological and technological aspects of these low platforms were consistent, and excavations suggest that most of the practices, including differential firing of waste disposal, were performed in relationship to these mounds. The two larger mounds, located within the geometric configuration, yielded considerably lower amounts of material culture, so it is possible that some of the mounds circumscribing the circular configuration were mainly used for daily practices, such as cooking and processing food and other materials. In contrast, the large mounds may have been related to practices involving less material culture, such as sleeping, eating, gatherings, and other communal activities. The largest mounds do not show an accumulation of any type of commodities, so their size does not necessarily imply a social hierarchy within the community. Instead, it may suggest differential practices that involved a larger number of people that necessitated additional space.

The results of this research prove that cooking practices in Alberto Obando predate these practices at Aguas Buenas; therefore, construction of Alberto Obando was clearly the first perennial architectural effort in the valley, followed by Aguas Buenas. However, that does not necessarily mean that Aguas Buenas was not a landmark and place of memory beforehand. In fact, it is possible that it had been used for centuries preceding its monumental architectural construction by communities possibly living on the Juigalpa plateau, in the mountains surrounding the valley, or by the Cuisala river south of Juigalpa. This is evinced by the fact that practices performed at the *Empty Area* of Aguas Buenas predate the construction of the *Outer Arches*.

The first frame of this time lapse starts with a valley that is both similar and different from the one observable today. Human transformations not only consisted of the modern urban area of Juigalpa, the construction of roads, and the architectural endeavors of the ancient dwellers. Deforestation related to urbanization and economic activities, such as cattle ranching, have dried the valley, resulting in profound transformations of water flows, animals, plants, soils, and people. Therefore, ancient communities might have lived in a slightly different valley, where water, food, and several materials used in daily practices were readily available. Dwellers of the valley were familiar with all its flows and intersections. The construction of architectural structures commenced

Figure 225: Example of a contemporary house in the area, for which bedrock was used as a foundation (credit: Alejandro Arteaga).

at Alberto Obando, a small place for permanent or seasonal living. Then, several communities—maybe including the dwellers of Alberto Obando—shared certain views that led them to monumentally transform the valley. This constellation of practitioners shared certain ideas, such as mound building, ceramic manufacture, chipped stone cutting implements, the practice of carving rocks, a geometric sense of built space that mainly followed an elliptical logic, and a strong relationship with seasonal streams that made them preferable to permanent rivers. Unfortunately, paleoecological data is lacking in the area, but these factors could suggest a much more humid valley, in which architectural efforts were only made on the slopes of the mountain range due to possible overflows of the Mayales river and the Carca streams during the rainy season, as well as the vertisol floodplain to the south. The shallow soils of this upper part, in combination with secure bedrock outcrops, could have formed a very good foundation for architectural structures as evinced by the excavation of mounds at Aguas Buenas and by the construction practices today (**figure 225**). Also, the excavation of bedrock at Alberto Obando not only evinces the possible extraction of materials for construction purposes, but also the idea to maybe elevate and channel access to the mounded area. In Aguas Buenas, a similar feature—an access—was also created but instead served as a pathway that cut across the *Outer Arches* and led to the *Central Plaza*. Gathering, cooking, serving, building; doing all these things together were practices shared by these communities, which possibly formed a constellation of practices that bonded different social groups, as evinced by ceramic manufacture.

To summarize, human trajectories in the valley of Juigalpa between cal CE 300 and 900 entwined the utilization of local and regional knowledge for the construction of perennial structures that—at least at Alberto Obando—possibly supported perishable

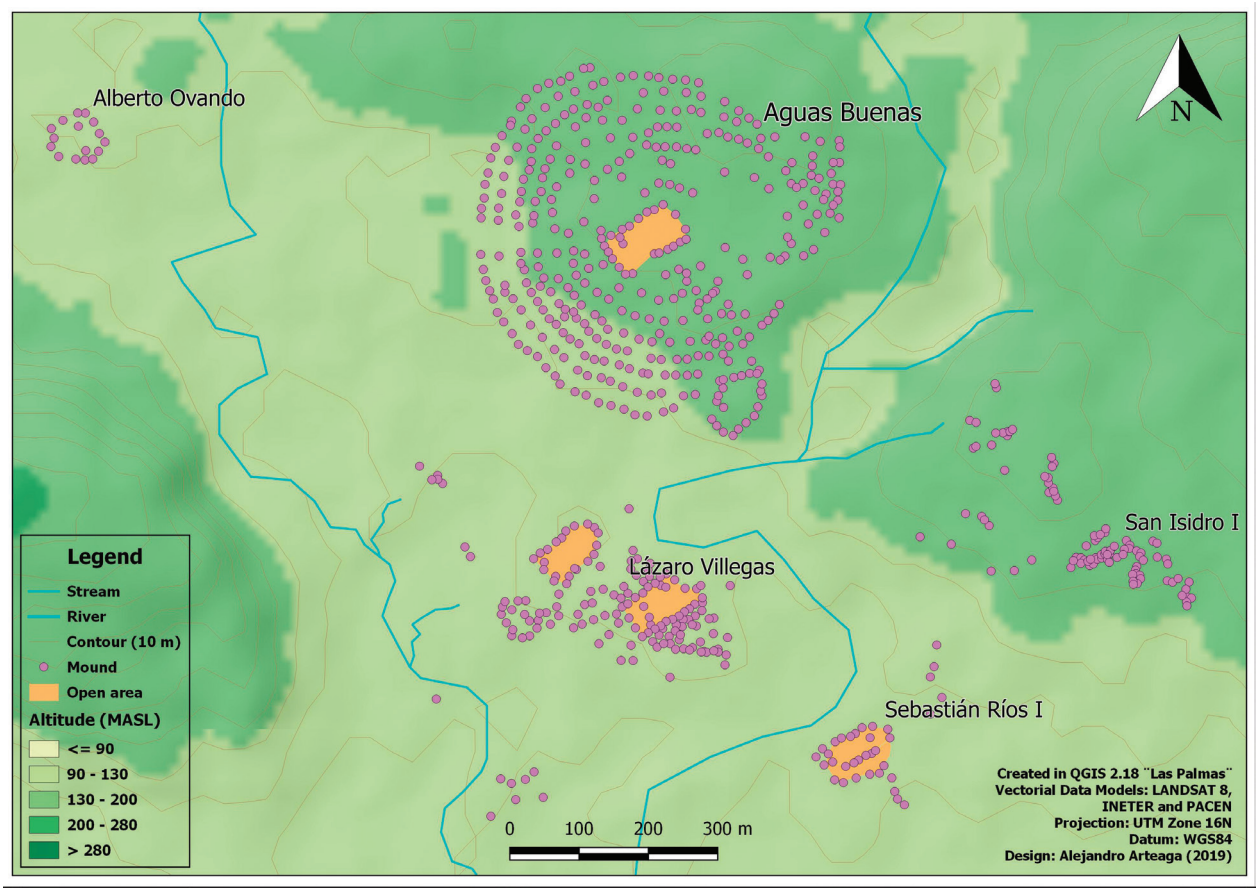

Figure 226: Map with AB and surrounding sites, featuring quadrangular mounded configurations (credit: Alejandro Arteaga).

buildings. Life was marked by seasonality, monumentality, and mobility; transformation of the landscape involved geometric patterns. Dwellers did not prefer the valley for long term commitments beyond the safe dry foothills of the Cordillera Amerrisque, and sites were not intensively used, as the low densities of material culture suggest. While Alberto Obando appears to be the effort of a single community and was likely occupied between one and three generations, Aguas Buenas clearly involved the participation of several communities throughout and possibly beyond the valley for many more generations. Ceramic analysis of the earliest portions of the site (AB3, AB4, AB5, AB6, M1) show critical technological coherence with the Alberto Obando assemblage but also divergence. For example, the ceramics excavated at M1 yielded sherds coherent with Pacific Nicaragua technical traditions (C. Dennet, pers. comm. 2019), as well as fragments identified as part of the Sulaco valley technical complex in Honduras (R. Joyce, pers. comm. 2018), and they are also characterized by recurrent tempering with grog, while that paste preparation practice is virtually absent not only at AO, but at the rest of the sites analyzed for this book (except for one single sherd excavated at OP1). Moreover, a recent geochemical clay procurement study established that clays employed for manufacturing the ceramics retrieved at M1 in Aguas Buenas were of local origin (Casale 2017). At the same time, fashioning and finishing are similar, with a preference towards wet clay and end products dominated by cooking preferences related to unrestricted vessels.

There are several other sites surrounding Aguas Buenas apart from Alberto Obando, including Lázaro Villegas, Sebastián Ríos, and Alcides Montiel. Unfortunately, analysis of the results of the excavations conducted at these sites have not

been completed yet, so their relationship to Aguas Buenas remains obscure. Radiocarbon dating at the base of the main mound of Alcides Montiel, located less than 1 km south of Aguas Buenas yielded cal 767 ± 98 CE, which strengthens the idea that at least some of the mound clusters located immediately around Aguas Buenas could be directly related to it. Apart from that, the *Central Area* of Aguas Buenas, a quadrangular architectural configuration 65.0 m long, comprised of less than 30 mounds distributed in a rectangular designed over a flat terrain (Auziņa 2018, 90-91), shows strong similarities with architectural features present in Lázaro Villegas and Sebastián Ríos **(figure 226)**. These two sites also have two quadrangular plazas—as defined by Arteaga (2017)—with a NE-SW orientation identical to that of Aguas Buenas' *Central Area*, with similar measurements, a comparable number of mounds, and similar topography. At Sebastián Ríos, the quadrangular architectural feature also shares with Aguas Buenas the presence of an inner and outer rectangle of mounds. Arteaga proposed that Alcides Montiel might also have had a rectangular configuration such as the ones described, which was destroyed by the construction of the La Libertad road (Arteaga 2017, 252). This observation, based on spatial analysis, strengthens the possibility of a chronological connection between the sites forming the Aguas Buenas mound cluster.

