The Origins of Mesoamerican Agriculture: Reconnaissance and Testing in the Sayula-Zacoalco Lake Basin

Research Year: 2000
Culture: Tarascan
Chronology: Pre-Classic, Classic, and Post Classic
Location: Jalisco, West México
Site: Sayula-Zacoalco Lake Basin

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Abstract

Archaeological reconnaissance and testing in rockshelters and open archaeological sites in the Sayula lake basin of western México was carried out in search of evidence to document the transition from hunting and gathering to agricultural food production. The local archaeological collectors have amassed a rich collection of cultural artifacts that document human occupation of the Sayula Lake Basin since terminal Pleistocene times. Botanical collecting during reconnaissance yielded collections of squash that may potentially represent a new cucurbit taxon. A total of 36 rockshelters were visited to evaluate their potential for yielding evidence of Archaic Period occupation. Fifteen open archaeological sites were also located and evaluated for their potential in providing evidence of the early stages of agricultural development. We tested three rockshelters and a single open site. Evidence of preceramic occupation was unearthed in one shelter dating 4780±60 radiocarbon years B.P., a second shelter provided evidence of possible Preceramic occupation, the third rockshelter provided evidence of Classic Period occupation only. The fourth archaeological site, this one an open site, was excavated to ascertain whether the earliest yet identified ceramic-bearing sediments in the valley might be located on top of preceramic occupation. A fifth site, a hardly accessible rockshelter, containing abundant evidence of Formative, Classic and Postclassic Period deposits, could not be test-excavated. A single radiocarbon date on a carbonized corncob obtained at the shelter by looters measured 1760±60 radiocarbon years B.P. Testing of this potentially rich rockshelter should be undertaken in the future. Continued excavation in the rockshelter-designated Moreno 5 will undoubtedly produce additional evidence of the Archaic in the Sayula-Zacoalco lake basin.

Resumen

En abrigos rocosos y sitios arqueológicos abiertos en la cuenca del lago Sayula, en el occidente de México, se llevó a cabo un reconocimiento arqueológico, como así también sondeos, en busca de evidencia para documentar la transición de la caza y la recolección a la producción agrícola de alimentos. Los coleccionistas locales de arqueología han logrado reunir una rica colección de artefactos culturales que documentan la ocupación humana en la cuenca del lago Sayula desde los tiempos terminales del Pleistoceno. Las recolecciones botánicas durante el reconocimiento, arrojaron colecciones de calabazas que potencialmente podrían representar una nueva entidad taxonómica cucurbitácea. Se visitó un total de 36 abrigos, con el fin de evaluar el potencial de los mismos para producir evidencias de una ocupación del período Arcaico. También se localizaron y evaluaron 15 sitios arqueológicos abiertos, con el objeto de determinar su potencial para proporcionar evidencias de las etapas tempranas del desarrollo agrícola. Estudiamos tres refugios y un único sitio abierto. En uno de los abrigos, fechado radiocarbónicamente para el 4780±60 A.P., se desenterró evidencia de una ocupación precerámica; un segundo abrigo proporcionó evidencia de una posible ocupación precerámica, y el tercer abrigo sólo proporcionó evidencias de

una ocupación del período Clásico. El cuarto sitio arqueológico, un sitio abierto, fue excavado para determinar si los sedimentos más tempranos con cerámica identificados hasta ahora en el valle, podrían estar ubicados encima de una ocupación precerámica. En el quinto sitio, un abrigo de muy difícil acceso que contenía abundante evidencia de depósitos de los períodos Formativo, Clásico y Posclásico, no fue posible hacer una excavación de prueba. Una única fecha radiocarbónica proveniente de una mazorca de maíz obtenida en el abrigo por saqueadores, arrojó una datación de 1760±60 años A.P. En el futuro, deberían emprenderse estudios en este abrigo potencialmente rico. Las excavaciones continuadas en el abrigo, designado como Moreno 5, sin duda producirán más evidencias del Arcaico en la cuenca lacustre de Sayula-Zacoalco.

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Introduction

Recently acquired evidence brought to light from the analysis of archaeological plant material from Oaxaca suggests that maize's wild ancestor teosinte was domesticated by 4200 B.C. (Benz, 2001). Previous research had demonstrated that the earliest maize from Tehuacán was at least 700 years more recent (Benz and Long, 2000). The morphological character of the ears from Oaxaca indicate human selection had transformed a spontaneous weedy plant species, teosinte, into a highly variable but dependably productive plant that depended on humans for dispersal. The earliest maize from Tehuacán, represented a full-blown domesticate that was fully dependent on humans for dispersal and in the midst of rapid morphological evolution brought about by agricultural selection. The earliest evidence of sedentary agricultural habitation in Mesoamerica is located in the Mazatán region on the coastal plain of Chiapas and the early Mesoamerican villages in the Valley of Oaxaca (Flannery, 1976). The earliest evidence of these Mokaya villagers of the Mazatán region dates to ca. 1550 B.C. (Blake and Clark, 1999). Between 3500 B.C. and 1550 B.C. Mesoamerican collectors and hunters underwent a significant change in settlement system. The only evidence of Late Archaic Period occupation in Mesoamerica during this 2000 year hiatus comes from the coast of Chiapas, the coast of Nayarit and the Valleys of Tehuacán, México and Oaxaca (Flannery, 1986; Michaels and Voorhies, 1999; MacNeish, 2001; MacNeish and Eubanks, 2001). The evidence of the Late Archaic occupation in Mesoamerica comes almost exclusively from rockshelters and shellmiddens. No evidence of multiseasonal residence during the Mexican Archaic Period exists until 1550 B.C., the Early Formative of Mazatán.

