

## Ten Years of Nicaraguan Archaeology

Geoffrey McCafferty (Department of Archaeology, University of Calgary)

Paper prepared for the 2010 Meeting of the Society for American Archaeology, Sacramento, Ca

In 2000, archaeologists from the University of Calgary began investigating late prehispanic cultures that lived along the shore of Lake Cocibolca (also known as Lake Nicaragua). Specifically, research sought to evaluate historical claims of migrations of Mesoamerican groups from central Mexico who spoke languages associated with Oto-manguean and Nahuatl language families (Abel-Vidor 1981; Carmack and Salgado 2006; Chapman 1974; Fowler 1989). Sixteenth-century accounts by Motolinia (1951); Oviedo y Valdes (1950), and Torquemada (1975-83) describe the migration of these groups and their cultural practices, especially religious beliefs (Leon-Portilla 1972). These ethnohistorical sources have been the basis for interpreting late Pre-Columbian indigenous history, in what has been termed the 'out of Mexico' hypothesis (Hoopes and McCafferty 1989). Yet relatively little archaeological research has been conducted to evaluate these claims (Carmack and Salgado 2006; Healy 1980, 1988; Salgado and Vasquez 2006). In fact, some archaeologists (most notably Fred Lange), have argued that foreign influences were negligible in the region in prehispanic times (Lange 1984; 1992-93).

Nicaragua is one of the least known archaeological regions of the western hemisphere. It was first explored by Ephraim Squier (1990), an American prehistorian of the mid-nineteenth century who, among other things, discovered monumental stone sculptures of standing and seated individuals on the islands of Lake Cocibolca. Several other European and North American scholars explored the country in the later nineteenth century (Bransford 1881; Bovallius 1886), but archaeological attention was directed more towards the 'high civilizations' of Mesoamerica and the Andes. Through political turmoil and natural disasters of the twentieth century, archaeology was not a significant endeavor with few exceptions (Healy 1980; Norweb 1964; Wyss). This began to change in the 1990s, with settlement pattern studies (Niemeel 2003; Salgado 1996), and rescue excavations (Espinoza et al 1999; Lange 1996 [ed.]). The objective of these projects was to identify and inventory archaeological sites and to collect baseline data to develop a fundamental culture history (Lange 1996). Nevertheless, the overarching historical paradigm for the final centuries of the prehispanic era was of Mexican migration into Pacific Nicaragua, overthrowing any autochthonous populations.

With these issues in mind, investigations were begun at the site of Santa Isabel, believed to have been the contact-period capital of the Nahuatl-speaking Nicarao encountered by Spanish conquistador Gil Gonzalez in 1522. The *teyte*, or ruler, of the Nicarao was known as 'Nicaragua,' and so this investigation had important implications for the political identity of the modern nation. Following four seasons of excavations and subsequent analyses (McCafferty 2008; Steinbrenner 2010), a second project focused on the Granada region at the northern end of the lake, at the sites of Tepetate and El Rayo (McCafferty et al. 2009). This area was historically associated with the Chorotega, the other major Mesoamerican group in Nicaragua at the time of Spanish contact. This paper presents results of these projects, representing the most intensive archaeological research ever conducted in Nicaragua, and challenging the traditional

culture history based on ethnohistorical accounts.

Research was funded by two major grants from the Social Sciences and Humanities Research Council of Canada, and by the University of Calgary. Although the projects were not conducted as formal field schools, they did offer opportunities for nearly 100 undergraduate students to participate, many experiencing life in Central America for the first time. Several graduate students also participated, already resulting in several theses and dissertations (Debert 2007; Dennett n.d.; Lopez-Forment 2007; Steinbrenner 2002, 2010). The projects also integrated many students from Central American countries, especially Nicaragua, El Salvador and Costa Rica.

## **Research Overview**

### *Santa Isabel*

Santa Isabel was identified in the foundational book *The Archaeology of Rivas, Nicaragua* by Paul Healy (1980), and later during the archaeological survey of Karen Niemel (2003). In these studies it was interpreted as one of the most important sites of the Postclassic (AD 800-1522), possibly Quauhtlapoca, the Nicarao capital at Spanish contact. From 2000 until 2005 the *Proyecto Santa Isabel, Nicaragua* investigated domestic features to infer daily practices of the Sapoa period (AD 800-1250; McCafferty 2008), but without finding evidence of the Ometepe period (AD 1250-1522) associated with the Nicarao.

Seven loci were investigated at Santa Isabel, using both shovel tests and horizontal excavations. Mounds 1, 3, and 6 were the most extensively excavated. Emphasis was placed on broad exposure of the uppermost levels relating to the final occupants. Radiocarbon dates suggest that the site was abandoned about AD 1250 (McCafferty 2008; McCafferty and Steinbrenner 2005a), roughly corresponding to the historical arrival of the Nicarao; the site occupation therefore probably related to the Oto-manguean Chorotega cultural group with abandonment possibly relating to events associated with the arrival of the Nicarao.