8.2.2 WATER WORLDS (CAL 900 - 1250 CE)

The next sites in this time lapse were built following similar technological concepts, such as the utilization of quarried bedrock, sediment, and non-organic debris for structuring and filling purposes; however, evidence for the first wattle-and-daub structures, which were possibly placed on top of the mounds, was found. These structures could have also been built as fences to create spatial divisions (A. Geurds, pers. comm. 2019), and while these separations could have been aimed at humans, they could have also involved small animals. Apart from that, there is a departure from the previous geometric forms regarding spatial configuration, and at least three different ways of relating to the landscape are present. First, Aguas Buenas continues to be constructed, but these efforts occur on its eastern side and no longer follow geometric patterns. Practices during this interval are more intense, reflecting human presence for longer periods of time or more repeated occasions throughout the year. Ceramic technologies at AB2 reflect both variability and homogeneity, suggesting a group of potters less cohesive than at Alberto Obando. Technical continuity between Alberto Obando and Aguas Buenas at this moment could suggest that the builders of AO relocated closer to it, together with other related groups that were now part of the same community of practitioners. Spatial logic of these new structures built at Aguas Buenas does not follow the larger geometric pattern but seems to delineate the meandering stream. Also, practices showed more intensity around a large oval platform (M366). This is also a relevant contrast from Alberto Obando, where the largest and most centrally located mound did not yield the highest material culture densities—which was also the case at Alcides Montiel and seems therefore to be characteristic for sites built between cal 300 and 900 CE. This new preference for more intense practices related to the larger mounds within sites is shared with other sites that are contemporaneous to this section of Aguas Buenas (AB1 and AB2), such as Oporta. Also, these places feature flat portions of terrain surrounded by mounds. The second group of sites (Oporta and JOR) are located on the banks of stream meanders (Carca and Manigua) and are also characterized by similar construction technologies that feature a non-geometric spatial logic and plazas surrounded by at least three larger mounds with high frequencies of material culture on their surface and in the subsoil. These sites are smaller agglomerations of mounds found in larger clusters that integrate various mounded sites within a 75.0 m vicinity (Arteaga 2017). The last group of sites (RAI, Sabana Grande, La Pachona) is located in relation to fresh water sources and elevations. Apart from yielding the highest variabilities regarding ceramic technologies, they evince intensive production of ceramics and lithic artifacts, probably for both consumption and trade, as suggested by the higher ubiquity of imported ceramic materials. Therefore, an increasing social diversity—which could also be linked to a population increase—is evidenced not only by the higher variability of technical traditions found in the ceramic assemblages, but also by the increased presence of imported ceramics. Apart from that, Sabana Grande and the northeastern sector of Piedras Grandes II featured sculpture fragments. This last group of sites was studied before by Magnus (1975b; 1975a), Gorin (1990), and Rigat (1992). La Pachona is now under examination by Roosmarie Vlaskamp (Leiden University), while RAI is being

investigated by Irene Torreggiani (University of Oxford). Therefore, analysis is concentrated on the first two groups of sites, along with insights concerning the third group.

Ceramic technologies in AB2, OP1, and JOR2 have distinct trajectories, in which OP1 and JOR2 seem to intersect more often with each other than with AB2. To begin with, the ratio between unrestricted, restricted, and unidentified vessel shapes was consistent, with 88.0%-8.0%-4.0% for AB2, 34.0%-48.0%-18.0% for OP1, and 34.0%-50.0%16.0% for JOR2. Differences in vessel shapes may be related to divergent foodways, which could be both related to context (Aguas Buenas vis-a-vis Josefa Ocón Robleto and Oporta) and content (differential lifeways). Excavation units OP1 and JOR2 were both located next to low circular platform mounds, which were hypothesized to hold a perishable structure on top that possibly served as a household. However, OP1 consisted of an approximation trench at the foot and inside of a mound, while JOR2 was situated in a flat area in between two mounds, a few meters away from them. Material evidence from OP1 suggests an intense use of on- and off-mound sections and a wattle-and-daub structure, with waste discarded at its base. In contrast, the context excavated at JOR2 seems to be related to cooking practices or the preparation of other substances (see stratigraphic discussion below). Even though AB2 is also hypothesized to be in a residential area, ceramics suggest different practices involving more unrestricted vessels and less restricted. This is possibly connected to divergent cooking, storage, and serving practices.

Table 23 outlines the most common vessel shapes at each excavation unit in decreasing order; even though morphologies and their ubiquity were fairly coherent across the three different excavation units, there is variability in the sizes that will be briefly examined. In general, *ollas* tended to be slightly smaller at JOR2 than at OP1 and AB2 and outflaring straight walled jars (CRD) reached larger proportions at JOR2 in comparison with the two other excavation units, while straight walled jars (CR) achieved smaller sizes at OP1. AB2 yielded larger curved jars and plates (P), and OP1 featured larger convergent straight walled jars (CRC) than the rest. These differences may relate to the divergent excavation contexts and practices associated to them. Other vessel shapes present in the sample are *molcajetes* (at JOR2, OP1, and AB2) and colanders (AB2 exclusively), which entail differential culinary practices involving grinding of soft or wet species, as well as sieving and steam boiling. Colanders were also present at Sabana Grande, La Pachona, and Roberto Amador.

Excavation unit	Vessel shape	⌀ (cm)	Wall thickness (mm)
JOR2	Ollas	4.0-22.0	5.0-10.0
OP1	Ollas	6.0-34.0	3.0-9.0
AB2	Ollas	7.0-30.0	4.0-12.0
JOR2	CRD	8.0-45.0	3.5-10.5
OP1	CRD	12.0-36.0	3.0-11.0
AB2	CRD	8.0-30.0	4.5-8.5
JOR2	CR	14.0-45.0	5.0-10.5
OP1	CR	4.5-31.0	2.0-11.5
AB2	CR	17.0-45.0	5.0-7.0
JOR2	Curved jars	20.0-35.0	4.0-8.0
OP1	Curved jars	10.0-25.0	4.0-6.0
AB2	Curved jars	15.0-50.0	4.5-9.0
JOR2	CRC	20.0-22.0	5.0-6.0
OP1	CRC	9.0-35.0	5.0-8.0
AB2	CRC	5.0-18.0	5.0-7.0
JOR2	P	11.0-30.0	4.0-7.5
OP1	P	30.0	5.0-7.0
AB2	P	40.0	4.0

Table 23: Outline of the most common vessel shapes within the sample excavated and analyzed.

Ceramic technologies at these sites develop different series, meaning that a set number of paste recipes were used in different frequencies and grain sizes. This might suggest diversification connected to standardization, possibly suggesting a higher degree of specialization when comparing with earlier pottery traditions. As mentioned above, it could also be connected to higher numbers of producers. Production was possibly still conducted at the household level but may have become more concentrated in certain households or groups of people within the community. Paste preferences involved very coarse to medium (JOR2), very coarse to fine-silt (OP1), and granule to fine (AB2) local clay recipes. At JOR2, all petrographic groups featured paste preparation practices (sieving, sorting, and tempering), while OP1 and AB2 also

yielded clay sources that were used as-is. At all three excavated contexts, sieving was usually followed by tempering but was not a prerequisite for adding anti-plastics. Intentionally added materials consisted of both volcanic rock inclusions as well as quartz and feldspars at JOR2 and OP1, but only quartz and feldspars at AB2. Therefore, concerning paste preparation, tempering practices at AB2 evince continuity with the materials excavated at AO1, AB3, AB4, AB5, and AB6, while they diverge from JOR2 and OP1. In this sense, OP1 could possibly show connections with Aguas Buenas M1 because they are the only contexts where grog was identified for clay recipes related to the manufacture of an incised *olla* (OP1.62.1), which was identified as Santa Barbara from the Ulúa Valley in Honduras (R. Joyce, pers. comm. 2018). Grog is not reported by Gorin (1990, 718-741) for central Nicaragua, nor by Dennett (2016, 177-210) or Platz (2015) for Greater Nicoya ceramics, both from Nicaragua and Costa Rica—also present in the sample. Other paste preparation practices involved sorting at AB2, and OP1 featured several unique traits, such as tempering with grog—only present in one sample—mixing of clays, and one petrographic group that is characterized by a geology connected with intrusive igneous rocks. The rest of the samples analyzed for all sites in this manuscript featured extrusive igneous rocks instead. Additionally, OP1 yielded samples with higher contents of volcanic glass and ash, which could suggest different geological backgrounds related to clay outcrops.

Fashioning involved coils between 0.4 and 2.5 cm, with a clear tendency in all excavated contexts towards coils between 1.0 and 1.5 cm. This suggests socially learnt bodily gestures connected to separating the clay mass into parts of similar sizes, which were then worked through rolling gestures for creating coils. These coils were then placed equidistantly with oblique movements, usually from outside to inside at JOR2 and OP1, but also from inside to outside in slightly fewer cases. At AB2, variability in these gestures was higher, also featuring oblique movements, but mostly inside to outside, though opposite and alternate modes were also present in minor quantities. Bases were fashioned through spiral coiling movements at all three contexts, which suggests connections among the potters in the sense of specific transmitted knowledge, possibly from generation to generation but also between peers. At JOR2, lip coils were either the same size of the rest of the vessel's coils, smaller, or larger. At OP1 they were either the same size or smaller, and at AB2 they were of equal size or larger.

Pressure was exerted through pinching and drawing bodily gestures, and pre-forming was conducted on wet clay at both JOR2 and OP1, with traces related to scraping with a tool or the fingers at JOR2, as well as a scraper (7.0-10.0 mm wide) and calabash shell at OP1. At both sites, tool marks were usually identified in the interior surfaces, which could be interpreted as specific bodily gestures connected to tool use for the internal walls of the vessels combined with the free hand and fingers as support for the external walls. Again, these gestures suggest strong ties in the learning processes of these potters. AB2 featured a unique combination of wet clay techniques, such as scraping with a soft tool or finger—either dry or re-hydrated in the majority of the samples—but also leather hard clay shaving, as well as smoothing with re-hydrated fingers. The identification of both techniques in one sample suggests integration of different techniques rather than divergent potting traditions. Also, leather hard clay techniques were suspected for some samples at JOR2 and OP1, but later surface treatment may have erased the traces. Smoothing was usually done in leather hard clay with a soft tool, and both JOR2 and AB2 featured unusual burnishing, which was more common at OP1.

Coating with slips or *barbotine* was common, but with different frequencies: 44.0% at JOR2 (mostly red, but also orange and brown), 90.0% at OP1 (red, orange, and brown), and 71.0% at AB2 (red, reddish brown, bright orange—distinctive for this assemblage—brown, and minimal white, only present in one single macrofabric group and outliers). Other decorative techniques were also recorded, again with different frequencies depending on the excavated context (7.0% for JOR2, 12.0% for OP1, and 15.0% for AB2). Incisions, appliqués, paint, and appendages were present at all three excavation units but suggested both divergent and convergent itineraries. For example, all contexts feature bands of subparallel incised lines oblique to each other, both on internal and external surfaces, and also criss-crossed lines incised on necks and shoulders of *ollas*. Moreover, combined decorative techniques were also present, generally integrating appliqué with either punctuations, incisions, or impressions. *Acanaladuras* were absent at AB2 but present in the other two units. Carca rims were present at OP1 and possibly also at JOR2, but they were absent at AB2. Paints and slips were also

combined for decorative purposes, and OP1 yielded a bright orange paint that is possibly related to the most ubiquitous decoration in AB2: a double slip formed by a red layer on top of a bright orange layer. JOR2 only featured one double slipped fragment, while the technique was absent at OP1. At AB2, double slipping also combined, in lower quantities than the red/orange tones, red on white and orange on brown. Paint (black, brown, orange, red) was also applied on slipped surfaces (red or white). Additionally, AB2 was characterized by the presence of annular bases; while it is possible that two samples at OP1 also featured them, they are too fragmentary to confirm. Firing was usually conducted in controlled, partially oxidizing atmospheres at temperatures below 750 °C, with higher temperatures in one petrographic group at OP1 and AB2. The latter unit also featured a complete oxidation atmosphere.

