INTO THE LAND OF RESEARCH: 2007 BROWN UNIVERSITY PETRA GREAT TEMPLE DOCUMENTATION

Martha Sharp Joukowsky

The Petra Great Temple is seemingly a wellspring of architecture, artifacts and complex stratigraphy. In each of our last 15 seasons of excavations, we have been overwhelmed with the cornucopia of data and details that had to be processed before any further work at the site could be carried out. Our need to document everything as completely as possible could scarcely be avoided any longer. We were determined that 2007 was the time to discontinue excavations and train our sights on reclaiming the pressing interests of publication, consolidation and restoration, and create a master plan for future site management. Measuring 11,524m^2 of area unearthed, we wanted to capture the Great Temple's rich legacy from the past. The following discussion provides a perspective on the 2006-2007 activities — one of our most defining years of research and reflection[1]. The site plan is shown in **Fig. 1**.

Sponsors

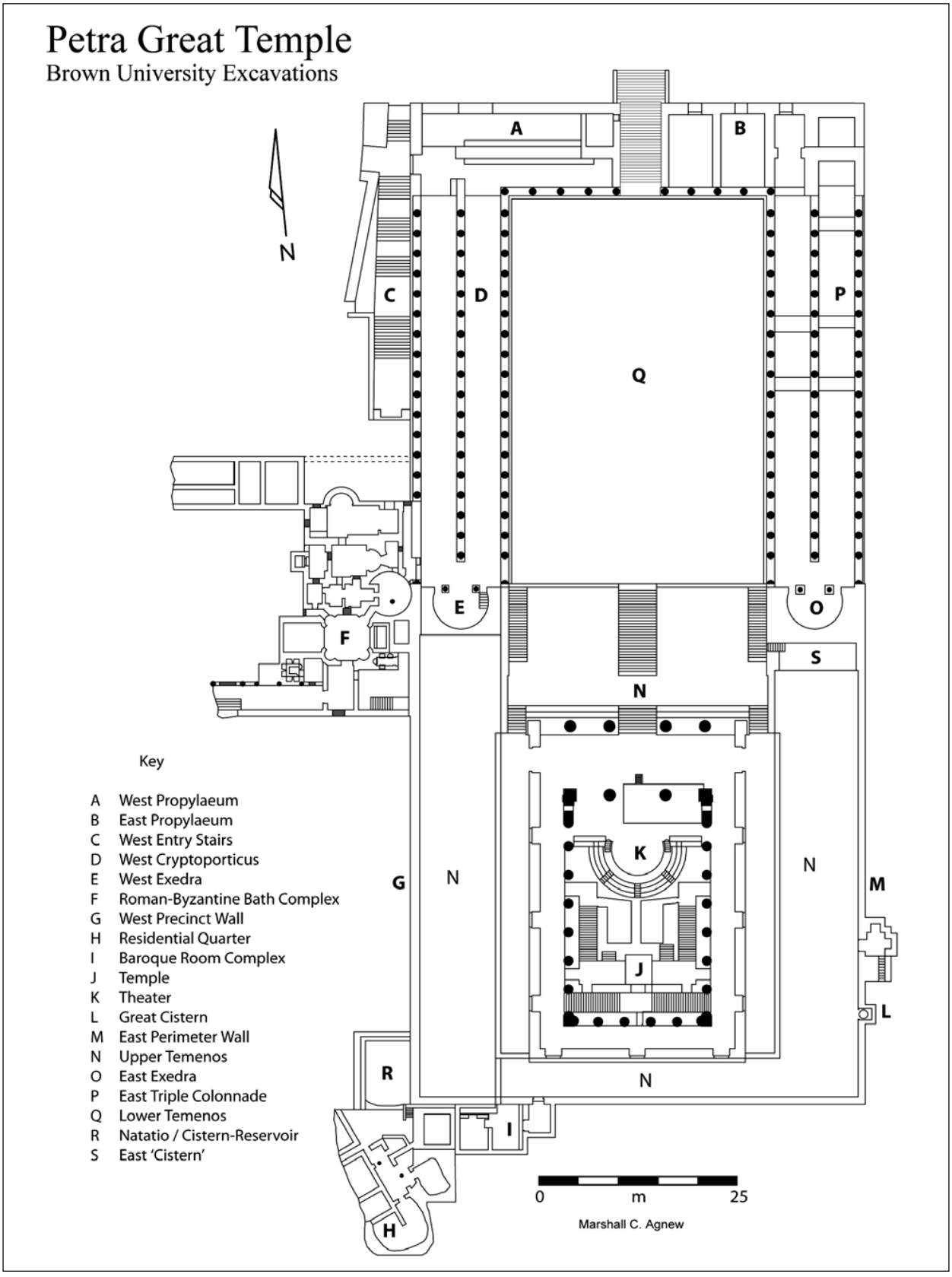
This 2007 campaign would not have been possible without the goodwill and generous assistance of the Jordanian Department of Antiquities, Fawwaz al-Kraysheh, Director, and Suleiman Farajat, Director of the Petra National Park and the Department of Antiquities Representative, as well as Mohammad Abdel Aziz Al-Marahleh. We are also grateful to the American Center of Oriental Research and Barbara A. Porter, the Director, the Luther I. Replogle Foundation, the Brown University Expedition Fund, the Joukowsky Family Foundation, and the numerous private donors who have continued to support this year of archaeological research both in Providence, RI, and in Jordan at the Petra Great Temple. We would also like to express our thanks to Brown University for making this season possible.

