

## Reports Submitted to FAMSI: Verónica Pérez Rodríguez Specialized Craft Production and Social Complexity in Formative Mixteca Alta



**Research Year:** 2004  
**Culture:** Mixtec  
**Chronology:** Pre-Classic  
**Location:** Mixteca Alta, Oaxaca, México  
**Site:** Nicayuju

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### Abstract

As archaeological luck would have it during the final weeks of excavation at the Postclassic site of Nicayuju in the Mixteca Alta region of Oaxaca, Mexico, we found a series of features that revealed large amounts of what seemed to be Formative pottery in modified bell-shaped pits. Given time and funding constraints five of the features were carefully excavated and the artifacts, approximately 10,000 sherds and thirteen complete but broken vessels, were washed and stored for future study. In the summer

of 2004 the FAMSI grant "Specialized Craft Production and Social Complexity in Formative Mixteca Alta" enabled a team of archaeologists from US and Mexican institutions to come together for a summer of intense ceramic analysis. The objectives of the analysis were to: (a) study and classify the ceramic material to determine the date and function of the excavated features and (b) assess the amount of standardization in the ceramic complex to investigate specialized craft production in Formative Mixteca Alta.

## Resumen

En las últimas semanas de excavación arqueológica en el sitio Posclásico de Nicayuju en la Mixteca Alta región de Oaxaca, México, por suerte encontramos una serie de formaciones que revelaron grandes cantidades de lo que parece ser alfarería en pozos del Formativo, modificados en forma de campana. Dadas las restricciones del fondo monetario y el tiempo, se excavaron cuidadosamente cinco de las formaciones y se lavaron y almacenaron los artefactos, aproximadamente 10,000 fragmentos y trece vasijas completas pero quebradas, para el estudio futuro. En el verano del 2004, la subvención de FAMSI "Producción de Alfarería Especializada y Complejidad Social en el Formativo Mixteca Alta" permitió a un equipo de arqueólogos de Estados Unidos y de instituciones mexicanas a reunirse en el verano, para un análisis intenso de cerámicas. Los objetivos de los análisis fueron para: (a) estudiar y clasificar el material cerámico para determinar la fecha y función de las formaciones excavadas y (b) evaluar la cantidad de estandarización en el complejo cerámico para investigar la producción de alfarería especializada en el Formativo Mixteca Alta.

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## Introduction

As archaeological luck would have it during the final weeks of excavation at the Postclassic site of Nicayuju in the Mixteca Alta region of Oaxaca, Mexico, we found a series of features that revealed large amounts of what seemed to be Formative pottery in modified bell-shaped pits. Given time and funding constraints five of the features were carefully excavated and the artifacts, approximately 10,000 sherds and thirteen complete but broken vessels, were washed and stored for future study. In the summer of 2004 the FAMSI grant "Specialized Craft Production and Social Complexity in Formative Mixteca Alta" enabled a team of archaeologists from US and Mexican institutions to come together for a summer of intense ceramic analysis ([Figure 1](#)). The

objectives of the analysis were to: (a) study and classify the ceramic material to determine the date and function of the excavated features and (b) assess the amount of standardization in the ceramic complex to investigate specialized craft production in Formative Mixteca Alta.



**Figure 1. Multi-cultural field crew composed of Mexican, Chinese, Japanese, and American archaeologists from US and Mexican institutions.**

Formative Mesoamerica is characterized by the specialized production and long distance exchange of 'luxury' items that bore Pan-Mesoamerican motifs thought to transmit and represent values attached to the then emergent forms of complex socio-political organization (Flannery 1968, 1999; Flannery and Coe 1968; Flannery and Marcus 2000; Pires-Ferreira 1975). Commercial, political-economic, and actor-based approaches have been used to study the relationship between specialization, exchange, and complexity (Brumfiel and Earle 1987; Childe 1951; Earle 1977; Flannery 1968; Polanyi 1957; Sahlins 1972; Sanders and Parsons 1968; Service 1975). While some argue that specialization and long-distance exchange resulted from the emergence of state-level societies, other studies suggest that household and community-based craft specialization along with intercommunity exchange may predate or operate outside the state (Adams *et al.* 1993; Jones 1996; Stark and Heindke 1998). There are well-documented cases where state-organized production operated alongside independent production even within imperial settings (D'Altroy and Earle 1985; Earle 1994; Janusek 1999). In other cases craft production and exchange may act as a catalyst for socio-political change.