Our objectives were to locate and characterize Archaic Period occupation of the Sayula-Zacoalco Lake basins. Our principal motivation in identifying the Archaic has been to identify the cultural and biological factors that led humans to devote available time for subsistence pursuits to the ancestors of corn beans and squash.

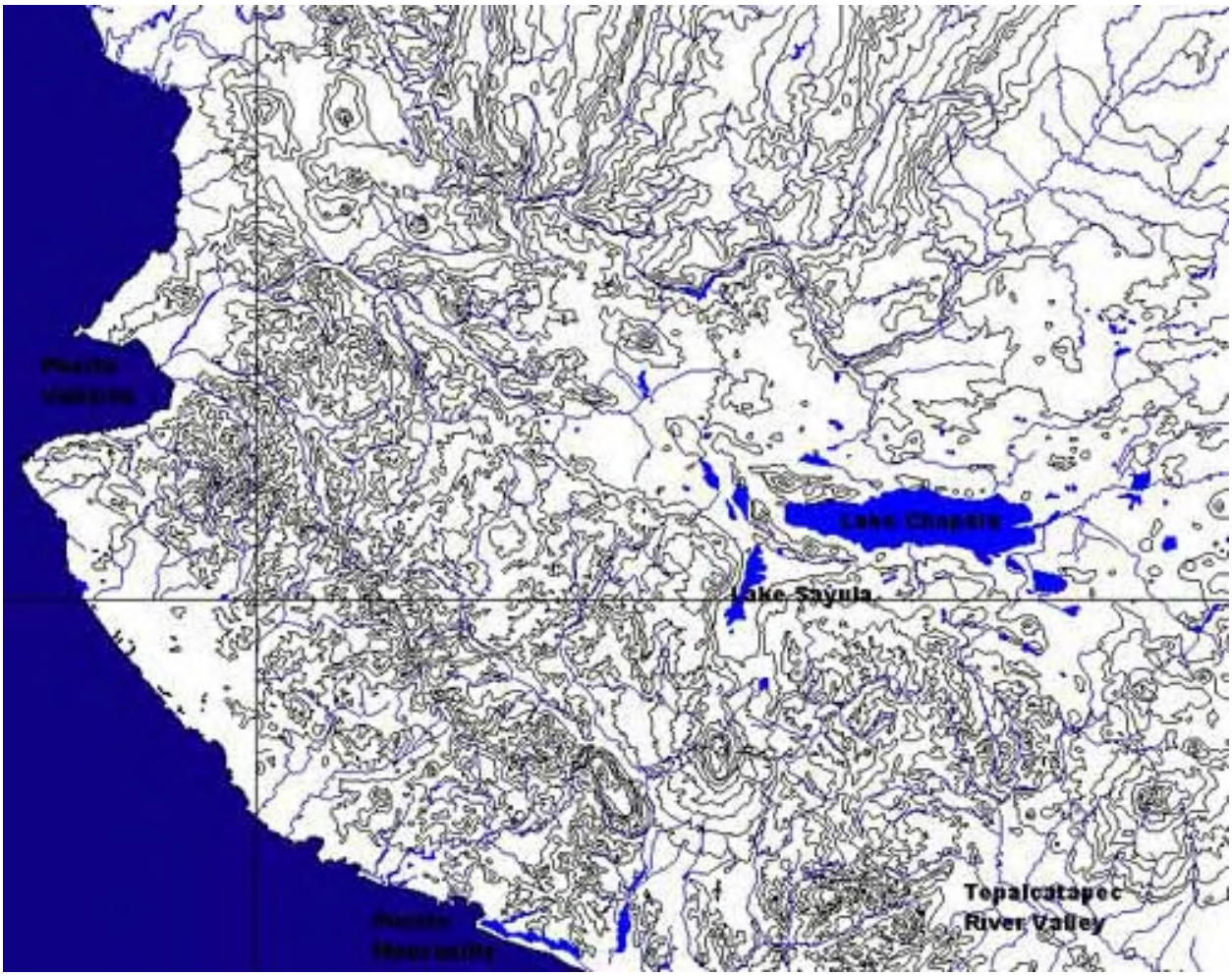

Figure 1. Map of Western México showing major landmarks. Map includes all of Jalisco, roughly top center to Puerto Vallarta to Manzanillo to Lake Chapala, and also covers parts of the states of Nayarit (upper left), Colima (bottom center), Michoacán (center and bottom right) and Zacatecas (top right). Lake Sayula, the region we focused on in our survey and testing is located southwest of Lake Chapala.