Staff

Brown University archaeologists included Martha Sharp Joukowsky, Director, Artemis W. Joukowsky, photographer, and two supervisors who served as most valued staff members, including Elizabeth Smolenski and Süreya Köprülü. Restoration efforts in the field were expertly undertaken by a workforce of 20 devoted Bedouin, directed by Dakhilallah Qublan, Foreman. Aude and Ismaeen Qublan and Ali Wieri undertook the 2007 fieldwork. Since publication dominated the greater part of the year, we will begin by describing that effort and then move into the field at Petra at the Great Temple and discuss the consolidation and restoration of the site, concluding with an update on the Great Temple artifact analysis.

For 15 field seasons, 1993 to 2006, Brown University archaeologists have excavated a total of 126 trenches and 86 Special Projects at the Petra Great Temple. Preliminary reports have been published in *ADAJ* each year. In 1998, the first five years of excavation were published in,

1. Most of all, I have enjoyed the encouragement of my husband, Artemis, my closest collaborator. During the year Eleanor A. Power took on a number of tasks including re-editing the signs while writing her Senior Honors thesis on the Roman-Byzantine Bath Complex. Additionally, I would like to thank Sarah Whitcher Kansa and Eric Kansa for their interest in the Great Temple Project and for making Open Context available to us.
Mathew Dickie and my staunchest critic Elizabeth Gebhard came into the field to lend their assistance. Finally I thank the indefatigable Dakhilallah Qublan and his band of merry Bedouin dedicating themselves to the restoration of the Great Temple site.



1. Plan of the Petra Great Temple Precinct (Marshall C. Agnew).

Petra Great Temple Vol. I. (Joukowsky 1998), and to date 215 additional publications have become part of the public record. 2006 and 2007 was devoted to writing and editing, Petra Great Temple Vol. II: Archaeological Contexts of the Remains and Excavations, Brown University Excavations at the Petra Great Temple, Jordan, 1993-2006. This volume is devoted to the examination of each precinct area: Propylaeum, Lower Temenos, Upper Temenos and the temple(s) proper. It presents the impressive quantity of our intensive field research from the beginning of our excavations at the site in 1993. Not only is there an abundance of new research since our preliminary reports, but also the potential integration of each area's excavation shows insights well beyond what our 1998 results produced.

Now, 12 years later, this volume has been published, and it examines the magnificent archaeological evidence for the Great Temple in the Nabataean and Roman periods. The Great Temple continues to be a most productive and surprising site. In Providence RI, during the summer of 2003, part of the team, including Emily Catherine Egan and Christian Cloke, began to wrestle with the stratigraphy. It is they who spearheaded the research for this volume, and for the past four years the whole team has been devoted to the completion of this volume. The agenda for documentation was demanding with a close examination of the 200+ trench notebooks plus the trench supervisors' final reports, site balk and wall drawings, and thousands of artifacts to consider. Linking together the stratigraphy and chronology by trench, the cross analysis of trenches by area (Propylaeum, Lower Temenos, Upper Temenos and Temple), the establishment of the 15 Site Phases was a challenge, however the greatest challenge of all was the placement of each trench and locus into one of the site phases. Often we were dealing with data that was totally unexpected and the data itself raised puzzling and complex issues — we had to wrestle with the ambiguities provided by the evidence. Overall, we sought to know who, what, when, and how the Nabataeans built and used the Great Temple. An immense amount was learned, and, now, after years of excavation, there is a better understanding of the Nabataean concept of this monumental precinct in their capital city. A perspective has also been gained on how Roman rule impacted the precinct and the city as a whole.

Any archaeological publication is fraught with layers of field data collection and interpretation. Like Volume I, Volume II is the collaboration between members of the Great Temple staff. From 1995 until the present, Deirdre G. Barrett has compiled the site catalog and lamp analysis; in 2003 Emily Catherine Egan and Christian F. Cloke sleuthed the stratigraphy and phasing, joined in 2005 by Eleanor A. Power. The staff of Gilbert Design in Providence undertook the design layout for Volume II, and the text was edited and the index compiled by Nan Sumner-Mack. Additionally for the Volume II publication, all site plans had to be re-worked, and measurements as well as elevations had to be re-checked. Marshall C. Agnew and Eleanor A. Power performed this task. Marshall C. Agnew also reconfigured all of our site plans and worked with Lynn Carlson, Systems Analyst of the Brown University Systems Data Center Geographic Information, to update the Petra Great Temple topographic map using GIS data. These results are shown in **Fig. 2**. Also documenting a detailed 3-D plan for publication and future reconstruction, Agnew prepared plans for the conservation and protection of each area, endangered by being exposed to the elements. It has taken four years to carry out the research for this volume's excavation report.

All of these researchers have the critical fiber from years of field experience and are able to bring their firsthand experience and knowledge of the Petra Great Temple archaeological record to the project, as well as their important analytical perspectives. In addition, Volume II greatly benefited from the cogent remarks of peer reviewers. Brown University's Petra Expedition Fund and the Joukowsky Institute for Archaeology and the Ancient World underwrote the financial support for this volume's publication.

Because our Brown University Great Temple Web site <http://www.brown.edu/Departments/Anthropology/Petra/> could not allocate the sufficient space we needed to share our data with other researchers and the public around the world, I elected to use Open Context, an archaeological web site, <http://www.opencontext.org> to publish the enormous compendium of materials we had collected over the years. All of the

2. Petra Great Temple Topographic Map (Lynn Carlson, Geographic Information System Analyst, Brown University).

trench and special project reports as well as our phasing charts and separate databases (catalog of small finds, architectural fragments, coins, and 'Grosso Modo' artifact collections) now are available on Open Context. This is an open access publication system enabling our Great Temple researchers to publish on line not only the primary field data like trench reports and databases, but also media such as photographs, annual site plans, stratigraphic drawings, aerial photographs, plus annual *ADAJ* reports. Open Context provides an easy to use, yet powerful, framework for exploring, searching, and analyzing excavation results, survey data, and the artifacts deposited in the Petra Museum collections, because the content is linked together as an integrated and cohesive resource and is freely available. It is unique in that it provides a framework for sharing archaeological research; it is free of burdensome copyright restrictions, and protects independent scholarly attribution.