Thanks to a growing body of research we know that the Mixteca Alta played a central role in the emergence of urbanism and states in Mesoamerica. The serendipitous find of what appeared to be Formative features, possibly firing features, that contained large amounts of pottery provided an opportunity to study a possible Formative ceramic production site and an assemblage found in its original context. By determining whether or not the features were firing kilns and by looking at the amount of standardization in the ceramic assemblage (Arnold 2000; Blackman *et al.* 1993; Costin and Hagstrum

1995), I would be able to get information about craft specialization in the Mixteca Alta prior to the emergence of state-level societies.

## **The Study Site**

The site of Nicayuju was initially surveyed, mapped and recorded by Stiver (2001) as part of a valley-wide survey that aimed to look at the history of human habitation in this portion of the Mixteca Alta. Stiver found that the site of Nicayuju was a Postclassic, 52-ha., well-preserved hilltop terraced site that was undoubtedly part of the Postclassic cacicazgo of Teposcolula, one of the most important and economically prominent polities in Late Prehispanic Mesoamerica. Nicayuju is located in the modern municipality of San Juan Teposcolula, approximately 6 km away, as the crow flies, from the capital site of the Pueblo Viejo of Teposcolula. The site was a densely populated late Prehispanic settlement, a rural settlement that extended across three hills and the adjacent drainages. All the hills showed signs of ancient habitation in the form of long and narrow residential and agricultural terraces that gave the hill the appearance of a multi-tiered cake. Nicayuju sits in a prime location for agricultural production given its climate, land, and proximity to water.

## **The Excavations**

The central focus of the excavations done at Nicayuju was to learn about the site's Postclassic inhabitants, their houses, lifestyles, and involvement in the construction and utilization of agricultural terraces. This information was to provide a bottom-up view on the socio-economic organization of the Mixtec cacicazgos, in particular the agricultural production that supported these polities. In line with the research objectives my work focused on excavating residential areas and agricultural terraces to learn about their characteristics, mode of construction, and the socioeconomic standing of the ancient inhabitants. During the final month of fieldwork, while exploring a residential terrace found near the hilltop portion of hill of Nicayuju, we came upon a series of features that first appeared as dark soil stains in a matrix of light pink sterile soil, the type of soil that made up the entire hill ([Figure 2](#)). We called this excavation area Cala 7. What these features revealed would surprise the entire crew.



**Figura 2. Dark soil stains as they appear before excavation.**

The cala, or trench, was initially aimed at sampling the front part of top-most terrace on the north side of the hill, and the back side of the next terrace down. Cala 7 was then actually composed of two trenches one that ran roughly N-S, set to 12° northwest of magnetic north, and the other was a perpendicular east-west axis. The N-S axis would sample parts of the two adjacent terraces, while the E-W trench would sample the back side of the lower terrace. I focused on the back side of terraces since we had previously found that these areas were protected from erosion by the soils that are deposited from the next terrace up. In this case I found that this small detail protected some very ancient features that had been lived in and over for hundreds of years prior to Spanish contact.

The excavation of Cala 7 first seemed to be unfruitful since we reached sterile soil sometimes within 30 to 40 centimeters of surface level. However, as we expanded our excavations we found that in the sterile soil, a series of darker soil stains started to appear. We began by fully exposing, mapping, and naming the various soil stains as features. We then proceeded to excavate the features and found that some intruded into the sterile soil layer for up to two meters. These intrusions were then filled with fill and large amounts of ceramic debris. The initial observations in the field were that this pottery was not Postclassic as the occupation found throughout the rest of the site would suggest, the pottery seemed to be much earlier, Formative.



**Figure 3. High concentration of broken but complete vessels found at the bottom of Feature 5.**

We proceeded to excavate five features. All of them consisted of layers, some thick, of soil deposits filled with ceramic and lithic artifacts as well as bone and other organic materials. At the bottom of two features, Feature 4 and 5 ([Figure 3](#)) we found a series of whole but broken vessels which were carefully drawn, photographed and collected. I provide a brief description of each feature along with photos and preliminary notes on their contents.

Feature 1 was found on the E-W axis of Cala 7, in unit N1W4. This was the smallest and most shallow feature, only 10-cm deep.