The Santa Isabel project was one of the first projects in Central America to investigate domestic practices, including residential architecture, foodways, specialized production, and religious ideology (McCafferty 2008). Another important result was the use of radiocarbon dating of samples associated with polychrome ceramics to revise the Postclassic chronology (McCafferty 2008; McCafferty and Steinbrenner 2005a). Additional analyses have included ceramics (Dennett n.d.; McCafferty et al. 2007; McCafferty and Steinbrenner 2005b; Steinbrenner 2002, 2010), lithics (Debert and Sheriff 2007), faunal remains (Hoar 2006; Lopez Forment 2007), textile production (McCafferty and McCafferty 2008), figurines and adornment (McCafferty and McCafferty 2009, 2011).

### *Tepetate*

Tepetate is located on the northern edge of modern Granada, and has been known to archaeologists (and looters) for over 100 years. Silvia Salgado (1996) identified it as the regional center, probably relating to the Contact period indigenous community of Xalteva. In 2008, excavations by the *Proyecto Arqueologico Granada, Nicaragua* explored three loci on the

northern edge of the site (McCafferty et al. 2009).

Architectural remains were found in deep levels of Mound 1, although the upper levels were badly disturbed by looting activities. It is a tragedy that one of the most important sites in Nicaragua has been nearly destroyed in recent years. Architectural rubble on the surface of the mound suggests that it may have been faced with flat slabs (*lajas*), as was described for mounds by early twentieth-century visitors to the site (Salgado 1996). Deeper excavations encountered remnants of paving stones, probably associated with floors, and also a slab lined enclosure that was likely a tomb. A second low mound was found on the northern edge of the site, and excavations exposed a stone foundation wall. In Locus 3 we excavated a cemetery of poorly preserved human remains, some associated with 'shoe-shaped' burial urns.

### *El Rayo*

The site of El Rayo is located on the Asese peninsula extending into Lake Cocibolca; the peninsula was formed through the eruption and consequent partial collapse of the Mombacho volcano. It was discovered by Silvia Salgado (1996) as part of her inventory of sites in the Granada region. In 2007, road construction exposed a Postclassic cemetery, with remains of 'shoe-shaped' urns. To recover information from the site, investigations began in 2009 and continued in 2010.

El Rayo is one of the most important archaeological sites excavated in Nicaragua, in part because of the continuous occupation from late Bagaces times through the Sapoá period (AD 600-1250), but also because of the excellent preservation. It features a range of burial practices, including ritual interments associated with a possible shrine. Domestic debris found at Locus 2 allows comparisons of material culture relating to the Bagaces/Sapoá transition, when ethnic groups from Mexico allegedly moved into Pacific Nicaragua. Careful analysis of these contexts allow a rigorous re-evaluation of these migration myths.

This essay presents conclusions from ten years of archaeological investigation. It is divided into sections on chronology, foodways, architecture, mortuary patterns, ornamentation, and specialized craft production. The paper concludes with an evaluation of the 'out of Mexico' hypothesis in light of a diverse range of archaeological evidence.

### **Chronological Foundations**

Archaeological cultures are usually described based on their spatial and temporal dimensions. As such, regional chronology is an important foundation for interpretation. The chronology of Pacific Nicaragua has traditionally been linked to that of nearby Costa Rica, in part because of the relatively greater amount of scientific archaeology conducted there (Bonilla et al. 1990; but see Niemel et al. 1997). In fact, northwestern Costa Rica and Pacific Nicaragua are often lumped into the related cultural region known as Greater Nicoya (Norweb 1964). The result has been a sequence of five time periods of relatively long duration: Orosi (2000-500 BCE); Tempisque (500 BC-AD 300); Bagaces (AD 300-800); Sapoá (AD 800-1350); and Ometepe (AD 1350-1522).

Seventeen radiocarbon samples were processed from Santa Isabel, and all dated between AD 900 to 1250, consistent with the Sapoá period (McCafferty 2008; McCafferty and Steinbrenner 2005a). This was surprising because previous research at the site had concluded that it was occupied through the Ometepe period up until European contact. These previous interpretations were based on the presence of pottery traditionally believed to be diagnostic of Ometepe period, such as Vallejo and Madeira polychromes, and Castillo Engraved (Bonilla et al. 1990). The conclusion based on these new dates is that the traditional ceramic sequence requires revision, with many 'Ometepe' diagnostics actually introduced several centuries earlier.

When Ometepe period remains were not found at Santa Isabel, the site of Tepetate was selected because it had supposedly been occupied at the moment of European contact (Salgado 1996). Excavations recovered ceramics associated with the traditional sequence, including Mombacho and Vallejo polychromes. Two C14 dates (1030 +/- 40 and 1140 +/- 40) again relate to the Late Sapoá period, and thus support the notion that the traditional sequence does not correspond well with the new information.

