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Dating Cholula, México



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Abstract

The "Dating Cholula" project was designed to develop an independent chronological sequence for Cholula based on radiocarbon dates derived from excavated archaeological contexts. Funding provided by FAMSI paid for an initial suite of 16 ^{14}C dates from a number of distinct contexts in Cholula: fill inside the earliest construction phases of the Great Pyramid (samples obtained by the Tetimpa Project), fill from two buried adobe platforms to the northeast of the Pyramid (samples obtained by the Sondeo Arqueológico Rancho de la Virgen 2002), strata with Early Postclassic ceramics on the north side of the main square of San Pedro Cholula (sample obtained by the Sondeo Arqueológico Colegio Coley B. Taylor, 2002), and a bell-shaped pit with Middle Formative ceramics on the Universidad de las Américas campus (samples obtained by the Rescate Arqueológico UA-03A, 2003). These initial dates allow us to confirm an early Middle Formative occupation along the southern edge of the swamps, the emergence of monumental constructions during the second century A.D., and evidence of a major volcanic event that separates the Classic and Postclassic in Cholula.

Resumen

El proyecto "Fechando Cholula" fue diseñado para desarrollar una secuencia cronológica independiente para Cholula en base a fechas de radiocarbono derivadas de contextos arqueológicos excavados. El financiamiento proporcionado por FAMSI se destinó a pagar una serie de 16 fechas de ^{14}C de distintos contextos en Cholula: relleno del interior de las fases constructivas más tempranas de la Gran Pirámide (muestras obtenidas como parte del Proyecto Tetimpa), relleno del interior de dos plataformas de adobe enterradas al nororiente de la Pirámide (muestras obtenidas en el Sondeo Arqueológico Rancho de la Virgen 2002), estratos con cerámica del Posclásico Temprano del lado norte de la plaza principal de San Pedro Cholula (muestras obtenidas en el Sondeo Arqueológico Colegio Coley B. Taylor, 2002), y un pozo tronco-cónico con cerámica del Formativo Medio en el campus de la Universidad de las Américas (muestras obtenidas por el Rescate Arqueológico UA-03A, 2003). Estos datos iniciales nos permiten confirmar la ocupación del Formativo Medio en las riberas del lado sur de los pantanos, el surgimiento de construcciones monumentales durante el segundo siglo d.C., y evidencia de un evento volcánico mayor que separa el Clásico del Posclásico en Cholula.

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Figure 1. Pyramid of Cholula, Puebla, México.

Introduction

Although Cholula is considered to be one of the major cities of prehispanic México, it has been the subject of relatively little archaeological work because almost all of the ancient settlement lies buried beneath the modern city. Most research has focused on its Great Pyramid, the largest Pre-Columbian structure in the Americas, but the results of these projects have never been published in detail (López *et al.* 1976; Marquina 1970b, 1975, 1981; Messmacher 1967; Noguera 1937, 1954, 1956; Romero 1935), leaving doubts about its initial configuration and the dating of the various construction stages (see interpretative attempts in McCafferty 1996a and b). Traditionally, the chronology of Cholula has depended on temporal sequences developed for sites in the Basin of México, and until recently few absolute dates from archaeological contexts were available (see Plunket and Uruñuela 1998b, 2002; Siebe *et al.* 1996; Suárez 1995). Most minor excavations that have taken place in response to development projects have not been published and no comprehensive interpretive overview of this archaeological research is currently available.

Because of this situation, it is difficult to understand the origins of urban Cholula and assess the relationship between the city and other settlements in the Puebla-Tlaxcala

Valley or in greater Mesoamerica. The "Dating Cholula" project was designed to initiate the development of an independent chronological sequence for Cholula based on radiocarbon dates from excavated archaeological contexts. In particular, we wanted to explore the possibility that the monumental architecture of the site developed—at least in part—as an adaptive politico-religious response as people sought to cope with the ecological, social, political, economic, and ideological conflicts that certainly developed in the wake of a huge volcanic eruption of the Popocatepetl volcano, which took place around the middle of the first century A.D. This spectacular event deposited 3.2 km³ of pumitic lapilli over an area extending at least 25 km east of the crater; shortly thereafter, lava flows covered close to 50 km² of the eastern piedmont of the volcano with between 30 and 100 meters of rock that dammed and diverted drainages, altering the surface hydrology of the western Puebla valley (Panfil 1996:16-20).