Feature 2 was located on the E-W axis of Cala 7, in units N1W4 and N1W3. This was one of the largest features and was roughly circular in shape. This feature was 123 cm deep.

Feature 3 was located on the E-W axis of Cala 7, in units N1E1 and S1E1. This was a smaller circular feature, 24 cm deep.

Feature 4 was located on the N-S axis of Cala 7, on the top-most terrace in units S4E1, S5E1. This was an irregular number 8-shaped feature 140 cm deep and divided in half by a low rock wall that sat almost at the bottom of the feature ([Figure 4](#)). The north half of the feature contained at the bottom complete but broken red-on-tan vessels surrounded by charcoal and ash.



**Figure 4. Irregular shape of Feature 4 and the low endeque wall that divides the two chambers that make up the feature.**

Feature 5 was located on the E-W axis of Cala 7, on the bottom terrace in units N1E2, N2E2, and N1E3. This was the largest feature, of an almost perfectly circular shape and 167 cm deep.

### **The Laboratory Procedures**

The artifact contents of the Cala 7 excavations were initially washed and processed for future study. In 2004 FAMSI awarded a grant aimed specifically at the study, analysis, and dating of the Cala 7 finds. In the summer of 2004 I traveled to Oaxaca to set up a laboratory for ceramic analysis. I was able to assemble a team of archaeology students from US and Mexican institutions. Barbara Elizalde Carbajal, Nobuyuki Matsubara, and Ismael Vicente from the Escuela Nacional de Antropología e Historia de Mexico, Emily Kellogg from Northern Arizona University, and Xinyu Ren the University of Georgia ([Figure 1](#)).

Once having set up the laboratory we began to work on sorting and identifying the ceramic types and vessel forms with the aid of a reference library. We first divided rims from bodies and for both we recorded paste, type, number of sherds, and weight. For rims we collected more information such as rim thickness and diameter, surface color, treatment, and finish, paste color, temper size and vessel form. From this information we would be able to (a) identify ceramic types, which would help us date the features, and (b) assess vessel forms and functions. Finally this information would be part of a master's thesis project which would look at the level of standardization in production to determine whether or not the ceramic assemblage may have been produced by specialized crafters (Kellogg 2005). I selected the best carbon samples to be sent to the laboratory for radiocarbon dating. During the summer 2004 I worked with INAH and the National Council of Archaeology to obtain the proper export permits to send the charcoal samples to a US lab. The lab results are integrated into this final report. Lastly bone material and soil samples, these later ones collected from inside the vessels that were found at the bottom of Features 4 and 5, were sent to the zooarchaeological and ethnobotanical laboratories of the National School of Anthropology and History in Mexico City for their flotation and chemical analysis. I am currently awaiting final results and a full report.

We worked for two months in Oaxaca. The process was a wonderful learning experience for everybody, especially the students. We incessantly worked on classifying the sherds, sorting them, and comparing them to the established typologies (Caso *et al.* 1967; Drennan 1976; Flannery and Marcus 1994; Spores 1972; Whalen 1981; Winter 1972). We were fortunate enough to be visited by some of Oaxaca's ceramic experts such as Stephen Kowalewski, Mary Thieme, Marcus Winter and Ronald Spores. We also visited the modern potters' town of Atzompa in the Valley of Oaxaca to see and learn first-hand about traditional ceramic production techniques. After these visits and weeks of work we were able to establish, without a doubt, that the ceramic assemblages dated to the Early/Middle Formative. Upon the work we had done I was able to put forth some ideas about what the Cala 7 features might have been in ancient times.

## **The Results and Interpretation**

Careful study of the ceramic contents of the Cala 7 showed that the features dated to the Preclassic. We identified fragments and in some cases entire vessels of diagnostic Early/Middle Cruz and Late Cruz pottery such as Yucuita Polished Brown wares, Nochixtlán Gray wares, Jazmin Red and White (Carlitos Two-Tone and Reyes White varieties; [Figure 5](#)) (Spores 1972). During excavation we opportunistically collected carbon samples and in the summer of 2004 I selected the best seven to be sent to the Center for Applied Isotope Studies at the University of Georgia for dating. I integrate the radiocarbon results to the following discussion of the Cala 7 features.