El Rayo was also excavated in hopes of encountering Ometepe period remains, and again the site appears to have been abandoned during the Late Sapoá period (c. AD 1100-1150). Surprisingly, deep levels at Locus 2 included rich deposits of Late Bagaces period pottery. Radiocarbon dates indicate that the site was first occupied about AD 600, and between AD 650-800 innovative pottery types such as Momta Polychrome were introduced. Sapoá pottery was adopted relatively quickly, perhaps between AD 750-850, with major changes in the types and vessel forms used.

Recent projects in Santa Isabel, Tepetate, and El Rayo have contributed 27 radiocarbon dates relating to the Late Bagaces through Late Sapoá periods, AD 600-1250 (Table 1). The results challenge the traditional ceramic sequence, especially relating to Ometepe period diagnostics, and clarify the Bagaces/Sapoá transition (AD 650-800). Future research should clarify the Sapoá/Ometepe transition.

### **Foodways**

Foodways – defined as the plants and animals consumed as well as the techniques of preparation and associated rituals – are a fundamental means of inferring cultural identity, especially ethnicity. In order to identify possible migrant groups into Pacific Nicaragua, consistent with the ethnohistorical sources, archaeological foodways were an important goal of these projects.

Pacific Nicaragua has been described as an ecological paradise, with abundant wild plants and animals (Pohl and Healy 1980). This is reflected in the rich diversity of remains found in archaeological contexts, including fish, turtle, deer, armadillo, and assorted birds, reptiles, and mammals (Hoar 2006). Fish were the most abundant faunal remains found in well-preserved contexts at Santa Isabel and El Rayo. Deer, however, made up the greatest meat contribution to the diet at Santa Isabel (Lopez Forment 2007), but were less abundant at El Rayo.

Archaeological evidence for hunting and fishing included some of the most abundant artifact

classes. This was particularly true of ceramic net weights used for fishing. Bone fish hooks were also found at both Santa Isabel and El Rayo. Projectile points, probably used on spears for hunting large animals, were rare. More common were clay balls used as blow-gun projectiles for hunting birds.

Excellent preservation of plant remains has included many examples of carbonized wood and seeds. Microscopic analysis of the carbonized wood is providing information on the prehispanic forest. The most numerous of the seeds are of jocote, a fruit that can be used to produce a fermented wine. Other seeds include beans, cacao, and coyol palm nuts. Notably, no evidence for maize has been found among the carbonized seeds; analysis of phytoliths and starches from organic soil samples have also failed to recover evidence of maize.

Other artifacts relate to the preparation of food. Lithic scrapers were used to butcher game animals. Other stone tools were probably used to cut trees and dig for roots. Grinding stones were used for crushing seeds and fruits, although recent studies of phytoliths again indicate that maize was not processed (Dennett and Simpson 2009). Small chipped stone tools, ‘raspaditas,’ may have been embedded in wooden grater boards for processing root crops such as manioc. (Debert 2007; Debert and Sheriff 2007). Notably, while thousands of raspaditas were found at Santa Isabel they were scarce from Tepetate and El Rayo, suggesting that grater boards were not an important factor in food preparation in the Granada region.

Large utilitarian vessels provide additional information on cooking practices. Open pots (cazuelas) were probably used for preparing stews with a mix of wild plants and animals. Shoe-shaped pots may have been used for boiling liquids, with the condensed steam trapped in the upper surface of the vessel. A notable omission from the ceramic assemblage of Pacific Nicaragua are comales, the large griddles typically used for heating tortillas, and found in abundance in Postclassic sites of central Mexico.

Recent archaeological investigations provide extensive information on prehispanic foodways, especially for the Sapoá period. People consumed plants and animals obtained from the rich natural environment. In contrast to expectations, however, almost no evidence was found of domesticated plants or animals: no evidence for maize, turkey, or dog was recovered among the hundreds of carbonized seeds or hundreds of thousands of faunal remains. Nutritional studies using stable isotope analysis are now in process to further clarify ancient dietary patterns.

### **Architecture**

Little information exists about prehispanic architectural forms. In ethnohistorical sources from the sixteenth-century, for example by Oviedo y Valdes (1950), are descriptions of impermanent structures made of wattle-and-daub and with thatch roofs. Some of these had long, rectangular shapes similar to indigenous *buhios* from Panama (Steinbrenner 2010). Historical photos also provide images of indigenous houses. Until the beginning of the University of Calgary projects, archaeological excavations had never recovered much information on architectural patterns from Pacific Nicaragua.

The excavations at Santa Isabel investigated domestic remains in several artificial mounds; these were built up over time of collapsed architectural material and living debris, there is little evidence of intentional ‘mound building.’ Although it was not possible to identify complete building ‘footprints,’ numerous floors and wall fragments were encountered. The majority of the floors consisted of compact sand, but in some cases there were also thin layers of a stucco-like substance. On Mound 3, a sequence of eight superimposed floors spanning a time period of about 350 years indicates that each living surface was occupied for 30-50 years before the next construction episode. Walls were made of wattle-and-daub, a construction technique whereby thin poles are woven together and then covered in dried mud. Archaeological remains of wattle-and-daub architecture consists of chunks of burnt mud with impressions of the poles.