Figure 2. Popocatepetl volcano; the dark band at the base of the volcano is the lava flow known as the Pedregal de Nealtican.

We have focused heavily on dating of the earliest construction phases of the Great Pyramid that are exposed in tunnels excavated by Ignacio Marquina (1970a, 1981) in order to provide a chronological framework for the first monumental architecture in the ceremonial heart of the emergent city. In addition, we have obtained samples from various other contexts that have become available to us through test excavations and rescue work (López *et al.* 2002a and b, 2004a and b; Plunket and Uruñuela 2002). This

second group of dates is important since it can be used to anchor the ceramic assemblages in time.



Figure 3. View of house compound (Op. 31) at Tetimpa with the Popocatepetl volcano rising in the background.

"Dating Cholula" forms part of the Tetimpa Project whose primary goal has been to study the impact of volcanic activity on the western Puebla Valley. Up until recently, most of our work has centered on the Formative village of Tetimpa, which was buried under the pumitic ash deposited in the first century A.D. The research described in this report represents an attempt to expand our knowledge beyond the immediate boundaries of the territory directly affected by pyroclastic materials and look at a major settlement that must have received refugees at the same time that it had to deal with significant environmental consequences. Dating different areas and occupations within Cholula can help us develop before and after views of the city which will be of central importance to any consideration of the regional effects of the natural disaster. Additionally, we have sought to address the chronology of the Classic-Postclassic transition since Siebe and his colleagues (1996) have suggested that Cholula and its

region were impacted by a second major volcanic eruption, sometime in the eighth or ninth centuries (see also Panfil 1996).

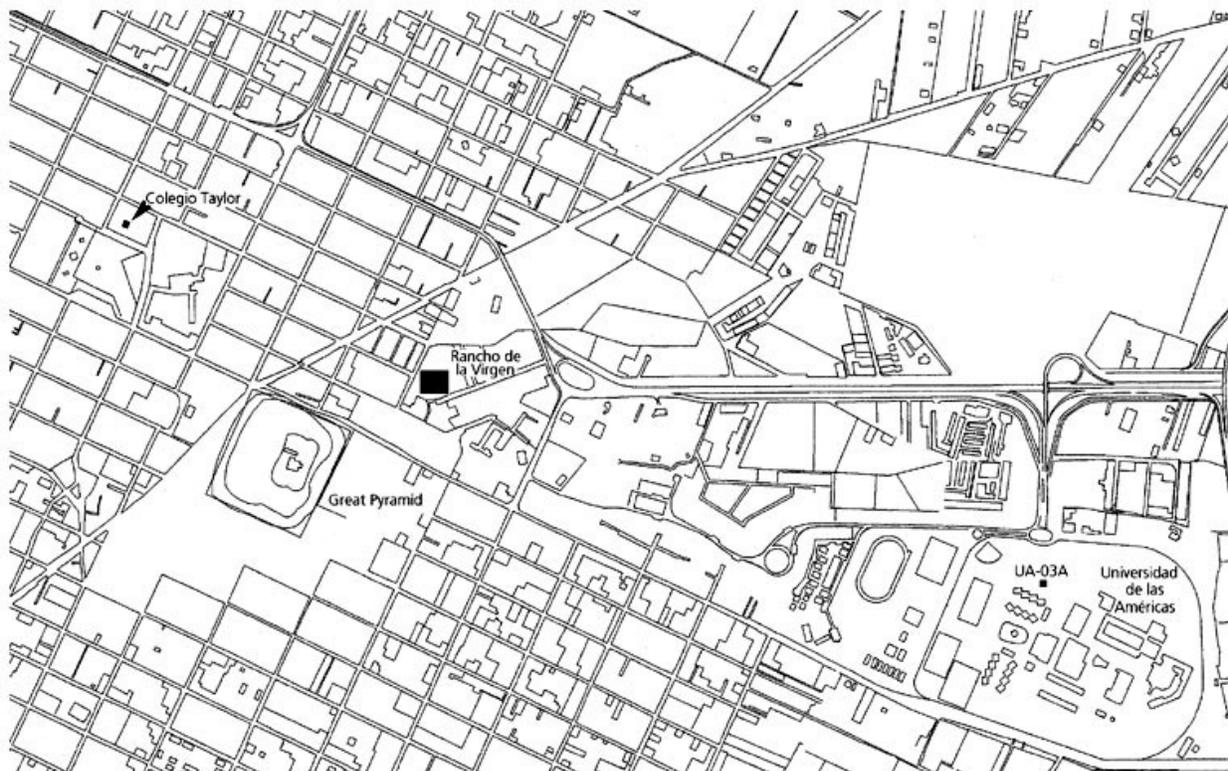


Figure 4. Map of Cholula indicating areas from which 14C dates were obtained.

