

ARCHAEOLOGICAL INVESTIGATIONS IN THE HOLMUL REGION, PETEN RESULTS OF THE FOURTH SEASON, 2003

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Preclassic mask on Structure 1, Group 1, at Cival.

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INTRODUCTION

The present is a preliminary report of the archaeological work carried out at Holmul in 2003. The field season started on May 13 and ended on June 30, 2003. The analysis of artifacts was conducted in the USAC-CUDEP laboratory in Flores, Petén between June 30 and July 18, 2003. Further analysis of all data is in progress at the time of this writing. A brief summary is given here of the highlights of the season with the major excavations and finds from each of the site investigated. In the following chapters excavation supervisors provide a detail description of the stratigraphy and features encountered accompanied by illustrations.

LA SUFRICAYA

Excavation

At La Sufricaya, work directed by Vanderbilt University graduate student Jenn Foley focused on the Str. 1 mural building. Two excavations were placed on the centerline of the mound, 3 meters west of the location of previously found murals. An interesting sequence of construction stages emerged from these excavations. We were able to identify at least 5 different sub-structure stages within the mound. The latest phase is of Late/Terminal Classic date and includes mostly perishable buildings, probably residences, built on top of a flat-topped mound. Two consecutive staircases leading up to a perishable building on the north end of the mound were found underneath the Late/Terminal Classic construction. The ground plan of the building at the summit of the staircases is largely lost due to the collapse of the edge of the mound into the plaza below. The earliest staircase of the two had eroded painted decoration on the steps, possibly hieroglyphic in content.

A tunnel on the east side of this staircase led to the uncovering of a C-shaped wall with a painted mural. This wall was actually the western end wall of the room containing the Teotihuacan murals found in 2001. While most of the paint is still covered by a thin lime wash applied in ancient times, some of the figures are visible and can be identified as (more) seated warriors wearing goggle-eyed headdresses in Teotihuacan style.

In effect, the stairway was built on the outside of the C-shaped mural room, which actually resembles an open portico, and the murals could have been visible on the side of the stairway when it was in use.

The stairway covered an earlier construction on the outside of the mural room (Structure 1 sub 1, formerly Room 1). This consisted of a long E-W wall abutting the NW corner of the Room 1 building. A large masonry bench was constructed at the centerline of this wall (and the mound itself). The position and size of this bench suggests that it may have been a throne, even though it is not very elaborate. This centerline throne would have been accessed by walking past the portico with the Teotihuacán mural when it was in use. The excavation of the throne also reinforces our initial hypothesis that this structure functioned as a royal palace, at least for a short time in the Early Classic period (ca A.D. 200-550), and that the Structure 1 sub 1 mural depicts an accession ceremony presided by Teotihuacán warriors.

The outside (NW) corner of the mural room (Structure 1 sub 1), which is abutted by the E-W wall with the new bench, is decorated with a stucco frieze. This frieze included quatrefoils and a small stucco head painted in black and red. The rather devilish-looking head wears a bib and cloth in the ears and has inlaid teeth. According to Coggins (pers. comm.) it may be a representation of a captive with Highland Mexican connotations. This possible representation of a captive, as well as the Mural 5 scaffold sacrifice, may actually depict important components of Early Classic accession rituals.

Further excavation within the tunnel revealed a doorway opening from Structure 1 sub1 to the north where a later room (Structure 1 room 3) was built onto an open portico (as described above). From this room, a sealed doorway led to a second room to the west. The removal of the plaster and rubble that sealed the doorway revealed the outer walls (south and east) of a buried small structure with a cornice and plastered walls. In style and size, this building resembles Structure 5D sub 10-1st in the Northern Acropolis of Tikal (Coggins pers. comm.). This structure, the outer walls of which were elaborately painted also served as a funerary temple (Coe 1990). While La Sufricaya Structure 1 sub 3 certainly resembles the Tikal structure its construction and layout, no paintings were evident on the outer walls of our building.

It is difficult to determine the function of this small building although a small temple or a funerary shrine would be appropriate due to its centerline location, and the construction of a later throne on top of it.

We believe that an excavation from the north end of the mound will reveal the main entrance to this small building, its sub-floor contents and its function. Based on initial ceramic stylistic analysis, the tentative date for this building is A.D. 350-400.

Conservation

Also at La Sufricaya, Dr. A. Semeraro (Istituto Centrale di Restauro) cleaned and stabilized all of Mural 5 (the scaffold sacrifice) and a small section of Mural 1 (Teotihuacan figures). Dr. Gene Ware (BYU) completed the high-resolution documentation of Mural 5 with a multi-spectral camera. The images produced by the multi-spectral and infra-red photography are much more vivid and reveal details of great significance that are invisible to the naked eye, which will enable the creation of accurate reproductions. Earlier this spring conservators Lesley Rainier and Angelyn Rivera inspected the murals and prepared a lengthy technical report on their conservation and long-term salvage. Plans for long-term preservation of the murals are still in progress.

HOLMUL-SITE CENTER

Group III – The Palace

At Holmul site center, work in Group III revealed a grand staircase leading up to the court from the main plaza. An arched entryway was uncovered at the summit of the staircase. This entryway was built between two multi-room buildings facing out to the plaza below. A stairway led from the arched entrance down to the courtyard facing the western throne room.

Removal of the rubble in the rooms adjacent to the arched entrance revealed a throne (with tapered legs and arm rests) in room 8. This throne may represent the latest official use of the court as a palace.

Clearing of a vaulted passage under the western throne room (Str. 43) revealed a Terminal Classic midden filled with fine ceramics, possibly from the palace rooms. The buildings at the southern end of the court (Str. 60) were cleared of rubble, and indicated that use of this area was discontinued during the Terminal Classic period. Access to the southern end was sealed-off, and the discovery of large midden indicated that this section of the court was used as a trash midden by the last occupants of the complex.

Group II – Protoclassic Tombs

Also at Holmul, the protoclassic tombs of Building B excavated in 1911 by R.E. Merwin were cleaned, and the deposits produced by the earlier excavations were investigated. A protoclassic tomb, not excavated by Merwin, was accidentally uncovered during the 2003 investigations. The stone crypt contained a single body accompanied by a complete mammiform vessel and a tubular jade bead. The burial was found stratigraphically below the earliest of the excavated tombs (Rooms 9 and 8) and under the broken floor of Room 1 (the earliest). Therefore, it is a most significant addition to the sample of protoclassic tombs in that it provides a secure dating for the beginning of the Holmul 1 phase in this group and for its stylistically interesting pot. Further excavation may reveal more burials and architecture undetected by the Merwin's excavation of the building.

CIVAL

Some of the most spectacular finds of the 2003 seasons were made at Cival. A tunnel in Str. 1 on top of Triadic Group 1 (the eastern structure) penetrated the later phase stairway of a Preclassic pyramid (dated stylistically to A.D. 100 in 2002). An almost perfectly preserved giant stucco mask (ca. 5m wide and 3 m high) was discovered on an earlier façade of this pyramid. The mask depicts a Sun-God (perhaps G III), with an L-shaped eye and eyebrows with U-shape motifs, surmounted by merlons. The image has a squarish mouth with single fang, short nose, Kan-cross incised on the cheek, ear flare with four dots on a squared-circle and U-shape sign in the center. The flare is surmounted by a knot and a scroll with an unusual motif dangling from it.

Strong parallels with the Cerros lower terrace masks on Str. 5C-2nd support the identification of this anthropomorphic mask as a Sun God (Freidel and Schele 1988). It is located on the south side of the upper terrace of the pyramid. We believe that a lower terrace mask and a paring set on the opposing side of the stairway may well be preserved on this structure. Also, at the top of this pyramid is a largely preserved Late Preclassic masonry building only partially exposed by a looters' trench which may be explored in future excavations.

On the centerline of the east platform of Cival's E-group (Str. 7) an excavation conducted by Vanderbilt University graduate students Molly Morgan and Jeremy Bauer attempted to locate the stela butt for Preclassic Stela 2, which was stylistically dated by Nikolai Grube to ca. 300-200 B.C. A possible cut was found, with stone bracing and the correct dimensions to fit a stela. The bottom of this stela cut contained a cache of Sierra Red bowl with two Spondylus shells which encapsulated a jade fragment, a carved shell disc and a fragment of hematite as well as the remains of cinnabar. The Late Preclassic date

of this stela butt is consistent with Grube's initial stylistic dating of Stela 2 as one of the earliest carved stelae in the Maya Lowlands. A second, similar cache was found at an earlier level in this same area.

Further down into the stratigraphy of this centerline location a large cruciform cut into bedrock was detected. Four large jars were found smashed in each of the four arms of the cross and one in the center. The southern jar was red while all others were black.

Under the central jar was a depression containing five upright plain jade celts (ca. 25 cm long) in cruciform patterns. The central and western celts were shaped out of blue jade while all others were of green jade. Surrounding the celts was a scatter of 115 pebbles of green and blue jade.

We identified the jars as Chunhinta black, Desprecio Incised and Joventud red types which date the whole cache to the Middle Preclassic Period. The content and shape of this cache closely approximates the early Middle Preclassic cache from Seibal and other jade caches from San Isidro Chiapas and La Venta (Lowe 1989). Structural and material similarities also link this cache to the Nohmul and Cerros Late Preclassic jade masks caches as well as the Pomona ear flare and associated figurines (four) as elaborated kan-cross or cruciform cosmograms (Justeson et al. 1986).

The new Cival deposit of jars and jade recalls water symbolism. The upright jade celts may also symbolize sprouting Maize plants (Taube pers. comm.), while the scattering of jade is often equated with scattering of blood (Stuart 1988). A round post hole was found cut into the surface of fill covering the cache. Schele (1992) suggests a symbolic link between jades/sprouting maize plants and a central world tree, as part of a royal symbolism common throughout lowland Mesoamerica. Therefore, a ceremony of accession to power involving the erection of a world-tree may be associated with this offering.

Moreover the structural similarity of this cache with other Preclassic Maya cruciform caches reveals a Sun-God symbolism as well as a cardinal-direction cosmological order. Its placement on the centerline of the eastern platform of the E-group (i.e. on the equinoxial axis) reinforces the idea of a sun-based ritual and agricultural cycle/accession to power. The cache itself may help date the very first use of this long eastern structure as an E-Group complex in the Middle Preclassic.

In sum, we believe the significance of this cache may not only be in the early date, its material contents and its cosmological symbolism but also in the architectural context in which it was found which identifies it as part of a public ritual associated with accession to secular power (in homology to later Pomona Flare text and Nohmul, Cerros caches), and as such, it may be one of the earliest examples of dynastic rituals among the Preclassic Maya. Furthermore, at Cival there is clear continuity between the cache's early context and symbolism of secular power with Sun-God, maize, rain symbolism and the triadic group as a later monumental cosmogram formed by the Sun God mask (as at Cerros) and other yet to be discovered masks flanking an eastern building on the same E-W axis as the earlier cruciform cache.

Further research at Cival, will certainly uncover further evidence of monumental sculpture, burial and ritual deposits connected with the early development of kingship among the Preclassic Lowland Maya.

Synthesis of analyses of mural fragments by Artelab, s.r.l., Italy

Seven fragments of painted stucco from La Sufricaya murals 1-5 were submitted for analysis (C1-C7) to Artelab. The specimens were analyzed using thin-slices and spectrography (FT-IR) in order to characterize the stuccoes and the painted "film" they support.

In all, the specimens showed a similar composition consisting of a lime base mixed with an organic "fixative". It was not possible to identify with certainty which organic substances were used as fixative. However, either dairy or animal protein are likely to have been used.

As an temper ingredient in the stucco, both volcanic pumice or ash and plant fibers were used.

In addition, within the mix of the stucco grains of brown material were found. These appear to include particles of charcoal, quartz, feldspar, and fossil shell. These may be grains of bedrock material included in the limestone mix used to create the stucco or remains from the bottom of the firing pit in which the lime was melted.

In specimen C4, a second layer of stucco and paint overlaid the first layer of painted stucco. While the older paint is red in color, the more recent is dark grey. In both layers in this specimen, a layer of lime with an organic protein as fixative was laid down as primer before the paint was applied.

Also in the other specimens superimposed layers of painted stucco were found (at least two). The technique used was that of 'fresco' except in one case C6 which appears to have been done in the 'secco' technique. In some cases two layers of painted film were found (C5). In these cases a first coat of black paint is applied as background, followed by a second coat of the desired color.

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Figures



Figure 1. Stucco mask adorning the NW corner of Room 1. Paint is red and black. Traces of mural painting below the mask is also visible.



Figure 2. Mammiform vessel found in tomb in Building B, Group III.



Figure 3. Stucco mask adorning the southern side of the upper terrace of Str.1 sub-2nd in Triadic Group 1 at Cival, Petén. Viewer looks northeast. Scale bar is 2 m.



Figure 4a. Cruciform cache of five jars and underlying jades cut into bedrock on centerline of E-Group at Cival. Scale is 25 cm.



Figure 4b Detail of center of cruciform cache.



Figure 5. Central pit in cruciform cache with five upright jade celts and 115 pebbles. Scale is 25 cm.



Figure 6. Cival Cruciform cache with partially reconstructed jars reassembled in the lab. Scale is 25 cm

HOLMUL 2003 REPORTS PART I

Conservation and Excavations at La Sufricaya

Jennifer Foley, Field Supervisor

Since the discovery of several carved stelae and elaborately painted murals at La Sufricaya, the site has been an integral component of the Holmul Archaeological Project (Estrada-Belli 2001, 2002). The epigraphic and iconographic analysis of the monuments and mural art has revealed implications of cultural contact or interaction between the elite of La Sufricaya and the distant site of Teotihuacan in Central Mexico. The mural art of La Sufricaya also depicts unique details of Early Classic dynastic ritual activity. The evidence from La Sufricaya has the potential to contribute invaluable data to models of sociopolitical interaction during the Early Classic period and further our knowledge of the dynastic history of the Holmul region. For these reasons, La Sufricaya has been the focus of intense conservation and archaeological efforts over the past three years. The work conducted during the 2003 field season continued these efforts and contributed a vast amount of information which enhanced our understanding of the form, function and history of the site (Estrada-Belli & Foley 2004).

Conservation

The long-term conservation project at La Sufricaya consists of a three-part program including the documentation, stabilization and reproduction of the murals. During the 2003 season significant progress was made toward these goals through the combined effort of professional conservators archaeologists and high-resolution photographers.

Professional conservators Leslie Rainier and Angelyn Rivera of The Getty Institute were invited to assess the condition of the murals within Structure 1 at La Sufricaya. The conservators visited the site in March of 2003 and evaluated the degree of preservation and stability of the murals. A long-term plan for the preservation, conservation and reproduction of the murals was designed and implemented with their assistance.

Dr. Gene Ware of Brigham Young University continued the documentation of the murals, which was initiated in 2002, through the use of multi-spectral and infra-red photography. During the 2003 season Dr. Ware completed the documentation of Mural 5 (the scaffold sacrifice scene). The images produced by the high-resolution documentation have elucidated details of the murals obscured by accretions of time and invisible to the naked eye. The photographs produced by Dr. Ware will be the basis for reproductions of the murals.

The conservation of the murals has been directed by Dr. Alberto Semeraro of the Instituto Centrale di Resauro for the past two field seasons. Dr. Semeraro has repaired damaged portions of the murals and removed calcium concretions from them as well. During the 2003 season his efforts were concentrated on Mural 5 and a small portion of Mural 1 (Teotihuacano figures). Thanks to Dr. Semeraro's efforts, the murals have been stabilized and their future study ensured.

Excavation

The archaeological research program at La Sufricaya has been primarily focused on clarifying the construction sequence, layout and function of Structure 1, which surmounts the main platform of Group 1. The location of the murals inside Structure 1 and the number of carved stelae found in association with Platform 1 indicate that Group 1 was the focus of elite or dynastic ritual activity during the Early Classic period (Figure 1). During the 2003 field season a number of excavations were placed within the group to test this hypothesis and clarify the construction and occupation sequence of the site (Figure 2).

I directed a series of excavations placed on the central axis of Structure 1 (ST17, ST20 and ST08E), which sought to clarify our understanding of the layout and function of the structure. The excavations revealed an interesting sequence of at least five construction phases which greatly modified the mound during the Early Classic period.

The earliest phases include a small temple or shrine (Structure 1 sub 3) and a series of rooms (Structure 1 sub 1 and Structure 1 room 3), which formed a small complex on top of Platform 1. One of the more exciting results of these excavations was the discovery of the western wall of Structure 1 sub 1, which contains the Teotihuacan murals (Murals 1-3). The inner face of the newly discovered wall revealed additional murals which are probably a continuation of Murals 1-3. These murals are covered by a layer of whitewash, and will be focus of documentation and conservation efforts during the upcoming 2004 field season. The 2003 excavations also revealed the elaborately decorated outer face of the western wall, which is adorned with painted plaster and a frieze including a painted stucco mask and decorative motif.

Subsequent construction phases revealed in these excavations include a crude bench placed on the central axis, which may have also served as a throne, and a staircase – the stairs of which are covered in polychrome painted plaster. All of these construction phases were later buried by rubble fill, which was subsequently sealed by a plaster surface. The latest phases of construction revealed during the field season consist of perishable structures – probably residences – built on the evened surface of the mound covering Structure 1 during the Late/Terminal Classic period.

The complex construction sequence including several rooms, a possible temple or shrine and a throne, revealed during the 2003 excavations supports the initial hypothesis that Structure 1 served as a royal palace during the Early Classic period. During the upcoming 2004 field season further excavations should provide a conclusive construction and occupation sequence and determine the function of Structure 1 sub 3.

Nina Neivins directed the excavation (ST18) of a small structure (Structure 146) situated on top of Platform 1 directly south of Structure 1. This structure is aligned with the central axis of the Structure 1, and was initially believed to be a temple platform or funerary shrine associated with the Early Classic phase of Structure 1. Excavations revealed a number of construction sequences culminating with a Late Classic deposit of cache vessels beneath a patio outside the northwest wall of the structure. The excavation of this structure will be continued during the upcoming field season in order to fully understand the construction sequence and function of the structure as well as its relation to Structure 1 and Group 1 in general.

Jeremy Bauer directed an excavation (ST19) on the southeastern edge of Platform 1 of Group 1 which sought to discern the access to Platform 1 from the plaza below. Unfortunately this excavation did not locate a staircase or other means of access, indicating that the platform was not approached from the southeast side of the platform, and the staircase visible in a looter's trench cut into the northern façade of Structure 1 was the main, and perhaps sole, access point.

Jeremy Bauer also directed the excavation of small structure (Structure 147) on the northeast edge of the plaza below Group 1. The objective of this excavation was to clarify the function of the structure and its relation to Group 1. The __ meter structure is aligned with a pyramid with an Early Classic construction phase (Structure 2), and the initial hypothesis was that Structure 147 served as a residence or funerary shrine for the ruler associated with Structure 2. The excavation however, revealed a single phase of crudely constructed walls, but little else. The ceramic evidence from the excavation indicates that Structure 146 was part of a Late Classic occupation.

Excavation ST17

Introduction

Excavation ST17 was placed on top of Structure 1, which surmounts the main platform of La Sufricaya Group 1, north of Excavation ST10 from the 2002 field season. The 2 meter by 3.5 meter trench was placed on the central axis of Structure 1, with the intention of clarifying the layout of Structure 1 and to test the hypothesis that the structure served as a site for elite rituals or as a royal palace.

When a staircase was uncovered during the excavation, a tunnel extension was placed in the northern section wall to follow the staircase. Due to the fragile condition of the painted plaster covering the stairs, the extension was terminated after approximately 1 meter of further excavation. A second tunnel extension was placed in the eastern section wall in an attempt to understand the relationship between the staircase and an early phase of construction uncovered in Excavation ST20. This tunnel continued into the center of the structure and opened into the mural room found during the 2001 field season (Structure 1 sub 1, formerly Room 1). The tunnel continued through the mural room and reached the backside of the northern façade of Structure 1.

The main excavation and tunnel revealed five phases of construction within the mound, beginning with a small temple or shrine buried within the core of Structure 1, and culminating with perishable structures built on top of the mound. The excavation revealed that Structure 1 was not a single edifice, but rather a collection of rooms and sub-structures which comprised a multi-room complex.

Contexts

Excavation ST17 began with the removal of a humus layer consisting of dark brown, moist soil with plant material. This layer of topsoil was assigned context number ST17.01. ST17.02, which was a layer of loose, light brown soil with medium (ranging from 0.06-0.10 meters in size) cobble inclusions, was directly below ST17.01. Artifacts encountered in this context included ceramic sherds, unworked chert flakes, and daub cobbles. Initial analysis of the ceramic sherds identified them as Late/Terminal Classic utilitarian wares. This context was interpreted as a layer of accumulation fill. ST17.03 was approximately 0.30 meters below ST17.01 and consisted of large stones (ranging from 0.10-0.20 meters in length), and densely packed, brown soil with pebble inclusions. This layer was distributed throughout the trench, but formed a distinct East-West line at the 2 meter mark of the trench, which appeared to be a foundation for a wall. Ceramic sherds, unworked chert flakes and daub were also found in this context, which was interpreted as fill for a floor or foundation wall. ST17.04 was a circular deposit, approximately 0.40 meters in diameter, of packed daub with small pebble inclusions near the foundation wall formed by ST17.03. ST17.05 was uncovered below ST17.03 and ST17.04. This context consisted of densely packed, gray/brown marl unevenly distributed throughout the trench. The marl, which could have been the remains of a floor, was most prevalent in the northern and southern edges of the trench. The absence of the context in the middle of the trench was probably due to tree root disturbance. The same types of artifacts found in association with the later contexts, (ceramic sherds, unworked chert flakes, and daub), were also encountered in ST17.05. ST17.05A was found in association with the marl of ST17.05, and consisted of a rough line of stones, (approximately 0.40-0.60 meters in length), placed in the northwest corner of the trench (Figure 3). The two contexts, ST17.05 and ST17.05A were likely deposited at the same time, but a different context number was assigned to the stones to distinguish them from the marl. The marl of ST17.05 was below and surrounding the stones of ST17.05A. A mano fragment was found in association with the stones of ST17.05A, which led to the conclusion that the stones comprised a foundation wall for a perishable structure. ST17.06 consisted of a poorly preserved limestone plaster floor of varying thickness (0.20-0.40 meters), which was beneath ST17.05 and covered ST17.07. A small (0.16 meters in length), well-preserved patch was uncovered in the southwest corner of the trench. Beneath ST17.06 context ST17.07 was encountered, which consisted of large (ranging from 0.30-0.40 meters in length), limestone blocks packed with white limestone plaster with small pebble inclusions. A few ceramic sherds and chert flakes were included in the plaster. The blocks formed a rough line running east to west in the southwest corner of the trench, and a perpendicular line running north to south (Figure 4). These blocks were originally believed to be a wall, but further excavation did not reveal additional courses of the wall so the context was reinterpreted as a construction fill or a low retaining wall constructed to level the surface of Structure 1. ST17.08 appeared to be a cut into ST17.07, but further investigations proved that it was merely a depression formed by tree root disturbance. As a precaution the fill of cut ST17.08 was assigned a different context number, ST17.09. The fill consisted of loose, light brown/tan soil, and was devoid of artifacts. Context ST17.10 consisted of a limestone plaster marl that was very similar in consistency to ST17.05, but

slightly lighter in color. ST17.10 was covered by ST17.07, and overlaid ST17.11. This context was interpreted as construction fill deposited in order to even the surface of the mound.

Beneath ST17.10 context ST17.11 was encountered, which consisted of a thin lens of white/tan limestone plaster, which in turn sealed the rubble fill of ST17.12. ST17.12 consisted of 2-meter deep rubble fill including rocks of various sizes, (ranging from 0.20-0.70 m), packed with loose sand. The fill was used to cover the staircase (Context number ST17.14, ST17.15, ST17.16, ST17.17, ST17.18 and ST17.19) and to fill in the mural room of Structure 1 sub 1 (formerly Room 1) (Figure 5). Loose, light brown sand with small pebble inclusions was encountered beneath ST17.12 and immediately above the plaster floor of ST17.14 and stairs ST17.15 through ST17. 19, and was assigned a distinct context number, ST17.13. A green obsidian blade fragment was found in association with ST17.13 above stair ST17.17. Stair ST17.15 was the first step of the staircase, which is aligned on the east-west axis of the center line of Structure 1, to be uncovered during excavations in Excavation ST17. Stairs ST17.16, ST17.17, ST17.18 ST17.19 and floor ST17.14 were also uncovered and are situated about stair ST17.15 in that same order (Figure 6). Stairs ST17.15, ST17.16 and ST17.17 are roughly equal in depth and height, measuring roughly 0.40 m deep. Stair ST17.15 is just 0.20 m high, while ST17.16 and ST17.17 are approximately 0.40 m high. All of the stairs are covered in fine limestone plaster and also have traces of red and orange paint.

After uncovering stair ST17.17 the excavation was interrupted in ST17 and a 1 m wide tunnel was opened in its northern section following context ST17.18. The stair of ST17.18 is deeper than the rest of the stairs, measuring 1.44 m deep and 0.30 m high, and could be a terrace rather than a stair. The riser of Stair ST17.19 extends 0.34 m above stair ST17.18 and is painted with what appears to be a glyph or face (Figure 7). Dr. Gene Ware of Brigham Young University took several photographs of the painting with multi-spectral imaging equipment, which should help identify the painted image. Due to the fragile condition of the painted plaster, excavation of the tunnel was halted after just 1.40 meters. Since only a small section of the upper extent of the staircase was exposed, it was not possible to determine its exact form and function.

A tunnel extension was initiated in the eastern section wall following stairs ST17.16 and ST17.17 (Figure 8). These stairs terminated approximately 2.7 meters into the tunnel, resulting in a total excavated length of 4.7 meters. The stairs could be longer than the excavated 4.7 meters, since they also continue into the western section wall of Excavation ST17. Once the eastern edge of the staircase was uncovered, the tunnel turned a corner to follow this wall to the north (Figure 9). Our excavations revealed that the stairs were built up against a wall, which was later identified as the western wall of Structure 1 sub 1. An interface between the edge of the stairs and wall ST17.25 (which extends east to west for 0.58 m, is approximately 2.25 m tall and 0.34 m thick), is clearly visible on the southern side of the wall of Structure 1 sub 1 (ST17.25) covered in polychrome plaster. The stairs may cover additional murals on the south side of this wall.

A later burial (context ST17.21, Burial number 13), was placed within the fill of ST17.12 near the corner of the tunnel by the edge of the stairs. A clearly defined cut was not apparent in our excavations. The remains of the burial consisted of just a few poorly preserved long bone fragments. No grave goods were found in association with the burial. This simple burial must have consisted of a bundle of bones placed in the fill. The bone fragments may also just be refuse faunal remains incorporated in the fill. The poor preservation of the bone fragments made a conclusive identification in the field impossible.

Wall ST17.26 (1.5 m long, 1.7 m tall, thickness unknown), extends perpendicular (north to south) to ST17.25 and is also covered with painted plaster. The only preserved portions of the mural (Mural 6) are on this wall. The mural is not very well-preserved but appears to consist of human figures. A yellow tassel of the headdress of one of the figures is clearly visible (Figure 10). The squared goggles of the headdress of another figure are less clear, but discernible. An orange, wavy line is also visible and may serve as a divider between panels of the mural (Figure 11). Wall ST17.27 (0.73 m long, 1.65 m tall, thickness unknown), extends perpendicular (east to west) to ST17.26, and along with ST17.26 and ST17.25 forms a small alcove in the tunnel, and also the western wall of Structure 1 sub 1.

The removal of the rubble fill of ST17.12 continued to the north and revealed a series of doorways (Figure 12). The first doorway encountered was 1.22 meters wide and interrupted the north wall (SLT05.10) of Structure 1 sub 1 uncovered during the 2001 field season. Wall ST17.28 (0.56 m long, 1.60 m tall, thickness unknown), extends perpendicular (north to south) to ST17.27, and forms the western doorjamb of this doorway. Wall ST17.39 (0.36 m long, approximately 1.60 m tall, thickness unknown), forms the eastern doorjamb of the doorway and extends perpendicular (north to south) to wall SLT05.10, the north wall of Structure 1 sub 1. The corners of the walls, as well as the first, outer doorjambs, were painted with vertical, solid red bands. A layer of white wash appears to have been laid over some portions of the walls and mural.

After the first doorway was cleared of rubble, a second narrower (spanning only 0.74 m) doorway was uncovered, which provided access to Structure 1 room 3. Wall ST17.29 (0.31 m long, approximately 1.60 m tall, thickness unknown), extends perpendicular (east to west) to and abuts ST17.28 and with wall ST17.30 (0.64 m long, 1.52 m high, thickness unknown), which extends perpendicular (north to south) to and abuts ST17.29, forms the western doorjamb of this second, inner doorway. Wall ST17.38 (0.20 m long approximately 1.60 m tall, thickness unknown), extends perpendicular (east to west) to and abuts ST17.39 and with wall ST17.37 (0.34 m long approximately 1.60 m tall, thickness unknown), which extends perpendicular (north to south) of ST17.38 forms the eastern doorjamb of the second, inner doorway.

Removal of the rubble ST17.12 from the doorways revealed the entrance to Structure 1 room 3 (Figure 13). A later cache was found in the fill (ST17.12) of this room just north of the doorway. The cut of the cache (ST17.23), which was cut into the rubble fill of ST17.12, was roughly oval in shape (1.10 m long at the N-S diameter and 0.55 meter wide at the E-W diameter), and lined with burned stones. The cache itself (ST17.24) consisted of numerous large conjoinable ceramic sherds, none of which could be reconstructed to form a complete vessel. The initial analysis of these sherds indicates that they are typical of Late Classic forms and wares. A carbon sample was taken from the cache for radio-carbon dating. The cache was sealed with plaster floor ST17.22, which was not excavated since it was revealed in the roof of the tunnel. The high amount of carbon, burned stones and pottery fragments also suggest that the deposit served as a midden or fire pit, perhaps in association with the perishable structure on top of Structure 1 built during a later, post-abandonment occupation.

Contexts ST17.31, ST17.32, ST17.35 and ST17.36 form the walls of Structure 1 room 3, which was also filled by rubble fill ST17.12. Wall ST17.31 (0.44 m long, approximately 2.3 m tall, thickness unknown), extends perpendicular (east to west) to and abuts the doorjamb formed by ST17.30. Wall ST17.32 (2.4 m long, 2.3 m tall, thickness unknown), extends perpendicular (north to south) to and abuts ST17.31. Walls ST17.35 and ST17.36 were not fully exposed because the rubble fill was unstable due to a large looter's trench which cut into the northern face of Structure 1. The excavated portion of wall ST17.35, which forms the northern wall of Structure 1 room 3, is only 0.90 meters long. The excavated portion of wall ST17.36, which forms the eastern side of the southern wall of Structure 1 room 3, is only 0.65 meters long.

All of the walls of Structure 1 room 3 are covered in rough limestone plaster unlike the finely painted walls of Structure 1 sub 1. Faint traces of red and orange paint are visible, implying that the walls were once painted with the same colors as the mural room. Evidence of burning in the form of dark gray patches in the northwest and southwest corners of the room on the floor and on the western wall ST17.32 indicates that this room was used for some sort of ritual activity, alternatively the burned patches may have been caused by a termination ritual fire. A line of dark brown residue approximately 1.1 meter in length extends across the lower portion of wall ST17.32, just above a burned patch on the same wall. This residue may have been from copal incense, although a sample must be analyzed in order to make a conclusive identification.

Doorway ST17.33 (0.83 meter wide and 1.9 meters high), was built into this same wall (ST17.32), and later filled with rubble and sealed shut with white limestone plaster (ST17.34). The plaster sealing the doorway also appeared to have been burned, as there were gray burned patches on the lower portion of the door. Once the layer of plaster was removed, rubble fill was found inside the doorway, ST17.39, consisted of limestone plaster, large squared, limestone blocks, pieces of painted plaster, and brown soil. A significant amount of ceramic sherds and charcoal (of which a sample was taken) were included in the fill.

Once the rubble of ST17.39 was removed, a wall extending north to south was uncovered approximately 0.50 meters from the western edge of the doorjamb (ST17.32) of doorway ST17.33 (Figure 14). This wall, ST17.41 (2.09 m long and approximately 2.3 m tall), abuts the northern wall (ST17.43) of Structure 1. Another wall (ST17.42) built perpendicular to the south of ST17.41 runs east to west and is 1.84 meters long and approximately 2.3 m tall. The two walls form a corner of an earlier structure, Structure 1 sub 3, which was buried within Structure 1. Structure 1 sub 3 appears to share a northern wall with Structure 1. The western wall has not yet been excavated, and it is assumed that access to this structure was gained through a door in the western wall, since neither the eastern or southern walls contain a door. Another possibility is that access to this room was gained through a door in the northern façade of Structure 1. If so, the door may be below or incorporated into the mask uncovered in Excavation ST08E.

Walls ST17.41 and ST17.42 have plinths along their bottoms, although the plinth of the eastern wall has been partially covered by the plaster floor extending through the doorway from Structure 1 sub 1 Room 3. There is also a cornice extending outward approximately 0.20 meters and upward approximately 0.50 meters from the walls which has traces of plaster and orange paint covering it (Figure 15). Structure 1 sub 3 was enclosed on the south by wall ST20.25, which also abuts wall ST20.31; both walls were uncovered in

Excavation ST20 and are discussed below, but are also visible from the tunnel of Excavation ST17. Within the meter of space between wall ST17.42 and wall ST20.25 is a square cut, which chopped off a portion of the plinth of wall ST17.42, and was filled with dark gray soil (Figure 16). The purpose of this cut was not determined during our excavations, since the fill was not removed due to time constraints.

Conclusions

The excavation and tunnel of Excavation ST17 revealed an enormous amount of information regarding the layout of La Sufricaya Structure 1. The tunnel extension of ST17 revealed the western half of Structure 1 sub 1 (formerly Room 1), which is a C-shaped structure with a 4 meter- wide open entrance on the south side, a narrow doorway to the north, and a flat beam and mortar roof. The inner walls of this structure contain painted figures – Mural 6, located on the western wall is coeval with Murals 1-3 discovered on the northern and eastern walls of Structure 1 sub 1 during the 2001 field season. Further excavation and close examination of the wall interfaces is required to determine the exact sequence of construction and relationship between Structure 1 sub 1, Structure 1 room 3, and Structure 1 sub 3. The analysis of the ceramic artifacts and radiocarbon samples from each of these construction phases will shed more light on the absolute dating and function of the rooms.

Based on the available data however, tentative sequence can be formulated (Figure 17). The sequence begins with the construction of Structure 1 sub 3, which consists of walls ST17.41 and ST17.42 as well as the northern façade of Structure 1, identified in this excavation as ST17.43. Structure 1 sub 1 may be contemporaneous with sub 3, but it is more likely that it was constructed after Structure 1 sub 3. Structure 1 sub 1 which contains the Teotihuacan mural, consists of walls ST17.25, ST17.26, ST17.27, SLT05.10 and SLT05.08 identified in 2001. Structure 1 room 3 appears to be a later addition to Structure 1 sub 1, since the construction material and methods appear to be less sophisticated and the plaster floor extending through the doorway (ST17.33) leading to Structure 1 sub 3 covers the plinth at the base of the western wall (ST17.41) of Structure 1 sub 3. The interfaces of the walls, floors and doorways of Structure 1 sub1, Structure 1 room 3 and Structure 1 sub 3 need to be examined in more detail to conclusively define the construction sequence. It may be possible that the construction phase involving the completion of Structure 1 room 3 involved the removal of a portion of the northern wall (SLT05.10) to provide an entrance to Structure 1 room 3. Structure 1 room 3 provided access between Structure 1 sub 1 and sub 3, and also seems to have been the site for ritual activities possibly involving offerings of burned incense.

The fourth phase of construction encountered in this excavation included the staircase, which covers the southwest and western walls of Structure 1 sub 1. However, while the staircase was in use, the rest of Structure 1 sub 1 was left exposed since the staircase and Structure 1 were both later filled with the same 2-meter layer of rubble fill (ST17.12), when use of the area was discontinued. The rubble fill was then sealed with the plaster floor and marl of ST17.11 and ST17.10. The poorly preserved limestone floor of ST17.06 may have been the living surface and foundation of a much later, perishable structure of which daub cobbles and a rough line of stones forming the foundation wall are the only remaining traces.

Although the exact construction sequence has yet to be clarified, the ST17 excavation has revealed that Structure 1 is not composed of a single structure, but is rather a later mound platform (and façade) that covers several distinct stand-alone structures that were in use at the same time and may have formed a multi-room complex or structure. The excavations carried out during the 2003 field season seem to provide more questions than answers concerning the exact sequence of construction and relationship between the sub-structures. Future investigations focusing on the northern and western half of Structure 1 may supply answers to the questions resulting from this field season.

Excavation ST20

Introduction

Excavation ST20 was placed 2 meters to the north of Excavation ST17, on top of and on the central axis of La Sufricaya Structure 1 in Group 1. The main objective of the operation was to determine the function of the staircase uncovered in Excavation ST17. Specifically, we hoped to encounter a platform or bench at the summit of the staircase. The excavation was also initiated with two secondary objectives - to contribute more information regarding the layout and function of Structure 1- since the data recovered from Excavation ST17 resulted in as many questions as conclusions. The operation began as a 2 meter by 2.5 meter trench, and was later extended one meter to the west and one meter to the north, over the northern edge of Structure 1.

Excavation ST20 revealed several construction phases as well as the western (outer) face of the western wall of Structure 1 sub 1, which is elaborately decorated with a molded and painted stucco frieze. Later construction phases included a crude bench flanked by walls that could support the staircase uncovered in Excavation ST17. The location of this bench on the central axis of the structures suggests that it was used as a throne, despite the undecorated and crude construction materials. The latest construction phase included a terrace or structure placed near on the northern edge of Structure 1.

Contexts

Excavation ST20 began with the removal of ST20.01, which was a humus layer consisting of dark brown, moist soil and plant material. The artifacts found in association with this context included two ceramic cylinder seals (Small Find numbers ST20.01.03.01 and ST20.03.02) (Figures 18 and 19), three obsidian blade fragments, a mano fragment, as well as ceramic sherds and unworked chert flakes. A layer of light gray, loose soil, ST20.02, was uncovered below the layer of topsoil. The nature and associated artifacts of these contexts suggest that they could have comprised a midden or ritual offering site. ST20.02 covered a two-course wall made of large, unshaped limestone blocks ST20.03. A plaster floor, ST20.04, was laid in front of the wall of ST20.03, and the plaster lipped up to cover the lower edge of the stones of the wall. There were patches of burned plaster on the floor directly in front of wall ST20.03. A one-course row of limestone blocks, ST20.05, was placed in front of and below the floor of ST20.04, which formed a step. Another plaster floor, ST20.06, was laid in front of the step ST20.05. The wall ST20.03, step ST20.05 and plaster floors ST20.04 and ST20.06 seem to form a terrace near the northern edge of Structure 1 (Figure 20). The relationship between this terrace and the perishable structure discovered in Excavation ST17 remains unclear.

The northern extension of Excavation ST20 revealed a layer of fill (ST20.07), which consisted of packed stones and light brown/tan soil on the outer, northern edge of Structure 1 was uncovered immediately behind wall ST20.03 and below the humus layer. Below ST20.07 a sequence of three plaster floors were uncovered. These floors represent several phases of resurfacing, as they lie directly on top of one another. The floors were poorly preserved, however, and small patches no larger than 0.40 m are the only remaining traces. A small patch of a tan, preserved plaster floor was uncovered on the western side of the trench, immediately above the tumbled rocks of ST20.08. This plaster floor, ST20.09, must have once led up to or extended over the face of Structure 1. The subsequent floor, ST20.10, was made of white limestone plaster and was best preserved in the western corner of the trench. Floor ST20.11 was tan in color and was best preserved in the middle section of the trench, immediately behind ST20.03, and in the northeast corner of the trench. Floor ST20.12 was the earliest of the three floors and was off-white in color. The only remnants of this floor consisted of a small patch to the north of and partially below floor ST20.11.

Large limestone blocks (ranging from 0.40 to 0.80 meters in length) were encountered below the layer of fill ST20.07 and the patches of plaster floors, and were assigned the context number ST20.08. These stones were packed with white/gray mortar on the northern façade of Structure 1. Most of these blocks appeared to be tumble, so their original form and function was not apparent. Due to time constraints, the excavation of the northern façade of Structure 1 was interrupted and efforts were refocused on the original portion of the excavation; none of the tumbled stones comprising ST20.08 were removed.

In order to preserve the architecture of the terrace, the western meter of the trench was left unexcavated. The stones of wall ST20.03, step ST20.05 and floors ST20.04 and ST20.06 were removed to the east of this section. A layer of limestone plaster and rock marl, ST20.13, was uncovered below floor ST20.04. ST20.14, which was a layer of marl very similar to the consistency of ST20.13, was uncovered below floor ST20.06. The northern wall of Structure 1, ST20.21, was revealed once the plaster floors were removed from behind wall ST20.03.

Below the terrace a two-course wall in the shape of an L (extending N-S, W-E), and abutting wall ST20.21 was uncovered (Figure 21). Wall ST20.15 was constructed of large (ranging from 0.40-0.60 meters in length), square limestone blocks packed with whitish gray mortar. This mortar, ST20.17, was poured on top of the corner of the wall and over the southern edge as well. A white limestone plaster floor (ST20.18) was laid to the west of wall ST20.15. The fill of wall ST20.15, (ST20.16), was only distinguished from the mortar of ST17.17 by the few ceramic sherds included in the context.

Wall ST20.15 was built directly on top of a tan limestone plaster floor, ST20.19. This floor also lipped up to cover a portion of wall ST20.21. A fissure ran east to west across the surface of the floor and was probably caused by uneven settling of the fill below floor ST20.19. The fissure was assigned a context number, ST20.20, in case excavations revealed that it was a deliberate cut into the floor rather than a fissure; it was later determined that ST20.20 was not a deliberate cut.

Another fissure in floor ST20.19 along the eastern edge of the trench revealed a cut (ST20.26) for Burial 11 (ST20.27). This simple burial was placed in a cut approximately 0.60 meters long, and did not contain any grave goods. The burial was poorly preserved and consisted of long bone and vertebrae fragments, as well as several molars and incisors. A textile impression made on a chunk of plaster found in association with Burial 11 suggests that the burial was originally wrapped in a textile to form a bundle.

Rubble fill (ST20.22), consisting of unshaped rocks of various sizes and light brown soil was uncovered directly below floor ST20.19. This layer of fill was approximately 3.7 meters deep and covered all of the features described below. A plaster surface, ST20.23, was uncovered in the southeast corner of the trench. This surface has a distinct edge and is approximately 0.20 meters high. It was left unexcavated since it seemed as though the exposed section was possibly the upper edge of a stair from the staircase uncovered in Excavation ST17 (See Excavation ST17 above), and it needed to be preserved. Two square-shaped stones covered with plaster with traces of orange paint were also uncovered in the fill. One of the stones jutted out from the eastern section wall, while the other jutted out from the unexcavated portion of the trench. Together, these stones (ST20.24) could be the remnants of a bench or wall associated with stair or floor ST20.23.

The removal of the rubble fill also revealed two walls built perpendicular to and abutting each other (ST20.34 and ST20.25). They are made of similar construction material, which implies that they are contemporaneous. Both consist of large limestone blocks covered with tan mortar. Wall ST20.34 extends north to south and is located directly below the unexcavated portion of the trench, this wall also forms the western section wall of the trench. Wall ST20.25 extends east to west and was constructed 0.50 meters to the south of wall ST20.21, which forms the south side of the northern façade of Structure 1. Wall ST20.25 is approximately 3.3 meters high and 4.7 meters long. A plaster floor, ST20.30, was uncovered in the corner between walls ST20.25 and ST20.34 at a depth of 5.1 meters.

The removal of the fill ST20.22 continued to the east, where an elevated platform or bench (ST20.28) was uncovered at a depth of approximately 4 meters (Figure 22). Since the terminus of wall ST20.25 had not yet been discovered, a tunnel extension was placed in the eastern section wall. This extension continued for approximately 2.2 meters and ended when wall ST20.31 was encountered. The exposed 0.70 m section of this wall runs north to south and has a painted plaster mask on the cornice with a motif of red painted arrows and molded stucco quatrefoil crosses (Figures 23 through 25). The face of the mask is painted red with black lines which could represent tattoos or face paint. The mouth is open to reveal yellow teeth with painted black spots, perhaps representing jade inlays. Long strips of paper or cloth hang from the figure's ears, and the figure also appears to have a beard or bib below the chin. The wall below the cornice also has traces of red painted plaster. Wall ST20.25 abuts wall ST20.31 approximately 0.05 m to the north of the mask.

More of the rubble fill of ST20.22 was removed from the area directly in front of wall ST20.31, and revealed plaster floor ST20.30 at a depth of 5.1 meters. This floor was also uncovered in the area in front of bench ST20.28, as well as below it. The removal of the rubble fill of ST20.22 revealed more of bench ST20.28, and it became apparent that the bench was very crudely constructed (Figure 26 through 28). The bench was constructed in front of wall ST20.25 and is 2.1 m wide and 1.7 m deep. The uneven surface of the bench consisted of tan mortar/plaster overlying large, unshaped stones, which explains the varying height of the bench. The square-shaped stones covered in white plaster which formed the sides of the bench were the only indication that it actually was a bench and not a platform. The front of the bench was not present and is assumed to have been ritually destroyed in antiquity. A small test excavation was placed in the middle of the bench which revealed its construction of large, unshaped rocks and mortar. The test excavation was interrupted when plaster floor ST20.30 was encountered.

Two walls were visible in front of the bench in the southern section of the excavation. Wall ST20.32 was constructed to the east of the bench, and wall ST20.33 to the west of the bench. The exposed section of wall ST20.32 extends east to west for approximately 1.1 m, while the exposed section of wall ST20.33 extends east to west for approximately 1 meter. Both walls were made of large, crudely shaped, square limestone blocks, some of which had remnants of plaster on their surfaces. These exposed sections appear to be the unfaced backside of walls which may flank the staircase uncovered in Excavation ST17 and face the south. Continued investigation is required to determine the exact form and function of these walls, but they could have served to cover the bench, or perhaps to support or flank the stairway uncovered in Excavation ST17. They could also be related to the plaster surface of ST20.23, which is approximately 2 meters above the surface of the bench.

Conclusion

Excavation ST20 did not provide conclusive evidence regarding the purpose or function of the staircase encountered in Excavation ST17, but it did provide a wealth of information regarding several successive phases of construction and ritual activity in Structure 1.

The earliest phase of construction uncovered in Excavation ST20 consisted of floor ST20.30 and wall ST20.31. During a later phase of construction, wall ST20.25 was built directly abutting the corner of wall ST20.31, leaving the mask, cornice and painted wall exposed. During the same phase wall ST20.34 was built to the west and perpendicular to wall ST20.25. The bench ST20.28 was also built directly in front of the south side of wall ST20.25 during the same phase. It is worth noting here that this bench was placed only slightly to the west of the centerline of Structure 1 sub 3, which is directly behind (on the north side of) wall ST20.25.

The next phase consisted of the construction of walls ST20.32 and ST20.33 flanking the bench. Wall ST20.32 also covered the rest of wall ST20.31, leaving approximately one meter of the wall and decorated cornice visible. These walls (ST20.32 & ST20.33) may serve as flanking walls to the stairway in Excavation ST17, but their construction also effectively terminated the use of bench ST20.28.

The entire area was later filled with a 4.7 meter deep layer of rubble (ST20.22). The presence of the plaster surface of ST20.23 and demolished wall or bench of ST20.24, indicates that there was another phase of construction activity before the area was sealed by floor ST20.19, but further excavations are required to determine the exact form and nature of this intermediate phase.

Floor ST20.19 was laid to seal off the area. Wall ST20.15 was constructed on top of this floor, but the exact layout and function of the wall has yet to be determined. During the next phase, wall ST20.15 was covered with a 0.20 m thick layer of fill, then a terrace (composed of ST20.03, ST20.04, ST20.05 and ST20.06) was constructed during the subsequent phase. Our excavations failed to determine the precise function of the terrace, but the burned plaster and the nature of the artifacts found in association with the context on top of it would indicate that it served either as a midden, a site for ritual offerings, or possibly a later structure.

The northern extension of ST20, which was placed over the edge and façade of Structure 1 revealed tumbled construction fill (ST20.08), which could be the remnants of a staircase, and the northern façade wall (ST20.21) of Structure 1. The northern wall was surmounted by four successive plaster floors (ST20.09-ST20.12) and a 0.10 m thick layer of construction fill (ST20.07).

All of the phases of construction and ritual activity exposed in Excavation ST20 take place in an area that corresponds with the centerline of Structure 1 sub 3 buried on the northern side of wall ST20.25. The unusual number of rebuilding episodes in such a small space suggests that the structure held a great deal of significance for later inhabitants of the platform, who may have sought to commemorate the structure or affiliate themselves with its significance through later construction phases.

Excavations ST08 and ST08E

Introduction

Excavation ST08 from the 2002 field season was reopened with the hope of shedding light on the function of the staircase uncovered in Excavation ST17. In 2002 the operation was placed in the northern façade of Structure 1, the main platform at La Sufricaya. During the 2002 field season a wall was discovered in ST08, which was believed to be contemporaneous with the ST17 staircase. After Excavation ST08 was reopened, the trench was extended to 1.5 meters to the west and connected with the extension of Excavation ST20, this extension and its corresponding context numbers was called Excavation ST08E.

Contexts

Excavation ST08 began with the removal of loose, dark brown soil and large limestone blocks, which comprised the backfill of the 2002 excavation, and was assigned the context number of ST08.00. ST08.01 and ST08.02 were uncovered during the 2002 field season, and correspond to ST08E.01 and ST08E.02 described below, but were not encountered during this excavation as they were removed in 2002. After the back fill was removed, large limestone slabs approximately 0.6 to 1.1 meters long and 0.2 meters wide were discovered (Figure 29). These slabs (ST08.03) were placed vertically to form a niche, and actually form the eye and eyebrow of a mask built on the façade of Structure 1. A large stone block approximately 0.60 meters long and 0.45 meters wide and covered with plaster was placed perpendicular to the slabs of ST08.03 (Figure 30). This block may form the nose of the mask. The context ST08.05 consisted of tumbled stones of various sizes, which may or may not form part of the mask.

The excavation of extension ST08E began with the removal of ST08E.01, dark brown, loose soil with plant material, which comprised a humus layer. A layer of fill, ST08E.02, was encountered below the humus layer, and consisted of loosely packed stones and light brown soil. Ceramic sherds were found in association with both ST08E.01 and ST08E.02. Below the layer of fill a mortar wall running east to west was uncovered. This wall, ST08E.03, approximately 1.5 meters long and 0.40 meters high, could form the cheek of the mask. Immediately in front of wall ST08E.03 tumbled stones comprising ST08E.04 were uncovered. These stones may or may not form part of the mask.

Conclusions

Unfortunately, the ST08 excavations did not elucidate the function of the staircase in Excavation ST17. They did however uncover a crude mask on the façade of Structure 1. What was originally believed to be a wall uncovered in ST08 during the 2002 field season was reinterpreted as the nose of the mask. The mask is formed of large limestone blocks and limestone plaster. There is no evidence that the plaster was once painted. The clearly visible parts of the mask are the eye and eyebrow formed by the limestone slabs of ST08.04, the cheek formed by ST08E.03, and the nose formed by ST08.04. It is assumed that the mask was constructed during the Early Classic period, and is contemporaneous with the latest phase of construction of Structure 1, but an analysis of the ceramic sherds found in the fill covering the mask will help confirm the suggested dating of the sequence.

