

# CHALLENGES IN THE FIELD: THE BROWN UNIVERSITY 2005 PETRA GREAT TEMPLE EXCAVATIONS

*Martha Sharp Joukowsky*

The Luther I. Replogle Foundation, the Brown University Exploration Fund, the Joukowsky Family Foundation, and several private donors support archaeological research at the Petra Great Temple. The 13th excavation season by Brown University archaeologists took place from June 11 to August 4, 2005. To better understand its stratigraphy and phasing, excavations continued in all sectors of the Great Temple—Propylaeum, Lower Temenos, Upper Temenos and the Great Temple proper.

This campaign would not have been possible without the generous assistance of the Jordanian Department of Antiquities, Fawwaz al-Krayshah, Director, and Suleiman Farajat, Director of the Petra National Park and the Department of Antiquities Representative. We are also grateful to Department of Antiquities Representative Samia Fallahat, and the American Center of Oriental Research, Pierre M. Bikai, Director. We would also like to express our thanks to Brown University for making this season possible.

Brown University archaeologists included Martha Sharp Joukowsky, Director, Artemis W. Joukowsky, photographer<sup>1</sup>, and five supervisors served as most valued staff members, including Emma Susan Libonati, Marshall Agnew and Eleanor A. Power, (Surveyors), Tarek M. Khanachet, and Christopher A. Tuttle. Deirdre G. Barrett expertly processed the finds as our Reg-

istrar-Cataloguer and lamp analyst, and Christian Augé analyzed our coins. We were supported by a work force of 50 devoted Bedouin, directed by Dakhilallah Qublan, Foreman. Rune Frederiksen spent two weeks at the site as our Theater Consultant. Our discussions revolved around the study of and future publication on the Petra Great Temple Theater.

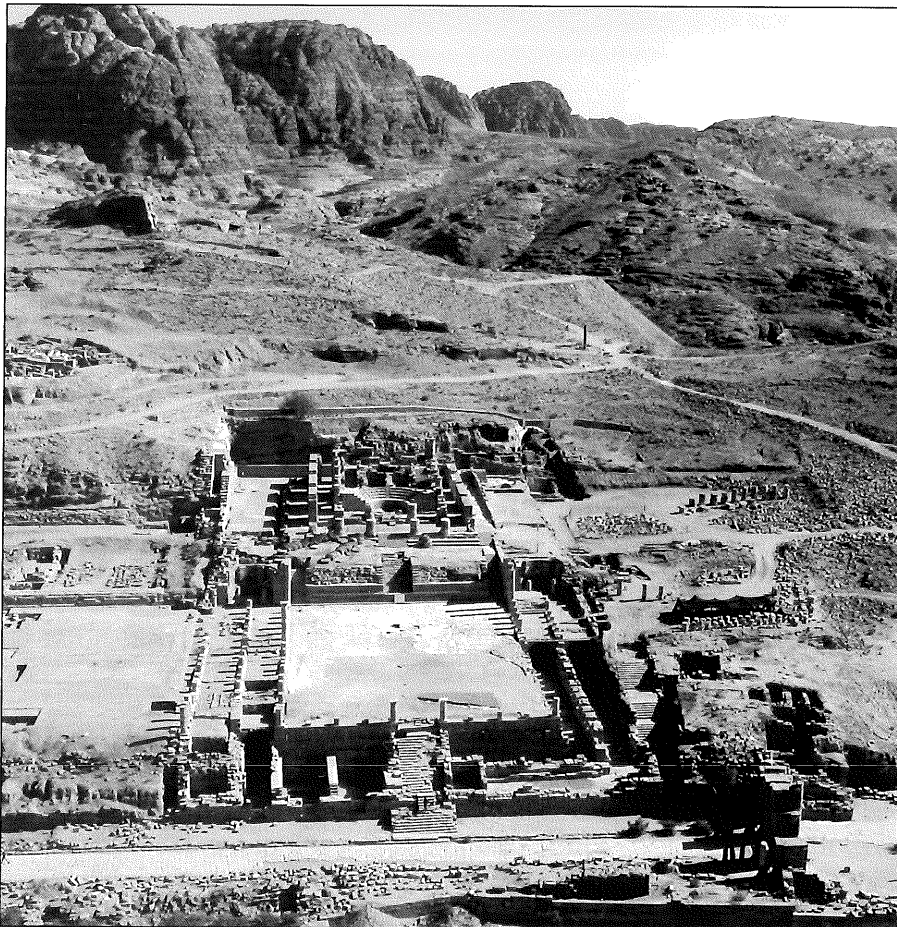
The Petra Great Temple occupies the site on a south slope south of the Roman Road just east of the Temenos Gate of the Qaşr al-Bint. Founded in the last quarter of the first century BC, the Great Temple is the result of a great urbanization program undertaken by the Nabataeans. Located in the heart of the city, the Great Temple is one of the monumental complexes of Petra, and because it houses a theater in its center, appears to celebrate civic as well as a religious functions. As seen today, the temple is a freestanding tetrastyle in antis building in an elevated Upper Temenos<sup>2</sup>.

## Fieldwork 2005

The 2005 site plan is presented in **Fig. 1**. Figure 2 illustrates the four divisions of the precinct — the Propylaeum, Lower Temenos, Upper Temenos and the Great Temple proper. The site plan outlined with 2005 projects is illustrated in **Fig. 3**. Four large trenches and eleven Special Projects are excavated to demystify stratigraphic problems. The phasing and dating of the site<sup>3</sup>

1. All photographs are to be credited to Artemis W. Joukowsky.  
2. Large-scale annual excavations carried out by Brown University archaeologists since 1993 have exposed the architecture of the Great Temple, and our research has concentrated on recording the site plan and on conservation of the site, (see Joukowsky annual reports in *ADAJ*). For a complete bibliography please refer to our web page <http://www.brown.edu/Departments/Anthropology/Petra/>.

3. We cannot fix the architectural events to absolute dates — thus our chronology is relative. The Petra Great Temple Site Phasing is comprised of 15 phases, as follows: Pre-Site Phase I-Early first century BC (perhaps earlier); Phase I-Early to mid-first century BC; Phase II-first century BC; Phase III-Minor damage; Phase IV-the “Grand Design,” last quarter of the first century BC to AD first century; Phase V-late AD first century; Phase VI-AD early to mid-second century; Phase VII-AD mid second century, Roman period; Phase VIII-abandon-



*1. Aerial view of the Petra Great Temple to south at the completion of the 2005 excavations.*

will be employed in our discussion of each 2005 trench or Special Project development. This 2005 report summarizes the excavations and phasing as well as the artifact repertoire, and concludes with the consolidation and restoration measures undertaken.

### **Propylaeum**

The 2005 campaign comprised three important trenches in the Propylaeum East, Center, and West. Activities in the Propylaeum and Lower Temenos are illustrated in **Fig. 4**.

#### *Propylaeum East*

In 2005 the excavation of Special Project 150, a 2.30-by-2.30m sondage, supervised by Christopher A. Tuttle, reveals an assemblage of architectural features at a shallow depth below the floor level in East Propylaeum Room 2. The

complexity of these features is not completely understood. The earliest stage encompasses the early wall constructions found in the sounding, although it is not at all certain that these architectural features are contemporary, or even interrelated.

#### *Propylaeum Central Stairs*

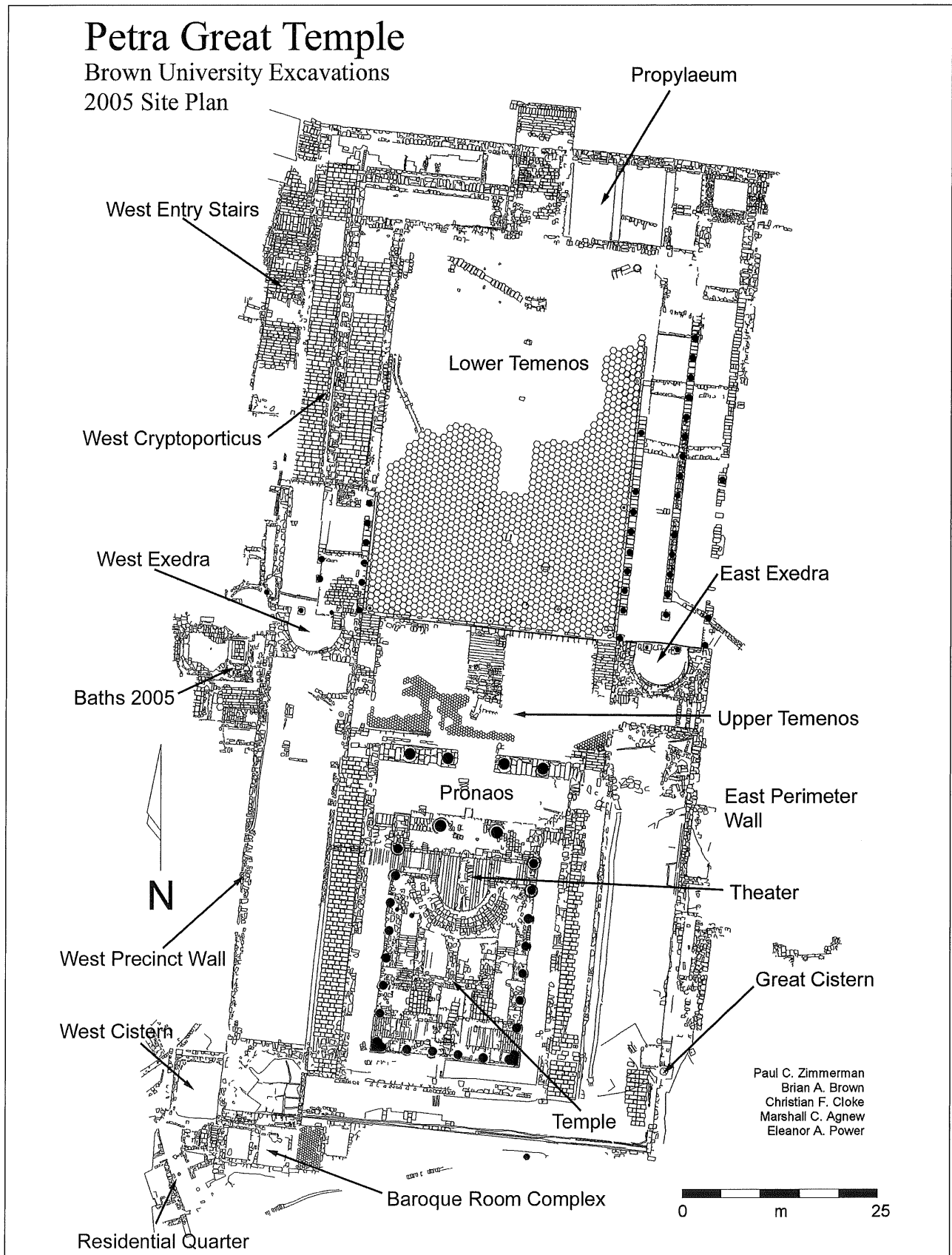
In 2005 a small probe 1.20-by-1.20m, supervised by Tarek M. Khanachet, at the bottom of the earlier stairs adjacent to the Room 1 landing in Special Project 114 confirms that at the entry to Room 1, the ballista ball assemblage is not found under the stairs, so the ballista balls used as rubble fill and leveling for the flooring of the Propylaeum West do not continue under the landing pavers for the earlier steps. This leads us to conclude that the ballista balls predate both staircases. Thus, two possibilities emerge: if the

ment and robbing; Phase IX-363 AD earthquake; Phase X-abandonment, Byzantine period, AD late fourth through fifth centuries; Phase XI-post AD fifth century, perhaps result of 512 AD earthquake? Phase XII-rob-

bing and abandonment; Phase XIII-major collapses that continue into the Islamic period; Phase XIV-modern period, Bédouin activities and accumulation of debris.