Methodology

The funding provided by FAMSI was specifically used to pay for a suite of 16 14C dates from Cholula ([Figure 4](#), shown above). Ten AMS dates were derived from samples obtained from distinct layers of fill associated with the initial construction phases of the Cholula Pyramid (as part of the Tetimpa Project), while another three determinations came from the fill of two adobe platforms uncovered during test excavations in a field adjacent to the northeast corner of the Pyramid complex, just to the northeast of the platform known as the Edificio Rojo (Noguera 1956) (as part of the Sondeo Arqueológico Rancho de la Virgen 2002). Additionally, stratigraphic excavations on the north side of the main plaza of San Pedro Cholula (as part of the Sondeo Arqueológico Colegio Coley B. Taylor 2002), in an open space on the east side of the Casa del Caballero Aguila (now the Museo de la Ciudad de Cholula), provided us with two carbon samples associated with Early Postclassic ceramics. A final date came from charcoal recovered from a Formative bell-shaped pit on the Universidad de las Américas

campus, which is located on the eastern side of modern Cholula (as part of the Rescate Arqueológico UA-03A). All samples were exported with the permission of the Consejo de Arqueología of the Instituto Nacional de Antropología e Historia, and processed by Beta Analytic in Miami, Florida.

In order to make better sense of the dates from the Great Pyramid, as part of the Tetimpa Project, Amparo Robles is currently making a 3D computer map with a total station of the initial construction phases for her licenciatura thesis. All dating samples have been located on this map. She has also undertaken a detailed description of the fill visible in the tunnel walls in order to better relate the dates to the building sequence. These descriptions will be a useful interpretive tool as we try to understand the development of the Great Pyramid. This is a work in progress: to date, over 1500 m have been mapped and 240 m have been recorded and described.

Discussion of Results

The Cholula Pyramid

The mapping and description of the fill visible in the tunnel profiles shows that the stepped platform Marquina identified as the initial structure (Structure I, phase A) is actually the second building stage of the Great Pyramid. An unrecorded irregular pit excavated into the occupation surface on the west side of the Pyramid, in front of the central staircase of Structure I-A, penetrates to a depth of about 2 m; the east wall of this pit was then excavated to create a tunnel that perforates beneath Structure I-A approximately 53 m until it terminates in an adobe cell ("cajón") that forms part of an earlier two-tiered platform (Structure Sub-I-A) (see McCafferty 2001 for a different interpretation). This tunnel was obviously not excavated by Marquina's team since it is not recorded on any of his plans, nor does it conform to his very exacting standards. However, it cuts through Structure Sub-I-A—the remains of an earlier unsurfaced platform constructed of an adobe grid filled with crushed tepetate and occasional trash lenses—which rests directly on sterile subsoil (tepetate). The location of this initial construction phase and its precise relation to the later construction stages of the pyramid will appear on the computer map. We have three AMS dates from the adobe fill of Structure Sub-I-A, which indicate that it was erected sometime between the first and third centuries A.D. The 2 Sigma range of these radiometric determinations is as follows: B-162997 [cal A.D. 110 to 330], B-188345 [cal 5 B.C. to A.D. 230], and B-188346 [cal A.D. 60 to 260].



Figure 5. Pit 2 excavated into sterile tepetate underneath the Great Pyramid.

Further evidence for dating this early structure comes from six bell-shaped pits excavated into the sterile tepetate and exposed in the walls of the unrecorded tunnel beneath the phase A construction ([Figure 5](#), shown above). Two carbonized beans and an unidentified seed from these features provided three AMS dates: B-188342 [cal A.D. 115 to 385], B-188343 [cal A.D. 45 to 250], and B-188344 [cal 30 B.C. to A.D. 225]. It would appear that the pits probably were filled between A.D. 100 and 200 as part of a resurfacing program related to preparations for the construction of the first stage of the Great Pyramid. Taken together with three dates from inside the reticulated adobe cells of Structure Sub-A (B-162997, B-188345 and B-188346), we can tentatively suggest that this first construction phase was undertaken during the second century A.D. ([Table 1](#) and [Table 2](#)).