The most complete mound at Tepetate had been badly looted in recent years. Excavations discovered remains of wall rubble in the upper levels of structure, as well as stone slabs that may have comprised a covering for the mound. At a meter in depth was evidence of floors made of stone, associated with wall bases; a similar stone floor was also found at Locus 3. In another locus of the site a well-preserved stone wall was excavated.

A rare example of monumental architecture was found at Locus 2 at El Rayo, with a stone wall of about one meter in thickness, that probably served as a retaining wall for a platform. This was probably constructed during the Late Bagaces period, based on ceramics embedded in the wall. Additional architectural remains of residential structures were located on the Locus 2 platform, also associated with the Bagaces period occupation.

A small structure, represented by stone foundation walls, was located at El Rayo in Locus 3. It measured only about 1 m in width and 2 m in length. This structure, which may have been a small shrine or altar, was adjacent to a cluster of shoe-shaped Sacasa urns and other possible offerings, including scattered human skeletal remains.

Although minimal, the architectural evidence uncovered in these projects is among the first ever discovered in Nicaragua. It indicates that the indigenous population lived in permanent houses, and in long-term settlements. The presence of a platform wall at El Rayo implies a degree of political organization whereby the inhabitants may have worked together for the public good.

### **Mortuary Patterns**

Recent archaeological investigations in Pacific Nicaragua have encountered a range of mortuary patterns dating to the Bagaces and Sapoá periods (600-1200 AD). These periods encompass the supposed arrival of Mesoamerican migrants, as asserted in historical accounts, and so relate to cultural changes. Mortuary patterns offer valuable insights to evaluate these changes.

The best known burial form for the Postclassic period involves large shoe-pots. At Santa Isabel these were consistently associated with infant burials. In contrast, the one adult and two adolescents were buried directly in the soil beneath house floors. The adult (male) was buried with pieces of greenstone, lapidary tools, and an unusual pot with owl faces. Near the adult and with a parallel orientation, a sub-adult of 7-9 years of age was buried with its head resting on a turtle shell.

At Tepetate, clusters of crushed burial urns, including shoe-pots and large-mouth ollas, were found with poorly preserved human skeletal remains. All identifiable individuals were adults; some buried in urns but others were extended above the vessels. Associated grave goods included bowls, miniature vessels with appliqué faces, and ornamentation. A possible burial crypt was found within Mound 1, with alignments of flat stones. A single human tooth was the only skeletal remain found in what was a badly disturbed context with abundant evidence of looting.

The El Rayo site featured burials from both the Bagaces and Sapoa period components, so presents excellent evidence for changing burial patterns. The main cemetery was exposed in a road cut, revealing burial urns and human remains. Several clusters of shoe-pot urns were found, containing miniature vessels and cobbles of volcanic rock—but only occasional human skeletal remains. Instead, isolated human crania were found adjacent to the ‘burial’ urns. One exception was a skull found in an urn, and with a chert lance point placed in the mouth. A cluster of three urns was associated with a grouping of well-formed knives, two large ear spools, and a small bowl filled with nearly 100 beads.

Beneath the level of Sapoa urns were primary burials in flexed position, with ceramics from the Bagaces period. One was associated with a ground stone mano, and another was buried with a spindle whorl – unfortunately the skeletal remains were too poorly preserved for a sexing of the individual. Near this cluster of primary burials were three complete vessels: one with modelled and incised decoration in the form of a nude female, another with a constricted neck, and one with modelled and incised decoration to form a rodent face. This ‘rodent vessel’ contained fragmented human skeletal remains of several individuals.

At Locus 2, three individuals were found relating to the Bagaces occupation. A fetus was found in a deep deposit, associated with domestic refuse. An adult was placed in an extended, dorsal position; and another adult, probably an elderly female, was in a flexed position.

Locus 3 featured additional shoe-pot urns, aligned in a north/south orientation in front of a possible shrine. Human remains were again rare in these vessels, but bones were found scattered around the urns, together with smaller vessels. In another area poorly preserved skeletal remains were found associated with several complete vessels, a ceramic ocarina, bone weaving tools, and a copper bell.

In sum, recent excavations in the Granada region have found a variety of mortuary practices. During the Bagaces period, interments were primary, with skeletons in flexed or extended positions. Shoe-shaped urns were typical of the Sapoa period, although how human remains were placed in or around these vessels was inconsistent. These results differ from the pattern found at Santa Isabel, where infants were consistently buried in ‘womb-pots’ and adults and adolescents were primary burials. Mortuary offerings were also inconsistent, with miniature vessels found in the Granada region. At El Rayo, cobbles of volcanic rock were often placed in shoe-pots, and the interior base of the pots were occasionally lined with broken potsherds.

Some of the urns seem to have been placed one inside another, forming concentric deposits in cross-section.