Our Great Temple videos, undertaken as part of our NSF grant, were also prepared for publication by Michael S. Zimmerman for the World Wide Web and can be found on 2005-2007 (Web pages and for digital videos and 3D images) <The Joukowsky Institute Workplace>, <The Petra Great Temple Database Project>, <http://proteus.brown.edu/PGTdata/Home >, or http://lems.brown.edu/.

More definitive conclusions will be addressed in Volume III, which is currently underway. Projected is that Volume III, Petra: Great Temple Brown University Excavations 1993-2006, Architecture and Material Culture, will focus on specialist studies including analyzes of the architecture of the temple and the theater, the sculpture, the iconography of the stucco decoration, and the vast hydraulic systems of the precinct, as well as the Roman-Byzantine Baths. It will also include specific artifact coverage of the coins, pottery, figurines and lamps, bone objects, metals, glass, archaeobotanical and faunal analysis, as well as shell analysis, and the results of the several Great Temple databases, including architectural fragments, 'Grosso Modo', the artifact small finds catalog and coins. Specialist reports include contributions (in alphabetic order) by Marshall C. Agnew (surveying and 3-D reconstructions), Donna Jean D'Agostino (FileMaker Pro databases), Christian Augé (numismatics), Deirdre G. Barrett (small finds catalog and lamps), Joseph J. Basile (pilaster relief sculptures), Christian F. Cloke (numismatics and the site hydraulic systems), Emily Catherine Egan (stucco revetments), Rune Frederiksen (theater-in temple analysis), Yvonne Gerber (ceramic typology and analysis), Sarah Whicher Kansa (faunal analysis of 3800 samples), Margaret O'Hea (glass analysis), Eleanor A. Power (the Roman-Byzantine Baths) , Shaher M. Rababeh (construction techniques of the Great Temple), David S. Reese (shells), Shari Saunders (ceramic analysis), and Christopher A. Tuttle (figurines). This author will edit the volume and submit essays devoted to the elephant-headed capitals, Great Temple capitals, the betyls and nefesh sculptures. At this writing most of these studies are at an advanced stage of preparation.

As all of the aforementioned reports have extensive tables and graphs. We have elected to have these accessible as well on Open Context. Those researchers who publish with Open Context retain the copyright of their material — this means all contributors are free to publish their material with other venues (including journals, books, and other Web sites). Each item in Open Context is licensed with an open, Creative Commons license, giving explicit permissions for users to freely use the material so long as they properly attribute the source. Creative commons licenses include machine-readable metadata that is captured by commercial search engines such as Yahoo and Google (Kansa 2005; Kansa, Schultz and Bissell 2005).

This metadata facilitates discovery of openly licensed content, including Open Context resources. Such openness ensures the Open Context content is of maximum value for reuse in both instructional and research applications. Finally, to facilitate scholarly applications, citation information is automatically generated for each item in the database. The stable URLs to each item in Open Context facilitate citation and later retrieval. We believe this is a community approach to data integration, because it builds meaningful links across diverse archaeological data sets.

Restoration and Preservation

Even before this 2007 summer when Petra was acclaimed as one of the Wonders of the

World, tourism had emerged as the site's largest industry. Responsible tourism in Petra (ecotourism) has proven to be a sustainable economic reality. Now more than ever, with increased tourist impact, we had to continue to implement a more aggressive conservation strategy. After holding several meetings, the Great Temple team created a master plan as a blueprint for the precinct's restoration as well as its infrastructure. This was a challenge in reconciling conservation needs with financial constraints.

The conservation and restoration of the Great Temple precinct involves the scientific application of intervention measures that add to the unique precinct's permanence. Our aim is to monitor, protect and conserve the greater Great Temple precinct (including the Roman-Byzantine Baths, plus our excavations of the Small Temple to the west) and to conserve these sectors' integrity and cultural meaning. Our restoration design gives priority to areas or architecture at high risk due to tourist traffic, natural forces, such as flash floods, or due to our archaeological investigations.

The fundamental philosophy of the Petra Great Temple excavations from the beginning has been that the site is a fragile, non-renewable resource that would require protection. The measures we have taken are geared only to the reversible preservation of the structural integrity of the precinct. Exposure of the architectural features has been of serious concern, for the site is susceptible to the havoc created by heavy rains and earth tremors. This has been acknowledged and instituted by the incorporation of several additional consolidation procedures that have become part of our research design. Each year we envision a more extensive, organized plan for the consolidation of the Great Temple architecture, which has been on going for 13 years under the expert guidance of D. Qublan and some 20 local workmen who have now become local artisans in their own right. We have also made several studies of consolidates for the conservation and restoration of standing structures, and also have diagnosed a wide variety of sensitivities in order to slow the process of sandstone and limestone deterioration. With this in mind, yearly conservation surveys of the excavated portions of the temple have been carried out with a view to preserving and restoring various architectural features.

Before discussing the 2007 summer work, the consolidation and preservation measures put in place during the 2006 fall and spring of 2007 will be presented.

The Petra Great Temple conservation measures in 2006-2007 undertaken during the inter-excavation season included a multitude of projects in the principal areas of the precinct. All of these projects were generated by our Great Temple master plan team with D. Qublan, restorer, and were reviewed and approved by S. Farajat, Director of the Petra National Park, and approved by the Jordanian Department of Antiquities, Dr. Fawwaz al-Khraysheh, Director.