It is important to note here that other monumental architecture in Cholula also has been dated to this time period. Excavations at the Franciscan monastery of San Gabriel on the east side of the main square of the modern city uncovered the well-preserved staircase—over 12 m wide with more than 13 steps—of a large east-facing platform that continues under the kitchen of the sixteenth-century building and the adjoining school yard. This platform also was constructed on sterile subsoil. A ^{14}C determination on

charcoal from a hearth associated with the superstructure of this platform provided a date of 1890 ± 80 BP (I-17,627) with a 2 Sigma range of cal B.C. 41 to A.D. 268 and cal A.D. 273 to 336 (Plunket and Uruñuela 2002), placing this construction in the second and third centuries A.D.

Marquina (1981:121) considered that Structure I (which covers Structure Sub-I-A) belonged to the Teotihuacán I period, or Tzacualli phase (A.D. 1-150). This building consists of two stages. He indicates that stage A is an undecorated stepped platform that faces west and is divided into two groups: a basal series of five levels that is crowned by an additional set of two upper levels. Stage B corresponds to certain modifications and enlargements of the north side of the stage A structure, where *talud-tablero* profiles were added to the upper two levels; he assures us that the addition of the *talud-tablero* profile distinguishes phase A from phase B. These *tableros* are painted with the Chapulines Murals. From Marquina's description, it would appear that stage B was also characterized by a new ideological program encapsulated in the mural art that accompanied the reorientation of the building from the west to the north. The decorated *tableros* are located on the north side of the building and wrap around the east and west corners. At the center of the north side, the *talud-tablero* façade is interrupted by a void which must have held a staircase although none is present. Marquina associated this architectural change in the Great Pyramid with the Teotihuacán II period (Miccaotli phase, A.D. 150 to 200) because of certain similarities between this building and the Feathered-Serpent Temple at Teotihuacán (i.e., the decorated *tableros*), although there is no emphasis on the northern direction in that building.

The change in the orientation of the façade between phases A and B is puzzling since it only affects the upper two levels of the structure that bear the mural art. We are currently trying to understand exactly what evidence Marquina used to suggest that the *talud-tablero* profile was added to the existing phase A structure, but we have yet to find any. Indeed, the alfardeas of the staircase that rises on the west side of the stage A structure were put in place after the painted *tableros* were finished. This seems to indicate that stages A and B were part of the same building program, but we have not finished our evaluation of the structural details visible in the tunnels and prefer not to make any definitive statements yet.

We have no dates from the fill inside the phase A structure of the Pyramid since none of Marquina's tunnels penetrated this building. However, the two dates that were obtained on materials recovered from the fill covering the west side of phase A near the central staircase (B-162998 [cal A.D. 220 to 450] and B-188347 [cal A.D. 95 to 265 and cal A.D. 290 to 325]) suggest that a new version of the monument (Structure II) was built between the third and fifth century A.D. ([Table 1](#) and [Table 2](#)).

A small amount of charred material was recovered from between the clay plaster and stone body of one of the *tableros* of the phase B construction. This provided a date with a 2 Sigma range of cal B.C. 40 to A.D. 215 (B-188348). This early date may indicate that phase B was added shortly after the completion of phase A, or that as we have already suggested, stages A and B are actually part of the same building, but it also

could result from earlier carbon being incorporated into the building. This is a distinct possibility considering that there are Terminal Formative structures in the vicinity of the Great Pyramid. Additionally, we recovered two dates (AMS) from charred materials in the fill deposited on top of the north façade of Structure I-B. The 2 Sigma range is between cal A.D. 155 to 390 (B-188349) and cal B.C. 80 to A.D. 120 (B-198350). This second date is very early and probably results from incorporating older materials into the fill used to cover the phase B structure, while the first date (B-188349) may signal new building activity at the Great Pyramid in the third or fourth century A.D. It is consistent with the dates from the fill on the west side of the pyramid that provided determinations of A.D. 220 to 450 (B-162998) and cal A.D. 95 to 265 and cal A.D. 290 to 325 (B-188347) ([Table 2](#)). Taken together, these dates allow us to suggest that Structure I (phases A and B) was covered over with an entirely new building program (Structure II, the "stepped" pyramid) between the third and fifth century A.D.



Figure 6. East-West tunnel, following the central staircase of phase A construction.