Future investigations could include an operation placed to the east of ST08 to uncover the other eye of the mask, as well as an operation placed below ST08 to uncover the mouth.

FIGURES

Figure 1 Map of La Sufricaya

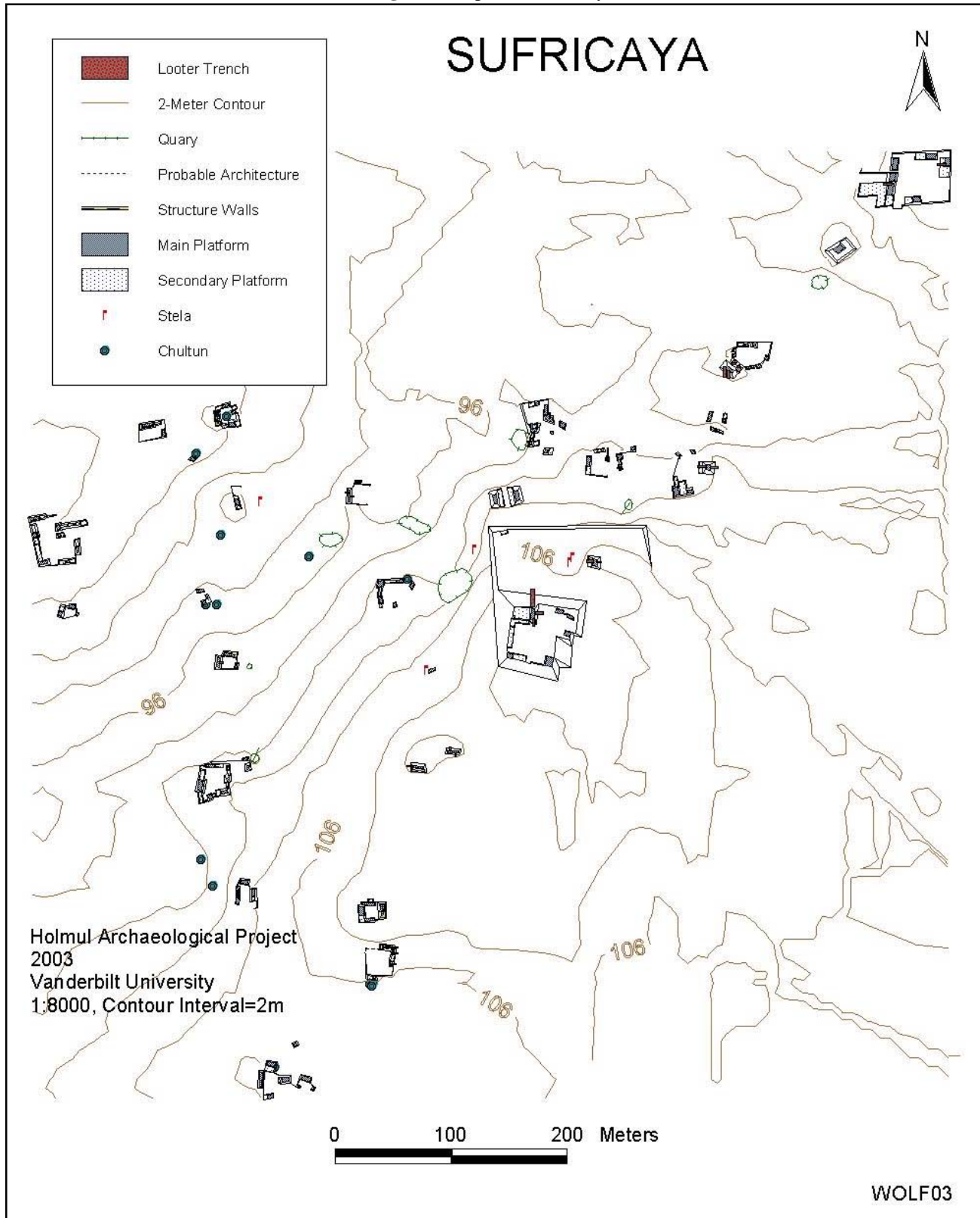


Figure 2 Map of La Sufricaya Group 1 detailing excavations conducted during the 2003 field season

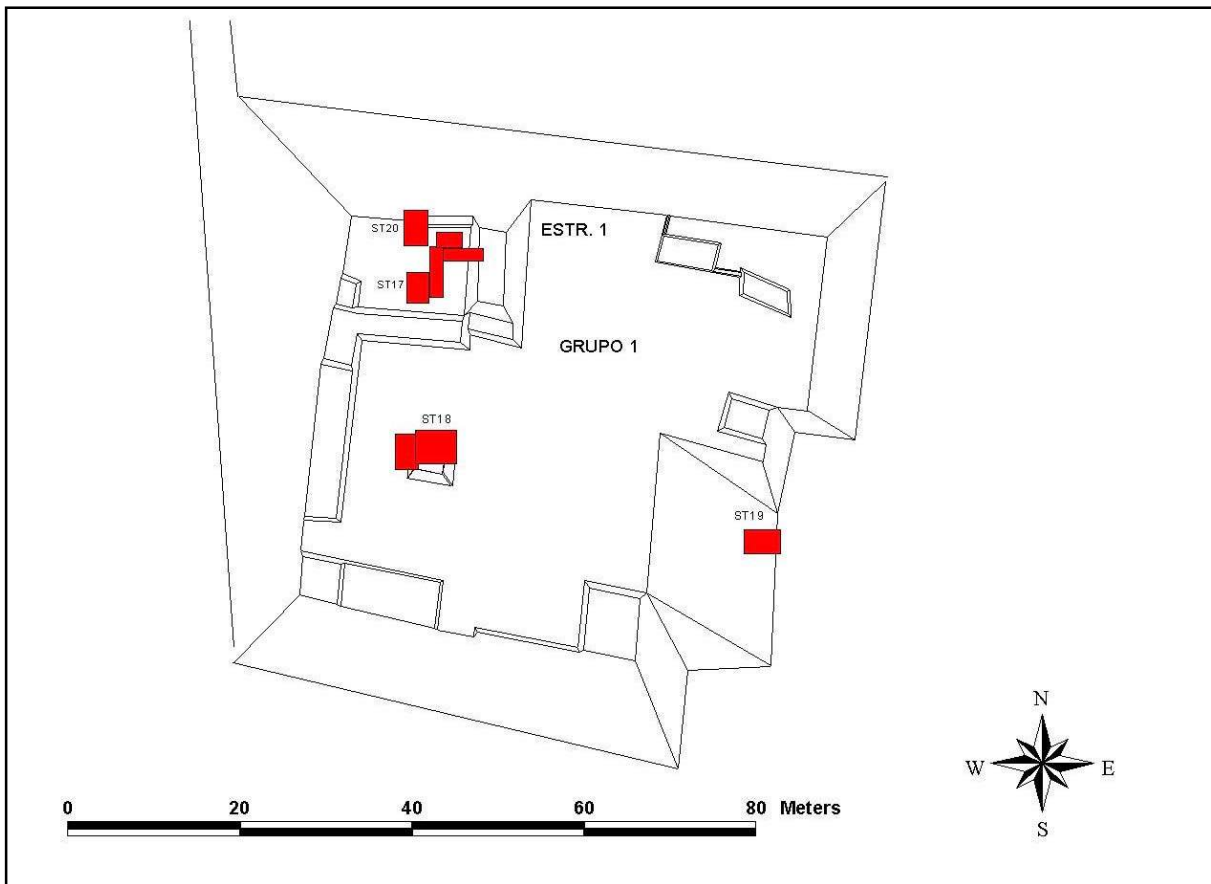


Figure 3 Excavation ST17 with the row of stones comprising context ST17.05 in the northern edge of the trench



Figure 4 Excavation ST17 with row of blocks comprising context ST17.07 in the southeast edge of the trench



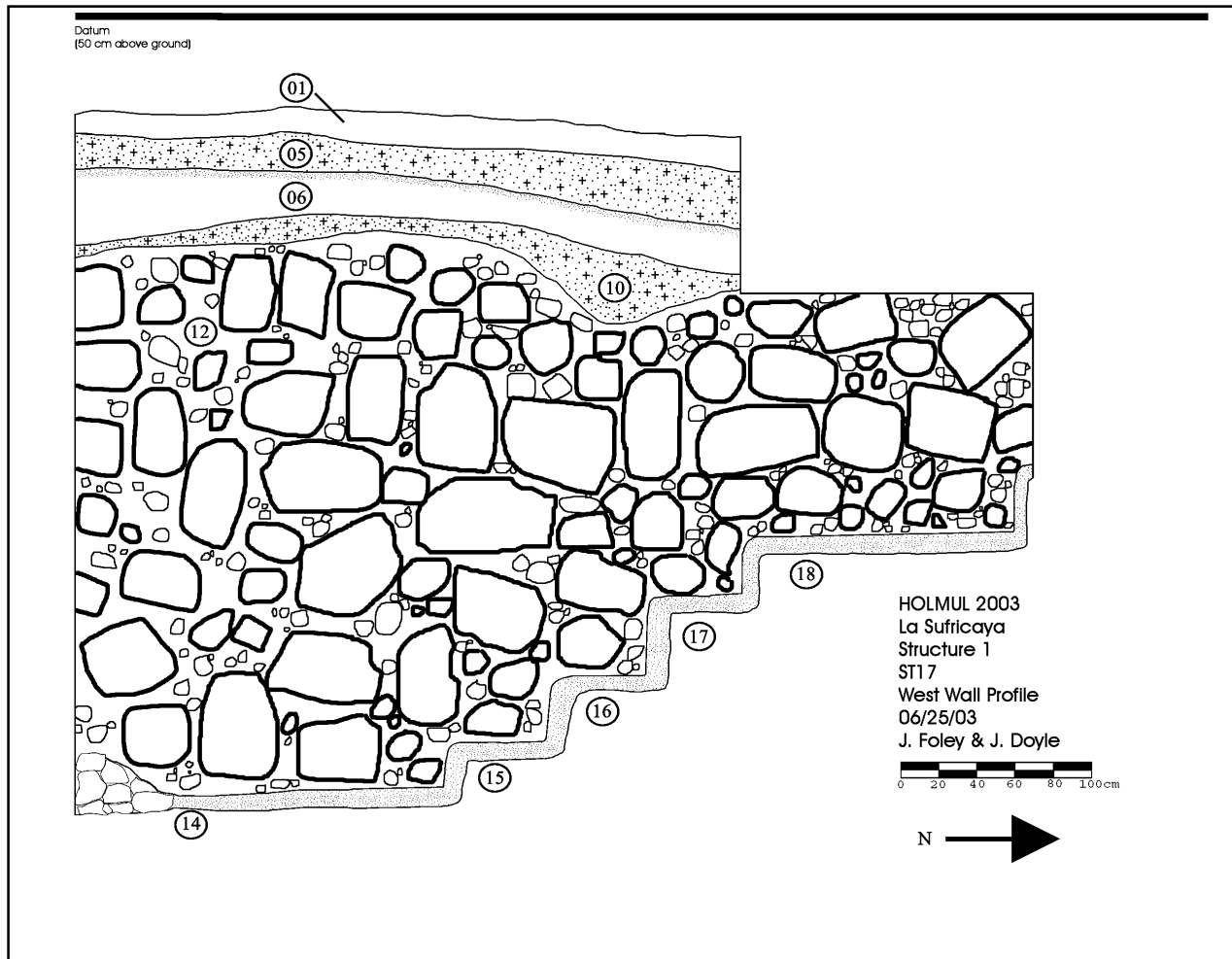


Figure 5 Profile of the western section of Excavation ST17



Figure 6 Staircase uncovered in Excavation ST17



Figure 7 Utmost stair of Staircase uncovered in Excavation ST17, with polychrome painted plaster and possible glyph.



Figure 8 Eastern end of stairs ST17.16 and ST17.17 and entrance to tunnel extension of Excavation ST17 in the eastern section wall

Figure 9 Plan of tunnel extension of Excavation ST17

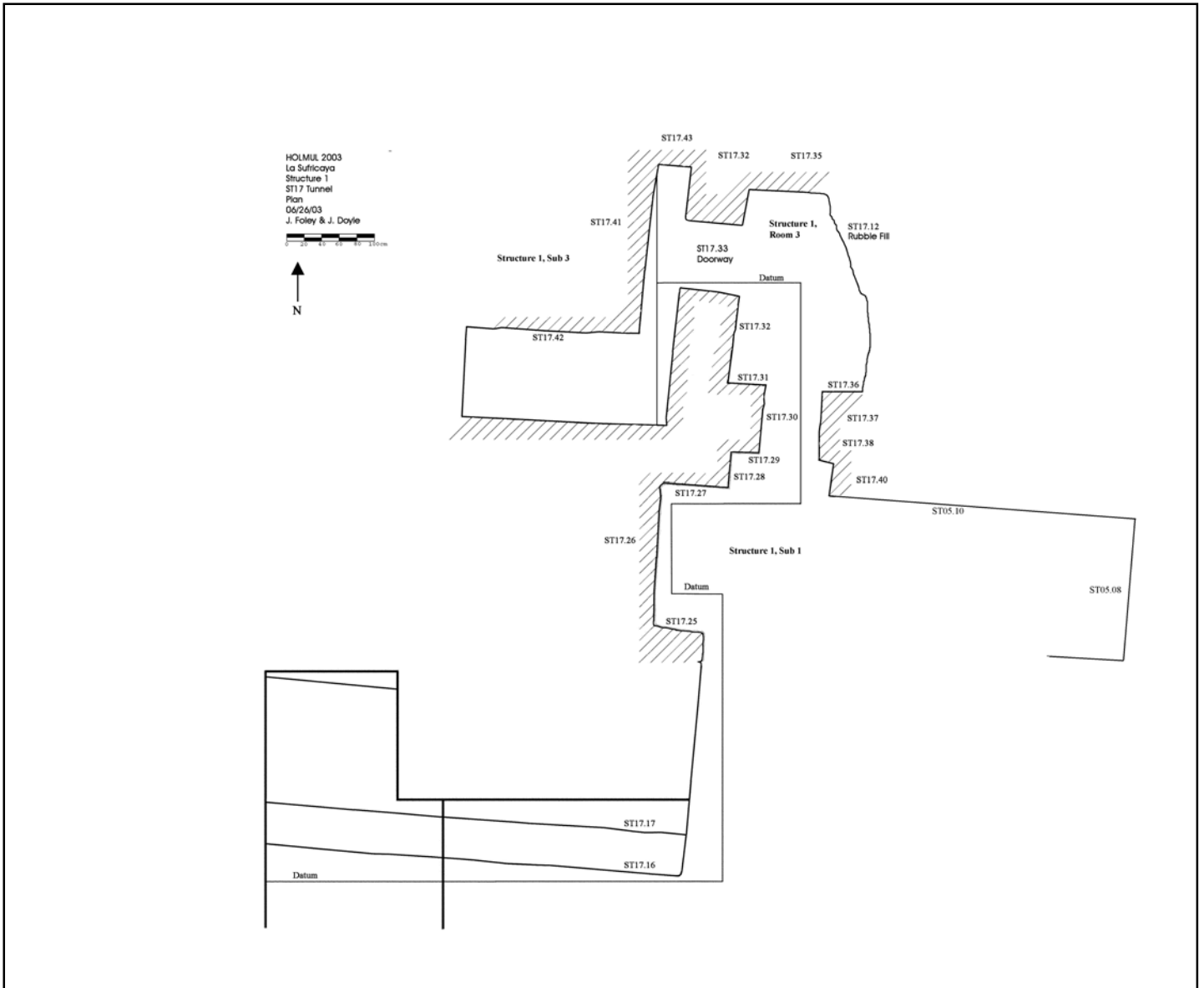




Figure 10 Rubble-filled doorway to Structure 1 room 3



Figure 11 Entrance to and interior of Structure 1 room 3, with doorway leading to Structure 1 sub 3



Figure 12 Eastern wall of Structure 1 sub 3 with doorway leading to Structure 1 room 3 to the east



Figure 13 Southern wall of Structure 1 sub 3 with cornice



Figure 14 Structure 1 sub 3 with plinth at the base of the wall in foreground. Cut ST17.44, wall ST20.25 and wall ST20.31 in background

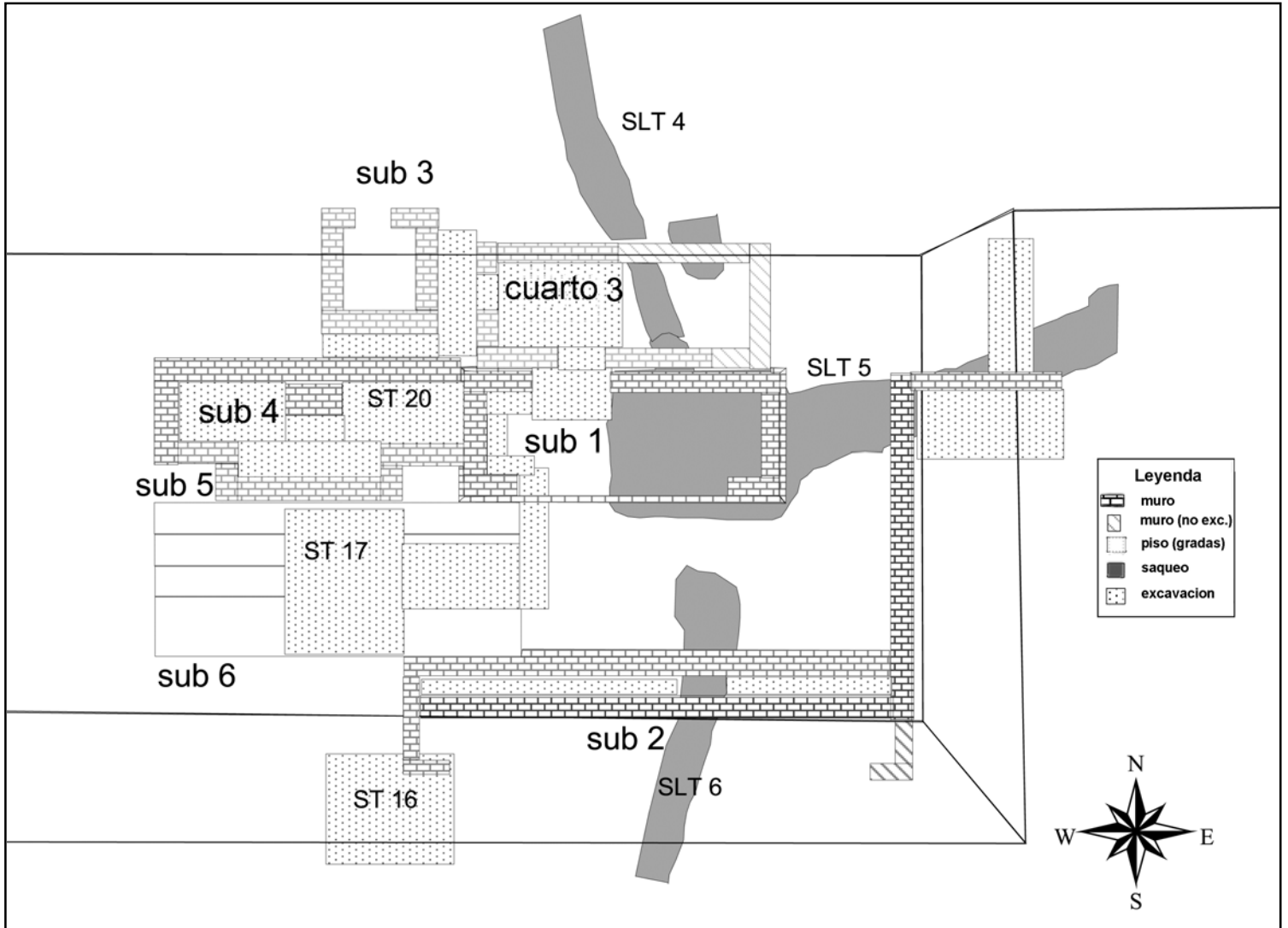


Figure 15 Layout of Structure 1 including construction phases, excavations and looters trenches



Figure 16 Cylinder seal recovered from Excavation ST20



Figure 17 Cylinder seal recovered from Excavation ST20



Figure 18 Terrace uncovered in Excavation ST20



Figure 19 L-shaped wall uncovered in Excavation ST20



Figure 20 Overhead view of Excavation ST20 with wall ST20.25, bench ST20.28 and floor ST20.30 visible



Figure 21 Decorated frieze adorning outer face of western wall of Structure 1 sub 1



Figures 22 & 23 Detail of Structure 1 sub 1 frieze (Drawing by Jessica Mundt)





Figure 24 Bench uncovered in Excavation ST20

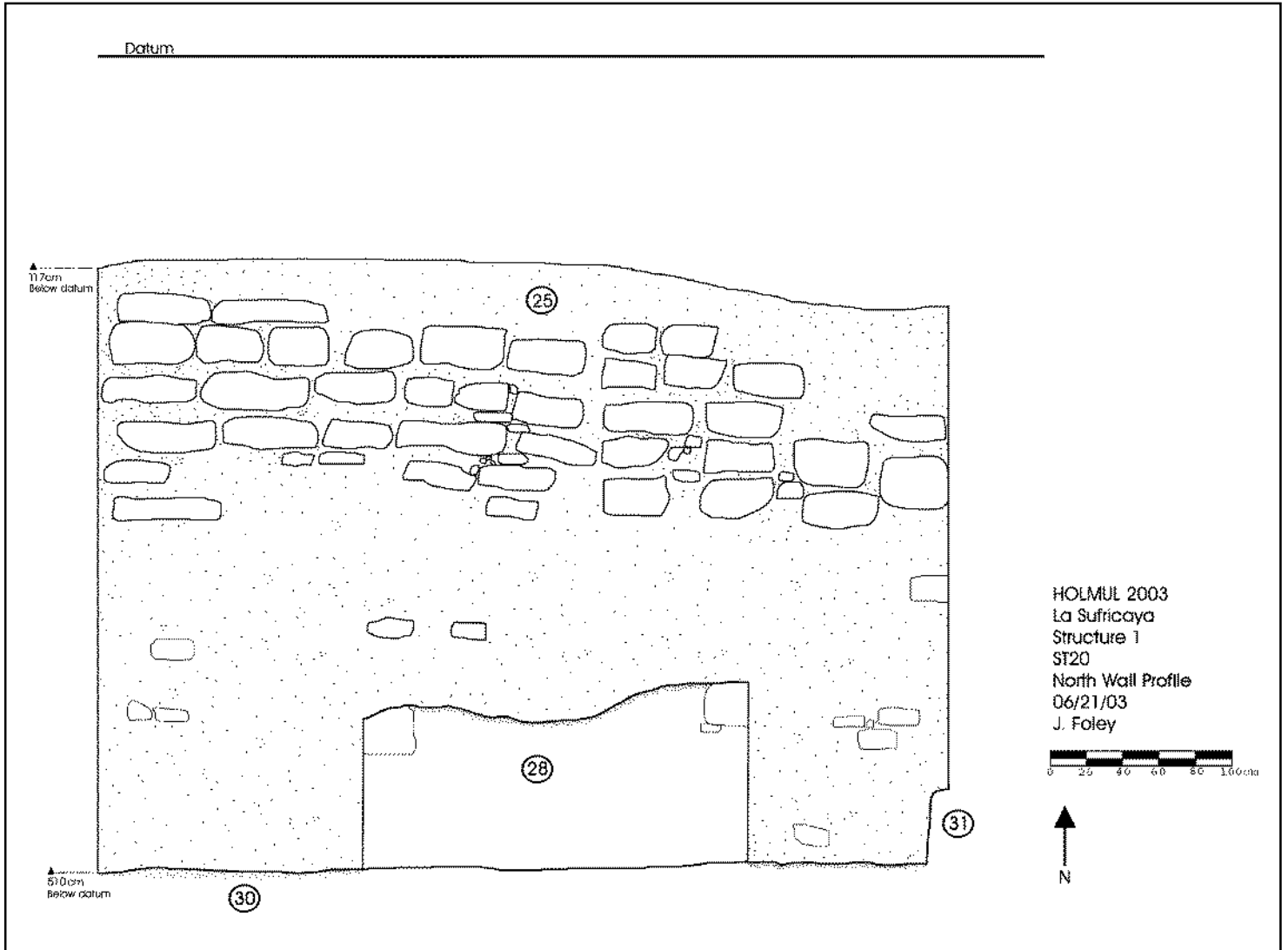


Figure 25 Profile of northern section wall of Excavation ST20, including the bench

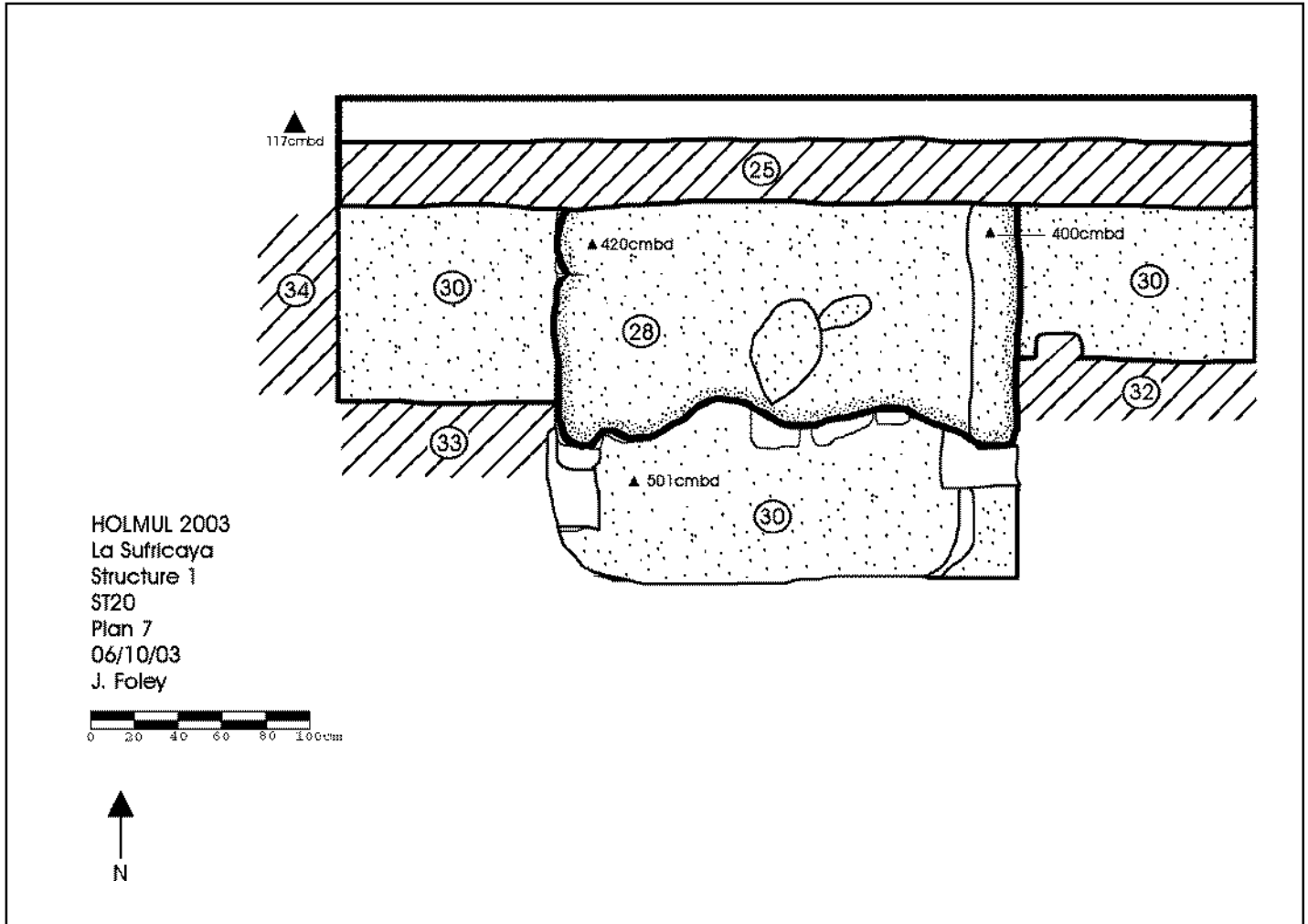


Figure 26 Plan of features uncovered in Excavation ST20



Figure 27 Eye of mask uncovered in Excavation ST08E



Figure 28 Nose of mask uncovered in Excavation ST08E

La Sufricaya- ST 18 and SL07

Niña Neivens
Holmul Archaeological Project
2003

Introduction

The investigations SL07 and ST 18 examined a small, low mound on top of the Structure 146, located in the center of the elevated Group 1 acropolis and south of Structure 1 at La Sufricaya. This subcenter of Holmul is of particular significance because of the murals found in 2001 containing Central Mexican iconography, in the form of several individuals shown in profile with elaborate headdresses, similar to those illustrated at Teotihuacan (Techinantitla murals), Monte Alban (Estela Lisa), and on a ceramic vessel from Tikal (Burial 10), which are referred to as Teotihuacan emissaries (Millon, 1992). Investigations at La Sufricaya in 2002 revealed another mural in Structure 1 as well as several pieces of Pachuca green obsidian within this structure and from the area surrounding its platform (Estrada-Belli and Tomasic, 2003). In 2003, three excavations examined the Group 1 Platform; ST 17 and ST 20 in Structure 1, ST 19 on the east side of the platform, and ST18 in the center of Structure-146.

These excavations were designed to define the sequence of construction and use of the building before, during, and after the period exhibiting Teotihuacan characteristics. These investigations aim to illuminate the nature of this period and the relationship of the Maya at Holmul with the Central Mexican city of Teotihuacan. Structure 146 was investigated because its orientation and placement on the platform seemed to be related to Structure 1, and because of its unusual size and shape which seemed incompatible with what we would expect of a residential structure. Therefore, these excavations aimed to determine the nature of the building and its relationship to Structure 1.

Investigations began with the cleaning and documentation of the looter's trench, SL07. This trench ran from the structure's eastern extent to its interior, revealing a masonry wall running north-south and a cavity within the rubble fill beneath. Then a 3.5 m by 5 m trench, ST18, was laid out across the building's northern side, adjacent to SL07. This trench was extended 3 times; 1 m to the west, then 3 m to the south, then 1 m south, and 1 m west in the southwest corner. This excavation revealed 2 structures, the latter of which with 2 major phases of construction, and 2 caches each with one ceramic vessel of Late Classic period interment.

Discussion and Stratigraphy

The looter's trench, SL07, revealed three main contexts; the humus layer (SL07.02), a very thick layer of grey marl (SL07.03), and a plaster floor of 10 cm thick (SL07.04) supported by a thick layer of rubble fill (SL07.05). The plaster floor ran under the masonry wall in the west profile of the trench (see Multiphase Plan). The eastern side of the trench revealed a small line of stones running north-south with 2 floors outside it, one on top of the other. Section drawings of the north, south, and west walls were completed, followed by a plan view of the trench (see Multiphase Plan). The trench was also cleared of the backfill left by the looters (SL07.01) revealing the rubble fill (ST07.05) beneath.

The excavation (ST18) was placed adjacent to SL07, running 3.5 m to the north and 5 m to the west. The stones on the surface were called ST18.01, covering several layers of humus, ST18.02-06 (see site notebook for minor distinctions). Then I found walls running from the looter's trench to the north, ST18.09, and perpendicular to that across the trench east-west and stopping 3 cm before the west section wall of the same trench, ST18.10 and ST18.33. These were abutted in the center of the excavation or on their east face by a layer of densely packed grey soil, ST18.08, probably coeval with the last plaza floor. On the top of the mound there were many tumbled stones from some sort of superstructure, ST18.20, including one large rectangular stone set perpendicular to ST18.09 adjacent to the looters trench. East of, and parallel to, this stone was a substantial earlier wall running north-south, ST18.11, in the middle of the mound. Beneath ST18.08 there were 2 overlying floors outside the building; a yellow plaster floor, ST18.13 above a grey one, ST18.14. In the western part of the trench ST18.08, the densely packed grey soil and came down almost immediately on the fragmentary remains of a different thick plaster floor, ST18.16, which was interrupted by a cut along the west section and along the wall ST18.33. Inside the cut,

ST18.30, were a fill, ST18.27, fill, and a layer of greymortar ST18.18, abutting a low 2 stones-wide wall, ST18.15 (aligned N-S) (see Multi-phase plan). Then we excavated inside the the western room, formed by walls ST18.11, ST18.33, and ST18.12 which was filled by ST18.07, revealing the floor ST18.16 continuing through the room. There was another wall perpendicular to ST18.33, ST18.12, both these walls were only one stone high. Then the trench was extended 1 m west to examine the cut in floor ST18.16 and the articulation of a cut stone with wall ST18.12. This wall, ST18.12, was perpendicular to ST18.33, both of these walls were only one stone high. Then the trench was extended 1 m west to examine the cut in floor ST18.16 and the articulation of a cut stone with wall ST18.12. The stone turned out to be part of a 2 stone-high wall, 1 stone long, perpendicular to ST18.12, which was called ST18.29. The floor, ST18.16, continued underneath both walls, ST18.12 and ST18.29, cut by ST18.31, interrupted it along the outside of the walls. Also in this NW section of the excavation the other cut, ST18.30, continued to the west. The trench was then extended another 3 meters to the south and 2 meters west, to examine the entrance to the room. Meanwhile the fill was removed from the eastern room, ST18.20, and ST18.22 to reveal the thick floor beneath, ST18.24. This also revealed that floor ST18.24 was continuous beneath wall ST18.11, as could be seen by the continuation of the floor and of the small plinth stones, ST18.23, running along the east side of both ST18.11 and ST18.15. Either these two walls are the same, the earlier having been cut when the perpendicular walls (ST18.10, ST18.33) were constructed, or the later one was built on the foundation of the earlier. The second extension revealed numerous collapsed stones, under which there was a pile of 2 stones (ST18.42), roughly rectangular, parallel to ST18.29 but separated from it by fill, ST18.35. To the south, there were two similar parallel stone piles, ST18.43 and ST18.44, each separated from the floor by a thin lens of fill. Perpendicular to these and also on top of fill was a rectangular stone, ST18.45. Behind these, running under the east section wall was a cut stone block, ST18.47 similar to and parallel to the stones of ST18.33 and sitting directly on floor ST18.16. In the southwest corner of the trench was a flat rectangular stone with a considerable quantity of chert debitage around it (see Multiphase Plan). Recognizing that this could be a cache, we extended the trench one meter south and one meter west. This area was covered in tumbled stones, probably from another structure to the southwest. Under the flat stone was a roughly square area of chert debitage lined with flat stones. Beneath the chert was a layer of stones, ST18.38, and under these a layer of fill, ST18.39 with one ceramic red-slipped bowl placed upright (ST18.39.02.01). Beneath the fill was an earlier floor, ST18.51, with a circular cut, ST18.40, in it (see Plan of Cache #1). The cut contained fill, ST18.41 and the fill contained a second, identical ceramic red-slipped bowl placed upright (ST18.41.02.01) (see Plan of Cache #2). To the west, in front of the room there was another cut into floor ST18.16, roughly square and extending into the west section wall, ST18.48, which contained only fill, ST18.49. Within this fill was a stone, ST18.46, which looked very similar to the stones of wall St18.12, leading me to believe that the symmetrical wall on the south side had been removed in a termination ritual. Then the trench was backfilled to be investigated in the upcoming season.

Conclusion

The earliest contexts found in ST18 are wall ST18.15 and floor ST18.51. The latter is a floor seen only in the profile of cut, ST18.52, and itself cut by ST18.40, the two Late Classic caches, nothing more will be known about this floor until further excavation is completed. ST18.15 is a wall, the same as ST18.11 and ST18.23, together these form a broad wall of 2 stones thick and 3 high at the center of the mound and of the excavation. It had a plinth, a layer of smaller uncut stones laid to the east. Then a floor was laid to the east, forming either the interior of a structure or the outer plaza floor, ST18.14 and ST18.24. Then the northern part of the wall was destroyed leaving only the lowest layer of stones and the part to the south was reused, ST18.11, forming the eastern wall of a room. From this wall a floor ST18.16, and 2 walls built on it, ST18.33 was laid to the west, consisting of one course of rectangular stones, and ST18.12, a one-course wall of square stones was laid at its western extent running south, parallel to ST18.11. On the south side another wall, ST18.47, of rectangular stones was laid parallel to ST18.33.

Then a wall, ST18.10, was built running east of ST18.11 and another, ST18.09 from its eastern end to the south. These walls are made of two courses of rectangular blocks, and are one block wide. They sit directly on mortar which was laid over floor ST18.14/24. The inner floor, ST18.24, was reused for the interior of this room. Outside of it, a plaza floor, ST18.13, was laid over ST18.14. Either these two rooms were used simultaneously, or the earlier one was filled in while the latter was in use.

It is possible that the earlier room was ritually terminated with the removal of the square stones of the wall to the south that would have been symmetrical to ST18.12, and a layer of fine grey fill was laid, ST18.35. Then the building was enlarged to the south with the stones, ST18.45, along the same (E-W)

alignment of the removed stone wall. A number of small walls were laid to the west of the structure, ST18.29, ST18.42, ST18.43, and ST18.44 to extend the structure. A number of cuts were made into the floor ST18.16; cut ST18.30 to the north of the building, cut ST18.31 between walls ST18.12, cut ST18.29, and cut ST18.48 on the centerline of the building between and in front of walls ST18.42 and ST18.43. These cuts were then filled with fills ST18.27, ST18.28, and ST18.49 respectively. Then the room was filled with rubble layers ST18.07, ST18.06, ST18.26, and ST18.34, which included some of the square stones from the wall that had been removed.

The eastern room was filled in at the same time or later. It was first filled with rubble ST18.22, then ST18.20. Then both rooms were covered with stones found in the humus layers, ST18.06, ST18.05, ST18.04, ST18.03, ST18.02, ST18.25, ST18.32, ST18.36, and on the surface in ST18.01.

On the southwest corner, two caches were made before (?-it had to be before unless it was cut through the fill) the mound was filled. The first cut, ST18.40, was filled with ST18.41 containing one complete ceramic vessel. Then ST18.52 was cut directly above it, extending slightly to the south. This was lined with flat stones and filled with ST18.39 containing another ceramic vessel of the same style. This was covered by a layer of stones, ST18.38, and a layer of chert debitage, ST18.37. The whole thing was then covered by a large flat stone. The area around the mound continued in use through the Late Classic and a layer of densely packed gray soil occurred around the building, ST18.08, and finally the humus layer ST18.32 and ST18.36 covered the area.

ST18 –Illustrations

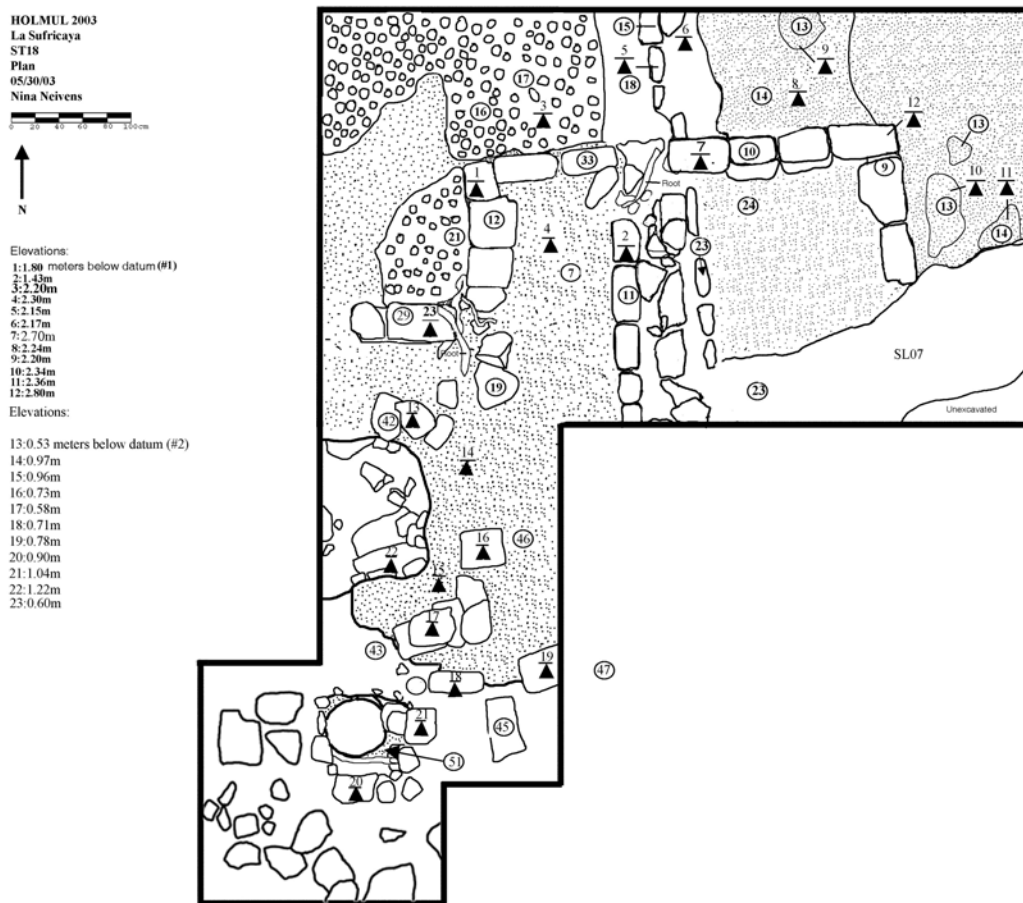


Figure 1. Final plan of excavation

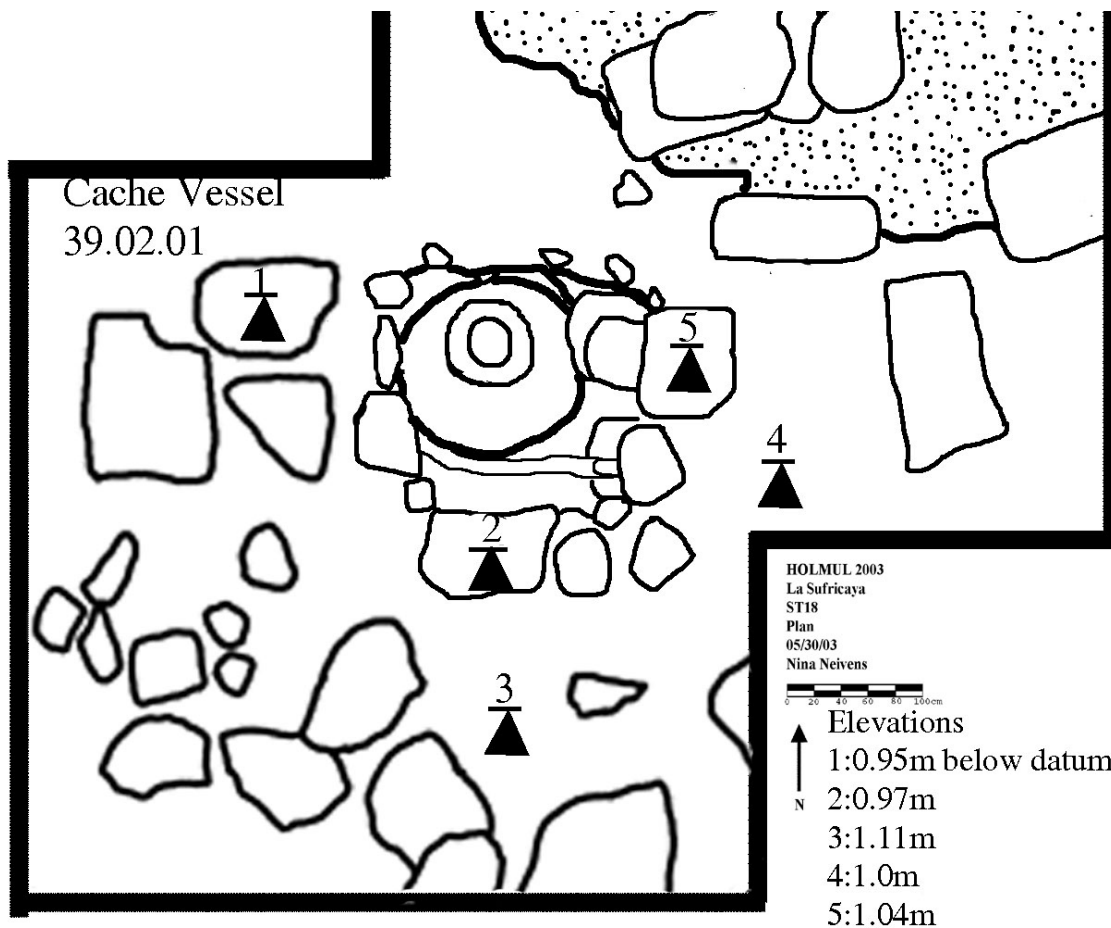


Figure 2. Detail of SW extension and cache #1

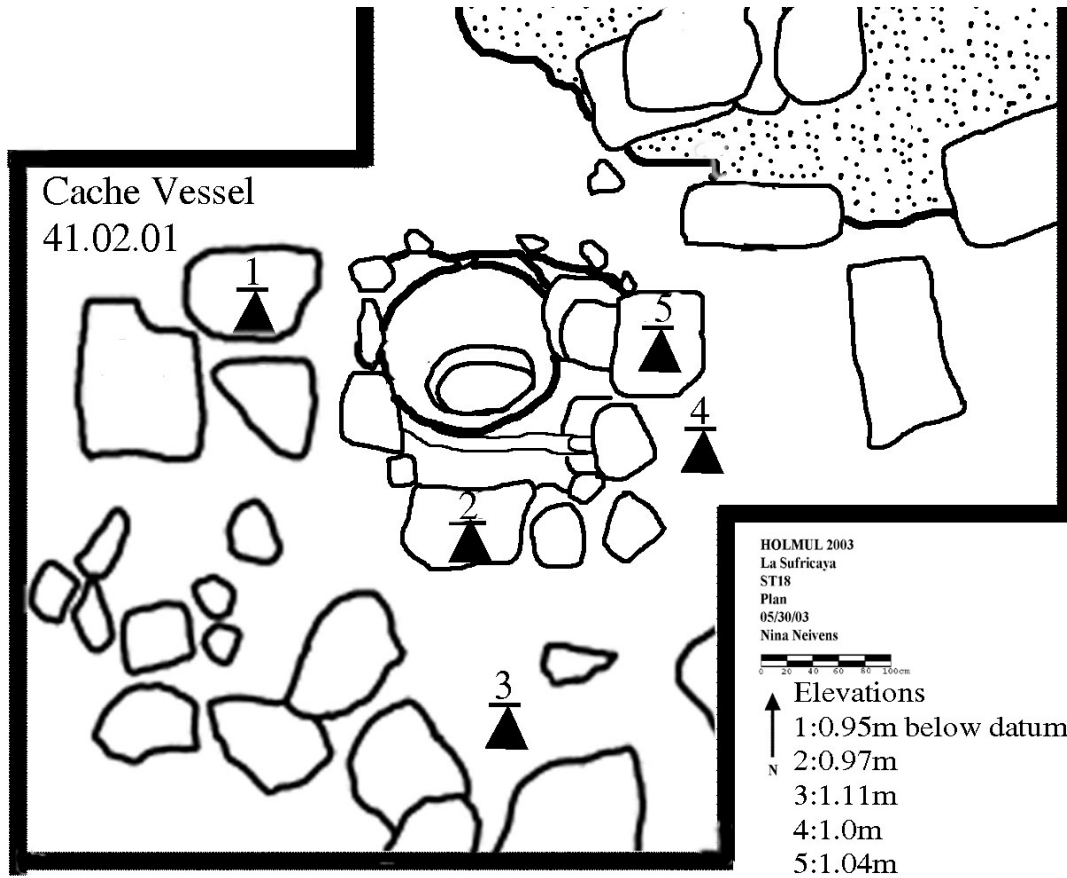


Figure 3. Detail of SW extension and cache #2.

Excavations in Group III court A, Season 2003

Chris Hewitson

In Group III Court A, excavation T32 was placed in the center of the plaza in order to obtain a continuous section from the eastern side of the plaza at structure 50 (Excavated in 2002) to the western side at Structure 2 (Looter's Trench recorded in 2000). The latest plaster floor was uncovered and followed into Structure 2, revealing a cut capped by large stones that may have been a cyst burial at one time. However, expansion of excavation to the south revealed that the capstones had been disturbed and the cut did not contain any human remains. Therefore, this grave was most likely emptied in antiquity for reburial.

Continuation of tunneling occurred perpendicular to looter's trench LT11. This revealed the nature of the third from last phase of construction within Structure 2. This phase of construction formed a projecting corner at the north-eastern edge of the structure. West of this corner the pyramid was indented by c.3.5m and continued west for a further c.5.5m before turning south in what appears to be a near-vertical face. The second to last phase was located during tunneling and in the looter's trench and appeared to be a later addition to the northern and western side of the temple designed to provide a greater base width at the rear of the temple. Excavations at the north-west corner of Structure 2 (T44) revealed poorly preserved remains of the last phase of the pyramid. This was also located in LT11 but in better preservation condition. The plan of this phase is unclear but appears to have involved a more whole-scale re-modeling of the pyramid than the previous phase adopting the projection at the north-east corner of the earlier phase whilst incorporating the expansion to the west of the temple for greater structural integrity.

A looter's trench LT 13 bisecting Structure 53 on the north side of Court A was cleaned and the profile was drawn to reveal at least four different phases of construction, the earliest of which was a large plaster staircase with a red-painted stucco wall perpendicular to it. A later plaster floor phase covered this associated with a circular façade that faced northward away from the platform. Further excavation is needed to understand the exact construction of this rounded building.

Excavations within Court III B, Holmul Site Center, 2003 Season

Introduction

This seasons excavations within Court III B were aimed at a three-fold investigation within separate areas of the court.

1. Intrusive key-hole excavation in the interior and western exterior of Structure 43 (The Palace Building) designed at establishing the extent of earlier phases of the palace complex (C. Hewitson, T38, T39, T43)
2. Examination of occupation evidence in the southern area of the complex, in order to establish the extent of the southern court and its relationship with Structure 60, Structure 70 and Structure 71 (J. Valle T40). Combined with this an examination of the nature of the complex west of Structure 70 and south of Structure 43 by the excavation and recording of the passageway between the west and central courts (N. Erwin T35).
3. Extensive open excavation of the area between the central court and the plaza floor designed to establish a continuous relationship between the interior and exterior of the court (D. Bell, R. Trujillo, G. Valle, T42). Complimentary to this investigation of domestic structures to the north and south in order to establish their relationship and nature in respect to the rest of the complex (Structure 57, Structure 58, and Structure 63, C. Hewitson T36, T37).

Further survey-work was undertaken in order to establish the extent of remaining standing architecture, its alignment and relate this to the excavations undertaken in the previous two seasons (2001, 2002)

Discussion

Excavations within and surrounding Structure 43 were carried out in three locations, centrally within the eastern room numbered 2 by Merwin (T38) in the western room (3 by Merwin, T39) and at the base of the access staircase east of Structure 43 uncovered during excavations of 2002 (T43).

Excavations within the palace revealed a latest phase of construction directly relating to the upstanding architecture of Structure 43, consisting of thick repeated re-plastering of the floor surfaces contemporary with the re-modeling of the benches in this phase. A discontinuous floor located in the western room directly below these floors suggests an earlier phase with a bench located centrally against the rear wall that was removed prior to re-modeling of this room. This phase appeared to relate to the latest phase of floor beneath the main stairwell in excavation T43. This was excavated initially in 2002 but discontinued after approximately c.0.5m and was visible only as a gravel construction layer beyond this until it becomes visible again at the far side of the court (see excavation T42).