The Sayula-Zacoalco lake basin is located in south central Jalisco, southwest of Lago Chapala, México's largest lake (Figure 1). The highest elevations surrounding the Sayula-Zacoalco lake basin are clothed in Pine forest. Below 1800 meters, pines drop out and oaks dominate the vegetation. Oaks extend down to 1500 meters with some arid-tolerant species extending down to 1350 meters. This deciduous oak forest contains populations of two widely harvested species: Camote del Cerro (*Dioscorea*

remotiflora Kunth) and Jarillas (*Jarilla spp*.), the former for its starchy roots and the latter for its fruits. Protected mesic environments extending along watercourses and in canyons between 1750 and 1300 meters contain rich Mesophytic forest, a forest type recognized in the region as a source of edible fruits and seeds including *Eugenia culmicola* (Cav. & Schlect.) Ngu. From 1500 to 1300 meters, the surrounding slopes are covered by tropical deciduous forest. Elements of the tropical deciduous forests are still sought after today for their edible fruits including Guaje (*Leucaena esculenta* (DC) Benth.), guamuchil (*Pithecellobioum dulce* (Roxb.) Benth.), Mesquite (*Prosopis laevigata* (Willd) M. Johns.), Ciruela (*Spondius pupurea* L.), Pitayas (*Stenocereus querretaroensis* (Weber) Buxbaum), and Tunas (*Opuntia* spp.) as well as Nopales (*Nopalea karwinskiana* Salm-Dyck) Schumann and species used for their foliage and fibers (*Agave* spp., *Heliocarpus terebthinaceus* (DC) Hochr.).

Southern Jalisco offers biological opportunities that are not commonly matched elsewhere in Mesoamerica. Southern Jalisco harbors spontaneous populations of the wild relatives of three staple crops of México and Central America, maize, squash and beans. The area of sympatry of these plant species for the most part includes the Sayula-Zacoalco Lake basins. Furthermore, the biological diversity present today in this area of Mesoamerica provides a unique opportunity that must have been tantalizing to Holocene hunters and gatherers, even in the midst of periodic atmospheric changes in temperature and rainfall. Within a few hours walk of the lakes' margins, as many as six natural vegetation zones exist that offer at least 100 species of edible plants (Benz *et al.*, 1994). We hypothesized that this closed watershed should contain evidence of the earliest stages of plant domestication and subsequent stages of agricultural development because the area provides a wealth of plant and animal resources that would have been exploited by the prehispanic occupants of western México. See however, Mountjoy's (1999) recent synthesis where he concludes that the Archaic will not be found in Western México.

Prior to our investigation, the area boasted a rich history of prehispanic occupation back through the Late Formative (Valdez, 1996; Ramirez *et al.*, 1996; Liot, 1996) and abundant evidence of Paleoindian occupation (Aliphat, 1980; Schondube, 1982). Our examination of one local museum collection (see Plate 1 and Plate 2) corroborates earlier reports of Paleoindian occupation of the Sayula Lake basin and provides suggestive evidence of Archaic Period occupation. Earlier reports of cultural manifestations in this area indicate that caves and rockshelters are common. The great potential for preservation of organic material in rockshelters led us to postulate that evidence of Archaic Period occupation and associated organic materials documenting patterns of hunting and gathering would be forthcoming from the rockshelters in the Sayula Lake basin.

This report describes our reconnaissance in the Sayula basin, the results of test excavations in three rockshelters and a single open site and the preliminary analytical results of artifacts recovered. In summarizing the results of our fieldwork, we will show that the Sayula Basin does in fact hold promise of producing evidence of the cultural transition from hunting and gathering to food production.

Plate 1. Archaic and Paleo-Indian projectiles and bifaces from the Sayula-Zacoalco Basin. All surface finds. Clockwise from upper left: Kent, basalt, Archaic; Clovis, flint/chert, Paleo-Indian; unidentified, basalt; Angostura, flint/chert, Paleo-Indian; unidentified, quartzite, Paleo-Indian(?); Agate Basin, basalt, Paleo-Indian. Identifications courtesy of Karen Hardy (see also Hardy, 1994; 1996) (Photo by Bruce Benz).

Plate 2. Two potentially Archaic Period projectiles from Sayula-Zacoalco Lake Basin. Private collection in Teocuicatlán. (Photos by Marcus Winter).

Regional Survey and Sondage Testing

The fieldwork carried out during the summer of 2000 and the spring of 2001 can be divided into two phases. The first involved reconnaissance of the lake margins and piedmont areas surrounding the four lakes/lagoons in the Sayula-Zacoalco basin. Discussion of the projects objectives with local municipal authorities, landowners and collectors provided directions to areas and sites with potential for producing Archaic Period evidence. These discussions also provided invitations to examine artifact collections. The second phase of research developed around test excavation in three rockshelters and a single open site. We located 35 rockshelters and fifteen open sites in the course of our reconnaissance. Material culture was collected from all sites visited during reconnaissance. Six to eight of the caves/rockshelters exhibited potential that warranted test excavation based on the project's objectives. Numerous open sites also warranted testing but could not be due to a time constraint. Assessment of the sites' potential has been made based on considerations of site location, the surface artifact collections from these sites and the depth of cultural deposits estimated from trowel tests.