### **Ornamentation and Identity**

One of the primary goals of research in Pacific Nicaragua has been the interpretation of cultural identities, especially ethnicity. Ornamentation is one of the aspects of material culture that is most directly related to identity (McCafferty and McCafferty 2009, 2011). In Nicaragua ornamentation consists of such items as beads, pendants, and ear spools, made of greenstone, bone, shell, and ceramic. Other ornamentation of perishable materials included textiles, featherwork, and body stamping. These can be inferred from the polychrome figurines that are common in archaeological contexts

Beads were one of the most numerous objects of ornamentation found. Most were made of ceramic, but bone and greenstone were also used. At El Rayo, a small bowl was found with nearly 100 ceramic and bone beads, probably as a burial offering. Greenstone beads were found at all three sites; blanks and mis-drilled pieces indicate that beads were being manufactured at Santa Isabel.

Pendants were made of clay, bone (including human and animal teeth), shell, and greenstone. The most elaborate pendants were carved from bone: one from Santa Isabel depicted feathered serpents, while another probably represented the mandible of a crocodilian. A bone skeletal insect pendant was found at El Rayo. Perforated teeth, including those of peccary, jaguar, and shark, were found at all sites; perforated human teeth were only found at Santa Isabel and may be related to the practice of teeth bracelets found in northwestern Costa Rica. Shell was most common at Santa Isabel, where there was evidence for manufacturing using marine shell. Greenstone pendants were also found at Santa Isabel, again with evidence of manufacture. At El Rayo a copper bell was found, as a rare example of metal jewelry. The most abundant form of pendant was made of re-worked potsherds, at least at Santa Isabel where several hundred perforated worked sherds were found. These were quite rare, however, at Tepetate and El Rayo, and so may indicate a localized form of ornamentation.

Most ear spools were made of fine clay, burnished to a brownish-black color. The most common form consisted of hollow circles with thin, hour-glass shaped walls. Some earspools were more elaborate, with incised decorations in a cross pattern. Others were made from fish vertebrae. The variation in size, from 1 to 5 cm in diameter, may relate to age grades or status – unfortunately no ear spools have been found with aged or sexed skeletons.

Figurines, as miniature portraits, provide valuable insight into the way that ancient Nicaraguans viewed themselves, while also including details of ornamentation that does not preserve archaeologically, such as hairstyles, tattoos, body paint, and clothing. Careful analysis of figurines, along with other aspects of ornamentation, offers important information on the aesthetics of concepts relating to the ‘body beautiful’ (McCafferty and McCafferty 2009, 2011). From the perspective of diachronic change between the Bagaces and Sapoa periods, when foreign groups allegedly migrated into the region, figurines show dramatic differences. Bagaces

figurines from El Rayo are generally monochrome female figures with prominent bellies and buttocks. Sapoia figurines are also typically of females, but are painted with representations of clothing, body paint, and occasional ornamentation. Interestingly, at Santa Isabel both monochrome and polychrome figurines were found together, as possible evidence of cultural mixing during the Sapoia period.

### **Specialized Craft Production**

One of the fundamental characteristics of complex societies is the specialized production of materials. This implies the allocation of time and energy for labor apart from basic subsistence. It also suggests a degree of social hierarchy, and long-distance trade of precious commodities. Investigations in Pacific Nicaragua, and particularly at Santa Isabel, have discovered a variety of specialized craft activities.

The most abundant evidence of specialized production is in the form of thousands of pieces of chipped stone, a by-product of stone tool production. The majority of lithic materials used along the shore of Lake Cocibolca was a white chert, but a dark red chert, chalcedony, and obsidian were also used. Since none of these materials are available locally they imply long-distance trade: red chert from Chontales and obsidian from Honduras. Some tools may have arrived pre-made, but the abundance of flakes of all materials indicates local manufacture, as well. Obsidian was most common at Tepetate, where it represented about 8% of the total lithic assemblage. It was most often found as prismatic blade fragments, a common Mesoamerican form. One expended core was found, as evidence that at least some of the blades may have been produced locally. Obsidian was much less common at El Rayo or Santa Isabel, at about 1% of the total lithic assemblage, perhaps as an indication that these sites were less involved in exchange of this rare commodity.

Evidence for textile production was abundant at Santa Isabel in the form of spindle whorls as well as a variety of bone weaving tools (McCafferty and McCafferty 2008). In contrast, whorls were relatively rare at Tepetate and El Rayo, indicating that they probably imported thread from production centers such as Santa Isabel. Due to the exceptional preservation conditions at Santa Isabel and El Rayo, numerous bone weaving tools were recovered. These could be classified as needles, picks, and battens; some of the small picks were carved with decorative patterns. A few textile tools from Santa Isabel (two whorls and several batten fragments) were made out of polished greenstone. Painted figurines represent netted blouses on females, and possible skirts, as evidence for the possible kinds of clothing produced, but thread was probably also used for making fishing nets and hammocks.