A limestone-rubble construction layer of c.0.2m separates a plaster floor that appeared to be contemporary with the well-preserved court floor located in T43 and the previous seasons excavation (2002). Within T43 located underneath the first step of the stairway were the remains of an obsidian cache directly over-lying the floor. This consisted of 8 large obsidian blades, two blades with opposing notches at either end, a well-formed symmetrical knife blade and a series of other single edged blades that suggested these to be the remnant of a personal tool kit.

Below this with evidence of a rough built partition construction wall running east-west within the excavation in the eastern room (T38) and in the central court (T43) that directly overlay a good quality plaster floor. This floor does not appear in the western room (T39) and it is suggested that is due to the presence of a bench or platform here that extends beyond the limit of excavation.

A layer of construction fill within T38 containing large quantities of burnt limestone lay below this sealing a set of two well preserved stucco covered steps. The corresponding floor was not located within the court (T43) but a similar layer of construction fill suggests the floor existed at one time but preservation was exceptionally poor. The upper stucco step appears to be a later addition designed to meet the theorized bench or platform (see above), and the original floor level of the lower step continued to meet a floor located in the western room (T39). This is contemporary with a faced limestone wall (T39) running north-south that appeared to be the rear wall of the earliest structure constructed in the palace.

Excavations in T39 and T43 were continued to a depth of c.2.5m revealing a single poor quality construction floor in T39 and deep layers of limestone block construction fill. It is therefore suggested four phases of construction can be seen in the palace. However, it cannot be theorized whether these are sub-phases or distinct phases of construction.

The second area of excavation

Excavation of the passageway between central and western courts was primarily designed to establish construction phases of this feature and relate them to the topography visible on the surface. The majority of the fill within the tunnel related to episodic looters disturbance. This revealed the remains of several unstratified well-preserved ceramic vessels of late and terminal classic dates. These included a polychrome vessel located at the far western end of the tunnel.

At the eastern end of the tunnel located at the entrance to the central court were the remains of a deep midden deposit of terminal classic domestic wares. This confirms the theory that the complex as a whole was used in the terminal classic period as a squatter settlement, in common with the evidence from the south court of the complex and Court III A.

The architectural evidence revealed by the excavation suggested the passageway was of multi-phase construction incorporating the elements of the surrounding structures.

The earliest visible phase within the passage is located within looter's disturbance on the northern wall. A hole excavated by looter's reveals an earlier phase of what can be presumed to be a structural wall of the platform for Structure 43. It is sealed by a later wall constructed in front, of small but well-cut limestone blocks that discontinue towards the eastern end of the tunnel in a sloped face. This is structurally identical and presumably contemporaneous with the wall on the southern side of the passage that discontinues at the eastern end at the same point as the northern wall except in a vertical wall break that over-hangs at its base. At the western end this turns sharply and turns south to form the western wall of what is presumed to be a narrow structure. The wall terminates at the south and turns east again in a vertical wall break. Looters disturbance at this location clearly reveals the wall continuing eastward and forming the southern wall of this structure.

Abutting the corner here and stratigraphically later is another wall of a structure located south of that above. The wall continues directly south and forms the eastern half of the discontinued passage described below.

At the western end of the passageway were twin structures that the topographic evidence suggested to be of similar dimensions, aligned east-west with the passageway in-between running east-west. The passage in its final form turned at a right-angle and continued north following the line of the northern structure wall before turning west. However looters disturbance suggested the passage originally had a more open and inter-connecting plan. The passage originally appears to continue to the south through a passage that had been terminated at a later date by blocking using material sympathetic to the surrounding structures.

At the eastern end the passage turned at a slight angle and continues until it met the corner of the central court. The construction material of the walls on both sides of the passage was of larger rough block

construction and it appeared that this was a later addition designed at enclosing the passageway and changing its direction. It seemed probable this phase of construction was contemporary with the alteration of the central court by the construction of the staircase located north of structure 60 during the previous seasons excavation. This would have necessitated a change in access due to the restriction created by this construction.

It is unclear at present whether the passage was covered in its original form or this was a later alteration. The final phase of alteration appears to have been the blocking of the western end of the passage in order to remove access to the western court.

The third area of excavation centered on the western side of the central court. The largest excavation T42 was designed to link the excavation of the staircase of the previous season with an extended excavation locating the entrance to the complex from the central court to the plaza in a single continuous section. Excavation revealed the remains of a platform enclosed to the south and north by two ranges of buildings Structures 57 and 58. Centrally located door jambs suggested the presence of a formal arched entrance to the complex, but the platform did not appear to be roofed. Descending to the west was a series of wide platform steps before a series of three smaller steps led to the floor of the central court. Two plaster floors were located within the court. The latest was of poor condition but was contemporary with the floor located at the foot of the stairway to Structure 43.

To the east of the entrance platform the access was more complex. Two wide and deep stucco platform steps were encountered in poor condition. These led to a narrow trench with a plaster floor at the base. The purpose of this trench at present is unclear but it bears striking parallels to a similar construction located in LT16 on the southern edge of the complex. It is possible this was a continuous trench around the side of the complex. However, this requires further investigation to be confirmed. A series of three narrow limestone steps continued below this before a series of wide plaster steps descended to the plaza floor. These were covered by five to six later limestone steps located only in the northern section of the excavation. Access appears to have been located either side of the entrance platform via these later steps. In turn, the wide platform steps would have provided access to the rooms of Structures 57 and 58.

Two phases of plaza floor were encountered. The first was in poor condition and survived for only a short distance where a cover of rubble collapse had preserved it. Beyond this it was of very poor condition and only visible in the change of the nature of the soil. A second plaza floor of superior quality was located below this at a depth of c.0.8m.

To the north of T42 two rooms of Structure 63 were excavated. These were originally excavated by Merwin and were labeled Room 6 and Room 8 of Building A. The re-excavation revealed Room 6 (T36) to be a simple unadorned room with access to the north of probable domestic function. Room 8 was more complex with two benches. The earliest was centrally located facing north towards the central access from the north. It was decorated with two sloping feet at either end with an armrest on the western side. Originally a low bench appeared to have been located to the east of this. An L-shaped bench that filled the space between the eastern wall and the central bench replaced this later. Within the northern wall adjacent to this bench were located two niches.

Overview of the Complex

Detailed assessment of the complex included assessment of all available looter's disturbance revealed a far more complex construction sequence than initially thought.

At the front of the complex two twin sets of cells Structure 58 (MA2 and MA4) and Structure 57 (MA10 and MA12) flanked the arched entrance revealed during excavation of T42. These four rooms opened onto the main plaza through doorways either collapsed or unexcavated at present. To the rear of Structure 57, a range of narrow contemporary rooms appeared to have existed revealed at either corner in T42 and LT14. T36 (MA6) excavated this year may also be contemporaneous as well.

A further cell was located to the south of Structure 57, MA16. It was a later addition to the range and seemed to relate to a similar wall located in LT15 to the south. However, the form of the later structure south is unclear at present. The northern wall of MA16 was of similar construction material to MA12 and probably delineates an earlier room between the two (MA14).

Structure 71, revealed during excavations of T40, defined the southern edge of the complex. The extent of this structure at present is poorly defined and may merely relate to a wall with buttress supports designed to enclose the southern court. The central and southern courts have been partitioned by the construction of Structure 60 an east-west range. This appeared later than both Structure 57 to the east and Structure 70 to the west and suggested a departmentalizing of the complex in its latest form. The southern area between the southern and western courts is poorly understood at present. Excavation of the passage (T35) suggests a series of small interlinked domestic structures.

The area to the north of the central court is a complex of small domestic style rooms originally described by Merwin. They are non-symmetrical, of varying form and size and appear to represent a gradual expansion of the area in a minimum of five separate sub-phases. It is presently unclear what the stratigraphic relationships of these phases are. However, broad categorization has been possible.

Structure 62 may relate to an un-numbered structure to the east with a passageway in-between.

West of Structure 62 a series of 6-7 small rooms appear to a stratigraphically later construction phase in two to three corridor ranges.

In the north-eastern corner of the complex are a minimum of two late rooms of poor construction built out over the north of the complex edge.

Structure 62 and the two excavated rooms of Structure 63 (see above) appear to be separated by a small raised court.

Towards the western end of this area a late arch-way (MA22) and Structure 65 located in LT17 appear to bear the same alignment as Structure 43 and may represent part of a construction phase relating the palace building to the domestic range.

The major questions still to be addressed by excavation appear to revolve around establishing the sequence of construction between Structure 43 and the surrounding domestic ranges. A sequence has been established between the Front Range and the palace complex. However, further excavation adjacent to the eastern range is necessary to establish whether this merely relates to the latest phase or earlier sequences exist. The area of northern domestic construction appears to be the key to understanding the relationships within the complex and excavation within this area will hopefully resolve the relationships between the two areas.

In the southern area of the complex it remains unclear how the southern court operated within the whole complex. Access to this court is presently un-established. The nature of the complex of buildings that lie to the west, adjacent to the passage (T35) require further investigation. The relationship between Court III

A and Court III B remains a mystery and clearly the area where the two courts meet needs investigation and may provide clues as to how the two courts interacted.

Figures

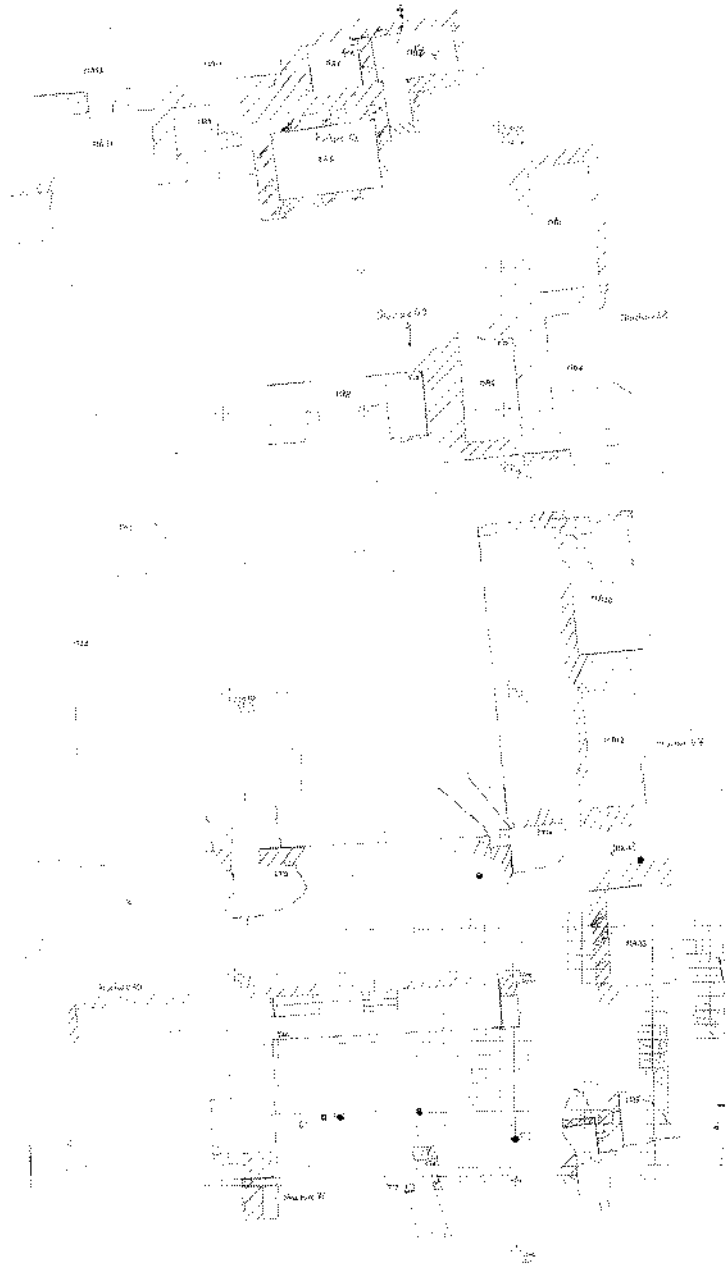


Figure 1. Preliminary plan of eastern half of Group III, C. Hewitson.

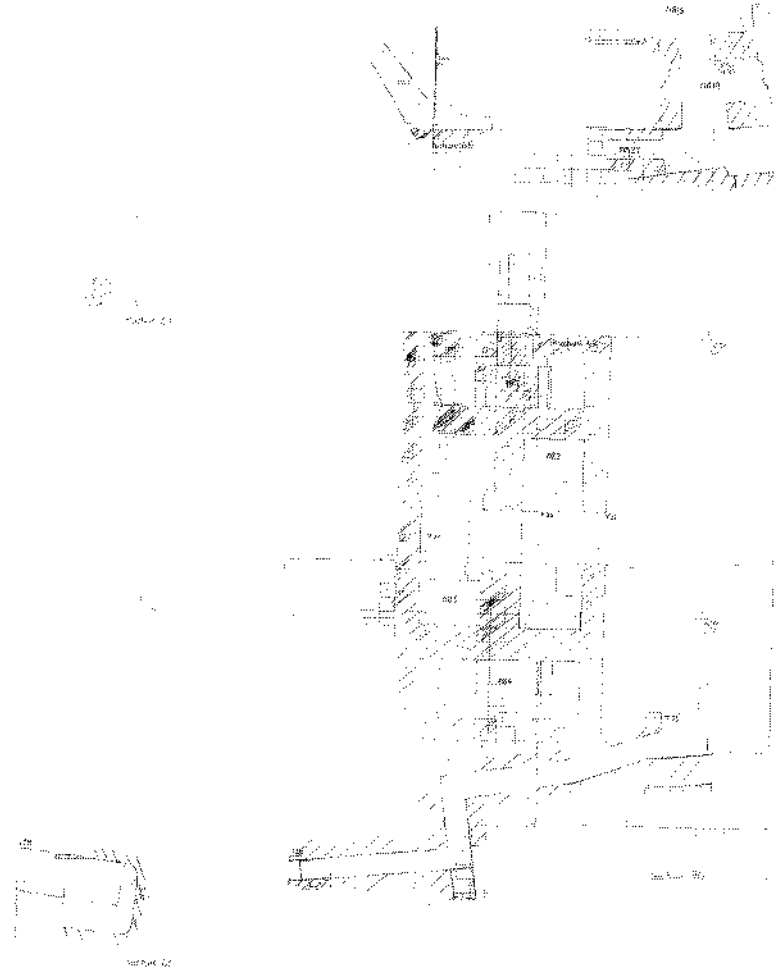


Figure 2. Preliminary plan of western half of Group III, C.Hewitson.

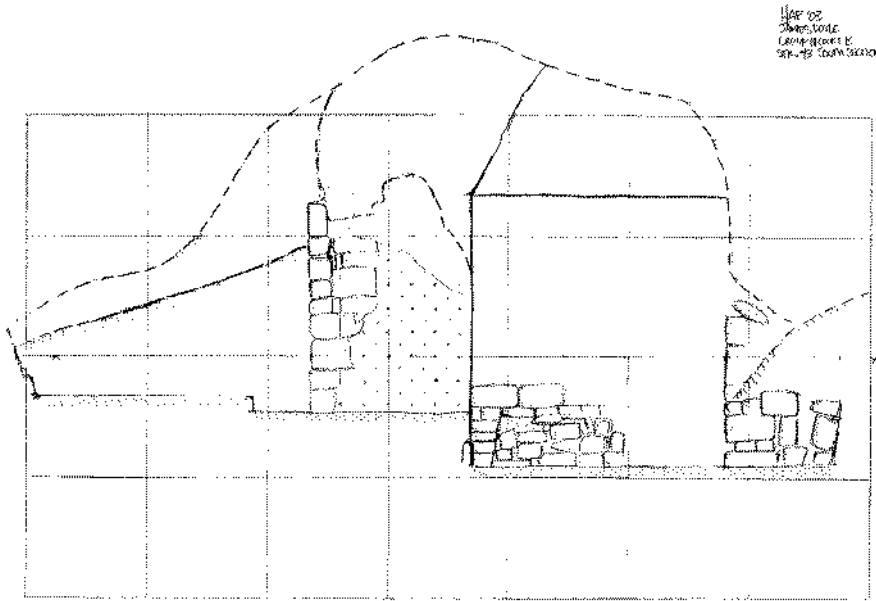


Figure 3 South profile of Str. 43, James Doyle.

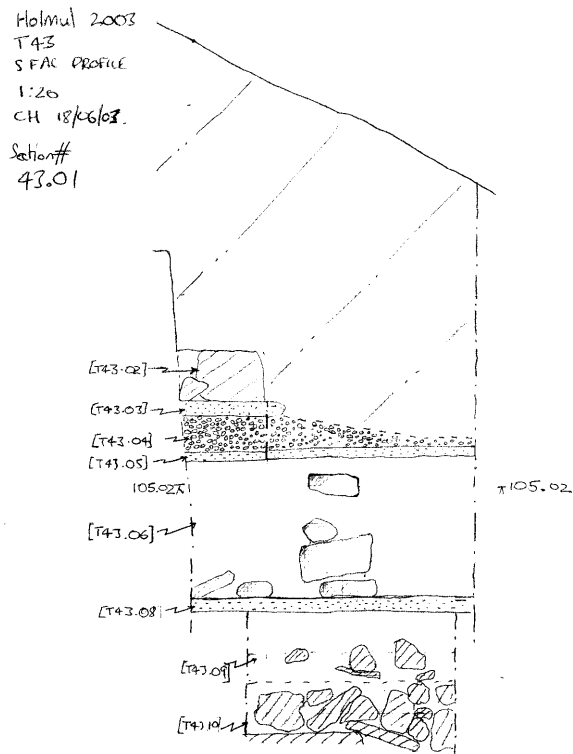


Figure 4 North Profile of HT43 in Str. 43, C. Hewitson

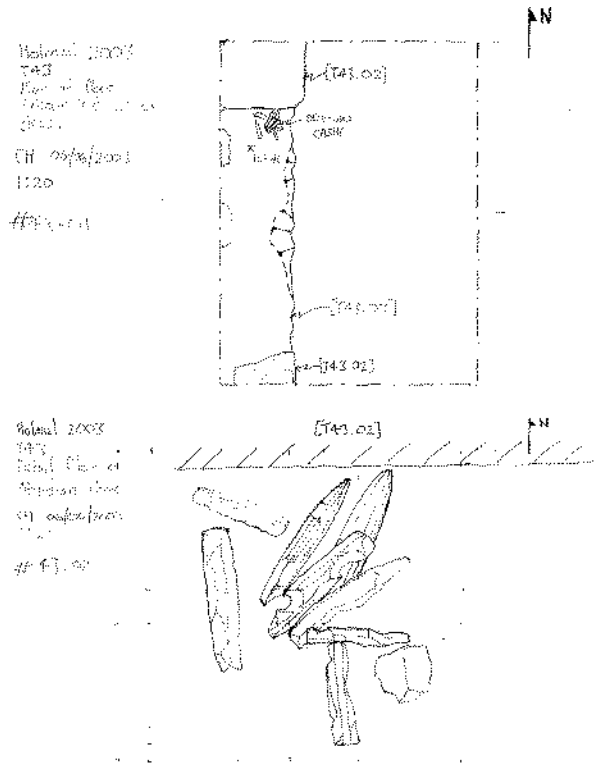


Figure 5. Plans of obsidian cores cache in HT43.

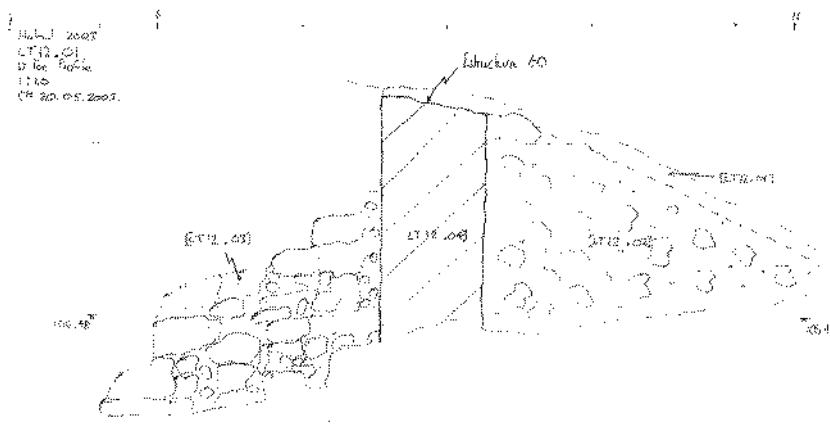


Figure 6. East profile of Str. 60

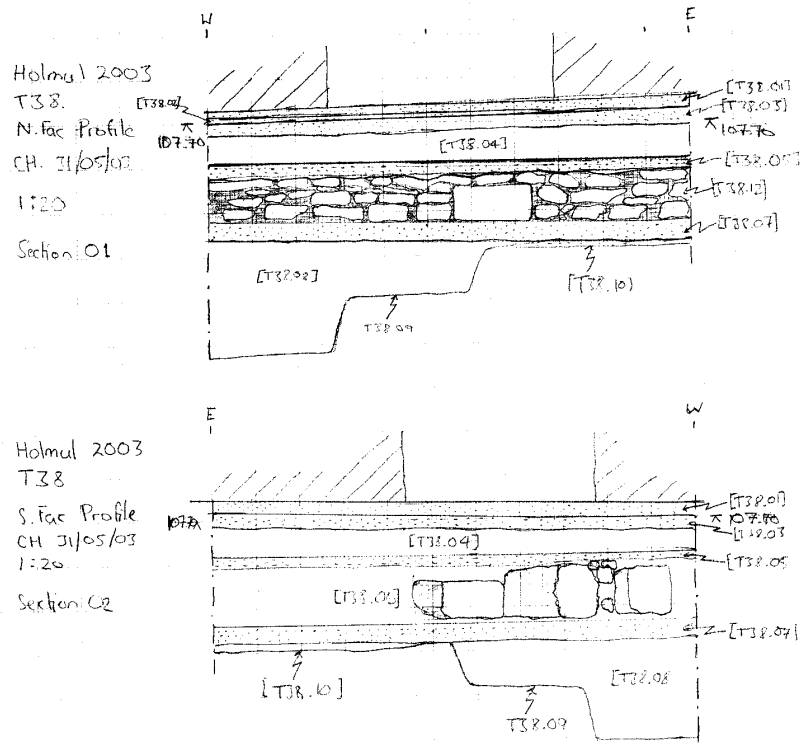


Figure 7. North and South profiles of HT38 test pit in east room of Str. 43.

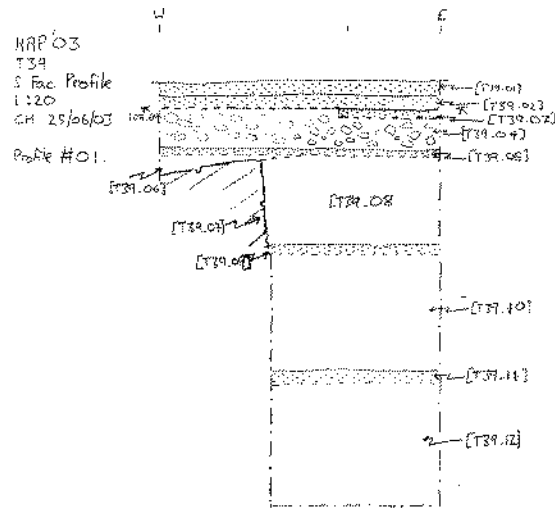


Figure 8. North Profile of HT39 test pit in plaza in front of stairway of Str. 1

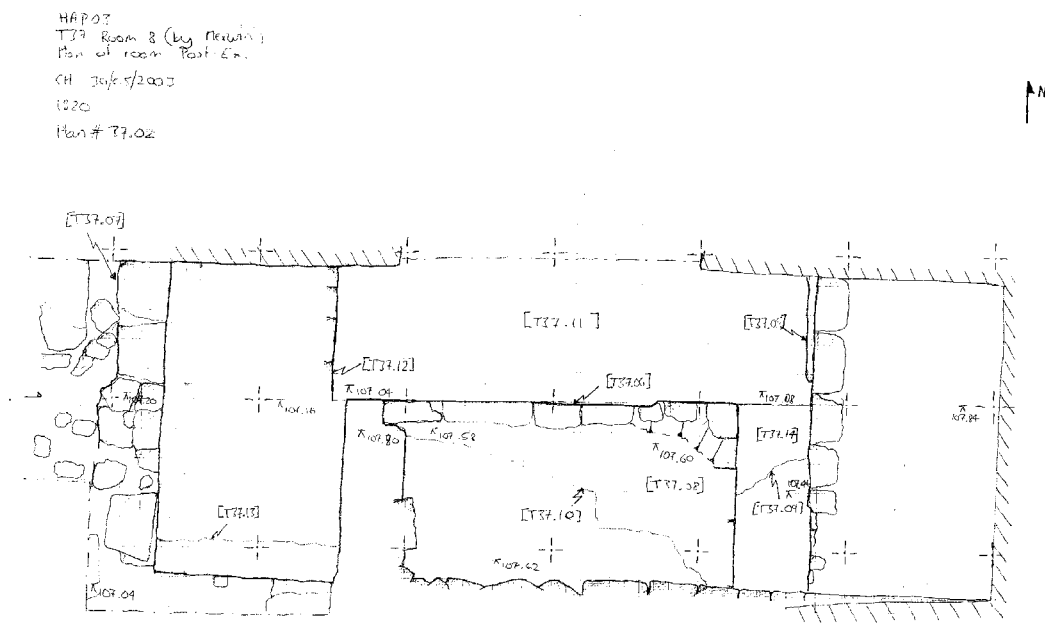


Figure 9. Plan of HT37 in Room 8 building, Group III.

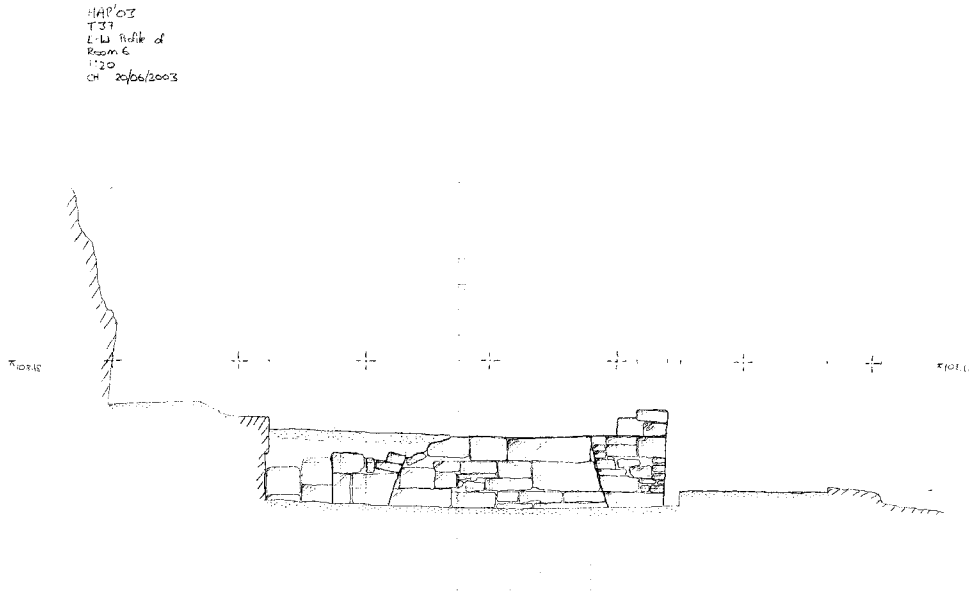
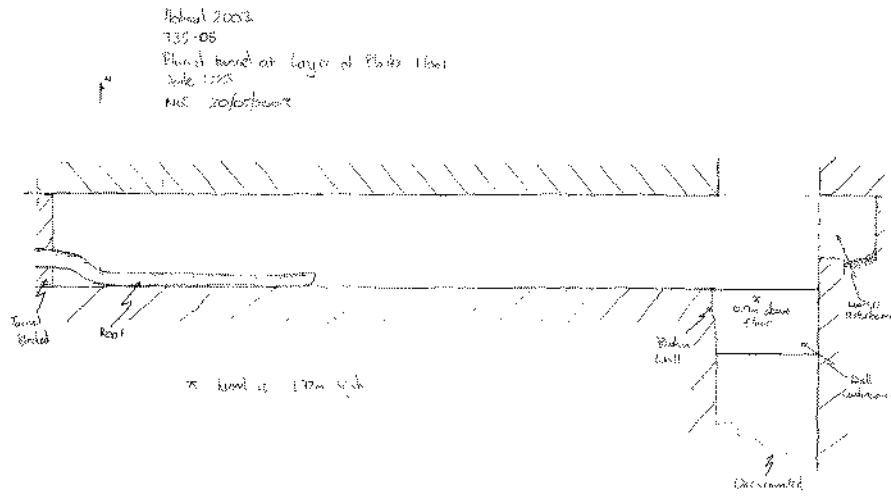


Figure 10. South profile of HT37 in R. E. Merwin's Room 6, Group III



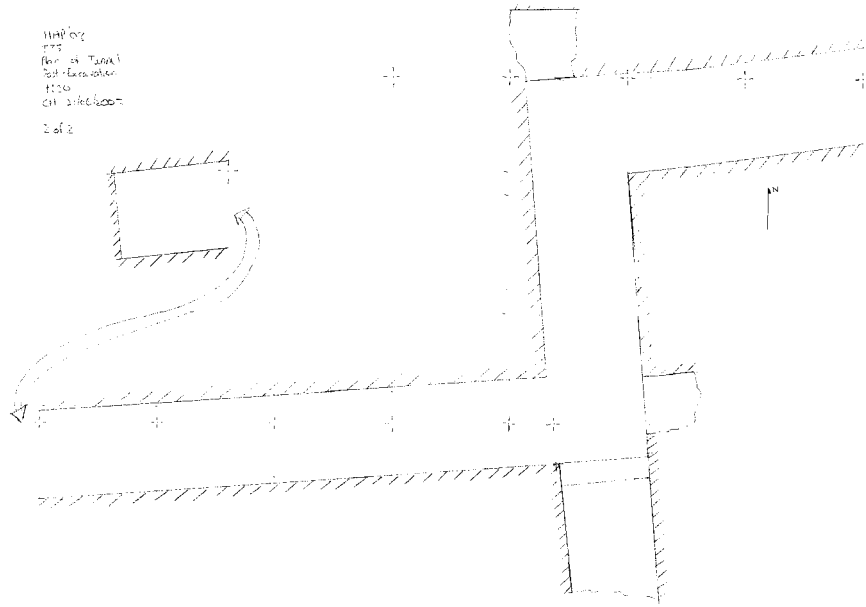


Figure 11. Plan of vaulted passage under Str. 43.

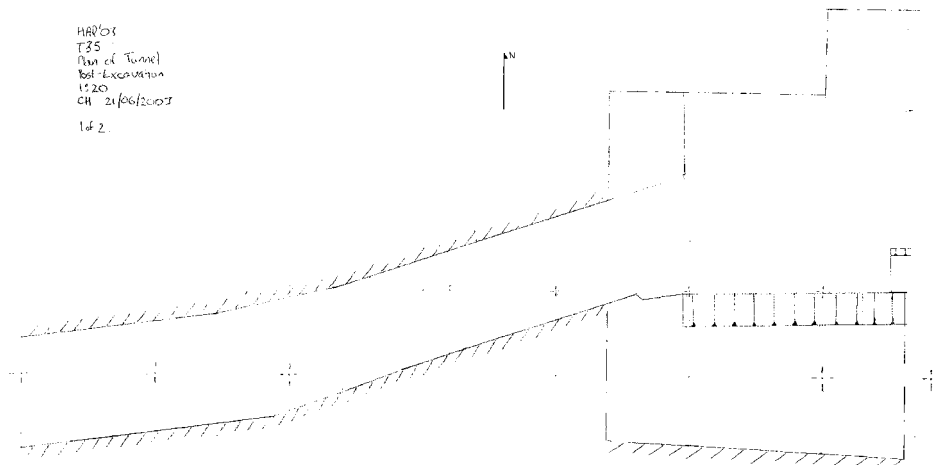


Figure 12. Plan of entrance of vaulted passage under Str. 43.

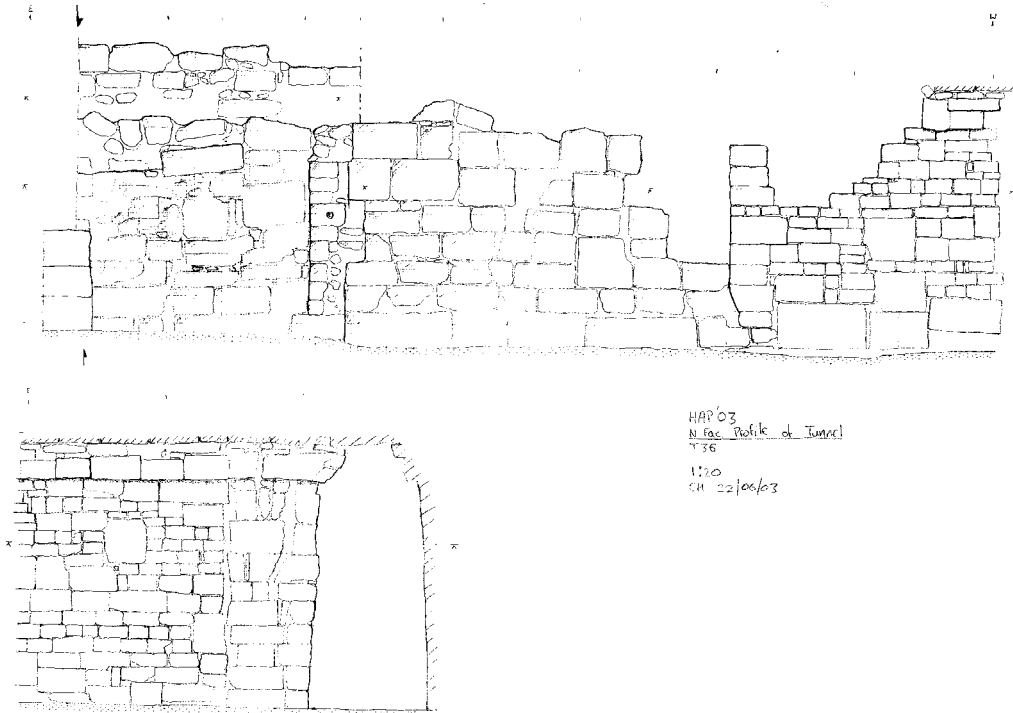
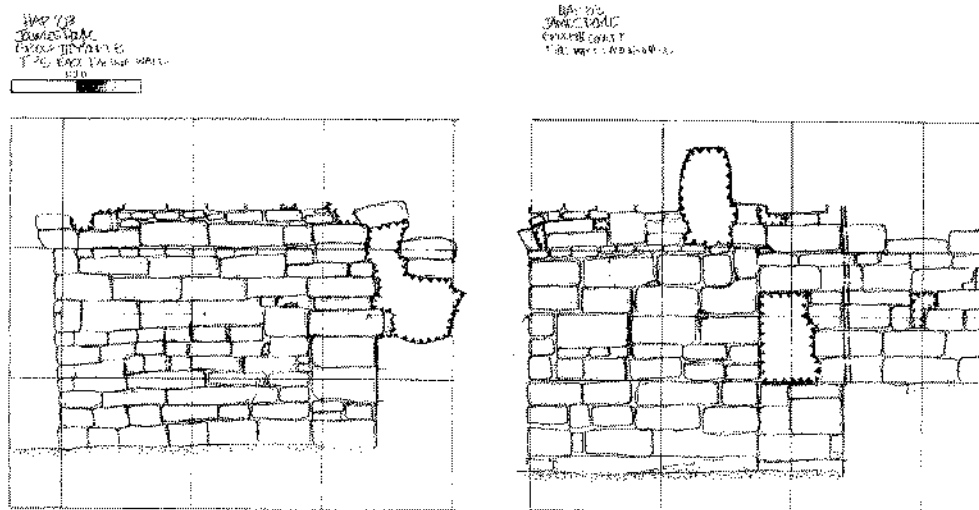


Figure 13. Profile of South wall of vaulted passage under Str. 43 (HT36).



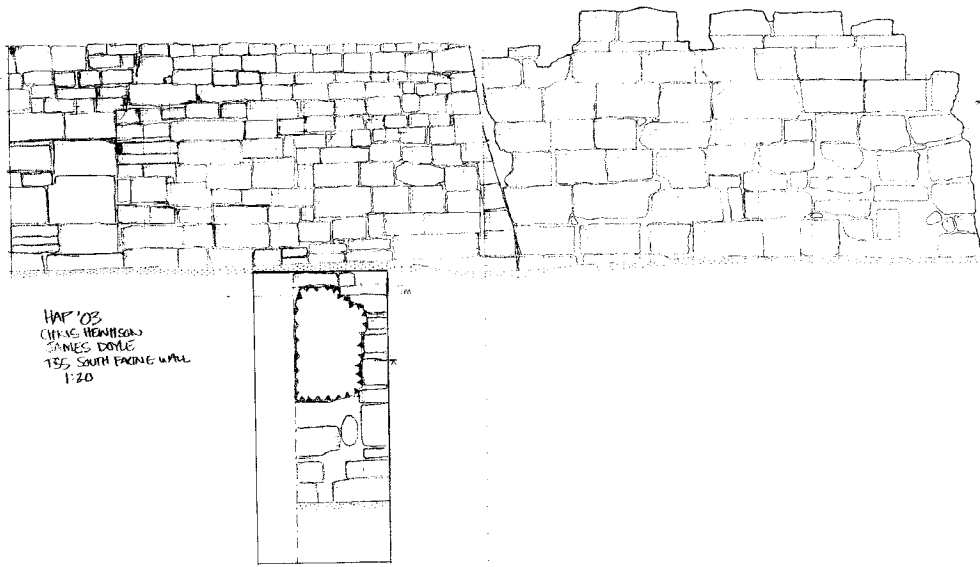
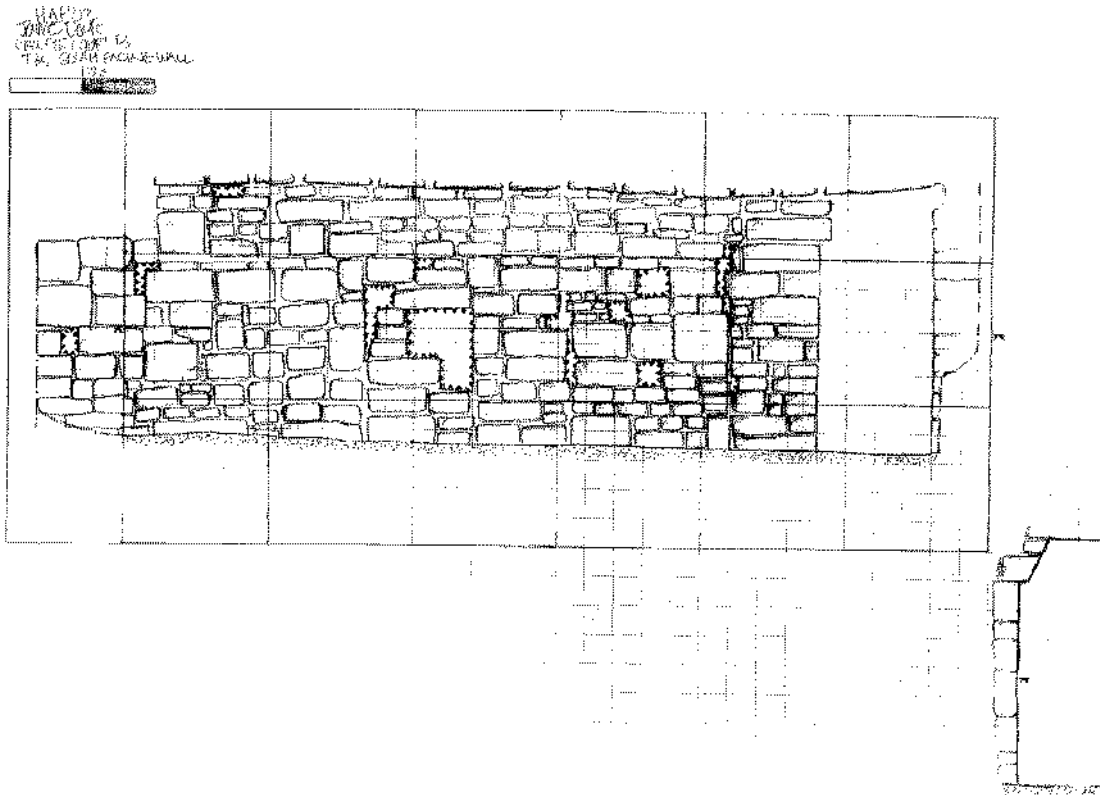


Figure 14. Profiles of wall of vaulted passage under Str. 43 (HT35).



HAP 02
STR. 43
GROUP III
1:25 NORTH FACING WALL
1:25

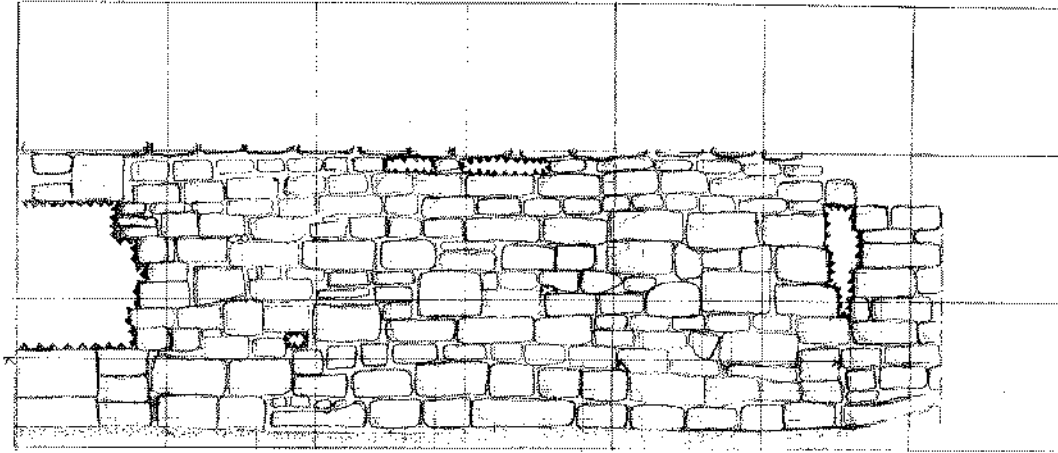


Figure 15. Profiles of walls in vaulted passage under Str. 43.

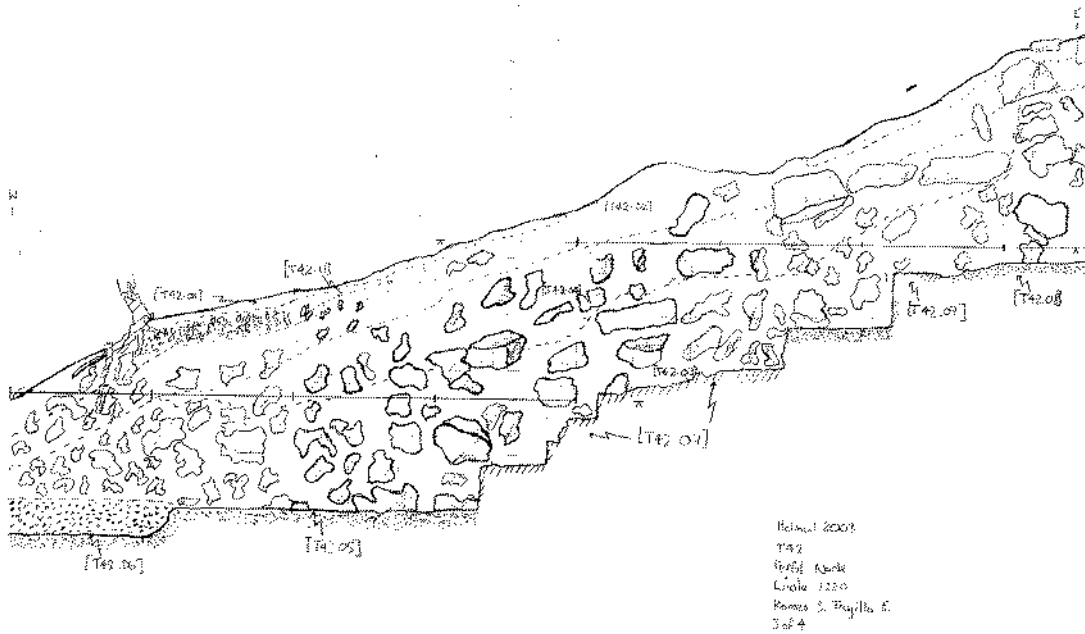


Figure 16. North profile of HT42, stairway into courtyard B.

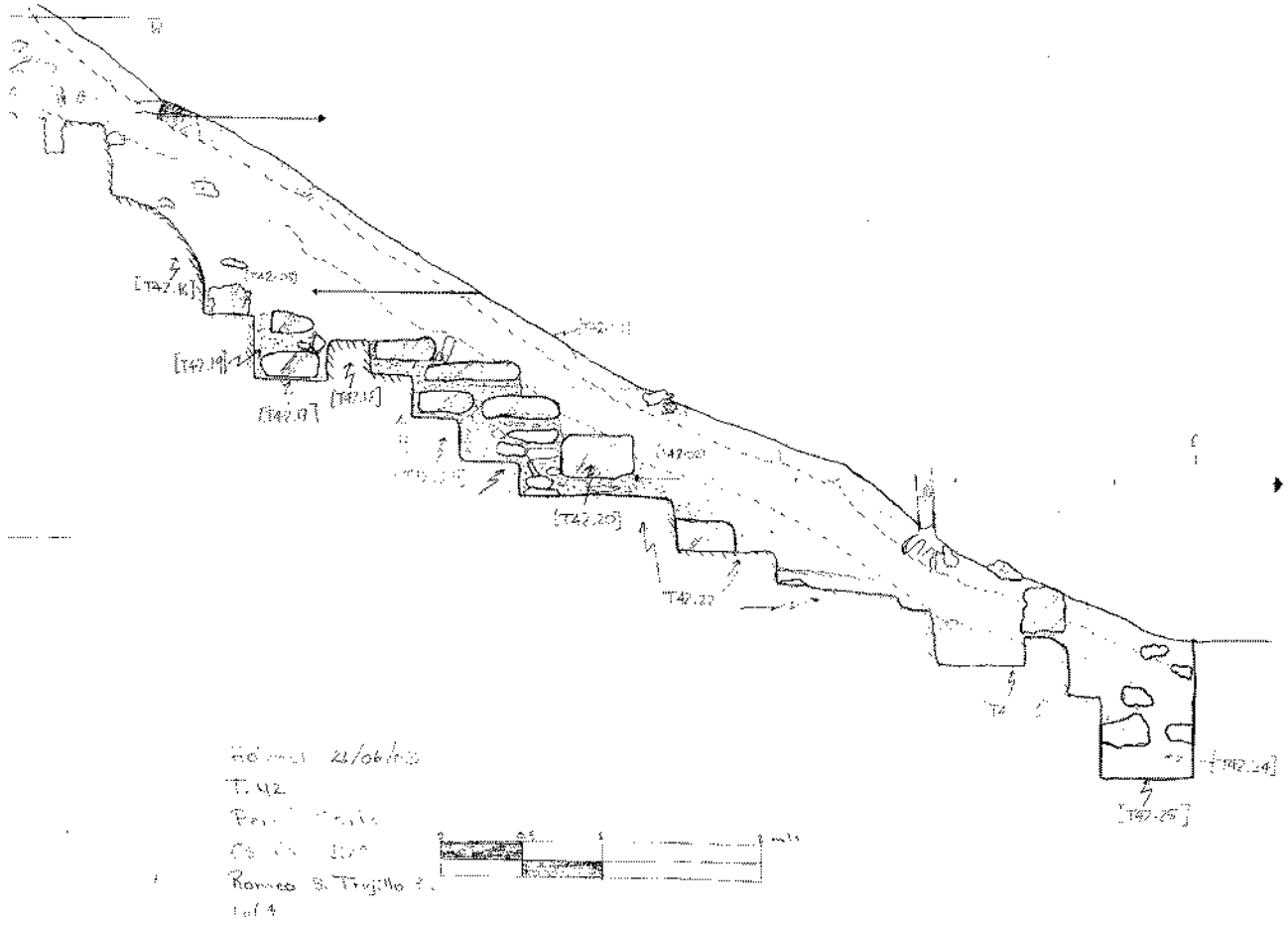


Figure 17. North profile of HT42, stairway leading to Court B from Main Plaza.

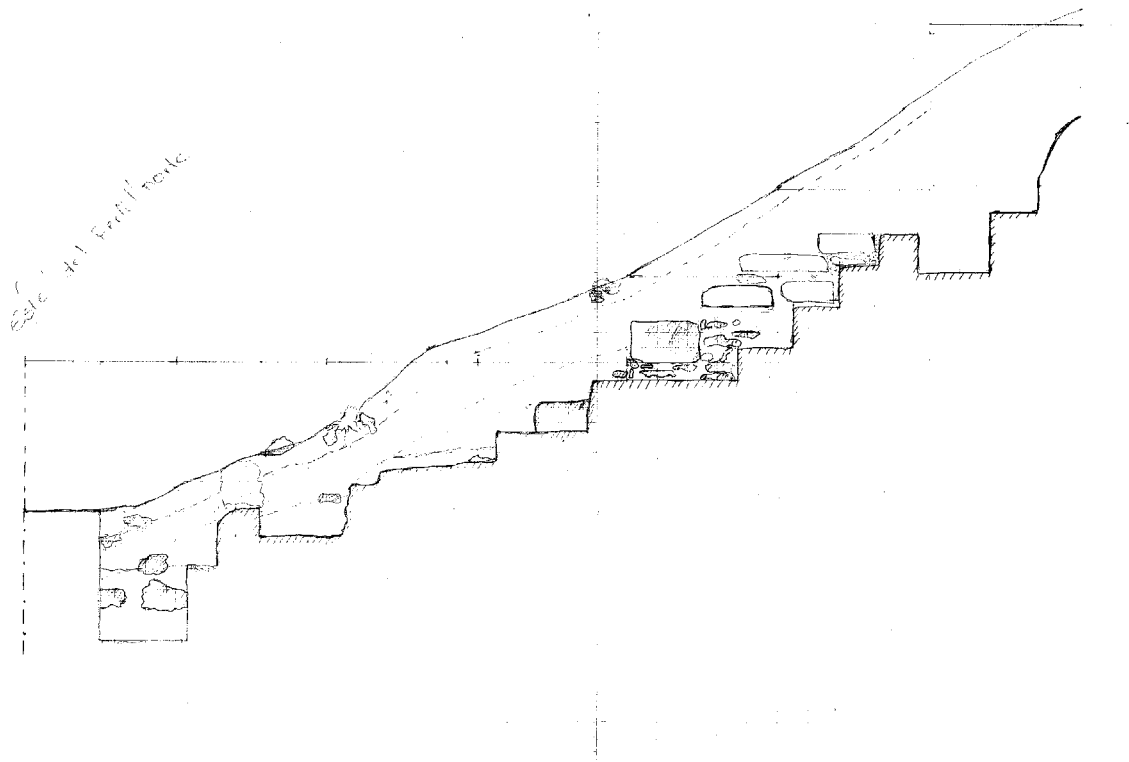


Figure 18. South profile of HT42, stairway leading to Court B from Main Plaza.