At JOR2, a braided handle is reminiscent of the diagnostic Cuapa handles characterized by Gorin (1990, 483); however, manufacturing techniques are different. The particular handle shape at JOR2 was achieved by braiding two coils each measuring 1.3-1.4 cm in diameter, whereas the ones reported by Gorin braided four coils together each measuring 0.7 cm in diameter (Gorin 1990, 483). Other fired clay objects were found both at OP1 and JOR2. At JOR2, clay balls, a seal fragment, and beads—similar to those excavated at La Pachona (R. Vlaskamp, pers. comm. 2016)—were recovered. Apart from that, imported materials from Pacific Nicaragua (C. Dennett, pers. comm. 2019) and Honduras—which usually feature higher frequencies of volcanic ash and glass—were identified in all contexts (R. Joyce, pers. comm. 2018), and JOR2 also featured a fragment of a sherd traditionally ascribed to the León Punteado type. Finally, the JOR2 assemblage is characterized by well-defined use-alteration traces suggesting boiling and over-boiling, while the other two contexts did not yield these kinds of traces. Therefore, the preparation of dishes in a specific way that implied these higher temperatures was done at JOR2 but not at the other two sites. These higher temperatures (up to 300° C), achieved by overboiling, could also explain the absence of zooarchaeological remains in the sample, because their exposure to such heat combined with the generally poor preservation within the research area would have disintegrated them (Gill *et al.* 2019).

Itineraries of lithic technologies show new intersections with the introduction of a bifacial industry, which is only associated with contexts dated between cal 900 and 1250 CE (Jiménez Castillo 2017, 15). Bifacial artifacts and their by-products were only identified at Roberto Amador, Oporta (OP1), Sabana Grande (LD1), and Aguas Buenas (AB1) (Jiménez Castillo 2017, 15) as well as at La Pachona (Pothuizen 2016). Their absence in both previous (AO1, AB3, AB4, AB5, AB6, AB-M1) and contemporary units (JOR2) could be related to contextual differences rather than suggesting a technological shift (Jiménez Castillo 2017, 15). In fact, this presence-absence interplay is another transect of the valley that can shed light on human trajectories. The multiplicity of excavated contexts provides sufficient data to sustain the hypothesis that, even though it is possible that bifacial technology was known and used before cal 900 CE in the valley, there is no evidence to propose that it was produced and used at the excavated sites. The numerous chipped stone surface scatters throughout the valley could be related to this time frame, so maybe their absence in excavation units is related to transformations in production practices—for example from production at or near procurement sites to transport of raw materials to households-workshops. Also, it could indeed be related to how sites such as Alberto Obando and Aguas Buenas were conceived and used by their constructors, which possibly did not entail practices requiring bifacial technology. In either case, human trajectories in the valley implied the production and utilization of bifacial technology at mounded sites, which can be proposed as a "chronological marker" for the research area. Apart from the introduction of bifacial technology, sites dated from cal 900 CE on also see the novelty of obsidian use throughout the valley. Even though fragments are scarce, they seem to be the result of the debitage of small nodules, which are consistent with the sources reported by Garayar (1972) for the research area and the region surrounding it. Therefore, it is possible that obsidian was procured locally, but its introduction may be related with the participation in certain constellations and networks of practices that entailed obsidian work and use.

Regarding rock art, no petroglyphs were found at the excavated contexts except for the ones at Aguas Buenas, which—as discussed before—might be related to the process of constructing the site. In contrast, three-dimensional stone sculpture was found in context at the surface of two sites, Sabana Grande and Piedras Grandes II (Arteaga 2017), which are both located by the Carca-Copelito stream. Basalt columns, which could be related to sculpture carving practices, were found both at Josefa Ocón Robleto and Oporta.

These finds—especially the sculpture fragments—are indeed remarkable in light of the large private and public collections. For example, the Museo Arqueológico Gregorio Aguilar Barea stores more than 100 sculptures of human and animal-like figures with little information regarding their provenience (Geurds *et al.* 2018, 124). In spite of this, provenance by means of geochemical techniques has proved to be promising (Pietersen 2012). Also, numerous fragments can be found in small informal collections at local houses (Arteaga 2017). Again, this shift in sculpting practices could be related to a contextual bias, but a reflection on the possibilities of changing rock art itineraries is also worthwhile. Stone sculpture in the research area is monumental, and manufacturing practices involved several lithologies—mostly igneous, but also some sedimentary rocks—for raw materials (Pietersen 2012, 53) and an ambiguous style (Geurds *et al.* 2018). The monumentality of stone sculpture in the valley was not necessarily always associated to architectural monumentality, as evinced by its absence of this type of materials at Aguas Buenas.[88] However, from cal 900 CE onwards, sites with monumental architecture, such as Sabana Grande, did yield stone sculpture. Sabana Grande is comprised of 80 mounds but is part of a larger cluster that encompases four other sites, including Piedras Grandes II, where the other sculpture fragment was located, and Josefa Ocón Robleto (JOR2). Therefore, petroglyphs seem to be connected with a geometric spatial logic, while sculpture could be linked to site clusters without a specific spatial arrangement. Apparently, this relationship between monumental sites, including different clusters of mounds in relationship to permanent streams without clear spatial arrangements but featuring open spaces surrounded by mounds of various sizes and morphologies, constituted part of human experiences in the valley at the time.

Paleoenvironmental data is limited to samples that were tested through AMS for Carbon-13 (13C) signatures. Samples at Oporta (OP1) yielded both -18.5% and -25.7% values, which could be related to CAM and C3 plants respectively. At Roberto Amador, samples yielded similar values, with -18.5% in a mound context (RAI-M25) and -25.3% at excavation unit RAI1. At Josefa Ocón Robleto, -15.9% was obtained, which could be related to either C4 or CAM plants. Finally, Sabana Grande featured the highest quantity of samples and most variability, with values of -8.6%, -19.8% and -25.7% at excavation unit LD1, suggesting C4, CAM, and C3 plants; while unit LD2 yielded -24.6%, coherent with C3 species. Starch analysis on one sample excavated at AB1 suggests consumption of maize (R. Angeles Flores, pers. comm. 2019), but no other microbotanical data is available for now. In contrast, zooarchaeological remains were extremely abundant for these contexts, which is also an important difference compared to earlier sites, such as Alberto Obando and Aguas Buenas earlier units. This again may be due to sample, contextual, or preservation bias, or reflect differential practices—which can also be in turn related to context, not necessarily reflecting transformations in foodways and human-animal entanglements.

Stratigraphic analysis suggests that the dwellers of Oporta dealt with flooding episodes of the Carca-Copelito stream, while apparently the ones at JOR2 did not encounter such problems. It is possible that the reconstruction of mound OP15 (associated to excavation unit OP1) was somehow related to these flooding episodes but could also be connected to vermin issues or the necessity to expand the mound, among other reasons. The renewed construction effort, though, first evinces curatorial practices related to actual mound use within the valley. Within Aguas Buenas, it is unlikely that perishable structures were built on top of mounds (Auziņa 2018; A. Geurds, pers. comm. 2019). At Alberto Obando, this relationship between mounds and perishable structures on top of them is hard to assess. Even though burnt clay was found at both Aguas Buenas and Alberto Obando, quantities were minimal, fragmentation was high, and no samples evinced the imprints of wooden logs that suggest wattle-and-daub construction practices. That kind of evidence was indeed archaeologically recovered at least from OP1, so clay-based architectural practices were combined with the technologies involved in mound construction. Possibly, the type of sediment utilized for these clay structures is the same one as the one employed today, *lanilla* (E. Castillo, pers. comm. 2016), and the imprint diameter suggests thin tree stems or trunks, which is also habitual nowadays. A main difference between current clay architectural practices and ancient ones could be the absence of grass in the clay

88 Even though sculptures could have been removed from the site, Geurds intensively reviewed the collection at the Museo Arqueológico Gregorio Aguilar Barea and conducted interviews with the land owners of Aguas Buenas, producing negative results (A. Geurds, pers. comm. 2019).

mix within the archaeological samples. According to locals, *lanilla* soil does need tempering materials in order to achieve the right plasticity and stability required for architectural purposes—and also for making ceramics, if combined with other clays—so it is nowadays mixed with grasses. Further analysis of the archaeological samples will clarify which kinds of materials were intentionally added for these purposes, but it can confidently be stated that grass was not used. Stratigraphy at OP2, situated in a flat area surrounded by large mounds, elicited trampling associated with floor surfaces, suggesting this open space was used for circulation and practices related to the largest mounds within the site. Excavation unit OP1 was situated at the base of a mound, while JOR2 was located between two low mounds. Analyses of the stratigraphy and material remains found in each excavation unit suggest that waste was discarded right next to the structures, which were the foundations for wattle-and-daub buildings that required posts to hold a possibly thatched roof. Cooking might have taken place a few meters away from the architectural remains, kitchen areas were kept very clean, floors were swept, and at least the organic debris was burned and then deposited next to the mound. All the excavated sites that yielded radiocarbon dates between cal 900 and 1250 CE (Oporta, Sabana Grande, Roberto Amador, La Pachona, except Josefa Ocón Robleto) show an abundance of zooarchaeological remains. This contrasts their absolute absence in previous contexts. Even though poor preservation could have affected the chances of finding zooarchaeological remains, the complete absence at the earlier contexts of Alberto Obando and Aguas Buenas should be examined in light of the discussions—outlined above—regarding human experiences in connection to those sites, which might have not necessarily involved procurement, processing, consumption, and discard of animals, at least *in situ*. In contrast, all the sites dated between cal 900 and 1250 CE provided extremely useful insights into foodways related to animal dishes within the valley. To begin with, the archaeozoological sample as a whole evinces a clear tendency towards the consumption of mammals (72.0%), followed by reptiles and birds (12.0% each).[89] Bony fish, gastropods, and bivalves were also found in minimal quantities (less than 1.0%) (Gill *et al.* 2019). Exploited mammals consisted of mainly deer, medium and small sized species. Ratios of deer consumption are variable, with Sabana Grande and Roberto Amador sharing similar proportions (46.0% and 49.0% each), with much less ubiquity at Oporta (14.0%) and extremely high frequencies at La Pachona (65.0%) (Gill *et al.* 2019). Butchery practices connected to deer consumption were shared by all sites. At Oporta, Sabana Grande and Roberto Amador, these practices were also applied to smaller mammals. In contrast, La Pachona did share butchery practices of deer with the valley, but processing of smaller mammals showed variability and the possibility of several communities of practice (Gill *et al.* 2019). Therefore, divergences in the ratios of the different species among the valley sites could be related to social factors. For example, the two sites that yielded a considerable higher consumption of deer also evinced fish and bird remains, which are absent at Oporta.

Sabana Grande and Roberto Amador show strong connections with Pacific Nicaragua, as demonstrated by the consistent presence of ceramics either imported from that area or produced locally sharing their aesthetic and morphological standards. In contrast, Oporta shows more visible connections with Honduran materials. At the same time, all sites share the first occurence of obsidian and other practices such as wattle-and-daub architecture, bifacial technology, and zooarchaeological remains, for example. Therefore, several communities and constellations of practices were interwoven in the social landscape of the valley, combining shared butchery practices with divergent ceramic technologies, strong relationships with other areas that were both grouping and dividing dwellers of the valley, and differential foodways that might be connected to these wider constellations and networks of practices. The possibility of a certain degree of social differentiation should be explored, especially when taking into account variability in food and ceramic consumption.