Marquina (1970a:39) mentions that the north façade of Structure I-B underwent further episodes of modification and enlargement although he provides few details. In her survey of the tunnel walls, Amparo Robles found that there is another *talud-tablero* façade on the north side that was sliced by the tunnels in the fill that covers Structure I-B, and we have designated this as Structure I-B¹. We recovered a small sample of

charred material from the fill placed on top of this additional *talud-tablero* profile, which provided an AMS date with a 2 Sigma range of cal 40 B.C. to A.D. 215 (B-188351). Although this result might indicate that structures I-A, I-B, and I-B¹ were built in rapid succession, we think it is more likely that the Pyramid's architects commonly mined middens from surrounding areas for fill. Significantly, the date does not conflict with our suggestion that Structure I was covered over with an entirely new building (Structure II) perhaps as early as the third or as late as the fifth century A.D.



Figure 7. Collapse within Túnel 46, exposing adobe wall 49.

Table 1. Radiocarbon dates (AMS) obtained from samples associated with early construction phases of the Cholula Pyramid (2003).					
Beta	Years BP	Context	Intercept	1 Sigma	2 Sigma
188342 (AMS)	1790 ± 50	carbonized bean from bell-shaped pit beneath Structure I-A (Pit 1)	cal A.D. 240	cal A.D. 155-265 cal A.D. 290-325	cal A.D. 115-385
188343 (AMS)	1870 ± 50	fragment of carbonized bean from bell-shaped pit beneath Structure I-A (Pit 1)	cal A.D. 130	cal A.D. 80-225	cal A.D. 45-250
188344 (AMS)	1920 ± 50	carbonized seed from bell-shaped pit beneath Structure I-A (Pit 2)	cal A.D. 80	cal A.D. 45-130	cal B.C. 30 - A.D. 225
188345 (AMS)	1910 ± 50	carbonized bean from sandy fill between adobe walls of Structure Sub-I-A	cal A.D. 85	cal A.D. 55-135	cal B.C. 5 - A.D. 230
188346 (AMS)	1850 ± 50	carbonized maize kernel from sandy lens between the two stepped bodies of Structure Sub-I-A	cal A.D. 140	cal A.D. 95-235	cal A.D. 60-260
188347 (AMS)	1820 ± 40	carbonized maize kernel from trash lens within fill placed over west side of Structure I-A close central staircase	cal A.D. 225	cal A.D. 135-245	cal A.D. 95-265 & cal A.D. 290-325
188348 (AMS)	1930 ± 50	charred material from the east side of the second level of Structure I-B (Chapulines mural) between the clay plaster and the base of the <i>tablero</i>	cal A.D. 75	cal A.D. 30-120	cal B.C. 40 - A.D. 215
188349 (AMS)	1760 ± 40	charred material from fill placed directly on top of the second level of the north face of Structure I-B (Chapulines mural)	cal A.D. 255	cal A.D. 235-340	cal A.D. 155-390
188350 (AMS)	1980 ± 50	charred material from fill placed directly on top of the second level of the north face of Structure I-B (Chapulines mural)	cal A.D. 30	cal B.C. 40 - A.D. 75	cal B.C. 80 - A.D. 120
188351 (AMS)	1930 ± 50	charred material from fill placed directly on top of the second level of the north face of Structure I-B ¹	cal A.D. 75	cal A.D. 30-120	cal B.C. 40 - A.D. 215

The dates we obtained from the early structures of the Great Pyramid are fairly consistent even though they come from fill, which is not the best context for dating purposes. Taken as a whole, however, the suite of 12 radiocarbon dates ([Table 1](#) and [Table 2](#)) documents intense building activity with continuous design modifications in the ceremonial heart of Cholula during the second and third centuries A.D. This construction was initiated after the volcanic eruption that destroyed the village of Tetimpa, a fact that requires us to reconsider the motivation behind the massive building programs that characterize the Classic period at Cholula.

Beta	Years BP	Context	Intercept	1 Sigma	2 Sigma
162997 (AMS)	1810 ± 40	charred material from fill of phase Sub-A	cal A.D. 230	cal A.D. 140-250	cal A.D. 110-330
162998	1700 ± 60	charred material from fill covering W façade of Structure I-A	cal A.D. 370	cal A.D. 250-410	cal A.D. 220-450