# Petra Great Temple

Brown University Excavations  
2005 Site Plan

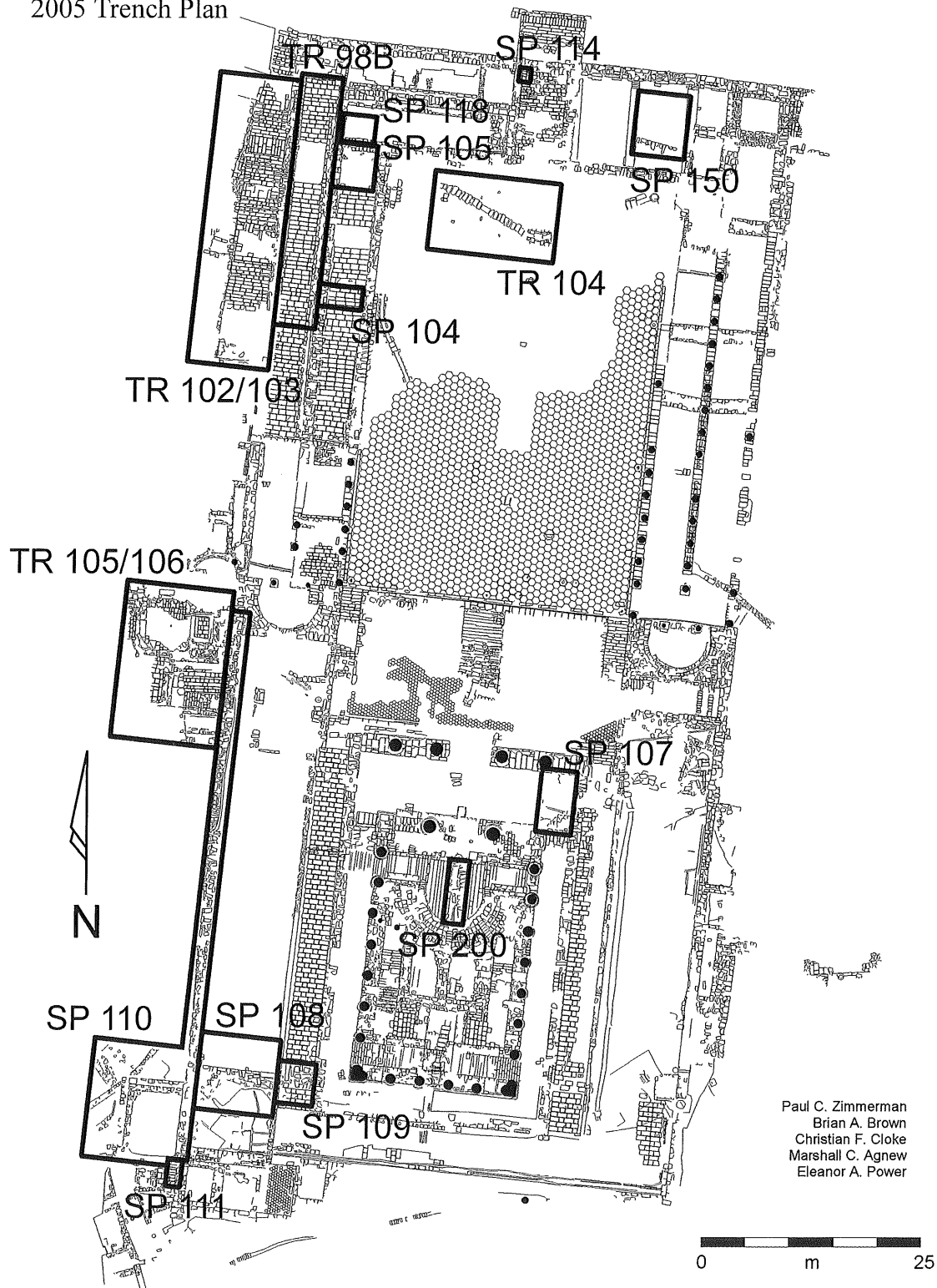


2. Plan of the Petra Great Temple precinct with areas identified (Paul C. Zimmerman, Brian A. Brown, Christian F. Cloke, Marshall C. Agnew, and Eleanor A. Power).

# Petra Great Temple

Brown University Excavations

2005 Trench Plan



3. Petra Great Temple Site Plan showing the positions of the 2005 Trenches and Special Projects (Paul C. Zimmerman, Brian A. Brown, Christian F. Cloke, Marshall C. Agnew, and Eleanor A. Power).





4. Great Temple to south with 2005 excavation activity in the Propylaeum and Lower Temenos.

current date for the ballista balls is correct (Site Phase VII, AD mid-second century), then both the early and later stairs are from the Roman period; alternatively, the ballista balls could be earlier and the early steps are from the Nabataean period. A careful analysis will shed more light on the dating of this area.

#### *West Propylaeum South Gallery*

In 2005 Special Project 118 was undertaken by Christopher A. Tuttle to clarify the nature of the access into the West Cryptoporticus East from the south gallery of the Propylaeum West — this was not evident from earlier excavations<sup>4</sup>. The awkward height difference between the south gallery floor level and the cryptoporticus would have been well served in antiquity by stairs. This 2.35-by-3.00m sondage succeeds in clarifying the nature of this access, indicating that stairs are non-existent at the time of the destruction event(s), and suggesting that the West Cryptoporticus East ceases to function before the collapse occurs.

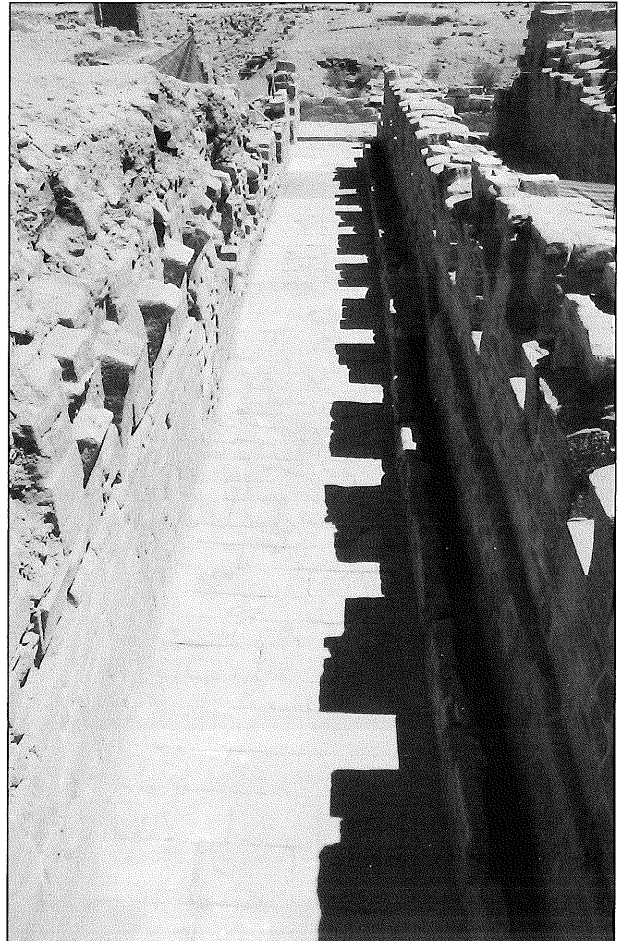
#### **Lower Temenos**

Five 2005 projects were carried out in the Lower Temenos — three projects in the West Cryptoporticus, a probe for the canalization system, and the West Entry Stairway.