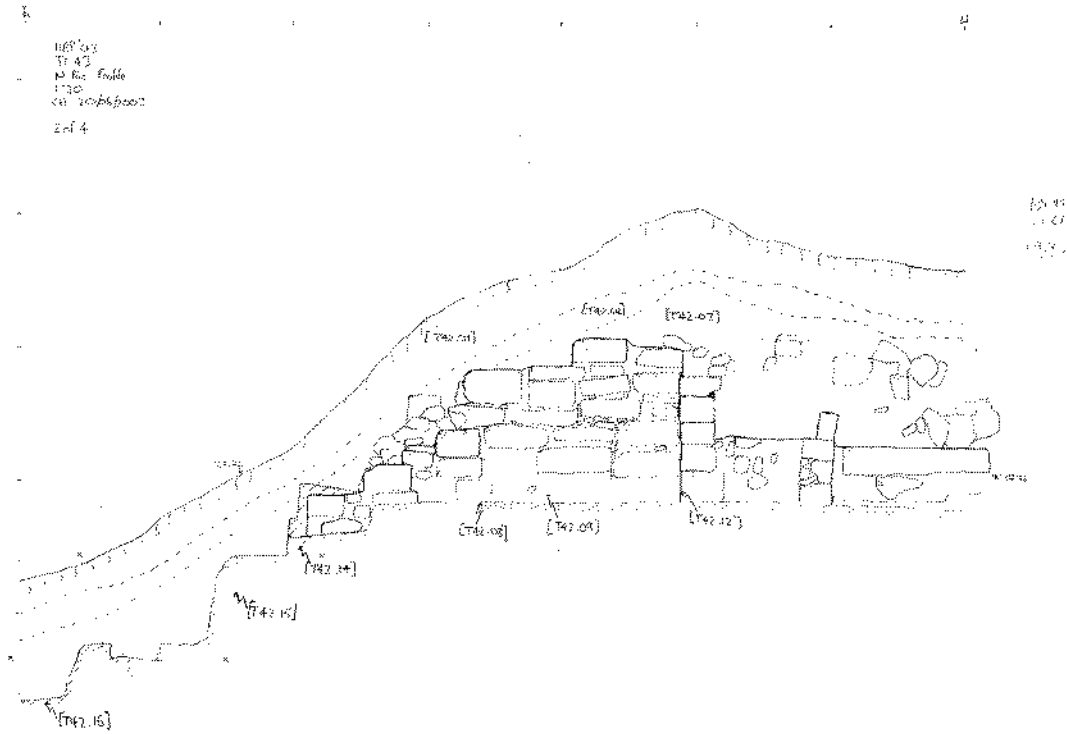


Figure 19. South profile of HT42, upper structure on stairway leading to Court B from Main plaza.

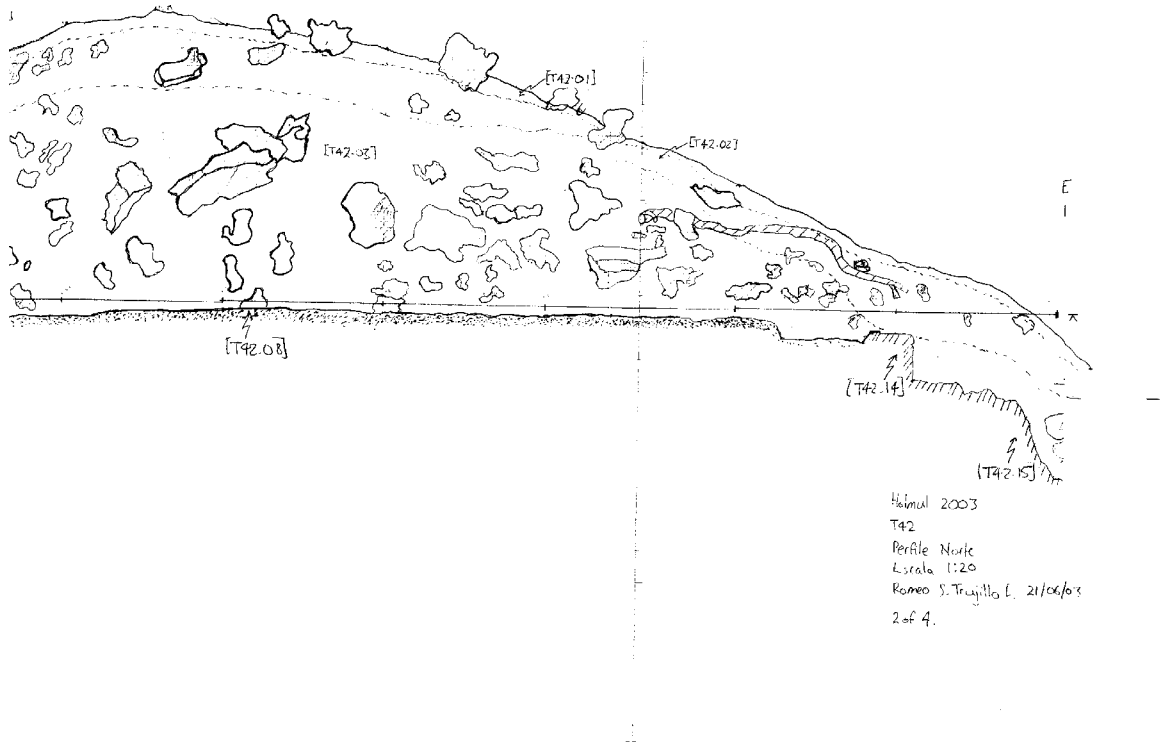


Figure 20. North profile of HT42, upper structure on stairway leading to Court B from Main Plaza.

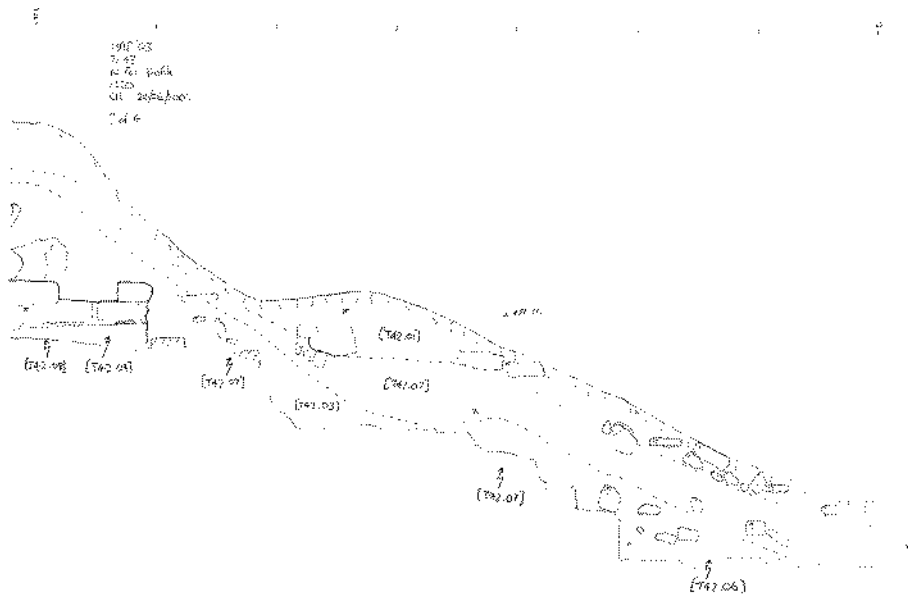


Figure 21. South profile of HT42 (courtyard section), stairs leading into courtyard.

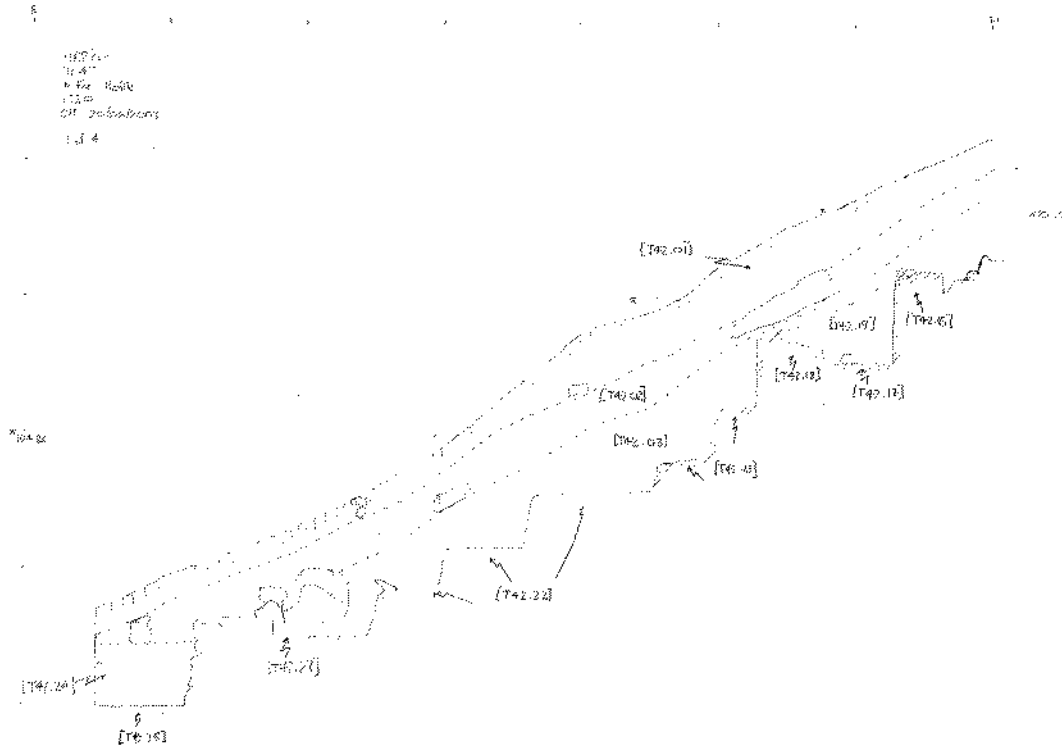
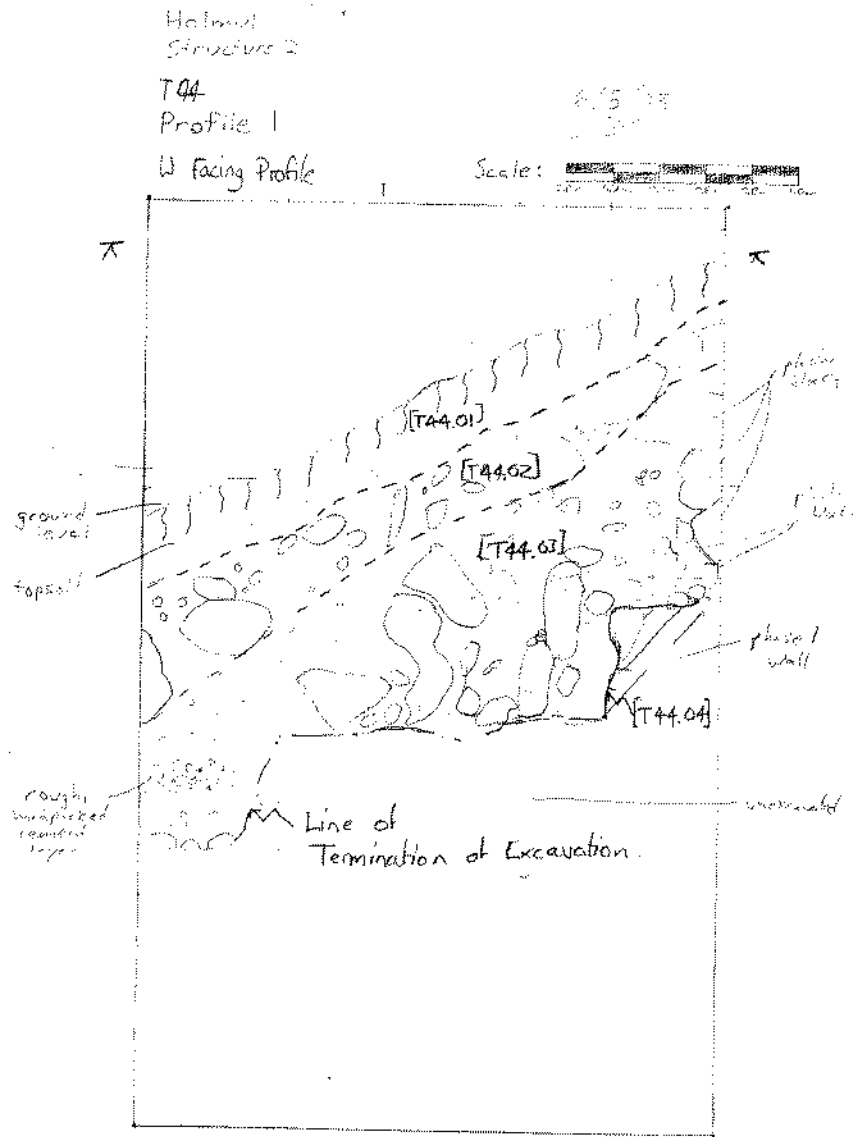


Figure 22. South profile of HT42 (plaza section), stairs leading to Court B.



HOLMUL 2003 REPORTS PART 2

Group II, Building B, Excavation HT41

Niña Neivens

Holmul Archaeological Project 2003

Introduction

The excavation HT41 investigated the construction fill of Room 1, the southernmost room of Building B, on top of the acropolis Group II. This building was excavated extensively by Raymond Merwin, who conducted investigations at Holmul in 1909-1911. His findings are reported in a posthumous monograph authored by him and George Vaillant (Merwin and Vaillant 1932). Building B, Group II was of particular interest to Merwin because it revealed a high number of burials, 17, which included many complete ceramic vessels that he used to create his ceramic chronology of the site. The building has been of particular interest to scholars of the ancient Maya because it revealed several burials from the Protoclassic period. This period occurs in the transition from the Pre-classic to Classic periods and is defined primarily as a ceramic facet which has been argued to exist primarily in burial contexts. Intriguingly, this building is one of few examples of the Protoclassic ceramic phase excavated archaeologically. Mayanists have yet to define exactly why these ceramics first appeared in this area, and its relationship with the Cimi phase at Tikal and Tzakol 1 at Uaxactun. The primary goal of this excavation was to determine the dates of the Protoclassic tombs found by Merwin.

The initial investigations included sweeping the tombs excavated by Merwin in hopes of finding some human skeletal remains that could be dated using the radiocarbon method. Therefore, the backfill left by Merwin was removed to screen for skeletal material. Serendipitously, the excavation uncovered a previously unknown Protoclassic cyst-type burial, providing a new example of the ceramic sphere and ample skeletal material for radiocarbon dating.

Discussion and Stratigraphy

The examination of Building B, Group II, was initially undertaken by Donna Yates, and completed by the author. Donna began by sweeping the floors of the tombs found by Merwin, hoping to reveal some remaining fragments of human skeletal material. Unfortunately, the tombs had been thoroughly emptied when Merwin excavated them. She then began to investigate the area in front of (west) Room 1. Merwin removed the final floor of this room across three quarters of its surface, revealing an earlier plaster floor, he then backfilled this area with the removed building material. Donna opened excavation HT41, which consisted of a trench into this backfill (HT41.01/04) left by the earlier excavations conducted by Merwin. Beneath the backfill she located the earlier floor and noted a cut into it on the central axis of the building, also filled with the earlier archaeologist's backfill. At the base of the backfill left by Merwin was a tin can, presumably left there to identify the extent of his excavations, which rested upon two large cut-stone rectangular slabs. These slabs were removed, revealing the interior of a cyst-type burial, lined with roughly cut blocks and capped by four rectangular blocks which were supported by large upright rectangular blocks placed intermittently within the stone lining. The human remains, Burial 10, HT41.11, were placed in an extended supine position on a east-west axis with the head towards the east, then the body was covered with dirt (HT41.06/08) and the grave filled before placing the capstones over the grave. Donna Yates removed three of the four capstones and the majority of the grave fill, except in the western end over the feet, and discovered a ceramic vessel, Mammiform Tetrapod (HT41.10.02.01) of the Protoclassic period. She then left the project. The excavation was completed by the author. I excavated the grave fill, the Protoclassic vessel, the skeletal remains, and cleaned the base of the grave before closing the excavation.

Conclusion

The earliest context encountered in HT41 is the plaster/mortar base of the grave. This layer was placed in the interior of the building while it was being constructed. Then the stones (HT41.13) lining the grave were placed around the plaster/mortar base, held upright by the surrounding construction fill. Then the human remains (Burial 10, HT41.11) were placed in an extended supine position with the head towards the east. The deceased individual was wearing a necklace including one tubular asymmetrical bead made of jade (HT41.10.06.01) during interment. Then an offering of an unidentified animal bone and an object of perishable material covered in plaster and painted green was placed over the individuals thighs (HT41.09). The Mammiform Tetrapod vessel (HT41.10.02.01) was then placed inverted over these offerings on top of the thighs. A fill containing a high concentration of charcoal was then placed over the body. Then the grave was filled with soil containing some potsherds and other cultural material (HT41.06/08, see site notebook for minor distinction). Finally, the grave was covered by four rectangular cap stones. The entire grave was surrounded and buried by construction fill. Above approximately 20 cm of construction fill a plaster floor was laid across the area, which also serves as the base for the tomb of Room 8, excavated by Merwin. This floor was later covered by another 40 cm of construction fill and covered again by a plaster floor, the final floor of the building's Room 1. In 1911 Merwin made a cut into the floor removing the floor and its fill, from 2 meters south of the western wall of Room 1 to the eastern wall, revealing the earlier floor (HT41.05). Merwin then made a second cut into this floor at the central axis of the building, revealing the three southernmost capstones of the grave of Burial 10. The final event in this stratigraphy was the filling of both these cuts with backfill (HT41.01/04) by Merwin.

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1932. *The Ruins of Holmul*. Memoirs of the Peabody Museum of American Archaeology and Ethnology, Vol. III no. 2. Cambridge: Harvard University

Archaeological Investigations at South Group 1: The 2003 Field Season Results

Justin Ebersole

One facet of the Holmul Archaeological Project (HAP) has been the investigation of South Group 1 and its associations with the site center of Holmul. Excavations initiated last year within the group were continued this year and expanded upon. The objective was to elicit further data about the plaza group and the Maya who lived there: their daily lives, their relations with Holmul proper, and eventually their demographics (as assessed through burial remains). To do this, Trench 28 (T28) was reopened and expanded and new trenches (30, 31, 33, 34, and 45) were excavated by Juan Carlos Pérez Calderón, Justin Ebersole, and Antoline Vasquez. These trenches will be described and preliminary analyses discussed in the following report.

South Group 1

At the basis of this investigation are the mounds of South Group 1. This small site is a cardinaly oriented plaza group located at approximately one kilometer from the site center of Holmul and just west of the south transect datum line. The group contains six main mounds, all less than three meters in height, laid out along the sides of the plaza. Within the barely 30-meter wide plaza are several additional low mounds and a chultun. The entire site was erected on a low hill of limestone bedrock covered by a shallow soil layer. The mounds rest on top of a main basal platform whose truncated surface forms the plaza foundation. A visual investigation of the basal mound suggests that the eastern side was built up to level out the hill for use as a living area. The plaza then fades almost imperceptibly into the western half of the natural hill. In addition to having been shaped by human intervention, the eastern side also appears to have served as the formal entrance into the plaza. This is arguable on the basis of two stelae: one at approximately ten meters from the basal mound's edge and the other directly east at nearly another ten meters. If this is the formal entrance, then steps may be present beneath the surface on either side of Structure 3 (Str. 3), or this structure may itself have been a stairway. Whatever the case, this probable entrance would direct a visitor to face west towards Structures 5 and 6, while being flanked on either side by low range structures. To the north lies Structures 1 and 2 and to the south Structure 4. The focus of the 2003 excavations were directed towards Str. 1, Str. 5, and the low mounds within the plaza.

Trench 30 of Structure 1

Structure 1 was the subject of intensive excavations by Justin Ebersole during the 2002 field season. At that time Trenches 28 and 29 were opened. This year, a new trench, T30, was initiated to the immediate west of T28. It resulted in a rolling excavation that expanded northward (1.5 by 3.5-meters) and westward (2.65 by 2-meters and 3.20 by 2-meters) from the initial 4 by 4-meter trench. The natural strata overlaying Str. 1 here were the same as those exposed in T28 and thus excavation proceeded rapidly. Members of the team utilized trowels, picks, and shovels for soil removal and sifted 100% of the material through ¼ inch screens. All excavations proceeded by using the existing stratigraphy without the need for arbitrary layers.

The result of this work was the exposure of two more rooms (numbers 2 and 3) within the structure, as well as uncovering more of the front terrace, the southwest corner of the building, the western facade, and portions of the front or eastern facade of Str. 6 (see Figure 1 for a general plan of Structure 1).

Room 2

Room 2 is a slightly skewed 3-meter (E/W) by 2.5-meter (N/S) centrally located living space (see Figure 2 for a photo and Figure 1 for the plan drawing). Entered from the south by a 1.16-meter wide threshold, it was the largest of the three rooms. Its floor was plastered and smooth but not perfectly level. Above it, the investigators encountered context 22--a 4 to 24-cm thick layer comprised of very loose, dark-grayish brown silt believed to represent an ash deposit consistent with a living surface. This deposit contained the majority of artifacts and ecofacts found, as well as the greatest diversity of such. This diversity included two chert celts, worked conch shell items, animal bones, painted sherds, utilitarian sherds, obsidian nodules, and charcoal. Moreover, once the layer was removed, it was evident that the floor was penetrated by five cuts (numbers 2, 3, 4, 6, and 7) along the northern and eastern walls. Three of these cuts were investigated. Of the three, two contained human interments. These will be discussed in turn.

Room 3

Immediately west of Room 2 and partitioned by a 52-cm wide wall, Room 3 was the final and smallest chamber in the structure (see Figure 3 for a photo and Figure 1 for the plan view). Excavators removed nearly two thirds of its contents to reveal a rectangular room 1.45-meters (E/W) by ~2.5-meters (N/S). Room 3 was entered via a 68-cm wide door built in the partitioning wall. It was adjacent to the front wall of the building. The threshold is also a step above the actual plaster floors of the two chambers. A second door was further added to this last room. The door was an obvious later addition that was literally punched out of the western wall. It has a width of 64-cm and a thickness of about 68-cm. The threshold is not level and slopes upwards towards the outside of the wall. Beyond this door, a small midden was encountered. It is of note because an entire whitetail deer antler measuring 21-cm in length was found within this context (#30). Room 3 also contained a visible floor cut averaging 80 by 86-cm. Due to time constraints and the suspicion that more human remains lay within, it was deemed unfeasible to attempt an excavation this season. As for the artifacts recovered here, utilitarian ceramics constituted the majority of finds followed by debitage. More importantly, perhaps, a spindle whorl was recovered. Once again, the artifacts were principally removed from context 22 immediately above the flooring.

Structure 6

This mound located just west of Structure 1 intrigued excavators because of its close proximity. Therefore, T30 was extended further in order to catch part of the eastern face of Str. 6 and to ascertain its construction style. The east wall was finally encountered 76-cm beyond Str. 1. A doorway was also exposed. It too had a raised threshold just like the other known doorways. Moreover, the limestone apron around the wall's base is also the same style as that of Str. 1. The last interesting find was the terrace corner. The terrace reaches out 67-cm in front of the door and rises 42-cm above the bedrock of the plaza floor (see Figure 1). The same plaster terrace also formed a narrow alleyway between Structures 1 and 6, suggesting that either a close relationship existed between the inhabitants of the building or that the same people occupied both.

The Interments

Burial 9

Initial excavations down to the floor of Room 2 uncovered a subcircular anomaly in the plaster of the southeastern corner. The floor here was noticeably softer, with roots penetrating it. Excavators immediately recognized it as a floor cut (#2) and began to remove the deposit from the 64-cm (E/W) by 56-cm (N/S) feature. At approximately 28.5-cm below the floor level or 196-cm below datum, the remains of an adult human male were located thereby confirming speculations that this was indeed a burial cut (see Figure 4 for a photo and Figure 5 for the plan view drawing). Fortunately, the level of preservation was better than expected despite the natural destruction of the cranium and pelvis. The bones remained largely articulated. As a result of this, it was assessed that the individual was interred intact, on his left side, and in a flexed position. His head pointed westward while his face gazed northward. From the mandible and adjacent area, many teeth were recovered. Several of the teeth were incisors displaying the characteristic shovel-shaped lingual surface common to Native Americans. Two of these incisors were also modified by human means. One of the two, a central upper incisor, revealed a modification that suggests that the individual had his two central upper incisors filed to form a T-shape. This was perhaps an attempt to mimic the T-shaped tooth of the sun god Kinich Ahau. Based on this, it appears reasonable to assume that this Maya was a person of considerable standing within his social sphere. There were not, however, any mortuary items to support further claims, though a fragment of carved bone was associated with the stratum. After the removal of the bones, the rest of the deposit was excavated down to an earlier plaster floor layer (Context 21) at 224-cm below datum or 66-cm below the upper floor. In total, the burial resided within an 18-cm thick layer of soil (Context 20).

Burial 14

The second burial to be removed from Room 2 was number 14 (see Figure 6 for the photo and Figure 7 for a plan view). It was located in the northwest corner. Originally, this cut was labeled #4 and contained large sections of an olla rim and body within the fragmented and soft plaster that once capped the burial (see Figure 8). As before, it was this difference in plaster along with the presence of root penetration and large cobbles that enabled investigators to easily recognize the feature. The cut was given the Context #32. The fill within the 94-cm (E/W) by 80-cm (N/S) feature was excavated as Context #33. The first bone material to be encountered emerged at a depth of 209-cm below datum or 24-cm below the floor. As with Burial 9 this individual was found rather well preserved, largely articulated, and lying in a flexed position on his/her right side. The remains revealed that this person was also laid to rest with his/her head to the west. This time, however, the face looked south. Despite the differing position of the face, the burial

was altogether strikingly similar. The preservation was also nearly the same, for in both cases the crania and pelvis were destroyed by collapse. Both individuals were flexed and laid such that their spines were adjacent to the walls and their faces gazed into Room 2. They both lacked definitive grave goods. And lastly, they were both buried after Structure 1 Phase II was completed. It is further thought that Burial 14 represents an adult male based on the protrusion of the chin. The last of these bones came out at a depth of 223-cm below datum or 38-cm below the floor. Once again excavations continued down to the earlier stucco floor (Context 34 in this cut), which is the same floor found in cut 2 (Context 21), and then proceeded further down to sterile bedrock.

Feature 3

Feature #3 came to light when an extension trench was added in order to verify the location of the back wall of Str. 1. Once located, this feature, which was recognized as a floor cut (Context 23) was excavated in the belief that it too would contain a burial. Oddly, human remains were never found in the fill (Context 24). What was found was the stucco floor of the earliest phase of Str. 1's construction as well as an apparent posthole (Context 26). The posthole was carved directly into the bedrock (see Figure 9 for a plan view and profile). Both of these features are at a depth of 230-cm below datum or 66-cm below the floor of Room 2. The plaster floor (Context 27) extends a further 3-cm down and is once again the same as Contexts 21 and 34. The floor abutts against the bedrock containing the 23-cm deep semicircular (21-cm by 20-cm) hole. This discovery proved to be the most definitive evidence for the presence of an earlier phase of construction for Str. 1. It was also possible to speculate that this previous building was constructed with mostly perishable materials, perhaps as a wattle and daub design. Unfortunately, the artifacts associated with it were rather sparse and may limit temporal dating. To alleviate this problem, a soil sample was taken of the deposit (Context 25) just below the floor and within the hole. A radio carbon analysis should be possible as this layer contains ash.

Trench 28

One of the last objectives remaining after the completion of T30 and the exposure of the western portion of Str. 1 was to uncover the rest of the eastern front facade. In order to do this, T28 had to be reopened, cleaned, and then extended eastward via a 2 by 3-meter unit (see Figure 1). The excavators followed the terrace and front wall seeking a terminus. In so doing, it was soon ascertained that the terrace continues onward connecting up with Str. 2. Here, it serves the same function of a basal platform. More importantly, the southeastern corner of Str. 1 was located thereby enabling an accurate measure of the length of the building: 10.40 meters (see Figure 10). In the process of seeking this information, two mano fragments and two complete obsidian blades were recovered from context 3 above the terrace. The majority of other artifacts found included the prevalent utilitarian ceramic sherds, many of which came from Context 3 just above the plaza surface.

Conclusion: Structure 1 Reappraised

After two seasons of investigation at Str. 1, excavators have been able to provide a detailed description of the structure as well as a concise history. Of equal importance, it has been possible to significantly revise previous notions about Str. 1.

In terms of the history of the edifice, two construction phases are now known. Both date to the Late Classic. In Phase I the building was erected directly on limestone bedrock. From Trench 30, Floor Cut 3 evidence in the form of an apparent posthole suggests that the Phase I version had pole walls. These walls were possibly a wattle and daub construction style supporting a thatched roof. Inside, the Maya laid a layer of plaster directly over bedrock to form a leveled living surface. The dimensions of this first building are undetermined, but the flooring does extend from Floor Cut 1 in Room 1 to Floor Cut 4 in Room 2.

The structure that remains today represents the Phase II construction completed during the Late Classic. To build this final phase, the Maya retained the Phase I flooring as a foundation. On and around this the front terrace and major load bearing walls were erected. They then commenced to place varying depths of dirt and rubble fill as a core for the new structure's basal platform and internal flooring. The inside fill reached a final depth of approximately 60-cm before a 4 to 6-cm thick plaster floor surface was installed. With the floor in place, the major external walls could be continued upwards to form a vault. At the same time, two interior walls were raised to provide support for the heavy vault and also to delineate three chambers. The end result of this second phase of construction was a 10.40-meter long by ~3.64-meter wide box-like building complete with two doorways and a front terrace.

Within the building, the Maya had established their three rooms for daily usage. The first room on the eastern side has an estimated length of 3.28-meters and a width of 2.54-meters. It was entered through a single doorway 1.39-meters wide. A large bench occupied the majority of this room. It rises 60-cm

above the floor and extends 1.82-meters to the back wall. In front of the bench, nestled within the southwestern corner of the room, the Maya interred human remains. This was discovered in the 2002 field season and labeled as Burial 8. The presence of the burial seems to indicate that this room was for daily human occupation. If the bench is added to this assessment, then there is a real possibility that the room functioned as a sleeping quarters.

The second room exposed by Trench 30 appears to have a very different function from the first. Given its large size, absence of a bench, central placement within the building, and its direct connection to Room 3, it is arguable that Room 2 was the main activity room. Context 22, which was the layer of ashy soil denoting a living surface, supports this. Just what activities occurred cannot be definitively proven but food preparation and cooking are possible because of the discovery of animal bones, utilitarian ceramic wares, and two celts.

Similarly, Room 3 likely had a related function, perhaps as a preparation room or even temporary storage. The ceramics here were all utilitarian. Interestingly, a spindle whorl was removed from Context 3 inside this room. No other weaving paraphernalia were located and so it cannot be suggested that this room functioned solely for such. The fact is, the floor of this chamber was largely devoid of artifacts.

All three chambers unfortunately lacked definitive evidence for any specific activity aside from perhaps sleeping in the first room. But the inability to delineate specific activity areas rather confirms the general-purpose nature of these rooms. Future excavations within adjacent structures may help to solve this question of room usage.

The last issue concerning Str. 1 is its proximity to Str. 6. It appears plausible that Str. 1 served as living quarters for a group of Maya, perhaps a family. It would also seem likely that Str. 6 functioned in the same or very similar manner. This inspires several questions: 1) Did each structure house a single family, extended family, or simply a group of Maya?; 2) If families did indeed occupy these structures, were they related and how, or did a single family occupy both units?; and 3) What kinds of relations can be surmised as existing between the Maya living in Structures 2 through 5 if these also are verified as living units? Once again, future excavations will need to address these issues. In the mean time, excavators are confident that Structures 1 and 6 were likely affiliated units, especially since they shared the same terrace and had doorways approximately 5 meters apart from one another.

Trench 31

The second major unit opened during the 2003 season was T31. Under the supervision of Antolin Vasquez, this trench was centrally located in the southern portion of the plaza. T31 was a 4-meter (N/S) by 3-meter (E/W) trench laid out over a low mound. Excavators agreed that the barely one-meter tall mound warranted investigation because of its odd position within the plaza, its adjacency to the much larger Str. 5, and the presence of many rocks upon its surface. These traits combined led to the suspicion that the mound might represent a Terminal Classic reoccupation of South Group 1.

As excavations commenced it soon became evident that this mound was not commensurate in form with Str. 1. The architecture was noticeably different. At approximately 10-cm below ground level two walls were located. These walls demarcated the southern side of a house and proved to be more crudely constructed than Str. 1. The walls still exhibited the general tendency towards cardinal orientation, but unlike Str. 1 each displayed a greater degree of error in direction. Moreover, the walls of this newly discovered room had a doorway set in the southeastern corner rather than being centrally located, with respect to the room, as seen elsewhere on site. The doorway was also awkwardly narrow at 44-cm wide. An additional difference was the fact that the plaster floors were quite thin, barely 3-cm thick. All of these attributes suggested a rather shoddy structure comprised of a low foundation wall supporting some type of perishable superstructure (see Figure 11 for a general photo and Figure 12 for a general plan view).

Further work just south of the walls revealed that the structure was set on top of multiple construction layers used to level the contoured bedrock basement (see Figure 13 for a profile of the layers). A total of four layers of leveling fill were noticed below the plaster flooring. These strata were not excavated but merely observed in profile from a cut. At the base of the cut, where the fill meets the bedrock, the Maya established a small midden. They exploited a natural depression in the bedrock to dispose of ash, carbonized material, ceramics, and debitage (include burned debitage).

Additional discoveries in T31 included a probable wall along the eastern edge of the unit. This two-meter long row of limestone blocks terminated in a well-dressed, 40 by 50-cm block. This probable wall links up with the remaining plaster floor of the existing room. To the south of the large block excavators encountered three massive chert quadri-face tools (the longest is 29 cm). By all appearances, their stacked arrangement suggests that this was a possible cache (see Figure 14). Root disturbance,

however, is also likely.

With the completion of this primary unit, an additional 10.5 by 1-meter test trench was ran northward from the northwestern corner (see Figure 15 for a plan view and Figure 16 for a profile). The intention was to gain a cross-section of the plaza and these mounds so that further architecture could be viewed. The test unit uncovered a total of four more walls and three plaster floor surfaces (see Figure 17 for a general photo). These walls and floors were all contemporaneous and confirmed the presence of at least two adjacent structures. A 40-cm wide alley-way or channel separated them. The walls fronting this channel exhibited considerable care in construction (more so than the first walls in T31) and ran east/west. On either side of the walls were plaster floors. The floor to the north extends about 1.20-meters before terminating in a cut. At the base of this 44-cm deep cut, where fill meets bedrock, excavators uncovered an articulated human foot and lower leg. This became Burial 15. Oddly, no wall bearing east/west exists to the north of the remains to suggest an enclosed room. There is, however, a north/south bearing wall (Context 16) along the east side of the trench. It begins 50 cm beyond the east/west bearing wall (Context 15). This 50-cm gap was identified as another narrow doorway. Unfortunately, the test unit still did not allow for the demarcation of definitive houses, only walls with undetermined associations. The situation was further complicated by the discovery of another find: Burial 12. This interment was positioned adjacent to wall Context 16 at roughly 30-cm above bedrock. A formal burial cut was never identified around the bones.

The last major find was two cubes of soft, white limestone. Each was incised with ~4-cm wide bands such that the stones had the appearance of wrapped presents. The objects, which possibly represent weights, were removed from soil Context 25, where they were found as a pair adjacent to wall Context 16. No floor was associated with the two.

Burials 12 & 15

Evidence of human remains was prevalent throughout T31 and its extension. The initial 4 by 3-meter unit revealed several teeth and many bone fragments within Context 2. The poor condition, high degree of fragmentation, and general scattering of the bone caused excavators to refuse acknowledgment of it as a true burial. The northern extension, on the other hand, proved more conclusive, offering two genuine interments (see Figure 15).

The first to be discovered was Burial 12 at a depth of 1.25-meters below datum or 55-cm below ground level. The poorly preserved remains were adjacent to a well constructed wall (Context 16) built directly on bedrock. The unsexed individual was incomplete and not within a recognizable burial cut (see Figure 18 for a photo and Figures 19 and 20 for plans). Despite this, many bones were identifiable and their positions suggest that the body was still intact when interred. The head of this individual was placed to the south with the spine apparently to the west. Excavators believe, however, that the person may have been buried with his or her face downward based on the position of the mandible and remaining cranial fragments. Lastly, no grave goods were recovered in association with the remains.

The last burial to be observed in the 2003 season at South Group 1 was number 15. Workmen located it at a depth of 1.56-meters below datum or 1.34-meters below ground level. Only a foot and part of the lower leg were observed in the northern extension. They were directly on top of limestone bedrock within Context 25 and may be associated with the apparent cut in the floor, Context 18. Given the bone placement, the body probably lays in an east/west direction with the head to the west. The excavators chose not to further disturb the burial this season because of a lack of time.

Conclusion: T31 in Context

The architectural remains discovered in T31 provide evidence that South Group 1 was subject to a reoccupation by the Maya at some point in the closing years of the Classic Period. This is an important find as it reveals a longer, more complex history concerning the group. If confirmed as a true reoccupation then South Group 1 underwent three major phases of construction. The first two, as revealed in Trenches 28 through 30, likely date to the Late Classic Period. The third, dating to the Terminal Classic, is now hypothesized based on the findings in Trench 31. Ceramic analyses and carbon dating will hopefully support this conclusion. Even without such data, the architectural style, construction methods, and building location hint at some measure of cultural change or at least a deviation from the Maya who originally occupied Str. 1. For example, these structures are comprised of smaller blocks; they lack apron stones around the foundations; and they exhibit more error in orientation towards the cardinal points. Moreover, the buildings were not vaulted. Instead, they likely had walls and roofs of perishable materials set on a stone foundation. The fact that these mounds were also built within an existing plaza group further suggests a reoccupation. These later Maya were, in a sense, squatters who seemingly took advantage of

existing structures by utilizing materials (i.e. blocks) from them to build new homes or by literally reoccupying the abandoned buildings. Both of these behaviors are plausible. In the case of the first, many of the blocks used in the construction of the latest structures are smaller than those found in Str. 1. This is perhaps evidence of recycling building materials. In the second instance, the doorway added to the west wall of Room 3, Str. 1 is not in keeping with the architectural style. It was a later addition and was literally just cut through the wall. Its function was apparently to allow access to a new, small midden deposited in a tumble layer and not on any floor surface. This suggests that enough time elapsed prior to reoccupation and the beginning of the midden to allow for some erosion of Structures 1 and 6.

In essence, then, T31 uncovered structures seemingly inconsistent with the rest of South Group 1. It revealed a wholly unexpected chapter in the history of South Group 1. Excavators hope to further define this history by delineating more of the mounds and verifying the likelihood of this hypothesis of reoccupation by a new group of Maya.

South Group 1 In Perspective

As of the end of the 2003 field season at South Group 1 excavators are growing ever confident of the beneficial knowledge to be gained from these ruins. Future objectives are being modified to better address the questions being generated about the group. It is our objective to excavate every structure within the group. From this, better assessments of the functions and construction phases of the various rooms and units will be possible. Special interest will also be directed at the Terminal Classic reoccupation of the group subsequently discovered during the 2003 season. We seek, therefore, a greater understanding of the daily lives of these Maya of Holmul and what differences there may exist between the Late Classic and Terminal Classic peoples. Further objectives include in depth burial analyses, with the hopes of demographic studies as well as testing the degree of relatedness between the human remains from the various structures and time periods. Lastly, we desire to preserve the archaeological remains of the group as they presently stand and may one day be capable of consolidating it for the benefit of possible public tourism at Holmul, that they may see a prime example of a plaza group preserved in the jungles of the Petén.

Introduction to the Excavations at Cival, Petén Guatemala: Season 2003

Jeremy R. Bauer

The investigation of the Preclassic minor center of Cival, located within the Holmul Archaeological Region, continued during the 2003 field season. Previous field seasons in 2001 and 2002 saw the continuation mapping program by Marc Wolf, the discovery of an early dynastic stela (Estrada Belli 2003b), and the realization that much of the site's architecture dated to the Preclassic period (Estrada- Belli et al. 2003a, Estrada-Belli et al 2003b, Estrada Belli et al 2003c). All of the efforts expended in these previous two field seasons, suggested that Cival was an important center of chiefly or dynastic power within the Holmul Region during the Preclassic period, and that it likely served as the seat of power for the region. Due to these discoveries, we sought to elucidate more of the history of Cival in order to understand its role in the formation of more secular rule at Holmul center during the Terminal Late Preclassic period (see also Estrada-Belli this volume and Neivens this volume), and its role in interregional exchange networks of goods and ideas. We also wanted to expand our understanding of the settlement of Cival through continued mapping in the periphery. To these ends, our continuing research in 2003 focused on several key objectives:

- 1) Continue the mapping program in the site center and into the hinterland surrounding Cival. Site center mapping continued with the explicit purpose of assessing the correlation between Ian Graham's 1984 map, and Wolf et al's recent map. Hinterland mapping sought to gain a greater understanding of the time frame and scale of the settlement supporting Cival.
- 2) Investigate and record the numerous looters trenches that penetrate the structures at Cival with the intent of understanding of each looted structure's chronology
- 3) Open test excavations to determine the chronological placement of stelae in order to understand the site's monument chronology.
- 4) Continue investigations on the summit of the large Triadic Group-One. Earlier research showed that the majority of the construction on the summit dated to the late Preclassic period. We hoped to continue excavation of sealed (not looted) deposits to thoroughly access this assertion.

At seasons end, we have completed all of these objectives. The mapping program has remapped a large portion of the site center including the E-Group assemblage and many of the structures located to the west of it. Wolf and crew have now completed a holistic and corrected map of the site's center and are processing the map data gained from the periphery of the site.

Four of some of the largest looters trenches at the site were cleared, recorded and excavated. After the clearing and recording of the structural sequence, test units were opened within each in an attempt to understand the nature of the architecture that we could only view in profile. Operations within many of the looters trenches sadly revealed the disruption of several tombs. In Structure 31 Dan Leonard exposed the walls of a Late Preclassic temple that had housed a vaulted crypt. This structure appears to have been built with a construction technique not well documented at Cival, but quite common in the Late Preclassic at El Mirador (Hansen 1998: 99). The structure was built in several phases, and in its final phase, the summit was turned into a mausoleum. In Structure 18 Rodgers and Clark cleared a looters trench that penetrated a structure located on the eastern side of a raised platform group. Built of a finely dressed limestone blocks, the structure excavated by Rodgers and Clark similarly housed a late Preclassic crypt that also was sadly looted.

Despite these lamentable discoveries, there were several positive outcomes from our examination of looters trenches. In Structure 1 on Group 1, it was revealed that looters had terminated their efforts just short of reaching the backside of a beautifully preserved Late Preclassic stucco mask (see Castillo this volume). The excavation unearthed a modeled stucco mask of immense proportions and exquisite preservation. Preliminary iconographic analysis of the mask indicates that it represents a sun deity, and based on correlation to similar masks found at Cerros, Uaxactun and El Mirador, we expect to find a complete suite of four masks decorating the western face of Structure 1 (Estrada-Belli et al 2003d). This structure will clearly become a focus of research for years to come.

In Structure 7, the investigation of looters trenches by Morgan and Bauer were quite fruitful on many levels. We were able to provisionally sort out the construction phases of Structure 7, starting with its earliest Middle Preclassic component, leading up to its late Preclassic final phase. At the western terminus of the looters cut, we were able to clarify the disturbed stratigraphy, and were eventually able to correlate some of the plaza floors to Structure 7. In our research near Stela 2, several Preclassic cached offerings and buried monuments came to light, including a large monolithic stela-like slab, an elaborate cruciform shaped offering of

ceramic jars and jade, an empty stela cut with the stone bracing and cached offering still *in situ*, and two other offerings, dedicated to monuments that have since been removed or demolished.

Additionally, Nick Bentley conducted investigations into the chronology of plaza floors and stela dedications. His excavations in and around Stela 6 located at the western edge of Cival's center, revealed a sequence of plaster floors underlying an un-carved and badly damaged stela. Unfortunately, no datable offering was discovered behind or in front of the stela and the preservation of the ceramic material associated with the stela prevents an accurate placement. However, given what we have learned from the excavations in the plaza near Structure 7, future excavations beneath Stela 6 may yet yield results that support our speculation that Stela 6 also dates to the Preclassic period.

In sum, the results of the 2003 field season have dramatically reshaped our understanding of the complexity and wealth of Cival in the Middle to Late Preclassic period. The findings of Angel Castillo in Structure 1 reveal that Cival was integrated in a Preclassic interaction sphere that connected it to widely distributed Preclassic sites. The similarity in detail and iconography of the exposed mask clearly links Cival to other prominent Preclassic centers both within the Central Lowlands and the coast of Belize; sites such as Kohunlich, El Mirador, Uaxactun and Cerros. At the same time, the artistic style of the mask is clearly unique to Cival. The size and complexity of the Triadic Group and stuccoed masks at Cival clearly demonstrate access to skilled craftsmen, massive amounts of labor, and resources that were unexpected for this region.

Research by Leonard, Rodgers, Clark, and Bentley has demonstrated the antiquity of many of the structures at Cival. Although we are certain there was Late Classic occupation at the site, we did not know just how much of Cival's architecture dated to the Late Classic Period. We are now certain that all of this season's examined structures date almost exclusively to the Preclassic period, and that, although disturbed, many of Cival's monuments similarly date to the Preclassic period.

The discoveries by Morgan and Bauer indicate that construction and ritual activity at the site dates back at least to the end of the Middle Preclassic period, and likely even earlier. The dedication of monuments clearly was part and parcel of Cival's early ritual activity, as evidenced by a monolithic stone monument dedicated near the completion of the earliest phase of Structure 7. The area west of Structure 7 quickly became a locus of continued ritual activity for the ensuing centuries, and appears to have been one of Cival's most sacred. The cruciform offering found in front of Structure 7 not only symbolically marked the center of Cival's ritual world, but it also attests to the wealth wielded by Cival. This offering radically demonstrates the long-distant trade connections and resources controlled by Cival. Given its proximity to the Holmul River and its location upon a promontory, it is not unsound to speculate that Cival's prominence derived from its riverine location. Cival is strategically located to reap the benefits of the local water and bajo resources for cultivation, and to oversee the trade that entered the Central Lowlands through the Holmul River via the Rio Hondo.

Future research hopes to build upon the solid foundation of research already laid at Cival. Future efforts aimed at Structure 1 are expected to thoroughly document and record the stucco mask, and to consolidate the unstable looters trench to its rear. Further exploration of other masks may also ensue. Research into Structures 7 and 9 is also planned for upcoming seasons in order to assess the supposition that the two formed an E-Group for solar/astronomical observations. We also hope to explore the construction phases of the Triadic Group, and correlate those phases to the E-Group.

In the not too distant future, we hope to implement a sampling regime to gain an understanding of the lives of the support population. While uncovering the Preclassic houses of commoners is admittedly difficult, we intend to gain some understanding of the urban settlement. Also, investigations of the defensive wall surrounding the site's center should elucidate the date of the wall, and will hopefully provide insights into the site's precipitous abandonment at the end of the Late Preclassic period. All of these proposed efforts will illuminate the place of Cival in the history of the Holmul Region and in the Central Maya Lowlands as well.

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Investigations of Structure 7 and Stela 2 at Cival, Petén, Guatemala

Molly Morgan and Jeremy Bauer

Introduction:

During the 2003 field season, the excavation of Structure 7 began. Structure 7 is approximately 129 meters long, 5 meters high, and 8 meters wide structure oriented along a north-south axis. On the summit of this structure are located three small pyramidal structures: one to the south, one to the north, and one in the center equidistant from both terminal ends (Figure 1). Together with Structure 9, Structure 7 forms an “E-Group” assemblage like those found at Uaxactun, El Mirador, and other sites in the central and southeastern Maya Lowlands. The exact astronomical or solar observational properties of Cival’s E-Group are not yet known. In order to better understand the temporal placement of this structure, clearing and excavation of the structure was initiated.

It had been known since the 2001 field season, that a large looters trench penetrated the western side of the central pyramid located on top of Structure 7. This looters trench had almost completely bisected the structure and left a gaping hole in its western front. The result was a large cave at the summit with the roof intact, although some of the fill above had fallen since the time of looting. Since we had little indication of the date of Structure 7, aside from the associated Stela 2 which clearly had been moved from its original location but still dated to the Preclassic period, it was decided that the clearing of the looters trench would help us clarify the dating of Structure 7 and its relationship to Stela 2. Clearing and recording of the looters trench began with Operation CL 02. In addition, Operations CT 02 and CT 07 investigated the standing architecture of Structure 7 through excavation of deposits at its base (CT 02) and at its summit (CT 07). Furthermore, two other Operations (CT 05 and CT 08) saw the excavation of a trench in the plaza west of Structure 7 and beneath Cival Stela 2. Operations CT 05 and 08 sought to examine the relationship between Stela 2 and Structure 7, and to search for the Stela 2’s original location in the plaza.

The results of the excavations revealed that Structure 7 was built in at least five phases, with several minor sub-phases or additions added to existing structures. The earliest phase appears to have been created through the shaping of a natural bedrock rise, while later phases were constructed of cut and faced limestone blocks and mortar. The final phase of Structure 7 shows armatures for modeled stucco outsets on either side of a recessed central stairway. Unfortunately, the modeled stucco had eroded so that the original decoration is unknown.

All of the known construction phases of Structure 7 date to the Preclassic period. The earliest phase likely dates to the Middle to Late Preclassic period transition (c.a. 500 BC), based on its association with a large cruciform cache (see discussion below). The final phase likely dates to the end of the late Preclassic period (c.a. 150-200 AD). These dates are tentative, awaiting absolute ceramic placement, although it is almost certain most of the construction occurred in the Preclassic period.

Associated with Structure 7 was a series of offerings and monuments which radiated westward from its base. Each monument had originally faced west, and new monuments and offerings were dedicated with each successive phase of Structure 7. As Structure 7 grew outward, earlier monuments were buried or removed. In all, 5 offerings were discovered that were dedicated to both Structure 7 and the monuments located to its western face.

Excavations in Structure 7

Operation CL 02:

Introduction

Cival Looters Trench Two penetrates the western side of Structure 7. Operation CL 02 sought to gain some understanding of the construction of this building by using the destruction of looters activities.

The methods used to accomplish this included the removal of looters back dirt and debris, and the cleaning of the profiles created by the looting activity.

A discussion of each context appears below. Please refer to Figure 2 for all stratigraphic discussions of CL 02

Stratigraphy

CL 0201 Loose fill of assorted colors and consistencies and varying inclusions. Context CL 0202 delineated from stratified contexts by the looseness of its make-up.

Interpretation: This context includes all of the disturbed building material and other debris left behind by the looters.

CL 0202 Limestone bedrock used in the construction of Structure 7. The bedrock was modified by the carving of shallow steps in front of the earliest construction phase. There is also a natural terrace in the bedrock that was used to create the structure. The looters encountered this bedrock terrace in their excavation and followed it into the earliest structure.

CL 0203 Cut into bedrock (60 by 80 by 20 cm). Looters uncovered this cut and cleaned out anything that may have been in it. Presumably, it was a cache dedication made upon the building of the second construction phase. It is located directly outside the west wall of the earliest structure, flush with the line of the wall.

CL 0204 Brown, fine, silty soil located directly above bedrock. Approximately 20 cm thick. Fill for first floor CL 0205.

CL 0205 Plaster floor. This floor goes beneath the first structure construction. Moving westward, it meets bedrock CL 0202 and is associated with four steps carved into bedrock.