Between cal 900 and 1250 CE, the valley experienced considerable transformations. To begin with, it seems that environmental conditions became dryer, allowing for construction practices at the foot of permanent streams and rivers. People still avoided—as they still do today—the floodplain, located at the center of the research area, for construction purposes, with agriculture, hunting, and procurement of raw materials instead practiced there (Arteaga 2017). The changing environmental conditions could be linked

89 Processing and consumption of these animals may have included the use of fur and feathers as well.

to several factors, but earlier volcanic eruptions in Pacific Nicaragua (Dennett 2016), in combination with the impact of deforestation practices that started at least during the construction of Aguas Buenas and Alberto Obando 600 years beforehand, might have contributed. It is apparent that different groups of people who were related to each other through different communities, constellations, and networks of practice decided to make the valley a more permanent home than before. Human populations increased, both continuing and departing from earlier forms of relating to the landscape. Sites usually comprised several mound clusters that lacked a clear geometric design, possibly suggesting a more organic growth; flat areas surrounded by large mounds were used for circulation and also practices related to food and beverage preparation and consumption; waste was discarded next to mounds with previous burning of organic debris; and kitchen areas appear to be outside of mounded structures and kept clean. These mounds held perishable structures and were possibly associated to three-dimensional stone sculpture. Lithic technologies beyond carving practices entailed the production of bifacial artifacts as well as obsidian work, which were absent before. Foodways seem to evince both continuity and departure from earlier traditions; new vessel shapes such as colanders and *molcajetes*, together with the high frequency of faunal remains, are evidence of some of these shifting tendencies. Sites were abandoned without traces of burning, flooding, or a less intense use; therefore, it is hard to assess which decisions led most dwellers of the valley to possibly look for alternative places to call home.

8.2.3 DISTANT NEIGHBORS (CAL 1250 - 1450 CE)

Radiocarbon assays dated between cal 1250 and 1450 CE were retrieved from two different excavated sites: Barillas (UBI), located by the Mayales river, and Rosa Dolores Oporta (RDO), situated next to the Carca stream. Since both sites differ in spatial configuration, number of mounds, building techniques, and material culture, they are discussed separately, and comparisons are drawn at the end of this section. However, it is important to mention that, for the first time since cal 300 CE, human experience within the valley of Juigalpa does not seem to be related to Aguas Buenas in any way or at least did not involve mound construction practices or the consumption of food and beverages at the site. Population densities decreased, and communities seem to be more disconnected than before, possibly due to the lack of a shared project, such as Aguas Buenas.

The people of the cliff

The Barillas site is a large group of 129 mounds located on a steep alluvial terrace of the Mayales river. The site was constructed following the valley's technical tradition, which integrates quarried bedrock fragments, sediment, rocks, non-organic household debris, and the utilization of natural bedrock elevations as foundations for structures. Clay architecture was also practiced at Barillas, as evinced by a fragment of burnt clay excavated at UBI3AA, which shows the imprint of thin trunks on one side and a flat surface on the other. A particularity of the mounds at Barillas is the inclusion of small river cobbles to fill mounds, something that was not observed in excavations at other pre-Hispanic sites. Apart from that, the site features a spatial organization that combines open flat areas surrounded by mounds, mortars carved on bedrock outcrops (both next to mounds as well as a few meters away), and a spiral petroglyph.

Regarding ceramic technology, end products showed a clear tendency towards unrestricted shapes (75.0%), which shows continuity with sites such as Alberto Obando and the earliest sections of Aguas Buenas. The variability in paste recipes identified at the site—both macro and microscopically—denotes the utilization of various local clays, possibly all procured at the vicinity of the site by the shores of the Mayales river. The simultaneous exploitation of several nearby clay outcrops could be connected to other practices related to the Mayales river, such as agriculture, hunting, fishing, and the procurement of raw materials, wood, and water. In fact, paste preparation involved all of these practices, since tempering, sieving, and mixing—all requiring surveys to collect raw materials and tools—were all identified in the sample analyzed. Apart from that, the combination of variability in raw material exploitation with the creation of several ceramic series implies a well-developed manufacturing tradition rooted in knowledge of the environment, as well as the pottery production process, and the challenges of different consumption practices. For example, tempering practices were identified as functional (Donner *et al.* 2019), and mixing of clays was carried out for certain vessel parts, such as bases.

In this case, combination of different clays was not necessarily functional, with the base featuring finer grain sizes that the vessel walls.

Heterogeneity in clay recipes is contrasted by a very homogenous roughing-out process, including coils exclusively between 1.0 and 1.5 cm. An exception are the *comales*, a newly introduced griddle-like shape produced following local microtechnical traditions and featuring larger coils between 1.5 and 2.5 cm. The function and use of these vessels apparently not only determined production choices reflected in paste preparation but also in coil size. Coiling technique was extremely homogeneous, with specific gestures repeated all over the sample analyzed, featuring alternate and oblique positioning followed by pinching and drawing. Finishing was undertaken on wet clay without the use of a hard tool, and surface treatment involved leather hard clay smoothing and coating with slips. Decoration techniques aside from slipping (66.0%) were very scarce, only present in 2.0% of the assemblage. Firing was also fairly homogenous, with oxidizing atmospheres prevailing.

The contrast between clay procurement and paste preparation variability and highly homogenous fashinioning, finishing, surface treatment, firing, and decoration techniques reinforces a hypothesis based on local production with some degree of functional variability, at least for operational sequences Barillas-I, Barillas-II, and Barillas-IV. Bodily gestures and tool kits were shared by a group of potters that learned their craft in a very similar context. The exception—and reinforcement of this idea—is operational sequence Barillas-III, which not only implied divergent clay procurement and preparation practices, but also a highly standardized technical approach with regular sizes of coils—which always measured 1.0 cm—as well as differential firing practices. Apart from that, it is the only technical group featuring a very fine matrix, while the rest of the assemblage at Barillas, regardless of the function and use of sherds, were manufactured with coarse to very coarse pastes. All these traits, combined with a preference for adding supports as appendages—not exclusive to this sequence—denote common technical and aesthetic perspectives that are, in contrast to the rest of the operational sequences, identified as local. While it is certainly possible that this clay was procured elsewhere—it is the only petrographic group lacking the signature of lamellar plagioclase with orthopyroxenes and olivine—practices from the sequence Barillas-III are very similar to the other ways of manufacturing pottery found at Barillas. Therefore, it is important to ask how this partial technical and aesthetic compatibility (fashioning, vessel shape, and tendency to add supports) relates to the differences recorded in paste preparation, firing, and decorative techniques. The end products of operational sequence Barillas-III were already classified as one macrofabric group, meaning that their clustering is evident even from a macroscopic perspective. A broader overview of the context of these finds will aid in explaining these data.

The operational sequence Barillas-III was exclusively excavated from stratigraphic unit UBI11B, which also yielded materials from Barillas-I, a sequence that mainly includes the *comales*. This stratigraphic coherence should be taken into account because it suggests an association between imported materials (Barillas-III) with a newly introduced vessel shape manufactured locally that might have entailed preparation of communal foods (Donner *et al.* 2019). Griddles are completely absent from all of the other contexts excavated at Barillas, and the lack of *molcajetes* and colanders contrasts with culinary practices at the other sites previously discussed.

Lithic technologies at Barillas continue with the local flake and sheet industry, mainly using chert, and production of Chontales cores, as well as scrapers. Sculpture is absent, and only one two-dimensional rock art fragment—a spiral petroglyph—was found on the surface, carved on a quarried piece of bedrock; therefore, its provenance is questionable. Obsidian was absent in all of the excavated contexts at Barillas, which is a clear departure from the immediately previous sites but could possibly suggest connections with Aguas Buenas and Alberto Obando. Absence of bifacial technology could be connected to divergences in foodways and other practices, but the total absence of faunal remains makes interpretations difficult.

Paleoenvironmental data is reduced to two samples that were tested through AMS for Carbon-13 (13C) signatures, which both yielded values (-13.6% and -14.7%) that can be associated to C4 or CAM plants. Microbotanical analysis of samples excavated at UBI1—*olla* fragment, *comales*, and plates—provided evidence for chili pepper, maize, and manioc consumption (Ciofalo *et al.* 2020). In particular, flat breads were possibly prepared with maize and manioc flour, or with a combination of both. *Tortilla*-like breads combining manioc and

maize flour are considered a delicacy within the research area by locals today (A. Villegas, pers. comm. 2015). Microbotanical studies point out that manioc and maize were also cooked in *ollas* with the addition of water (Ciofalo *et al.* 2020), so soups and stews might have also been part of the culinary practices at Barillas. Even though no faunal remains were retrieved during the excavations—which is possibly related to a conservation bias—a few zoomorphic representations were identified in the ceramics as supports depicting mammals and birds.

Stratigraphic analysis at Barillas suggests that, as in other sites before, flat areas surrounded by mounds were places mainly related to circulation and some practices related to food and beverage preparation and consumption. Mound use depended on location within the site; large structures surrounding flat open spaces were used for communal eating and drinking of non-daily products, such as flat breads cooked on griddles (Donner *et al.* 2019; Ciofalo *et al.* 2020), whereas mounds outside of the flat area configuration involved practices necessitating a higher number of ceramic vessels—possibly daily cooking—and unmounded areas within the open sections were mostly for circulation. Ceramic manufacture, lithic technologies, mound construction practices, and petroglyph carving are all itineraries present at Barillas and at different sites throughout the valley from cal 300 CE. Association to permanent water sources, wattle-and-daub buildings, and plaza configurations surrounded by mounds are traits present since cal 900 CE that continue through Barillas. However, a departure from immediately preceding practices is evinced by the absence of monumental stone sculpture and obsidian, as well as the minimal frequencies of ceramic materials from Pacific Nicaragua.[90] While these itineraries show certain discontinuity, other ones continue or are re-engaged with, evincing how continuity and discontinuity both play a role in the various intersecting trajectories of the valley.

Digging as re-beginning

The interweaving of continuity and discontinuity of practices is clearly evinced at Rosa Dolores Oporta, where two architectural features are combined. First, data shows a "comeback" of a geometric spatial configuration, featuring a mound at the center and adaptations to the topography; second, located just a few meters away, a flat open area is surrounded by larger mounds, with high densities of surface materials. Also, the site was constructed at the foot of a curve on the Carca-Copelito stream, on top of the hill, but mainly sloping down towards another connected stream located 150 meters south. Mound construction practices involved regularly-sized low platforms that likely held wattle-and-daub structures arranged in a V-shape design on the slopes of a hill, with a mound at the top of the elevation. Apart from that, the open area was formed by three large mounds surrounding a flat terrain, where a vessel was purposely buried before this section of the site started to be used. Mound construction practices followed the traditional valley ways, in which quarried bedrock, river stones, sediment, and debris from ceramic and lithics were used as filling for structures surrounded by a ring of larger rocks. Excavations at RDO1 also evinced a hearth that was possibly used during the construction of the mound, so both excavation units at the site showed building practices on top of previously used areas, even if their use was during or immediately prior to the construction.