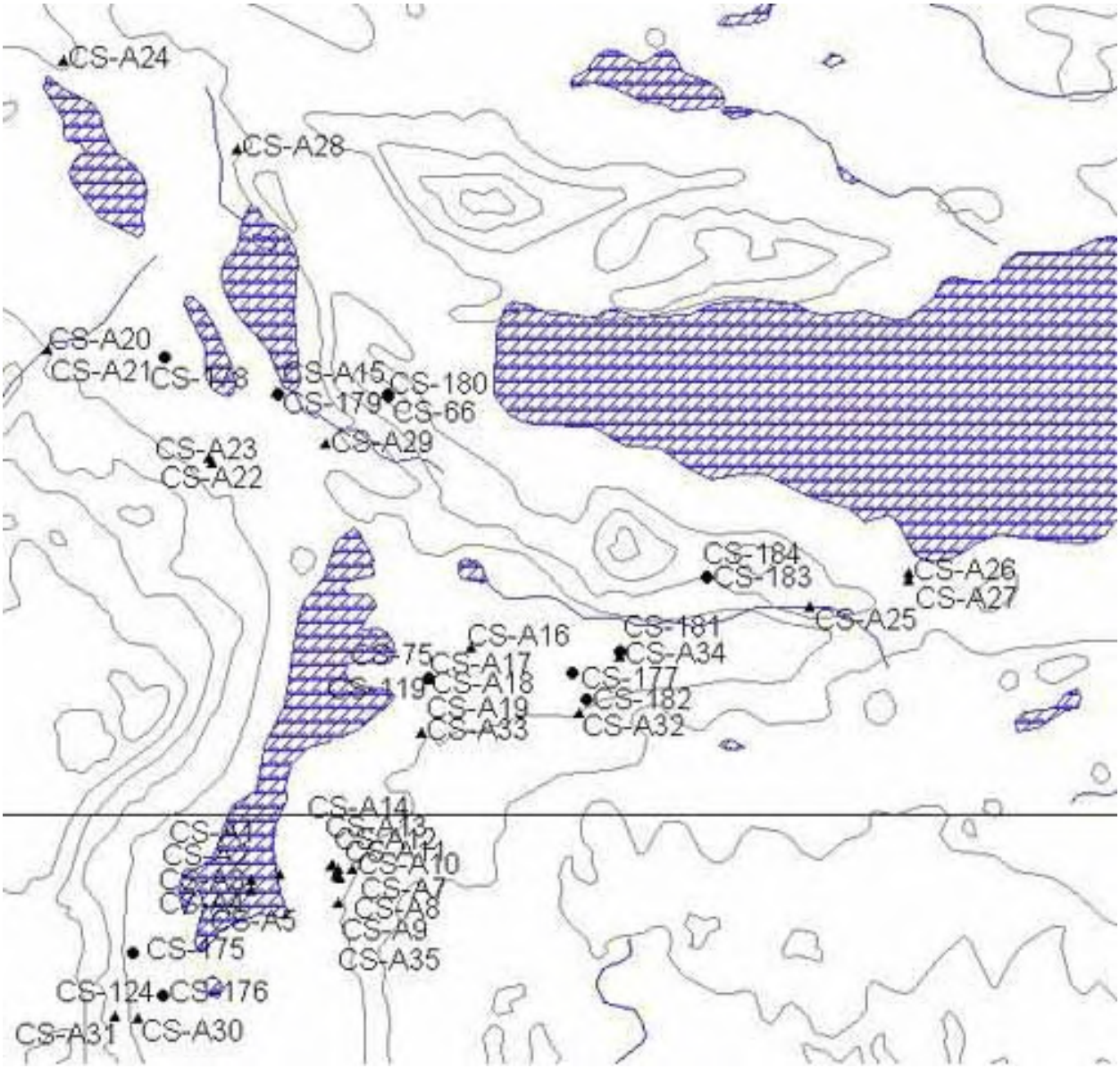

Figure 2. Sites located during surface reconnaissance in the Sayula-Zacoalco lake basin. All site designations have the CS prefix that refers to the Cuenca de Sayula. Rockshelters have a numerical designation that begins with an "A". Solid horizontal line indicates 20° North latitude.

Paleo-Indian period lithic artifacts (see Plate 1) have been recovered repeatedly on the surface in the Sayula-Zoacalco lake basin (Schondube, 1982). Our surface reconnaissance of open sites around islands in the center of the lakes recovered bifacial tools that may be Paleoindian and Archaic in age. These bifacial tools were found along the northern and southeastern lakeshore of El Tecolote island in areas exhibiting superficial scatters of fossilized megafauna. The association of megafauna and lithic debitage and stone tools is of questionable authenticity due to mixing with a variety of plastic and metal refuse that has clearly been discarded recently. Nevertheless, our pursuit of evidence for the Archaic logically required reconnaissance

in areas where continuous occupation could have produced evidence of prior and subsequent occupations, such as the Paleo-Indian localities already mentioned, as well as sites demonstrating evidence of Late Formative occupation (circa 2300 – 1700 B.P.) which was, until recently, the earliest phase of occupation recognized in the Sayula Basin. One of the open sites we located contains contextual evidence of Capacha Phase occupation, which is the earliest ceramic-bearing agricultural phase known in western México. Some archaeologists believed Capacha to be contemporaneous with the earliest sedentary agricultural groups from southeastern México (Kelly, 1986; Mountjoy, 1999). Surface indications of Preceramic occupation were not encountered at any of the shelters. Test excavation was undertaken at three rockshelters containing Formative (Usmajac/Verdia Phase), Classic (Sayula Phase/Cojamatlán) and Postclassic (Amacueca Phase) evidence of occupation (Valdez *et al.*, 1996; Ramirez *et al.*, 1996).

Plate 4a. Open sites encountered in profile in arroyo de Jasmín. Cultural feature exposed is Usmajac (Formative) Phase oven associated with prehistoric ground surface approximately 1 meter below the present ground surface. (Photos by Marcus Winter).

Plate 4b. Open sites encountered in profile in Sayula brick manufacturing borrow pit. House floor exposed in profile as light gray horizontal line above head of individual contained abundant ceramic sherds and obsidian projectiles characteristic of Sayula Phase (Classic Period). (Photos by Marcus Winter).