**Figure 5. Carlitos Two-Tone.**

**Feature 1**, on the E-W axis of Cala 7 and in unit N1W4, was the smallest and most shallow feature, only 10-cm deep. Its ceramic contents revealed un-diagnostic tan ware ceramics that are not unlike those found associated with Cruz phase materials in adjacent features. No carbon samples were retrieved from this feature.

**Feature 2** is located on the E-W axis of Cala 7, in units N1W4 and N1W3. This was one of the largest features and was roughly circular in shape. This feature was 1.23 m deep. These laboratory results and the associated ceramic assemblage date this feature to the Middle to Late Cruz phases. Samples recovered from Feature 2 turned up dates of about 781-478 cal B.C. ( $p=.857$ ) and 471-411 cal. B.C. ( $p=.143$ )<sup>1</sup>. Feature two revealed a very large amount of ceramic materials. Ceramics near the top of the feature were stylistically Late Cruz diagnostics. Nochixtlán gray wares were common, we found jars but mostly out-leaning wall bowls with incised and excised lines on the inner rims, some even display remains of white slip. The most common ceramic types were tan and red-on-tan jars and bowls. Very common as well were polished brown ware jars, tecomates (neck less jars), and everted rim bowls, most decorated with incised two, three and even four line breaks. In this feature we also retrieved three spindle whorl fragments all in gray paste and six pieces of Jazmin red-on-white Carlitos Two-Tone variety, which according to Spores (1972) are diagnostic types for Early/Middle Cruz. Ceramic materials found towards the bottom of the feature appear to date to an Earlier Cruz phase. In addition, towards the bottom of the feature we retrieved a complete tan ware cucharón (large ladle) and a series of tan ware water jug fragments. This feature also turned up three Cruz diagnostic figurine fragments ([Figure 6](#)).

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<sup>1</sup> All calibrations done by CALIB 4.4 (Stuiver and Reimer 1993; Stuiver *et al.* 1998).

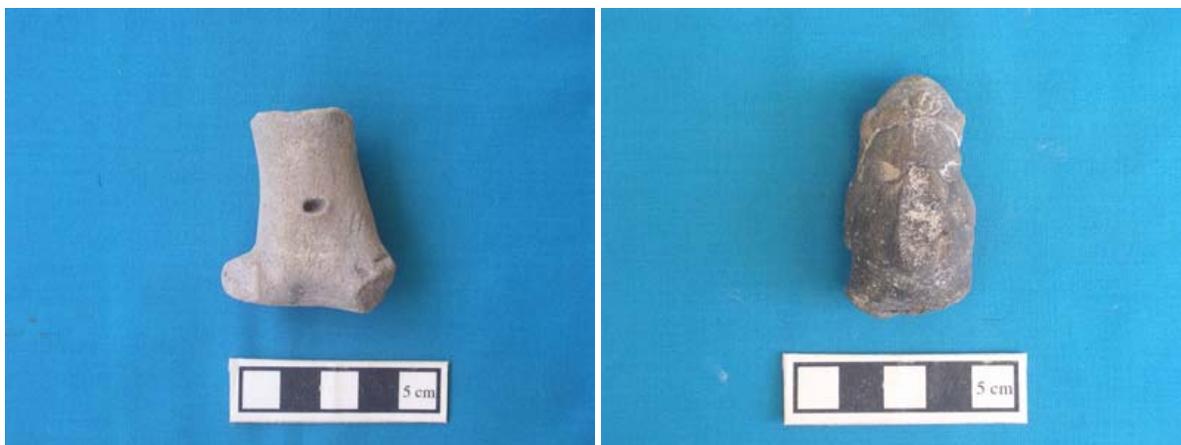


Figure 6. Diagnostic Cruz figurines.

**Feature 3** was located on the E-W axis of Cala 7, in units N1E1 and S1E1. This was a smaller circular feature, 24 cm deep. The ceramic contents of this feature revealed Nochixtlán gray ware and polished brown ware bowls with incised doubleline breaks, as well as a number of tan and red-on-tan ware jars and out-leaning wall bowls. No carbon samples from this feature were sent to the lab for dating.