Regarding ceramic technologies, the ratio between unrestricted, restricted, and unidentified vessel shapes was 40.0%-32.0%-28.0%, which is divergent from Barillas but consistent with previous sites situated along the Carca stream (JOR2 and OP1). Also, the identification of Carca style rims within the RDO ceramic assemblage strengthens some continuous threads for these sites. Vessel shapes were also consistent with previous forms, but no colanders, *molcajetes*,[91] or *comales* were identified in the assemblage. Apart from that, ceramics at RDO are highly homogeneous in relation to all different manufacturing steps, clay procurement was local—except for possible imported fragments—and paste preparation was uncommon but might have involved sieving and tempering. Fashioning involved

90 Even though the presence or absence of certain raw materials and technologies—embodied in things—can be the result of sample bias, the methodological choice to excavate comparable contexts within the sites, specifically in regards to distance and position of the test pit in relation to mound configuration and topography, ensures that the interplay between presence and absence can be used as an analytical variable.

91 One sample could be interpreted as such, but the sherd is too fragmentary to confirm *molcajetes* at RDO.

assembled elements between 1.0 and 2.6 cm, positioned equidistantly and in an oblique manner. Shaping was done through pinching and drawing, and finishing was done on wet clay, possibly with dried fingers or a tool. Leather hard clay smoothing and coating with slips (33.0%) comprised some of the surface treatment techniques, while decoration (21.0%) mostly involved incisions, appliqué, impressions, and appendages.

Lithic technologies at RDO continue with the local flake and sheet industry, mainly using chert as raw material. A very small fragment (<5.0 mm) of obsidian was found at RDO1, suggesting continuity with itineraries present at previous sites but absent at Barillas. Sculpture and petroglyphs were completely absent from the site and its surroundings, suggesting a possible change in rock art trajectories. The absence of bifacial technology could be related to shifting animal procurement practices (trapping vs. hunting, for example); but scarcity of faunal remains impeded exploring these ideas further. Changes in the procurement of other resources could also be related to the lack of bifacial technology.

Environmental data is only available from C13 signatures, which yielded values associated with C4 or CAM plants (-12.8%), as well as C3 plants (-25.6% and -24.8%). Faunal remains at RDO only consisted of deer tooth fragments found on a hearth feature related to the construction of mound RDOIV9. However, the tooth fragments did not show burn marks (Gill *et al.* 2019). As opposed to the excavations of flat open areas surrounded by mounds at Oporta, but consistent with similarly situated test pits at Barillas, Aguas Buenas, and Alberto Obando, faunal remains were absent within this architectural configuration at RDO. Also, it is important to mention that waste discard practices suggest a departure from previous trends, in which waste was burned and then deposited next to the mound.

Stratigraphy and material culture densities suggest that both sections of the site—the geometric area and the flat open area surrounded by mounds—were used with similar intensity, but the latter shows more trampling and therefore more circulation than the former. As such, it is possible that the open area was more related to communal practices than the lower platform mounds; however, fragmentation of the ceramic assemblage and a lack of further studies concerning lithics, microbotanical remains, together with a scarcity of zooarchaeological evidence, limit further insights. With the available evidence, it can confidently be stated that Rosa Dolores Oporta shows, as does Barillas, continuities and discontinuities in different itineraries. While mound construction, wattle-and-daub architecture, lithic technology, ceramic manufacture, and use of obsidian show clear connections with the rest of the valley, the practice of burying a vessel without human interments at the center of the flat open area was not identified at any of the other sites studied. Also, the absence of petroglyphs and stone sculpture, in combination with the construction of larger mounds within the open area, could indicate divergent paths regarding monumentality, which could be partly shared by Barillas. The return of geometric spatial configurations with a central mound—that does not necessarily evince the highest density of material culture at the site—also connects RDO with earlier ways of conceiving the landscape, especially the relationship between humans and the environment. As in the majority of the other sites excavated—except for the ones that show evidence of flooding events after the construction of mounds—the site was abandoned without traces of dramatic events. The volcanic activity in Pacific Nicaragua during the sixteenth century (Dennett 2016) and the European invasion could have played a part in the choice to abandon the site, but excavation data did not yield materials supporting these hypotheses.

8.2.4 MICROHISTORIES OF VIOLENCE, RESILIENCE, AND RESISTANCE (CAL 1650 - 1900 CE)

Even though evidence of human presence in the valley had previously been elusive (Gorin 1990; van Broekhoven 2002), two different excavated sites yielded confident radiocarbon dates between cal 1650 and 1900 CE: La Aventura (LA) and Sebastián Ríos Histórico (SRH). The latter was selected for excavation because it was the only site in the surveyed area that yielded surface colonial sherds, while the former was misinterpreted as a pre-Hispanic site due to its mounds and surface materials (ceramics, chipped stone, and a basalt column). La Aventura is located at the foot of the Güegüestepe hill, 100 meters east of the Mayales river and 500 meters east of the Cuapa road, which is used today not only to connect towns but also as part of a spiritual pilgrimage route. Mounds at the site featured construction techniques strongly related to pre-Hispanic ways of doing, such as the placement of a circle of rocks (quarried bedrock) filled afterwards with bedrock fragments, river stones, sediment, and material culture. However, technological choices regarding building techniques

did show differential traits when compared to pre-Hispanic traditions; for example, some mounds at LA featured larger rocks positioned vertically. Also, mounds varied in size, and even though a clear spatial arrangement was not visible beyond adaptation to the topography and enhanced visibility, a flat open area surrounded by mounds was identified (Arteaga 2017), and excavation results suggest daily practices, including living quarters within the site. Sizes of mounds suggest both communal and familial contexts.

Sebastián Ríos Histórico is an unmounded site located at the top of Loma San Gabino, which has excellent 360° parallel visibility of the valley, with views to the Lake Cocibolca volcanoes to the southwest, the Aguas Calientes hill to the West, and Cerro de la Cruz to the south; it also has easy access to a seasonal stream by descending the hill towards the east.

La Aventura was sampled for full ceramic analysis due to fragmentation and conservation issues related to the SRH ceramic assemblage. However, some insights into manufacturing practices were also identified for SRH, and they coincide—both technically and stylistically—with the sample analyzed at LA. The differences between the two sites seem to be connected to their use and function; while LA was inhabited by permanent residents (maybe one or various family groups), SRH consisted of a small household or camp (not necessarily permanent), or a place used during specific times (for example, during the days or during the night), possibly related to cattle-ranching or other agricultural practices. This is evinced by the absence of mounds, low material culture densities, and the reduced sizes of most of the vessels, which could indicate individual portions or dishes cooked and consumed by a small amount of people.

From a ceramic technology perspective, the most profound transformations—not only human—in the history of the valley took place with the invasion by Europeans. However, those changes do not appear to be as abrupt as form might suggest, as resilient and resistant strategies can also be interpreted from the microhistories of technical traditions. During pre-European times, the pottery manufacturing process suggests a subtle interplay between continuity and change for at least 1100 years (cal 300 - 1400 CE). Stable connections to the landscape (shared perceptions regarding raw material procurement, paste preparation, and firing practices) were combined with variability in the transmission of bodily gestures and tool kits (fashioning and finishing), aesthetic ideals (surface treatment), and foodways (vessel shape, which imply the incorporation of new products, storage, cooking, and eating practices). In contrast, ceramic technologies went through dramatic changes from the sixteenth century onwards, with transformations that not only suggest shifts in the social landscape, but also the incorporation of imported and likely imposed bodily gestures, tools, and culinary practices.

To begin with, clay procurement at the two sites dated between cal 1650 and 1900 CE—La Aventura and Sebastián Ríos Histórico—was reduced to a single main clay outcrop, with a clear preference for fine grained clays. Paste preparation practices were minimally represented in the assemblage and consisted of sieving and tempering related to the different functions of the end products, which consisted of cooking and storage vessels (operational sequence LA-IC). In this sense, there is a clear difference regarding landscape perceptions in pre-Hispanic times, where diverse clay outcrops were exploited simultaneously and did not subscribe to a 'least effort' model (Casale 2017). In contrast, the potters at La Aventura collected their clays from a single source located a few meters away from their dwellings. Instead of integrating several paste recipes into their kitchenware, they preferred to use their clay "as is" for most production, although sometimes they selected to sieve or temper when manufacturing cooking and storage vessels, which usually—though not exclusively—featured thick walls (10.0-12.0 mm). Since thicker, tempered walls aid in thermal distribution and shock resistance, as well as in evaporation and cooling processes, these paste preparation practices were interpreted as mostly functional.

This reduction in the variability of raw material sourcing localities and paste recipes might have several implications regarding the production group. To begin with, it may imply a homogenous manufacturing context, which could be due to cohesive social relationships—perhaps familiar, for example—but could also be the result of imposed ways of doing. Second, a less exploratory approach to landscape can be inferred, which could be related to several factors. First, increased security concerns are not difficult to imagine in such a tumultuous context and are also partially supported by settlement choices connected to high terrain with optimal visibility. Second, transformation of daily practices might have resulted in the restriction or abandonment of surveys throughout the valley aimed at obtaining resources, such as raw materials and food. Also, general changes in procurement relationships among communities might

have modified perceptions regarding clay outcrops as shared places of inter-community interaction (Donner *et al.* 2017). These inter-community relationships were possibly connected to the population decline within the valley, and this demographic decrease can be directly linked to the homogenization and loss of variability in clay procurement and preparation: when exposed to less producers that do things in a different way, there is a greater tendency to standardize. Finally, shifts in the organization of production might have also affected technical choices.

Even though clay procurement and preparation practices dramatically shifted, this is not surprising, since they have been classified as some of the most malleable steps of the operational sequence (Gosselain & Livingstone Smith 2005). In contrast, fashioning techniques, defined as some of the steps of the manufacturing process less prone to change, display a huge investment in resilience and resistance. Potters at La Aventura and Sebastián Ríos Histórico refused to transform all their socially learnt bodily gestures connected to the pre-forming of vessels. The potter's wheel was unanimously rejected,[92] and even though rotary non-kinetic energy and molding were partially adopted, they are minimally represented in the sample analyzed, consisting of only a handful of sherds. Therefore, the coiling technique, which implies the separation of a clay mass into assembled elements for shaping a vessel, together with bodily gestures of rolling, positioning, pinching, and drawing, show a continuity that resisted the impact of the colonizer.

Just as coiling (0.8-2.0 cm) was combined with new ways of making, such as the use of a mold and a passive support for non-kinetic rotary energy, finishing techniques also showed a small degree of variability. Both leather hard clay and wet clay gestures were identified in the sample analyzed, and maybe the most remarkable technique is the one that involved the possible use of a corn cob or straw for both fashioning and finishing purposes. Even though brushing was already identified at JOR and RDO, it was only minimally present; in contrast, it is a recurrent trace at LA.

Homogeneity in surface treatment resulted in matching external appearances of vessels. The virtual absence of chromatic decorative techniques, such as coating with slips, might relate to restrictive political and ideological circumstances that did not favor colorful decorations. The only decoration present, represented by digital pinching marks on the external vessel walls or on reinforcements, might indicate a vague stylistic connection with a pre-Hispanic tradition, defined in this manuscript as the Carca style. Transformations in firing technology resulted in the use of open hearths with little control of temperature, exposure, and duration of the firing. However, end products were fired following the necessary standards for manufacturing durable earthenware, as evinced by the good preservation status of the sherds.