#### *West Cryptoporticus*

Trench 98B uncovers the west gallery of the

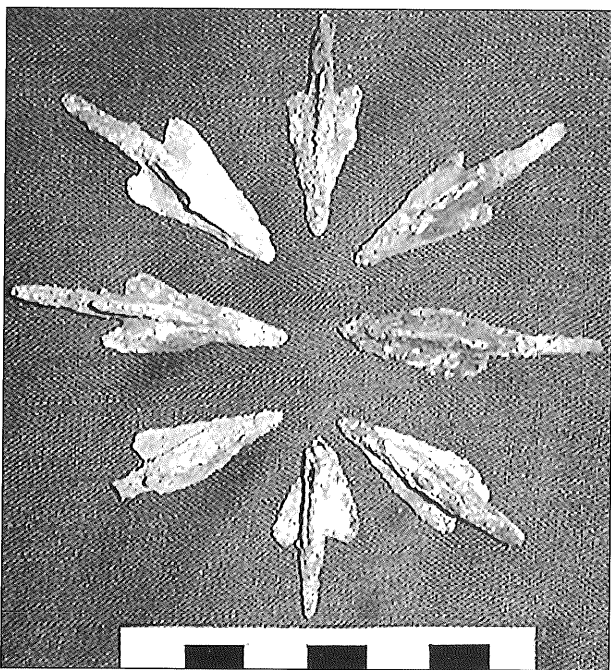
West Cryptoporticus, as can be seen in **Fig. 5**. Excavated by Tarek M. Khanachet, Trench 98B,



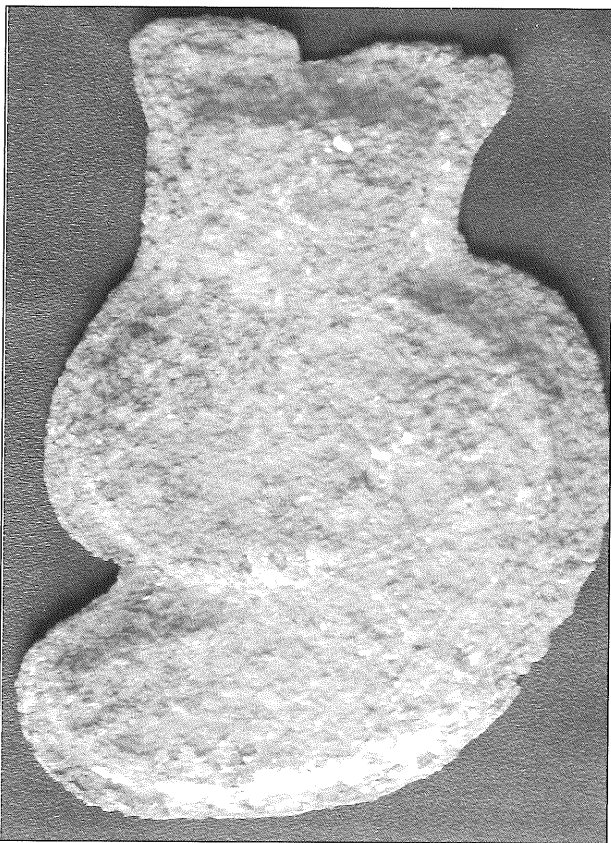
5. Lower Temenos West Cryptoporticus east gallery, completed excavation to north.

4. Trench 97 in 2004 or Trench 69/Special Project 70 in 2000.

measuring 17.21m-by-3.93m, completes the excavations to the west gallery paved floor. Martial artifacts continue to be recovered. Figure 6 is a collection of arrowheads and **Fig. 7** is a cheek



6. Arrowheads from the West Cryptoporticus excavations.



7. Cheek piece from the West Cryptoporticus excavations.

piece from a helmet.

During the 2005 season we wrestled with an important question: What lay below the pavement of the West Cryptoporticus galleries? In 2005 we decided to remove a section of flagstone pavement and excavate a 4.00-by-4.30m sondage below the east gallery floor. Supervised by Christopher A. Tuttle and known as Special Project 104, 13 stages in the stratigraphy are identified, beginning with a Pre-Site Construction Phase I from the earliest pottery assemblage to range between 125 BC and 50 BC. The stratigraphy reveals a complex sequence of natural and human events. Beneath the Lower Temenos is at least one earlier period of architectural development and the course of the Wādī Mūsā likely flowed further to the south prior to the construction of the artificial terracing for the precinct. The presence of two early activity strata also raises the intriguing possibility of tent habitations in the area dating from the elusive period of Nabataean history before permanent architecture is constructed. Bedrock is not reached. The Cryptoporticus galleries are constructed over earlier remains; however, the pavement is laid after 50 BC. But how long after? This poses an interesting question.

To better understand the stratigraphy of the West Cryptoporticus east gallery, Special Project 105 was also excavated in 2005; a 1.50m-by-4.30m probe, supervised by Christopher A. Tuttle, was placed in the east gallery of the West Cryptoporticus. Here terracing underlies the preparatory construction for the gallery, and there are four stages in the construction sequence of the West Cryptoporticus East — under terracing, preparatory constructions, wall constructions and floor leveling. Concentrating on the phasing of the area, the excavations disclose the area's later uses and ultimate collapse. The lowest layer is associated with Pre-Site Phase I and Site Phases I and II are from the Special Project 104 sounding, *supra*, with its various strata: sedimentation, habitation and pre-construction preparation. Above this is Site Phase IV Grand Design when the West Cryptoporticus is constructed with the insertion of vaults. In Site Phase V, the vaults are blocked when the floors of the Cryptoportici are laid, and repairs take place in the center cryptoporticus wall that supports the vaults extending to the east and west.

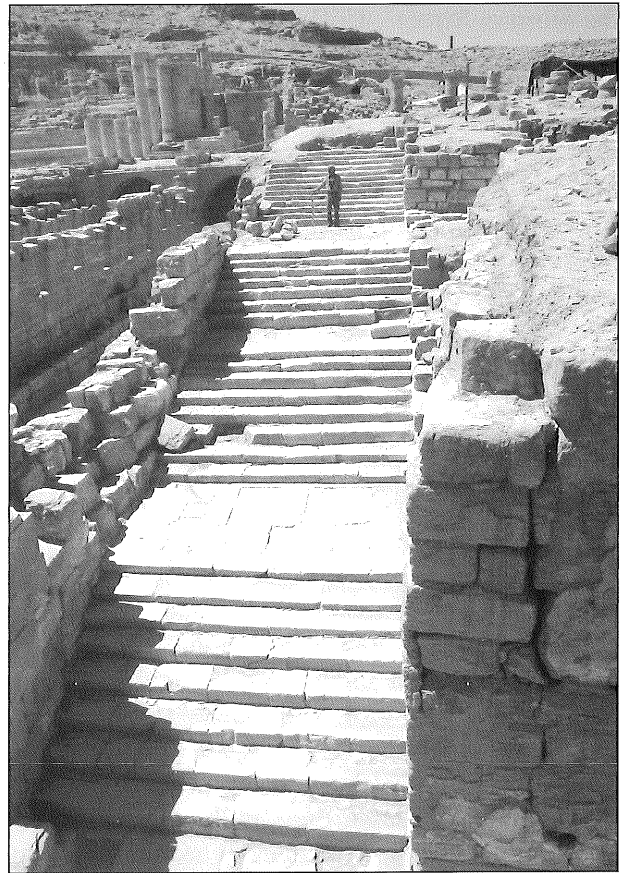
Tarek M. Khanachet excavated Trench 104, an 8.00m-by-10.00 m trench. Expecting to find a cistern-like feature revealed by the 1995 Ground Penetrating Radar, we uncovered a mysterious extension of the canalization system which does not appear to be functional. Pictured in **Fig. 8**, it may serve as an overflow for the central subterranean system.

#### *West Entry Steps<sup>5</sup>*

Located at the extreme west of the Lower Temenos in the 2005 excavations of Trenches 102-103, this grand stairway, pictured in **Fig. 9**, is a continuation of the West Entry Stairs excavated in Trench 88, 2002. Findings from this earlier recovery made clear that the stairway might continue up to the Upper Temenos. To bring this concept to reality, the 2005 excavations, including the removal of mountains of rubble, enabled us to interrogate the data. The final dimensions of the 2005 trenches are 30.75m north south-by-4.00 to 4.55m in width. Now that we have completed the West Entry Stairway, the following discussion includes details of the entire feature.



8. Lower Temenos Trench 104 canalization capstones to southeast in situ.



9. 2005 West Entry Stairway to south.

This West Entry Stairway follows the slope of the Great Temple precinct that falls away at a dramatic angle from the Lower Temenos to the Roman Street. Composed of five stair flights it is interrupted by four platform landings set at irregular intervals creating an entry passage totaling 40.85m in north south length. It is probable that more steps exist at the top of the stairway, but from the stratigraphy there is scant evidence for them. It is a comfortable south to north descent from the Great Temple to the West Baths<sup>6</sup> or from either of those features to

5. Technically these stairs are located in the Lower Temenos; they are a continuation of the steps that originate in the Propylaeum West.
6. The West Baths (not to be confused with the 2005 Great Temple Roman Baths of the Upper Temenos) were previously excavated by the Jordanian Department of Antiquities some 20 years ago. Were the West Baths constructed at the same time as the Petra Great Temple? We believe they were constructed later. Is their layout part of a single architectural program? If it is, the architects realized they had to change the orientation of the West Baths either to conform to the Roman Street or to re-orient the West Entry Stairs to a building pattern that had already been laid out, and the orientation of the two complexes had to be justified.

What appears clear is the West Stairway entry and the lower courses of their construction were oriented to the Great Temple. This would suggest that the west wall would have been constructed at a slightly later time than the entry walls below the entry platform. The continuation of this wall to the south above the entry platform seems to be later because the ashlar are smaller in dimension. This might be a difficult assertion to accept — it is such a monumentally high wall that this idea can only be accepted as conjecture at this point. It is only to the south of the main Platform-Landing which serves as both the entry into the West Cryptoporticus as well as to the as yet unexcavated stairs to the West Baths that there is a change in orientation. Would those who were using this stairway even take

the Roman Street<sup>7</sup>. Collapse covers all the features including the tops of most of the walls. As a result of destruction and collapse, the soil is a dusky red 2.5YR 3/4 Munsell color, composed of a sandy sedimentation with small stones on the surface bleeding into a more homogeneous soil with some inclusions including roof tiles, mortar (either in clumps or facing from walls) and collapsed large ashlar. Few carved decorative elements are present. Intermittent episodes of burned debris probably from wooden support beams are also found above a layer of sterile sandy soil that covers most of the stairway architecture. Had it not been for this cushion of sand, greater attrition of the step architecture would be present.

The inner and outer faces of the walls are constructed of dressed ashlar masonry, each course averaging 0.40m in height. The ashlar are set into mortar in both the vertical and horizontal joints. The east wall stands 1.73m above the platform landing at the bottom of the steps. At the south, the entry is composed of four courses of well-hewn diagonally dressed sandstone ashlar in the Nabataean casemate system with fill. At some point in antiquity this section of wall collapses, and is subsequently rebuilt with roughly hewn ashlar above one course of rubble fill 0.50m in height. Some plaster, however, still adheres to the west face of this poorly executed wall indicating that it is hidden behind a plaster surface. To the south of this portion of wall is a vertical split between the ashlar that are slumped to the south. This suggests that the rubble fill, middle bonding course has pulled away from the wall matrix and collapsed<sup>8</sup>.

In the north, the west wall is thirteen courses in height, and constructed with well-dressed

sandstone ashlar, many are also slumped out of position. On a platform to the west, there is as yet an unexplored doorway leading to the West Baths that undergoes modifications — the lower courses of this wall's east face exhibit ancient repairs.