The Nabataeans built this district of the city to reflect their own success, and the Great Temple precinct is one of the earliest freestanding precincts to be constructed in central Petra. Facing north, the precinct is situated on the southern slope just far enough removed from the hustle and bustle of the city, protecting the Great Temple's view to the incredible nature preserve of the adjoining Garden Pool Complex to the west, as well as to the opposing ridge on the north side of the mightiest river in Petra, the Wadi Musa. This district also enjoyed a splendid view to the north with the Temple of the Winged Lions, the valley and the hills. It is set back approximately 5.25m from the Roman Road overlying the ancient Nabataean path. This sector of the Roman Road, beyond the Colonnaded Street (Zimmerman 2000) followed the Nabataean sacred way — the main artery into the central Petra city.

Propylaeum

One approaches the Great Temple from the road by a curb and sidewalk, and a 17.00m north south long x 7.40m wide central staircase of the Propylaeum, which directly accesses the Lower Temenos. This central staircase was a seriously eroded hodgepodge of 42 steps, with upper portions being added well into our Site Phase IX after the 363AD earthquake. The eight lower steps and platform abutting the Portico Wall we attribute to Site Phase IV of the Nabataean period. The midlevel of this stairway was constructed in Site Phase VII, dating to the Roman period or the mid-second century AD; however, it had undergone fill-ins, build-ups and repairs until Site Phase IX. When excavated, these stairs were

composed of irregularly sized, unstable and uneven ashlars that had to be completely removed, reworked and reset for "comfortable" visitor access. Near the top of the upper flight there was a considerable cavity that had to re-fill. With the addition of re-cut ashlar Propylaeum steps, the central stairway was restored and ease in access is now assured. These stairs were extended as a regularized flight of their original span to the west — the flight of earlier stairs constructed in Site Phase VI ca. 106AD were purposefully left open for view.

There has never been such a grand Nabataean staircase found as the Great Temple west entry stairs. How this stairway survived over 2000 years of collapse and neglect is surely a miracle. It is amazing to see the craftsmanship exhibited in this monumental stairway with four exquisite limestone platforms with individually cut flagstones fitting so snugly that it was not necessary to consolidate them for a tighter fit. This stairway is constructed in Site Phase IV or during the time of the Great Temple Grand Design dating from ca. first century BC to the first century AD. These grand west entry stairs from the Roman Road had an additional three new steps added for ease in visitor access from the Roman Road-sidewalk. Additionally, at the top of the West Entry Stairs, three steps that had fallen away in antiquity were replaced with re-cut ancient ashlars from our lapidary storage to complete the stairs. Today the complete flight, nearly 40m north south x 4.60m width has been returned to its former glory. The most striking feature as the visitor ascends the stairs, is the nefesh reproduction on the upper platform, which we installed (replacing the original) *in situ* in 2006.

Future plans include a path to the west to assist tourist access from the top of the stairway to the Roman-Byzantine Baths. At present there is danger for the unsuspecting visitor of falling into the 6m deep room excavations of the West Baths-Palatial complex, which were excavated some years ago by the Jordanian Department of Antiquities.

Lower Temenos

The Lower Temenos triple colonnade with its elephant-headed capitals is the "upper floor" of the Lower Temenos in Site Phase IV, intended for use by the public. Ongoing is our consolidation of the various Lower Temenos elements, and consolidation has included the re-erection of additional column drums to regularize the East Triple Colonnade.

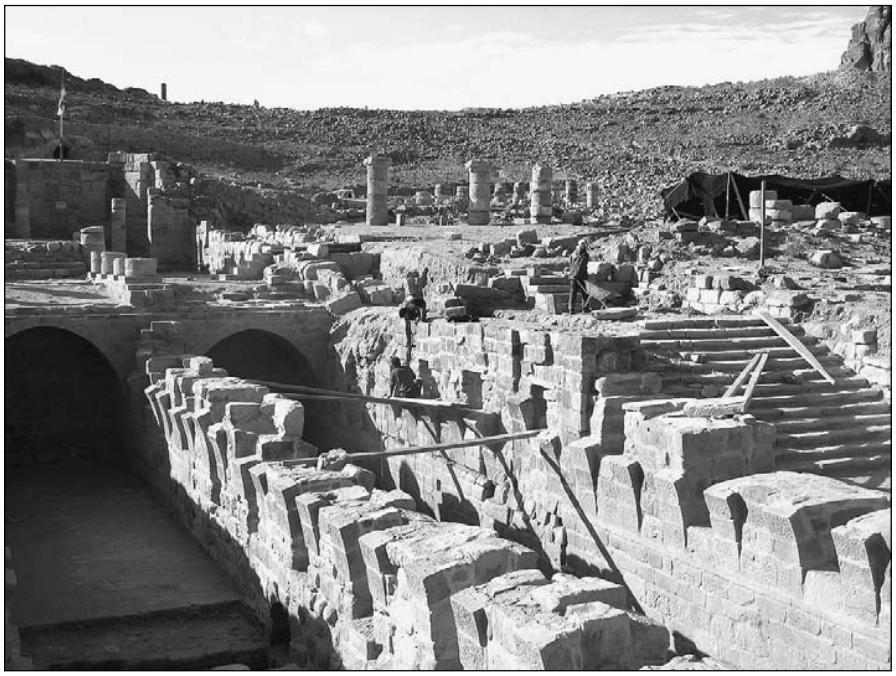
In the niches of the East Exedra, we mounted five of our pilaster reliefs (the female with a wet drapery style chiton, two women holding cornucopias and one male) for ease in public viewing as well as to ensure their safety and protection. Unquestionably, they do not belong in these niches, but their display in the East Exedra is to keep them out of harm's way. Future plans are to build up the height of the East Exedra to equal the height of the West Exedra.