Finally, kitchenware is characterized by dominant unrestricted shapes; however, both jars of various forms and *ollas* (restricted) share similar morphometric characteristics, with diameters of minimally 5.0 cm and never exceeding 30.0 cm, with walls between 5.0 and 12.0 mm wide. In contrast, plates (both cooking and serving ones) featured diameters between 25.0 and 45.0 cm, in combination with walls 7.0-9.0 mm wide. This trend was also present at Sebastán Ríos Histórico, where diameters of all vessels tended towards smaller sizes, as mentioned above, but griddles still yielded measurements up to 40.0 cm. Even though *comales* were excavated in pre-Hispanic archaeological contexts within the study area at UBI1 (Donner *et al.* 2019), their ubiquity at both LA and SRH implies a profound transformation in foodways, with a marked preference of flat breads, possibly *tortilla*-like foods. In fact, excavation unit LA3 yielded one of the few excavated samples of a defined grinding stone tool, a *mano*. The remarkable increase in the frequency of griddles—from less than 5% in pre-Hispanic Barillas to 14% at LA1—evinces that the incorporation of Post-classic Mesoamerican practices (the *comales* and *tortilla* food kit) did not (only?) happen during pre-European times as was previously believed but apparently was a by-product of European invasion and colonization.

Transformation of foodways is not only shown by shifts in ceramic vessel shapes and a possible increase of the importance of maize agriculture—probably connected to the use of corn cobs as tools in ceramic manufacture and to the preference of *tortilla*-like dishes—but also by butchery and cooking practices studied through the zooarchaeological remains excavated at SRH and LA (Gill *et al.* 2019). Narratives of resilience and resistance are supported by the consumption of both native and European introduced species, which involved butchery practices with both metal and stone tools (axes and chert blades), as well as continuity in the consumption

92 Only one sherd with signs of having been wheel-thrown was excavated from superficial levels at the site of Sebastián Ríos Histórico.

of slider turtles. However, exploitation of European domesticates points out to well-defined transformations in human-animal relationships. Hunting was at least partially replaced by keeping livestock next to households, which ensured a consistent meat supply. Finally, animal-based food diversity decreased, since small mammals—which comprised over 50% of the pre-Hispanic foodways in different ratios depending on spatiotemporal context—were notably lacking.

Living in the valley during these times was apparently isolated, lonely, and possibly dangerous. Both settlements feature elevated terrain with excellent visibility, and data points to human-environmental interactions in more circumscribed spaces when compared with pre-colonial times. The contemporary town of Juigalpa was already in existence, so it is possible that changes in landscape and environmental entanglements were related to a new hierarchized settlement pattern, together with the establishment of a new road network. Juigalpa, the regional center, might have been an assiduous destination for dwellers in the valley, who probably gathered there periodically (weekly, monthly, seasonally) for supplies from the market, socialization at the park, health care, legal and religious matters, feasting, etc. Even though the valley was slowly re-populated in the 19th and 20th centuries, these new ways of living and organizing were transmitted and reproduced by the newcomers, who continued with certain practices and transformed others.

8.2.5 THE SOLITUDE OF A SEEMINGLY DISCONNECTED PRESENT (CAL 1900 CE - TODAY)

Maybe one of the most relevant aspects of understanding ceramic manufacturing practices today in the valley of Juigalpa is that this delicate interplay of intertwining stability and change is a continuous thread in its history. Microtechnical traditions of ceramic production today and in the past are embodiments of several itineraries, pre- and post-Hispanic, that interweaved together. Even though narratives of resilience and resistance are still possible thanks, for example, to the rejection of the potter's wheel, the coiling technique has been largely abandoned in favor of working on a clay mass using a convex mold. In the time spanning the lives of the dwellers of La Aventura and Sebastián Ríos Histórico and the experiences of current-day potters, new bodily gestures involving percussion and beating have replaced pinching and drawing. Perhaps as a metaphor for the incorporated hierarchical order, gestures from up to down replaced bottom-up ones. Clay procurement practices continued to transect itineraries of exploitation of a single source, paired with little to no paste preparation practices. Finishing continued to be done mostly on wet clay, with a corn cob and more recently with a plastic tool. Surface treatment involves, such as at LA and SRH, burnishing with a hard tool, either a *zapoyol* seed or a river stone (chert). Shapes produced are varied, but *comales*, jars, and *ollas* continue to dominate. Firing is usually conducted in a kiln (specialized potters), but also in open hearths or even on the kitchen fire (non-specialized potters). Distribution of pottery—such as other products coming from the valley—is centralized in the Juigalpa and other town markets; the potters of the Güegüestepe village live such precarious lives that when the PACEN team returned to the community in 2016 to conduct more interviews, most of the families had emigrated to Juigalpa in search of more sustainable jobs. Therefore, it appears that the thread of ceramic manufacture is about to be cut in the valley. However, even though ceramic and tile production are activities that have been almost completely abandoned, bricks are still produced and represent a sustainable alternative that still involves working with clay. However, this practice requires building an expensive massive kiln, as well as ready access to water and fuel, which is prohibitive for most local families. Subsistence, then, relies on cattle, agriculture, production of edible products or collection of resources to sell at the Juigalpa market, as well as wage labor. Houses are still constructed following the traditional manner (Llaudet 2019) and domestic compounds integrate a larger house (normally occupied by the head of the family) with smaller structures, usually where younger generations sleep. If the kitchen is located in the larger house, all members—regardless of where they sleep—tend to eat and spend their free time there. If the kitchen is constructed as a separate building, then daily life mostly happens around it. Agriculture and pasture practices are integrated into domestic life. Poverty and a lack of education and opportunities are also part of it; illiteracy rates among the dwellers of the valley are still very high in spite of the thorough literacy campaigns organized by the revolutionary government over the last 40 years.

Continuity in human-environment entanglements is not only evinced by the resilience of traditional pottery manufacture, but also by other practices, such as construction with local materials, hunting, fishing, gathering, agriculture, and foodways, just to name

some examples. Locals showed a deep understanding of the valley landscape, but this knowledge was rarely extended to the Amerrisque mountains or south beyond Juigalpa. Their insights into soils, land, animals, plants, seasonal cycles, climate, and winds were fundamental for the development of this research. Therefore, rural communities in central Nicaragua might have transformed the way they engage with their landscape, but their relative isolation and marginalization from cities has proved to be both a blessing and a curse. On the one hand, it has confined them to poverty, limited access to education, and social stagnation; on the other hand, it has provided them with the privilege to understand how the destruction and conservation of our environment has the potential to destroy all our ways of living, even for those of us who usually live our lives as if we were detached from nature, as if we were not part of its bundle of unfolding materialities.

8.3 SHAKING WHAT WAS TAKEN FOR GRANTED

The redefinition of the chronology of central Nicaragua started with a very simple point of departure, which first and foremost accepted that any attempt to characterize the history of ceramics of such a large area as the modern department of Chontales, or between the *cordillera* and the lake, was indeed too broad. Consequently, a Braudelian approach was followed, in which the valley of Juigalpa was the protagonist, together with the people who have dwelled there, understood always in their relationships with the environment. Therefore, the histories told in section 8.2 of this chapter are microregional and should not be extrapolated to the whole region. Even though Gorin and Rigat surveyed a comparable area, the scope of this book is dramatically different in scale, space, and therefore time. Giving up certain types of generalizations also provided the freedom to explore the experiences of these groups of potters and to be able to tell parts of their forgotten and erased histories. At the same time, a microregional approach does not stumble in the presence of "gaps", as an absence of human technological evidence during specific intervals is commonly interpreted.

In a way, the definition of the Mayales I and Mayales II periods in Gorin's (1990) chronology was rooted in this macroregional goal, which was forced to match the chronology of Pacific Nicaragua. Therefore, both phases should be discarded for several reasons. First, they lack reliable radiocarbon dating. Second, the only excavated context from which they were recovered is La Pachona, located a few kilometers south of the research area. Two other sites were included in these phases: Los Andes and the agricultural school near Juigalpa. While the latter was not visited, a systematic survey at Cerro Los Andes, as well as over nine square kilometers around La Pachona, was conducted for this research. The mounds surrounding and constituting La Pachona were so different that recording architectural structures was very complicated when trying to use the forms developed for the valley (A. Arteaga, pers. comm. 2015). The survey at Los Andes also yielded very different traits regarding material culture; even though piles of rocks as a mound type are very common throughout the valley and are associated with sites of different temporalities (Arteaga 2017), those identified at Los Andes were unique, featuring a large circular stone as a lid. Other mound morphologies were also unique, and agricultural terraces were also identified—the only ones recorded for the whole research area. For these reasons, together with the presence of surface materials mostly dated between cal 900 and 1250 CE, these two areas were left outside of the scope of this study. Additionally, recent excavations at La Pachona indicate later dates. Four assays yielded dates between cal 1000 and 1160 CE, one between cal 1446 and 1528 CE (R. Vlaskamp, pers. comm. 2017), and the only early one—cal 195-42 BCE (R. Vlaskamp, pers. comm. 2017)—is problematic because it was found a few centimeters above bedrock and it is associated to later ceramics.[93] Therefore, even though it is of course more than possible that human groups dwelled around La Pachona, at Los Andes, and on the Juigalpa plateau between BCE 500 and 300 CE, evidence is not solid enough to support this assertion at this time, especially not for the valley.

The Cuisala phase, as defined by Gorin (1990), spanned from 400 to 800 CE largely coincides with my "Geometric Worlds". Main differences reside in the inclusion of obsidian and arrow points in the

93 I conducted a general inspection of the assemblage from Unit 3 of the off-mound trench excavated by Roosmarie Vlaskamp and her team at La Pachona in 2015. Even though the profile of the trench evinced a "gap" as reported by Gorin (1990), the presence of sherds and *malacate* fragments below this possible hiatus that were usually found in more superficial stratigraphic units contest the interpretation of an earlier phase followed by abandonment and re-occupation. Additionally, a posthole was identified in the excavation unit, so stratigraphy may have been disturbed.

lithic repertoire, which this research has placed from cal 900 CE on instead. Also, Gorin only establishes connections with Greater Nicoya and Costa Rica—both Pacific and Caribbean coasts, while the dataset in this book demonstrates that long-standing relationships with northern Nicaragua and Honduras were also in place. Ceramic analysis east of the research area, near the Caribbean watershed, also suggests ties with central Nicaragua (Miranda Tapia 2014), a connection that should be further explored.

However, one of the most important differences between Cuisala and Geometric Worlds is the identification of monumentality and social complexity without specific evidence pointing towards hierarchical social structures. According to Gorin, communities were small with no observable spatial arrangement (but see El Tamarindo) and characterized by low social complexity (Gorin 1990). Since the author includes the sites of Tamarindo, El Cóbano, and Aguas Buenas, "temporal" views are convergent in spite of divergent epistemological paradigms. However, monumentality at AB embodies the materialization of a long tradition of earth and stone moving, mound construction, clay manipulation for architectural purposes, ceramic and lithic manufacturing, and consumption practices. These rooted traditions were constrained to household compounds like AO, which were stages for habitual, ritual, and strategic practices (Pauketat 2001). The action of constructing Aguas Buenas, however, shows spatial regularities, a geometric integration that reveals a common plan, an intended consequence to build something completely different, which would restructure practices and future actions. In this sense, it is pertinent to separate the act of mound building from the activities that took place on the mounds (Joyce 2004; Sassaman 2005).