From the evidence we cannot assume the stairway is unroofed. The distance between the east and west walls is between four to five meters, which is a reasonable span for wooden beams to support roof tiles, and fragments of co-vertile and pantiles were found in the collapsed debris, so we assume it is roofed.

The well-preserved stairs are characterized by large impressive well-dressed ashlar set into mortar built from the bottom to the top. These exceptional steps are expertly laid and in many cases are bonded to the east and west walls with plaster; they are constructed as a single unit to abut the sidewalls. Although each flight of steps and platforms differs in dimensions, the platforms stabilize the steps by providing a secure foundation between flights. The platforms are composed of well-laid plain white limestone flagstones with tightly fitted blocks affixed with mortar. In view of the preservation of these features, it is worth noting that ancient Nabataean stonemasons had a developed, exceptional technology in their design.

Underlying debris collapse and fill off to the west between the two uppermost stair flights is a terraced platform landing measuring 4.97m north south-by-4.35m east west. The platform elevation averages 896.500m, and it is bordered to its east with smoothed blocks measuring 0.25m to 0.32m in size. Behind this platform to the west is a narrow corridor leading to the West Baths. Resting on this platform, just below the

note of the change in orientation? It is difficult to say. In appearance, the west wall has had its north south orientation compromised in antiquity and it leans to the west, pulling away from the staircase. The Nabataean builders may have had a problem with orientation and the orientation of the Great Temple precinct with the West Baths. As can be seen from the aerial photograph in **Fig. 1**, the axis of the two sectors is appreciably different, and yet this stairway served both areas. Its west wall is intentionally compromised and oriented more to the west to serve both precincts. This evidence suggests that the city plan may have been modified with the construction of the West Baths, but this is conjecture.

I speculate that the West Baths were part of a complex that may originally have served as a palace.

7. The question also has to be posed as to whether the

upper flights of steps were constructed at the same time as the lowest flight of entry steps from the Roman Road. Because they are of different architectural styles, presumably the lowest flight of steps is re-laid, using larger ashlar (not conforming to the upper four flights' design, riser height or depth).

8. This wall and its secondary wall repair are placed in the same construction phase, although the repaired section is noticeably different from the original wall construction. As we cleared the platform landing we also realized that the collapse had compromised the east wall, which had tumbled into the West Cryptoporticus. Ashlar and caution tape were put in place in the affected area to provide a barrier to discourage visitors from using this point as a lookout over the West Cryptoporticus, which is more than a 5.00m precipice.





10. 2005 West Stairway to west with the *nefesh* and *betyl* *in situ*.

corridor doorway, pictured in **Fig. 10** is found a *nefesh*<sup>9</sup> accompanied by a *betyl*, positioned behind an ash-discolored deposit. This *nefesh* is a white limestone/sandstone slab with an incised obelisk carved above a squared cut *betyl* block, which is removable<sup>10</sup>. The block itself measures 0.78m in height-by-0.57m in width. The carved obelisk is 0.19m in height-by-0.135m in width and the small *nefesh* *betyl* measures 0.135m wide-by-0.13m in height. Besides the *nefesh* and the *betyl* are prolific collapsed ashlar numbers in the 900s. Little pottery, some bone, glass and metal are found, but of note are a bronze lance head and four coins. Since this area has been subject to erosion over the millennia, the artifact repertoire does not originate from sealed deposits; thus little dating can be ascribed to the artifact record.

There is an important west access to the Petra Great Temple — an access contemporary with its Grand Design in Site Phase IV. The date of its final use we ascribe to Site Phases XII-XIII or to post-date the 512AD earthquake, after which the West Entry is covered with a massive collapse fill, suggesting the West Entry Stairs are in use for approximately 500 years. We speculate the upper stairs are destroyed by natural causes; nonetheless it is clear that connecting walls provide a link between the West Stairway and the West Baths.

The Petra Great Temple has regained a remarkable and yet puzzling monumental stairway, which is clearly a product of desired access, providing a direct approach to the Great

Temple Upper Temenos from the Roman Road while bypassing the Lower Temenos. Integral to the precinct, it exists independently and/or interdependently with the Great Temple and the West Baths. This stairway is one of the most impressive flights of stairs so far found associated with freestanding buildings in Petra. Indeed, it gives us a fascinating insight into the Nabataean understanding of structural engineering. In addition to the architectural remains is the *in situ* discovery of the *nefesh* stele and the accompanying *betyl*, which certainly is one of the most spectacular finds of the Great Temple excavations. This roughly carved, freestanding bas-relief placed on The West Stairway raises several questions. What was the compelling rationale for this memorial monument's placement? On stylistic and iconographic grounds, why does our *nefesh* contain both the *betyl* and an obelisk with a separate freestanding rectilinear *betyl* placed next to it? Robert Wenning, in his 2001 article, "The Betyls of Petra," in *BASOR* 324: 79-95, states that the *nefesh* is commonly found along the "paths of the city." This suggests that the placement of our West Stairway is an important city artery. Obviously, the monuments on this platform are significant religious commemorative installations, indicating that some ritual is performed here—some Nabataeans 2000 years ago expressed a dedicatory tribute both to the god and probably to a person of considerable influence.

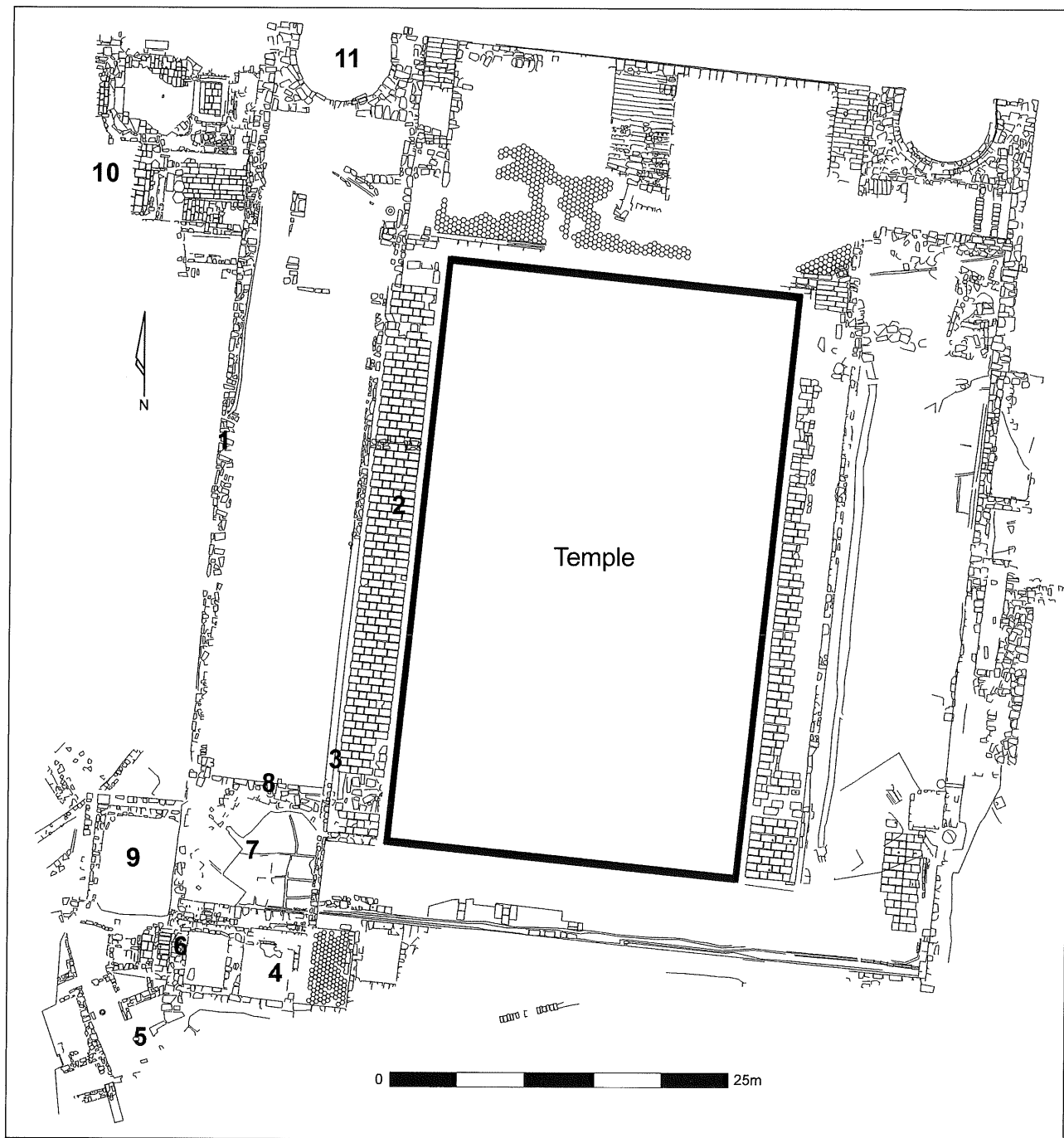
### Upper Temenos

The plan of the Upper Temenos is shown in **Fig. 11** with major features numbered. The 2005 excavations continue between the Great Temple West Walkway Wall and the West Precinct Wall, and from the West Precinct Wall further to the west. The West Precinct Wall divides the two areas. Each unit is discussed separately beginning with the previously unexcavated strip 40.00m north south-by-11.00-12.00m east west between the West Walkway and West Precinct Walls. This includes the West Precinct Wall, the Residential Quarter Steps, the West Plaza Bedrock Installations and the East West Support Wall. The dis-

9. A *nefesh* is a sacred Nabataean commemorative monument, a stele. It was carved to consecrate a person or a family, and to be the receptacle of the soul. Often there is no burial associated with it, as in the case at the Great Temple. It serves as a witness to a Nabataean shared belief.

10. For safekeeping the *nefesh* was moved from the site; -359-

a 1:1 reproduction will be placed in its original position. When the small *betyl* block was removed from the slab, it was found that the slab had been completely carved through, and the *betyl* had been affixed to a square "window" in the block. Originally it had been set into the window with white mortar (which we removed for sampling).



11. Upper Temenos plan with major features numbered: 1. West Precinct Wall, 2. West Walkway, 3. West Walkway Wall, 4. Baroque Room Complex, 5. Residential Quarter, 6. Residential Quarter Steps, 7. West Plaza Bedrock, 8. East West Support Wall, 9. Cistern-Reservoir, 10. Roman Baths, and 11. West Exedra (Marshall C. Agnew, Eleanor A. Power).

cussion of these features follows.