We conducted pedestrian survey of the beaches, piedmont and alluvium in areas where rockshelters and surface finds had been reported (Plate 4a & Plate 4b). We talked with local landowners, looters and local authorities, which provided directions to locate rockshelters and open sites that might contain evidence of the Preceramic Period. We also revisited sites where Formative, Classic, and Postclassic Period occupations had been identified. In addition to the assistance we obtained from local people and from previous archaeological work, our survey focused on areas of the lake basins that had ready access to the lakes and lakeshores, water, alluvium for agricultural pursuits and areas located in close proximity to forested slopes for hunting and gathering. Rockshelters and open sites, as well as localities in the vicinity of cities and pueblos that showed potential were located using a GPS and coordinates were recorded for mapping

and relocation. Surface indications of prehispanic occupation were collected and placed in labeled bags for later analysis.

All rockshelters that contained accumulated surface sediment that overlaid the shelter's bedrock floor were trowel tested, and when possible, auger tested, to determine the depth of the sediments (Plate 5). In many, in fact the majority, of shelters, these surface sediments were too shallow to harbor significant cultural deposits. Collections were made of all diagnostic artifacts occurring on the surface in all rockshelters.

Plate 5. POAM personnel making trowel and auger tests in shallow deposits in Abrigo El Romerio (CS-A33). (Photo by Marcus Winter).

Test Excavation

Three rockshelters were the focus of test excavation. Upon discovery, and based on trowel testing and mapping, all of these shelters appeared to contain more than 30-40 cm of loose sediment overlying the shelter's bedrock floor. Testing was undertaken to determine whether they contained evidence of Preceramic occupation and to ascertain whether cultural deposits might contain organic material indicating the shelter was a locus where past hunting and gathering activities had been carried out. All shelters appear to have formed in sediments of volcanic origin, where unconsolidated volcanic

debris flows are weathered more rapidly than the overlying consolidated basaltic sediments. The Atotonilco shelter (CS-A17) is located at the southern juncture of the Sayula basin and the Teocuitatlán arm of the watershed (Figure 2; Plate 6, shown above). It is conveniently located slightly above the lakeshore but has ready access to the forested slopes of the low sierra to the south and east. Two additional shelters that we tested are located east of Cuyacapan. These shelters, Moreno 3 (CS-A12) and Moreno 5 (CS-A14), are situated slightly above the Sayula lake level along a north-south oriented fault line that creates the eastern topographical boundary of the basin (Figure 2; Plate 8 and Plate 10, shown below). The latter two shelters face each other across a small ephemeral drainage. They would have had access to the alluvial soils at the base of the piedmont and the forests in the Sierra los Manzanillos to the east of the lake. A single open site, El Tepehuaje, where construction activities had recently discovered a Capacha Phase composite vessel was also tested. It is located on a terrace slightly above the alluvium along the north margin of the Teocuitatlán arm of the basin. Springs are locally abundant, forested slopes are within a few minutes walk and the view from the site permits a 180 degree panorama of the entire valley. El Tepehuaje (CS-183) produced abundant cultural material representing all three of the major phases of occupation of the Sayula Basin (i.e., Usmajac-Verdia; Sayula-Cojomatlán and Amacueca) as well as abundant ceramic evidence of earlier, presumably Capacha Phase habitation.

Plate 6. Cerro Atotonilco from the northwest. Shelter that was tested is located above the fence line in the center left of the photo. This cerro is located at the point where the Sayula Lake Basin adjoins the Teocuitatlán valley. (Photo by Marcus Winter).

Plate 8. Moreno 3 shelter from the south. Alternate squares were excavated from inside the shelter 6.5 meters down the talus slope. Slope below shelte r mouth is coamíl in barbecho. The greatest quantity of cultural material was recovered in the test pit 6 meters below shelter mouth. (Photo by Bruce Benz).

Plate 10. Moreno 5 is the one rockshelter in the Sayula-Zacoalco basin that has produced evidence of Archaic occupation. The shelter faces west and is located beneath rock face at center of photo and above accumulation of boulders forming apron in front of the shelter's mouth. (Photo by Bruce Benz).

All test excavation proceeded by arbitrary levels until natural or cultural stratigraphy could be recognized. Features of cultural activity were excavated separately. Organic material found in relevant datable contexts was mapped according to the established site datum. Sediment samples from excavation levels were retained after screening for future analysis.

Abrigo Atotonilco 1 (CS-A17)

This rockshelter was occupied within the last decade by an individual who left refuse on the surface of the shelter inside the dripline. This shelter faces north. It has an opening four meters wide and measures three meters from drip line to the back wall (Plate 7). The talus slope in front of the opening is covered by large angular blocks/boulders that have fallen from the basalt rock face above the shelter. The ledge in front of the shelter's opening appears to be topographically abrupt suggesting that a build up of occupational debris and/or rockfall from above the shelter has created an apron. A 2.5 by 0.5-meter north-south oriented test trench was located so that it penetrated one meter inside and extended two meters outside the dripline. This trench was excavated in natural stratigraphic units to a depth of 1.3 meters outside the dripline and to a depth of one meter from the modern surface inside the shelter. The trench reached the bedrock floor at the mouth of the rock shelter at this depth. Outside the mouth of the shelter, cultural material-bearing sediments were excavated down to where large boulders forced us to stop excavation. Cultural material-bearing sediments may extend below the boulders though soil auger tests could not penetrate further.