As stated above, Aguas Buenas shows no evidence of permanent residence. Also, no human interments were found during either on- or off-mound excavations; therefore, it likely had no intended funerary function either. In contrast to early architecture projects in Mesoamerica, in which monumentality was an unintended consequence of functional solutions (Joyce 2004) in Aguas Buenas the project itself seems to represent the intended consequence. Therefore, the action of building Aguas Buenas restructured mound building, which was part of the material world at the time, creating a previously type of unknown and permanent landmark. Therefore, Aguas Buenas, as a monument today and in the past, is a site of intended and unintended memory work, the material consequence of both practices and experiences (Pauketat 2014). In that sense, the results of the PACEN research project as a whole argue that the site was probably a place for periodic reunion since even before its monumental erection, and the practices that gathered people and communities in Aguas Buenas were malleable and thus constantly negotiated and transformed. This view qualitatively departs from the assessment made by Gorin. The monumentality of Aguas Buenas contrasts with the traditional disciplinary views of the archaeology of southern Central America, in which monumentality is seen as a synonym of inequality. Instead, life in the valley of Juigalpa during what has been known as the Cuisala phase was characterized by non-hierarchical yet complex communities, who periodically moved in and out of the valley, while a smaller portion resided within it, probably choosing locations near Aguas Buenas. Even though these communities shared technological and aesthetic perceptions, they also had their own individual signatures, and they all joined together in a large inter-communal building effort to construct Aguas Buenas (Casale 2017).

For the Potrero phase (800 - 1200 CE), there is a temporal mismatch between Gorin (1990) and the chronological proposal included in this manuscript, which may be linked to issues in incorporating "gaps" in meta-narratives that try to connect different regions, in this case central to Pacific Nicaragua. Since 800 CE was traditionally regarded as an extremely important date that marked the arrival of foreign groups (McCafferty & Dennett 2013), a new phase was inferred that would specifically signal an increase in ceramic types imported from Greater Nicoya and the appearance of *malacates*. However, the radiocarbon assays analyzed in this book determined that sites featuring an important increase in those types of ceramics are actually situated between cal 900 and 1250 CE, in what is defined in these pages as "Water Worlds". During this time, human agency throughout the valley kept on with leaving traces that are still observable today. Aguas Buenas continued to be expanded and used, but material evidence suggests practices that depart from the previous ones, which were more concentrated around mound construction. In contrast, Aguas Buenas was now a place to build and to stay in for longer periods of time, enough to prepare, consume, and store food and supplies. The social landscape of the valley became increasingly complex; this does not mean that the previous sites lack complexity but implies that variability in manner of dwelling, as well as membership in different

communities, constellations, and networks of practices, is more evident now, possibly thanks to increases in population and site numbers.

Chronological markers for sites in the valley between cal 900 and 1250 CE are the first evidences for wattle-and-daub architecture, bifacial lithic technology combined with the traditional flake industry, butchering of animals, the use of obsidian, monumental sculpture, architectural configurations in the form of flat open areas surrounded by mounds, and the presence of the traditional vessel shapes for the valley in combination with colanders and *molcajetes*, which were previously unknown. Also, human interments were found within the valley on an off-mound context at Roberto Amador (I. Torreggiani, pers. comm. 2019) as well as on- and off-mound excavations at La Pachona (Gorin 1990; Hartog 2017). Differential excavation strategies might have contributed to the sample bias, so it is also possible that human remains were deposited in and away from mounds at other excavated sites. Apart from that, traces of waste discarding may be connected to households. The consumption of mammals dominated the protein-based diet, and sites feature differential ratios of the diversity of species consumed. This could entail either divergent hierarchies or approaches to foodways, since all faunal remains should have been readily available for anyone with sufficient skill to hunt or trap them. Even though fishing in the area is possible today at streams and rivers during the rainy season and therefore was available as well during ancient times, fish remains are minimally represented within the archaeological faunal remains. This could be connected to specific procurement and consumption practices. For example, there is the possibility of a preference for lake species that were directly consumed at the shores of the lake. These trips might have implied navigation down the lake, but canoe transportation is unlikely back up to the valley.[94] Therefore, the way back from the lake to the valley was possibly transited on foot. Probably, both raw materials and finished products (such as ceramic polychromes, for example) were traded across the lake, so walking back up to the valley would have been habitual act. Special fish species found in mortuary contexts clearly evince a lake connection (Gill *et al.* 2019), knowledge of these species, and specific links to human interments. Thus, data suggest that even though the people of the valley were familiar with fish and lived near rivers, streams, and a lake that could easily provide them with sufficient protein in their diet, they preferred the consumption of mammals. It seems that one of the ironies in these "Water Worlds" is the preference for terrestrial animals above aquatic ones.

The definition of the Monotá (1200 - 1550 CE) and Cuapa (1400 - 1600 CE) phases was connected—even if indirectly—to the "types are people" premise, since it is based on the supposed appearance of different lithic and ceramic types. For example, the site Barillas was characterized by Gorin (1990) and Rigat (1992) as one of the ten sites defined for the Cuapa (1400 - 1600 CE) phase. The last pre-conquest occupation in Chontales, Cuapa features homogeneous decorated and undecorated ceramics that share a very low-quality paste and completely differ from all previous phases. According to Gorin (1990), the poor paste quality is the result of low temperature firing, which also played a role in conservation. Also, when compared with previous phases, Gorin and Rigat (Gorin & Rigat 1987; 1988; González Rivas *et al.* 1990; Gorin 1992; Rigat 1992; Rigat & Gorin 1993; Espinoza Pérez & Rigat 1994) established that sites during the Cuapa phase were larger in size (47-300 mounds, up to 6.5 ha) and show clear spatial arrangements, including plazas and aligned platforms. Denticulated flakes, hammers, arrow points, *manos* and *metates* characterize lithic production during this phase, with a main flake industry comparable to preceding phases. Also, Rigat (1992) identified what he considered a chronological marker for Cuapa: the Cuapa scraper, a multifunctional tool shaped like an orange segment.

The radical differences found in the ceramics, together with the minimal presence of Greater Nicoya ceramics, led Gorin (1990) to propose the arrival of an external group that re-occupied abandoned Monotá (1200 - 1550 CE) sites and started new settlements in a progressive manner. These immigrants were well-organized and numerous; for Rigat and Gorin (1993), they probably took advantage of the consequences of the Spanish conquest, which left the local Nicarao of Chontales in a crisis after their connections to the Pacific coastal regions were severed. According to Gorin, the Cuapa phase practitioners were the *chondales* described by Oviedo: the foreigners in the eyes of the Nicarao eyes. Even though Gorin proposed that the newcomers might have been Matagalpa speakers, later work conducted by Espinoza Pérez and Rigat (1994) found no connections between this group's material assemblages in the Northern Highlands with the Cuapa materials from Chontales.

94 During the rainy season, however, it is indeed possible to navigate back up through the Mayales river (A. Geurds, pers. comm. 2019).

Lab No	Lab	Site	Region	Excavation Unit	Depth (cm)	Material	14C Dates BP
GIF-7228	Gif sur Yvette	La Pachona	Chontales	SS1	1-10	charcoal	430 ±60
GIF-6894	Gif sur Yvette	El Cobano	Chontales	SS1	10-20	charcoal	1160 ±60
GIF-6896	Gif sur Yvette	El Cobano	Chontales	SS2	60-70	charcoal	1290 ±70
GIF-7226	Gif sur Yvette	El Cobano	Chontales	SS2	100-110	charcoal	1200 ±60
GIF-6895	Gif sur Yvette	El Cobano	Chontales	SS1	40-50	charcoal	1030 ±60
GIF-6893	Gif sur Yvette	El Tamarindo	Chontales	SS2	10-20/20-30	charcoal	1510 ±60
GIF-7229	Gif sur Yvette	La Pachona	Chontales	SS1	50-60	charcoal	1100 ±60
GIF-7230	Gif sur Yvette	La Pachona	Chontales	SS1	70-80	charcoal	750 ±60

Table 24: Raw data of the radiocarbon assays examined by Gorin (1990, 259).

Recently, Geurds (2013b) analyzed the arguments surrounding this Cuapa complex, especially critiquing Gorin and Rigat's arguments for their definition of it as a stand-alone phase. Geurds challenged the foundations of the Chontales chronology, which was mainly based on the polychrome ceramic cross-dating that more recent radiocarbon results (McCafferty & Steinbrenner 2005a) have proved inaccurate (Geurds 2013b). The materials that aided in the proposal of the Cuapa dates (1400 - 1600 CE) have now been positively dated to 1000 - 1350 CE, earlier than previously believed. Moreover, Geurds re-examined the stratigraphic excavations conducted by Gorin and determined that data resolution and quality were insufficient for establishing the chronological position of Cuapa (Geurds 2013b). His suspicions proved to be accurate, and the first radiocarbon dates from a site previously characterized as Cuapa, Barillas, yielded dates of cal 1255 - 1391 CE (Donner & Geurds 2018). Apart from that, absolute dates associated with the Cuapa scraper actually place its occurrence even earlier than Barillas, in sites like Josefa Ocón Robleto (cal 995-1150 CE) and Oporta (cal 1020 - 1190 CE), and even Alberto Obando (cal 300 CE) (Donner & Geurds 2018; 2019).[95] In this sense, the basis for Gorin and Rigat's claims of the arrival of a completely new group and the start of a new phase was unreliable. Differences in site design and size should also be re-evaluated with this newly available dataset (Arteaga 2017; Donner *et al.* 2018). Therefore, the Cuapa phase in Chontales chronology urgently needs to be re-examined and possibly discarded. The Miragua común type, which was established as a Cuapa diagnostic, can be identified as vessels made with a similar paste to the one used to make *comales* at Barillas. However, griddles at Barillas were of local manufacture, as the analysis of the techniques involved in their production showed. In turn, the presence of the Cuapa scraper cannot be exclusively associated to this phase anymore, since its occurrence is earlier. The current dataset establishes that between cal 1255 and 1390 CE, the people who lived at Barillas continued with local traditions of lithic and ceramic manufacture, as well as mound building practices, using their own technical and stylistic signatures. As a result, there is enough evidence now to discard the arrival of a new group as an explanation for changes that apparently took place in different rhythms and intensities than previously outlined.