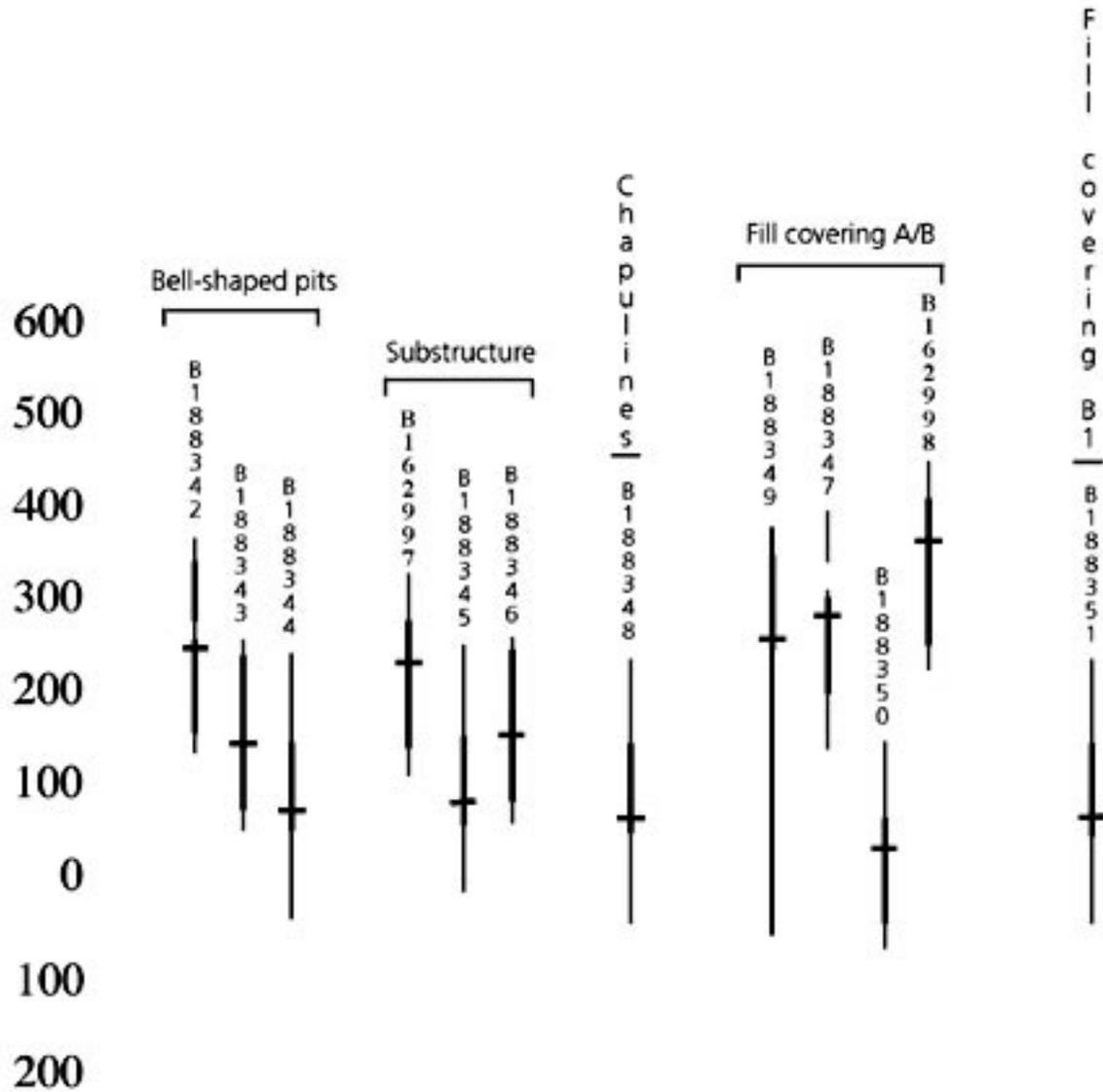


Figure 8. Chronological graph of radiocarbon dates associated with the early construction phases of the Cholula Pyramid.

Rancho de la Virgen

In a large open field known as Rancho de la Virgen, located to the northeast of the Edificio Rojo that rises at the northeast corner of the Great Pyramid, the Coordinación de Apoyo Arqueológico of the Universidad de las Américas, Puebla, undertook test excavations in 2002 (López *et al.* 2002a and b). Four adobe platforms were recorded 1.80 to 3.60 meters below the surface in the test pits. We recovered two samples of charred material from the two superimposed adobe platforms in Pit 5, while more organic material came from a water well excavated into the surface of another adobe platform located in Pit 6. All of these dates have 2 Sigma ranges that indicate activity in the Late and Terminal Formative, spanning the second century B.C. through the middle of the third century A.D. Noguera (1956) reported significant amounts of Late Formative material from his excavations at the Edificio Rojo. It would appear then that the area to the north of the Great Pyramid witnessed an important occupation during this time period. However, most of the ceramics associated with the surface of these platforms are from the Early Classic, when the Teotihuacán Tlamimilolpa styles were important and significant amounts of Thin Orange were in use ([Figure 9](#), shown below).