Ceramic potting traditions using detailed decorative and morphological characteristics was the theme of Larry Steinbrenner's PhD dissertation (2010). He infers several diachronic trajectories as different polychrome types evolved through time, especially with the early Papagayo type developing into Vallejo Polychrome. Ceramic manufacture using compositional analyses is the topic of Carrie Dennett's current doctoral research at the University of Calgary (Dennett n.d.). Thin sections of different ceramic types are being studied microscopically to identify different clay types, representing distinct production centers. This analysis is being supplemented using

Instrumental Neutron Activation Analysis (INAA) using the Smithsonian Institution's nuclear facilities, and also with X-ray Diffraction analysis (McCafferty et al. 2007). The current compositional analysis builds on a foundational study by Bishop and Lange (Bishop et al. 1988)

Further evidence for specialized production from Santa Isabel involves polished greenstone, which takes on a luster that has resulted in it being called 'social jade': not true jade but rather a local imitation (Lange 1993). Santa Isabel featured evidence for the production of social jade beads, pendants, and amulets using locally available mudstone. Raw materials showed evidence of string-saw cut marks as the rough forms were shaped, as well as wasters that were discarded during manufacture.

The exceptional preservation of bone at Santa Isabel and El Rayo included examples of bone tools such as fish hooks and needles. At Santa Isabel this also included evidence of their production. For example, long bones of deer had cut marks from string saws, probably for the production of fish hooks. Other bones were modeled to produce weaving tools and ornamentation.

In Santa Isabel there were various examples of shell jewelry; and also there was waste from marine shell cores as evidence of manufacture. The abundance of these cores implies production for exchange. It is interesting, therefore, that there were no examples of shell jewelry at either Tepetate or El Rayo.

## **Conclusion**

Excavations in Santa Isabel, Tepetate, and El Rayo represent the most extensive archaeological program ever conducted in Nicaragua, and have produced many new discoveries and interpretations. We are in the process of 'reinventing' the prehistory of the country based on scientific data, in contrast to the mythical histories that have previously been the basis of interpretation. The Santa Isabel, Tepetate, and El Rayo projects demonstrate the value of scientific research, and reveal the diversity and complexity of indigenous Nicaraguan culture. Although they lived in simple houses, the inhabitants enjoyed the abundance available from the land and the lake. They practiced mortuary rituals in a variety of ways, perhaps relating to different regional and social identities. The beautifully decorated pottery demonstrated highly developed artistic abilities. Ornamentation and specialized production indicate the complexity of their social organization as well as interaction with distant regions.

The overarching goal of our recent research in Pacific Nicaragua has been to evaluate, archaeologically, the ethnohistorically based 'out of Mexico' hypothesis that Nicarao and Chorotega migrants from central Mexico settled the region during the Postclassic period. Two of the principal centers of indigenous culture, Santa Isabel and Tepetate, were specifically selected for investigation because settlement surveys of the region by Niemel (2003) and Salgado (1996) had identified them as being prominent at the time of Spanish contact. Revised radiocarbon chronologies now indicate that at least in the areas sampled these sites were abandoned several centuries prior to contact, and so the final centuries of prehispanic life have not yet been explored.

Nevertheless, the Sapoa period, when alleged Oto-Manguéan-speaking Chorotega migrants settled in the area is abundantly represented at Santa Isabel, Tepetate, and El Rayo. Archaeological evidence now presents an ample record of daily life and mortuary ritual at these sites. At El Rayo, in particular, the Bagaces to Sapoa transition shows diachronic change occurring between AD 750-850 consistent with the arrival of foreign innovations in material culture, consistent with a high degree of population replacement. Some symbolic elements exist, such as the use of the 'feathered serpent' and Ehecatl wind god on vessel supports, that indicate affiliation with Mexican religious cults. However, while there are significant changes in pottery, figurine styles, and mortuary practices; there are significant elements traditionally associated with Mesoamerican culture that is lacking, especially the use of maize, dog, and turkey in the diet, and the use of incense burners in ritual practice. Lack of these fundamental traits makes it impossible to casually affirm the presence of Mexican migrants, and instead we must consider a less direct form of cultural change, involving ethnic groups from intermediate regions that may have had more contact with, or incentive to adopt, Mesoamerican religious ideology. Thus we are currently leaning away from an 'out of Mexico' scenario to consider other Central American regions in El Salvador and/or Honduras as origins of migration.

Research over the past ten years has produced a material record useful for characterizing ancient Chorotega ethnic identity. Despite this solid foundation, however, more questions continue, requiring additional research. Paramount is the problem of the Nicarao of the Late Postclassic Ometepe period: no Nicarao sites have been significantly investigated, and what were thought to be Nicarao diagnostic artifacts are now recognized as having been introduced hundreds of years earlier by the Chorotega themselves. Similarly, the Bagaces to Sapoa transition remains key to understanding cultural changes brought about by possible migrant groups, perhaps deriving from central Mexico (following the ethnohistorical accounts) or from intermediate zones in El Salvador or Honduras (as is now suggested by ceramic associations from El Rayo). Further research is currently being planned, and hopefully the next decade will produce additional advances to address these questions.

## References

Abel-Vidor, Suzanne

1981 Ethnohistorical Approaches to the Archaeology of Greater Nicoya. In *Between Continents/Between Seas: Precolumbian Art of Costa Rica*, edited by Elizabeth P. Benson, pp. 85-92. Harry N. Abrams, Inc. Publishers, New York.