#### West Precinct Wall

Located in the west temple precinct is the West Precinct Wall. The length of the West Precinct Wall is cleared in trench Special Project 110 in 2005, supervised by Eleanor A. Power and Marshall A. Agnew. Extending 62.00m in

north south length, we predict its original depth at 899.747 elevation, or to be approximately 3.28m in preserved height. As yet this badly eroded wall's excavation is not completed.

Inside the West Precinct Wall are the Residential Quarter Steps linking the Residential Quarter to the Settling Tank of the Baroque Room complex. Special Project 111 involves



the removal of the steps to test the stratigraphy. Under the supervision of Tarek M. Khanachet, it was concluded the Residential Quarter steps are built on layers of rubble and soil fill with layers of wadi mud directly beneath. Pottery is also recovered that confirms their construction to Site Phase IV.

#### *West Plaza Bedrock Installations*

Special Project 108, excavated in 2005, is located in the southwest corner of the Great Temple precinct in the West Plaza. Figure 12 provides an aerial view of the West Plaza with the recovered architecture. Measuring 12.40-by-5.00m in the west-by-9.20m in the east and supervised by Emma S. Libonati, most striking are the quarrying cuts on an elevated bedrock plateau. Immediately west of the quarrying cuts are a group of intriguing features — three bedrock caves. Aligned north to south, the three caves hug the edge of the bedrock plateau, each opening to the west. Like the caves of the Residential Quarter, these caves show evidence of human manipulation. In the floor of the south cave are two square cuts, one near the cave's entrance and a smaller cut in the rear north corner, presumably used to anchor posts to support either a doorway or a

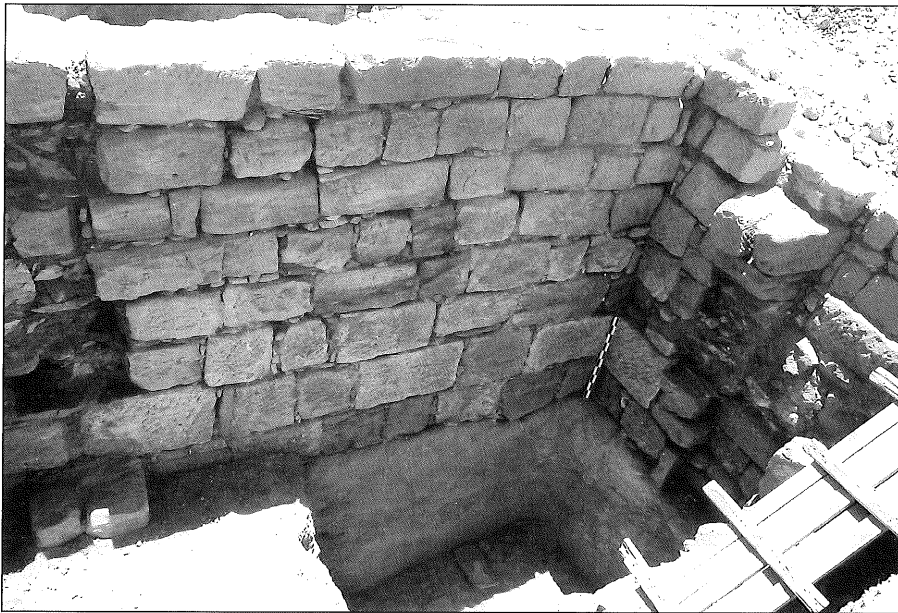
ceiling. In the central cave, a bedrock partition wall is chiseled down to form a doorjamb. In the north cave a carved ledge is visible, presumably to support a roof. This evidence of chisel working combined with large quantities of ceramic and bone material, sheds light on the early use of the southwest area of the precinct prior to the Great Temple's construction. In antiquity, once plans for the temple are approved and quarrying begins, the caves are shaved back and purposefully filled with large unhewn stones; the north cave, however, is carefully fitted with stacked hewn sandstone ashlar.

#### *East West Support Wall*

During the excavations of Special Project 108 it becomes clear that the West Plaza architecture is much more extensive than we expected. Set on bedrock, the East West Support Wall opens at a 904.849m elevation and closes at an elevation of 901.549m; it is 12.00m in length-by-2.00m in width, and 5.10m in height. Illustrated in **Fig. 13**, this wall is composed of five to eight ashlar courses, with the lowest two courses potentially from an earlier building phase. The East West Support Wall, which in itself is a monumental construction, is designed and constructed with



12. Aerial view of the West Plaza.



13. View of the East West Support Wall abutting the West Precinct Wall to southwest.

the express purpose of providing an artificial platform for the temple. From the exposure of the juncture between the West Precinct Wall and the East West Support Wall, it is clear that both walls are originally constructed in Site Phase I and therefore are intrinsically linked.

Its discovery clarifies the west support for the temple. Hitherto we were uncertain as to how the temple architecture is supported on the west, assuming that where the bedrock falls away, fill is brought in to build up the founding level. Once the temple architects choose the specific location and plan, they manipulate the landscape to bring their architectural concept to fruition. In creating this massive wall, they support the structure by using enormous stones and supportive retaining walls for the substructure.

Now we turn to features beyond the West Precinct Wall further to the west — the Cistern-Reservoir and the Roman Baths.

#### *The Cistern-Reservoir*<sup>11</sup>

In 2005 the West Precinct Wall was further examined to the south of Special Project 110. This project, supervised by this author with the aid of Elizabeth A. Smolenski, involves the dis-

covery and excavation of a Cistern-Reservoir (**Fig. 14**) extending to the west just below the Residential Quarter. Trench measurements average 11.85m north south-by-9.20m east west. On the north the trench is bordered by unexcavated fill, on the south it abuts bedrock and the excavated Residential Quarter, to the east it rests against the southernmost extension of the West Precinct Wall and bedrock, and on the west it abuts an unexcavated fill deposit. This monumental cistern-reservoir measures 38.8 square meters-by-an average of 1.96m in depth, and holds approximately 19,571.97 gallons of water. On the north and west are walls repaired in antiquity, and resting beside the west wall is a monumental stone basin.

Also important is the discovery of a series of pre-cistern-reservoir walls indicating how the area is manipulated and used by earlier builders. In its pre-Cistern-Reservoir days, the carved out bedrock features and built walls indicate that it serves as a residential area. Material culture is prolific, particularly with the recovery of bones and ceramics. Noteworthy is the sculpted head of a deity, (**Fig. 15**) found among the collapsed ashlar of the West Precinct Wall. Other artifacts

11. It might be questioned why we combine the terms “cistern” and “reservoir” for this feature — “Cistern-Reservoir”. According to Bellwald 2003:137, *The Petra Siq: Nabataean Hydrology Uncovered*, a “cistern is a closed storage for runoff water, not spring water,” and a reservoir is a “closed (i.e. covered) tank for storing drinking water from a spring”. In actual fact we

are not sure if our feature is one or the other or can be defined as either of these structures. As a matter of fact it may be a detention storage control basin for storm water run off. Unfortunately, at this point in our investigations we have little idea of how the water is collected or dispersed.



14. Cistern-Reservoir to south with the Residential Quarter behind.



15. Head of a deity found in the collapse of the West Precinct Wall.

include a recumbent animal spouted vessel, a bone pin with a bronze ring, five coins and a ceramic infant feeder/lamp filler in the shape of a hedgehog (**Fig. 16**).

There are questions that may never be an-



16. Hedgehog found in the lowest deposits of the Cistern-Reservoir (Scale: 5cm).

swered. How was this structure roofed? Was it a flat roof or are the ashlar seen on the west for an arched structure? In its collapse did it bring down arches that spanned from east to west? How did water enter the Cistern-Reservoir? What is its relationship to the Residential Quarter? We assume that it is in use at the same time; however, access to the Residential Quarter is difficult given that the cistern is there<sup>12</sup>.

Discussed from earliest to latest: Pre-Site

12. Other questions involve an understanding of how the water is dispersed. Did it travel along and/or over the West Precinct Wall? There are no openings in the cistern itself evident from the excavated evidence. Why is this Cistern-Reservoir installed? The Great Cistern in the East Plaza excavated in Special Project 85 in

2001 measures 389.844 cubic meters holding 102,985 gallons of water, whereas this facility measures 74.088 cubic meters and holds 19,571.979 gallons. In comparison the Great Cistern is significantly larger. Why were two such entities totaling 122,556.97 gallons of water required for the Great Temple and its environs?

Phase I is the manipulation of the bedrock. The cutting away of bedrock, we assume, predates the subsequent building of the temple. Chisel marks on the east and south walls attest to this premeditated plan. In Site Phase I are the construction and use of early installations, as well as the building of the West Precinct Wall. The shelf of bedrock continues at a high elevation on the southeast where it drops off and is cut back for the cistern-reservoir construction. Subsequently in Site Phases III and IV the early Cistern-Reservoir is built. Site Phase VI, brings fire and collapse to Cistern Reservoir walls, which are repaired in Site Phase VIII (and are seen today). In Site Phase IX is the collapse of Cistern-Reservoir and subsequent abandonment. In Site Phase X are signs of continued abandonment, but the water systems may be repaired and still in use. Site Phases XI-XIII show no signs of use, but in Site Phase XIV there is the construction of a Bedouin Wall over the Nabataean wall and perhaps reuse of this water system on a limited scale for the watering of Bedouin fields.

### *The Roman Baths*

Figure 17 is a plan of the Roman Baths with the various features and **Fig. 18** gives an aerial view of the baths. Trench 105-106 is located just to the west of the West Precinct Wall, to the southwest of the West Exedra. Bounded on the west by the West Precinct Wall and on the north by the north wall of the 'reception room' and the north wall of the frigidarium, the extensions of the trench to the south and to the east are not defined by architectural features but rather by balks created during the course of the excavation and left intact<sup>13</sup>. Supervised by Eleanor A. Power and Marshall C. Agnew,

The final dimensions of Trench 105-106 are ca. 18.00m north south at its largest-by-ca. 12.00m east west. The first features uncovered are the 'bathrooms' (lavatories), with two semicircular and two rectangular niches visible in **Fig. 19**. To the south of the bathrooms is the 'hypocaust room,' so-named because it is full of dumped hypocaust and flue tiles. In the east is a frigidarium with a small pool shown in **Fig. 20**, and

to the west is an elegant marble-floored reception room with four semicircular features at its four corners. This excavation is to be completed in 2006.