Figure 9. Sample of Classic period ceramics recovered from the water well (Feature 1, Pit 6) at the Rancho de la Virgen.

The three calibrated dates from the test excavations span a period between 195 B.C. and A.D. 250. The Sub-I-A platform at the core of the Great Pyramid was built in the second half of this period, as were phases I-A, I-B, and I-B¹. The fill placed over this building sequence doubtless contains trash generated by the inhabitants of the Rancho

de la Virgen; and it is also likely that the façades of the adobe platforms in this low-lying, swampy area were mined for stone since we found little evidence of stone platform surfaces even though these were commonly used in western Puebla during the Formative and Classic (Mountjoy and Peterson 1973; Plunket and Uruñuela 1998a).

Beta	Years BP	Context	Intercept	1 Sigma	2 Sigma
188352	2010 ± 80	charred material from adobe wall of Structure 2 in Pit 5 (Wall 1)	cal B.C. 5	cal B.C. 100 - A.D. 75	cal B.C. 195 - A.D. 140
188353	2030 ± 70	charred material from adobe wall of Substructure 1 in Pit 5 (Wall 4)	cal B.C. 40	cal B.C. 115 - A.D. 55	cal B.C. 195 - A.D. 115
188354	1970 ± 100	charred material from inside water well (Feature 1, Pit 6)	cal A.D. 45	cal B.C. 60 - A.D. 130	cal B.C. 195 - A.D. 250

The Classic occupation is sealed by an airfall deposit of angular volcanic sand that appears to correspond to an important eruption of the Popocatepetl volcano that took place between A.D. 700 and 850 (Panfil 1996; Siebe 1996). The Postclassic inhabitants of Cholula built new houses directly on top of this sandy layer, and in general it can be used to divide the Classic and Postclassic in the area.

UA-03A-1

Construction work on the north side of the Universidad de las Américas, Puebla campus uncovered six bell-shaped pits and a circular oven excavated into sterile tepetate (López *et al.* 2004b). These features contained ceramic materials similar to those recovered in 1969 and 1970 by Mountjoy and Peterson (1973:13-19, 46-56). The pits are in an area of thin soils, generally between 0.40 and 0.50 m, that borders a swampy drainage system filled with thick black clay. Mountjoy and Peterson (1973:13) found Middle Formative materials along the edge of this swamp, about 150 meters north of the bell-shaped pits we excavated in 2003. Although these pits undoubtedly form part of one or more Middle Formative residences along the shores of the swamp, structural elements have been damaged or destroyed by plowing and construction activities, and all that remains are materials contained in pits excavated into the sterile subsoil. The ceramics recovered from these bell-shaped pits are the earliest with archaeological provenience for Cholula, and they extend the occupation of the area back to the beginning of the Middle Formative ([Figure 10](#), shown below, and [Figure 11](#)). A sample of charred material recovered from one of these features (Feature 1) provided a radiocarbon date with a 2 Sigma range of cal B.C. 1260 to 795 and an intercept at cal B.C. 930 (Beta 188355), the earliest dated material recorded for Cholula ([Table 4](#)).



Figure 10. Sample of ceramics recovered from bell-shaped pits on the Universidad de las Américas, Puebla campus.

Mountjoy and Peterson (1973:62) obtained a ^{14}C date on partially carbonized wood associated with Middle Formative ceramics and figurines from the lower levels of the swamp clay. The sample (GX-2256) yielded a determination of 2645 ± 110 radiocarbon years or a non-calibrated date of 695 ± 110 B.C. By running this sample through the *Radiocarbon Calibration Program Rev 4.3* (Stuiver and Reimer 1993), we obtained an intercept of cal 804 B.C. This date overlaps with the one from the bell-shaped pit, and helps confirm the Middle Formative occupation along the south shore of the Cholula swamp.



Figure 11. Figurine from bell-shaped pit on Universidad de las Américas, Puebla campus.

Table 4.
Radiocarbon date on charcoal from a bell-shaped pit on the Universidad de las Américas campus on the eastern edge of Cholula (Rescate Arqueológico UA-03A, 2003) and calibration of Mountjoy and Peterson's date (1973:62).