Bishop, Ronald L., Frederick W. Lange, and Peter C. Lange

1988 Ceramic Paste Compositional Patterns in Greater Nicoya Pottery. In *Costa Rican Art and Archaeology: Essays in Honor of Frederick R. Mayer*, edited by Frederick W. Lange, pp. 14-44. University of Colorado Press, Boulder.

Bonilla, Leidy, Marlin Calvo, Juan Guerrero, Silvia Salgado, and Frederick Lange

1990 La cerámica de la Gran Nicoya. *Vinculos: Revista de Antropología del Museo Nacional*

*de Costa Rica* 13(1-2): 1-327.

Bovallius, Carl

1886 *Nicaraguan Antiquities*. Serie Arqueologica No. 1, Swedish Society of Anthropology and Geography. Stockholm, Sweden.

Bransford

Carmack, Robert M. and Silvia Salgado González

2006 A World-Systems Perspective on the Archaeology and Ethnohistory of the Mesoamerican/Lower Central American Border. *Ancient Mesoamerica* 17(2):219-229.

Chapman, Anne C.

1974 *Los Nicaraos y los Chorotega segun los fuentes historicas*. Ciudad Universitaria, Costa Rica.

Debert, Jolene

2005 *Raspadita, A New Lithic Tool Type from Santa Isabel, Nicaragua*. MA thesis, Department of Anthropology, University of Manitoba, Winnipeg, Manitoba.

Debert, Jolene and Barbara Sheriff

2007 Raspadita: A new lithic tool type from the Isthmus of Rivas, Nicaragua. *Journal of Archaeological Science* 34:1889-1901.

Dennett, Carrie L.

n.d. Ceramic Economy and Social Identity in Pre-Columbian Pacific Nicaragua. Ph.D. dissertation, Department of Archaeology, University of Calgary, Calgary, AB.

Dennett and Simpson

Espinoza Pérez, Edgar, Ramiro García V., and Fumiyo Suganuma

1999 Rescate Arqueológico en el Sitio San Pedro, Malacatoya, Granada, Nicaragua. Instituto Nicaragüense de Cultura, Museo Nacional de Nicaragua, Managua, Nicaragua.

Fowler, William R., Jr.

1989 *The Evolution of Ancient Nahua Civilizations: The Pipil-Nicaraos of Central America*. University of Oklahoma Press, Norman, OK.

Healy, Paul F.

1980 *Archaeology of the Rivas Region, Nicaragua*. Wilfred Laurier University Press, Waterloo, Ontario.

1988 Greater Nicoya and Mesoamerica: Analysis of Selected Ceramics. In *Costa Rican Art and Archaeology*, edited by Frederick W. Lange, pp. 293-301. University of Colorado

Press, Boulder, CO.

Hoar, Bryanne

2006 The Isthmus of Plenty: Faunal Analysis for the Site of Santa Isabel "A", Rivas, Nicaragua. Honour's thesis, Department of Archaeology, University of Calgary, Calgary, AB.

Hoopes, John W. and Geoffrey G. McCafferty

1989 Out of Mexico: An Archaeological Evaluation of the Migration Legends of Greater Nicoya. Paper presented at the Annual Meeting of the Society for American Archaeology, Atlanta, GA.

Lange, Frederick W.

1984 The Greater Nicoya Archaeological Subarea. In *The Archaeology of Lower Central America*, edited by Frederick W. Lange and Doris Stone, pp. 165-194. University of New Mexico Press, Albuquerque, NM.

1992-93 Evaluación histórica del concepto Gran Nicoya. *Vinculos: Revista de Antropología del Museo Nacional de Costa Rica* 18-19: 1-8.

1993 Formal Classification of Prehistoric Costa Rican Jade: A First Approximation. In *Precolumbian Jade: New Geological and Cultural Interpretations*, edited by Frederick W. Lange, pp. 269-288. University of Utah Press, Salt Lake City, UT.

1996 Gaps in Our Databases and Blanks in Our Syntheses: The Potential for Central American Archaeology in the Twenty-First Century. In *Paths to Central American Prehistory*, edited by Frederick W. Lange, pp. 305-326. University Press of Colorado, Niwot, CO.

Lange, Frederick W. (Editor)

1996 *Abundante Cooperación Vecinal: La Segunda Temporada del Proyecto "Arqueología de la Zona Metropolitana de Managua."* Alcaldía de Managua, Nicaragua.

León-Portilla, Miguel

1972 *Religión de los Nicaraos: Análisis y Comparación de Tradiciones Culturales Nahuas*. Instituto de Investigaciones Históricas, Universidad Nacional Autónoma de México, Mexico, DF.

López-Forment VÍlla, Angélica

2007 *Aprovechamiento Cultural de los Recursos Faunísticos en el Sitio de Santa Isabel, Nicaragua*. Manuscript on file, Escuela Nacional de Antropología e Historia, Mexico City.

McCafferty, Geoffrey G.