Below the west triple colonnade and hidden away is an enormous basement gallery of twin parallel galleries or cryptoportici, measuring 38.89m north south x 12.08m east west by 5.18m depth. Yet again, additional anastylosis of the west cryptoporticus west gallery wall (**Fig. 3**) had to be undertaken where the ashlars were in a state of collapse (**Fig. 4**), and threatened to plummet into the west cryptoporticus. Slumping into and over the west cryptoporticus, this wall, which was damaged under the weight of collapse, has taken two inter-excavation seasons to restore. At the same time there was also the restoration of the window ducts in the west cryptoporticus west wall. These windows controlled light, air circulation and ventilation for the west Cryptoporticus.

Subsequent to the 2005 excavations in the west cryptoporticus east, the corridor floor pavement had been removed for the excavation of a sondage. This sondage had to be refilled with clean sand and the original pavers had to be replaced according to their original *in situ* positions. This meant the leveling, replacement, and restoration of each block, which proved to be a great success. Another project involved the erection of a protective grill fronting the west cryptoporticus east, which had to be installed to increase the security and protection of our sculpture repository where decorative capital elements and ballista balls were stored. Unfortunately we found that some of these carved architectural elements had been stolen and others moved from their former position. This brings up the sticky issue of site protection in Petra, which unfortunately has been sorely lacking during our excavations.

Sculpted facsimiles of the elephant headed

3. Lower Temenos West Cryptoporticus west gallery wall (Christopher A. Tuttle).



4. Lower Temenos West Cryptoporticus west gallery wall (Christopher A. Tuttle).

capitals had been commissioned from Dakhilallah Qublan. Four smaller scale capitals, each with four heads were transported to the United States, for the understanding and enjoyment of the Nabataean sculptors' extraordinary abilities. One such capital, clearly demonstrating the prowess of our Bedouin foreman-restorer, Dakhilallah Qublan, can be seen in **Fig. 5**.

Upper Temenos

Since the east Upper Temenos has a large plaza with the east perimeter wall flanking it to the east, it is at a rather remote side of the complex. Together with the Great Cistern, the Sword Deity and the canalization system on its west, the east perimeter casemate wall has interior rooms. The west facing entrance of Room

5. Elephant-headed capital, reproduction sculpted by Dakhilallah Qublan.

A is directly opposite the west corridor wall of the temple. The inside of Room A is well hidden from view and here we uncovered traces that the room had been used as a toilet. A grill gate preventing access to Room A was installed to deter users from further compromising the integrity of this room.

Today the Site Phase II central stairs that originally had been the central artery from the Lower Temenos to the forecourt of the distyle temple are always subjects of interest to visitors. Constructed in the mid first century BC, these once grand ceremonial stairs, 5.90m north south x 4.56-4.70m east west, had been blocked completely in Site Phase IV by the construction of the east west retaining wall of the Lower Temenos, and when excavated we found that the treads had been robbed out in antiquity leaving only their plaster bedding exposed. There was concern about the erosive nature of winter storms. These stairs can be identified today, because of the 20 steps exposed, every other step, 10 steps, were replaced with lighter-colored sandstone steps, thereby displaying the difference between the Site Phase II central stairs and the Site Phase IV east and west stairways that flank the earlier stairs and also lead up to the temple forecourt.

By gravity, the subterranean canalization system drains water from most of the temple area to take its course down into the interconnected Lower Temenos extension (which in turn flows under the Propylaeum and from there it drains further under the Roman Road, hypothetically, to empty into the Wādī Mūsā). In the temple forecourt, a see-though iron grill was placed over the central water passage system, an area measuring only 1.30 x 0.80m. The missing or cracked cover slabs covering the conduit opening were replaced. Intentionally a grill was placed over the forecourt canalization so the visitor could view the feature — this grill ensures the safety of visitors and animals by preventing them from accidentally falling into the system, and at the same time protects the excavated remains. In the Upper Temenos, in addition, a major undertaking was the replacement of the temple forecourt small hexagonal pavers, covering an area 3.70m north by 11.50m east west. Again, we were concerned with the erosion that had taken place in the forecourt, exposed, as it is to flood damage. When possible, the temple forecourt original hexagonal pavers were cleaned and repaired, and set between them were the newly cut facsimiles. Additional rows of hexagonal pavers stabilized the forecourt from further erosive action, as can be seen in **Fig. 6**.

The Roman-Byzantine Bath Complex added probably in the Late Nabataean – Roman period and dated to Site Phase VI, ca. 106AD, offsets the strict symmetry of the Great Temple. As mentioned previously, building begins in Site Phase VI and the baths partially collapse in the 19 July 363AD earthquake of Site Phase X. They are then remodeled and are in use until the devastat-

6. Great Temple forecourt with restored hexagonal pavement (Artemis W. Joukowsky).

ing earthquake of 551AD. Measuring 32m north south x 28.40m east west, this complex is located on the west side of the temple resting against the west perimeter wall for support. The 2005 excavations recovered a 'well,' a small court, a marble clad vestibule-frigidarium and a settling tank. Recovered in 2006, a platform, an apsed caldarium, a second caldarium, the praefurnium, a splash bath, tepidarium or laconicum, and a service passage, as well as a small cistern, bathroom (toilet), a hypothesized apodyterium, and a colonnaded corridor. The immediate conservation of the baths was complex especially because the delicate hypocaust system in the apsed caldarium had two partially fallen arches under the entrance floor, which had to be supported from further collapse. Using wooden struts, we shored up the entry entrance pavement and the two arches that were about to implode under the pavement. Additionally this room was in particular danger because of the exposure of its fragile hypocaust system to being deteriorated by the winter rains. The only interim measure we could take for the integrity of the friable hypocaust system was to create a temporary zinc shelter to cover the complete caldarium chamber and hope that this would protect its needs until consolidation could be undertaken.