Lab	Years BP	Context	Intercept	1 Sigma	2 Sigma
Beta 188355	2800 ± 100	charred material from bell-shaped pit (Feature 1)	cal B.C. 930	cal B.C. 1055-830	cal B.C. 1260-795
GX-2256	2645 ± 110	carbonized wood from Pit 6, Mountjoy and Peterson excavations (1973)	cal B.C. 804	cal B.C. 901-765	cal B.C. 1010-412

Colegio Taylor

In May and June of 2002, the Coordinación de Apoyo Arqueológico of the Universidad de las Américas, Puebla, undertook test excavations in a plot of land in the middle of the block that borders the north side of the main square of San Pedro Cholula (López *et al.* 2002b, 2004a). Although a complex sequence of modern and colonial construction was documented in the 12x2 meter east-west exploratory trench, no remains of prehispanic buildings were located in this excavation. The post-Conquest building activity rests upon about 2.50 meters of interdigitated clays and sands. The lower part of these strata consists of dark clays that contain Late Classic ceramics, deposited directly on the sterile *tepetate*. These clays are sealed by a 0.20 to 0.30 meter layer of volcanic ash. On top of this ash, Postclassic ceramics, like Cocoyotla Black-on-Orange, which is similar to Aztec I, occur for the first time (Figure 12, shown below). The two dates we obtained from this excavation come from two different strata of waterlain sediments deposited above the volcanic ash.



Figure 12. Sample of ceramics from Level K in excavations at the Colegio Taylor.

Table 5.
Radiocarbon dates from charcoal associated with Epiclassic/Early Postclassic ceramics found in test excavations on the north side of the main plaza of San Pedro Cholula (Sondeo Arqueológico Colegio Coley B. Taylor, 2002).

Beta	Years BP	Context	Intercept	1 Sigma	2 Sigma
188340	970 ± 50	charred material from Layer K, Pit S2E4: Early Postclassic ceramics above volcanic ash	cal A.D. 1030	cal A.D. 1010-1055 & cal A.D. 1085-1150	cal A.D. 990-1185
188341	1040 ± 130	Charred material from Layer M, Pit S2E4: Early Postclassic ceramics above volcanic ash	cal A.D. 1005	cal A.D. 880-1155	cal A.D. 690-1260

Concluding Remarks

The dated contexts presented in this short study allow us to make several preliminary observations about the chronology of Cholula. First of all, the Middle Formative occupation along the southern edge of the swamps on the northeastern side of Cholula appears to be much as Mountjoy and Peterson (1973) envisioned, albeit somewhat earlier. The materials they recovered were from within the swamp muck, and probably represent trash thrown into the shallow water. The bell-shaped pits, on the other hand, are features that correspond to Middle Formative houses that have not survived two millennia of agricultural activity on the shallow soils that characterize the southern shore of the swamp. The high *tepetate* here made it an ideal area for construction since it was elevated enough to avoid flooding during the rainy season. A detailed study of the ceramics from these pits is currently underway.

After establishing a mid-first century date for a major volcanic eruption of Popocatepetl through our work at Tetimpa (Plunket and Uruñuela 2000 and n.d.), we wanted to explore the possibility that monumental architecture at the site developed as an adaptive politico-religious response as people sought to cope with the numerous conflicts that must have emerged in the aftermath of the catastrophe. Although our dates come from fill inside the Great Pyramid, and we are well aware of the problems of using fill for the construction of chronological sequences, we believe that the consistency of the 12 determinations, confirms an early second century A.D. date for the initial building phase of this important structure. Interestingly, this dating is similar to that of the Moon Pyramid at Teotihuacán (Kabata *et al.* 2001), and perhaps signals related processes at work on both sides of the Sierra Nevada after the great eruption.

Our interpretation of the dates from fill covering the construction set formed by the Sub-I-A/I-A/I-B/I-B¹ building sequence suggests that it was covered over with an entirely new conception of the Great Pyramid (Marquina's Structure II) in the fourth or early fifth

century A.D. However, we will not begin to explore this building until we have a clear understanding of the construction sequence underneath it.

The dates from the Colegio Taylor indicate that the area to the north of the main square in San Pedro Cholula was devoid of Classic period construction, and also that the second major eruption visible in the stratigraphy at Tetimpa occurs as a marked strata in Cholula that separates the Classic from the Postclassic.

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