The uppermost sediments (above 45 cm below datum) contained ceramic evidence of Amacueca Phase occupation mixed with modern refuse. This deposit extended the entire length of the test trench though a feature, a concentration of Amacueca Phase sherds arranged in a prepared circular burned depression in the cave sediments, suggests limited occupational activity debris are concentrated inside the shelter. Below 45 cm, the sediment is similar in color and texture to the above but is more compact. Inside the shelter at roughly 60 cm below datum, sediment color and texture changed. Outside the shelter's dripline, the stratum containing Amacueca sherds continues down to a depth of about 70 centimeters (Liot, 1996; Ramirez, 1996). Sherds from all major cultural phases are abundant throughout the two uppermost stratigraphic units. Amacueca phase sherds predominate in all excavated sediments of the two uppermost strata. Usmajac phase sherds commonly occur throughout suggesting that the later occupation, Amacueca Phase, resulted in stratigraphic mixing. A large basalt biface and a couple of obsidian flakes occurred at the bottommost extent of our test excavation. Numerous samples of organic material were set aside for dating but have not been submitted for radiocarbon analysis because of dubious association.

Plate 7. Test trench at mouth of Atotonilco shelter before backfilling. Stadia rod at right is one meter tall. Rock fall made excavation extremely difficult and forced us to terminate excavation at slightly below one meter below datum. Black at bottom of trench is plastic covering left to delineate limits of test excavation. (Photo by Bruce Benz).

Abrigo Moreno 3 (CS-A12)

The floor of this rockshelter was covered by animal dung. The surface contained a very light scattering of late period ceramics and a few obsidian flakes/blades. The mouth of the shelter faces northeast and the talus below extends to the ephemeral stream draining the canyon. Two additional shelters occur in the same unconsolidated volcanic conglomerate within the confines of the canyon to the east. The depth to the back wall

of this shelter extends 5 meters from the mouth and the mouth is 9.5 meters wide (Plate 8). The floor is flat and is derived from the same material as that which is eroded to form the shelter. To the west the same conglomerate has been eroded but the overlying basaltic blocks have fallen creating a jumble of blocks lying on a small apron of eroded conglomerate extending three to five meters from the vertical cliff face. This conglomerate is composed of angular rocks and stones cemented within a fine friable sand-size matrix. The talus slope below the mouth is steep (80 percent) and rocky with incipient soil formation between the rocks. A one-meter grid was established from the interior of the shelter outside the dripline and extended seven meters below the shelter's mouth down the talus slope. Test pits were excavated to the depth at which the angular rocks and stones are cemented in a sand-grain-size matrix to form a continuous pavement suggesting they represent the underlying bedrock and geological stratum that has eroded to form the shelter (Plate 9). Five test pits located along this base line were excavated. Sediment depths from the modern ground surface are progressively greater proceeding downslope.

The matrix within the shelter extended 15 cm below the present ground surface and was composed of a dense and very compact cattle dung. The sediment overlying the bedrock outside Moreno 3 is a rich homogenous organic dark brown soil that is only 30 cm deep near the dripline but extends to a depth of one meter seven meters down the talus below the shelter's mouth. Seeds and fruit fragments of plants common on the talus slope today (*Leucaena esculenta, Guazuma ulmifolia, Merremia* spp.) are common constituents of the upper organic horizon of this soil. Cultural debris including sherds and flaked stone tools and/or debitage were recovered in all five test units with the largest number occurring in the deepest deposits farthest from the shelters. Three bifacial projectiles were recovered from deposits near the basal conglomerate in test unit L6 that are reminiscent of similar artifacts unearthed in Sayula Phase deposits elsewhere in the watershed. We suspect that some of this cultural material traveled downslope after being dropped. Alternatively, reworking of these bifaces might have occurred downslope from the mouth of the shelter; it is also possible that the shelter mouth might have opened further downslope than at the present time and that bifacial reworking might have taken place near the mouth of the shelter. This shelter produced no clear evidence of Preceramic occupation. It is possible that testing the talus slope below the apron to the west might be more productive.

Plate 9. Test (1 square) pits on talus below shelter mouth at Moreno 3. Talus is composed of large and small rocks. Follow-up excavation will remove rocks to ensure excavation proceeds to bedrock. (Photo by Bruce Benz).

Abrigo Moreno 5 (CS-A14)

This rockshelter is filled to the roof with accumulated sediment. The apron of the shelter extends south approximately three to five meters from the mouth that extends along the front of the resistant basaltic cliff-face for 27 meters (Plate 10). The shelter faces south at the opening of the canyon that extends upslope to the southeast, hence this shelter overlooks alluvial deposits that drain from the canyon above that are deposited along

the shore of the lake for a distance of approximately 2 kilometers to the west. The rockshelter extends back from the mouth approximately 6 to 8 meters north-northeast. The datum and grid baseline extended into the rockshelter although test excavation was confined to an area at the shelter's mouth. This rockshelter's apron is littered with leaves, lose angular rocks and animal dung. The sediment deposited inside the shelter and the apron is very fine-grained dark gray sandy clay with large angular rocks that have fallen from the overlying basalt that make up the shelter's overhang.

Plate 11. Photo of profile of east wall in Moreno 5 test pit. Archaic occupation was documented by an obsidian biface (see Plate 3) and an associated radiocarbon date of 5610-5450 B.P. (calibrated) located at interface of light and dark gray horizons at the center of the photograph. (Photo by Bruce Benz).