Future conservation measures for the complex are on the drawing board and will be put into effect as soon as possible. Moreover, the baths are a complex area for tourist access. Again such plans have to be implemented so that tourists and scholars alike can easily visit these impressive remains.

Temple

Work also continued to restore the West Corridor murals to show the embellished Nabataean corridor of antiquity. In 2000, unobtrusive informative bilingual signs had been placed to identify the major decorative components of the Great Temple corridor walls, but these signs have been mysteriously "lost" for some time.

The centerpiece of the Site Phase V Great Temple, dating to the first century AD, is the more than 600-seat theater placed in the middle of the structure. In 2006 two rows of the lowest theater seating were removed to excavate below them to better understand the stratigraphy. Our earliest strategy was to refill the sondage with clean sand, but that would defeat the purpose of the stratigraphy being studied by future archaeologists. Carrying out a later plan in 2007 we designed a robust frame of metal uprights and struts set in a reversible mortar under the seats for support. Once the seats had been put back in place, reversible mortar was used as grout in between the blocks. Therefore, while the five rows of extant theater seating gives the impression of being a solid cavea, there is, in fact, more than a 5.00m open sondage below the seating. This conservation scheme allows future researchers (albeit with some effort) the option of removing the seats to review the stratigraphy of the sondage. Whether or not these metal uprights with mortar consolidants have limitations is a complex question, but we are hopeful of their continued success.

As far as the theater orchestra was concerned, here in 2005 we had excavated an additional sondage. The sondage was a transverse cut located in the center of the orchestra floor of the theater in order to preserve as much of the *in situ* pavement as possible. The boundaries of the trench were the orchestra retaining wall and the pulpitum including the central niche in the pulpitum to the south and the north respectively. The trench itself was 6.96m north south and roughly 1.96m east west although terracing stones for the foundation of the floor made it difficult to keep the east west boundaries of the trench perfectly aligned. The uncovering of the central pivot stone used for laying out the apsidal structure of the theater was an unusual feature to find *in situ*, as was the recovery of the central artery of the subterranean canalization system with the majority of its capstones cracked in the middle. In our conservation of the feature, clean sand was placed on top of the south half of the orchestra opening and a metal grate was installed, positioned flat over the remains of the pivot stone, as well as the subterranean canalization system so that the structural integrity of the remains could be viewed. For added stability, the remaining orchestra floor was supported with replacement flagstones. Rune Frederiksen in Volume III will analyze the theater architecture, along with a study of comparable monuments.

Erosion

In the winter of 2006 -spring 2007, a trou-

bling amount of soil erosion took place with appreciable soil loss, as can be seen in **Fig. 7**. The severity of erosion appears to vary markedly over various areas of the site. On site impact resulted in the washing away of the balk adjacent to the Upper Temenos cistern-reservoir. This threat will impact the long term sustainability of the walls and is a major cause for our concern. To counteract further erosion in 1999, we constructed a cross wall 110m in length on bedrock to the south of the site. This wall does not span far enough to the west for the flooding water to have created a path to rush around its west end. To further protect the areas of the Upper Temenos west that are most vulnerable, a future project is planned to extend this wall some 40m to the west, so that the impact to the site will be minimized.

Stone, particularly sandstone deterioration, is appreciable in the Temple's erosion, and the long-term efforts of the mortar on the sandstone are difficult to predict. It is a matter of judgment for the archaeologist and the conservator. For each stone there are differing porosities, differing salt, water and acid absorption rates and a difference in how they react to sunlight, therefore each individual stone has its own problems of deterioration. One of our tasks is to monitor these factors, and therefore during 2007 "tired" ashlars were replaced.