CL 0206 Construction fill between floors CL 0205 and CL 0207. Fine, brown, silty soil with no inclusions. Abuts first structure construction. Moving westward in the section, this floor is lost, as it was removed for later construction.

CL 0208 Construction fill used in the first major phase of construction. Supports construction of CL 0207. Fine gray limestone marl matrix with inclusions of large (50-30 cm) irregularly shaped stones and smaller (15 cm rocks). Covers floor CL 0205, and is roughly 1m thick.

CL 0207 First major construction phase. Looters revealed a 5-7 course wall with what may have been a 2 course inset at the top. This is the west wall of the earliest structure in this location. This also includes the floor that was built with this structure, on top of sub floor fill CL 0206, which is lost in section further west. This structure was penetrated roughly 40 cm by looters activities. The structure is about 1m high and probably functioned as a platform. It also has a floor topping it, which could be seen in the back (east) section of the looters trench.

CL 0209 Thick (2.5m) layer of construction fill used to build up platform for the second major construction phase. Loose limestone rocks, mostly large (60 by 40 cm). Some appear to be cut stones that are reused cut masonry blocks. Color is predominantly white. Covers floor CL 0207. Also contains retaining or construction assisting walls CL 0210 and CL 0211.

CL 0210 Only seen in part in profile. Includes a cut limestone block (60 by 30 by 20 cm) that is oriented for possible building purposes and has a floor moving over it like a step. The floor does not extend very far in either direction, and must have been demolished in the building of major construction phase two.

CL 0211 Three to four course wall made of large (50 by 30 by 20 cm) cut limestone masonry blocks. Clearly visible in both the north and south profiles. Retaining wall to assist in construction of platform addition in construction Phase Two.

CL 0212 Plaster floor (third), 10 cm thick. Includes two steps moving westward away from the structure, it disappears in section wall and must have been destroyed in later construction phases. Supported by construction fill CL 0209.

CL 0213 Compacted crushed limestone marl with cobble inclusions. Construction fill for next floor, roughly 50 cm thick. Above floor three.

CL 0214 Plaster floor covering fill CL 0214 (fourth floor). Final major building phase of platform Structure 7 construction. 5-1-cm thick. Includes 5 steps leading to the plaza to the west. Floor goes beneath the small structure (central of three) on top of the platform.

CL 0217 Construction fill for the small structure (small platform) that was built on top of platform Structure 7. This construction phase is the last major phase in this location. This context covers floor CL 0214 and supports wall CL 0216 and CL 0215. Large irregularly shaped limestone rocks (20-40 cm), limestone cobble inclusions, and gray marl fill.

CL 0215 Plaster floor and plaster facing of the small structure on platform of Structure 7. West and front face of structure includes 4 steps. It is seen in the back (east) profile of the looters trench and is 5 cm thick. This small structure is the last phase of construction on this building.

CL 0216 Outer wall of final phase of small building on top of platform. This wall is the same phase as the inset stairway CL 0215 that it was built with. Has stuccoed masonry blocks. This wall was investigated in operation CT07.

CL 0218 Rubble above the final construction phase. Irregular limestone rocks and reused masonry blocks (to size 40 by 30 cm). Perhaps piled on at the end of the use of this building. Light brown soil.

CL 0219 Humic layer, 10-30 cm thick covering the entire mound. Rich brown organic silt.

Conclusions

Operation CL 02 successfully identified the major construction phases of Structure 7. First, directly upon bedrock (CL 0202), the first floor (CL 0205) was constructed. Upon this floor, another floor and associated building (CL 0207) form the first major construction phase on Structure 7. Later, it appears that a cache dedication was made into bedrock in front of this first structure commemorating further construction. Then, the platform was significantly raised (2.5 m) and a new floor (CL 0212) was constructed. Later, another increase (.5 m) in the height of the platform occurred, and the construction of the last floor (CL 0214) of this large platform Structure 7. On top of this platform Structure 7, three smaller mounds are seen from the surface. Cival Looters Trench Two penetrates the central structure. This structure has a plastered inset staircase (CL 0215) built into its western wall (CL 0216). Excavation of operation CT 07 revealed that there were sub phases of minor construction after the last major phase on this structure. They included the addition of a lengthened first step on the structure, and an addition of a small terrace at the front, or western side of the structure. When the structure was abandoned, it appears that rocks were purposefully stacked on top of it. Future excavations at this location should further investigate the possible presence of features on the face of the small structures on top of platform Structure 7; consider the possibility of the structure functioning as an E-Group by investigating its association with other related structures, and sample ceramics from construction levels for dating purposes.

Operation CT 02:

Introduction

The looters trench into Structure 7 was investigated previously in operation CL 02. Operation CT 02 was a continuation of that investigation. At the western base of the structure, just below the looters back dirt, a few stratified layers were left in context, and those were excavated in this operation. The goal of the excavation involved uncovering remaining layers of construction on Structure 7. The excavation extends the length of the looters trench before it enters the structure itself, beginning on the west side at the location

of a large limestone monolith, running eastwardly, to a natural rise in bedrock upon which the structure was built. The trench was about 3 m long and 1.10 m wide. All excavated soil was sifted through a 6 mm screen.

Stratigraphy

CT 0205 Hard, impenetrable bedrock. Carved into shallow steps in construction and used for its natural slope upon which to build Structure 7.

CT0208 Cut into bedrock. 40 cm diameter, 20 cm deep, and circular in shape. Filled with above layer CT 0202.

CT 0206 Cut in bedrock into which monolith CT0204 was placed. Exposed by this excavation only on the east side of monolith.

CT 0204 Large monolithic dense limestone rock. 40 cm thick and at least 100 cm wide as is seen in this excavation. Placed into cut CT 0206 in bedrock.

CT 0207 Compacted gray friable soil with limestone cobbles (15-20 cm). Packing for monolith CT0204 in cut CT0206.

CT 0203 Thin (5-10 cm) layer of dark gray clay-like soil. Covering bedrock.

CT 0202 Soft brown soil matrix with limestone inclusions (10 cm) and pebbles (2-5 cm). 55 cm thick. Sub floor fill.

CT 0201 Soft, patchy plaster layer, 20 cm thick, with pebble inclusions (2-5 cm). Abuts monolith CT 0203. Eroded floor.

Conclusions

Operation CT 02 successfully uncovered the first construction levels of Structure 7. It is now known that the first floor built above bedrock was not penetrated by looters activity, and that it was cut through by two cuts, one with no purpose discernable, and the other in which to place a large, monolithic stone. Excavations done on the other side of the stone, in CT0205 and CT0208, as well as future research, will hopefully shed more light on the purpose of this monolith placement.

Operation CT 07

Introduction

Structure 7 at Cival was investigated previously in Operations CL02 and CT02. These previous investigations revealed construction phases of the building. Operation CT07, attempted to uncover the face of the final construction phase of the central pyramid upon Structure 7. The nature of other buildings and groups of this type (E-Groups) led the archaeologists to believe that there could be a feature on the face of this building, worth investigating. The trench was 3.5 X 4.5m, oriented north-south. All soils were sifted through a 6 mm screen.

Stratigraphy

CT0710 Plaster floor on top of the platform for Structure 7, upon which the little structure under investigation was built.

CT0702 This context was given to the little structure under investigation, on top of the platform for Structure 7. The eroded west wall of this structure was the subject of investigation. Excavation revealed a heavily eroded feature built into this wall. The time constraints of the project did not allow for full investigation of this feature. Two stone tools were uncovered within the construction of the wall, presumably forming a ritual dedication during construction.

CT 0708 The face of the structure appears to have been stuccoed, but most of the stucco decoration has fallen off. This context was assigned to a small chunk of stucco decoration still connected to the wall CT 0702.

CT 0709 Plaster floor topping wall CT 0702 forming the top of this structure.

CT 0711 The first post phase to the construction of the structure involved a plastered masonry wall that extended the first step of the building above the platform.

CT 0706 Masonry wall that is a part of the second post phase construction added to the front of the structure. This wall formed a terrace extending from the wall CT0702. Three courses in height, and composed of shaped limestone blocks.

CT 0707 Irregularly shaped limestone rocks (20 cm) used with loose gray soil as fill for the addition of terrace and wall CT0706. Located below floor CT0705.

CT 0705 Plaster floor forming the surface of the terrace addition of wall CT 0706. This floor abuts wall CT 0702.

CT 0704 Plaster floor found only in patches. Resurfacing of floor CT 0705.

CT 0703 Tightly compacted irregularly and regularly shaped limestone blocks (20-40 cm). Covering wall of structure CT 0702 and addition of CT 0706.

CT 0701 Mixed matrix of topsoil, wall fall, and looters debris that covered the final phases of Structure 7.

Conclusion

Cival Excavation Seven revealed much about the final constructions of Structure 7. Now it is understood that the final major phase of construction involved building a feature in the construction of the west wall of the central small structure on Platform Structure 7. The nature of this feature was not determined in the time limits of the project. After this final major construction phase, there were two additional post phases to the building. First, a plastered wall was built onto the first step of the building, extending this step. Then, a short terrace was built in front of the building, covering the lower half of the original face of the building, and part of the feature that it included. Future excavations on the face of this building will better reveal the nature of these construction activities.

Excavations near Stela 2

Operation CT 05:

Introduction

The purpose of Operation CT 05 was to investigate the area around Cival Stela 2 in order to determine its original location and to attempt to associate it with Structure 7. The Holmul project team located the stela in 2002 (Estrada Belli et al. 2003) sitting on its side, to the west of Structure 7, directly in front of Cival Looters Trench 2. The trench for Operation CT 05 was set around the Stela, and was 2m by 4m. The eastern limit of the operation abutted the west face of the monolithic rock (CT 0515/0844) in the looters trench. Soil excavated was screened through a 6 mm screen.

Stratigraphy

CT 0517 Bedrock. Operation CT 05 encountered many cuts that were carved into bedrock.

CT 0509 Plaster floor below floor CT 0508. Floor CT 0509 was directly above bedrock.

CT 0508 Plaster floor layer above floor CT 0509. Perhaps a resurfacing of this floor.

CT 0518 Fill beneath layer CT 0405 and above floor CT 0508. This is a tightly compacted layer of soft grayish white silt.

CT 0504 Dark gray/black sandy silt. Below looters backdirt, marking the extent of looters activity. Only in the east part of this trench. 15 cm thick. Fill.

CT 0514 Cut into which monolith CT 0515 was placed. Filled with CT 0516. Cuts through CT 0518 fill and is covered by fill CT 0504. At E edge of excavation, so that only the west part of this cut is included in this trench.

CT 0515 Monolithic limestone boulder resting on its side, oriented north-south. At least 140 cm long and 40 cm wide. Placed into cut CT 0514.

CT 0516 Not completely excavated fill for cut CT 0514. Stone inclusions (10-15 cm) probably used as packing stones for the placement of monolith CT 0515.

CT 0512 Cut filled with packed stones CT 0506, which went beyond the limits of this excavation, and was further investigated in CT 08.

CT 0506 Loose brownish gray soil filling cut CT 0512. Packed stones and one metate fragment (10-12 cm).

CT 0505 In the southern part of the trench, where there was no looters activity, this is gray friable soil below layer CT 0503. It has large (30-40 cm) limestone inclusions and covers floor CT 0508. Fill.

CT 0511 Cut that reaches beyond the limits of this excavation and was investigated in CT 08. Filled with CT 0507. Cut through floors CT 0508 and CT 0509.

CT 0507 Dark brown silt matrix filling cut CT 0511.

CT 0510 Cut packed tightly with rocks CT 0513 that goes through floors CT 0509 and CT 0508. Also investigated in CT 08.

CT 0513 Tightly packed rocks (10-30 cm) and grayish loose soil. Deposited in cut CT 0510.

CT 0503 Grayish brown sandy silt below topsoil CT 0501. In south part of trench, where there was no looters activity. Fill.

CT 0502 Looters backdirt. Friable crushed limestone, mixed matrix. Only in northern part of trench.

CT 0501 Rich brown organic layer 2-10 cm thick. Humic layer.

Conclusion

This operation determined that Stela 2 at Cival is likely not in its original location, since no stela base was located. The excavation also uncovered several cuts that could not be investigated within the scope of this operation. After moving the stela, operation CT 08 more carefully investigated the cuts located by this operation.

Operation CT 08:

Introduction:

The decision to begin Operation CT 08 was based on two main factors: the disturbed nature of the deposits encountered in Operation CT 05, and the fact that Operation CT 05 could not be extended westward until Stela 2 had safely been moved to accommodate an excavation unit beneath it. A new operation number (CT 08) was created so as not to confuse the ceramics and stratigraphy of Operation CT 05 with those of the westward extension (CT 08). Many of the contexts that were excavated in CT 08, actually were found in the area demarcated by Operation CT 05. In reality, both Operations CT 05 and CT 08 formed a single unit that was 2 X 5 m and reached the base of Structure 7.

The initial excavation of CT 05 revealed a series of cuts into plaza floor fills and bedrock that warranted careful examination. Thus, CT 08 was carefully excavated to determine the relationship between each of the cuts. As a result of five major cuts (four excavated in 2003, the other awaiting completion in 2004) were discovered. Within each cut was discovered an offering dedicating each cut and the monument that each cut had originally supported (i.e. stela, altar, post, etc.). Each successive cache offering shifted westward away from Structure 7 through time. These offerings display considerable wealth, especially during the Middle to Late Preclassic transition.

Excavation of Deposits:

Excavation of Operation CT 08 began with the removal of looters backdirt CT 0800, This was an array of mixed fills of gray and brown silt. There were many inclusions in this fill, including limestone cobbles (.05-.15 m diameter) and boulders (.20-.50 m diameter). Beneath the backdirt of the looters, topsoil CT 0801 was removed. This context was an organically rich layer of dark brown humic soil with many rootlets that was roughly .15-.20 m thick where excavated. Within this context were many limestone pebbles inclusions.

Beneath CT 0801 were encountered the remains of an eroded plaster surface CT 0802. All that remained was a few patches of plaster, and the cobble packing that underlay the plaster. Beneath this cobble floor fill, several cuts and fills were encountered. Fill CT 0855, a dark brown clayey silt with frequent cobble and pebble inclusions, was the fill for a cut that was not excavated this season.

Another fill was encountered at the extreme western end of Operation CT 08 under the eroded floor CT 0802. This fill, CT 0803, was encountered in cut CT 0809 and consisted of cobbles arranged in a circle, overlying fill CT 0810. Fill CT 0810 was soft light-brown silt with numerous limestone cobble inclusions. CT 0810 covered the remains of a limestone boulder CT 0811, which appears to be a stela fragment that was re-deposited into CT 0809 after the removal of the original monument. All of these fills were found filling cut CT 0809

At a lower level within cut CT 0809 and clearly representing a different assemblage of contexts, an offering and the fragmentary remains of a monument were found. Presuming that the Maya would not have made a dedicatory offering for an eroded stump of a monument (CT 0845), we can only assume that this offering was for a more substantial monument, perhaps an altar. Thus, below CT 0811, the fragmentary *in situ* remains of CT 0845 were encountered. CT 0845 consisted of a slab of broken and eroded limestone approximately .5 X .8 m in width and breadth and .35 m thick. The limestone used for this monument

fragment was low quality and the internal bedding of the limestone layers ran horizontally (i.e. parallel to the ground). This would make the monument fragment and unlikely candidate for a stela, but a perfect candidate for an altar.

Beneath CT 0845, we encountered fill CT 0851: gray-brown friable silt with frequent pebble inclusions. Fill CT 0851 surrounded a series of lip-to-lip ceramic vessels. In all, there were four sets of cylinder vessels capped by four shallow vertical-walled bowls. To the north was uncovered cylinder vessel CT 0854.02.01 and bowl CT 0858.02.01. In the west, cylinder vessel CT 0856.02.01 was found capped by bowl CT 0860.02.01. To the east, CT 0853.02.01 capped cylinder vessel CT 0852.02.01. To the south, the badly damaged remains of a cylinder vessel were found along with a capping bowl CT 0857.02.01. Unfortunately, the cylinder vessel was so badly eroded and damaged, that much of its remains were commingled with the fill CT 0851. Once fill CT 0851 and all of the ceramic vessels were removed, the base of cut CT 0809 was exposed. CT 0809 cut through context CT 0808 and was in the shape of an oval approximately 1.1 m x .7 m and .4 m deep.

Thus, within cut CT 0809, an offering of 8 ceramic vessels arranged in a cruciform pattern was encountered. The *in situ* remains of an eroded monument fragment (CT 0845), which appears to have been an altar whose upper remains were removed prior to the laying of floor CT 0802, which capped the offering.

Just east of the offering in cut CT 0809 and truncated by it, another offering cut (CT 0805) was discovered. Like the offering in CT 0809, the offering within cut CT 0805 was likewise cut through fill CT 0808 and capped by eroded floor CT 0802: indicating that they were both coeval and co-terminus. At the uppermost levels of cut CT 0805 we exposed the remains of a small out-flaring walled bowl (CT 0807.02.01). The vessel was poorly preserved with no slip remaining: the ceramic dating still pending. The bowl was placed in a declivity created by the junction of three large limestone boulders CT 0806, 0813 and 0814. The boulders were of very dense limestone similar to the type used for other stelae at Cival, and they varied in size between 4-.6 X .3-.4 X .4-.7 m. The presence of shaped edges and uniform thickness (.3-.4 m thick) indicated that these boulders were in fact fragments of stelae that had been re-deposited into cut CT 0805 after the original monument had been removed: likely some time in the Late Preclassic period. All three boulders overlay fill CT 0812, fine and compact gray clayey silt with few pebble and cobble inclusions.

As was the case in cut CT 0809, the upper fill of stelae fragments (CT 0806, 0813 and 0814), ceramic offering (CT 0807.02.01) and fill (CT 0812) were clearly deposited into cut CT 0805 after the original monument had been removed. This supposition was confirmed when we encountered the intact bracing (CT 0815) for a stela packed into the lowest levels of cut CT 0805, just beneath fill CT 0812. CT 0815 was a collection of limestone rocks which varied in size (none of which were larger than .3 x .4 x .2 m) and were arranged along the exterior edges of cut CT 0805, but were not found in the center of CT 0805. In the center of the bracing, fill CT 0816 filled the .6 X .25 m void created by the arrangement of stones CT 0815. CT 0816 was friable gray clayey silt with few pebble inclusions (much like CT 0812 above it, and perhaps the lowest level of the same fill). Once CT 0815 and 0816 were removed, the base of cut CT 0805 was exposed. At its lowest level, CT 0805 had dimensions 1.8 X 0.9 meters. The overall depth of cut CT 0805 was approximately 0.75 meters. This depth was more than adequate to support a stela at least 2.5 meters tall. CT 0805 cut through two distinct floor and fill layers. To the north and west, it cut through fill layer CT 0808, to the east it cut through eroded floor CT 0804.

In the base and center of cut CT 0805, a smaller circular cut CT 0817 was encountered. The cut was roughly 0.4 meters in diameter, 0.5 meters deep, and was capped by a thin (.03 m) layer of plaster CT 08.67 Just beneath CT 08.67 we unearthed a capping stone for a cache. This stone (CT 0818) was .2 m thick, and roughly .35 meters in diameter. It surmounted fill CT 0819: a soft, tan clayey-silt with few pebble inclusions. Fill CT 0819 in turn covered another capstone CT 0820: a limestone rock roughly .2 X .3 X .15 m which capped the offering beneath. The offering that we discovered beneath capstone CT 0820 consisted of a Sierra Red Bowl (CT 0822.02.01) with vertical walls and a flat base. The bowl was in fragmentary condition, as the weight of the capstone CT 0820 had applied undue pressure on it and the offering beneath it, causing the lower offering to break through the bottom of the vessel. The lower offering was discovered beneath the Sierra Red bowl (CT 0822.02.01) and consisted of two non-matching marine shell halves (CT 0824.10.01 & CT 0824.10.02), placed upright and facing one another. Between the two shells were a tubular jade bead (CT 0825.06.01), a hematite disk (CT 0825.14.01), a perforated shell disk (0825.10.01), soil fill CT 0825 and traces of cinnabar. Surrounding the shells and the bowl was fill CT

0821: a silty tan clay with no inclusions. A fill with exactly the same characteristics (CT 0823) filled the void within bowl CT 0822.

Thus, within cut CT 0817, found at the base and center of cut CT 0805, an offering of two marine shell halves, a tubular jade bead, a perforated shell disc, a hematite flake, cinnabar, and a Sierra Red bowl were encountered. Two capstones and a plaster layer sealed the whole offering. The offering clearly was a dedication offering for what appears to have been a stela cut.

As noted already, both cuts CT 0809 and CT 0805 cut through fill CT 0808. CT 0808 is an odd fill consisting of brown, compact clayey-silt with frequent (.01-.03 m) blue-gray, burnt daub inclusions. Fill CT 0808 was not excavated completely in 2003 and its relationship to nearby floor CT 0804 is not entirely certain, as there was no interface encountered within the limits of the excavation between the two contexts. It appears that their interface lies beyond the northern limit of the excavation. However, it seems most likely that CT 0808 postdates floor CT 0804 based on absolute elevations, and the precedent (to be discussed below) for the movement of monuments westward away from Structure 7. CT 0804 was an eroded plaster floor of which mainly the cobble fill (CT 0826) for its makeup survived. A few patches of intact plaster were encountered, but not many. Combined with its cobble fill CT 0826, floor CT 0804 was approximately .04-.06 m and only survived as a small "peninsula" between cuts CT 0805 and the western limit of excavation of the original Operation CT 05. Much of the eastern remains of floor CT 0804 were likely obliterated in the excavation of Operation CT 05 by untrained workers. However, enough of it survived to determine that floor CT 0804 capped the fill for cut CT 0827. Floor CT 0804 directly overlay the fill (CT 0830) of cut CT 0827 and floor CT 0828, which cut CT 0827 truncates.

Floor CT 0804 was found sealing an offering located just east of stela cut CT 0805 and its associated offering cut (CT 0817). The cut for this stratigraphically earlier offering was CT 0827, a pit whose eastern and southern extent was originally cut through floor CT 0828, had been lost due to overzealous and untrained workers in Operation CT 05. Regardless, the western edge of CT 0827 was located and it cut through floor CT 0828. The lowest limits on all sides of cut CT 0827 were also found. At its lowest level, cut CT 0827 was roughly oval in plan 1 meter along its east-west axis, and .85 m along its north-south axis, and roughly 0.8 m deep from the top of floor CT 0828. The whole of cut CT 0827 was filled by CT 0830: brown clayey-silt with frequent limestone cobbles (.03-.10 m diameter) and pebbles (.01-.02 m diameter) inclusions. At the lowest levels, CT 0827 was filled with what appears to be packing (CT 0835) for a monument. Some of the northern half of CT 0835 was mistakenly removed in Operation CT 0805. However, enough of CT 0835 remained to reveal that it consisted of several limestone rocks (.10-.20 m average diameter), filling the lowest levels of cut CT 0827. These stones CT 0835 clearly followed the slope of the bottom of the cut. Due to the loss of the northern extent of CT 0835, we are uncertain as to what kind of monument the cut had originally supported, however, given what we learned later on (see cruciform cut discussion below), it seems likely that this cut supported a wooden post. The cut seems too small to have supported a stela, and too deep to have been for an altar.

At the base of the aforementioned cut CT 0827 and to the west of the stone packing (CT 0835), an offering was encountered. This offering consisted of several items. The first item removed was a small, restricted neck jar or olla (CT 0832.02.01) filled with gray-brown silty-clay (CT 0834) and capped by a .06 X .08 X .04 irregularly shaped limestone cobble (CT 0833). Although broken, the vessel was complete and appears to be of the Pital Cream ceramic group dating to the Late Preclassic period. A sample of the soil was removed from the pot for residue analysis.

Twenty centimeters to the east of vessel CT 0832 and also within cut CT 0827, another vessel was found. This vessel (CT 0836.02.01) was fragmentary and incomplete. Although we know that some of the vessel was accidentally removed during the excavation of Operation CT 05, analysis of the ceramics of Operation CT 05 failed to reveal the complete remains of CT 0836.02.01. What remained of CT 0836.02.01 revealed that it too was a small restricted-neck jar or olla. This one however had a dark-red, almost maroon slip and paste. The vessel has yet to be succinctly identified ceramically. Beneath the vessel, more artifacts were discovered. A single marine shell half (CT 0840.10.01), two fragments of greenstone (CT 0830.06.01 & CT 0830.06.02), and a piece of hematite (CT 0830.14.01) came to light.

As mentioned, cut CT 0827 truncated floor CT 0828. Cut CT 0831 was also cut through the same floor CT 0828 along the northern edge of the excavation unit. CT 0831 was not thoroughly excavated in

2003, but it appears to be a circular cut of unknown dimensions (but probably not exceeding 0.50 m in diameter). It may have served as a post-hole.

Beneath floor CT 0828, another floor was noted in the section wall. This floor (CT 0829) varied in color from black to brown and from orange to yellow. Its remains were approximately .03-.05 m thick and it showed evidence of heavy burning and erosion. We suspect that this floor may have originally capped the cruciform offering (to be discussed below). However, we have no direct evidence of this supposition. The authentic cut CT 0827 and under-supervised workmen had obliterated whatever remained of the floor sealing the cruciform cut. In 2004 we hope to ascertain the placement of this floor within the stratigraphic sequence and determine its relationship to the cuts that truncate it. Currently we are only certain that CT 0828 postdates floors CT 0837 and CT 0838, and predates floor CT 0828

As just mentioned, we suspect that floor CT 0829 originally capped a cruciform offering that was uncovered only after cut CT 0827 was completely excavated. Cut CT 0827 was located to the west of the cruciform cut (CT 0846) and truncated its western end. Thus we are certain that CT 0827 postdates cut CT 0846. This new cut (CT 0846) was quite elaborate and contained a great wealth of offerings that we can only begin to describe in this report.

The discovery of the cruciform cut occurred near the season's end and its excavation spanned several weeks. Initial excavation involved the removal of a thick (.12-.18 m) layer of black sticky clay loam (CT 0865) which covered the remains of a poorly defined cut with dimensions roughly 1.5 m by 1.5 m. Thankfully the composition of its fill was sufficiently distinct from the edges of the cut that we were able to define its edges. The fill of cut CT 0846 was light-brown sandy silt with few limestone pebble inclusions (CT 0866). While excavating the fill of the cut, we encountered soft and loose soil (CT 0842) that had collapsed into a circular void (CT 0841) located roughly in the center of the cruciform cut. The void was roughly .45 m in diameter, .25 m deep and appears to have been created when the stump of a wooden post rotted and the surrounding fill (CT 0842) collapsed into the space originally occupied by the post; thus void CT 0841 appears to be a post hole left by the rotted remains of a post. Beneath fill CT 0866, we removed a plaster cap which sealed the whole of cut CT 0846 (save for its western edge which had been disturbed by cut CT 0827). This plaster cap (CT 0843) was made of coarse plaster with frequent pebble inclusions and the plaster appears to have been swathed into the cut, after several limestone blocks and stones (CT 0867) had been deposited. These stones (CT 0867) had dimensions roughly .10-.15 X .20-.25 X .08-.15 m and were spread regularly throughout the cut as if they had been arranged intentionally. These stones directly overlay five ceramic vessels. Once the stones were removed, we encountered great quantities of pottery sherds lining the edges of the cut. After we had clearly defined the edges of the cut, we realized that the cut was in fact shaped like a cross, and that a complete, although broken, vessel had been deposited into each arm of the cross with a fifth vessel placed in the center in a deeper cut. To the west was vessel CT 0850.02.01, to the north was vessel CT 0847.02.01, to the east was vessel CT 0848.02.01, to the south was vessel CT 0849.02.01 and in the center was vessel CT 0859.02.01. The western jar CT 0850.02.01 clearly suffered irreparable damage due to the truncation of the plaster sealing caused by cut CT 0827. The other vessels however, were well-preserved and are in the process of reconstruction.

All of the vessels were restricted-opening globular jars or ollas, and all appear to have been of similar dimensions and shape. The central, western and northern vessels were black-slipped, the southern jar was red-slipped, and the eastern jar was black-slipped with a chamfered neck and post-slip, pre-firing incision. For the black vessels, there was notable variation in color: from brown to deep-lustrous black. Preliminary ceramic analysis tentatively places these black vessels as part of the Chunhinta Ceramic Group and the red vessel as part of the Joventud Ceramic Group. These vessels likely date to the end of the Mamom ceramic sphere and the beginning of the Chicanel ceramic sphere (roughly 500 BC).

While excavating the central vessel (CT 0859.02.01), we encountered two large jade celts located underneath it in the southern and eastern cardinal points. Given the cruciform shape of the cut and offerings, we expected to find three more celts in a similar orientation. As such, we removed the central vessel after photographing and planning the whole offering and vessels *in situ*. We were not disappointed in our speculation, as once the central vessel was removed, three more celts appeared: giving a total of five celts. In each cardinal direction a jade celt was found standing with its cutting edge upright. In the center of the whole cut and in a deeper circular cut another jade celt was found. This central jade (CT 0861.06.120) was clearly the most prized of all due to its fine finish and deep translucent green-blue color.

The other jade celts however, varied in quality and finish. The north (CT 0861.06.116), south (CT 0861.06.118) and east (CT 0861.06.117) celts were complete and all appear to have been green jade or serpentine. The west celt (CT 0861.06.119) however, was a fragmentary, highly-polished blue- jade axe with evidence of use: only about $\frac{3}{4}$ of it remained. Some 110 more pieces of blue and green jade polished pebbles ranging in size from .01 m in diameter to approximately .13 m in diameter were found scattered around the base of the cut, with the highest quality translucent blue jade pebbles circling the central jade celt. All of the jade offerings are currently being recorded and drawn by Licda. Judith Valle for submission to IDEAH.

Once all of the offerings were removed, the cut was cleared out (Figure 26). The overall shape of the cut was cruciform. The north-south dimension was 1.4 m and the east-west dimension was 1.5 m. We do not know the overall depth of the cut, as we are not entirely certain from which elevation the cut was originally made. However, the depth of the cruciform part of the cut from the top of bedrock (through which the cut was made) averaged approximately .5-.7 m. The central sunken cut within the cruciform cut was a .56 X .62 m square approximately 1.20 m deep from the top of bedrock. The circular cut located within the central square cut was approximately 1.4 m deep from the top of bedrock and was .2 m in diameter.

After we had completely removed the offerings within cut CT 0846, we turned our interest to the large monolithic boulder originally encountered in Operation CT 05. Because the cut (CT 0862) for the monolithic boulder CT 0844 was cut through the same material as the cruciform cut, we suspected that the two might have been roughly contemporaneous. The boulder appeared to have been sealed by a floor CT 0201 on its eastern side (see Operation CT 02 discussion above), but that floor did not appear in the CT 08 excavation. Due to the limits of time, we were unable to fully investigate monument CT 0844, but we are certain that it is a large, shaped monolithic boulder without inscriptions. It was placed in front of Structure 7, parallel to its long axis (north-south) and it has dimensions similar to that of a stela, but curiously, has been placed into the ground on its lateral side. The stone was deposited into a cut CT 0862 made through a mottled gray/white fill CT 0864 (unexcavated in 2003), which extends from the front of the monolith, westward out to the preserved plaster floor CT 0837. We were able to expose most, but not the entire monument. The exposed portion of the monument was 1.4 m long and .4 m wide. The rest of the monument extended beyond the limits of the excavation. We hope to fully excavate this monument in 2004.

The only others contexts we encountered in 2003 were two floors, both of which surmounted bedrock CT 0839. Directly upon bedrock was floor CT 0838. CT 0838 was not excavated in 2003, so we are unsure of its extent and thickness. CT 0838 was located in the western end of Operation CT 08 beneath cuts CT 0805, 0809 and 0827. Cuts 0846 and 0862 did not cut through this floor. Floor CT 0837 was a 4-5 cm thick resurfacing of floor CT 0838 and only survived in a patch approximately .6 X .8 m just along the southern edge of the excavation. Both of these floors, along with floors CT 0828 and 0829, await complete excavation in 2004 to reveal their relationships with the offering cuts.

Stratigraphic Interpretations and Conclusions

In Operation CT 08, many thin and complexly interrelated contexts were encountered. Based on the stratigraphic relationships outlined above, we can reconstruct the currently known history of the area located to the west of Structure 7 and underneath Stela 2. The description that follows is a reconstruction of these events in time, starting with the earliest event and working to the most recent.

Construction at Cival on Structure 7 began on bedrock (CT 0839) which underlies all of Cival. It is soft, chalky and much like soapstone. Interestingly, all of the preexisting paleosol was stripped off the bedrock prior to the construction of plaza floors. It appears that the creation of the first version (phase) of Structure 7 may have been carved directly out of a natural rise in the bedrock. As noted earlier in this report, it appears that steps were carved into the face of a natural rise in bedrock. This act created a freestanding structure from the bedrock. It would only follow that the builders would also carve the bedrock into a plaza floor in front of the structure. Future excavations will explore these possibilities in more detail.

After the first phase of Structure 7 was erected (or possibly at the same time), a floor (CT 0838) was laid over bedrock. This floor may predate the earliest offerings to the west of Structure 7; however, many of the interfaces between the floor and the deposits have been lost. Clarification on this waits future excavation. Another floor (CT 0837) was laid over the original floor (CT 0838), but its stratigraphic relationship to the cuts is not entirely certain either, although it appears to precede the dedication of monument CT 0844 and the cruciform cut (CT 0846).

Some time later, a large monolithic limestone slab (CT 0844) with a regular shape and no decorative carving was placed on its side in front of Structure 7, parallel to its long axis (north-south). The stone has dimensions similar to that of a stela, but curiously, had been placed into the ground on its lateral side. It is likely that the dedication of the monolith was accompanied by an offering. The monolithic boulder is certainly intriguing and warrants further investigation. Given that its stratigraphic placement is somewhere in the Middle-Late Preclassic transition, it could be one of the earliest *in situ* stone monuments yet discovered in the Maya Lowlands. Perhaps even more interesting, is the fact that no other monument of this type has been discovered in the front of an E-Group eastern range structure.

At the same time that the monolithic monument was dedicated, or shortly thereafter at around 500 BC, an elaborate offering was interred just west of Structure 7 and in front of the large monolithic boulder. The offering clearly was made to commemorate the dedication of a single large post, of which only the void (CT 0841) from its rotted stump remains. The offering was begun as a series of concentric cuts, the most central being the deepest. The cardinaly oriented, cruciform cut into bedrock created was the main cut (CT 0846), while another square and another circular cut were dug in the center of the cruciform cut.

After the completion of the three concentric cuts, an offering was placed into the cut. Into the deepest central circular cut, a single jade celt was placed upright with its cutting edge facing upwards. In the square cut above this jade celt, four more jade celts were placed. Each jade was originally placed upright with the cutting edge facing upwards in each of the cardinal directions. In the space between the celts, some 110 more pieces of blue and green jade polished pebbles were scattered, with the highest quality translucent bluegreen jade pebbles circling the central jade celt. Covering the jade offering, a single large, restricted neck, black-slipped ceramic jar was placed. In the west and north arms of the cut, two black slipped jars were placed, to the south a red-slipped jar was placed, and finally to the east a black-slipped jar with a chamfered neck and post-slip, pre-firing incision was deposited. The overlying fill had crushed all five vessels, but each was crushed in its original location.

Several layers of stone fill, marl fill, plaster and black clayey soil capped the whole of the offering. First, several large limestone blocks were placed upon the vessels, and the whole offering was capped by a plaster seal. On top of the plaster capping, a post was placed and secured with fill CT 0866, however, all that remained of the post was the void (CT 0841) left from its rotted base (CT 0865). It is interesting to note that a layer of thick black clay was deposited over the whole offering and nearly up to the base of monolith CT 0844. At the moment the purpose of the black clay fill (CT 0864) is unknown, although a layer of black fill covered Cache 7 at Seibal: a similar cruciform offering of jade celts and ceramic vessels dating to the Real/Xe (c.a. 900-800 BC) ceramic sphere (Smith 1983: 115, Fig 98c). The black clay may have accumulated naturally, or, given the presence of a similar fill in the Seibal cache, may represent a specific aspect of the ritual deposit.

Although unconfirmed by the disturbed stratigraphy, the cruciform cache was likely capped by burnt floor CT 0829. Given the wealth buried within the cruciform cache, it would not be surprising if the ceremony were accompanied by the burning of massive amounts incense on the floor that sealed the offering. The burnt floor (CT 0838) was later resurfaced with floor CT 0837.

In the Late Preclassic period, another offering was made in this location. This one was placed just to the west of the previous cruciform offering and it cut through part of its plaster cap and fill. Into this cut (CT 0827), two ceramic vessels, a marine shell, a piece of hematite and two pieces of greenstone were interred. Although unconfirmed by the disturbed stratigraphy, this offering was likely dedicated to a wooden post, which was secured with stone bracing. The offering was then sealed with a plaster floor (CT 0804).

After the dedication of the previous monument and offering (within CT 0827), another offering and monument were dedicated in the area some .6 m to the west. This new offering was likewise made during the Late Preclassic period. It cut through the pre-existing plaza floor (CT 0804) and contained

bracing to support a stela. The stela had been removed in antiquity, but the dedication offering at its base still remained. The offering consisted of Sierra Red bowl placed above two marine bivalve shells which encapsulated a perforated shell disc, a tubular jade bead, a hematite flake, and cinnabar powder. The cut for the monument was large enough to have received Cival Stela 2 or any other stela of the same size for that matter, however, there is no direct connection between Cival Stela 2 and this cut other than the fact that Stela 2 was found to lie directly above the cut above topsoil.

Just .6 m west the stela offering, and likely dedicated at the same time, another monument and offering were made. The cut (CT 0809) for this offering was too small and too shallow to have supported a stela, and it appears to have been made for a stubby altar, the stump of which (CT 0845) was still *in situ*. This altar fragment surmounted an offering of 8 ceramic vessels arranged in a cruciform pattern. The vessels were arranged in pairs, lip-to-lip and each pair consisted of a cylinder vessel and a shallow vertical-walled bowls.

It is probable the two monuments originally placed into cuts CT 0805 and CT 0809 were contemporaneous. Both offerings cut through the same fill layer CT 0808, and both were filled with large broken stela fragments after their original monuments had been exhumed. The same cobble fill/sub-floor fill layer CT 0802 also capped both groups, indicating that both were ritually de-sanctified and then later sealed by the same floor. If contemporaneous, the two offerings may represent the introduction of the stela-altar cult at Cival and may be one of the earliest such monument assemblages documented in the Maya Lowlands.

These two monuments stood for some time, perhaps even until the end of the majority of the occupation of Cival had dispersed, before they were ritually removed and a new and final plaza floor (CT 0802) was paved over the voids left by their absence. Into the unoccupied voids that previously had supported the monuments, several fragments of stelae were deposited: on top of which, a single ceramic bowl was placed.

After the abandonment of the site, topsoil (CT 0801) accumulated and then looting took place (CT 0800).

Conclusions:

Excavations carried out on the western face of Structure 7 revealed a great deal about the structure's history and the history of the monuments dedicated to it. No fewer than five stone and wooden monuments were dedicated on the western front of Structure 7, and perhaps more. Nearly all of these monuments were dedicated with the deposition of a cache. Excavation of the large monolithic boulder CT 0844 in 2004 may reveal another offering. As Structure 7 grew, each monument was either removed or buried, and a new monument was dedicated just west of the preexisting one. Some of the monuments appear to have been contemporaneous, so that two monuments were visible during a single phase of Structure 7. The last monuments erected in front of Structure 7 likely formed a stela-altar assemblage that was completely removed and paved over by a new plaza surface. At least five plaza floors were created in the E-Group plaza; however, the relationship between the earliest floor (CT 0838 and 0837) to the chronology of Structure 7 and its monuments and offerings is as yet unclear. Likewise, the relationship between the burnt plaster floor CT 0828 and Structure 7's monuments is also unclear.

Investigations of Structure 7 itself revealed a sequence of building phases dating back to the Middle Preclassic period. The earliest version of Structure 7 appears to have been carved out of bedrock. Subsequent versions were fashioned with stone and mortar. In all, at least five phases of construction have been noted in the looters trench examinations. In its final phase, Structure 7 appears to have supported large stucco masks, as evidenced by armatures for modeled stucco. According to preliminary ceramic analysis, all phases seem to date to the Preclassic period.

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Figures

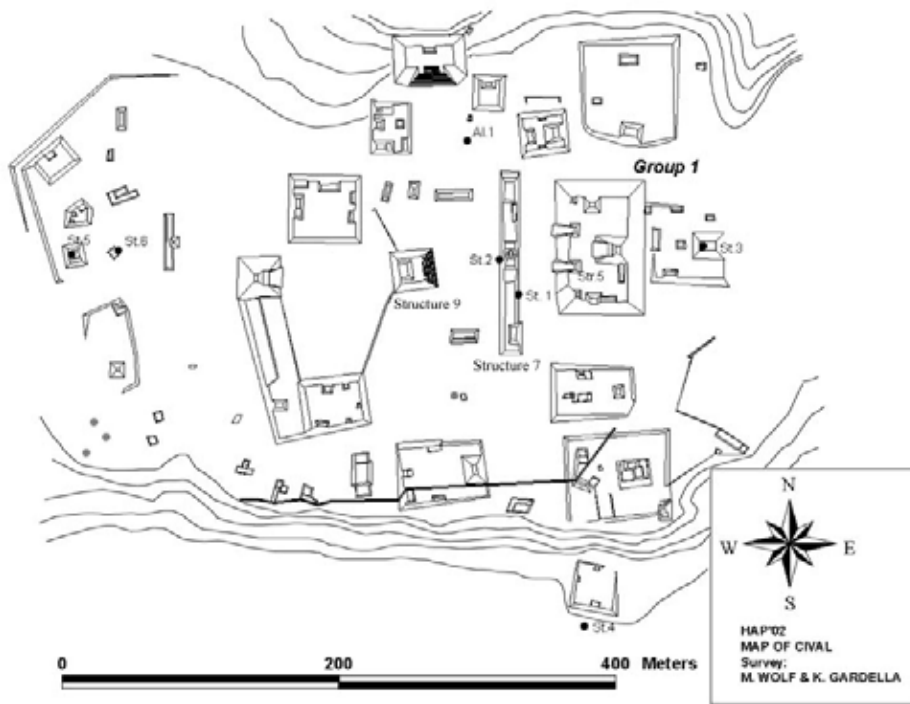


Figura 1. Map of Cival (as of 2002)



Figure 2.

HOLMUL 2003
Cival
Stela 2
CIV.T.08
Plan
23/06/03
M. Morgan & J. Bauer

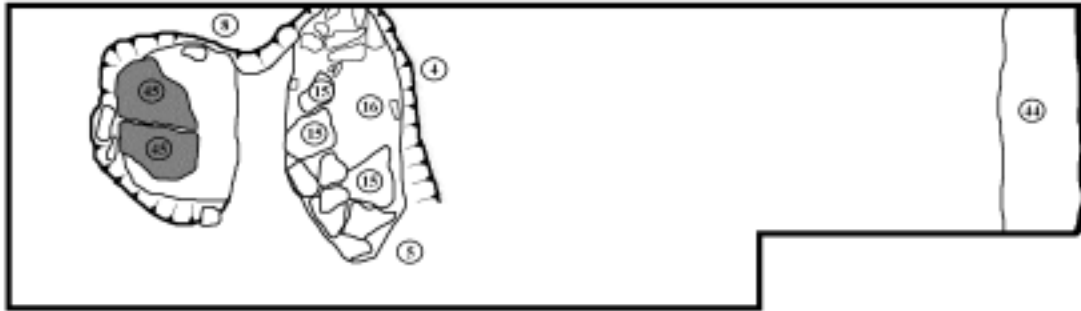


Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12. Cut CT08.17



Figure 13. Cache CT08.17



Figure 14. Cuts CT08.05 and CT08.17

HOLMUL 2003
Cival
Stela 2
CIV.T.08
Plan
23/06/03
M. Morgan & J. Bauer

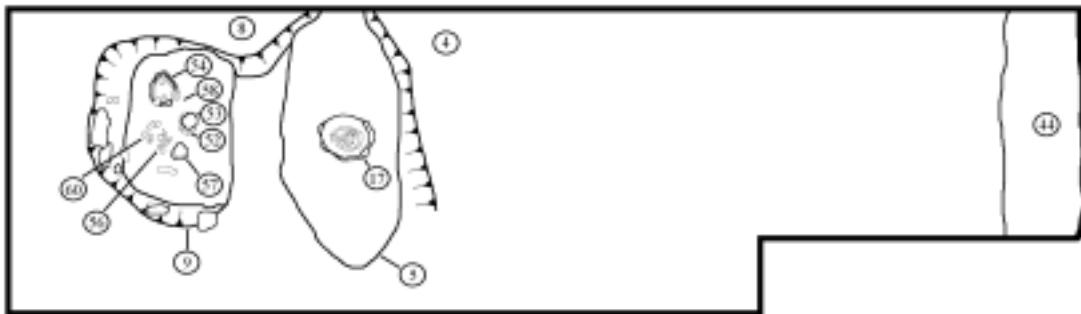


Figure 15. Cuts CT08.09, CT08.05 and CT08.07.



Figure 16. Cache CT08.27



Figure 17. Cache CT0825



Figure 18. Pital Cream jar in cut CT08.27

HOLMUL2003
Cival
Seela 2
CIV.T.08
Plan
23/06/03
M. Morgan & J. Bauer

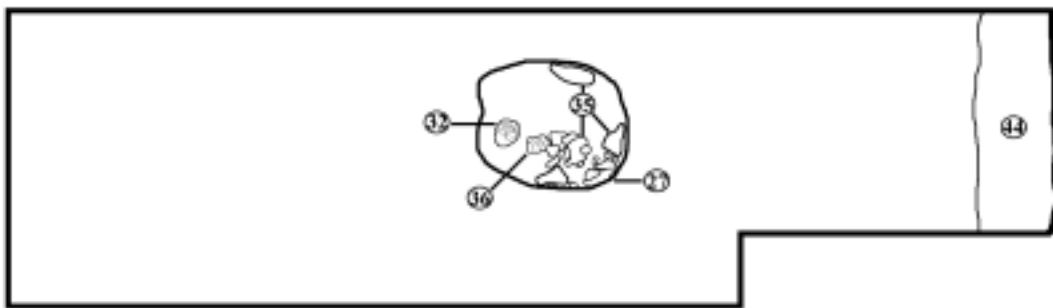


Figure 19. Offering CT08.27.



Figure 20.

HOLMUL 2003
Cival
Stela 2
CIV.T.08
Plan
23/06/03
M. Morgan & J. Bauer



Figure 21. Cuts in cache CT08.46 including post hole CT08.41.



Figure 22.



Figure 23. Cruciform cache of jars and jades (CT08.46).



Figure 24. Cache of 5 celts and 114 jade pebbles in cruciform arrangement.



Figure 26. Plan view of bedrock cut CT08.46 with central round pit where upright celts was found.

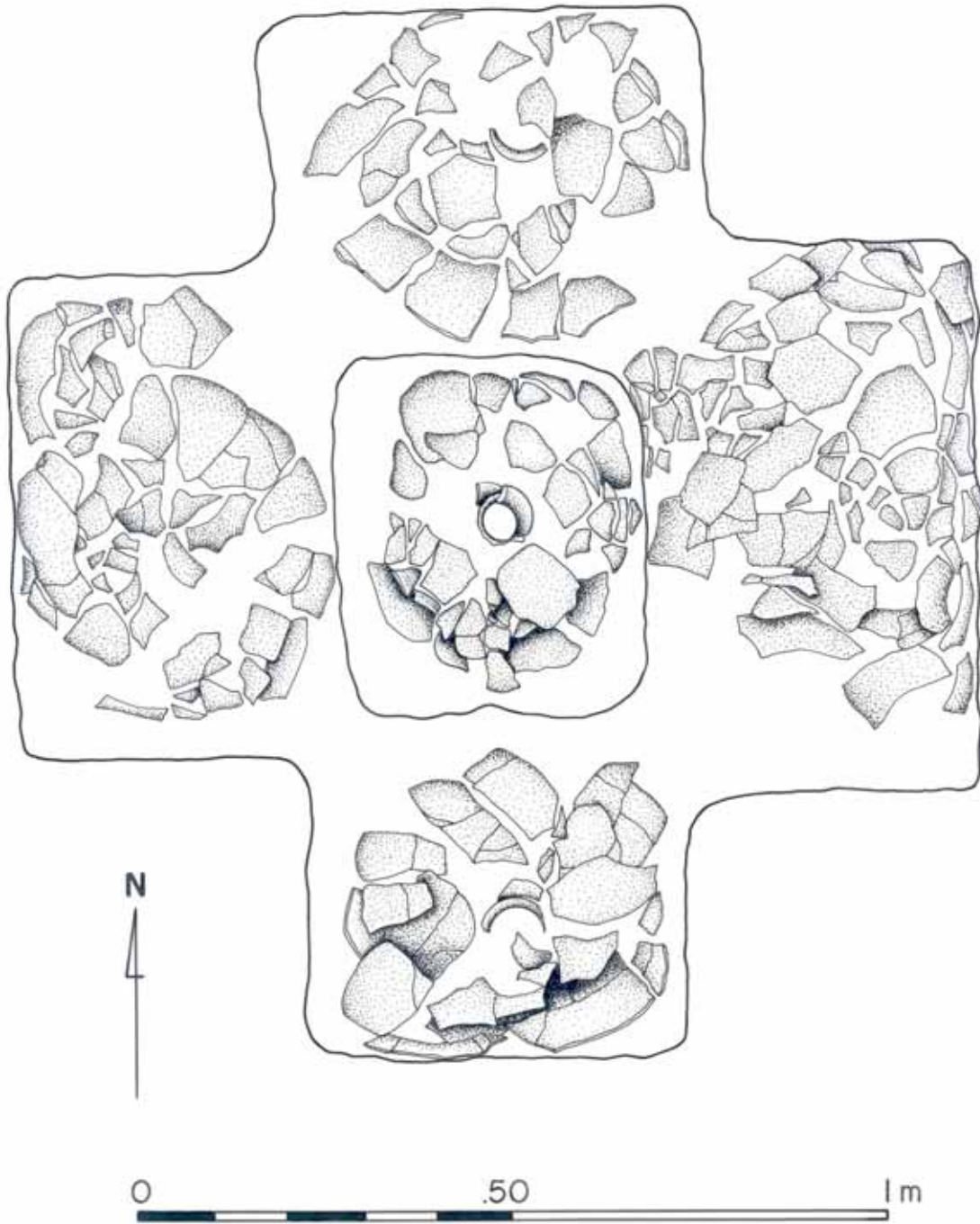


Figure 27. Plan of cache in cut CT08.46

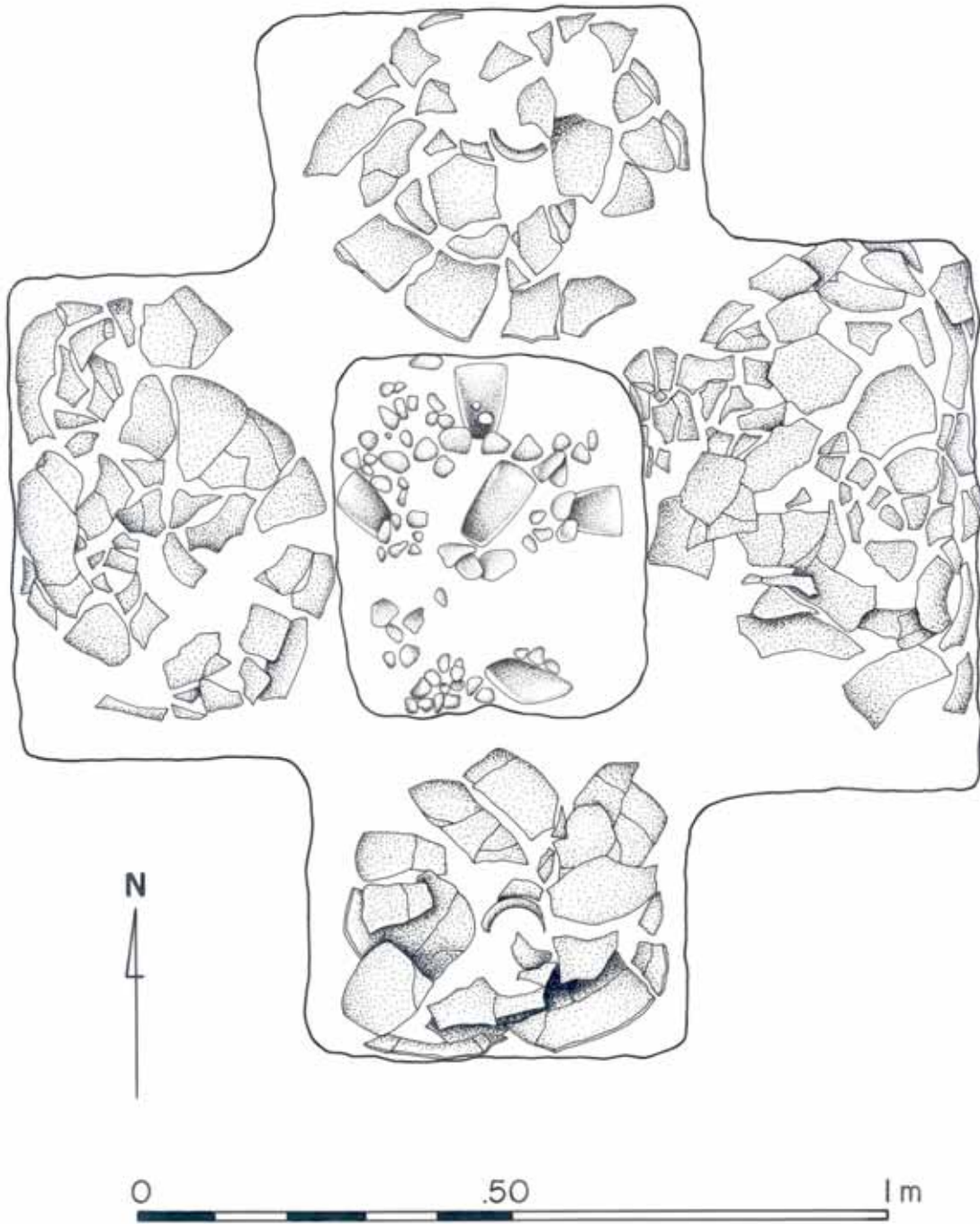


Figure 28. Plan of cache in cut CT08.46, showing jades in lowest central pit.