A one by 2.5 meter trench was excavated at the mouth of the shelter (Plate 11). The trench was oriented perpendicular to the shelter's opening along a northwest-southeast axis. This trench penetrated three distinct strata. The overlying stratum is composed of coarse grained and loose gray sediment with small to medium and a few very large angular rocks. This stratum contained fragments of a large neckless jar; the latter extended down into the underlying compact dark gray clay where the large rim of a second neckless jar was found adjacent to an area of burned sediment. Below this cultural feature and to the south friable human bone of a young juvenile individual occurred in loose sediment surrounded by the same overlying compact dark gray clay. The deposit of bone is probably associated with the ceramics and burned earth. A third

natural stratum was encountered below that consisted of very compact light gray clay. This stratum contained an obsidian biface and obsidian flakes at a depth of 60 cm below the surface of the shelter floor. Carbonized wood localized in the area where the biface and associated flakes were unearthed yielded a date of 4780±60 radiocarbon years before the present (5590 – 5470 B.P. calibrated), or about the same age as the earliest maize from San Marcos Cave in the Tehuacán Valley. No ceramics were encountered neither in this stratum nor in any stratum below; nor was any additional organic matter found in association with the hearth and lithic debitage. Sediments below the aceramic deposits were culturally sterile. Reddish eroded rocks occur in black clay nearly one meter below the surface of the shelter's. The eroded rocks suggest they overlie the bedrock sediments, that is, the conglomerate from which the rockshelter was formed.

El Tepehuaje (CS-183)

Dr. Enrique García of Teocuitatlán acquired a vessel from a local landowner in El Tepehuaje in the fall of 2000. Catherine Liot recognized this vessel as characteristic of the Capacha Phase. We requested Dr. García take us to meet the local collector hoping to locate the site and conduct test excavations in the event that the site showed promise. The vessel had been unearthed from an apparent burial context during construction of a garden fence surrounding a patio of a house that has been occupied for decades. Inspection of the patio and the area surrounding the residence produced scattered obsidian flakes and ceramic sherds that suggested later post-Capacha occupations. Three test pits were excavated in and around the patio. The cultural deposits in test pit A inside the patio, that contain apparently Capacha Phase ceramics and lithic debris were unearthed in the test pit between 20-65 cm below the present ground surface in a natural stratum of loose brown and compact grayish brown clay. The cultural deposit contained large quantities of cultural material including burned *jacal*, charcoal flecks, modified and unmodified animal bone, obsidian tools and flaking debris and ceramic sherds, as well as evidence of post depositional disturbance by rodents and insects. The integrity of the cultural deposit remains questionable because most of the ceramics do not exhibit familiar manufacture and surface treatments. Apparently the majority of the ceramics represent the Capacha Phase. The two underlying natural strata that are distinct in terms of color and texture are both culturally sterile. The apparent Capacha Phase deposit appears to rest on a culturally sterile buried prehistoric soil. The ceramics are still being analyzed to determine whether the assemblage contains any significant number of post-Capacha Phase sherds.

Abrigo El Salto (CS-A32)

The El Salto shelter was discovered and has been subject to looting by a number of local collectors from Teocuitatlán. The collections obtained by these collectors, and some that have since been given to Dr. Garcia, indicated this shelter could contain

Archaic Period deposits. The shelter is located at a considerable distance from Teocuitatlán accessible only on foot or horseback. Our initial visit indicated the site is difficult to locate and would require special means to excavate. The shelter's surface sediments indicate that considerable looting has taken place. Trowel testing suggests the deposits could be at least one meter deep. Large fragments of prehispanic ceramic vessels and lithic debitage were collected from the surface. The ceramics suggest that the shelter was utilized during all phases of Prehispanic occupation of the Sayula-Zacoalco basin. A single corncob obtained from unascertainable contexts by one of the local collectors was dated at 1760±70 radiocarbon years B.P. (1740-1570 BCE calibrated; A.D. 250). The date supports conjecture from a limited number of ceramic sherds that occupation of the shelter occurred during the Usmajac Phase. The richness of surface indications suggests future excavation would be rewarding.

Summary and Conclusion

The Sayula-Zacoalco Basin contains evidence of human occupation that dates back to the Paleo-Indian Period. Paleo-Indian projectiles and bifacial tools have been found and reported by local collectors and by professional archaeologist but evidence of later Preceramic use of the lake basins has been less abundant. Stone tools representing the Preceramic era occupation of the area overall are scarce and except for the single obsidian biface unearthed in the Moreno 5 rockshelter, the stone tools that have been found on the surface are apparently not found in context. Surface finds suggestive of the Archaic Period number fewer than five.

The single contextual find of an Archaic age bifacial tool comes from Moreno 5 (CS-A14). This biface (see Plate 3) was found in association with a small fire hearth that yielded a date of 3460-3380 BCE. The Atotonilco 1 shelter test excavation reached deposits that contained evidence of Formative Period occupation. No definite aceramic strata were documented. The test pits excavated into the talus slope of Moreno 3 yielded only Classic Period artifacts. In the case of the latter two shelters, continued excavation of the talus down below the rockfall is warranted but could not be undertaken due to limited timing and funds. Additional excavation at Moreno 5 is clearly warranted. The shelter's deposits inside the drip line could hold considerably more material than was unearthed in our limited test excavation. Additional reconnaissance should be undertaken along the western margin of Lake Sayula that includes the skirts of the Sierra de Tapalpa and the southeast slopes of Lake Sayula.