7. Erosion in the Upper Temenos, 2007 (Artemis W. Joukowsky).

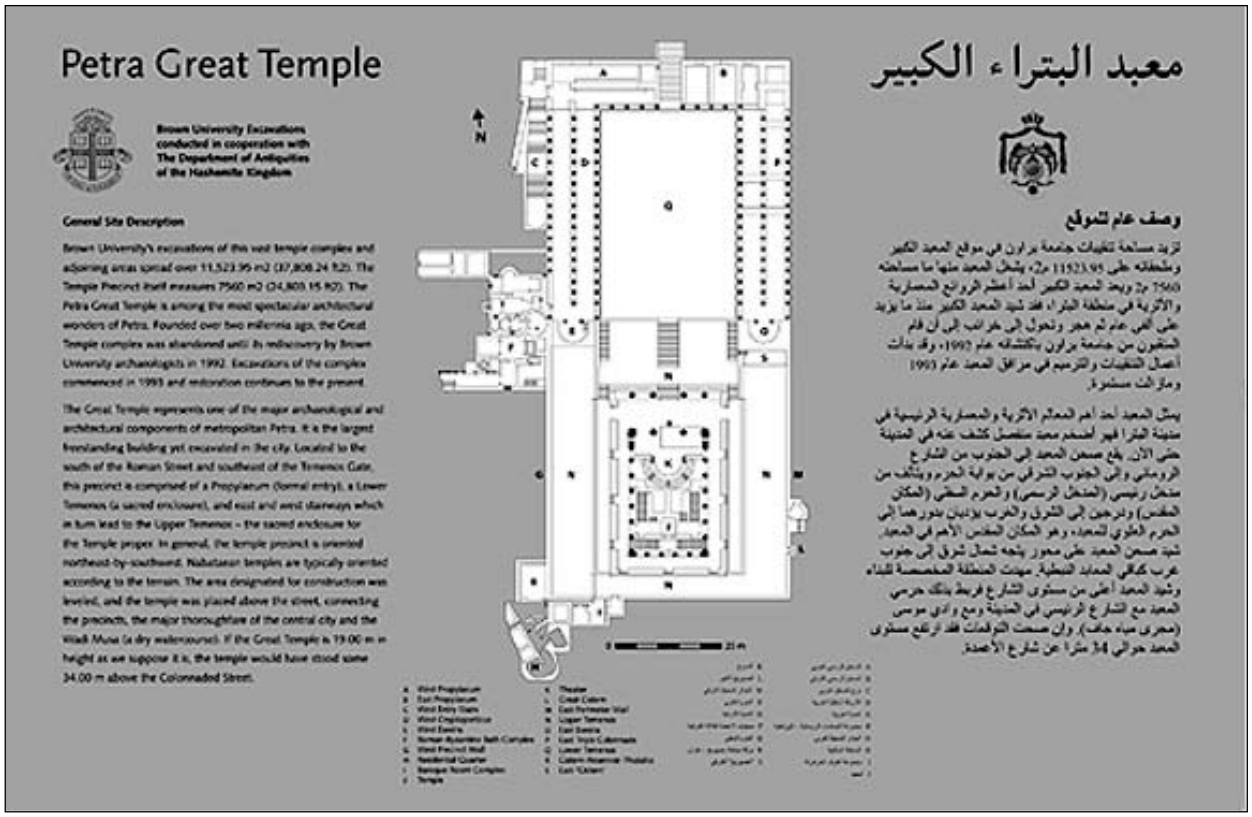
Information Systems

During the inter-excavation season, the Great Temple master plan process, one of the items raised by the team was not knowing where you are and what you are viewing within the monumental Nabataean Great Temple precinct. Petra as a tourist site has struggled to find its voice. In its labyrinthine environment and the visitor is often left confused. This remarkable site and its ruins are incomprehensible to many of the site's visitors. Local guidebooks carry little mention of the Great Temple, and local maps, for instance, don't even have the site marked on them! Our infrastructure plan included assisting the scholar-tourist, which had long been one of our priorities. The goals were to design and produce educational signs to increase awareness of the Nabataean Great Temple architectural and sculptural vocabulary and history. Communication was designed to take advantage of the experience when viewing a feature. As with a few of Petra's architectural monuments, the target audiences were tourists. The Great Temple team conducts all of its projects with environmental sensitivity and respect for Petra's historic landscape and the tourist needs of modern users. Working with the Jordanian Department of Antiquities and the Brown University Publication Services, we developed 37 educational point of reference signs to be placed on site. We sought to provide visitors with the opportunity to connect the enjoyment of visiting the Great Temple with information about what they were experiencing.

With funding from the Brown University Petra Expedition Fund, the Great Temple team worked with the technical assistance from the Brown University Publication Services and Graphic Design and the Jordanian Department of Antiquities to develop handsome bilingual signs in Arabic and English. The unobtrusive signs include information, interpretation, and identification, and provide information about the precinct and its history. The process was

initiated by our developing a design vocabulary with the most important information and interpretation. Using the city GIS data and master plan maps to develop highly legible precinct plans, we considered sign components including sign size, color, languages and text styles, graphics, stanchion design, and the materials to be used. Not only were there the knottier problems of writing, editing and reediting of the English by the author and Eleanor A. Power, but of the Arabic as well. Once the English texts were finalized, Brown University faculty members, Ramadan Hussein and Mirena Christoff, translated the English texts into Arabic. Kathryn deBoer, Art Director of the Brown University Publication Services designed the sign formats. As time went on we selected the manufacturer and reviewed shop drawings. Once the signs had been designed the final English and Arabic texts were sent to the Jordanian Department of Antiquities for their approval. A full set of matte laminated sandstone-colored signs were reviewed and manufactured. The three largest measured 113 x 62cm and presented the site plan, and six horizontal signs were designed for explanations of the distyle in antis temple, the theater, the east propylaeum, the tetrastyle in antis temple, the Roman-Byzantine Bath complex, and the elephant-headed capitals. One example of such a sign is shown in **Fig. 8**. A set of 13 signs measuring 20 x 15.5cm explained specific features, such as the temple south passageway, the Lower Temenos east west retaining wall, the temple east and west chambers, the inner antae and the central arch. And another 13, measuring 20 x 27cm, were devoted to offer explanations of features deserving lengthy explanations, such as the site phasing. Other signs measuring 40 x 28cm highlighted the cultural history and architectural vocabulary of the precinct. In the end, finally, during this 2007 summer, we oversaw the sign installation as can be seen in **Fig. 9**.

In summary, ideally, our master plan team wanted to promote archaeology by education and increasing public awareness of and interest in archaeology, and the archaeology of Petra and the Great Temple, in particular. To enhance the archaeological record of the area and to promote archaeology by education, and to increase public awareness of and interest in the archaeol-



8. Great Temple sign (Artemis W. Joukowsky).

9. Sign installation, 2007 (Artemis W. Joukowsky).

ogy of the Great Temple, the Great Temple signs now provide interpretative guides to the site. The Great Temple's rich historic testimony now offers the visitor a greater understanding of the monument and its sectors of interest. Sensitive use of interpretative educational elements brings visitors closer to a cultural experience. Historic landscapes, like the Petra Great Temple, are places to interpret through signs, and thereby enrich the visitor's experience. Determining how to incorporate signs with interpretation into the Petra Great Temple fabric has been an important aspect of our 2007 fieldwork, bringing educational awareness, and thereby, increased visitor interaction with the Petraean cultural landscape. Already the signs are in constant use and enrich the experiences of visitors. As for brochures and other media like pod casts, we are beginning to develop concepts of design and oversee the fabrication of additional educational and interpretive information systems for the public edification of Petra Great Temple. Currently we are working on a podcast with video to introduce the site to the public, particularly to those who are unable otherwise to visit Petra. We are also working on a brochure as a complement to the signs that can be handed out to visitors. As time moves on, we are finding new and expanding initiatives that simply require more thought and reflection.