Figure 29. Partially reconstructed jars and lithics from offering CT08.46.



Figure 30. Artist's reconstruction of cache CT08.46. (Joel Zovar)



Figure 31. View to east of trench CT08.

HOLMUL 2003
Cival
Stela 2
CIV.T.08
Plan
23/06/03
M. Morgan & J. Bauer

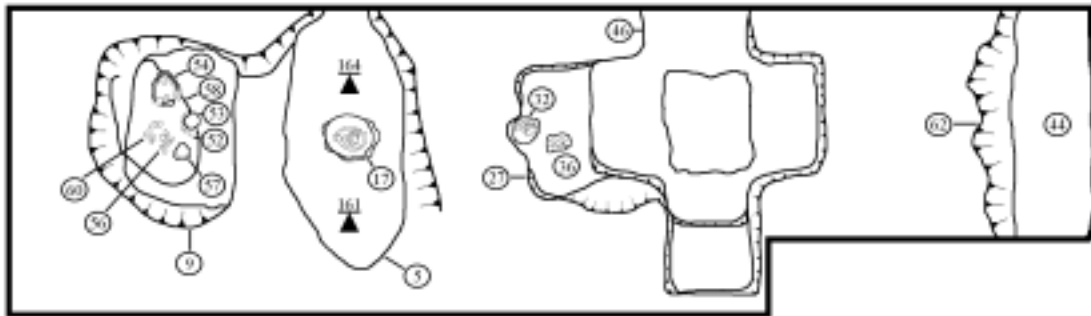


Figure 32. Excavation plan with main features cut into bedrock exposed in 2003.

Operation CT 03: Excavation of Stela 6 at Cival, Petén Guatemala

Nick Bentley

Introduction

Operation CT 03 investigated Stela 6 at Cival during the 2003 field season. Stela 6 is located at the extreme western part of the site and its fragmentary remains were strewn about the plaza in a circle approximately 4 m in diameter. Due to the badly shattered remains of the stela, a primary goal of this operation was to see if we could determine the original location and context of the stela and to see if any of its broken pieces contained inscriptions. A second goal was to dig a test unit down to bedrock in order to determine the plaza's various construction phases. Our efforts in Operation CT 03 discovered the eroded remains of at least five plaza floors, the last of which appears to have been cut for the placement of Cival Stela 6, the butt of which still remained *in situ*. Excavations to the north and south of Stela 6 failed to produce a dedicatory offering with which to date the stela.

Methodology

A 4 m x 2.5 m trench was dug around the largest pieces of the stela, and soil was removed until plaza floors were encountered. A 2 m x 0.5 m extension later was added to the south of the original trench, just behind Stela 6. Test units were dug to the north and south of the supposed stela base, and a third one was dug in the northwest corner of the trench. All dirt was screened using 6 mm screen. A profile of Test Unit-1 was drawn at 1:10 scale, and an overview of the entire trench was drawn at 1:20 scale. All of the descriptions that follow begin with the latest (most recent) event and work back to the earliest (most ancient).

Description & Interpretation

CT 0301: The first layer of the trench, bounded on the bottom by one of the several floors encountered in the structure. The sherds obtained in this area were generally too damaged by root growth to yield any valuable analysis. Soil was light brown, and contains large amounts of organic matter.

CT 0302: The highest of the plaza floors (Floor 5). Any smooth surface that this floor may have once possessed has since been completely eroded. This context was composed primarily of large cobbles held together with plaster. CT 0302 generally only appeared in the eastern half of the excavation.

CT 0303 The next highest floor (Floor 4). Composed of large cobbles and plaster. The surface of the floor was generally well preserved when found underneath floor 5, but much more eroded when directly under CT 0301.

CT 0311 The various parts of the fragmentary stela found throughout the excavation.

CT 0312 The cut for the stela butt.

TEST UNIT 1

Test Unit 1 was dug with the goal of reaching bedrock in order to determine the various construction phases of the plaza. The dimensions of the trench were 1 m x 1 m, and it was located 60 cm from both the northern and western limits of the excavation. Bedrock was ultimately reached at a level of 189 cm, and the unit yielded six additional contexts, corresponding to three additional construction phases.

CT 0304 The best preserved of all the floors in this trench (Floor 3). Furthermore, this floor was found throughout the trench, at the bottom of both Test Unit-2 and Test Unit-3. This and all subsequent contexts were found in the excavation of Test Unit-1.

CT 0307 Very large limestone rocks with light gray soil. Interpreted as a layer of fill for floor 3. Artifacts from CT 0307 have been bagged together with CT 0304.

CT 0305 A thin layer of plaster surmounting cobbles, more or less flat, but very eroded. Called Floor 2.

CT 0308 Very fine gray soil. Very few rocks, and no organic material. This context also held a large amount of small finds including beads, obsidian, and several pieces of animal bone, which contained a large canine tooth. Artifacts from CT 0308 have been bagged together with CT 0305.

CT 0306 Several large limestone rocks separating two distinctly different types of soil. Called Floor 1.

CT 0309 Very dark gray soil with bluish tints. No large rocks, but very little material passed through the screen. This context appears to have been paleosol.

CT 0310: Bedrock.

TEST UNIT 2

Test Unit 2 was excavated to see if there was evidence of any earlier cuts to the North of the stela. The dimensions of the trench were 50 cm x 50 cm, and it was located 1 m from the east wall and 1.4 m from the north wall. After 20 cm, Floor 3 was encountered, a construction phase that predates the placement of the stela.

TEST UNIT 3

Test unit 3 was dug in the southern extension in order to investigate a possible cut in Floor 5. This test unit also hit floor 3 after 10 cm, yielding little more than a small fragment of a jade bead. The dimensions of the trench were 50 cm x 170 cm, and it was located entirely within the southern extension.

Conclusion

The original location of Cival Stela 6 was near the southeast corner of Operation CT 03, and the butt of the stela was still in its original place in cut CT 0312 with stone bracing used to support the stela still in place. The fragmentary parts of the stela failed to reveal any inscriptions, suggesting that the stela was originally blank, or that any original inscriptions have since eroded.

We can determine that the date of the stela postdates or coincides with the final construction phase of the plaza floor (Floor 5). There was, however, no evidence of any caches to the north or south of the monument. We know this because test units on either side of Stela 6 encountered Floor 3: a floor that predates the stela dedication. This does not preclude the possibility that an offering was placed *beneath* the stela, as opposed to behind or in front of it.

Further research may be warranted for the context CT 0305. The presence of what was quite possibly a jaguar tooth (as well as several bones) and fine grain dirt distinctly different from the contexts below and above might indicate that this context was some kind of offering which was later capped and covered by Floor 3.

Cursory ceramic analysis has failed to place a date for the dedication of Cival Stela 6, but future investigations may yield a relative date for its dedication. As mentioned the offering dedicating Stela 6 may yet lay beneath it. Given the discoveries by Morgan and Bauer near Structure 7 (see Morgan and Bauer this volume) the likelihood that an offering exists beneath the *in situ* stela is high, especially if the stela was dedicated during the Preclassic period.

Cival Looters' Trench CL04

Daniel Leonard

Introduction

During the 2003 season I had the pleasure of working at Cival, a satellite center located 4km northeast of Holmul. My work focused on a structure, Str. 31, at the western periphery of the ceremonial sector, about 30m west of stela 6. A looter's trench, 20m long x 1 m wide x 5m high, had been cut into the east side of the mound, more or less along the center line. The goals were to clean out the trench, draw the profile, and lay out the construction sequence and temporal span of the building's use.

Methodology

Looter backdirt was removed with shovel and bucket down to the point where the original stratigraphy resumed. All dirt was screened using 1/4in. mesh. Both walls of the trench were scraped down to expose clearly the cross-section, and the south profile was drawn at 1:20 scale.

Description and Interpretation

3 construction phases were identified for this building, and based on preliminary ceramic analysis, all phases date to the Preclassic period.

Phase 1

CL4.19 (Wall 3) – Deposit: this is a north-south running wall 3 courses high made of large, cut-faced limestone blocks (55cm tall x 40cm deep) and mud cement.

CL4.5 – Deposit: construction fill consisting of very large, irregularly shaped limestone boulders mixed with all sizes of cobbles, pebbles, and loosely packed grey and light brown soil.

CL4.20 – Deposit: retaining wall made of 12 irregularly shaped limestone blocks, placed 60cm behind (to the west of) Wall 2; 130cm tall.

CL4.17 (Wall 2) – Deposit: north-south running wall, 7 courses, made of cut-faced blocks with mud cement; 136cm tall x 40cm deep.

C0L4.18 (Floor 3) – Deposit: poorly preserved lime plaster floor 6cm thick.

CL04.16 (Floor 2) – Deposit: rough, choppy lime plaster floor 4cm thick.

Phase 1 is a two-terraced structure, 2m high, made of cut limestone blocks, rubble construction fill surmounted by plaster floors. The construction sequence begins with a 1meter high retaining wall made of cut limestone blocks (CL04.19), behind which a layer of rubble (CL04.05) is laid down. The inset retaining wall (CL04.20) is then placed on top of this layer of rubble (about 3m west of Wall 3) and the

area behind it is then packed with more of the same rubble (CL04.05). Next, Wall 2 (CL4.17) is erected just in front (to the east) of the retaining wall (CL04.05), and the space between the two is filled with yet more rubble fill. Finally, Floor 3 (CL4.18) is laid on top of rubble fill (CL05.04) and overlaps Wall 3 (CL4.19), forming the first and lowest terrace. Floor 2 (CL4.16) is then laid on top rubble fill (CL04.05) and overlaps Wall 2, thus forming the second terrace of the first phase of the structure.

Phase 2

CL4.15 (Wall 1) – Deposit: north-south running wall composed of cut limestone blocks and mud cement; 7 courses, 1.64m tall. The top course forms a cornice, overhanging the rest of the wall by 10cm.

CL4.03 – Deposit: construction fill composed primarily of very large, irregularly shaped limestone blocks as well as pebbles, plaster clumps, and a layer of plaster close to the top. Medium-packed, grayish brown silty soil fills the spaces in between.

CL4.21 (Floor 1) – Deposit: very smooth, well preserved, 6cm thick plaster floor with a thin layer of brown at the top, most likely due to some burning event.

During Phase 2, a third terrace is added to the building. It begins 3m west of Wall 2 (CL4.17) and sits directly on top of Floor 2 (CL4.16). Wall 1 (CL4.15) is erected first. The space behind Wall 1 (CL4.15) is filled with large-block rubble (CL4.03), and finally Floor 1 (CL4.14) caps the construction fill (CL4.03) and overlaps Wall 1 (CL4.15).

Phase 3

CL4.14 (Floor 1a) – Deposit: very smooth, well preserved, 6cm thick plaster floor with a thin layer of brown at the top, most likely due to some burning event.

CL4.22 – Deposit: eastern wall of the tomb, made of large, flat, roughly cut limestone blocks held together with mud cement.

CL4.23 – Deposit: western wall of the tomb, made of large, flat, roughly cut limestone blocks held together with mud cement.

CL4.04 – Deposit: 10cm thick layer of probable disturbed gray soil, the remains of the fill for the burial.

CL4.24 – Deposit: capstones for the tomb made of massive, cut rectangular limestone blocks measuring approximately 80cm wide x 30-50cm wide.

CL4.13 – Deposit: rubble piled above the tomb, including massive, irregular limestone blocks, patches of plaster, cobbles, pebbles, all surrounded by a matrix of grayish brown dirt.

Phase 3 is represented by a tomb built on top of Floor 1a (CL4.14), about 5m in (west of) from Wall 1 (CL4.15). The tomb is oriented along a north-south axis; its interior dimensions are 60cm wide x 70cm high x 180cm long. A small pillow of plaster (6cm high x 15cm deep) at the south end of the tomb may indicate that the head was laid at the south. The position of the tomb is probably the center of the third

terrace. Floor 1a (CL4.14) appears to be a repaving of Floor 1 (CL4.21), and like Floor 1 (CL4.21), it shows a thin layer of burning at its top. It seems reasonable to suggest that Floor 1a (CL4.14) is associated with the construction of the tomb: before the burial of the deceased, Floor 1 (CL4.21) was repaved to form Floor 1a (CL4.14); the tomb was built, then there was a burning event, probably connected with the interment of the individual. Floor 1a (CL4.14) was laid down, then the sides of the tomb were built (CL4.22 and CL4.23). Subsequently, the body was interred and the rest of the tomb filled with rubble. The capstones were placed to cover the tomb, and finally, rubble was piled around the tomb in order to bury it.

Features

CL4.25 – Cut:

CL4.09 – Deposit: fill for cut CL4.25. Loosely packed brown dirt with many pebbles and small cobbles.

CL4.26 – Cut:

CL4.10 -Deposit: fill for cut CL4.26. Slightly darker brown soil than that in CL4.09, with an even greater percentage of pebbles and cobbles.

CL4.27 – Deposit: curved wall of large, irregularly shaped limestone cobbles place on top of Floor 3 (CL4.19) and abutting Wall 2 (CL4.17).

CL4.11 – Deposit: fill behind the curved wall (CL4.27): dark brown soil with 30-40% small cobbles and pebbles.

Several events, resulting in the above features, occurred at some point after the first phase of construction, but the relationship of these events to the other phases cannot be known without further excavation. A 130cm deep cut (CL4.25) was made into Floor 2 (CL4.16) between Wall 2 (CL4.17) and the retaining wall (CL4.20). The cut was filled with soil (CL4.09) and presumably capped by a repaving of Floor 2 (CL4.16), although the section of Floor 2 (CL4.16) above the cut (CL4.25) is missing. (In the north profile the cut is capped by Floor 2 (CL4.16); in the south profile this section of the Floor 2 (CL4.16) most likely was destroyed by erosion or slumping after abandonment of the structure). Later, another cut (CL4.26) was made, presumably again through Floor 2 (CL4.16), into the preexisting pit (CL4.25/CL4.09) but this time only about 50cm deep. This later cut (CL4.26) was filled with soil (CL4.10) and again, presumably capped by Floor 2 (CL4.16) as we see in the north profile, but this section of the floor (CL4.16) is absent in the south profile.

Outside (to the east) of Wall 2 (CL4.17), a small, arching wall of stones (CL4.27) was placed on top of Floor 3 (CL4.18) with the top course abutting Wall 2 (CL4.17). The arched wall (CL4.27) enclosed a small space 80cm tall x 40cm wide, and contained a dark brown soil (CL4.11).

All three of these features may have contained burials, perhaps linked to a new phase of construction. However, no skeletal remains were recovered from these features in either the north or the south profile during cleaning. Since the looter's trench is located roughly on the east-west center line of the building, if the features had contained burials the skeletons were destroyed or removed by the looters.

CT6 Test Unit

In order to expose the entire sequence of construction for this building down to bedrock, a 1m x 1m test unit was placed into the floor of the looters trench just behind (to the west of) Wall 2(CL4.17). The south wall of the test unit is flush with the south profile of the looters trench. The unit was excavated using pick and trowel, and all dirt was screened in 1/4 in. mesh.

Description and Interpretation

Phase 3-sub

CT6.01 – Deposit: Gray, silty dirt mixed with dark brown soil, limestone pebbles, and irregularly shaped cobbles measuring 5-10cm in diameter. This level is approximately 40cm thick. Artifacts include 28 pot sherds and 1 chert flake.

CT6.02 – Deposit: light gray marly fill with lots of bits of plaster and large limestone cobbles up to 40cm in diameter. The level is 60cm thick and artifacts include 67 sherds, 1 shell bead made from a conch, and a Preclassic figurine head.

CT6.11 – Deposit: 10 cm thick layer of brown soil with 40% limestone pebbles. It is visible in the east profile but not clear in the others. This layer was missed in plan view and no artifacts were taken.

CT6.03 – Deposit: light gray soil with many plaster inclusions, lots of gravel, and limestone cobbles from 20-40cm in diameter. Level is 20cm thick and 14 sherds were collected.

Except for CT6.01, which is a mixed context of looter backdirt and Maya construction fill, Phase 3-sub contains several types of Maya construction fill that merge with the fill (CL4.05) seen in the looter's trench profile, and therefore are part of Phase 1.

Phase 2-sub

CT6.04 – Deposit: rough, gray marl layer 30cm thick with small pebbles 2-5cm in diameter. Artifacts include 22 sherds and 1 conch shell bead.

CT6.05 – Deposit: dark brown, compact soil with specs of plaster, approximately 40% pebbles, and a few cobbles measuring 10-30cm in diameter. Level is 40cm thick and 72 sherds and 7 chert flakes were collected.

CT6.06 – Deposit: dark brown, compact soil with specs of plaster, approximately 40% pebbles, and a hard, smooth layer of marl at the top. The level is 25cm thick and artifacts include 64 sherds and 5 chert flakes.

CT6.07 – Deposit: 30cm thick layer of limestone cobbles ranging from 15-40cm in diameter with very little dirt in between. Artifacts collected include 24 sherds and 2 chert flakes.

CT6.08 – Deposit: dark brown, very compact layer of soil 20cm thick with few inclusions. Artifacts include 16 sherds and 6 chert flakes.

Phase 2-sub is construction fill for floor CT6.04. Contexts CT6.05, CT6.06, and CT6.07 are similar in consistency and could have been excavated as one context. Context CT6.08 is distinct from the above fill (CT6.05/CT6.06/CT6.07), but is fill nonetheless for floor CT6.04. Floor CT6.04 was laid on top of fill (CT6.05/CT6.06/CT6.07/CT6.08). However, floor CT6.04 was absent in plan view, and only could be seen in the south section wall and the corner where the south and east section walls meet. Perhaps it was cut by the Maya, or simply it did not preserve in the small area encompassed by the test unit. Still, it represents the plaza floor that existed before the above structure was erected, and should connect with plaza floors identified in Nick Bentley's test unit at stela 6.

Phase 1-sub

CT6.09 – Deposit: plaster floor of mediocre preservation, about 3cm thick and only present in 50% of the plan.

CT6.10 – Deposit: paleosol – extremely compact layer of clay, nearly black in color, with some small cobble up to 20cm in diameter and pebbles.

Phase 1-sub represents the earliest plaza floor (floor CT6.09). It was laid down on top of the paleosol (CT6.10), which sits directly on bedrock. The Maya initially probably used the bedrock as a floor surface, then later put a small layer of fill(CT6.10) on top of the bedrock and built the first true plaster floor(CT6.09).

Conclusions

Together, excavation of CT6 and cleaning of the CL4 looter's trench revealed 5 phases of construction in the vicinity this structure: first plaza floor(CL4.09), second plaza floor(CL4.04), first two terraces of the structure, addition of a third terrace to the structure, and finally a tomb built on top of the third terrace and covered in rubble. Sierra Red sherds, many with gouged lines running around the rim, show up in all five phases. Other ceramic types present include Joventud Red, Polvera Black, and possibly Pital Creamware. Along with Sierra Red, these types, all dating to the Preclassic, occur consistently in almost all contexts of all phases. The initial impression was that the structure dated to the Late Classic based on the somewhat mediocre limestone block and mud cement construction. However, preliminary ceramic analysis suggests that all phases of construction here – the 2 plaza floors and the subsequent structure with its three phases – date to the Late Preclassic and possible earlier.

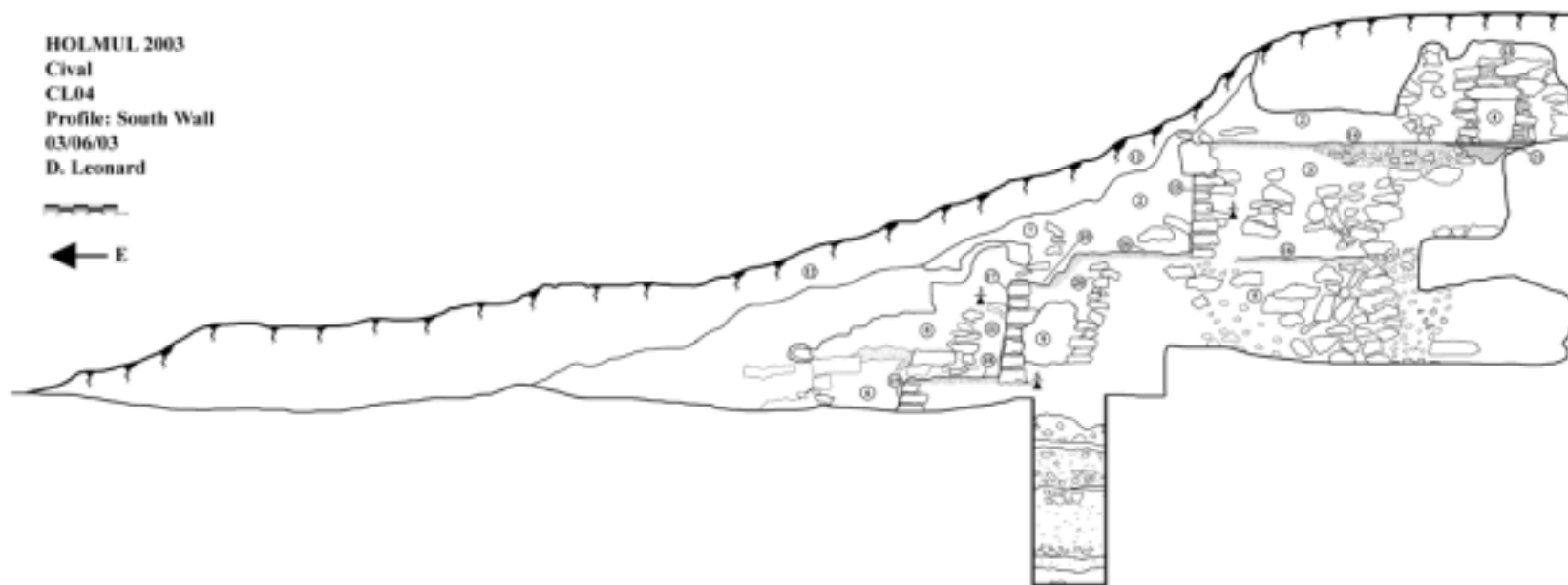


Figure. South profile of CL04 looters trench in Cival Str. 31

Excavación en la Estructura 1 de Cival

Angel Chavez Castillo

INTRODUCCIÓN

El Proyecto Arqueológico Holmul, (HAP por sus siglas en ingles), abarca en su totalidad cinco sitios o grupos de mucha importancia, y uno de estos sitios se le conoce como Cival.

El sitio de Cival, un sitio preclásico, primeramente fue reportado, nombrado y mapeado por Ian Graham en 1984 y desde el año 2001 se le han estado haciendo investigaciones por el proyecto ya anteriormente mencionado. Su centro ceremonial o ritual esta situado en el margen izquierdo del río Holmul, en una cordillera muy alta de un área de 1000 * 500m viendo hacia una pequeña aguada al sur y el río Holmul hacia el este. Dicho sitio se encuentra en las coordenadas NE – SW, aparentemente un lugar estratégico para el acceso a la ruta del río hacia el norte.

La plataforma mas alta del sitio, el Grupo 1, localizada en el extremo este de la cordillera, es una plataforma de templos múltiples midiendo 70 * 40m soportando 5 pequeños templos – pirámides. Estos cinco edificios forman en conjunto un grupo triádico lo que nos hace recordar un diseño bien reconocido para unos pocos sitios preclásicos del Petén.

DESCRIPCIÓN

La temporada del Proyecto Arqueológico Holmul se inicio el 16 de mayo del 2003. En el sitio de Cival se situaron varios puntos de investigación uno de estos puntos estaba en la Estructura 1 de la pirámide triádica anteriormente mencionada. Dicha estructura anteriormente había sido dañada por saqueadores, tiene dos enormes trincheras de saqueo, una del norte hacia el sur y la otra del este hacia el oeste.

En la trinchera que esta hacia el poniente, los saqueadores mejor conocidos como “huecheros”, dejaron expuestas las paredes de la sub estructura de la Estructura 1. La pared norte de la sub estructura se encuentra aun con estuco y tiene una pequeña ventan por la cual se nota una franja aproximadamente de unos 15cm de ancho pintada de rojo. Luego siguieron destruyendo la sub estructura y llegaron a una esquina de la pared este y le hicieron un corte de unos 20cm de ancho. En esa pequeña abertura fue que nos dimos cuenta de que la pared este de la sub estructura posiblemente podría estar decorada con un mascarón. La forma por la cual nos pudimos dar cuenta de esto es que por la abertura ya mencionad se podía meter la mano en espacios libres que había entre pared y relleno y al meter la mano se podía sentir algo moldeado en alto relieve.

La investigación en esta pirámide seria pues tratar de ver si en realidad la sub estructura de la Estructura 1 estaba decorada por un mascarón, y la única forma de hacer esto seria haciendo un túnel empezando del frente de la Estructura 1 hacia el poniente tratando de llegar al punto exacto de la abertura de la esquina ya mencionada de la sub. Para lograr esta meta tuvimos que tomar medidas exactas alrededor de la estructura. Primero se tiro una pita nivelada hacia el este, esta pita tiro de la esquina de la sub

estructura anteriormente mencionada hasta la falda de la estructura 1, luego se puso otra pita en dirección sur aquí ya solamente siguiendo la falda de la Estructura 1, al llegar a la esquina de la estructura se tiro otra pita hacia el oeste nuevamente al llegar a la otra esquina de la estructura se tiro otra pita hacia el norte, esta con la misma medida que tenía la primera pita que estaba en dirección sur, luego de haber tomado la medida se tiro la última pita nuevamente hacia el este. El punto de esta pita fue a dar a unos cuatro metros de la base de la estructura, al haber llegado a este punto todavía se le bajo se le bajo un metro mas para poder llegar al punto deseado de la sub estructura.

Al haber logrado este punto se midió un metro hacia el norte lo cual sería el ancho del túnel, luego de haber trazado el cuadro del túnel se le tomo fotos para referencia y el 17 de mayo del 2003 se empezó a excavar, a esta excavación se le llamo CT1. Se quito la capa de humos, en la cual no se encontró mucha evidencia de cerámica, a esta capa se le llamo contexto 1. Al haber quitado se llego a la tierra gris ya mezclada con relleno a esto se le llamo contexto 2 y en este contexto ya se empezó a ver cerámica y como era de esperab a la cerámica es preclásica. Siguiendo la excavación en el mismo contexto, el 18 de mayo se encontraron las gradas de la Estructura 1, esto solamente a 2m 6cm del inicio de la excavación. En esta parte el túnel ya tenía 2m 36cm de alto lo cual nos hizo posible ver cuatro gradas de la Estructura 1. Luego de haberlas descubiertas se extendió la exacción un metro mas esta vez para el sur, se hizo esto por la razón de era necesario quitar las gradas para poder continuar con el túnel y era necesario dejar evidencia de la existencia de gradas por este lado de la estructura y también para ver si dichas gradas continuaban y no hacían esquina precisamente en este punto. Ya teniendo todo esto se procedió a dibujar para dejar record de las piedras de gradas que se iban a quitar de sus lugares. Se dibujo el perfil norte, planta y perfil este de la excavación. También se le tomo fotografías. Al tener todo esto hecho se procedió a quitar las gradas en el mismo metro en el que se había empezado. Dichas gradas fueron muy difíciles de quitar por la razón de estaban pegadas con especie de mezcla muy compactada de unos 40cm de ancho. A esta mezcla se le llamo contexto tres.

El 20 de mayo ya se empezó a excavar en lo que es el relleno que hay entre la última fase de construcción y la sub estructura. A este se le llamo contexto cuatro, en esta parte ya se empezó a ver mas cerámica siempre preclásica, esta cerámica muy bonita con engobe pero también se nota la presencia de la cerámica utilitaria. El 22 de mayo se llego a lo que podría ser un pequeño muro de contención, este muro que era piedra sobre piedra pudo haber sido para que el relleno ya con una masa de piedras grandes no fuera a dar directamente a las gradas de la estructura. A este muro también se le tomo foto y se dibujo. Ya registrado se quito para poder seguir con la excavación del túnel.

Al tener unos cinco metros de profundidad en el túnel la visibilidad ya no era muy buena así que hubo necesidad de poner focos de luz los cuales generaban la luz por medio de una planta. Se siguió excavando pero se notaba que el túnel no estaba muy seguro, el relleno se miraba muy flojo, esto debido a que la estructura se veía aun mas debilitada con el túnel por que ya como habíamos dicho antes tenía dos trincheras de saqueo.

El 27 de mayo luego de haber excavado seis metros de profundidad en el túnel se llego al punto que intentábamos llegar y resulto que las formas podíamos tocar por el lado de atrás era una enorme orejera de un mascarón. Lo que primeramente se encontró fue una forma como de caracol y abajo pegado a este un lazo con un nudo, todo esto tallado en alto relieve y muy bien conservado. Como esto se encontró en la esquina de la sub estructura se tuvo que seguir el túnel en dirección norte tratando de descubrir el mascarón. De este día en adelante se le fue descubriendo mas el rostro al mascarón. Se le descubrió el ojo izquierdo que lo tiene en forma de L, solamente el ojo mide 86 cm de ancho lo cual indica que el mascarón es enorme. Sobre la pestaña de este dos cachos tipo Olmeca. La pestaña esta tallada en bajo y alto relieve y tiene tallada una forma de U. Todo esto por el momento muy bien preservado con estuco. En la frente tiene tallado un ovalado. Se siguió descubriendo hacia el norte y cada día se le encontraba al sorprendente.

El relleno que se iba quitando al frente del mascarón se le llamo contexto 5 y la cerámica que se iba encontrando siempre era preclásica lo cual indica que el mascarón podría ser preclásico o quizá preclásico terminal. El mascarón solamente se descubrió hasta el inicio del ojo derecho por la razón de se hizo obligado ampliar mas el túnel por la grandeza del mascarón y se le podría derrumbar el relleno. Hasta el punto que de excavar el mascarón mide 3m 36cm de ancho lo cual nos dice que en total el dicho

mascaron podría tener 5m de ancho. Los diseños que se le encontraron al mascaron aparte del enorme ojo son dos arrugas sobre una enorme nariz, un pequeño diseño bajo el ojo una gota en la frente.

Para saber la altura del mascaron se tuvo que excavar hacia abajo siendo la orejera. Se descubrió la enorme oreja de este, la cual tiene cuatro círculos en cada esquina unido con líneas, el centro de esta también esta tallada en bajo y alto relieve y en el centro se puede observar la misma forma de U al igual que la de la pestaña. Hasta el momento tiene características similares a los mascarones del mirado, las dos U, los dos cachos sobre la pestaña, el lazo con el nudo y el caracol. Debajo de la oreja esta otra decoración que parece un signo de exclamación y luego se encontró el piso. Aquí si ya se pudo medir lo alto del mascaron y este mide 2m 78cm de alto.

Luego de haber llegado al piso se siguió excavando hacia el norte nuevamente esta vez siguiendo el nivel del piso. Se encontró la mejilla y en esta un forma como de cruz, luego descubrió bien el grosor del labio y le descubrieron los dientes que están pintados de negro. Pegado a la esquina en donde se une el labio con el la mejilla se le descubrió un colmillo como de serpiente parcialmente pintado de negro. Luego se le descubrió lo podría se la lengua pintada de rojo y si esto fuera la lengua dicho mascaron solamente tendría el labio superior por que la lengua esta pegada al piso.

El mascaron como ya habíamos mencionado a pesar la cantidad de años que tiene de estar se encuentra en muy buen estado. Las únicas partes que se encuentran deterioradas debido al peso del relleno son en parte la nariz, parte del enorme labio y la mejilla o cachete. También tiene un parte de gretaduras que se le han hecho mas que todo en la frente porque esta parte esta soportando una buen parte del relleno debido a que los saqueadores prácticamente le llegaron al mascaron por el lado este como ya habíamos mencionado. Como habíamos dicho que solamente se descubrió la tercera parte del mascaron por la razón anteriormente mencionada y también por que se supone que la otra parte tendría las mismas características, se procedió a tomarle fotos ya estando al descubierto aun que se le había estado tomando fotos conforme se iba descubriendo. Del 6 al 11 de junio se utilizo para dibujar lo que es el perfil norte del túnel lo cual incluye el perfil del mascaron, luego se dibujo el mascaron viéndolo de frente y también la planta del túnel con la planta del mascaron.

Ya habiendo hecho todo esto se vio la necesidad de que el mascaron necesitaría esta cubierto por si al caso se derrumbara el cielo del túnel y como ya iba a terminar la temporada del proyecto se procedió a ponerle soporte o pontalear la parte del túnel que esta pegada al mascaron y a este se le puso "guano" para que formara un colchón y luego se le puso tablas encima por si acaso el puntaleado fallara el mascaron siempre estuviera cubierto. El 19 de junio se cerro la investigación de este lugar mas que todo por que no se podía seguir trabajando por lo inseguro del túnel. Para que el mascaron no quedara expuesto a depredadores la boca del túnel se dejo prácticamente sellado con relleno solamente de piedras de unos tres metros de profundidad en el túnel, las gradas se dejaron cubiertas también con el relleno de piedras y luego se procedió a rellenar un poco también el lado de atrás del mascaron para que este no soportara solo el relleno.

CONCLUSIÓN

Se cree que como el sitio de Cival es Preclásico Tardío, el mascaron junto a la sub estructura pueden ser preclásico medio fechando de unos 200 a.c. y esto se puede verificar con la clase de cerámica que es en su totalidad del periodo preclásico. Se cree que el mascaron sea una representación del dios viejo que se encuentra viendo hacia la caída del sol. También se puede decir que la razón el por que esta pintado el de negro es por que esta representado la puesta del sol y se ponía la oscuridad, lo cual los mayas representaban mucho ya sea con el color negro, con monos en las paredes que están viendo hacia el poniente, y con calaveras. Pueda que este mascaron haya representado a un dios de la oscuridad por su característica zoomorfa de rostro de humano con colmillos de serpiente y pueda que la lengua sea también de serpiente.

En muchos casos los mascarones que se encuentran están parcialmente o totalmente destruidos, pero lo que este mascaron haya sido para los mayas fue de mucho importancia por que lo dejaron muy conservado al rellenar para construir sobre esta estructura o quizás el señor que mando a edificar esta

estructura no estuvo mucho tiempo gobernando y por eso el mascarón no estuvo tanto tiempo expuesto a los deterioros de la naturaleza porque fue rellenado. Todo esto tendría que ser investigado con mucho tiempo.

El 22 de junio se inició una pequeña excavación en el sitio de Lechugal ahora conocido como K'o. Esta fue una excavación de rescate en una trinchera de saqueo. Aquí los saqueadores excavaron en una estela que se encuentra frente a una pequeña estructura circular dicha estructura es circular con un muro también circular. Esta estructura también fue destruida parcialmente.

Se limpió bien lo que los saqueadores habían hecho de lo que se tomó foto de referencia y se dibujó. Luego de haber hecho esto se empezó a excavar sin mover la estela y su altar, aquí la presencia de cerámica es en abundancia, pero al parecer solamente cerámica posclásica y utilitaria porque los tuestos que se recogen están muy deteriorados.

El siguiente día se llegó al piso el cual no se encuentra muy bien conservado por la razón de que está muy cerca del humo y las raíces lo han roto. A esto se le tomó fotos y luego se dibujó junto con el perfil de la estela y el altar. Ya al haber realizado esto se rompió solamente un pedazo del piso que está pegado al perfil norte de la trinchera. Debajo del piso el cual ya es otro contexto la presencia de cerámica no es mucha. A unos cuarenta centímetros después de haber roto el piso se llegó a la roca madre y para comprobar si en realidad era esta se abrió un pequeño hoyo en la esquina de los perfiles norte y este. Se dibujaron la planta junto con la roca madre, el perfil norte mostrando los cortes, perfil este mostrando un pedazo de la trinchera de saqueo, también se dibujó el perfil sur mostrando la estela.

El 26 de junio se aterro nuevamente la pequeña trinchera a la cual se le denominó KLT2.

PLANES PARA EL FUTURO

Se supone que la sub estructura haya tenido este mascarón luego una escalinata y otro mascarón por lo cual la siguiente temporada se tratará de abrir otro túnel para verificar esto. También se cree que puede tener otros dos más abajo lo cual implica que se tendrá que seguir el piso en el que montado el mascarón y ver en donde hace corte y luego excavar hacia abajo, en otras palabras la sub estructura podría tener cuatro mascarones y la siguiente temporada se tratará de ver si esta teoría se aplica a esta sub estructura.

Cival CT01-Figuras

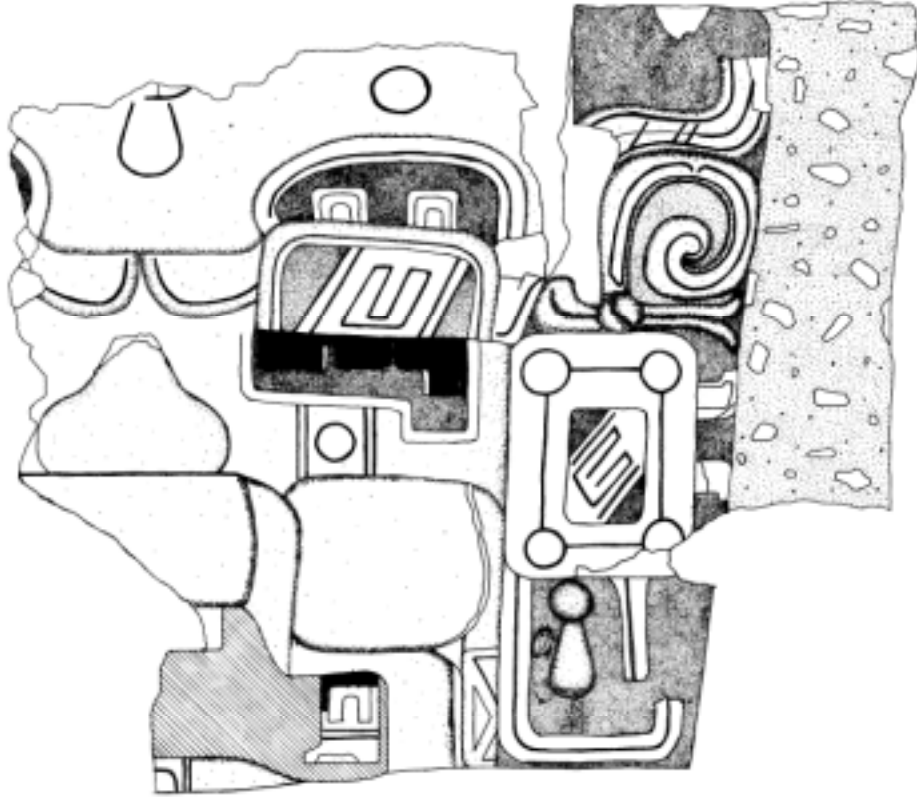


Figura 1. Vista fronta del Mascaron de Cival.

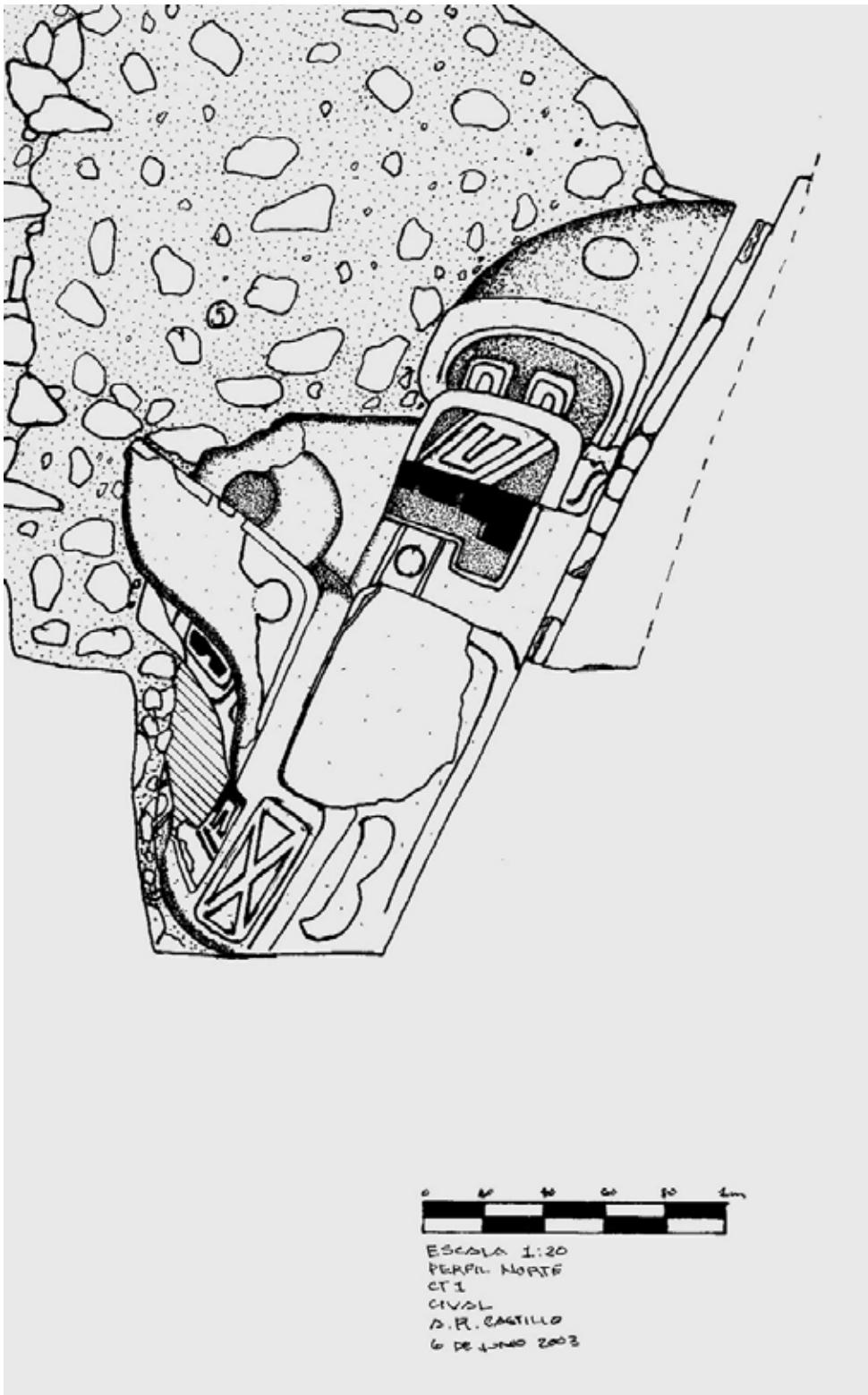


Figura 2. Perfil del Mascaron de Cival.

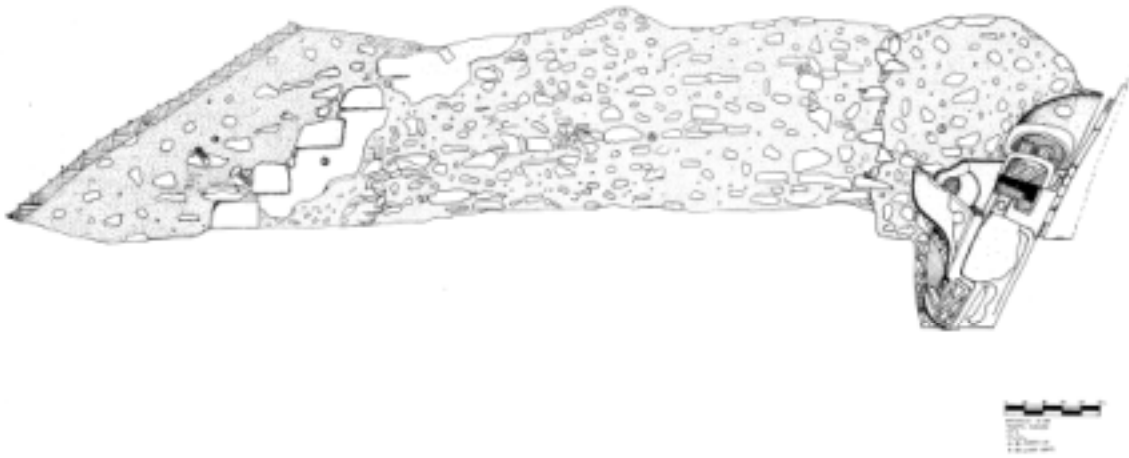


Figura 3. Perfil de la excavación CT1



Figura 4. Vista al oeste del Mascarón estucado policromo en la Estructura 1, de Cival (excavación CT01).

PRELIMINARY EXAMINATION OF THE MURALS AT
LA SUFRICAYA, HOLMUL

PETEN, GUATEMALA

MAY 2003

Submitted by:
Leslie Rainer
Angelyn Bass Rivera

SUMMARY

The following is a report on a two-day site visit to the archaeological site of Holmul. The objective of the site visit was specifically to examine two murals in a group of structures known as La Sufricaya, carry out a summary condition survey, and provide recommendations for conservation of the murals. Angelyn Bass Rivera and Leslie Rainer carried out the survey on March 7-8, 2003. Project archaeologist Francisco Estrada-Belli led the visit. Nora Lopez, Director of Cultural Patrimony (IDAEH) and William Saturno, archaeologist, were also present. The murals were examined visually, and then documented graphically, photographically, and in written form. Conditions were mapped on acetate sheets overlaid on printed digital images of the murals to give an overall map of the condition of the murals, and a general idea of the conservation problems and patterns of deterioration.

The murals are located in two separate areas of Structure 1, Group 1 of La Sufricaya, hereinafter called Mural Room 1 and Mural Room 2. They date to 400-500 A.D. (Early Classic Period). Mural Room 2 is later phase of construction than Mural Room 1, but still within 400-500 A.D. Both murals were originally located on building exteriors. The murals display both figurative and geometric designs. The paintings are faint and fairly fragmentary, and show damage from roots, water, and other environmental factors. Generally, the murals are in relatively poor condition due to impact from extreme environmental conditions and disruption from roots of the *Brosinum alicastrum* or Ramon (Breadnut) tree.

DESCRIPTION OF SITE AND MURALS

Holmul is located in the Petén region of Guatemala, approximately 45 km from Melchor, and 40 km east of Tikal. The site is composed of numerous groups of structures. The murals are located in Structure 1 of Group 1 in the area known as La Sufricaya.

Mural Room 1

Description-Mural Room 1

Mural 1 is painted on three walls (north, east, and south) under the rubble of Structure 1. It depicts figures in a grid, and is arranged in horizontal registers outlined in red. The description from the 2001 field report follows:

“The composition is divided into two parts, with small 10 x 20cm red-lined frames on the left, and 5 stacked 20 cm-high registers, each with five figures, on the right. All 25 individuals are seated and face left (west); each holds spear-thrower darts, some with trilobe-shaped points. Most wear a drum-shaped headdress, while some have eye-goggles and feathers; the outfit also includes knee-pads, thigh bands and belts with feather tails. The body proportions are unusual for Classic Maya art, showing traits more common in coeval central Mexico. On the left, one standing figure wears a jaguar-skin loincloth and tail, another a ball-game yoke around the waist. Both are in recognizably Maya style.”¹

The figures are very faint and are fairly illegible due to color loss and surface deterioration. The south wall is painted red and does not appear to have any figures. The north wall is approximately 190cm high and 350cm long. The east wall is 186cm long and 180cm high. The south wall is approximately 160cm high and 53cm wide.

Structural Description-Mural Room 1

¹ Estrada Belli, Francisco. Personal correspondence, April 2003.

The wall supporting the mural is constructed of shaped limestone blocks set in a lime and rubble mortar. Average limestone block size is 15x30cm, and the wall is one block or wythe thick. Some of the limestone blocks have impurities of mud in pockets and veins. Rubble fills the space between early construction and later phases. Prior to excavation, the room was filled with dry-laid limestone masonry as a foundation for the overlying structure. The room and murals were excavated in 2001. Unexcavated rubble forms a ceiling above the room and is still in place in the south end of the room. An original plaster floor abuts the mural.

Structural Condition-Mural Room 1

The condition of the wall is good and it is structurally stable. A vertical crack extends the height of the north wall, however this does not appear to pose an urgent structural threat. This crack is narrow at the bottom and opens at the top. There are voids in the fill behind the wall and between the stone units. There are two large holes from looters trenches on the north and east walls.

The condition of the rubble ceiling is poor. The loosely packed fill is unstable. A network of roots, most from the *Brosimum alicastrum*, is growing through the rubble roof of the space. In one way the roots serve to stabilize the ceiling by keeping rocks and soil in place; however they also may endanger the mural in the future by growing down into the walls and through the plaster layers.

The floor is covered by debris from excavation and its condition could not be determined.

Plaster Description-Mural Room 1

The plaster stratigraphy appears to be two plaster layers with paint on each layer. The layer closest to the wall is approximately 1cm thick and the overlying layer is approximately 1mm thick. The plaster on the north wall extends around the northwest corner. The plaster on the south wall continues around the southwest corner. Both plaster layers have a smooth texture. The composition of the paint and plaster should be confirmed through instrumental analysis. Samples are being sent to Diano Magaloni, a conservation scientist specialized in the type of work in Mexico.