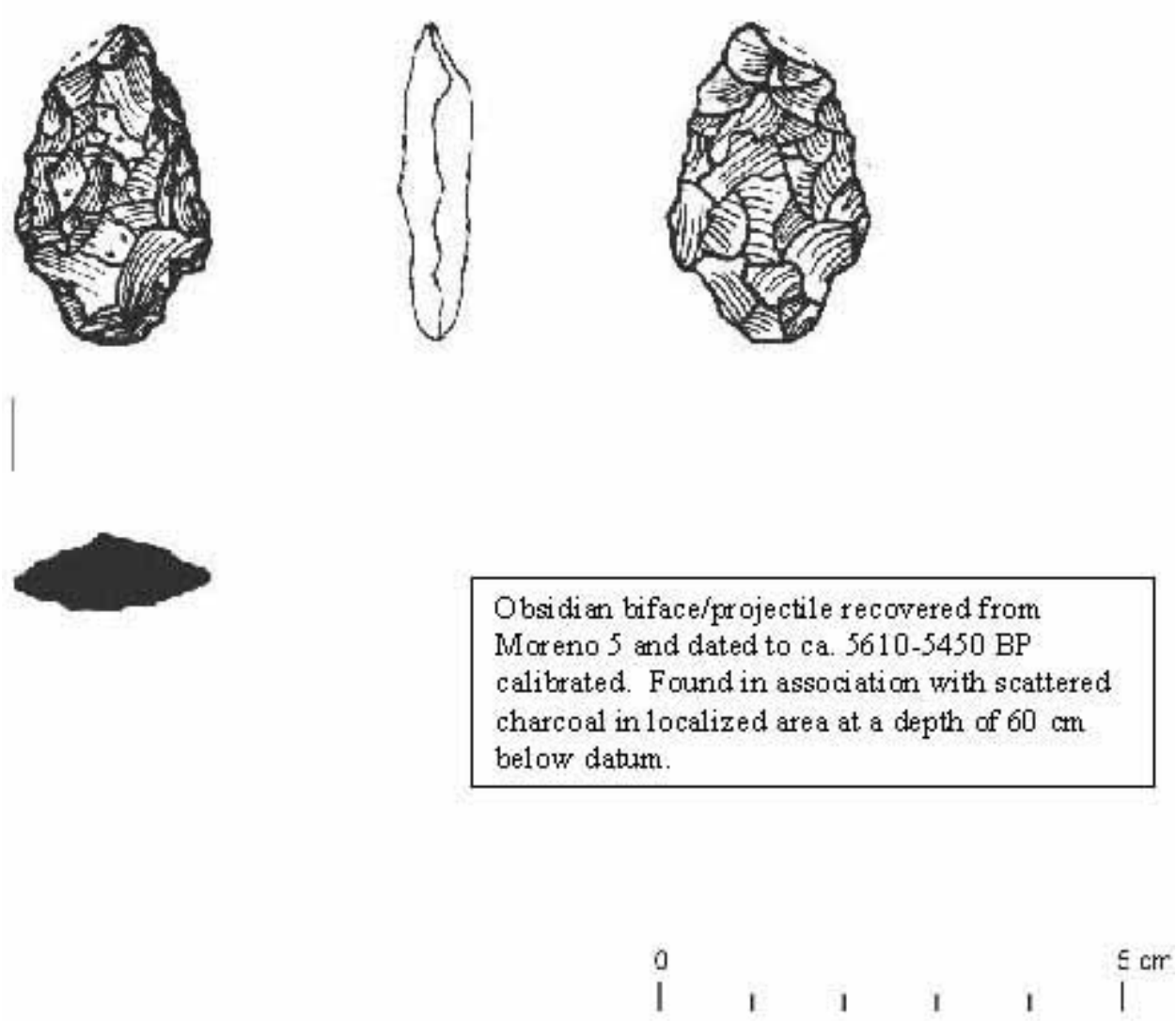

Plate 3. Drawing of Archaic obsidian projectile unearthed from Moreno 5 (CS-A14). (Drawing by Ana Laura Iñiguez Dávalos).

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terminate excavation at slightly below one meter below datum. Black at bottom of trench is plastic covering left to delineate limits of test excavation. (Photo by Bruce Benz).

Plate 8. Moreno 3 shelter from the south. Alternate squares were excavated from inside the shelter 6.5 meters down the talus slope. Slope below shelter mouth is coamíl in barbecho. The greatest quantity of cultural material was recovered in the test pit 6 meters below shelter mouth. (Photo by Bruce Benz).

Plate 9. Test (1 square) pits on talus below shelter mouth at Moreno 3. Talus is composed of large and small rocks. Follow-up excavation will remove rocks to ensure excavation proceeds to bedrock. (Photo by Bruce Benz).

Plate 10. Moreno 5 is the one rockshelter in the Sayula-Zacoalco basin that has produced evidence of Archaic occupation. The shelter faces west and is located beneath rock face at center of photo and above accumulation of boulders forming apron in front of the shelter's mouth. (Photo by Bruce Benz).

Plate 11. Photo of profile of east wall in Moreno 5 test pit. Archaic occupation was documented by an obsidian biface (see Plate 3) and an associated radiocarbon date of 5610-5450 B.P. (calibrated) located at interface of light and dark gray horizons at the center of the photograph. (Photo by Bruce Benz).

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