2008 Domestic Practice in Postclassic Santa Isabel, Nicaragua. *Latin American Antiquity*

19(1): 64-82.

McCafferty, Geoffrey G., Jillian Logee, and Larry Steinbrenner

2007 X-ray Diffraction Analysis of Greater Nicoya Ceramics. *La Tinaja: A Newsletter of Archaeological Ceramics* 18:12-17.

McCafferty, Geoffrey G., and Sharisse D. McCafferty

2009 Crafting the Body Beautiful: Performing Social Identity at Santa Isabel, Nicaragua. In *Mesoamerican Figurines: Small-Scale Indices of Large-Scale Social Phenomena*, edited by Christina T. Halperin, Katherine A. Faust, Rhonda Taube, and Aurore Giguët, pp. 183-204. University Press of Florida, Gainesville, FL.

2011 Bling Things: Ornamentation and Identity in Pacific Nicaragua. In *Identity Crisis: Approaches to the Archaeology of Identity*, edited by Lindsay Amundsen and Sean Pickering. *Proceedings from the 40<sup>th</sup> Annual Chacmool Conference*, University of Calgary, Calgary, AB.

McCafferty, Geoffrey G., Silvia Salgado González, and Carrie L. Dennett

2009 Cuando llegaron los Mexicanos? La transición entre los periodos Bagaces y Sapoá en Granada, Nicaragua. Proceedings of the III Congreso Centroamericano de Arqueología en El Salvador. Digital version published by the Museo Nacional de Antropología, San Salvador, El Salvador.

McCafferty, Geoffrey G. and Larry Steinbrenner

2005 Chronological Implications for Greater Nicoya from the Santa Isabel Project, Nicaragua. *Ancient Mesoamerica* 16 (1):131-146.

McCafferty, Sharisse D., and Geoffrey G. McCafferty

2008 Spinning and Weaving Tools from Santa Isabel, Nicaragua. *Ancient Mesoamerica* 19(1): 143-156.

Motolinía, Fray Toribio de Benavente

1951 *History of the Indians of New Spain* (translated by F.B. Steck), Academy of American Franciscan History, Washington D.C. [Originally written in 1540]

Niemel, Karen Stephanie

2003 *Social Change and Migration in the Rivas Region, Pacific Nicaragua (1000 BC - AD1522)*. PhD dissertation, Department of Anthropology, State University of New York, Buffalo, NY.

Niemel, Karen, Manuel Román Lacayo, and Silvia Salgado González

1997 El migración de grupos mesoamericanos hacia el pacífico de Nicaragua durante el período posclásico temprano: una revisión de la secuencia cerámica de Gran Nicoya. In *XI Simposio de Investigaciones Arqueológicas en Guatemala, 1997*, edited by Juan Pedro

- Laporte and Hector Escobedo. Museo Nacional de Arqueología e Etnología, Guatemala.
- Norweb, Alfred H.  
1964 Ceramic Stratigraphy in Southwestern Nicaragua. In *Actas y memorias del 35<sup>th</sup> Congreso Internacional de Americanistas* I:551-561. Mexico, D.F.
- Oviedo y Valdés, Gonzalo Fernando de  
1950 *Sumario de la Natural Historia de las Indias* (edited and with introduction by José Miranda). Fondo de Cultura Económica, Mexico, DF. (Originally written in 1526)
- Pohl, Mary and Paul Healy  
1980 “Mohammed’s Paradise”: The Exploitation of Faunal Resources in the Rivas Region of Nicaragua. In *Archaeology of the Rivas Region, Nicaragua*, edited by Paul F. Healy, pp. 287-294. Wilfrid Laurier University Press, Waterloo, ON.
- Salgado González, Silvia  
1996 *Social Change in the Region of Granada, Pacific Nicaragua (1000 B.C. - 1522 A.D.)*. Ph.D. dissertation, State University of New York, Albany, NY.
- Salgado Gonzalez, Silvia and Ricardo Vasquez Leiva  
2006 Was there a Greater Nicoya Subarea during the Postclassic? *Vinculos, Revista de Antropología del Museo Nacional de Costa Rica* 29 (1-2): 1-16.
- Squier, Ephraim G.  
1990 *Observations on the Archaeology and Ethnology of Nicaragua*. Labyrinthos, Culver City, CA. (Originally published in 1853)
- Steinbrenner, Larry Leonard  
2002 *Ethnicity and Ceramics in Rivas, Nicaragua, AD 800-1550*. MA thesis, Department of Archaeology, University of Calgary, Calgary, AB.
- 2010 *Potting Traditions and Cultural Continuity in Pacific Nicaragua, A.D. 80–1350*. Ph.D. dissertation, Department of Archaeology, University of Calgary, Calgary, AB. University Microfilms, Ann Arbor, MI.
- Torquemada, Fray Juan de  
1975-83 *Monarquía Indiana*, 7 volumes (coordinated by M. Leon-Portilla). Instituto de Investigaciones Históricas, Universidad Nacional Autónoma de México, Mexico D.F. [Originally written in 1615]
- Wyss, Susan