Plaster Condition-Mural Room 1

Generally the plaster is in good condition and is well adhered to the wall. Locations of these conditions were mapped on the graphic condition survey. Problems occur in discrete areas and include:

- deep losses of plaster to the stone support;
- surface plaster loss of the upper plaster layer;
- deformation and bulging of the plaster in association with losses;
- loose plaster along the top edges and associated with cracks;
- cracks through the plaster layers on the north and east walls;
- minor interlayer delamination between plaster layers.

Paint Description-Mural Room 1

There appear to be three paint layers on the north and east walls. A light pink layer can be seen in areas of loss on the first plaster layer. The principal design layer is painted on the second, thinner plaster layer. The design consists of a grid with figures in individual squares and in

horizontal registers. The colors are red black and yellow on a pinkish-gray background. The final layer appears to be a limewash with a decorative orange band that can be seen along the edges of the walls. The paint appears to have been applied thinly. This stratigraphy would indicate that the wall, or parts of the wall, was painted in at least three campaigns, with the last layer applied directly over the design layer. Microscopic analysis can confirm the stratigraphy and thickness of each layer.

Paint Condition-Mural Room 1

The paint of the mural is worn and abraded with numerous losses. The limewash has been removed in certain areas. Some of the limewash that remains on the wall obscures the grid design. The paint is powdering and flaking in areas on the north and east walls. The south wall has drips where water has washed down the surface. Roots have grown into the structure and infiltrate the plaster and paint of the murals, especially on the south wall, in the southeast corner of the east wall, and in patches of plaster loss on the north wall. Most roots coming through the mural are less than 1mm in diameter.

Sample Collection-Mural Room 1

Two samples, less than 1 cm² in size, were taken from the murals and were given to Francisco Estrada-Belli. *Suf 1* is a sample of plaster and at least two paint layers, and exhibits orange paint and limewash over red and possibly one underlayer. The sample can be used for cross section analysis of the paint and plaster stratigraphy, as well as for pigment and binder identification. *Suf 2* shows a whitish powdery deterioration product seen on the surface in areas of disrupted plaster. This sample should be used to identify the substance, which may be salts. Characterization and identification of the original paint and plaster materials, as well as deterioration products will provide information on building technology and will help to guide future conservation treatment of the murals.

Immediate and Long-term Treatment Recommendations-Mural Room 1

The recommendations that follow are based on first-hand, preliminary observation by specialists in wall paintings and architectural conservation. The recommendations form the basis of a conservation treatment strategy for the murals, but do not in themselves constitute a comprehensive conservation plan for the murals, the rooms or the site. Development of a conservation plan that is most appropriate for the resource must be made based on a thorough assessment of the values, physical condition of the resource, and the management of the site in context. An advisory group composed of the principal stakeholders (local, national, and international) of the site should be actively involved in making these longer-term planning decisions.

Different long-term conservation strategies for the murals exist and include:

1. in situ preservation and protection for presentation to visitors;
2. lifting and relocating to a protected environment; and
3. complete reburial.

To preserve the murals *in situ*, and to allow them to be viewed by the public or studied directly, is an option that is selected for many archaeological sites. This option would entail stabilization of the room, shelter / protection from water, animals, plant growth and vandalism, permanent security measures, conservation treatment of the murals, and regular maintenance of the surrounding area. The murals at La Sufricaya, which are located in a remote area that is often inaccessible during the rainy season and therefore difficult to monitor and maintain, may be incompatible with a policy of public presentation. In addition, protecting such sites with just a shelter is rarely an adequate solution and may cause inadvertent damage to the murals.

Removal of the murals is an alternative means of preserving them while allowing for additional study, however removal is incompatible with conservation principles that seek to preserve the original context and integrity of the site. Furthermore, removing the murals may be difficult at Holmul due to its remote location, which would present tremendous logistical problems. Detachment, considered as only a last resort for murals that are in imminent danger of damage, involves stabilizing the murals *insitu*, removing the wall in whole or in part from the site, and then conserving and displaying the murals in a suitable location. There is great risk of damage or loss to the mural during and after removal, and the costs of relocation may be high. After detachment a proper conservation space is needed to complete treatments and fabricate a physical support, and then a climate controlled storage or exhibition space is needed to display the mural and conduct regular maintenance. If these conditions cannot be met, damage will result over the long term.

The third option that exists for the preservation of the murals at Holmul is to conserve and document the murals and re-bury them using the best methods possible to control damaging vegetation and prevent further deterioration of the site. This option though, is not without risk. The proximity of the murals to the ground level where large trees with invasive roots grow, and the fragile condition of the murals makes them extremely susceptible to deterioration from chemical, biological and mechanical actions. Long-term reburial will require a specialized design to mitigate deterioration, and a strict site monitoring and maintenance plan is needed to control growth of harmful vegetation and minimize soil erosion.

In the interim, until decisions about future conservation and use of the murals are made, we recommend that the murals not remain exposed in their current environment. Due to the fragile condition and faded appearance of the murals, and since protection from the harsh climate, light, and roots is paramount, we suggest the room be temporarily reburied or similarly protected. Prior to any further action, the mural and the room must be stabilized. This should be done as soon as possible. Stabilization will help preserve the murals and allow for future study. An interdisciplinary conservation team should be formed to address the specific issues of structural stability, protection of the mural, and reburial methods and materials. All treatment on the murals should be performed by qualified conservators with experience in the conservation of architectural surfaces on archaeological sites. The following actions are necessary:

1. fully document the condition of murals prior to treatment;
2. replace wood posts supporting the rubble ceiling with another support that will not be subject to biogrowth, or build a stable ceiling to protect the room from root and water infiltration (the roof must be strong enough to support the weight of the overburden);
3. remove debris on the floor and cover with fine-grained fill ;

4. fill large vertical crack at the NE corner with compatible fill material;
5. edge loose plaster fragments and ends of walls with compatible fill material;
6. fill voids and rubble behind north wall with compatible fill material;
7. grout / fill voids in plaster and interlayer delamination with compatible grout material;
8. brush surface with a soft bristle brush to remove dust and spider webs;
9. reattach flaking paint with appropriate adhesive;
10. consolidate powdering paint with appropriate consolidant;
11. remove drips on south wall;
12. clip roots protruding from plaster;
13. remove surface accretions and wasp nests; and
14. document treatment procedures and current condition of the murals in graphic, photographic, and written form following treatment and prior to reburial. Include list of conservation materials used and locations of treatment.

Reburial Design

A reburial strategy must be carefully designed for both temporary and long-term protection. The design must be such that it will not promote further damage and will preserve the mural. A reburial strategy will need to address certain technical considerations and constraints imposed by the remote location and extreme environment of the site, as well as the fragile condition of the murals. The following should be considered in the reburial design:

- the room and the walls should be documented in detail to compensate for removing the resource from direct examination;
- documentation should meet research as well as display and exhibition needs;
- research and testing (archaeological and conservation) should be completed prior to reburial;
- a set of reference samples should be taken and archived for future study;
- duration of the reburial must be established and materials and methods chosen to meet (and exceed) that time period;
- since there is the certainty of continual growth of vegetation at the site and associative damage to the walls and mural, reburial materials must be selected to prevent root growth into the fill;
- vegetation in the immediate area of the murals should be identified and removed if needed (keeping in mind that some vegetation is needed to maintain soil stability);
- close proximity of the walls to the ground surface makes them susceptible to root and moisture penetration, therefore the depth of reburial should be as high as possible to create a stable (not fluctuating) thermal and hygral environment;
- specialized fill materials may be needed in proximity to the mural as both a marker layer and for protection from root penetration or other damage;
- the surface of the reburial mound must be designed to control soil erosion and to promote drainage of surface water runoff;
- the site must be routinely monitored and maintained to control vegetation and provide site security.

Mural Room 2

Description-Mural Room 2

The mural is located on the north wall of a narrow excavated passageway. In total, the mural measures approximately 12 meters long and 2 meters high. A large looter's tunnel divides the wall in two sections, east and west. The room and murals were excavated in 2002, and is dated to 400-500 AD. During this site visit, approximately 5 meters on the east end were exposed and visible. The west end had been backfilled and was not accessible. The exposed portion of the mural depicts a complex iconography. According to the 2002 field report:

“The composition is centered on a seated individual, whose body is painted in yellow. His arms are tied by large bows to vertical posts of what appears to be a scaffold placed on a bench. He wears a simple loincloth and a belt with a serpent or turtle head at the right end. A white cape seems to be draped over his shoulders. In front of this figure is what appears to be a lip-to-lip pottery cache or a bundle. To the right is a kneeling [figure], also painted in yellow, with hand stretched out to the central figure. The hands seem to support an offering of sorts (in black, possibly a headdress). Further to the right is a standing frontal figure wearing a red and black beaded pectoral with long black fringes draped on his chest. On the opposite side, to the left of the central figure, is another kneeling figure, poorly preserved and possibly a mirror image of the first one, also bearing an offering to the main character. Further outward, to the left, is a standing figure in profile. The face of this personage is painted in red and black and a shell disk or mirror is visible in the chest area.”²

The figures are nearly life-sized, extending from the excavated ground level to the ceiling. The paint colors are red, yellow, and black on a buff-colored ground.

Structural Description-Mural Room 2

The wall supporting the mural is constructed of shaped limestone blocks set in a lime and rubble mortar. The average limestone block size is 15x30cm, and the wall is one block or wythe thick. Rubble forms a ceiling above the room. There appears to be a plaster floor under the floor fill.

Structural Condition-Mural Room 2

In general, the wall is structurally sound. There are some voids in the masonry wall where mortar rubble is loose and missing [with snakes in some of the voids]. A looter's trench cut the wall and mural in two sections, however, the trench does appear to have compromised the wall's stability.

Plaster Description-Mural Room 2

The plaster stratigraphy appears to be three thin lime plaster layers, each approximately 0.5-1.0cm thick, with at least one layer of paint on each. This would indicate that the wall, or parts of the wall, was redecorated in at least three campaigns. The composition of the paint and plaster should be confirmed through instrumental analysis.

² Estrada Belli, Francisco. 2002. *Archaeological Investigations at Holmul, Peten, Guatemala. Preliminary Results of the Third Season, 2002.*

Plaster Condition-Mural Room 2

The plaster is in poor condition. It has been infiltrated by roots that penetrate all of the plaster layers. This likely has caused some of the loss of plaster to the masonry substrate, separation of layers from each other, and bulges or deformations with associated voids. There are loose plaster fragments around areas of detachment and loss. There are also numerous cracks in the surface and through plaster layers. The plaster is fragmentary at the base of the wall near the floor. The poor condition of the plaster is likely due to post-deposition alteration while buried, and also possibly its original setting as the exterior wall of a building.

Paint Description-Mural Room 2

There is paint on each of the plaster layers. The first two paint layers can be seen in areas of loss. These appear to be pinkish-red in color. The surface paint layer shows the mural design. The colors are black, yellow, orange and red. Incisions can also be seen that outline details of the figures.

Paint Condition-Mural Room 2

The image is fragmentary due to losses in the paint layer. The paint that remains is fairly stable. It is well adhered to the wall and is not powdering. There are accretions (possibly calcareous) and root impressions on the surface. The accretions obscure some of the design and would be difficult to remove without damaging the underlying paint and plaster. The composition of the accretions should be analyzed to help design cleaning solutions, should the decision be made in the future to remove the accretions from the mural. It is doubtful that cleaning or other such treatments would reveal significantly more detail than what is already visible in the painted parts of the mural.

Sample Collection-Mural Room 2

Two samples were taken and given to Fransisco Estrada-Belli. *Suf 3* is from the cache of detached plaster fragments that were temporarily stored in the looters trench (these plaster fragments had fallen from the wall and were wrapped in aluminum foil and labeled). *Suf 3* shows plaster with red, yellow and black paint. This sample has an intact stratigraphy of paint and plaster that can be used for cross-section analysis, and for pigment and binder identification. *Suf 4*, is less than 1 cm² in size, and was taken directly from the mural. *Suf 4* shows the whitish encrustations on the wall, with some red pigment included. It should be used to determine the composition of the accretion on the surface of the mural. Characterization and identification of the original paint and plaster materials and deterioration products will provide information on building technology and will help guide future conservation treatment of the murals.

Immediate and Long-term Treatment Recommendations-Mural Room 2

Both immediate and long-term treatment recommendations for Mural Room 2 are similar to Mural Room 1 (see above). The long-term conservation strategies for the murals are:

1. in situ preservation and protection for presentation to visitors;
2. lifting and relocating to a protected environment; and
3. complete reburial.

Until a decision about how to preserve the murals for the long-term is made, we recommend the room be temporarily reburied or similarly protected. Considerations for reburial design are also outlined in the Treatment Recommendations section for Mural Room 1.

Prior to any further action, the mural and the room must be stabilized. This should be done as soon as possible. Stabilization will help preserve the murals and allow for future study. An interdisciplinary conservation team should be formed to address the specific issues of structural stability, protection of the mural, and reburial methods and materials. All treatment on the murals should be performed by qualified conservators with experience in the conservation of architectural surfaces on archaeological sites.

The following actions are necessary:

1. document the condition of the entire mural prior to treatment;
2. remove debris on the floor and cover with fine-grained fill;
3. fill unstable losses and edges with appropriate fill material;
4. grout / fill voids in plaster and interlayer delamination using a compatible grout material;
5. clip roots protruding from plaster;
6. remove surface accretions where possible with wood hand tools; and
7. document treatment procedures and condition of mural in graphic, photographic, and written form following treatment prior to reburial. Include a list of conservation materials used and locations of treatment.

CONCLUSIONS

Both murals in Mural Room 1 and Mural Room 2 have tremendous significance and should be conserved. They are important for understanding the evolution and use of the buildings, they are iconographically unique, and they provide rare information about Mayan painting and building technology. The general condition of the murals is poor; the paints have faded or been lost, and/or the plaster is unstable. The principal threats to their preservation are root damage, moisture infiltration, and in the case of Mural Room 1, collapse of the rubble ceiling. *In situ* conservation treatments are necessary, and the murals must be protected from environmental impacts. Protection may be accomplished through a carefully designed temporary reburial or other form of physical protection. Due to the great significance of the murals, an advisory group composed of the site's principal stakeholders should convene to make critical long-term decisions about future use and conservation of the murals and the site. Select *in situ* stabilization treatments should be implemented by conservators as soon as possible.

SAMPLE LIST

Samples of paint and plaster from Mural Room 1 and Mural Room 2 at La Sufricaya were collected by Leslie Rainer and Angelyn Bass Rivera on March 8, 2003. The samples were given to Fransisco Estrada-Belli for analysis.

Sample I.D #	Sample Location	Sample Description	Sample Date	Reason for sampling
Suf-1	Mural Room 1, North wall 190 cm from ground 40 cm from N.E corner	Sample shows plaster and at least two paint layers – Orange paint and whitewash over red band (?) and possibly one underlayer	08 March 2003	Stratigraphy of paint and plaster layers for x-section Pigment and binder identification.
Suf-2	Mural Room 1, North wall 104 cm from ground 93 cm from N.E. corner	White crystalline powder in disrupted area of plaster	08 March 2003	Deterioration product – identify possible salts
Suf-3	Mural Room 2, North wall, east side Fragment from floor	Paint and plaster – red, yellow and black paint on plaster layer	08 March 2003	Stratigraphy of paint and plaster for x-section Pigment and binder identification
Suf-4	Mural Room 2, North wall, east side 120 cm from ground 151 cm from west entrance	White encrustations on wall, some red pigment included	08 March 2003	Deterioration product / accretion on surface of mural – id and composition

**Analisi dei campioni di intonaco dipinto prelevati a la Sufricaya nella
campagna di scavo anno 2003 – Holmul Guatemala**

Committente: Prof. Francisco Estrada Belli Vanderbilt University e Istituto di
Antropologia e Storia Ministero Cultura e Sport del Guatemala

Analisi: ARTELAB s.r.l., *via dei Pettinari, 73 – 00186 Roma*

Data: ottobre 2003

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Prospetto con localizzazione dei punti di prelievo

Ns. rif. U-68

Prof. Francisco Estrada Belli Vanderbilt
University e Istituto di Antropologia e Storia
Ministero Cultura e Sport del Guatemala

Oggetto. Analisi dei campioni di intonaco dipinto prelevati a la Sufricaya nella campagna di scavo anno 2003 – Holmul, Guatemala.

I campioni sono stato forniti dal committente

1. Premessa

Sono stati analizzati alcuni campioni di intonaci dipinti prelevati sia direttamente dal supporto murario sia dal suolo (campioni caduti spontaneamente).

Nella tabella esposta nella pagina seguente vengono indicate le caratteristiche più importanti dei campioni, così come sono state indicate dai restauratori. Nella stessa tabella vengono anche indicate le analisi eseguite su ciascun campione.

Le indagini eseguite hanno avuto i seguenti obiettivi:

- identificare i materiali costituenti gli intonaci e la pellicola pittorica;
- evidenziare i rapporti stratigrafici fra i vari strati;
- definire la tecnica pittorica impiegata;
- acquisire informazioni utili alla comprensione delle cause e dei meccanismi di deterioramento evidenziati in sito misurando il contenuto di sali solubili presenti negli intonaci.

I risultati delle analisi vengono esposti in paragrafi a tema sia sinteticamente sia dettagliatamente all'interno di schede analitiche comprensive della necessaria documentazione grafica e fotografica.

Le indagini oggetto del presente lavoro sono state eseguite secondo le raccomandazioni contenute nei documenti UNI – Normal e le indicazioni dettate da pubblicazioni scientifiche edite da istituti nazionali e internazionali che operano nel campo della conservazione dei beni culturali: ICR, ICCROM, ICOM, ecc.

I campioni sono stati preventivamente esaminati mediante stereomicroscopio e successivamente preparati per i relativi esami di approfondimento.

Infine, si precisa che i colori risultanti dalle microfotografie possono differire da quelli che si percepiscono con l'osservazione visiva delle superfici dipinte; infatti, a scala microscopica si apprezzano le diverse colorazioni delle varie componenti (pigmenti, carica, legante) che nel loro insieme (ad una scala macroscopica) conferiscono il colore globale a ciascuno strato.

Roma 22 - 10 – 2003

Dott. Domenico Poggi

Elenco dei prelievi, loro localizzazione ed analisi eseguite

<i>Campione</i>	<i>Descrizione fornita insieme al prelievo</i>	<i>Analisi eseguite e loro finalità</i>
C 1	“Mural 5, campitura nera”. Frammento di intonaco con strato pittorico.	OSM, ICA
C 2	“Mural 5, campitura gialla”. Frammento di intonaco con strato pittorico.	OSM, ICA
C 3	“Mural 5, campitura rossa”. Frammento di intonaco con strato pittorico.	OSM, ICA, FT-IR
C 4	“Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore nero”.	OSM, FT-IR, SS
C 5	“Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore giallo”.	OSM, SS
C 6	“Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore rosso”.	OSM, FT-IR, SS
C 7	“Mural 1, campitura rossa”. Frammento di intonaco con strato pittorico.	OSM, ICA, FT-IR

Legenda

OSM: osservazione mediante stereomicroscopio mirata al preliminare studio dei campioni ed alla loro preparazione per le analisi di approfondimento.

SS: analisi microstratigrafica su sezione lucida e sottile, corredata di test microchimici, finalizzata allo studio della struttura e della composizione dei vari strati (Uni Normal 12/83).

FT-IR: analisi mediante spettrofotometria infrarossa con trasformata di Fourier (FT-IR) finalizzata allo studio della composizione chimico mineralogica degli intonaci, con particolare riguardo alla loro componente organica.

ICA: misura della conducibilità e del pH, analisi quali quantitativa degli anioni idrosolubili mediante cromatografia ionica finalizzata alla definizione dello stato di conservazione dei dipinti.

2. Studio delle malte, degli strati pittorici e della relativa tecnica di esecuzione mediante analisi mineralogico petrografiche su sezione lucida e sottile (Doc UNI - Normal 12/83) ed indagini mediante spettrofotometria infrarossa con trasformata di Fourier (FT-IR)

2.1 Sintesi dei risultati e loro interpretazione

Lo studio delle sezioni lucide e sottili, realizzate con i frammenti di intonaci dipinti prelevati, integrato dagli esami spettrofotometrici (FT-IR) ha permesso di acquisire informazioni utili alla caratterizzazione sia degli intonaci sia della ‘pellicola pittorica’.

In tutti i campioni degli intonaci le analisi hanno evidenziato una composizione simile, essendo costituiti da un legante di calce carbonatata con l’aggiunta, molto probabilmente, di additivi organici di tipo proteico. Gli esami spettrofotometrici non hanno consentito di individuare con precisione la natura delle sostanze proteiche (campioni C3, C4 e C6). Tuttavia, è possibile ipotizzare siano stati impiegati latte, suoi derivati (ad es. caseina) o colle animali (¹). La presenza di additivi organici, che presumibilmente hanno limitato il ritiro volumetrico degli intonaci, è anche segnalata, sebbene indirettamente, dal tipo di porosità osservata al microscopio in sezione sottile. Oltre alle numerose fessure prodotte dall’essiccamento della calce, talvolta localizzate ai bordi di alcuni granuli, sono presenti numerosi pori di forma globulare. Questo tipo di pori caratterizza le malte che fanno presa ed induriscono non solo grazie al processo di carbonatazione della calce.

Per il confezionamento degli intonaci, come aggregato (o ‘inerte’) è stato utilizzato materiale ‘sciolto’ di origine vulcanica (piccole scorie vetrose e pomici) e fibre vegetali. La presenza di materiale vulcanico è stata evidenziata sia dalle indagini spettrofotometriche (FT-IR) sia dall’esame delle sezioni sottili. Le scorie e le pomici hanno dimensioni variabili da sub-millimetriche a millimetriche, mostrano colore biancastro e, anche ad un’osservazione macroscopica delle sezioni lucide, spiccano all’interno dell’impasto leggermente più scuro. E’ probabile che la colorazione biancastra delle pomici e delle scorie sia stata accentuata dalla presenza della calce che ne ha permeato la forte porosità.

Frequentemente, all’interno delle bollosità delle pomici e delle scorie sono presenti dei sottili cristalli aciculari, organizzati secondo una struttura a feltro che, talora, riempiono quasi per intero la porosità.

Tali prodotti vulcanici hanno caratteristiche molto diverse da quelle che contraddistinguono le pozzolane dell’area romana e napoletana, abbondantemente impiegate in Italia per il confezionamento delle malte pozzolaniche. In particolare, in relazione alle caratteristiche morfologiche e composizionali delle pomici e delle scorie si ritiene che entrambe non abbiano conferito idraulicità alle malte. E’ infatti probabile che sia stato utilizzato materiale vulcanico a bassa ‘attività pozzolanica’, ossia poco reattivo con la calce. Le malte risultano infatti tenere, poco coerenti ed alquanto disgregate, tutte condizioni che probabilmente non si verificherebbero nel caso di malte dotate di una forte idraulicità.

¹ Anche se in contesti storico culturali molto differenti, malte a base di calce additivate con latte sono state impiegate da maestranze orientali in chiese calabresi del X – XII sec. L’impiego di additivi quali la caseina o la colla animale negli intonaci di finitura è segnalato in Italia in varie epoche.

All'interno degli impasti è stata rilevata anche la presenza di alcuni granuli arrotondati di colore bruno, composti da una fine massa a base di calce carbonatata e, probabilmente, di sostanze amorfe, che ingloba particelle di nero carbone, granuli di quarzo, feldspato e frammenti di gusci di fossili (molluschi bivalvi e foraminiferi). E' possibile che si tratti di grumi di calce ricchi di impurezze 'terrose' presenti nella materia prima da cui è stata ricavata la roccia stessa o inglobate dalla calce nella fossa di spegnimento.

Tali grumi di colore bruno sono sovente separati dal legante da fessure anulari che li isolano quasi completamente.

Nel campione C4 si è rilevata la sovrapposizione di uno strato di intonachino di rifacimento, con relativo livello pittorico, sopra un precedente strato di intonachino dipinto (vedi documentazione fotografica).

Mentre la pittura più antica mostra colore rosso vivo, quella più recente è di colore grigio scuro. La prima è stata applicata direttamente sull'intonaco quando questo era ancora fresco. Anche lo strato pittorico più recente sembra applicato con tecnica 'a fresco'.

E' interessante notare che prima dell'applicazione dell'intonaco di rifacimento è stato steso un sottile strato di preparazione (spessore di circa 0.2 mm), composto di calce con l'aggiunta, molto probabilmente, di sostanze organiche di tipo proteico (vedi foto). La funzione di questo strato è in parte quella di primer.

Anche negli altri campioni esaminati sembrerebbe che sia stata impiegata, almeno per gli strati contemporanei all'intonachino, la tecnica 'a fresco'. Per gli strati di ridipintura (nei campioni n. 6 dovrebbero essere almeno due) sembra invece sia stata usata la tecnica a calce.

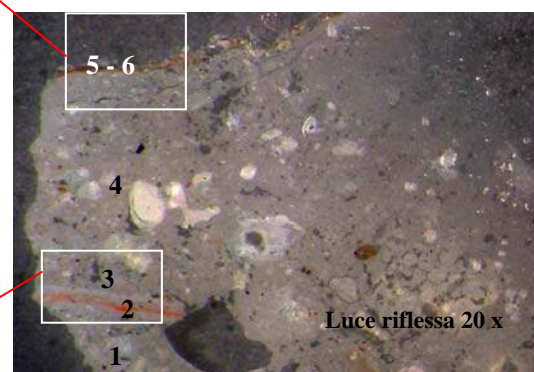
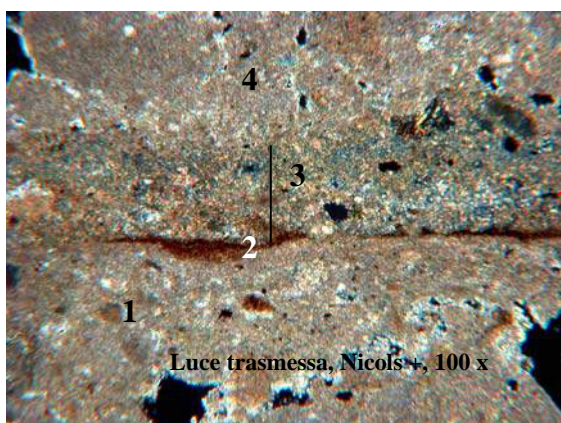
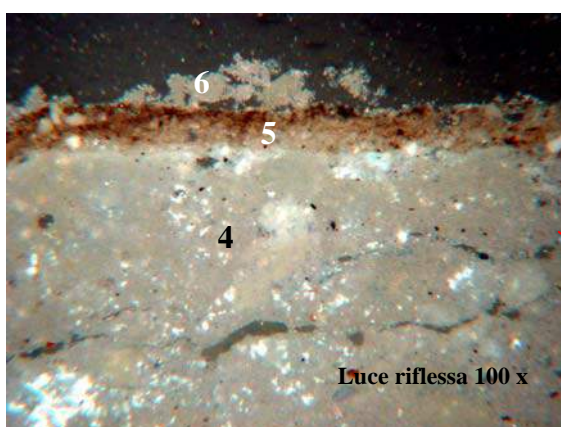
Solamente nel campione C7 potrebbe essere stata impiegata una tecnica differente. L'analisi FT-IR ha infatti evidenziato che nell'intonaco, prelevato in corrispondenza della superficie pittorica, è presente della resina vegetale.

Infine è interessante notare che in alcuni casi la pellicola pittorica è composta da due strati (campione n. 5). In particolare il primo strato, molto sottile e di colore nero, è stato applicato a diretto contatto dell'intonaco probabilmente con funzione di 'mano di fondo'. Lo strato pittorico vero e proprio è sovrapposto a quello nero e rappresenta il colore voluto.

2.2 Documentazione fotografica – aspetto della superficie dei campioni prelevati

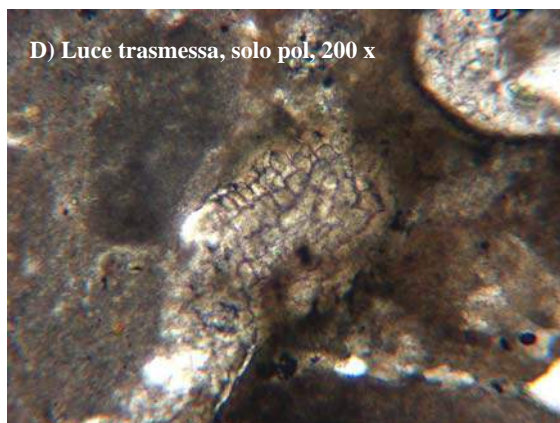
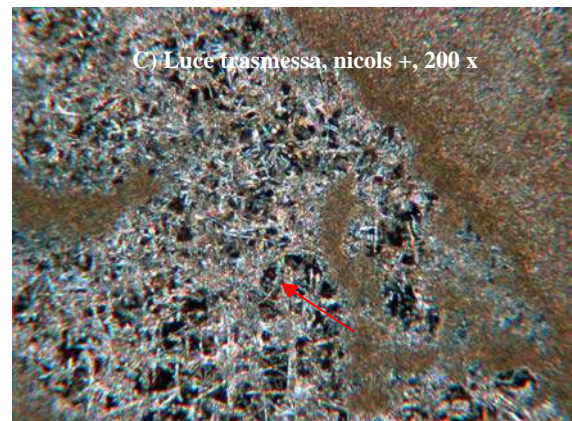
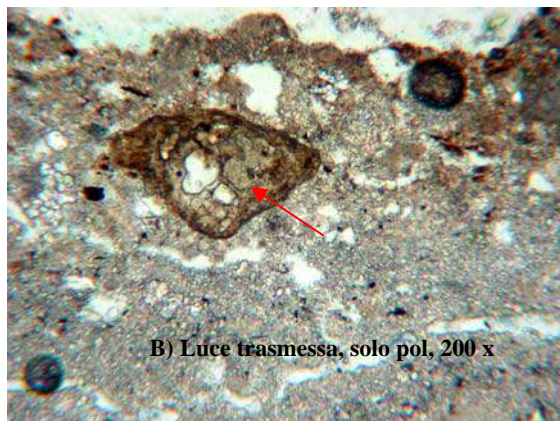
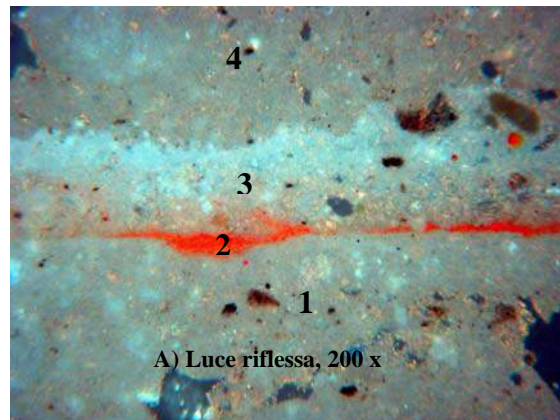


Campione C4. Stereomicroscopio, luce riflessa, ingrandimento rispettivamente di circa 6.5 x
La foto evidenzia una porzione della superficie del campione C4: “Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore nero”. Nell’immagine si osservano l’intonachino di rifacimento (strato n. 4 della stratigrafia), lo strato pittorico superficiale di colore grigio scuro (n. 5) e tracce di un livello biancastro (n. 6).

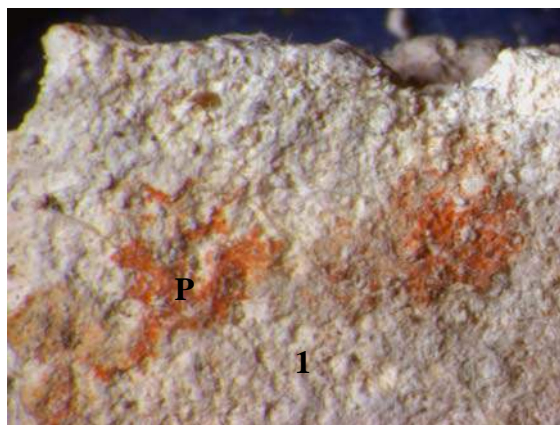


Campione C4

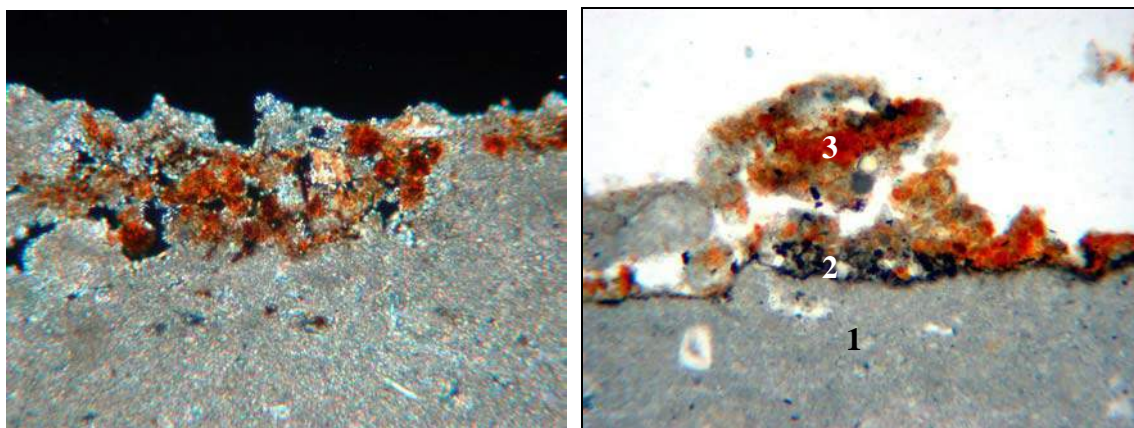
Le tre foto, riprese a differente ingrandimento, illustrano bene l’intera stratigrafia. Le foto a sinistra, particolari ingranditi dell’immagine a destra, descrivono meglio gli strati pittorici. La descrizione dettagliata di ciascuno strato viene esposta nelle foto successive e nella scheda analitica del campione.



Campione C4. Sezione sottile. La foto in alto evidenzia il primo strato pittorico di colore rosso interposto fra i due strati di intonaco. Le altre immagini illustrano alcuni particolari delle malte degli intonaci. La foto B evidenzia un granulo di una scoria vulcanica bollosa presente nell'intonaco di rifacimento (freccia). La foto C illustra l'aspetto di una parte di una scoria vulcanica con pori completamente occlusi da cristalli aciculari ad alta birifrangenza. Le foto D ed E illustrano due granuli caratterizzati da una struttura cellulare regolare che ricorda quella delle fibre vegetali.

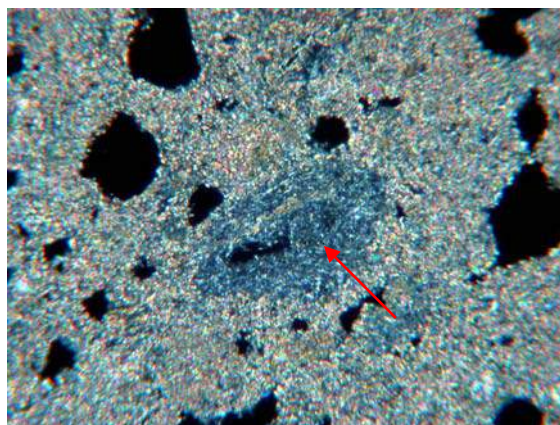
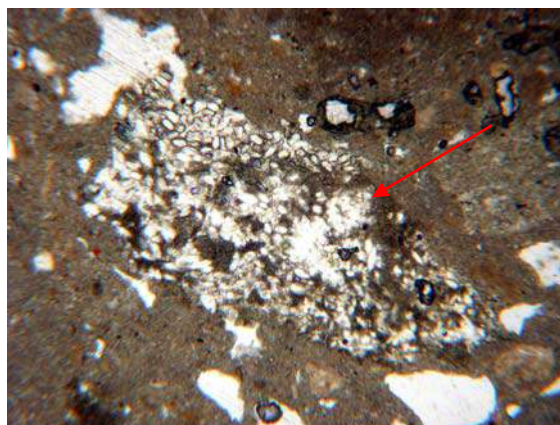


Campione C5. Stereomicroscopio, luce riflessa, ingrandimento rispettivamente di circa 10 x
 Aspetto di una piccola porzione superficiale del frammento prelevato. Sopra l'intonaco (n. 1) tracce di una pellicola pittorica molto erosa (P).



Campione C5. Sezione sottile, luce trasmessa, rispettivamente nicol incrociati (a sinistra) e solo polarizzatore, ingrandimento di circa 200 x e 500 x.

Le foto evidenziano due diversi particolari della pellicola pittorica. In quella a sinistra si osserva come lo strato pittorico rosso, a base di particelle ocracee, risulti quasi inglobato dalla calcite microcristallina dell'intonachino. La foto a destra evidenzia tutti gli strati: 1) intonachino; 2) esile strato nero a base di nero fumo; 3) strato pittorico di colore giallo – arancio.



Campione C5. Sezione sottile, luce trasmessa, rispettivamente solo polarizzatore (in alto) e nicol incrociati (in basso), ingrandimento di circa 200 x e 100 x.

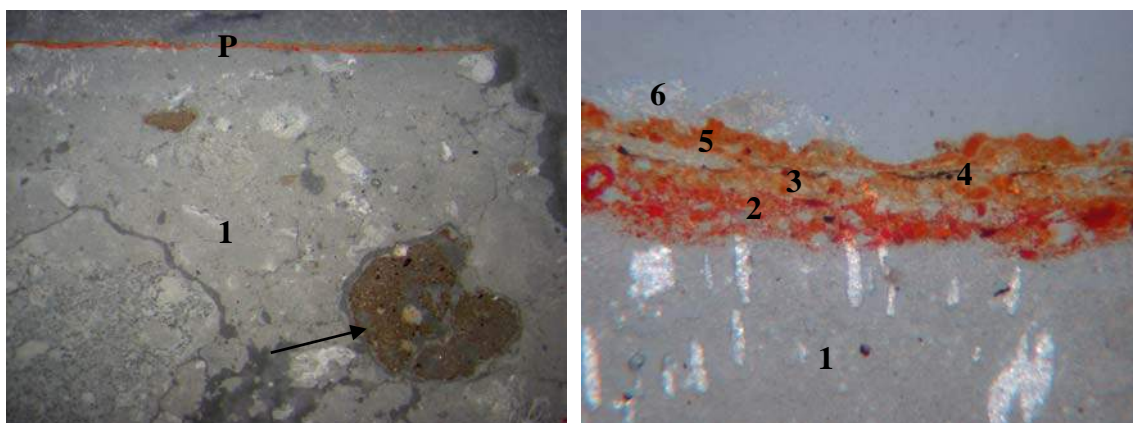
L'immagine in alto evidenzia una piccola porzione della sezione caratterizzata da un granulo di pomice o scoria bollosa immersa all'interno di un legante di calce microcristallina.

La foto in basso evidenzia la microstruttura del legante contraddistinta da zone aventi birifrangenza bassa e tessitura criptocristallina (freccia). Tali caratteristiche del legante suggeriscono l'ipotesi che questo non sia stato confezionato con sola calce ma anche (come viene indicato dalle analisi spettrofotometriche) con piccole aggiunte di sostanze organiche di tipo proteico.

Il legante è anche caratterizzato da una diffusa porosità di forma globulare (di colore nero nella foto).



Campione 6. Stereomicroscopio, luce riflessa, ingrandimento rispettivamente di circa 10 x
 Aspetto di una porzione del campione prelevato. Sopra l'intonaco (I), di colore avorio
 giallino, la pellicola pittorica di colore rosso arancio (P).

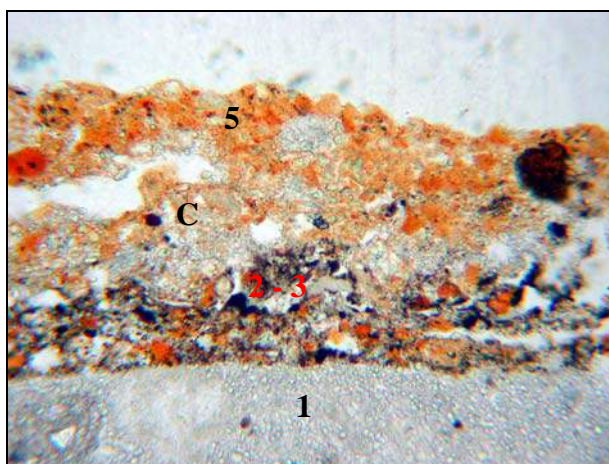


Campione C6. Sezione sottile, luce riflessa, ingrandimento rispettivamente di circa 16 x e
100 x.

L'immagine a sinistra, ripresa a basso ingrandimento, illustra essenzialmente la struttura della malta. Al suo interno si vedono diverse fessurazioni (freccie) ed un granulo di colore bruno, separato dal legante da fessure anulari. La pellicola pittorica è appena visibile (P).

La foto a destra rappresenta un particolare della pellicola pittorica che risulta costituita da 4 strati (n.ri 2, 3, 4 e 5). Lo strato n. 6 è invece riferibile ad un deposito concrezionale dovuto alla precipitazione di carbonato di calcio da parete di acque percolanti.

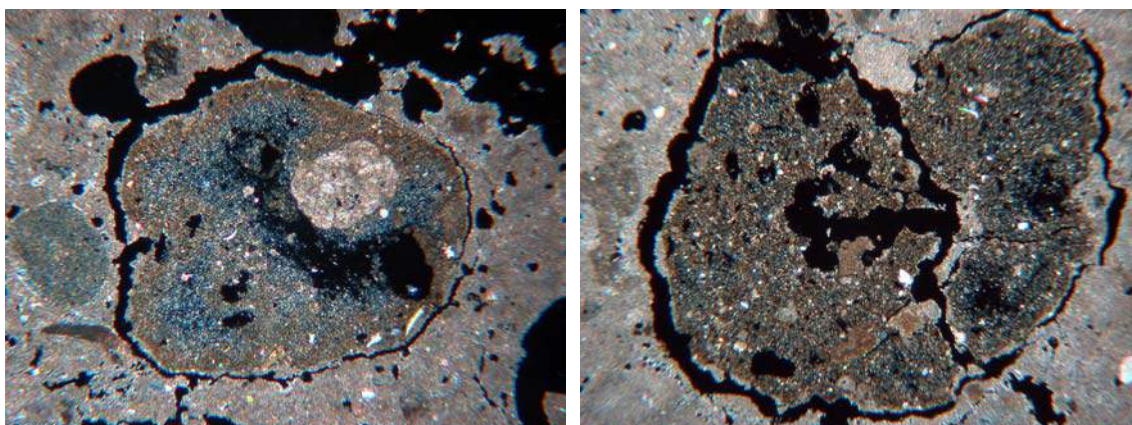
All'interno della scheda analitica del campione vengono descritti dettagliatamente tutti gli strati.



Campione C6. Sezione sottile, luce trasmessa, ingrandimento di circa 200 x

L'immagine illustra un particolare della pellicola pittorica dove non sono presenti tutti gli strati ed alcuni di quelli presenti non risultano distinguibili. La zona indicata con la lettera C è composta da calcite microcristallina che può essere riferita sia a calce carbonatata del legante di uno degli strati pittorici sovrapposti sia ad un esile deposito concrezionale: questo potrebbe essere stato deposto dalle acque percolanti durante uno dei periodi che separano due dei successivi interventi di manutenzione che hanno portato alla stratificazione osservata.

La descrizione dettagliata di ciascuno strato è riportata all'interno della scheda analitica del campione.



Campione C6. Sezione sottile, luce trasmessa, nicol incrociati, ingrandimento di circa 50 x.

Nelle due foto altrettanti granuli bruni di forma globulare separati dal resto del legante da fessure anulari. In base a quanto osservato in sezione sottile è possibile ipotizzare si tratti di impurezze associate alla calce impiegata. Sono infatti composte da residui delle rocce calcaree utilizzate per produrre la calce e da carbone (forse ciò che resta del carbone impiegato per la calcinazione delle rocce).

Dal punto di vista tecnologico la presenza di tali grumi indebolisce la struttura del materiale in quanto produce una forte porosità.

Schede analitiche dei campioni

Campione C3

Descrizione fornita insieme al prelievo: “Mural 5, campitura nera”.

Analisi per spettrofotometria infrarossa con trasformata di Fourier (FT-IR)

Preparazione del campione e metodologia di analisi

Alcuni piccoli frammenti di intonaco sono stati finemente macinati con mortaio di agata, inglobati in pasticca di KBr e finalmente analizzati in assorbanza, lavorando in vuoto. L'interpretazione dello spettro FT-IR, ottenuto dall'analisi, è stata eseguita per confronto con la banca dati del laboratorio e con quella riportata in varie pubblicazioni scientifiche. In particolare le assegnazioni sono state effettuate in base alle frequenze vibrazionali di standard di riferimento puri o miscelati a particolari matrici (calcite, calcite e gesso, ecc.), registrate nelle stesse condizioni sperimentali.

Risultati

Lo studio dello spettro IR ottenuto dall'analisi (vedi pagina successiva) ha permesso di stabilire che il campione è costituito essenzialmente dai seguenti componenti (elencati in ordine di abbondanza relativa):

- *carbonato di calcio* (CaCO_3) *nella fase calcite*;
- *ossalato di calcio biidrato* (*weddellite*: $\text{CaC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$);
- *sostanza organica* caratterizzata da effetti di assorbimento IR simili a quelli delle *sostanze proteiche* (gli effetti IR non sono perfettamente chiari per cui non è possibile avere informazioni più precise riguardo questa classe di sostanze organiche);
- *'silicati minerali'* (*SiOn*) riferibili a materiali vulcanici. Alcuni assorbimenti potrebbero essere attribuiti a zeoliti (minerali tipici delle rocce piroclastiche: tufi vulcanici);
- *nitrati* (NO_3^-).

Osservazioni

La *calcite* è riferibile quasi esclusivamente alla calce con cui è stato realizzato l'intonaco.

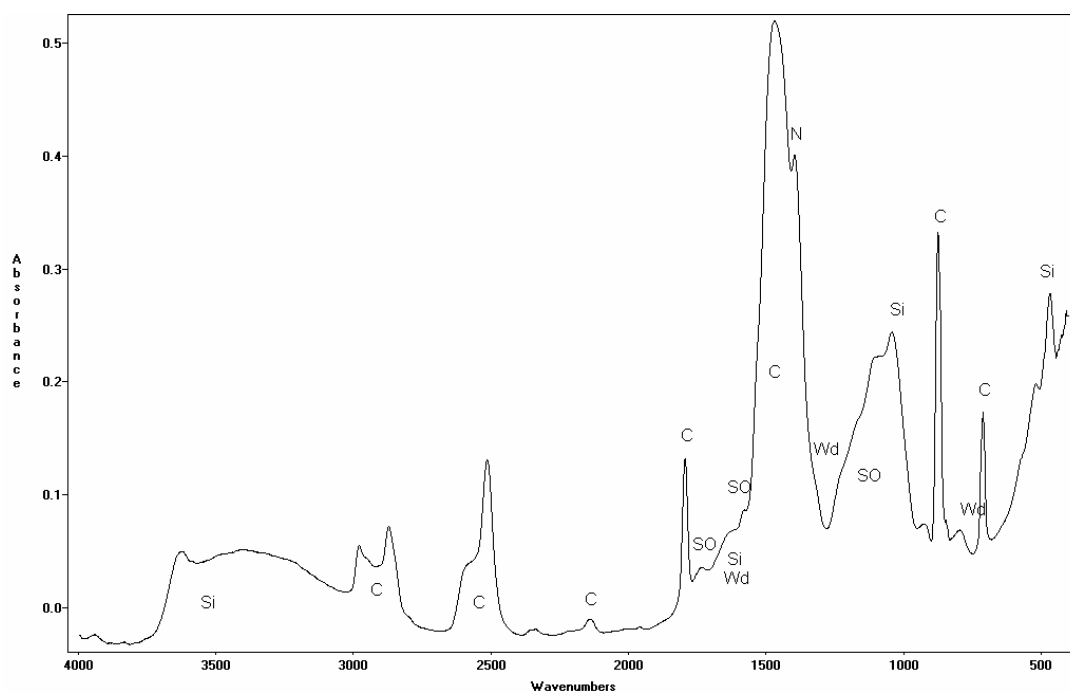
La *weddellite* (*ossalato di calcio biidrato*) è dovuta probabilmente all'alterazione (mineralizzazione) delle *sostanze proteiche* rilevate ⁽²⁾. Queste potrebbero dipendere dalla presenza di additivi (ad es. colla animale, latte, caseina, ecc.) aggiunti intenzionalmente nell'impasto al fine di modificarne la lavorabilità e la durezza.

I *silicati*, del tutto attribuibili a materiale di tipo vulcanico, sono probabilmente contenuti all'interno di alcuni 'inerti' della carica.

I nitrati sono sali solubili che possono essere penetrati all'interno dell'intonaco insieme alle acque di risalita capillare. Questi sali possono derivare sia dalla naturale degradazione dei vegetali sia dalla decomposizione di sostanze organiche di tipo animale (cadaveri).

² Ulteriori informazioni sull'origine degli ossalati si possono trovare negli atti dei convegni “Le pellicole ad ossalati: origine e significato nella conservazione delle opere d'arte”, centro CNR “Gino Bozza”, ottobre 1989 e marzo 1996 – Milano.

Spettro FT-IR



Legenda

C: calcite

Si: materiale vulcanico siliceo

Wd: weddellite

SO: una sostanza organica riferibile a materiale proteico

N: nitrati.

Campione C4

Descrizione fornita insieme al campione: “Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore nero”.

Analisi per spettrofotometria infrarossa con trasformata di Fourier (FT-IR)

Preparazione del campione e metodologia di analisi

Alcuni piccoli frammenti di intonaco sono stati finemente macinati con mortaio di agata, inglobati in pasticca di KBr e finalmente analizzati in assorbanza, lavorando in vuoto. L’interpretazione dello spettro FT-IR, ottenuto dall’analisi, è stata eseguita per confronto con la banca dati del laboratorio e con quella riportata all’interno di varie pubblicazioni scientifiche. In particolare le assegnazioni sono state effettuate in base alle frequenze vibrazionali di standard di riferimento puri o miscelati a particolari matrici (calcite, calcite e gesso, ecc.), registrate nelle stesse condizioni sperimentali.