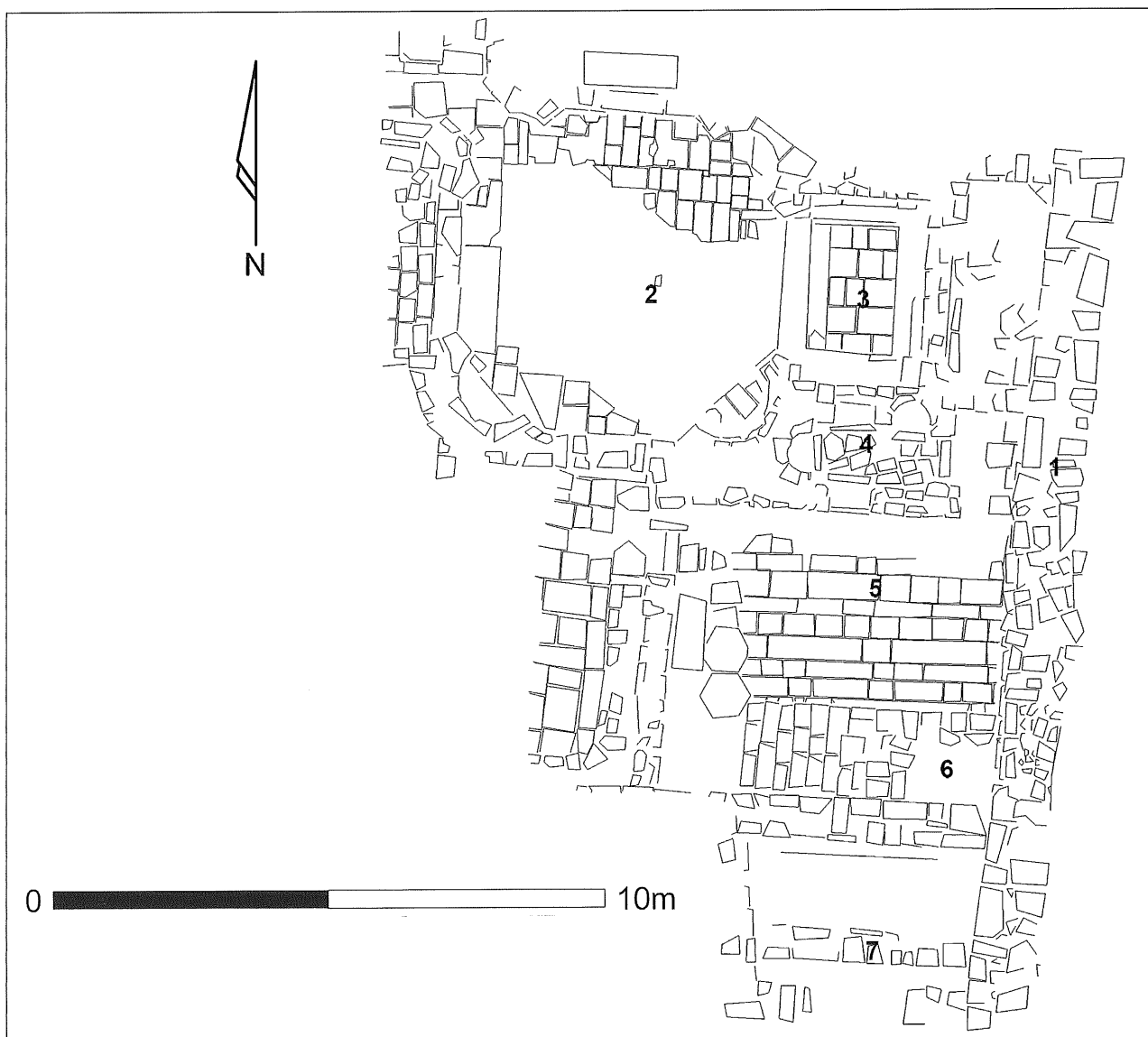
Besides the obvious importance of the architectural features that are revealed in the Roman Baths, there are a number of interesting artifacts recovered — 1,092 architectural fragments and 61 special finds. Most of the architectural fragments are ashlar and marble tile fragments found in the collapse layers. Of the special finds, 24 are coins and there are more than 20 glass beads, in addition to two complete Byzantine lamps. Most important of the special finds, however, are two marble Greek inscriptions<sup>14</sup> both dating to the AD second and third centuries. Illustrated in **Fig. 21** (Seq. No. 105623, Catalog No. 05-S-7) is a two-line inscription of five letters in the first line with a second line of two words and 12 letters bearing the Homeric word "prudent" (Tryanos) and may have been written in hexameter. The second inscription (Seq. No. 106238, Catalog No. 05-S-11), with four letters, is not as yet translated but may well be part of the same A style inscription.

Of primary importance is establishing a chronology for the construction and destruction events that shape the bath remains. The earliest event is the construction of the West Precinct Wall, which is part of the site preparation in Phase I (first century BC). This massive wall defines the extent of the temple. The next stage of construction is an east-west wall in the south of the trench (numbered 7 on the **Fig. 17** plan). This wall, which clearly abuts the West Precinct Wall, is large and well built, and extends across the bath perimeter, continuing further to the west. It is unclear why it is constructed but seems to belong with Site Phase IV of the Great Temple phasing as part of the Nabataean Site Phase IV Grand Design. This suggests that the scope of the Grand Design extends beyond the confines of the West Precinct Wall and possibly connects it with other structures and as yet unexcavated complexes further to the west.

With the annexation of Nabataea by the Romans in 106AD new architectural concepts and

13. Trench 31, undertaken in 1996 by Butler and Goldstein and located just to the north of Trench 105-106, exposed features likely related to this bath complex.

14. We are grateful to Trainos Gagnos of the University of Michigan for his preliminary assessment of this inscription.



17. Plan of the Roman Baths. 1. West Perimeter Wall, 2. Vestibule, 3. Frigidarium, 4. Lavatories Bathrooms, 5. "Hypocaust Room," 6. Steps, and 7. East West Wall (Marshall C. Agnew and Eleanor A. Power).



18. Aerial overview of the Roman Bath Complex.

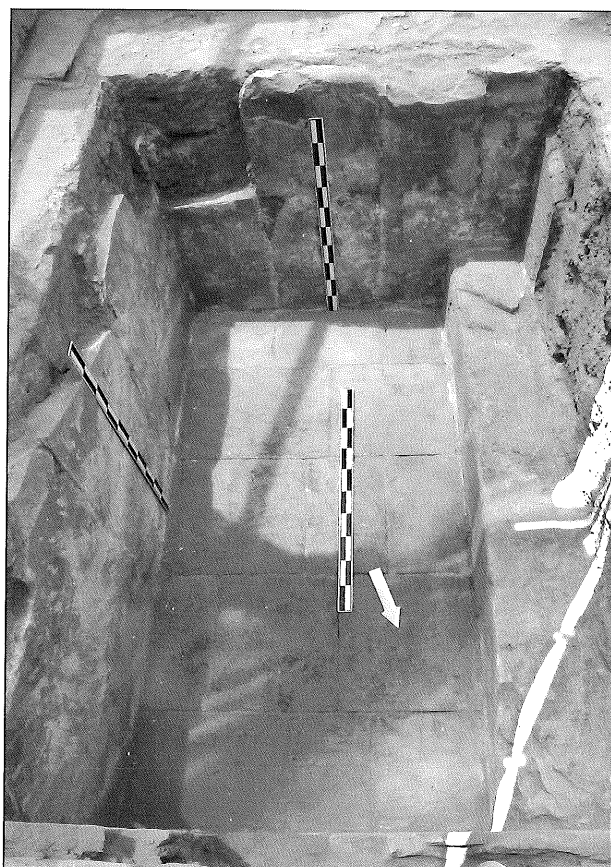




19. Lavatories-bathrooms, 2005 Roman Baths to north.

social norms arrive in Petra, poignantly demonstrated by the construction of the bath complex. This is a grand undertaking, the extent of which is still not fully revealed. In comparison with Nabataean masonry the workmanship is generally mediocre — further support for the Byzantine date for the finds above the floor.

Following the construction of the bath complex, there is a stage of reconfiguration occurring during Phase VII (AD mid second century). Abutting the West Precinct Wall, stairs in the “hypocaust room” are added, using robbed-out column drums and ashlar; the pavers of the “hypocaust room” floor extend underneath the stairs. This raises the question of a redirected access into the bath complex; with the addition of the stairs, traffic flow changes, potentially suggesting a change in use of the space. Site Phase VIII is a relatively short period of sedimentation seen just above the floor in the “hypocaust room”. This is the first sign of disuse of the bath complex and an abandonment of its original



20. 2005 Roman Baths, frigidarium to south.



21. Marble inscription (Cat. No. 05.S.7) from the Upper Temenos Roman Bath. Length 19.45cm, W. 9.14cm, Th. 2.56cm.

purpose. Following this also in Site Phase VIII, there is the purposeful dumping in the “hypocaust room”. The massive quantity of hypocaust and flue tiles suggests that this debris is from a caldarium, most likely near by. This dumping is Byzantine, indicated by the extraordinary quan-



tity of Byzantine glass and lamps.

The full collapse of the bath complex and the West Precinct Wall is part of the major 363AD collapse (Site Phase IX) of the Petra Great Temple. This is a cataclysmic event, with much of the West Precinct Wall falling into the bath complex and whole sections of architecture being dislodged and collapsing. Following this event, the area is fully covered by wash and overburden<sup>15</sup>.

With this broad chronology established, we can now look at some of the interesting questions that stem from the discoveries and interpretations of the baths. Of significance to the entire Petra Great Temple, perhaps, is the shift in our understanding of Site Phase VI. It now appears that this period, which covers the annexation of Petra by the Romans and the resulting Romanization of the site, is much more active than previously thought. More than just a period of minor collapse and repair, there appears to be more large-scale construction, including the bath complex and possibly other features. There is clearly a reuse of the Nabataean Great Temple for secular purposes, and the presence of something as public as a bath highlights this alteration. This new purpose continues the use of the Petra Great Temple as a public space, although the bath has no religious or civic purpose beyond being a gathering point for its clientele. It is also interesting to question who the clientele are. A small bath complex, especially with the West Baths just to the northwest, would seem to have a restricted membership. Are these people a Byzantine elite? A resident family?