**Feature 4** was located on the N-S axis of Cala 7, on the top-most terrace in units S4E1, S5E1. This was an irregular number 8-shaped feature 140 cm deep and divided in half by a low rock wall that sat almost at the bottom of the feature. The north half of the feature contained at the bottom complete but broken red-on-tan vessels surrounded by charcoal and ash ([Figure 4](#)). Two samples obtained from this feature were sent to the laboratory for dating. One provided a date of about 1134-896 cal. B.C. ( $p=.851$ ). This date would place the feature in the Early/Middle Cruz phase. However, the second sample gave a date of about A.D. 81-401 ( $p=1.0$ ), the Ramos Phase. The radiocarbon results confirm the field and laboratory observations that Feature 4 consisted of an earlier Preclassic feature that was later disturbed in Ramos to Las Flores times, as the pottery suggested.

**Feature 5** was located on the E-W axis of Cala 7, on the bottom terrace in units N1E2, N2E2, and N1E3. This was the largest feature, of an almost perfectly circular shape, and 167 cm deep. In the top levels of the feature (depth -2.2 to -2.4) we found a small number of polished brown fragments amongst a large number of red-on-tan and rough paste gray wares. The ceramic assemblage near the top of the feature dates to about the Late Cruz phase. Deeper into the feature (depth -2.4 to -3.0) the polished brown sherds disappear and instead we find a large number of red-on-tan bowls, most with everted rims decorated with incised lines as well as a small number of fine gray bowl fragments that show a distinctive eccentric rims, one with a two-line incised decoration, another with a St. Andrew's cross decoration. Further down the feature at a depth between -3.0 to -3.5 we found textbook examples of San Jose phase pottery such as bowl fragments in tan and gray paste with white slip and multi-line breaks and more intricate decoration ([Figure 7](#)). At this depth we found also a few pieces of Carlitos Two-

Tone bowls as well as jar, tecomates, and bowl fragments in tan paste with orange-red paint decoration.

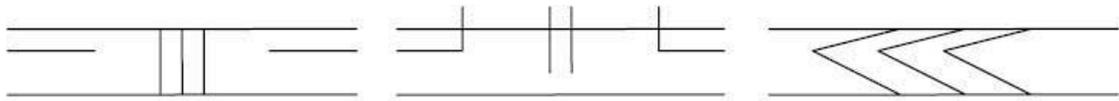


Figure 7. Examples of line decoration in Feature 5 ceramics.

Between the depths of -3.3 to -3.5 we found the remains of a dog that lacked hind legs and near this find we found an almost complete composed silhouette bowl in fine gray paste (Leandro gray) with a three line incised decoration in the outside rim ([Figure 8](#)).

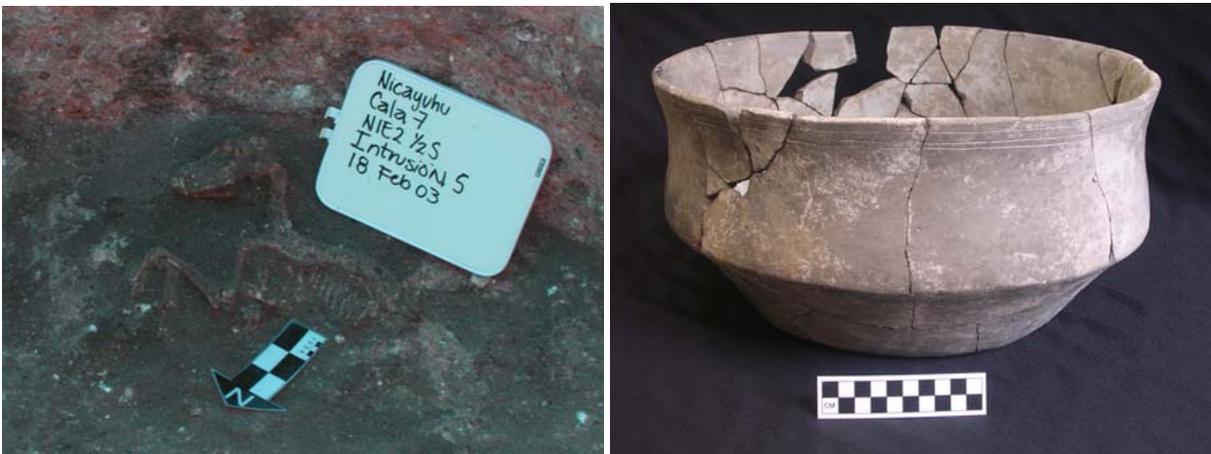


Figure 8. Dog remains found in Feature 5 and the almost complete gray vessel found nearby.