Artifact Analysis

Yearly implementation and the management of our various databases have helped us expand and ensure the continuity of information access and data preservation. Our goal has been to provide a continuous program of collections and archive management. This is of particular importance in relation to our coin catalog. From 1993-2006, we have collected approximately 681 coins. Some of the coins cannot be identified due to deterioration, which is typical of the coins found in Petra, because of the corrosive soil conditions.

Each year during excavation the coins are registered in the field, and cataloged in the site coin database with a preliminary reading. In Amman, Naif Zaban at the American Center of Oriental Research then cleans the coins; they are scanned, and are returned to the Petra Museum for their separate museum registry. After this process, which involves a time lag of several months, the coins are read by Christian Augé, Université de Paris I, and the final catalog is created by Deirdre G. Barrett. All the Petra Great Temple coins, except those of the 2005 and 2006 seasons, have been analyzed by Augé. This summer the 2005-2006 coins were read by Christian F. Cloke of the University of Cincinnati, who on special assignment, completed the examination and identification of all the site numismatics. Cloke also documented a comparative analysis of where the coins were found, their contexts, dates, (Nabataean, Roman, Byzantine or Islamic), and whether they came from local or foreign mints. The complete catalog of coins can be found in Open Context, and Cloke will present his numismatic analysis in Volume III of the Petra Great Temple.

Zeyad al-Salameen asked for permission to study and publish our 2005 coin collection, which was stored with the Department of Antiquities at the Petra Museum. His study will be of great interest to the team.

In conclusion, the pinnacle of the Nabataean state was from the first century BC to the second century AD. These were centuries in which

Nabataean freestanding buildings left their mark. The Nabataeans made every effort possible to demonstrate their power to their world. This was particularly the case when it came to constructing monumental buildings and unusual sculpture. The completion of the massive Great Temple excavation has now revealed the edifice in its entirety. Understanding the dynamics of the structure on a theoretical level has been continuing as well, but it is most difficult to define certain cultural traits that appear to reflect particular concepts evident in this structure. A considerable level of acculturation must be assumed, but there is a cultural clarity of evidence here: the Petra Great Temple with and in spite of the processes of cultural contact, diffusion and assimilation of architectural ideas, offers its own eclectic Nabataean statement.

Now a total 37 Great Temple signs are actually posted in ideal venues, and they have been extremely well received and are widely used by Petra Archaeological Park visitors. The number of visitors reading them and the compliments we have received has been some measure of our success. For sure, questions remain, as do the inherent problems due to further conservation measures and publication. Figure 10 illustrates the precinct as it appears today, and demonstrates that the physical dimensions of the Petra Great Temple are being preserved with close attention to the Nabataean architectural character of the precinct. The Petra Great Temple project is moving into a period of renewed rigor that extends the reach of its scholarship and supports our commitment to the discovery, preservation and dissemination of the archaeological knowledge. We will continue to examine the ways in which the Great Temple architects confronted and challenged this religious and administrative edifice and the ways we continue to challenge it today. We know that the tourist visitor never sees the Great Temple the way that my team and I do right now. Our experience has become deeper and more profound over the years. Although we think we understand as much as we do, we still find wonder in the Great Temple precinct as well as questions that remain to be answered. The above comprehensive profile of the Great Temple research and preservation establishes the importance of 2007 in shaping the goals and the thought processes embedded in our consolidation of ideas as well as the remains. All of these factors will form the basis for further discussion.

Martha Sharp Joukowsky
Brown University, Joukowsky Institute of Archaeology and the Ancient World
Box 1837 Providence RI 02912 USA
Martha_Joukowsky@brown.edu

10. Petra Great Temple at the close of the 2007 season to south (Artemis W. Joukowsky).

Bibliography

Joukowsky, M.S.

2007 *Petra Great Temple, Vol. II: Archaeological Contexts of the Remains and Excavations: Brown University Excavations in Jordan at the Petra Great Temple, 1993-2006*. Brown University, Petra Expedition Fund, Providence RI, USA.

1998 *Petra: The Great Temple, Vol. I—Brown University Excavations 1993–1997*. With Contributions by Christian Augé, Deirdre G. Barrett, Joseph J. Basile, Jean Blackburn, Leigh-Ann Bedal, Donna J. D'Agostino, Sara G. Karz, Elizabeth E. Payne, Thomas R. Paradise, Erika L. Schluntz, Monica L. Sylvester, Stephen V. Tracy, Loa P. Traxler, Terry Tullis, Peter Warnock, and Paul C. Zimmerman. Brown University, Petra Expedition Fund, Providence RI, USA.

Kansa, E.C.

2005 A Community Approach to Data Integration: Authorship and Building Meaningful Links Across Diverse Archaeological Data Sets. *Geosphere 1,* 2: 97-109.

Kansa, E.C., Schultz, J. and Bissell, A.

2005 Protecting Traditional Knowledge and Expanding Access to Scientific Data. *International Journal of Cultural Property* 12, 3: 97-109.

Zimmerman, P.

2000 Mapping Petra. *Expedition* Vol. 42, 2: 37-41.