The excavation of Trench 105-106 is much more complex and informative than we could hope. The unearthed remains give us insight into a later period of history in Petra and, just as importantly, show us the impact of Romanization on Nabataea. With further study and excavation we can learn even more from this small but significant structure.

### **Temple**

In the Great Temple three Special Projects were excavated; West Walkway Special Project 109, the East Pronaos Special Project 107 and a

sondage below the orchestra floor of the Theater Special Project 200.

### **West Walkway Sondage**

Tarek M. Khanachet excavated a West Walkway sondage, Special Project 109, measuring 3.30-by-3.63m, in 2005. The West Walkway Wall abuts the East West Support Wall and the temple platform with rubble fill beside it. The previous excavations prove that the bedrock on which the temple is constructed slopes off steeply to the south and immediately to the west of the West Walkway. A platform is then purposefully built up with monumental ashlar and rubble fill above the bedrock, as part of the temple substructure. During the course of the excavation, a gap is noticed beneath one of the ashlars that is thought to be canalization, but is found to be a vertical shaft down into the fill created by the space left between layers of monumental ashlars when the substructure is constructed. Therefore, the West Walkway and the west portion of the temenos platform are built up by enormous rough-cut ashlars resting on bedrock; the West Walkway Wall is constructed on a dirt and soil foundation, approximately 0.40m west of the original platform edge. The East West Support Wall (see the Upper Temenos discussion) abuts the platform construction and rubble/ashlar fill to support the monumental platform construction.

### **Temple East Pronaos**

In 2005 Special Project 107, a 6.40-by-3.55m sondage supervised by Emma S. Libonati at the east end of the East Pronaos, proves that at least a portion of the Pronaos and tetrastyle in antis porch are later additions to the original distyle in antis façade. In the sondage, shown to the north against the stylobate and East Anta in **Fig. 22**, and to the south against the East Corridor and the East Distyle Anta in **Fig. 23**, two very important structures are unearthed: an early stuccoed platform/wall and an early east west canalization system. **Fig. 24** shows the stuccoed platform set between the walls of the Pronaos.

A vertical water system located directly below the distyle in antis foundation wall may be part of an installation built around a bedrock

15. During the course of the Petra Great Temple excavation, an exposed upper portion of the West Precinct

Wall was consolidated, which has been labeled as belonging to Site Phase XIV.

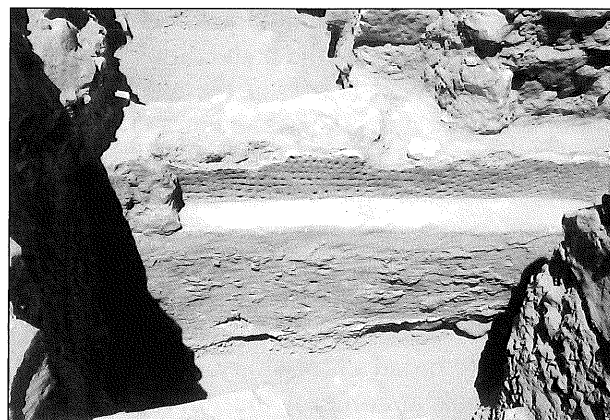


22. Pronaos sondage to north against the Porch stylobate wall.



23. Pronaos sondage to south against the East Corridor Wall and the Distyle Column.

spring, but there is no connection between it and the East Plaza artery (and we are unsure if it flows into the Central Artery of the subterranean canalization system). It is also difficult to phase it adequately. The stuccoed platform/wall is located north of the water system at an oblique



24. Pronaos sondage, detail of dimpled platform to east.

angle to the distyle in antis foundation wall, and it is difficult to determine both its function and its overall size as only one side is exposed. The ledged platform south face is covered by thick gray white stucco decorated with dimpled finger impressions. In association with this platform are Hellenistic and Early Nabataean ceramics and quantities of bone.

The site phasing for these features is dependent on the early platform-wall; is it associated with the Great Temple or is it a structure from the site's previous incarnation? The sondage in the Pronaos reveals a more intricate architectural phasing for the Great Temple complex and earlier and potentially greater information for the development of Nabataean architecture. The purpose of the platform may be the south wall of a side altar. The platform and the material remains associated with it create problems for the overall chronology and architectural plan of the Great Temple by placing the distyle in antis temple structure at an earlier date than our site phasing hitherto has indicated. It is conceivable in an earlier temple phase this platform was visible as part of the distyle in antis temple, and if so, prior to the Grand Design of Site Phase IV, the Pronaos encompasses a more extensive area<sup>16</sup>.

#### *Theater Sondage*

In our attempt the better understand the Great Temple Theater, Rune Frederiksen undertook a research visit to the site. Dr. Frederiksen will be publishing the results of his research in Volume

16. It is also possible that this structure was the altar for an earlier sacral site, and that underneath the central

section of the building is the footprint of a much earlier shrine.

III of the Great Temple publication series. His preliminary assessments of the theater can be found in the note below<sup>17</sup>.

With the encouragement by Rune Frederiksen to investigate the Theater orchestra, Special Project 200 was excavated. Supervised by Emma S. Libonati, a 6.96-by-1.96m sondage below the theater orchestra floor helped us analyze the Theater construction and recover datable material remains. Figure 25 shows the orchestra with the sondage against the theater wall, and Fig. 26 is the sondage to the north against the Pulpitum wall. The uncovering of a central pivot drum (Fig. 27), 0.38m diameter, is presumably used for laying out the apsidal structure of the Theater; it is an unusual feature to find *in situ*, with both horizontal and vertical pivot points. The horizontal pivot stone is a common feature in Hellenistic theaters, suggesting architects from the Greek East are influenced more by structures from Hellenistic theater cities rather than the Roman theater cities.

There is a possibility that when the Theater was placed in the temple that a small colonnade or decorative structure was dismantled and its parts reused as fill or as portions of buildings. In other places in the Great Temple there are reused smaller column drums with roughly the same diameter. Likewise, the reused pieces of stucco in the fill suggest that some orchestra fill originates from a period of redecoration.

Just as puzzling is the discovery of the subterranean canalization system extending below the orchestra floor. There is a discrepancy between the orchestra wall and height of the canalization's central artery capstones. In comparison with the East Vaulted Chamber where the top of the capstones was at 905.341m, and in the orchestra itself where the north the top level of the capstones is 905.146m, the orchestra floor is at 905.526m, suggesting a build-up and leveling during the construction of the theater area.

Study of the canalization system under the theater structure, stage and Pronaos (between

17. Rune Frederiksen: Report on research visit to Petra 12th to 24th July 2005.

"The purpose of my visit was to do an autopsy of the architectural remains from the theatron in the Great Temple, to understand the relationship between these two structures, to study architectural elements and fragments found during the excavation of the theatron and to suggest what remains of archaeological investigation before the theatron part of the Great Temple can be said to be fully explored.

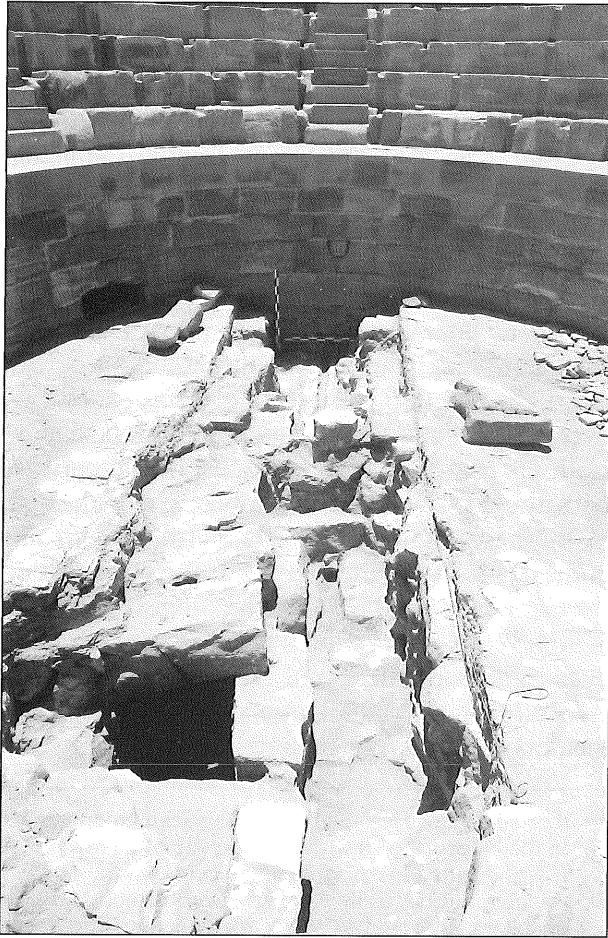
I spent the 12th to the 18th getting a sense of the site for a general overview of the site which included studying the architecture and comparing it to the data from the trench reports. This exercise was not expected to bring about any new observations but was necessary to fully understand the vast amount of material data from the excavations. I found that the basic elements of the theatron are comparable directly to Greek Hellenistic theatre structures rather than assembly buildings of other kinds like *bouleuteria*, *dikateria* or *odeia*. An interpretation of the primary function of the structure — which determined its architecture in the first place — as anything other than a space for dramatic performances must be based on new evidence from the building itself rather than on speculations of assembly needs that may have existed contemporaneously with the theatron. The building may have been used for a number of activities, as other ancient assembly buildings were, but this is an issue which should not be confused with the identification of the primary function of the building as a theater space.