At the bottom of Feature 5 (-3.5 to -3.8) we found a number of very large jars, jugs, and tecomates complete, but broken ([Figure 9](#)). We carefully drew, photographed, and collected these vessels along with the soils they contained for further study. These seem to have been sitting at the bottom of the feature. All these vessels were rather large and were of a tan paste and some had red paint decoration. At these depths we also found a few small body sherds with zone punctate Fidencio coarse decoration which would suggest a San Jose phase or Early Cruz date to the bottom of the feature. From Feature 5 we recovered two carbon samples that were sent to the lab, one dated to about 1449-1040 cal. B.C. ( $p=.991$ ) and 1312-896 cal. B.C. ( $p=.980$ ). These dates correspond with the dates associated with the ceramic materials recovered at the lower levels of Feature 5.



Figure 9. Reconstructed vessels recovered from Feature 5.

Kellogg (2005) looked at the morphological and technological attributes between utilitarian and non-utilitarian wares and found that there was no significant difference in the amount of standardization between these two types of vessels. Although non-utilitarian wares required more labor input than utilitarian wares, in some cases utilitarian wares, such as red-on-tan jars, were the most standardized.

These finds suggest that utilitarian wares may have been produced with the same amount of skill, experience, and practices as non-utilitarian wares that bore pan-Mesoamerican motifs. This outcome is unexpected since the initial expectation was that decorated non-utilitarian wares that were subject of long distance exchange may have been produced in a more specialized or controlled manner. Although these initial finds require further study of production loci in particular, it may suggest that ceramic production of decorated non-utilitarian wares with ideological motifs may have taken place in a fashion similar to that of local utilitarian wares that required a lesser labor and capital investment.

Although we began working with the idea that the Cala 7 features were firing pits, careful study of the features and a comparison with Pre-Contact firing features excavated elsewhere in Mesoamerica and the Southwestern US suggested that the Cala 7 features were not used for firing pottery (Kellogg 2005). We found virtually no production by-products or production tools. Comparisons of the Cala 7 features with dimensions and characteristics of different known pottery kilns excavated in Mesoamerica and the Southwestern US revealed that the features 1, 2, 3, and 5 were not pottery firing features. Feature 4 still remains suspect given its size and morphology, possibly similar to a two-chambered firing feature. However, this feature was disturbed by later Prehispanic activity and its original contents and form may have been moved making its classification as a kiln problematic.

Currently I am working with the idea that the features were possibly storage features, bell-shaped pits – a common feature in Formative Mesoamerica – that were later modified, abandoned, filled, and disturbed. It is possible that these subterranean features were associated with residential areas that have since been eroded or destroyed by later Prehispanic occupation. This makes the task of interpretation much harder.

Barbara Elizalde Carbajal, Nobuyuki Matsubara, and Ismael Vicente Cruz studied, at the ENAH laboratories, the faunal remains and conducted ethnobotanical and chemical analyses of the soils obtained from the complete but broken vessels found at the bottom of Feature 5. I am currently waiting for the final report on the studies, but I can discuss some preliminary finds. Working with the hypothesis that the features were possibly used for storage we took into consideration that the most common and widely farmed and stored plant in Mesoamerica is maize, however there were no traces of maize found in the soils of the Feature 5 vessels. The paleobotanical and zooarchaeological analyses conducted at ENAH found that the only plant material recovered from inside the features corresponded to epazote, verdolaga, and amaranth, all widely used but wild edible plants. Zooarchaeological analysis of the Feature 5 soils found a very large number of frog eggs and some frog bones. So far there are two possible scenarios, either the frogs were kept or these came to inhabit the abandoned vessels and features that would later become inundated with rainwater.

The integration of all lines of evidence provides an intriguing picture of these features and their function in a small Formative settlement in the Mixtec highlands. Bell-shaped pit features appear to have been rather common domestic features in Formative Mesoamerica; they were used for storage, burial, and as activity areas (Winter 1976). Excavations conducted by Raul Matadamas in nearby Yucunama have revealed Formative bell-shaped pits confirming that these features were found in the Mixteca at this time (Spores personal communication 2005). However, determining the function of these features is more complex. It is possible that these features served different functions at different times. In the case of the Cala 7 features we find that although some features may have been contemporary, not all of them were. Although most features were roughly circular, all were different in size. Feature 4 was completely different consisting of two roughly circular chambers interconnected by a narrow area marked by a low endoque wall. Given the different morphology of Feature 4, I suspect that it might have had a different function.