The raw radiocarbon data from the eight samples retrieved by Gorin (1990, 259) (**table 24**) were recalibrated using the same software packages

95 Identification of the Cuapa scraper was done by S. Jiménez Castillo and João Carlos Moreno de Sousa.

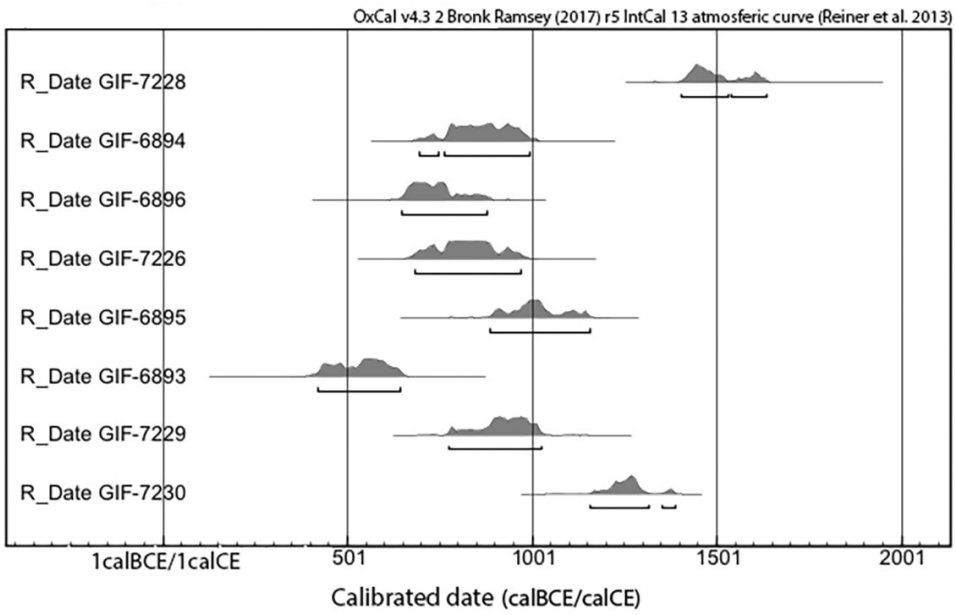

Figure 227: Multiplot showing the dates retrieved by Gorin (1990, 259), recalibrated with OxCal v4.3.2.

applied for the samples analyzed in this book (Donner & Geurds 2020). Results (**figure 227**) point out to coherence and not discrepancies between the two researches, with Gorin's dates showing a general span from cal 423 to 1635 CE. La Pachona ranges from cal 775 to 1635 CE, which coincides with the preliminary assessment made for its ceramics, together with the dates obtained by Vlaskamp. El Cóbano yielded dates between cal 648 and 1157 CE, so it could be partially contemporaneous with the construction of the *Outer Arches* of Aguas Buenas and with Water Worlds. Finally, El Tamarindo provided a date between cal 775 and 1025 CE.

8.4 THOUGHTS REGARDING AMS DATING IN CENTRAL NICARAGUA

Since this book was designed to answer questions regarding time, it allowed me to experiment with different types of datable materials to test accuracy and, as a result, propose effective strategies for future inquiries within and beyond the research area. Five different types of materials were submitted to different labs for AMS dating: organic sediment, charcoal fragments, and ceramic sherds featuring charred encrustations in their inner surfaces, as well as animal bone sampled by an archaeozoologist and charred seeds sampled by an archaeobotanist. In all cases, stratigraphic analysis of each excavation unit preceded sampling.

The most accurate results were obtained through organic sediment samples and sherds featuring charred remains. Even though 36.0% of the charcoal fragments matched the results achieved through organic sediment dating, this was only the case with deposits deeper than 40.0 cm below surface and at least 20.0 cm above bedrock. Since the only charred seed sampled for dating was retrieved on a superficial level (10.0-20.0 cm below surface), it is recommendable to date deeper samples. Regarding animal bone fragments, collagen on pre-colonial context samples was deemed insufficient by lab technicians, so only post-contact samples were successfully dated. This conservation issue regarding faunal remains could partially strengthen the idea that their absence before cal 900 CE within the valley might reflect post-depositional processes and not ancient human practices.

8.5 FUTURE RESEARCH: ITINERARIES IN CONTEXT

Research in the valley of Juigalpa has questioned the relationships between different types of monumentality, such as architectural or sculptural, with hierarchies and social complexity. The communities that dwelled in the valley engaged in shared monumental architectural and rock carving projects as far back as cal 300 CE and were part of a constellation of practices related to monumental stone sculpture from at least cal 900 CE. Even though their technologies and consumption practices do not necessarily show social inequalities in the traditional sense, each community identified itself by divergent practices that made them unique. In the context of a valley where all resources were readily available, where control of these resources does not seem to have been asymmetric, divergencies in practices seem to be connected to participation in different communities, constellations, and networks of practices.

From a ceramic technology point of view, different communities engaged with the valley, but they all shared certain standards regarding clay procurement and preparation practices, as well as fashioning, finishing, surface treatment, decoration, and vessel shape. The bulk of variability is indeed found in the most malleable steps of the operational sequence, surface treatment and decoration. The rest of the manufacturing process remained more or less stable, especially those steps related to habitual embodied practices, learned through observation and supervision within a social group. Therefore, narratives of migration waves and population displacements do not represent the complexity of the intersecting flows of the people of the valley. These communities were continuously in contact with other communities, who possibly lived in the surrounding environments, such as the Cordillera Amerrisque and the lakeshore. Evidence of contact with the north, including parts of present-day Honduras, as well as with the Managua Department and wider Pacific Nicaragua, are evident. Through history, relationships between "the people of the valley" and the valley underwent several transformations. These changes were both enabled and constricted by shifting socio-environmental conditions within the valley, as well as beyond it. The study of the different itineraries of traces of human practices show that chronologies cannot be built reducing the complexity and richness of human experience to one single thread. Future research in the valley should expand along the following itineraries: first, a comprehensive dating project of Aguas Buenas is urgent for understanding human-valley entanglements over time. A coring campaign encompassing all of the architectural arrangements proposed by Auzina (2018), with the goal of obtaining organic sediment samples would be a good start. Technological ceramic analysis of these divergent contexts, paired with an overview of lithic technologies, rock art, paleoenvironmental data, and residue analysis, should be taken into account. Second, materials excavated at other contexts between cal 300 and 1250 CE should be thoroughly analyzed before engaging in more excavation projects. Technological analysis of these assemblages will clarify many of the questions regarding these sites, the changing role of Aguas Buenas, population shifts, and continuities and discontinuities in material repertoires. Finally, these microscale projects should be emulated in other regions of the country in order to create comparable datasets that can shed light on the actual lives of ancient communities throughout parts of Nicaragua.

Theoretically and methodologically speaking, this exercise in chronology building could be expanded with more research focused on the *longue durée*, which could be achieved through a transdisciplinary endeavour integrating paleoenvironmental and pre-ceramic data. A deeper history of the valley, for example, could shed light into various itineraries present in the history of the people of the valley. The integration of other datasets, such as human remains, could also aid in these narratives. Also, the expansion of the research area beyond the valley, including the Cordillera Amerrisque and the lakeshore, could enlighten how these three units intertwined in the past and in the present. Also, geochemical characterization of material culture, in combination with the expansion of geochemical reference collections throughout the country, could help situate the research area within a broader context.

8.6 CONCLUDING REMARKS

The history of the relations between humans and the valley of Juigalpa was conceived in these pages as the intersecting itineraries of interweaving traces of practices. Through a non-geometric paradigm of time, the intervals established by the probabilistic interpretation of AMS dating were organized in bundles of unfolding traces, which were always

narrated trying to encompass at least some fraction of the practitioner's perspective, but also the palimpsestic ontology of materiality. Five different bundles were outlined, which historicize the changing relationships between human communities and the valley from at least cal 300 CE through to the present. In this narrative, ceramics is one thread—itself made up of various smaller threads—that was only analyzed in relationship to other interweaving threads.

This book granted me the opportunity to undertake—together with a heterogenous and numerous group of people—a journey into the microhistories of the valley of Juigalpa. The depth and high-grain resolution achieved in this study of the different trajectories of practices provided me with a powerful and unique tool to discuss and conceptualize a chronological discourse.

Chronologies are not—and therefore should not be conceived as—the histories of ceramic types or modes. This research has proven that, for example, the high variability in ceramic decoration techniques—which is always constrained within certain universes of possibilities—is contrasted with very stable trends regarding all other steps of the operational sequence of ceramic manufacture, especially the steps involving specific bodily gestures, which are learned in a situated context, in a time and a place. Additionally, decoration and vessel shape, which were the basis of the previous chronology, may even vary among potters who shared the valley during the same time scale but experienced it in divergent itineraries. The study of ceramic technologies entails a lot more than the history of local pottery. The interplay between stable and variable steps within the manufacturing sequence, when seen in their intersection with other itineraries (building practices, stone industries, foodways), sheds a unique light on the life experienced by different peoples. Therefore, lithic artifacts—considered unsuitable for chronology building by Rigat, because their transformation rhythms are too slow to be of any use (Rigat 1992)—should not be discarded from chronological studies. Mound construction practices can look deceivingly continuous and unaltered, but mounds can be either an end product themselves or conceived as foundations for something else. They can also be thought of as tombs, and even when they are used by living people, different traces—such as differential artifact frequency, shape, or location-—can indicate divergent itineraries that in turn will intersect with stone tools and ceramics. Apart from the fact that pots are not people, pots are also not just pots, an arrow point is not just a bifacial lithic tool, a mound is not just a mound, and a starch grain of maize is not just maize. These are conceptualizations rooted in a Western scientific archaeological tradition. In contrast, the traces of these things unfold, become, and bundle in many ways, and a chronology builder must carefully choose these bundles.

The results of this research have provided an updated chronological narrative of the valley of Juigalpa that is both different and similar to the previous attempt. It included the first systematic, complete coverage, intensive survey in the country, as well as stratigraphically controlled excavations in a multiplicity of contexts. Ceramic analysis was conducted with a technological perspective incorporating thin section petrography and macrotrace examination, a combination of techniques that has never been applied before in southern Central America. My work was immensely enriched by results from other colleagues, who studied lithic technologies, foodways, faunal remains through a practice theory approach, rock art, and the people who live in the valley today, just to name a few. Also, this research was enhanced and many times even re-directed by local individuals, whose profound knowledge of their environment and the many cycles of the valley served as a baseline for all the scientifically legitimated studies mentioned above. Beyond the contributions in fieldwork and laboratory methodologies and techniques, I think the most important outcome of this research is theoretical and ethical. As a discipline, it is urgent to move away from our ruling chronological paradigm and our geometric organization of time. The present is a palimpsest; there is no divide between the present and the past. The line is paradigmatic and only estranges modern local populations from a rich history that was immensely and violently impacted by the colonial invasion and regime. History does not stop; the valley and its dwellers continue to unfold.

To understand the histories of the different communities that lived and experienced the valley of Juigalpa—-and beyond it—in the past and the present, we need more than an ability to identify ceramic types. This study of interweaving practices shows that culture areas are fallacies, that boundaries between indigenous and exogenous can be deceiving. The histories of embodied practices are histories of continuity and change, but also of

power struggles inscribed in bodies and therefore in things. A technological approach to the ceramics of other regions throughout the country, especially the Caribbean watershed, the north, the Pacific coast, and the Managua region, would enrich this first time-lapse that was composed for the valley of Juigalpa. And even though I know this task might seem overwhelming, it is completely feasible if we succeed at establishing collaborative research agendas with specific research questions. These inquiries should start by addressing both the local microtechnical histories and communities of potters, but also their participation in different constellations and networks of practices. A bigger picture of these intersecting bundles through time and place will allow us to paint a much more creative and life-like portrait of ancient Nicaragua, especially one that is not constrained by delineating cultural areas but is a complex mesh of overlapping, intersecting, unfolding, and becoming trajectories that make life vital and vibrant.