Risultati

Lo studio dello spettro IR ottenuto dall’analisi (vedi pagina successiva) ha permesso di stabilire che il campione è costituito essenzialmente dai seguenti componenti (elencati in ordine di abbondanza relativa):

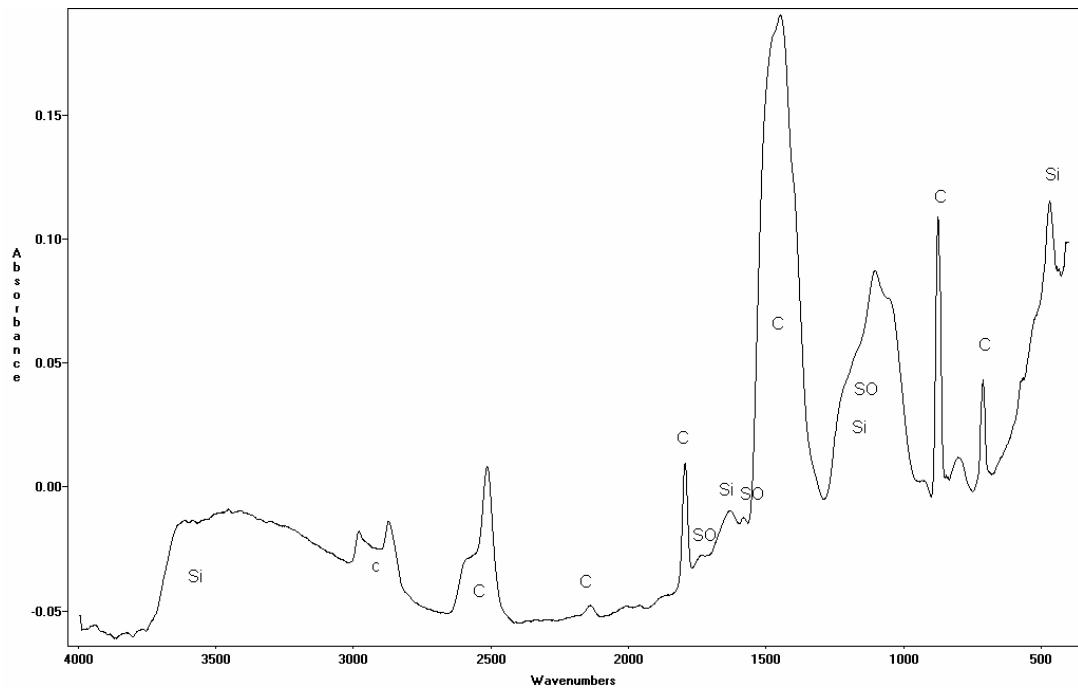
- *carbonato di calcio* (CaCO_3) *nella fase calcite*;
- *sostanza organica* caratterizzata da effetti di assorbimento IR simili a quelli delle *sostanze proteiche* (gli effetti IR non sono perfettamente chiari per cui non è possibile avere informazioni più precise riguardo questa classe di sostanze organiche);
- *‘silicati minerali’* (*SiOn*) riferibili a materiali vulcanici. Alcuni assorbimenti potrebbero essere attribuiti a zeoliti (minerali tipici delle rocce piroclastiche: tufi vulcanici);

In questo campione non sono stati rilevati assorbimenti IR relativi ad ossalati. Questi minerali potrebbero tuttavia essere presenti in piccola percentuale nel campione. Infatti i loro assorbimenti nell’infrarosso potrebbero essere ‘coperti’ da quelli molto forti della calcite, presente in quantità molto elevata.

Osservazioni

Per quanto concerne la correlazione fra le sostanze rilevate ed i prodotti impiegati per il confezionamento della malta si vedano le osservazioni riportate nella scheda relativa al campione n. 3.

Spettro FT-IR



Legenda

C: calcite

Si: materiale vulcanico siliceo

SO: una sostanza organica riferibile a materiale proteico

Analisi mineralogico petrografica su sezione sottile

Scheda analitica redatta in conformità delle indicazioni contenute nel Doc Normal 12/83.

1) Intonaco a base di calce, con aggiunta probabilmente di additivi di natura organica, materiale vulcanico sciolto (pomici e scorie vescicolate) e fibre vegetali

CARATTERISTICHE DELL'AGGREGATO ("INERTE")

Granulometria: variabile da limosa media (0.01 – 0.06 mm) a ghiaiosa molto fine (2 – 4 mm)

Dimensioni estreme presentate dai granuli: 0.02 – 3.0 mm

Intervalli dimensionali prevalenti: 0.05 – 2.0 mm

Classazione (grado di uniformità dimensionale dei granuli): scarsa

Distribuzione dell'aggregato entro la matrice: concentrata in nuvole

Orientamento dei granuli: non orientati

Addensamento (stima rapporto % granuli/legante): medio alto (40 – 50 %)

Valutazione dell'originario rapporto volumetrico fra il legante e la carica: compreso fra 1:2 ed 1:3.

Composizione mineralogico petrografica dei granuli

Tipologia	Dimensioni	Arrotond. (1)	Sfericità (2)
Diversi granuli di colore beige, caratterizzati da struttura fortemente vacuolare con collosità arrotondate o meno frequentemente irregolari, aventi dimensioni generalmente comprese fra circa 0.02 e circa 0.08 mm. All'interno delle collosità si osservano piccoli cristalli aciculari che si incrociano secondo angoli irregolari. Mostrano alta birifrangenza (con colori di interferenza simili a quelli della calcite), indice di rifrazione maggiore di quello del balsamo ed estinzione inclinata. Si tratta probabilmente di granuli di piroclastiti: pomici e scorie molto vescicolate.	0.3 – 3.0 mm	Sub - angoloso	Media
Rari granuli di quarzo monocristallino talora includenti minute inclusioni di cristalli di mica muscovite.	0.02 – 0.06 mm	Sub - arrotondato	Medio alta
Rari cristalli di calcite spatica talora contraddistinti da abito perfettamente romboedrico.	0.07 – 0.12 mm	Angoloso	Media
Numerose impronte di fibre vegetali contraddistinte da struttura cellulare.	0.1 – 0.6 mm	Angoloso	Bassa
Numerose passerelle arrotondate composte probabilmente da calcite micritica e da nero vegetale.	0.12 – 0.45 mm	Arrotondato	Alta
Scarsi granuli di feldspato ad abito sub-edrale.	0.01 – 0.05 mm	Angoloso	Bassa
Rari granuli di forma irregolare contraddistinti da struttura fortemente vacuolare. Mostrano colore biancastro e sono composti da una sostanza leggermente birifrangente.	0.08 – 0.34 mm	Sub-angoloso	Media

(1) Classi di arrotondamento: Fortemente angoloso; Angoloso; Sub-angoloso; Sub-arrotondato.
(2) Classi di sfericità: Alta; Media; Bassa; Molto bassa.

CARATTERISTICHE DEL LEGANTE (MATRICE)

Composizione: a base di calcite microcristallina (calce carbonatata) e, probabilmente, sostanze organiche. La struttura del legante, infatti, non è simile a quella di malte composte da sola calce.

E' possibile che per il confezionamento del legante, oltre alla calce, siano stati impiegati degli additivi di natura organica (ad es. latte, caseina, ecc.).

Struttura: a grumi

Tessitura: micritica (costituita da cristallini aventi dimensioni inferiori a 4 µm)

Caratteristiche porosimetriche

<i>Percentuale dei pori (stima della porosità totale)</i>	<i>Bassa (< 20 %)</i>	<i>Media (20 - 40 %)</i>	<i>Alta (> 40 %)</i>
			X
<i>Origine della porosità</i>	<i>Da granuli dell'aggregato</i>	<i>Da sutura granuli - matrice a causa della cattiva aderenza</i>	<i>Da matrice - legante</i>
		X	X
<i>Forma dei pori</i>	<i>Bollosa</i>	<i>A Fessura</i>	<i>Irregolare</i>
	X	X	

Definizione del tipo di impasto

La malta è stata confezionata con calce idrata e con una carica ottenuta dall'impiego di materiale vulcanico sciolto (pomici e scorie molto vescicolate) e di fibre vegetali. E' probabile che nel legante sia stato aggiunto anche un additivo organico (ad es. latte, caseina, ecc.), al fine di favorire le caratteristiche di lavorabilità e durabilità della malta (le analisi spettrofotometriche – FT-IR hanno consentito di accertare tale ipotesi).

Nonostante l'impiego di materiale vulcanico si ritiene, in base a quanto osservato in sezione sottile, che la malta possa ancora essere classificata fra le malte aeree o, al più, lievemente idrauliche. Si ritiene infatti che il materiale vulcanico impiegato non sia dotato di attività pozzolanica (capacità di reagire chimicamente con la calce del legante dando luogo alla formazione di minerali che conferiscono idraulicità alla malta: capacità di far presa ed indurire anche a contatto dell'acqua).

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

2) Strato di colore rosso a base di ocra rossa, applicato probabilmente 'a fresco'

Spessore: 0.01 – 0.035 mm

E' costituito da finissime particelle di colore rosso (in luce riflessa), forma globulare ed aspetto variabile da leggermente traslucido a semi opaco. Il legante è a base di calcite micritica.

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

3) Strato biancastro a base di calce e, probabilmente, di una sostanza organica (preparazione – primer per la stesura dello strato successivo)

Spessore: 0.2 – 0.22 mm

E' costituito da una massa di struttura variabile da microcristallina a microspartita. Non è composto solamente da cristallini di calcite ma anche da una sostanza basso rifrangente o monorifrangente. Si tratta forse di una sostanza organica aggiunta alla calce per migliorare le caratteristiche di adesione dello strato.

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

4) Intonaco di rifacimento molto simile a quello rappresentato dallo strato n. 1

Spessore: pari a circa 3.2 mm

CARATTERISTICHE DELL'AGGREGATO ("INERTE")

Granulometria: variabile da limosa media (0.01 – 0.06 mm) a sabbiosa grossolana (0.5 – 1.0 mm)

Dimensioni estreme presentate dai granuli: 0.02 – 0.65 mm

Intervalli dimensionali prevalenti: 0.2 – 0.5 mm

Classazione (grado di uniformità dimensionale dei granuli): moderata

Distribuzione dell'aggregato entro la matrice: concentrata in nuvole

Orientamento dei granuli: non orientati

Addensamento (stima rapporto % granuli/legante): medio (30 %)

Valutazione dell'originario rapporto volumetrico fra il legante e la carica: 1: 2.

Composizione mineralogico petrografica dei granuli

<i>Tipologia</i>	<i>Dimensioni</i>	<i>Arrotond. (1)</i>	<i>Sfericità (2)</i>
Diversi granuli di colore beige, caratterizzati da struttura fortemente vacuolare con collosità arrotondate o meno frequentemente irregolari, aventi dimensioni generalmente comprese fra circa 0.02 e circa 0.08 mm. All'interno delle collosità si osservano piccoli cristalli aciculari che si incrociano secondo angoli irregolari. Mostrano alta birifrangenza (con colori di interferenza simili a quelli della calcite), indice di rifrazione maggiore di quello del balsamo ed estinzione inclinata. Si tratta probabilmente di granuli di piroclastiti: pomici e scorie molto vescicolate.	0.2 – 0.65 mm	Sub - angoloso	Media
Rari granuli di quarzo monocristallino talora includenti minute inclusioni di cristalli di mica muscovite.	0.02 – 0.08 mm	Sub - arrotondato	Medio alta
Rari cristalli di calcite spatica talora contraddistinti da abito perfettamente romboedrico.	0.05 – 0.18 mm	Angoloso	Media
Numerose impronte di fibre vegetali contraddistinte da struttura cellulare.	0.07 – 0.45 mm	Angoloso	Bassa
Numerose masserelle arrotondate composte probabilmente da calcite micritica e da nero vegetale.	0.1 – 0.35 mm	Arrotondato	Alta
(1) Classi di arrotondamento: Fortemente angoloso; Angoloso; Sub-angoloso; Sub-arrotondato. (2) Classi di sfericità: Alta; Media; Bassa; Molto bassa.			

CARATTERISTICHE DEL LEGANTE (MATRICE)

Composizione: a base di calcite microcristallina (calce carbonatata) e, probabilmente, sostanze organiche. La struttura del legante, infatti, non è simile a quella di malte composte da sola calce. E' possibile che per il confezionamento del legante, oltre alla calce, siano stati impiegati degli additivi di natura organica (ad es. latte, caseina, ecc.).

Struttura: a grumi

Tessitura: micritica (costituita da cristallini aventi dimensioni inferiori a 4 µm)

Caratteristiche porosimetriche

<i>Percentuale dei pori (stima della porosità totale)</i>	<i>Bassa (< 20 %)</i>	<i>Media (20 - 40 %)</i>	<i>Alta (> 40 %)</i>
			X
<i>Origine della porosità</i>	<i>Da granuli dell'aggregato</i>	<i>Da sutura granuli - matrice a causa della cattiva aderenza</i>	<i>Da matrice - legante</i>
		X	X
<i>Forma dei pori</i>	<i>Bollosa</i>	<i>A Fessura</i>	<i>Irregolare</i>
	X	X	

Osservazioni

Le differenze sostanziali riscontrate nell'intonaco dello strato n. 4 rispetto a quello più 'antico', rappresentato dallo strato n.1, sono le seguenti: granulometria più sottile della carica, minore rapporto legante - aggregato e, probabilmente, presenza di una maggiore quantità di sostanza organica nella calce.

In prossimità della superficie dell'intonaco è visibile una lunga fessura parallela alle stratificazioni che tende ad isolare una scaglia di materiale dello spessore di circa 0.08 – 0.1 mm.

Tipo di superficie di contatto fra gli strati: poco definita con molta adesione.

5) Strato pittorico di colore grigio scuro applicato sull'intonaco ancora 'fresco'

Spessore: 0.06 – 0.1 mm

Lo strato 'sfuma' gradualmente senza soluzioni di continuità verso l'intonaco sottostante (strato n. 4). E' composto da una fine massa di calcite microcristallina che ingloba piccoli grumi di calcite e minutissime particelle di colore bruno nerastro irrisolvibili anche ai più elevati ingrandimenti (500 X). Tali particelle sono riferibili a nero fumo.

All'interno dello strato si osservano anche particelle opache di colore nero, caratterizzate da dimensioni più grossolane rispetto alle precedenti. Si tratta di granuli di nero carbone.

- Superficie di contatto fra gli strati: netta con buona adesione.

6) Esile e discontinuo strato biancastro a base di calcite microcristallina (deposito concrezionare)

Spessore: 0.05 – 0.1 mm

Molto discontinuo ed irregolare è composto da calcite microcristallina.

Campione C 5

Descrizione fornita insieme al campione: “Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore giallo”.

Analisi mineralogico petrografica su sezione sottile

Scheda analitica redatta in conformità delle indicazioni contenute nel Doc Normal 12/83.

1) Intonaco a base di calce, con aggiunta probabilmente di additivi di natura organica, materiale vulcanico sciolto (pomici e scorie vescicolare) e fibre vegetali

CARATTERISTICHE DELL’AGGREGATO (“INERTE”)

Granulometria: variabile da limosa media (0.01 – 0.06 mm) a sabbiosa grossolana (0.5 – 1.0)

Dimensioni estreme presentate dai granuli: 0.02 – 0.9 mm

Intervalli dimensionali prevalenti: sono rappresentate tutte le classi granulometriche

Classazione (grado di uniformità dimensionale dei granuli): moderata

Distribuzione dell’aggregato entro la matrice: omogenea

Orientamento dei granuli: lievemente orientati parallelamente alla superficie esterna

Addensamento (stima rapporto % granuli/legante): medio alto (40 – 50 %)

Valutazione dell’originario rapporto volumetrico fra il legante e la carica: compreso fra 1:2 ed 1: 3.

Composizione mineralogico petrografica dei granuli

<i>Tipologia</i>	<i>Dimensioni</i>	<i>Arrotond. (1)</i>	<i>Sfericità (2)</i>
Diversi granuli di colore beige, caratterizzati da struttura fortemente vacuolare con collosità arrotondate o meno frequentemente irregolari, aventi dimensioni generalmente comprese fra circa 0.02 e circa 0.08 mm. All’interno delle collosità si osservano piccoli cristalli aciculari che si incrociano secondo angoli irregolari. Mostrano alta birifrangenza (con colori di interferenza simili a quelli della calcite), indice di rifrazione maggiore di quello del balsamo ed estinzione inclinata. Si tratta probabilmente di granuli di piroclastiti: pomici e scorie molto vescicolate.	0.15 – 0.9 mm	Sub - angoloso	Media
Rari granuli di quarzo monocristallino talora includenti minute inclusioni di cristalli di mica muscovite.	0.02 – 0.07 mm	Arrotondato	Medio alta
Rari cristalli di calcite spatica talora contraddistinti da abito perfettamente romboedrico.	0.05 – 0.15 mm	Da angoloso (prevalente) a sub- arrotondato	Medio - bassa
Numerose impronte di fibre vegetali contraddistinte da struttura cellulare.	0.1 – 0.6 mm	Angoloso	Bassa
Scarsi frammenti di carbone ancora perfettamente caratterizzati da struttura cellulare.	0.1 – 0.6 mm	Angoloso	Bassa
Scarsi granuli arrotondati di selce.	0.06 – 0.09 mm	Arrotondato	Media
(1) Classi di arrotondamento: Fortemente angoloso; Angoloso; Sub-angoloso; Sub-arrotondato. (2) Classi di sfericità: Alta; Media; Bassa; Molto bassa.			

CARATTERISTICHE DEL LEGANTE (MATRICE)

Composizione: a base di calcite microcristallina – microspartita (calce carbonatata) e, probabilmente, sostanze organiche. La struttura del legante, infatti, non è simile a quella di malte composte da sola calce. E' possibile che per il confezionamento del legante, oltre alla calce, siano stati impiegati degli additivi di natura organica (ad es. latte, caseina, ecc.).

Struttura: omogenea

Tessitura: micritica (costituita da cristallini aventi dimensioni inferiori a 4 µm)

Caratteristiche porosimetriche

<i>Percentuale dei pori (stima della porosità totale)</i>	<i>Bassa (< 20 %)</i>	<i>Media (20 - 40 %)</i>	<i>Alta (> 40 %)</i>
			X
<i>Origine della porosità</i>	<i>Da granuli dell'aggregato</i>	<i>Da sutura granuli - matrice a causa della cattiva aderenza</i>	<i>Da matrice - legante</i>
		X	X
<i>Forma dei pori</i>	<i>Bollosa</i>	<i>A Fessura</i>	<i>Irregolare</i>
	X	X	

Definizione del tipo di impasto

La malta è stata confezionata con calce idrata e con una carica ottenuta dall'impiego di materiale vulcanico sciolto (pomici e scorie molto vescicolate) e di fibre vegetali. E' probabile che nel legante sia stato aggiunto anche un additivo organico (ad es. latte, caseina, ecc.), al fine di favorire le caratteristiche di lavorabilità e durabilità della malta (le analisi spettrofotometriche – FT-IR – hanno consentito di accertare tale ipotesi).

Nonostante l'impiego di materiale vulcanico si ritiene, in base a quanto osservato in sezione sottile, che la malta possa ancora essere classificata fra le malte aeree o, al più, lievemente idrauliche. Si ritiene infatti che il materiale vulcanico impiegato non sia dotato di attività pozzolanica (capacità di reagire chimicamente con la calce del legante dando luogo alla formazione di minerali che conferiscono idraulicità alla malta: capacità di far presa ed indurire anche a contatto dell'acqua).

- Tipo di superficie di contatto fra gli strati: netta con soluzioni di continuità.

2) Esile e discontinuo livello nero a base di nero fumo applicato 'a fresco'

Spessore: minore di 0.01 mm

E' costituito da finissime particelle di colore nero ed aspetto opaco, appena risolvibili anche ai più elevati ingrandimenti (nero fumo).

- Tipo di superficie di contatto fra gli strati: netta con molta adesione.

3) Strato di colore arancio a base di calce ed ocra gialla, applicato probabilmente ‘a fresco’

Spessore: minore di 0.02 – 0.035 mm

E' costituito da calcite microcristallina che ingloba particelle di ocra gialla (ossidi di ferro idrato) e scarsi cristalli di calcite spatica. Quest'ultima è stata probabilmente aggiunta intenzionalmente nella 'tinta', per rendere più corposo e riflettente lo strato ⁽³⁾.

La morfologia dello strato ed i suoi rapporti con l'intonachino sottostante indicano che lo strato è stato applicato sull'intonaco ancora fresco.

³ In pratica è possibile che la calcite spatica, ottenuta dalla frammentazione di particolari porzioni di rocce calcaree, svolga la stessa funzione della 'polvere di marmo' aggiunta negli strati pittorici dei dipinti murali di epoca romana o rinascimentale.

Campione C 6

Descrizione fornita insieme al campione: “Frammento prelevato da terra, comprendente l’intonaco ed uno strato di colore rosso”.

Analisi mineralogico petrografica su sezione sottile

Scheda analitica redatta in conformità delle indicazioni contenute nel Doc Normal 12/83.

1) Intonaco a base di calce, con aggiunta probabilmente di additivi di natura organica, materiale vulcanico sciolto (pomici e scorie vescicolare) e fibre vegetali

CARATTERISTICHE DELL’AGGREGATO (“INERTE”)

Granulometria: variabile da limosa media (0.01 – 0.06 mm) a ghiaiosa fine (4.0 – 8.0mm)

Dimensioni estreme presentate dai granuli: 0.02 – 5.0 mm

Intervalli dimensionali prevalenti: sono rappresentate tutte le classi granulometriche

Classazione (grado di uniformità dimensionale dei granuli): scarsa

Distribuzione dell’aggregato entro la matrice: omogenea

Orientamento dei granuli: lievemente orientati parallelamente alla superficie esterna

Addensamento (stima rapporto % granuli/legante): medio alto (40 %)

Valutazione dell’originario rapporto volumetrico fra il legante e la carica: intorno a circa 1:2.

Composizione mineralogico petrografica dei granuli

<i>Tipologia</i>	<i>Dimensioni</i>	<i>Arrotond. (1)</i>	<i>Sfericità (2)</i>
Diversi granuli di colore beige, caratterizzati da struttura fortemente vacuolare con collosità arrotondate o meno frequentemente irregolari, aventi dimensioni generalmente comprese fra circa 0.02 e circa 0.08 mm. All’interno delle collosità si osservano piccoli cristalli aciculari che si incrociano secondo angoli irregolari. Mostrano alta birifrangenza (con colori di interferenza simili a quelli della calcite), indice di rifrazione maggiore di quello del balsamo ed estinzione inclinata. Si tratta probabilmente di granuli di piroclastiti: pomici e scorie molto vescicolate.	0.2 – 2.8 mm	Sub - angoloso	Media
Granuli arrotondati di grandi dimensioni costituiti da una massa basso o monorifrangente che ingloba: <ul style="list-style-type: none"> • diffusa calcite microcristallina; • masserelle di struttura micritica – microspartica; • frammenti di rocce calcaree di struttura microcristallina o microspartica; • frammenti di carbone; • frammenti di gusci di molluschi bivalvi; • un guscio di un foraminifero classificabile nella famiglia degli Orbitoididae; • scarse particelle di ocra; granuli di quarzo monocristallino arrotondato; • scarsi granuli di plagioclasio geminato albite. 	0.22 – 5.0 mm	Arrotondato	Medio alta
Rari granuli di quarzo monocristallino talora includenti minute inclusioni di cristalli di mica muscovite.	0.02 – 0.08 mm	Arrotondato	Medio alta

<i>Tipologia</i>	<i>Dimensioni</i>	<i>Arrotond. (1)</i>	<i>Sfericità (2)</i>
Rari cristalli di calcite spatica talora contraddistinti da abito perfettamente romboedrico.	0.07 – 0.18 mm	Da angoloso (prevalente) a sub-arrotondato	Medio - bassa
Numerose impronte di fibre vegetali contraddistinte da struttura cellulare.	0.1 – 0.6 mm	Angoloso	Bassa
Frammenti di carbone ancora perfettamente caratterizzati da struttura cellulare.	0.1 – 0.25 mm	Angoloso	Bassa
(1) Classi di arrotondamento: Fortemente angoloso; Angoloso; Sub-angoloso; Sub-arrotondato. (2) Classi di sfericità: Alta; Media; Bassa; Molto bassa.			

CARATTERISTICHE DEL LEGANTE (MATRICE)

Composizione: a base di calcite microcristallina – microspartita (calce carbonatata) e, probabilmente, sostanze organiche. La struttura del legante, infatti, non è simile a quella di malte composte da sola calce. E' possibile che per il confezionamento del legante, oltre alla calce, siano stati impiegati degli additivi di natura organica (ad es. latte, caseina, ecc.).

Struttura: omogenea

Tessitura: micritica (costituita da cristallini aventi dimensioni inferiori a 4 µm)

Caratteristiche porosimetriche

<i>Percentuale dei pori (stima della porosità totale)</i>	<i>Bassa (< 20 %)</i>	<i>Media (20 - 40 %)</i>	<i>Alta (> 40 %)</i>
			X
<i>Origine della porosità</i>	<i>Da granuli dell'aggregato</i>	<i>Da sutura granuli - matrice a causa della cattiva aderenza</i>	<i>Da matrice - legante</i>
		X	X
<i>Forma dei pori</i>	<i>Bollosa</i>	<i>A Fessura</i>	<i>Irregolare</i>
	X	X	

Definizione del tipo di impasto

La malta è stata confezionata con calce idrata e con una carica ottenuta dall'impiego di materiale vulcanico sciolto (pomice e scorie molto vescicolate) e di fibre vegetali. E' probabile che nel legante sia stato aggiunto anche un additivo organico (ad es. latte, caseina, ecc.), al fine di favorire le caratteristiche di lavorabilità e durabilità della malta (le analisi spettrofotometriche – FT-IR hanno consentito di accertare tale ipotesi).

Nonostante l'impiego di materiale vulcanico si ritiene, in base a quanto osservato in sezione sottile, che la malta possa ancora essere classificata fra le malte aeree o, al più, lievemente idrauliche. Si ritiene infatti che il materiale vulcanico impiegato non sia dotato di attività pozzolanica (capacità di reagire chimicamente con la calce del legante dando luogo alla formazione di minerali che conferiscono idraulicità alla malta: capacità di far presa ed indurire anche a contatto dell'acqua).

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

2) Strato pittorico di colore rosso vivo, a base di ematite, applicato probabilmente ‘a fresco’

Spessore: 0.01 – 0.035 mm

E' costituito essenzialmente da finissime particelle ematitiche inglobate all'interno del legante di calcite micritica dell'intonachino. Oltre all'ematite sono presenti anche scarsi frammenti di nero vegetale e rari granuli arrotondati di quarzo (molto probabilmente impurezze associate all'ocra rossa impiegata).

- Tipo di superficie di contatto fra gli strati: priva di soluzioni di continuità, con buona adesione.

3) Discontinuo strato di colore giallo - arancio a base di calce ed ocra gialla e calcite microcristallina

Spessore: 0.02 – 0.03 mm

Alquanto discontinuo è costituito da ossidi di ferro idrato (ocra gialla) inglobati in una massa di calcite microcristallina. Ingloba anche cristalli di calcite spatica di forma sia arrotondata sia angolosa sia sub-edrale).

Lo strato potrebbe essere stato steso sia ‘a fresco’ (in tal caso sarebbe sicuramente contemporaneo al precedente) sia a calce.

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

4) Esile e discontinuo livello di colore nero a base di nero fumo

Spessore: minore di 0.005 mm

E' costituito da finissime particelle nere di aspetto opaco irrisolvibili anche ai più elevati ingrandimenti (500 X). Colpisce il fatto che lo strato, in alcuni punti, sia caratterizzato da struttura cellulare. Ciò potrebbe essere stato prodotto dall'essiccamento di una sostanza organica, ad es. il medium legante od un'altra sostanza associata allo strato.

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

5) Strato di colore giallo a base di calce ed ocra gialla e calcite microcristallina

Spessore: 0.03 – 0.07 mm

E' costituito da una massa di calcite microcristallina, talora microspartica, che ingloba ossidi di ferro idrato (ocra gialla). Ingloba anche rari cristalli di calcite spatica di forma cristallina propria (euedrali).

- Tipo di superficie di contatto fra gli strati: netta con buona adesione.

6) Discontinuo strato di colore di colore biancastro a base di calcite microcristallina

Spessore: 0.01 – 0.02 mm

E' costituito da una massa di calcite microcristallina e microspartica. Si tratta probabilmente di un deposito concrezionare prodotto dalla deposizione di carbonato di calcio da parte di acque percolanti.

Osservazioni

La calcite microcristallina, talvolta microspartita, presente all'interno dei vari strati è riferibile prevalentemente alla calce carbonatata del legante (sia nel caso degli strati applicati 'a fresco' sia nel caso di quelli che potrebbero essere stati applicati con tecnica del tipo 'a mezzo fresco').

In alcuni casi, tuttavia, la calcite microcristallina sembra essere concentrata in piccoli livelli a se stanti che indicherebbero derivi dalla deposizione di carbonato di calcio da parte delle acque di percolazione. Analoga origine potrebbero avere i granuli di calcite spatica, di forma arrotondata.

Analisi per spettrofotometria infrarossa con trasformata di Fourier (FT-IR)

Preparazione del campione e metodologia di analisi

Alcuni piccoli frammenti di intonaco sono stati finemente macinati con mortaio di agata, inglobati in pasticca di KBr e finalmente analizzati in assorbanza, lavorando in vuoto.

L'interpretazione dello spettro FT-IR, ottenuto dall'analisi, è stata eseguita per confronto con la banca dati del laboratorio e con quella riportata da varie pubblicazioni scientifiche. In particolare le assegnazioni sono state effettuate in base alle frequenze vibrazionali di standard di riferimento puri o miscelati a particolari matrici (calcite, calcite e gesso, ecc.), registrate nelle stesse condizioni sperimentali.

Risultati

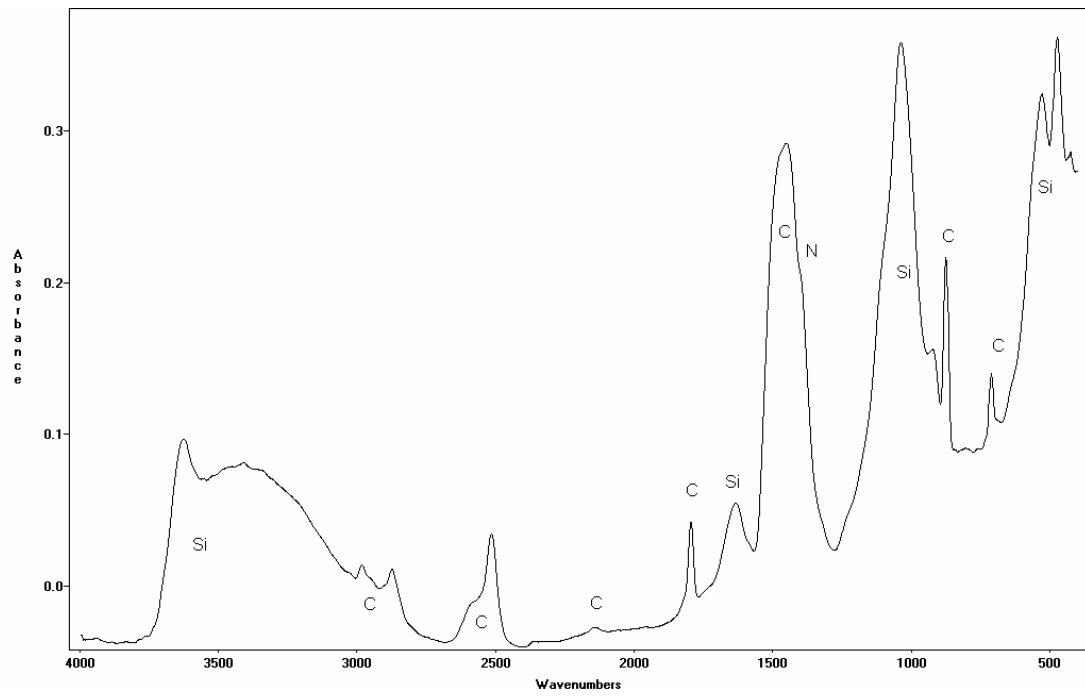
Lo studio dello spettro IR ottenuto dall'analisi (vedi pagina successiva) ha permesso di stabilire che il campione è costituito essenzialmente dai seguenti componenti (elencati in ordine di abbondanza relativa):

- *carbonato di calcio* (CaCO_3) *nella fase calcite* (sostanza nettamente prevalente sulle altre);
- *'silicati minerali'* (*SiOn*) riferibili a materiali vulcanici. Alcuni assorbimenti potrebbero essere attribuiti a zeoliti (minerali tipici delle rocce piroclastiche: tufi vulcanici);
- *nitrati* (NO_3^-).

Osservazioni

Per quanto concerne la correlazione fra le sostanze rilevate ed i prodotti impiegati per il confezionamento della malta si vedano le osservazioni riportate nella scheda relativa al campione n. 3.

Spettro FT-IR



Legenda

C: calcite

Si: materiale vulcanico siliceo

N: nitrati.

Campione C7

Descrizione fornita insieme al prelievo: “Mural 1, campitura rossa”.

Analisi per spettrofotometria infrarossa con trasformata di Fourier (FT-IR)

Preparazione del campione e metodologia di analisi

Alcuni piccoli frammenti di intonaco prelevati in corrispondenza della superficie dello stesso sono stati finemente macinati con mortaio di agata, inglobati in pasticca di KBr e finalmente analizzati in assorbanza, lavorando in vuoto.

L'interpretazione dello spettro FT-IR, ottenuto dall'analisi, è stata eseguita per confronto con la banca dati del laboratorio e con quella riportata all'interno di varie pubblicazioni scientifiche. In particolare le assegnazioni sono state effettuate in base alle frequenze vibrazionali di standard di riferimento puri o miscelati a particolari matrici (calcite, calcite e gesso, ecc.), registrate nelle stesse condizioni sperimentali.

Risultati

Lo studio dello spettro IR ottenuto dall'analisi (vedi pagina successiva) ha permesso di stabilire che il campione è costituito essenzialmente dai seguenti componenti (elencati in ordine di abbondanza relativa):

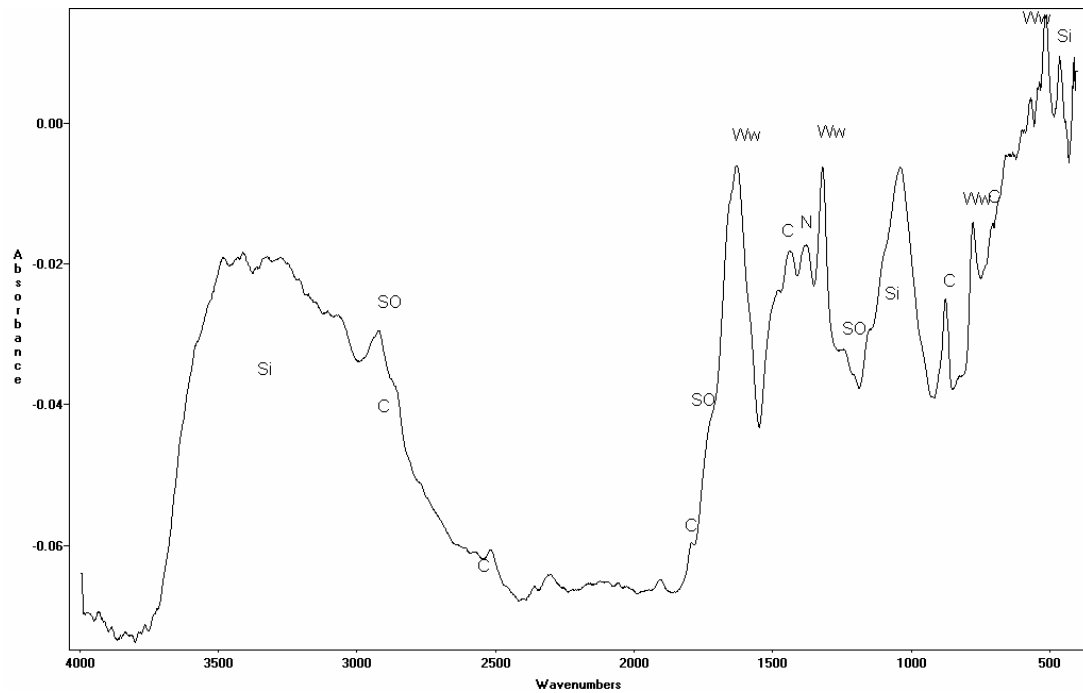
- *ossalato di calcio monoidrato (wewellite: $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$);*
- *'silicati minerali' (SiOn) riferibili a materiali vulcanici. Alcuni assorbimenti potrebbero essere attribuiti a zeoliti (minerali tipici delle rocce piroclastiche: tufi vulcanici);*
- *carbonato di calcio (CaCO_3) nella fase calcite;*
- *nitrati (NO_3^-) e probabilmente altri sali solubili;*
- *sostanza organica caratterizzata da effetti di assorbimento IR simili a quelli delle resine vegetali (ad es. mastice, dammar, ecc.).*

Osservazioni

Per quanto concerne la correlazione fra le sostanze rilevate ed i prodotti impiegati per il confezionamento della malta si vedano le osservazioni riportate nella scheda relativa al campione n. 3.

Per quanto riguarda la sostanza organica, riferibile ad una resina vegetale, è possibile che questa sia stata impiegata come legante nello strato pittorico.

Spettro FT-IR



Legenda

Ww: wewellite

Si: materiale vulcanico siliceo

C: calcite

N: nitrati

SO: resina vegetale

3. Valutazione del rischio di alterazione chimica e possibili interferenze con eventuali prodotti applicati nel corso dell'intervento di restauro mediante analisi quantitative degli anioni idrosolubili per cromatografia ionica.

3.1. Nota introduttiva

Nell'ambito dello studio dei dipinti, su piccoli frammenti di intonaco sono state eseguite delle analisi dei sali solubili totali, mediante conduttimetria, ed analisi degli anioni idrosolubili mediante cromatografia ionica.

Gli obiettivi principali delle indagini sono i seguenti:

- acquisire informazioni utili alla comprensione delle cause e dei meccanismi di deterioramento evidenziati in sito;
- valutare il rischio di un aumento della velocità di deterioramento dei dipinti anche nell'eventualità di "trattamenti" conservativi mediante impiego di prodotti che potrebbero risultare incompatibili con i sali presenti .

Le analisi dei sali solubili sono state eseguite secondo le raccomandazioni contenute nel documento UNI – Normal 13/83 e le indicazioni dettate da pubblicazioni scientifiche edite da istituti nazionali e internazionali che operano nel campo della conservazione dei beni culturali: ICR, ICCROM, ICOM, ecc.

Le caratteristiche dei campioni prelevati (zona prelievo e sue alterazioni) ed i risultati delle analisi sono esposti dettagliatamente all'interno di schede analitiche, comprensive della necessaria documentazione grafica.

L'interpretazione dei dati ottenuti dalle analisi dei vari campioni è invece riportata in un paragrafo a parte.

Per interpretare correttamente i risultati ottenuti dalle analisi quantitative dei sali solubili e quali – quantitative degli anioni idrosolubili, è necessario correlare i dati acquisiti dalle analisi stesse con le caratteristiche della zona di prelievo: tipo di materiale (roccia, malta), sue caratteristiche fisiche (porosità, fessurazione, ecc.), grado e tipo di alterazioni.

Da tali parametri dipendono infatti sia il tenore dei sali solubili totali, presenti localmente, sia la differente concentrazione delle specie saline.

Nell'interpretazione dei risultati analitici si deve anche tenere in considerazione che, a parità di altre condizioni, la concentrazione delle varie specie saline dipende dalla profondità alla quale è stato eseguito il prelievo. Infatti è noto che i sali più solubili (cloruri e nitrati) tendono a concentrarsi più in profondità (per diversi centimetri) rispetto a quelli meno solubili (solfati) che invece tendono ad essere presenti in quantità maggiori in corrispondenza della superficie dei materiali.

3.2 Sintesi dei risultati e loro interpretazione

Nella tabella seguente vengono riportati i dati acquisiti dalle analisi degli anioni idrosolubili, dalle misure di conducibilità e di pH. Sono esposti anche i valori indicativi della percentuale dei sali solubili totali presenti in ciascun campione, ricavati dalla conducibilità mediante formule empiriche (4).

Camp.	PH	Conducibilità (μS)	% peso sali solubili totali (stima)	Fluoruri (mg/l)	Cloruri (mg/l)	Nitriti (mg/l)	Nitrati (mg/l)	Solfati (mg/l)
C1	7.4	41	2.8 %	0.149	2.958	< 0,05	< 0.01	2.373
C2	7.5	36	2.5 %	0.030	1.008	< 0.05	< 0.01	1.246
C3	7.4	37	2.5 %	< 0.01	1.391	< 0.05	< 0.01	1.477
C7	7.5	39	2.7 %	0.111	0.619	< 0.05	< 0.01	8.116

Legenda:
< 0,01 e < 0,05 : limiti di rilevabilità.
In tutti i campioni i *fosfati* sono risultati in concentrazione inferiore al loro limite di rilevabilità: 0.01 mg/l.

Tutti i campioni mostrano una bassa concentrazione dei sali solubili totali, con valori compresi fra un minimo di circa 2.5 % ad un massimo di circa 2.8 %.

Di conseguenza anche la concentrazione delle specie anioniche analizzate risulta sempre molto bassa.

Il valore più elevato di solfati si è riscontrato nel campione n. 7 ed è pari a circa 8 milligrammi litro. I cloruri raggiungono la concentrazione più alta nel campione n. 1 (2.958 milligrammi litro), mentre i fluoruri sono presenti sempre in concentrazioni molto basse (in tracce). Nitrati, nitriti e fosfati hanno sempre mostrato valori inferiori ai limiti di rilevabilità dello strumento.

Mentre la presenza dei solfati è facilmente giustificabile in quanto questo tipo di sali è molto comune in vari tipi di terreno (5) risulta molto più difficile formulare ipotesi circa la 'provenienza' dei cloruri. Questo tipo di anioni è infatti molto comune nelle zone prossime al mare o nelle regioni a clima freddo. Nel primo caso derivano infatti dalla deposizione degli aerosols marini, ricchi di cloruro di sodio, sulle superfici degli edifici. Nel secondo caso traggono la loro origine dal sale depositato sui manti stradali al fine di abbassare il punto di congelamento della neve.

E' anche possibile, in via del tutto teorica, ipotizzare che i cloruri provengano direttamente dal sottosuolo qualora questo contenga depositi salini. In questo tuttavia caso si dovrebbero riscontrare valori di cloruri e solfati molto più elevati di quelli rilevati.

Come ultima possibilità si indica infine quella che sembrerebbe più probabile, ovvero che i cloruri derivino dalla roccia impiegata nelle murature. Potrebbe trattarsi infatti

⁴ DIMOS: corso sulla manutenzione di Dipinti murali – Mosaici – Stucchi; Parte I: Tecniche di Esecuzione – Materiali Costitutivi, Modulo 3, Leganti, Fissativi, Pigmenti: Metodi di Riconoscimento. Istituto Centrale del Restauro, 1978 Roma.

⁵ Dal terreno per capillarità, veicolati dall'acqua di risalita, i vari tipi di sali possono penetrare all'interno delle murature e migrare successivamente in corrispondenza della pellicola pittorica, spinti dall'acqua in evaporazione.

di una roccia sedimentaria derivante dalla litificazione di un sedimento marino (contenente quindi piccole quantità cloruro di sodio).

La presenza di circa 3 milligrammi litro di cloruri in corrispondenza della pellicola pittorica fa ipotizzare, vista l'alta solubilità di questi sali, che, procedendo all'interno della muratura, la concentrazione aumenti in maniera sensibile.

In base ai dati ottenuti si può affermare che le forme di alterazione rilevate in situ siano solo in parte connesse con la presenza di sali all'interno del materiale lapideo.

Il grave stato di disgregazione degli intonaci e degli strati pittorici è stato causato oltre che dalla cristallizzazione salina probabilmente anche dagli stress meccanici connessi con gli sbalzi termici 'sentiti' in maniera differenziata dalla roccia di supporto e dagli intonaci. Anche gli attacchi biologici da parte di microrganismi e piante superiori hanno contribuiscono certamente in maniera non trascurabile al deterioramento degli intonaci dipinti.

Per quanto concerne la possibilità di interferenze negative dei sali rispetto all'applicazione di prodotti chimici applicati come consolidanti e/o protettivi si segnala che i cloruri, se presenti in quantità elevate, possono portare a vistosi sbiancamenti delle policromie trattate con silicato di etile. Nel caso in esame, viste le basse concentrazioni rilevate, ciò non dovrebbe accadere. Tuttavia nel caso si optasse per l'impiego di questa classe di consolidanti si consiglia di eseguire dei piccoli test pilota prima di procedere all'applicazione del prodotto sull'intera superficie dipinta.

Nelle pagine successive vengono riportate le schede analitiche di ciascun campione, corredate di documentazione grafica, che espongono dettagliatamente tutti i dati acquisiti.

Schede analitiche dei campioni

Campione C1

Descrizione fornita insieme al prelievo: “Mural 5, campitura nera”.

Misura dei sali solubili totali mediante conduttimetria, misura del pH ed analisi degli anioni idrosolubili mediante cromatografia ionica

Metodologia

Il materiale prelevato è stato polverizzato, essiccato in stufa a 60 °C e portato in soluzione secondo le raccomandazioni contenute nel doc. Normal 13/83: “dosaggio dei sali solubili”.

Risultati delle analisi (vedi cromatogramma in allegato)

Conducibilità: 41 μ S/cm			PH: 7.4		
F^-	Cl^-	NO_2^-	NO_3^-	PO_4^{--}	SO_4^{--}
0.149	2.958	< 0.05	< 0.01	< 0.01	2.373
LEGENDA					
F ⁻ : Fluoruro; Cl ⁻ : Cloruro; NO ₂ ⁻ : Nitrito ⁶ ; NO ₃ ⁻ : Nitrato; PO ₄ ⁻⁻ : Fosfato; SO ₄ ⁻⁻ : Solfato; - ione non rilevato. I valori preceduti dal segno < indicano concentrazioni inferiori ai limiti di rilevabilità dello strumento. I risultati sono espressi in milligrammi – litro.					

Osservazioni

La tabella riporta il valore della conducibilità, del pH e la concentrazione in milligrammi litro degli anioni analizzati.

Dal valore della conducibilità, misurato nella soluzione mediante la formula empirica riportata nel documento DIMOS parte II, modulo 3 (ICR, 1978), si può stimare che la percentuale di sali solubili totali presenti nel campione è pari a circa il 2.8 % %. Si tratta quindi di un valore molto basso.

Il valore del pH indica che i sali che compongono il campione, venendo in contatto con acqua, danno luogo a soluzioni leggermente basiche (pH = 7.4).

⁶ La concentrazione di nitriti è stata valutata mediante apposito Kit della Macherey Nagel con sensibilità pari a 0.05 mg/l.

Campione C2

Descrizione fornita insieme al prelievo: “Mural 5, campitura gialla”. Frammento di intonaco con strato pittorico.

Misura dei sali solubili totali mediante conduttimetria, misura del pH ed analisi degli anioni idrosolubili mediante cromatografia ionica

Metodologia

Il materiale prelevato è stato polverizzato, essiccato in stufa a 60 °C e portato in soluzione secondo le raccomandazioni contenute nel doc. Normal 13/83: “dosaggio dei sali solubili”.

Risultati delle analisi (vedi cromatogramma in allegato)

Conducibilità: 36 μ S/cm			PH: 7.5		
F^-	Cl^-	NO_2^-	NO_3^-	PO_4^{--}	SO_4^{--}
0.030	1.008	< 0.05	< 0.01	< 0.01	1.246
LEGENDA					
F ⁻ : Fluoruro; Cl ⁻ : Cloruro; NO ₂ ⁻ : Nitrito ⁷ ; NO ₃ ⁻ : Nitrato; PO ₄ ⁻⁻ : Fosfato; SO ₄ ⁻⁻ : Solfato; - ione non rilevato. I valori preceduti dal segno < indicano concentrazioni inferiori ai limiti di rilevabilità dello strumento. I risultati sono espressi in milligrammi – litro.					

Osservazioni

La tabella riporta il valore della conducibilità, del pH e la concentrazione in milligrammi litro degli anioni analizzati.

Dal valore della conducibilità, misurato nella soluzione mediante la formula empirica riportata nel documento DIMOS parte II, modulo 3 (ICR, 1978), si può stimare che la percentuale di sali solubili totali presenti nel campione è pari a circa il 2.5 %. Si tratta quindi di un valore molto basso.

Il valore del pH indica che i sali che compongono il campione, venendo in contatto con acqua, danno luogo a soluzioni leggermente basiche (pH = 7.5).

⁷ La concentrazione di nitriti è stata valutata mediante apposito Kit della Macherey Nagel con sensibilità pari a 0.05 mg/l.

Campione C3

Descrizione fornita insieme al prelievo: “Mural 5, campitura rossa”. Frammento di intonaco con strato pittorico.

Misura dei sali solubili totali mediante conduttimetria, misura del pH ed analisi degli anioni idrosolubili mediante cromatografia ionica

Metodologia

Il materiale prelevato è stato polverizzato, essiccato in stufa a 60 °C e portato in soluzione secondo le raccomandazioni contenute nel doc. Normal 13/83: “dosaggio dei sali solubili”.

Risultati delle analisi (vedi cromatogramma in allegato)

Conducibilità: 37 μ S/cm			PH: 7.4		
F ⁻	Cl ⁻	NO ₂ ⁻	NO ₃ ⁻	PO ₄ ⁻	SO ₄ ⁻
< 0,01	1.391	< 0.05	< 0.01	< 0.01	1.477
LEGENDA					
F ⁻ : Fluoruro; Cl ⁻ : Cloruro; NO ₂ ⁻ : Nitrito ⁸ ; NO ₃ ⁻ : Nitrato; PO ₄ ⁻ : Fosfato; SO ₄ ⁻ : Solfato; - ione non rilevato. I valori preceduti dal segno < indicano concentrazioni inferiori ai limiti di rilevabilità dello strumento. I risultati sono espressi in milligrammi – litro.					

Osservazioni

La tabella riporta il valore della conducibilità, del pH e la concentrazione in milligrammi litro degli anioni analizzati.

Dal valore della conducibilità, misurato nella soluzione mediante la formula empirica riportata nel documento DIMOS parte II, modulo 3 (ICR, 1978), si può stimare che la percentuale di sali solubili totali presenti nel campione è pari a circa il 2.5 %. Si tratta quindi di un valore molto basso.

Il valore del pH indica che i sali che compongono il campione, venendo in contatto con acqua, danno luogo a soluzioni leggermente basiche (pH = 7.4).

⁸ La concentrazione di nitriti è stata valutata mediante apposito Kit della Macherey Nagel con sensibilità pari a 0.05 mg/l.

Campione C7

Descrizione fornita insieme al prelievo: “Mural 1, campitura rossa”. Frammento di intonaco con strato pittorico.

Misura dei sali solubili totali mediante conduttimetria, misura del pH ed analisi degli anioni idrosolubili mediante cromatografia ionica

Metodologia

Il materiale prelevato è stato polverizzato, essiccato in stufa a 60 °C e portato in soluzione secondo le raccomandazioni contenute nel doc. Normal 13/83: “dosaggio dei sali solubili”.

Risultati delle analisi (vedi cromatogramma in allegato)

<i>Conducibilità: 39 μS/cm</i>			<i>PH: 7.5</i>		
<i>F⁻</i>	<i>Cl⁻</i>	<i>NO₂⁻</i>	<i>NO₃⁻</i>	<i>PO₄⁻</i>	<i>SO₄⁻</i>
0,111	0.619	< 0.05	< 0.01	< 0.01	8.116
<i>LEGENDA</i>					
<i>F⁻: Fluoruro; Cl⁻: Cloruro; NO₂⁻: Nitrito⁹; NO₃⁻: Nitrato; PO₄⁻: Fosfato; SO₄⁻: Solfato; - ione non rilevato. I valori preceduti dal segno < indicano concentrazioni inferiori ai limiti di rilevabilità dello strumento. I risultati sono espressi in milligrammi – litro.</i>					

Osservazioni

La tabella riporta il valore della conducibilità, del pH e la concentrazione in milligrammi litro degli anioni analizzati.

Dal valore della conducibilità, misurato nella soluzione mediante la formula empirica riportata nel documento DIMOS parte II, modulo 3 (ICR, 1978), si può stimare che la percentuale di sali solubili totali presenti nel campione è pari a circa il 2.7 %. Si tratta quindi di un valore molto basso.

Il valore del pH indica che i sali che compongono il campione, venendo in contatto con acqua, danno luogo a soluzioni leggermente basiche (pH = 7.5).

⁹ La concentrazione di nitriti è stata valutata mediante apposito Kit della Macherey Nagel con sensibilità pari a 0.05 mg/l.