Bell-shaped pits were commonly used for storage and burial. The evidence found in Cala 7 does not suggest a funerary function for any of the features. At this point I pursue the idea that the features were used for storage. This idea is partly supported by the find of a large number of very large, complete, but broken jars, tecomates, and water jugs found at the bottom of Features 4 and 5. However, the story becomes more intriguing after we take into consideration the soil contents of these vessels. These vessels, given their size would be rather difficult to move when full and they may have been mostly kept inside these features. Their contents may have been taken when the features were abandoned. In time the open pits may have become filled with water and frogs. Later on, either by human action or nature the upper portions of the pits were

broken in or modified to create a more open shape to the features. The pits were later filled with trash and eroding soils, which formed thick layers of ash, soils, and debris. Much later, a rural settlement of Postclassic farmers would live on top of the Preclassic remains, covering the deposits, at times protecting them, and at others disturbing and modifying them.

In the future, additional studies of Formative bell-shaped features throughout Mesoamerica should help clarify their function, form, and variation throughout time and space. In fact a couple of the students who worked in this project last year are currently working on their thesis, which will focus precisely on these questions based on the information available for the Mixteca Alta. Work is on-going, but the finds in Cala 7 are an important contribution to our knowledge of Formative common life in the Mixteca. During the fieldwork done at Nicayuju many more bellshaped features associated with Cala 7 were found, but only 5 were excavated.

## **Acknowledgements**

I want to thank FAMSI for funding both the fieldwork and analysis portions of this study. Additional funding for the excavation was provided by NSF and the Wenner-Gren foundations. The analysis phase was also supported by a Northern Arizona University Intramural Grant. I want to acknowledge the Consejo Nacional de Arqueología de México for granting the required permits and the Centro INAH Oaxaca for their support, especially Marcus Winter and Nelly Robles. Experienced Oaxacan researchers Stephen Kowalewski, Mary Thieme, and Ronald Spores provided additional guidance on the study and classification of the ceramic materials. Finally I want to thank my excavation and laboratory fieldworks who without their work and enthusiasm this study wouldn't have been possible.

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## Sources Cited

- Adams, E. C., M. T. Stark, and D. S. Dosh  
1993 Ceramic Distribution and Exchange - Jeddito Yellow Ware and Implications for Social Complexity. *Journal of Field Archaeology* 20(1):3-21.
- Arnold, D. E.  
2000 Does the standardization of ceramic pastes really mean specialization? *Journal of Archaeological Method and Theory* 7(4):333-375.
- Blackman, M. J., G. J. Stein, and P. B. Vandiver  
1993 The Standardization Hypothesis and Ceramic Mass-Production: Technological, Compositional, and Metric Indexes of Craft Specialization at Tell Leilan, Syria. *American Antiquity* 58(1):60-80.
- Brumfiel, E. M. and T. K. Earle (editor)  
1987 *Specialization, Exchange and Complex Societies*. Cambridge University Press, Cambridge.
- Caso, A., Ignacio Bernal, and Jorge R. Acosta  
1967 *La Ceramica de Monte Alban*. Memorias del Instituto Nacional de Antropología e Historia XIII. Instituto Nacional de Antropología e Historia, México.
- Childe, V. G.  
1951 *Man Makes Himself*. The New American Library, New York and Toronto.
- Coe, M. D. and R. A. Diehl  
1980 *In The Land of the Olmec: The People of the River 2*. 2 vols. University of Texas Press, Austin.
- Costin, C. L., and M. B. Hagstrum  
1995 Standardization, Labor Investment, Skill, and the Organization of Ceramic Production in Late Pre-Hispanic Highland Peru. *American Antiquity* 60(4):619-639.