Of further interest to my study are the other theatrical structures identified in Petra and other Nabataean sites. Apart from the great theatre at the mouth of the Siq there is a structure next to the Temple of the Winged Lions and one at nearby Wādi Šabrā. For fur-

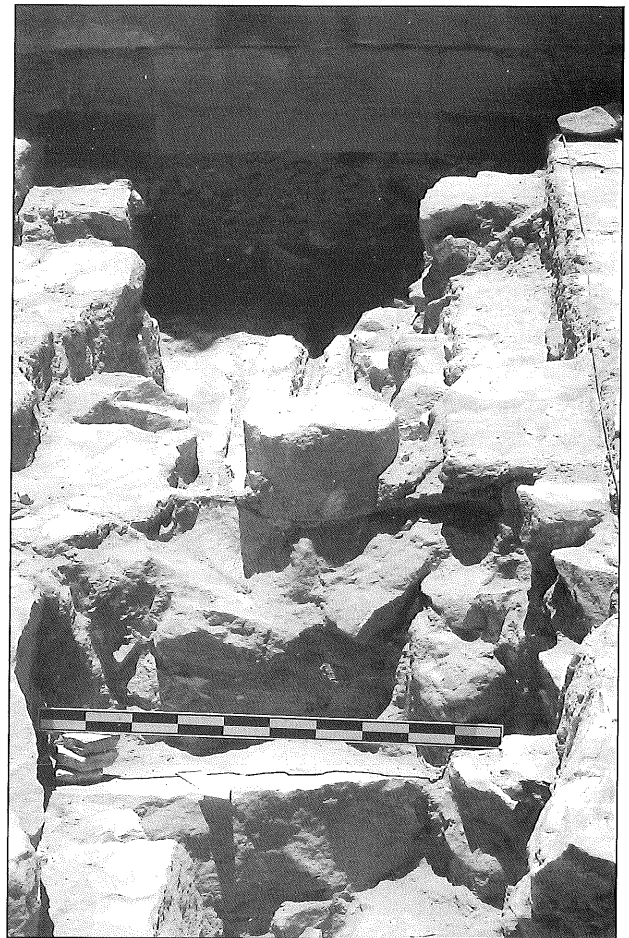
ther study are Herodian and Nabataean comparisons in the Negev, the Hawrān and the site of Delos.

It was decided to excavate in the centre of the orchestra area in order to investigate the construction of the orchestra floor and to check for structures predating the existing theatron. This sounding was particularly rewarding. As expected the construction of the floor can now be fully described and it was found that there were no earlier phases from the theatron in this area. It was found that the monumental canalization structure that enters the Great Temple from the south continued through the Temple. Particularly important for our understanding of the theatron was the unexpected and sensational find of a column drum placed precisely in the middle of the orchestra but below the pavers and therefore not visible when the construction of the floor was complete. This was used — we believe — as the central point for laying out the orchestra and the semicircular rows of seating of the *koilon*. This is important new evidence and helps tremendously in our attempt at understanding how Nabataean architects worked, but also in general to understand how ancient architects worked; very often we have nothing but the ruins themselves to interpret from.

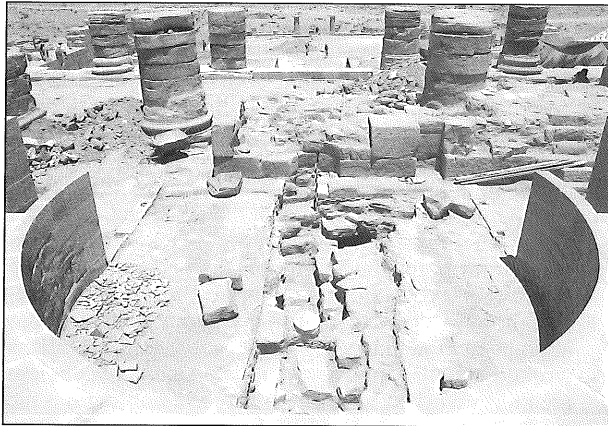
I spent the 19th through the 23rd of July studying architectural fragments from the theatron. The purpose of this exercise was to separate fragments from the theatron and from those of the Great Temple and to choose objects for further analysis, publication drawing and photography. 975 fragments were removed from the depot east of the Lower Temenos to a temporary depot just west of this. The westernmost pile of fragments is from everything but the theatron. The middle pile is fragments with no numbers, and the easternmost two piles are from trenches 62 and 47. July 23rd 2005".



25. Theater sondage through the orchestra floor to south.



27. Theater sondage, detail of column drum to south.



26. Theater sondage to north of the Pulpitum wall.

the two previous sondage explorations)<sup>18</sup> shows that the central canalization artery accumulated a tremendous amount of sediment, requiring repairs in antiquity for flushing it out. The reexamination of the Central Arch portion of the sub-

terranean canalization system in Special Project 120, 2004 proves that there is no south inlet for the central artery but that it is constructed in the earliest architectural site phase of the complex. The artery in the Theater confirms this.

With few exceptions the capstones of the central artery are cracked in the middle; whether this results from earthquake damage or is prior to the abandonment of the temple is difficult to say, but clearly the structural integrity of the system is not flawless and might bring about the abandonment and general rebuilding of the water systems in the Great Temple precinct. There are arteries from the west and east adjacent to the central staircase that are the viable water carrying systems in the first phase of canalization construction<sup>19</sup>.

Of particular note for the canalization construction is the progressive narrowing in the

18. Trench 55a, 1999 (East Vaulted Chamber) and Special Project 4, Part II 1994 (in the center of the Pronaos).

19. Or the central artery may be a builder's folly or an overflow valve for the entire water system.



area underneath the pulpitum and the distyle in antis foundation wall. The west wall of the canalization consistently slopes westward, while the east wall narrows at roughly 2.00m intervals and banks gently to the west. The result is a gradual narrowing of the canalization; the width at the north of the orchestra is 0.76m while at the north prior to the blockage in the Pronaos it is 0.56m. The most significant narrowing is at 3.80m from the canalization opening in the Theater where the distyle in antis foundation wall intercepts the canalization. From an examination of the construction technique, the distyle in antis foundation wall is built together with the central canalization and may be a contributing factor to the westward swing of the canalization.

The canalization follows a fairly linear route slightly east of the center axis of the building itself, except in the temple Pronaos where it is directed westward before swinging eastward again to flow underneath the central staircase between the Upper and Lower Temenos; this linear route continues through the Lower Temenos. This pattern, however, is disrupted in the temple Pronaos by the westward bend, which leads to some architectural questions. Was it necessary for the builders to avoid the Pronaos center because of a pre-existing architectural feature or could this section be rebuilt when the tetrastyle in antis is added? Either an early east west water canalization with a westward jog does exist in the area of the Pronaos, or there is a lower, earlier water system in place.

### Artifacts 2005

The 2005 Great Temple catalog includes 167 objects of which 78 are coins, 10 are of bone, 18 of faïence, 7 of glass, 20 metal objects including arrowheads (**Fig. 6**), 16 objects of pottery, plus 6 lamps and 12 stone artifacts, including the head of a deity (**Fig. 15**). Our databases of 13 years of excavation continue to swell with architectural fragments bringing the total to 16,883. There are also considerable cultural materials, numbering 38,763 for the 2005 season, bringing the overall total to 386,763 artifacts (fragments of pottery, bone, metal, glass, etc.) in our Grosso Modo database.

### Consolidation and Preservation 2005-2006

Consolidation and restoration are conducted under the direction of Dakhilallah Qublan and

include numerous projects involving the pointing of walls in all areas affected by the 2005 excavations. There is particular urgency to point the West Entry Stairway, which is in a state of collapse and requires stabilization. The Cistern-Reservoir also requires the pointing of its north and west walls.

The disturbed uppermost section of the West Stairway excavation is to be covered with clean sand and a platform with a railing for support. For ease of passage, an east west bridge was constructed between the Upper Temenos and the Lower Temenos Triple Colonnade. As for the Roman Baths, many small projects are underway, such as the reinsertion of the limestone curved wall elements that had tumbled out of the Roman toilets, the replacement of a lintel. Additionally, the north, east and south walls are to be reconstructed to the same height as the north wall and door, and the frigidarium entry is to be built to one level with white mortar and/or limestone slabs. The full exposure of the pipe around the base of the bathrooms requires mortar support, but the major project is attending to the West Precinct Wall — to move the slumped ashlar and replace them with new blocks.

In the Great Temple several projects have been undertaken, including the construction of a frame around the excavated Temple Theater orchestra so that the stratigraphy can be viewed. Old and new pavers are to be intermingled and set to cover the Great Temple Forecourt (leaving the subterranean canalization system open). As for the Central Stairs, three sets of stairs in limestone are to be restored — two upper steps, two middle steps, and two lower steps — leaving the stair bedding open on the remaining steps. Limestone is to be used to mark the difference from the sandstone east and west stairs that are later additions. As for the artifacts, all the metal artifacts including the coins are in 'Amman for restoration by Naif Zaban at the American Center of Oriental Research, after which they will be analyzed and returned to the Petra Museum. A copy is to be made of the nefesh with one *in situ* on the West Stairway where the original is found; the original will be safeguarded by the Petra Museum.

### At Home Research 2005

At least four months are dedicated to the

drafting of measured drawings<sup>20</sup>, updating the records of all project areas and the Great Temple web page. These projects range in complexity from scanning and digitizing illustrations to updating our extensive computerized site databases. A great deal of time is to be spent in the preparation of The Petra Great Temple Volume II, a summary of our excavations since their inception. Vol. II is part of our planned publication series which is set to go to press in 2006, and Volume III will be devoted to specialist studies of the excavations, including submissions by Rune Frederiksen, Joseph J. Basile (who continues work on the sculpture), Sarah Whicher Kansa (who continues to analyze our bone corpus) and David S. Reese (who is studying our shell remains), among other researchers.

In April 2005 I was honored to lecture in Grand Rapids, Michigan for the "Experience Petra Exhibition", and in May I lectured at the American University of Beirut Museum. In September I was most privileged to celebrate the 20th anniversary of the Anthony McNicholl Visiting Lectureship<sup>21</sup> in Australia and presented a series of lectures in Sydney, Adelaide, Melbourne, Canberra and Perth.

### Conclusion

The remarkable portfolio of 2005 projects

at the Petra Great Temple reveals the results of entrenched archaeological questions, as well as our consolidation and preservation of the site. Our discoveries offer an unparalleled view into the quintessential fabric of Nabataean architectural and cultural heritage. Our 13th campaign has resulted in a vast compendium of challenges that we are excited to address in 2006. I am grateful to my team and share their enthusiasm and pride in the uniqueness of the Petra Great Temple, which we have been entrusted to excavate.

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20. Our Wall Drawer program developed from our U. S. National Science Foundation grant continued to serve us well. (NSF Information Technology Research [ITR #0205477] Grant of \$2 million for four years).

21. Dr. Anthony McNicoll, after whom the lecture is named, was senior lecturer in Middle Eastern Archae-

ology at the University of Sydney from 1976 until his untimely death in 1985. He delivered a series of outstanding courses while co-directing with Prof. J. Basil Hennessy the University of Sydney's excavations, first at Tulaylāt al-Ghassūl and later at the major site of Pella in Jordan.