- D'Altroy, T., and T. K. Earle  
 1985 State Finance, wealth finance, and storage in the Inka political economy. *Current Anthropology* 26:187-206.
- Drennan, R. D.  
 1976 *Fábrica San Jose and Middle Formative Society in the Valley of Oaxaca*. Prehistory and Human Ecology of the Valley of Oaxaca 4. Memoirs of the Museum of Anthropology University of Michigan Number 8, Ann Arbor.
- Earle, T. K.  
 1994 Wealth Finance in the Inka Empire: Evidence from the Calchaqui Valley, Argentina. *American Antiquity* 59(3):443-460.
- Earle, T. K. and J. E. E. (editor)  
 1977 *Exchange Systems in Prehistory*. Academic Press, New York.
- Flannery, K. V.  
 1968 The Olmec and the Valley of Oaxaca: A Model of Interregional Interaction in Formative Times. In *Dumbarton Oaks Conference on the Olmec*, edited by E. P. Benton. Dumbarton Oaks Library, Washington D. C.  
 1999 Process and agency in early state formation. *Cambridge Archaeological Journal* 9(1):3-21.
- Flannery, K. V. and J. Marcus  
 1994 *Early Formative Pottery of the Valley of Oaxaca, Mexico*. Prehistory and Human Ecology of the Valley of Oaxaca 10. Memoirs of the Museum of Anthropology University of Michigan Number 27, Ann Arbor.  
 2000 Formative Mexican Chiefdoms and the Myth of the "Mother Culture". *Journal of Anthropological Archaeology* 19:1-37.
- Flannery, K. V. and M. D. Coe.  
 1968 Social and Economic Systems in Formative Mesoamerica. In *New Perspectives in Archaeology*, edited by S. R. Binford and L. R. Binford. Aldine Atherton, Chicago.
- Janusek, J. W.  
 1999 Craft and local power: Embedded specialization in Tiwanaku cities. *Latin American Antiquity* 10(2):107-131.
- Jones, T. L.  
 1996 Mortars, Pestles, and Division of Labor in Prehistoric California: A View from Big-Sur. *American Antiquity* 61(2):243-264.

- Kellogg, E.  
2005 Ceramic Specialization In Formative Mixteca Alta, Oaxaca, Mexico. M.A., Northern Arizona University.
- Pérez Rodríguez, V.  
2003 Household Intensification and Agrarian States: Excavation of Houses and Terraced Fields in a Mixtec Cacicazgo. Ph.D., University of Georgia.
- Pires-Ferreira, J. W.  
1975 *Formative Mesoamerican Exchange Networks with Special Reference to the Valley of Oaxaca*. Prehistory and Human Ecology of the Valley of Oaxaca 3. Memoirs of the Museum of Anthropology University of Michigan Number 7, Ann Arbor.
- Polanyi, K., Conrad M. Arensberg, Harry W. Pearson (editor)  
1957 *Trade and Market in the Early Empires*. The Free Press & The Falcon's Wing Press, Glencoe, Illinois.
- Sahlins, M. D.  
1972 *Stone Age Economics*. Aldine, Chicago.
- Sanders, W. T. and B. J. Parsons.  
1968 *Mesoamerica: The evolution of a civilization*. Random House, New York.
- Service, E. R.  
1975 *Origins of the State and Civilization*. W.W. Norton & Company Inc, New York.
- Spores, R.  
1972 *An Archaeological Settlement Survey of the Nochixtlán Valley, Oaxaca*, Nashville.
- Stark, M. T., and J. M. Heidke  
1998 Ceramic manufacture, productive specialization, and the early classic period in Arizona's Tonto Basin. *Journal of Anthropological Research* 54(4):497-517.
- Stiver, L.  
2001 *Prehispanic Mixtec Settlements and the State in the Teposcolula Valley of Oaxaca, Mexico*. Ph.D., Vanderbilt University.
- Whalen, M. E.  
1981 *Excavation at Santo Domingo Tomaltepec: Evolution of a Formative Community in the Valley of Oaxaca, Mexico*. Prehistory and Human Ecology of the Valley of Oaxaca 12. Memoirs of the Museum of Anthropology University of Michigan, Ann Arbor.

Winter, M.

1972 *Tierras Largas: A Formative Community in the Valley of Oaxaca, Mexico.*  
Ph.D., University of Arizona.

1976 The Archaeological Household Cluster in the Valley of Oaxaca. In *The Early Mesoamerican Village*. Edited by Kent V. Flannery. Academic Press Inc., New York.